Milling

M

M1~M156

Octagonal MOF Mill

Octagonal
MOF Mill
Edge strengthened type

See M26

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 M28

High-efficiency Multi-Edge design MSE45

High-efficiency Multi-Edge design
New **MSE45**

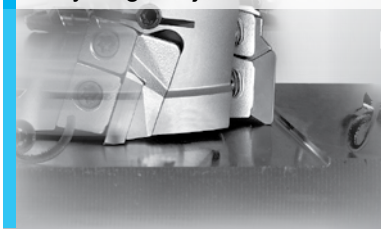
See M30

Easy Edge Adjustment MSE45-SF

Easy Edge Adjustment
MSE45-SF
For MSE45-SF type, Wiper Inserts are lined up

See M32

Easy Edge Adjustment MTE90-SF



Easy Edge Adjustment
MTE90-SF

See M44

Right Angle 4-edge MSO90

Right Angle 4-edge
New **MSO90**

See M46

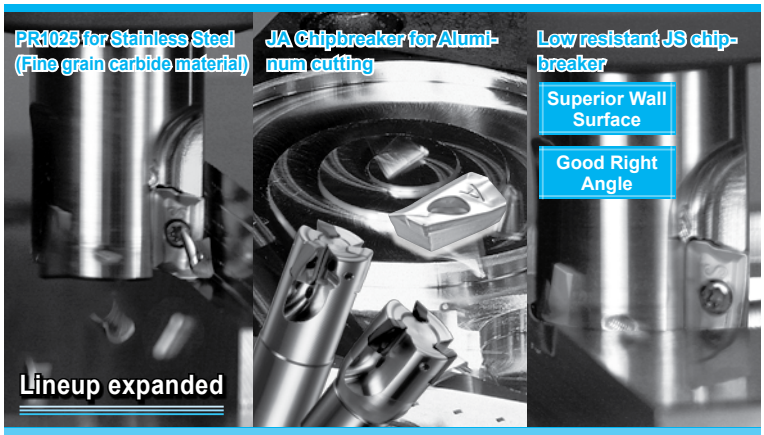
High Efficiency Endmill MECX

Good Right Angle
Superior Wall Surface

High efficiency cutting on turning mill and small machining achieved

See M56

High Efficiency Endmill MEC



PR1025 for Stainless Steel (Fine grain carbide material)
JA Chipbreaker for Aluminum cutting
Low resistant JS chipbreaker
Superior Wall Surface
Good Right Angle
Lineup expanded

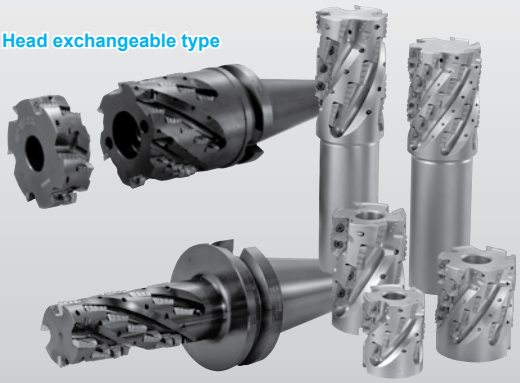
High efficiency Multi-Edge types are lined up for Face Mill type
Lineup of Insert / Corner-R is expanded
JA Chipbreaker and KPD001 (PCD) for Aluminum cutting.

See M48

Helical Endmill MECH

Productivity is improved with Notched Insert!

Head exchangeable type

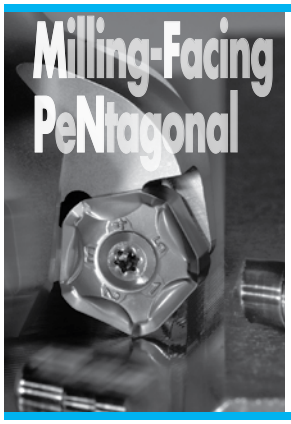


Head exchangeable type,
Integral Arbor type and Shell Mill type
are available

High efficiency cutting is achieved with large ap
MECH solves problems with heavy cutting

See M60

High Efficiency Mill MFPN NEW



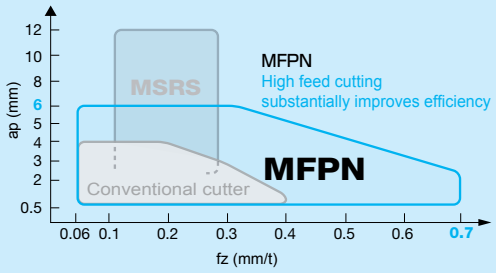

With cylindrical shank

BIG 5 5 Advantages

1. A roughing and general-purpose face mill with 10-edge pentagonal inserts
2. Low cutting force due to helical cutting-edge design
3. Fractures suppressed with double-edge position
4. Mold chipbreaker improves chip evacuation
5. Long tool life with PR12-Series MEGACOAT Carbide inserts

See M21

Selection of Face Mills

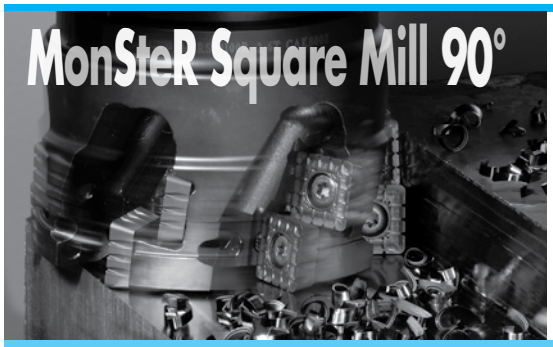


Face Mill for Heavy Milling MSRS15

Roughing is completed with 1 pass. MSRS type changes heavy cutting! (Max. ap 12mm)
Drastically increases metal remove rate

See M38

Face Mill for Heavy Milling MSRS90



1. High performance, low friction and low vibration cutting tool
2. Neutral and corner-R insert NEW
   Applicable to shouldering (cutting angle: 90°), high feed cutting (cutting angle: 30°), plunging, and side cutter. (Using custom-ordered toolholder)

See M70

Slot Mill MST

MSTA Self clamping system — For narrow groove widths (Width: 1.6~4.0mm)

MSTB Semi-adjustable style — For medium groove widths (Width: 6.0~13.0mm)

MSTC Full-adjustable style — For wide groove widths (Width: 14.0~23.3mm)

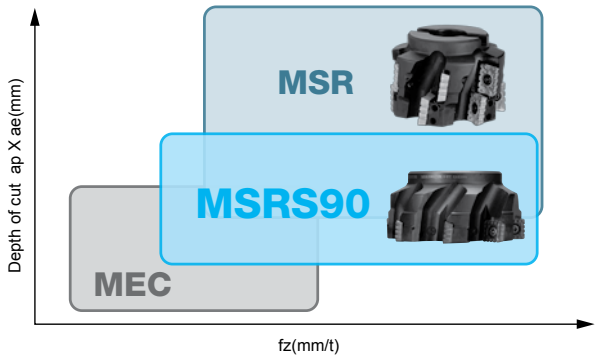
See M108

For Heavy Milling Cutter MSR

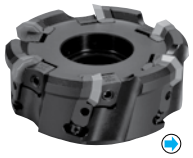
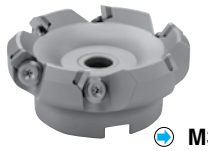
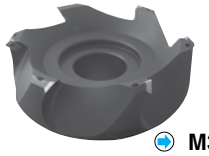
1. Notched insert reduces cutting force, chattering and enables efficient cutting.
2. Chipbreaker design with specialized notches improves chip evacuation
3. Enables heavy milling and deep cutting, and also drastically improves cutting efficiency. (Reduction of cutting time)

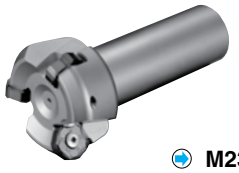
See M75

Application Map (Standard toolholder)

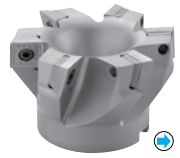
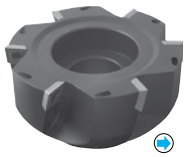
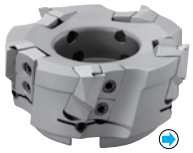


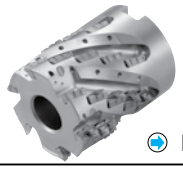
Corner Angle 45° / Corner Angle 15° type

Corner Angle	Application / Shape	Facing	Chamfering
45°	**MFPN45-R**  M21	●10-edges pentagonal inserts Double-sided pentagonal insert Economical with 10-edge insert ●Low cutting force due to herical cutting-edge design ●Fractures suppressed with double-edge position	
	MOF45-R  M26	●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.	
	MOFX45-R  M28	●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)	
	MSE45-R (Standard / Multi-Edge)  M30	●The insert is fixed by top clamp ●Silver coated ●Standard edge type and Multi-edge type	
	MSE45-SF (Easy Edge Adjustment)  M32	●A simplified adjusting mechanism eases the task of correcting cutting edge fluctuation ●Silver coated	
	MSD45-R  M35	●Low cutting force ●For small machines and M/C ●For thin workpiece milling of Steel / Cast Iron, Anti-Vibration	
	MSO45-09  M37	●Cost reduction with screw clamp system and 09 size insert ●Screw clamping	
	MSO45-R  M36	●Use insert with 13.494mm internal circumference ●Insert max. external dia. matches cutter external dia.	

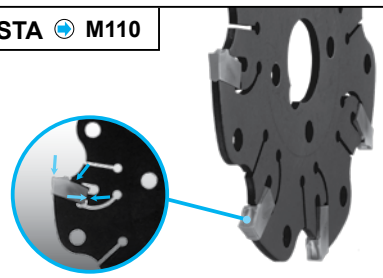
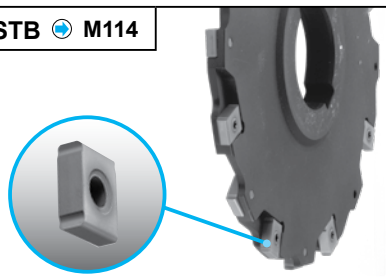
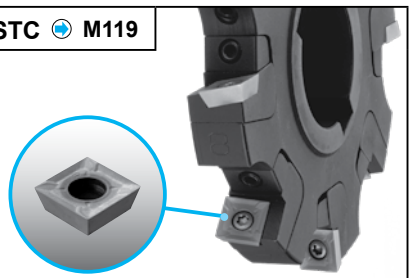
Corner Angle	Application / Shape	Facing	Chamfering
45°	**MFPN45**  M23	●10-edges pentagonal inserts Double-sided pentagonal insert Economical with 10-edge insert ●Low cutting force due to herical cutting-edge design ●Fractures suppressed with double-edge position ●With ø32 cylindrical shank	
	MSD45  M35	●Low cutting force ●For small machines and M/C ●For thin workpiece milling of Steel / Cast Iron, Anti-vibration	
	MSE45  M31	●Low cutting force ●For small machines and M/C ●For thin workpiece milling of Steel / Cast Iron, Anti-vibration	
	MSO45-S-09  M37	●Cost reduction with screw clamp system and 09 size insert ●Smaller insert for MSO45 series	
	MSO45-S  M36	●High efficiency cutting of Stainless steel ●Stronger edge with Insert Thickness 3.97 mm	
15°	**MSRS15-R**  M38	●For heavy milling ●Max ap 12mm ●Chip evacuation per unit time is increased drastically	
	MSP15-R  M43	●Facing ●Medium to roughing of Steel / Cast iron	
	MSP15  M43	●Facing ●Medium to roughing of Steel / Cast iron	
	MSE15  M43	●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**  M50	●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		
	MECX  M57	●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		
	MSO90  M46	●Highly efficient multiple insert design ●Safe design with shim ●Easy edge change ●Slim design offers weight savings		
	MSO90-09  M47	●Low cutting force ●Cost reduction with screw clamp system and 09 size insert		
	MSRS90-R  M72	●Notched insert reduces cutting force ●Stable cutting without chatter ●Various expansive possibilities due to combining neutral insert and custom-ordered cutter		
	MTE90-SF (Easy Edge Adjustment)  M44	●A simplified adjusting mechanism eases the task of correcting cutting edge fluctuation ●Silver coated		
	MTE90  M45	●Low cutting force ●Shouldering of Cast iron, Non-ferrous metals		

Corner Angle	Shape \ Application	Facing	Shouldering	Slotting
0° (Long Cutting Edge)	**MECH** **MECH-W**  M62	●Notched insert promotes higher productivity ●Large depth of cut provides high efficiency cutting ●MECH is the best solution for problems with heavy milling		
	MECH-R  M62	●MECH shell mill type		
	MECH-BT50 **MECH-BT50SA** **MECH-SK**  M63	●High rigid Arbor integrated for MECH ●Head exchangeable type is available (MECH-BT50SA)		
	MSR-R  M76	●Low resistance and restrain chattering with notched insert ●Chipbreaker design with specialized notches improves chip evacuation ●Chipbreaker achieves stabilized cutting for heavy roughing applications		
	MSR-BT50  M77	●Highly rigid BT50 Arbor integrated for MSR		
	MHD FMA-SA  M86	●Long cutting edge :74.7~106.2mm ●For roughing of mold / jig cutting ●Low resistance		
	MHD-BT50-SA  M86	●Adjustable edge length (separate-type)		

Slot Mill MST type

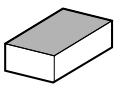
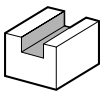
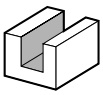
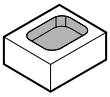
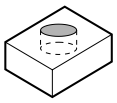
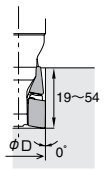
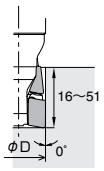
MSTA M110	MSTB M114	MSTC M119
		
●Self-clamping system ●Remove insert with dedicated wrench	●Easy screw on tangential clamped insert	●Adjustable slotting width due to unique cam adjustment structure

Corner Angle 0° type

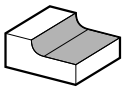
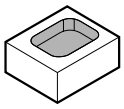
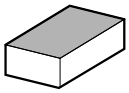
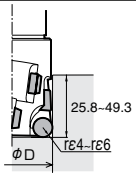
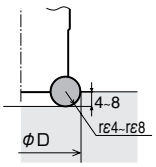
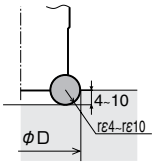
Corner Angle	Shape \ Application	Facing	Shouldering	Slotting	Deep Slotting
0°	**MSO90-S**  M47	●Screw clamping & 4 edge insert reduces cost ●Good chip evacuation ●Low cutting force			
0°	**MTE90**  M45	●Low cutting force ●For shouldering of Cast iron, Non-ferrous metals			
0°	**MTP90**  M45	●Medium to Roughing of Steel / Cast iron ●For Small machines and M/C			
0°	**MHD-SA**  M81	●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**  M81				
0° (Long Cutting Edge)	**MHD-C**  M81	●Integral arbor type ●Roughing of molds ●Low cutting force			

Corner Angle	Shape \ Application	Facing	Shouldering	Slotting
0°	**MEC** **MEC-W**  M48	●Good squareness ●Low cutting resistance ●The silver coating prevents chip wear on the tool body ●With air hole (Over ø16)		
0°	**MECX** **MECX-W**  M56	●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**  M96	●Low cutting force, Good chip evacuation ●High-efficiency cutting of Steel and Cast iron ●Notched inserts prevent chattering		
0°	**MEB** **MEB-W**  M96	●Low cutting force, Good chip evacuation ●High-efficiency cutting of Steel and Cast iron ●Notched inserts prevent chattering		
0°	**DMC**  M92	●For small milling machine, M/C		
0°	**DMC-SX**  M92	●For small milling machine, M/C		
0°	**DMC-H**  M93	●High rake type ●For small milling machine, M/C		
0°	**MTPS / MTES**  M95	●For small dia., Low cutting force type		
0°	**MEAL**  M94	●For Aluminum alloys ●With air hole		

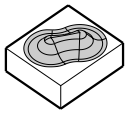
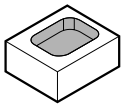
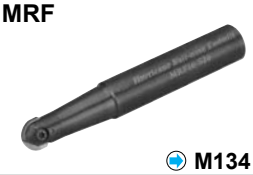
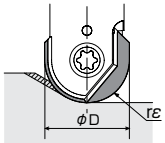
Multi-Function Cutting Endmill

Application / Shape	Facing	Shouldering	Slotting	Deep Slotting	Pocketing	Drilling	Corner Angle and Max ap	Cutting Dia. øD
								ø10 ø25 ø50
MEY **MEY-W**  **M100**	●Ultra drill mill ●Multi-function cutting (Drilling / Ramping / Shouldering / Grooving) ●High-efficiency mold cutting ●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			ø16 ø50
MEZ-G **MEZ-GW**  **M104**	●Silver drill mill ●Multi-function cutting ●High-efficiency mold cutting ●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)

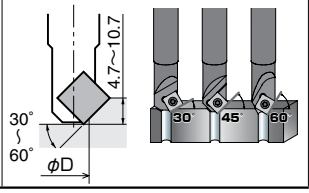
Application / Shape	Radius Milling / Profiling	Pocketing	Facing	Corner Angle and Max ap	Cutting Dia. øD
					ø32 ø50 ø63 ø80 ø100 ø125 ø160 ø200
MHD-RSA  **M143**	●Radius type of Plus Mill (Separate type can be linked to conventional Plus Mill by changing front piece) ●High-efficiency mold cutting ●Helical milling / Ramping				ø32 ø50
MRP-S **MRP-W**  **M137**	●For mold cutting ●Recommended for various types of Machining (Contouring, Helical Milling, Ramping, etc.) ●Firm insert seat by new ratchet design				ø12 ø63
MRP  **M138**					ø50 ø125

Ball-Nose Endmill

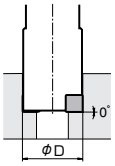
Application / Shape	Contouring / Profiling	Pocketing	Corner Angle and Max ap	Cutting Dia. øD
				ϕ10 ϕ25 ϕ50 ϕ80
MRF  **M134**	●For high quality mold finishing ●High R-accuracy (Insert's R-accuracy: Under ±0.01mm) ●The bushing ensures insert installation accuracy			ø8 ø25
MRFW  **M134**	●High quality mold finishing ●High R-accuracy (Insert's R-accuracy: Under ±0.01mm) ●The bushing ensures insert installation accuracy ●Superior to anti vibration, and stable cutting is possible with long over hand length without no chattering			ø8 ø12

Product Lineup

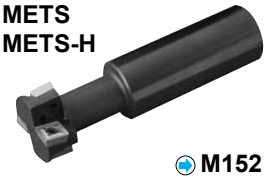
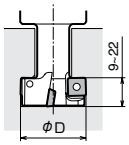
Chamfering

Application / Shape	Chamfering	Back Chamfering	V Shape Sloting	Countersinking	Corner Angle and Max ap	Cutting Dia. øD
MCSE **MCSE-W**  M148	●For 30°, 45°, 60° Chamfering ●Economical S-type Insert (4 Edges) ●Back chamfering is possible					ø10 ø25 ø50 ø4 ø36

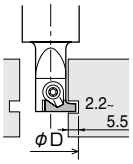
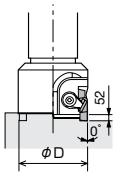
Bolt Countersinking

Application / Shape	Bolt Countersinking	Facing	Shouldering	Corner Angle and Max ap	Cutting Dia. øD
MEF **MEF-W**  M150	●Countersink for hexagon socket bolt (M6~M30) ●Economical S-type Insert (4 Edges)				ø10 ø25 ø50 ø80 ø11 ø48

T-Slotting

Application / Shape	T-Slotting	Back side milling	Corner Angle and Max ap	Cutting Dia. øD
METS **METS-H**  M152	●T-Slotting ●Recommended for high feed cutting with 2 Flute design ●Economical S-type Insert (4 Edges)			ø10 ø25 ø50 ø80 ø21 ø50

Grooving

Application / Shape	Internal Grooving	Ring Grooving	Corner Angle and Max ap	Cutting Dia. øD
MGI  M146	●Edge Width 1.0~4.0mm ●Grooving for M/C			ø10 ø25 ø50 ø80 ø14 ø40
MVG  M154		●Cutting Dia. ø30~ø75 ●Edge Width: 4.0~4.9mm ●O-Ring Grooving (G Series)		ø10 ø25 ø50 ø80 ø30 ø75

Milling Inserts Identification System

Symbol	Shape
H	Hexagon
O	Octagon
P	Pentagon
S	Square
T	Triangle
C	80° Rhombic
D	55° Rhombic
E	75° Rhombic
F	50° Rhombic
M	86° Rhombic
V	35° Rhombic
W	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

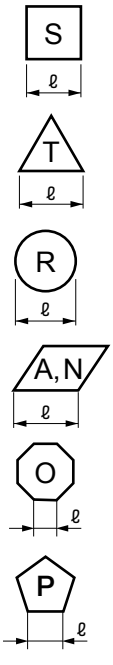
④Hole / Chipbreaker Symbol

Symbol	Shape
F	Sharp Edge
E	R-honed
T	Chamfer
S	Chamfer + R-honed

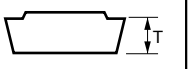
⑨Edge Preparation

S	E	K	N	12	03	A	F	T	N	
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪

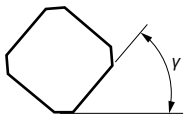
⑤Edge Length



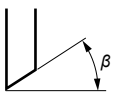
⑥Thickness	
Symbol	Thickness
02	2.38
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35



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°

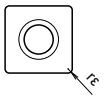


⑩Tool Hand	
Symbol	Hand
R	Right
L	Left
N	Neutral

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)	P	Carbon Steel / Alloy Steel	■ ★ ☆
		Mold Steel	■ ★ ☆
	M	Stainless Steel	★ ☆
	K	Gray Cast Iron	★ ☆
		Nodular Cast Iron	★ ☆
	N	Non-ferrous Metals	★
	S	Heat-resistant Alloys	★ ☆
		Titanium Alloys	★ ☆
	H	Hard Materials	□ □ □

Insert (Handed Insert shows R-hand)	Description	Dimension (mm) A	T	X	Z	rε	Angle (°) α	β	γ	Cermet TN60	TN100M	TC60	MEGACOAT PR1225	PR1210	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									□	●	□	●	●	●	●			●	●	●		M35
	1203AUFN																					●	
	SDKN 1504AUTN	15.875	4.76							□	●		●		●	●					●		-
	SDKR 1203AUEN-S	12.70	3.18	0.5	1.7	-	15°	23°	45°		●		●			●			●	●			
	SDMR 1203AUER-H	12.70	3.18	R1.0	0.8	-	15°	23°	45°				●		●	●							M35
	SEEN 1203AFTN	12.70	3.18	0.5	1.4	-	20°	25°	45°	□	●										●		M30
	SEKN 1203AFTN										●	□	●	●	●	●	●	●	●	●			M31
	1203AFFN																					●	M32
NEW	SEKN 1204AFTN		4.76										●										-
	SEKN 1504AFTN	15.875											●										
 1-Edge With Wiper Edge	SEEN 1203AFTR-W	12.70	3.18	-	3.5	B= 14.56	20°	25°	45°		●												M32
	1203AFFR-W																					●	
	SEKN 1203EFTR	12.70	3.18	1.2	1.4	-	20°	25°	15°		●	□			●	●							M43
	SEKR 1203AFEN-S	12.70	3.18	0.5	1.7	-	20°	25°	45°		●		●			●	●	●	●	●			M30 M31 M32
	SEMR 1203AFER-H	12.70	3.18	R1.0	1.0	-	20°	25°	45°				●		●	●	●						
	SEMR 1204AFER-H		4.76												●	●							-
	SOKN 13T3AXTN	13.494	3.97	0.5	1.1	-	27°	32°	45°		●	□	●	●	●	●			●	●			
	13T3AXFN																					●	M36
	SOKR 13T3AXEN-J	13.494	3.97	0.5	1.1	-	27°	32°	45°		●		●		●	●			●	●		●	

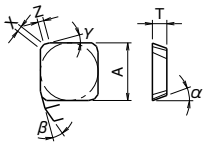
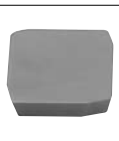
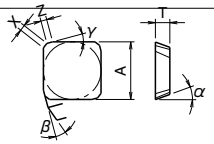
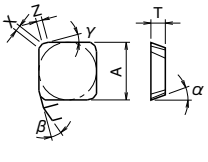
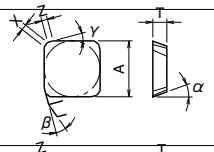
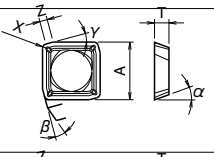
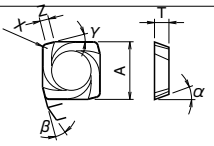
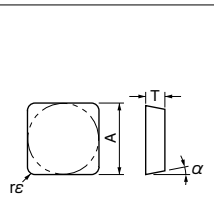
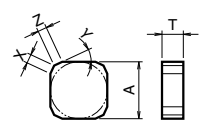
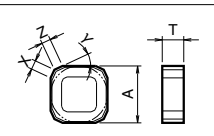
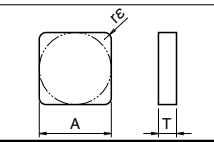
Inserts are sold in 10 piece boxes.

SEEN-W type Inserts are sold in 5 piece boxes.

● : Std. Item
○ : Check Availability
□ : Deleted from the next catalogue

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 Alloys	★ ☆
		Titanium Alloys	★ ☆
	H	Hard Materials	□ □

Insert (Handed Insert shows R-hand)	Description	Dimension (mm) A	T	X	Z	rε	Angle (°) α	β	γ	Cermet TN60	TN100M	TC60	MEGACOAT PR1225	PVD Coated Carbide PR1210	PR630	PR730	PR830	PR1025	PR660	PR905	Carbide PW30	KW10	Ref. Page for Toolholder
 	SPCN 1203EDTR	12.70	3.18	R1.0	2.0	-	11°	15°	15°		●												
	SPKN 1203EDTR			1.0						□	●	□	●	●	●	●			●		●		M43
	1203EDTL			R1.0							□			●						●			-
	1203EDFR			1.0	1.6																	●	M43
	1203EDFL																						-
	SPKN 1504EDTR	15.875	4.76		2.2					□	●	□	●	●	●	●					●	●	-
	1504EDFR																					●	
 	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			1.0						□	●	□			●	●				●		□	
	1203XPTL			R1.0							●												
	1203XPFR			1.0																		●	
	SPKN 1504XETR	15.875	4.76			-		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°		●		●			●			●	●			M43
 	SPMR 1203EDER-H	12.70	3.18	R1.0	2.0	-	11°	15°	15°				●		●	●							
 	SPMN 120308	12.70	3.18	-	-	0.8	11°	-	-	○	●	□											-
	120312					1.2				○	●												
	SPMN 120408		4.76			0.8								●						●			
	120412					1.2														●			
	SPGN 090304	9.525	3.18	-	-	0.4																●	
	090308					0.8																●	
	SPGN 120304	12.70				0.4																●	
	120308					0.8																●	
	SPUN 090308	9.525	3.18	-	-	0.8	11°	-	-														-
	120308	12.70	3.18	-	-	0.8	11°	-	-														-
 	SNCN 1204XNTN	12.70	4.76	2.0	2.0	-	-	-	25°		●	□											-
	SNKN 1204XNTN										●	□											
 	SNMF 1204XNTN	12.70	4.76	2.0	2.0	-	-	-	25°		●	□											-
 	SNMN 120408	12.70	4.76	-	-	0.8	-	-	-					●						●			-
	120412					1.2								●						●			

● : Std. Item
○ : Check Availability
□ : Deleted from the next catalogue

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 ● : Profiling / 1st Choice ○ : Profiling / 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 Alloys			★						☆							
		Titanium Alloys				★												☆
	H	Hard Materials			□			□	□									

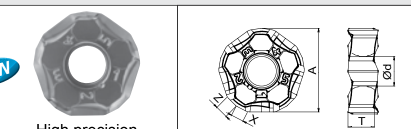
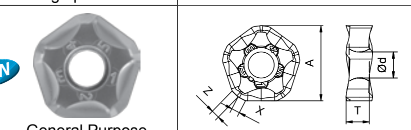
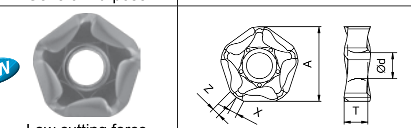
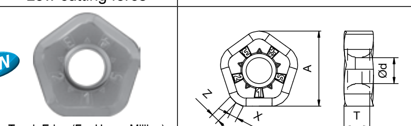
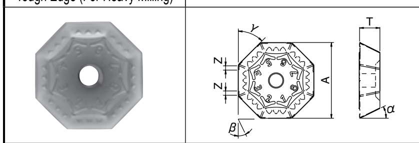
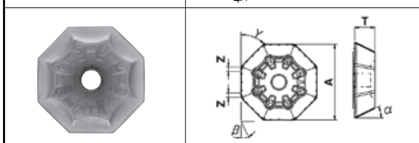
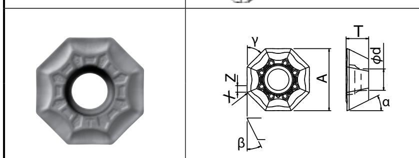
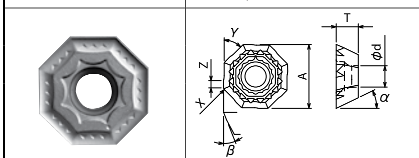
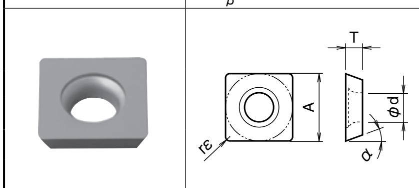
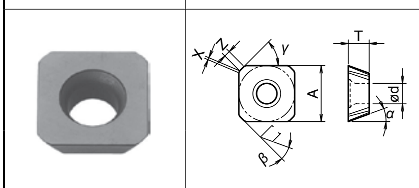
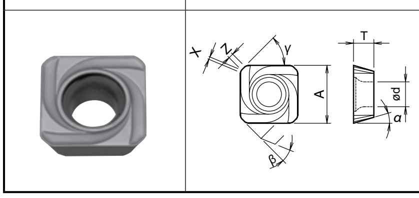
Insert (Handed Insert shows R-hand)		Description	Dimension (mm) A	T	ød	W (X)	rε (Z)	Angle (°) α	β	γ	Cermet TN100M	TC60	MEGACOAT PR1225	PR1230	PR1210	PVD Coated Carbide PR630	PR730	PR830	PR1025	PR660	PR905	Carbide PW30	KW10	Ref. Page for Toolholder
NEW High precision		PNEU 1205ANER-GL	17.51	5.56	6.2	2.7	2.7	-	-	-			●		●									M22 M23
NEW General Purpose		PNMU 1205ANER-GM	17.88			2.0	2.0						●		●									
NEW Low cutting force		PNMU 1205ANER-SM											●		●									
NEW Tough Edge (For Heavy Milling)		PNMU 1205ANER-GH	17.98	6.17									●		●									
		OFMR 070405EN-SH	17.98	4.94	-	-	Z= 1.2	26°	26°	45°			●		●			●	●		●			M28
		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°			●		●			●			●			M26
		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°			●		●			●	●		●			M26
		070405EN-SH	17.98	4.87	5.8		-		26°				●		●			●	●		●			
		SDKW 09T204TN	9.525	2.78	3.4	-	0.4	15°	-	-	●		●				●							M149
		09T204FN																					●	
		SEKW 120304TN	12.70	3.18	5.5			20°			●	□	●			●	●							
		120304FN																					●	
		120308TN					0.8				●	□	●			●	●							
		120308FN																					●	
		SDKW 1204AESN	12.70	4.76	5.5	X= R1.0	Z= 1.5	15°	20°	45°			●											-
		1204AETN													●									
		SEKW 1204AFTN				X= 0.5	Z= 1.7	20°	25°				●		●									-
		SDMT 1204AESR-H	12.70	4.76	5.5	X= R1.0	Z= 0.8	15°	20°	45°			●											-

● : Std. Item
□ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes.

Milling Inserts (With Hole)

Classification of usage			TN100M	TC60	PR1225	PR1230 (NEW)	PR1210	PR630	PR730	PR830	PR1025	PR660	PR905	PW30	KW10
★ : Roughing / 1st Choice	P	Carbon Steel / Alloy Steel	■		★				☆	☆					
☆ : Roughing / 2nd Choice		Mold Steel	■		★				☆	☆					
■ : Finishing / 1st Choice	M	Stainless Steel			★						☆				
□ : Finishing / 2nd Choice	K	Gray Cast Iron					★						☆		☆
● : Profiling / 1st Choice		Nodular Cast Iron					★						☆		
○ : Profiling / 2nd Choice	N	Non-ferrous Metals													★
(In case hardness is under 45HRC)	S	Heat-resistant Alloys			★						☆				
		Titanium Alloys					★								☆
	H	Hard Materials			□				□	□					

Insert (Handed Insert shows R-hand)	Description	A	T	ød	W (X)	rε (Z)	α	β	γ	TN100M (Cermet)	TC60 (Cermet)	PR1225 (MEGACOAT)	PR1230 (MEGACOAT)	PR1210 (MEGACOAT)	PR630 (PVD Coated Carbide)	PR730 (PVD Coated Carbide)	PR830 (PVD Coated Carbide)	PR1025 (PVD Coated Carbide)	PR660 (PVD Coated Carbide)	PR905 (PVD Coated Carbide)	PW30 (Carbide)	KW10 (Carbide)	Ref. Page for Toolholder
NEW  High precision	PNEU 1205ANER-GL	17.51	5.56	6.2	2.7	2.7	-	-	-			●		●									M22 M23
NEW  General Purpose	PNMU 1205ANER-GM	17.88			2.0	2.0						●		●									
NEW  Low cutting force	PNMU 1205ANER-SM											●		●									
NEW  Tough Edge (For Heavy Milling)	PNMU 1205ANER-GH	17.98	6.17									●		●									
	OFMR 070405EN-SH	17.98	4.94	-	-	Z=1.2	26°	26°	45°			●		●			●	●		●			M28
	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°			●		●			●			●			M26
	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°			●		●			●	●		●			M26
	070405EN-SH	17.98	4.87	5.8		-		26°				●		●			●	●		●			
	SDKW 09T204TN	9.525	2.78	3.4	-	0.4	15°	-	-	●		●				●							M149
	09T204FN																					●	
	SEKW 120304TN	12.70	3.18	5.5			20°			●	□	●			●	●							
	120304FN																					●	
	120308TN					0.8				●	□	●			●	●							
	120308FN																					●	
	SDKW 1204AESN	12.70	4.76	5.5	X=R1.0	Z=1.5	15°	20°	45°			●											-
	1204AETN													●									
	SEKW 1204AFTN				X=0.5	Z=1.7	20°	25°				●		●									-
	SDMT 1204AESR-H	12.70	4.76	5.5	X=R1.0	Z=0.8	15°	20°	45°			●											-

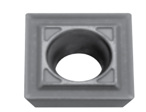
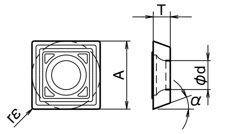
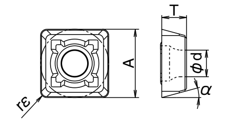
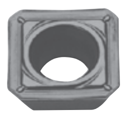
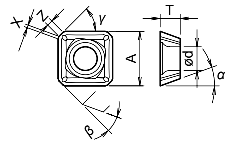
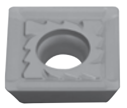
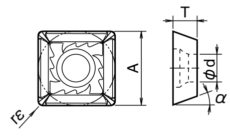
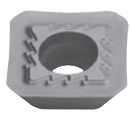
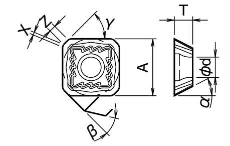
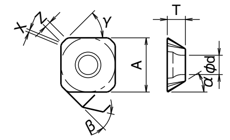
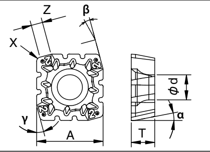
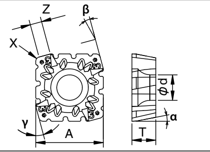
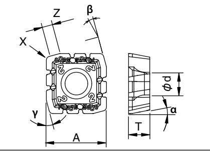
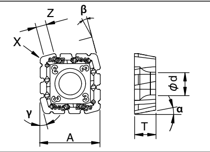
● : Std. Item
□ : Deleted from the next catalogue

Inserts are sold in 10 piece boxes.

Milling Inserts (With Hole)

NEW

Classification of usage			TN100M	TC60	PR1225	PR1230	PR1210	PR630	PR730	PR830	PR1025	PR660	PR905	PW30	KW10
★ : Roughing / 1st Choice	P	Carbon Steel / Alloy Steel	■		★	★			☆	☆					
☆ : Roughing / 2nd Choice	P	Mold Steel	■		★	★			☆	☆					
■ : Finishing / 1st Choice	M	Stainless Steel			★	★					☆	☆			
□ : Finishing / 2nd Choice	K	Gray Cast Iron					★						☆		☆
● : Profiling / 1st Choice	K	Nodular Cast Iron					★						☆		
○ : Profiling / 2nd Choice	N	Non-ferrous Metals													★
(In case hardness is under 45HRC)	S	Heat-resistant Alloys			★	★					☆	☆			
	S	Titanium Alloys					★								☆
	H	Hard Materials			□	□			□	□					

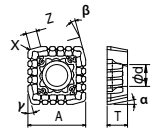
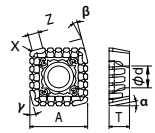
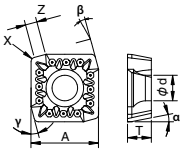
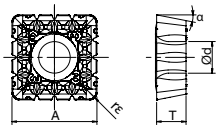
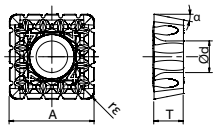
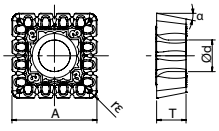
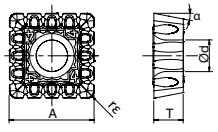
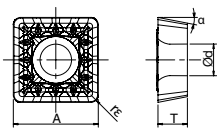
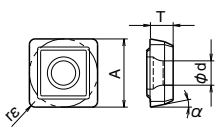
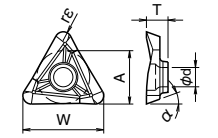
Insert (Handed Insert shows R-hand)	Description	Dimension (mm) A	T	ød	W (X)	rε (Z)	Angle (°) α	β	γ	Cermet TN100M	TC60	MEGACOAT PR1225	PR1230	PR1210	PVD Coated Carbide PR630	PR730	PR830	PR1025	PR660	PR905	Carbide PW30	KW10	Ref. Page for Toolholder
 Low resistance type 	SDMT 09T204C	9.525	2.78	3.4	-	0.4	15°	-	-	●		●				●						●	M149
	SEMT 120304C	12.70	3.18	5.5	-	0.4	20°	-	-			●				●						●	
 	SDMT 060304E-K	6.35	3.18	2.8	-	0.4	15°	-	-				●	●		●			●	●		●	M152
	080308E-K	8.00		3.4		0.8							●	●		●			●	●		●	
	120408E-K	12.70	4.76	4.4									●	●		●			●	●		●	
 	SEKT 1204AFEN-S	12.70	4.76	5.5	X= 0.5	Z= 1.7	20°	25°	45°			●											-
 	SEMM 09T308PESR	9.525	3.97	3.4	-	0.8	20°	-	-	●					●	●			●	●		●	M46 M47
	150408PESR	15.875	4.76	5.5						●		●		●	●	●	●	●	●	●		●	
 	SOMT 0903AXEN-J	9.525	3.18	3.4	X= 0.5	Z= 1.1	27°	32°	45°	●					●	●			●	●		●	M37
 	SOMW 0903AXTN	9.525	3.18	3.4	X= 0.5	Z= 1.1	27°	32°	45°	●					●	●			●	●			
	0903AXFN																					●	
 2-Notched General Purpose 	SPMT 1806EDER-NB2	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°			●	●	●			●		●	●			M40
 3-Notched General Purpose 	SPMT 1806EDER-NB3	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°			●	●	●			●		●	●			
 2-Notched Tough Edge 	SPMT 1806EDSR-NB2T	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°				●	●			●			●			
	SPMT 1806EDSL-NB2T												●				●						-
 3-Notched Tough Edge 	SPMT 1806EDSR-NB3T	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°				●	●			●			●			M40
	SPMT 1806EDSL-NB3T												●				●						-

● : Std. Item

Inserts are sold in 10 piece boxes.

Milling Inserts (With Hole)

Classification of usage			NEW											
★ : Roughing / 1st Choice	P	Carbon Steel / Alloy Steel			★	★			☆	☆				
☆ : Roughing / 2nd Choice		Mold Steel			★	★			☆	☆				
■ : Finishing / 1st Choice	M	Stainless Steel			★	★						☆		
□ : Finishing / 2nd Choice	K	Gray Cast Iron					★						☆	☆
● : Profiling / 1st Choice		Nodular Cast Iron					★						☆	
○ : Profiling / 2nd Choice	N	Non-ferrous Metals												★
(In case hardness is under 45HRC)	S	Heat-resistant Alloys			★	★						☆		
		Titanium Alloys					★							☆
	H	Hard Materials			□	□			□	□				

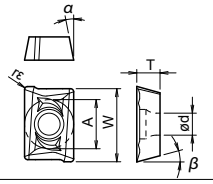
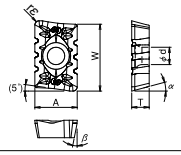
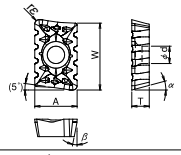
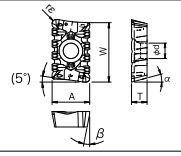
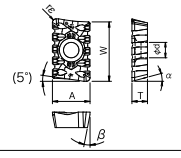
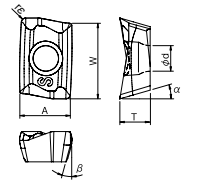
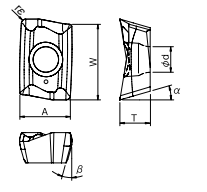
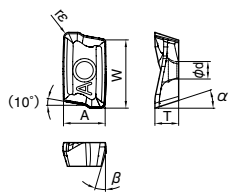
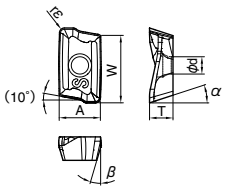
Insert (Handed Insert shows R-hand)		Description		Dimension (mm)					Angle (°)			Cermet		MEGACOAT			PVD Coated Carbide					Carbide		Ref. Page for Toolholder
				A	T	ød	W (X)	rε (Z)	α	β	γ	TN100M	TC60	PR1225	PR1230	PR1210	PR630	PR730	PR830	PR1025	PR660	PR905	PW30	KW10	
4-Notched Low resistance type		SPMT	1806EDER-NB2P	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°			●	●	●		●				●			
5-Notched Low resistance type		SPMT	1806EDER-NB3P	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°			●	●	●		●				●			M40
Without notch		SPMT	1806EDER-V	18	6.35	6.8	X= R1.2	Z= 3.1	11°	15°	15°			●	●	●		●			●	●			
NEW 3-Notched		SPMT	180616EN-NB3	18	6.35	6.8	-	1.6	11°	-	-				●	●									
NEW 4-Notched		SPMT	180616EN-NB4	18	6.35	6.8	-	1.6	11°	-	-				●	●									
NEW 3-Notched Low resistance type		SPMT	180616EN-NB3P	18	6.35	6.8	-	1.6	11°	-	-				●	●									M72
NEW 4-Notched Low resistance type		SPMT	180616EN-NB4P	18	6.35	6.8	-	1.6	11°	-	-				●	●									
NEW Without notch		SPMT	180616EN-V	18	6.35	6.8	-	1.6	11°	-	-				●	●									
		SPMT	060204E-Z	6.35	2.38	2.5	-	0.4	11°	-	-			●		●		●				●	●		M150
			060208E-Z					0.8						●		●		●				●	●		
		SPMT	090304E-Z	9.525	3.18	3.4	-	0.4	11°	-	-			●		●		●				●	●		
			090308E-Z					0.8						●		●		●				●	●		
		TEMT	250624-AQ	15.875	6.35	5.5	23.0	2.4	20°	-	-												●		M94

● : Std. Item

Inserts are sold in 10 piece boxes.

Milling Inserts (With Hole)

Classification of usage			
★ : Roughing / 1st Choice	P	Carbon Steel / Alloy Steel	
☆ : Roughing / 2nd Choice		Mold Steel	
■ : Finishing / 1st Choice	M	Stainless Steel	
□ : Finishing / 2nd Choice	K	Gray Cast Iron	
● : Profiling / 1st Choice		Nodular Cast Iron	
○ : Profiling / 2nd Choice	N	Non-ferrous Metals	
(In case hardness is under 45HRC)	S	Heat-resistant Alloys	
		Titanium Alloys	
	H	Hard Materials	

Insert (Handed Insert shows R-hand)		Description		Dimension (mm) A	T	X	Z	rε	Angle (°) α	β	γ	Cermet TN100M	TC60	MEGACOAT PR1225	PR1230	PR1210	PVD Coated Carbide PR930	PR730	PR830	PR1025	PR660	PR905	Carbide PW30	GW25	Ref. Page for Toolholder
		APMT	1003PDER-V	6.72	3.18	2.8	10.0	0.4	11°	15°	-			★	★				☆	☆					-
			100308PDER-V					0.8						★	★				☆	☆					
		APKT	1604PDER-V	9.525	4.76	4.4	16.0	0.8			-			★	★				☆	☆					-
 3-Notched		APMT	250608ER-NB3	15.875	6.35	6.5	25	0.8	15°	11°	-			●	●			●		●	●			M76 M77
			250616ER-NB3					1.6						●	●			●		●	●			
			250640ER-NB3					4.0						●	●			●		●	●			
		APMT	250616EL-NB3					1.6						●				●						-
 4-Notched		APMT	250608ER-NB4	15.875	6.35	6.5	25	0.8	15°	11°	-			●	●			●		●	●			M76 M77
			250616ER-NB4					1.6						●	●			●		●	●			
			250640ER-NB4					4.0						●	●			●		●	●			
		APMT	250616EL-NB4					1.6						●				●						-
 Low cutting force 3-Notched		APMT	250616ER-NB3P	15.875	6.35	6.5	25	1.6	15°	11°	-			●	●			●			●	●		M76
 Low cutting force 4-Notched		APMT	250616ER-NB4P	15.875	6.35	6.5	25	1.6	15°	11°	-				●	●			●			●	●		M77
		BDMT	070302ER-JS	4.6	2.6	2.3	6.7	0.2	16°	15°	-			●					●	●		●			M56
			070304ER-JS					0.4						●					●	●		●			
			070308ER-JS					0.8						●					●	●		●			
		BDMT	070302ER-JT	4.6	2.6	2.3	6.7	0.2	16°	15°	-			●		●			●	●		●			M57
			070304ER-JT					0.4						●		●			●	●		●			
			070308ER-JT					0.8						●		●			●	●		●			
 Non-ferrous Metals		BDGT	11T302FR-JA	6.7	3.8	2.8	11.0	0.2	18°	13°	-													●	
			11T304FR-JA					0.4																●	
			11T308FR-JA					0.8																●	
		BDGT	170404FR-JA	9.6	4.9	4.4	17.0	0.4	18°	13°	-													●	
			170408FR-JA					0.8																●	
			170420FR-JA					2.0																●	
			170431FR-JA					3.1																●	M48
 Stainless steel Low cutting force		BDMT	110302ER-JS	6.3	3.0	2.8	11.0	0.2	18°	15°	-			●					●	●					M49 M50
			110304ER-JS					0.4						●					●	●					
			110308ER-JS					0.8						●					●	●					
		BDMT	11T302ER-JS	6.7	3.8	2.8	11.0	0.2	18°	13°	-			●					●	●					
			11T304ER-JS					0.4						●					●	●					
			11T308ER-JS					0.8						●					●	●					
		BDMT	170404ER-JS	9.6	4.9	4.4	17.0	0.4	18°	13°	-			●					●	●					
			170408ER-JS					0.8						●					●	●					

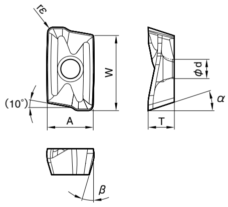
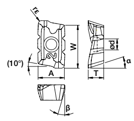
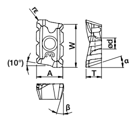
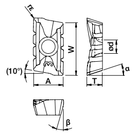
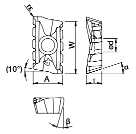
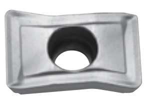
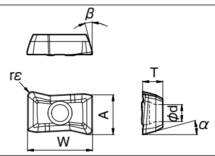
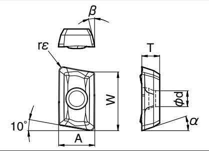
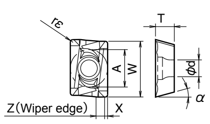
Inserts are sold in 10 piece boxes.

● : Std. Item

Milling Inserts (With Hole)

Classification of usage			TN100M	TC60	PR1225	PR1230	PR1210	PR630	PR730	PR830	PR1025	PR660	PR905	PW30	KW10
★ : Roughing / 1st Choice	P	Carbon Steel / Alloy Steel	■		★	★			☆	☆					
☆ : Roughing / 2nd Choice		Mold Steel	■		★	★			☆	☆					
■ : Finishing / 1st Choice	M	Stainless Steel			★	★						☆			
□ : Finishing / 2nd Choice	K	Gray Cast Iron					★						☆		☆
● : Profiling / 1st Choice		Nodular Cast Iron					★						☆		
○ : Profiling / 2nd Choice	N	Non-ferrous Metals													★
(In case hardness is under 45HRC)	S	Heat-resistant Alloys			★	★						☆			
		Titanium Alloys					★								☆
	H	Hard Materials			□	□			□	□					

NEW: PR1225, PR1230

Insert (Handed Insert shows R-hand)		Description		Dimension (mm) A	T	φd	W (X)	rε (Z)	Angle (°) α	β	γ	Cermet TN100M	TC60	MEGACOAT PR1225	PR1230	PR1210	PVD Coated Carbide PR630	PR730	PR830	PR1025	PR660	PR905	Carbide PW30	KW10	Ref. Page for Toolholder
		BDMT	110302ER-JT	6.3	3.0	2.8	11.0	0.2	18°	15°	-			●		●			●			●			M48 M49 M50
			110304ER-JT					0.4						●		●			●			●			
			110308ER-JT					0.8						●		●			●			●			
		BDMT	11T302ER-JT	6.7	3.8	2.8	11.0	0.2	18°	13°	-			●		●			●			●			
			11T304ER-JT					0.4				●		●		●			●			●			
			11T308ER-JT					0.8				●		●		●			●			●			
			11T312ER-JT					1.2						●		●			●			●			
			11T316ER-JT					1.6						●		●			●			●			
			11T320ER-JT					2.0						●		●			●			●			
			11T324ER-JT					2.4						●		●			●			●			
			11T331ER-JT					3.1						●		●			●			●			
		BDMT	170404ER-JT	9.6	4.9	4.4	17.0	0.4	18°	13°	-			●		●			●			●			
			170408ER-JT					0.8				●		●		●			●			●			
			170412ER-JT					1.2						●		●			●			●			
			170416ER-JT					1.6						●		●			●			●			
			170420ER-JT					2.0						●		●			●			●			
			170424ER-JT					2.4						●		●			●			●			
			170431ER-JT					3.1						●		●			●			●			
			170440ER-JT					4.0						●		●			●			●			
 2-Notched		BDMT	11T308ER-N2	6.7	3.8	2.8	11.0	0.8	18°	13°	-			●	●	●			●			●			M62 M63 M64 M65
 3-Notched		BDMT	11T308ER-N3	6.7	3.8	2.8	11.0	0.8	18°	13°	-			●	●	●			●			●			
 3-Notched		BDMT	170408ER-N3	9.6	4.9	4.4	17.0	0.8	18°	13°	-			●	●	●			●			●			
 4-Notched		BDMT	170408ER-N4	9.6	4.9	4.4	17.0	0.8	18°	13°	-			●	●	●			●			●			
		GOMT	08T208ER-D	5.21	2.78	2.3	8.7	0.8	13°	17°	-			●		●			●			●			M101
			100308ER-D	6.56	3.30	2.8	10.7							●		●			●			●			
			13T308ER-D	8.36	3.85	3.4	13.2							●		●			●			●			
			160408ER-D	10.03	4.76	4.4	16.7							●		●			●			●			
		JOMT	08T208ER-D	5.14	2.78	2.3	8.5	0.8	17°	13°	-			●		●			●			●			
			100308ER-D	6.42	3.18	2.8	10.2							●		●			●			●			
			13T308ER-D	8.05	3.70	3.4	13.2							●		●			●			●			
			160408ER-D	9.67	4.76	4.4	16.7							●		●			●			●			
		NDKT	090304ER-V	6.35	3.18	2.8	W=9.5 X=0.25	rε=0.4 Z=1.25	15°	-	-	●					●	●			●	●		●	M81 M82 M83 M97 M143
			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				●					●	●			●	●		●	M97
			150408TR-V				W=15.9 X=0.6	rε=0.8 Z=1.4																	

● : Std. Item

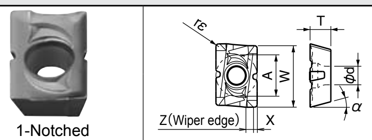
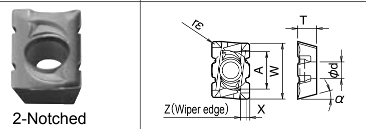
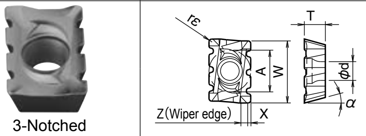
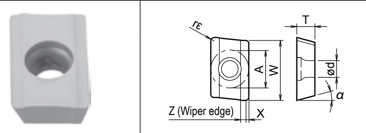
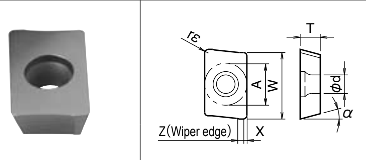
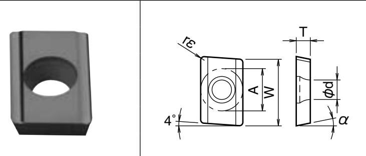
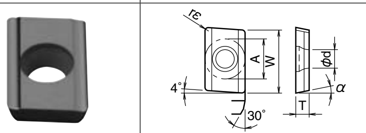
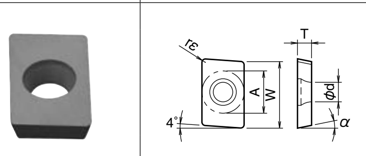
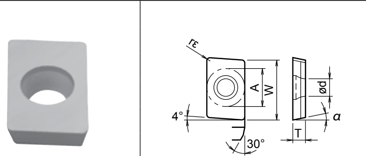
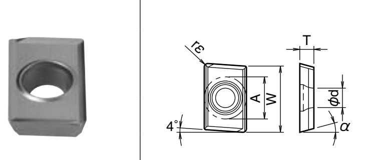
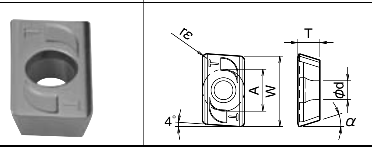
Inserts are sold in 10 piece boxes.

M Milling

Milling Inserts (With Hole)

NEW

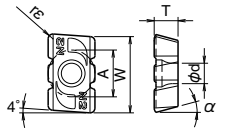
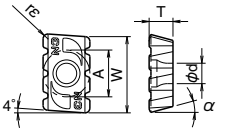
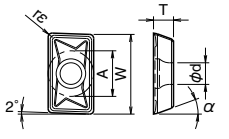
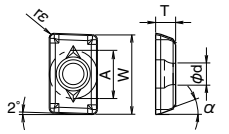
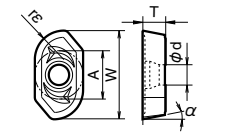
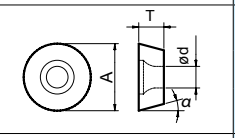
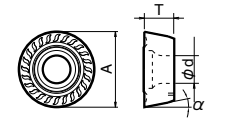
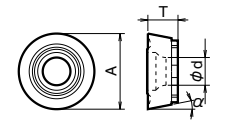
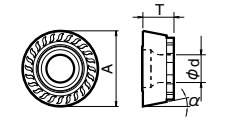
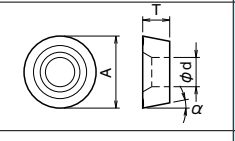
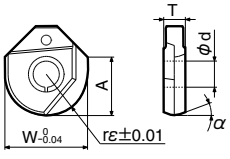
Classification of usage			TN100M	TC60	PR1225	PR1230	PR1210	PR630	PR730	PR830	PR915	PR660	PR905	PW30	KW10
★ : Roughing / 1st Choice	P	Carbon Steel / Alloy Steel	■						☆	☆					
☆ : Roughing / 2nd Choice	P	Mold Steel	■						☆	☆					
■ : Finishing / 1st Choice	M	Stainless Steel										☆			
□ : Finishing / 2nd Choice	K	Gray Cast Iron											☆		☆
● : Profiling / 1st Choice	K	Nodular Cast Iron											☆		
○ : Profiling / 2nd Choice	N	Non-ferrous Metals													★
	S	Heat-resistant Alloys										☆			
	S	Titanium Alloys													☆
(In case hardness is under 45HRC)	H	Hard Materials							□	□					

Insert (Handed Insert shows R-hand)	Description	Dimension (mm) A	T	φd	W (X)	rε (Z)	Angle (°) α	β	γ	Cermet TN100M	Cermet TC60	MEGACOAT PR1225	MEGACOAT PR1230	MEGACOAT PR1210	PVD Coated Carbide PR630	PR730	PR830	PR915	PR660	PR905	Carbide PW30	Carbide KW10	Ref. Page for Toolholder
 1-Notched	NDKT 090304ER-N1	6.35	3.18	2.8	W=9.5 X=0.25	rε=0.4 Z=1.25	15°	-	-	●					●	●			●	●		●	M81 M82 M83 M97 M143
 2-Notched	NDKT 090304ER-N2	6.35	3.18	2.8	W=9.5 X=0.25	rε=0.4 Z=1.25	15°	-	-	●					●	●			●	●		●	
 3-Notched	NDKT 150408ER-N3	10.00	4.76	4.4	W=15.9 X=0.6	rε=0.8 Z=1.4	15°	-	-	●					●	●			●	●		●	M97
	NDKT 090304TR	6.35	3.18	2.8	W=9.5 X=0.25	rε=0.4 Z=1.25	15°	-	-														M81 M82 M143
	NDKT 150408TR	10.0	4.76	4.4	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°	-	-														M81 M82 M83 M97 M143
	NDKW 150408ER	10.0	4.76	4.4	W=15.9 X=0.6	rε=0.8 Z=1.4	15°	-	-														M97
	NDCT 090204TR	6.35	2.38	2.8	9.5	0.4	15°	-	-	●	□												M92
	090204FR																					●	
	NDCT 120208TR	7.94	2.38	3.4	12.7	0.8	15°	-	-	●	□												
	120208FR																					●	
	NDCT 150308TR	9.525	3.18	4.5	15.0	0.8	15°	-	-	●	□				●	●							M93
	150308FR																					●	
	NDCT 150308TRX	9.525	3.18	4.4	15.0	0.8	15°	-	-	●	□												M92 M93
	NDCW 150302TR	9.525	3.18	4.5	15.0	0.2	15°	-	-	●	□												M92
	150304TR					0.4				●	□				●	●							
	150308TR					0.8				●	□				●	●							
	150320TR					2.0				●	□												
	150330TR					3.0				●	□												
	150340TR					4.0				●	□												
	NDCW 150302TRX	9.525	3.18	4.4	15.0	0.2	15°	-	-														M92 M93
	150304TRX					0.4																	
	150308TRX					0.8				●													
	150320TRX					2.0																	
	150330TRX					3.0																	
	150340TRX					4.0																	
	NDCW 150308FRX	9.525	3.18	4.4	15.0	0.8	15°	-														●	
	NDMM 090204ER-SP	6.35	2.38	2.8	9.5	0.4	15°	-	-	●	□				●	●							M92
	NDMM 120204ER-SP	7.94	2.38	3.4	12.7	0.4				●	□				●	●							
	120208ER-SP					0.8				●	□				●	●							
	NDMM 150304ER-SP	9.525	3.18	4.4	15.0	0.4				●	□				●	●							M93 M94
	150308ER-SP					0.8				●	□				●	●							
	NDMM 12T308ER-T	7.58	3.97	3.4	12.7	0.8	15°	-	-	●						●	●		●	●		●	M81 M82 M83 M140

● : Std. Item
□ : Deleted from the next catalogue

Milling Inserts (With Hole)

Classification of usage				NEW												
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice ● : Profiling / 1st Choice ○ : Profiling / 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 Alloys			★	★					☆					
		Titanium Alloys					★								☆	
	H	Hard Materials			□	□		□	□							

Insert (Handed Insert shows R-hand)		Description		Dimension (mm) A	T	φd	W	rε	Angle (°) α	β	γ	Cermet TN100M	TC60	MEGACOAT PR1225	PR1230	PR1210	PVD Coated Carbide PR630	PR730	PR830	PR915	PR660	PR905	Carbide PW30	KW10	Ref. Page for Toolholder
 2-Notched		NDMM	12T308ER-N2	7.79	3.97	3.4	12.7	0.8	15°	-	-	●						●	●		●	●		●	M81 M82 M83 M86 M87 M88 M140
 3-Notched		NDMM	12T308ER-N3	7.79	3.97	3.4	12.7	0.8	15°	-	-	●						●	●		●	●		●	
		NDMT	080208ER-D	5.086	2.38	2.2	8.5	0.8	15°	-	-	●		●		●	●	●			●	●		●	M104
			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					●		●		●		●			●	●		●	
		FPMT	090340ER	6.64	3.18	2.8	9.2	4.0	11°	-	-							●			●	□		●	M140
		RDHX	0702M0T	7.0	2.39	2.8	-	-	15°	-	-				●										-
			1003M0T	10.0	3.18	3.8									●										
			12T3M0T	12.0	3.97										●										
 Tough Edge		RDMT	08T2M0-H	8.0	2.78	3.4	-	-	15°	-	-				●	●		●			●	●		●	M134 M135
 Low resistance type		RPMT	10T3M0	10.0	3.97	3.4	-	-	11°	-	-				●	●		●			●	●		●	M134 M135 M140
			1204M0	12.0	4.76	4.4									●	●		●			●	●		●	
 Tough Edge		RPMT	1204M0-H	12.0	4.76	4.4	-	-	11°	-	-	●			●	●		●			●	●		●	M134 M135 M140
			1606M0-H	16.0	6.35	5.5						●			●	●		●			●	●		●	M134 M135
			2006M0-H	20.0	6.35	6.5									●	●		●			●	●		●	
		RPMT	120400	12.70	4.76	5.16	-	-	11°	-	-							●			●				-
		RDFG	08FR	6.6	2.1	3.1	8.0	4.0	15°	-	-									●					M132
			10FR	8.0	2.7	3.6	10.0	5.0												●					
			12FR	9.4	3.2	4.1	12.0	6.0												●					
			16FR	11.3	4.2	5.1	16.0	8.0	10°	-	-									●					
			20FR	14.1	5.2	6.1	20.0	10.0												●					
			25FR	15.5	6.2	6.1	25.0	12.5												●					

● : Std. Item
□ : Deleted from the next catalogue

RDFG Inserts are sold in 2 piece boxes.

PCD Inserts are sold in 1 piece boxes.

Milling Inserts (CBN & PCD)

Classification of usage			
★ : Roughing / 1st Choice	P	Carbon Steel / Alloy Steel	
☆ : Roughing / 2nd Choice		Mold Steel	
■ : Finishing / 1st Choice	M	Stainless Steel	
□ : Finishing / 2nd Choice	K	Gray Cast Iron	
		Nodular Cast Iron	
	N	Non-ferrous Metals	□ ■
	S	Heat-resistant Alloys	
		Titanium Alloys	□ ■
	H	Hard Materials	■

Insert (Handed Insert shows R-hand)		Description	Dimension (mm) A	T	X	Z	S	B	Angle(°) α	β	γ	CBN KBN510	KBN525		PCD KPD001	KPD010	KPD230		Ref. Page for Toolholder
		SDKN 1203AUFN-NE	12.70	3.18	0.5	1.2	3.1	-	15°	23°	45°				●				M35
		1203AUFN					3.6								●	●			
		SEEN 1203AFFN-NE	12.70	3.18	0.5	1.4	3.0	-	20°	25°	45°				●				M30
																			M31
		1203AFFN					3.5								●	●			M32
With Wiper Edge		SEEN 1203AFFR-W	12.50	3.18	-	3.5	1.7	14.56	20°	25°	45°				●				M32
		SOKN 13T3AXFN-NE	13.494	3.97	0.4	1.1	3.0	-	27°	32°	45°						●		M36
		TEEN 1603PTFR-NE	9.525	3.18	0.6	1.4	4.1	-	20°	22°	30°				●		●		M95
		1603PTFR					4.7								●	●			
		TEKN 2204PTFR-NE	12.70	4.76	0.7	1.8	4.2	-	20°	22°	30°				●		●		M44
		2204PTFR					4.8								●	●			M45

Insert (Handed Insert shows R-hand)		Description	Dimension (mm) A	T	rε	S	Angle(°) α	CBN KBN510	KBN525		PCD KPD001	KPD010	KPD230		Ref. Page for Toolholder
		TPGN 110304T00815	6.35	3.18	0.4	3.8	11°	□	□						
		110308T00815			0.8	3.5		□	□						
		TPGN 110302NE			0.2	3.4					●				
		110304NE			0.4	3.2					●				M95
		110308NE			0.8	2.9					●				
		TPGN 110302			0.2	3.9					●	●			
		110304			0.4	3.7					●	●			
		110308			0.8	3.4						●			

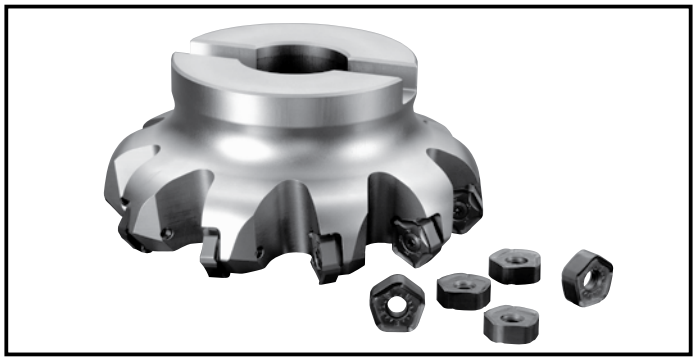
Insert (Handed Insert shows R-hand)		Description	Dimension (mm) A	T	φd	W	rε	S	Angle(°) α	β	CBN KBN510	KBN525		PCD KPD001	KPD010	KPD230		Ref. Page for Toolholder
		BDMT 11T302FR	6.7	3.8	2.8	11.0	0.2	3.6	18°	13°				●		●		
		11T304FR					0.4							●		●		M48
		BDMT 170402FR	9.6	4.9	4.4	17.0	0.2	4.4	18°	13°				●		●		M49
		170404FR					0.4							●		●		M50
		NDCW 150302FRX-NE	9.525	3.18	4.4	15.0	0.2	5.1	15°	-				●		●		M93
		150302FRX						5.7						●	●			

● : Std. Item
□ : Deleted from the next catalogue

CBN & PCD Inserts are sold in 1 piece boxes.

High Efficiency Mill MFPN

NEW



Carving out a new era

High Efficiency Mill

MFPN

Milling-Facing PeNtagonal type

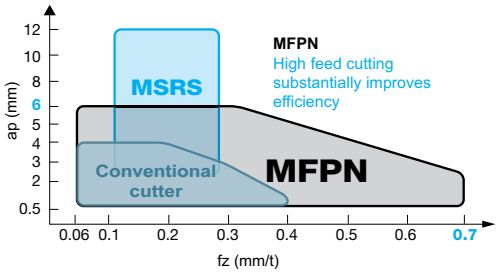
BIG 5

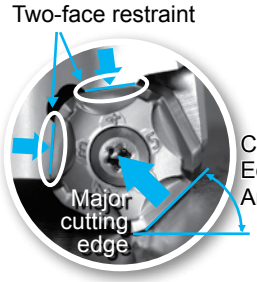
Five Advantages

1 A roughing and general-purpose mill with 10-edge pentagonal inserts

Economical

- Double-sided pentagonal insert
- Stable cutting due to two-face restrain
- 10-edge insert reduces cost per edge





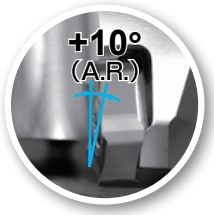
Two-face constraint facing the major cutting edge

➡ Highly stabilized accuracy

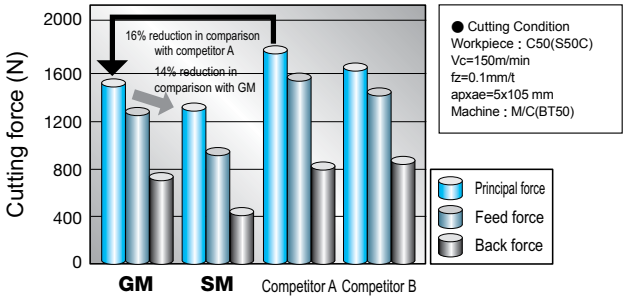
2 Low cutting force due to helical cutting-edge design

New design

- Helical cutting-edge design with low cutting force reduces chattering
- High rake angle (A.R. Max. +10°)



● Cutting Force Comparison

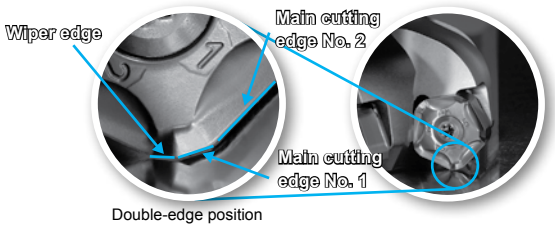


3 Fractures suppressed with double-edge position

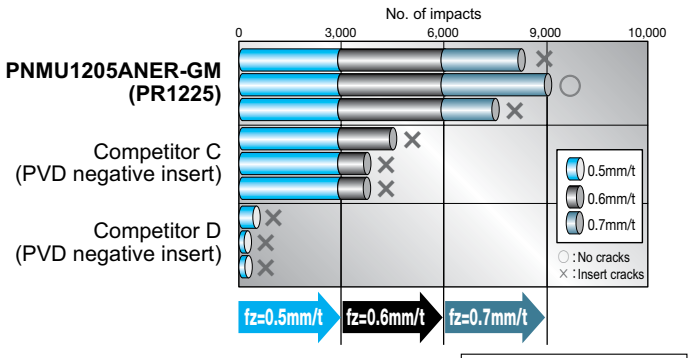
Toughness

■ Double-edge position

・Major cutting edge makes chips thin, thereby reducing impact load at entrance and exit of workpiece



● Fracture resistance comparison



● Cutting Conditions
Workpiece : 42CrMo4(38~42HS)
(SCM440)
(workpiece with 20mm width slot)
machine : BT50 M/C
Vc=100m/min
fz=0.5~0.7mm/t
apxae=2x100mm

4 3-dimensional chipbreaker improves chip evacuation

5 Long tool life with PR12-Series MEGACOAT Carbide inserts

M

Milling

High Efficiency Mill MFPN45 NEW

Facing | Chamfering

MFPN45 Face Mill

Rake Angle(°)	A.R.	R.R.
	max +10°	øD=63 -10° øD=80 -8° øD=100-250 -6°

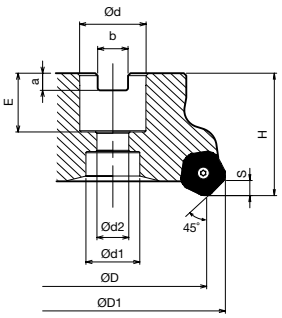


Fig.1

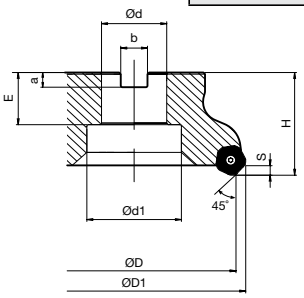


Fig.2

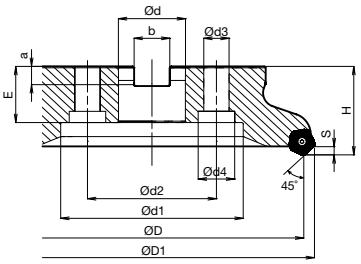


Fig.3

Toolholder Dimensions

		Description		Std.	No. of Inserts	Dimension (mm)											Drawing	Weight (kg)	Shim
						øD	øD1	ød	ød1	ød2	H	E	a	b	ød3	ød4			
Metric	Coarse pitch	MFPN	45063R-4T-M	●	4	63	76	22	19	11	40	21	6.3	10.4	-	-	Fig.1	0.5	Yes
			45080R-5T-M	●	5	80	93	27	22	13	50	24	7	12.4				1.1	
			45100R-6T-M	●	6	100	113	32	48	-		30	8	14.4			Fig.2	1.4	
			45125R-7T-M	●	7	125	138	40	58		63	32	9	16.4				2.6	
			45160R-8T-M	●	8	160	173		68	66.7					14	20	Fig.3	3.8	
			45200R-10T-M	●	10	200	213	60	110	101.6		40	14	25.7	18	26		6.4	
			45250R-12T-M	●	12	250	263											9.1	
	Fine pitch	MFPN	45063R-5T-M	●	5	63	76	22	19	11	40	21	6.3	10.4	-	-	Fig.1	0.5	-
			45080R-6T-M	●	6	80	93	27	22	13	50	24	7	12.4				1.0	
			45100R-8T-M	●	8	100	113	32	48	-		30	8	14.4			Fig.2	1.4	
			45125R-10T-M	●	10	125	138	40	58		63	32	9	16.4				2.5	
			45160R-12T-M	●	12	160	173		68	66.7					14	20	Fig.3	3.8	
			45200R-14T-M	●	14	200	213	60	110	101.6		40	14	25.7	18	26		6.5	
			45250R-16T-M	●	16	250	263											9.1	
	Extra fine pitch	MFPN	45063R-6T-M	●	6	63	76	22	19	11	40	21	6.3	10.4	-	-	Fig.1	0.5	-
			45080R-8T-M	●	8	80	93	27	22	13	50	24	7	12.4				1.1	
			45100R-10T-M	●	10	100	113	32	48	-		30	8	14.4			Fig.2	1.3	
			45125R-13T-M	●	13	125	138	40	58		63	32	9	16.4				2.6	
			45160R-16T-M	●	16	160	173		68	66.7					14	20	Fig.3	3.9	
			45200R-18T-M	●	18	200	213	60	110	101.6		40	14	25.7	18	26		6.6	
			45250R-20T-M	●	20	250	263											9.3	
Bore Dia. Inch spec	Coarse pitch	MFPN	45080R-5T	●	5	80	93	25.4	22	13	50	27	6	9.5	-	-	Fig.1	1.1	Yes
			45100R-6T	●	6	100	113	31.75	48	-		32	8	12.7			Fig.2	1.4	
			45125R-7T	●	7	125	138	38.1	58		63	36	10	15.9				2.6	
			45160R-8T	●	8	160	173	50.8	72			38	11	19.1				4.0	
			45200R-10T	●	10	200	213	47.625	110	101.6		40	14	25.4	18	26	Fig.3	6.7	
			45250R-12T	●	12	250	263											9.4	
	Fine pitch	MFPN	45080R-6T	●	6	80	93	25.4	22	13	50	27	6	9.5	-	-	Fig.1	1.1	-
			45100R-8T	●	8	100	113	31.75	48	-		32	8	12.7			Fig.2	1.4	
			45125R-10T	●	10	125	138	38.1	58		63	36	10	15.9				2.7	
			45160R-12T	●	12	160	173	50.8	72			38	11	19.1				4.0	
			45200R-14T	●	14	200	213	47.625	110	101.6		40	14	25.4	18	26	Fig.3	6.9	
			45250R-16T	●	16	250	263											9.6	
	Extra fine pitch	MFPN	45080R-8T	●	8	80	93	25.4	22	13	50	27	6	9.5	-	-	Fig.1	1.1	-
			45100R-10T	●	10	100	113	31.75	48	-		32	8	12.7			Fig.2	1.3	
			45125R-13T	●	13	125	138	38.1	58		63	36	10	15.9				2.7	
			45160R-16T	●	16	160	173	50.8	72			38	11	19.1				4.0	
			45200R-18T	●	18	200	213	47.625	110	101.6		40	14	25.4	18	26	Fig.3	6.9	
			45250R-20T	●	20	250	263											9.6	

* Dimension S: 6 mm (GM, SM, GH chipbreakers), 5 mm (GL chipbreaker)

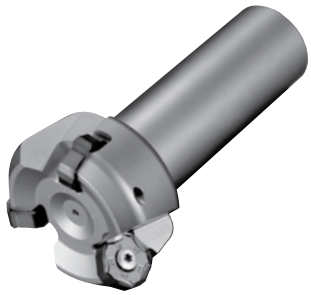
● : Std. Item ○ : Check Availability

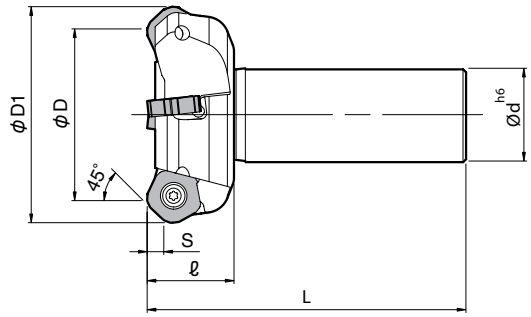
Spare Parts (mm/mm & mm/inch spec)

Description		Spare Parts							
		Clamp Screw	Wrench TT	Wrench DTM	Shim	Shim Screw	Wrench	Anti-seize Compound	Mounting bolt
Coarse pitch	MFPN 45063R-4T-M	SB-50140TR	TT-15	-	MFPN-45	SPW-7050	LW-5	MP-1	HH10x30
	MFPN 45080R-5T-(M)								HH12x40
	MFPN 45100R-6T-(M) ~ 45250R-12T-(M)								-
		for Insert Clamp Recommended torque 4.2Nm				for Shim Clamp Recommended torque 6.0Nm			
Fine pitch	MFPN 45063R-5T-M	SB-50140TR	TT-15	-	-	-	-	MP-1	HH10x30
	MFPN 45080R-6T-(M)								HH12x40
	MFPN 45100R-8T-(M) ~ 45250R-16T-(M)								-
		for Insert Clamp Recommended torque 4.2Nm							
Extra fine pitch	MFPN 45063R-6T-M	SB-40140TRN	-	DTM-15	-	-	-	MP-1	HH10x30
	MFPN 45080R-8T-(M)								HH12x40
	MFPN 45100R-10T-(M) ~ 45250R-20T-(M)								-
		for Insert Clamp Recommended torque 3.5Nm							

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed.

MFPN45 Endmill NEW (With cylindrical shank)





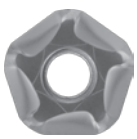
Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm) øD	øD1	ød	L	ℓ	S	Rake Angle (°) A.R. (MAX)	R.R.	Spare Parts Clamp Screw	Wrench	Anti-seize Compound
MFPN	45050R-S32-3T	●	3	50	63	32	110	30	6 (5)	+ 10°	- 12°	SB-50140TR	TT-15	MP-1
	45063R-S32-4T	●	4	63	76						- 10°			
	45080R-S32-5T	●	5	80	93						- 8°	Recommended torque4.2Nm		

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed.

* Dimension S: 6 mm (GM, SM, GH chipbreakers), 5 mm (GL chipbreakers)

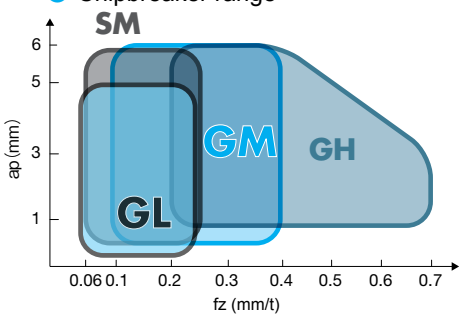
Applicable Inserts (Common for face mill and endmill)

Toolholder	Applicable Inserts ➔ M13			
				
MFPN 45...	PNMU 1205ANER-GM	PNMU 1205ANER-SM	PNMU 1205ANER-GH	PNEU 1205ANER-GL

● : Std. Item

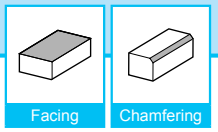
Recommended Cutting Conditions, see page ➔ M24

● Chipbreaker range



High Efficiency Mill MFPN45

NEW



Cutter type and chipbreaker selection

Milling Purpose	Cutter Type			Chipbreaker			
	Coarse pitch	Fine pitch	Extra fine pitch	GM	SM	GH	GL
General milling for steel and alloy steel		●		●			
Steel and alloy steel (at chattering due to low rigidity machine or poor clamping power)	●				●		
Productivity oriented (Running cost decrease) (ap=4mm Over, fz=0.35mm/t Over)	●					●	
Focusing on finishing quality	●	●					●
General milling for stainless steel		●			●		
Stainless steel (to prevent chattering due to low rigidity machine or poor clamping power)	●				●		
Cast iron (for processing efficiency improvement)			●	●			
Cast iron (ap=4mm Over, fz=0.35mm/t Over)	●					●	

Recommended Cutting Conditions

Workpiece Material	Insert Grade	Vc(m/min)	Chipbreaker	fz (mm/t) 0.06 / 0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7
Carbon Steel SxxC	PR1225	120~**180**~250	GM★	0.1 **0.2** 0.4
			SM☆	0.06 **0.12** 0.25
			GH	0.2 **0.4** 0.7
			GL	0.06 **0.12** 0.25
Alloy Steel SCM	PR1225	100~**160**~220	GM★	0.1 **0.2** 0.4
			SM☆	0.06 **0.12** 0.25
			GH☆	0.2 **0.4** 0.6
			GL	0.06 **0.12** 0.25
Mold Steel SKD/NAK	PR1225	80~**140**~180	GM★	0.1 **0.2** 0.35
			SM☆	0.06 **0.1** 0.2
			GH☆	0.2 **0.35** 0.5
			GL	0.06 **0.1** 0.2
Stainless Steel SUS	PR1225	100~**150**~200	GM☆	0.1 **0.2** 0.4
			SM★	0.06 **0.12** 0.25
			GL	0.06 **0.12** 0.25
Gray Cast Iron FC	PR1210	120~**180**~250	GM★	0.1 **0.2** 0.4
			SM	0.06 **0.12** 0.25
			GH☆	0.2 **0.4** 0.7
			GL	0.06 **0.12** 0.25
Nodular Cast Iron FCD	PR1210	100~**150**~200	GM★	0.1 **0.2** 0.35
			SM	0.06 **0.1** 0.2
			GH☆	0.2 **0.35** 0.5
			GL	0.06 **0.1** 0.2
Titanium Alloys	PR1210	30~**50**~70	SM★	0.06 **0.08** 0.15
			GL	0.06 **0.08** 0.15

Cutter Specification	
	Coarse pitch (with shim)
	Fine pitch (without shim) (For GH chipbreaker, recommend under fz=0.4mm/t.)
	Extra fine pitch (without shim) (The use of the GH breaker is not recommended.)

※ The bold-faced number indicates a center value of recommended condition.

★ 1st Choice, ☆ 2nd Choice

Precautions for use (How to mount an insert)

1.Be sure to remove dust and chips from the insert mounting pocket.

2.After applying anti-seize compound on portion of taper and thread, while pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten the screw with appropriate torque. See Fig. 1 and Fig. 2.
Recommended tightening torque ⇒ The torgue for coarse pitch (using M5 screw) is 4.2 Nm
The torgue for extra fine pitch (using M4 screw) is 3.5 Nm.

3.After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the holder and between the insert side surfaces and the constraint surface of the holder.

4.To change the cutting edge of the insert, turn the insert counterclockwise (see Fig. 3).

Insert corner identification number is stamped on the top surface of insert (Fig. 4). To protect the wiper edge, use the corners of insert in the sequence of corner numbers.

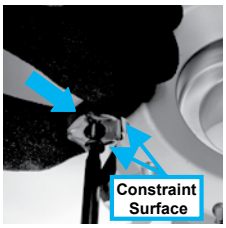


Fig.1

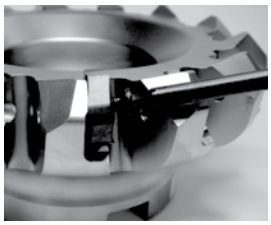


Fig.2

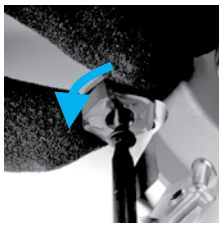


Fig.3

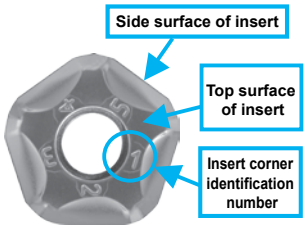


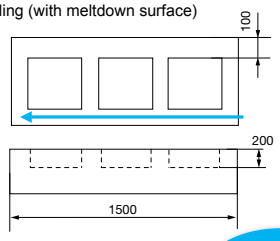
Fig.4

Case studies

1.0040 / Ust42-2 (SS400)

- Construction machine part
- Vc=170m/min
- apxae=4x10mm
- fz=0.3mm/t
- Vf=1350mm/min
- Without coolant
- MFPN45125R-10T (10 edges)
- PNMU1205ANER-GM (PR1225)

Face milling (with meltdown surface)



MFPN (PR1225)	3 pcs/edge
Competitor A	1 pcs/edge

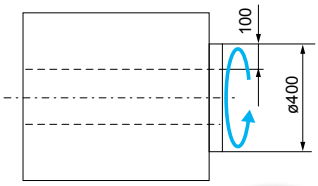
2 times longer tool life

- MFPN facemill enables stable milling due to reduced chip-biting and edge cracks.
- MFPN facemill, no chattering, showed 3 times longer tool life than competitor.

Evaluation by the user

Alloy steel (SCM)

- Construction machine part
- Vc=175m/min
- apxae=1.5x100mm
- fz=0.19mm/t
- Vf=790mm/min
- Without coolant
- MFPN45160R-12T (12 edges)
- PNMU1205ANER-GM (PR1225)



MFPN (PR1225)	2 pcs/edge
Competitor D	1 pcs/edge

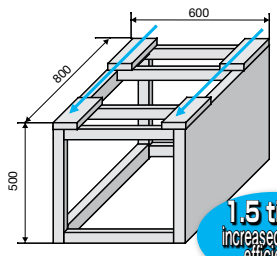
2 times longer tool life

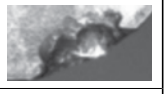
- MFPN facemill showed 2 times longer tool life than competitor.
- Competitor caused cracks by chip-biting. MFPN facemill had no cracks and allowed stable milling.
- MFPN facemill enabled twice the table feed rate compared with the competitor. Milling efficiency improved two-fold.

Evaluation by the user

1.4301/ X5CrNi18-10 (SUS304)

- Case
- Vc=90m/min
- apxae=0.4x50mm
- fz=0.19mm/t
- Vf=410mm/min
- Without coolant
- MFPN45080R-6T (6 edges)
- PNMU1205ANER-GM (PR1225)



MFPN (PR1225)	1.5 pcs/edge	
Competitor C	1 pcs/edge	

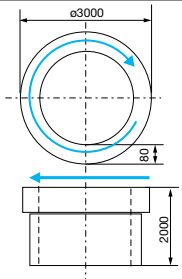
1.5 times increased milling efficiency

- Even when the cutting depth, cutting speed and feed rate cannot be raised due to the low rigidity of a workpiece, MFPN facemill enables stable milling without chattering and also has an improved tool life of 1.5 times.

Evaluation by the user

GGG-40, 3 (FCD450)

- Pipe
- Vc=180m/min
- apxae=2x80mm
- fz=0.44mm/t
- Vf=2010mm/min
- Without coolant
- MFPN45080R-10T (10 edges)
- PNMU1205ANER-GM (PR1210)



MFPN (PR1210)	3 pcs/edge
Competitor E	2 pcs/edge

1.5 times longer tool life

- MFPN facemill showed 1.5 times longer tool life than the competitor.
- High feed rate of MFPN allowed 1.3 times higher milling efficiency compared to the competitor.

Evaluation by the user

Octagonal MOF Mill

Facing | Chamfering

MOF45 Face Mill (05 type 07 type)

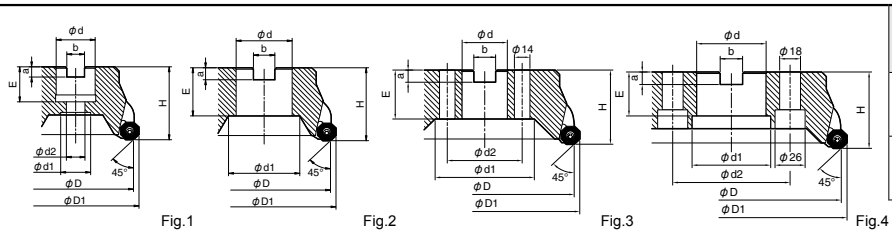


Fig.1 Fig.2 Fig.3 Fig.4

Rake Angle (°)	
A.R.	R.R.
+15°	+5°

Toolholder Dimensions

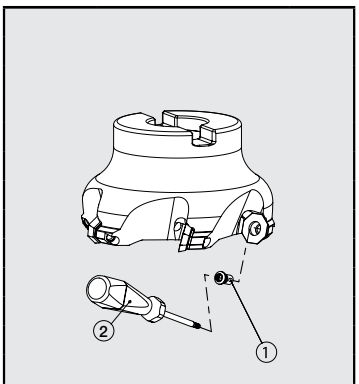
Description			Std.	No. of Inserts	Dimension (mm)										Drawing	Weight (kg)	Applicable Inserts ➔ M13
					øD	øD1	ød	ød1	ød2	H	E	a	b	S			
Metric	MOF	45040R-05-3T-M	●	3	40	49	16	13.5	8.5	40	19	5.6	8.4	-	Fig.1	0.3	OFMT05 Type
		45050R-05-4T-M	●	4	50	59	22	17	11		21	6.3	10.4			0.4	
		45063R-05-5T-M	●	5	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-07-5T	●	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			

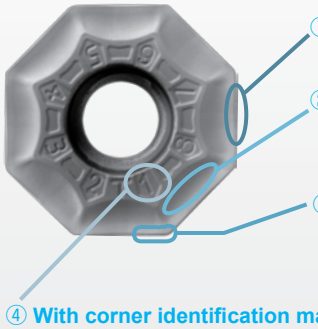
Max. ap and usable edges

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

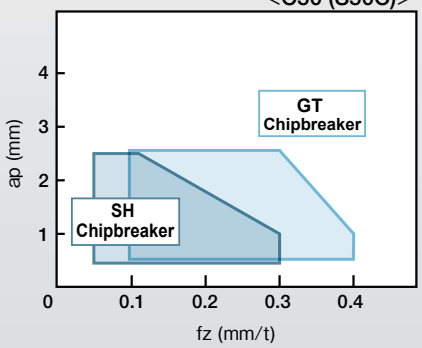
④ **With corner identification mark**

	OFMT05 type	OFMT07 type
GT Chipbreaker (Tough Edge type)		
SH Chipbreaker (General Purpose)		

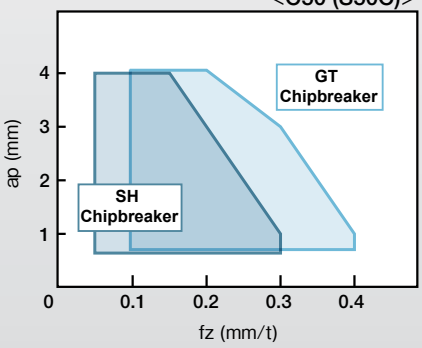
Note 1) OFMT07 type insets cannot be used for MOFX type cutters (See **M28**).

Chipbreaker applicable range

● 05 types <C50 (S50C)>



● 07 types <C50 (S50C)>



◆Recommended Cutting Conditions (MOF / MOFX)

Workpiece Material	fz (mm/t)		Insert Grade (Cutting Speed Vc : m/min)				
			MEGACOAT		PVD Coated Carbide		
	GT Chipbreaker (Tough Edge type)	SH Chipbreaker (General purpose type)	**PR1225**	**PR1210**	**PR830**	**PR1025**	**PR905**
Stainless Steel	-	0.08～**0.12**～0.25	★ 120～**160**～220	-	-	☆ 120～**150**～200	-
Carbon Steel	0.10～**0.25**～0.40	0.10～**0.15**～0.30	★ 120～**180**～250	-	☆ 120～**150**～200	☆ 100～**120**～180	-
Alloy Steel	0.10～**0.25**～0.35	0.10～**0.15**～0.30	★ 100～**160**～ 220	-	☆ 100～**150**～180	-	-
Mold Steel	0.10～**0.20**～0.35	0.08～**0.12**～0.25	★ 80～**140**～ 180	-	☆ 80～**120**～150	-	-
Gray Cast Iron	0.10～**0.25**～0.40	0.10～**0.15**～0.30	-	★ 120～**180**～250	-	-	☆ 100～**150**～200
Nodular Cast Iron	0.10～**0.20**～0.35	0.08～**0.12**～0.25	-	★ 100～**150**～ 200	-	-	☆ 80～**120**～160

★: 1st Recommendation ☆: 2nd Recommendation

Octagonal MOFX Mill

Facing | Chamfering

MOFX45 Face Mill

Rake Angle (°)	A.R.	+15°
	R.R.	+5°

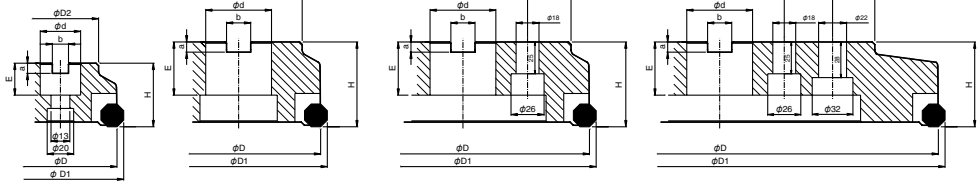
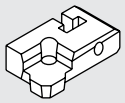
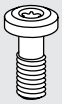
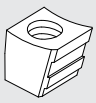


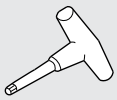
Fig.1 Fig.2 Fig.3 Fig.4

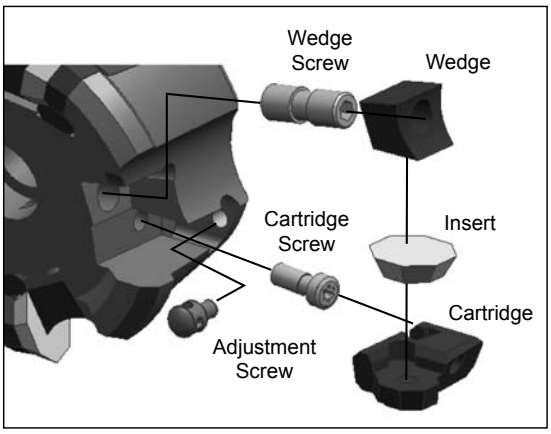
Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm)										Drawing	Weight (kg)	Applicable Inserts ➔ M13
				øD	øD1	øD2	ød	ød1	ød2	a	b	E	H			
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
				
LOF07R	SH-50150TR	WOF07R	W8×21	AJ-412

Wrench (for Wedge)	Wrench (for Cartridge)
	
TH-4	TTC-20



Features

1) Wedge clamp system
2) Good surface finish (Easy edge height adjustment system)
3) 8-edges insert provides high cost efficiency
4) High axial rake angle and double positive angle on chipbreaker provide low cutting force
5) SH chipbreaker (for general purpose / low cutting force) and GT chipbreaker (Tough edge)

● : Std. Item
MTO: Made to order

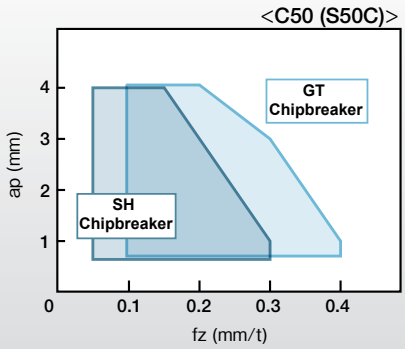
● Applicable Inserts

Description	Applicable Inserts ⇒ M13	
		
MOFX45...-SF	OFMR 070405EN-SH	OFMR 070408EN-GT

For recommended cutting conditions, see page ⇒ M27

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 **M26**).

Chipbreaker range

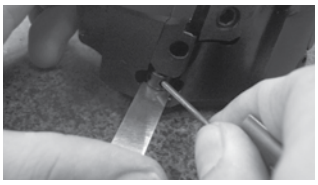


Max ap and usable edges

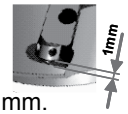
Usable edges	Max. ap (mm)
	OFMR07 types
4 edges	10mm
8 edges	4mm

How to Correct the Edge Fluctuation

1.Set the edge fluctuation adjustment screw



- Set the distance between the bottom of edge fluctuation adjustment screw and the cutter body to approximately 1 mm.



2. Set the cartridge

- Set the cartridge to the cutter body with the cartridge screw. Recommended torque: 5 Nm

3. Set the wedge

- After setting the insert to the cartridge, set the wedge with the wedge screw.

4. Loosen the screws (Preparation for edge fluctuation adjustment)

- Loosen the wedge screw by approximately 10°.
- Loosen the cartridge screw by approximately 45°.

5. Correct the front edge fluctuation

- Measure the front edge fluctuation. With reference to the most protruding edge, turn the edge fluctuation adjustment screw counterclockwise to correct the front edge fluctuation.

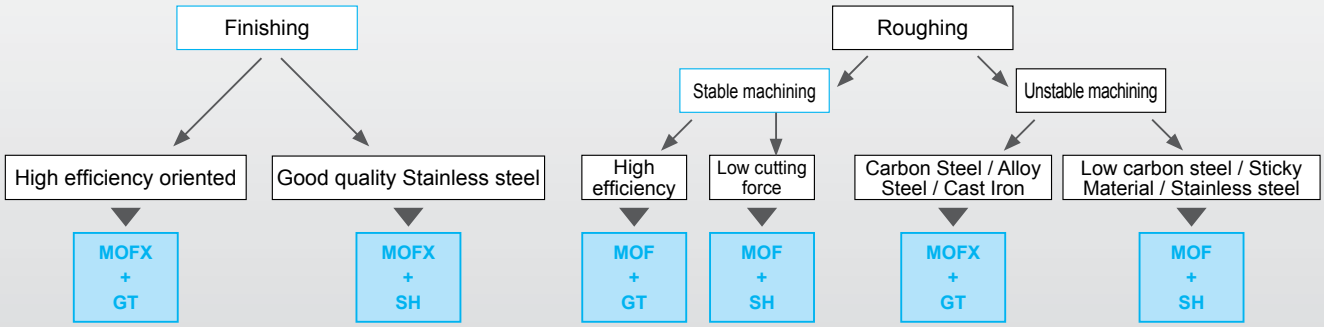
6. Make the final adjustment

- Tighten the cartridge screw Recommended torque: 5Nm
- Tighten the wedge screw Recommended torque: 6Nm
- Measure the front edge fluctuation again.

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 **M26**)
Excellent chips evacuation when roughing sticky materials such as low carbon steel and stainless steel.

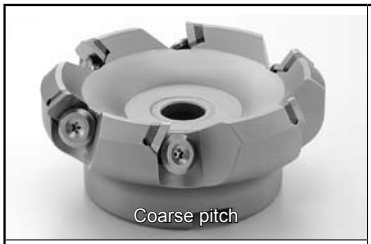


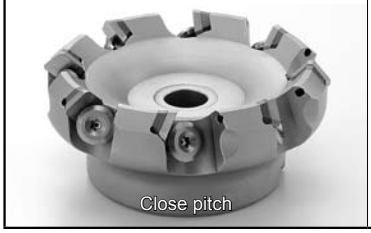
MOFX is suitable for more precious machining and unstable machining.

High-efficiency Multi-Edge design MSE45

Facing | Chamfering

MSE45 Face Mill (Coarse pitch / Close pitch)





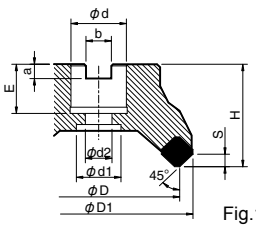


Fig.1

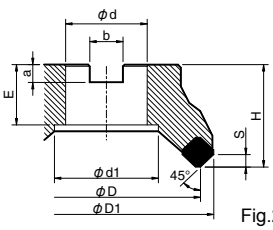


Fig.2

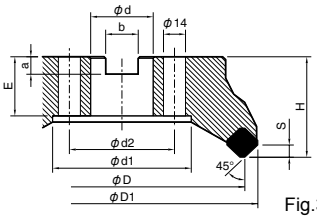


Fig.3

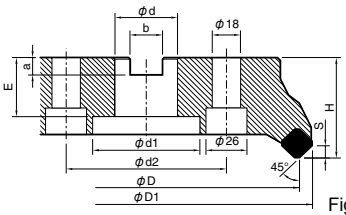


Fig.4

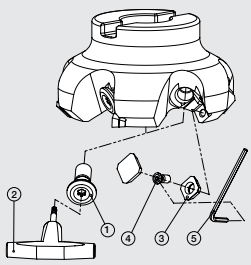
Toolholder Dimensions

Description			Std.	No. of Inserts	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
	Fine 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
	Fine 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					

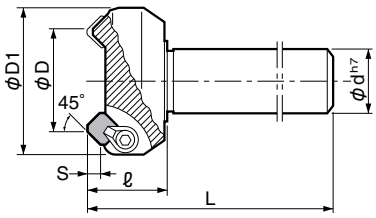
・Mounting bolt(SP8X35) is included for MSE45040R- ○ T-M.
・Mounting bolt(HH10X30S) is included for MSE45050R- ○ T-M and MSE45063R- ○ T-M.
・Mounting bolt(HH12X35M) is included for MSE45080R- ○ T and MSE45080R- ○ T-M.

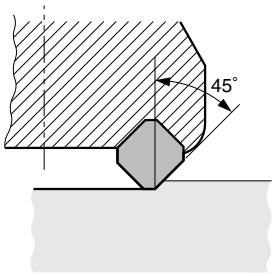


Clamp Screw ① has L-hand thread.
Therefore turn the wrench to the right to remove the insert.

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

MSE45 Endmill (High Rake)

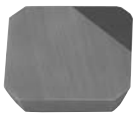




Toolholder Dimensions

Description		Std.	No. of Inserts	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 ➔ **M20**
				
MSE45○○-○○ **MSE45○○○R-○T** **MSE45○○○R-○T-M**	SEMR 1203AFER-H	SEKR 1203AFEN-S	SEEN 1203AFTN SEKN 1203AFTN 1203AFFN	SEEN 1203AFFN 1203AFFN-NE (PCD)

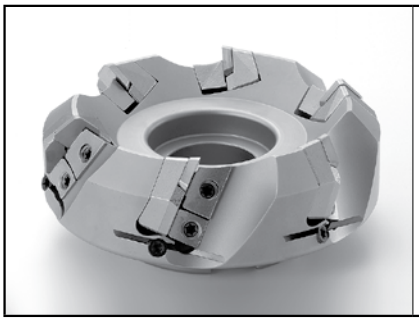
Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed Vc : m/min)													
		Cermet			MEGACOAT		PVD Coated Carbide						Carbide		PCD
		TN60	TN100M	TC60	PR1225	PR1210	PR630	PR730	PR830	PR660	PR1025	PR905	PW30	KW10	KPD001 (KPD010)
Stainless Steel	~0.25		☆ 120~200	☆ 120~200	★ 120~220		☆ 120~200	☆ 120~200	☆ 120~200	☆ 100~200	☆ 100~200		☆ 80~120		
Carbon Steel	~0.30	☆ 150~220	★ 120~200	☆ 120~200	★ 120~250		☆ 120~200	☆ 120~200	☆ 120~200	☆ 100~180	☆ 100~180		☆ 80~150		
Alloy Steel	~0.30	☆ 120~200	★ 100~180	☆ 100~180	★ 100~220		☆ 100~180	☆ 100~180	☆ 100~180	☆ 80~150			☆ 80~150		
Mold Steel	~0.25	☆ 120~200	★ 100~180	☆ 100~180	★ 80~180		☆ 80~150	☆ 80~150	☆ 80~150	☆ 60~130			☆ 80~150		
Cast Iron	~0.30					★ 100~220						☆ 100~200		☆ 80~150	
Non-ferrous Metals	~0.20													★ 100~300	★ 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)



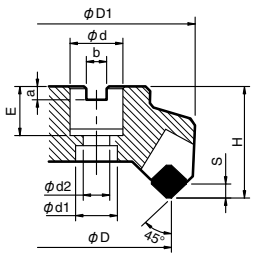


Fig.1

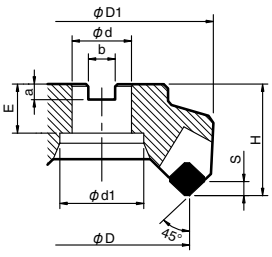


Fig.2

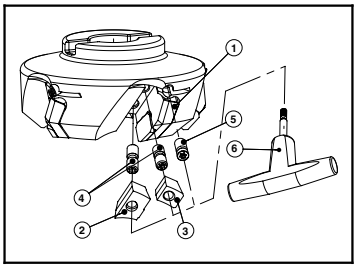
Toolholder Dimensions

Description		Std.	No. of Inserts	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	40	13		24	7	12.4			-8.5°		1.5
	45100R-6T-M-SF	●	6	100	119	32	45	-		32	8	14.4			-7.5°	Fig2	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

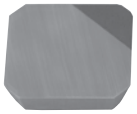
Spare Parts

Description	① Cartridge	② Clamp	③ Clamp	④ Clamp Screw	⑤ Adjustment Screw	⑥ Wrench
						
MSE 45○○R-○T-M-SF	LSE-445SR	C43R (for Insert)	C44R (for Cartridge)	W6X17	SV-60136TR	TTC-20
MSE 45○○R-○T-SF						

・Mounting bolt (HH10X30S) is included for MSE45063R-4T-M-SF.
・Mounting bolt (HH12X35M) is included for MSE45080R-5T-M-SF.



Applicable Inserts

Description	Applicable Inserts ➔ M10				Applicable Inserts ➔ M20	
				 Wiper		 Wiper
MSE45...-SF	SEMR 1203AFER-H	SEKR 1203AFEN-S	SEEN 1203AFTN SEKN 1203AFTN 1203AFFN	SEEN 1203AFTR-W 1203AFFR-W	SEEN 1203AFFN-NE 1203AFFN (PCD)	SEEN 1203AFFR-W (PCD)

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed Vc : m/min)												
		Cermet			MEGACOAT		PVD Coated Carbide						Carbide		PCD
		TN60	TN100M	TC60	PR1225	PR1210	PR630	PR730	PR830	PR660	PR1025	PR905	PW30	KW10	KPD001 (KPD010)
Stainless Steel	~0.25		☆ 120~200	☆ 120~200	★ 120~220		☆ 120~200	☆ 120~200	☆ 120~200	☆ 100~200	☆ 100~200		☆ 80~120		
Carbon Steel	~0.30	☆ 150~220	★ 120~200	☆ 120~200	★ 120~250		☆ 120~200	☆ 120~200	☆ 120~200	☆ 100~180	☆ 100~180		☆ 80~150		
Alloy Steel	~0.30	☆ 120~200	★ 100~180	☆ 100~180	★ 100~220		☆ 100~180	☆ 100~180	☆ 100~180	☆ 80~150			☆ 80~150		
Mold Steel	~0.25	☆ 120~200	★ 100~180	☆ 100~180	★ 80~180		☆ 80~150	☆ 80~150	☆ 80~150	☆ 60~130			☆ 80~150		
Cast Iron	~0.30					★ 100~220						☆ 100~200		☆ 80~150	
Non-ferrous Metals	~0.20													★ 100~300	★ 300~800

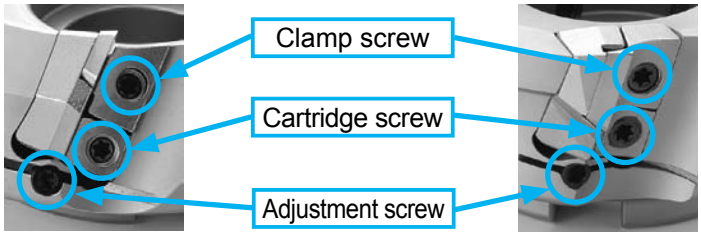
★: 1st Recommendation ☆: 2nd Recommendation

● : 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

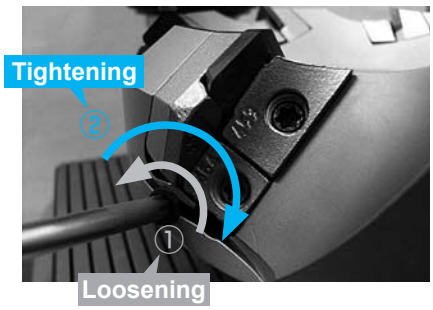
● Adjustable height for the cutting edge

・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.

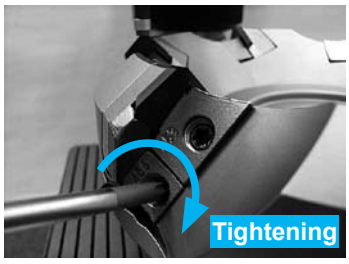
1) Partial adjustment of the adjustment screw

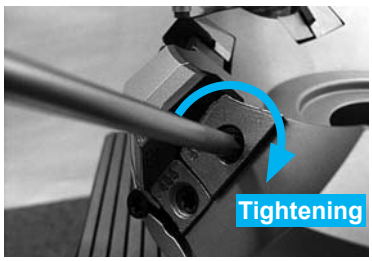
① Loosen the edge adjustment screw
② Tighten as much as the edge adjustment screw is tensioned



2) Partial tightening of the clamp screw and cartridge screw

① Partial tighten the cartridge screw.[Note)] ② Partial tighten the cartridge screw.[Note)]

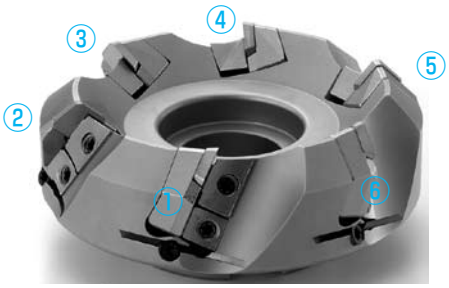




*Perform work with all inserts attached in their correct positions.
Note) Partial tightening: Tighten the adjustment screw only partially, so that further adjustment is still possible.

3) Measuring the cutting edge fluctuation

Example: Measuring the front cutting edge fluctuation



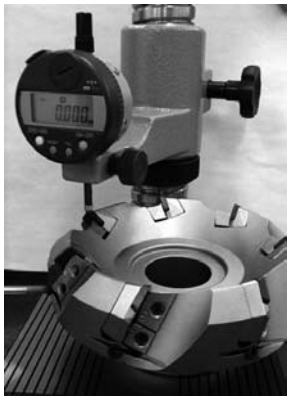
No.	Measurement results	Results	Edge fluctuation
①	0.263mm		-6μm
②	0.258mm		-11μm
③	0.254mm		-15μm
④	0.269mm	Max.	0μm
⑤	0.261mm		-8μm
⑥	0.250mm	Min.	-19μm

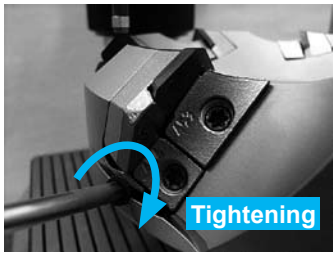
Current fluctuation: 19μm
(Number ① ~ ⑥ are not indicated on Milling Cutter)

*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.

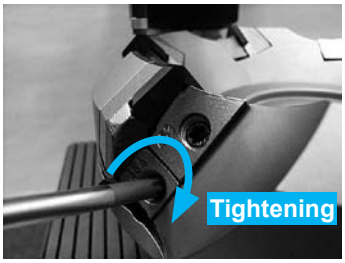


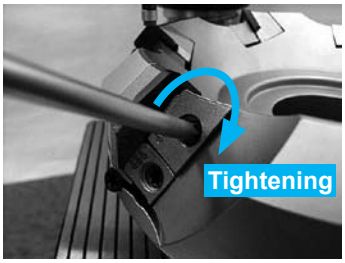


Using the measured amount of fluctuation, adjust so that the fluctuation is corrected at the highest corner of the cutting edge, then fully tighten the adjusting screw.

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

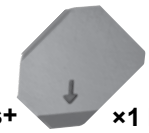
1) Insert only one wiper insert against standard insert.
2) As wiper insert is one edge use, please attach insert arrow "↓" that faces to workpiece cutting surface.
3) Control overhang amount for wiper insert using MSE45-SF type. So you can obtain much more stable surface roughness.

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

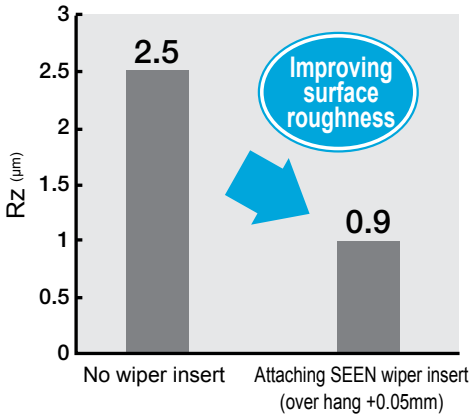
KW10

KPD001
Arrow sied is wiper edge

Low cost and good cutting surface

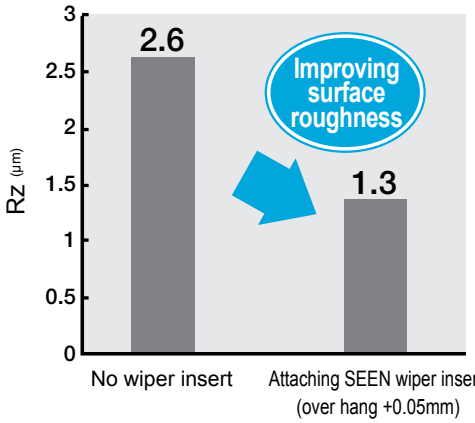
Case Studies

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

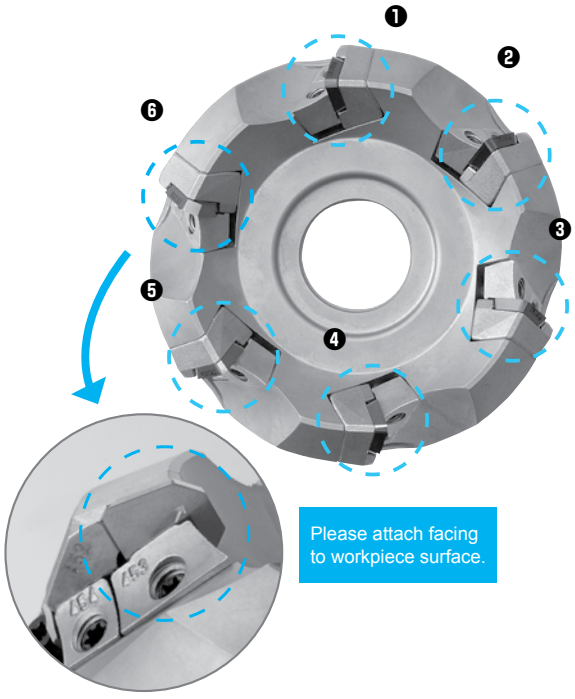
In case of C50 (S50C)



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

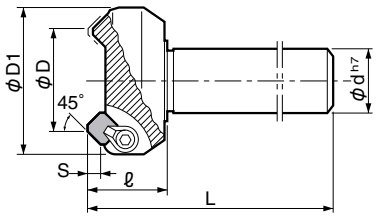
Example of attaching wiper insert

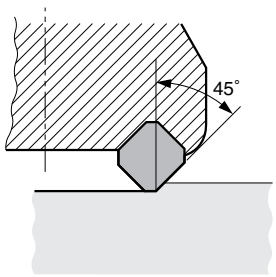
NO.	Insert	Edge deviation
①	Standard	-6µm
②	Standard	-11µm
③	Standard	-15µm
④	Standard	0µm
⑤	Standard	-8µm
⑥	Wiper insert	+0.03~+0.1mm



Please attach facing to workpiece surface.

MSD45 Endmill





● Toolholder Dimensions

Description		Std.	No. of Inserts	Dimension (mm)						Rake Angle (°)		Spare Parts				
												Clamp Set	Wrench	Shim	Clamp Screw	
				øD	øD1	ød	L	ℓ	S	A.R.	R.R.					
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

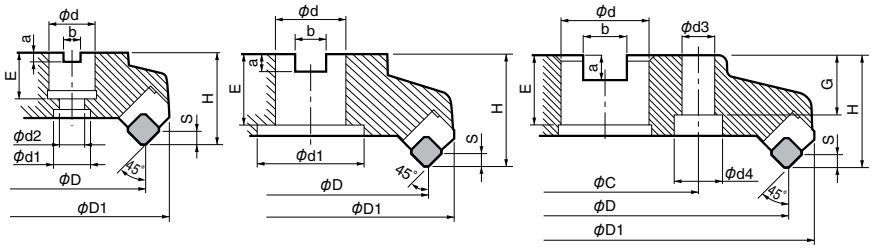


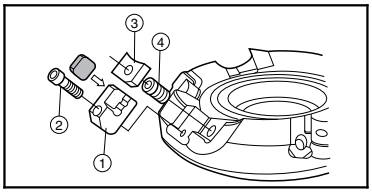
Fig.1 Fig.2 Fig.3

● Toolholder Dimensions

Description		Std.	No. of Inserts	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

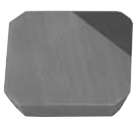
● Spare Parts

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

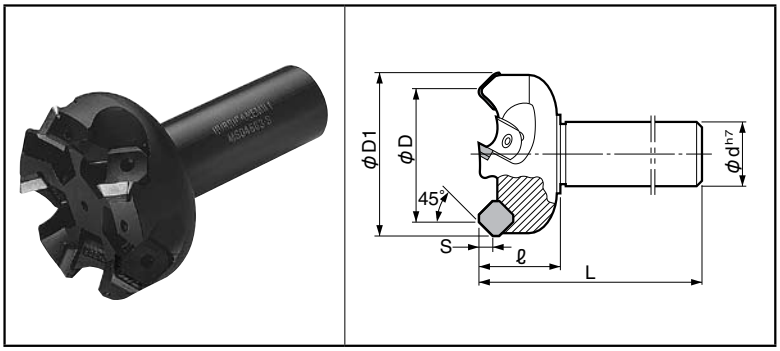
● Applicable Inserts

Toolholder	Applicable Inserts ➔ M10			Applicable Inserts ➔ M20
				
MSD 45...	SDMR 1203AUER-H	SDKR 1203AUEN-S	SDCN 1203AUTN SDKN 1203AUTN 1203AUFN	SDKN 1203AUFN-NE 1203AUFN (PCD)

For recommended cutting conditions, see page ➔ M155

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

MSO45-S Endmill (High Rake)



Applicable Inserts

Toolholder	Applicable Inserts	
MSO 45...	SOKR 13T3AXEN-J	M10
	SOKR 13T3AXTN 13T3AXFN	
	SOKR 13T3AXFN-NE (PCD)	M20

Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm)						Rake Angle (°)	
			øD	øD1	ød	L	ℓ	S	A.R.	R.R.
MSO 4550-S	●	4	50	66	32	120	40	7.1	+27°	-8°
4563-S	●	5	63	79						
4580-S	●	5	80	96						

For recommended cutting conditions, see page M155

MSO45-R (High Rake)

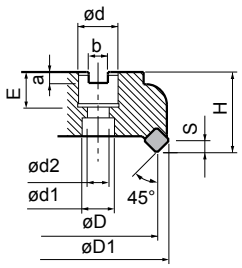


Fig.1

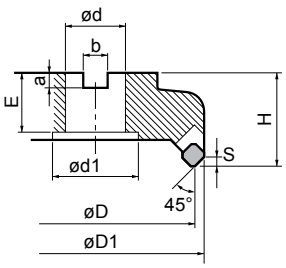


Fig.2

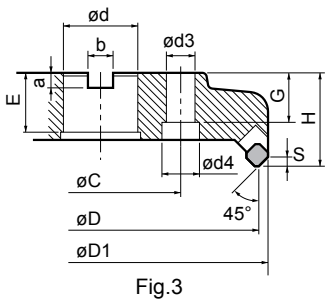
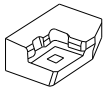
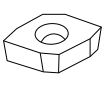
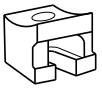


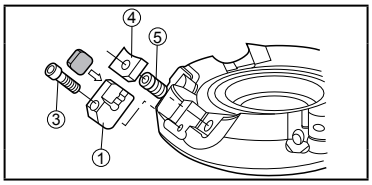
Fig.3

Toolholder Dimension

Description	Std.	No. of Inserts	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

Spare Parts

Description	① Cartridge	② Shim	③ Clamp Screw	④ Clamp	⑤ Clamp Screw	Wrench
			HH SP 			
MSO 45..-S MSO 45..R/R-E	LSO-445R	-	HH4X16	CH-20R	TH8X15	TH-4
MSO 45..-T	-	MSO-4T245	SP3X6			

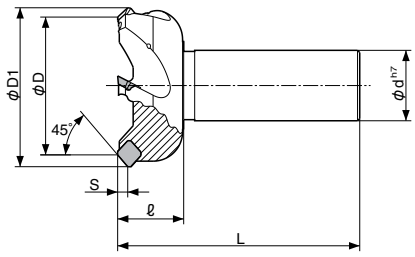


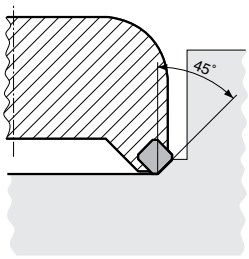
This figure indicates cartridge type.

- Mounting Bolt (HH10X25) is included for MSO4550R-13E-4T and MSO4563R-13E-5T.
- Mounting Bolt (HH12X30) is included for MSO4580R-13E-5T.

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

MSO45-S-09 Endmill (High Rake)





● Toolholder Dimensions

Description		Std.	No. of Inserts	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)

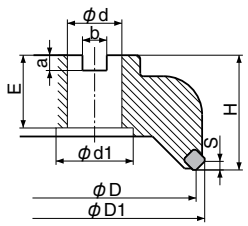
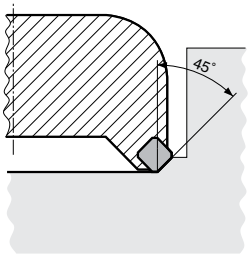


Fig.1

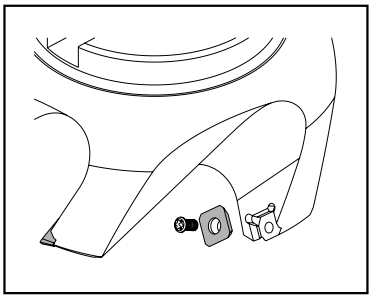


● Toolholder Dimensions

Description		Std.	No. of Inserts	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 ➔ **M155**

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

Face Mill for Heavy Milling MSRS15

Facing

Roughing is processed in one pass.
MSRS15 type changes heavy cutting! (Max. ap is 12 mm)

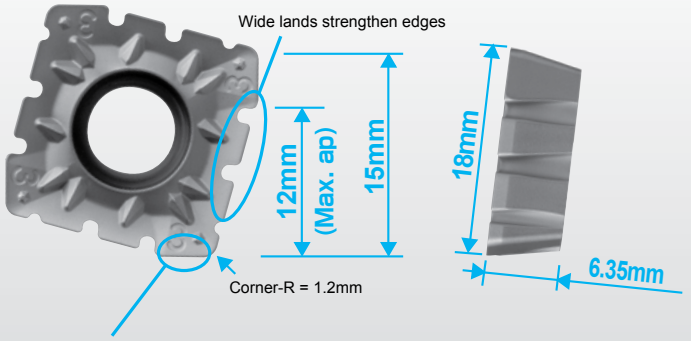
Conventional tools

The amount of chip evacuation per unit time is increased considerably.

MSRS15 type

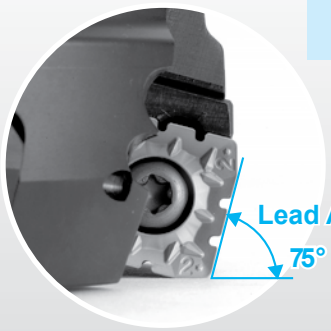
Large depth of cut and high feed rate achieve high efficiency cutting.

● Recommended ap: 5~10mm



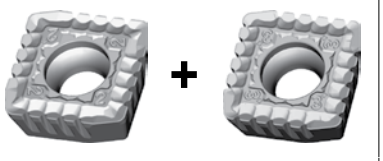
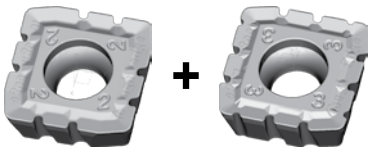
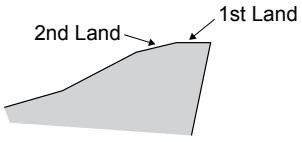
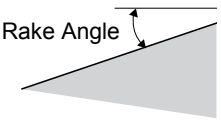
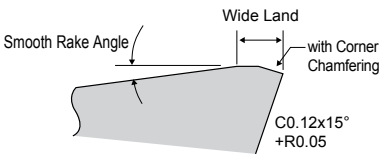
Large wiper edges achieve high feed rate.

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 cutting 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.

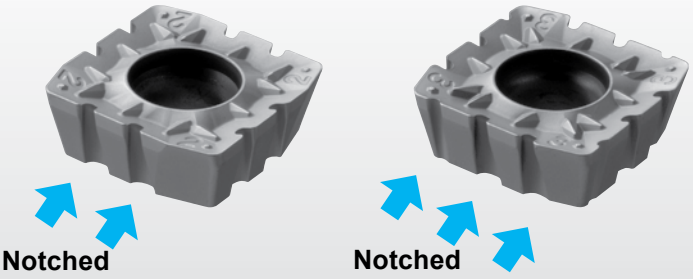
● About insert no. of NB2P (4 Notches) and NB3P (5 Notches)
In order to adjust applicable inserts on marked numbers on tool holders, "2+" is marked for NB2P (4 Notches) and "3+" is marked on NB3P (5 Notches).

Face Mill for Heavy Milling MSRS15

Facing

Notched insert reduces cutting force, chattering and enables efficient cutting

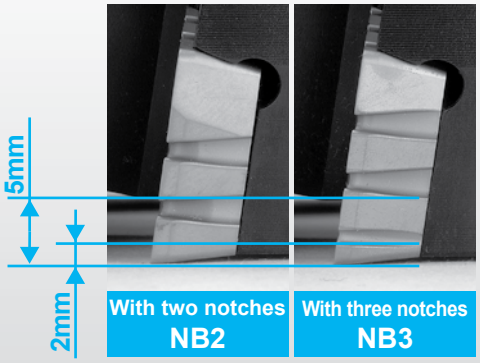
Notched Insert



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

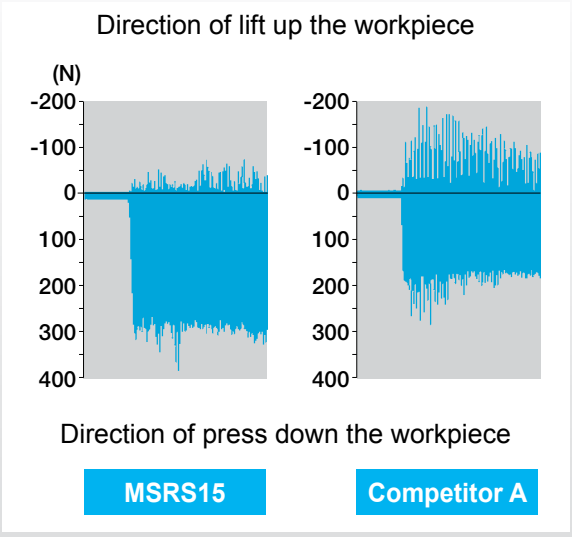
Possible to cut thin-plate workpieces (low rigidity material such as can manufacturing equipment)

MSRS15160R-8T

Workpiece Material: C50 (S50C)
Vc=200m/min (n=398min^{-1})
fz=0.15mm/t(Vf=477mm/min), ap×ae=6×100mm
(Cutting of overhang from 15mm to 9mm)

Comparison of cutting force (radial force)

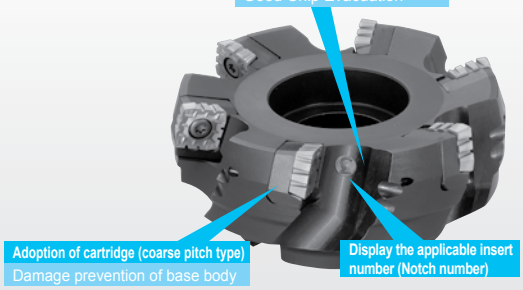
MSRS Type suppresses chattering since less force to lift workpiece is needed during cutting.



Features of Toolholder

Coarse pitch type

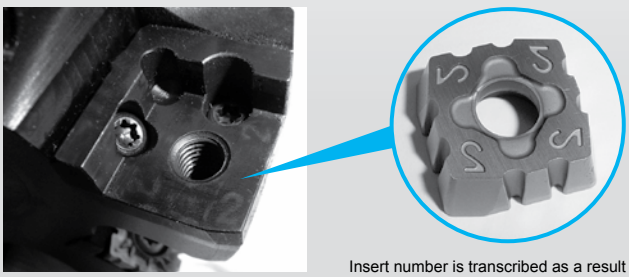
Design of large chip pocket
Good Chip Evacuation



Close pitch type

Higher productivity due to close pitch design

Insert Replacement Identification



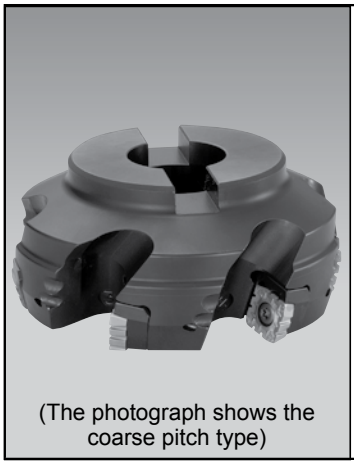
Insert number is transcribed as a result of the cutting tool load.

*Depending on the cutting conditions, marks are not transcribed.

M

Milling

MSRS15



(The photograph shows the coarse pitch type)

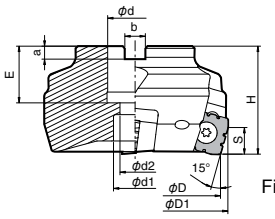


Fig.1

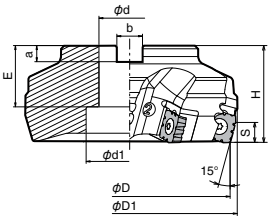


Fig.2

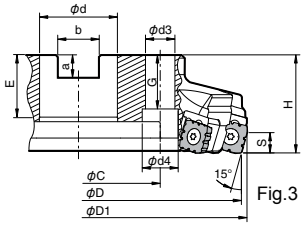


Fig.3

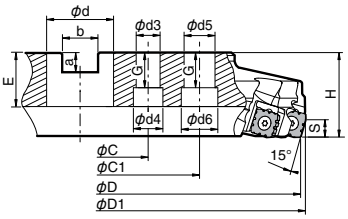


Fig.4

Rake Angle (°)		
Description	A.R.	R.R.
MSRS15080R-··	+9°	-9°
MSRS15100R-·· ~ MSRS15315R-··	+9°	-5°

Toolholder Dimensions (Bore ød: Metric)

	Description		Std.	No. of Inserts	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
Fine 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.

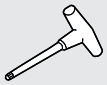
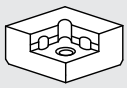
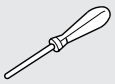
Toolholder Dimensions (Bore ød: Inch)

	Description		Std.	No. of Inserts	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
Fine 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)

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				-
Fine 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.

Applicable Inserts

Description	Applicable Inserts → **M14** 〔Handed Insert shows R-hand〕			
	 2-Notched	 3-Notched	 2-Notched Tough Edge	 3-Notched Tough Edge
MSRS… MSRS…M	SPMT 1806EDER-NB2	SPMT 1806EDER-NB3	SPMT 1806EDSR-NB2T	SPMT 1806EDSR-NB3T
For custom-ordered cutter	-	-	SPMT 1806EDSL-NB2T	SPMT 1806EDSL-NB3T

Description	Applicable Inserts → **M15**			
	 4-Notched Low Cutting Resistance	 5-Notched Low Cutting Resistance	 Without notch	
MSRS… MSRS…M	SPMT 1806EDER-NB2P	SPMT 1806EDER-NB3P	SPMT 1806EDER-V	Selection of chipbreaker → **M38**

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)			Insert Grade (Vc m/min)					
				MEGACOAT			PVD Coated Carbide		
	NB2P + NB3P	NB2 + NB3	NB2T + NB3T	**PR1225**	**PR1230**	**PR1210**	**PR660**	**PR830**	**PR905**
Carbon steel (SxxC)	0.15	0.2	0.3	☆ 120～**180**～250	★ 120～**180**～220	-	☆ 120～**160**～200	☆ 120～**170**～220	-
Alloy steel (SCM etc.)	0.15	0.2	0.3	☆ 120～**180**～250	★ 120～**180**～220	-	☆ 120～**160**～200	☆ 120～**170**～220	-
Mold Steel (SKD/NAK etc.)	0.1	0.15	0.2	☆ 100～**160**～220	★ 100～**160**～200	-	☆ 100～**140**～180	☆ 100～**150**～200	-
Gray Cast Iron (FC)	0.2	0.25	0.35	-	-	★ 120～**180**～250	-	-	☆ 120～**170**～240
Nodular Cast Iron (FCD)	0.15	0.2	0.3	-	-	★ 100～**160**～220	-	-	☆ 100～**150**～200
Stainless steel (SUS etc.)	**Not Recommended**								
Aluminum / Copper	**Not Recommended**								

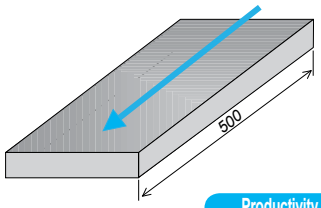
★:1st Recommendation ☆:2nd Recommendation

Case Studies—Improved productivity / Shortened Cutting 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!

MSRS15	Chip Evacuation Rate 572cc/min.
Competitor's Cutter A	129cc/min.

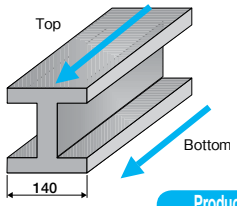
[Competitor's Cutter A]
ø125, 6 flutes
Vc=150m/min (n=382min^{-1})
ap×ae=3×125mm
fz=0.15mm/t (Vf=344mm/min)

[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!

MSRS15	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 cutting with 1 pass for what needed to be cut with 3 passes usually. Still cutting 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!

MSRS15	Chip Evacuation Rate 724cc/min.
Competitor's Cutter C	290cc/min.

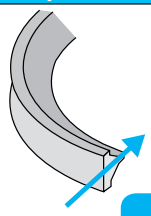
[Competitor's Cutter C]
6 inches, 8 flutes
Vc=250m/min (n=522min^{-1})
ap×ae=2.5×114mm
fz=0.25mm/t (Vf=1016mm/min)

[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!

MSRS15	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)

Q&A

Q-1 What amount of cutting width (ae) is necessary in a radial direction?

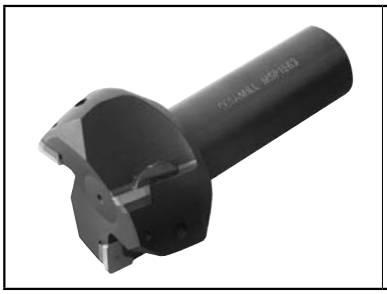
A-1 The estimated amount is 70 to 80% of diameter of the cutting tool.

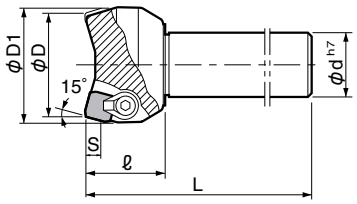
Q-2 Why MSRS15 type is adopting the cutting angle 75°?

A-2 45° cutting angle type can reduce an impact in biting a workpiece but increase a thrust force. On the other hand, 90° cutting angle type can reduce a thrust force but increase an impact in biting a workpiece. 75° cutting angle MSRS15 type can suppress both a thrust force and impact in biting keeping a good balance and enable smooth machining even in large cutting.

MSP15 Endmill

MSE15 Endmill (High Rake)





Toolholder Dimensions

Description		Std.	No. of Inserts	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

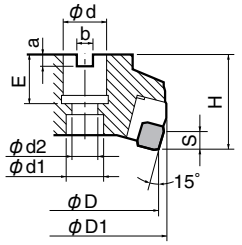


Fig.1

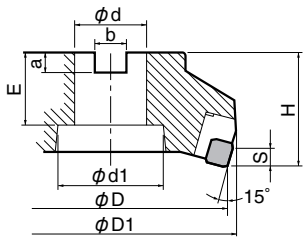


Fig.2

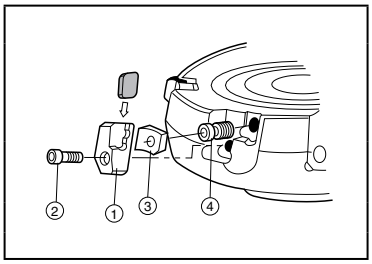
Toolholder Dimensions

Description		Std.	No. of Inserts	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

Spare Parts

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



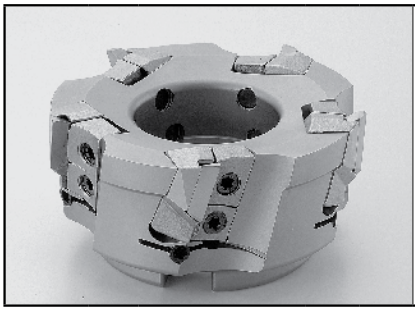
Applicable Inserts

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 → M155

MTE90-SF Face Mill (Adjustable insert height)



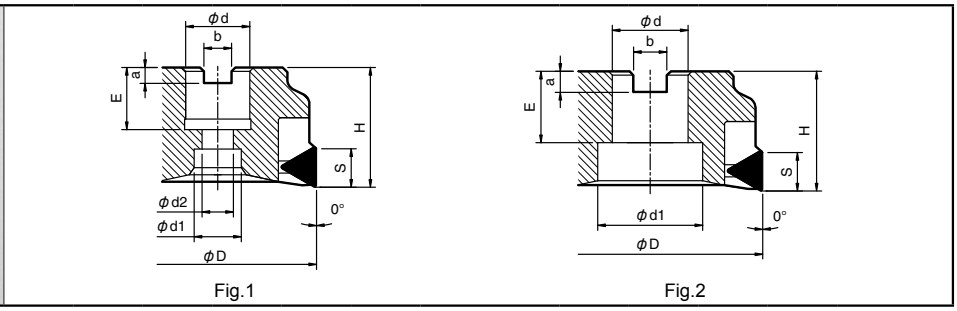


Fig.1 Fig.2

Toolholder Dimensions

Description		Std.	No. of Inserts	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	LTE-490SR	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)	Insert Grade (Cutting Speed Vc : m/min)													
		Cermet			MEGACOAT		PVD Coated Carbide						Carbide		PCD
		TN60	TN100M	TC60	PR1225	PR1210	PR630	PR730	PR830	PR660	PR1025	PR905	PW30	KW10	KPD001 (KPD010)
Stainless Steel	~0.20	-	☆ 120~200	☆ 120~200	★ 120~220	-	☆ 120~200	☆ 120~200	☆ 120~200	☆ 100~200	☆ 100~200	-	☆ 80~120	-	-
Carbon Steel	~0.25	☆ 150~220	★ 120~200	☆ 120~200	★ 120~250	-	☆ 120~200	☆ 120~200	☆ 120~200	☆ 100~180	☆ 100~180	-	☆ 80~150	-	-
Alloy Steel	~0.25	☆ 120~200	★ 100~180	☆ 100~180	★ 100~220	-	☆ 100~180	☆ 100~180	☆ 100~180	☆ 80~150	-	-	☆ 80~150	-	-
Mold Steel	~0.20	☆ 120~200	★ 100~180	☆ 100~180	★ 80~180	-	☆ 80~150	☆ 80~150	☆ 80~150	☆ 60~130	-	-	☆ 80~150	-	-
Cast Iron	~0.25	-	-	-	-	★ 100~220	-	-	-	-	-	☆ 100~200	-	☆ 80~150	-
Non-ferrous Metals	~0.20	-	-	-	-	-	-	-	-	-	-	-	-	★ 100~300	★ 300~800

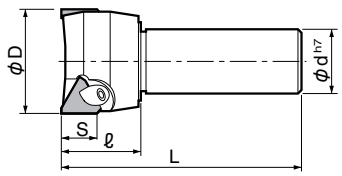
★: 1st Recommendation ☆: 2nd Recommendation

How to Adjust Cutting Edge height

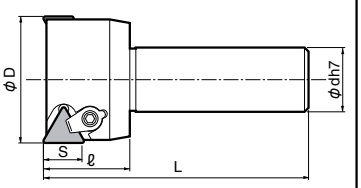
For adjustment method of edge height, see page ➔ **M33**.

● : 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 Inserts	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)

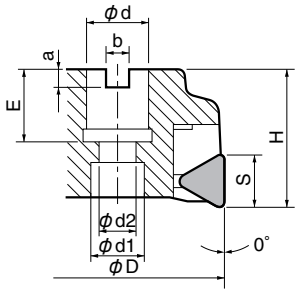


Fig.1

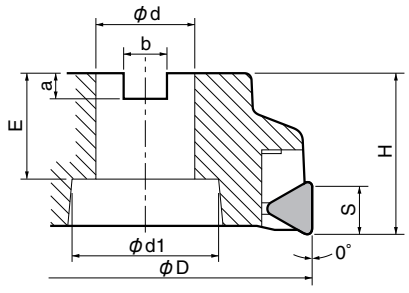


Fig.2

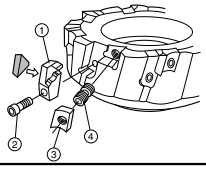
・Mounting bolts (HH12X30) are included in MTE90080R and Mounting bolts (HH6X40) are included in MTE900100R

Toolholder Dimensions

Description		Std.	No. of Inserts	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 → M20
MTE 90...	TEMR 2204PTER-H	TEKR 2204PTER-S	TEEN 2204PTTR TEKN 2204PTTR 2204PTFR	TEKN 2204PTFR-NE 2204PTFR (PCD)
MTP 90...	TPMR 2204PDER-H	TPKR 2204PDER-S	TPKN 2204PDTR 2204PDFR	-

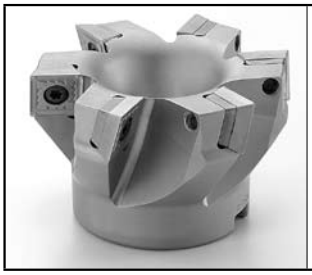
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

For recommended cutting conditions, see page → M44

Right Angle 4-edge MSO90

Shouldering | Slotting | Facing

MSO90 Face Mill (Coarse pitch / Close pitch)



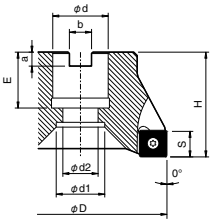


Fig.1

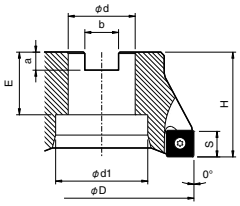


Fig.2

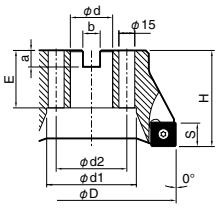


Fig.3

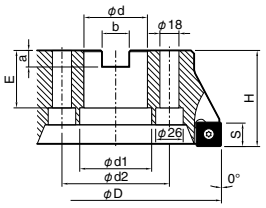


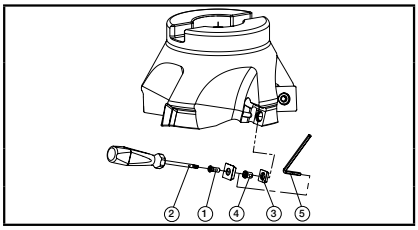
Fig.4

Toolholder Dimensions

Description			Std.	No. of Inserts	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			33	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
	Fine 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			33	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
	Fine 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 (HH10X30S) are included in MSO90063R-15-○T-M

Applicable Inserts

Toolholder	Applicable Inserts ➔ M14
	
MSO90...R-09	SEMM09T308PESR
MSO90○○○R-15...	SEMM150408PESR

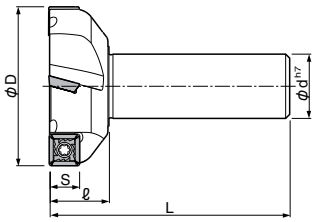
Recommended Cutting Conditions

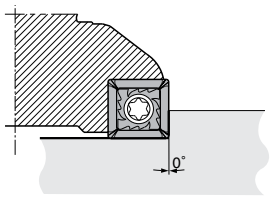
Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed Vc : m/min)									
		Cermet	MEGACOAT		PVD Coated Carbide						Carbide
		TN100M	PR1225	PR1210	PR630	PR730	PR830	PR660	PR1025	PR905	KW10
Stainless Steel	~0.20	☆ 120~200	★ 120~220	-	☆ 120~200	☆ 120~200	☆ 120~200	☆ 100~200	☆ 100~200	-	-
Carbon Steel	~0.20	★ 120~200	★ 120~250	-	☆ 120~200	☆ 120~200	☆ 120~200	☆ 100~180	☆ 100~180	-	-
Alloy Steel	~0.20	★ 100~180	★ 100~220	-	☆ 100~180	☆ 100~180	☆ 100~180	☆ 80~150	-	-	-
Mold Steel	~0.20	★ 100~180	★ 80~180	-	☆ 80~150	☆ 80~150	☆ 80~150	☆ 60~130	-	-	-
Cast Iron	~0.20	-	-	★ 100~220	-	-	-	-	-	☆ 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 Inserts	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

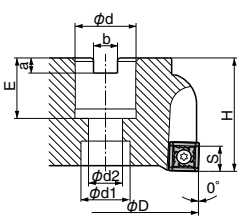


Fig.1

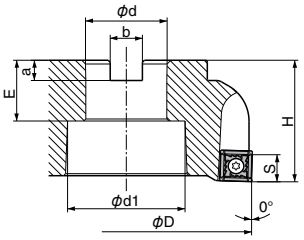
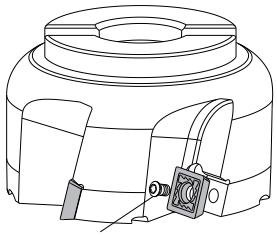


Fig.2



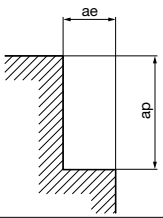
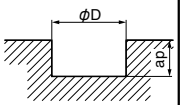
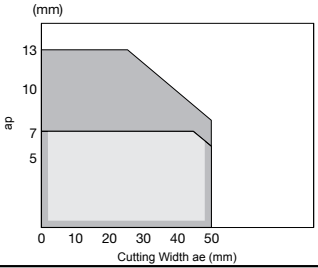
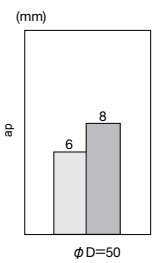
● Toolholder Dimensions

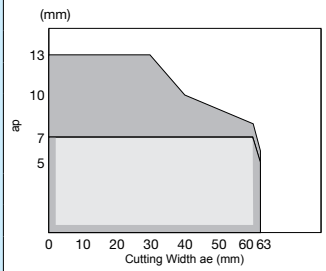
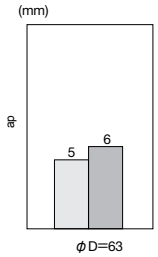
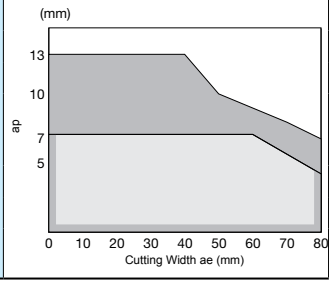
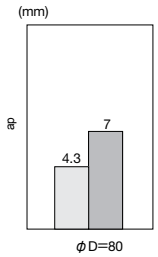
Description		Std.	No. of Inserts	Dimension (mm) øD	ød	ød1	ød2	H	E	a	b	S	Rake Angle (°) A.R.	R.R.	Drawing	Weight (kg)	Spare Parts Clamp Screw	Wrench
MSO	90080R-09	○	4	80	25.40	20	14	50	26	6	9.5	7	+12°	-9°	Fig.1	1.3	SB-3080TR	DT-10
	90100R-09	○	5	100	31.75	48	-	60	32	8	12.7				Fig.2	1.9		
	90125R-09	○	6	125	38.10	59			38	10	15.9					3.0		

・Mounting bolts (HH12X30) 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		

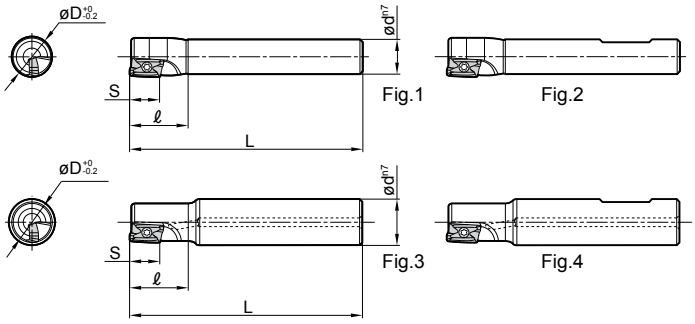
● : Std. Item ○ : Check Availability

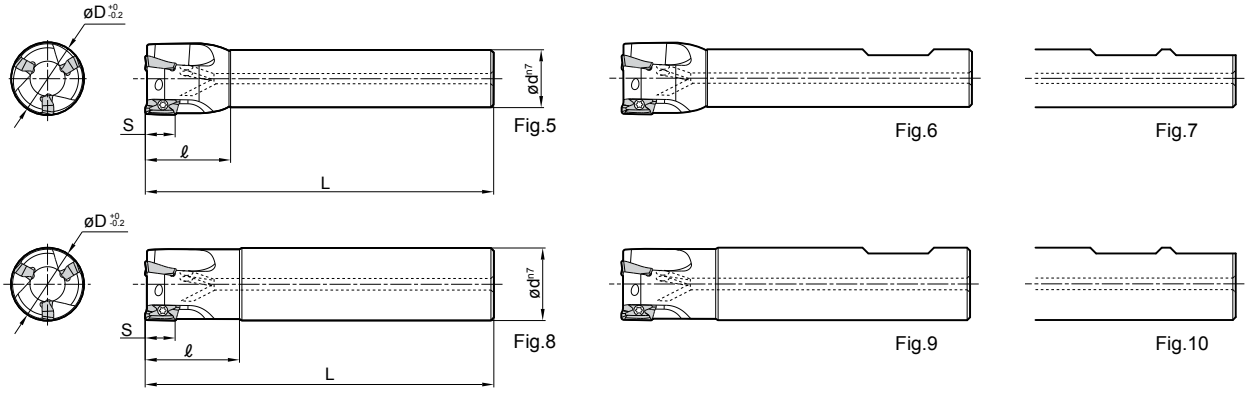
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MEC Endmill


(Straight)


(Weldon)





Toolholder Dimensions

Description			Std.	No. of Inserts	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 Inserts	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 **M51**.

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

MEC Face Mill

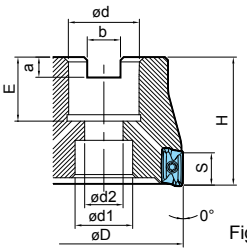


Fig.1

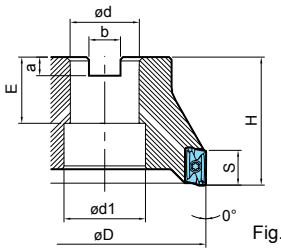
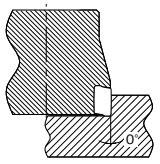


Fig.2

Rake Angle (°)
11Type A.R.(MAX): +23° R.R. : -7°
17Type A.R.(MAX): +19° R.R. : -7°



Dimensions

Description				Std.	No. of Inserts	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
	Fine 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
	Fine 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 **M51**.

●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.

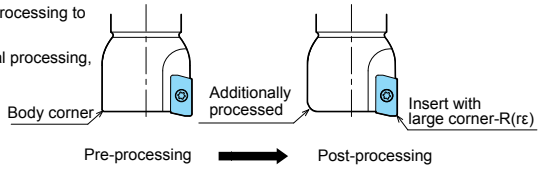
●MEC's surface finish when shouldering with multiple passes

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, M17			Applicable Inserts ➔ M20
				
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

Workpiece Material	fz (mm/t)		Insert Grade (Cutting Speed: m/min)				
	Holder		Cermet	MEGACOAT		PVD Coated Carbide	
	MEC10～MEC19	**MEC20～MEC40 MEC040R～MEC160R**	**TN100M**	**PR1225**	**PR1210**	**PR830**	**PR905**
Stainless Steel	0.06~0.08~0.1	0.08~0.12~0.15	-	☆ 100~160~200	-	☆ 100~140~180	-
Carbon Steel	0.06~0.1~0.15	0.08~0.15~0.25	☆ 120~160~200	★ 120~180~250	-	☆ 120~160~200	-
Alloy Steel	0.06~0.1~0.12	0.08~0.15~0.2	☆ 100~140~180	★ 100~160~220	-	☆ 100~140~180	-
Mold Steel	0.06~0.08~0.1	0.08~0.12~0.2	☆ 80~120~150	★ 80~140~180	-	☆ 80~120~150	-
Gray Cast Iron	0.06~0.1~0.15	0.08~0.18~0.25	-	-	★ 120~180~250	-	☆ 100~140~180
Nodular Cast Iron	0.06~0.08~0.1	0.08~0.15~0.2	-	-	★ 100~150~200	-	☆ 80~120~160
Titanium Alloys	0.06~0.08~0.1	0.08~0.15~0.2	-	-	★ 30~50~70	-	☆ 20~35~50

*Cutting with coolant is recommended for Titanium Alloy.

★: 1. Recommendation ☆: 2. Recommendation

• JS Chipbreaker

Workpiece Material	fz (mm/t)		Insert Grade (Cutting Speed: m/min)		
	Holder		MEGACOAT	PVD Coated Carbide	
	MEC10～MEC19	**MEC20～MEC40 MEC040R～MEC160R**	**PR1225**	**PR830**	**PR1025**
Stainless Steel	0.06~0.08~0.1	0.08~0.1~0.12	★ 120~180~250	☆ 100~140~180	☆ 100~140~180
Carbon Steel	0.06~0.1~0.12	0.08~0.15~0.18	★ 120~180~250	☆ 120~160~200	☆ 100~120~150
Alloy Steel	0.06~0.08~0.1	0.08~0.12~0.15	★ 100~160~220	☆ 100~140~180	-
Mold Steel	0.06~0.08~0.1	0.08~0.1~0.12	★ 80~140~180	☆ 80~120~150	-

★: 1. Recommendation ☆: 2. Recommendation

• JA Chipbreaker

Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed: m/min)
		Carbide
		GW25
Aluminium Alloys (Si 13% or below)	0.05~0.3	200~800
Aluminium Alloys (Si 13% or above)	0.05~0.2	200~300

• PCD

Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed: m/min)
		PCD
		KPD230 (KPD001)
Aluminium Alloys (Si 13% or bellow)	0.05~0.2	500~1,500
Aluminium Alloys (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

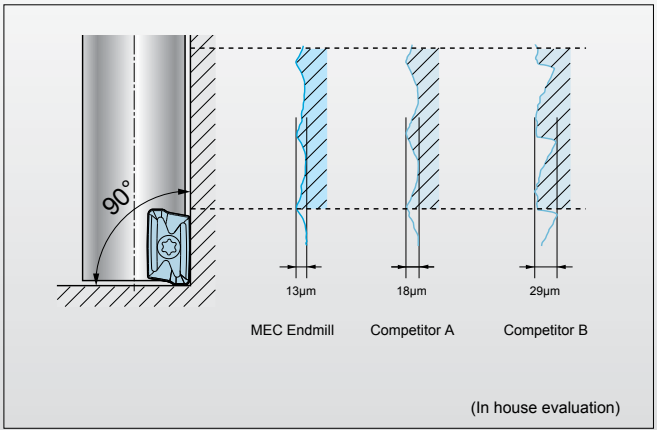
1. When running the endmill and the facemill at revolutions exceeding the maximum revolution limit, the inserts or toolholder may be damaged due to the centrifugal force.
2. For actual practical revolution, please set within recommended cutting condition.
3. When using at a higher revolution (over 10,000min-1), refer to the table to adjust the balance of MEC and suitable arbor.

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

Features of MEC

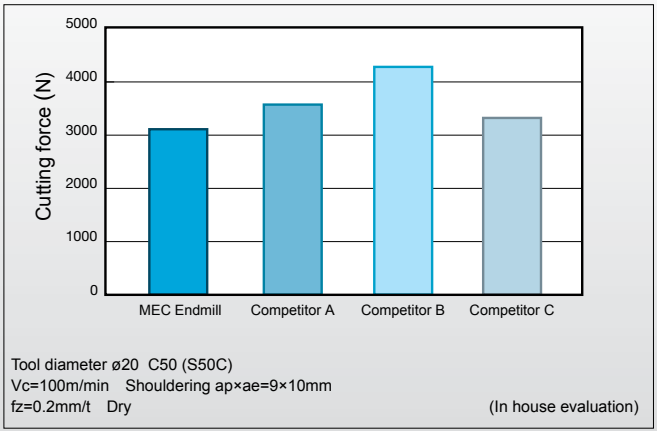
Good squareness

<Cutting Surface Comparison>



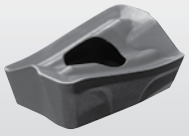
Low cutting resistance

<Cutting Force Comparison>

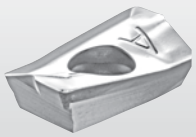


Chipbreaker

JT Chipbreaker (General Purpose)

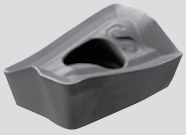


JA Chipbreaker (For Alminum)



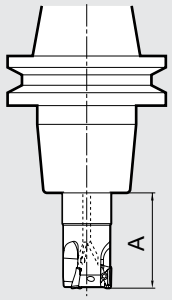
Low resistant JS chipbreaker

Cutting resistance 20% down

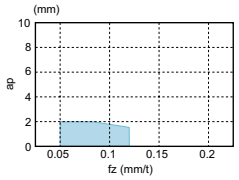
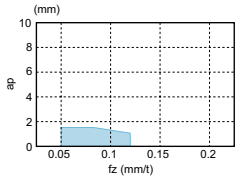
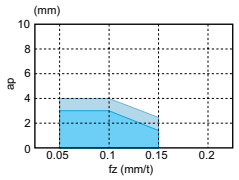
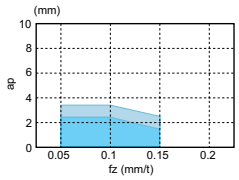
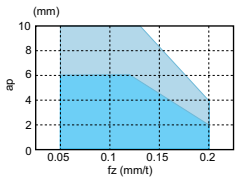
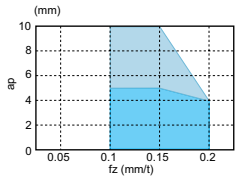
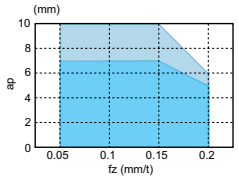
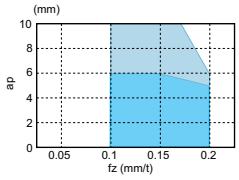
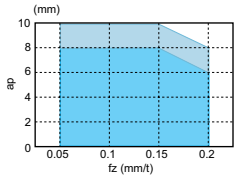
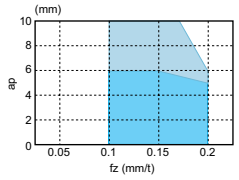
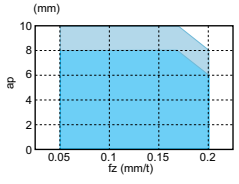
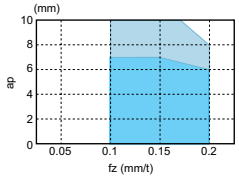


Cutting Performance of MEC Endmill

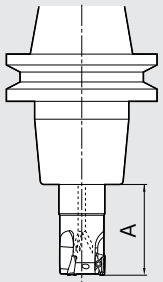
①Cutting edge length 10mm Type
(Standard / Straight Shank)

Cutting Dia.	Description	Overhang Length A (mm)		Shape
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	

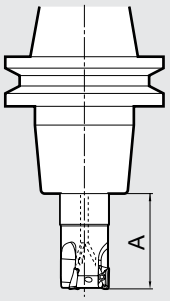
[**JT** chipbreaker Vc=120m/min Workpiece material: C50 (S50C)]

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		

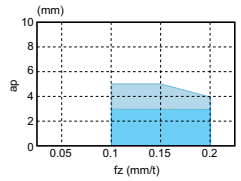
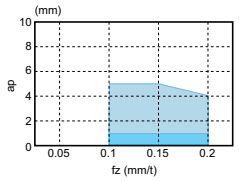
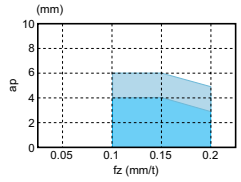
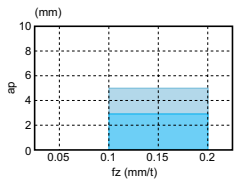
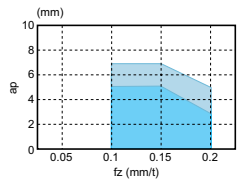
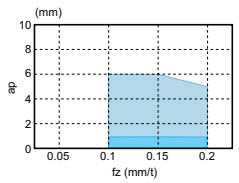
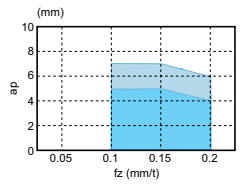
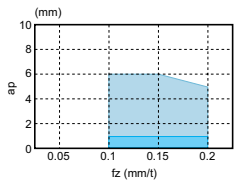
②Cutting edge length 10mm Type (Long Shank)

Cutting Dia.	Description	Overhang Length A (mm)		Shape
ø20 Long Shank	**MEC20-S20-140-11T**	60	90	
ø25 Long Shank	**MEC25-S25-160-11T**	60	100	
ø32 Long Shank	**MEC32-S32-200-11T**	100	130	
ø40 Long Shank	**MEC40-S32-240-11T**	100	130	

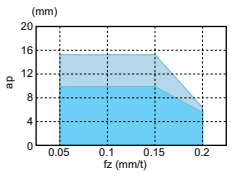
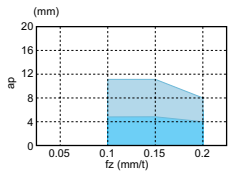
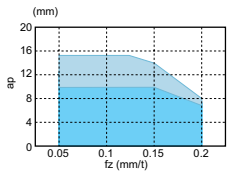
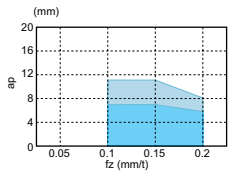
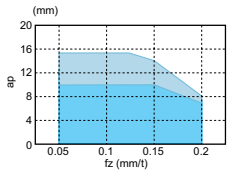
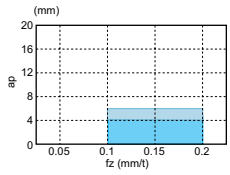
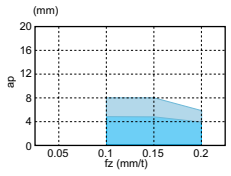
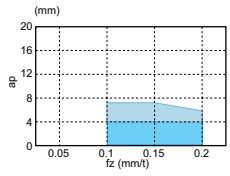
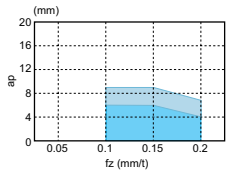
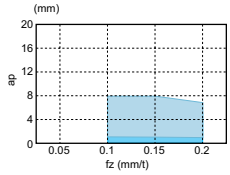
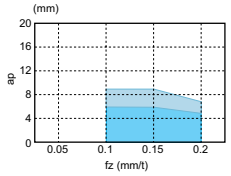
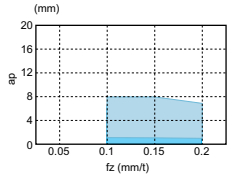
③Cutting edge length 15.7mm Type

Cutting Dia.	Description	Overhang Length A (mm)		Shape
ø25	**MEC25-S25-17**	36	54	
ø32	**MEC32-S32-17**	40	60	
ø40	**MEC40-S32-17**	50	75	
ø25 Long Shank	**MEC25-S25-160-17**	60	100	
ø32 Long Shank	**MEC32-S32-200-17**	100	130	
ø40 Long Shank	**MEC40-S32-240-17**	100	130	

[**JT** chipbreaker 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		

[**JT** chipbreaker Vc=120m/min Workpiece material: C50 (S50C)]

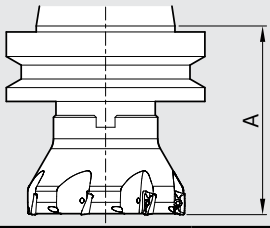
Description	■ Shouldering (When cutting width ae = øD/2)	■ Slotting ■ Ramping and Helical Milling
MEC25-S25-17		
MEC32-S32-17		
MEC40-S32-17		
MEC25 -S25-160-17 Long Shank		
MEC32 -S32-200-17 Long Shank		
MEC40 -S32-240-17 Long Shank		

Cutting Performance of MEC Milling Cutter

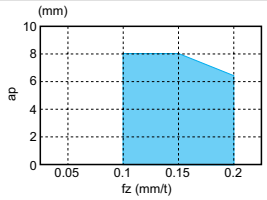
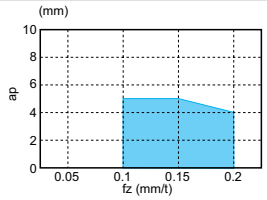
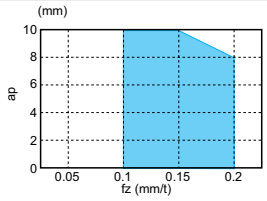
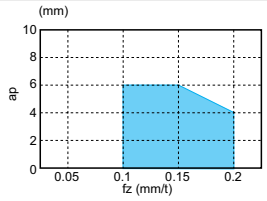
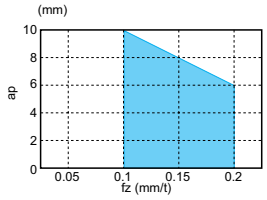
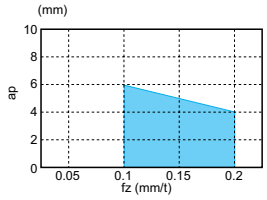
Cutting edge length 10mm Type

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



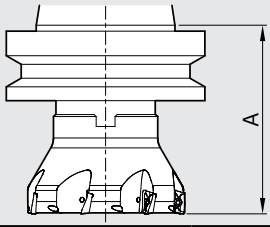
[**JT** chipbreaker Vc=120m/min Workpiece material: C50 (S50C)]

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)		

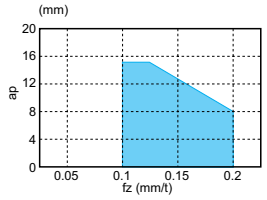
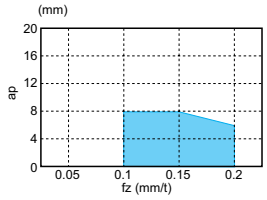
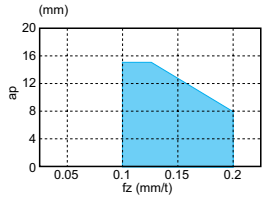
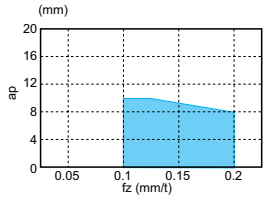
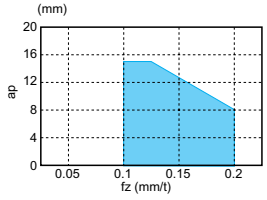
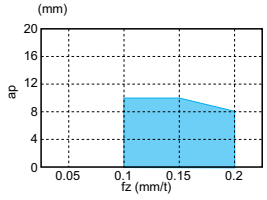
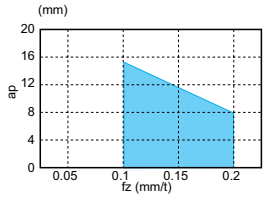
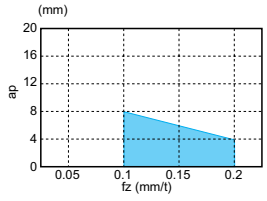
Cutting edge length 15.7mm Type

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



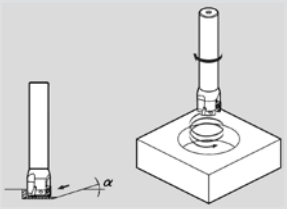
[**JT** chipbreaker Vc=120m/min Workpiece material: C50 (S50C)]

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

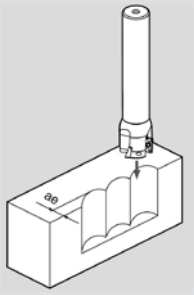
- **Ramping angle is recommended under α°.**
- **Refer each tools cutting performance list for depth of helical milling per one revolution.**
  Use compressed air during cutting.



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.

Guidance of minimum cutting dia by helical cutting.

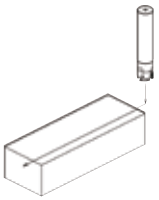
MEC	Helder Dia	ø16	ø18	ø20	ø22	ø25	ø28	ø30	ø32	ø40	ø50
BD_T11T3	Guidance of minimum cutting dia by helical cutting.	ø21	ø25	ø29	ø33	ø39	ø45	ø49	ø53	ø69	Helical cutting is not recommended.
	Guidance of minimum cutting dia in case of flatting bottom after helical cutting.	ø28	ø32	ø36	ø40	ø46	ø52	ø56	ø60	ø76	

MEC	Helder Dia	ø25	ø32	ø40	ø50
BD_T1704	Guidance of minimum cutting dia by helical cutting.	ø34	ø48	ø64	Helical cutting is not recommended.
	Guidance of minimum cutting dia in case of flatting bottom after helical cutting.	ø46	ø60	ø76	

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)

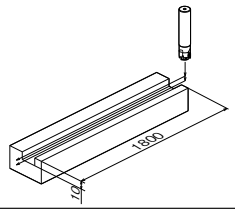


MEC	Chip Removal Amount = 71.3cm^3 (Sustainable)
Competitor's Endmill A	Chip Removal Amount = 2.9cm^3 (Chipping occurred)

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 cutting.
(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)

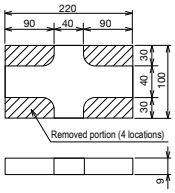


MEC	23pcs/edge
Competitor's Endmill B	10~11pcs/edge

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)

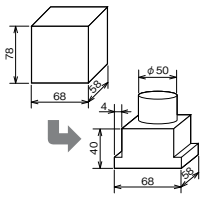


MEC	4pcs/edge or more
Competitor's Endmill C	1pcs/edge or less

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 cutting after cut 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)

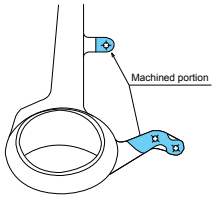


MEC	2 hours (Small Wear: Extendible)
Competitor's Endmill D	2 hours (halted due to insert breakage)

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 cutting after used for cutting 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 (Shouldering)
- fz=0.1mm/t (Vf=478mm/min)
- Dry
- MEC40-S32-17
- 4 flutes
- BDMT170408ER-JT (PR830)

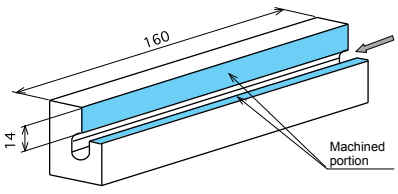


MEC	150pcs/edge
Competitor's Endmill E	40pcs/edge

MEC had a better finished surface comparing to Competitor's Endmill E and also improved the tool life by more than 3 times.

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)

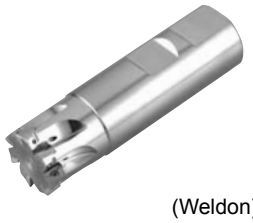


MEC	9pcs/edge
Competitor's Endmill F	1pcs/edge or less

Competitor's Endmill H (Coated Insert) could not finish cutting of 1 workpiece, but MEC could cut 9pcs/edge and the finished surface was good.

MECX Endmill

(Straight)



(Weldon)

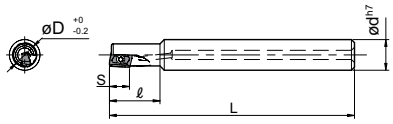


Fig.1

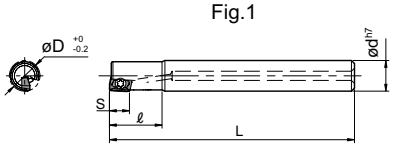


Fig.2

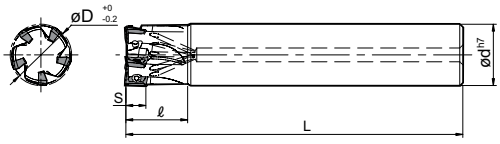


Fig.4

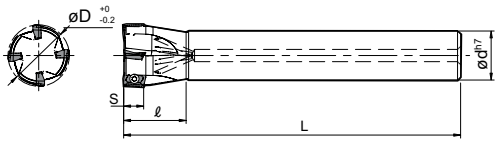


Fig.3

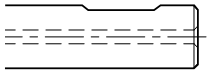


Fig.5

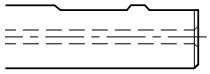


Fig.6

Toolholder Dimensions

Description			Std.	No. of Inserts	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 cutting condition.
3. When using at a higher revolution (over 10,000min-1), refer to the table to adjust the balance of MECX and suitable arbor.

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

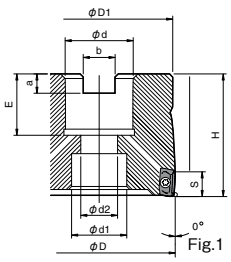


Fig.1

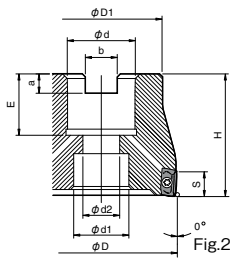
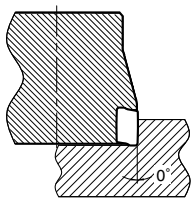


Fig.2



Toolholder Dimensions

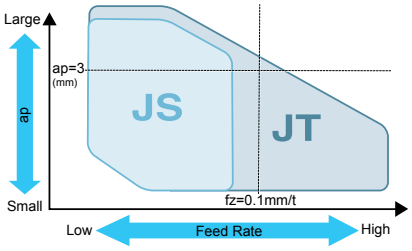
Description		Std.	No. of Inserts	Dimension (mm)									Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Spare Parts		Max. Revolution (min^{-1})
				øD	øD1	ød	ød1	ød2	H	E	a	b	S	A.R. (MAX)	R.R.				Clamp Screw	Wrench	
MECX	032R-07-8T-M	●	8	32	30	16	14	8.5	40	20	5.5	8.5	6	+16.3°	-8.9°	Yes	Fig.1	0.15	SB-2042TRG	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 **M56**.
■ 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.
■ MECX032R comes with arbor screw (HH8X25H) and MECX040R/050R/063R comes with arbor bolt (HH10X30H).

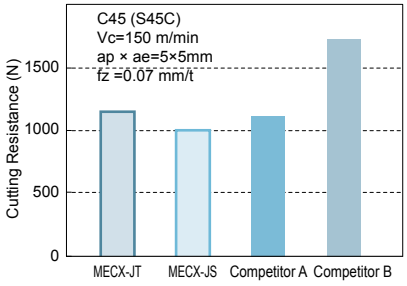
Applicable Inserts (MECX Face Mill)

Toolholder	Applicable Inserts ➔ M16	
		
MECX···R-07..	BDMT 0703 ○○ ER-JT	BDMT 0703 ○○ ER-JS

Selecting Chipbreaker



Cutting Resistance



◆ Recommended Cutting Conditions

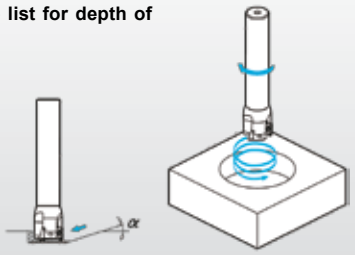
Workpiece Material	fz (mm/t)		Insert Grade (Cutting Speed Vc : m/min)				
			MEGACOAT		PVD Coated Carbide		
	JS Chipbreaker	JT Chipbreaker	**PR1225**	**PR1210**	**PR830**	**PR1025**	**PR905**
Stainless Steel	0.03~0.04~0.05	0.05~0.06~0.07	★ 120~180~250	-	-	☆ 100~160~200	-
Carbon Steel	0.04~0.08~0.1	0.06~0.1~0.12	★ 120~180~250	-	☆ 120~150~180	-	-
Alloy Steel	0.04~0.06~0.08	0.06~0.08~0.1	★ 100~160~220	-	☆ 100~140~180	-	-
Mold Steel	0.04~0.06~0.08	0.06~0.08~0.1	★ 80~140~180	-	☆ 80~120~150	-	-
Gray Cast Iron	0.04~0.08~0.1	0.08~0.1~0.15	-	★ 120~180~250	-	-	☆ 100~140~180
Nodular Cast Iron	0.04~0.06~0.08	0.08~0.1~0.12	-	★ 100~150~200	-	-	☆ 80~120~160
Titanium Alloys	0.04~0.06~0.08	0.08~0.1~0.12	-	★ 30~50~70	-	-	☆ 20~35~50

*Cutting with coolant is recommended for Titanium Alloys.

★: 1. Recommendation ☆: 2 Recommendation

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 cutting.**



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°

Guidance of minimum cutting dia by helical cutting.

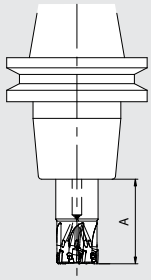
MECX	Helder Dia	ø8	ø10	ø12	ø14	ø16	ø17	ø18	ø20
BDMT0703	Guidance of minimum cutting dia by helical cutting.	Helical cutting is not recommended.	ø14	ø18	ø22	ø26	ø28	ø30	ø34
	Guidance of minimum cutting dia in case of flatting bottom after helical cutting.		ø17	ø21	ø25	ø29	ø31	ø33	ø37

MECX	Helder Dia	ø21	ø25	ø26	ø32	ø33
BDMT0703	Guidance of minimum cutting dia by helical cutting.	ø36	ø44	ø46	ø58	ø60
	Guidance of minimum cutting dia in case of flatting bottom after helical cutting.	ø39	ø47	ø49	ø61	ø63

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

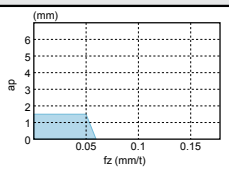
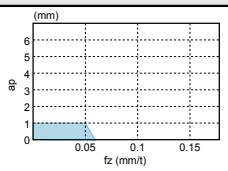
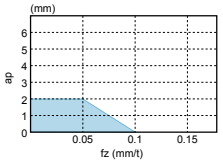
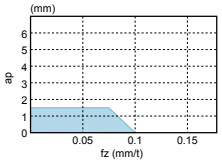
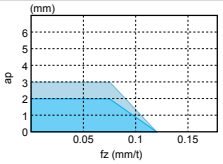
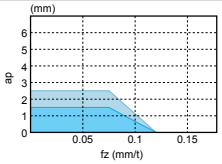
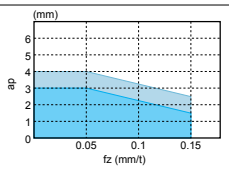
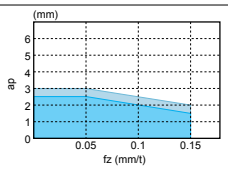
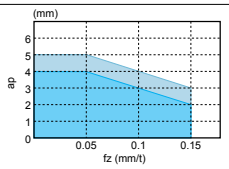
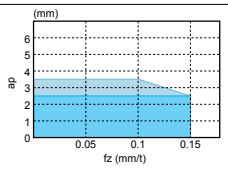
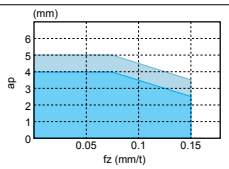
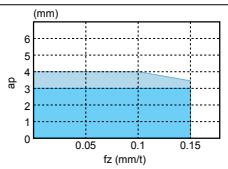
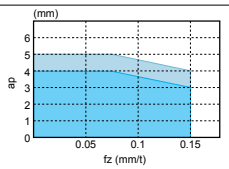
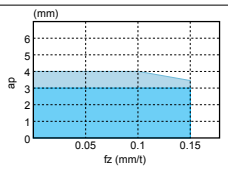
①For MECX08~MECX12

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.

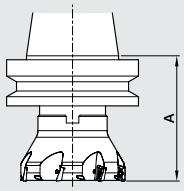
[**JT** chipbreaker Vc=150m/min Workpiece material: C50 (S50C)]

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		

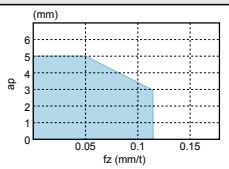
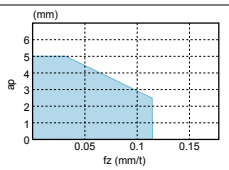
Cutting Performance of MECX Milling Cutter

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



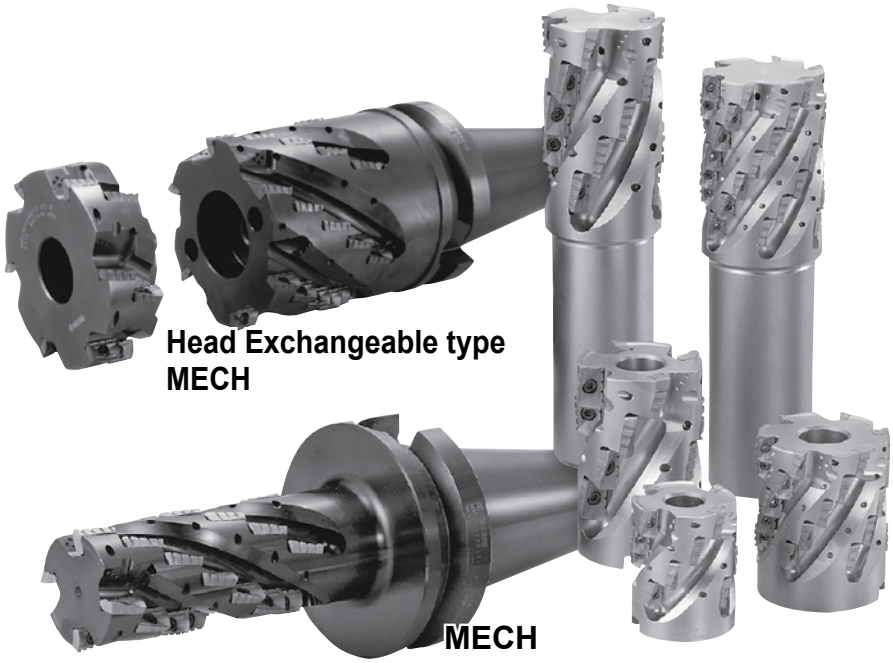
[**JT** chipbreaker Vc=150m/min Workpiece material: C50 (S50C)]

Description	■ Shouldering (Cutting width ae = øD/2)
MECX032R-07-8T-M **MECX040R-07-10T-M**	
MECX050R-07-12T-M **MECX063R-07-14T-M**	

※Not Recommended for Slotting.

Helical Endmill MECH

Lineup

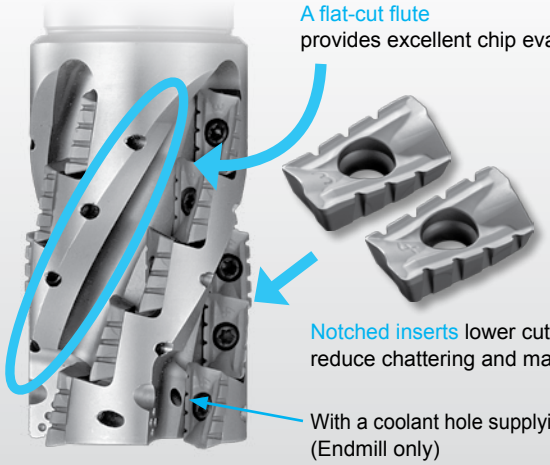


Good Chip Evacuation

Good Chip Evacuation

Notched insert breaks chips into small pieces

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.

With a coolant hole supplying to the tip insert
(Endmill only)

High Efficiency Milling

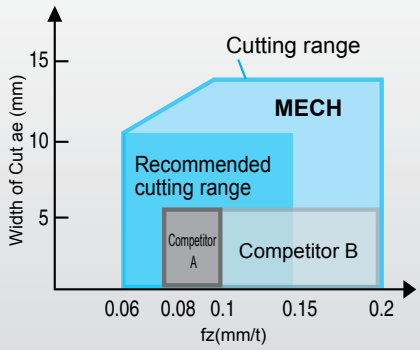
High efficiency cutting with Multi-Edge design

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)

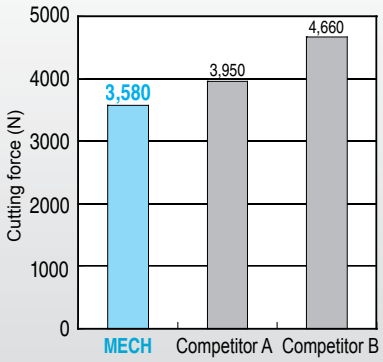
Low Cutting Force

Low Cutting Force due to Notched Inserts



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)



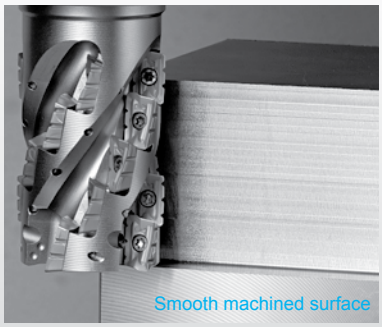
C50 (S50C)
Vc = 120 m/min
ap×ae = 40mm×10 mm
fz = 0.1mm/t
MECH032-S32-11-5-4T

(In house evaluation)

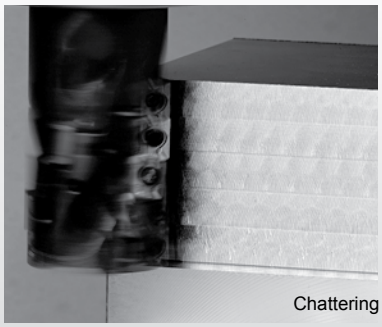
Reduced chattering

Comparison of surface wall (Lateral surface)

Notched insert lowers and disperses cutting force, and enables high feed rates by reducing chattering.



MECH



Competitor A

C50 (S50C)
Vc=120m/min
fz=0.12mm/t
ap×ae=40×7mm

(In house evaluation)

PR1225, PR1230 and PR1210 (MEGACOAT) are now available.

MEGACOAT (PVD Coated carbide)

Long tool life and high-speed milling due to superior toughness and high oxidation resistance

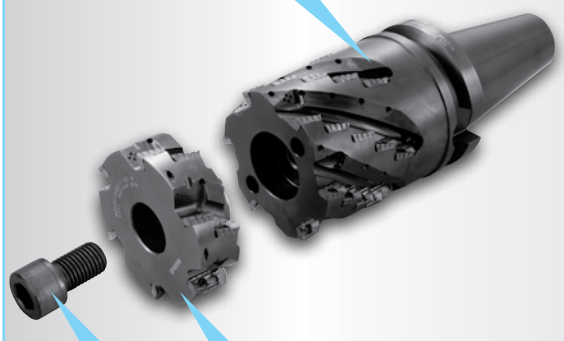
Head exchangeable type MECH

Minimizing cost on toolholder

1) The toolholder front piece (the top and second edges only) can be separated from the body.
2) If the tip of head is damaged, you only need to replace the front piece.

Separate structure

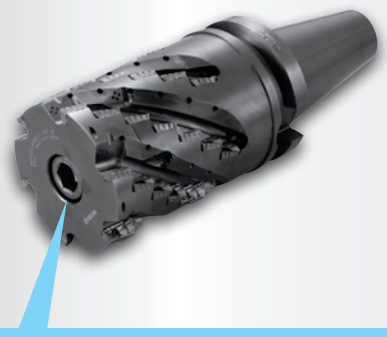
The base unit is high rigidity in combination with BT50



Clamp Bolt

The front piece composed of the top and second edges can be separated

When assembled



The base unit and front piece are connected by the clamp bolt (HH...)

M

Milling

MECH Endmill (with coolant hole for bottom insert)

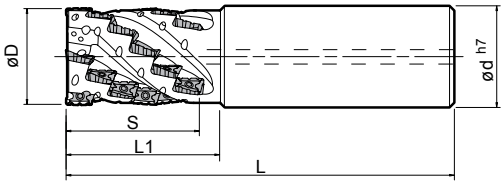


Fig.1

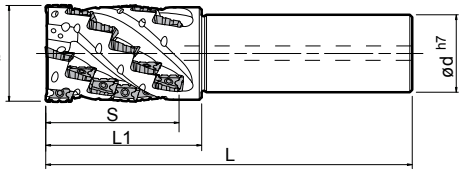


Fig.2

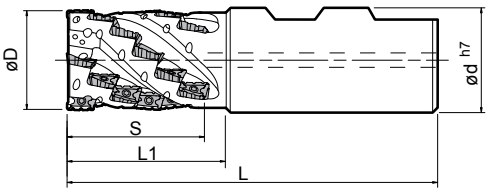


Fig.3

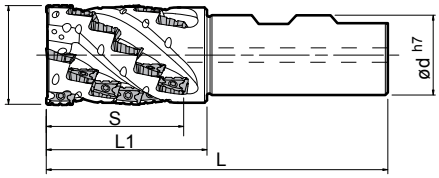


Fig.4

Dimensions

Description		Std.	No. of Flutes	No. of Stages	No. of Inserts	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.

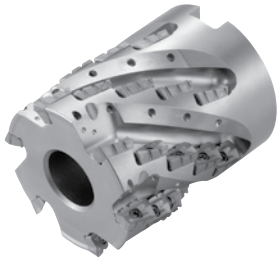
Applicable Inserts

Toolholder	Applicable Inserts ➔ M17			
	2-Notched	3-Notched	3-Notched	4-Notched
MECH····-11-	BDMT 11T308ER-N2	BDMT 11T308ER-N3	–	–
MECH····-17-	–	–	BDMT 170408ER-N3	BDMT 170408ER-N4

Recommended Cutting Conditions ➔ M67

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

MECH Shell Mill (without coolant hole)



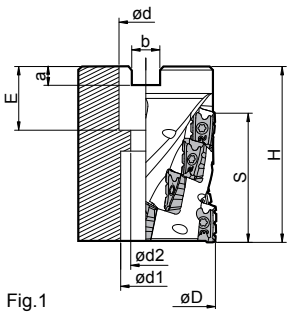


Fig.1

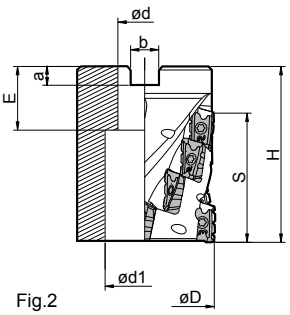


Fig.2

Rake Angle (°)		
Description	A.R. (MAX)	R.R.
MECH•••-11-	+23°	-8°
MECH•••-17-	+19°	-7°

● Dimensions

Description	Std.	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)									Drawing	Spare Parts				Applicable Inserts ⇒ M17
					øD	ød	ød1	ød2	H	E	a	b	S		Clamp Screw	Wrench	Anti-seize Compound	Mounting Bolt	
MECH 040R-11-4-4T-M	●	4	4	16	40	16	15	9	50	19	5.6	8.4	37	Fig.1	SB-2555TRG	DTM-8	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, without coolant hole)

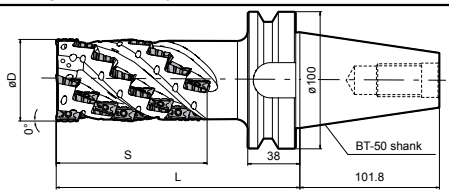


Fig.1

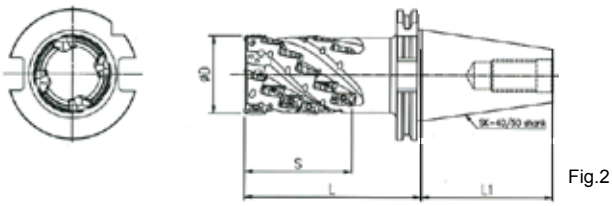


Fig.2

Rake Angle (°)		
Description	A.R. (MAX)	R.R.
MECH•••-11-	+23°	-7°
MECH•••-17-	+19°	-7°

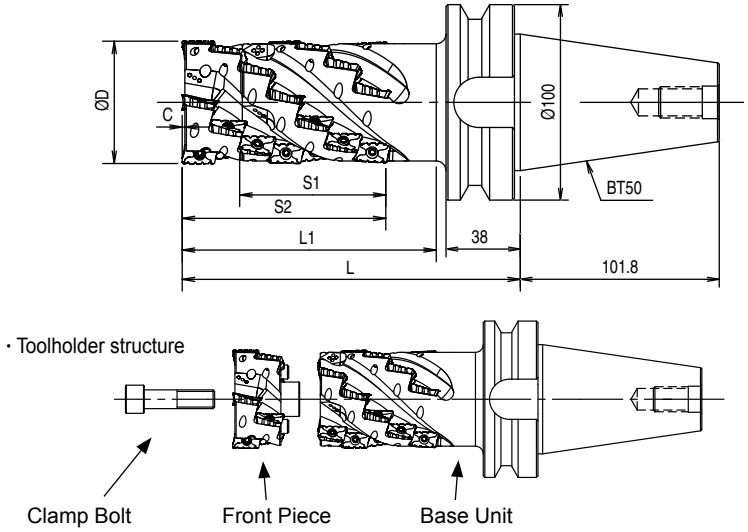
● Dimensions

Description	Std.	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)			Drawing	Weight (kg)	Spare Parts			Applicable Inserts ⇒ M17
					øD	L	S			Clamp Screw	Wrench	Anti-seize Compound	
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-4070-TRN	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	1.3	SB-2555-TRG	DTM-8	MP-1	BDMT11T308ER-N2 BDMT11T308ER-N3
MECH 050R11-8-4T-SK50			8	32	50	124	73		3.8				BDMT11T308ER-N2 BDMT11T308ER-N3
050R17-7-4T-SK50			7	28		154	104		6.8	SB-4070TRN	DTM-15	MP-1	BDMT170408ER-N3 BDMT170408ER-N4

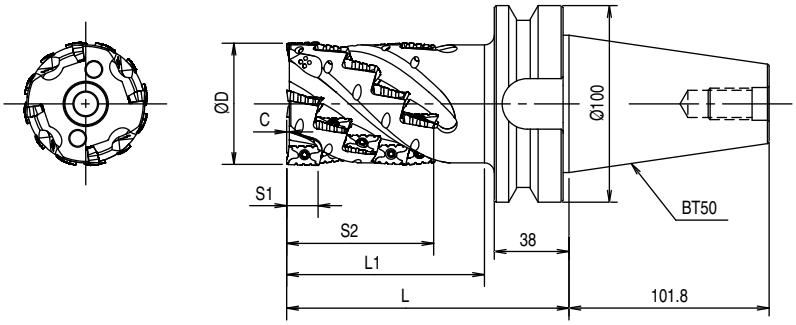
Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

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

MECH-BT50SA (Without a coolant hole) Arbor Integral Type (Base Unit+1 Front Piece+Clamp Bolt)



MECH-BT50-A (Without a coolant hole) Base Unit



Toolholder Dimensions

Description			Std.	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)						Rake Angle(°)		Weight (kg)
							øD	L	L1	C	S1	S2	A.R.	R.R.	
NEW Arbor Integral Type	MECH	050R11-4T-BT50SA	MTO	4	8	32	50	143	99	0.7	55	73	+23°	-7°	4.8
		063R17-4T-BT50SA	MTO		7	28	63	173	130	1.3	75	104	+19°	-7°	5.8
		080R17-4T-BT50SA	MTO				80								7.6
		100R17-6T-BT50SA	MTO	6	7	42	100								9.8
NEW Base Unit	MECH	050R11-4T-BT50-A	MTO	4	6	24	50	125	81	0.7	10	55	+23°	-7°	4.6
		063R17-4T-BT50-A	MTO		5	20	63	143	100	1.3	16	75	+19°	-7°	5.4
		080R17-4T-BT50-A	MTO				80								6.8
		100R17-6T-BT50-A	MTO	6	5	30	100								8.5

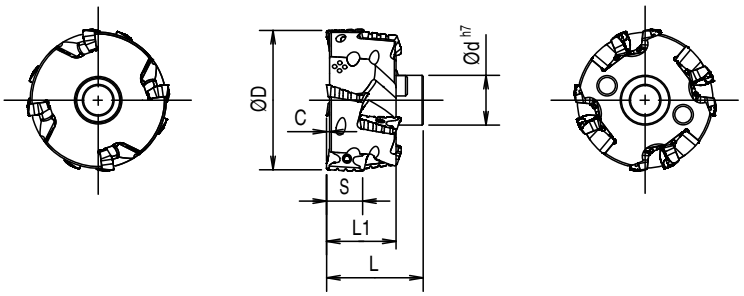
Recommended Cutting Conditions M67

Toolholder structure

Endmill			Base Unit M64		Front Piece (1pcs) M65		Clamp Bolt
MECH	050R11-4T-BT50SA	=	MECH050R11-4T-BT50-A	+	MECH050R11-4T-F	+	HH12X35
	063R17-4T-BT50SA		MECH063R17-4T-BT50-A		MECH063R17-4T-F		HH12X40
	080R17-4T-BT50SA		MECH080R17-4T-BT50-A		MECH080R17-4T-F		HH16X40
	100R17-6T-BT50SA		MECH100R17-6T-BT50-A		MECH100R17-6T-F		HH20X40

MTO: Made to order

MECH-F (Without a coolant hole) Front Piece



Toolholder Dimensions

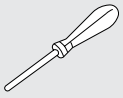
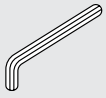
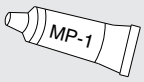
Description		Std.	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)						Rake Angle(°)		Weight (kg)
						øD	ød	L	L1	C	S	A.R.	R.R.	
MECH	050R11-4T-F	●	4	2	8	50	22	32	18	0.7	10	+23°	-7°	0.2
NEW	063R17-4T-F	●				63	22	44	30	1.3	16	+19°	-7°	0.4
NEW	080R17-4T-F	●				80	32							0.8
	100R17-6T-F	●	6	2	12	100	45							1.3

Applicable Inserts

Endmill		Base Unit ➔ M64	Front Piece ➔ M65	Applicable Inserts ➔ M17
MECH	050R11-4T-BT50SA	MECH050R11-4T-BT50-A	MECH050R11-4T-F	BDMT11T308ER-N2 BDMT11T308ER-N3
	063R17-4T-BT50SA	MECH063R17-4T-BT50-A	MECH063R17-4T-F	
	080R17-4T-BT50SA	MECH080R17-4T-BT50-A	MECH080R17-4T-F	BDMT170408ER-N3 BDMT170408ER-N4
	100R17-6T-BT50SA	MECH100R17-6T-BT50-A	MECH100R17-6T-F	

・For installation of notched inserts, see page ➔ M66.

Spare Parts

Description			Spare Parts				
			Clamp Screw	Wrench (for Clamp Screw)	Clamp Bolt	Wrench (for Clamp Bolt)	Anti-seize Compound
							
Arbor Integral Type (Set)	MECH	050R11-4T-BT50SA	SB-2555TRG	DTM-8	HH12X35	LW-10	MP-1
		063R17-4T-BT50SA	SB-4070TRN	DTM-15	HH12X40	LW-10	
		080R17-4T-BT50SA			HH16X40	LW-14	
		100R17-6T-BT50SA			HH20X40	LW-17	
Base Unit	MECH	050R11-4T-BT50-A	SB-2555TRG	DTM-8	HH12X35	LW-10	
		063R17-4T-BT50-A	SB-4070TRN	DTM-15	HH12X40	LW-10	
		080R17-4T-BT50-A			HH16X40	LW-14	
		100R17-6T-BT50-A			HH20X40	LW-17	
Front Piece	MECH	050R11-4T-F	SB-2555TRG	-	-	-	
		063R17-4T-F	SB-4070TRN				
		080R17-4T-F					
		100R17-6T-F					

・If you purchased the front piece only, wrench (for clamp screw) / clamp bolt and wrench (for clamp bolt) is not included.

When using the anti-seize compound (MP-1), apply it in a thin layer to the clamp screw.

● : Std. Item

Number of Inserts Installed

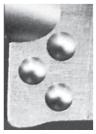
Description	No. of Flutes	No. of Inserts	No. of Inserts BDMT11T308ER- N2	BDMT11T308ER- N3	BDMT170408ER- N3	BDMT170408ER- N4
MECH 025-○25-11-4-2T	2	8	4	4	-	-
032-○32-11-5-2T		10	5	5		
032-○32-11-5-4T	4	20	10	10		
040-○32-11-6-4T		24	12	12		
040-S42-11-6-4T						
050-S42-11-7-4T		28	14	14		
050-W40-11-7-4T						
050-S42-11-7-6T	6	42	21	21		
050-W40-11-7-6T						
MECH 040-○32-17-4-2T	2	8	-	-	4	4
040-S42-17-4-2T						
050-S42-17-5-4T	4	20			10	10
050-W40-17-5-4T						
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						
MECH 050R17-7-4T-BT50	4	28	-	-	14	14
050R17-7-4T-SK50						
063R17-7-4T-BT50						
080R17-7-4T-BT50						
MECH 100R17-7-6T-BT50	6	42	-	-	21	21

Description	No. of Flutes	No. of Inserts	No. of Inserts BDMT11T308ER- N2	BDMT11T308ER- N3	BDMT170408ER- N3	BDMT170408ER- N4
MECH 050R11-4T-BT50SA	4	32	16	16	-	-
063R17-4T-BT50SA	4	28	-	-	14	14
080R17-4T-BT50SA						
100R17-6T-BT50SA	6	42	-	-	21	21
MECH 050R11-4T-BT50-A	4	24	12	12	-	-
063R17-4T-BT50-A	4	20	-	-	10	10
080R17-4T-BT50-A						
100R17-6T-BT50-A	6	30	-	-	15	15
MECH 050R11-4T-F	4	8	4	4	-	-
063R17-4T-F	4	8	-	-	4	4
080R17-4T-F						
100R17-6T-F	6	12	-	-	6	6

Precautions when installing inserts with notched.

1. Install notched inserts by cutting 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.

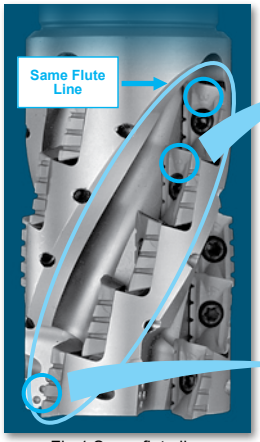


Fig.1 Same flute line

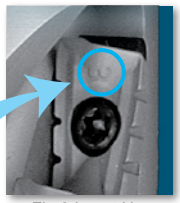


Fig.2 Insert No.


Fig.3 Marks

Recommended Cutting Conditions (When using a notched insert)

Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed Vc : m/min)				
		MEGACOAT			PVD Coated Carbide	
		PR1225	**PR1230**	**PR1210**	**PR830**	**PR905**
Carbon Steel	0.08~0.1~0.15	☆ 120~180~250	★ 120~180~220	-	☆ 100~140~180	-
Alloy Steel	0.08~0.1~0.15	☆ 100~160~220	★ 100~160~200	-	☆ 100~140~180	-
Mold Steel	0.08~0.1~0.15	☆ 80~140~180	★ 80~140~160	-	☆ 100~120~150	-
Groy Cast Iron	0.08~0.15~0.18	-	-	★ 120~180~250	-	☆ 100~140~180
Nodular Cast Iron	0.08~0.15~0.18	-	-	★ 100~150~220	-	☆ 100~120~150
Titanium Alloys	0.08~0.1~0.15	-	-	★ 30~50~70	-	☆ 20~35~50

★:1st Recommendation ☆:2nd Recommendation

※ Cutting with coolant is recommended for titanium alloy.

1. The recommended cutting conditions above are for notched inserts.
2. If using an insert without notch, the cutting depth (ap) and width (ae) should be less than 60% of those of a notched insert.

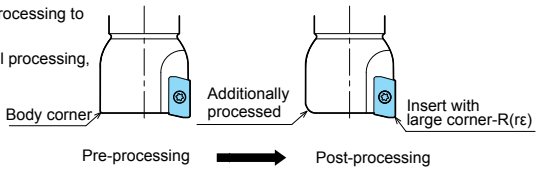
・JA Chipbreaker

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc : m/min)
		Carbide
		GW25
Aluminium Alloy (Si 13% or below)	0.05~0.3	200~800
Aluminium Alloy (Si 13% or above)	0.05~0.2	200~300

■ 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.

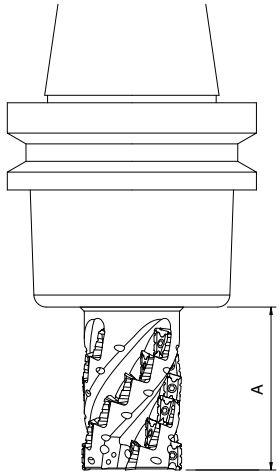


Cutting Performance (Used Machine: Machining center equivalent to AC15 / 18.5kw)

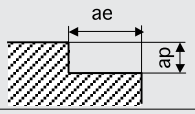
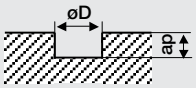
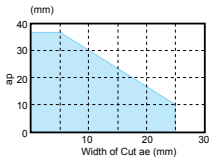
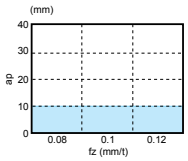
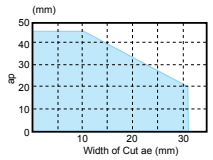
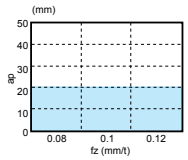
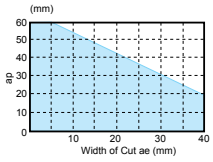
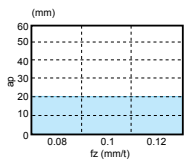
MECH Endmill Type

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	

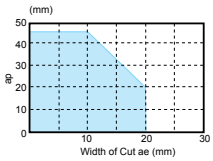
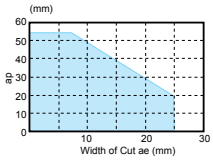
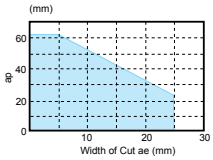
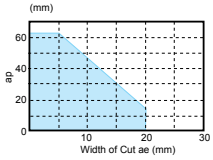
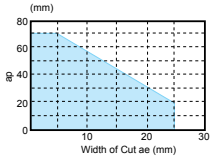
Shape



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	

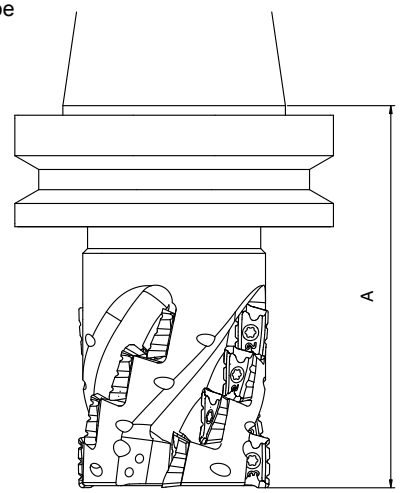
4 Flute / 6 Flute Type are not recommended for Slotting.

● **MECH** Shell Mill Type

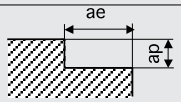
[Workpiece material: C50 (S50C)]

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

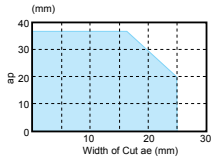


■ Shouldering

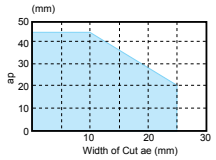


Cutting Speed: Vc=100~180m/min
Feed Rate: fz=0.08~0.15mm/t

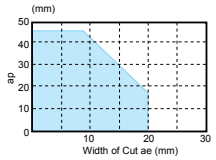
MECH040R -11-4-4T-M



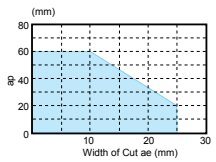
MECH063R -17-3-4T-○



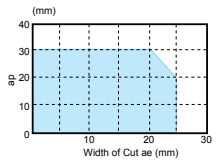
MECH050R -11-5-6T-M



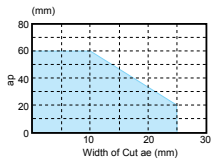
MECH080R -17-4-6T-○



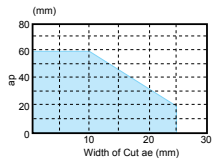
MECH050R -17-2-4T-M



MECH100R -17-4-6T-○



MECH050R -17-4-4T-M



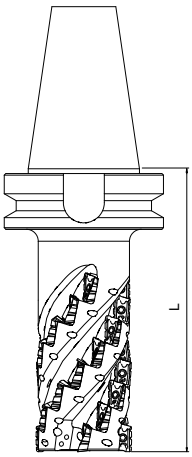
Not Recommended for Slotting.

● **MECH-BT50** (Integral Arbor type) / **MECH-SK50** (Integral Arbor type)
MECH-BT50 SA (Head exchangeable type / Integral Arbor type)

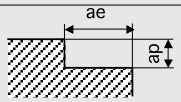
[Workpiece material: C50 (S50C)]

Cutting Dia.	Description	Overhang Length A (mm)
ø40	**MECH040R11-6-4T-SK40**	92
ø50	**MECH050R11-8-4T-SK50**	124
	MECH050R17-7-4T-SK50	154
	MECH050R11-8-4T-BT50 **MECH050R11-4T-BT50SA**	143
	MECH050R17-7-4T-BT50	173
ø63	**MECH063R17-7-4T-BT50** **MECH063R17-4T-BT50SA**	
ø80	**MECH080R17-7-4T-BT50** **MECH080R17-4T-BT50SA**	
ø100	**MECH100R17-7-6T-BT50** **MECH100R17-6T-BT50SA**	

Shape

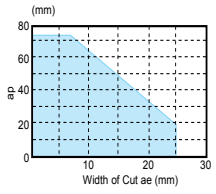


■ Shouldering

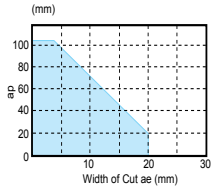


Cutting Speed: Vc=100~180m/min
Feed Rate: fz=0.08~0.15mm/t

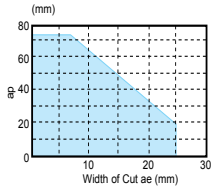
MECH040R11 -6-4T-SK40



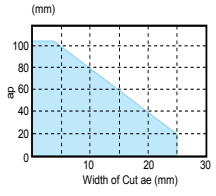
MECH063R17 -7-4T-BT50
MECH063R17 -4T-BT50SA



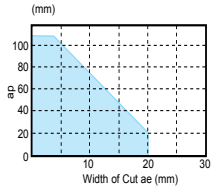
MECH050R11 -8-4T-BT50
MECH050R11 -4T-BT50SA
MECH050R11 -4T-BT50SA



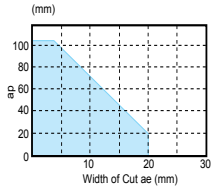
MECH080R17 -7-4T-BT50
MECH080R17 -4T-BT50SA



MECH050R17 -7-4T-BT50
MECH050R17 -7-4T-SK



MECH100R17 -7-6T-BT50
MECH100R17 -6T-BT50SA

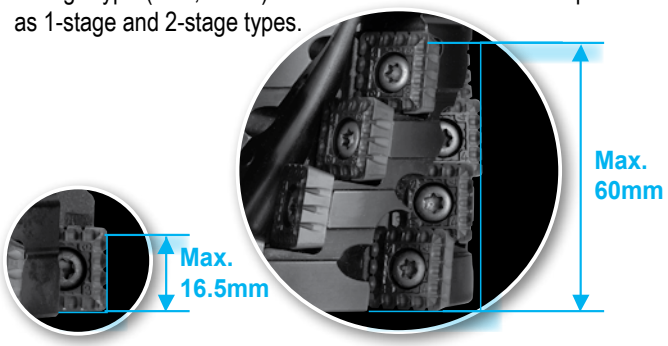


Not Recommended for Slotting.

Heavy Milling Cutter MSRS90 NEW

Wide selection of cutting edge length according to cutting conditions

4-stage type (Φ80, Φ100) is added to the standard lineup as well as 1-stage and 2-stage types.



High efficiency, low cutting force and low vibration milling cutter

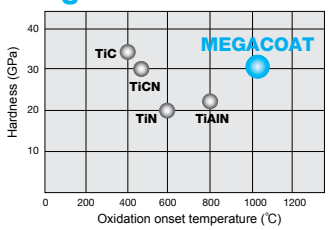
Neutral and corner-R insert

Applicable to shouldering (cutting angle: 90°),
high feed cutting (cutting angle: 30°),
plunging, and side cutter.

Custom-ordered milling cutter with high performance notched neutral inserts provides various applications.

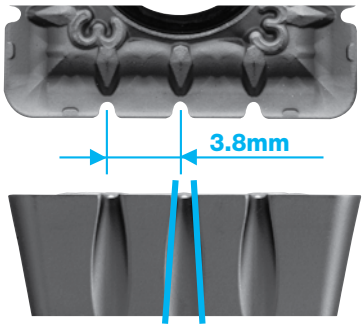
Neutral insert with corner-R is available to various applications.

Long tool life: MEGACOAT



- High hardness and high oxidation resistance
- High strength and fracture resistance

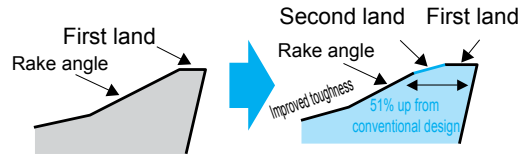
Notched insert SPMT180616EN type



The notched insert breaks chips into small pieces and reduces cutting force.

The second land near the cutting edge improves edge strength.

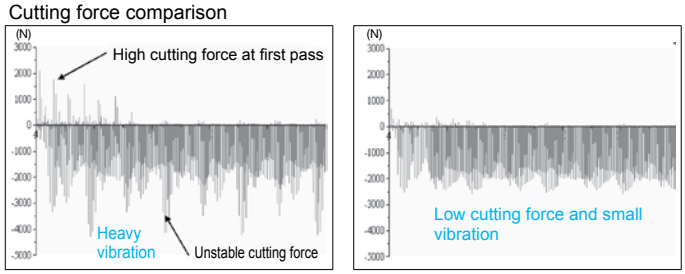
For neutral (right / left) hand
Applicable for various cutting angles.
Cutting edge length: 18mm



Edge Prep.

Low cutting force (Notched insert benefit)

Cutting force comparison



Competitor A　　MSRS90

Notched insert realizes lower cutting force and smaller vibration

Tapered Cutter

Plunge Cutter

45° Face Mill

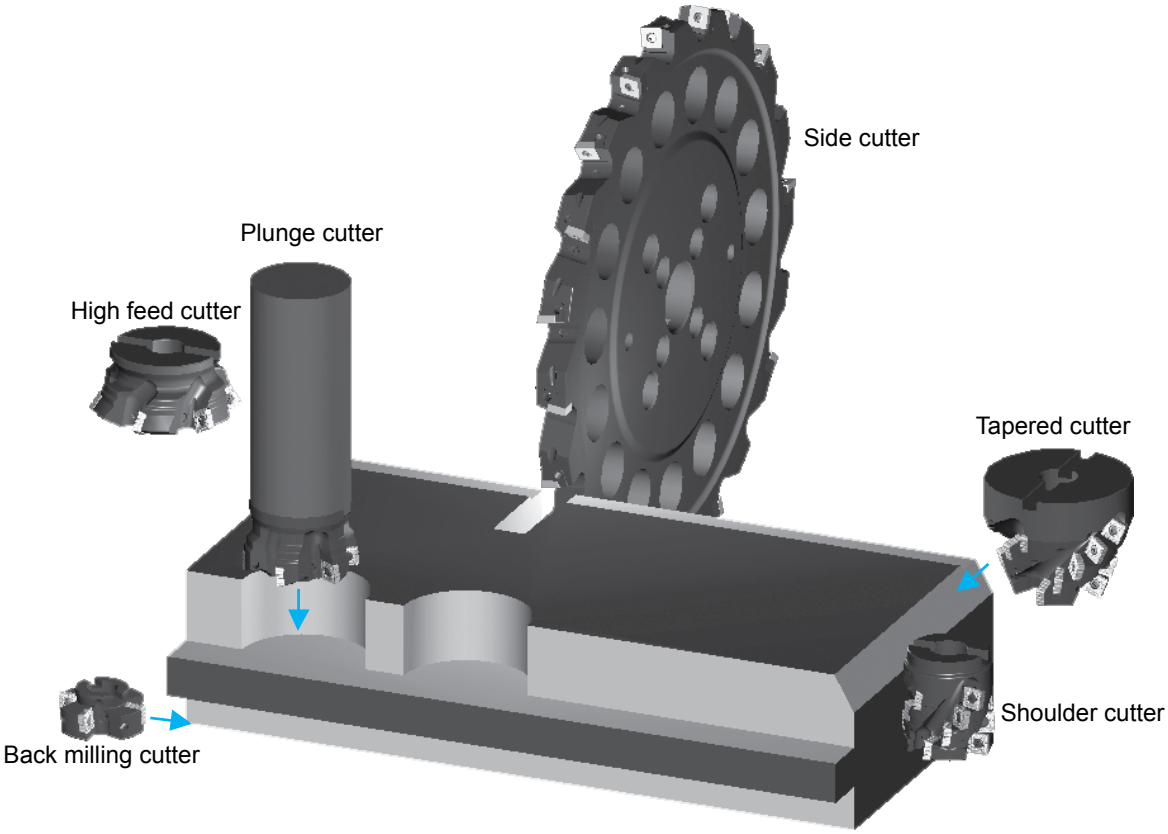
High Feed Cutter

Shoulder Cutter

Applicable Inserts: Available for various applications

Applications	Chipbreaker type	3 Notched	4 Notched	Without notch
General Purpose	Standard	NB3 +	NB4	
Low Cutting Force	Low Cutting Force	NB3P +	NB4P	
Focusing on edge strength	Without notch (Usable with notched inserts)	(NB3 or	NB4) +	

Various expansive possibility (Custom-ordered and standard milling cutter)



● Shaft length determination

The custom-ordered milling cutter can be customized for your requirements such as diameter, cutting angle, number of insert stages.

MSRS90

Rake Angle	
A.R.	R.R.
+7°	-10°

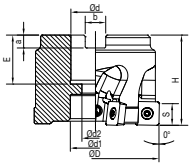


Fig.1

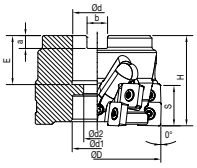


Fig.2

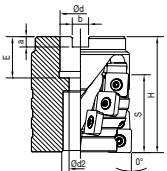


Fig.3

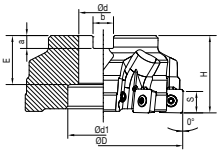


Fig.4

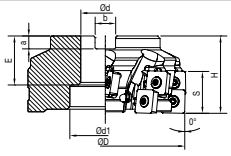


Fig.5

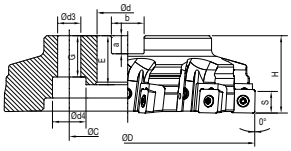


Fig.6

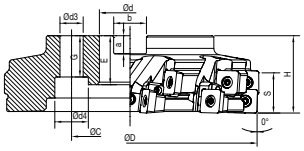


Fig.7

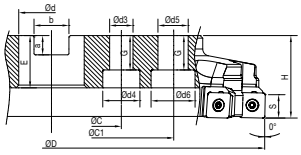


Fig.8

Toolholder Dimensions

Description		Std.	No. of Inserts	No. of Flutes	No. of Stages	Dimension (mm) øD	ød	ød1	ød2	H	E	a	b	S	ød3	ød4	ød5	ød6	G	Drawing	Weigh (kg)
Metric	MSRS 90080R-1-4T-M	●	4	4	1	80	27	20	13	60	24	7	12.4	16.5	-	-	-	-	-	Fig.1	1.3
	90080R-2-4T-M	●	8	4	2									31						Fig.2	1.1
	90080R-4-4T-M	●	16	4	4					90				60						Fig.3	1.4
	90100R-1-6T-M	●	6	6	1	100	32	45	-	60	30	8	14.4	16.5						Fig.1	2.2
	90100R-2-6T-M	●	12	6	2									31						Fig.2	2.0
	90100R-4-6T-M	MTO	24	6	4					90				60						Fig.3	3.1
	90125R-1-8T-M	●	8	8	1	125	40	55		60	33	9.4	16.4	16.5						Fig.4	2.6
	90125R-2-8T-M	MTO	16	8	2									31						Fig.5	2.4
	90160R-1-8T-M	●	8	8	1	160	60	70						16.5						Fig.4	4.2
	90160R-2-8T-M	MTO	16	8	2									31						Fig.5	4.0
	90200R-1-10T-M	●	10	10	1	200		-			38	15	25.9	16.5						Fig.6	6.7
	90200R-2-10T-M	MTO	20	10	2									31						Fig.7	6.6
	90250R-1-12T-M	●	12	12	1	250								16.5						Fig.6	12.6
	90250R-2-12T-M	MTO	24	12	2									31						Fig.7	12.5
	90315R-1-14T-M	●	14	14	1	315								16.5	17	27	22	32	25	Fig.8	16.1
	90315R-2-14T-M	MTO	28	14	2									31						-	16.0
Bore Dia. Inch spec	MSRS 90080R-1-4T	●	4	4	1	80	31.75	27	18	60	32	8	12.7	16.5	-	-	-	-	-	Fig.1	1.4
	90080R-2-4T	●	8	4	2									31						Fig.2	1.2
	90080R-4-4T	●	16	4	4					90				60						Fig.3	1.5
	90100R-1-6T	●	6	6	1	100	38.1	39	21	70	38	10	15.9	16.5						Fig.1	2.3
	90100R-2-6T	●	12	6	2									31						Fig.2	2.1
	90100R-4-6T	MTO	24	6	4					90				60						Fig.3	3.2
	90125R-1-8T	●	8	8	1	125		55	-	60				16.5						Fig.4	2.6
	90125R-2-8T	MTO	16	8	2									31						Fig.5	2.4
	90160R-1-8T	●	8	8	1	160	50.8	70				11	19.1	16.5						Fig.4	4.3
	90160R-2-8T	MTO	16	8	2									31						Fig.5	4.1
	90200R-1-10T	●	10	10	1	200						14	25.4	16.5						Fig.6	6.7
	90200R-2-10T	MTO	20	10	2									31						Fig.7	6.6
	90250R-1-12T	●	12	12	1	250	47.625	-						16.5						Fig.6	12.6
	90250R-2-12T	MTO	24	12	2									31						Fig.7	12.5
	90315R-1-14T	●	14	14	1	315								16.5	17	27	22	32	25	Fig.8	16.1
	90315R-2-14T	MTO	28	14	2									31						-	16.0

●: Std. Item ○ : Check Availability
MTO : Made to order

Applicable Inserts

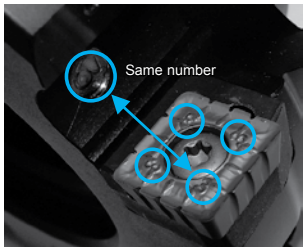
Description	Applicable Inserts → M15				
	 3-Notched	 4-Notched	 3-Notched Low cutting force	 4-Notched Low cutting force	 Without notch
MSRS90…	**SPMT 180616EN-NB3**	**SPMT 180616EN-NB4**	**SPMT 180616EN-NB3P**	**SPMT 180616EN-NB4P**	**SPMT 180616EN-V**

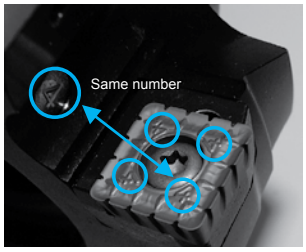
Caution when installing Notched Insert

It is important to install the appropriate motched insert into the correct position. If it is installed in incorrect position, the tool cannot cut the workpiece and it may damage the toolholder body. For MSRS90 type, Notched Insert location indicator is marked at insert installed pocket of the cutter body.

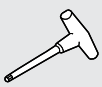
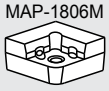
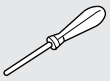
Description		No. of Inserts	No. of Flutes	No. of Stages	No. of Inserts Notched	
					NB3(P)	NB4(P)
MSRS	**90100R-1-6T**	6	6	1	3	3
	90100R-2-6T	12		2	6	6
	90100R-4-6T	24		4	12	12

When installing the inserts, match the number on the top of insert to the number of the cutter body.





Spare Parts

Description		Spare Parts							
		Clamp Screw	Wrench	Cartridge		Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
				MAP-1806M 	MAP-1806S  (Bottom edge only)			 MP-1	
Without cartridge	**MSRS 90080R-○-4T**	SB-60120TR for Insert Clamp Tightening torque 7.5Nm	TT-25L	-	-	-	-	MP-1	HH16×45
	90100R-○-6T								HH20×55
	90125R-○-8T								-
Without cartridge	**MSRS 90080R-○-4T-M**			-	-	-	-		HH12×35
	90100R-○-6T-M								-
	90125R-○-8T-M								
With cartridge	**MSRS 90160R-○-8T(-M)** ≀ **90315R-○-14T(-M)**			MAP-1806M*1	MAP-1806S*2 for Shim Clamp Tightening torque 3.5Nm	SB-40140TR	DT-15		

Notes) *1 : MAP-1806M is only for the bottom edge (1st stage) of MSRS90..R-1.
*2 : MAP-1806S is only for the bottom edge (1st stage) of MSRS90..R-2(4)... Use it only for the bottom edge (1st stage).

How to attach the cartridge : You need to tighten 2 clamp screws to fix the cartridge. Tighten the slant screw first and then tighten the other screw.

When using the anti-seize compound (MP-1), apply it in a thin layer to the clamp screw.

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Vc (m/min)	
	Standard NB3 + NB4	Low Cutting Force NB3P + NB4P	MEGACOAT	
			PR1230	**PR1210**
Soft Steel (SS etc.)	0.1~0.2~0.25	0.1~0.2~0.25	★ 120~150~220	☆ 120~150~220
Carbon Steel (SxxC etc.)	0.1~0.2~0.25	0.1~0.2~0.25	★ 100~150~200	☆ 100~150~200
Alloy Steel (SCM etc.)	0.1~0.15~0.2	0.1~0.15~0.2	★ 100~150~200	☆ 100~150~200
Mold Steel (SKD/NAK etc.)	0.1~0.15~0.2	0.1~0.12~0.15	★ 100~150~180	☆ 100~150~180
Gray Cast Iron (FC)	0.1~0.2~0.3	0.1~0.2~0.25	☆ 100~180~250	★ 100~180~250
Nodular Cast Iron (FCD)	0.1~0.2~0.25	0.1~0.18~0.2	☆ 100~180~220	★ 100~180~220
Stainless Steel (SUS etc.)	Not recommended.			
Aluminum / Copper	Not recommended.			

★: 1st Recommendation ☆: 2nd Recommendation

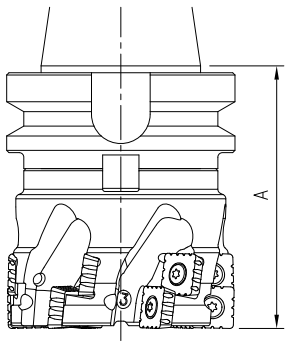
Heavy Milling Cutter MSRS90 NEW

Cutting Conditions (Shouldering)

● In case of MSRS90100R-1-6T

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Removal Rate (cc/min)
		Cutting speed	Feed rate		
Cast Iron	Less than 120mm	Vc=180m/min	fz=0.2mm/t	15×80	826
	120~200mm	Vc=180m/min	fz=0.2mm/t	15×40	413
	201mm and over	Vc=230m/min	fz=0.1mm/t	15×40	263
Carbon Steel	Less than 120mm	Vc=150m/min	fz=0.2mm/t	15×80	689
	120~200mm	Vc=150m/min	fz=0.2mm/t	15×40	344
	201mm and over	Vc=200m/min	fz=0.1mm/t	15×40	229

Overhang Length A (mm)



● In case of MSRS90100R-2-6T

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Removal Rate (cc/min)
		Cutting speed	Feed rate		
Cast Iron	Less than 120mm	Vc=180m/min	fz=0.2mm/t	30×50	1032
	120~200mm	Vc=180m/min	fz=0.2mm/t	30×30	619
	201mm and over	Vc=230m/min	fz=0.1mm/t	30×25	329
Carbon Steel	Less than 120mm	Vc=150m/min	fz=0.2mm/t	30×50	861
	120~200mm	Vc=150m/min	fz=0.2mm/t	30×30	517
	201mm and over	Vc=200m/min	fz=0.1mm/t	30×25	287

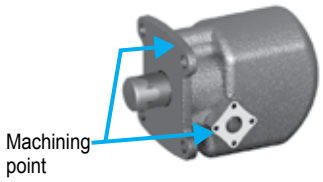
● In case of MSRS90100R-4-6T

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Removal Rate (cc/min)
		Cutting speed	Feed rate		
Cast Iron	Less than 140mm	Vc=180m/min	fz=0.2mm/t	60×20	826
	140~200mm	Vc=180m/min	fz=0.2mm/t	60×10	413
	201mm and over	Vc=230m/min	fz=0.1mm/t	60×10	263

Case studies

GGG45 (FCD450)

Industrial parts
Cutter and inserts
MSRS90100R-1-8T (ø100 ·6 inserts)
SPMT180616EN-NB3/NB4
(PR1210)
·Vc=150 m/min
·ap × ae=6 × 65 mm
·fz=0.15mm/t
(Vf=430mm/min)



MSRS90(PR1210)	Chip Removal=258cc/min.
Competitor B	107cc/min.

· MSRS90 more than doubled the cutting efficiency compared with competitor B.
· Competitor B machined with 2 passes (ap x ae = 3 x 65 mm).
MSRS90 machined with only 1 pass.
· Cutting time was reduced.
(Evaluation by the user)

20CrMo5 (SCM420)

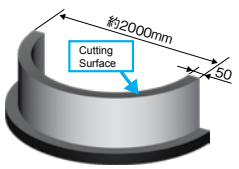
Construction machine part
Cutter and inserts
MSRS90125R-1-8T (ø125 ·8 inserts)
SPMT180616EN-NB3/NB4
(P)R1230)
·Vc=200 m/min
·ap × ae=10 × 50 mm
·fz=0.1mm/t
(Vf=400mm/min)

MSRS90(PR1230)	Chip Removal=200cc/min.
Competitor C	153cc/min.

· MSRS90 improved the cutting efficiency to 1.3 times that of competitor B.
· Competitor C machined with ap × ae=5 × 50mm
· Tool cost is reduced to 1/3 although competitor C is expensive using 2-corner insert.
MSRS90 reduced machining cost as well as improved cutting efficiency.
(Evaluation by the user)

Mold Steel (SKD)

Shipbuilding parts
Cutter and inserts
MSRS90160R-1-8T (ø160 ·8 inserts)
SPMT180616EN-NB3/NB4
(PR1230)
·Vc=150 m/min
·ap × ae=10 × 10~50 mm
·fz=0.1mm/t
(Vf=240mm/min)

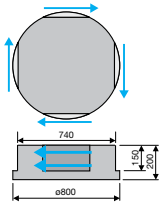


MSRS90(PR1230)	Chip Removal=120cc/min.
Competitor D	60cc/min

· MSRS90 more than doubled the cutting efficiency compared with competitor D.
· Competitor D machined with ap × ae=5 ×10~50mm
⇒Low cutting resistance of MSRS90 enabled twice as large ap as that of competitor.
· It can double the ap as well as increase the cutting speed (Vc=100 ⇒ 150).
⇒Cutting efficiency was improved (by achieving reduction in cutting time).
(Evaluation by the user)

Alloy Steel (SNCM)

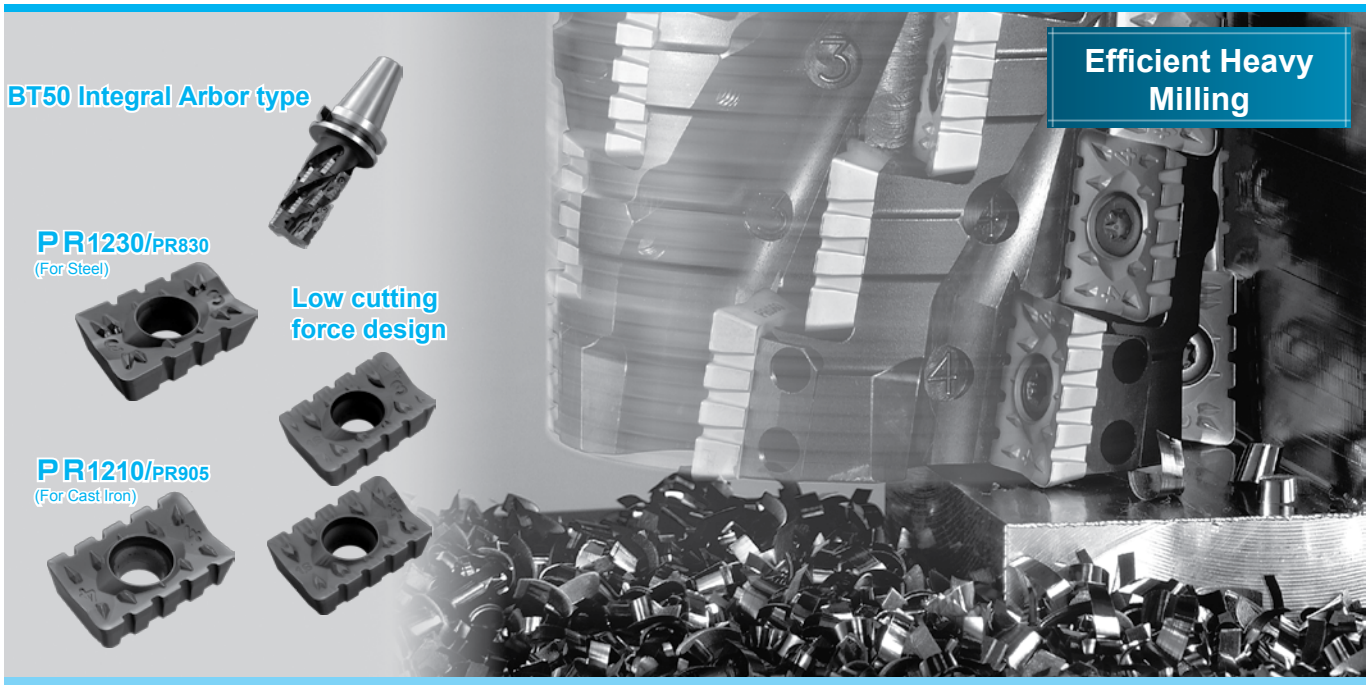
Power generation parts
Cutter and inserts
MSRS90125R-1-8T (ø125 ·8 inserts)
SPMT180616EN-NB3/NB4
(PR1230)
•Vc=160 m/min
•ap × ae=10 × 0~20 mm
•fz=0.15mm/t
(Vf=500mm/min)



MSRS90(PR1230)	12 surfaces/c
Competitor E	8 surfaces/c

· MSRS90 showed 1.5 times longer tool life than that of competitor E.
· Competitor E machined with 2 passes on a side (ap x ae = 12 x 0 to 10 mm).
Competitor E was poor in feed rate (Vf=400 mm/min). ⇒ Cutting efficiency was improved by MSRS90 (by achieving reduction in cutting time).
· Although competitor E makes large noise due to high cutting resistance, MSRS90 operates with fairly small noise.
(Evaluation by the user)

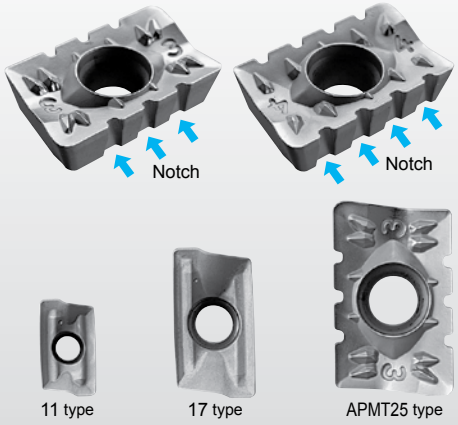
Heavy Milling Cutter MSR



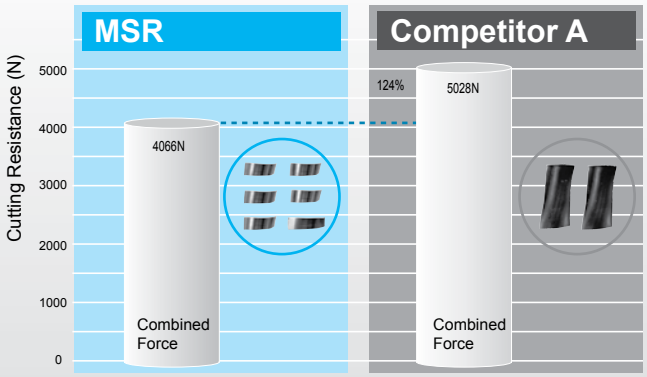
Notched insert reduces cutting force, and enables high feed rates by reducing chattering.
Improved chip evacuation and low resistance due to the special chipbreaker.
Enables heavy milling and deep cutting, and also drastically improves cutting efficiency.
(Reduction of cutting time)

Notched Insert

Size Comparison (Full-Scale)

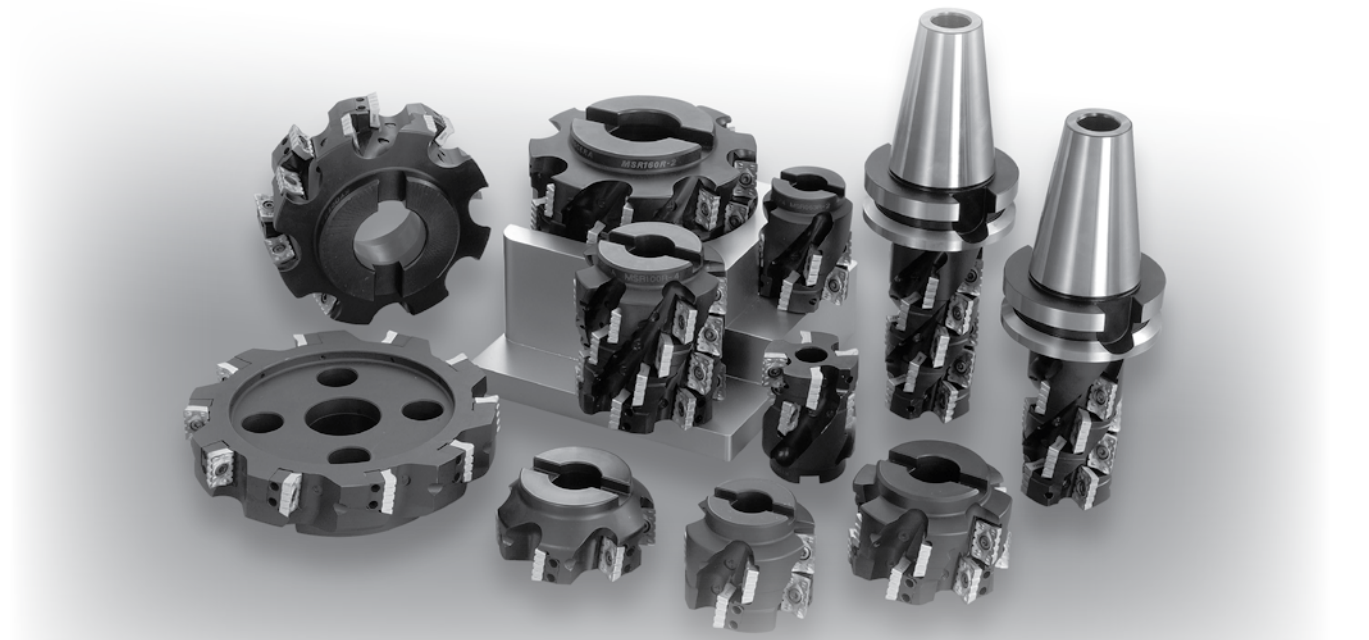


Comparison of Cutting Resistance

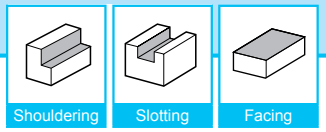


*The exclusive notched chipbreaker provides low resistance and good chip evacuation.

(Internal evaluation)

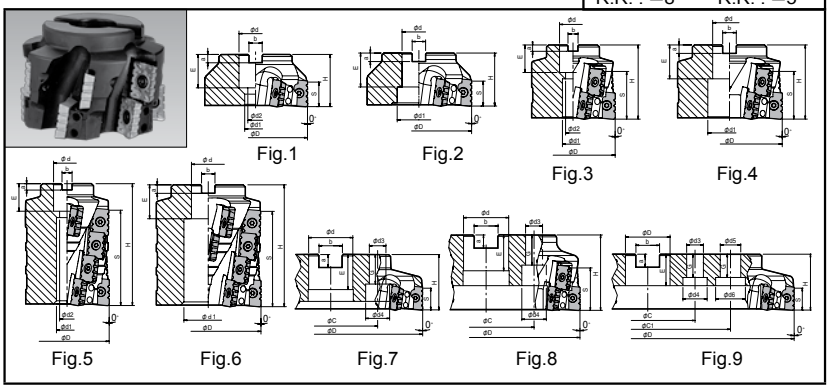


Heavy Milling Cutter MSR



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-○○			MAP-2506	SB-40140TR	DT-15	
	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 Inserts	No. of Flutes	No. of Stages	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	18	26	-	-	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	18	26	-	-	101.6	-	32	Fig.7	10.3
250R-2M	○	24		2					80				45								Fig.8	14.2
315R-1M	●	14	14	1	315	60	-	-	60	35	14	25.4	23.5	17	27	22	32	101.6	177.8	25	Fig.9	15.5

·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 Inserts	No. of Flutes	No. of Stages	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	18	26	-	-	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	18	26	-	-	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	17	27	22	32	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

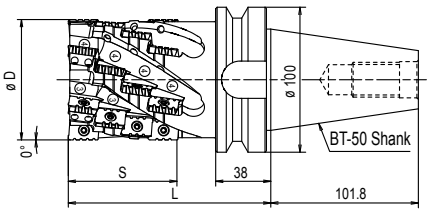


Fig.1

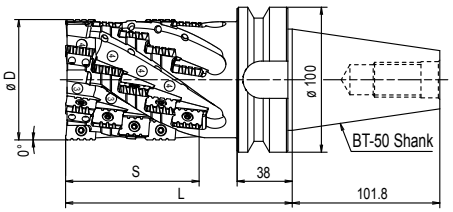


Fig.2

Toolholder Dimensions (BT50 Integral Arbor type)

Description	Std.	No. of Inserts	No. of Flutes	No.of Stages	Dimension (mm) øD	L	S	Rake Angle (°) A.R.	R.R.	Drawing	Weight (kg)	Spare Parts: Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-seize Compound
MSR 063R-BT50-4	●	16	4	4	63	160	90	+9°	-5°	Fig.1	5.7	SB-60120TR	TT-25L	-	-	-	MP-1
063R-BT50-5	●	20		5		180	111			Fig.2	6.2	for Insert Clamp					
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 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 ➔ M16			
	 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···				

Recommended Cutting Conditions see page ➔ M78

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 cut 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)

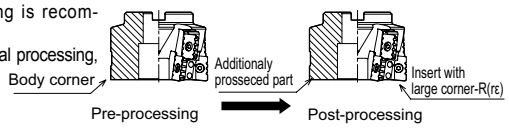
Description	No. of Insert	No. of Flute	No. of Inserts With Notch NB3	NB4
MSR 100R-1	6	6	3	3
100R-2	12		6	6
100R-4	24		12	12

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)

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Insert Grade (Cutting Speed Vc : m/min)				
	Low Resistance	Universal	MEGACOAT		PVD Coated Carbide		
	NB3P+NB4P	NB3+NB4	**PR1230**	**PR1210**	**PR660**	**PR830**	**PR905**
Cast Iron	0.15	0.2	-	★ 100～**150**～200	-	-	☆ 100～**140**～180
Carbon Steel	0.15	0.2	★ 100～**150**～200	-	☆ 100～**140**～180	☆ 100～**150**～180	-

※For MSR, cutting speed should be carefully adjusted depending on the length of toolholder protruding from the end of machine spindle.
・When the protruding length of toolholder is small, set the cutting speed to slightly higher than the recommended cutting couditions.
・When the protruding length of toolholder is large, set the cutting speed to slightly lower than the recommended cutting couditions.

★: 1. Recommendation ☆: 2. Recommendation

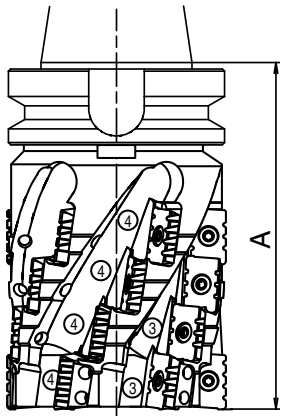
Cutting Conditions

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

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

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

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

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

Note) MSR...-4 (No. of stage)
Slotting is not recommended.

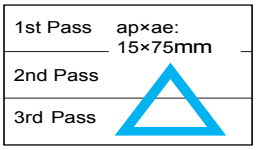
Q&A

Q-1 What is the most recommended cutting condition for MSR?

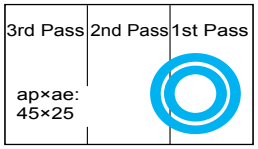
A-1 Vc=150m/min, fz=0.2mm/t, larger cutting depth and smaller cutting width

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 cutting

◎Effective for increasing cutting speed and decrease feed rate.
Vc=150m/min, fz=0.2mm/t
↓
Vc=200m/min, fz=0.15mm/t

Q-5 What is the tool life?

A-5 Chip weight: 700kg/Corner (Result by PR660)
Cutting time: 90min. (calculated value)
Cutting distance: 65m (calculated value)
•How great 1000cc/min? ⇒ About 7.8kg chips removed per minute
•Tool life time = 700kg (Chip weight)÷7.8kg (Chip evacuation amount per 1min) = 90min
•Cutting distance= 90min (Time by the end of tool life) x 717mm/min (Table feed ratio per 1min)=65m
*In case of cutting Vc=150m/min, apxae: 20x70mm, Vf=717mm/min.
*Tool : MSR100R-2 (6 Flutes)

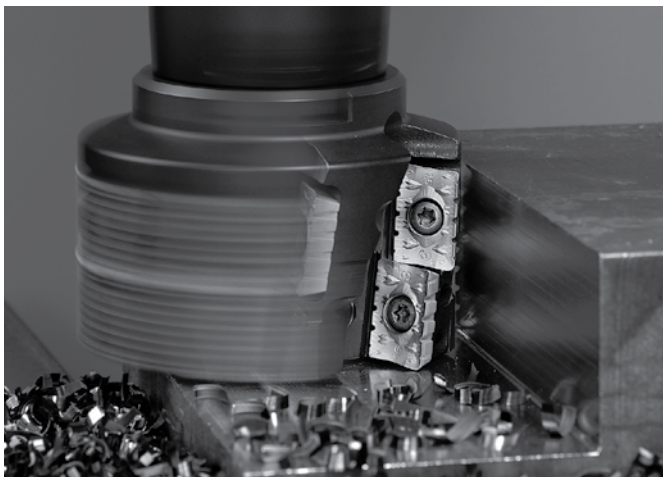
Q-6 How to reduce chattering.

A-6 If chattering is caused under.
●In case of chattering cutting 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

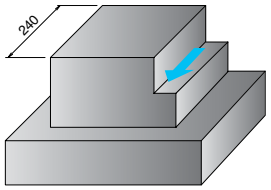
Case Studies



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.

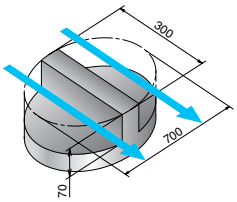
Since MSR is able to machine a greater ap than competitor.
Cutter A [dia 100mm (6 edges) Vc=150m/min fz=0.12mm/t (Vf=344mm/min) apxae=5x25mm] Chip Removal rate=43cc/min, the cutting time is drastically improved.

(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.

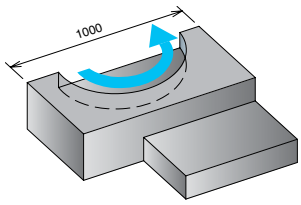
Since MSR is able to evacuate more than 10 times as many chips as competitor Cutter B [dia 125mm (6 Edges) Vc=120m/min fz=0.1mm/t (Vf=184mm/min) apxae=6x30mm] Chip Removal rate= 33cc/min, the cutting time is improved.

(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

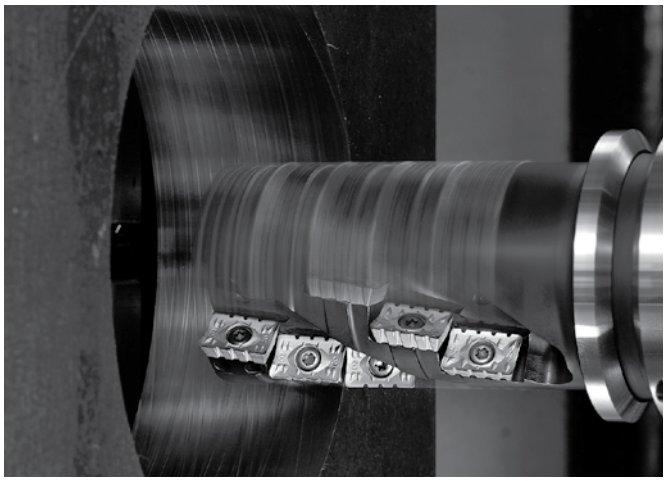
(PR660)



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.

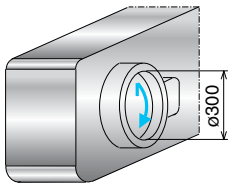
(Evaluation by the user)



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.

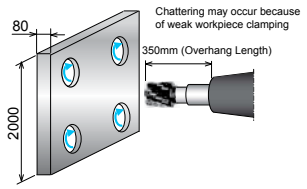
Even with double the feed rate, stable cutting was possible. and cutting efficiency was improved compared with Competitor Cutter D[Dia. 100(4 edges) Vc=125m/min fz=0.08mm/t (Vf=180mm/min) apxae=15x45mm]

(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.

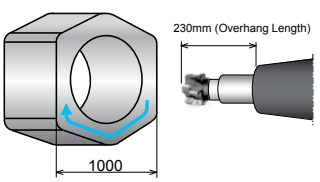
Comparing to Competitor Cutter E's [ø100 (4 Edges) Vc=250m/min fz=0.06mm/t (Vf=200mm/min) ap×ae=39×10mm] Chip Removal Amount = 78cc/min., MSR had Chip Removal Amount = 184cc/min due to its large cut (ap) and improved cutting efficiency by 2.3 times with quiet cutting sound.

(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)

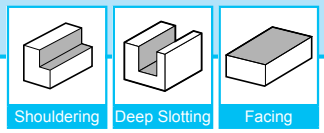


MSR	Chip Removal Rate = 165cc/min.
Competitor's Cutter F	Chip Removal Rate = 51cc/min.

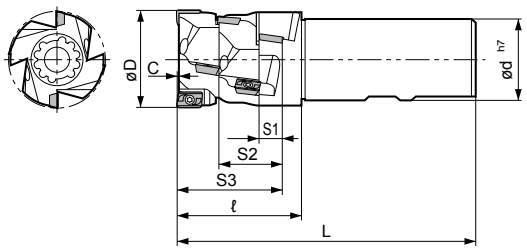
Comparing to Competitor Cutter F's [ø100 (6 Edges) Vc=90m/min fz=0.2mm/t (Vf=343mm/min) ap×ae=3×50mm] Chip Removal Amount = 51cc/min., MSR had Chip Removal Amount = 165cc/min. and improved cutting efficiency by 3.2 times.

(Evaluation by the user)

MHD Helical Endmill



MHD-SA Separate type (Base Unit A + 2 Front Pieces)

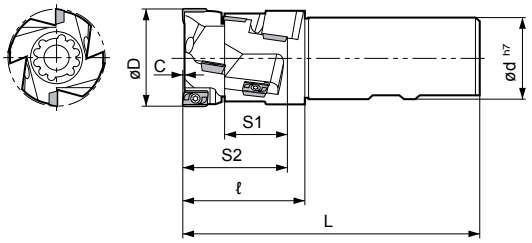


Toolholder Dimensions

Description	Std.	No. of Inserts	No. of Flutes	Dimension (mm)								Rake Angle (°)	
				øD	ød	L	ℓ	C	S1	S2	S3	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

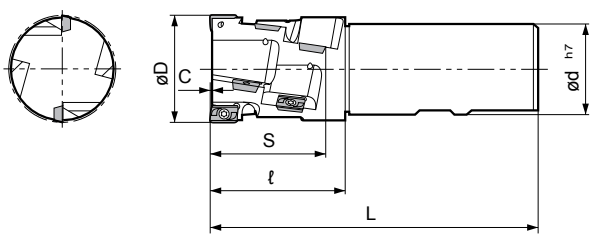
Description	Std.	No. of Inserts	No. of Flutes	Dimension (mm)								Rake Angle (°)	
				øD	ød	L	ℓ	C	S1	S2		A.R.	R.R.
MHD 40-S42-SB	●	10	2	40	42	154	64	0.9	31.9	53.8		+9°	-3°
50-S42-SB	●			50									-1°

・When using "-T" Insert, the finished diameter (øD) will be approx. 0.2mm smaller.

Applicable Inserts and Composition of Toolholder

Endmill	Applicable Inserts ➡ M17~M19	Base Unit ➡ M82	Front Piece (Middle) ➡ M83	Front Piece (End) ➡ M83
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

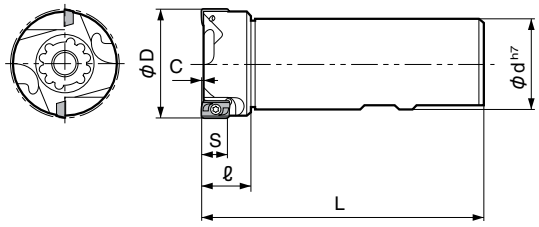
Description	Std.	No. of Inserts	No. of Flutes	Dimension (mm)						Rake Angle (°)		Applicable Inserts ➡ M17~M19
				øD	ød	L	ℓ	C	S	A.R.	R.R.	
MHD 20S-S20-C	●	3	1	20	20	96	24.5	0.5	17.5	+9°	-7°	NDKW090304ER NDKT090304ER-V
25-S25-C	●	8	2	25	25	116	41.5	0.5	34.5		-3°	NDKT090304ER-N1 / N2
32-S32-C	●	10		32	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 Inserts	No. of Flutes	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°

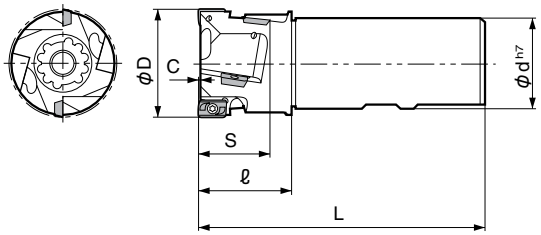
・When using "-T" Insert, the finished diameter (øD) will be approx. 0.2mm smaller.

Applicable Inserts and Front Piece

Endmill	Applicable Inserts ➡ **M17~M19**	Applicable Front Piece (Middle) ➡ **M83**	Applicable Front Piece (End) ➡ **M83, M143**
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. ➡ **M140**

MHD-B Base Unit B



Toolholder Dimensions

Description	Std.	No. of Inserts	No. of Flutes	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

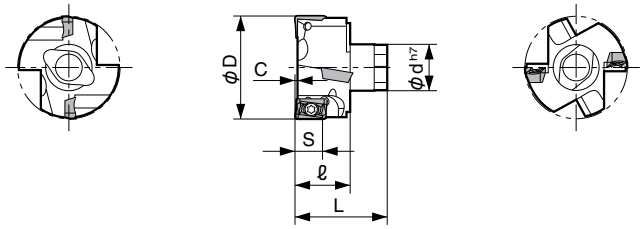
Endmill	Applicable Inserts ➡ **M18, M19**	Applicable Front Piece (End) ➡ **M83, M143**
MHD 40-S42-B	NDMM12T308ER-T / N2 / N3	MHD40-F, (MHD40-5RF)
50-S42-B		MHD50-F, (MHD50-6RF)

・Component in ( ) is for Radius Plus Mill Series. ➡ **M140**

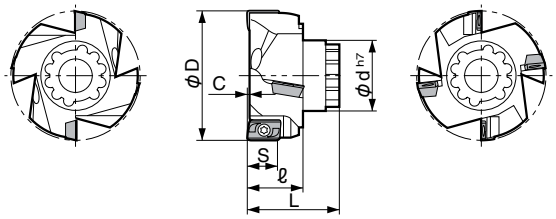
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MHD-F Front Piece

MHD32-F



MHD40/50-F

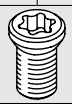
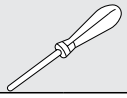
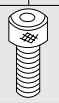


Toolholder Dimensions

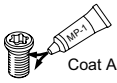
Description		Std.	No. of Inserts	No. of Flutes	Dimension (mm) øD	ød	L	ℓ	C	S	Rake Angle (°) A.R.	R.R.	Applicable Inserts ➡ M17~M19
MHD	32-F	●	4	2	32	14.4	28.6	17.1	0.7	9.0	+9°	-7°	NDKW090304ER NDKT090304ER-V / N1 / N2
	40-F	●			40	19	35	21.9	0.9	11.8		-3°	NDMM12T308ER-T / N2 / N3
	50-F	●			50	27	36					-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. ➡ M91
・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. ➡ M91



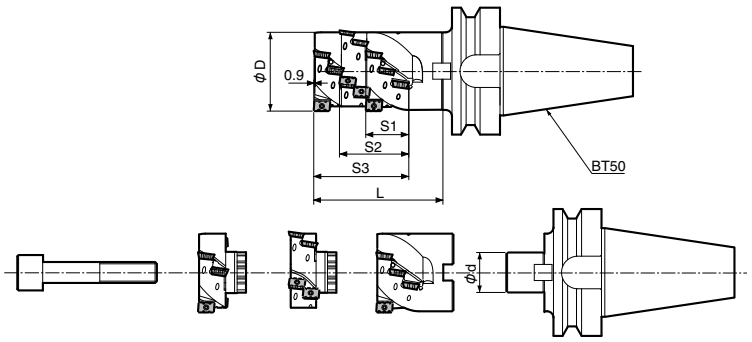
Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

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

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

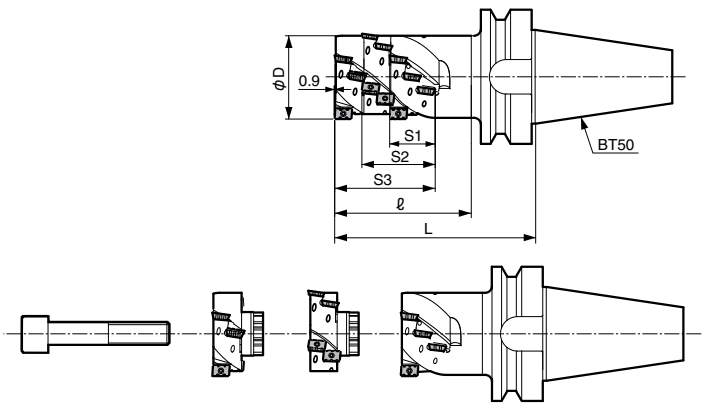
Description	Std.	No. of Inserts	No. of Flutes	Dimension (mm)							Rake Angle (°)		Weight (kg)
				øD	ød	L	C	S1	S2	S3	A.R.	R.R.	
MHD 63-FMA-SA	□	21	3	63	31.75	102.9	0.9	31.8	52.8	74.7	+9°	0°	1.6
80-FMA-SA	□	27		80	38.1	123.9			63.3	95.7			3.5
100-FMA-SA	□	40	4	100	50.8	129.9		42.3	73.8	106.2			5.7

・Above weight does not include arbor's weight.

Applicable Insert and Composition of Toolholder

Endmill	Applicable Inserts ➡ M19	Base Unit ➡ M87	Front Piece (2pcs) ➡ M88	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

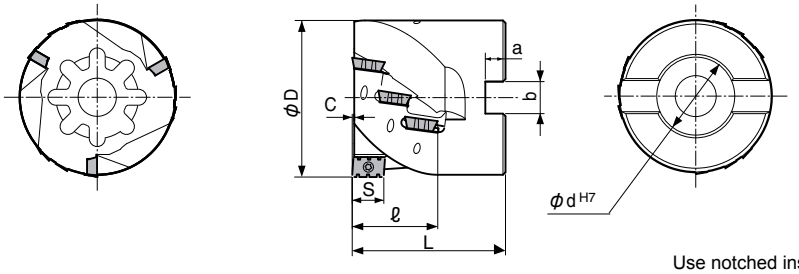
Description	Std.	No. of Inserts	No. of Flutes	Dimension (mm)							Rake Angle (°)		Weight (kg)
				øD	L	ℓ	C	S1	S2	S3	A.R.	R.R.	
MHD 63-BT50-SA	□	21	3	63	137	89	0.9	31.8	52.8	74.7	+9°	0°	5.3
80-BT50-SA	□	27		80	158	110			63.3	95.7			7.6
100-BT50-SA	□	40	4	100	168	129.9		42.3	73.8	106.2			10.2

Applicable Inserts and Composition of Toolholder

Endmill	Applicable Inserts ➡ M19	Base Unit ➡ M87	Front Piece (2pcs) ➡ M88
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 □ : Deleted from the next catalogue

MHD-FMA-A Base Unit (FMA Arbor-Free type)



Use notched insert (-N2, -N3).

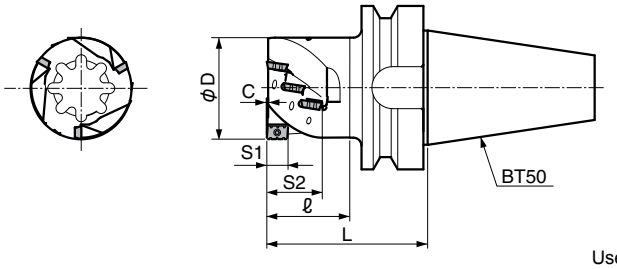
● Toolholder Dimensions

Description	Std.	No. of Inserts	No. of Flutes	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 ➡ **M88**	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 Inserts	No. of Flutes	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

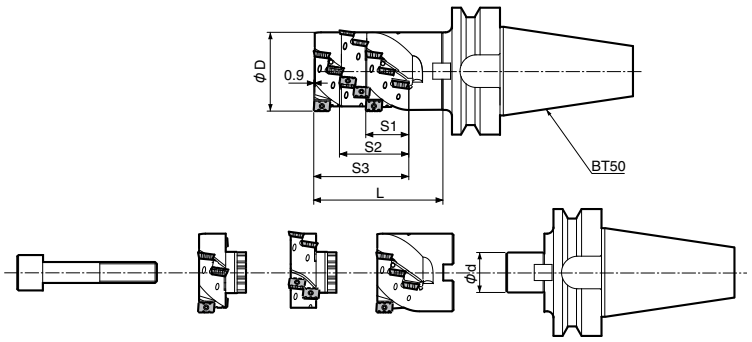
Endmill	Applicable Inserts ➡ **M19**	Applicable Front Piece ➡ **M88**
MHD 63-BT50-A	NDMM12T308ER-N2 / N3	MHD63-F
80-BT50-A		MHD80-F
100-BT50-A		MHD100-F

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

MHD 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

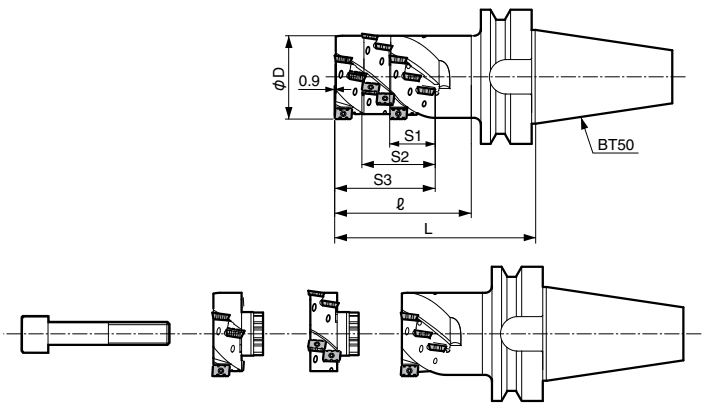
Description	Std.	No. of Inserts	No. of Flutes	Dimension (mm)							Rake Angle (°)		Weight (kg)
				øD	ød	L	C	S1	S2	S3	A.R.	R.R.	
MHD 63-FMA-SA	□	21	3	63	31.75	102.9	0.9	31.8	52.8	74.7	+9°	0°	1.6
80-FMA-SA	□	27		80	38.1	123.9			63.3	95.7			3.5
100-FMA-SA	□	40	4	100	50.8	129.9		42.3	73.8	106.2			5.7

・Above weight does not include arbor's weight.

Applicable Insert and Composition of Toolholder

Endmill	Applicable Inserts ➡ M19	Base Unit ➡ M87	Front Piece (2pcs) ➡ M88	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

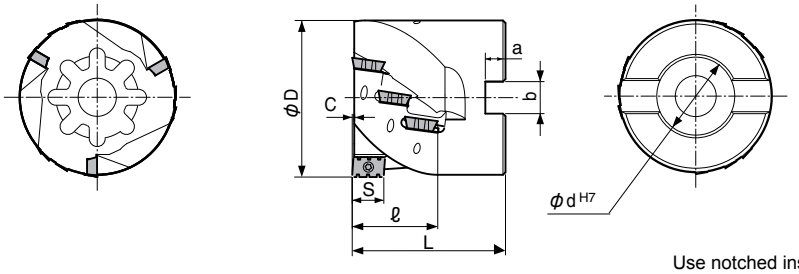
Description	Std.	No. of Inserts	No. of Flutes	Dimension (mm)							Rake Angle (°)		Weight (kg)
				øD	L	ℓ	C	S1	S2	S3	A.R.	R.R.	
MHD 63-BT50-SA	□	21	3	63	137	89	0.9	31.8	52.8	74.7	+9°	0°	5.3
80-BT50-SA	□	27		80	158	110			63.3	95.7			7.6
100-BT50-SA	□	40	4	100	168	129.9		42.3	73.8	106.2			10.2

Applicable Inserts and Composition of Toolholder

Endmill	Applicable Inserts ➡ M19	Base Unit ➡ M87	Front Piece (2pcs) ➡ M88
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 □ : Deleted from the next catalogue

MHD-FMA-A Base Unit (FMA Arbor-Free type)



Use notched insert (-N2, -N3).

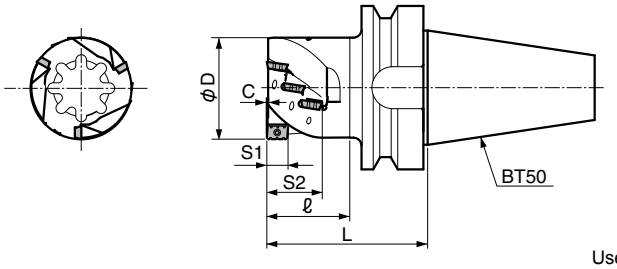
● Toolholder Dimensions

Description	Std.	No. of Inserts	No. of Flutes	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 ➡ M88	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

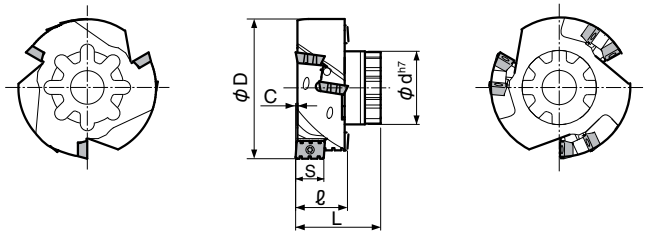
Description	Std.	No. of Inserts	No. of Flutes	Dimension (mm)							Rake Angle (°)		Weight (kg)
				øD	L	ℓ	C	S1	S2		A.R.	R.R.	
MHD 63-BT50-A	●	9	3	63	94.1	46.1	0.9	11.8	31.8		+9°	+0°	4.5
80-BT50-A	●			80									5.5
100-BT50-A	●	16	4	100	104	66.0			42.3				6.8

● Applicable Inserts and Front Piece

Endmill	Applicable Inserts ➡ M19	Applicable Front Piece ➡ M88
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)

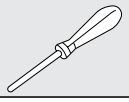
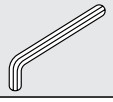
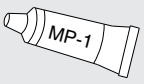


Use notched insert (-N2, -N3).

Toolholder Dimensions

Description	Std.	No. of Inserts	No. of Flutes	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 ➔ M86	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 ➔ M87	MHD 63-FMA-A			HH16X90	LW-14	
	80-FMA-A			HH20X110	LW-17	
	100-FMA-A			HH24X110	LW-19	
Arbor Integral Type ➔ M86	MHD 63-BT50-SA			HH16X65	LW-14	
	80-BT50-SA			HH20X90	LW-17	
	100-BT50-SA			HH24X90	LW-19	
Base Unit ➔ M87	MHD 63-BT50-A			HH16X65	LW-14	
	80-BT50-A			HH20X90	LW-17	
	100-BT50-A			HH24X90	LW-19	
Front Piece ➔ M88	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. ➔ M91

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 ➔ M17, M18				Applicable Inserts ➔ M18, M19		
			 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 **M90**.

◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		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 cutting with long overhang length or using long shank types.
・Reduce the cutting speed by 20-50% when cutting with multiple front pieces.
・Compressed air is recommended to aid in chip evacuation.

★: 1st Recommendation ☆: 2nd Recommendation

No. of inserts to be installed in the Plus Mill

Description		No. of Inserts	No. of Flutes	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 Inserts	No. of Flutes	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	8		
	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 cut the workpiece and it may damage the toolholder body.

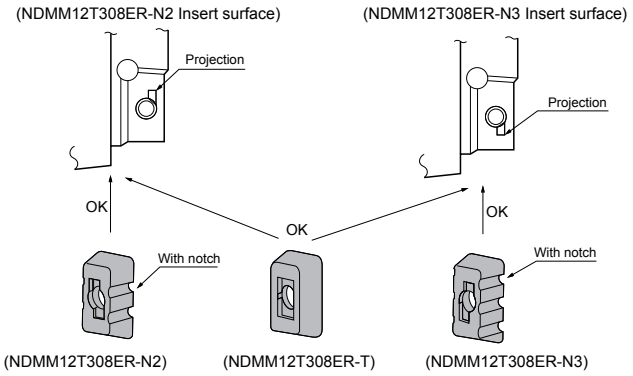
Description of Notched Insert	Applicable Toolholder In case of having insert installation mark
NDKT 090304ER-N1 / N2	MHD25,32
NDMM 12T308ER-N2 / N3	MHD40,50,63,80,100

In case of "having insert installation mark"

Caution during insert installation

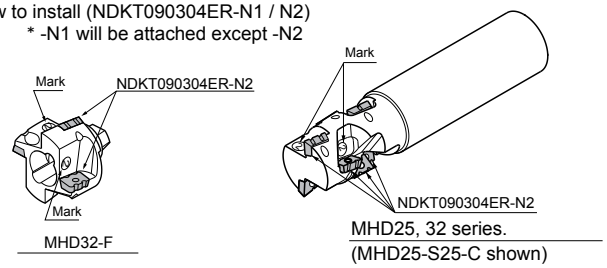
1) NDMM12T308ER-N2 or -3 in the insert pocket with projection (only MHD40 / 50)
2) ND□□○○○○○○ER-N2 in the insert pocket marked ②
3) ND□□○○○○○○ER-N3 in the insert pocket marked ③

1. How to install (MHD40, 50)

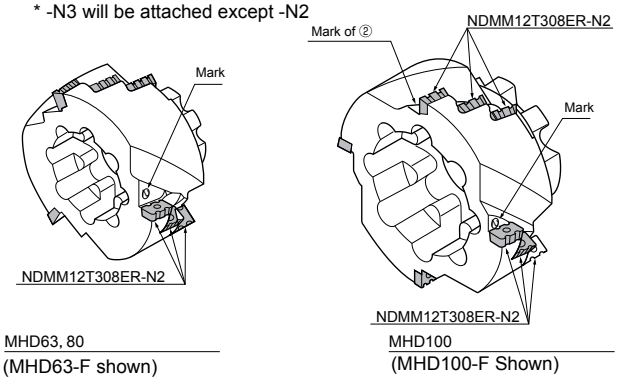


2. How to install (MHD25, 32, 63, 80, 100)

● How to install (NDKT090304ER-N1 / N2)
* -N1 will be attached except -N2

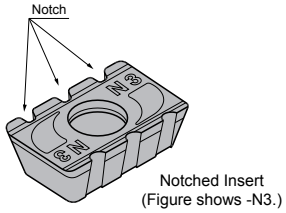


● How to install (NDMM12T308ER-N2 / N3)
* -N3 will be attached except -N2



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 Flutes	No. of Inserts	Plus Mill ➔ M82~M83, M87~M88				Radius Plus Mill ➔ 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				
		10		2	41.8	**HH8X50**		1	**MHD32-4RF**	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.

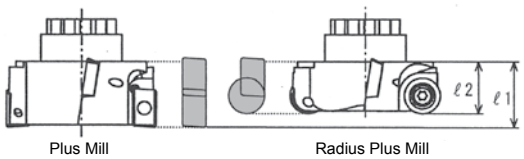


Fig.1

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)

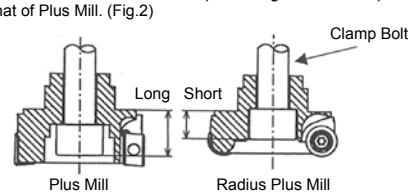
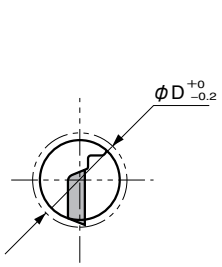


Fig.2

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



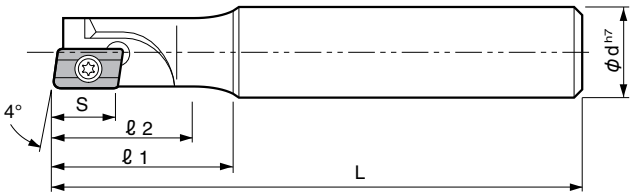


Fig.1

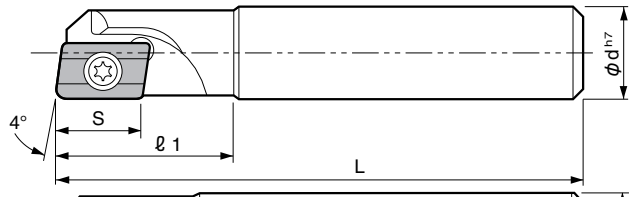


Fig.2

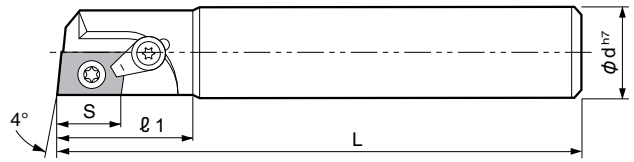


Fig.3

Toolholder Dimensions

Description	Std.	No. of Inserts	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
DMC 811-S16	●		11						+3°	-10°				
DMC 812-S16	●		12			31	20		+5°	-10°				
DMC 813-S16	●		13			28.5			+5°	-9°				
DMC 814-S16	●		14		100	33.5	25		+6°	-8°				
DMC 815-S16	●		15						+6°	-8°				
DMC 816-S16	●	2	16			31			+6°	-4°				
DMC 818-S20	●		18	20					+6°	-3°				
DMC 820-S20	●	3	20		120	36	30		+8°	-6°				
DMC 822-S25	●		22	25					+8°	-5°				
DMC 825-S25	●		25			46	40		+8°	-5°				
DMC 810	●	1	10	10	70	20	-	8.5	+3°	-6°	Fig.2		SB-2545TR	FT-8
DMC 812	●		12	12	80	25			+3°	-5°				
DMC 014	●	1	14	16	90	25	-	11.0	+3°	-4°	Fig.2		SB-3060TR	FT-10
DMC 016	●		16						+4°	-2°				
DMC 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
DMC 320SX	●		20	20	110					-3°	Fig.3	CPS-2TR	SB-4065TR	
DMC 325SX	●	2	25	25	120	40				-2°				
DMC 332SX	●		32	32	130					0°				
DMC 340SX	●		40	32	150					0°				
DMC 320SX-200	●	1	20	20	200	50	-	14.0	+3°	-3°	Fig.2	-	SB-4065TR	FT-15
DMC 325SX-220	●	2	25	25	220	60				-2°				
DMC 332SX-250	●		32	32	250	80				0°				

Applicable Inserts

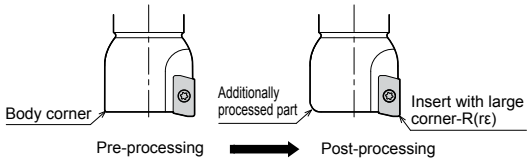
Toolholder	Applicable Inserts ➡ M18		
DMC8○○(-S○○)	-	NDCT 090204TR 090204FR	NDMM 090204ER-SP
DMC0○○		NDCT 120208TR 120208FR	NDMM 120204ER-SP 120208ER-SP
DMC 316SXT	NDCW 150302TR	NDCT 150308TR 150308FR (NDCT 150308TRX)	NDMM 150304ER-SP 150308ER-SP
DMC 320SX	150304TR		
DMC 325SX	150308TR		
DMC 332SX	150320TR		
DMC 340SX	150330TR		
DMC 320SX-200	150340TR		
DMC 325SX-220	(NDCW 150308TRX)		
DMC 332SX-250	(NDCW 150308FRX)		

( ) insert is also attachable, however toolholder will be out from insert bottom.(See lower section of **M93**)

■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

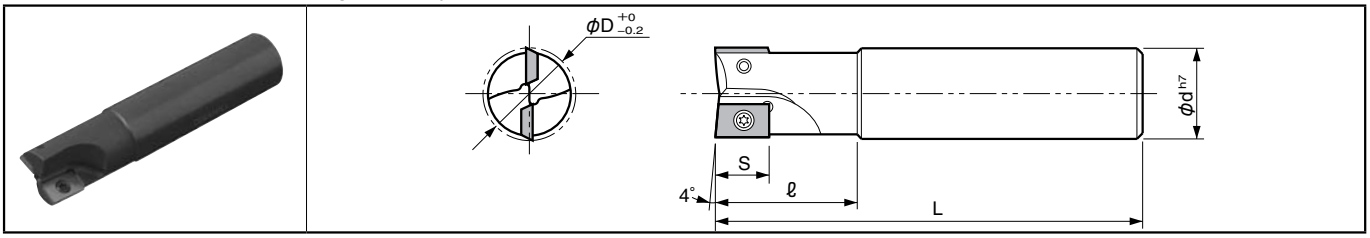
*R shape is recommended for additional processing toward the body corner. When applying chamfer shaped additional processing, do not cut away too much.



For recommended cutting conditions, see page ➡ **M156**

● : 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 Inserts	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°				
325H	●	2	25	25	120	40			+8°	-2°		SB-4065TR		
332H	●		32	32	130				+8°	0°				
340H	●		40		150				+8°	0°				

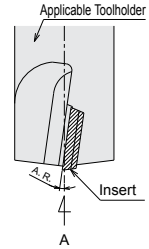
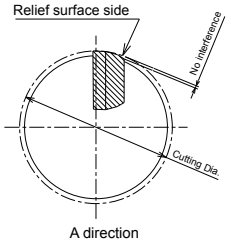
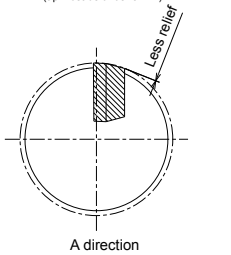
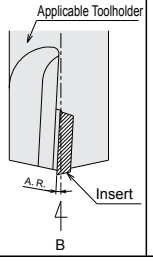
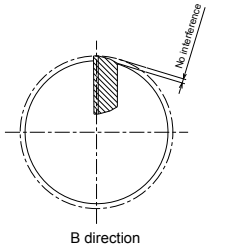
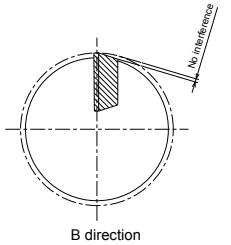
Applicable Inserts

Toolholder	Applicable Inserts ➡ M18			Applicable Inserts ➡ M20
				
DMC 316H 320H 325H 332H 340H	NDMM 150304ER-SP 150308ER-SP	NDCT 150308TRX	NDCW 150308TRX 150308FRX	NDCW 150302FRX-NE 150302FRX (PCD)

DMC-H type Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	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 (ap×ae)
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

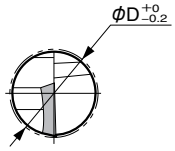
Insert / Description	NDCT . . . TRX NDCW . . . (T / F) RX	NDCW . . . TR NDCT . . . (T / F) R	Insert / Description	NDCT . . . TRX NDCW . . . (T / F) RX	NDCW . . . TR NDCT . . . (T / F) R
DMC-H	No interference of relief surface	Less relief (ap must be under 5mm.)	DMC-SX	No interference of relief surface	No interference of relief surface
					

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

Endmill for Aluminum Cutting

Shouldering | Slotting | Facing

MEAL (Aluminum Machining: with air hole)



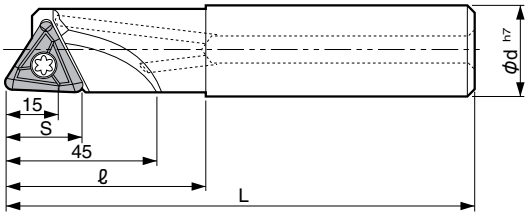
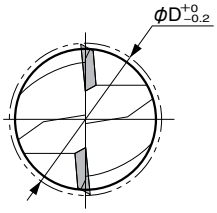


Fig.1



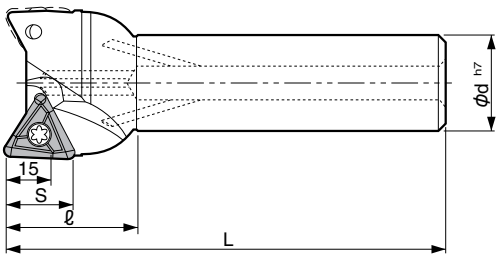
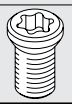
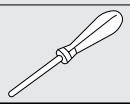
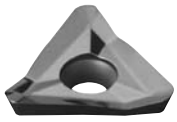


Fig.2

Toolholder Dimensions

Description	Std.	No. of Inserts	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)	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

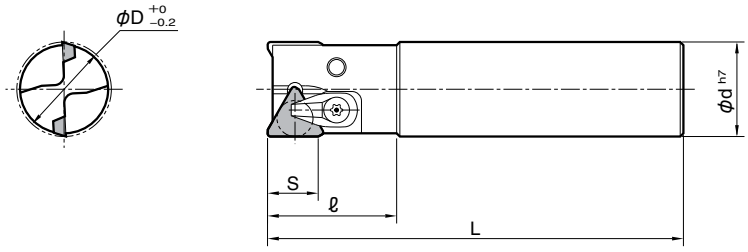
★ : 1st Recommendation

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

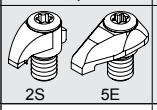
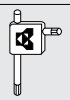
Endmill [TP □□ / TE □□ Insert]

Shouldering | Slotting | Facing

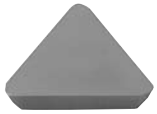
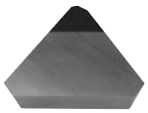
MTPS / MTES



Toolholder Dimensions

Description	Std.	No. of Inserts	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	**M20**	**M12**	**M12**	**M20**
					
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-NE 1603PTFR (PCD)

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed Vc: m/min)													Max. ap (mm)		
		Cermet			MEGACOAT		PVD Coated Carbide				Carbide		CBN	PCD			
		TN60	TN100M	TC60	PR1225	PR1210	PR630	PR730	PR830	PR905	PW30	KW10	KBN525 (KBN510)	KPD001 (KPD010)	Cutting Dia. (øD)	Slotting (ap)	Shouldering (ap×ae)
Stainless Steel	~0.12	-	☆ 120~200	☆ 120~200	★ 120~220	-	☆ 120~200	★ 120~200		-	☆ 80~120	-	-	-	~ø20	2	5×2
															ø25~	4	13×5
Carbon Steel	~0.15	☆ 150~200	★ 120~200	☆ 120~200	★ 120~250	-	☆ 120~200	★ 100~200		-	☆ 60~120	-	-	-	~ø20	3	6×2
															ø25~	6	13×5
Alloy Steel	~0.15	☆ 120~200	★ 100~180	☆ 100~180	★ 100~220	-	☆ 100~180	★ 100~180		-	☆ 60~120	-	-	-	~ø20	3	6×2
															ø25~	6	13×5
Mold Steel	~0.15	☆ 120~200	★ 100~180	☆ 100~180	★ 80~180	-	☆ 80~150	★ 80~150		-	☆ 60~120	-	-	-	~ø20	3	6×2
															ø25~	6	13×5
Cast Iron	~0.2	-	-	-	-	★ 100~220	-	-		☆ 80~150	-	☆ 80~150	★ 300~500	-	~ø20	3	6×2
															ø25~	6	13×5
Non-ferrous Metals	~0.2	-	-	-	-	-	-	-		-	-	★ 100~300	-	★ 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

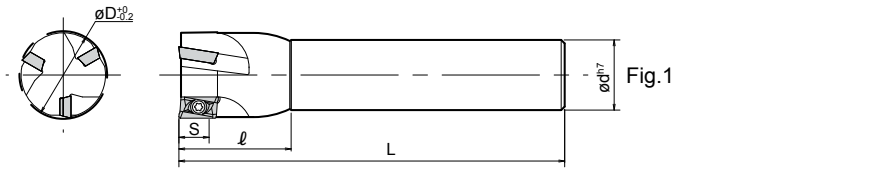


Fig.1

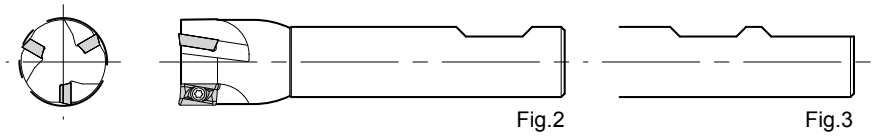


Fig.2 Fig.3

- Same Shank type

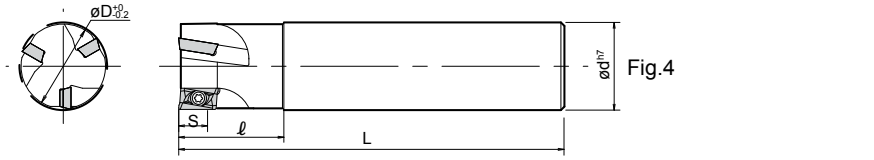


Fig.4

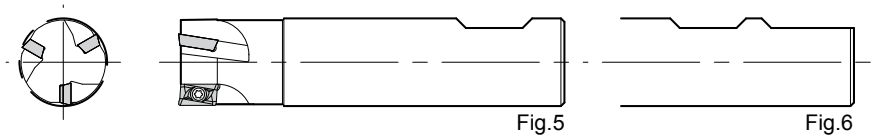


Fig.5 Fig.6

- Long Shank type

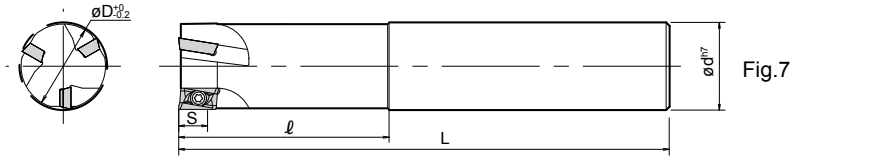


Fig.7

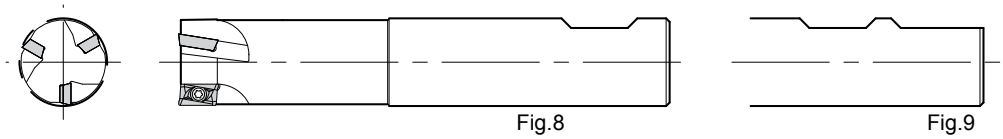


Fig.8 Fig.9

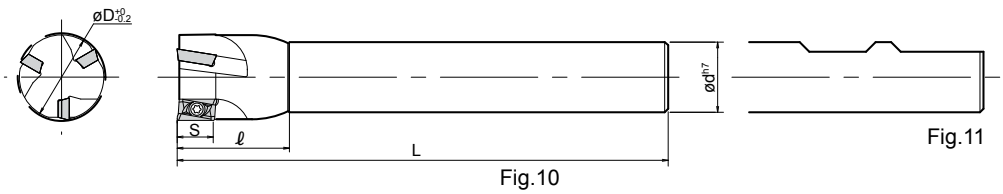


Fig.10 Fig.11

Applicable Inserts

Description	Applicable Inserts → **M17, 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 Inserts	Dimension (mm)					Rake Angle (°)		Drawing	Spare Parts		Applicable Inserts ⇒ M17, M18
					øD	ød	L	ℓ	S	A.R.	R.R.		Clamp Screw	Wrench	
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		+9°	-24°				
		16-S16-W		2	16	16	90	30			-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 Inserts	Dimension (mm)					Rake Angle (°)		Drawing	Spare Parts		Applicable Inserts ⇒ M17, M18
					øD	ød	L	ℓ	S	A.R.	R.R.		Clamp Screw	Wrench	
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			-11°	Fig.6			
		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)		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 Metals	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)	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 Metals	~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 cut 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

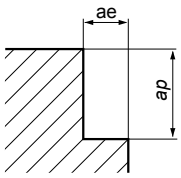
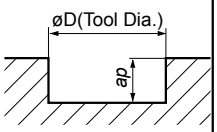
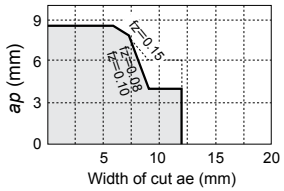
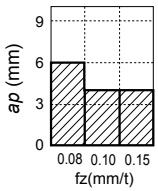
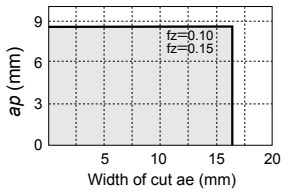
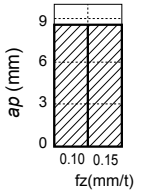
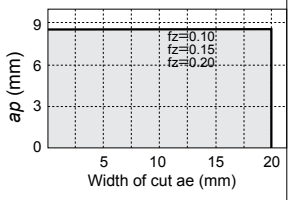
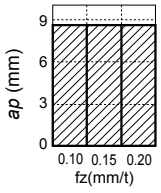
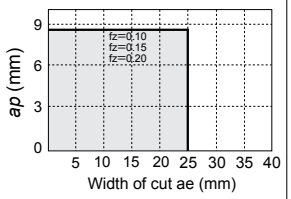
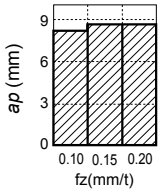
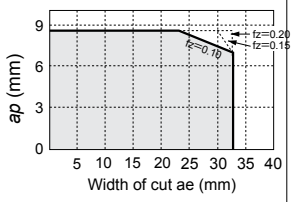
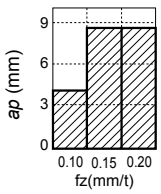
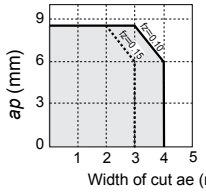
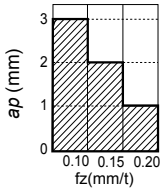
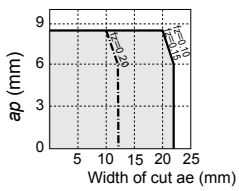
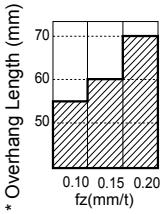
Description	No. of Insert	NDK□ 09 type		
		Without notch	With notch N1	With notch N2
MEA 30-S25 32-S25 (-...)	4	-	2	2
32-S32-W-5T 40-S32	5	-	3	2
40-S32-110W-6T 50-S32	6	-	3	3
63-S32 80-S32	8	-	4	4
MEA 10-S10 (-...) 12-S12-W	1	1	-	-
16-S16 (-...) 20-S20-Z2	2	-	1	1
20-S20 (-...) 25-S25	3	-	2	1
25-S25-W-4T 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

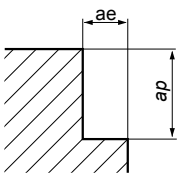
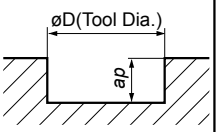
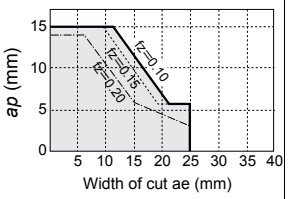
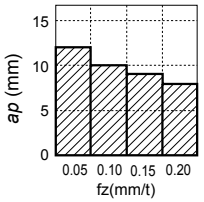
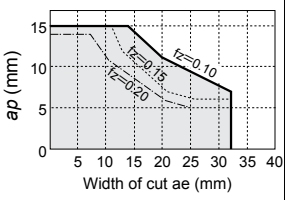
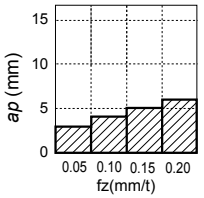
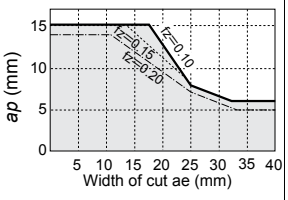
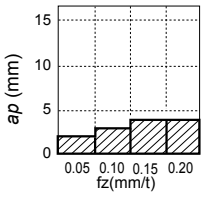
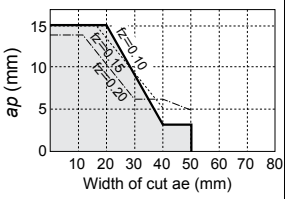
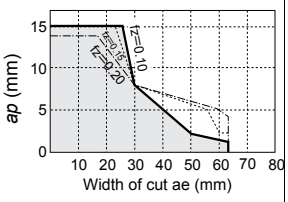
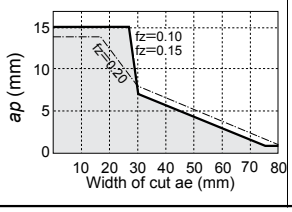
Cutting Performance of MEA

[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.

Multi-Function Cutting Endmill

Pocketing | Drilling | Shouldering | Deep Slotting | Facing

MEY

With Coolant Hole Standard (Weldon)

Standard (Straight)

Long Head (Straight)

Long Shank (Straight)

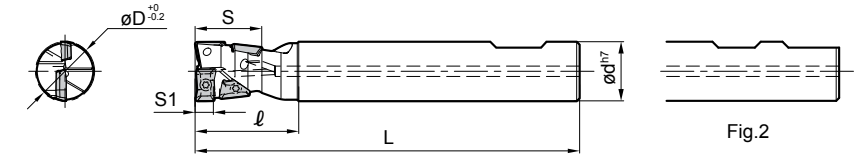


Fig.1

Fig.2

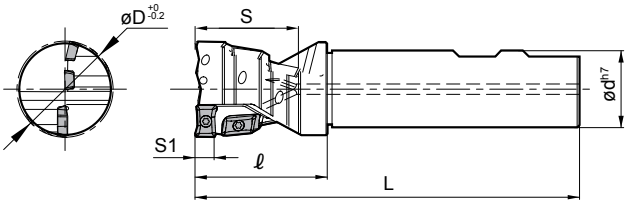


Fig.3

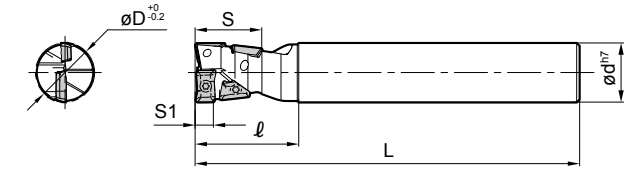


Fig.4

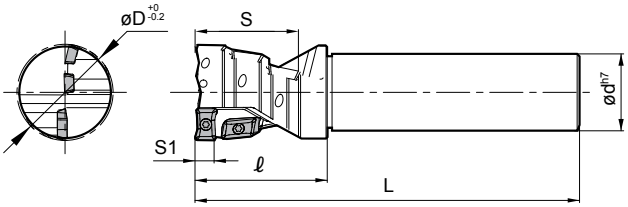


Fig.5

Toolholder Dimensions

Description			Std.	No. of Inserts	No. of Flutes	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 Inserts	No. of Flutes	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 ➔ M17 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	Insert Grade (Cutting Speed Vc : m/min) Cermet TN60	TN100M	TC60	MEGACOAT PR1225	PR1210	PVD Coated Carbide PR630	PR730	PR830	PR660	PR905	Carbide PW30	KW10
Stainless Steel	0.08~0.12	0.05~0.15				★ 120~220	-			☆ 100~180		-		
Carbon Steel	0.08~0.15	0.05~0.25				★ 120~250	-			☆ 120~200		-		
Alloy Steel	0.08~0.15	0.05~0.25				★ 100~220	-			☆ 100~180		-		
Mold Steel	0.08~0.12	0.05~0.15				★ 80~180	-			☆ 80~150		-		
Cast Iron	0.05~0.20	0.05~0.25				-	★ 100~220			-		☆ 100~200		

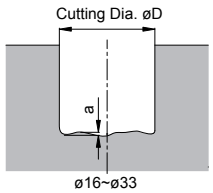
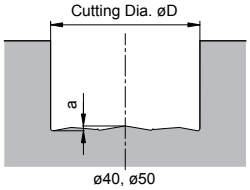
★ : 1st Recommendation

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	
ø20, ø21	0.64	
ø25, ø26	0.85	
ø32, ø33	1.12	
ø40	1.54	
ø50	1.65	

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

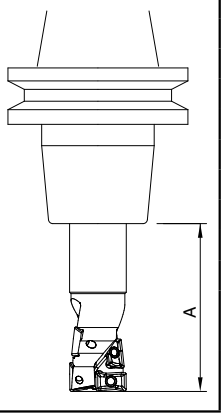
Multi-Function Cutting Endmill

◆ Cutting Performance of MEY

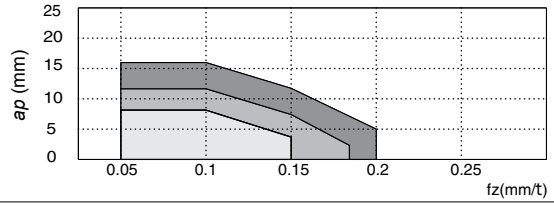
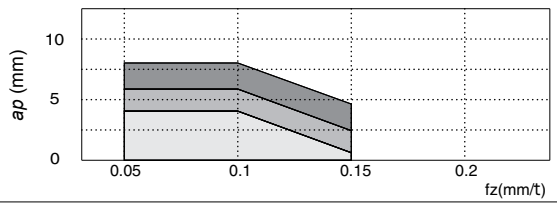
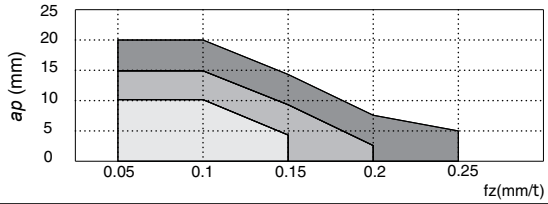
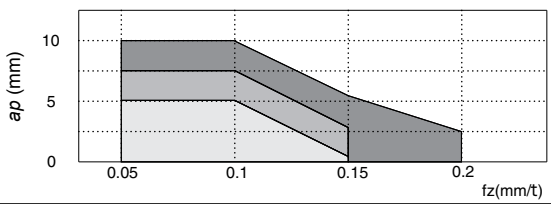
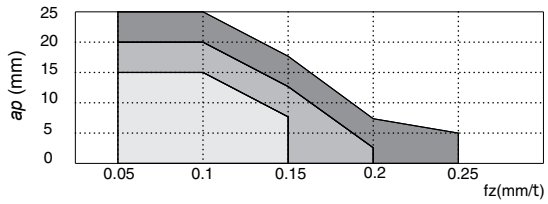
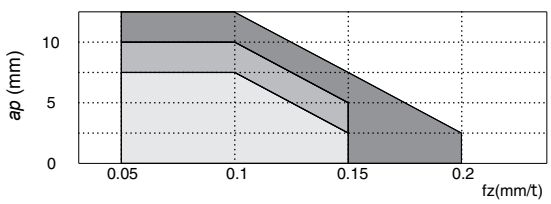
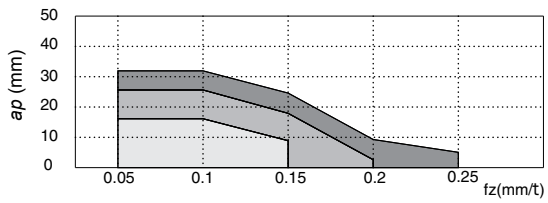
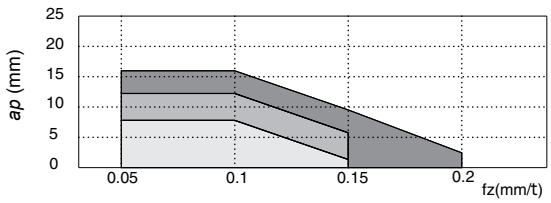
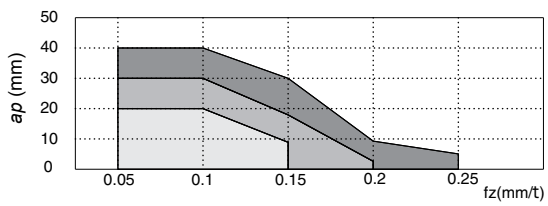
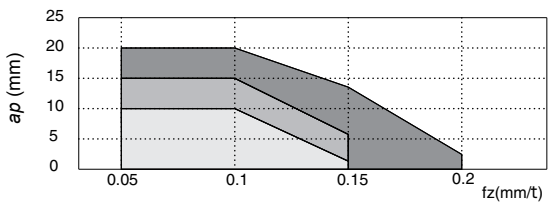
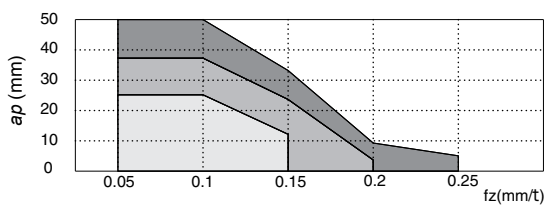
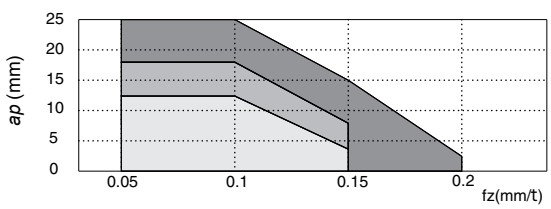
[Workpiece Material: C50 (S50C)]

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



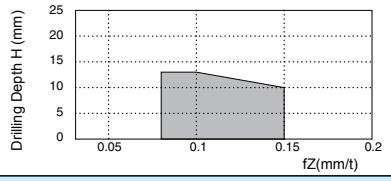
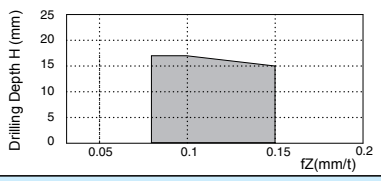
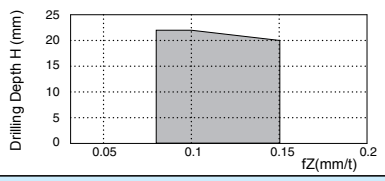
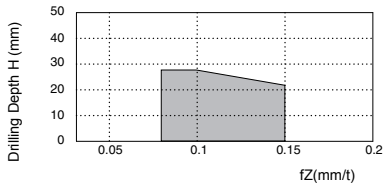
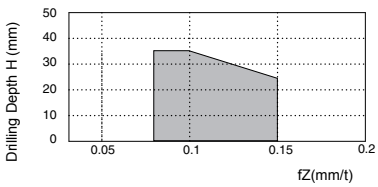
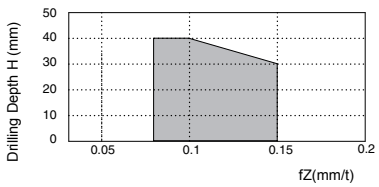
When using in [ ] dimension,
be careful that the chucking length to the shank may get too short.

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

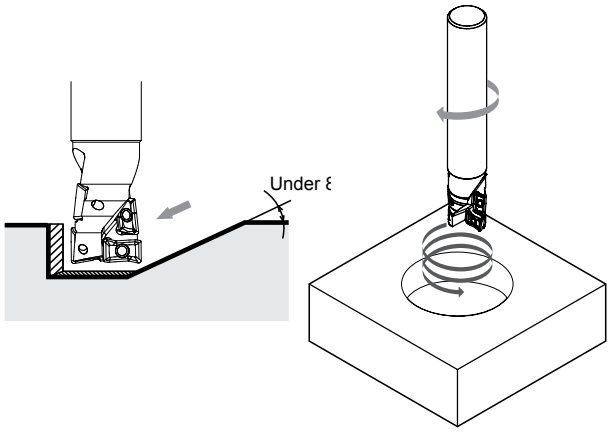
Drilling Depth [Standard / Long Head / Long Shank: C50 (S50C)]

MEY16-S16 MEY17-S16	MEY20-S20 MEY21-S20	MEY25-S25 MEY26-S25
		
MEY32-S32 MEY33-S32	**MEY40-S32**	**MEY50-S42**
		

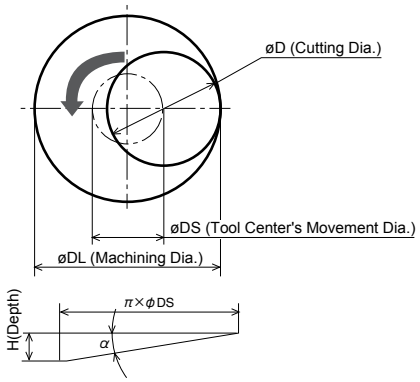
How to Use MEY Effectively

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



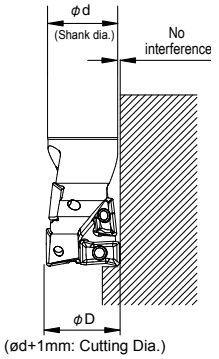
How to Find "øDS"
øDS=øDL-øD

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

Description	ϕD	ϕd
MEY17-S16..	17	16
MEY21-S20..	21	20
MEY26-S25..	26	25
MEY33-S32..	33	32



MEZ-G

Standard (Straight)

Standard (Weldon)

Long Head (Straight)

Long Shank (Straight)

With Coolant Hole (Weldon)

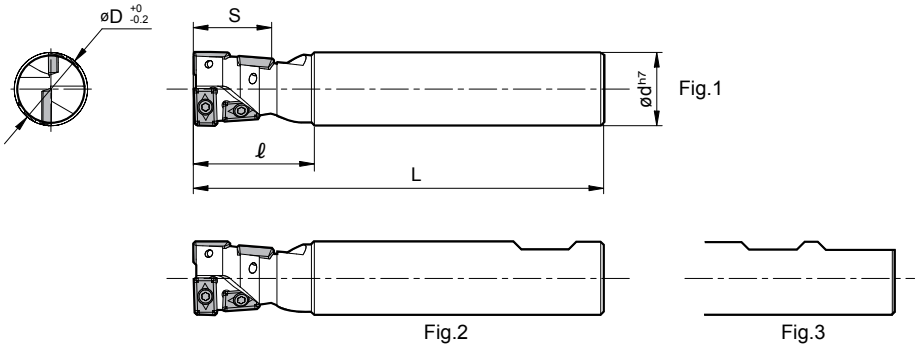


Fig.1

Fig.2

Fig.3

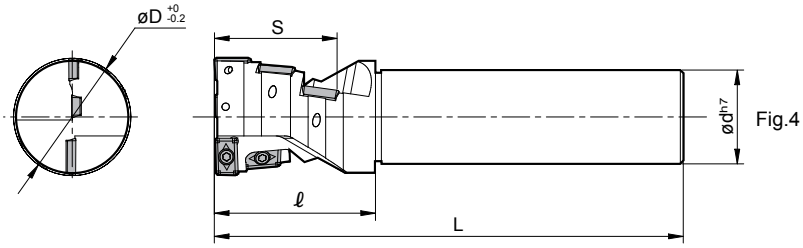


Fig.4

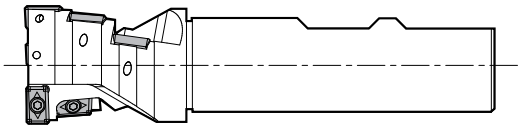


Fig.5

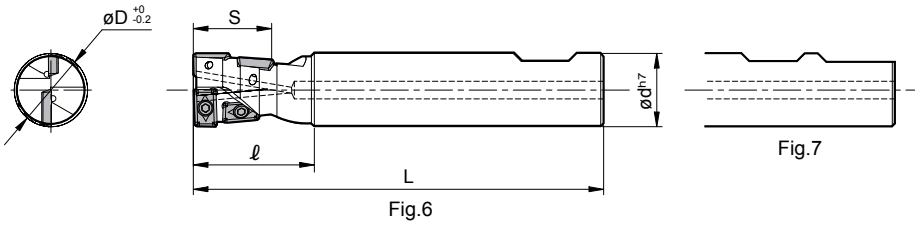
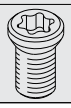
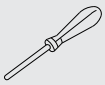


Fig.6

Fig.7

Toolholder Dimensions

Description		Std.	No. of Inserts	No. of Flutes	Dimension (mm)					Rake Angle (°)		Drawing	Spare Parts	
					øD	ød	L	ℓ	S	A.R.	R.R.		Clamp Screw 	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

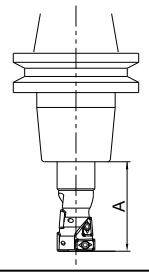
Applicable Inserts

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

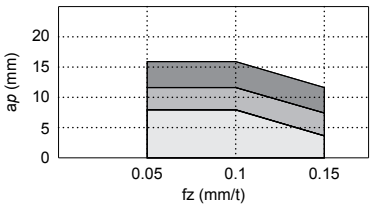
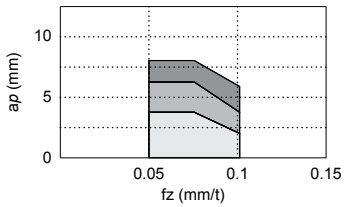
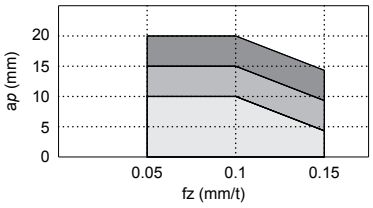
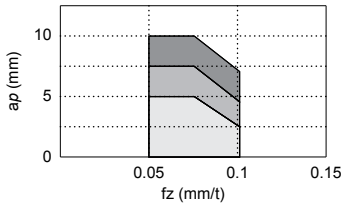
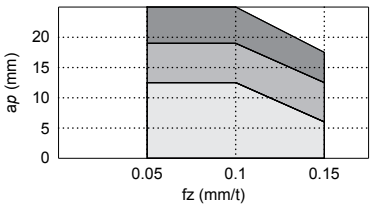
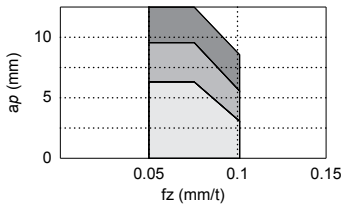
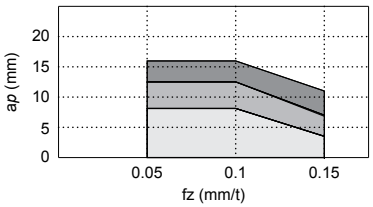
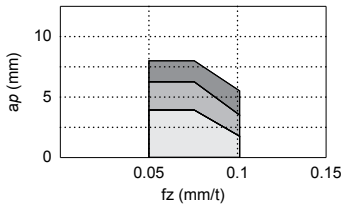
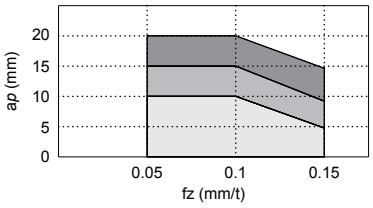
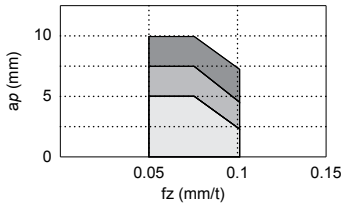
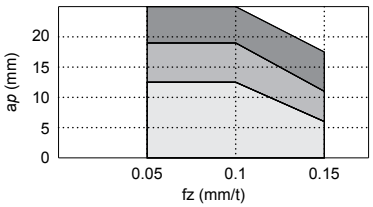
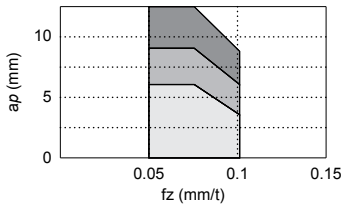
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

◆ Cutting Performance of Silver Drill Mill / Drill Mill

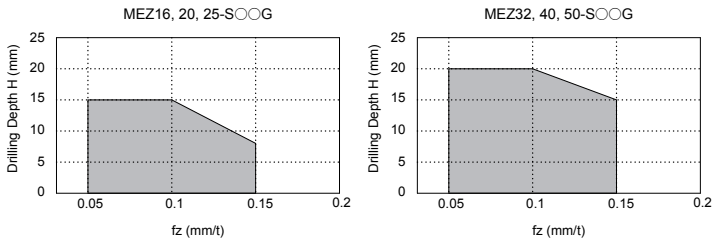
[Workpiece Material: C50 (S50C)]

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	

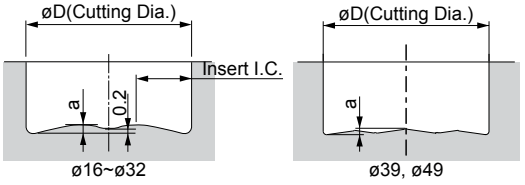
• When using in [ ] dimension, be careful that the chucking length to the shank may get too short.

Description	■ Shouldering (Cutting Width ae =øD/2) ▭ Part ae=øD/4	■ Slotting ■ Ramping • Helical Milling
MEZ16-S16G MEZ16 -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)

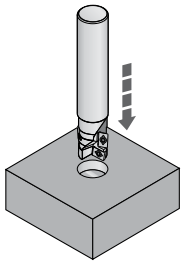


Cutting Dia.	ø16	ø20	ø25	ø32	ø39	ø49
a (mm)	0.30	0.33	0.38	0.45	0.68	0.74

◆ How to use the Silver Drill Mill (MEZ-G) and Drill Mill (MEZ) effectively

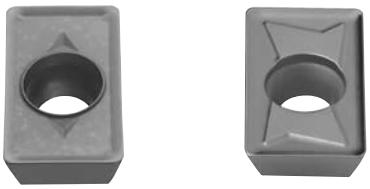
Drilling

- 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.

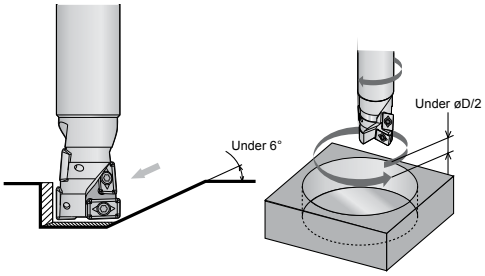


N(D / E)MT...ER-DH (Tough Edge)

N(D / E)MT...ER-D (Low Cutting Force)

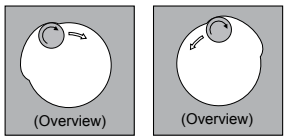
Ramping•Helical Milling

- 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.

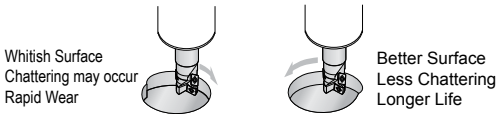


Others

- Down-Cut milling is recommended for the improvement of tool life and surface finish.
- Compressed air is recommended.



Up-Cut Down-Cut



Whitish Surface
Chattering may occur
Rapid Wear

Better Surface
Less Chattering
Longer Life

◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Recommended Insert Grade (Cutting Speed Vc : m/min)											
			Cermet			MEGACOAT		PVD Coated Carbide				Carbide	
	Drilling	Shouldering Slotting	TN60	TN100M	TC60	PR1225	PR1210	PR630	PR730	PR660	PR905	PW30	KW10
Stainless Steel	0.05~0.12	0.05~0.15		☆ 120~200		★ 120~220	-	☆ 120~200	☆ 120~200	☆ 100~180	-		-
Carbon Steel	0.05~0.2	0.05~0.2		★ 120~200		★ 120~250	-	☆ 120~200	☆ 120~200	☆ 100~180	-		-
Alloy Steel	0.05~0.2	0.05~0.2		★ 100~180		★ 100~220	-	☆ 100~180	☆ 100~180	☆ 80~150	-		-
Mold Steel	0.05~0.12	0.05~0.15		★ 100~180		★ 80~180	-	☆ 80~150	☆ 80~150	☆ 60~130	-		-
Cast Iron	0.05~0.2	0.05~0.2		-		-	★ 100~220	-	-	-	☆ 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.

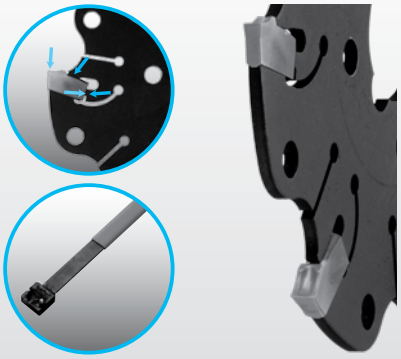
★ : 1st Recommendation ☆ : 2nd Recommendation

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)

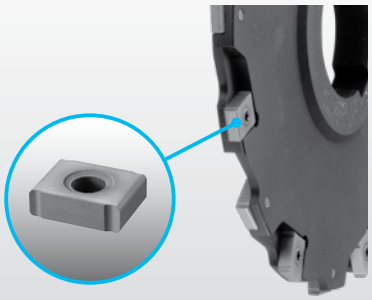
- Self-clamping type Slot Mill
  MSTA Slot Mills have simple self-clamping system to allow for easy attachment by just installing the insert.
- High Rigidity Clamping System
  Toolholders achieve high operability through the stopper highly rigid clamping system and achieve stable slotting by maintaining 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.

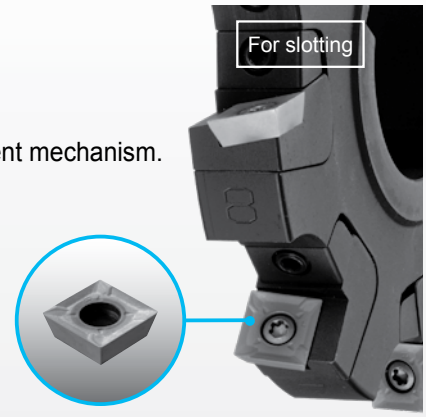


Full lineup of MST Series Slot Mills

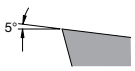
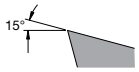
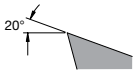
Type	Applicable Inserts	Features	Slot Width (mm)													
			1.6	2.2	3	4	6	8	10	13	14	16	18	20	22	24
MSTA	SLT..	1.6~4mm fixed	●	●	●	●										
MSTB	LNEU12..	6~13mm semi-adjustable					←			→						
							* Adjustable in 0.5mm increments between 6mm and 13mm with the combination of inserts									
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			

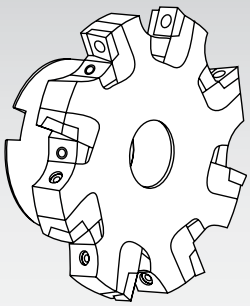
CA0835
- TiN+TiCN+Al_2O_3 based CVD Coated Carbide
- For carbon steel, alloy steel, stainless steel and nodular cast iron
- For middle to high speed cutting

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

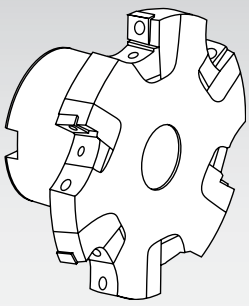
PR0110
- TiB2 based PVD Coated Carbide
- For Non-ferrous Metal such as Aluminum Alloy (Si<10%) and Titanium Alloy
- For high speed cutting

With Boss

Right-Hand



Left-hand

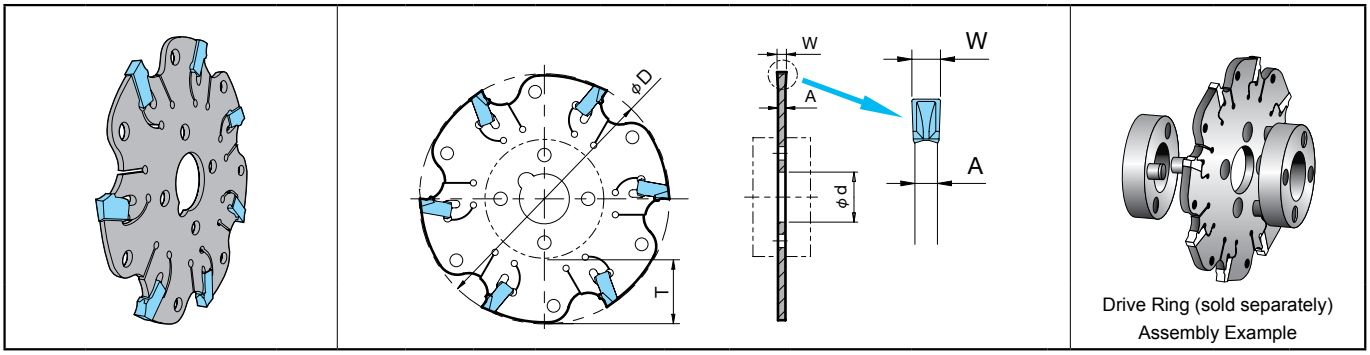


Identification System

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 Inserts	Dimension (mm) øD	Dimension (mm) ød (H7)	Dimension (mm) A	Weight (kg)	Applicable Inserts See page ➡ M112	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 →M113	See page M113	See page M133
	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.

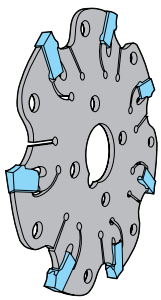
Drive Ring (For Metric)

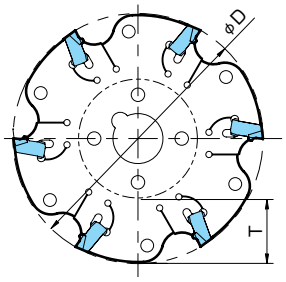
Shape	Description	Std.	Dimension (mm) ød	øD	A1	a	ød1	Drawing	Applicable Toolholders
Fig.1	DR16-32A	●	16	32	8	4.1	3	Fig.2	MSTA 63N16-5T, 63N22-7T
Fig.2	DR16-32B	●					4	Fig.1	MSTA 63N30-4T, 63N40-4T
Fig.3	DR16-38	●		38				Fig.3	MSTA 80N○○-○T
	DR22-46	●	22	46	10	6.1	5		MSTA 100N○○-○T
	DR32-55	●	32	55		8.1	6		MSTA 125N○○-○○T
	DR40-80	●	40	80	12	10.1	12		MSTA 160N○○-○○T

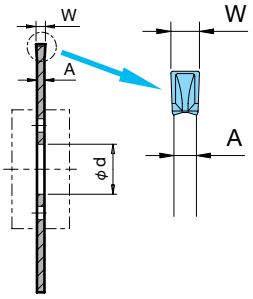
Wrenches and drive rings are sold in 1 piece per 1 box.

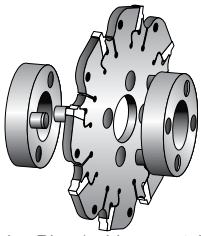
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MSTA (inch spec)









Drive Ring (sold separately)
Assembly Example

Toolholder Dimensions

Description		Std.	Edge Width W (inch)	Slot Depth T (inch)	No. of Inserts	Dimension (inch) øD	Dimension (inch) ød (H7)	Dimension (inch) A	Weight (kg)	Applicable Inserts See page M112	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 →M113	See page M113	See page M133
	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.

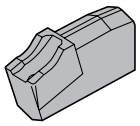
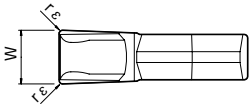
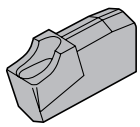
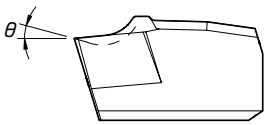
Symbol	Cutting Edge Spec.
S	Chamfer + R-honed

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°	●	●	M110 M111
			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

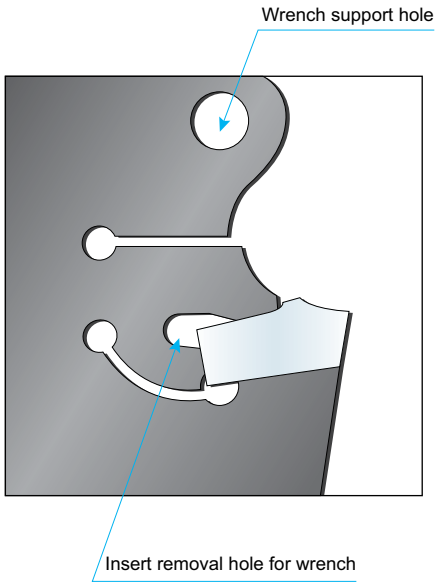
PR0735

- TiN based PVD Coated Carbide
- For Stainless Steel, Heat-Resistant Alloy, etc
- For low to middle speed cutting

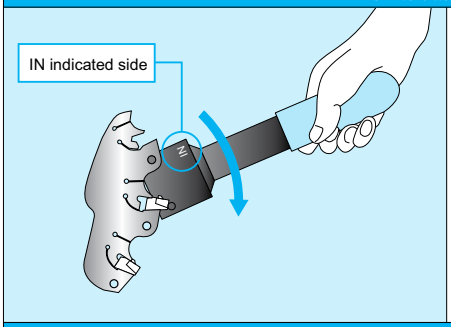
Inserts are sold in 10 piece boxes.

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

Set up

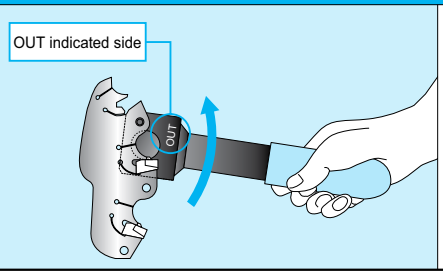


How to attach inserts



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



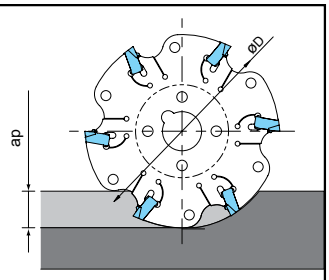
1. Insert one of the pin on the wrench (on OUT indicated side) into the wrench support hole, and insert other pin into the hole on releasing wrench.
2. Insert can be uninstalled by rotating the wrench counter clock wise. (A magnet is installed out side)

Note) Use appropriate wrench for set up.

Recommended Cutting Conditions

Workpiece Material		Hardness (HB)	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	With 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 cutting.
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

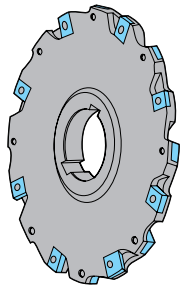
- MSTB: Slot Mill with Up-right Insert
- ○○○: Cutting Dia. (mm)
- A: Without Boss, S: With Boss
- N: Neutral
- ○○: Edge Width (mm)
- ○○: No. of Edge Line
- T

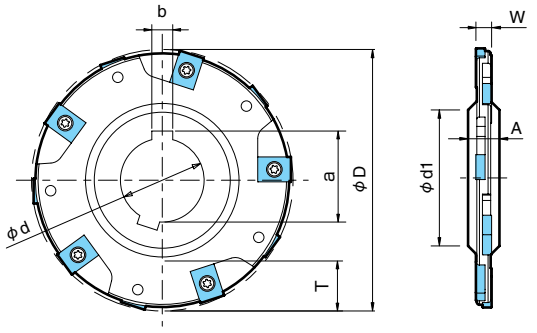
Inch spec

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)

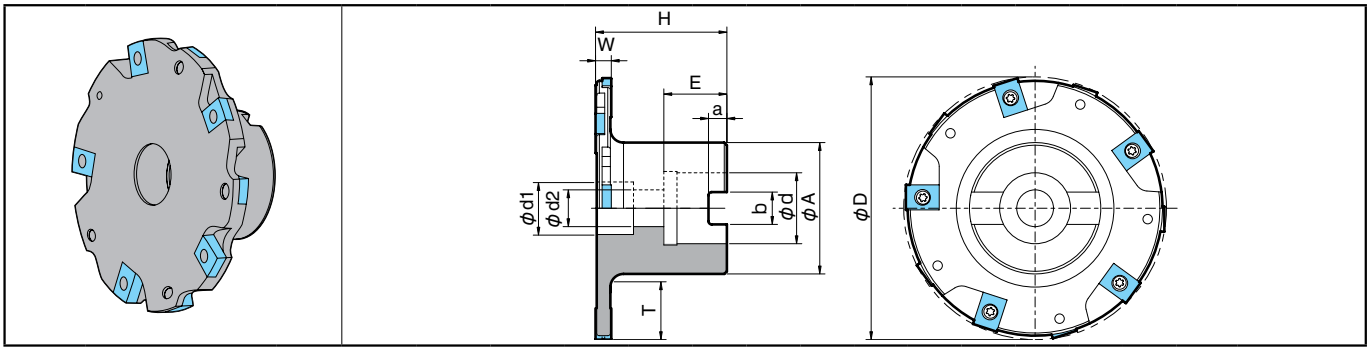
Description	Std.	Edge Width (mm) W (min)	Edge Width (mm) W (max)	Slot Depth T (mm)	No. of Inserts	No. of Edge Lines	Dimension (mm) øD	ød (H7)	ød1	A	a	b	Weight (kg)	Max. Revolution (min⁻¹)
MSTB 80AN0607-4T	●	6	7	15	8	4	80	27	44	12	29.8	7	0.3	9,240
100AN0607-5T	●			21	10	5	100	32	52		34.8	8	0.4	8,270
125AN0607-6T	●			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	6,540
MSTB 125AN1011-4T	●	10	11	30	12	4	125						0.9	7,390
160AN1011-5T	●			47.5	15	5	160						1.6	6,540
MSTB 160AN1213-5T	●	12	13	48.5	15	5	160						1.6	6,540

Toolholder Dimensions (Inch spec)

Description	Std.	Edge Width (inch) W (min)	Edge Width (inch) W (max)	Slot Depth T (inch)	No. of Inserts	No. of Edge Lines	Dimension (inch) øD	ød (H7)	ød1	A	a	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 Inserts	No. of Edge Lines	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... M116, M117**	See page **M118**	See page **M133**
			○○○**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	-	4
①	②	③		④	⑤		

① Insert Symbol

② Insert Length

Symbol	Insert Length
12	12.7mm

③ Edge Width

Symbol	Edge Width
35	3.5mm
40	4.0mm

④ Corner R(rε)

Symbol	Corner-R
03	0.3mm
04	0.4mm

⑤ Edge Prep.

Symbol	Cutting Edge Spec.
S	Chamfer + R-honed

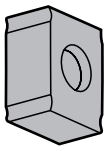
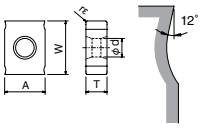
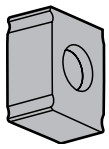
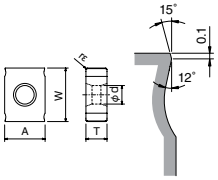
LN

(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	 Details of Edge	**LNEU**	**1235-03-4**	4	3.5	0.3	●	**SE-40050TR**	**M114 M115**	**M118**
			1240-08-4	4	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	 Details of Edge	**LNEU**	**1235-03S-4**	4	3.5	0.3	●	**SE-40050TR**		
			1240-03S-4	4	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 Multi-layer PVD Coated Carbide
- For carbon steel, alloy steel, stainless steel, heat resistant alloy and nodular cast iron
- For middle speed cutting

Inserts are sold in 10 piece boxes.

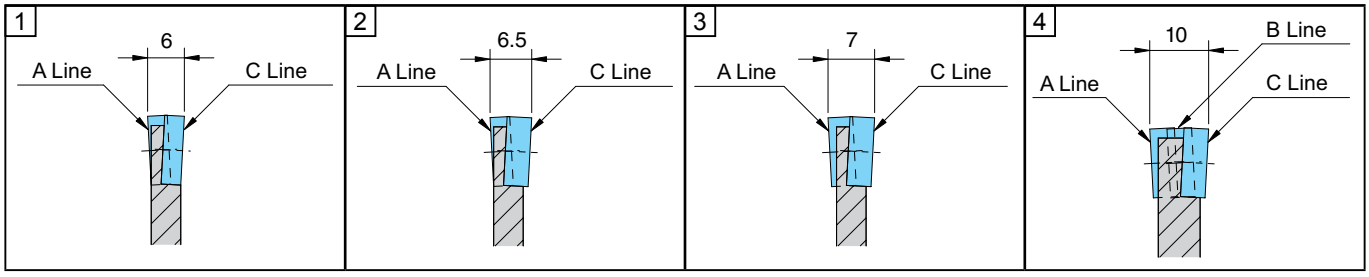
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Combination of Applicable Inserts

	Description	Clamp Screw (Standard attachment parts)	Edge Width mm	Edge Width inch (mm)	A Line Applicable Insert	A Line Clamp Screw	B Line Applicable Insert	B Line Clamp Screw	C Line Applicable Insert	C Line Clamp Screw	Wrench For Clamp Screw	Tightening Torque (Nm)
Metric	MSTB ○○○AN0607-○T	SE-40050TR	6	-	LNEU1235..	SE-40050TR	-	-	LNEU1235..	SE-40050TR	TT-15L	3
	MSTB ○○○SN0607-○T		6.5		LNEU1240..	SE-40055TR			LNEU1240..	SE-40055TR		
			7									
	MSTB ○○○AN0809-○T	SE-40068TR	8	-	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR		
	MSTB ○○○SN0809-○T		8.5						LNEU1250..	SE-40080TR		
			9		LNEU1250..	SE-40080TR						
	MSTB ○○○AN1011-○T	SE-40068TR	10	-	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR		
	MSTB ○○○SN1011-○T		10.5						LNEU1250..	SE-40080TR		
			11		LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR				
	MSTB ○○○AN1213-○T	SE-40090TR	12	-	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR		
			12.5						LNEU1260...	SE-40100TR		
			13		LNEU1260...	SE-40100TR	LNEU1260...	SE-40100TR				
Inch spec	MSTB ○○○○AN250-○T	SE-40055TR	-	.250 (6.35mm)	LNEU1240..	SE-40055TR	-	-	LNEU1240..	SE-40055TR		
				.270 (6.86mm)					LNEU1245..	SE-40068TR		
				.289 (7.34mm)	LNEU1245..	SE-40068TR						
	MSTB ○○○○AN312-○T	SE-40068TR	-	.312 (7.92mm)	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR		
				.332 (8.43mm)					LNEU1250..	SE-40080TR		
				.351 (8.91mm)	LNEU1250..	SE-40080TR						
	MSTB ○○○○AN375-○T	SE-40068TR	-	.375 (9.525mm)	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR		
				.395 (10.33mm)					LNEU1250..	SE-40080TR		
				.414 (10.52mm)	LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR				
	MSTB ○○○○AN500-○T	SE-40090TR	-	.500 (12.7mm)	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR		
				.520 (13.21mm)					LNEU1260...	SE-40100TR		
				.539 (13.69mm)	LNEU1260...	SE-40100TR	LNEU1260...	SE-40100TR				

* For clamp screw, above listed “Standard attachment parts” are attached. In case of necessity of another size of clamp screw by changing slotting width, please purchase separately.

Slot width (edge width) adjustment



● The Slot width (edge width) of MSTB-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.

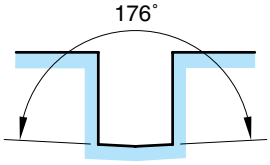


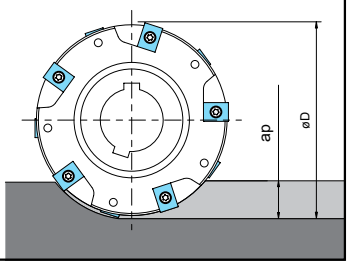
Fig.1 Convex bottom shape

Slot Mill Up-right: LN Insert

◆ Recommended Cutting Conditions

Workpiece Material		Hardness (HB)	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	With 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 cutting.
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

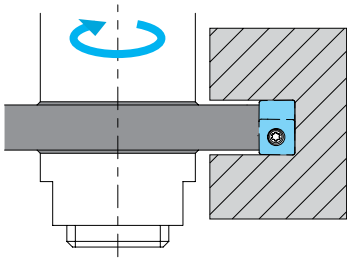
MSTC ○○○ **A** **N** ○○○ - ○○○ - ○○

Slot Mill with Lay-down type	Cutting Dia. (inch)	A: Without Boss	N: Neutral R: R-hand L : L-hand	Edge Width (inch)

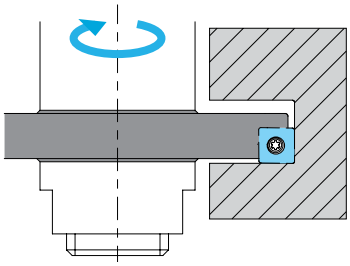
Applicable Insert 10: SP..10T3..
12: SD..1204..

Cutting Direction of MSTC Slot Mill

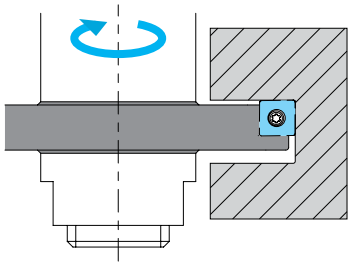
AN (Slotting)



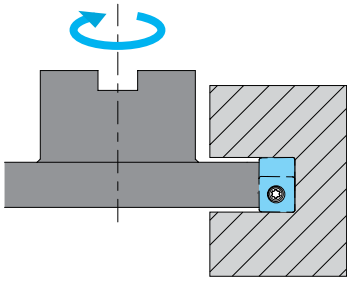
AR (Lower surface machining)



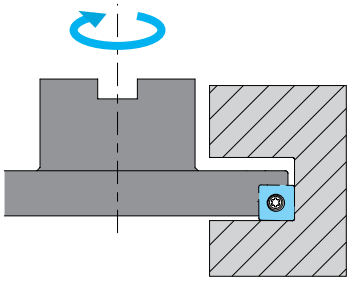
AL (Upper surface machining)



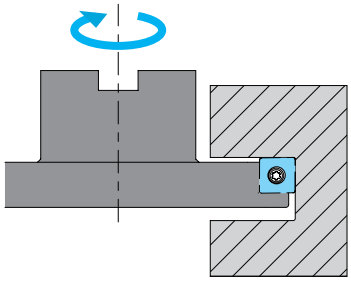
SN (Slotting)



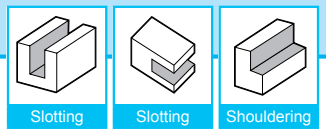
SR (Lower surface machining)



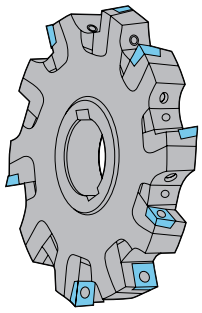
SL (Upper surface machining)

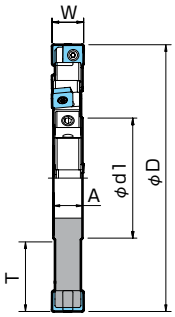


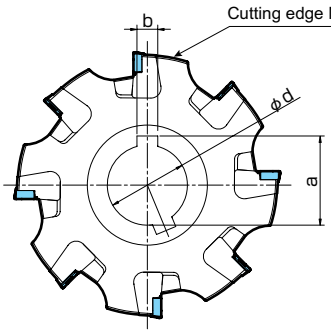
Slot Mill Lay-down type



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)

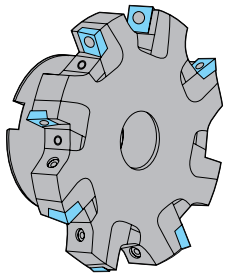
Description		Std.	Edge Width (mm)		Slot Depth	No. of Inserts	No. of Edge Lines	Dimension (mm)						Weight (kg)	Max. Revolution (min^{-1})
			W	W	T			øD	ød (H7)	ød1	A	a	b		
MSTC	100AN1416-10-3T	●	14	16	25.9	6	3	100	32	46.8	13.9	34.8	8	0.5	17,250
	125AN1416-10-4T	●			34.4	8	4	125	40	54.8		43.5	10	0.8	15,450
	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 Inserts	No. of Edge Lines	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



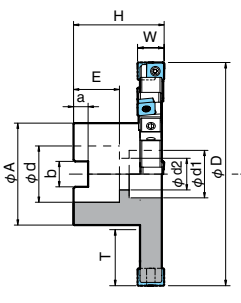


Fig.1

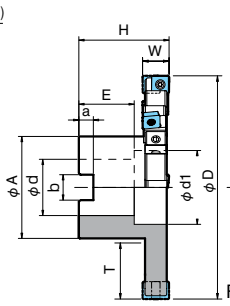


Fig.2

Toolholder Dimensions (Metric)

Description		Std.	Edge Width (mm)		Slot Depth	No. of Inserts	No. of Edge Lines	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 **M128-M129**	
		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 **M130**

Spare Parts (common to Inch spec / Metric)

• For spare parts, see page **M126**.

Slot width (edge width) adjustment

• See page **M131~M132**.

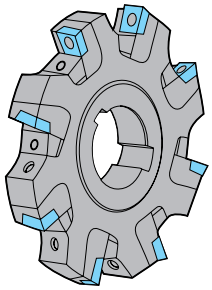
Applicable Arbor

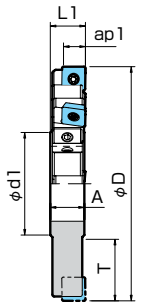
• See page **M133**.

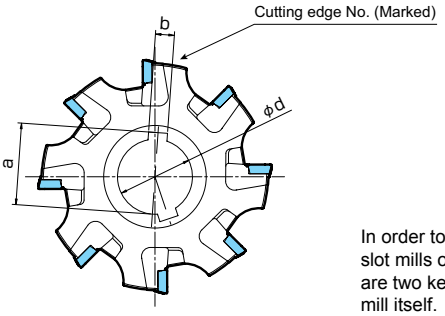
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Half Side Slot Mill

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)

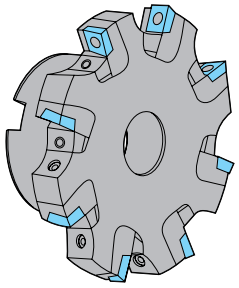
Description		Std.	No. of Inserts	Dimension (mm)										Weight (kg)	Max. Revolution (min^{-1})
				øD	ød (H7)	ød1	A	L1 (min)	L1 (max)	T	ap1 (max)	a	b		
MSTC	100AR1416-10-6T	●	6	100	32	46.8	13.9	13.9	14.9	25.9	9.1	34.8	8	0.5	17,250
	125AR1416-10-8T	●	8	125	40	54.8				34.4		43.5	10	0.8	15,450
	160AR1416-10-10T	●	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

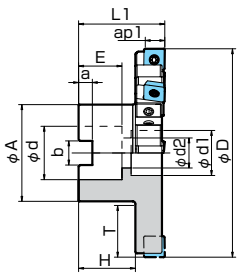
Toolholder Dimensions (Inch spec)

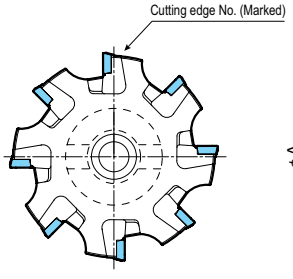
Description		Std.	No. of Inserts	Dimension (inch)										Weight (kg)	Max. Revolution (min^{-1})
				øD	ød (H7)	ød1	A	L1 (min)	L1 (max)	T	ap1 (max)	a	b		
MSTC	400AR551-630-10	●	6	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.75mm)	.545 (13.84mm)	.548 (13.92mm)	.588 (14.94mm)	1.030 (26.1mm)	.359 (9.1mm)	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)

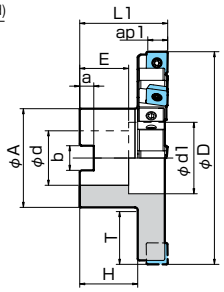






● Right-hand Shown

Fig.1



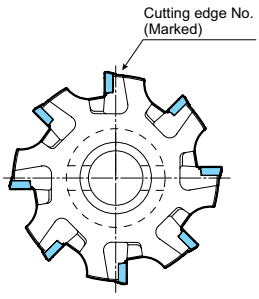


Fig.2

● Toolholder Dimensions (Metric)

Description		Std.	No. of Inserts	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 **M128-M129**	
	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 ➡ **M130**

Spare Parts (common to Inch spec / Metric)

• For spare parts, see page **M127**.

Slot width (edge width) adjustment

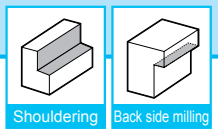
• See page **M131~M132**.

Applicable Arbor

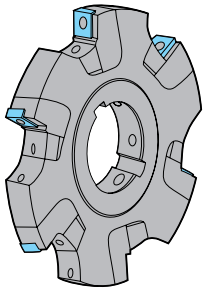
• See page **M133**.

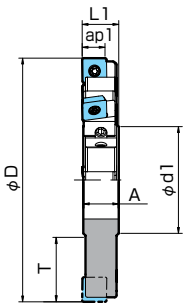
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

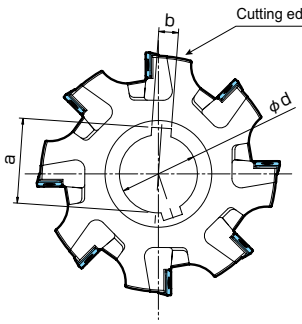
Half Side Slot Mill



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)

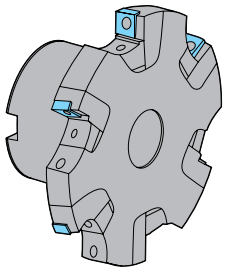
Description		Std.	No. of Inserts	Dimension (mm)										Weight (kg)	Max. Revolution (min^{-1})
				øD	ød (H7)	ød1	A	L1 (min)	L1 (max)	T	ap1 (max)	a	b		
MSTC	100AL1416-10-6T	●	6	100	32	46.8	13.9	13.9	14.9	25.9	9.1	34.8	8	0.5	17,250
	125AL1416-10-8T	●	8	125	40	54.8				34.4		43.5	10	0.8	15,450
	160AL1416-10-10T	●	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

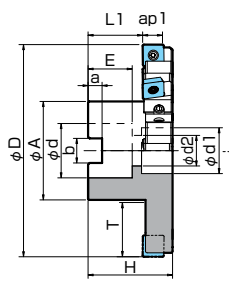
Toolholder Dimensions (Inch spec)

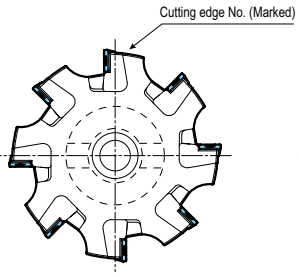
Description		Std.	No. of Inserts	Dimension (inch)										Weight (kg)	Max. Revolution (min^{-1})
				øD	ød (H7)	ød1	A	L1 (min)	L1 (max)	T	ap1 (max)	a	b		
MSTC	400AL551-630-10	●	6	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.75mm)	.545 (13.84mm)	.548 (13.92mm)	.588 (14.94mm)	1.030 (26.1mm)	.359 (9.1mm)	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)

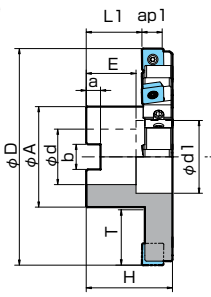






• Left-hand Shown

Fig.1



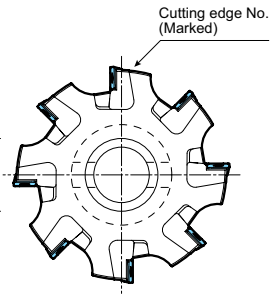


Fig.2

Toolholder Dimensions (Metric)

Description		Std.	No. of Inserts	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 **M128-M129**	
	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 **M130**

Spare Parts (common to Inch spec / Metric)

• For spare parts, see page **M127**.

Slot width (edge width) adjustment

• See page **M131~M132**.

Applicable Arbor

• See page **M133**.

● : 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-3070-TRP	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-3590-TRP		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-3070-TRP	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-3590-TRP		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-3070-TRP	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-3590-TRP		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-3070-TRP	TH-3L	LW-2.5	DTP-9	MP-1	-
			125AR1416-10-8T				W6 X 20							
			160AR1416-10-10T											
		MSTC	125AR1618-10-8T	C90SP1618-10R		WC-16	W6 X 20							
			160AR1618-10-10T											
		MSTC	125AR1820-12-8T	C90SD1820-12R		WC-18	W6 X 20	AP-1820	SB-3590-TRP		LW-3	DTP-15		
			160AR1820-12-10T											
		MSTC	125AR2123-12-8T	C90SD2023-12R		WC-20								
			160AR2123-12-10T											
		MSTC	100AL1416-10-6T	-	C90SP1416-10L	WC-14	W6 X 18	AP-1416	SE-3070-TRP		LW-2.5	DTP-9		
			125AL1416-10-8T				W6 X 20							
			160AL1416-10-10T											
		MSTC	125AL1618-10-8T		C90SP1618-10L	WC-16	W6 X 20							
			160AL1618-10-10T											
		MSTC	125AL1820-12-8T		C90SD1820-12L	WC-18	W6 X 20	AP-1820	SB-3590-TRP		LW-3	DTP-15		
			160AL1820-12-10T											
		MSTC	125AL2123-12-8T		C90SD2023-12L	WC-20								
			160AL2123-12-10T											
	Inch spec	MSTC	400AR551-630-10	C90SP1416-10R	-	WC-14	W6 X 18	AP-1416	SE-3070-TRP	TH-3L	LW-2.5	DTP-9		
			500AR551-630-10				W6 X 20							
			600AR551-630-10											
		MSTC	500AR630-709-10	C90SP1618-10R		WC-16	W6 X 20							
			600AR630-709-10											
		MSTC	500AR709-813-12	C90SD1820-12R		WC-18	W6 X 20	AP-1820	SB-3590-TRP		LW-3	DTP-15		
			600AR709-813-12											
		MSTC	500AR813-917-12	C90SD2023-12R		WC-20								
			600AR813-917-12											
		MSTC	400AL551-630-10	-	C90SP1416-10L	WC-14	W6 X 18	AP-1416	SE-3070-TRP		LW-2.5	DTP-9		
			500AL551-630-10				W6 X 20							
			600AL551-630-10											
		MSTC	500AL630-709-10		C90SP1618-10L	WC-16	W6 X 20							
			600AL630-709-10											
		MSTC	500AL709-813-12		C90SD1820-12L	WC-18	W6 X 20	AP-1820	SB-3590-TRP		LW-3	DTP-15		
			600AL709-813-12											
		MSTC	500AL813-917-12		C90SD2023-12L	WC-20								
			600AL813-917-12											
With Boss	Metric	MSTC	100SR1416-10-6T	C90SP1416-10R	-	WC-14	W6 X 20	AP-1416	SE-3070-TRP	TH-3L	LW-2.5	DTP-9	MP-1	HH12 X 35
			125SR1416-10-8T											HH16 X 35
			160SR1416-10-10T											-
		MSTC	125SR1618-10-8T	C90SP1618-10R		WC-16								HH16 X 35
			160SR1618-10-10T											-
		MSTC	125SR1820-12-8T	C90SD1820-12R		WC-18	W6 X 20	AP-1820	SB-3590-TRP		LW-3	DTP-15		HH16 X 35
			160SR1820-12-10T											-
		MSTC	125SR2123-12-8T	C90SD2023-12R		WC-20								HH16 X 35
			160SR2123-12-10T											-
		MSTC	100SL1416-10-6T	-	C90SP1416-10L	WC-14	W6 X 20	AP-1416	SE-3070-TRP		LW-2.5	DTP-9		HH12 X 35
			125SL1416-10-8T											HH16 X 35
			160SL1416-10-10T											-
		MSTC	125SL1618-10-8T		C90SP1618-10L	WC-16								HH16 X 35
			160SL1618-10-10T											-
		MSTC	125SL1820-12-8T		C90SD1820-12L	WC-18	W6 X 20	AP-1820	SB-3590-TRP		LW-3	DTP-15		HH16 X 35
			160SL1820-12-10T											-
		MSTC	125SL2123-12-8T		C90SD2023-12L	WC-20								HH16 X 35
			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

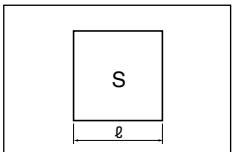
Inserts Identification System

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	Neutral
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

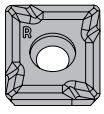
SP..10T3

● 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 Edges	Dimension (mm) rε	Dimension (mm) Z (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.

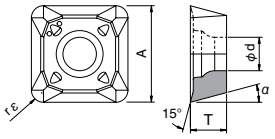
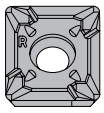
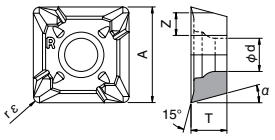
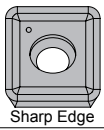
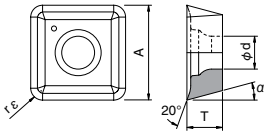
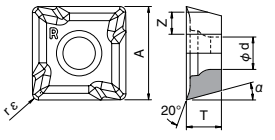
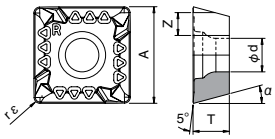
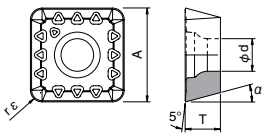
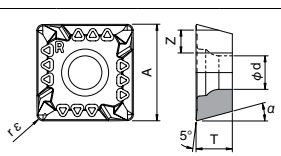
SD..1204

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 Edges	Dimension (mm) rε	Dimension (mm) Z (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 Multi-layer PVD Coated Carbide
- 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

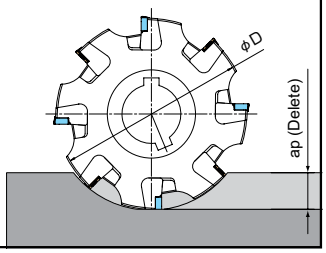
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

Recommended Cutting Conditions (For **CA0835** / **PR0725**)

Workpiece Material		Hardness (HB)	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%.



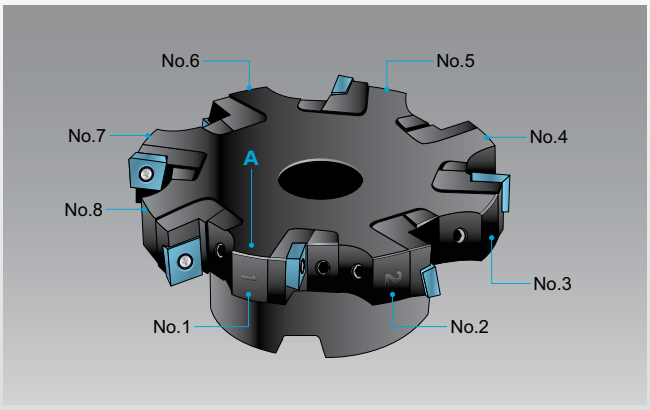
Recommended Cutting Conditions (For **PR0110**)

Workpiece Material		Hardness (HB)	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

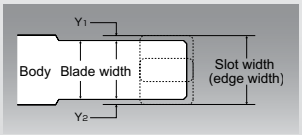
Note) 1. Use down-cut machining.
2. If ap is under 1/10 of Cutter Dia.(øD), it is possible to increase feed per tooth(fz) 40%.

Slot width (edge width) adjustment of MSTC slot mills

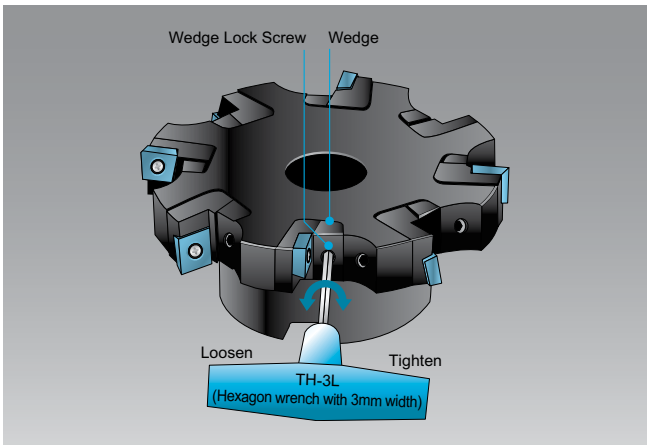
Slot width (edge width) measurement



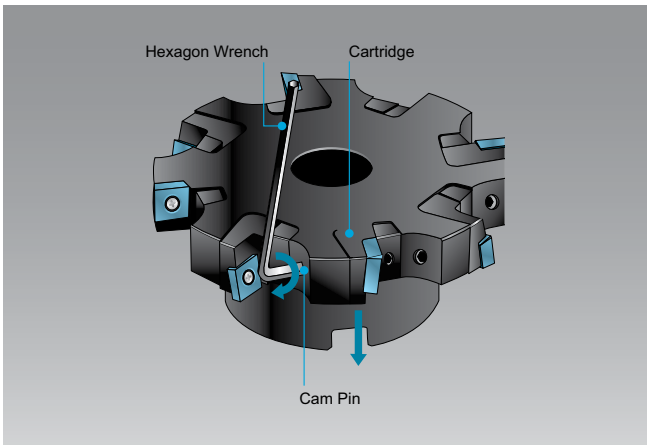
1) Please check slot mill egde location number.
(The edge location number is marked on the slot mill body.)
2) Set up the slot mill on length measuring equipment such as tool presetters.
3) Place the point A of the slot mill body near the position No.1 to “0 (zero)” of the length measuring equipment.
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).



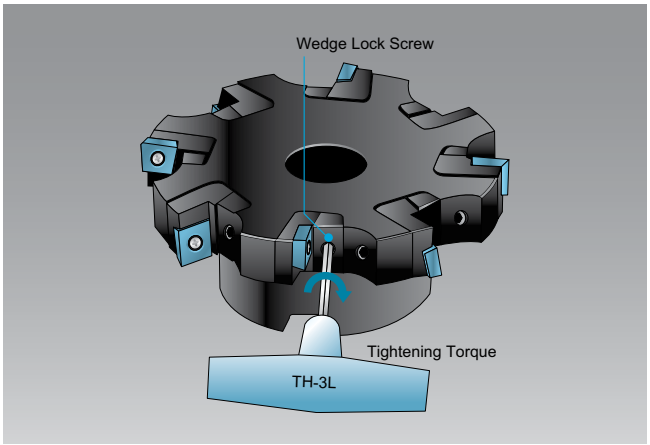
In the case of changing the slot width (edge width)



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.

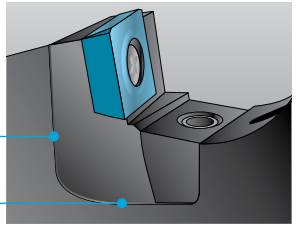


5) Insert a Hexagon wrench (LW-2.5 or LW-3) into the Cam Pin on the back of the cartridge.
6) Turn the wrench and adjust the position of the Cartridge.
7) To secure the adjustment, back the Cam Pin off and make sure that it does not touch the groove surface of the back of the Cartridge.
8) Remove the Hexagon wrench from the Cam Pin.



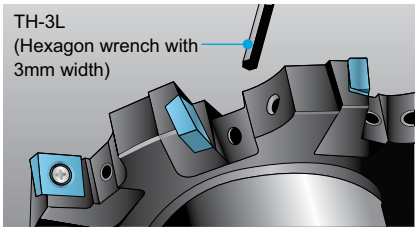
9) Insert TH-3L into the Wedge Screw.
10) Tighten the Wedge Screw by the torque of 5-6Nm.
(Use a torque wrench to get the correct torque.)
11) Make sure there is no gap between the Cartridge and the Slot Mill body.

Make sure there is no gap.

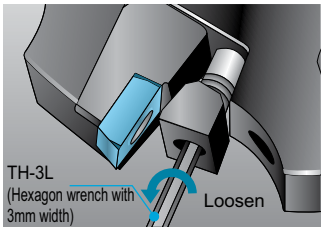


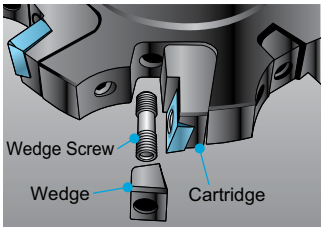
Replacement of the Cartridge

Follow the instruction below to replace the Cartridge.



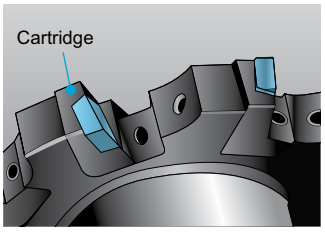
1) Insert Hexagon wrench with 3mm width (TH-3L) into the Wedge Screw.

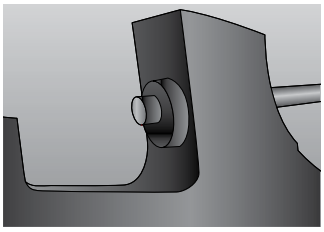




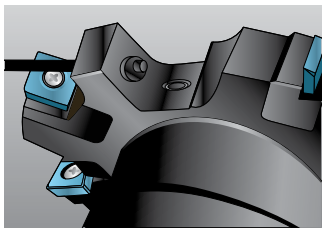
2) Loosen the Wedge Screw.

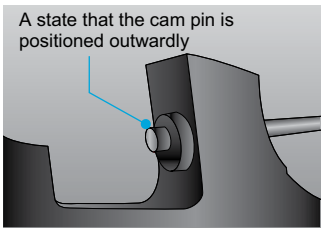
3) Remove the Wedge Screw and Wedge.



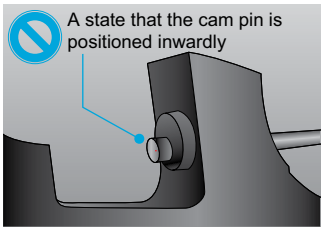


4) Remove the Cartridge.

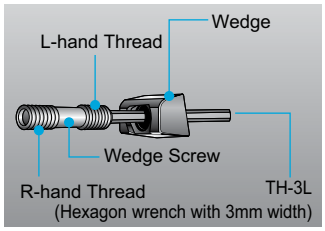


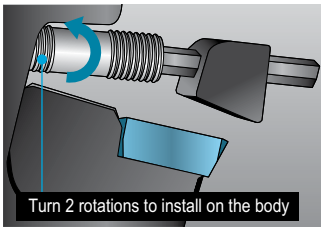


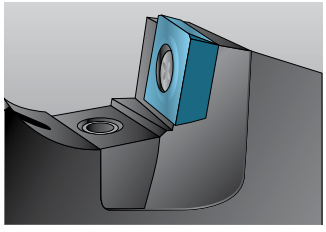
5) Before replacing the Cartridge, confirm that the Cam Pin is positioned radially-outwardly.



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	M110	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..	
	M111	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..
	M114	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..
	M120 M122 M124	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	M115	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..
	M121 M123 M124 M125	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

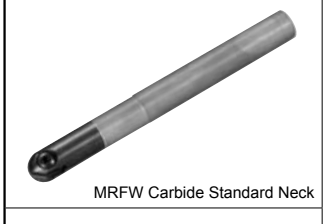
Shape	Ref. Page	Toolholder		Bore Dia. (ød)	Straight Shank				
					BIG	MST	NIKKEN	NT TOOL	SHOWA
Without Boss	M110	MSTA	63N..	16					
			80N..	16					
			100N..	22					
			125N..	32					
			160N..	40					
	M111	MSTA	02N..	.625 (15.875)					ST○○-SCA15.875..
			03N..	.625 (15.875)					ST○○-SCA15.875..
			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..
	M114	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..
	M120 M122 M124	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..

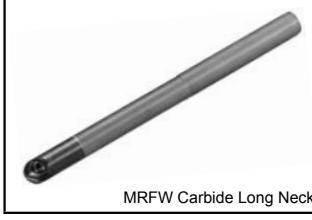
This table is created, based on companies' catalogues and publications, and not officially approved by those companies.

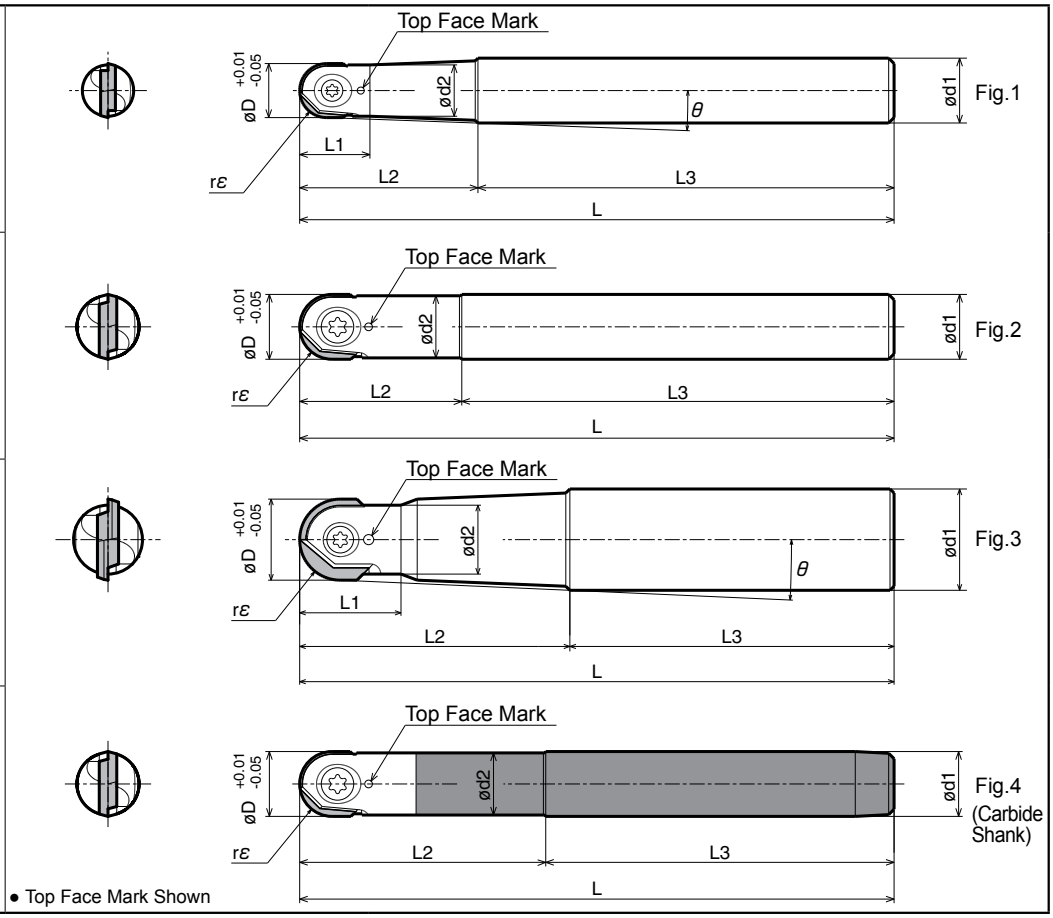
MRF / MRFW (Carbide Shank)


MRF Standard Neck


MRF Long Neck


MRFW Carbide Standard Neck


MRFW Carbide Long Neck

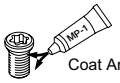


● Top Face Mark Shown

Toolholder Dimensions

Description			Std.	No. of Inserts	Dimension (mm) rε	øD	ød1	ød2	L	L1	L2	L3	θ	Drawing	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Applicable Inserts ➔ M19
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

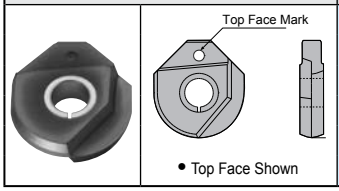
・θ (Toolholder's interference angle) is the angle formed by the tangential line from insert dia. to toolholder's shank dia.



Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

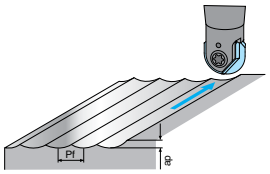
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

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	

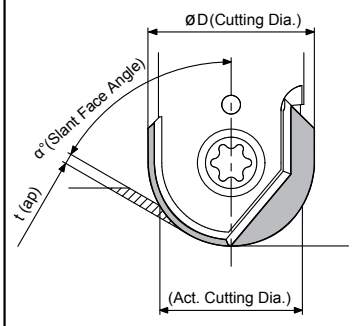
For ø8, Holder may be broken because of over load if ap exceeds 0.3mm.

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)

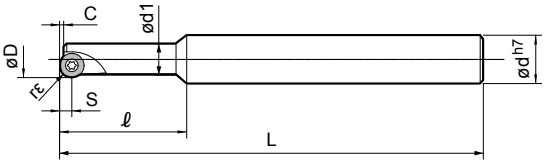


Fig.1

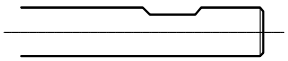


Fig.2

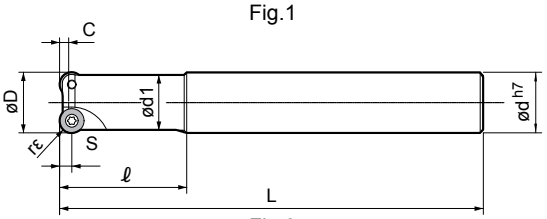


Fig.3

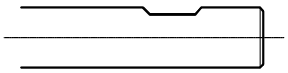


Fig.4

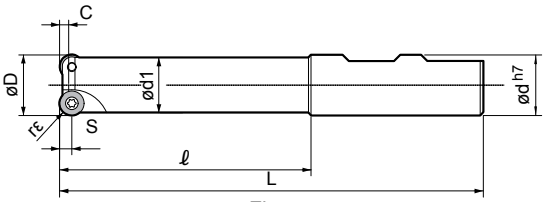


Fig.5

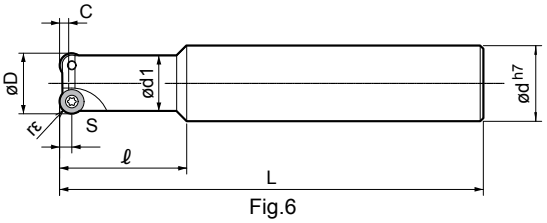


Fig.6

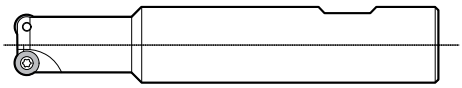


Fig.7

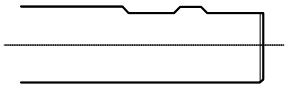


Fig.8

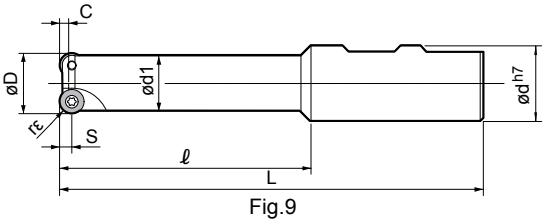


Fig.9

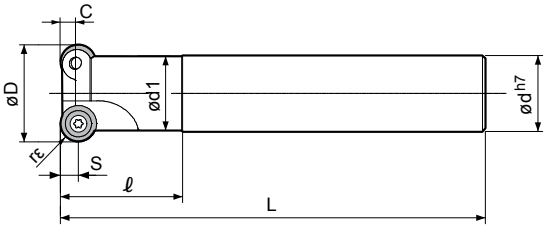


Fig.10

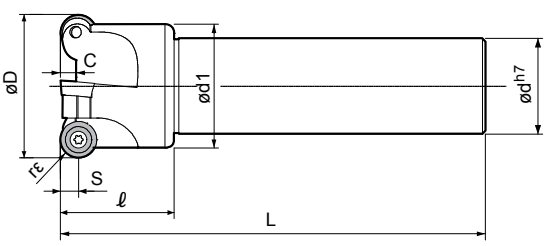


Fig.11

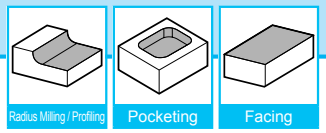
● Toolholder Dimensions

	Description	Std.	No. of Inserts	Dimension (mm) rε	øD	ød	ød1	L	ℓ	C	Pd	S	Rake Angle (°) A.R.	R.R.	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ⇒M19
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

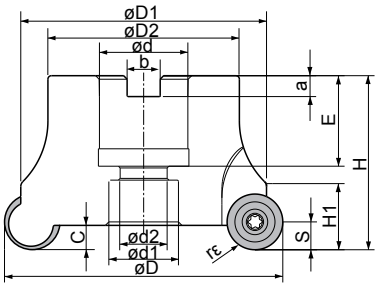


Fig.1

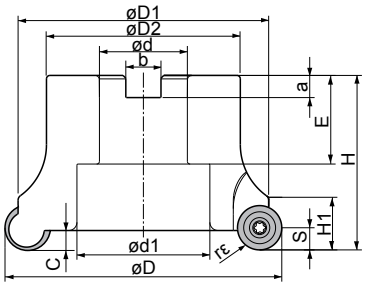


Fig.2

Toolholder Dimensions

Description	Std.	No. of Inserts	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	50	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 ➔ M19
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

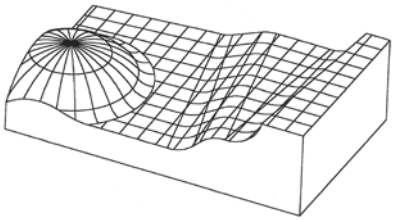
- Mounting Bolt (HH10X25) is included for MRP050R.
- Mounting Bolt (HH12X25) is included for MRP063R and MRP066R-10E-7T.
- Mounting Bolt (HH12X25) is included for MRP080R and MRP080R-12E-7T.
- Mounting Bolt (HH10X25) is included for MRP052R-10E-6T.

● : 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.

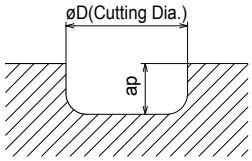
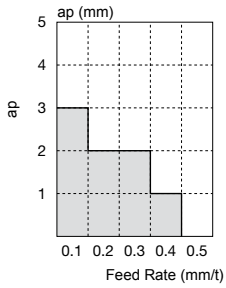
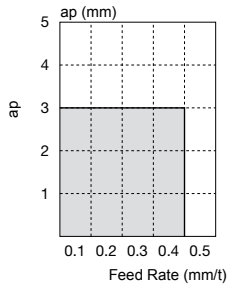
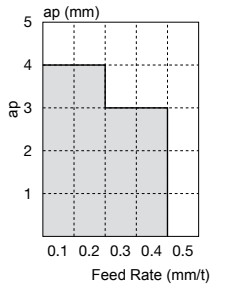
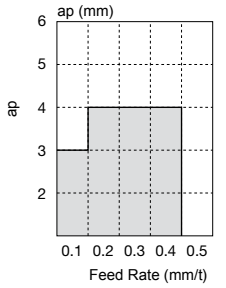
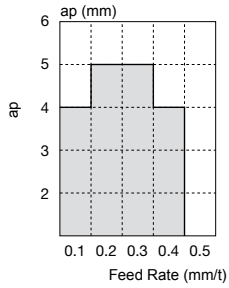
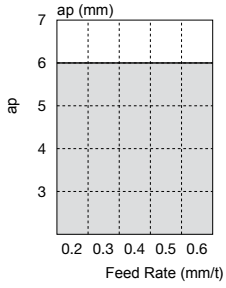
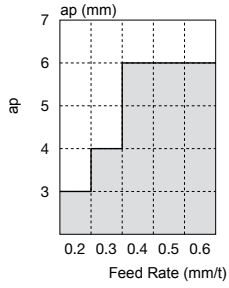
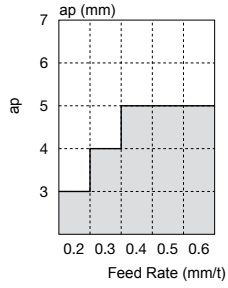
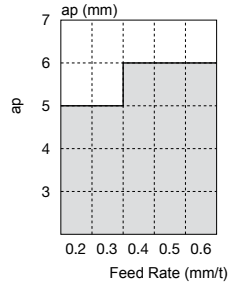
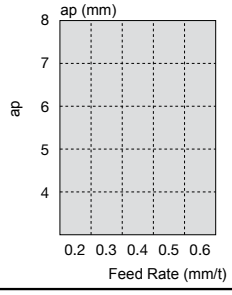
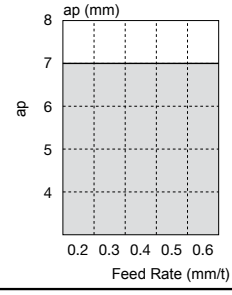
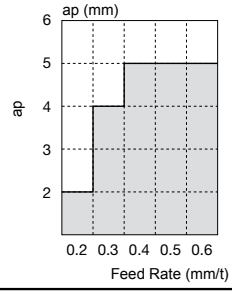
Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed Vc: m/min)											
		Cermet			MEGACOAT		PVD Coated Carbide					Carbide	
		TN60	**TN100M**	**TC60**	**PR1230**	**PR1210**	**PR630**	**PR730**	**PR830**	**PR660**	**PR905**	**PW30**	**KW10**
Stainless Steel	~0.4		☆ 120~200		★ 120~220	-		☆ 120~200		☆ 100~180	-		-
Carbon Steel	~0.6		★ 120~200		★ 120~250	-		☆ 120~200		☆ 100~180	-		-
Alloy Steel	~0.6		★ 100~180		★ 100~220	-		☆ 100~180		☆ 80~150	-		-
Mold Steel	~0.5		★ 100~180		★ 80~180	-		☆ 80~150		☆ 60~130	-		-
Cast Iron	~0.6		-		-	★ 100~220		-		-	☆ 100~180		☆ 80~150
Non-ferrous Metals	~0.6		-		-	-		-		-	-		★ 100~300

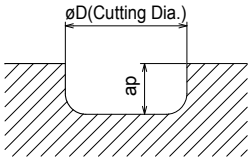
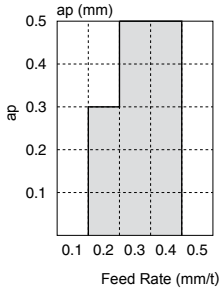
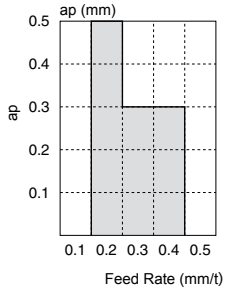
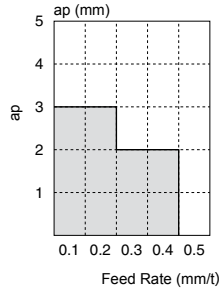
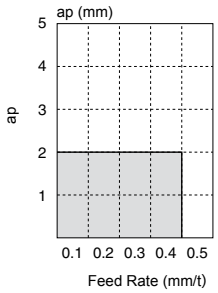
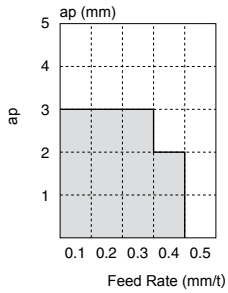
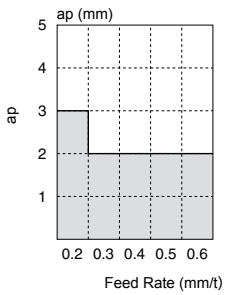
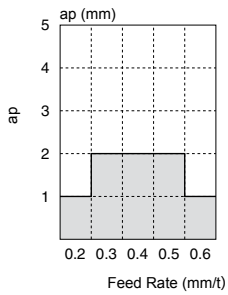
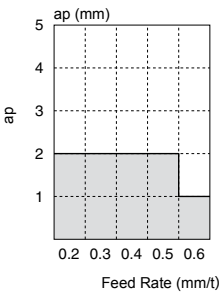
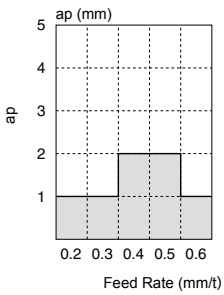
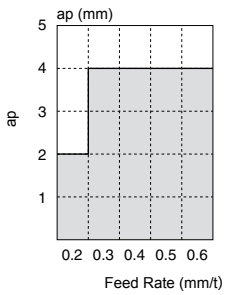
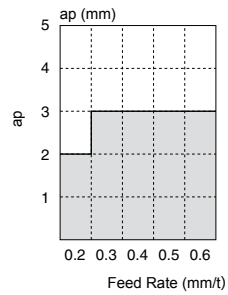
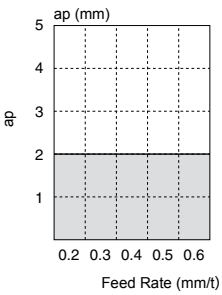
Note) Reduce the ap by 20-50% when machining with long overhang length or using long shank types.

★ : 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 = L_1 (See below table)			
Description				
08 type (RDMT08T2M0-H)	MRP012-S16-08 n=3980min^{-1} (Vc=150m/min) L_1=42mm 	MRP016-S16-08 n=2980min^{-1} (Vc=150m/min) L_1=42mm 	MRP020-S20-08 n=2390min^{-1} (Vc=150m/min) L_1=42mm 	
10 type (RPMT10T3M0)	MRP025-S25-10-3T n=1910min^{-1} (Vc=150m/min) L_1=60mm 	MRP032-S32-10-4T n=1490min^{-1} (Vc=150m/min) L_1=80mm 		
12 type (RPMT1204M0-H)	MRP032-S25-12 n=1490min^{-1} (Vc=150m/min) L_1=80mm 	MRP040-S32-12 n=1195min^{-1} (Vc=150m/min) L_1=80mm 	MRP040-S32-12-4T n=1195min^{-1} (Vc=150m/min) L_1=80mm 	MRP050-S42-12 n=765min^{-1} (Vc=120m/min) L_1=80mm 
16 type (RPMT1606M0-H)	MRP040-S32-16 n=1195min^{-1} (Vc=150m/min) L_1=90mm 	MRP050-S42-16 n=765min^{-1} (Vc=120m/min) L_1=90mm 	MRP063-S42-16 n=605min^{-1} (Vc=120m/min) L_1=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.)

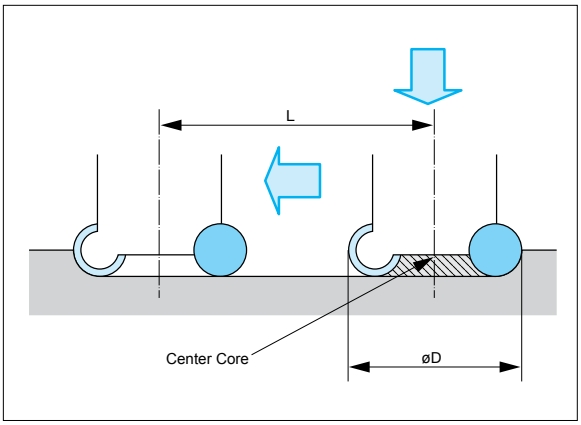
【Traversing after Drilling】

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)

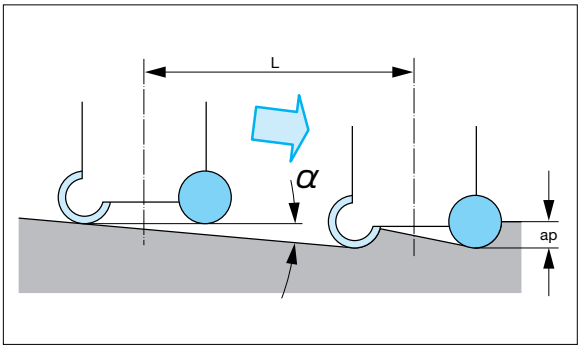
The transfer length “L” at the maximum slant angle α in the ramping operation depends on the ap.

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

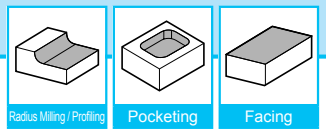
* Above is the value considering the clearance 1mm between the tool body and the workpiece.

Formula of the Transfer Length “L” at Max. Slant Angle

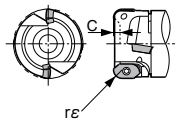
$$L = \frac{ap}{\tan \alpha}$$



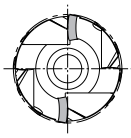
Radius Helical Endmill

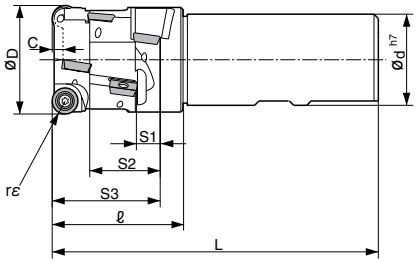


MHD-RSA Separate-type (Base Unit A + Front Piece + Radius Front Piece)



MHD32


MHD40
MHD50



Toolholder Dimensions

Description		Std.	No. of Insert: Bottom Edges	No. of Insert: Middle Edges	No. of Flutes	Dimension (mm): rε	øD	ød	L	ℓ	C	S1	S2	S3	Rake Angle (°): 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°

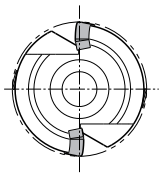
・When using "-T" Insert, the finished diameter (øD) will be approx. 0.2mm smaller.

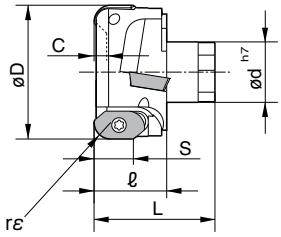
Applicable Inserts and Composition of Toolholder

Endmill		Applicable Inserts ➔ M17~M19	Base Unit ➔ M82	Front Piece (Middle) ➔ M83	Front Piece (End) ➔ M143
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

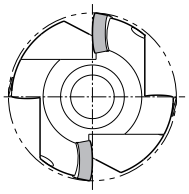
MHD-RF Radius Front Piece

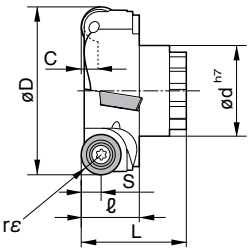
MHD32-4RF





MHD40-5RF
50-6RF





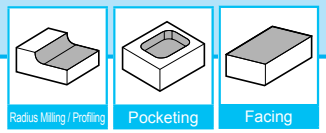
Toolholder Dimensions

Description		Std.	No. of Insert: Bottom Edges	No. of Insert: Middle Edges	No. of Flutes	Dimension (mm): rε	øD	ød	L	ℓ	C	S	Rake Angle (°): A.R.	R.R.: Bottom Edge	R.R.: Middle Edge	Applicable Inserts ➔ M17~M19
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

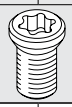
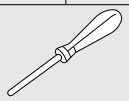
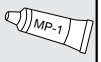
・When using "-T" Insert, the finished diameter (øD) will be approx. 0.2mm smaller.

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue

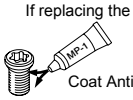
Radius Helical Endmill



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. **M91**
・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. **M91**



Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

Applicable Inserts

ND □□ 09 Insert

Description	Applicable Inserts **M17, M18**				Applicable Inserts **M19**
			 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 **M18,M19**			Applicable Inserts **M19**		
		 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 **M90**.

◆ 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.

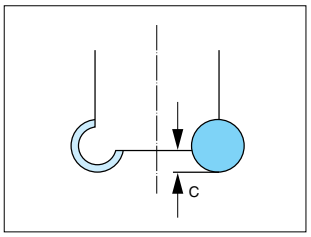
Guide for Drilling

【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.



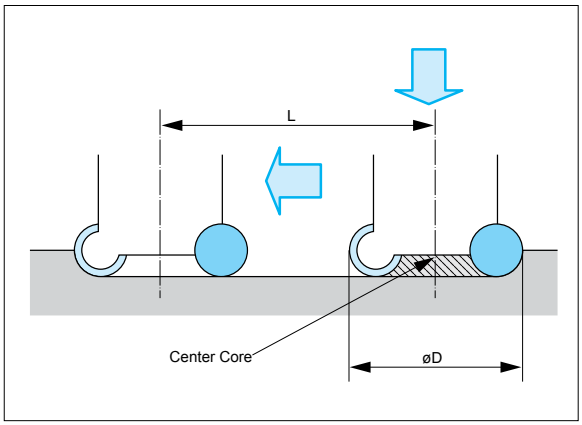
【Traversing after Drilling】

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)

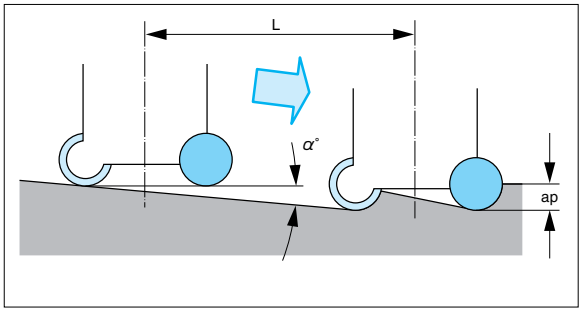
The transfer length “L” at the maximum slant angle α in the ramping operation depends on the ap.

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.

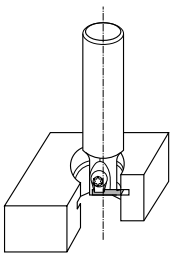
Formula of the Transfer Length “L” at Max. Slant Angle

$$L = \frac{ap}{\tan \alpha}$$



MGI Grooving Endmill

MGI



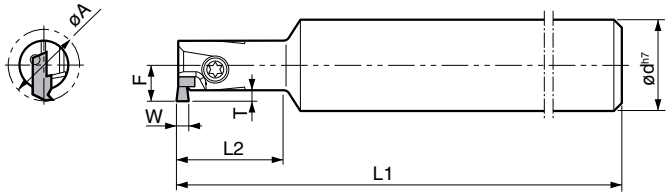


Fig1

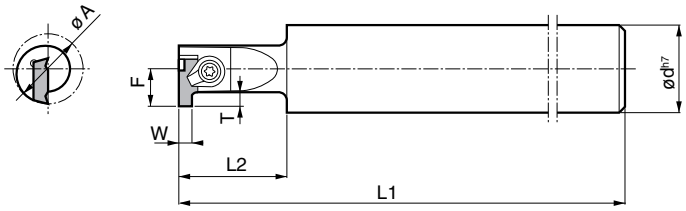


Fig2

Toolholder Dimensions

Description		Std.	Min. Bore Dia. øA	Dimension (mm) ød	L1	L2	F	T	Edge Width W	Drawing	Spare Parts: Clamp Set 5F / 6F	Clamp Screw	Wrench FT / LW	Applicable Inserts M147
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							

・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 cutting because of toolholder's rigidity.

Recommended Cutting Conditions

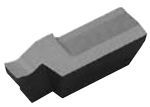
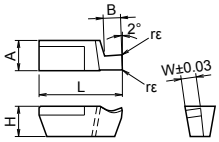
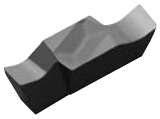
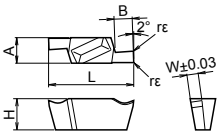
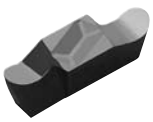
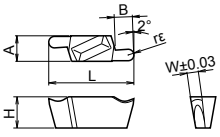
Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed Vc: m/min) Cermet TN60	TN90	TC40	TC60	CVD Coated Carbide CR9025	PVD Coated Carbide PR630	PR930	Carbide KW10
Stainless Steel	0.03~0.12		☆ 100~180	☆ 100~180	★ 80~150		☆ 60~130	★ 60~130	
Carbon Steel	0.05~0.15		★ 120~200	☆ 120~200	☆ 100~180		☆ 80~150	☆ 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 cutting.

★ : 1st Recommendation ☆ : 2nd Recommendation

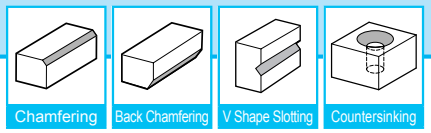
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Applicable Inserts

Insert (Right-hand Shown)		Description	(Previous Description)	W	B	rε	A	L	H	Insert Grade: Cermet TN60	Cermet TN90	Cermet TC40	Cermet 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		●				●	●
		125-020SS	125SS	1.25							●				●	●
		145-020SS	145SS	1.45							●				●	●
		200-020SS	200SS	2.00							●				●	●
		250-020SS	250SS	2.50							●				●	●
		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							●	●			●	●
		145-020S	145S	1.45							●	●			●	●
		185-020S	185S	1.85							●	●			●	●
		200-020S	200S	2.00							●	●			●	●
		250-020S	250S	2.50							●	●			●	●
		340-020S	340S	3.40								●			●	●
 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							●	●			●	●
		140-020A	140A	1.40												
		145-020A	145A	1.45							●	●			●	●
		170-020A	170A	1.70												
		185-020A	185A	1.85							●	●			●	●
		195-020A	195A	1.95												
		200-020A	200A	2.00							●	●			●	●
		225-020A	225A	2.25												
		250-020A	250A	2.50							●	●			●	●
		275-020A	275A	2.75												
		300-020A	300A	3.00							●	●			●	●
		340-020A	340A	3.40							●	●			●	●
		GVR 145-020B	GVR 145B	1.45	2.8	0.2	4.5	15	5.5		●	●			●	●
		185-020B	185B	1.85							●	●			●	●
		200-020B	200B	2.00	3.2						●	●			●	●
		225-020B	225B	2.25												
		230-020B	230B	2.30							●	●			●	●
		250-020B	250B	2.50							●	●			●	●
		275-020B	275B	2.75												
		280-020B	280B	2.80							●	●			●	●
		300-020B	300B	3.00	4.2						●	●			●	●
		325-020B	325B	3.25												
		340-020B	340B	3.40							●	●			●	●
		400-020B	400B	4.00							●	●			●	●
		GVR 280-020C	GVR 280C	2.80	4.5	0.2	5.8	21	6.5		●	●			●	●
		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							●	●			●	●
		(460-020C)	(460C)	4.60								●			●	●
		(500-020C)	(500C)	5.00							●	●			●	●
 2-edge Full-R		**GVR 200-100AR**	GVR 100AR	2.00	2.3	1.00	4.0	12	5.0						●	●
		250-125AR	125AR	2.50		1.25									●	●
		300-150AR	150AR	3.00		1.50									●	●
		GVR 200-100BR	GVR 100BR	2.00	3.2	1.00	4.5	15	5.5		●				●	●
		300-150BR	150BR	3.00	4.2	1.50					●				●	●

• Only R-hand insert is applicable.

● : Std. Item ○ : Check Availability □ : Deleted from the next catalogue



MCSE

Standard (Straight)

Standard (Weldon)

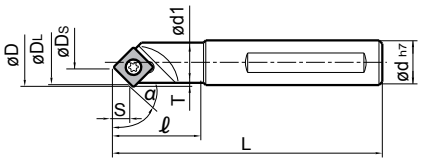


Fig.1

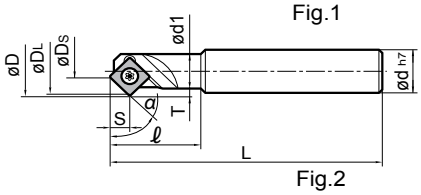


Fig.2

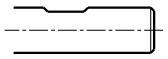


Fig.3

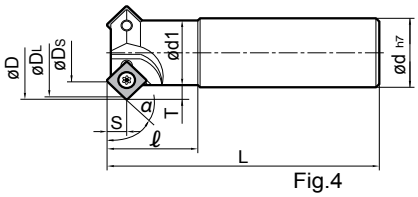


Fig.4

Fig.5

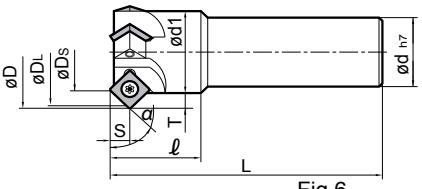
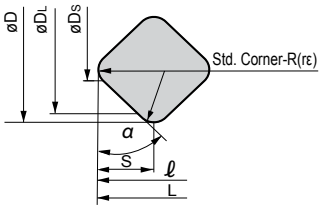


Fig.6

Fig.7



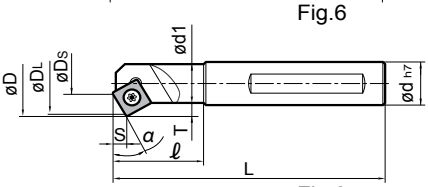


Fig.8

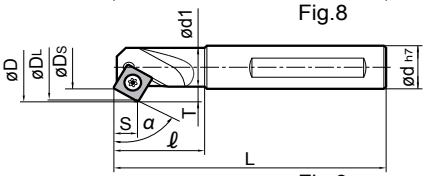


Fig.9

Toolholder Dimensions

Toolholder Dimensions			Std.	No. of Inserts	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)

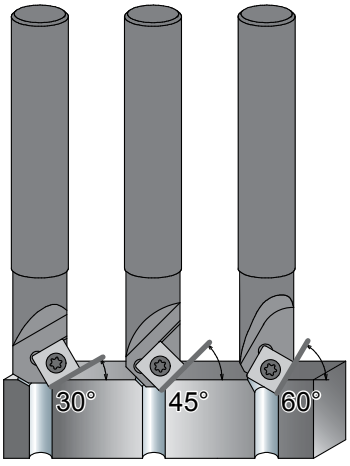
Applicable Inserts

Description	Applicable Inserts → M13,M14		
			
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			

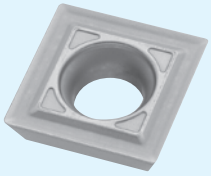
Recommended Cutting Conditions

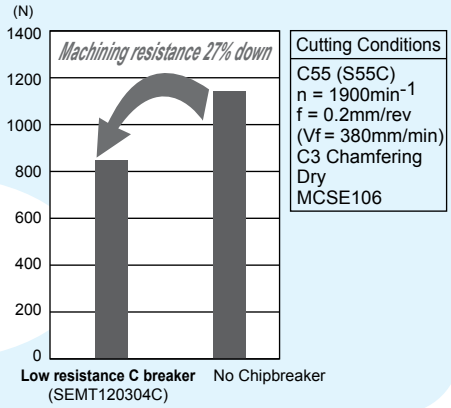
Workpiece Material	fz (mm/t)		Insert Grade (Cutting Speed Vc: m/min)											
			Cermet			MEGACOAT		PVD Coated Carbide					Carbide	
	øDs (ø4~ø20)	øDs (ø27~ø36)	TN60	TN100M	TC60	PR1225	PR1210	PR630	PR730	PR830	PR660	PR905	PW30	KW10
Stainless Steel	0.05~0.2	0.1~0.3		☆ 100~180	☆ 80~160	★ 120~220	-	☆ 100~180	☆ 100~180					-
Carbon Steel	0.05~0.25	0.2~0.4		★ 100~180	☆ 80~160	★ 120~250	-	☆ 100~180	☆ 100~180					-
Alloy Steel	0.05~0.25	0.2~0.4		★ 100~180	☆ 80~160	★ 100~220	-	☆ 80~150	☆ 80~150					-
Mold Steel	0.05~0.25	0.2~0.4		★ 100~150	☆ 80~130	★ 80~180	-	☆ 60~130	☆ 60~130					-
Cast Iron	0.1~0.3	0.3~0.5		-	-	-	★ 100~220	-	-					★ 80~150
Non-ferrous Metals	0.1~0.3	0.3~0.5		-	-	-	-	-	-					★ 100~300

★ : 1st Recommendation ☆ : 2nd Recommendation



■Cutting Performance of low resistance C breaker





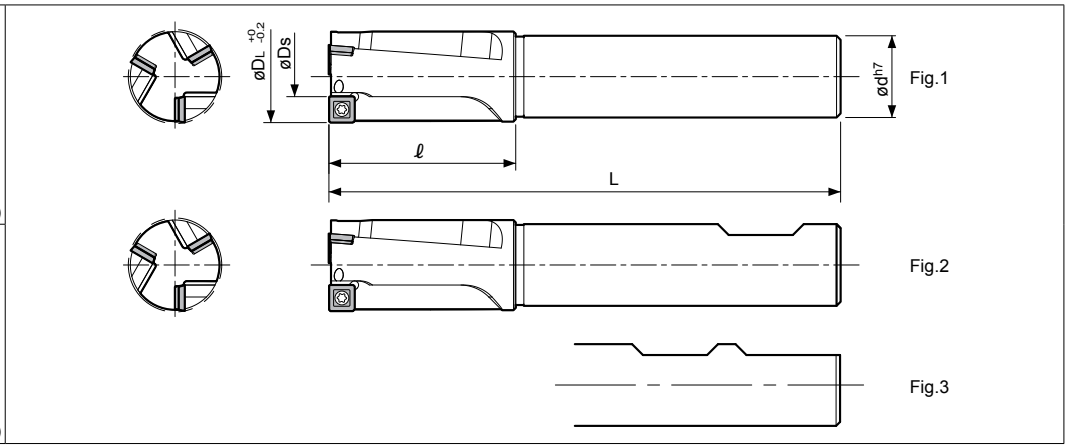
Machining resistance is reduced 27% by low resistance C breaker.

MEF Bolt Countersink Endmill

MEF

Standard (Straight)

Standard (Weldon)

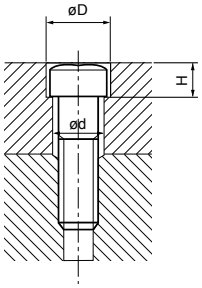


Toolholder Dimensions

Description		Std.	No. of Inserts	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	0.4	+5°	-13°	Fig.1	M8	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	17-S16	●	2	17.5	7.3	16	115	35	0.4	+5°	-13°	Fig.1	M10	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	18-S16	●	2	18	7.7	16	117	38	0.4	+5°	-13°	Fig.1	-	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	20-S16	●	3	20	9.5	16	120	0.4	0.4	+5°	-12°	Fig.1	M12	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	22-S20	●	3	22	11.4	20	124	44	0.4	+5°	-12°	Fig.1	-	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	23-S20	●	3	23	12.4	20	126	46	0.4	+5°	-12°	Fig.1	M14	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	24-S20	●	3	24	13.4	20	128	48	0.4	+5°	-12°	Fig.1	-	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	25-S20	●	3	25	14.4	20	130	50	0.4	+5°	-12°	Fig.1	-	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	25-S25	●	3	25	14.4	25	130	50	0.4	+5°	-12°	Fig.1	-	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	26-S25	●	3	26	9.8	25	132	52	0.8	+5°	-13°	Fig.1	M16	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	27-S25	●	3	27	10.6	25	134	54	0.8	+5°	-13°	Fig.1	-	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	28-S25	●	3	28	11.5	25	136	56	0.8	+5°	-13°	Fig.1	-	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	29-S25	●	3	29	12.6	25	138	58	0.8	+5°	-13°	Fig.1	M18	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	30-S25	●	3	30	13.5	25	140	60	0.8	+5°	-13°	Fig.1	-	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	32-S25	●	3	32	15.5	25	144	64	0.8	+5°	-13°	Fig.1	M20	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	35-S32	●	3	35	18.4	32	150	70	0.8	+5°	-13°	Fig.1	M22	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	39-S32	●	4	39	22.5	32	158	78	0.8	+5°	-13°	Fig.1	M24	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	43-S32	●	4	43	26.2	32	166	86	0.8	+5°	-12°	Fig.1	M27	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	48-S32	●	4	48	31.3	32	176	96	0.8	+5°	-12°	Fig.1	M30	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
Weldon	MEF 15-S12-80W		1	15	4.6	12	80	30	0.4	+5°	-13°	Fig.2	M8	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	18-S16-90W		2	18	7.5	16	90	36	0.4	+5°	-13°	Fig.2	M10	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	20-S16-90W		3	20	8.3	16	90	40	0.4	+5°	-12°	Fig.2	M12	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	26-S25-120W		3	26	9.8	25	120	52	0.8	+5°	-13°	Fig.3	M16	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	33-S25-140W		3	33	16.5	25	140	66	0.8	+5°	-13°	Fig.3	M20	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	40-S32-160W		4	40	23.3	32	160	80	0.8	+5°	-13°	Fig.3	M24	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z

• Before cutting, the workpiece must have a hole with diameter larger than øDs.
• Although Corner R(rε) pertains to MEF11-S10, ø Ds=3.0mm.

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

Diameter Adjustment using the Eccentric Sleeves (SHE / SHEM) ⇒ See page F81

●When using with a MEF counterboring endmill

- Adjustment of counterbore diameter (If in use with single blade, the diameter can be adjusted within the range of diameter allowed by the eccentric sleeve).
- Broadening of counterbore diameter (If in use with 2 or more blades, only broadening is possible for the diameter). Although multiple blades are used, Feed should be input as single blade.

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

◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed Vc: m/min)											
		Cermet			MEGACOAT		PVD Coated Carbide					Carbide	
		TN60	TN100M	TC60	PR1225	PR1210	PR630	PR730	PR830	PR660	PR905	PW30	KW10
Stainless Steel	0.05~0.1				★ 80~180	-		☆ 60~120		☆ 60~120	-		-
Carbon Steel	0.1~0.15				★ 120~220	-		☆ 80~150		☆ 60~130	-		-
Alloy Steel	0.1~0.15				★ 120~220	-		☆ 80~150		☆ 60~130	-		-
Mold Steel	0.05~0.1				★ 100~180	-		☆ 70~120		☆ 70~120	-		-
Cast Iron	0.1~0.2				-	★ 100~220		-		-	☆ 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.

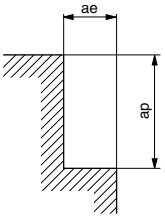
Description	Cutting Speed Vc (m/min)	Feed Rate fz (mm/t)	Step Feed (mm)
MEF11~MEF48	80~150	0.1~0.15	0.5~1.5

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 (S55C)
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.
(See Fig.2)

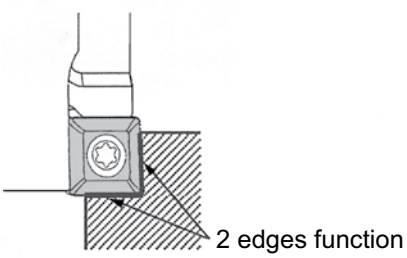


Fig.1

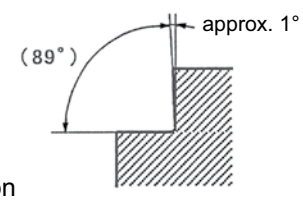
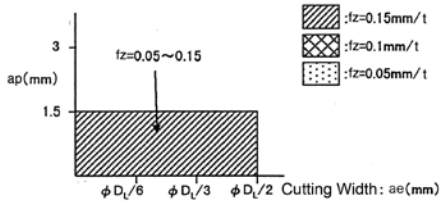
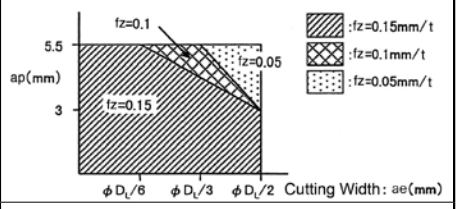
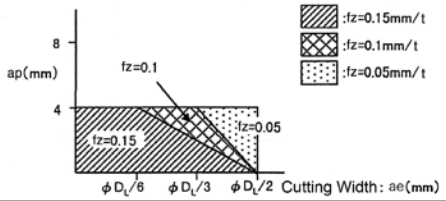
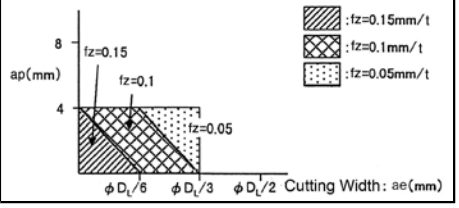


Fig.2

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

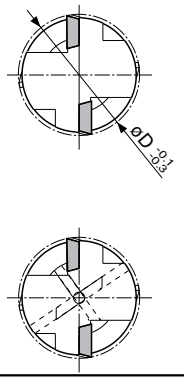


Fig.1

Fig.2

Toolholder Dimensions

Description		Std.	No. of Inserts	No. of Edge Lines	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 ➡ M14
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				SB-3060TR	DT-10	SDMT080308E-K
	40-S32	●	4	2	40		20.5	18	130	50					-12°		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				SB-3060TR	DT-10	SDMT080308E-K
	40-S32-H	○	4	2	40		20.5	18	130	50					-12°		SB-4085TR	DT-15	SDMT120408E-K
	50-S32-H	○			50		26.5	22	140	60									

・METS…-H type has air holes

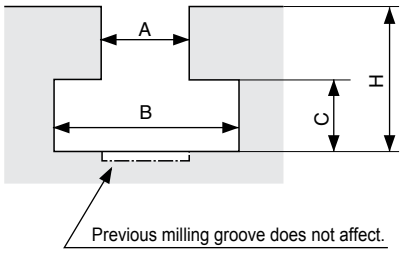
Applicable Inserts

Toolholder		Applicable Inserts ➡ M14
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

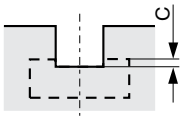
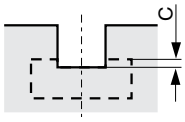
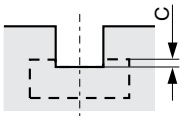
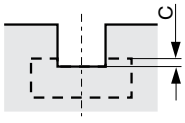
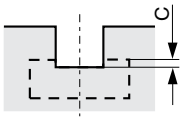
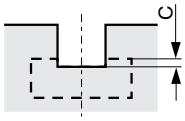
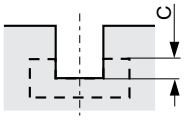
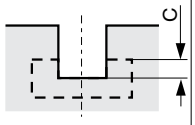
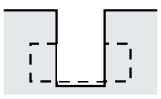


● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed Vc: m/min)											
		Cermet			MEGACOAT		PVD Coated Carbide					Carbide	
		TN60	TN100M	TC60	PR1230	PR1210	PR630	PR730	PR830	PR660	PR905	PW30	KW10
Stainless Steel	-				-	-		-		-	-		-
Carbon Steel	0.1~0.15				★ 100~200	-		☆ 80~150		☆ 60~130	-		-
Alloy Steel	0.08~0.12				★ 100~200	-		☆ 80~150		☆ 60~130	-		-
Mold Steel	0.05~0.1				★ 80~150	-		☆ 60~100		☆ 60~100	-		-
Cast Iron	0.1~0.15				-	★ 100~200		-		-	☆ 80~150		☆ 80~120
Non-ferrous Metals	0.1~0.15				-	-		-		-	-		★ 100~300

★ : 1st Recommendation ☆ : 2nd Recommendation

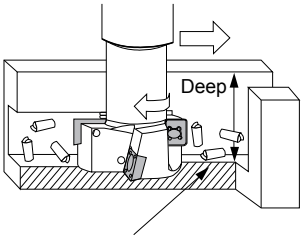
Toolholder Description (T Slot Nominal Size)	Steel			Cast Iron		
	Groove Shape at Pre-process	T-Slotting Conditions	Conditions to prevent chattering	Groove Shape at Pre-process	T-Slotting Conditions	Conditions to prevent chattering
METS21-S25(-H) (Nominal Size 12)	C=1~3mm 	Vc= 120 fz= 0.1 (n= 1820) (Vf= 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 cutting, the bigger the C-dimension becomes, the less chattering occurs.

How to prevent damaging Chips when Steel cutting

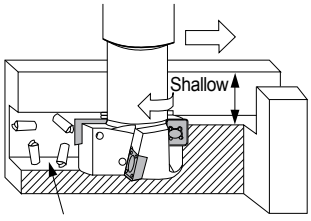
Before Improvement
(Deep Groove at Pre-Process)



Chips stay in the pre-process groove.

Improvement of chip biting

After Improvement
(Shallow Groove at Pre-Process)

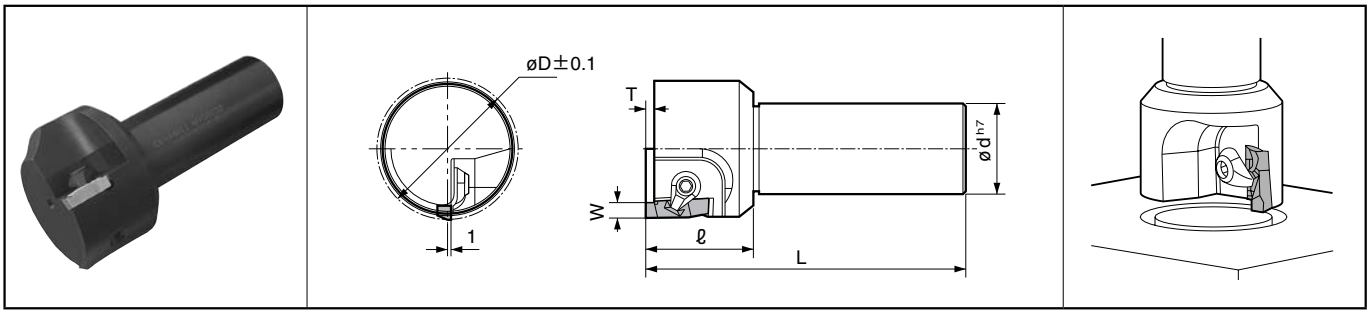


Chips are evacuated backward and chances of damaging chips are less.

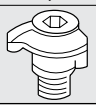
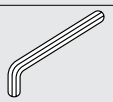
Make pre-process groove shallower to prevent the tool damage from chips.
Use compressed air to aid in chip evacuation.

MVG Ring Grooving Endmill

MVG

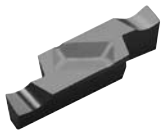
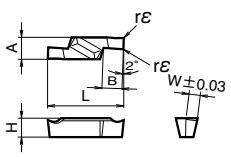


Toolholder Dimensions

Description		Std.	Dimension (mm)					Edge Width	Spare Parts	
									Clamp Set	Wrench
			øD	ød	L	ℓ	T	W		
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				PVD Coated Carbide		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		●	●	○		●	●
		430-020B	**430B**	4.30								●	○		●	●
		460-020B	**460B**	4.60								●	○		●	●
		490-020B	**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)	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 □ : Deleted from the next catalogue

Recommended Cutting Conditions

Cutting Conditions Table

◆ Recommended Cutting Conditions (MSD45 ⇒ **M35**, MSP15 ⇒ **M43**)

Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed Vc: m/min)													
		Cermet			MEGACOAT		PVD Coated Carbide					Carbide		PCD	
		TN60	TN100M	TC60	PR1225	PR1210	PR630	PR730	PR830	PR660	PR905	PW30	KW10	KPD001	KPD010
Stainless Steel	~0.25	-	☆ 120~200	☆ 120~200	★ 120~220	-	☆ 120~200	☆ 120~200		☆ 100~200	-	☆ 80~120	-	-	-
Carbon Steel	~0.3	☆ 150~220	★ 120~200	☆ 120~200	★ 120~250	-	☆ 120~200	☆ 120~200		☆ 100~180	-	☆ 80~150	-	-	-
Alloy Steel	~0.3	☆ 120~200	★ 100~180	☆ 100~180	★ 100~220	-	☆ 100~180	☆ 100~180		☆ 80~150	-	☆ 80~150	-	-	-
Mold Steel	~0.25	☆ 120~200	★ 100~180	☆ 100~180	★ 80~180	-	☆ 80~150	☆ 80~150		☆ 60~130	-	☆ 80~150	-	-	-
Cast Iron	~0.3	-	-	-	-	★ 100~220	-	-		-	☆ 100~200	-	☆ 80~150	-	-
Non-ferrous Metals	~0.2	-	-	-	-	-	-	-		-	-	-	★ 100~300	★ 300~800	☆ 300~800

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ Recommended Cutting Conditions (MSO45 ⇒ **M36**)

Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed Vc: m/min)													
		Cermet			MEGACOAT		PVD Coated Carbide					Carbide		PCD	
		TN60	TN100M	TC60	PR1225	PR1210	PR630	PR730	PR830	PR660	PR905	PW30	KW10	KPD230	
Stainless Steel	~0.25		☆ 120~200	☆ 120~200	★ 120~220	-	☆ 120~200	☆ 120~200		☆ 100~200	-		-	-	
Carbon Steel	~0.3		★ 120~200	☆ 120~200	★ 120~250	-	☆ 120~200	☆ 120~200		☆ 100~180	-		-	-	
Alloy Steel	~0.3		★ 100~180	☆ 100~180	★ 100~220	-	☆ 100~180	☆ 100~180		☆ 80~150	-		-	-	
Mold Steel	~0.25		★ 100~180	☆ 100~180	★ 80~180	-	☆ 80~150	☆ 80~150		☆ 60~130	-		-	-	
Cast Iron	~0.3		-	-	-	★ 100~220	-	-		-	☆ 100~200		☆ 80~150	-	
Non-ferrous Metals	~0.2		-	-	-	-	-	-		-	-		★ 100~300	★ 300~800	

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ Recommended Cutting Conditions (MSO45・・－09 ⇒ **M37**)

Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed Vc: m/min)													
		Cermet			MEGACOAT		PVD Coated Carbide					Carbide		PCD	
		TN60	TN100M	TC60	PR1225	PR1210	PR630	PR730	PR830	PR660	PR905	PW30	KW10	KPD001	KPD010
Stainless Steel	~0.25		☆ 120~200		★ 120~220	-	☆ 120~200	☆ 120~200		☆ 100~200	-		-		
Carbon Steel	~0.3		★ 120~200		★ 120~250	-	☆ 120~200	☆ 120~200		☆ 100~180	-		-		
Alloy Steel	~0.3		★ 100~180		★ 100~220	-	☆ 100~180	☆ 100~180		☆ 80~150	-		-		
Mold Steel	~0.25		★ 100~180		★ 80~180	-	☆ 80~150	☆ 80~150		☆ 60~130	-		-		
Cast Iron	~0.3		-		-	★ 100~220	-	-		-	☆ 100~200		☆ 80~150		
Non-ferrous Metals	~0.2		-		-	-	-	-		-	-		★ 100~300		

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ Recommended Cutting Conditions (MSE15 ⇒ **M43**)

Workpiece Material	fz (mm/t)	Insert Grade (Cutting Speed Vc: m/min)													
		Cermet			MEGACOAT		PVD Coated Carbide					Carbide		PCD	
		TN60	TN100M	TC60	PR1225	PR1210	PR630	PR730	PR830	PR660	PR905	PW30	KW10	KPD001	KPD010
Stainless Steel	~0.25		☆ 120~200	☆ 120~200	★ 120~220	-	☆ 120~200	☆ 120~200							
Carbon Steel	~0.25		★ 120~200	☆ 120~200	★ 120~250	-	☆ 120~200	☆ 120~200							
Alloy Steel	~0.25		★ 100~180	☆ 100~180	★ 100~220	-	☆ 100~180	☆ 100~180							
Mold Steel	~0.25		★ 100~180	☆ 100~180	★ 80~180	-	☆ 80~150	☆ 80~150							
Cast Iron	-		-	-	-	★ 100~220	-	-							
Non-ferrous Metals	-		-	-	-	-	-	-							

★ : 1st Recommendation ☆ : 2nd Recommendation

Cutting Conditions Table

◆ Recommended Cutting Conditions (DMC / DMC-SX ➡ **M92**)

Workpiece Material	fz (mm/t)	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