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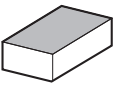

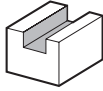
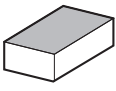

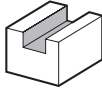


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Cutting edge angle 45°/66°/70°/75°

Cutting edge angle	Applications	Facing	Chamfering	Cutting edge angle	Applications	Facing	Chamfering
							
Shape				Shape			
45°	 <p>M12~M15</p>	<ul style="list-style-type: none"> • 10-edge pentagonal inserts (double-sided) • Low cutting force with helical cutting-edge design • Dual cutting edge design (High toughness) • End mills have $\varnothing 32$ cylindrical shank 		45°	 <p>M34</p>	<ul style="list-style-type: none"> • For heavy milling • Tough 4-edge vertical inserts • For large depths of cut and high feed rates • Max. ap 12 mm 	
	 <p>With Wiper Insert M28</p>	<ul style="list-style-type: none"> • Roughing Condition ($f_z = 0.25$ mm/t) Provides Excellent Surface Finish ($0.8 \mu\text{mRa}$ or Less) * (*Based on internal evaluation with wiper insert installed.) • Maintains Long Tool Life with High-Precision Inserts • Newly Developed Chipbreakers for Steel, Stainless Steel, and Aluminum • Improved Productivity with Excellent Chip Control 					
Cutting edge angle	Applications	Facing		Cutting edge angle	Applications	Facing	
							
Shape				Shape			
66°	 <p>M21~M23</p>	<ul style="list-style-type: none"> • Double-sided 10-edge insert • Cutting edge angle 66° • Reduces chattering with low cutting force design • End mills have $\varnothing 32$, $\varnothing 40$ cylindrical shank 		70°	 <p>M35</p>	<ul style="list-style-type: none"> • For heavy milling • Tough 4-edge vertical inserts • For large depths of cut and high feed rates • Max. ap 17 mm 	
	 <p>M49</p>	<ul style="list-style-type: none"> • For heavy milling • Max. ap 12 mm • High chip evacuation rate per unit 					
75°				70°	 <p>M40</p>	<ul style="list-style-type: none"> • High efficiency multi-edge cutter for cast iron • 10-edge pentagonal inserts (double-sided) • Low cutting force with helical cutting-edge design • Improved surface finish, minimizing chattering and prevented burr formation • Dual cutting edge design (High toughness) 	
					 <p>M42</p>	<ul style="list-style-type: none"> • For cast iron • Adjustable cutting edge height • High speed and high precision machining of cast iron by combining ceramic insert and CBN wiper insert 	











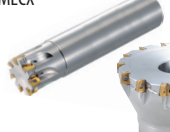




Cutting edge angle 88°/90° (Double-sided insert)

Cutting edge angle	Shape	Applications			Cutting edge angle	Shape	Applications		
		Facing	Shouldering	Slotting			Facing	Shouldering	Slotting
90°	MEW				90°	MFWN			
	MEW head (Modular type)	<ul style="list-style-type: none"> Economical double-sided 4-edge insert Obtuse edge increases cutting edge toughness Smooth surface wall with low cutting force and reduced chattering 				MFWN Mini	<ul style="list-style-type: none"> Economical double-sided 6-edge insert Superior fracture resistance with thick edge design "Large slant edge" design reduces shock when cutting edge enters the workpiece Low cutting force and reduce chattering End mills have ø32 cylindrical shank 		
		<ul style="list-style-type: none"> • Economical double-sided 4-edge insert • Obtuse edge increases cutting edge toughness • Smooth surface wall with low cutting force and reduced chattering 					<ul style="list-style-type: none"> • Can be used up to 5 mm D.O.C. • Good cost performance • Economical double-sided 6-edge insert • Superior fracture resistance with thick edge design • "Large slant edge" design reduces shock when cutting edge enters the workpiece • Low cutting force and reduce chattering • End mills have ø25, ø32 cylindrical shank 		
					88°	MFSN88			



Cutting edge angle 90°

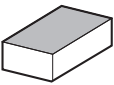

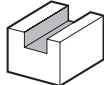
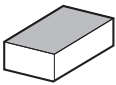

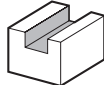



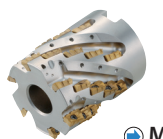



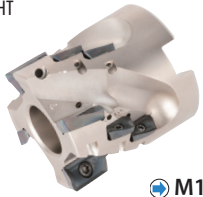


Cutting edge angle	Applications	Facing	Shouldering	Slotting	Cutting edge angle	Applications	Facing	Shouldering	Slotting
									
90°	 MEC M64~M66, M67	<ul style="list-style-type: none"> • Good squareness • Low cutting force • The silver coating prevents chip wear on the tool body • With coolant hole (Over shank size $\varnothing 16$) • The twisted cutting edge improves cutting performance • Smooth surface of shoulder wall 	 MEV M84, M85	<ul style="list-style-type: none"> • Newly developed vertical triangle inserts • Economical 3-edge insert • The MEV can perform a wide variety of machining processes 					
	 MEC head (Modular type) M68				 MEV head (Modular) M86				
	 MECX M76, M77				 DMC-H M149				
		 DMC-SX M148							

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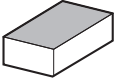

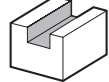
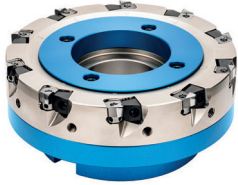

Milling

Cutting edge angle 90° (Heavy milling)

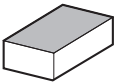

Cutting edge angle	Applications	Facing	Shouldering	Slotting	Cutting edge angle	Applications	Facing	Shouldering	Slotting
									
90° (Long cutting edge)	MEWH  ➔ M90	<ul style="list-style-type: none"> • Low cutting force and sharp cutting performance • Excellent surface finish quality • Economical double-sided 4-edge insert • High quality and stable machining with heavy milling 			90° (Long cutting edge)	MECH  ➔ M94	<ul style="list-style-type: none"> • Notched insert improves higher productivity 		
	MEWH shell mill  ➔ M91	<ul style="list-style-type: none"> • MEWH shell mill 				MECH shell mill  ➔ M95	<ul style="list-style-type: none"> • MECH shell mill 		
	MSRS90  ➔ M137	<ul style="list-style-type: none"> • High efficiency, low cutting force and stable machining without chatter • Various expansive possibilities with combining neutral insert and custom-ordered cutter 				MECH-BT50 MECH-BT50SA  ➔ M96, M97	<ul style="list-style-type: none"> • Highly rigid BT50 Arbor integrated for MECH • Head exchangeable type is available (MECH-BT50SA) 		
	MSR  ➔ M143	<ul style="list-style-type: none"> • Low cutting force and restrain chattering with notched insert • Chipbreaker design with specialized notches improves chip evacuation • Chipbreaker achieves stabilized machining for heavy milling 				MECHT  ➔ M105	<ul style="list-style-type: none"> • Excellent chattering resistance and good chip control with special design for titanium alloys • End mills have ø32, cylindrical shank 		
	MSR-BT50  ➔ M144	<ul style="list-style-type: none"> • Highly rigid BT50 Arbor integrated for MSR 							
	MFLN90  ➔ M130	<ul style="list-style-type: none"> • For heavy milling • Tough 4-edge vertical inserts • For large depths of cut and high feed rates • Max. ap 20 mm • Chamfered corner type available • Prevents chattering and insert fracturing 							



**Cutting edge angle 90°
(For aluminum alloys)**

Cutting edge angle	Applications	Facing	Shouldering	Slotting
				
Shape				
90°	<p>MFAH</p>  <p>➔ M154~M156</p> <ul style="list-style-type: none"> • High efficiency milling cutter for finishing aluminum alloys • Light-weight hybrid body with internal coolant available/Steel body • Adjustable cutting edge height • 3 different cutting edge design 			
	<p>MEAS</p>  <p>➔ M164</p> <ul style="list-style-type: none"> • High efficiency milling cutter for finishing aluminum alloys • Excellent scatter prevention to ensure stable 			

For finishing operations

Applications	Facing
	
Shape	
<p>MFF</p>  <p>➔ M171</p> <ul style="list-style-type: none"> • High-Quality surface finish • Molded wiper insert • Cutter body design provides excellent reliability • Easy-to-adjust cutting edge 	



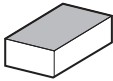

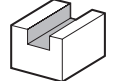
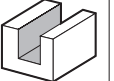
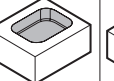


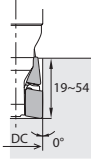

Milling

High feed cutter

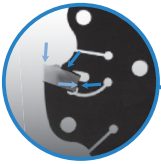
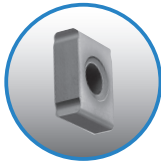
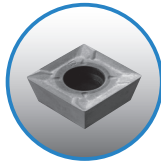
Applications Shape	Facing	Shouldering	Slotting	Pocketing	Cutting diameter DC ø8 ø16 ø25 ø32 ø40 ø50 ø80 ø160
MFH Harrier (Face mill) M176, M177	• Various applications with 4 types of inserts GM type (General purpose) GH type (Tough edge)				 ø50 (SOMT10 type) ø80 (SOMT14 type)
MFH Harrier (End mill) M178, M179	 LD type (Large D.O.C.) MAX. ap = 5mm FL type (With wiper edge) Roughing and finishing				 ø25 ø40 (SOMT10 type) ø50 ø80 (SOMT14 type)
MFH Harrier (Modular type) M180	• 3D convex cutting edge reduces shock of biting workpiece • Multi-functional cutter for ramping, helical milling vertical milling (plunging) etc. (GM/GH type)				 ø25 ø40 (SOMT10 type)
MFH Boost (Face mill) M190	• Economical double-sided 4-edge insert • High feed milling with large depth of cut capabilities GM type (General purpose)				 ø40 ø80
MFH Boost (End mill) M189	• Achieves high efficiency machining in various shouldering, slotting, helical milling, and ramping applications				 ø22 ø40
MFH Boost (Modular type) M191					 ø22 ø42
MFH mini (Face mill) M197	• Economical double-sided 4-edge insert GM type (General purpose) GH type (Tough edge)				 ø40 ø50
MFH mini (End mill) M196	• High efficiency and high feed machining at small dia. machining and small machining center				 ø16 ø32
MFH mini (Modular type) M198					 ø16 ø32
MFH micro (end mill) M204	• Micro diameter cutter for high feed machining • High efficiency machining with low cutting force and reduced chattering Micro insert				 ø8 ø16
MFH micro (modular type) M205					 ø8 ø16



Multi-function machining end mill

Applications	Facing	Shouldering	Slotting	Deep slotting	Pocketing	Drilling	Lead angle and max. ap	Cutting dia. DC		
								ø16	ø25	ø50
MEY  M208, M209	<ul style="list-style-type: none"> Multi-function machining (Drilling/Ramping/Shouldering/Grooving) High efficiency mold machining Low cutting force, Good chip evacuation 	<ul style="list-style-type: none"> Full 2-insert structure and high stability Good chip control when Ramping 	<ul style="list-style-type: none"> Cutting diameters that are larger than the shank diameters enables wall shouldering The silver coating prevents chip wear on the tool body 							

Slot mill MST

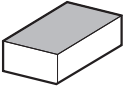
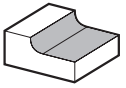
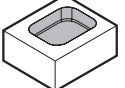

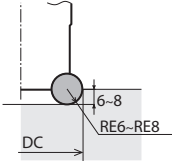


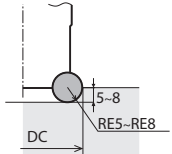


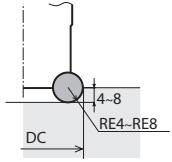



MSTA M216, M217	MSTB M220~M222	MSTC M227~M235
		
<ul style="list-style-type: none"> Self-clamping type Remove insert with appropriate wrench 	<ul style="list-style-type: none"> Easy screw on tangential clamped insert 	<ul style="list-style-type: none"> Adjustable slotting width due to unique cam adjustment structure

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Milling

Radius

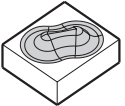
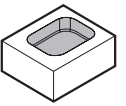

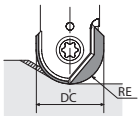



Applications	Facing	Shouldering	Pocketing	Lead angle and max. ap	Cutting dia. DC							
					ø12	ø16	ø32	ø40	ø50	ø63	ø80	ø100
MRW face mill/end mill  M248 M250	<ul style="list-style-type: none"> High efficiency radius cutter with double-sided insert Combine sharpness and cutting edge strength (A.R. Max. +12°) Prevent insert rotation during machining with flat lock structure Wide application range from steel to heat-resistant alloys 			 6-8 RE6-RE8	 ø32 — ø125							
MRX face mill  M255	<ul style="list-style-type: none"> Low cutting force and high performance radius cutter Low cutting force with helical cutting-edge design (A.R. Max. +10°) Prevent insert rotation during machining with flat lock structure Wide application from facing, grooving, pocketing to plunging Wide application range from steel to heat-resistant alloys 			 5-8 RE5-RE8	 ø40 — ø125							
MRX end mill  M258				 4-8 RE4-RE8	 ø16 — ø63							
MRX head (Modular type)  M259					 ø16 — ø40							

M



Milling

Ball-nose end mill

Applications	Contouring/Profiling	Pocketing	Lead angle and max. ap	Cutting dia. DC			
				ø8	ø25	ø50	ø80
MRF  M242	<ul style="list-style-type: none"> For high quality mold finishing High R-accuracy (Insert's R-accuracy: ±0.01mm or under) The bushing ensures insert installation accuracy 		 DC RE	 ø8 — ø25			
MRFW  M243	<ul style="list-style-type: none"> Carbide shank For high quality mold finishing High R-accuracy (Insert's R-accuracy: ±0.01mm or under) The bushing ensures insert installation accuracy Superior to anti vibration, and stable machining is possible with long overhang length without chattering 			 ø8 — ø12			

M9

Introduction

Chamfering

Applications	Chamfering	Back chamfering	V shape slotting	Countersinking	Lead angle and max. ap
Shape					
<p>M264</p>	<ul style="list-style-type: none"> For 30°, 45°, 60° chamfering Economical 4-edge insert Available back chamfering 				

Bolt countersinking

Applications	Bolt countersinking	Facing	Shouldering	Lead angle and max. ap
Shape				
<p>M266</p>	<ul style="list-style-type: none"> Countersink for hexagon socket bolt (M6 ~ M30) Economical 4-edge insert 			

T-Slotting

Applications	T-Slotting	Back side milling	Lead angle and max. ap
Shape			
<p>M269</p>	<ul style="list-style-type: none"> T-Slotting Recommended for high feed machining with 2 flute design Economical 4-edge insert 		

Grooving

Applications	Internal grooving	Ring grooving	Lead angle and max. ap
Shape			
<p>M272</p>	<ul style="list-style-type: none"> Edge Width 1.0 ~ 4.0mm Grooving for M/C 		
<p>M274</p>	<ul style="list-style-type: none"> Cutting dia. $\phi 30 \sim \phi 75$ Edge width 4.0 ~ 4.9mm O-Ring grooving (G Series) 		

M



Milling

M10

Milling Inserts Identification System

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

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

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

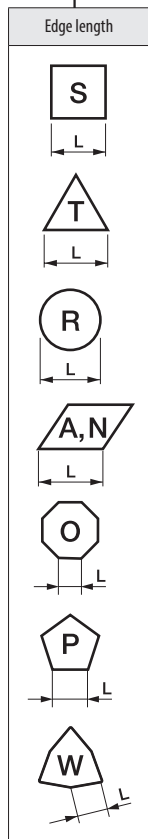
Symbol (Class)	Tolerance (mm)		
	Corner Height	Thickness	I.C. Size
A	±0.005	±0.025	±0.025
F	±0.013		±0.013
C			±0.025
H	±0.013		±0.013
E	±0.025	±0.13	±0.025
G			
J	±0.005	±0.05~±0.15	±0.05~±0.15
K*	±0.013		
L*	±0.025		
M*	±0.08~±0.18		
N*	±0.13~±0.38	±0.13	±0.08~±0.25
U*		±0.13	

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

Symbol	Shape
W	No chipbreaker, with hole
T	Single-sided chipbreaker, with hole
F	Double-sided chipbreakers, without hole
N	No chipbreaker, without hole
R	Single-sided chipbreaker, without hole
M	Single-sided chipbreaker, with hole
A	No chipbreaker, with hole

Symbol	Shape
F	Sharp edge
E	R-honed
T	Chamfered
S	Chamfered + R-honed

S E K N 12 03 A F T N -



Thickness

Symbol	Thickness (mm)
02	2.38
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35

Cutting edge angle

Symbol	Cutting edge angle
A	45°
D	60°
E	75°
F	85°
H	87°
P	90°
X	65°

Relief angle

Symbol	Relief angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
R	10°
S	14°
T	22°
U	23°

Hand of tool

Symbol	Hand of tool
R	Right-hand
L	Left-hand
N	Neutral

Manufacturer's option
Chipbreaker, etc.

In case of indicating corner-R (RE)

Corner-R (RE) (mm)	
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0



Spare parts (common to Metric / Inch spec)

Description		Spare parts							
		Clamp screw	Wrench		Shim	Shim screw	Wrench	Anti-seize compound	Mounting bolt
			TTW	DTM					
Coarse pitch	MFPN 45063R-4T-M	SB-50140TR	TTW-15	-	MFPN-45	SPW-7050	LW-5	P-37	HH10X30
	MFPN 45080 ³ / _L -5T(-M)								HH12X35
	MFPN 45100 ³ / _L -6T(-M)								-
	45315R-14T(-M)								-
Fine pitch	MFPN 45063R-5T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30
	MFPN 45080R-6T(-M)								HH12X35
	MFPN 45100R-8T(-M)								-
	45315R-18T(-M)								-
Extra fine pitch	MFPN 45063R-6T-M	SB-40140TRN	-	DTM-15	-	-	-	P-37	HH10X30
	MFPN 45080R-8T(-M)								HH12X35
	MFPN 45100R-10T(-M)								-
	45250R-20T								-

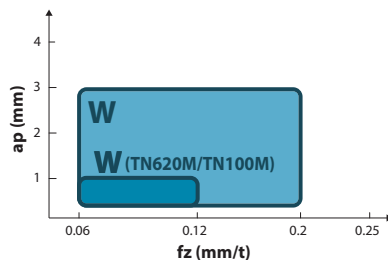
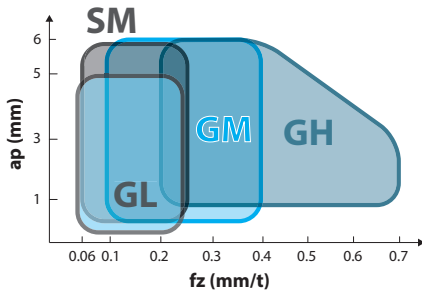
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

Applicable chipbreaker range

M



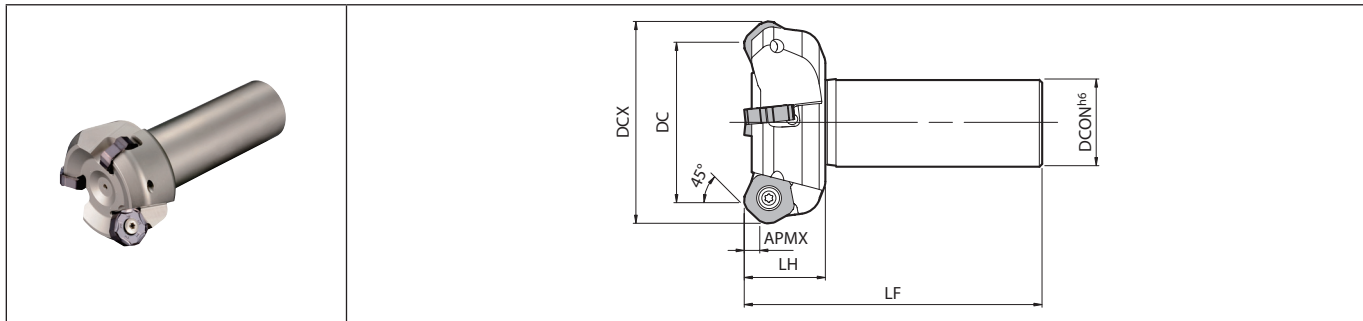
Milling



- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

MFPN45

MFPN45 (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)						A.R. max.(°)	R.R. (°)	Coolant hole	Spare parts			Applicable inserts ➔ M16
			R	DC	DCX	DCON	LF	LH				Anti-seize compound	Screw	Wrench	
MFPN 45050R-S32-3T	●	3	50	63					-12	No	P-37	SB-50140TR	TTW-15	PN□U1205...R-..	
45063R-S32-4T	●	4	63	76	32	110	30	+10	-10						
45080R-S32-5T	●	5	80	93					-8						

APMX : 6 mm (GM, SM, GH Chipbreakers), 5 mm (GL Chipbreaker), 3 mm (W Chipbreaker)
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.



● : Standard item



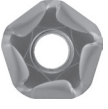



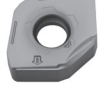
M15

PNMU/PNEU

Classification of usage

- ★ : Roughing / 1st Choice
- ☆ : Roughing / 2nd Choice
- : Finishing / 1st Choice
- : Finishing / 2nd Choice
- (In case hardness is 45HRC or under)

Carbon steel / Alloy steel				☆	★	☆	■	P
Mold and die steel				☆	★	☆	■	
Austenitic stainless steel				☆	★			M
Martensitic stainless steel	★					☆		
Precipitation hardening stainless steel						★		
Gray cast iron				☆	★			K
Nodular cast iron				☆	★			
Non-ferrous metals								N
Heat-resistant alloy	★			☆		☆		S
Titanium alloy				☆		★		
Hard materials	★							H

Insert	Description	No. of edges	Dimension (mm)					Carbide						Cermet	Applicable toolholder M12 M13 M15	
			S	D1	INSL	BCH	BS	CVD			PVD					
								CA6535	PR1210	PR1275	PR1510	PR1535	TN100M			TN200M
	PNMU 1205ANER-GM General purpose	10	5.56	6.2	17.88	2	2	●	●	●	●	●	●	●	●	MFPN45...R..
	PNMU 1205ANEL-GM General purpose	10	5.56	6.2	17.88	2	2	●		●	●	●		●		MFPN45...L..
	PNMU 1205ANER-SM Low cutting force	10	5.56	6.2	17.88	2	2	●	●	●	●	●	●	●	●	MFPN45...R..
	PNMU 1205ANER-GH Tough edge	10	6.17	6.2	17.98	2	2	●	●	●	●	●	●	●	●	MFPN45...R..
	PNEU 1205ANER-GL Surface finish oriented	10	5.56	6.2	17.51	2.7	2.7	●	●	●	●	●	●	●	●	MFPN45...R..
	PNEU 1205ANEL-GL Surface finish oriented	10	5.56	6.2	17.51	2.7	2.7	●		●	●	●		●		MFPN45...L..
	PNEU 1205ANER-W 2-edge / With wiper edge	2	5.56	6.2	17.85	2.3	8.1	●		●	●	●	●	●	●	MFPN45...R..

Recommended cutting conditions M17

- M
- Milling
- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

PNEU1205ANER-W inserts are sold in 5 piece boxes

M16

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t) (): TN620M	Recommended insert grades (Vc: m/min)					
			Cermet TN620M	MEGACOAT(PVD coated carbide)			CVD coated carbide	
				PR1535	PR1525 (PR1225)	PR1510 (PR1210)	PR015S	CA6535
GM	Carbon steel	0.1~ 0.2 ~0.4 (0.06~ 0.12 ~0.20)	200~ ★250 ~300	120~ ☆180 ~250	120~ ★180 ~250	-	-	-
	Alloy steel	0.1~ 0.2 ~0.4 (0.06~ 0.12 ~0.20)	180~ ★220 ~250	100~ ☆160 ~220	100~ ★160 ~220	-	-	-
	Mold steel	0.1~ 0.2 ~0.35 (0.06~ 0.08 ~0.15)	150~ ★180 ~220	80~ ☆140 ~180	80~ ★140 ~180	-	-	-
	Stainless steel (Austenitic related)	0.1~ 0.2 ~0.4	-	100~ ☆160 ~200	100~ ☆160 ~200	-	-	-
	Stainless steel (Martensitic related)	0.1~ 0.2 ~0.4	-	150~ ★200 ~250	-	-	-	180~ ☆240 ~300
	Stainless steel (Precipitation hardening)	0.1~ 0.2 ~0.3	-	90~ ★120 ~150	-	-	-	-
	Gray cast iron	0.1~ 0.2 ~0.4	-	-	-	120~ ★180 ~250	-	-
	Nodular cast iron	0.1~ 0.2 ~0.35	-	-	-	100~ ★150 ~200	-	-
Ni-base heat-resistant alloys	0.1~ 0.12 ~0.2	-	20~ ☆30 ~50	-	-	-	20~ ★30 ~50	
SM *1GL	Carbon steel	0.06~ 0.12 ~0.25 (0.06~ 0.10 ~0.15)	200~ ★250 ~300	120~ ☆180 ~250	120~ ☆180 ~250	-	-	-
	Alloy steel	0.06~ 0.12 ~0.25 (0.06~ 0.10 ~0.15)	180~ ★220 ~250	100~ ☆160 ~220	100~ ☆160 ~220	-	-	-
	Mold steel	0.06~ 0.1 ~0.2 (0.06~ 0.08 ~0.12)	150~ ★180 ~220	80~ ☆140 ~180	80~ ☆140 ~180	-	-	-
	Stainless steel (Austenitic related)	0.06~ 0.12 ~0.25	-	100~ ★160 ~200	100~ ☆160 ~200	-	-	-
	Stainless steel (Martensitic related)	0.06~ 0.12 ~0.25	-	150~ ★200 ~250	-	-	-	180~ ★240 ~300
	Stainless steel (Precipitation hardening)	0.06~ 0.12 ~0.25	-	90~ ☆120 ~150	-	-	-	-
	Gray cast iron	0.06~ 0.12 ~0.25	-	-	-	120~ ☆180 ~250	-	-
	Nodular cast iron	0.06~ 0.1 ~0.2	-	-	-	100~ ☆150 ~200	-	-
	Ni-base heat-resistant alloys	0.06~ 0.1 ~0.15	-	20~ ☆30 ~50	-	-	-	20~ ☆30 ~50
Titanium alloys	0.06~ 0.08 ~0.15	-	40~ ★60 ~80	-	-	-	-	
*2GH	Carbon steel	0.2~ 0.4 ~0.7	-	120~ ☆180 ~250	120~ ☆180 ~250	-	-	-
	Alloy steel	0.2~ 0.4 ~0.6	-	100~ ☆160 ~220	100~ ☆160 ~220	-	-	-
	Mold steel	0.2~ 0.35 ~0.5	-	80~ ☆140 ~180	80~ ☆140 ~180	-	-	-
	Stainless steel (Austenitic related)	0.2~ 0.3 ~0.4	-	100~ ☆160 ~200	100~ ☆160 ~200	-	-	-
	Stainless steel (Martensitic related)	0.2~ 0.3 ~0.4	-	150~ ★200 ~250	-	-	-	180~ ☆240 ~300
	Stainless steel (Precipitation hardening)	0.2~ 0.3 ~0.4	-	90~ ☆120 ~150	-	-	-	-
	Gray cast iron	0.2~ 0.4 ~0.7	-	-	-	120~ ☆180 ~250	-	-
	Nodular cast iron	0.2~ 0.35 ~0.5	-	-	-	100~ ☆150 ~200	-	-
	Ni-base heat-resistant alloys	0.2~ 0.3 ~0.4	-	20~ ☆30 ~50	-	-	-	20~ ☆30 ~50
Hard materials (60HRC or less)	0.05~ 0.1 ~0.2	-	-	-	-	50~ ★80 ~100	-	

★: 1st Recommendation ☆: 2nd Recommendation

The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation. Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

- *1. GL Chipbreaker: Recommended for surface finish oriented milling.
- *2. GH Chipbreaker: Fine pitch → fz≤0.4 (mm/t)
Extra fine pitch → Not recommended



Milling

Cutter type and chipbreaker selection

Milling purpose	Cutter type			Chipbreaker				
	Coarse pitch	Fine pitch	Extra fine pitch	GM	SM	GH	GL	W
General milling for steel and alloy steel		●		●				
Steel and alloy steel (At chattering due to low rigidity machine or poor clamping power)	●				●			
Productivity oriented (Running cost decrease) (ap=4mm or over, fz=0.35mm/t or over)	●					●		
Surface finish oriented	●	●					●	
General milling of stainless steel		●			●			
Stainless steel (To prevent chattering due to low rigidity machine or poor clamping power)	●				●			
Cast iron (For processing efficiency improvement)			●	●				
Cast iron (ap=4mm or over, fz=0.35mm/t or over)	●					●		
Improved surface finish in high efficiency milling		●	●					●

How to use wiper insert

1. Please use one wiper insert on one cutter.
(If you use 2 inserts or more on one cutter, the workpiece surface may be muddy white.)

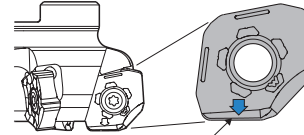
2. Combination of wiper insert with other chipbreakers

Combination	Chipbreaker		
	GM	SM	W
Recommended combination	●		●
Recommended combination		●	●

The combinations of GH+W and GL+W are not recommended.

3. For checking the protrusion amount of the wiper insert, use tool presetter. (Appropriate protrusion: 0.1mm)

How to attach wiper inserts on MFPN cutter



↓ The down arrow symbol indicates wiper cutting edge.
↓ When attaching inserts, make sure that the arrow symbol points downward.

Applicable chipbreaker

Cutter type	Chipbreaker		
	GM	SM (GL)	GH
Coarse pitch (With shim)	✓	✓	✓
Fine pitch (Without shim)	✓	✓	△ (Feed rate is recommended fz=0.4mm/t or under)
Extra fine pitch (Without shim)	✓	✓	Not recommended

M

Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Precautions for use (How to mount an insert)

1. Be sure to remove dust and chips from the insert mounting pocket.
2. After applying anti-seize compound on portion of taper and thread, while pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten the screw with appropriate torque. (Ref. to Fig. 1 and Fig. 2)
 Recommended tightening torque: The torque for coarse pitch (using M5 screw) is 4.2 N·m
 The torque for extra fine pitch (using M4 screw) is 3.5 N·m.
3. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder and between the insert side surfaces and the constraint surface of the toolholder.
4. To change the cutting edge of the insert, turn the insert counterclockwise. (Fig. 3)
 Insert corner identification number is stamped on the top surface of insert. (Fig. 4) To protect the wiper edge, use the corners of insert in the sequence of corner numbers.

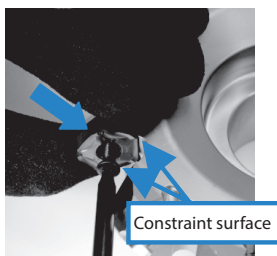


Fig. 1

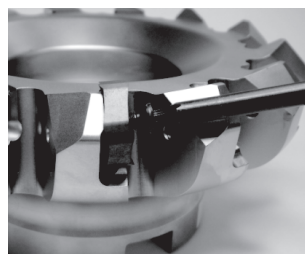


Fig. 2



Fig. 3

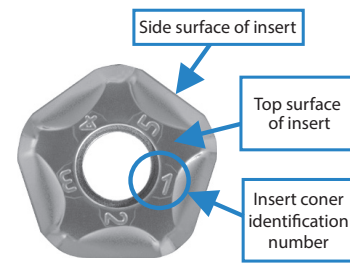


Fig. 4 (Right-hand insert)

How to replace a shim (for coarse pitch)

1. Be sure to remove dust and chips from the insert mounting pocket.
2. The shim must be mounted in the proper direction. While aligning the surface of the shim with the mark on it to the corresponding constraint surface (ref. to Fig. 5) and lightly pressing the shim toward the constraint surface, insert the screw into the hole of the shim and tighten it (ref. to Fig. 6).
 When tightening the screw, make sure that the screw is vertical to the bearing surface. Recommended tightening torque is 6.0 N·m.
3. After tightening the screw, make sure that there is no clearance between the shim seat surface and the bearing surface. If there is any clearance, remove the insert and mount it again according to the above steps.

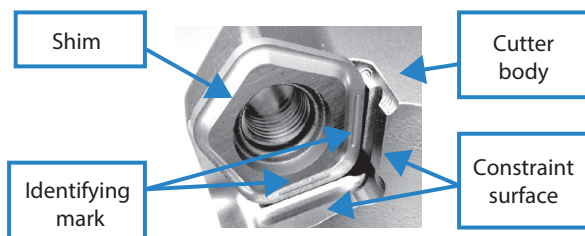


Fig. 5

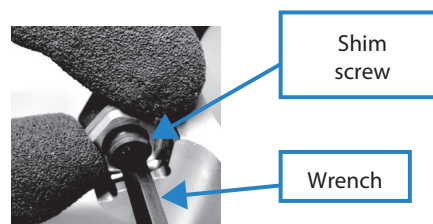


Fig. 6



Cutting edge angle 66°

MFPN66

Economical double-sided 10-edge insert reduces chattering with low cutting force design
Reduces cutting costs when machining auto parts and other general purpose machining applications

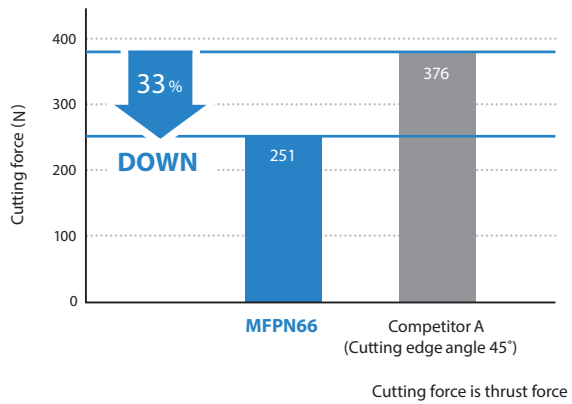
- 1 Economical double-sided 10-edge insert**
Applicable to various machining applications with wide size range from ø32

Cost reduction in various applications from general parts to automotive parts machining

- 2 Reduces chattering with low cutting force design**
Available for application from small ap to medium ap

Suppresses vibration for excellent surface finish with 66° cutting edge angle

Cutting force comparison (Internal evaluation)



Cutting conditions: Vc=200 m/min, ap=3 mm, fz=0.15 mm/t
 Cutter dia. ø63 Workpiece material: S50C

Surface finish (Machining with workpiece overhang length of 80mm)



Excellent surface finish with low workpiece clamping rigidity

Cutting conditions: Vc=200 m/min, ap=0.5 mm, fz=0.2 mm/t
 Cutter dia. ø63 Workpiece material: S50C

- 3 Extended tool life by MEGACOAT NANO technology**
Insert lineup also contains cermet grade for better surface finish



General purpose
GM chipbreaker



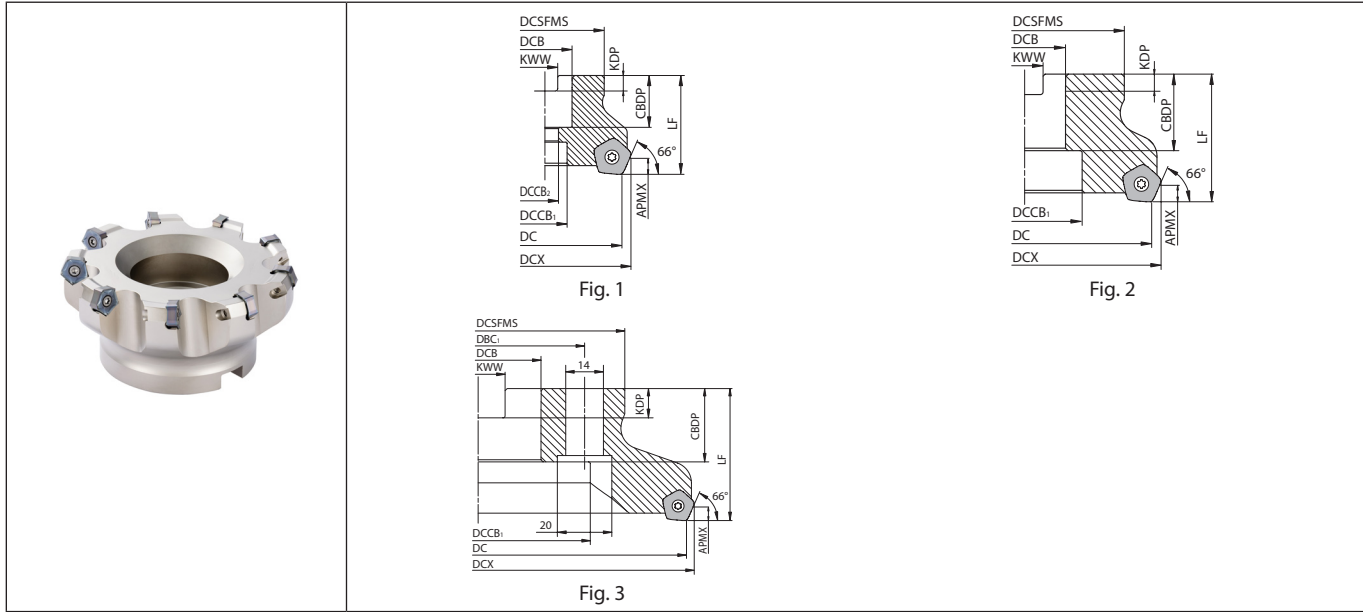
Tough edge
GH chipbreaker



For stainless steel
SM chipbreaker

M20

MFPN66 (Face mill)



Toolholder dimensions

Description		Availability	Dimension (mm)												A.R. max.(°)	R.R.(°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts M24		
			Inserts	DC	DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	DBC	LF	CDBP	KDP	KWW								
Metric	Fine pitch	MFPN 66050R-4T-M-G	● 4	50	58	48	22	18	11	-	40	21	6.3	10.4	-9	-8	No	0.3	PNMU0905...			
		MFPN 66063R-5T-M-G	● 5	63	71	48	22	18	11	-	40	21	6.3	10.4	-8	-7	No	0.5				
		MFPN 66080R-6T-M-G	● 6	80	88	70	27	20	13	-	50	24	7	12.4	-7	-7	No	1.2				
		MFPN 66100R-7T-M-G	● 7	100	107	78	32	20	13	-	50	24	7	12.4	-7	-7	No	1.6				
		MFPN 66125R-9T-M-G	● 9	125	132	89	40	20	13	-	63	33	9	16.4	-6	-6	No	2.8				
		MFPN 66160R-11T-M-G	● 11	160	167	110	50.8	20	13	66.7	63	33	9	16.4	-6	-6	No	3.8				
Metric	Extra fine pitch	MFPN 66050R-5T-M-G	● 5	50	58	48	22	18	11	-	40	21	6.3	10.4	-9	-8	No	0.4	PNMU0905...			
		MFPN 66063R-7T-M-G	● 7	63	71	48	22	18	11	-	40	21	6.3	10.4	-8	-7	No	0.5				
		MFPN 66080R-9T-M-G	● 9	80	88	70	27	20	13	-	50	24	7	12.4	-7	-7	No	1.2				
		MFPN 66100R-11T-M-G	● 11	100	107	78	32	20	13	-	50	24	7	12.4	-7	-7	No	1.6				
		MFPN 66125R-13T-M-G	● 13	125	132	89	40	20	13	-	63	33	9	16.4	-6	-6	No	3				
		MFPN 66160R-15T-M-G	● 15	160	167	110	50.8	20	13	66.7	63	33	9	16.4	-6	-6	No	4				
		Bore dia. inch spec	Fine pitch	MFPN 66080R-6T-G	● 6	80	88	70	25.4	20	13	-	50	27	6	9.5	-7	-7		No	1.2	PNMU0905...
				MFPN 66100R-7T-G	● 7	100	107	78	31.75	20	13	-	50	34	8	12.7	-7	-7		No	1.7	
MFPN 66125R-9T-G	● 9			125	132	89	38.1	20	13	-	63	38	10	15.9	-6	-6	No	2.9				
MFPN 66160R-11T-G	● 11			160	167	110	50.8	20	13	-	63	38	11	19.1	-6	-6	No	4.5				
Bore dia. inch spec	Extra fine pitch	MFPN 66080R-9T-G	● 9	80	88	70	25.4	20	13	-	50	27	6	9.5	-7	-7	No	1.2	PNMU0905...			
		MFPN 66100R-11T-G	● 11	100	107	78	31.75	20	13	-	50	34	8	12.7	-7	-7	No	1.7				
		MFPN 66125R-13T-G	● 13	125	132	89	38.1	20	13	-	63	38	10	15.9	-6	-6	No	3				
		MFPN 66160R-15T-G	● 15	160	167	110	50.8	20	13	66.7	63	38	11	19.1	-6	-6	No	4.8				

APMX : 5 mm (GM, SM, GH Chipbreakers, Coated cabide), 3 mm (GM Chipbreaker, Cermet)





● : Standard item




Milling

M21

Spare parts (common to Metric / Inch spec)

Description		Clamp screw	Wrench	Anti-seize compound	Mounting bolt
					
Fine pitch	MFPN 66050R-4T-M-G	SB-4090TRP	DTPM-15	P-37	HH10X30
	MFPN 66063R-5T-M-G				HH10X30
	MFPN 66080R-6T(-M)-G				HH12X35
	MFPN 66100R-7T(-M)-G				-
	MFPN 66125R-9T(-M)-G				-
	MFPN 66160R-11T(-M)-G				-
Extra fine pitch	MFPN 66050R-5T-M-G	SB-4090TRP	DTPM-15	P-37	HH10X30
	MFPN 66063R-7T-M-G				HH10X30
	MFPN 66080R-9T(-M)-G				HH12X35
	MFPN 66100R-11T(-M)-G				-
	MFPN 66125R-13T(-M)-G				-
	MFPN 66160R-15T(-M)-G				-

 Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

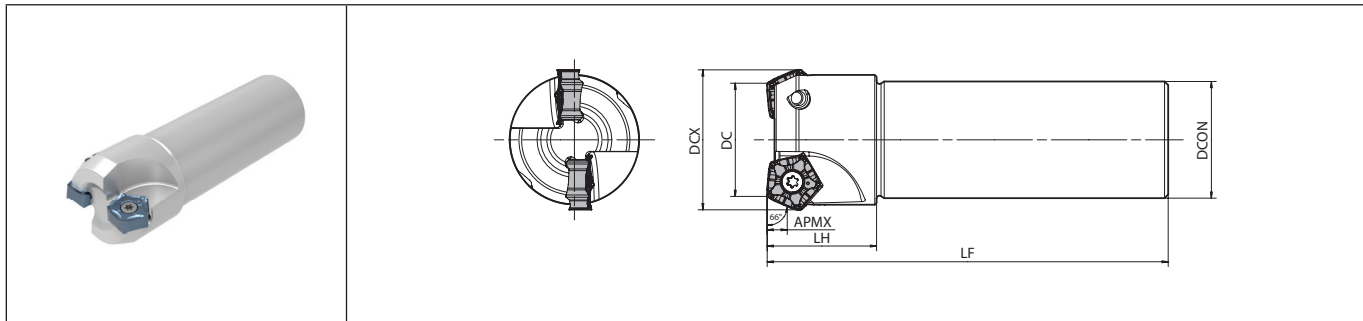
Slot Mill

Ball-nose
Radius

Others

MFPN66

MFPN66 (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)						A.R. max.(°)	R.R. (°)	Coolant hole	Spare parts			Applicable inserts ➔ M24
			DC	DCX	DCON	LF	LH	Anti-seize compound				Screw	Wrench		
														R	
MFPN 66032R-S32-2T-G	●	2	32	39.5	32	110	30	+12	-14	No	P-37	SB-4090TRP	DTPM-15	PNMU0905...	
66040R-S32-3T-G	●	3	40	47.5	32	110	30	+12	-12	No	P-37	SB-4090TRP	DTPM-15	PNMU0905...	

APMX : 5 mm (GM, SM, GH Chipbreakers, Coated cabide), 3 mm (GM Chipbreaker, Cermet)

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

Recommended tightening torque for insert clamp : 3.5N-m

● : Standard item



Milling

M23

PNMU

Insert		Description	No. of edges	Dimension (mm)					Carbide				Cermets	Applicable toolholder M21 M23
				S	D1	INSL	BCH	BS	PVD					
									PR0155	PR1510	PR1525	PR1535		
		PNMU 0905XNER-GM	10	5.56	4.7	14.6	2	2	●	●	●	●		MFPN66...
		PNMU 0905XNER-SM	10	5.56	4.7	14.6	2	2	●	●	●	●		MFPN66...
		PNMU 0905XNER-GH	10	5.56	4.7	14.6	2	2	●	●	●	●		MFPN66...

Classification of usage

- ★ : Roughing / 1st Choice
- ☆ : Roughing / 2nd Choice
- : Finishing / 1st Choice
- : Finishing / 2nd Choice

(In case hardness is 45HRC or under)

Carbon steel / Alloy steel	★	★	★	■	P
Mold and die steel	★	★	★	■	P
Austenitic stainless steel	☆	★	★	■	M
Martensitic stainless steel	★	★	★	■	M
Precipitation hardening stainless steel	★	★	★	■	M
Gray cast iron	★	★	★	■	K
Nodular cast iron	★	★	★	■	K
Non-ferrous metals					N
Heat-resistant alloy				★	S
Titanium alloy				★	S
Hard materials	★				H

Recommended cutting conditions M25

M



Milling

Cutting edge angle 45°~70°

Cutting edge angle 75°

Cutting edge angle 88°/90°

Cutter for Finishing

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others

● : Standard item

M24

Recommended cutting conditions

Coated carbide

Chipbreaker	Workpiece material	Feed (fz: mm/t)	Recommended insert grades (Vc: m/min)			
			MEGACOAT (PVD coated carbide)			
			PR1535	PR1525	PR1510	PR0155
GM	Carbon steel	0.1~ 0.2 ~0.3	120~ 180 ~250	120~ 180 ~250	-	-
	Alloy steel	0.1~ 0.2 ~0.3	100~ 160 ~220	100~ 160 ~220	-	-
	Mold steel	0.1~ 0.18 ~0.25	80~ 140 ~180	80~ 140 ~180	-	-
	Stainless steel (Austenitic related)	0.1~ 0.18 ~0.25	100~ 150 ~200	100~ 150 ~200	-	-
	Stainless steel (Martensitic related)	0.1~ 0.18 ~0.25	100~ 150 ~200	-	-	-
	Stainless steel (Precipitation hardening)	0.1~ 0.18 ~0.25	90~ 120 ~150	-	-	-
	Gray cast iron	0.1~ 0.2 ~0.3	-	-	120~ 180 ~250	-
	Nodular cast iron	0.1~ 0.18 ~0.25	-	-	100~ 150 ~200	-
	Ni-base heat-resistant alloys	0.1~ 0.12 ~0.2	20~ 30 ~50	-	-	-
	SM	Carbon steel	0.06~ 0.12 ~0.2	-	120~ 180 ~250	-
Alloy steel		0.06~ 0.12 ~0.2	-	100~ 160 ~220	-	-
Mold steel		0.06~ 0.1 ~0.15	-	80~ 140 ~180	-	-
Stainless steel (Austenitic related)		0.06~ 0.12 ~0.2	100~ 150 ~200	100~ 150 ~200	-	-
Stainless steel (Martensitic related)		0.06~ 0.12 ~0.2	100~ 150 ~200	-	-	-
Stainless steel (Precipitation hardening)		0.06~ 0.12 ~0.2	90~ 120 ~150	-	-	-
Gray cast iron		0.06~ 0.12 ~0.2	-	-	120~ 180 ~250	-
Nodular cast iron		0.06~ 0.1 ~0.15	-	-	100~ 150 ~200	-
Ni-base heat-resistant alloys		0.06~ 0.08 ~0.15	20~ 30 ~50	-	-	-
Titanium alloys		0.06~ 0.08 ~0.15	40~ 60 ~80	-	-	-
GH	Carbon steel	0.15~ 0.25 ~0.35	-	120~ 180 ~250	-	-
	Alloy steel	0.15~ 0.25 ~0.35	-	100~ 160 ~220	-	-
	Mold steel	0.1~ 0.2 ~0.3	-	80~ 140 ~180	-	-
	Gray cast iron	0.15~ 0.25 ~0.35	-	-	120~ 180 ~250	-
	Nodular cast iron	0.1~ 0.2 ~0.3	-	-	100~ 150 ~200	-
	Hard materials (60HRC or less)	0.05~ 0.08 ~0.16	-	-	-	50~ 80 ~100

★: 1st Recommendation ☆: 2nd Recommendation



Milling

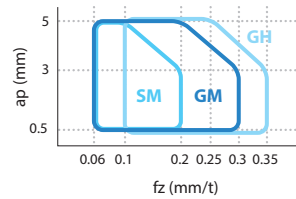
Cermet

Chipbreaker	Workpiece material	Feed (fz: mm/t)	Recommended insert grades Vc: m/min
			Cermet TN620M
GM	Carbon steel	0.06~ 0.12 ~0.15	★ 200~ 250 ~300
	Alloy steel	0.06~ 0.12 ~0.15	★ 180~ 220 ~250
	Mold steel	0.06~ 0.1 ~0.13	★ 150~ 180 ~220

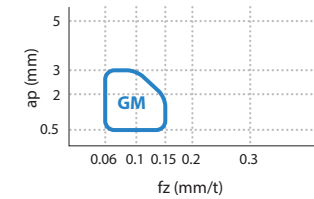
★: 1st Recommendation

Applicable chipbreaker range

Coated carbide



Cermet



Applicable chipbreaker

Cutter type	Chipbreaker		
	GM	SM	GH
Fine pitch	✓	✓	✓
Extra fine pitch	✓	✓	△ (Feed rate is recommended fz=0.2mm/t or under)

High precision and high efficiency high rake cutter

MFSE45

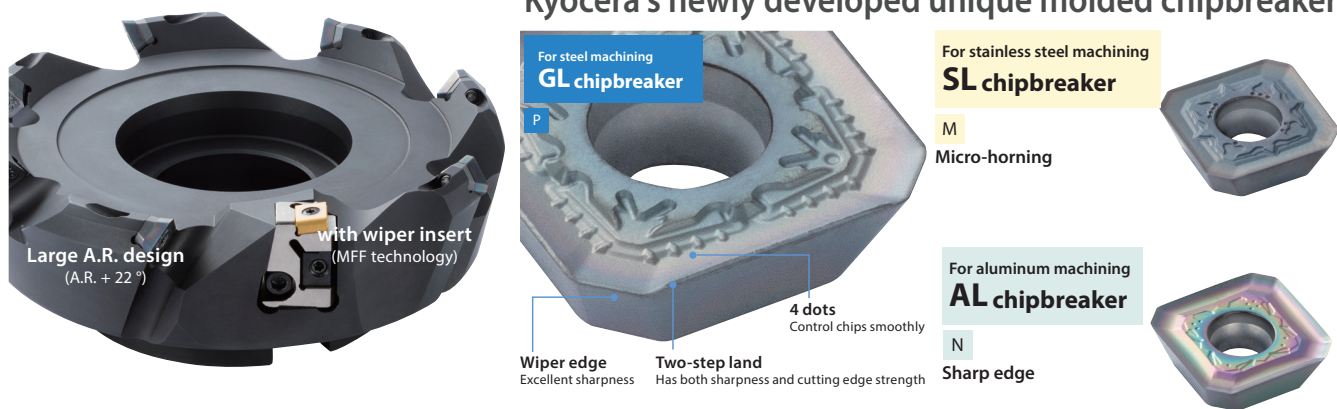
Rough and finish in 1 pass with excellent surface finish

Roughing condition ($fz = 0.25 \text{ mm/t}$) provides excellent surface finish ($0.8 \mu\text{mRa}$ or less)

1 The MFSE45 milling solution

Delivers high-quality surfaces by roughing and finishing simultaneously

Kyocera's newly developed unique molded chipbreaker



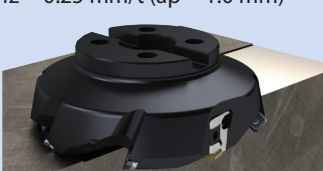
- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Machining comparison simulation (example)

MFSE45 1 Pass and cutting time was cut by 1/3, with a good surface finish ($0.8 \mu\text{mRa}$ or less)

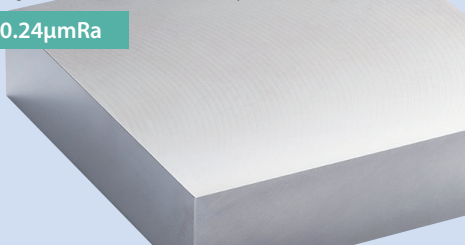
$fz = 0.25 \text{ mm/t}$ ($ap = 1.0 \text{ mm}$)

Cutting conditions: $Vc = 300 \text{ m/min}$, Dry S50C (Internal evaluation)



ø 160-8T GL chipbreaker (With wiper insert)

0.24 μmRa



SOLUTION

1 Pass

Time = 1/3

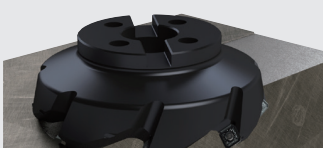
Surface finish ✓

Cutting time **Roughing + Finishing**

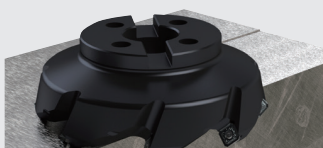
Conventional machining Two separate passes for roughing and finishing. Cutting time is longer due to low feed rates during finishing

$fz = 0.15 \text{ mm/t}$ ($ap = 0.8 \text{ mm}$)

$fz = 0.125 \text{ mm/t}$ ($ap = 0.2 \text{ mm}$)



ø160-8T



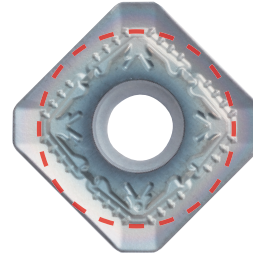
ø160-8T

Cutting time **Roughing** → **Finishing**

CG image

2 Beautiful surface finish and long tool life

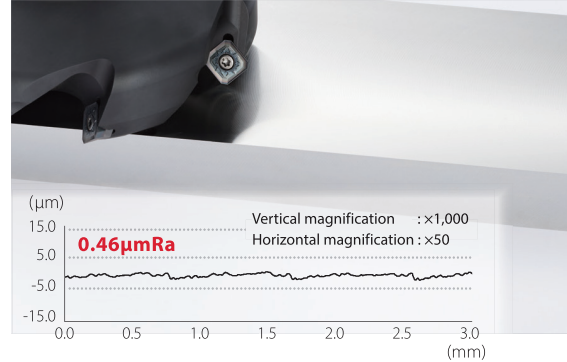
Strict control of insert inscribed circle tolerance
Improved surface finish quality and longer tool life
with reducing front edge runout



Inscribed circle tolerance
± 0.015 mm or less

(Class E standard ± 0.025 mm or less)

Surface roughness in stainless steel machining (Internal evaluation)



Cutting conditions : Vc = 250 m/min, ap x ae = 1.0 x 100 mm, fz = 0.15 mm/t, Wet SUS304 ø125 (Standard 6 inserts) SL chipbreaker

Excellent front edge runout accuracy

Advantage ① Theoretical reduction of roughness on finished surface, excellent surface roughness

Front edge runout: Small →
Surface roughness: Good

Advantage ② Insert wear progresses evenly and tool life can be improved

Effect on wear (User evaluation)

	Average corner examples	Heavily damaged corner examples	
MFSE45	Wear: 0.145mm	Wear: 0.172mm	Variation : Small
Competitor A	Wear: 0.105mm	Wear: 0.911mm	Variation : Large

Cutting conditions : Vc = 270 m/min, ap = ~ 1.5 mm, fz = 0.2 mm/t, Wet SS400 ø 250 (15 inserts) SL chipbreaker (PR1535)

Due to the high wear rate of the insert, all inserts need to be replaced, which may result in shorter tool life.

3 Various holders available for multiple applications

In addition to styles with a wiper insert, the standard type with only the standard inserts are also available

Toolholder Specifications

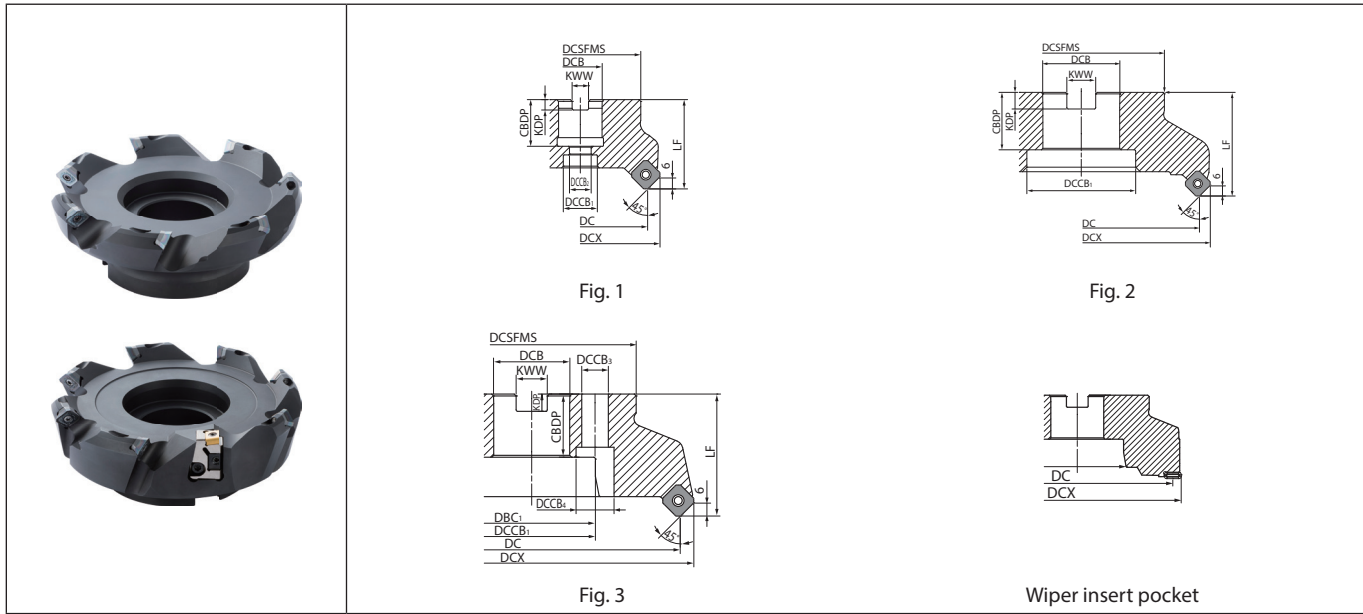
Type	With wiper insert	Standard
Surface roughness	Approx. 0.8μmRa	Approx. 1.6μmRa
Recommended feed	fz = 0.25 mm/t	fz = 0.12 mm/t (Finish machining time)
Application	High efficiency finishing	General purpose (Uses 1 insert style)



Using wiper insert for MFF
(Cutting edge adjustment mechanism with excellent operability)



MFSE45



Toolholder dimensions

Description		Availability		Inserts	Dimension (mm)													Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M30 M172
		R	L		DC	DCX	DCB	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DBC ₁	LF	CBDP	KDP	KWW						
Standard	Metric	MFSE	45063R-5T-M	MTO		63	71.7	22								21	6.3	10.4	14400	0.6	1	SEET13T3...
			45080R-5T-M	MTO	5	80	88.7	27					50	24	7	12.4	12800	1.4	1			
			45100R-5T-M	MTO		100	108.7	32						30	8	14.4	11500	1.8	2			
			45125R-6T-M	MTO	6	125	133.7		40					33	9	16.4	No	10200	3.2	2		
			45160R-7T-M	MTO	7	160	168.7			6				32			9000	5.4	3			
			45200R-8T-M	MTO	8	200	208.7							63			8100	7	3			
	45250R-10T-M	MTO	10	250	258.7		60					40	14	25.7	7200	15.5	3					
	Bore dia. inch spec	MFSE	45080R-5T	MTO	5	80	88.7	25.4	20	13				50	27	6	9.5	12800	1.4	1		
				MTO		100	108.7	31.75	48					32	8	12.7	11500	1.9	2			
				MTO	6	125	133.7	38.1	55					38	10	15.9	No	10200	3.3	2		
				MTO	7	160	168.7	50.8	72					63	11	19.1	9000	5.3	2			
				MTO	8	200	208.7		100					40	14	25.4	8100	7.3	3			
MTO				10	250	258.7	47.625	110					63	14	25.4	7200	15.8	3				
Wiper insert	Metric	MFSE	45160R-8T-W-M	MTO	8	160	168.7	40		8				63	33	9	16.4	No	1000	5.5	2	SEET13T3... LNGX1209...
			45200R-9T-W-M	MTO	9	200	212.8		1	9	18	26	101.6	40	14	25.7	800	7.3	3			
			45250-11T-W-M	MTO	11	250	262.7			11				38			12	3				
	Bore dia. inch spec	MFSE	45160R-8T-W	MTO	8	160	168.7	50.8	72					63	38	11	19.1	No	1000	5.5	3	SEET13T3... LNGX1209...
				MTO	9	200	208.7							40	14	25.4	800	7.6	3			
				MTO	11	250	258.7	47.625	133					63	14	25.4	800	12.3	3			



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius







Others

MT0 : Made to order








M28

Spare parts

Common

Clamp Screw	Wrench	Shim	Shim screw	Wrench	Anti-seize compound
					
SB-35120TRP	DTPM-15	MFSE-105	SPW-5035	LW-3.5	P-37
Recommended tightening torque for insert clamp 4N-m		Recommended tightening torque for shim clamp 5N-m			

For Wiper insert

Clamp screw	Wrench	Wedge	Cartridge	Cartridge clamp screw	Wrench	Adjustment Screw
						
SB-3592TR	DTM-10	AD-MFF	CR-MFF	HHSX15L	TTW-15	W6X18N
Recommended tightening torque for wiper insert clamp 1.2N-m						

M



Milling

SEET

Insert		Description	No. of edges	Dimension (mm)					Angle (°)		Carbide				Applicable toolholder ➔ M28
				IC	S	D1	RE	BS	AN	AS	CVD CA6535	DLC PD1025	PVD PRI1525 PRI1535		
		SEET 13T3AGSN-GL	4	13.4	3.97	4.2	1.5	2.1	20	29	●	●	●	●	MFSE45...
General purpose															
		SEET 13T3AGSN-SL	4	13.4	3.97	4.2	1.5	2.1	20	29	●	●	●	●	MFSE45...
Stainless steel															
		SEET 13T3AGFN-AL	4	13.4	3.97	4.2	1.5	2.1	20	29	●				MFSE45...
Non-Ferrous Metals															

Classification of usage

★ : Roughing / 1st Choice
 ☆ : Roughing / 2nd Choice
 ■ : Finishing / 1st Choice
 □ : Finishing / 2nd Choice
 (In case hardness is 45HRC or under)

Carbon steel / Alloy steel	☆	☆	★	P
Mold and die steel	☆	★	☆	
Austenitic stainless steel	☆	☆	★	M
Martensitic stainless steel	★	☆	☆	
Precipitation hardening stainless steel				
Gray cast iron	★	☆	☆	K
Nodular cast iron	★	☆	☆	
Non-ferrous metals		★		N
Heat-resistant alloy	★		☆	S
Titanium alloy			★	
Hard materials				H

M

LNGX

Insert		Description	No. of edges	Dimension (mm)					Carbide		Cermet		Applicable toolholder ➔ M28 M171
				IC	S	D1	RE	INSL	PVD PRI1525	PVD PV60M	PVD	PVD	
		LNGX 120916R-TT	4	9.525	4.76	4.2	1.6	12.7	MTO	MTO			MFSE45...-W MFSE45...-W-M MFF...-SF
Low cutting force													
		LNGX 120916	4	9.525	4.76	4.2	1.6	12.7	MTO	MTO			MFSE45...-W MFSE45...-W-M MFF...-SF

Recommended cutting conditions ➔ M31

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item MTO : Made to order

M30

Recommended cutting conditions

Chipbreaker	Workpiece	Feed (fz: mm/t)	Recommended insert grade (Vc: m/min)			
			MEGACOAT NANO		CVD coating	DLC coated carbide
			PR1535	PR1525	CA6535	PDL025
GL	Carbon steel	0.1 – 0.15 – 0.3	150 – ★ 200 – 300	150 – ☆200 – 300	150 – ☆200 – 300	–
	Alloy steel	0.1 – 0.15 – 0.3	150 – ★ 200 – 300	150 – ☆200 – 300	150 – ☆200 – 300	–
	Mold steel	0.1 – 0.15 – 0.25	100 – ☆150 – 250	100 – ★ 150 – 250	100 – ☆150 – 250	–
	Stainless steel (Austenitic related)	0.1 – 0.15 – 0.25	100 – ★ 200 – 250	100 – ☆200 – 250	100 – ☆200 – 250	–
	Stainless steel (Martensitic related)	0.1 – 0.15 – 0.25	100 – ★ 200 – 250	100 – ☆200 – 250	100 – ☆200 – 250	–
	Gray cast iron	0.1 – 0.15 – 0.25	100 – ☆200 – 250	100 – ☆200 – 250	100 – ☆200 – 250	–
	Nodular cast iron	0.1 – 0.15 – 0.25	100 – ☆200 – 250	100 – ☆200 – 250	100 – ★ 200 – 250	–
SL	Carbon steel	0.1 – 0.12 – 0.15	150 – ☆200 – 300	150 – ☆200 – 300	150 – ☆200 – 300	–
	Alloy steel	0.1 – 0.12 – 0.15	150 – ☆200 – 300	150 – ☆200 – 300	150 – ☆200 – 300	–
	Mold steel	–	–	–	–	–
	Stainless steel (Austenitic related)	0.1 – 0.15 – 0.2	100 – ★ 200 – 250	100 – ☆200 – 250	100 – ☆200 – 250	–
	Stainless steel (Martensitic related)	0.1 – 0.15 – 0.2	100 – ★ 200 – 250	100 – ☆200 – 250	100 – ☆200 – 250	–
AL	Aluminum alloys (Si Ratio 13% or less)	0.1 – 0.15 – 0.3	–	–	–	★ 200 – ★ 400 – 500

★ : 1st recommendation ☆ : 2nd recommendation

The number in **bold font** is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.



Face mills for heavy milling

MFLN

Tough 4-edge tangential inserts provide high reliability on heavy milling at large depths of cut and high feed rates.

Three cutting edge angles (incl. MFLN90) optimized for various machining applications.

1 Tough and reliable inserts for stable heavy milling

22 mm long inserts offer increased rigidity

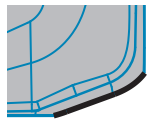
Tangentially mounted inserts provide
2 cutting edges on both sides

Corner chamfer

only available on MFLN90

Both general corner-R type and chamfered corner type available

Prevents chattering and insert fracturing



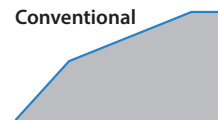
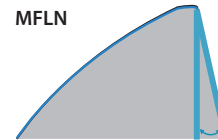
Convex cutting edge ridge

Reduced impact forces when entering the workpiece

Obtuse edge design

Increases the cutting edge angle only at the tip to maintain both strength and sharpness

Cross-section view of cutting edge



Wide flat mounting surface

Hold an insert firmly in heavy milling

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

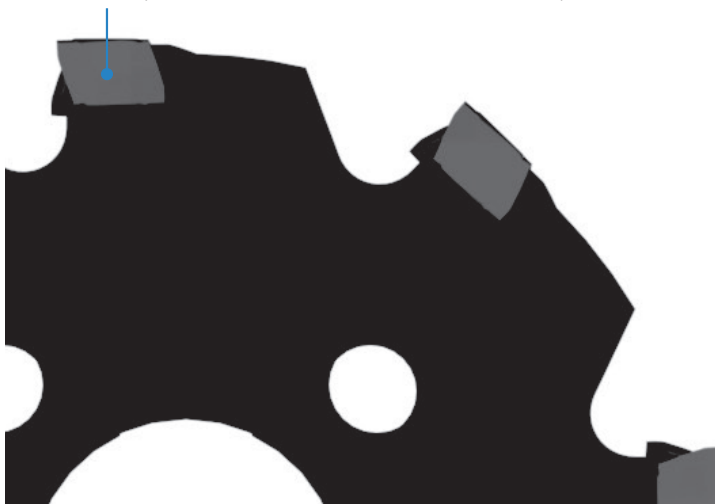
Multi-
Function

Slot Mill

Ball-nose
Radius

Others

Tangentially mounted inserts increase rigidity

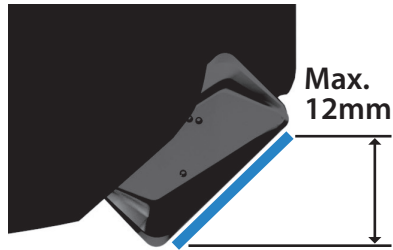


M32

2 Large D.O.C. and high feed rates

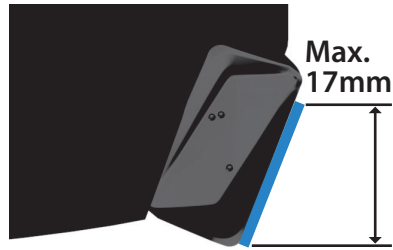
MFLN45

Cutting edge angle 45°

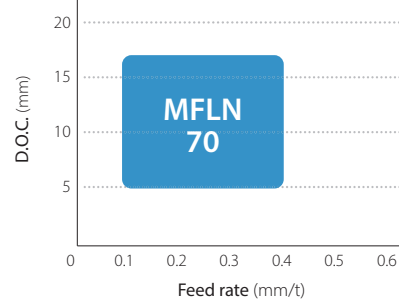
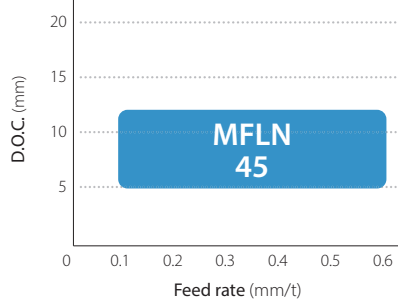


MFLN70

Cutting edge angle 70°



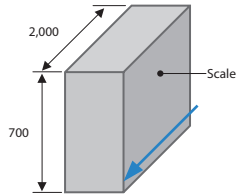
Applicable range



Case Studies

Forging Die for Automotive Parts

Vc = 90 m/min
 ap × ae = ~10 × ~80 mm
 fz = 0.36 mm/t Dry
 MFLN45080R-4T-M (ø80-4 flutes)
 LOGU221616ER-GM PR1535



Chip Evacuation Rate

MFLN45
 (ø80-4 flutes) **Q=416 cc/min** ↑ Machining efficiency x1.2

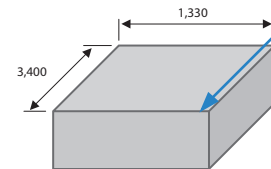
Competitor H
 (ø100-5 flutes) **Q=336 cc/min**

MFLN achieved 1.2 times machining efficiency.
 Quieter machining and good chip shapes.

(User Evaluation)

Machining base FCD600

Vc = 120 m/min
 ap = 11×165 mm
 fz = 0.65 mm/t Dry
 XMFLN70250R-13T-OH-M (ø250-13 flutes)
 Fine pitch, internal coolant, custom holder
 LOGU221616ER-GM PR1525



Chip Evacuation Rate

MFLN70
 Roughing **Q=2,340 cc/min** Finishing **Q=2,340 cc/min** ↑ Machining efficiency x1.1

Competitor
 Roughing (Competitor F) **Q=2,100 cc/min** Finishing (Competitor G) **Q=1,970 cc/min**

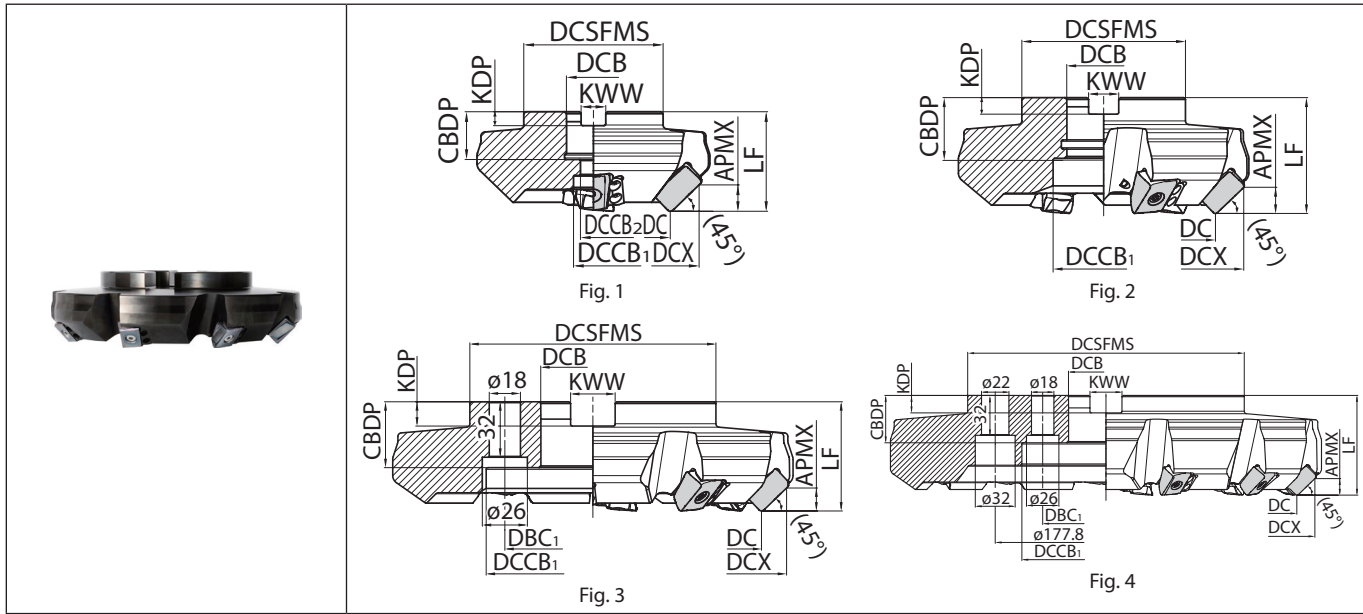
MFLN improved machining efficiency with lower cutting force.
 Also it can be used both for roughing and finishing.

(User Evaluation)



Milling

MFLN45



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)													A.R. max.(°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M36
			R	DC	DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	DBC ₁	LF	CBDP	KDP	KWW	APMX							
				DC	DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	DBC ₁	LF	CBDP	KDP	KWW	APMX							
Metric MFLN 45080R-4T-M 45100R-4T-M 45125R-6T-M 45160R-7T-M 45200R-8T-M 45250R-10T-M 45315R-12T-M	●	4	80	104	70	27	20	13	-	50	24	7	12.4	12	+2	-15.5	Yes	5970	2	1	LOGU221616ER-GM	
	●	4	100	124	78	32	45	-	50	30	8	14.4	4780					2.7	2			
	●	6	125	149	89	40	55	-	63	33	9	16.4	3820					4.6	2			
	●	7	160	184	110	50.8	90	-	66.7	38	14	25.7	2990					6.7	3			
	●	8	200	224	142	50.8	124	-	80	38	14	25.4	2390					9.7	3			
	●	10	250	274	222	47.625	160	-	101.6	38	14	25.4	1910					16.9	3			
	MTO	12	315	339	222	47.625	215	-	80	38	14	25.4	1520					25.1	4			
Bore dia. inch spec MFLN 45080R-4T 45100R-4T 45125R-6T 45160R-7T 45200R-8T 45250R-10T 45315R-12T	●	4	80	104	70	25.4	20	13	-	50	27	6	9.5	12	+2	-15.5	Yes	5970	2	1	LOGU221616ER-GM	
	●	4	100	124	78	31.75	45	-	50	34	8	12.7	4780					2.7	2			
	●	6	125	149	89	38.1	55	-	63	38	10	15.9	3820					4.6	2			
	●	7	160	184	110	50.8	90	-	66.7	38	11	19.1	2990					6.8	2			
	●	8	200	224	142	50.8	124	-	80	38	14	25.4	2390					10	3			
	●	10	250	274	222	47.625	160	-	101.6	38	14	25.4	1910					17.1	3			
	MTO	12	315	339	222	47.625	215	-	80	38	14	25.4	1520					25.3	4			



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

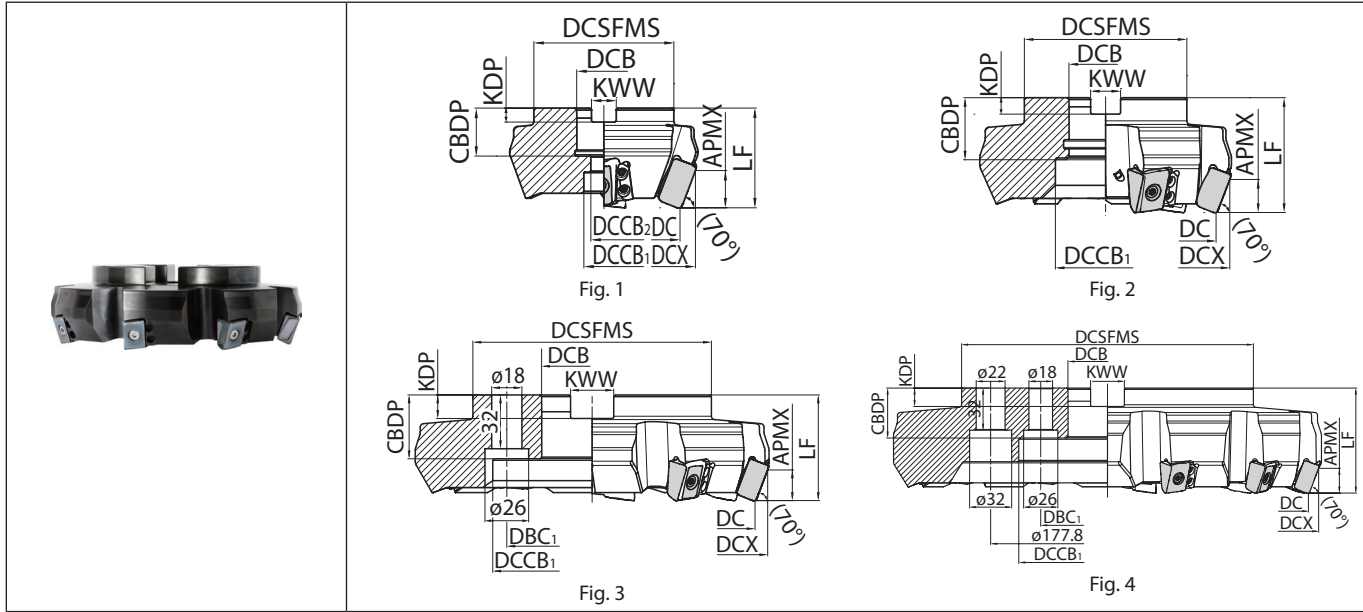
Ball-nose
Radius

Others

● : Standard item MTO : Made to order

M34

MFLN70



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)													A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M36
			DC	DCX	DCSFMS	DCB	DCB ₁	DCB ₂	DBC ₁	LF	CBDP	KDP	KWW	APMX								
Metric	●	4	80	93	70	27	20	13	-	50	24	7	12.4	17	+1	-16.5	Yes	5970	1.4	1	LOGU221616ER-GM	
			100	113	78	32	45	-	30	8	14.4	4780	1.9					2				
			6	125	138	89	55	-	33	9	16.4	3820	3.4					2				
			7	160	173	110	90	66.7	63	38	14	25.7	2990					5.3	3			
			8	200	213	142	120	-	80	14	25.4	2390	8.2					3				
			10	250	263	222	60	160	101.6	14	25.4	1910	14.8					3				
			MTO	12	315	328	215	-	80	14	25.4	1520	21.9					4				
Bore dia. inch spec	●	4	80	93	70	25.4	20	13	-	50	27	6	9.5	17	+1	-16.5	Yes	5970	1.4	1	LOGU221616ER-GM	
			100	113	78	31.75	45	-	34	8	12.7	4780	2					2				
			6	125	138	89	38.1	55	-	10	15.9	3820	3.5					2				
			7	160	173	110	50.8	70	-	11	19.1	2990	5.8					2				
			8	200	213	142	120	-	38	14	25.4	2390	8.5					3				
			10	250	263	222	47.625	160	101.6	14	25.4	1910	15.1					3				
			MTO	12	315	328	215	-	80	14	25.4	1520	22.2					4				




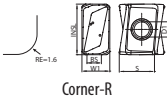
Spare parts

Description	Parts						
	Clamp screw	Wrench	Shim	Clamp screw	Wrench	Anti-seize compound	Arbor bolt
MFLN ○○080R-4T(-M)							
MFLN ○○100R-4T(-M)	SB-60200TRP	TTP-20	MAP-2216	SB-40140TR	DTM-15	P-37	HH12X35
MFLN ○○315R-12T(-M)	Tightening torque for clamping insert 6.0 N·m		Tightening torque for clamping shim 3.5 N·m				-

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

● : Standard item MTO : Made to order

LOGU

Classification of usage		Carbon steel / Alloy steel		★ ☆		P						
		Mold and die steel		★ ☆								
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Austenitic stainless steel				M						
		Martensitic stainless steel										
		Precipitation hardening stainless steel				K						
		Gray cast iron		★ ☆								
		Nodular cast iron		★ ☆		N						
		Non-ferrous metals										
		Heat-resistant alloy				S						
		Titanium alloy										
		Hard materials				H						
Insert	Description	No. of edges	Dimension (mm)						Carbide		Applicable toolholder ● M34 M35 M130	
			S	D1	RE	W1	INSL	BS	PVD			
	 Corner-R	LOGU 221616ER-GM	4	16.6	6.8	1.6	12.5	22.8	6.3	● ●		MFLN45... MFLN70... MFLN90...

Recommended cutting conditions ● M37

About applicable insert

	LOGU221616ER-GM (Corner-R)	LOGU2216PWER-GM (Corner Chamfer)
MFLN 45	✓	not applicable
MFLN 70	✓	not applicable

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

Others

● : Standard item

M36

Recommended cutting conditions

	Workpiece	D.O.C. (mm)		fz: mm/t	Recommended insert grades (Vc: m/min)	
		Width of cut $\leq 0.5 \times DC$	Width of cut $> 0.5 \times DC$		MEGACOAT NANO	
					PR1535	PR1525
MFLN 70	Carbon steel	~15	~12	0.1 – 0.2 – 0.4	☆ 80 – 120 – 150	★ 100 – 150 – 180
	Alloy steel				☆ 80 – 120 – 150	★ 100 – 150 – 180
	Mold steel				☆ 70 – 100 – 120	★ 80 – 120 – 150
	Gray cast iron	~17	~15	0.1 – 0.2 – 0.4	☆ 80 – 120 – 150	★ 100 – 150 – 180
	Nodular cast iron				☆ 80 – 120 – 150	★ 100 – 150 – 180
MFLN 45	Carbon steel	~10	~8	0.1 – 0.3 – 0.6	☆ 80 – 120 – 150	★ 100 – 150 – 180
	Alloy steel				☆ 80 – 120 – 150	★ 100 – 150 – 180
	Mold steel				☆ 70 – 100 – 120	★ 80 – 120 – 150
	Gray cast iron	~12	~10	0.1 – 0.3 – 0.6	☆ 80 – 120 – 150	★ 100 – 150 – 180
	Nodular cast iron				☆ 80 – 120 – 150	★ 100 – 150 – 180

The table above provides recommendations based on product specifications. Before using the product, check the machine's specifications such as power. The number in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation. Dry machining is recommended.

★ : 1st recommendation ☆ : 2nd recommendation

How to mount an insert

1. Completely eliminate chips and dust from the insert mounting side.
2. After mounting a clamp screw on the top edge of wrench, tighten the screw while keeping the insert pushed against the shim seat surface and holder surface (Fig.1,2)
3. Make sure that the identification on the top of the insert is the same in each pocket.(Fig.3)
4. Tighten the wrench (TTP-20) in while holding parallel to the clamp screw.
5. Tighten the insert clamp screw at an appropriate torque. (Recommended torque: 6.0 N-m)
6. After tightening, check that there is no gap between the insert and the surface of the shim, or between the side surface of insert and the holder surface. If there is a gap, remount the insert using the directions above.

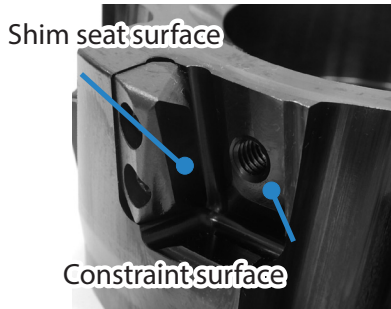


Fig.1

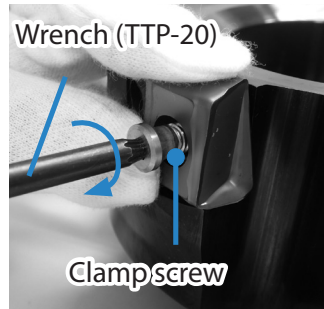


Fig.2

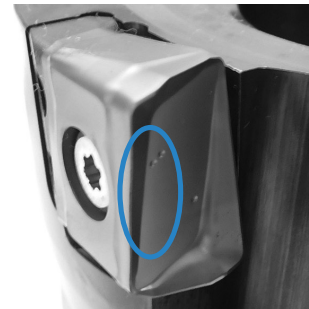


Fig.3

How to replace a shim

1. Completely eliminate chips and dust from the shim mounting side.
2. Coat medium strength screw locking adhesive on the screws.
3. Tighten the screw keeping the shim pushed against the pocket surface of toolholder.
4. After tightening both screws temporarily, tighten them with appropriate torque. (Recommended torque:3.5 N-m)
5. Please check that there is no gap between the shim and the pocket surfaces of toolholder.

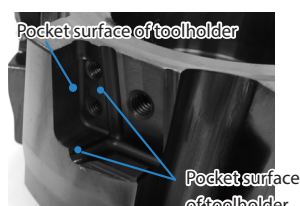


Fig.1

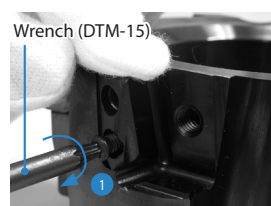


Fig.2

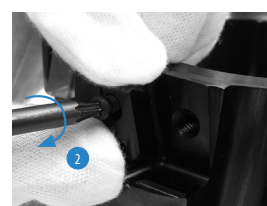


Fig.3



Fig.4



High efficiency cast iron machining

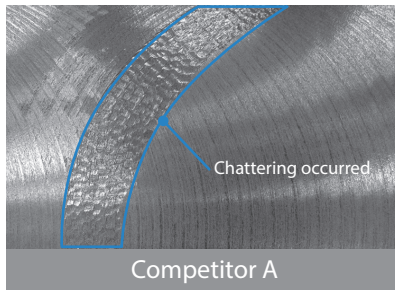
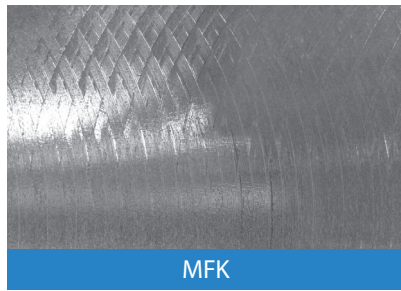
MFK

10-edge pentagonal inserts for stable and economical machining



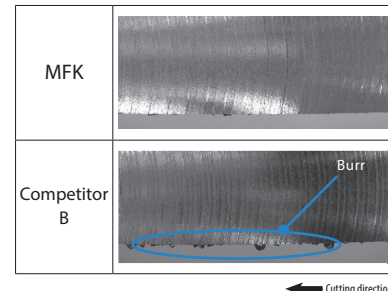
MFK reduces cutting force by good balanced design
Excellent surface finish by controlling chattering

Surface finish comparison (Internal evaluation)



Cutting conditions:
Workpiece material: FCD600, Dry, $V_c=180\text{m/min}$, $a_{p \times a_e}=3 \times 78\text{mm}$, $f_z=0.3\text{mm/t}$

Burr comparison (Internal evaluation)



Sharp cutting prevents burr formation

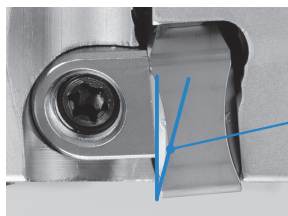
M



Milling

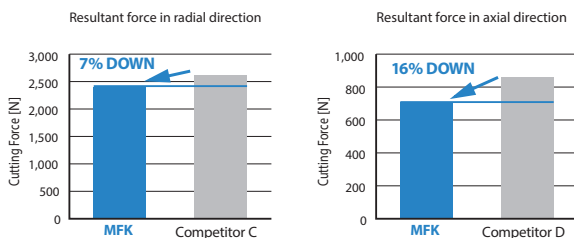
Two special insert structures reduce cutting force and improve edge strength

1 Low cutting force with helical cutting-edge design



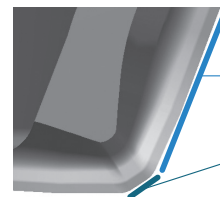
A.R. max. +15°

Cutting force comparison (Internal evaluation)



Cutting conditions:
Workpiece material: FCD600, dry, $\phi 125$
 $V_c=180\text{ m/min}$, $a_{p \times a_e}=3.0 \times 62\text{ mm}$, $f_z=0.3\text{ mm/t}$

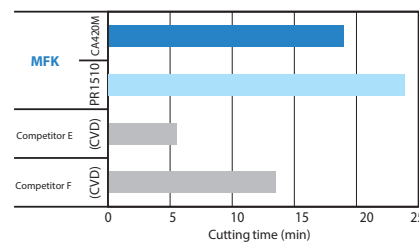
2 Dual cutting edge design (High toughness)



Second main cutting edge

First main cutting edge

Fracture resistance comparison (Internal evaluation)



Cutting conditions:
Workpiece material: FCD450 with 4 bores
 $V_c=300\text{ m/min}$
 $a_p=2.0\text{ mm}$
 $f_z=0.5\text{ mm/t}$
Wet

Reducing impact load when biting into the workpiece

M38

Toolholder lineup to meet various applications

Fine pitch type and extra fine pitch type are available
Choose most suitable cutter for your application



Fine pitch (Example: ϕ 125 12 flutes)

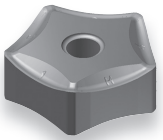
- Recommended for low rigid workpiece
- For wide application range



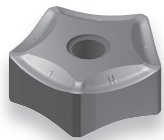
Extra fine pitch (Example: ϕ 125 18 flutes)

- Recommended for high rigid workpiece
- For high efficiency machining

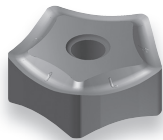
Applicable to various applications with wide range lineup of chipbreakers



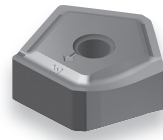
General purpose:
GM chipbreaker



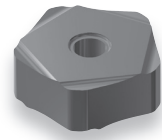
Tough edge:
GH chipbreaker



Finishing:
GL ground chipbreaker

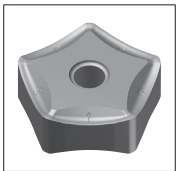


With wiper edge:
W ground chipbreaker

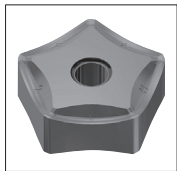


High speed machining:
Ceramic with chipbreaker

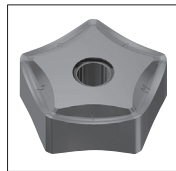
Insert grade lineup



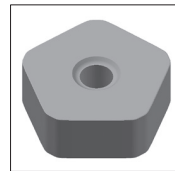
Long tool life
(1st Recommendation)
CA420M
(CVD)



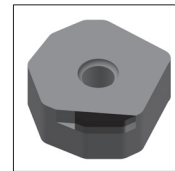
Stable machining
PR1510
(PVD)



Fracture resistance
oriented
PR1525
(PVD)



High speed machining
KS6050/CS7050
(Ceramic)



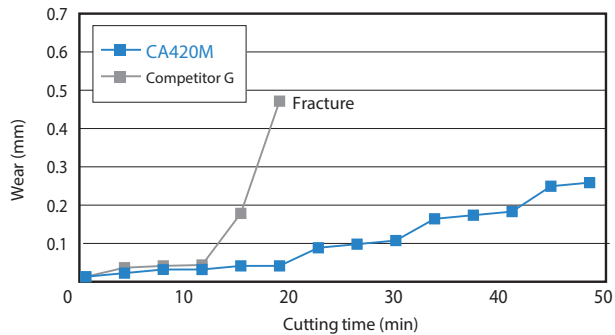
High speed and high
precision machining
KBN475
(CBN wiper insert)

Use CBN wiper inserts together with
ceramic (KS6050/CS7050) inserts.



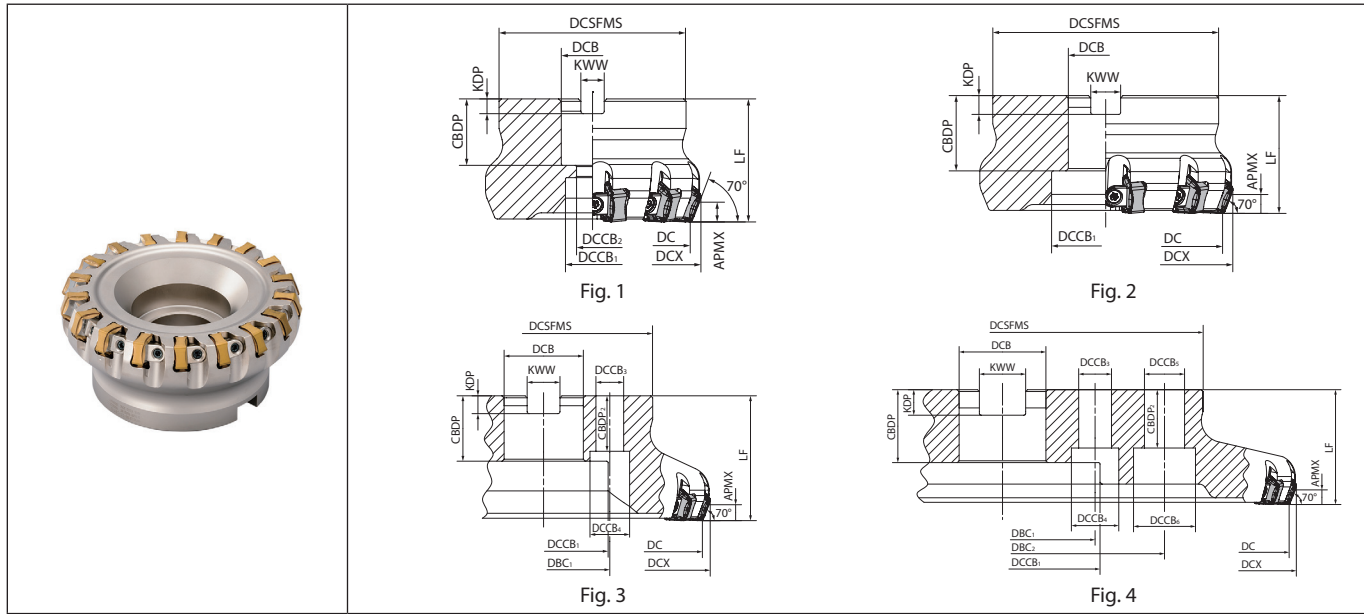
Milling

Wear resistance comparison (Internal evaluation)



Cutting conditions:
Workpiece material: FCD450, dry
 $V_c=200$ m/min, $ap_{xae}=2.0 \times 80$ mm, $f_z=0.3$ mm/t

MFK



Toolholder dimensions









Description	Availability	Dimension (mm)																		A.R. max (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.
		Inserts																							
		R	DC	DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DCCB ₅	DCCB ₆	DBC ₁	DBC ₂	LF	CDBP	KDP	KWW	APMX						
Metric Fine pitch	MFK	8	80	89	76	27	20	13							24	7	12.4			-7	8000	1.87	1		
		10	100	109	96	32	26	17							28	8	14.4			-6	7000	2.99	1		
		12	125	134		40	55								33	9	16.4				No	6100	3.56	2	
		16	160	169		70			14	20					63			6	28	+15	No	5300	4.51	3	
		20	200	209																	-5	4700	7.35	3	
		24	250	259	142	60	110		18	26			22	32	101.6							4200	10.43	3	
	MTO	28	315	324	220										177.8							3700	19.41	4	
Metric Extra fine pitch	MFK	10	80	89	76	27	20	13							24	7	12.4			-7	8000	1.81	1		
		14	100	109	96	32	26	17							28	8	14.4			-6	7000	2.86	1		
		18	125	134		40	55								33	9	16.4				No	6100	3.38	2	
		22	160	169	100	70			14	20					63			6	28	+15	No	5300	4.32	3	
		28	200	209																	-5	4700	7.1	3	
		36	250	259	142	60	110		18	26			22	32	101.6							4200	10.07	3	
	MTO	44	315	324	220										177.8							3700	18.92	4	
Bore dia. inch spec Fine pitch	MFK	8	80	89	76	31.75	26	17							32	8	12.7			-7	8000	1.76	1		
		10	100	109	96															-6	7000	2.98	1		
		12	125	134		38.1	55								38	10	15.9				No	6100	3.65	2	
		16	160	169		50.8	70								63			6	28	+15	No	5300	4.62	2	
		20	200	209																	-5	4700	7.65	3	
		24	250	259	142	47.625	110		18	26			22	32	101.6							4200	10.73	3	
	MTO	28	315	324	220										177.8							3700	19.71	4	
Bore dia. inch spec Extra fine pitch	MFK	10	80	89	76	31.75	26	17							32	8	12.7			-7	8000	1.7	1		
		14	100	109	96															-6	7000	2.85	1		
		18	125	134		38.1	55								38	10	15.9				No	6100	3.44	2	
		22	160	169	100	50.8	70								63			6	28	+15	No	5300	4.44	2	
		28	200	209																	-5	4700	7.4	3	
		36	250	259	142	47.625	110		18	26			22	32	101.6							4200	10.36	3	
	MTO	44	315	324	220										177.8							3700	19.21	4	

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

● : Standard item MTO : Made to order

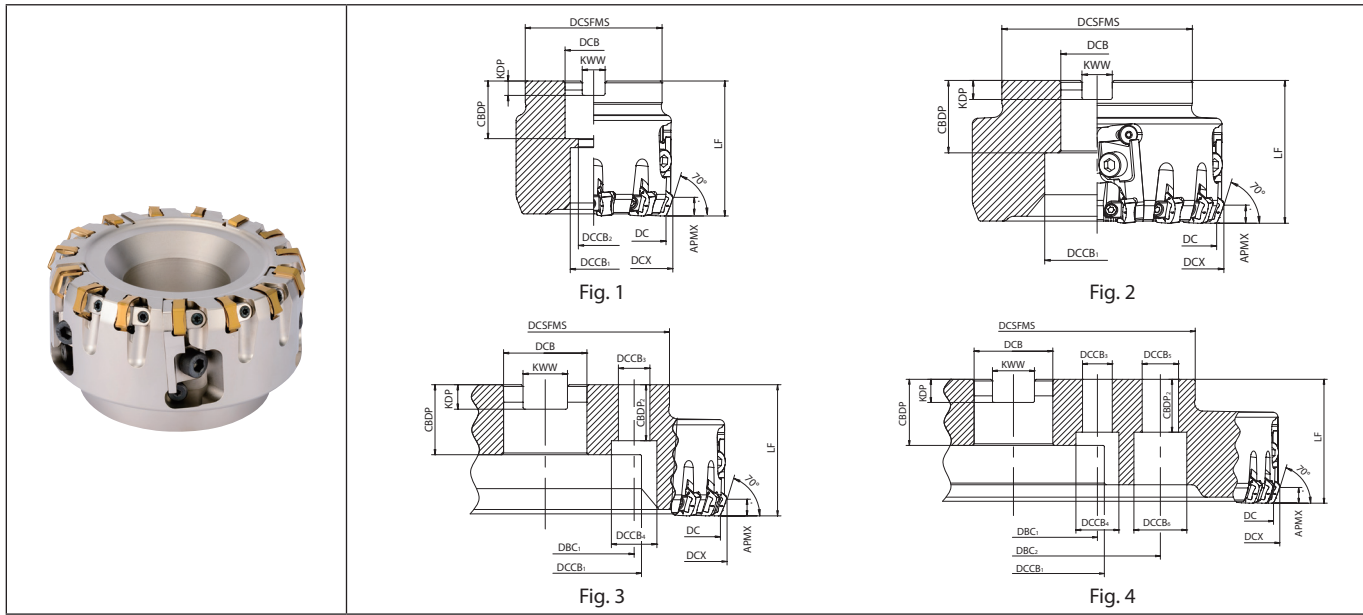
M40

Spare parts and applicable inserts (MFK)

Description	Spare parts				Applicable inserts ➔ M44	Description	Spare parts				Applicable inserts ➔ M44															
	Wedge	Wedge screw	Wrench	Mounting bolt			Wedge	Wedge screw	Wrench	Mounting bolt																
																										
MFK 080R-11-8T-M 100R-11-10T-M 125R-11-12T-M 160R-11-16T-M 200R-11-20T-M 250R-11-24T-M 315R-11-28T-M	C09N	W6X18N	TT-15	HH12X35	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W	MFK 080R-11-8T 100R-11-10T 125R-11-12T 160R-11-16T 200R-11-20T 250R-11-24T 315R-11-28T	C09N	W6X18N	TT-15	HH16X40	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W															
MFK 080R-11-10T-M 100R-11-14T-M 125R-11-18T-M 160R-11-22T-M 200R-11-28T-M 250R-11-36T-M 315R-11-44T-M				C09N		W6X18N				TT-15		HH12X35	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W	MFK 080R-11-10T 100R-11-14T 125R-11-18T 160R-11-22T 200R-11-28T 250R-11-36T 315R-11-44T	C09N	W6X18N	TT-15	HH16X40	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W							



MFK-SF



Toolholder dimensions

Description		Availability	Inserts	Dimension (mm)																A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.						
				R	DC	DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DCCB ₅	DCCB ₆	DBC ₁	DBC ₂	Lf	DBP	KDP							KPP	APMX	DBP2			
Metric	MFK 080R-11-9T-M-SF	●	9 (3)	80	89	76	27	20	13									24	7	12.4			-7	No	8000	2.21	1				
	MFK 100R-11-12T-M-SF	●	12 (4)	100	109	96	32	26	17									28	8	14.4			-6	No	7000	3.49	1				
	MFK 125R-11-15T-M-SF	●	15 (5)	125	134													33	9	16.4					6100	4.47	2				
	MFK 160R-11-18T-M-SF	●	18 (6)	160	169	100	40	55																		5300	6.99	3			
	MFK 200R-11-24T-M-SF	●	24 (8)	200	209																						4700	9.89	3		
	MFK 250R-11-30T-M-SF	MTO	30 (10)	250	259		60	110																			4200	16.35	3		
MFK 315R-11-39T-M-SF	MTO	39 (13)	315	324	220							22	32														3700	28.14	4		
Bore dia. inch spec	MFK 080R-11-9T-SF	●	9 (3)	80	89	76		31.75	26	17																		8000	2.08	1	
	MFK 100R-11-12T-SF	●	12 (4)	100	109	96																							7000	3.49	1
	MFK 125R-11-15T-SF	●	15 (5)	125	134		100		38.1	55																			6100	4.54	2
	MFK 160R-11-18T-SF	●	18 (6)	160	169				50.8	70																			5300	6.82	2
	MFK 200R-11-24T-SF	●	24 (8)	200	209																								4700	10.39	3
	MFK 250R-11-30T-SF	MTO	30 (10)	250	259					47.625	110																		4200	16.85	3
MFK 315R-11-39T-SF	MTO	39 (13)	315	324	220							22	32															3700	28.65	4	

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
 Numbers in parenthese () are the number of adjustable cutting edge pockets.
 Please install wiper inserts in the adjustable cutting edge pockets.

M









Milling

Cutting edge angle 45°~70°
 Cutting edge angle 75°
 Cutting edge angle 88°/90°
 Cutter for Finishing
 High Feed Cutter
 Multi-Function
 Slot Mill
 Ball-nose Radius
 Others

● : Standard item MTO : Made to order

M42

Spare parts and applicable inserts (MFK-SF)

Description	Spare parts								Applicable inserts ➔ M44
	Wedge 	Wedge screw 	Wrench 	Cartridge 	Cartridge clamp screw 	Wrench 	Adjustment screw 	Mounting bolt 	
MFK 080R-11-9T-M-SF	C09N	W6X18N	TT-15	CR-MFK70R	HH8X25	LW-6	AJ-519TR	HH12X35	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
100R-11-12T-M-SF								HH16X40	
125R-11-15T-M-SF									
160R-11-18T-M-SF									
200R-11-24T-M-SF								-	
250R-11-30T-M-SF									
315R-11-39T-M-SF									
MFK 080R-11-9T-SF	C09N	W6X18N	TT-15	CR-MFK70R	HH8X25	LW-6	AJ-519TR	HH16X40	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
100R-11-12T-SF									
125R-11-15T-SF									
160R-11-18T-SF									
200R-11-24T-SF								-	
250R-11-30T-SF									
315R-11-39T-SF									



Milling

PNMG/PNEG/PNEA

Insert		Description	No. of edges	Dimension (mm)				Carbide		Cera-mic		Applicable toolholder M40 M42
				S	INSL	BCH	BS	CVD	PVD	CVD	-	
				C4420M PR1510 PR1525 CS7050 KS6050 KBM75								
Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)												
		PNMG 1106XNEN-GM	10	6.35	17.23	2	2	●	●			MFK... MFK...-M MFK...-SF
		PNMG 1106XNEN-GH	10	6.35	17.23	2	2	●	●			MFK... MFK...-M MFK...-SF
		PNEG 1106XNEN-GL	10	6.35	17.18	2.6	2.6	●	●			MFK... MFK...-M MFK...-SF
		PNEG 1106XNER-W	2	6.35	18.02	2	10	●	●			MFK... MFK...-M MFK...-SF
		PNEA 1106XNTR-T01020	10	6.5	16.94	1.5	1.5			●	●	MFK... MFK...-M MFK...-SF
		PNEG 1106XNTR-T00515	10	6.35	17.07	-	-			●	●	MFK... MFK...-M MFK...-SF
		PNEG 1106XNTR-T01015W	2	6.5	18.06	1.7	4.8				●	MFK... MFK...-M MFK...-SF

Handed insert shows Right-hand

Recommended cutting conditions M45, M46



Milling

Cutting edge angle 45°~70°

Cutting edge angle 75°

Cutting edge angle 88°/90°

Cutter for Finishing

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others

● : Standard item

M44

PNEG1106XNER-W inserts are sold in 5 piece boxes

PNEG1106XNTR-T01015W inserts are sold in 1 piece boxes

Recommended cutting conditions (Ceramic/CBN)

Without chipbreaker

Workpiece material	Insert grades	Vc (m/min)	Edge preparation	fz(mm/t)				
				0.05	0.1	0.2	0.3	0.4
Gray cast iron	KS6050 ★ CS7050 ☆	600~900~1,200	0.10x20°					
Nodular cast iron	KS6050 ☆ CS7050 ★	400~600~900						

With chipbreaker

Workpiece material	Insert grades	Vc (m/min)	Edge preparation	fz(mm/t)				
				0.05	0.1	0.2	0.3	0.4
Gray cast iron	KS6050 ★ CS7050 ☆	600~900~1,200	0.05x15°					
Nodular cast iron	KS6050 ☆ CS7050 ★	400~600~900						

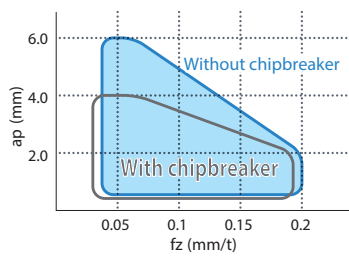
CBN wiper insert

Workpiece material	Insert grades	Vc (m/min)	Edge preparation	fz(mm/t)				
				0.05	0.1	0.2	0.3	0.4
Gray cast iron	KBN475	600~900~1,200	0.10x15°					
Nodular cast iron		400~600~900						

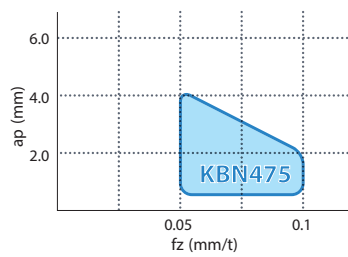
★: 1st Recommendation ☆: 2nd Recommendation

Recommended application range (Ceramic/CBN)

Workpiece material: Cast iron (Ceramic)



Workpiece material: Cast iron (CBN)



When using CBN wiper inserts

1. Please use CBN wiper inserts together with ceramic inserts. Feed rate should be fz=0.1mm/t or under.
2. The main cutting edge of CBN wiper insert is slightly higher than that of ceramic inserts. Therefore, the feed rate for the inserts next to CBN wiper inserts is double that of other inserts.



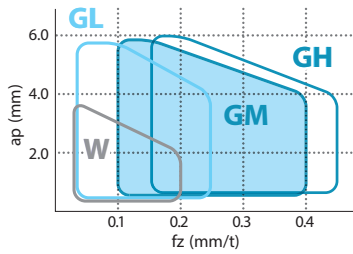
Recommended cutting conditions (Coated carbide)

Workpiece material	Insert grades	Vc (m/min)	Chipbreaker	fz (mm/t)				
				0.06	0.1	0.2	0.3	0.4
Gray cast iron	CA420M	170~230~300	GM ★			0.25		
	PR1510	120~180~250	GH ☆				0.3	
	PR1525		GL		0.12			
Nodular cast iron	CA420M	150~200~250	GM ★			0.2		
	PR1510	100~150~200	GH ☆				0.25	
	PR1525		GL		0.1			

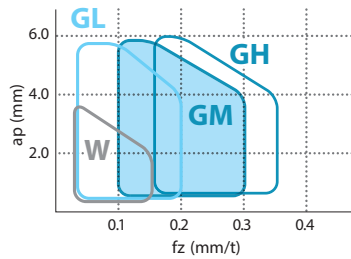
★: 1st Recommendation ☆: 2nd Recommendation

Recommended application range

Workpiece material: Gray cast iron



Workpiece material: Nodular cast iron



- Notes:
1. When using W, please use together with GM or GH.
 2. If machining fz=0.2 or over, insert corner will be damaged. The main cutting edge of W insert is receding from that of GM and GH. Therefore, the feed rate for the insert next to W type is double of the other inserts.

How to adjust cutting edge height

1. Assemble all related parts into the cutter.
2. Make sure the back end of cartridge makes contact with adjustment screw (Fig. 1), and pull them lightly inwards (Fig. 2). Tighten the cartridge clamp screw temporary.
3. Install the insert (Fig. 3), and tighten the wedge screw temporary. Temporarily tighten the screw with a 40 to 45 degree rotation after the wedge contacts the insert.
4. Loosen the cartridge clamp screw. (Fig. 4)
5. Adjust the extruding amount with adjustment screw. (Fig. 5)
6. Tighten the wedge screw and firmly fix the insert. (Recommended tightening torque: 6N·m)
7. Tighten the cartridge clamp screw firmly. (Recommended tightening torque: 10N·m)

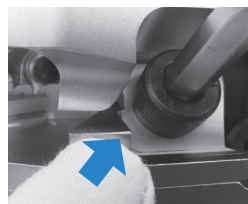
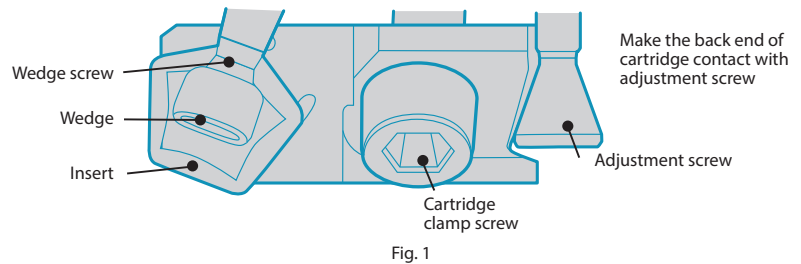


Fig. 2

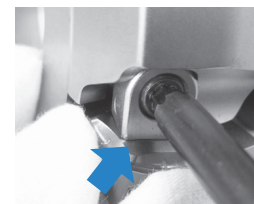


Fig. 3

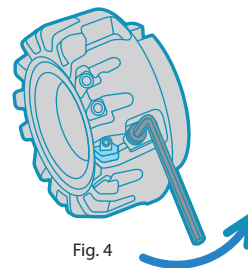


Fig. 4

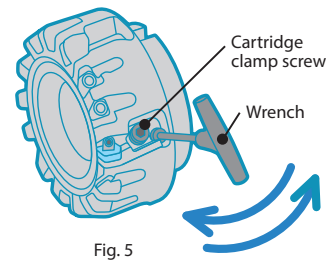


Fig. 5

- Notes:
1. Follow steps 1 ~ 7 above for adjustment.
 2. To adjust the edge height adjust the wedge screw and loosen the cartridge clamp screw. Tightening the adjustment screw with the clamp screw fixed firmly may damage the adjustment screw.
 3. The adjusted edge height difference must be within 5µm.

M

Milling

Cutting edge angle 45°~70°

Cutting edge angle 75°

Cutting edge angle 88°/90°

Cutter for Finishing

High Feed Cutter

Multi-Function


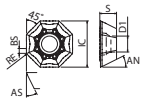

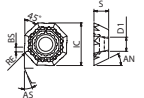

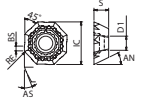
Slot Mill

Ball-nose Radius

Others

Inserts for MOF45

OFMT (Inserts for MOF45)

Insert		Description	No. of edges	Dimension (mm)					Angle (°)		Carbide		Applicable toolholder
				IC	S	D1	RE	BS	AN	AS	PVD		
											PR1210	PR1225	
Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)										★	P		
										★	M		
										★	K		
										★	N		
										★	S		
										□	H		
		OFMT 050405EN-GT	8	13.35	4.83	4.6	0.5	1.4	26	26	□	□	MOF45...-05-...
		OFMT 070408EN-GT	8	17.85	5.12	5.9	0.8	1.2	26	26	□	□	MOF45...-07-...
		OFMT 050405ER-SH	8	13.47	4.76	4.4	0.5	1.7	26	22	□	□	MOF45...-05-...
		OFMT 070405EN-SH	8	17.98	4.87	5.8	0.5	-	26	26	□	□	MOF45...-07-...

Handed insert shows Right-hand

□ : Deleted from the next catalog



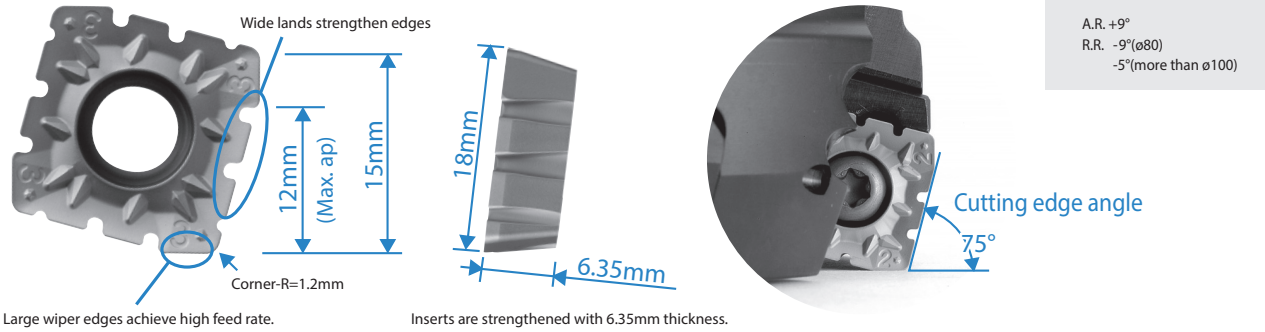
Milling

M47

MSRS15 face mill for heavy milling

Large depth of cut and high feed rate achieves high efficiency machining

Recommended ap: 5 ~ 10mm



Selection of chipbreaker

	Low cutting force	General purpose	Edge strength oriented
Insert type	NB2P(4-Notched) + NB3P(5-Notched)	NB2(2-Notched) + NB3(3-Notched)	NB2T(2-Notched) + NB3T(3-Notched)
Applications	When using long arbor or for machining of thin-plate workpieces	General purpose type with good balance of strength and cutting force	For interrupted machining and high load machining When feed rate is increased or workpiece material is cast iron
Edge preparation	As many as four (or five) notches help to alleviate the shock when biting into the workpiece 	Strength, edge and chip control are all well balance 	Strength is increased by the edge shape and moderate rake angle of the chamfer edge



Milling

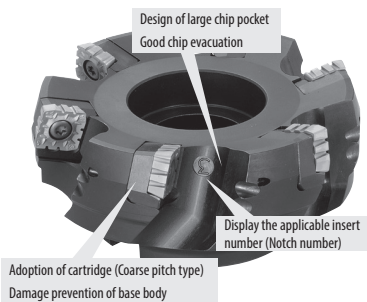
A supplemental chipbreaker is used when it is necessary to increase strength and bite while focusing on resistance, as when machining welded areas.



• About insert no. of NB2P (4-notched) and NB3P (5-notched)
In order to adjust applicable inserts on marked numbers on toolholders, "2+" is marked for NB2P (4-notched) and "3+" is marked on NB3P (5-notched).

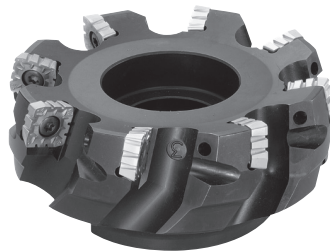
Features of toolholder

Coarse pitch

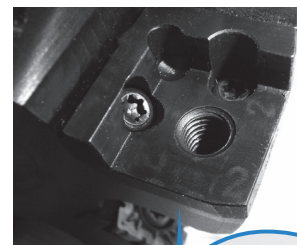


Fine pitch

Higher productivity with fine pitch design



Insert replacement identification



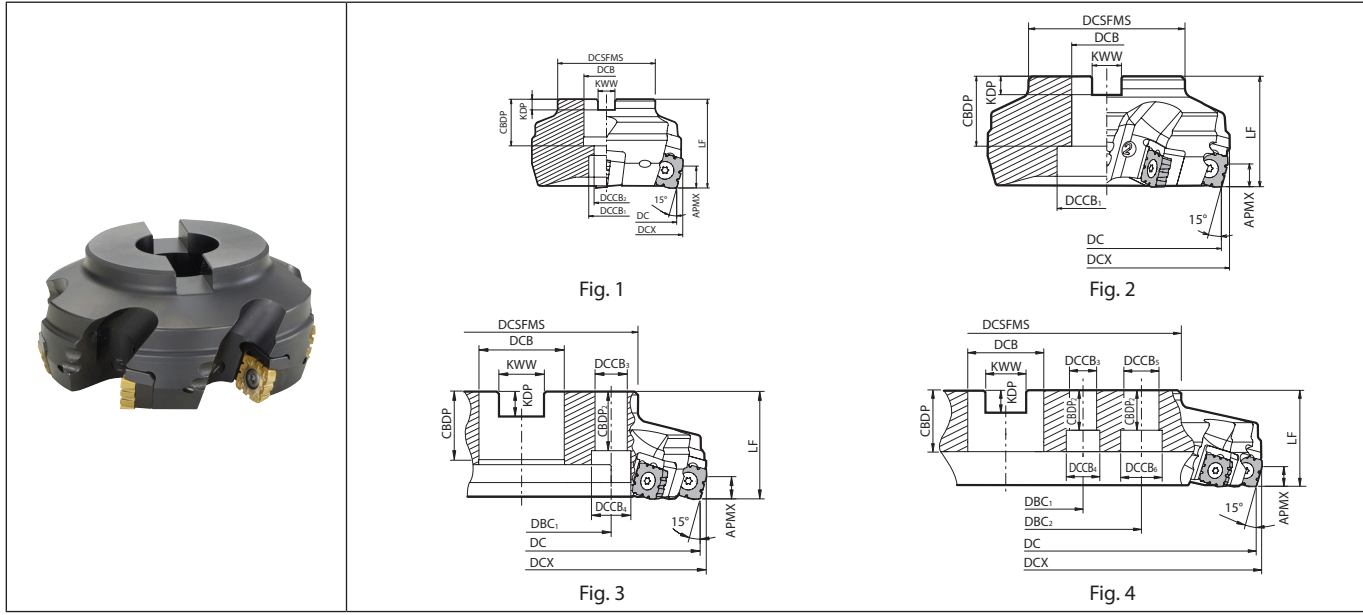
Insert number is transcribed as a result of the cutting tool load.



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

M48

MSRS15



Toolholder dimensions


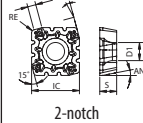

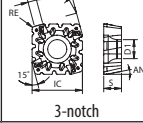

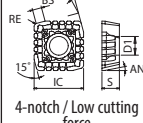

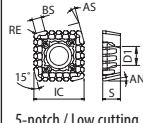

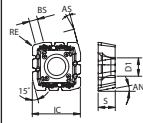

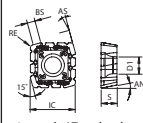

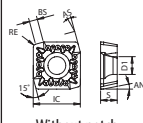
Description	Availability	Inserts	Dimension (mm)																				A.R. (°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts M50
			R	DC	DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DCCB ₅	DCCB ₆	DBC ₁	DBC ₂	LF	CDBP	KDP	KWW	APMX	CDBP ₂							
																						DC						
Metric Coarse pitch	MSRS	15080R-4T-M	●	4	80	87	70	27	20	13	-	-	-	-	-	50	24	7	12.4	-	-9	1.3	1	SPMT1806EDER... SPMT1806EDSR...				
		15100R-4T-M	●	4	100	107	85	32	45	-	-	-	-	-	29	8	14.4	-	-	-	-5	2	2					
		15125R-6T-M	●	6	125	132	85	40	55	-	-	-	-	-	33	9	16.4	12	28	+9	No	3.6	2					
		15160R-8T-M	●	8	160	167	110	40	68	14	20	-	-	66.7	-	33	9	16.4	12	28	+9	No	5		3			
		15200R-10T-M	●	10	200	207	140	60	-	18	26	-	-	101.6	-	38	15	25.7	32	-	-5	7.7	3					
		15250R-12T-M	●	12	250	257	140	60	-	18	26	-	-	101.6	-	38	15	25.7	32	-	-5	12	3					
15315R-14T-M	●	14	315	322	230	60	-	18	26	-	-	101.6	-	38	15	25.7	32	-	-5	17	4							
15315R-14T-M	MTO	16	315	322	230	60	-	18	26	-	-	101.6	-	38	15	25.7	32	-	-5	17	4							
Metric Fine pitch	MSRS	15080R-6T-M	●	6	80	87	70	27	20	13	-	-	-	-	-	50	24	7	12.4	-	-9	1.3	1	SPMT1806EDER... SPMT1806EDSR...				
		15100R-6T-M	●	6	100	107	85	32	45	-	-	-	-	-	29	8	14.4	-	-	-	-5	1.9	2					
		15125R-8T-M	●	8	125	132	85	40	55	-	-	-	-	-	33	9	16.4	12	28	+9	No	3.5	2					
		15160R-10T-M	●	10	160	167	110	40	68	14	20	-	-	66.7	-	33	9	16.4	12	28	+9	No	4.9		3			
		15200R-12T-M	●	12	200	207	140	60	-	18	26	-	-	101.6	-	38	15	25.7	32	-	-5	7.6	3					
		15250R-14T-M	●	14	250	257	140	60	-	18	26	-	-	101.6	-	38	15	25.7	32	-	-5	11.9	3					
15315R-16T-M	MTO	16	315	322	230	60	-	18	26	-	-	101.6	-	38	15	25.7	32	-	-5	17	4							
Bore dia. inch spec. Coarse pitch	MSRS	15080R-4T	●	4	80	87	55	25.4	20	13	-	-	-	-	-	50	26	6	9.5	-	-9	1.3	1	SPMT1806EDER... SPMT1806EDSR...				
		15100R-4T	●	4	100	107	70	31.75	42	-	-	-	-	-	32	8	12.7	-	-	-	-5	2	2					
		15125R-6T	●	6	125	132	85	38.1	54	-	-	-	-	-	10	15.9	-	-	-	-	-5	3.6	2					
		15160R-8T	●	8	160	167	100	50.8	68	-	-	-	-	-	11	19	12	25	-	-	+9	5	2					
		15200R-10T	●	10	200	207	130	50.8	68	18	26	-	-	101.6	-	38	14	25.4	32	-	-5	7.7	3					
		15250R-12T	●	12	250	257	130	50.8	68	18	26	-	-	101.6	-	38	14	25.4	32	-	-5	12	3					
15315R-14T	●	14	315	322	220	50.8	68	18	26	-	-	101.6	-	38	14	25.4	32	-	-5	17	4							
Bore dia. inch spec. Fine pitch	MSRS	15080R-6T	●	6	80	87	55	25.4	20	13	-	-	-	-	-	50	26	6	9.5	-	-9	1.3	1	SPMT1806EDER... SPMT1806EDSR...				
		15100R-6T	●	6	100	107	70	31.75	42	-	-	-	-	-	32	8	12.7	-	-	-	-5	1.9	2					
		15125R-8T	●	8	125	132	85	38.1	54	-	-	-	-	-	10	15.9	-	-	-	-	-5	3.5	2					
		15160R-10T	●	10	160	167	100	50.8	68	-	-	-	-	-	11	19	12	25	-	-	+9	4.9	2					
		15200R-12T	●	12	200	207	130	50.8	68	18	26	-	-	101.6	-	38	14	25.4	32	-	-5	7.6	3					
		15250R-14T	●	14	250	257	130	50.8	68	18	26	-	-	101.6	-	38	14	25.4	32	-	-5	11.9	3					
15315R-16T	MTO	16	315	322	220	50.8	68	18	26	-	-	101.6	-	38	14	25.4	32	-	-5	17	4							

Mounting bolt (HH12X35) is included for MSRS15080R-○T-(M).
Cartridge is included in the coarse pitch type, but no cartridge in the fine pitch type.

● : Standard item MTO : Made to order



SPMT

Insert		Description	No. of edges	Dimension (mm)					Angle (°)		Carbide			Applicable toolholder M49
				IC	S	D1	RE	BS	AN	AS	PVD	PR1210	PR1225	
<p>Classification of usage</p> <p>★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)</p>												★ ★		P
												★ ★		M
												★		K
												★		K
														N
												★ ★		S
												★		S
												□ □		H
	 2-notch	SPMT 1806EDER-NB2	4	18	6.35	6.8	1.2	3.1	11	15	● ● ●	● ● ●		MSRS15...
	 3-notch	SPMT 1806EDER-NB3	4	18	6.35	6.8	1.2	3.1	11	15	● ● ●	● ● ●		MSRS15...
	 4-notch / Low cutting force	SPMT 1806EDER-NB2P	4	18	6.35	6.8	1.2	3.1	11	15	● ● ●	● ● ●		MSRS15...
	 5-notch / Low cutting force	SPMT 1806EDER-NB3P	4	18	6.35	6.8	1.2	3.1	11	15	● ● ●	● ● ●		MSRS15...
	 2-notch / Tough edge	SPMT 1806EDSR-NB2T	4	18	6.35	6.8	1.2	3.1	11	15	● ● ●	● ● ●		MSRS15...
	 3-notch / Tough edge	SPMT 1806EDSR-NB3T	4	18	6.35	6.8	1.2	3.1	11	15	● ● ●	● ● ●		MSRS15...
	 Without notch	SPMT 1806EDER-V	4	18	6.35	6.8	1.2	3.1	11	15	● ● ●	● ● ●		MSRS15...

Handed insert shows Right-hand

Recommended cutting conditions M51



Milling

Cutting edge angle 45°~70°

Cutting edge angle 75°

Cutting edge angle 88°/90°

Cutter for Finishing

High Feed Cutter

Multi-Function

Slot Mill


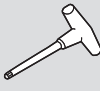
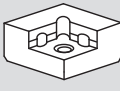

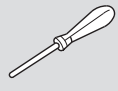
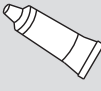

Ball-nose Radius


Others

● : Standard item

M50

Spare parts (common to Metric / Inch spec)

Description		Spare parts						
		Clamp screw	Wrench	Cartridge	Clamp screw	Wrench	Anti-seize compound	Mounting bolt
								
Coarse pitch	MSRS 15080R-○○(M)	SB-60120TR	TT-25L	MAP-1806	SB-40140TR	DT-15	P-37	HH12X35
	MSRS 15100R-○○(M)							-
	MSRS 15315R-○○(M)							-
Fine pitch	MSRS 15080R-○○(M)	SB-60120TR	TT-25L	-	-	-	P-37	HH12X35
	MSRS 15100R-○○(M)							-
	MSRS 15315R-○○(M)							-

 Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

Recommended cutting conditions

Workpiece material	fz (mm/t)			Recommended insert grades (Vc: m/min)		
	NB2P + NB3P	NB2 + NB3	NB2T + NB3T	MEGACOAT		
				PR1225	PR1230	PR1210
Carbon steel	0.15	0.2	0.3	☆ 120~180~250	★ 120~180~220	-
Alloy steel	0.15	0.2	0.3	☆ 120~180~250	★ 120~180~220	-
Mold steel	0.1	0.15	0.2	☆ 100~160~220	★ 100~160~200	-
Gray cast iron	0.2	0.25	0.35	-	-	★ 120~180~250
Nodular cast iron	0.15	0.2	0.3	-	-	★ 100~160~220
Stainless steel	Not recommended					
Aluminum/Copper	Not recommended					

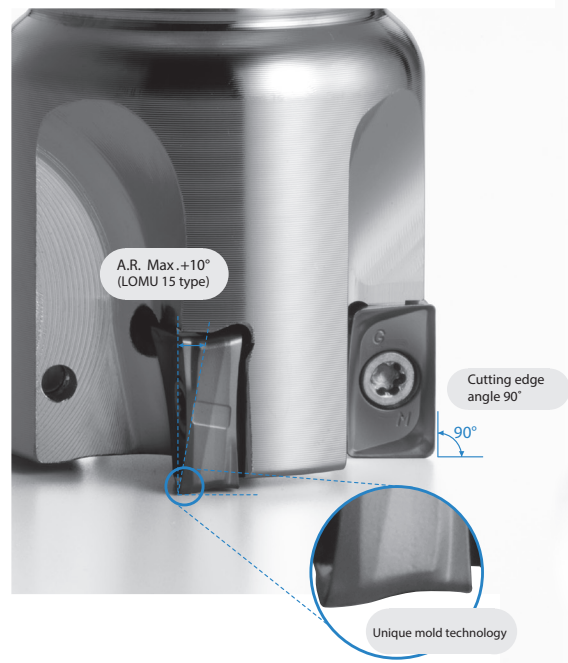
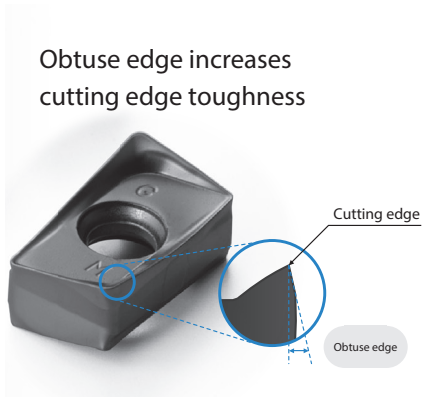
★: 1st Recommendation ☆: 2nd Recommendation



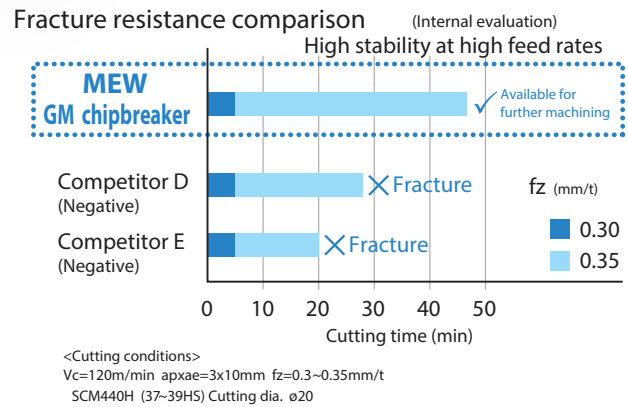
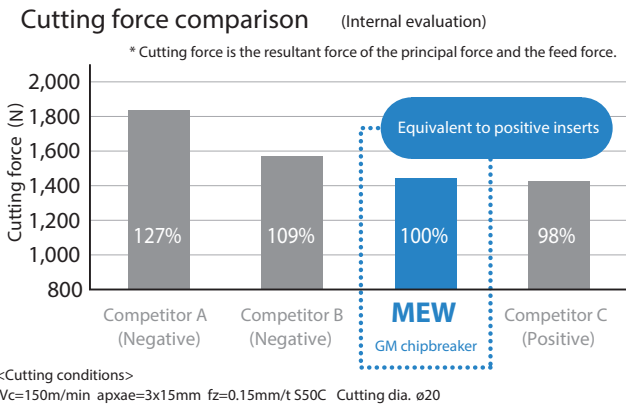
Double-sided 4-edge insert

MEW

Kyocera's unique mold technology reduces cutting force equivalent to positive inserts

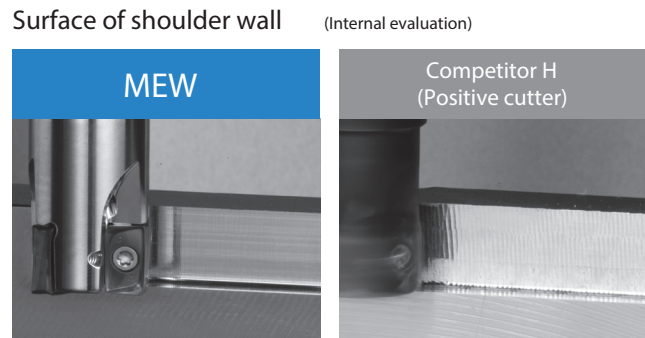


Low cutting force equivalent to positive inserts



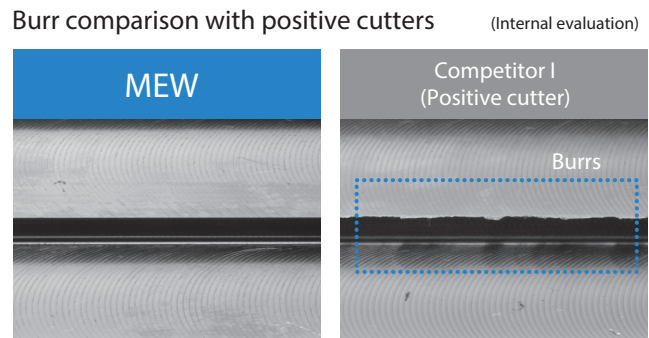
Improved surface finish, minimizing chattering

Sharp cutting and superior resistance to chattering and burrs with helical cutting edge and optimum axial rake design



Smooth surface of MEW without chattering

<Cutting conditions>
Vc=240m/min apxae= 4 (3passes) x5mm fz=0.12mm/t Dry S5400 Cutting dia. ø20



Sharp cutting enables less burrs than positive cutters

<Cutting conditions>
Vc=250m/min apxae=4x5mm fz=0.1mm/t Dry S50C Cutting dia. ø20

MEW GM chipbreaker	Competitor F (Negative)	Competitor G (Positive)
+20°	+17°	+17°

Large actual rake angle lowers cutting force



- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Long tool life by MEGACOAT NANO technology

Stable and longer tool life by special nano coating layer "MEGACOAT NANO"

PR1525
For steel and stainless steel (austenitic related)

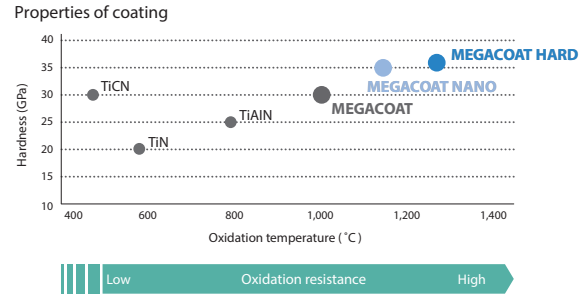
PR1510
For cast iron

PR1535
For heat-resistant alloys, titanium and stainless steel (precipitation hardening)

CA6535
CVD coated carbide for heat-resistant alloys and stainless steel (martensitic)

PDL025
DLC coated carbide for non-ferrous metals

GW25
Carbide for non-ferrous metals



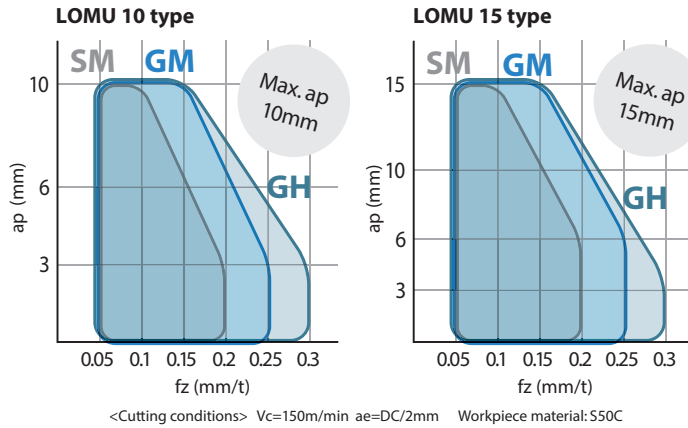
Prevents wear and fracture with high hardness (35GPa) and superior oxidation resistance (Oxidation temperature: 1,150°C)

PR015S
MEGACOAT HARD for hard materials

Various chipbreaker lineup

Newly developed 4 chipbreakers for various applications
Applicable to a wide range of application

Chipbreaker	Applications	Insert
GM	General purpose	
SM	Low cutting force	
GH	For heavy milling	
AM	For non-ferrous metals	

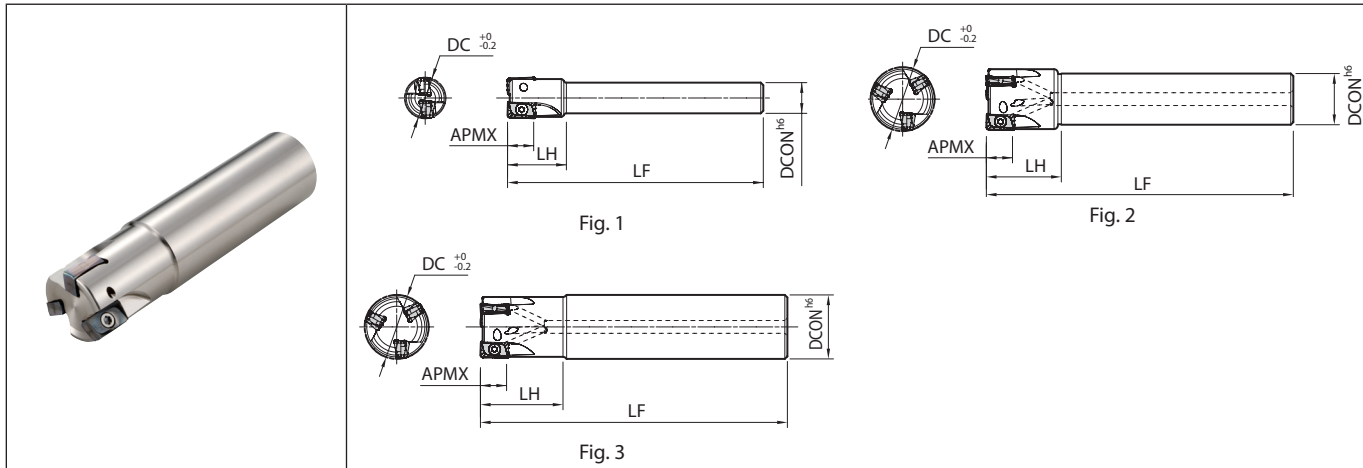


Lineup of corner-R(RE)

Corner-R(RE) 0.4, 1.0, 1.2, 1.6 and 2.0 added to GM chipbreaker lineup

Marking of 04	08 has no dimension marking	Marking of 10	Marking of 12	Marking of 16	Marking of 20
LOMU100404ER-GM LOMU150504ER-GM	LOMU100408ER-GM LOMU150508ER-GM	LOMU150510ER-GM	LOMU100412ER-GM LOMU150512ER-GM	LOMU100416ER-GM LOMU150516ER-GM	LOMU100420ER-GM LOMU150520ER-GM

MEW (End mill)



Toolholder dimensions

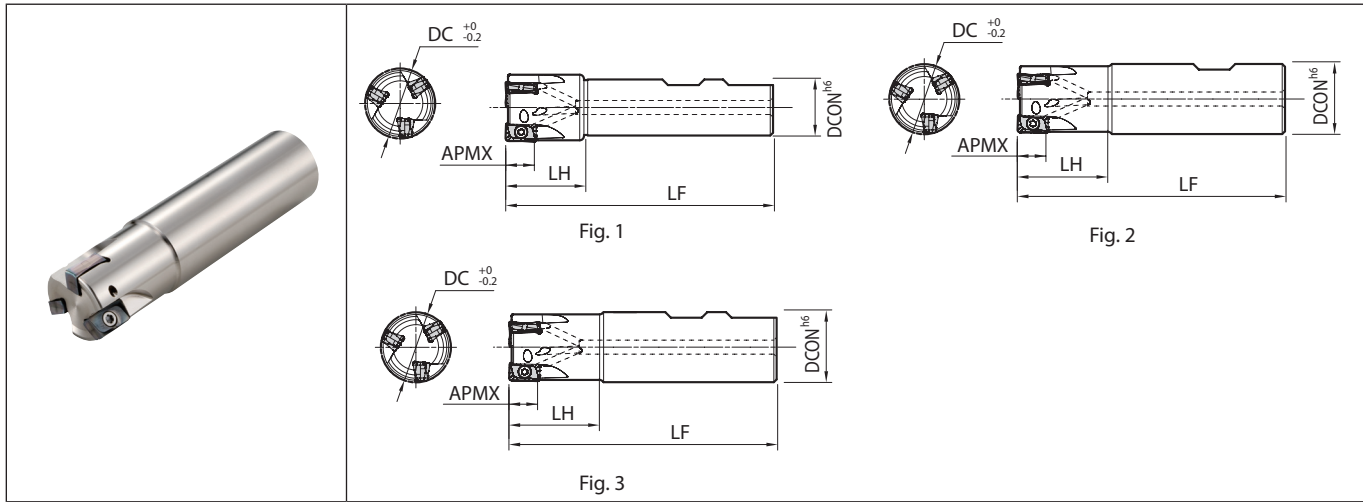
Description	Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Spare parts			Applicable inserts M59
			DC	DCON	LF	LH	APMX						Anti-seize compound	Screw	Wrench	
Standard shank	MEW	●	16	12	23	10	+7	-20	No	43750	1	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...	
			18	100	25				-21	43000	2					
			20	16	110				26	41000	2					
			22	20						39600	2					
			25	20	37500				2							
			28	120	29				35800	2						
			30	25	130				34800	2						
			32	32	150				33900	2						
			40	32	150				30000	2						
			50	32	120				22500	2						
Cylindrical Same shank	MEW	●	16	16	100	26	10	+7	-20	Yes	43750	3	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
			20	20	110	30				41000	3					
			25	25	120	32				37500	3					
			32	32	130	40				33900	3					
			20	20	150	40				41000	3					
			25	25	170	50				37500	3					
			32	32	130	32				30000	2					
			40	32	150	50				25000	2					
Standard shank	MEW	●	25	20	120	29	15	+10	-21	Yes	35000	2	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...
			32	25	130	32				30000	2					
			40	32	150	50				25000	2					
			50	120	40	17000				2						
Same shank	MEW	●	25	25	120	32	15	+10	-22	Yes	35000	3	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...
			32	32	130	40				30000	3					
			32	32	130	40				30000	3					

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

● : Standard item

M54

MEW (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Spare parts			Applicable inserts M59	
			DC	DCON	LF	LH	APMX						Anti-seize compound	Screw	Wrench		
Standard shank	MEW 40-W32-10-5T	MTO	5	40	32	111	50	10	+7	-19	Yes	30000	1	P-37	SB-3065TRP	DTPM-8	LOGT1004..., LOMU1004...
	MEW 40-W32-15-4T	MTO	4	40	32	111	50	15	+10	-21	Yes	25000	1	P-37	SB-4090TRP	DTPM-15	LOGT1505..., LOMU1505...
Weldon Same Shank	MEW 16-W16-10-2T 20-W20-10-2T 20-W20-10-3T	MTO	2	16	16	75	25	10	+7	-22	Yes	43750	2	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
		MTO	2	20	20	77						41000	2				
		MTO	3	25	25	90						32	37500				
	MEW 25-W25-15-2T 32-W32-10-4T	MTO	4	32	32	102	40	15	+10	-22	Yes	33900	3	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...
		MTO	3	25	25	90	32					35000	3				
	MTO	3	32	32	102	40						30000	3				

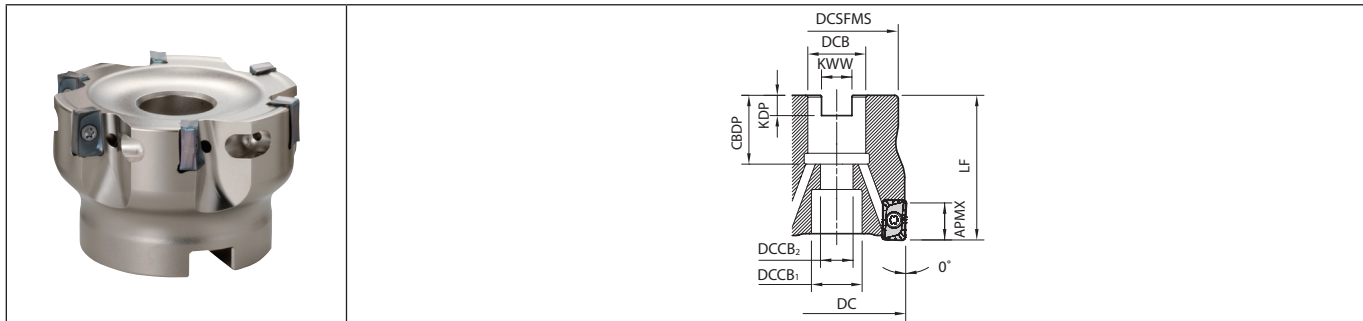
Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

MTO : Made to order



Milling

MEW (Face mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)										A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Applicable inserts ➔ M59
			R	DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW						
MEW 032R-10-4T-M 040R-10-5T-M 050R-10-5T-M 063R-10-6T-M	●	4	32	30	16	14	9	35	19	5.6	8.4	10	+7	-20	Yes	33900	0.1	LOGT1004... LOMU1004...
	●	5	40	34	22	18	11	40	21	6.3	10.4					30000	0.2	
	●	5	50	45	22	18	11	40	21	6.3	10.4					22500	0.4	
	●	6	63	47	22	18	11	40	21	6.3	10.4					20500	0.5	
MEW 040R-15-4T-M 050R-15-4T-M 063R-15-5T-M 080R-15-6T-M 080R-15-6T	●	4	40	34	16	14	9	35	19	5.6	8.4	15	+10	-21	Yes	25000	0.2	LOGT1505... LOMU1505...
	●	4	50	45	22	18	11	40	21	6.3	10.4					17000	0.3	
	●	5	63	47	22	18	11	40	21	6.3	10.4					14500	0.5	
	●	5	80	60	27	20	13	50	25	7	12.4					12000	1	
	●	6	80	60	25.4	20	13	50	27	6	9.5							
	●	6	80	60	25.4	20	13	50	27	6	9.5							

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Spare parts and applicable inserts (End mill/face mill)

Description	Spare parts				Applicable inserts ➔ M59			
	Clamp screw	Wrench	Anti-seize compound	Mounting bolt				
MEW ...-10-_T								
MEW 032R-10-_M 040R-10-_M 050R-10-_M 063R-10-_M	SB-3065TRP	DTPM-8	P-37	HH8X25 HH10X30	LOMU10...-GM	LOMU10...-SM	LOMU10...-GH	LOGT10...-AM
MEW ...-15-_T								
MEW 040R-15-_M 050R-15-_M 063R-15-_M 080R-15_(-M)	SB-4090TRP	DTPM-15	P-37	HH8X25 HH10X30 HH12X35	LOMU15...-GM	LOMU15...-SM	LOMU15...-GH	LOGT15...-AM

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

About wrench specifications

Wrenches and clamp screws are "Torx Plus".

1. Ref. to Fig. 1 for "Torx Plus" Wrench. (Purple grip)
2. Ref. to Fig. 2 for "Torx" Wrench. (Black grip)

A "Torx Plus" Wrench and a "Torx" Wrench have different top shapes. Please use a "Torx Plus" Wrench.

* If a "Torx" Wrench is used to tighten, the screw head might become damaged and then the screw cannot be removed.

● : Standard item

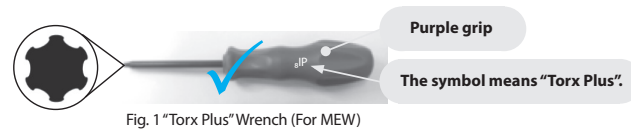


Fig. 1 "Torx Plus" Wrench (For MEW)

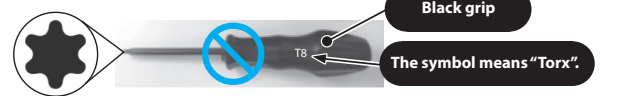


Fig. 2 "Torx" Wrench (Do NOT use it for MEW)

M

Milling

Cutting edge angle 45°~70°

Cutting edge angle 75°

Cutting edge angle 88°/90°

Cutter for Finishing

High Feed Cutter

Multi-Function

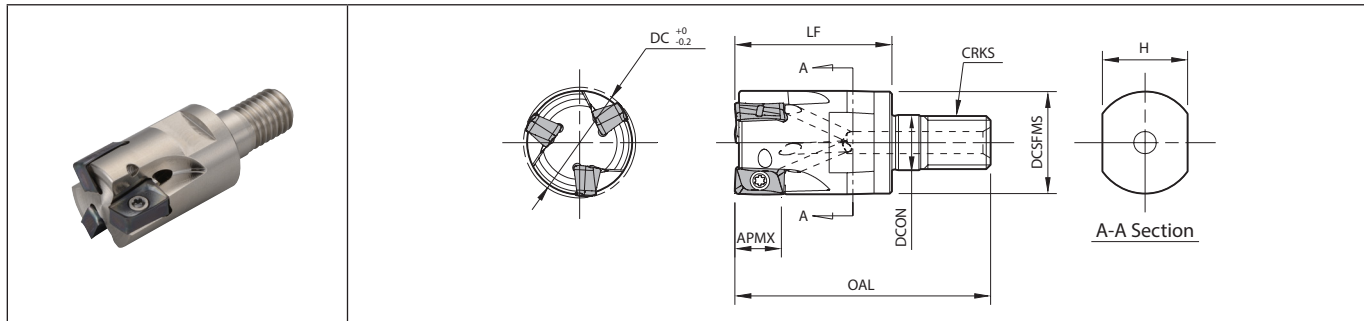
Slot Mill

Ball-nose Radius

Others

M56

MEW (Modular type)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)								A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Applicable inserts ● M59
			DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H					
MEW 16-M08-10-2T 20-M10-10-2T 20-M10-10-3T 25-M12-10-3T 32-M16-10-4T	●	2	16	8.5	14.7	42	25	10	M8x1.25	12	+7	-22	Yes	43750 41000 37500 33900	LOGT1004... LOMU1004...
	●	2	20	10.5	18.7	48	30		M10x1.5	15					
	●	3	25	12.5	23	56	35	M12x1.75	19	-20					
	●	3	25	12.5	23	56	35	M16x2.0	24						
	●	4	32	17	30	62	40	M16x2.0	24						
MEW 25-M12-15-2T 32-M16-15-3T	●	2	25	12.5	23	56	35	15	M12x1.75	19	+10	-22	Yes	35000 30000	LOGT1505... LOMU1505...
	●	3	32	17	30	62	40		M16x2.0	24					

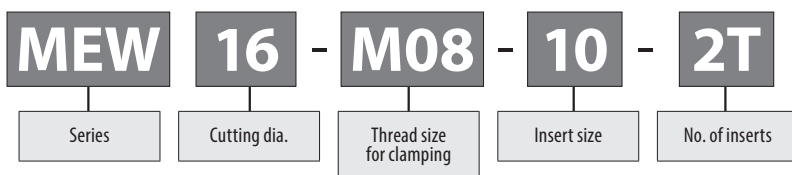
Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
See page M60 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

Spare parts and applicable inserts (MEW modular type)

Description	Spare parts			Applicable inserts ● M59				
	Clamp screw	Wrench	Anti-seize compound					
MEW 16-M08-10-2T 20-M10-10-2T 20-M10-10-3T 25-M12-10-3T 32-M16-10-4T								
	Recommended tightening torque for insert clamp 1.2N·m			P-37	LOMU10...-GM	LOMU10...-SM	LOMU10...-GH	LOGT10...-AM
	SB-4090TRP			DTPM-15	LOMU15...-GM	LOMU15...-SM	LOMU15...-GH	LOGT15...-AM
	Recommended tightening torque for insert clamp 3.5N·m			P-37				
	SB-4090TRP			DTPM-15				
MEW 25-M12-15-2T 32-M16-15-3T	SB-4090TRP		DTPM-15					

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

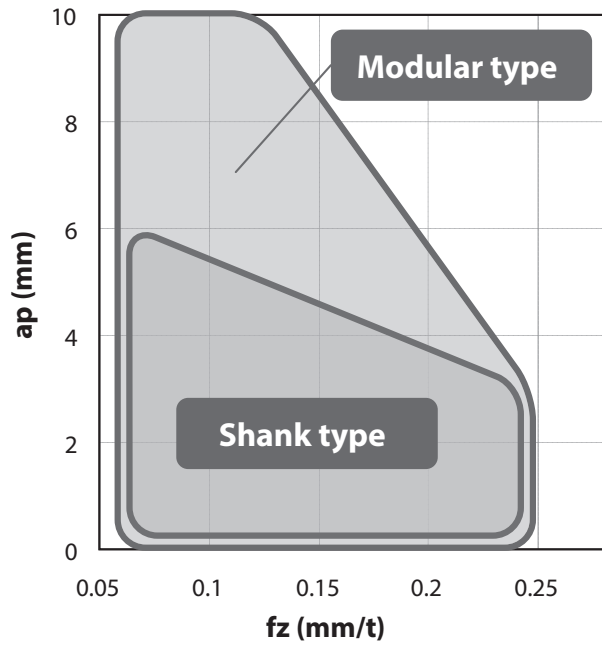
Modular end mill head identification system



● : Standard item

Feature of modular type

Applicable to a wide range of applications



<Cutting conditions>

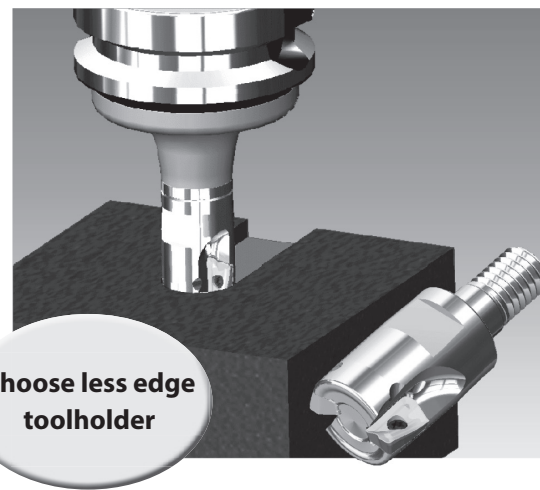
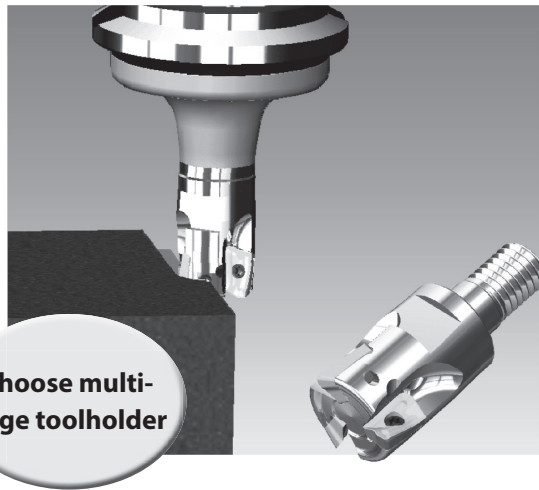
- Cutting speed: $V_c=150\text{m/min}$ ($n=2,390\text{min}^{-1}$)
- Width of cut: $a_e=10\text{mm}$ (Shouldering)
- Workpiece material: S55C, Dry
- **Machine: BT30 M/C**
- <Cutting tool>
- Modular type
 - Head: MEW20-M10-10-3T
 - Arbor: BT30K-M10-45
 - Insert: LOMU100408ER-GM (PR1525)
- Shank type
 - Toolholder: MEW20-S20-10-3T
 - Arbor: BT30 Milling Chuck (Double-face clamping)
 - Insert: LOMU100408ER-GM (PR1525)

A wide range of applications even in BT30 M/C with the superior anti-chattering performance

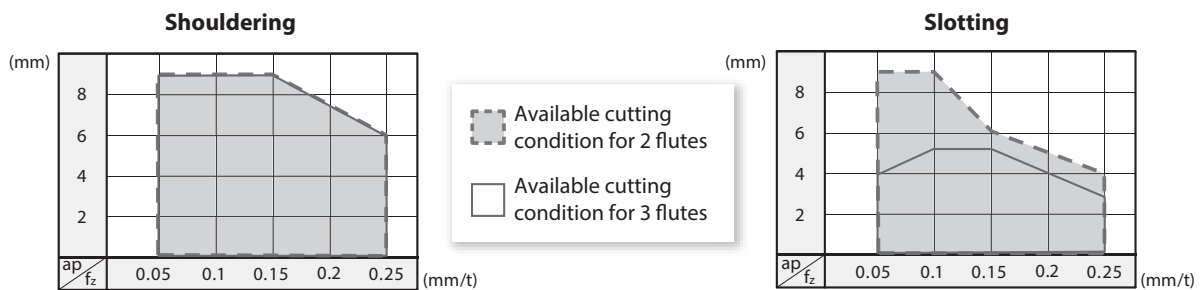
How to select multi-edge or less edge toolholder

Shouldering ($a_e=10\text{mm}$)

Slotting



Available cutting condition of modular type



M

Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

LOMU/LOGT

Insert		Description	No. of edges	Dimension (mm)					Carbide					Applicable toolholder M54~M57 M90, M91	
				S	D1	RE	L	W1	BS	CVD					
										CA6535	PDL025	PR0155	PR1510		PR1525
<p>Classification of usage</p> <p>★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)</p>		Carbon steel / Alloy steel								★	☆	P			
		Mold and die steel								★	☆				
		Austenitic stainless steel								☆	★	M			
		Martensitic stainless steel							★		☆				
		Precipitation hardening stainless steel									★				
		Gray cast iron									★	K			
		Nodular cast iron									★				
		Non-ferrous metals							★			☆	N		
		Heat-resistant alloy							★			☆			
		Titanium alloy										★	S		
		Hard materials								★					
														H	

Insert	Description	No. of edges	Dimension (mm)					Carbide					Applicable toolholder M54~M57 M90, M91	
			S	D1	RE	L	W1	BS	CA6535	PDL025	PR0155	PR1510		PR1525
 General purpose	LOMU 100404ER-GM	4	4	3.4	0.4	10.9	6.6	2.1	●		●	●	●	MEW...-10-... MEWH...-10-...
	LOMU 100408ER-GM				0.8			1.7	●		●	●	●	
	LOMU 100412ER-GM				1.2			1.3	●		●	●	●	
	LOMU 100416ER-GM				1.6			1	●		●	●	●	
	LOMU 100420ER-GM				2			1	●		●	●	●	
 Low cutting force	LOMU 150504ER-GM	4	5.6	4.8	0.4	15.7	9.2	2.2	●		●	●	●	MEW...-15-... MEWH...-15-...
	LOMU 150508ER-GM				0.8			1.8	●		●	●	●	
	LOMU 150510ER-GM				1			1.6	●		●	●	●	
	LOMU 150512ER-GM				1.2			1.4	●		●	●	●	
	LOMU 150516ER-GM				1.6			1	●		●	●	●	
 Tough edge	LOMU 100408ER-GH	4	4	3.4	0.8	10.9	6.6	1.7	●		●	●	●	MEW...-10-... MEWH...-10-...
	LOMU 150508ER-GH	4	5.6	4.8	0.8	15.7	9.2	1.8	●		●	●	●	MEW...-15-... MEWH...-15-...
 2-edge / Non-Ferrous Metals	LOGT 100408FR-AM	2	4	3.6	0.8	11.2	6.8	2.8	●				●	MEW...-10-...
	LOGT 150508FR-AM	2	5.6	4.9	0.8	15.9	8.9	2.9	●				●	MEW...-15-...

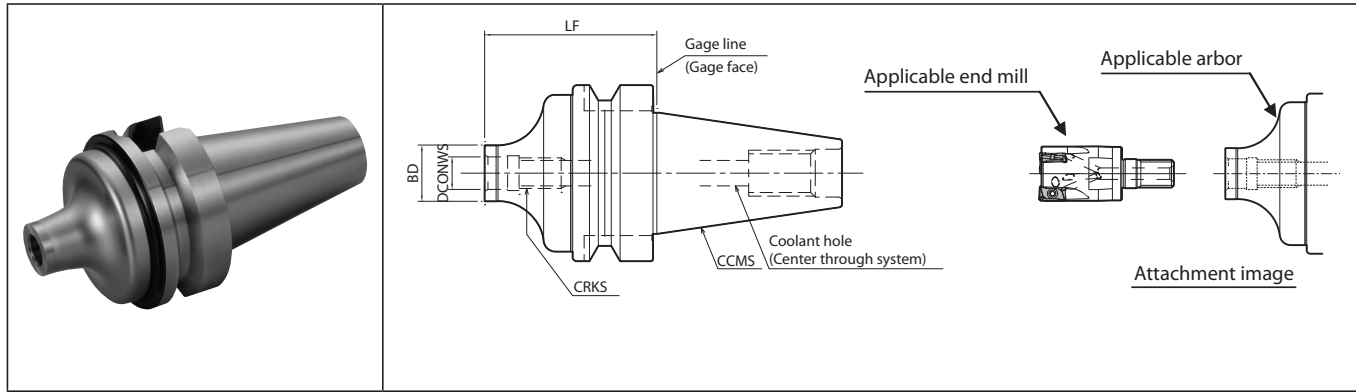
Handed insert shows Right-hand

Recommended cutting conditions M62



● : Standard item

BT Arbor (for exchangeable head / double-face clamping spindle)



Dimensions

Description	Availability	Dimension (mm)				Coolant hole	Arbor (Double-face clamping)	Applicable end mill (Head) MEW, MEC, MEV, MFH Harrier, MFH Boost, MFH Mini, MFH Micro, MRX ➔ M57(MEW), M68(MEC) M86(MEV), M180(MFH Harrier) M191(MFH Boost), M198(MFH Mini) M205(MFH Micro), M259(MRX)
		LF	BD	DCONWS	CRKS			
BT30K- M08-45	●	45	14.7	8.5	M8×1.25	Yes	BT30	(MEW/MEC/MFH/MRX)..-M08-..
	●		18.7	10.5	M10×1.5			(MEW/MEC/MEV/MFH/MRX)..-M10-..
	●		23	12.5	M12×1.75			(MEW/MEC/MEV/MFH/MRX)..-M12-..
BT40K- M08-55	●	55	14.7	8.5	M8×1.25	Yes	BT40	(MEW/MEC/MFH/MRX)..-M08-..
	●	60	18.7	10.5	M10×1.5			(MEW/MEC/MEV/MFH/MRX)..-M10-..
	●	55	23	12.5	M12×1.75			(MEW/MEC/MEV/MFH/MRX)..-M12-..
	●	65	30	17	M16×2.0			(MEW/MEC/MEV/MFH/MRX)..-M16-..

Actual end mill depth

Arbor description	Applicable end mill (Head)			Actual end mill depth (mm)	
	Description	Dimension (mm)			
		Cutting dia. (mm)	LF		
BT30K- M08-45	...16-M08-...	16	25	31.8	
	...17-M08-...	17		33.2	
	...18-M08-...	18		34.2	
	M10-45	...20-M10-...	20	30	36.8
		...22-M10-...	22		39.2
		M12-45	...25-M12-...		25
...28-M12-...	28		45.5		
BT40K- M08-55	...16-M08-...	16	25	31.7	
	...17-M08-...	17		33.2	
	...18-M08-...	18		34.3	
	M10-60	...20-M10-...	20	30	38.7
		...22-M10-...	22		44.5
		M12-55	...25-M12-...		25
	...28-M12-...		28	47.6	
	M16-65	...32-M16-...	32	40	51.2
		...35-M16-...	35		60.2
		...40-M16-...	40		64

● : Standard item

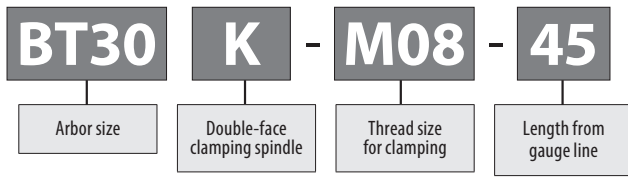
M60

M

Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Arbor identification system



How to attach head

1. When clamping the head on the arbor, make sure there is no dust or chips inside (Fig. 1).
Do NOT put lubricant on the clamping portion.

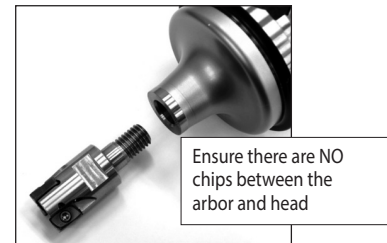


Fig. 1

2. Attach the head on the arbor and fix it using the wrench (Fig. 2).
Ref. to the Table 1 for Recommended tightening torque.
Note: The wrench is NOT included in the products.



Fig. 2

Table 1 recommended head tightening torque

Thread size for clamping	Wrench double width [mm]	Recommended tightening torque [N·m]
M8	12	23
M10	15	46
M12	19	80
M16	24	90

3. Confirm that the head is fixed firmly on the arbor. (Fig. 3)

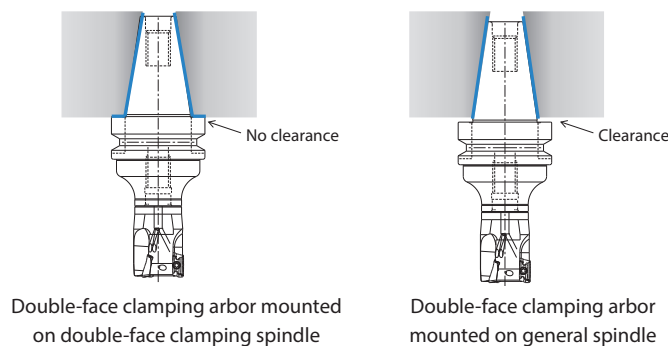


Fig. 3



Frequently asked question

Q: Can the double-face clamping arbor be mounted on a general BT spindle?
A: Yes. It can be used as a general BT arbor with a general BT spindle.



It can be used as a general BT arbor, though the advantage of the double-face clamping will not be shown.

How to mount an insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. Clamp screw
 1. Apply anti-seize compound on portion of taper and thread of clamp screw.
 2. Attach the screw (magnetic head) to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
 3. Tighten M3 screws (SB-3065TRP) slightly inclined from the insert surface. (Ref. to Fig. 2)
3. When tightening the screw, make sure that the wrench is parallel to the screw.
4. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder or between the insert side surfaces and the constraint surface of the toolholder. If there is any clearance, remove the insert and mount it again according to the above steps.

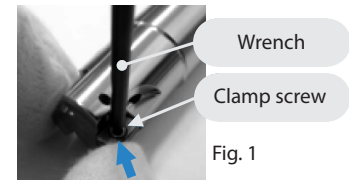


Fig. 1

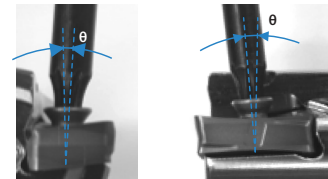


Fig. 2

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)				
		Toolholder description		MEGACOAT (PVD coated carbide)				
		MEW16~MEW18	MEW20~MEW40 MEW040R~MEW080R	PR1535	PR1525	PR1510	PR015S	CVD coated carbide CA6535
GM	Carbon steel	0.06~0.1~0.2	0.08~0.15~0.25	☆ 120~180~250	★ 120~180~250	-	-	-
	Alloy steel	0.06~0.1~0.14	0.08~0.15~0.2	☆ 100~160~220	★ 100~160~220	-	-	-
	Mold steel	0.06~0.08~0.12	0.08~0.12~0.2	☆ 80~140~180	★ 80~140~180	-	-	-
	Stainless steel (Austenitic related)	0.06~0.08~0.12	0.08~0.12~0.15	☆ 100~160~200	★ 100~160~200	-	-	-
	Stainless steel (Martensitic related)	0.06~0.08~0.12	0.08~0.12~0.2	☆ 150~200~250	-	-	-	★ 180~240~300
	Stainless steel (Precipitation hardening)	0.06~0.08~0.12	0.08~0.12~0.2	★ 90~120~150	-	-	-	-
	Gray cast iron	0.06~0.1~0.17	0.08~0.18~0.25	-	-	★ 120~180~250	-	-
	Nodular cast iron	0.06~0.08~0.12	0.08~0.15~0.2	-	-	★ 100~150~200	-	-
	Ni-base heat-resistant alloys	0.06~0.08~0.12	0.08~0.12~0.15	☆ 20~30~50	-	-	-	★ 20~30~50
	Titanium alloys	0.06~0.08~0.12	0.08~0.15~0.2	☆ 40~60~80	-	☆ 30~50~70	-	-
SM	Carbon steel	0.06~0.1~0.17	0.08~0.15~0.2	☆ 120~180~250	★ 120~180~250	-	-	-
	Alloy steel	0.06~0.08~0.12	0.08~0.12~0.18	☆ 100~160~220	★ 100~160~220	-	-	-
	Mold steel	0.06~0.08~0.12	0.08~0.1~0.15	☆ 80~140~180	★ 80~140~180	-	-	-
	Stainless steel (Austenitic related)	0.06~0.08~0.12	0.08~0.1~0.15	☆ 100~160~200	★ 100~160~200	-	-	-
	Stainless steel (Martensitic related)	0.06~0.08~0.12	0.08~0.1~0.15	☆ 150~200~250	-	-	-	★ 180~240~300
	Stainless steel (Precipitation hardening)	0.06~0.08~0.12	0.08~0.1~0.15	☆ 90~120~150	-	-	-	-
	Ni-base heat-resistant alloys	0.06~0.08~0.1	0.08~0.1~0.12	☆ 20~30~50	-	-	-	★ 20~30~50
	Titanium alloys	0.06~0.08~0.12	0.08~0.12~0.15	★ 40~60~80	-	☆ 30~50~70	-	-
GH	Carbon steel	0.06~0.1~0.2	0.08~0.2~0.3	☆ 120~180~250	★ 120~180~250	-	-	-
	Alloy steel	0.06~0.1~0.14	0.08~0.2~0.25	☆ 100~160~220	★ 100~160~220	-	-	-
	Mold steel	0.06~0.08~0.12	0.08~0.15~0.22	☆ 80~140~180	★ 80~140~180	-	-	-
	Stainless steel (Austenitic related)	0.06~0.08~0.12	0.08~0.12~0.15	☆ 100~160~200	★ 100~160~200	-	-	-
	Stainless steel (Martensitic related)	0.06~0.08~0.12	0.08~0.12~0.2	☆ 150~200~250	-	-	-	☆ 180~240~300
	Stainless steel (Precipitation hardening)	0.06~0.08~0.12	0.08~0.12~0.2	☆ 90~120~150	-	-	-	-
	Gray cast iron	0.06~0.1~0.2	0.08~0.22~0.3	-	-	☆ 120~180~250	-	-
	Nodular cast iron	0.06~0.08~0.15	0.08~0.18~0.25	-	-	☆ 100~150~200	-	-
	Ni-base heat-resistant alloys	0.06~0.08~0.12	0.08~0.12~0.15	☆ 20~30~50	-	-	-	☆ 20~30~50
	Titanium alloys	0.06~0.08~0.12	0.08~0.15~0.2	☆ 40~60~80	-	☆ 30~50~70	-	-
	Hard materials (60HRC or less)	0.06~0.08~0.12	0.08~0.15~0.22	-	-	-	★ 60~80~100	-
	Chipbreaker	Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)			
Toolholder description			DLC coated carbide		Carbide			
MEW16~MEW18			MEW20~MEW40 MEW040R~MEW080R	PDL025	GW25			
AM	Aluminum alloys	0.06~0.1~0.2	0.08~0.15~0.25	★ 200~600~900	☆ 200~500~800			

★ : 1st Recommendation

☆ : 2nd Recommendation

* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
 * Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

M

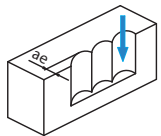
Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Ramping, helical milling and vertical milling (Plunging)

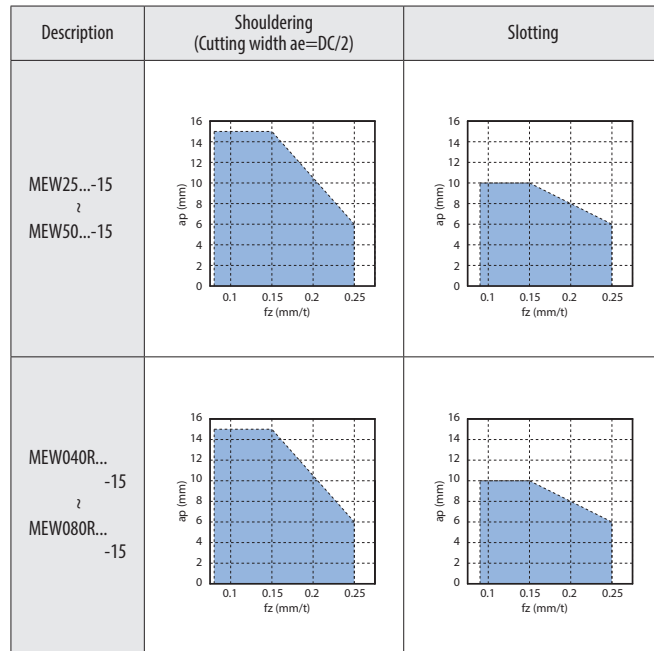
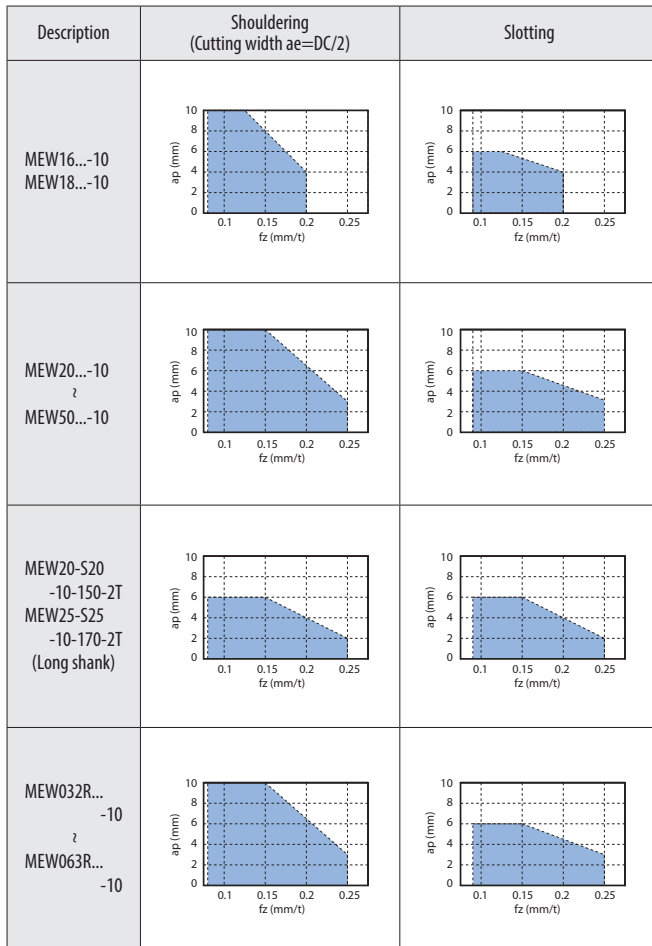
1. Available for vertical milling (plunging).
2. NOT available for ramping and helical milling, because interference between workpiece and insert may occur.

Vertical milling (Plunging)



Insert description	Max. width of cut
LOMU10 type	5mm
LOMU15 type	7mm

Cutting performance



<Cutting conditions>


- Vc=180m/min
- GM chipbreaker
- Workpiece material: S50C
- Overhang length
- 1. End mill: Same length as LH of the dimension
- 2. Face mill: LF of the dimension + minimum overhang length of the arbor



Case studies

SS400

- Construction machine part
- Vc=250m/min
- $a_{pxae}=4 \times 20\text{mm}$
- $f_z=0.14\text{mm/t}$ ($V_f=1,350\text{mm/min}$)
- Wet
- MEW32-S32-10-4T(4 flutes)
- LOMU100408ER-GM (PR1525)



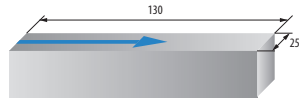
PR1525	Chip evacuation rate = 108cc/min
Competitor A (Positive cutter)	Chip evacuation rate = 72cc/min

MEW showed stable milling without chattering at higher feed, improving the machining efficiency by 150%. Burrs are prevented and excellent surface finish is achieved.

(User Evaluation)

15-5PH (42HRC)

- Aircraft part
- Vc=180m/min
- $a_{pxae}=2 \times 25\text{mm}$
- $f_z=0.1\text{mm/t}$ ($V_f=716\text{mm/min}$)
- Wet
- MEW32-S32-10-4T(4 flutes)
- LOMU100408ER-GM (PR1525)

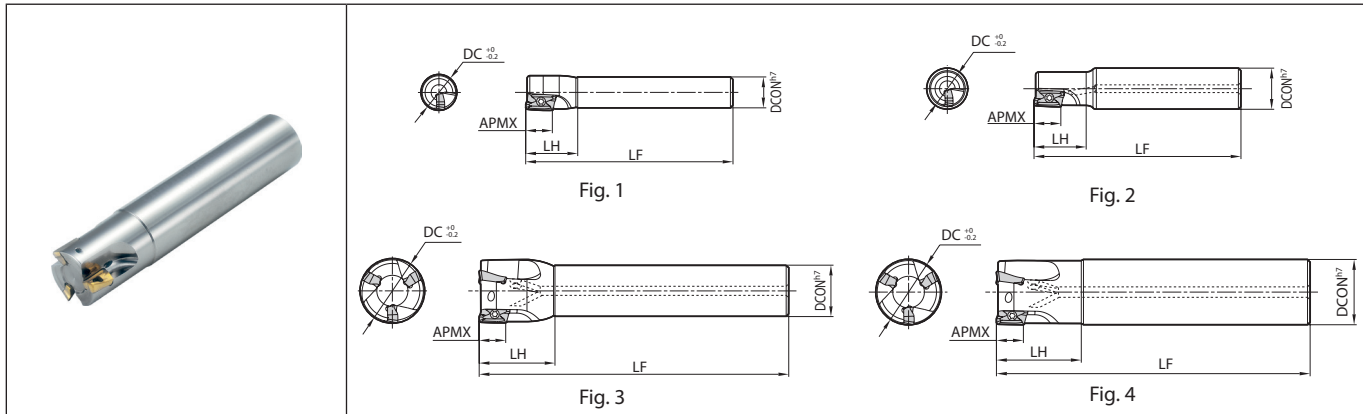


PR1525	Chip evacuation rate = 35.8cc/min (Further machining possible)
Competitor B (Positive cutter)	Chip evacuation rate = 26.8cc/min (Unable to continue machining)

No chattering and more stable milling is possible with MEW. Despite the milling difficulty because of the properties of the material (42HRC), PR1525 kept good cutting edge form, minimizing wear and adhesion.

(User evaluation)

MEC (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Spare parts			Applicable inserts ➔ M69																																																																							
			DC	DCON	LF	LH	APMX						Anti-seize compound	Screw	Wrench																																																																								
Cylindrical Standard shank MEC 10-S10-11 10-S16-11 12-S10-11 12-S12-11 12-S16-11 13-S12-11 14-S12-11 14-S16-11	●	1	10	10	17	10	10	+10	-24	No	54800	1	P-37	SB-2545TR	DTM-8	BDMT1103...																																																																							
			16	16								2																																																																											
			12	12	80							20					10	+12	-21	No	50800	1																																																																	
			16	16																		2																																																																	
			13	12	29																	10	+12	-19	No	49200	1																																																												
			14	16																							+21	-10	Yes	47700	2																																																								
			MEC 16-S12-11T 17-S16-11T 18-S16-11T 19-S16-11T 20-S16-11T 21-S20-11T 22-S20-11T 24-S20-11T 25-S20-11T 25-S20-11T-4 28-S25-11T 30-S25-11T 32-S25-11T 32-S25-11T-5 40-S32-11T 50-S32-11T	●																											2	16	12	100	10	+18	-14	No	43750	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...																																											
																																17	16							3																																															
																																18	16	110						26					10	+19	-13	No	43500	3																																					
																																19	16																	+20	-9	Yes	43000	3																																	
																																20	20	120																				29	+20	-10	Yes	42000	3																												
																																21	21																										32	130	+20	-9	Yes	41000	3																						
																																22	22																																32	130	+20	-9	Yes	40300	3																
																																24	24																																						32	130	+20	-9	Yes	39600	3										
25	25	32				130	+20	-9	Yes	38200	3																																																																												
25-S20-11T-4	25										32		130	+20	-9	Yes																37500	3																																																						
28-S25-11T	28											32					130	+20	-9	Yes	37500												3																																																						
30-S25-11T	30																																32																																												130	+20	-9	Yes	35800	3					
32-S25-11T	32				32																	130	+20	-9	Yes	34800																																																								3					
32-S25-11T-5	32																										32	130	+20	-9																																																				Yes	33900	3			
40-S32-11T	40		32	150																											+23				-8	No	30000	3																																																	
50-S32-11T	50																																					32	150		+23	-7	No	22500																																								3			
Cylindrical Same shank MEC 16-S16-11T 20-S20-11T 25-S25-11T 25-S25-11T-4 32-S32-11T 32-S32-11T-5	●																																							2					16	16	100	10	+18																																			-14	No	43750	4
																																													20	20				110	30	+20	-10																																		Yes
																																		25											25	120	32							+20	-10	Yes	37500	4																													
																																		25-S25-11T-4											25													120	32	+20	-10	Yes	37500	4																							
																																		32-S32-11T											32																			130	40	+23	-9	No	33900	4																	
																																		32-S32-11T-5											32																									130	40	+23	-9	No	33900	4											

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.




For more details, see "Warning" on page M71.

Coat Anti-seize Compound (P-37) thinly on portion of taper and thread when insert is fixed.

● : Standard item

M64

Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Spare parts			Applicable inserts ➔ M69					
			DC	DCON	LF	LH	APMX						Anti-seize compound 	Screw 	Wrench 						
Cylindrical Long shank MEC 20-S18-170-11T 20-S20-140-11T 20-S20-170-11T 22-S20-170-11T 25-S23-210-11T 25-S25-160-11T 25-S25-210-11T 28-S25-210-11T 32-S30-250-11T 32-S32-200-11T 32-S32-250-11T 35-S32-250-11T 40-S32-240-11T	●	2	18	170	30	10	+20		Yes	41000	3	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...						
	●															20	140	60	-10	39600	4
	●																				
	●		22	210	32		+22	35800	3												
	●									25	160					60	-9	33900	4		
	●		25	210	65		+23	32600	3												
	●									28	250					40	-8	30000	3		
	●		30	200	65																
	●									32	250					40					
	●		35	240	65																
	●									40											
	●		20	20	150		60	+20	41000											4	
	●									25	170					32	-10	37500	4		
	●		30	180	32		+21	34800	3												
	●									32	200					65	-9	33900	4		
●	4																				
●							5														

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
For more details, see „Warning“ on page M71.

● : Standard item

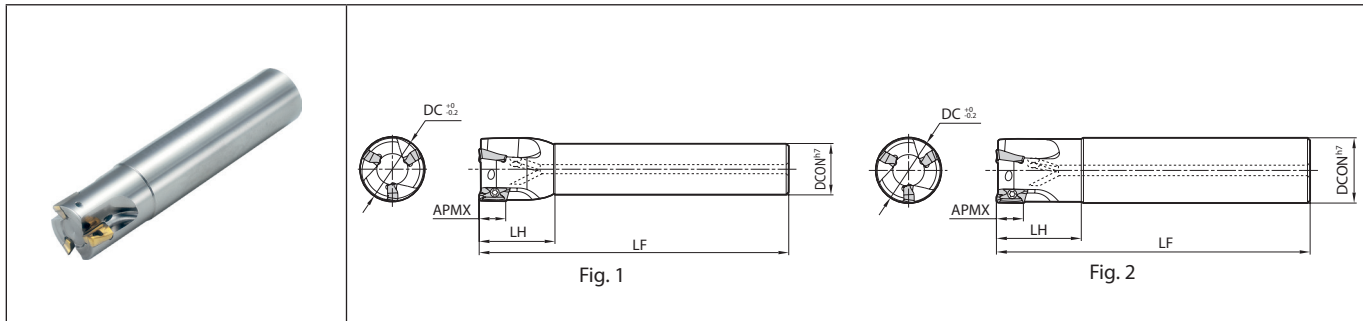
M



Milling

M65

MEC (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Spare parts			Applicable inserts ➔ M69			
			DC	DCON	LF	LH	APMX						Anti-seize compound	Screw	Wrench				
			✎			✎							✎	✎	✎				
Cylindrical	Standard shank	MEC	25-S20-17	●	2	25	20	120	36	15.7	+16	-11	Yes	35000	1	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
			32-S25-17	●	3	32	25	130	40	15.7	+17	-7	Yes	30000	1				
			40-S32-17	●	4	40	32	150	50	15.7	+19	-7	Yes	25000	1				
			50-S32-17	●	4	50	32	150	50	15.7	+19	-7	Yes	17000	1				
	Same shank	MEC	25-S25-17	●	2	25	25	120	36	15.7	+16	-11	Yes	35000	2	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
			32-S32-17	●	3	32	32	130	40	15.7	+17	-7	Yes	30000	2				
	Long shank	MEC	25-S25-160-17	●	2	25	25	160	60	15.7	+16	-11	Yes	35000	2	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
			25-S25-210-17	●				210	36										
			28-S25-210-17	●	28	210	36	15.7	+16	-11	Yes	32500	1						
			32-S32-200-17	●	2	32	200	65	15.7	+17	-7	Yes	30000	2					
			32-S32-250-17	●											250				
			35-S32-250-17	●	35	250	40	15.7	+17	-7	Yes	27700	1						
40-S32-240-17			●	40	240	65	15.7	+19	-7	Yes	25000	1							
MEC			32-S32-250-17-3	●	3	32	250	65	15.7	+17	-7	Yes	30000	2	P-37				
	40-S32-250-17-3	●	40	250												65			
	40-S32-250-17-4	●	4	40	250	64	15.7	+19	-6	Yes	25000	1							
	50-S42-250-17-4	●											50	42		64			

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

For more details, see „Warning“ on page M71.

Coat Anti-seize Compound(P-37) thinly on portion of taper and thread when insert is fixed.



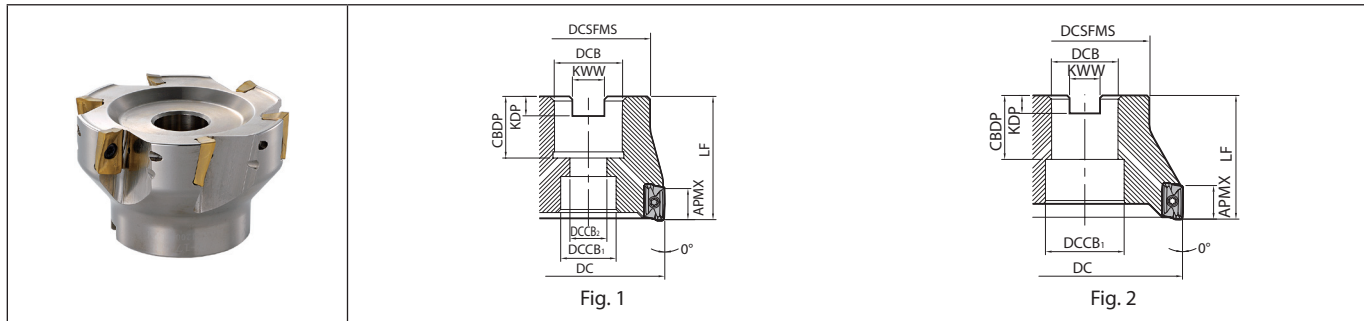
Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M66

MEC (Face mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)											A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts M69								
			R	DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CDBP	KDP	KWW	APMX							Anti-seize compound	Screw	Wrench									
Metric Coarse pitch MEC 040R-11-5T-M 050R-11-5T-M 063R-11-6T-M 080R-11-7T-M 100R-11-9T-MN 125R-11-11T-M	●	5	40	34	16	14	8.5	40	20	5.6	8.5	10	+23	-7	Yes	30000	0.2	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...									
	●	50	40	22	18	12	22		6.3	10.4	22500					0.3	1														
	●	63	40	22	18	12	22	6.3	10.4	20500	0.7					1															
	●	80	52.5	27	20	14	50	26	7	12.4	18500					1	1														
	●	100	65	32	26	17.6	55	26	8	14.4	17000					1.6	1														
	●	125	85	40	45	32	63	33	9.5	16.4	15000					3.1	1														
Metric Fine pitch MEC 032R-11-5T-M 040R-11-6T-M 080R-11-10T-M 100R-11-11T-M	●	5	32	30	16	11.5	8.5	35	20	5.6	8.4	10	+23	-7	Yes	33900	0.1	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...									
	●	40	34	14		40	20	5.6	8.4	30000	0.2					1															
	●	80	52.5	27	20	14	50	26.5	7	12.4	18500					0.9	1														
	●	110	65	32	26	17.6	55	26	8	14.4	17000					1.7	1														
Metric Coarse pitch MEC 040R-17-4T-M 050R-17-4T-M 063R-17-5T-M 080R-17-6T-M 100R-17-7T-MN 125R-17-9T-M 160R-17-12T-M	●	4	40	34	16	14	8.5	40	20	5.6	8.5	15.7	+19	-7	Yes	25000	0.3	1	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...									
	●	50	40	22	18	12	22		6.3	10.4	17000					0.4	1														
	●	63	40	22	18	12	22	6.3	10.4	14500	0.6					1															
	●	80	52.5	27	20	14	50	26	7	12.4	12000					1	1														
	●	100	65	32	26	17.6	55	26	8	14.4	10500					1.8	1														
	●	125	85	40	45	32	63	33	9.5	16.4	8900					3.1	1														
Bore dia. inch spec Coarse pitch MEC 063R-11-6T 080R-11-7T 100R-11-9TN 125R-11-11T	●	6	63	50	25.4	20	14	50	26	6	9.5	10	+23	-7	Yes	20500	0.8	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...									
	●	80	52.5	31.75		26	17.6	32	8	12.7	18500					1	1														
	●	100	65	31.75	26	17.6	63	32	8	12.7	17000					1.8	1														
	●	125	80	38.1	45	32	38	10	15.9	15000	3.4					1															
Bore dia. inch spec Fine pitch MEC 063R-11-8T 080R-11-10T	●	8	63	50	25.4	20	14	50	26	6	9.5	10	+23	-7	Yes	20500	0.8	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...									
	●	80	52.5	20		14	50	26	6	9.5	18500					1	1														
	Bore dia. inch spec Coarse pitch MEC 063R-17-5T 080R-17-6T 100R-17-7TN 125R-17-9T	●	5	63	50	25.4	20	14	50	26	6					9.5	15.7	+19					-7	Yes	14500	0.8	1	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
		●	80	52.5	31.75		26	17.6	63	32	8					12.7									12000	1	1				
●	100	65	31.75	26	17.6	63	32	8	12.7	10500	1.8	1																			
●	125	80	38.1	45	32	38	10	15.9	8900	3.4	1																				
Bore dia. inch spec Fine pitch MEC 063R-17-6T 080R-17-8T 100R-17-9TN	●	6	63	50	25.4	20	14	50	26	6	9.5	15.7	+19	-7	Yes	14500	0.8	1	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...									
	●	80	52.5	20		14	50	26	6	9.5	12000					1	1														
●	9	100	65	31.75	26	17.6	63	32	8	12.7	10500					1.8	1														

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

For more details, see „Warning“ on page M71.

Coat Anti-seize Compound (P-37) thinly on portion of taper and thread when insert is fixed.

When using center-through air/Coolant/Mist

If center through air (Coolant, Mist) is used, please use appropriate arbor and clamp with mounting bolt (Table1)

For good shoulder finishes by MEC multistage ap.

In order to obtain smooth machining wall surface by multiple passes of MEC milling cutter, please keep ap 5.5 mm or less for 11T3 type and also keep ap 9 mm or less for 1704 type.

● : Standard item

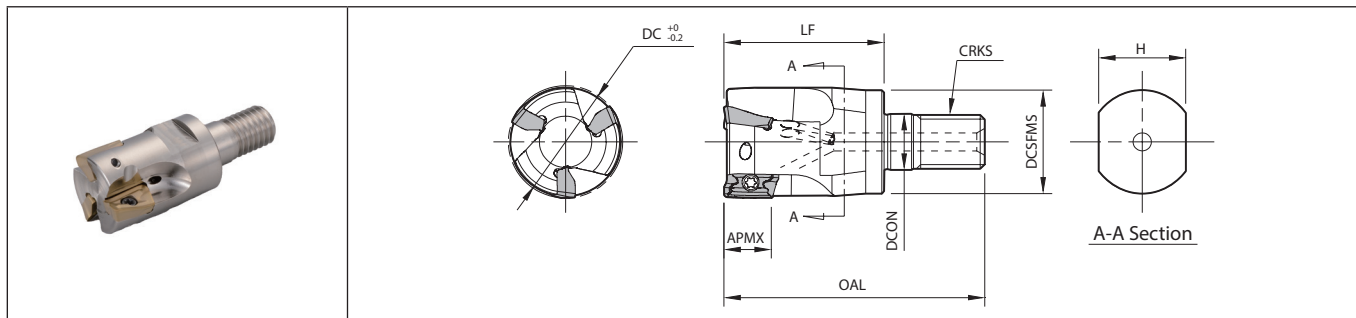
Table 1

Description	Mounting bolt (Attachment)	Wrench
MEC032R.....M	SP8X35	LW-5 (Double width 5 mm)
MEC040R.....M	HH8X25H	LW-5 (Double width 5 mm)
MEC050R.....M	HH10X30H	LW-6 (Double width 6 mm)
MEC063R.....M	HH12X35H	LW-8 (Double width 8 mm)
MEC100R.....N/M	HH16X52H	LW-12 (Double width 12 mm)
MEC125R.....	HF20X53H	LW-14 (Double width 14 mm)
MEC160R.....	HF24X60H	LW-17 (Double width 17 mm)

Wrench is not attached. Please purchase it separately.



MEC (Modular type)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)								A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Applicable inserts ● M69	
			DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H						
MEC 16-M08-11T-2T	●	2	16	8.5	14.7	42	25			M8x1.25	12	+18	-14	43750	BDGT11T3... BDMT11T3...	
MEC 20-M10-11T-2T	●	3	20	10.5	18.7	48	30			M10x1.5	15	+20	-10	41000		
MEC 20-M10-11T-3T	●		25	12.5	23	56	35	10			M12x1.75	19	+21			37500
MEC 25-M12-11T-3T	●		32	17	30	62	40				M16x2.0	24	+23	-9		33900
MEC 32-M16-11T-4T	●	4	32	17	30	62	40			M16x2.0	24	+23	-9	33900		
MEC 25-M12-17-2T	●	2	25	12.5	23	56	35	15.7		M12x1.75	19	+16	-11	35000	BDGT1704... BDMT1704...	
MEC 32-M16-17-3T	●	3	32	17	30	62	40			M16x2.0	24	+17	-7	30000		

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
For more details, see „Warning“ on page M71.
See page M60 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)



Spare parts (MEC modular type)

Description	Spare parts		
	Clamp screw	Wrench	Anti-seize compound
MEC 16-M08-11T-2T	SB-2555TRG	DTM-8	P-37
MEC 20-M10-11T-2T			
MEC 20-M10-11T-3T			
MEC 25-M12-11T-3T			
MEC 32-M16-11T-4T			
MEC 25-M12-17-2T	SB-4070TRN	DTM-15	P-37
MEC 32-M16-17-3T	Recommended tightening torque for insert clamp 3.5N-m		

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

● : Standard item

M68

BDGT/BDMT

Classification of usage			Material											Carbide					Cermets		PCD		Applicable toolholder M64~M68			
			Carbon steel / Alloy steel	Mold and die steel	Austenitic stainless steel	Martensitic stainless steel	Precipitation hardening stainless steel	Gray cast iron	Nodular cast iron	Non-ferrous metals	Heat-resistant alloy	Titanium alloy	Hard materials	CVD	DLC	PVD	-	TiN	AlN	PCD						
Insert	Description	No. of edges	Dimension (mm)							Angle (°)		Carbide					Cermets		PCD		Applicable toolholder M64~M68					
			S	D1	RE	L	INSL	LE	W1	AN	AS	C6535	PD025	PR1210	PR1225	PR1230	PR1535	GW25	TiN001	AlN001		RPD230				
	BDMT	110302ER-JT 110304ER-JT 110308ER-JT	2	3	2.8	0.2 0.4 0.8	11	-	-	6.3	15	18	●	●	●	●	●	●	●	●	●	●	●	●	MEC...-11	
	BDMT	11T302ER-JT 11T304ER-JT 11T308ER-JT 11T312ER-JT 11T316ER-JT 11T320ER-JT 11T324ER-JT 11T331ER-JT	2	3.8	2.8	0.2 0.4 0.8 1.2 1.6 2 2.4 3.1	11	-	-	6.7	13	18	●	●	●	●	●	●	●	●	●	●	●	●	MEC...-11T(...) MEC...-11-...	
	BDMT	170404ER-JT 170408ER-JT 170412ER-JT 170416ER-JT 170420ER-JT 170424ER-JT 170431ER-JT 170440ER-JT	2	4.9	4.4	0.4 0.8 1.2 1.6 2 2.4 3.1 4	17	-	-	9.6	13	18	●	●	●	●	●	●	●	●	●	●	●	●	MEC...-17(...) MEC...-17-...	
		BDMT	110302ER-JS 110304ER-JS 110308ER-JS	2	3	2.8	0.2 0.4 0.8	11	-	-	6.3	15	18	●	●	●	●	●	●	●	●	●	●	●	●	MEC...-11
		BDMT	11T302ER-JS 11T304ER-JS 11T308ER-JS	2	3.8	2.8	0.2 0.4 0.8	11	-	-	6.7	13	18	●	●	●	●	●	●	●	●	●	●	●	●	MEC...-11T(...) MEC...-11-...
		BDMT	170404ER-JS 170408ER-JS	2	4.9	4.4	0.4 0.8	17	-	-	9.6	13	18	●	●	●	●	●	●	●	●	●	●	●	●	MEC...-17(...) MEC...-17-...
		BDGT	11T302FR-JA 11T304FR-JA 11T308FR-JA	2	3.8	2.8	0.2 0.4 0.8	11	-	-	6.7	13	18	●	●	●	●	●	●	●	●	●	●	●	●	MEC...-11T(...) MEC...-11-...
		BDGT	170404FR-JA 170408FR-JA 170420FR-JA 170431FR-JA	2	4.9	4.4	0.4 0.8 2 3.1	17	-	-	9.6	13	18	●	●	●	●	●	●	●	●	●	●	●	●	MEC...-17(...) MEC...-17-...
		BDGT	11T302FR 11T304FR 11T308FR	1	3.8	2.8	0.2 0.4 0.8	-	11.5	3.8	6.7	13	18	●	●	●	●	●	●	●	●	●	●	●	●	MEC...-11T(...) MEC...-11-...
		BDGT	11T302FR-LE 11T304FR-LE 11T308FR-LE	1	3.8	2.8	0.2 0.4 0.8	-	11.5	5.2	6.7	13	18	●	●	●	●	●	●	●	●	●	●	●	●	MEC...-11T(...) MEC...-11-...
		BDMT	11T302FR 11T304FR	1	3.8	2.8	0.2 0.4	-	11	3.6	6.7	13	18	●	●	●	●	●	●	●	●	●	●	●	●	MEC...-11T(...) MEC...-11-...
		BDMT	170402FR 170404FR	1	4.9	4.4	0.2 0.4	-	17	4.4	9.6	13	18	●	●	●	●	●	●	●	●	●	●	●	●	MEC...-17(...) MEC...-17-...

Handed insert shows Right-hand

Recommended cutting conditions M70, M71

● : Standard item

CBN & PCD Inserts are sold in 1 piece boxes



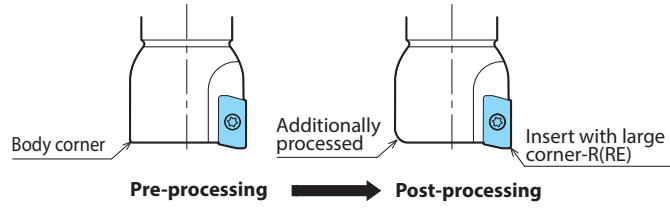
M69

When using inserts with corner-R(RE) 1.6 or larger, additional modifications of the cutter body will be necessary.
Ref. to the chart below for the recommended modifications. (Additional grind off is not necessary when corner-R(RE) is 1.2 mm or less.)

* Round-shaped additional processing is recommended.

When applying chamfer shaped additional processing, do not cut away too much.

Insert corner-R(RE) (mm)	Additional processing dimension to body corner (mm)
1.6	R1.0
2.0	
2.4	R1.2
3.1	R1.6
4.0	R2.5



Recommended cutting conditions

JT chipbreaker

Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)				
	Toolholder description		Cermet	MEGACOAT NANO	MEGACOAT		CVD coated carbide
	MEC10~MEC19	MEC20~MEC40 MEC032R~MEC160R	TN100M	PR1535	PR1225	PR1210	CA6535
Carbon steel	0.06 ~ 0.1 ~ 0.15	0.08 ~ 0.15 ~ 0.25	☆ 120 ~ 160 ~ 200	☆ 120 ~ 180 ~ 250	★ 120 ~ 180 ~ 250	-	-
Alloy steel	0.06 ~ 0.1 ~ 0.12	0.08 ~ 0.15 ~ 0.2	☆ 100 ~ 140 ~ 180	☆ 100 ~ 160 ~ 220	★ 100 ~ 160 ~ 220	-	-
Mold steel	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.12 ~ 0.2	☆ 80 ~ 120 ~ 150	☆ 80 ~ 140 ~ 180	★ 80 ~ 140 ~ 180	-	-
Stainless steel (Austenitic related)	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.12 ~ 0.15	-	☆ 100 ~ 160 ~ 200	☆ 100 ~ 160 ~ 200	-	-
Stainless steel (Martensitic related)	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.12 ~ 0.2	-	☆ 150 ~ 200 ~ 250	-	-	★ 180 ~ 240 ~ 300
Stainless steel (Precipitation hardening)	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.12 ~ 0.2	-	★ 90 ~ 120 ~ 150	-	-	-
Gray cast iron	0.06 ~ 0.1 ~ 0.15	0.08 ~ 0.18 ~ 0.25	-	-	-	★ 120 ~ 180 ~ 250	-
Nodular cast iron	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.15 ~ 0.2	-	-	-	★ 100 ~ 150 ~ 200	-
Ni-base heat-resistant alloys	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.12 ~ 0.15	-	☆ 20 ~ 30 ~ 50	-	-	★ 20 ~ 30 ~ 50
Titanium alloys	0.06 ~ 0.08 ~ 0.1	0.08 ~ 0.15 ~ 0.2	-	☆ 40 ~ 60 ~ 80	-	☆ 30 ~ 50 ~ 70	-

* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

★: 1st Recommendation ☆: 2nd Recommendation

M

Milling

Cutting edge angle 45°~70°

Cutting edge angle 75°

Cutting edge angle 88°/90°

Cutter for Finishing

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others

JS chipbreaker

Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)			
	Toolholder description		MEGACOAT NANO	MEGACOAT		CVD coated carbide
	MEC10~MEC19	MEC20~MEC40 MEC032R~MEC160R	PR1535	PR1225	PR1210	CA6535
Carbon steel	0.06~ 0.1 ~0.12	0.08~ 0.15 ~0.18	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-
Alloy steel	0.06~ 0.08 ~0.1	0.08~ 0.12 ~0.15	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-
Mold steel	0.06~ 0.08 ~0.1	0.08~ 0.1 ~0.12	☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-
Stainless steel (Austenitic related)	0.06~ 0.08 ~0.1	0.08~ 0.1 ~0.12	★ 100~ 160 ~200	☆ 100~ 160 ~200	-	-
Stainless steel (Martensitic related)	0.06~ 0.08 ~0.1	0.08~ 0.1 ~0.12	☆ 150~ 200 ~250	-	-	★ 180~ 240 ~300
Stainless steel (Precipitation hardening)	0.06~ 0.08 ~0.1	0.08~ 0.1 ~0.12	☆ 90~ 120 ~150	-	-	-
Ni-base heat-resistant alloys	0.06~ 0.08 ~0.1	0.08~ 0.1 ~0.12	☆ 20~ 30 ~50	-	-	★ 20~ 30 ~50
Titanium alloys	0.06~ 0.08 ~0.1	0.08~ 0.1 ~0.12	★ 40~ 60 ~80	-	-	-

* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

★ : 1st Recommendation ☆: 2nd Recommendation

JA chipbreaker

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)	
		DLC coated carbide	Carbide
		PDL025	GW25
Aluminum alloys (Si 13% or less)	0.05~0.3	200~1,000	200~800
Aluminum alloys (Si 13% and over)	0.05~0.2	200~300	200~300

PCD

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)	
		PCD	
		KPD230 (KPD001)	
Aluminum alloys (Si 13% or less)	0.05~0.2	500~1,500	
Aluminum alloys (Si 13% and over)	0.05~0.15	300~1,000	

Warning

Please observe below precautions fully. Failure to observe the precautions may cause serious damage to human body.

Warning about Max. Revolution indicated on main body

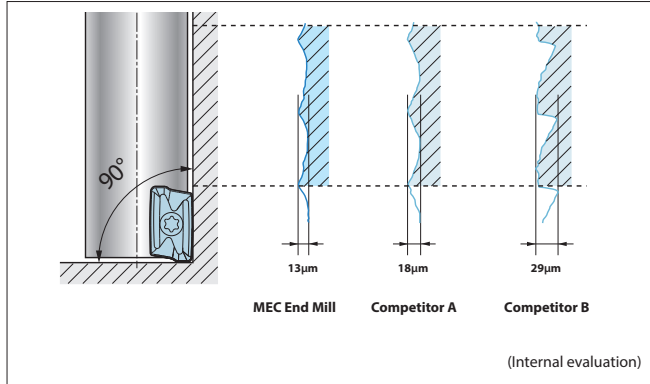
- Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter or the body may be damaged even under no load.
- For actual practical revolution, please set within recommended cutting condition.
- When using at a higher revolution (over 10,000min⁻¹), refer to the table to adjust the balance of MEC and suitable arbor.

Revolution (min ⁻¹)	Balance quality grade G ISO 1940-1/8821 (JIS B9905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5



Features of MEC

Good squareness
Cutting Surface Comparison



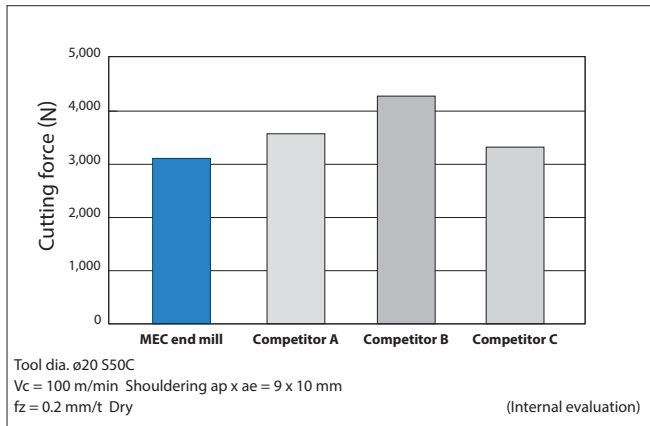
Cutting performance of mec end mill

1. Cutting edge length 10mm type (Standard/Same shank with JT chipbreaker)

Cutting dia.	Description	Overhang length LPR (mm)		Shape
		Standard	Max	
ø10	MEC10-S10-11	17	-	
ø12	MEC12-S16-11	20	30	
ø16	MEC16-S16-11T	30	45	
ø20	MEC20-S20-11T	30	45	
ø25	MEC25-S25-11T	32	48	
ø32	MEC32-S32-11T	40	60	

Low cutting force

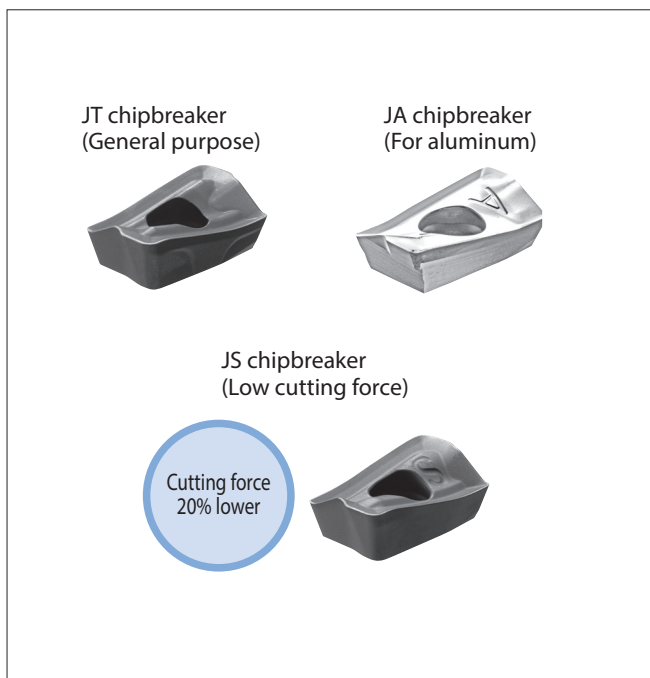
Cutting force comparison



(Vc=120m/min Workpiece material: S50C)

Description	Shouldering (Cutting width ae=DC/2)		Slotting Ramping and helical milling	
	ap (mm)	fz (mm/t)	ap (mm)	fz (mm/t)
MEC10-S10-11				
MEC12-S16-11				
MEC16-S16-11T				
MEC20-S20-11T				
MEC25-S25-11T				
MEC32-S32-11T				

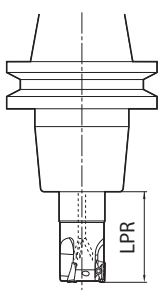
Chipbreaker



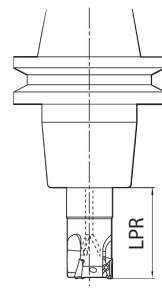
Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

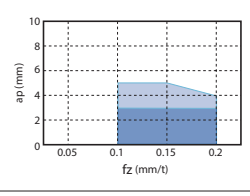
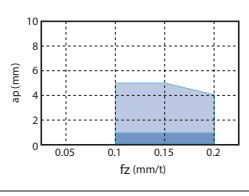
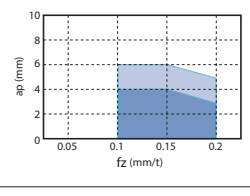
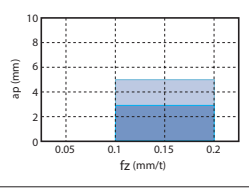
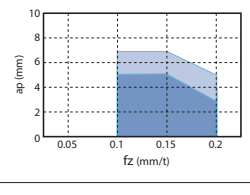
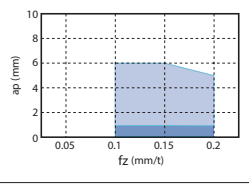
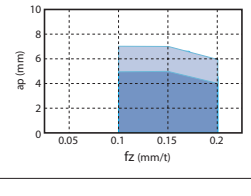
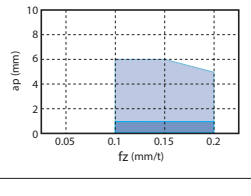
2. Cutting edge length 10 mm type (Long shank with JT chipbreaker)

Cutting dia.	Description	Overhang length LPR (mm)		Shape
ø20 Long shank	MEC20-S20-140-11T	60	90	
ø25 Long shank	MEC25-S25-160-11T	60	100	
ø32 Long shank	MEC32-S32-200-11T	100	130	
ø40 Long shank	MEC40-S32-240-11T	100	130	

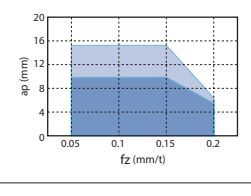
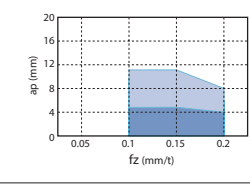
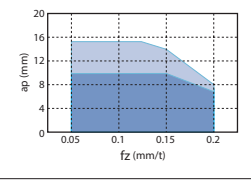
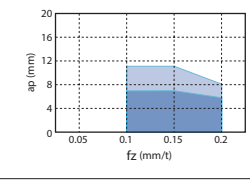
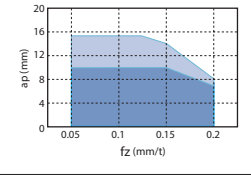
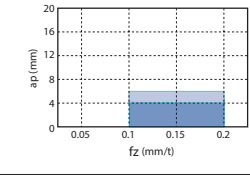
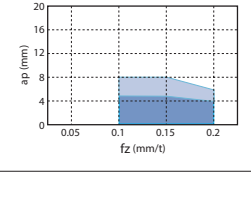
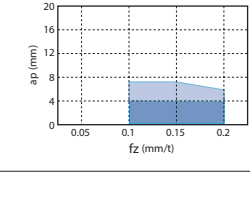
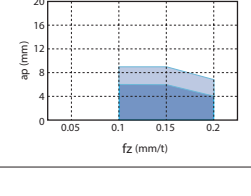
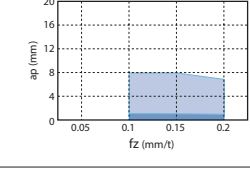
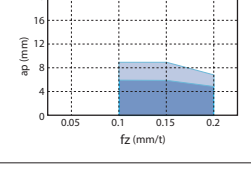
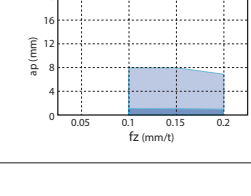
3. Cutting edge length 15.7 mm type (JT chipbreaker)

Cutting dia.	Description	Overhang length LPR (mm)		Shape
ø25	MEC25-S25-17	36	54	
ø32	MEC32-S32-17	40	60	
ø40	MEC40-S32-17	50	75	
ø25 Long shank	MEC25-S25-160-17	60	100	
ø32 Long shank	MEC32-S32-200-17	100	130	
ø40 Long shank	MEC40-S32-240-17	100	130	

(Vc = 120 m/min Workpiece material: S50C)

Description	Shouldering Cutting width ae = DC/2		Slotting Ramping and helical milling	
	ap (mm)		ap (mm)	
MEC20-S20-140-11T Long shank				
MEC25-S25-160-11T Long shank				
MEC32-S32-200-11T Long shank				
MEC40-S32-240-11T Long shank				

(Vc = 120 m/min Workpiece material: S50C)

Description	Shouldering Cutting width ae = DC/2		Slotting Ramping and helical milling	
	ap (mm)		ap (mm)	
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				



Milling

Cutting performance of MEC face mill

Cutting edge length 10 mm type (JT chipbreaker)

(Vc = 120 m/min Workpiece material: S50C)

Cutting dia.	Description	Overhang length LPR (mm)
ø32	MEC032R-11-5T-M	110
ø40	MEC040R-11-T-OM	115
ø50	MEC050R-11-OT-M	100
ø63	MEC063R-11-OT	95
	MEC063R-11-OT-M	
ø80	MEC080R-11-OT	95
	MEC080R-11-OT-M	
ø100	MEC100R-11-9TN	108
	MEC100R-11-9T-MN	
ø125	MEC125R-11-11T	
	MEC125R-11-11T-M	

Shape

Description	Shouldering (Cutting width $a_e=DC/2$)	Slotting
MEC040R-11-OT-M		
MEC050R-11-OT-M ? MEC100R-11-9TN(-MN)		
MEC125R-11-11T(-M)		

Cutting edge length 15.7 mm type (JT chipbreaker)

(Vc = 120 m/min Workpiece material: S50C)

Cutting dia.	Description	Overhang length LPR (mm)
ø40	MEC040R-17-4T-M	115
ø50	MEC050R-17-OT-M	100
ø63	MEC063R-17-OT	95
	MEC063R-17-OT-M	
ø80	MEC080R-17-OT	95
	MEC080R-17-OT-M	
ø100	MEC100R-17-OTN	108
	MEC100R-17-OT-MN	
ø125	MEC125R-17-9T	
	MEC125R-17-9T-M	
ø160	MEC160R-17-12T	
	MEC160R-17-12T-M	

Shape

Description	Shouldering (Cutting width $a_e=DC/2$)	Slotting
MEC040R-17-4T-M		
MEC050R-17-OT-M		
MEC063R-17-OT(-M) ? MEC100R-17-OTN(-MN)		
MEC125R-17-9T(-M) MEC160R-17-12T(-M)		

M

Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Ramping, helical milling and vertical milling (Plunging)

Ramping/Helical milling			
Ramping angle is recommended under RMPX. Refer to each tool's cutting performance list for sinking depth per revolution when helical milling. Use compressed air when during machining.	Cutting dia.	Applicable inserts	Max. ramping angle (RMPX)
	ø16~ø18	BDMT11T3 type BDGT11T3 type	3°
	ø19~ø21		5°
	ø22~ø25		2.5°
	ø28~ø32		1.5°
	ø40	BDMT1704 type BDGT1704 type	0.7°
	ø50 and over		Not recommended
	ø25		8°
	ø32		5°
	ø40	2.5°	
ø50 and over	Not recommended		

BDMT1103 type is not recommended for ramping and helical milling.

Vertical milling (Plunging)		
Cutting dia.	Applicable inserts	Max. width of cut (ae)
ø16 ~ ø19	BDMT11T3 type BDGT11T3 type	1.5 mm
ø20 ~ ø160	BDMT11T3 type BDGT11T3 type	5 mm
ø25 ~ ø160	BDMT1704 type BDGT1704 type	8 mm

BDMT1103 type is not recommended for vertical milling (plunging).

Guidance of minimum cutting dia. by helical milling

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

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

Case studies

RC55 (Pre-hardened Tool Steel)	
<ul style="list-style-type: none"> • Test piece (54~56HRC) • Vc = 50 m/min (n = 800 min⁻¹) • ap x ae = 2 x 14 mm • fz = 0.125 mm/t (Vf = 300 mm/min) • Dry • MEC20-S20-11T • 3 flutes • BDMT11T308ER-JT 	
MEC	Chip removal amount = 71.3cm ³ (Further machining possible)
Competitor's end mill A	Chip removal amount = 2.9 cm ³ (Chipping occurred)
<small>Competitor's end mill A (ø25 (2 flutes) Vc = 40 m/min fz = 0.075 mm/t ap x ae = 2 x 3 mm) had chipping occurred in 10 minutes and had loud machining sound. MEC could increase the feed rate, and the cutting edge remained in extremely good condition and is still sustainable for further machining. (User evaluation)</small>	

SS400	
<ul style="list-style-type: none"> • Plate • Vc = 88 m/min (n = 1,400min⁻¹) • ap x ae = (~3) x (~5) • fz = 0.12 mm/t (Vf = 500 mm/min) • Dry • MEC20-S20-11T • 3 flutes • BDMT11T308ER-JT 	
MEC	23 pcs/edge
Competitor's end mill B	10~11 pcs/edge
<small>MEC extended the tool life for more than twice. (User evaluation)</small>	

SUS304	
<ul style="list-style-type: none"> • Plate • Vc = 125 m/min (n = 1,600 min⁻¹) • ap = 9.0 mm • fz = 0.1 mm/t (Vf = 320 mm/min) • Dry • MEC25-25-17 • 2 flutes • BDMT170408ER-JT 	
MEC	4pcs/edge or more
Competitor's end mill C	1pc/edge or less
<small>Competitor's end mill C (indexable end mill) had high cutting force and had insert breakage, but MEC had no insert breakage and was still usable for further machining after machining 4 pieces (16 points). (User evaluation)</small>	

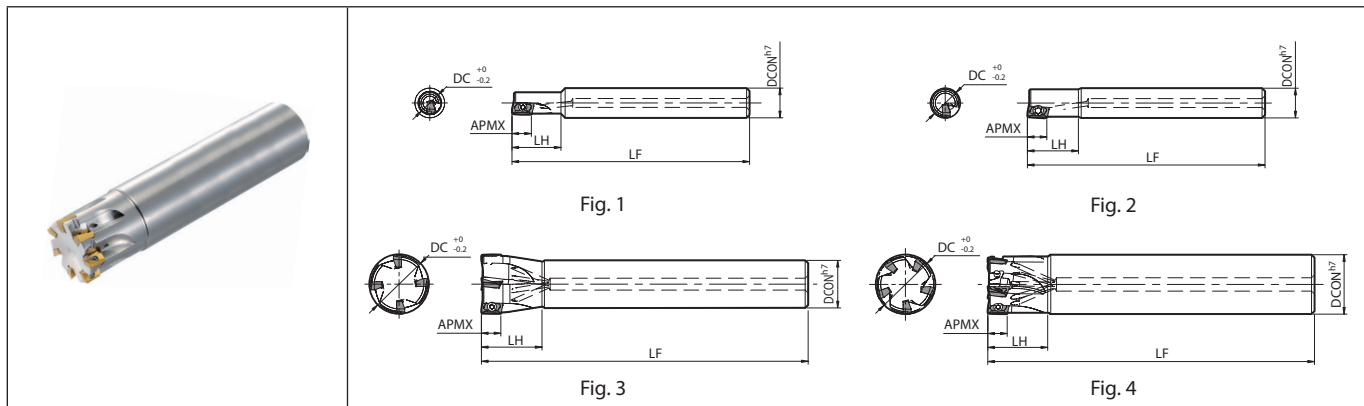
SKD61 (Hot work tool steel)	
<ul style="list-style-type: none"> • Mold • Vc = 130 m/min (n = 1,040 min⁻¹) • ap x ae = (~3) x (~5) (Varies depending on machining point) • fz = 0.18 mm/t (Vf = 936 mm/min) • Dry (Air blow) • MEC40-S32-11T + 5 flutes • BDMT11T308ER-JT 	
MEC	2 hours (Small wear: extendible)
Competitor's end mill D	2 hours (Halted due to insert breakage)
<small>MEC had better cutting performance/insert life comparing to competitor's end mill D, and the insert had only small wear and was usable for further machining after used for machining of the same duration as competitor's end mill D. Competitor's end mill D (6 flutes type) was used with Vf = 936 mm/min (fz = 0.15 mm/t). (User evaluation)</small>	

SCM420	
<ul style="list-style-type: none"> • Knuckle Steering • Vc = 150 m/min (n = 1,200 min⁻¹) • ap = 0.5~5 mm (Shouldering) • fz = 0.1 mm/t (Vf = 478 mm/min) • Dry • MEC40-S32-17 • 4 flutes • BDMT170408ER-JT 	
MEC	150 pcs/edge
Competitor's end mill E	40pcs/edge
<small>MEC had a better finished surface comparing to competitor's end mill E and also improved the tool life by more than 3 times. (User evaluation)</small>	

Ni-base heat-resistant alloys	
<ul style="list-style-type: none"> • Turbine parts • Vc = 15 m/min (n = 120 min⁻¹) • ap = 0.5 mm • fz = 0.08 mm/t (Vf = 38 mm/min) • Wet • MEC040R-17-4T-M • 4 flutes • BDMT170408ER-JS 	
MEC	9pcs/edge
Competitor's end mill F	1pc/edge or less
<small>Competitor's end mill F (Coated carbide Insert) could not finish machining of 1 workpiece, but MEC could cut 9pcs/edge and the finished surface was good. (User evaluation)</small>	



MECX (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Spare parts			Applicable inserts M78											
			DC	DCON	LF	LH	APMX						Anti-seize compound	Screw	Wrench												
			Icons			Icons																					
Standard shank Standard	MECX	08-S10-07-1T 14-S12-07-2T 17-S16-07-3T 18-S16-07-3T 20-S16-07-4T 21-S20-07-4T 25-S20-07-5T 26-S25-07-5T 33-S32-07-6T	● 1	8	10	16	6	+11.7	-24	Yes	48100	1	P-37	SB-2035TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS											
			● 2	14	12	80		18	-12.1								44800	3									
			● 3	17	16	100		20	-11								42400	3									
				18					-10.9								41600	3									
			● 4	20	20	110		25	-10.4								40200	3									
				21					-10.1								39500	3									
			● 5	25	25	120		25	-9.7								37000	3									
				26					-9.5								36500	3									
			● 6	33	32	130		30	-8.8								33100	3									
			Standard shank Fine pitch	MECX	20-S16-07-5T 25-S20-07-7T	● 5		20	16								110	20	+16.3	-10.4	Yes	40200	3	P-37	SB-2042TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
						● 7		25	20								120	25	-9.7	37000	3						
Same shank Standard	MECX	10-S10-07-1T 12-S12-07-2T 16-S16-07-3T 20-S20-07-4T 25-S25-07-5T	● 1	10	10	17	6	+12.8	-18.7	Yes	47100	2	P-37	SB-2035TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS											
			● 2	12	12	80		18	+14.3								-13.7	46200	4								
			● 3	16	16	100		20	-11.3								43200	4									
				20					-10.4								40200	4									
			● 4	20	20	110		25	-9.7								37000	4									
				25					-9.7								37000	4									
			Same shank Fine pitch	MECX	16-S16-07-4T 20-S20-07-5T 25-S25-07-7T 32-S32-07-8T	● 4		16	16								100	20	+16.3	-11.3	Yes	43200	4	P-37	SB-2042TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
						● 5		20	20								110	25	-10.4	40200	4						
						● 7		25	25								120	25	-9.7	37000	4						
								32											-8.9	33600	4						
Long shank Standard	MECX	17-S16-130-07-3T 21-S20-140-07-4T 26-S25-160-07-5T	● 3	17	16	130	20	+16.3	-11	Yes	42400	3	P-37	SB-2042TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS											
			● 4	21	20	140	25	-10.1	39500	3																	
			● 5	26	25	160	25	-9.5	36500	3																	

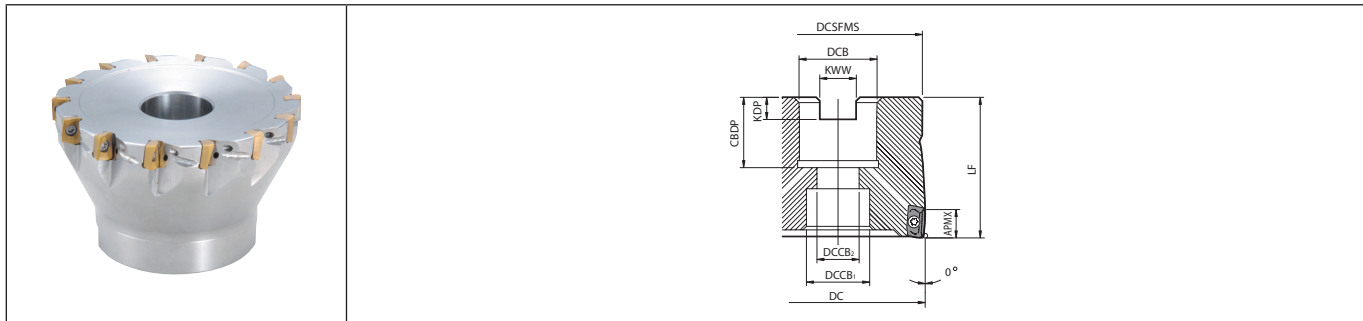
For good shoulder finishes by MECX multistage ap.
 In order to obtain smooth machining wall surface by MECX multistage ap set ap within 5mm for each cut.
 Coat Anti-seize Compound(P-37) thinly on portion of taper and thread when insert is fixed.

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
 For more details, see „Warning“ on page M79.

● : Standard item

M76

MECX (Face mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)										A.R. MAX. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Spare parts			Applicable inserts M78
			R	DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KWP	KWW						APMX	Anti-seize compound	Screw	
MECX 032R-07-8T-M	●	8	32	30	16	14	8.5	40	20	5.5	8.5	6	+7	-8.9	Yes	33600	0.15	P-37	SB-2042TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
MECX 040R-07-10T-M	●	10	40	38	22	18	12	40	22	6.3	10.4	6	+7	-8.4	Yes	30500	0.25	P-37	SB-2042TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS

For good shoulder finishes by MECX multistage ap.

In order to obtain smooth machining wall surface by MECX multistage ap set ap within 5mm for each cut.

Coat Anti-seize Compound (P-37) thinly on portion of taper and thread when insert is fixed.

MECX032R comes with mounting bolt (HH8X25H) and MECX040R comes with mounting bolt (HH10X30H).

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.


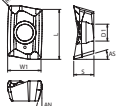

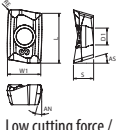
For more details, see „Warning“ on page M79.

● : Standard item



Milling

BDMT

<p>Classification of usage</p> <p>★: Roughing / 1st Choice ☆: Roughing / 2nd Choice ■: Finishing / 1st Choice □: Finishing / 2nd Choice (In case hardness is 45HRC or under)</p>		Carbon steel / Alloy steel										★	☆	P	
		Mold and die steel										★	☆		
		Austenitic stainless steel										☆	★	M	
		Martensitic stainless steel										★	☆		
		Precipitation hardening stainless steel										★	★		
		Gray cast iron										★	★	K	
		Nodular cast iron										★	★		
		Non-ferrous metals												N	
		Heat-resistant alloy										★	★	S	
		Titanium alloy										★	★		
Hard materials											□	H			
Insert	Description	No. of edges	Dimension (mm)					Angle (°)		Carbide				Applicable toolholder ➡ M76 M77	
			S	D1	RE	L	W1	AN	AS	CVD		PVD			
	 BDMT 070302ER-JT 070304ER-JT 070308ER-JT	2	2.6	2.3	0.2 0.4 0.8	6.7	4.6	15	16	●	●	●	●	●	MECX...-07...
	 BDMT 070302ER-JS 070304ER-JS 070308ER-JS <small>Low cutting force / Stainless steel</small>	2	2.6	2.3	0.2 0.4 0.8	6.7	4.6	15	16	●	●	●	●	●	MECX...-07...

Handed insert shows Right-hand

Recommended cutting conditions ➡ M79

M



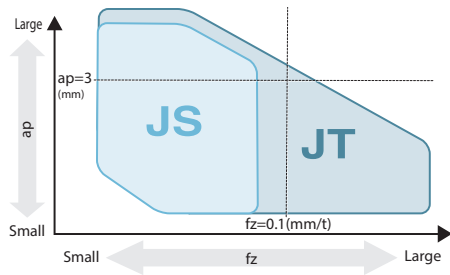
Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°**
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

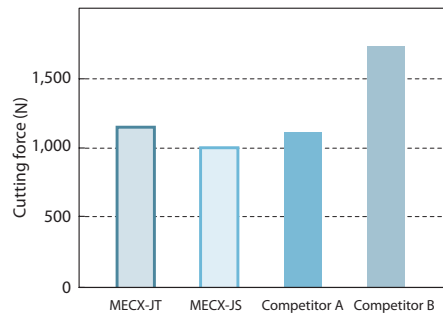
● : Standard item

M78

Chipbreaker selection



Cutting force comparison (Internal evaluation)



S45C
 $V_c = 150 \text{ m/min}$
 $a_p \times a_e = 5 \times 5 \text{ mm}$
 $f_z = 0.07 \text{ mm/t}$

! 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

- Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter or the body may be damaged even under no load.
- For actual practical revolution, please set within recommended cutting condition.
- When using at a higher revolution (over 10,000min⁻¹), refer to the table to adjust the balance of MECX and suitable arbor.

Revolution (min ⁻¹)	Balance quality grade G ISO 1940-1/8821 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

Recommended cutting conditions

Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)			
	JS chipbreaker	JT chipbreaker	MEGACOAT NANO	MEGACOAT		CVD coated carbide
			PR1535	PR1225	PR1210	CA6535
Carbon steel	0.04~ 0.08 ~0.1	0.06~ 0.1 ~0.12	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-
Alloy steel	0.04~ 0.06 ~0.08	0.06~ 0.08 ~0.1	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-
Mold steel	0.04~ 0.06 ~0.08	0.06~ 0.08 ~0.1	☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-
Stainless steel (Austenitic related)	0.03~ 0.04 ~0.05	0.05~ 0.06 ~0.07	★ 100~ 160 ~200	☆ 100~ 160 ~200	-	-
Stainless steel (Martensitic related)	0.03~ 0.04 ~0.05	0.05~ 0.06 ~0.1	☆ 150~ 200 ~250	-	-	★ 180~ 240 ~300
Stainless steel (Precipitation hardening)	0.03~ 0.04 ~0.05	0.05~ 0.06 ~0.1	★ 90~ 120 ~150	-	-	-
Gray cast iron	0.04~ 0.08 ~0.1	0.08~ 0.1 ~0.15	-	-	★ 120~ 180 ~250	-
Nodular cast iron	0.04~ 0.06 ~0.08	0.08~ 0.1 ~0.12	-	-	★ 100~ 150 ~200	-
Ni-base heat-resistant alloys	0.03~ 0.04 ~0.05	0.05~ 0.06 ~0.07	☆ 20~ 30 ~50	-	-	★ 20~ 30 ~50
Titanium alloys	0.04~ 0.06 ~0.08	0.08~ 0.1 ~0.12	★ 40~ 60 ~80	-	☆ 30~ 50 ~70	-

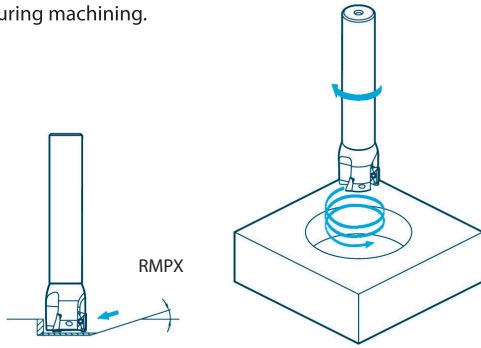
* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

★ : 1st Recommendation ☆ : 2nd Recommendation



Ramping/Helical milling

Ramping angle is recommended under RMPX.
 Refer to each tool's cutting performance list for sinking depth per revolution when helical milling.
 Use compressed air during machining.



Cutting dia.	Applicable inserts	Max. ramping angle (RMPX)
ø8	BDMT0703 type	Not recommended
ø10		1.5°
ø12,ø14		2°
ø16		3°
ø17,ø18		1.5°
ø20		2°
ø21		1.8°
ø25		1.3°
ø26		1.2°
ø32		0.8°
ø33		0.5°

Guidance of minimum cutting dia. by helical milling

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

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



Milling

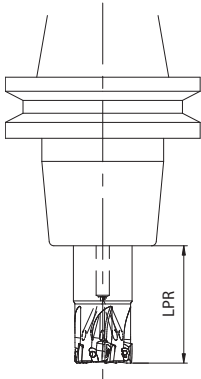
- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Cutting performance of MECX end mill

(Vc = 150 m/min Workpiece material: S50C)

Cutting dia.	Description	Overhang length LPR (mm)	
ø8	MECX08-S10-07-1T	16	-
ø10	MECX10-S10-07-1T	17	-
ø12	MECX12-S12-07-2T	18	30
ø16	MECX16-S16-07-3T	20	40
ø20	MECX20-S20-07-4T	20	40
ø25	MECX25-S25-07-5T	25	50
ø32	MECX32-S32-07-6T	30	50

Shape



- * Machining with extended Overhang length is not recommended for ø8 and ø10.
- * The cutting performance list shows applicable range of JT chipbreaker with Standard flute-number type.
- For multi-edge type, use with 70% or less of ap.
- * Cutting conditions of JS chipbreaker
- 1. For MECX08~MECX12
Decrease the feed rate by 25% according to cutting capability list.
- 2. For MECX16 and over
Decrease the feed rate and ap by 30% according to cutting capability list.

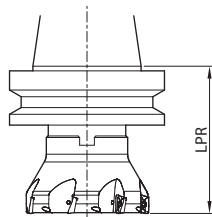
Description	Shouldering (Cutting width ae = DC/2)	Slotting Ramping and helical milling
MECX08-S10-07-1T		
MECX10-S10-07-1T		
MECX12-S12-07-2T		
MECX16-S16-07-3T		
MECX20-S20-07-4T		
MECX25-S25-07-5T		
MECX32-S32-07-6T		

Cutting performance of MECX face mill

(Vc = 150 m/min Workpiece material: S50C)

Cutting dia.	Description	Overhang length LPR (mm)
ø32	MECX032R-07-8T-M	100
ø40	MECX040R-07-10T-M	

Shape



Description	Shouldering (Cutting width ae=DC/2)
MECX032R-07-8T-M MECX040R-07-10T-M	

- * Use JT chipbreaker.
- * Slotting is not recommended.



Milling

High performance milling

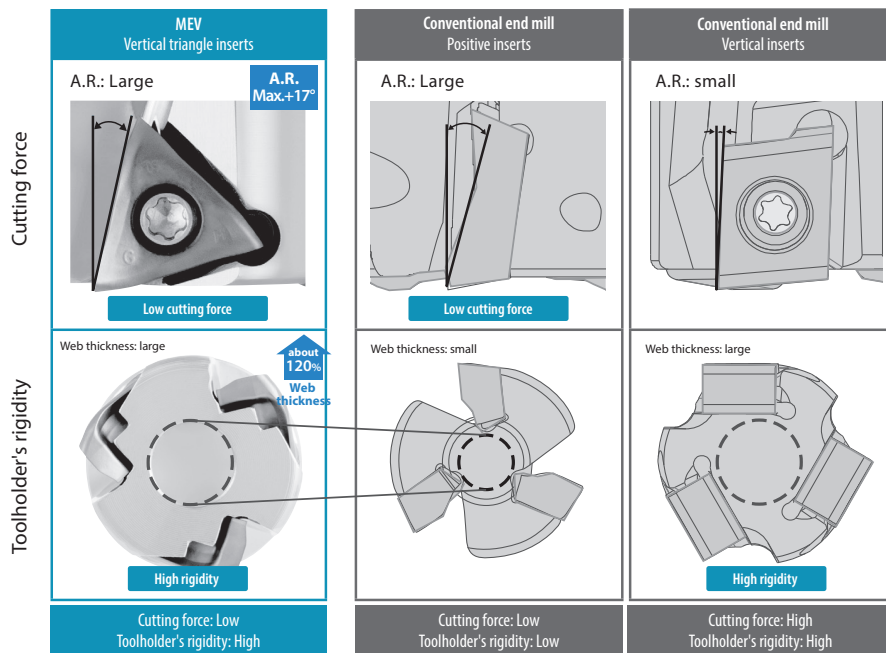
MEV

Newly developed triangular inserts providing low cutting force and increased toolholder rigidity. High performance, economical, and multi-functional milling solutions.

1 High performance: low cutting force and high rigidity

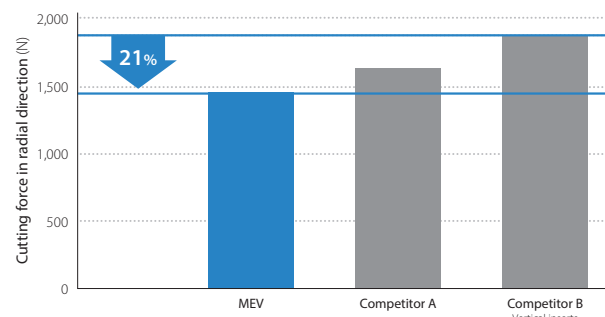
Newly developed vertical triangle inserts with 3 cutting edges achieve stable machining with reduced chattering.

MEV vs. competitor



Keeping A.R. max. at 17°, provides lower cutting force than the positive insert types of competitors

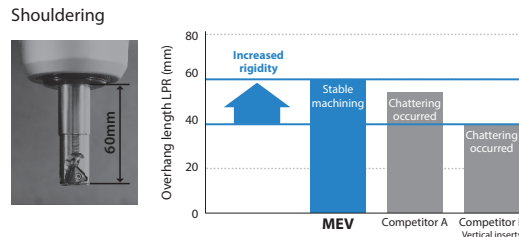
Cutting force comparison (internal evaluation)



Cutting conditions: $V_c = 200$ m/min, $a_p \times a_e = 3 \times 18$ mm, $f_z = 0.10$ mm/t, $\phi 20$ (3 inserts), Dry, workpiece material: SCM440

Low cutting force and large optimal web thickness provides excellent chattering resistance

Chattering resistance comparison (internal evaluation)



Cutting conditions: $V_c = 200$ m/min, $a_p \times a_e = 3 \times 18$ mm, $f_z = 0.10$ mm/t, $\phi 20$ (3 inserts), dry, workpiece material: SCM440

Slotting



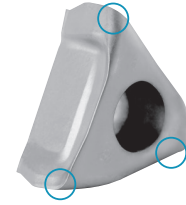
Cutting conditions: $V_c = 220$ m/min, $a_p = 3$ mm (Slotting), $f_z = 0.10$ mm/t, $\phi 20$ (3 inserts), dry, workpiece material: SCM440

M82

2 The economical choice: 3 cutting edge insert with long tool life

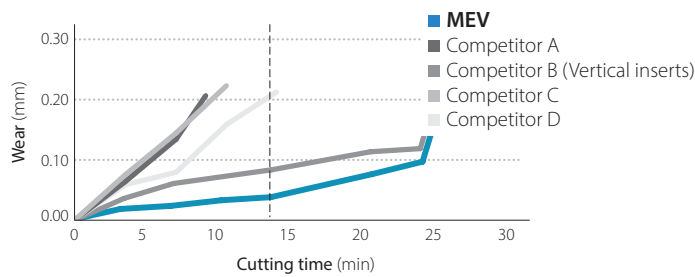
Insert

Unique triangle inserts with 3 cutting edges. PR15 series utilizes MEGACOAT NANO coating technology with excellent wear and adhesion resistance.



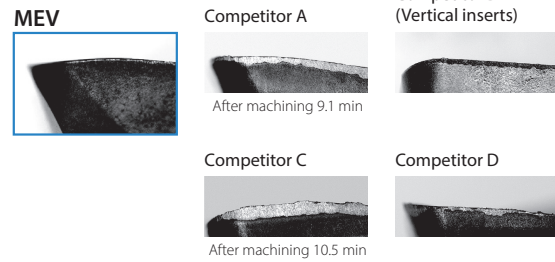
Long tool life with excellent wear resistance

Wear resistance comparison (internal evaluation)

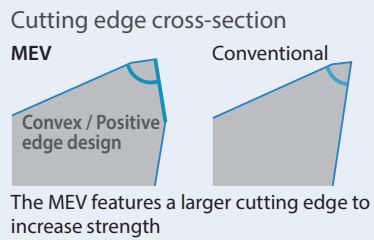
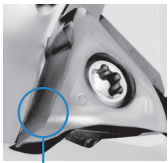


Cutting conditions: $V_c = 180$ m/min, $a_p \times a_e = 3 \times 10$ mm, $f_z = 0.1$ mm/t, $\phi 20$, dry, workpiece material: SKD11 (30~35HS)

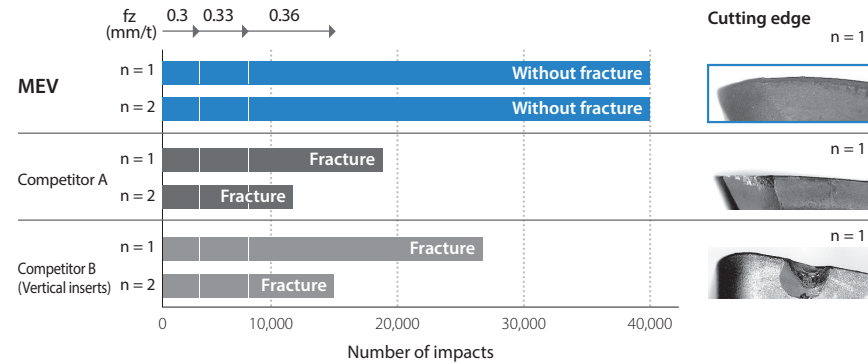
Cutting edge (after machining 14 min)



Improved stability with superior fracture resistance



Wear resistance comparison (internal evaluation)



Cutting conditions: $V_c = 120$ m/min, $a_p \times a_e = 2 \times 10$ mm, $f_z = 0.3 - 0.36$ mm/t, $\phi 20$ (1 insert), dry, workpiece material: SCM440 (37~39HS)

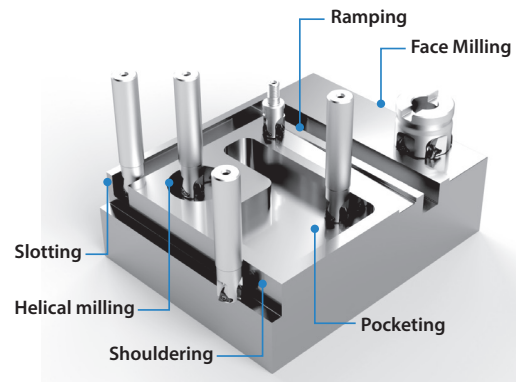
3 Multi-functional: The MEV can perform a wide variety of machining processes

Great performance in shouldering, slotting, and ramping applications (D.O.C. 6 mm or less)

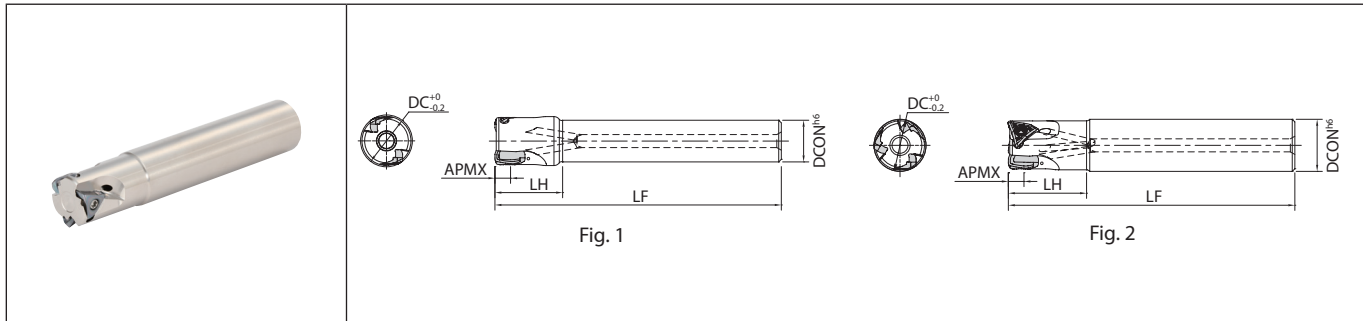
Chip example (slotting)



Cutting conditions: $V_c = 150$ m/min, $a_p = 6$ mm (Slotting), $f_z = 0.2$ mm/t, $\phi 20$ (3 insert), dry, workpiece material: SS400



MEV (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts ● M87				
			DC	DCON	LF	LH	APMX							Anti-seize compound	Screw	Wrench					
			Image			Image								Image							
Standard shank	MEV	●	2	20	16	110	26	6	+17	Yes	32000	0.2	1	P-37	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM				
			22	20			29000											0.3	1		
			3	25		120	29											25000	0.4	1	
			28				23000											0.5	1		
			4	30	25	130	32											21500	0.5	1	
			32				20000											1	1		
			5	40	150	50	16000											1	1		
			50	32	120	40	13000											0.9	1		
Cylindrical	Same shank	●	2	20	20	110	30	6	+17	Yes	32000	0.2	2	P-37	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM				
			3	25	25	120	32											25000	0.4	2	
			2	32	32	130	40											20000	0.7	2	
			3																		
			4	32	32	130	40											20000	0.7	2	
			3																		
			2	20	18	30												32000	0.3	1	
			3	20	150	40												32000	0.3	2	
Long shank	MEV	●	2	20	18	30	6	+17	Yes	32000	0.3	1	P-37	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM					
			3																		
			2	25	25	170											50	2	25000	0.6	2
			3																		
			2	32	32	200											65	2	20000	1.1	2
			3																		

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.



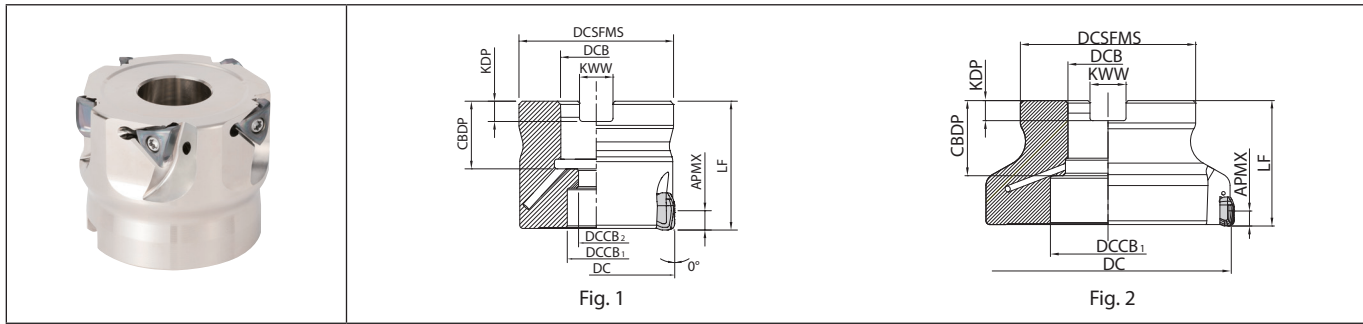
- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M84

MEV

MEV (Face mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)											A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts				Applicable inserts ➔ M87
			R	DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX							Anti-seize compound	Mounting bolt	Screw	Wrench	
MEV 032R-06-4T-M	●	4	32	30	16	13.5	9	35	19	5.6	8.4	6	+17	-36	Yes	20000	0.1	1	P-37	HH8X25	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM	
MEV 040R-06-5T-M	●	5	40	38	15	9	35	19	5.6	8.4	+16		16000			0.2	1							
MEV 050R-06-5T-M	●	5	50	48	22	18	11	40	21	6.3	10.4	6	+16	-35	Yes	13000	0.4	1	P-37	HH10X30	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM	
MEV 063R-06-6T-M	●	6	63	48	22	18	11	40	21	6.3	10.4	6	+16			10000	0.6	1						
MEV 080R-06-7T-M	●	7	80	60	27	20	13	50	24	7	12.4	6	+15	-35	Yes	7900	1.1	1	P-37	HH12X35	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM	
MEV 080R-06-7T	●	7	80	60	25.4	20	13	50	27	6	9.5	6	+15			7900	1.1	1						
MEV 100R-06-9T-M	●	9	100	70	32	46	-	50	30	8	14.4	8	+15	-35	Yes	6300	1.4	2	P-37	-	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM	
MEV 100R-06-9T	●	9	100	70	31.75	46	-	50	30	8	12.7	8	+15			6300	1.4	2						

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

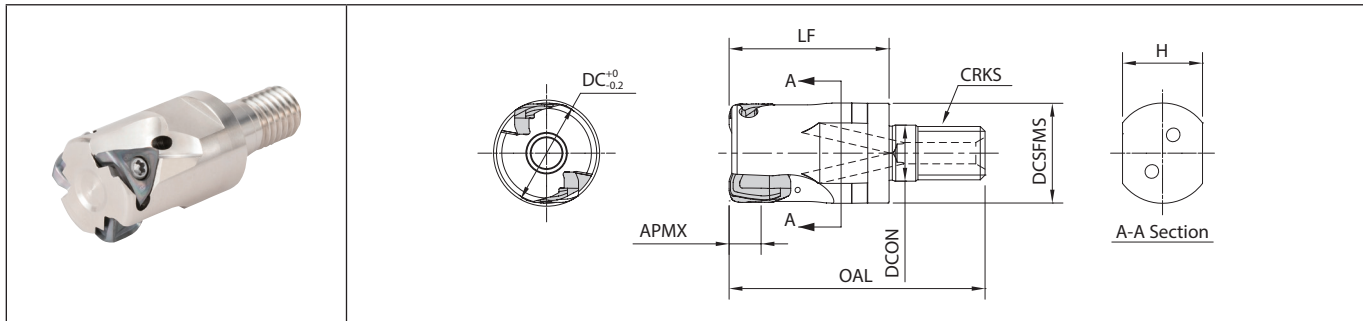
● : Standard item

M85



MEV

MEV (Modular type)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)								A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Spare parts			Applicable inserts ➔ M87		
			DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H					Anti-seize compound	Screw	Wrench			
MEV 20-M10-06-2T	●	2	20	10.5	18.7	48	30	6	M10x1.5	15	+17	-38	Yes	32000	P-37	SB-3076TRP	DTPM-10	TOMT0605...-GM TOMT0605...-SM		
20-M10-06-3T	●	3	25	12.5	23	56	35		M12x1.75	19									-37	25000
25-M12-06-3T	●	3	25	12.5	23	56	35		M12x1.75	19									-37	25000
32-M16-06-4T	●	4	32	17	30	62	40	M16x2.0	24	-36	-36	No	20000							

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

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

See page M60 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

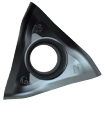
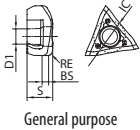
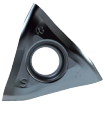
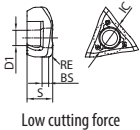
Ball-nose
Radius

Others

● : Standard item

M86

TOMT

Insert		Description	No. of edges	Dimension (mm)					Carbide			Applicable toolholder M84~M86		
				IC	S	D1	RE	BS	CVD		PVD			
									CA6535	PRI1510	PRI1525	PRI1535		
 General purpose		TOMT 060504ER-GM	3	7.2	5.7	3.4	0.4	0.8	1.9	●	●	●	●	MEV...-06-...
		TOMT 060508ER-GM								●	●	●	●	
 Low cutting force		TOMT 060508ER-SM	3	7.2	5.7	3.4	0.8	1.5	●	●	●		MEV...-06-...	

Classification of usage

★ : Roughing / 1st Choice
 ☆ : Roughing / 2nd Choice
 ■ : Finishing / 1st Choice
 □ : Finishing / 2nd Choice
 (In case hardness is 45HRC or under)

Carbon steel / Alloy steel			★	☆	P
Mold and die steel			★	☆	
Austenitic stainless steel			☆	★	M
Martensitic stainless steel	★			☆	
Precipitation hardening stainless steel				★	
Gray cast iron			★		K
Nodular cast iron			★		
Non-ferrous metals					N
Heat-resistant alloy			★	☆	S
Titanium alloy				★	
Hard materials					H

Handed insert shows Right-hand

Recommended cutting conditions M88

● : Standard item



Recommended cutting conditions

Chipbreaker	Workpiece	Feed (fz: mm/t)	Recommended insert grade (Vc: m/min)			
			MEGACOAT NANO			CVD coating
			PR1535	PR1525	PR1510	CA6535
GM	Carbon steel	0.08 – 0.15 – 0.25	120 – 180 – 250	120 – 180 – 250	–	–
	Alloy steel	0.08 – 0.15 – 0.2	100 – 160 – 220	100 – 160 – 220	–	–
	Mold steel	0.08 – 0.12 – 0.2	80 – 140 – 180	80 – 140 – 180	–	–
	Stainless steel (Austenitic related)	0.08 – 0.12 – 0.15	100 – 160 – 200	100 – 160 – 200	–	–
	Stainless steel (Martensitic related)	0.08 – 0.12 – 0.2	150 – 200 – 250	–	–	180 – 240 – 300
	Stainless steel (Precipitation hardening)	0.08 – 0.12 – 0.2	90 – 120 – 150	–	–	–
	Gray cast iron	0.08 – 0.18 – 0.25	–	120 – 180 – 250	120 – 180 – 250	–
	Nodular cast iron	0.08 – 0.15 – 0.2	–	100 – 150 – 200	100 – 150 – 200	–
	Ni-base heat-resistant alloy	0.08 – 0.12 – 0.15	20 – 30 – 50	–	–	20 – 30 – 50
	Titanium alloy	0.08 – 0.15 – 0.2	40 – 60 – 80	–	30 – 50 – 70	–
SM	Carbon steel	0.08 – 0.15 – 0.2	120 – 180 – 250	120 – 180 – 250	–	–
	Alloy steel	0.08 – 0.12 – 0.18	100 – 160 – 220	100 – 160 – 220	–	–
	Mold steel	0.08 – 0.1 – 0.15	80 – 140 – 180	80 – 140 – 180	–	–
	Stainless steel (Austenitic related)	0.08 – 0.1 – 0.15	100 – 160 – 200	100 – 160 – 200	–	–
	Stainless steel (Martensitic related)	0.08 – 0.1 – 0.15	150 – 200 – 250	–	–	180 – 240 – 300
	Stainless steel (Precipitation hardening)	0.08 – 0.1 – 0.15	90 – 120 – 150	–	–	–
	Ni-base heat-resistant alloy	0.08 – 0.1 – 0.12	20 – 30 – 50	–	–	20 – 30 – 50
	Titanium alloy	0.08 – 0.12 – 0.15	40 – 60 – 80	–	–	–

The number in **bold font** is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
 Cutting with coolant is recommended for ni-base heat resistant alloy and titanium alloy.
 Cutting with coolant is recommended to get good finished surface.

★ : 1st recommendation ☆ : 2nd recommendation

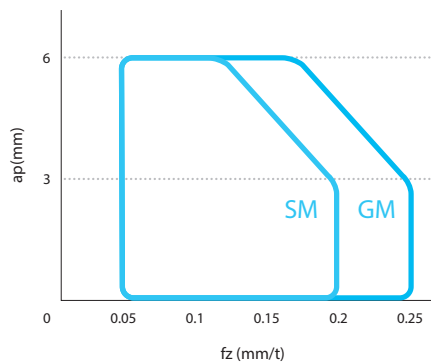


Milling

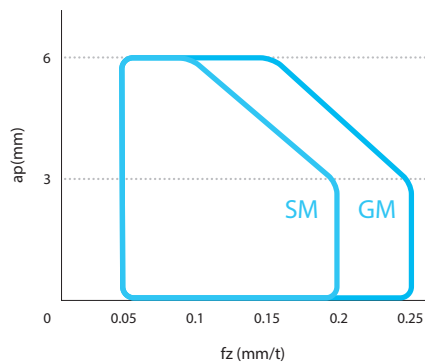
Recommended chipbreaker range

GM type for General purpose: Edge shape optimized for various machining applications
 SM type with low cutting force design: Sharp cutting and large rake angle

Shouldering



Slotting



Cutting Conditions : Vc = 150 m/min, ae = DC/2 mm, Workpiece Material : S50C

Cutting Conditions : Vc = 150 m/min, ae = DC mm, Workpiece Material : S50C

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Reference data for Ramping

Description	Cutter Dia. DC (mm)	20	22	25	28	30	32	40	50
MEV...-06-...	Max. Ramping Angle RMPX	1.00°	0.80°	0.65°	0.60°	0.55°	0.50°	0.40°	0.30°
	tan RMPX	0.017	0.014	0.011	0.010	0.010	0.009	0.007	0.005

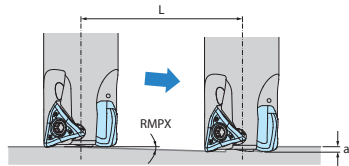
Decrease ramping angle if chips become excessively long.

Guide for Ramping (Slant Milling)

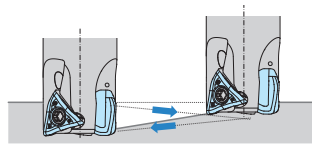
Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length "L" at Max. ramping angle

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



For two-way ramping, the ramping angle should be half of RMPX.

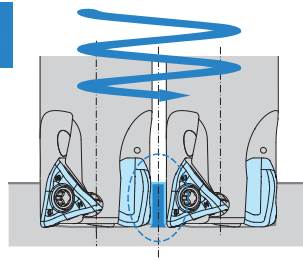


Guide for Helical milling

For helical milling, use between Min. cutting dia. and Max. cutting dia.

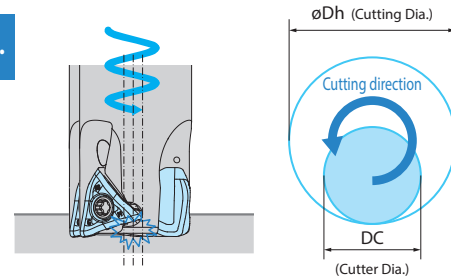
Exceeding Max. Cutting Dia.

Center core part remains after machining



Under Min. Cutting Dia.

Center core part interferes with toolholder

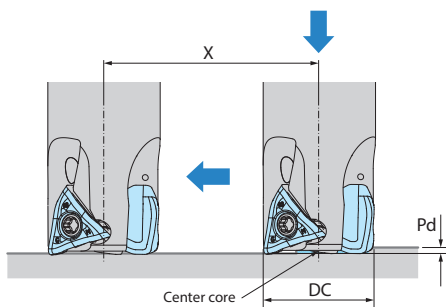


Unit : mm

Description	Min. Cutting Dia.	Max. Cutting Dia.
MEV...-06-...	2×DC-5	2×DC-2

For helical milling, use between Min. cutting dia. and Max. cutting dia. Keep machine depth (h) per rotation less than max. ap (S) in the cutter dimensions chart. Use caution to eliminate incidences caused by producing long chips.

Guide for Drilling



Unit : mm

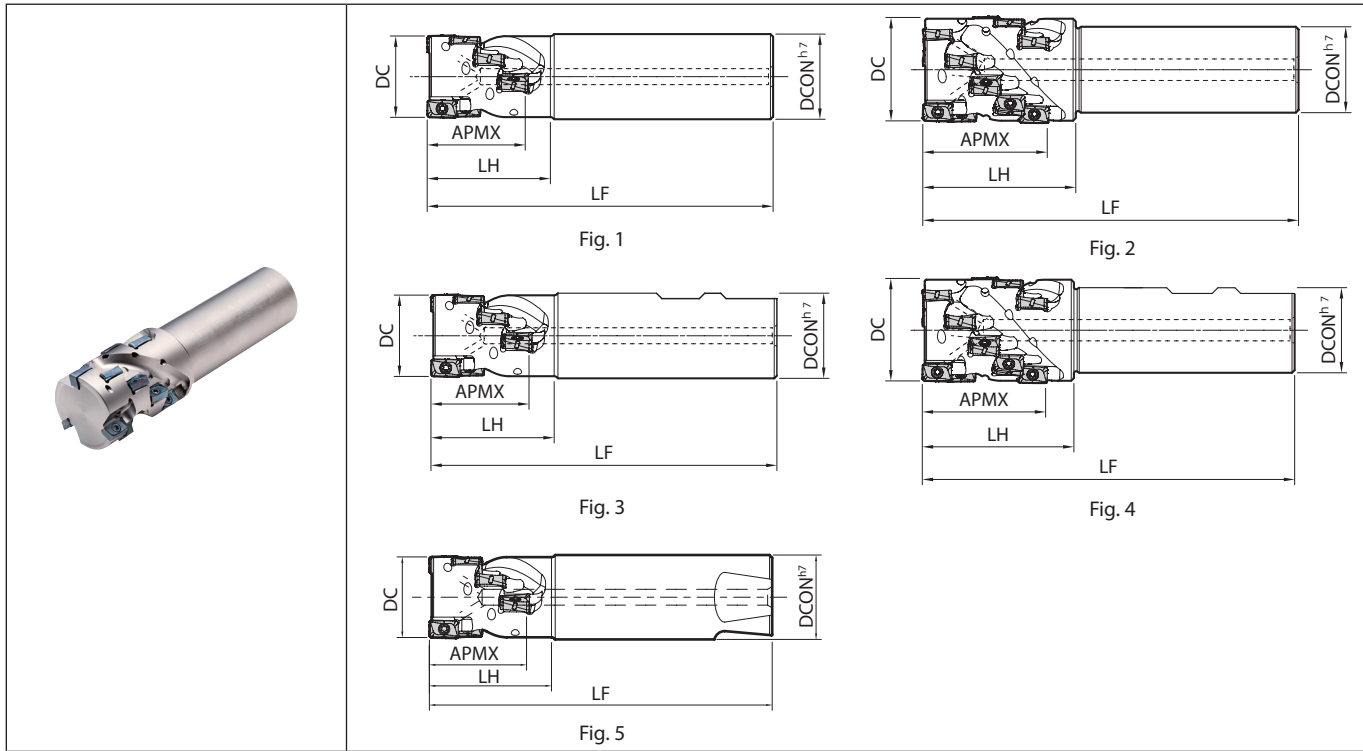
Description	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MEV...-06-...	0.25	DC-3

It is recommended to reduce feed by 25% of recommendation until the center core is removed when traversing after drilling. Axial feed rate recommendation per revolution is $f < 0.1 \text{ mm/rev}$.



Milling

MEWH (End mill)



Toolholder dimensions

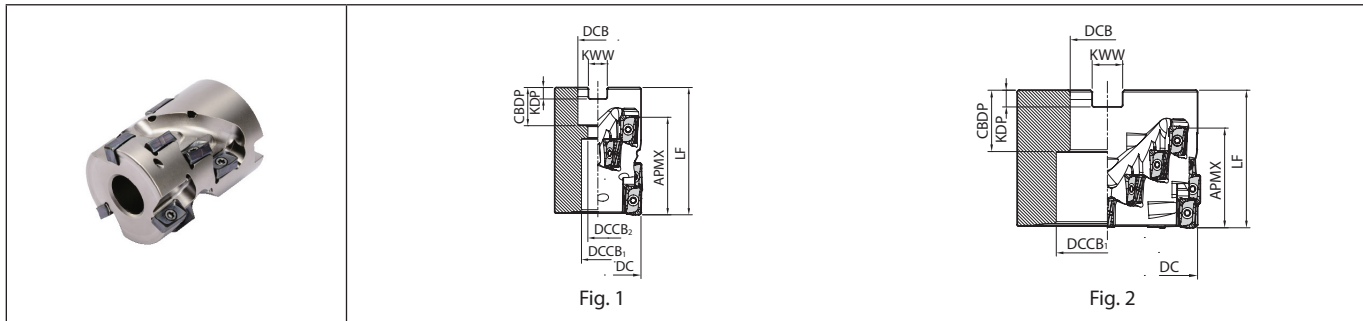
Description	Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts ➔ M92 M59
					DC	DCON	LF	LH	APMX					Anti-seize compound	Screw	Wrench	
MEWH 025-S25-10-3-2T 032-S32-10-4-2T 040-S32-10-5-2T 040-S32-10-5-3T	●	6	2	3	25	25	120	37	28	+13	-20	Yes	1	P-37	SB-3065TRP	DTPM-8	LOMU1004...
	●	8	2	4	32		130	46	37								
	●	10	2	5	40	32	140	57	46								
	●	15	3	5	40		140	57	46								
MEWH 040-S32-15-4-2T 050-S42-15-4-2T 050-S42-15-4-3T	●	8	2	4	40	32				+13	-20	Yes	2	P-37	SB-4090TRP	DTPM-15	LOMU1505...
	●	12	3	4	50	42	160	63	53								
	●	12	3	4	50	42	160	63	53								
MEWH 025-W25-10-3-2T 032-W32-10-4-2T 040-W32-10-5-2T 040-W32-10-5-3T	●	6	2	3	25	25	95	37	28	+13	-20	Yes	3	P-37	SB-3065TRP	DTPM-8	LOMU1004...
	●	8	2	4	32		108	46	37								
	●	10	2	5	40	32	119	57	46								
	●	15	3	5	40		119	57	46								
MEWH 040-W32-15-4-2T 050-W40-15-4-2T 050-W40-15-4-3T	●	8	2	4	40	32	125			+13	-20	Yes	4	P-37	SB-4090TRP	DTPM-15	LOMU1505...
	●	12	3	4	50	40	135	63	53								
	●	12	3	4	50	40	135	63	53								
MEWH 025S25-10-3-2TXT 032S32-10-4-2TXT	●	6	2	3	25	25	118	37	28	+13	-20	Yes	5	P-37	SB-3065TRP	DTPM-8	LOMU1004...
	●	8	2	4	32	32	133	46	37								

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
MEWH...XT Shank (X-Treme Shank) is for NIKKEN X-Treme chuck.

● : Standard item

M90

MEWH (Shell mill)



Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)										A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts				Applicable inserts ● M92 ● M59	
					R	DC	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KOP	KWW	APMX					Anti-seize compound	Mounting bolt	Screw	Wrench		
																								DC
MEWH 040R-10-4-3T-M	●	12	3	4	40	16	15	9	53	19	5.6	8.4	37	+13	-20	No	1	P-37	HH8X25	SB-3065TRP	DTPM-8	LOMU1004...		
MEWH 050R-10-5-3T-M	●	15	5	50	22	18	11	64	21	6.3	10.4	46				1	HH10X30		Recommended tightening torque for insert clamp 1.2N·m					
MEWH 050R-15-4-3T-M	●	12	3	4	50	22	18	11	70	21	6.3	10.4	53	+13	-20	No	1	P-37	HH10X30	SB-4090TRP	DTPM-15	LOMU1505...		
MEWH 063R-15-3-3T-M	●	9	3	63	27	20	13	58	24	7	12.4	41				1	HH12X35							
MEWH 080R-15-4-4T-M	●	16	4	80	32	26	18	70	28	8	14.4	53				1	HH16X45							
MEWH 100R-15-4-5T-M	●	20	5	100	40	55	-	74	33	9	16.4	53				2	-		Recommended tightening torque for insert clamp 3.5N·m					

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

Guidance of applicable inserts for MEWH

Insert location indication	Toolholder description											
	MEWH...10...						MEWH...15...					
	Corner-R(RE) (mm)						Corner-R(RE) (mm)					
Bottom inserts	0.4	0.8	1.2	1.6	2.0	0.4	0.8	1.0	1.2	1.6	2.0	
*Middle inserts	0.4 / 0.8	0.4 / 0.8	0.4 / 0.8	0.4	0.4	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6	

* For middle inserts, it is not recommended to use the insert with larger corner-R(RE) than shown in the table, because it will make finished surface uneven.

● : Standard item



LOMU

Insert		Description	Dimension (mm)						Carbide				Applicable toolholder M90 M91 M54~M57																																																																																																																																																																																																																																																							
			S	D1	RE	L	W1	BS	CVD		PVD																																																																																																																																																																																																																																																									
<p>Classification of usage</p> <p>★: Roughing / 1st Choice ☆: Roughing / 2nd Choice ■: Finishing / 1st Choice □: Finishing / 2nd Choice (In case hardness is 45HRC or under)</p> <table border="1"> <tr><td>Carbon steel / Alloy steel</td><td></td><td></td><td></td><td>★</td><td>☆</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>P</td></tr> <tr><td>Mold and die steel</td><td></td><td></td><td></td><td>★</td><td>☆</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Austenitic stainless steel</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>☆</td><td>★</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>M</td></tr> <tr><td>Martensitic stainless steel</td><td></td><td></td><td></td><td>★</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>☆</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Precipitation hardening stainless steel</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>★</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Gray cast iron</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>★</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>K</td></tr> <tr><td>Nodular cast iron</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>★</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>Non-ferrous metals</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>N</td></tr> <tr><td>Heat-resistant alloy</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>★</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>☆</td><td></td><td>S</td></tr> <tr><td>Titanium alloy</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>★</td><td></td></tr> <tr><td>Hard materials</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>★</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>H</td></tr> </table>																				Carbon steel / Alloy steel				★	☆															P	Mold and die steel				★	☆																	Austenitic stainless steel											☆	★									M	Martensitic stainless steel				★								☆										Precipitation hardening stainless steel												★										Gray cast iron												★									K	Nodular cast iron												★										Non-ferrous metals																					N	Heat-resistant alloy										★									☆		S	Titanium alloy																				★		Hard materials											★										H
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		LOMU 100404ER-GM	4	3.4	0.4			2.1	●	●	●	●	●	●	●	●	●	●	●	●	MEWH...-10-... MEWH...-10-...																																																																																																																																																																																																																																															
		LOMU 100408ER-GM			0.8			1.7	●	●	●	●	●	●	●	●	●	●	●	●		●																																																																																																																																																																																																																																														
		LOMU 100412ER-GM			1.2	10.9	6.6	1.3	●	●	●	●	●	●	●	●	●	●	●	●		●																																																																																																																																																																																																																																														
		LOMU 100416ER-GM			1.6			1	●	●	●	●	●	●	●	●	●	●	●	●		●																																																																																																																																																																																																																																														
		LOMU 100420ER-GM			2			1	●	●	●	●	●	●	●	●	●	●	●	●		●																																																																																																																																																																																																																																														
		LOMU 150504ER-GM	5.6	4.8	0.4			2.2	●	●	●	●	●	●	●	●	●	●	●	●	MEWH...-15-... MEWH...-15-...																																																																																																																																																																																																																																															
		LOMU 150508ER-GM			0.8			1.8	●	●	●	●	●	●	●	●	●	●	●	●		●																																																																																																																																																																																																																																														
		LOMU 150510ER-GM			1	15.7	9.2	1.6	●	●	●	●	●	●	●	●	●	●	●	●		●																																																																																																																																																																																																																																														
		LOMU 150512ER-GM			1.2			1.4	●	●	●	●	●	●	●	●	●	●	●	●		●																																																																																																																																																																																																																																														
		LOMU 150516ER-GM			1.6			1	●	●	●	●	●	●	●	●	●	●	●	●		●																																																																																																																																																																																																																																														
		LOMU 100408ER-SM	4	3.4	0.8	10.9	6.6	1.7	●	●	●	●	●	●	●	●	●	●	●	●	MEWH...-10-... MEWH...-10-...																																																																																																																																																																																																																																															
		LOMU 150508ER-SM	5.6	4.8	0.8	15.7	9.2	1.8	●	●	●	●	●	●	●	●	●	●	●	●	MEWH...-15-... MEWH...-15-...																																																																																																																																																																																																																																															
		LOMU 100408ER-GH	4	3.4	0.8	10.9	6.6	1.7	●	●	●	●	●	●	●	●	●	●	●	●	MEWH...-10-... MEWH...-10-...																																																																																																																																																																																																																																															
		LOMU 150508ER-GH	5.6	4.8	0.8	15.7	9.2	1.8	●	●	●	●	●	●	●	●	●	●	●	●	MEWH...-15-... MEWH...-15-...																																																																																																																																																																																																																																															

Handed insert shows Right-hand

Recommended cutting conditions M93

Milling

Cutting performance

LOMU1004 type

Cutting dia.	Description	2 flute		Description	3 flute	
		ap x ae			ap x ae	
ø25	MEWH025-S25-10-3-2T			-	-	
ø32	MEWH032-S32-10-4-2T			-	-	
ø40	MEWH040-S32-10-5-2T			MEWH040-S32-10-5-3T		

LOMU1505 type

Cutting dia.	Description	2 flute		Description	3 flute	
		ap x ae			ap x ae	
ø40	MEWH040-S32-15-4-2T			-	-	
ø50	MEWH050-S42-15-4-2T			MEWH050-S42-15-4-3T		

Cutting conditions>
 • Vc = 120 m/min
 • fz = 0.08~0.12 mm/t
 • GM chipbreaker
 • Workpiece material: SCM435
 • Overhang length
 End mill: Overhang length is "LH" of the dimension list

●: Standard item

M92

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)			
		Toolholder description	MEGACOAT NANO			CVD coated carbide
		MEWH025~MEWH050 (Helical end mill)	PR1535	PR1525	PR1510	CA6535
GM	Carbon steel	0.06~ 0.1 ~0.2	120~ [☆] 180 ~250	120~ [★] 180 ~250	-	-
	Alloy steel	0.06~ 0.1 ~0.14	100~ [☆] 160 ~220	100~ [★] 160 ~220	-	-
	Mold steel	0.06~ 0.08 ~0.12	80~ [☆] 140 ~180	80~ [★] 140 ~180	-	-
	Stainless steel (Austenitic related)	0.06~ 0.08 ~0.12	100~ [☆] 160 ~200	100~ [☆] 160 ~200	-	-
	Stainless steel (Martensitic related)	0.06~ 0.08 ~0.1	150~ [☆] 200 ~250	-	-	180~ [★] 240 ~300
	Stainless steel (Precipitation hardening)	0.06~ 0.08 ~0.1	90~ [★] 120 ~150	-	-	-
	Gray cast iron	0.06~ 0.1 ~0.17	-	-	120~ [★] 180 ~250	-
	Nodular cast iron	0.06~ 0.08 ~0.12	-	-	100~ [★] 150 ~200	-
	Ni-base heat-resistant alloys	0.06~ 0.08 ~0.1	20~ [☆] 30 ~50	-	-	20~ [★] 30 ~50
	Titanium alloys	0.06~ 0.08 ~0.12	40~ [☆] 60 ~80	-	30~ [☆] 50 ~70	-
SM	Carbon steel	0.06~ 0.1 ~0.17	120~ [☆] 180 ~250	120~ [★] 180 ~250	-	-
	Alloy steel	0.06~ 0.08 ~0.12	100~ [☆] 160 ~220	100~ [★] 160 ~220	-	-
	Mold steel	0.06~ 0.08 ~0.12	80~ [☆] 140 ~180	80~ [★] 140 ~180	-	-
	Stainless steel (Austenitic related)	0.06~ 0.08 ~0.12	100~ [★] 160 ~200	100~ [☆] 160 ~200	-	-
	Stainless steel (Martensitic related)	0.06~ 0.08 ~0.1	150~ [☆] 200 ~250	-	-	180~ [★] 240 ~300
	Stainless steel (Precipitation hardening)	0.06~ 0.08 ~0.1	90~ [☆] 120 ~150	-	-	-
	Ni-base heat-resistant alloys	0.06~ 0.08 ~0.1	20~ [☆] 30 ~50	-	-	20~ [★] 30 ~50
	Titanium alloys	0.06~ 0.08 ~0.12	40~ [★] 60 ~80	-	30~ [☆] 50 ~70	-
GH	Carbon steel	0.06~ 0.1 ~0.2	120~ [☆] 180 ~250	120~ [★] 180 ~250	-	-
	Alloy steel	0.06~ 0.1 ~0.14	100~ [☆] 160 ~220	100~ [★] 160 ~220	-	-
	Mold steel	0.06~ 0.08 ~0.12	80~ [☆] 140 ~180	80~ [★] 140 ~180	-	-
	Stainless steel (Austenitic related)	0.06~ 0.08 ~0.12	100~ [☆] 160 ~200	100~ [☆] 160 ~200	-	-
	Stainless steel (Martensitic related)	0.06~ 0.08 ~0.1	150~ [☆] 200 ~250	-	-	180~ [☆] 240 ~300
	Stainless steel (Precipitation hardening)	0.06~ 0.08 ~0.1	90~ [☆] 120 ~150	-	-	-
	Gray cast iron	0.06~ 0.1 ~0.2	-	-	120~ [☆] 180 ~250	-
	Nodular cast iron	0.06~ 0.08 ~0.15	-	-	100~ [☆] 150 ~200	-
	Ni-base heat-resistant alloys	0.06~ 0.08 ~0.1	20~ [☆] 30 ~50	-	-	20~ [☆] 30 ~50
	Titanium alloys	0.06~ 0.08 ~0.12	40~ [☆] 60 ~80	-	30~ [☆] 50 ~70	-

* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

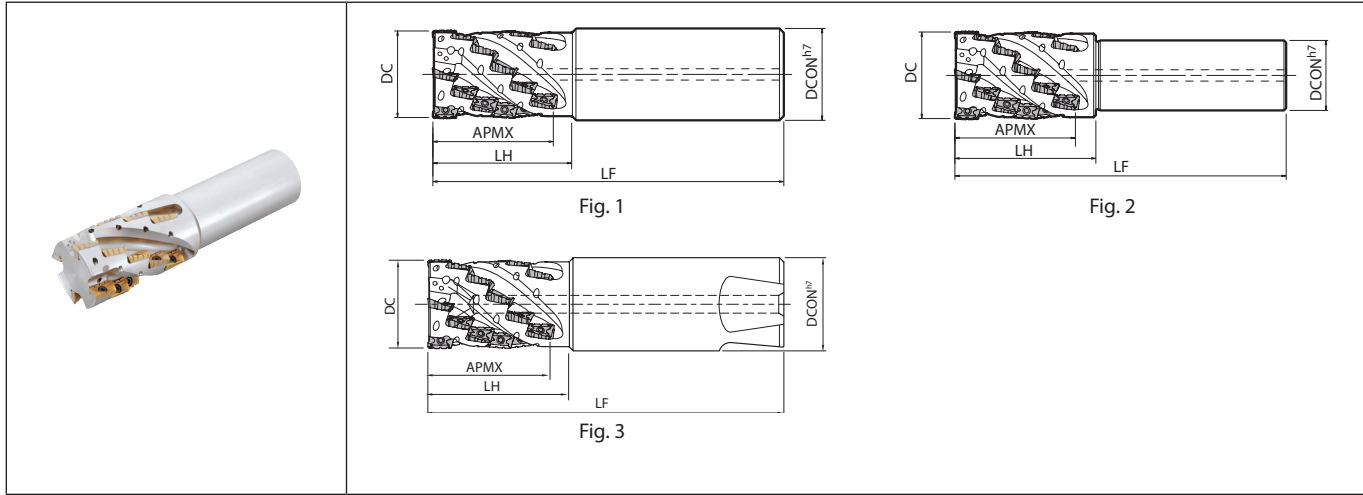
* Machining with coolant is recommended for Stainless steel, Ni-base heat-resistant alloys and titanium alloys with MEWH.

★ : 1st Recommendation

☆ : 2nd Recommendation



MECH (End mill, with coolant hole for bottom insert)



Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts ➔ M99
					DC	DCON	LF	LH	APMX					Anti-seize compound	Screw	Wrench	
MECH 025-S25-11-4-2T	●	8	2	4	25	25	120	46	37	+21	-10	1	P-37	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3	
032-S32-11-5-2T	●	10		5	32	32	140	55	46		-9						1
032-S32-11-5-4T	●	20	4	6	40	150	64	55	+23	-8	Yes	2	P-37	SB-2555TRG	DTM-8		
040-S32-11-6-4T	●	24															160
040-S42-11-6-4T	●	24	4	6	40	150	64	55	+23	-8	Yes	2	P-37	SB-2555TRG	DTM-8		
050-S42-11-7-4T	●	28															160
050-S42-11-7-6T	●	42	6	7	50	42	172	75	64	-7		2					
MECH 040-S32-17-4-2T	●	8	2	4	40	32	160	73	59	+19	-7	Yes	2	P-37	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4
040-S42-17-4-2T	●	8				42	170	73	59	+19	-7						
050-S42-17-5-4T	●	20	4	5	50	42	185	88	74	-6		2					
MECH 025S25-11-4-2TXT	●	8	2	4	25	25	127	46	37	+21	-10	Yes	3	P-37	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
032S32-11-5-2TXT	●	10															
032S32-11-5-4TXT	●	20	4									3					

For installation of notched insert, see page M100.

MECH...XT Shank (X-Treme Shank) is for NIKKEN X-Treme chuck.

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

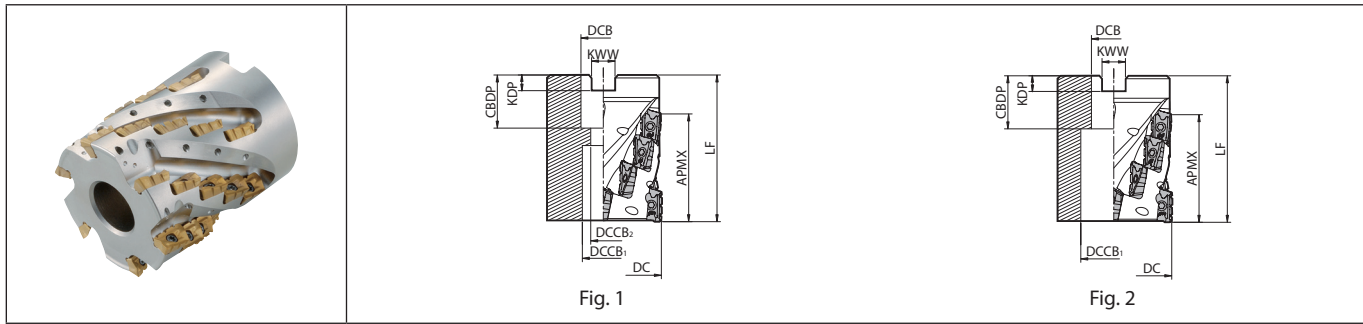


- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M94

MECH (Shell mill, without coolant hole)



Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)										A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts				Applicable inserts ➔ M99
					DC	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX	Anti-seize compound					Mounting bolt	Screw	Wrench		
MECH 040R-11-4-4T-M	●	16	4	4	40	16	15	9	50	19	5.6	8.4	37	+23	-8	No	1	P-37	HH8X25	SB-255STRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3	
MECH 050R-11-5-6T-M	●	30	6	5	50	22	18	11	63	21	6.3	10.4	46				1		HH10X30				
MECH 050R-17-2-4T-M	●	8		2	50	22	18	11	52	21	6.3	10.4	30				1		HH10X30				
MECH 050R-17-4-4T-M	●	16	4	4	50	22	18	11	78	21	6.3	10.4	59				1		HH10X40				
MECH 063R-17-3-4T-M	●	12		3	63	27	20	14	70	24	7	12.4	45	+19	-7	No	1	P-37	HH12X35	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4	
MECH 080R-17-4-6T-M	●				80	32	26	18		28	8	14.4					1		HH16X45				
MECH 100R-17-4-6T-M	●	24	6	4	100	40	56	-	85	30	9	16.4	59				2		-				
MECH 063R-17-3-4T	●	12	4	3	63	25.4	20	14	70	26	6	9.5	45	+19	-7	No	1	P-37	HH12X35	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4	
MECH 080R-17-4-6T	●				80	31.75	26	18		32	8	12.7					1		HH16X45				
MECH 100R-17-4-6T	●	24	6	4	100	38.1	56	-	85	38	10	15.9	59				2		-				

For installation of notched insert, see page M100.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

X-Treme Chuck [NIKKEN]

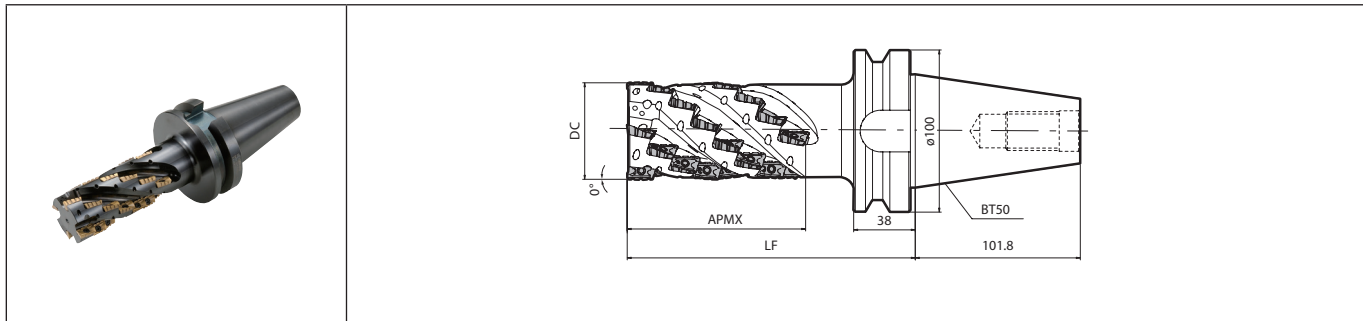
Description	See Page	Shank Dia. (DCON)	X-Treme Chuck			
			BT		HSK	
			BT40	BT50	HSK63A	HSK100A
4FR 120-260-R-XT	L15	12.0	NBT40-C12EX-86	NBT50-C12EX-96	HSK63A-C12EX-96	HSK100A-C12EX-96
160-350-R-XT		16.0	NBT40-C16EX-96	NBT50-C16EX-106	HSK63A-C16EX-101	HSK100A-C16EX-106
200-450-R-XT		20.0	NBT40-C20EX-96	NBT50-C20EX-116	HSK63A-C20EX-106	HSK100A-C20EX-116
4JER 120-260-R-XT	L21	12.0	NBT40-C12EX-86	NBT50-C12EX-96	HSK63A-C12EX-96	HSK100A-C12EX-96
160-350-R-XT		16.0	NBT40-C16EX-96	NBT50-C16EX-106	HSK63A-C16EX-101	HSK100A-C16EX-106
200-450-R-XT		20.0	NBT40-C20EX-96	NBT50-C20EX-116	HSK63A-C20EX-106	HSK100A-C20EX-116
MEWH 025S25-10-3-2TXT	M90	25.0	-	NBT50-C25EX-116	-	HSK100A-C25EX-116
032S32-10-4-2TXT		32.0	-	NBT50-C32EX-121	-	HSK100A-C32EX-121
MECH 025S25-11-4-2TXT	M94	25.0	-	NBT50-C25EX-116	-	HSK100A-C25EX-116
032S32-11-5-1TXT		32.0	-	NBT50-C32EX-121	-	HSK100A-C32EX-121

● : Standard item



Milling

MECH-BT50 (Integral Arbor type, without coolant hole)



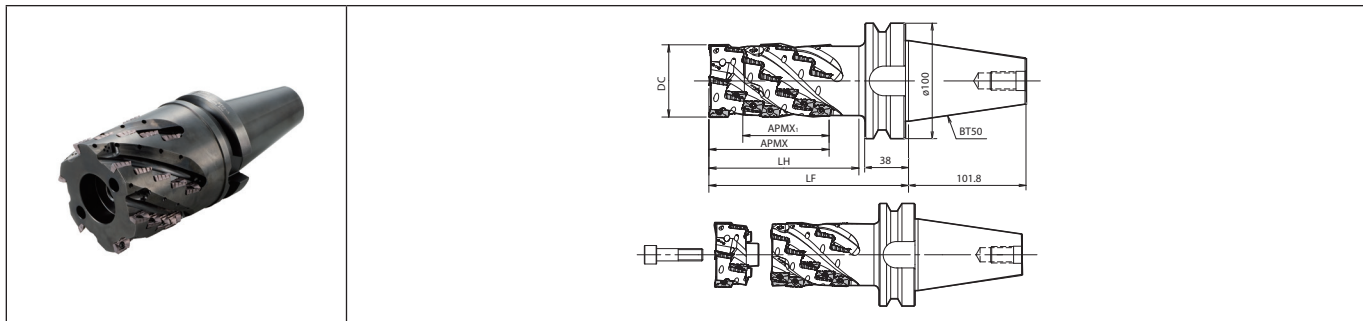
Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Spare parts			Applicable inserts ➔ M99
					DC	LF	APMX	Anti-seize compound	Screw					Wrench			
MECH 050R11-8-4T-BT50	●	32	4	8	50	143	73	+23	-7	No	4.8	P-37	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3		
MECH 050R17-7-4T-BT50	●	28	4	7	50	173	104	+19	-7	No	4.9	P-37	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4		
MECH 063R17-7-4T-BT50	●				63						5.9						
MECH 080R17-7-4T-BT50	●				80						7.8						
MECH 100R17-7-6T-BT50	●				100						10.2						

For installation of notched insert, see page **M100**.

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

MECH-BT50SA (Arbor Integral Type, without coolant hole, Base unit + 1 Front piece + Clamp bolt)



Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Spare parts					Applicable inserts ➔ M99		
					DC	LF	LH	APMX	APMX1					Anti-seize compound	Mounting bolt	Wrench (for Mounting bolt)	Screw	Wrench			
MECH 050R11-4T-BT50SA	MTO	32	4	8	50	143	99	73	55	+23	-7	No	4.8	P-37	HH12X35	LW-10	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3		
MECH 063R17-4T-BT50SA	MTO	28	4	7	63	173	130	104	75	+19	-7	No	5.8	P-37	HH12X40	LW-10	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4		
MECH 080R17-4T-BT50SA	MTO				80								7.6							HH16X40	LW-14
MECH 100R17-6T-BT50SA	MTO				100								9.8							HH20X40	LW-17

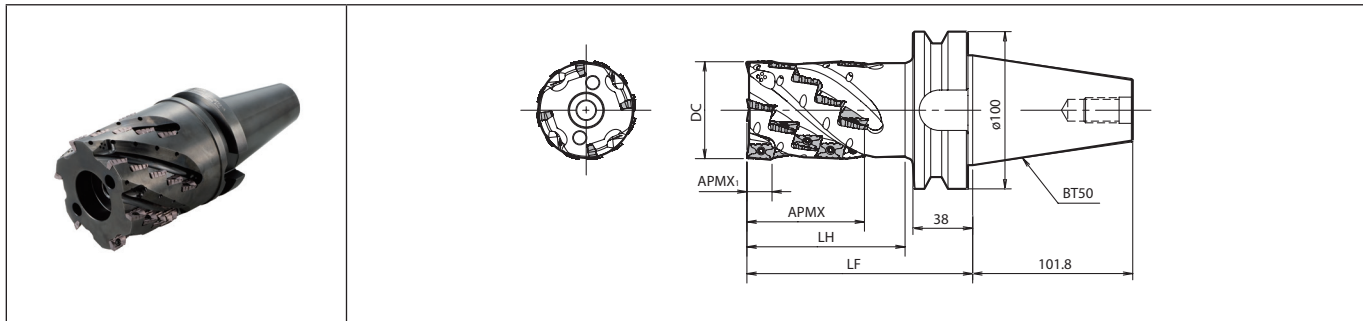
For installation of notched insert, see page **M100**.

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

● : Standard item MTO : Made to order

M96

MECH-BT50-A (Base unit, without coolant hole)

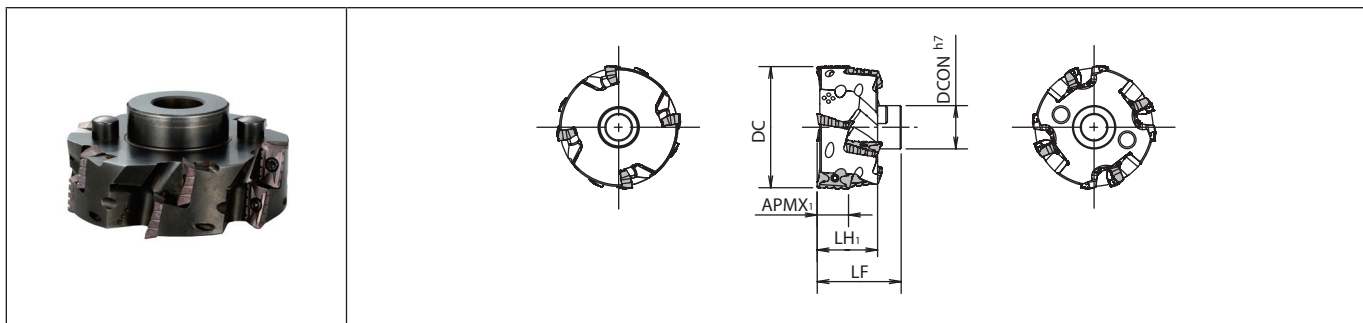


Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Spare parts					Applicable inserts ➔ M99
					DC	LF	LH	APMX	APMX1					Anti-seize compound	Mounting bolt	Wrench (for Mounting bolt)	Screw	Wrench	
MECH 050R11-4T-BT50-A	MTO	24	4	6	50	125	81	55	10	+23	-7	No	4.6	P-37	HH12X35	LW-10	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
MECH 063R17-4T-BT50-A	MTO	20	4	5	63	143	100	75	16	+19	-7	No	5.4	P-37	HH12X40	LW-10	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4
MECH 080R17-4T-BT50-A	MTO				80														
MECH 100R17-6T-BT50-A	MTO				100														

For installation of notched insert, see page M100.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

MECH-F (Front piece, without coolant hole)



Toolholder dimensions



Description	Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Spare parts		Applicable inserts ➔ M99
					DC	LF	LH	APMX1	DCON					Anti-seize compound	Screw	
MECH 050R11-4T-F	●	8	4	2	50	32	18	10	22	+23	-7	No	0.2	P-37	SB-2555TRG	BDMT11T3...-N2 + BDMT11T3...-N3
MECH 063R17-4T-F	●	8	4	2	63	44	30	16	32	+19	-7	No	0.4	P-37	SB-4070TRN	BDMT1704...-N3 + BDMT1704...-N4
MECH 080R17-4T-F	●				80											
MECH 100R17-6T-F	●				100											

For installation of notched insert, see page M100.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.




● : Standard item MTO : Made to order




Toolholder structure

End Mill			Base Unit 			Front Piece (1pc) 			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			

Applicable Inserts

End Mill		Base Unit 		Front Piece 		Applicable Inserts 	
MECH	050R11-4T-BT50SA	MECH050R11-4T-BT50-A	MECH050R11-4T-F	BDMT11T308ER-N2 +		BDMT11T308ER-N3	
	063R17-4T-BT50SA	MECH063R17-4T-BT50-A	MECH063R17-4T-F	BDMT170408ER-N3 +		BDMT170408ER-N4	
	080R17-4T-BT50SA	MECH080R17-4T-BT50-A	MECH080R17-4T-F				
	100R17-6T-BT50SA	MECH100R17-6T-BT50-A	MECH100R17-6T-F				

· For installation of notched insert, see page  **M100**

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

Others

BDMT

Insert		Description	No. of edges	Dimension (mm)					Angle (°)		Carbide				Applicable toolholder M94~M97
				S	D1	RE	L	W1	AN	AS	PVD				
											PRI1210	PRI1225	PRI1230	PRI1535	
		BDMT 11T308ER-N2	2	3.8	2.8	0.8	11	6.7	13	18	●	●	●	●	MECH...11...
		BDMT 11T308ER-N3	2	3.8	2.8	0.8	11	6.7	13	18	●	●	●	●	MECH...11...
		BDMT 170408ER-N3	2	4.9	4.4	0.8	17	9.6	13	18	●	●	●	●	MECH...17...
		BDMT 170408ER-N4	2	4.9	4.4	0.8	17	9.6	13	18	●	●	●	●	MECH...17...

Handed insert shows Right-hand

Recommended cutting conditions M101

Classification of usage

- ★ : Roughing / 1st Choice
- ☆ : Roughing / 2nd Choice
- : Finishing / 1st Choice
- : Finishing / 2nd Choice
- (In case hardness is 45HRC or under)

Carbon steel / Alloy steel	★	★	☆	P
Mold and die steel	★	★	☆	
Austenitic stainless steel	☆	☆	★	M
Martensitic stainless steel			☆	
Precipitation hardening stainless steel			★	
Gray cast iron	★			K
Nodular cast iron	★			
Non-ferrous metals				N
Heat-resistant alloy		★	★	S
Titanium alloy	★		★	
Hard materials		□		H



Applicable Inserts

Description	Applicable Inserts			
		+		
MECH...-11-	BDMT 11T308ER-N2	+	BDMT 11T308ER-N3	-
MECH...-17-		-		BDMT 170408ER-N3 + BDMT 170408ER-N4

● : Standard item

Smooth chip evacuation

Smooth chip evacuation

Notched insert breaks chips into small pieces

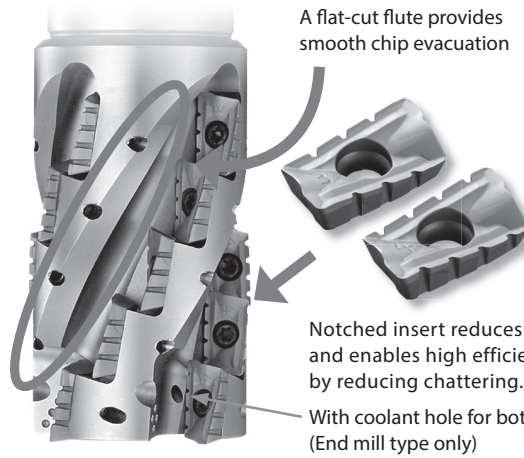


MECH



Competitor A

Workpiece material: SS400
 Vc=120m/min
 apxae=40mmx10mm
 fz=0.12mm/t
 MECH032-S32-11-5-4T



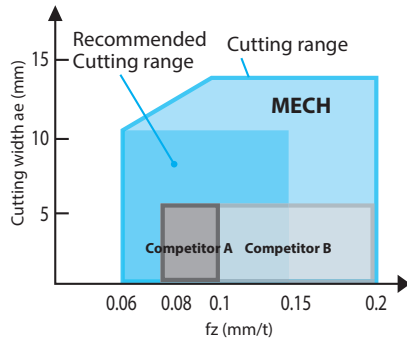
A flat-cut flute provides smooth chip evacuation

Notched insert reduces cutting force, and enables high efficiency machining by reducing chattering.

With coolant hole for bottom insert (End mill type only)

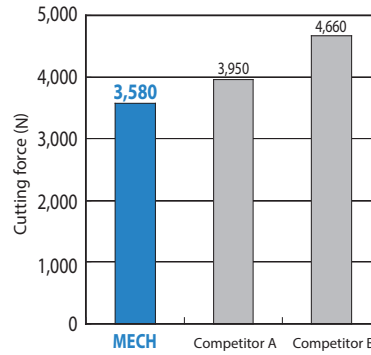
Low cutting force

Low cutting force due to notched inserts



Workpiece material: S50C
 Vc=120m/min
 apxae=40 mmx5~13mm
 fz=0.06 ~ 0.2mm/t
 MECH032-S32-11-5-4T

Cutting force comparison (Principal force)



Workpiece material: S50C
 Vc = 120 m/min
 ap x ae = 40 mm x 10 mm
 fz = 0.1 mm/t
 MECH032-S32-11-5-4T

(Internal evaluation)

M



Milling

Number of inserts installed

Description	No. of flutes	No. of inserts	No. of inserts			
			BDMT11T308ER-		BDMT170408ER-	
			N2	N3	N3	N4
MECH 025-S25-11-4-2T 032-S32-11-5-2T 032-S32-11-5-4T 040-S32-11-6-4T 040-S42-11-6-4T	2	8	4	4		
		10	5	5		
	4	20	10	10		
		24	12	12	-	-
		28	14	14		
MECH 050-S42-11-7-4T 050-S42-11-7-6T	6	42	21	21		
MECH 040-S32-17-4-2T 040-S42-17-4-2T	2	8	-	-	4	4
		20			10	10
	4	20			10	10
MECH 040R-11-4-4T-M 050R-11-5-6T-M	4	16	8	8	-	-
	6	30	15	15		
MECH 050R-17-2-4T-M 050R-17-4-4T-M 063R-17-3-4T-M 080R-17-4-6T-M 100R-17-4-6T-M	4	8			4	4
		16			8	8
	6	12			6	6
		24	-	-	12	12
		24			12	12
MECH 063R-17-3-4T 080R-17-4-6T	4	12			6	6
	6	24			12	12

Description	No. of flutes	No. of inserts	No. of inserts			
			BDMT11T308ER-		BDMT170408ER-	
			N2	N3	N3	N4
MECH 050R11-8-4T-BT50 050R17-7-4T-BT50 063R17-7-4T-BT50 080R17-7-4T-BT50 100R17-7-6T-BT50	32	16	16	-	-	
		28	-	-	14	14
	4	42			21	21
		32	16	16	-	-
		28	-	-	14	14
MECH 050R11-4T-BT50SA 063R17-4T-BT50SA 080R17-4T-BT50SA 100R17-6T-BT50SA	4	32	16	16	-	-
		28	-	-	14	14
	6	42	-	-	21	21
MECH 050R11-4T-BT50-A 063R17-4T-BT50-A 080R17-4T-BT50-A 100R17-6T-BT50-A	4	24	12	12	-	-
		20	-	-	10	10
	6	30	-	-	15	15
		30	-	-	15	15
MECH 050R11-4T-F 063R17-4T-F 080R17-4T-F 100R17-6T-F	4	8	4	4	-	-
		8	-	-	4	4
	6	12	-	-	6	6
		12	-	-	6	6
		12	-	-	6	6

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

M100

Caution when installing notched insert

1. Install notched inserts by cutting the insert with the number of marks on the toolholder body.

<Insert number and toolholder marks>

Insert size	11 type		17 type	
Insert no.	2	3	3	4
Marks				

* Using the cutter with the inserts installed incorrectly will damage the toolholder.

2. When installing notched inserts in flute line, ensure that the number on the insert is the same as the insert in first stage. (Ref. to Fig. 1, 2 and 3)

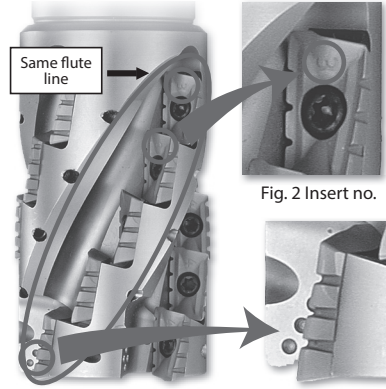


Fig. 1 Same flute line

Fig. 3 Marks

Recommended cutting conditions (When using a notched insert)

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)			
		MEGACOAT NANO	MEGACOAT		
		PR1535	PR1225	PR1230	PR1210
Carbon steel	0.08~0.1~0.15	☆ 120~180~250	☆ 120~180~250	★ 120~180~220	-
Alloy steel	0.08~0.1~0.15	☆ 100~160~220	☆ 100~160~220	★ 100~160~200	-
Mold steel	0.08~0.1~0.15	☆ 80~140~180	☆ 80~140~180	★ 80~140~160	-
Gray cast iron	0.08~0.15~0.18	-	-	-	★ 120~180~250
Nodular cast iron	0.08~0.15~0.18	-	-	-	★ 100~150~220
*Titanium alloys	0.08~0.1~0.15	★ 40~60~80	-	-	☆ 30~50~70

* Machining with coolant is recommended for titanium alloys.

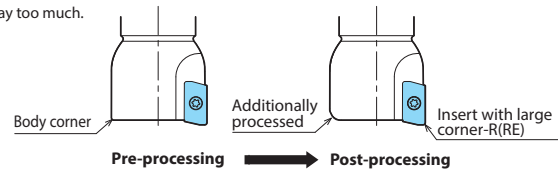
★: 1st Recommendation ☆: 2nd Recommendation

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

When using inserts with corner-R(RE) 1.6 or larger, additional modifications of the cutter body will be necessary. Ref. to the chart below for the recommended modifications. (Additional grind off is not necessary when corner-R(RE) is 1.2mm or less.)

Insert Corner-R(RE) (mm)	Additional processing dimension to body corner (mm)
1.6	R1.0
2.0	
2.4	R1.2
3.1	R1.6
4.0	R2.5

* Round- shaped additional processing is recommended. When applying chamfer shaped additional processing, do not cut away too much.

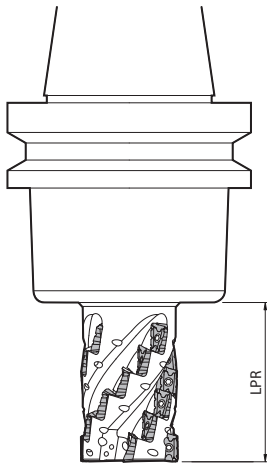


Cutting performance (Used machine: Machining center equivalent to AC15/18.5kW)

MECH end mill

Cutting dia.	Description	Overhang length LPR (mm)
ø25	MECH025-S25-11-4-2T	48
ø32	MECH032-S32-11-5-2T	57
	MECH032-S32-11-5-4T	
ø40	MECH040-S32-11-6-4T	65
	MECH040-S42-11-6-4T	
ø50	MECH050-S42-11-7-4T	76
	MECH050-S42-11-7-6T	
ø40	MECH040-S32-17-4-2T	74
	MECH040-S42-17-4-2T	
ø50	MECH050-S42-17-5-4T	89

Shape



2 flute type

(Workpiece material: S50C)

Description	Shouldering	Slotting
	 Cutting speed: $V_c = 100 \sim 180$ m/min Feed: $f_z = 0.08 \sim 0.15$ mm/t	 Cutting speed: $V_c = 100 \sim 120$ m/min Feed: $f_z = 0.08 \sim 0.12$ mm/t
MECH025-S25-11-4-2T		
MECH032-S32-11-5-2T		
MECH040-S32-17-4-2T MECH040-S42-17-4-2T		

4 flute/6 flute type

MECH032-S32-11-5-4T	
MECH040-S32-11-6-4T MECH040-S42-11-6-4T	
MECH050-S42-11-7-4T	
MECH050-S42-11-7-6T	
MECH050-S42-17-5-4T	

4 flute/6 flute type are not recommended for slotting.



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

Others

M102

MECH shell mill

Cutting dia.	Description	Overhang length LPR (mm)
∅40	MECH040R-11-4-4T-M	125
∅50	MECH050R-11-5-6T-M	123
	MECH050R-17-2-4T-M	112
	MECH050R-17-4-4T-M	138
∅63	MECH063R-17-3-4T-□	115
∅80	MECH080R-17-4-6T-□	130
∅100	MECH100R-17-4-6T-□	130

Shape

(Workpiece material: S50C)

Shouldering			
Cutting speed: $V_c = 100 \sim 180$ m/min Feed: $f_z = 0.08 \sim 0.15$ mm/t			
MECH040R-11-4-4T-M		MECH063R-17-3-4T-□	
MECH050R-11-5-6T-M		MECH080R-17-4-6T-□	
MECH050R-17-2-4T-M		MECH100R-17-4-6T-□	
MECH050R-17-4-4T-M		Slotting is not recommended.	

MECH-BT50 (Integral arbor type)
MECH-BT50SA (Head exchangeable type/Integral arbor type)

Cutting dia.	Description	Overhang length LPR (mm)
∅50	MECH050R11-8-4T-BT50 MECH050R11-4T-BT50SA	143
	MECH050R17-7-4T-BT50	
∅63	MECH063R17-7-4T-BT50 MECH063R17-4T-BT50SA	
∅80	MECH080R17-7-4T-BT50 MECH080R17-4T-BT50SA	
∅100	MECH100R17-7-6T-BT50 MECH100R17-6T-BT50SA	

Shape

(Workpiece material: S50C)

Shouldering			
Cutting speed: $V_c = 100 \sim 180$ m/min Feed: $f_z = 0.08 \sim 0.15$ mm/t			
MECH050R11-8-4T-BT50 MECH050R11-4T-BT50SA		MECH080R17-7-4T-BT50 MECH080R17-4T-BT50SA	
MECH050R17-7-4T-BT50		MECH100R17-7-6T-BT50 MECH100R17-6T-BT50SA	
MECH063R17-7-4T-BT50 MECH063R17-4T-BT50SA		Slotting is not recommended.	



Helical end mill for titanium alloy machining

MECHT

Insert size combination improves roughing capabilities

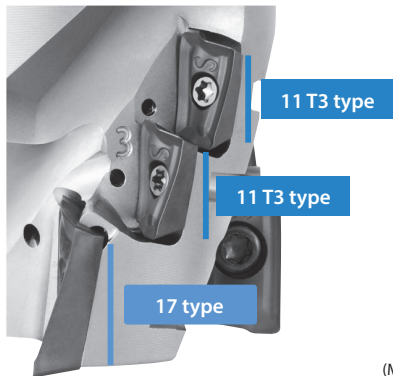
Maintains stable machining and long tool life

1 Developed to reduce chattering and chip recutting issues

Unique insert combination

The larger bottom inserts are positioned to handle larger cutting forces (excluding $\phi 32$)

Stable machining with improved fracture resistance



(MECHT50R-1711 type)

New design for higher reliability

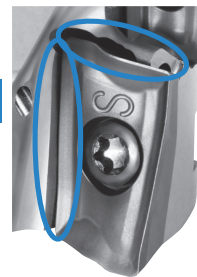
Bottom inserts are held in place by double-faced contacts

Holding surface 1

Wide holding surface

Holding surface 2

Additional hold in the axial direction



Bore dia.

Larger bore diameter improves fastening power and reduces chattering $\phi 50$ mm cutter with a $\phi 27$ mm bore (conventional bore: $\phi 22$ mm)

Toolholder hardness Hardened 15% more than conventional holders

Toolholder spec Custom ordering available
Custom number of inserts and stages

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

Others

Excellent chip evacuation

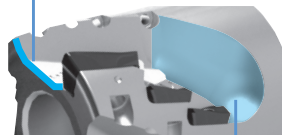
New flute design

Large, smooth flutes prevent chip clogging

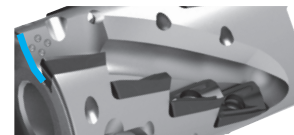
MECHT ($\phi 50$ -4T 3 stages)

Conventional ($\phi 50$ -4T 4 stages)

Large flute



Smooth design



All inserts have coolant holes

Optimized hole diameter controls flow amount and pressure

Smooth chip evacuation as well as superior cooling of the cutting edge



Chips example

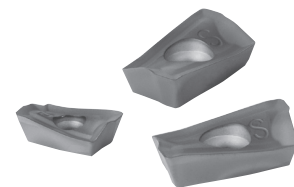
2 Longer tool life with low-resistance JS chipbreaker and tough PVD coating

Low cutting force JS chipbreaker

Heat at the cutting edge is suppressed due to sharp cutting performance. Long tool life

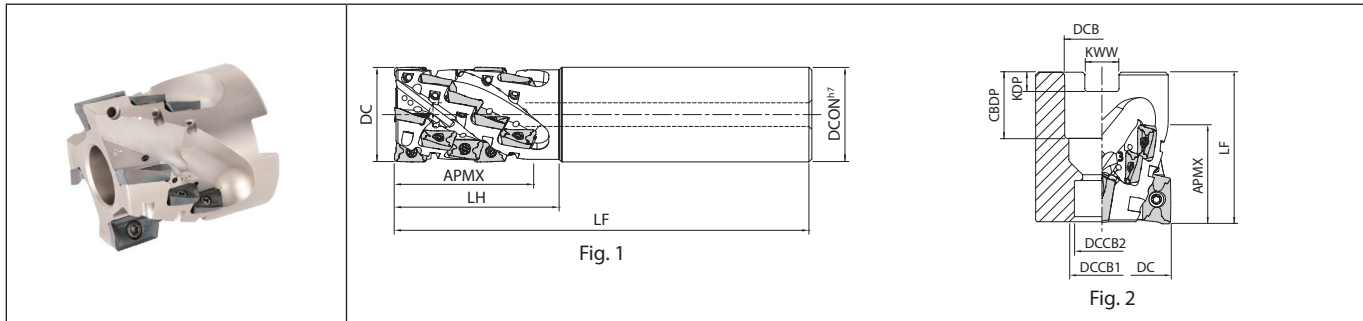
Greater toughness PR1535

Fracture resistant with a tough substrate and high heat-resistant MEGACOAT NANO coating technology



M104

MECHT



Toolholder dimensions


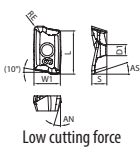
Description	Availability	Inserts	Flutes	Stages	Dimension (mm)											A.R. max. (°)	R.R. max. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts M106	
					DC	DCON	DCB	DCCB ₁	DCCB ₂	LF	LH	CBDP	KDP	KWW	APMX					Mounting bolt	Screw	Wrench	Stages	
																								1st
MECHT 32-S32-11-5-4T	●	20	4	5	32	32	-	-	-	140	55	-	-	-	46	+23	-9	Yes	1	-	SB-2555TRG	DTM-8	BDMT11T3..	BDMT11T308..
MECHT 50R-1711-3-4T-M	●	12	4	3	50	-	-	-	-	55	-	-	-	34	-	-	-	Yes	2	HH12X40	SB-2555TRG	DTM-8	BDMT1704..	BDMT11T308..
50R-1711-4-5T-M	●	20	5	4	63	-	27	20	14	65	-	24	7	12.4	43	+19	-7	Yes	2	HH12X50	SB-4070TRN	DTM-15	BDMT1704..	BDMT11T308..
63R-17-4-5T-M	●	24	6	4	63	-	-	-	-	65	-	-	-	43	-	-	-	Yes	2	HH12X65	SB-4070TRN	DTM-15	BDMT1704..	BDMT170408..
80R-17-4-6T-M	●	24	6	6	80	32	26	17	17	80	-	28	8	14.4	60	-	-	Yes	2	HH16X65	SB-4070TRN	DTM-15	BDMT1704..	BDMT170408..

Use inserts with Corner-R of 0.8 or less for the 2nd or higher stages
 Machining with coolant is recommended (Internal coolant pressure 1.5 MPa or higher)
 Coat Anti-seize Compound(P-37) thinly on portion of taper and thread when insert is fixed.


● : Standard item



BDMT

<p>Classification of usage</p> <p>★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)</p>		Carbon steel / Alloy steel		P							
		Mold and die steel		P							
		Austenitic stainless steel		M							
		Martensitic stainless steel		M							
		Precipitation hardening stainless steel		M							
		Gray cast iron		K							
		Nodular cast iron		K							
		Non-ferrous metals		N							
		Heat-resistant alloy		S							
		Titanium alloy		★ S							
Hard materials		H									
Insert	Description	No. of edges	Dimension (mm)					Angle (°)		PVD PR1535	Carbide M105
			S	D1	RE	L	W1	AN	AS		
  <p>Low cutting force</p>	BDMT 11T302ER-JS 11T304ER-JS 11T308ER-JS	2	3.8	2.8	0.2 0.4 0.8	11	6.7	13	18	● ● ●	MECHT...11...
	BDMT 170404ER-JS 170408ER-JS	2	4.9	4.4	0.4 0.8	17	9.6	13	18	● ●	MECHT...17...

Handed insert shows Right-hand

Recommended cutting conditions  M107



Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

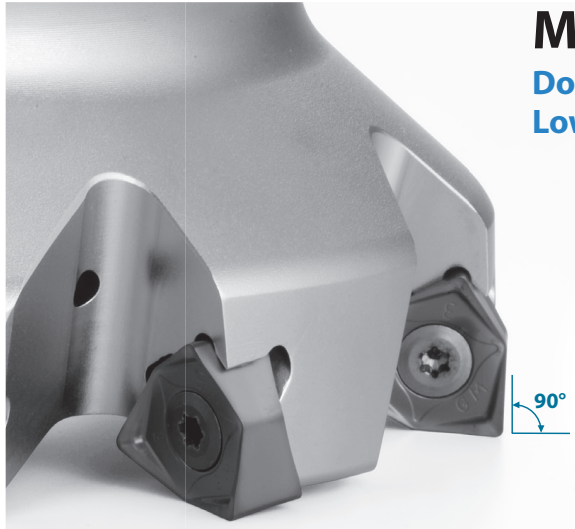
M106

Recommended cutting conditions

Workpiece	Applications	Depth of cut (mm)		fz (mm/t)	Recommended insert grade (Vc: m/min)
		ap	ae		MEGACOAT NANO
					PR1535
Titanium alloy (Ti6Al4V)	Shouldering	~Length of cut (APMX)	~0.5DC	0.10 ~ 0.12 ~ 0.16	30 ~ 40 ~ 60
	Slotting	~0.5DC	1DC	0.05 ~ 0.07 ~ 0.09	30 ~ 40 ~ 50

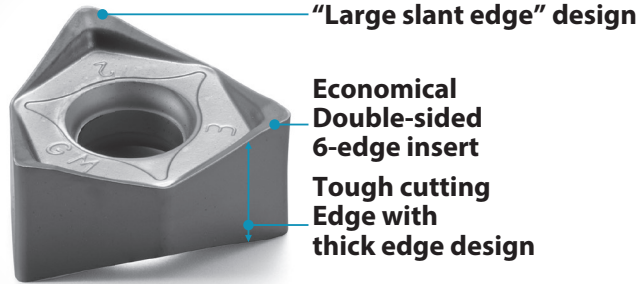


Milling



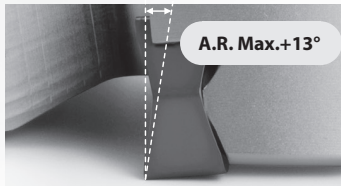
MFWN

Double-sided, 6-edge insert, 90° cutters
Low cutting force and reduced chattering

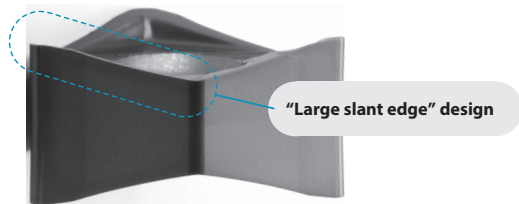


1 Sharp cutting with low cutting force

Sharp cutting by large rake angle

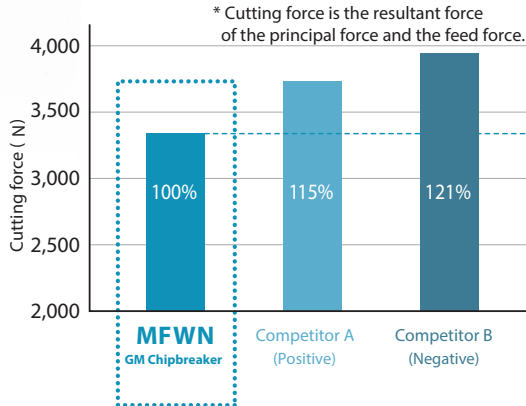


"Large slant edge" design reduces shock when cutting edge enters the workpiece

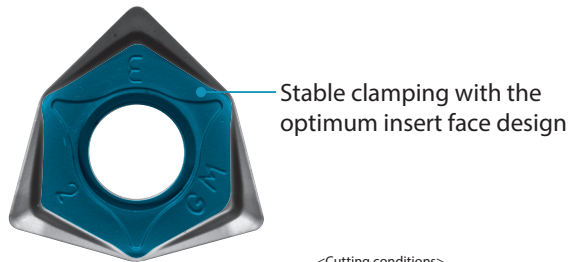
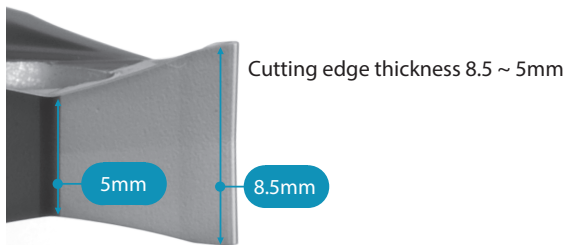


Cutting force comparison (Internal evaluation)

<Cutting conditions>
Vc = 180m/min
apxae = 7x 110mm
fz = 0.2mm/t
Workpiece material: S50C
ø125mm Cutter

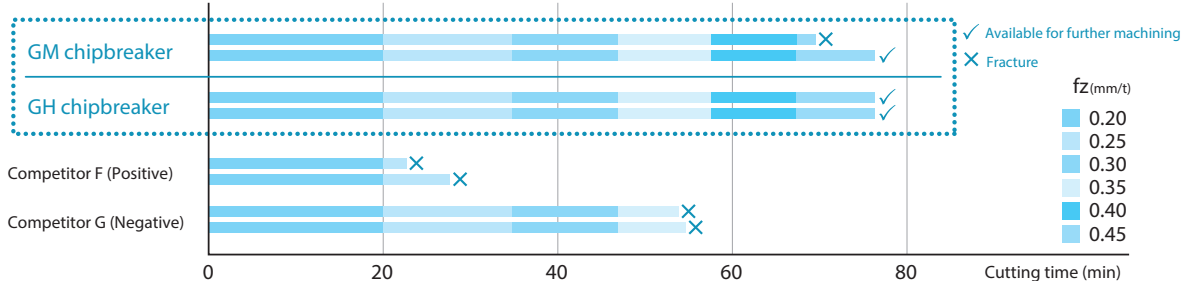


2 Superior fracture resistance with thick edge design



Fracture resistance comparison (Internal evaluation)

<Cutting conditions>
Workpiece material: SCM440H(38-42H5) Interruption with a slot on the workpiece
Vc = 100m/min apxae = 2x100mm fz = 0.2 ~0.45 mm/t Dry



M

Milling

Cutting edge angle 45°~70°

Cutting edge angle 75°

Cutting edge angle 88°/90°

Cutter for Finishing

High Feed Cutter

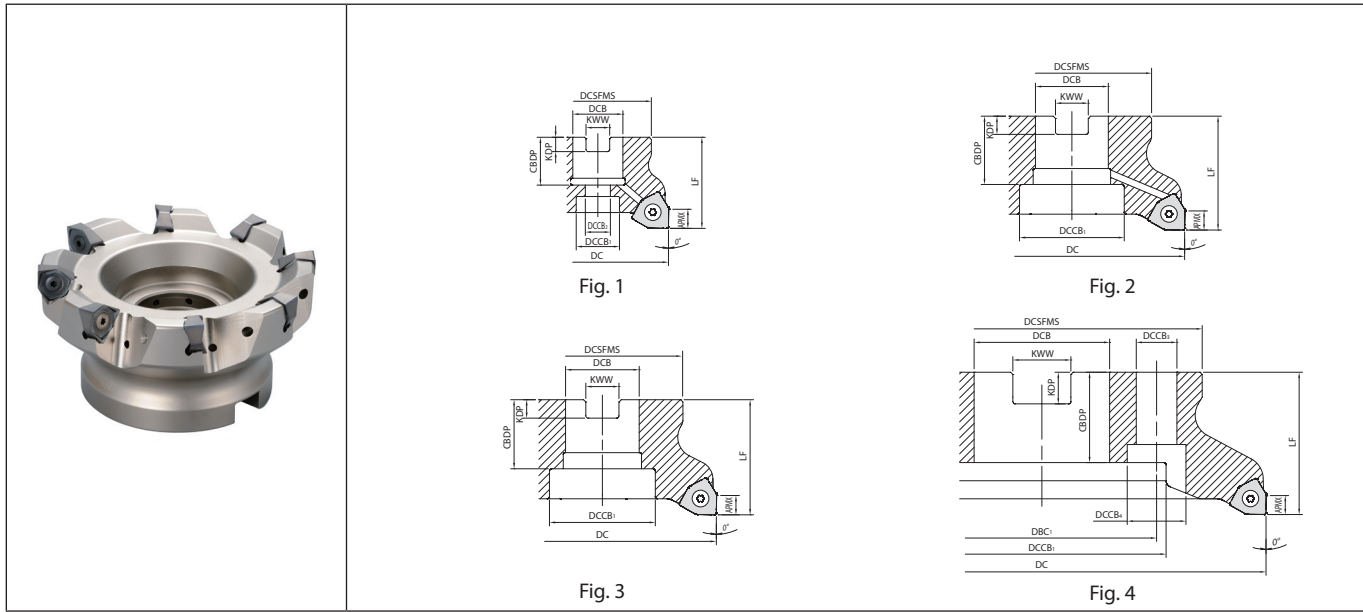
Multi-Function

Slot Mill

Ball-nose Radius

Others

MFWN (Face mill)



Toolholder dimensions

Description		Availability	Dimension (mm)														A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M113			
			R	DC	DCSFM5	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DBC1	LF	CBDP	KDP	KWW	APMX										
Coarse pitch	MFWN 90063R-3T-M	●	3	63	47	22	19	11	-	-	-	-	-	-	40	21	6.3	10.4	8	+13	-10	Yes	14000	0.5	1	WNEU0806... WNGT0806... WNMU0806...
	MFWN 90080R-4T-M	●	4	80	60	27	20	13	-	-	-	-	-	-	50	24	7	12.4	8	+13	-9	Yes	12000	1	1	
	MFWN 90100R-5T-M	●	5	100	70	32	46	-	-	-	-	-	-	-	50	30	8	14.4	8	+13	-8	Yes	10500	1.3	2	
	MFWN 90125R-6T-M	●	6	125	87	40	55	-	-	-	-	-	-	-	63	33	9	16.4	8	+13	-7.5	Yes	9500	2.5	2	
	MFWN 90160R-8T-M	●	8	160	102	40	68	-	-	14	20	66.7	-	-	63	32	9	16.4	8	+13	-7	No	8000	3.8	4	
	MFWN 90200R-10T-M	●	10	200	142	60	110	-	-	18	26	101.6	-	-	63	40	14	25.7	8	+13	-7	No	7500	6	4	
MFWN 90250R-12T-M	●	12	250	142	60	110	-	-	18	26	101.6	-	-	63	40	14	25.7	8	+13	-7	No	6500	8.4	4		
Metric Fine pitch	MFWN 90063R-4T-M	●	4	63	47	22	19	11	-	-	-	-	-	-	40	21	6.3	10.4	8	+13	-10	Yes	16000	0.5	1	WNEU0806... WNGT0806... WNMU0806...
	MFWN 90080R-5T-M	●	5	80	60	27	20	13	-	-	-	-	-	-	50	24	7	12.4	8	+13	-9	Yes	13500	1	1	
	MFWN 90100R-7T-M	●	7	100	70	32	46	-	-	-	-	-	-	-	50	30	8	14.4	8	+13	-8	Yes	12000	1.3	2	
	MFWN 90125R-8T-M	●	8	125	87	40	55	-	-	-	-	-	-	-	63	33	9	16.4	8	+13	-7.5	Yes	10500	2.6	2	
	MFWN 90160R-10T-M	●	10	160	102	40	68	-	-	14	20	66.7	-	-	63	32	9	16.4	8	+13	-7	No	9000	3.9	4	
	MFWN 90200R-12T-M	●	12	200	142	60	110	-	-	18	26	101.6	-	-	63	40	14	25.7	8	+13	-7	No	8000	6.3	4	
MFWN 90250R-14T-M	●	14	250	142	60	110	-	-	18	26	101.6	-	-	63	40	14	25.7	8	+13	-7	No	7000	8.7	4		
Extra fine pitch	MFWN 90063R-5T-M	●	5	63	47	22	19	11	-	-	-	-	-	-	40	21	6.3	10.4	8	+13	-10	Yes	16000	0.5	1	WNEU0806... WNGT0806... WNMU0806...
	MFWN 90080R-7T-M	●	7	80	60	27	20	13	-	-	-	-	-	-	50	24	7	12.4	8	+13	-9	Yes	10500	1.1	1	
	MFWN 90100R-9T-M	●	9	100	70	32	46	-	-	-	-	-	-	-	50	30	8	14.4	8	+13	-8	Yes	9500	1.3	2	
	MFWN 90125R-12T-M	●	12	125	87	40	55	-	-	-	-	-	-	-	63	33	9	16.4	8	+13	-7.5	Yes	8000	2.6	2	
	MFWN 90160R-14T-M	●	14	160	102	40	68	-	-	14	20	66.7	-	-	63	32	9	16.4	8	+13	-7	No	7000	3.9	4	

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

● : Standard item



Toolholder dimensions

Description		Availability		Dimension (mm)																	A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts ➔ M113
		R	Inserts	DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DBC ₁	LF	CBDP	KDP	KWW	APMX											
Bore dia. inch spec	Coarse pitch	MFWN 90080R-4T	●	4	80	60	25.4	20	13	-	-	-	50	27	6	9.5	8	+13	-9	No	12000	1	1	WNEU0806... WNGT0806... WNUMU0806...			
		MFWN 90100R-5T	●	5	100	70	31.75	46	-	-	-	34	8	12.7	-8	Yes			10500	1.3	2						
		MFWN 90125R-6T	●	6	125	87	38.1	55	-	-	-	38	10	15.9	-7.5	No			9500	2.6	2						
		MFWN 90160R-8T	●	8	160	102	50.8	72	-	-	-	63	11	19.1	-7	No			8000	3.9	3						
		MFWN 90200R-10T	●	10	200	142	47.625	110	18	26	101.6	40	14	25.4	-7	No			7500	6.3	4						
		MFWN 90250R-12T	●	12	250	182	50.8	110	18	26	101.6	40	14	25.4	-7	No			6500	8.7	4						
	Fine pitch	MFWN 90080R-5T	●	5	80	60	25.4	20	13	-	-	-	50	27	6	9.5	8	+13	-9	No	13500	1	1	WNEU0806... WNGT0806... WNUMU0806...			
		MFWN 90100R-7T	●	7	100	70	31.75	46	-	-	-	34	8	12.7	-8	Yes			12000	1.4	2						
		MFWN 90125R-8T	●	8	125	87	38.1	55	-	-	-	38	10	15.9	-7.5	No			10500	2.7	2						
		MFWN 90160R-10T	●	10	160	102	50.8	72	-	-	-	63	11	19.1	-7	No			9000	4	3						
		MFWN 90200R-12T	●	12	200	142	47.625	110	18	26	101.6	40	14	25.4	-7	No			8000	6.6	4						
		MFWN 90250R-14T	●	14	250	182	50.8	110	18	26	101.6	40	14	25.4	-7	No			7000	8.9	4						
	Extra fine pitch	MFWN 90080R-7T	●	7	80	60	25.4	20	13	-	-	-	50	27	6	9.5	8	+13	-9	No	10500	1.1	1	WNEU0806... WNGT0806... WNUMU0806...			
		MFWN 90100R-9T	●	9	100	70	31.75	46	-	-	-	34	8	12.7	-8	Yes			9500	1.3	2						
		MFWN 90125R-12T	●	12	125	87	38.1	55	-	-	-	38	10	15.9	-7.5	No			8000	2.7	2						
		MFWN 90160R-14T	●	14	160	102	50.8	72	-	-	-	63	11	19.1	-7	No			7000	4.1	3						
		MFWN 90200R-16T	●	16	200	142	47.625	110	18	26	101.6	40	14	25.4	-7	No			6500	6.7	4						
		MFWN 90250R-18T	●	18	250	182	50.8	110	18	26	101.6	40	14	25.4	-7	No			5500	9.1	4						

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.











Milling


- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M110

Spare parts

Description		Spare parts							
		Clamp screw	Wrench		Shim	Shim screw	Wrench	Anti-seize compound	Mounting bolt
			TTW	DTM					
									
Coarse pitch	MFWN 90063R-3T-M	SB-50140TR	TTW-15	-	MFWN-90	SPW-7050	LW-5	P-37	HH10X30
	MFWN 90080R-4T(-M)								HH12X35
	MFWN 90100R-5T(-M)								-
	MFWN 90250R-12T(-M)								
Fine pitch	MFWN 90063R-4T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30
	MFWN 90080R-5T(-M)								HH12X35
	MFWN 90100R-7T(-M)								-
	MFWN 90250R-14T(-M)								
Extra fine pitch	MFWN 90063R-5T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30
	MFWN 90080R-7T(-M)	SB-40140TRN	-	DTM-15					HH12X35
	MFWN 90100R-9T(-M)	-							
	MFWN 90250R-18T								

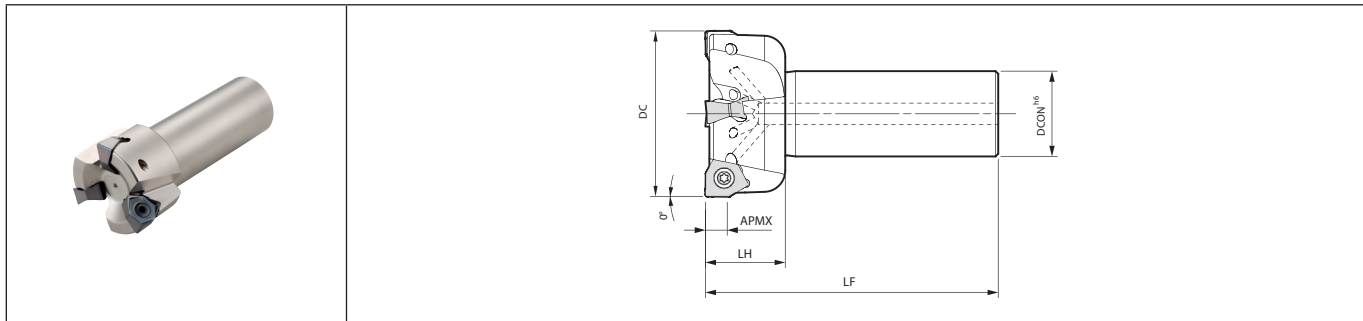
 Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

M



Milling

MFWN (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Spare parts			Applicable inserts M113	
			R	DC	DCON	LF	LH					APMX	Screw	Wrench		Anti-seize compound
MFWN 90050R-S32-3T	●	3	50					-12	18500	SB-50140TR	TTW-15		WNEU0806...			
90063R-S32-4T	●	4	63	32	110	30	8	+13	16000	Recommended tightening torque for insert clamp 4.2N·m		P-37	WNGT0806...			
90080R-S32-5T	●	5	80					-9	13500				WNMU0806...			

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

How to mount an insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. After applying anti-seize compound on portion of taper and thread, attach the screw to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
3. When tightening the screw, make sure that the wrench is parallel to the screw.
Remember that the screw hole of the toolholder for Extra fine pitch is inclined to the bearing surface. (Ref. to Fig. 2 and Fig. 3)
4. Be careful not to tighten the screw with excessive torque.
Recommended tightening torque is 4.2N·m for M5 screw (SB-50140TR) and 3.5N·m for M4 screw (SB-40140TRN).
5. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder or between the insert side surfaces and the constraint surface of the toolholder. If there is any clearance, remove the insert and mount it again according to the above steps.
6. To change the cutting edge of the insert, turn the insert counterclockwise (Ref. to Fig. 4). The insert corner identification number is stamped on the top surface of the insert.



Fig. 1



Fig. 2

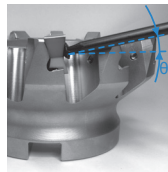


Fig. 3

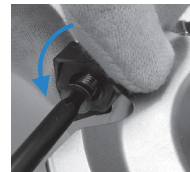


Fig. 4

How to replace a shim (For coarse pitch)

1. Be sure to remove dust and chips from the insert mounting pocket.
2. The shim must be mounted in the proper direction. While aligning the surface of the shim with the mark on it to the corresponding constraint surface (Ref. to Fig. 1) and lightly pressing the shim toward the constraint surface (Ref. to Fig. 2), insert the screw into the hole of the shim and tighten (Ref. to Fig. 3). When tightening the screw, make sure that the screw is vertical to the bearing surface (Recommended tightening torque is 6.0N·m).
3. After tightening the screw, make sure that there is no clearance between the shim seat surface and the bearing surface. If there is any clearance, remove the insert and mount it again according to the above steps.



Fig. 1

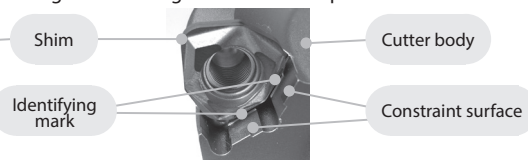


Fig. 2



Fig. 3

● : Standard item

M112

WNEU/WNMU/WNGT

Insert		Description	No. of edges	Dimension (mm)					Carbide							Applicable toolholder M109 M110 M112		
				IC	S	D1	RE	BS	CVD		PVD			Cermet				
									CA6535	PDL025	PR0155	PR1510	PR1525		PR1535		GW25	TN620M
<p>Classification of usage</p> <ul style="list-style-type: none"> ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under) 		Carbon steel / Alloy steel									★	☆	■	P				
		Mold and die steel								★	☆	■	M					
		Austenitic stainless steel								☆	★				K			
		Martensitic stainless steel							★		☆					N		
		Precipitation hardening stainless steel									★						S	
		Gray cast iron										★						H
		Nodular cast iron										★						
		Non-ferrous metals							★			☆						
		Heat-resistant alloy							★			☆						
		Titanium alloy										★						
		Hard materials								★								
	 Surface finish oriented	WNEU 080608EN-GL	6	14.02	6.65	6.2	0.8	1.5	●		●	●	●	●				
	 3-edge / Non-Ferrous Metals	WNGT 080608FN-AM	3	14.02	6.65	6.2	0.8	1.5	●					●	MFWN90...			
	 Tough edge	WNMU 080608EN-GH	6	14.02	6.65	6.2	0.8	1.3	●		●	●	●		MFWN90...			
	 General purpose	WNMU 080604EN-GM 080608EN-GM	6	14.02	6.65	6.2	0.4 0.8	1.7 1.3	●		●	●	●	●	MFWN90...			
	 Low cutting force	WNMU 080608EN-SM	6	14.02	6.65	6.2	0.8	1.3	●		●	●			MFWN90...			

Recommended cutting conditions M114

● : Standard item

M

Milling

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t) ():TN620M	Recommended insert grades (Vc: m/min)							
			Cermet	MEGACOAT (PVD coated carbide)				CVD coated carbide	DLC coated carbide	Carbide
			TN620M	PR1535	PR1525	PR1510	PR015S	CA6535	PDL025	GW25
GM	Carbon steel	0.1~ 0.2 ~0.3 (0.06~ 0.10 ~0.15)	★ 200~ 250 ~300	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-	-	-	-
	Alloy steel	0.1~ 0.2 ~0.3 (0.06~ 0.10 ~0.15)	★ 180~ 220 ~250	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-	-	-	-
	Mold steel	0.1~ 0.15 ~0.25 (0.06~ 0.10 ~0.13)	★ 150~ 180 ~220	☆ 80~ 140 ~180	☆ 80~ 140 ~180	-	-	-	-	-
	Stainless steel (Austenitic related)	0.1~ 0.15 ~0.25	-	☆ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-	-	-
	Stainless steel (Martensitic related)	0.1~ 0.15 ~0.25	-	☆ 150~ 200 ~250	-	-	-	☆ 180~ 240 ~300	-	-
	Stainless steel (Precipitation hardening)	0.1~ 0.15 ~0.25	-	★ 90~ 120 ~150	-	-	-	-	-	-
	Gray cast iron	0.1~ 0.2 ~0.3	-	-	-	★ 120~ 180 ~250	-	-	-	-
	Nodular cast iron	0.1~ 0.15 ~0.25	-	-	-	★ 100~ 150 ~200	-	-	-	-
	Ni-base heat-resistant alloys	0.1~ 0.12 ~0.2	-	☆ 20~ 30 ~50	-	-	-	★ 20~ 30 ~50	-	-
SM *1GL	Carbon steel	0.06~ 0.12 ~0.2 (0.06~ 0.08 ~0.12)	★ 200~ 250 ~300	☆ 120~ 180 ~250	☆ 120~ 180 ~250	-	-	-	-	-
	Alloy steel	0.06~ 0.12 ~0.2 (0.06~ 0.08 ~0.12)	★ 180~ 220 ~250	☆ 100~ 160 ~220	☆ 100~ 160 ~220	-	-	-	-	-
	Mold steel	0.06~ 0.08 ~0.15 (0.06~ 0.08 ~0.10)	★ 150~ 180 ~220	☆ 80~ 140 ~180	☆ 80~ 140 ~180	-	-	-	-	-
	Stainless steel (Austenitic related)	0.06~ 0.12 ~0.2	-	★ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-	-	-
	Stainless steel (Martensitic related)	0.06~ 0.12 ~0.2	-	☆ 150~ 200 ~250	-	-	-	☆ 180~ 240 ~300	-	-
	Stainless steel (Precipitation hardening)	0.06~ 0.12 ~0.2	-	☆ 90~ 120 ~150	-	-	-	-	-	-
	Gray cast iron	0.06~ 0.12 ~0.2	-	-	-	☆ 120~ 180 ~250	-	-	-	-
	Nodular cast iron	0.06~ 0.08 ~0.15	-	-	-	☆ 100~ 150 ~200	-	-	-	-
	Ni-base heat-resistant alloys	0.06~ 0.1 ~0.15	-	☆ 20~ 30 ~50	-	-	-	☆ 20~ 30 ~50	-	-
	Titanium alloys	0.06~ 0.08 ~0.15	-	★ 40~ 60 ~80	-	-	-	-	-	-
*2GH	Carbon steel	0.2~ 0.3 ~0.4	-	☆ 120~ 180 ~250	☆ 120~ 180 ~250	-	-	-	-	-
	Alloy steel	0.2~ 0.3 ~0.4	-	☆ 100~ 160 ~220	☆ 100~ 160 ~220	-	-	-	-	-
	Mold steel	0.15~ 0.2 ~0.3	-	☆ 80~ 140 ~180	☆ 80~ 140 ~180	-	-	-	-	-
	Stainless steel (Austenitic related)	0.2~ 0.25 ~0.3	-	☆ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-	-	-
	Stainless steel (Martensitic related)	0.2~ 0.25 ~0.3	-	☆ 150~ 200 ~250	-	-	-	☆ 180~ 240 ~300	-	-
	Stainless steel (Precipitation hardening)	0.2~ 0.25 ~0.3	-	☆ 90~ 120 ~150	-	-	-	-	-	-
	Gray cast iron	0.2~ 0.3 ~0.4	-	-	-	☆ 120~ 180 ~250	-	-	-	-
	Nodular cast iron	0.15~ 0.2 ~0.3	-	-	-	☆ 100~ 150 ~200	-	-	-	-
	Ni-base heat-resistant alloys	0.15~ 0.2 ~0.25	-	☆ 20~ 30 ~50	-	-	-	☆ 20~ 30 ~50	-	-
	Hard materials (60HRC or less)	0.05~ 0.1 ~0.2	-	-	-	-	★ 80~ 100 ~120	-	-	-
AM	Non-ferrous metals	0.1~ 0.2 ~0.3	-	-	-	-	-	★ 200~ 600 ~900	☆ 200~ 500 ~800	

The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation. Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

*1. GL Chipbreaker is recommended for Surface finish oriented milling.
 *2. GH Chipbreaker: Fine pitch ⇨ fz≤0.3 (mm/t)
 Extra fine pitch ⇨ Not recommended

★: 1st Recommendation
 ☆: 2nd Recommendation



Milling

Cutting edge angle 45°~70°

Cutting edge angle 75°

Cutting edge angle 88°/90°

Cutter for Finishing

High Feed Cutter

Multi-Function

Slot Mill

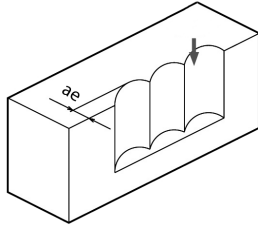
Ball-nose Radius

Others

Applicable chipbreaker

Cutter type	Chipbreaker			
	GM	SM (GL)	GH	AM
Coarse pitch (With shim)	●	●	●	●
Fine pitch (Without shim)	●	●	△ (Feed rate is recommended fz=0.3mm/t or under)	●
Extra fine pitch (Without shim)	●	●	Not recommended	Not recommended

Vertical milling (Plunging)



Cutting dia.	Max. width of cut (ae)
All items	8mm

Cutter type and chipbreaker selection

Milling purpose	Cutter type			Chipbreaker				
	Coarse pitch	Fine pitch	Extra fine pitch	GM	SM	GH	GL	AM
General milling for steel and alloy steel		●		●				
Steel and alloy steel (At chattering due to low rigidity machine or poor clamping power)	●				●			
Productivity oriented (Running cost decrease) (ap=4 mm and over, fz=0.25 mm/t and over)	●					●		
Surface finish oriented	●	●					●	
General milling of stainless steel		●			●			
Stainless steel (At chattering due to low rigidity machine or poor clamping power)	●				●			
Cast iron (For processing efficiency improvement)			●	●				
Cast iron (ap=4 mm and over, fz=0.25 mm/t and over)	●					●		
General milling of aluminum alloys		●						●
Aluminum alloys (at chattering due to low rigidity machine or poor clamping power)	●							●



Case studies

FC300

Machine part
Vc=170m/min
apxae=2.5x130mm
fz=0.183mm/t (Vf=500mm/min)
Wet
MFWN90160R-8T (8 flutes)
WNMU080608EN-GM (PR1510)

PR1510	Chip evacuation rate = 163cc/min
Competitor A (Positive cutter)	Chip evacuation rate = 68cc/min

Competitor A proceeded machining under low cutting conditions, as the workpiece was slipping because of the unstable chucking. With MFWN, stable machining was possible at higher cutting conditions. (User evaluation)

Manganese Steel

Construction machine part
Vc=150m/min
apxae=1x100mm
fz=0.2mm/t (Vf=668mm/min)
Dry
MFWN90100R-7T (7 flutes)
WNMU080608EN-GM (PR1525)

PR1525	Machining efficiency: 2 pcs/edge
Competitor B (Negative cutter) (Vertical inserts)	1 pc/edge

Despite instability with the long overhang of the workpiece, MFWN doubled tool life, improving the efficiency by 150%. (User evaluation)

Low cutting force 90° milling cutter

MFWN Mini

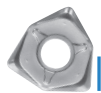
Economical small diameter MFWN series milling cutters
Additional fine pitch, small diameter toolholders available

1 Cost-efficient 6-edge inserts

Smaller insert design technology maintains original MFWN cutting performance
Can be used up to 5 mm depth of cut.

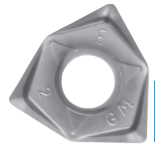
Smaller insert size

MFWN Mini
05 size



D.O.C. ~5 mm

MFWN
08 size



D.O.C. ~8 mm

Increased versatility

Large small-diameter lineup

High-efficiency machining with fine pitch styles

1 ~ 3 additional flutes



Expanded lineup of smaller diameters

Face Mill ø50
End Mill ø25 - ø40



2 Inherits previous MFWN series design elements and features

M

Low cutting force and high chattering-resistance

Superior fracture resistance with thick edge design

Neutral inserts for various uses



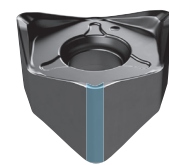
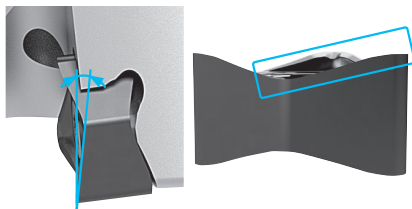
Sharp cutting by large rake angle
"Large slant edge" design reduces shock when cutting edge enters the workpiece

Stable clamping strength with unique insert face Design

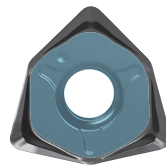
Symmetrical side and bottom cutting edges provide a wide range of machining applications

Milling

A.R. Max +11° "Large slant edge" design



Cutting edge thickness: 5.2 mm (3.1 mm at the thinnest point)

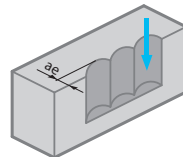


Optimized seating surface



Bottom edge

Plunging possible



Side edge

Left-handed toolholders are also available (Custom order)

Cutting edge angle 45°~70°

Cutting edge angle 75°

Cutting edge angle 88°/90°

Cutter for Finishing

High Feed Cutter

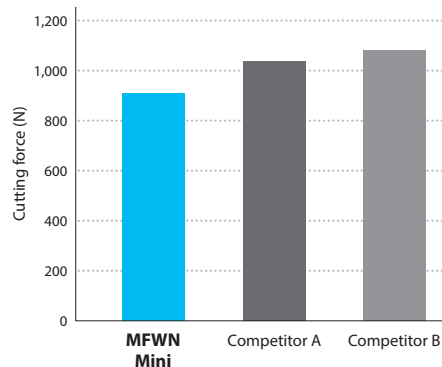
Multi-Function

Slot Mill

Ball-nose Radius

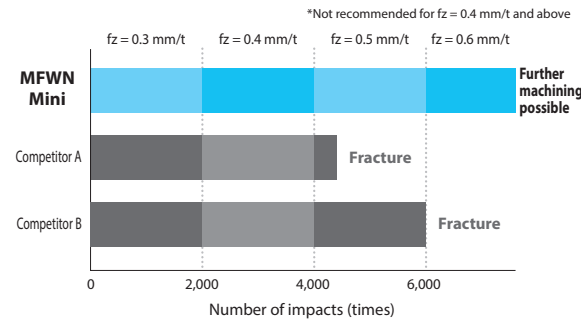
Others

Cutting force comparison (Internal evaluation)



Cutting conditions: $V_c = 150$ m/min, $f_z = 0.15$ mm/t, $a_p \times a_e = 1.5 \times 35$ mm, dry cutting, Dia.ø63, workpiece material: SCM440

Fracture resistance comparison (Internal evaluation)

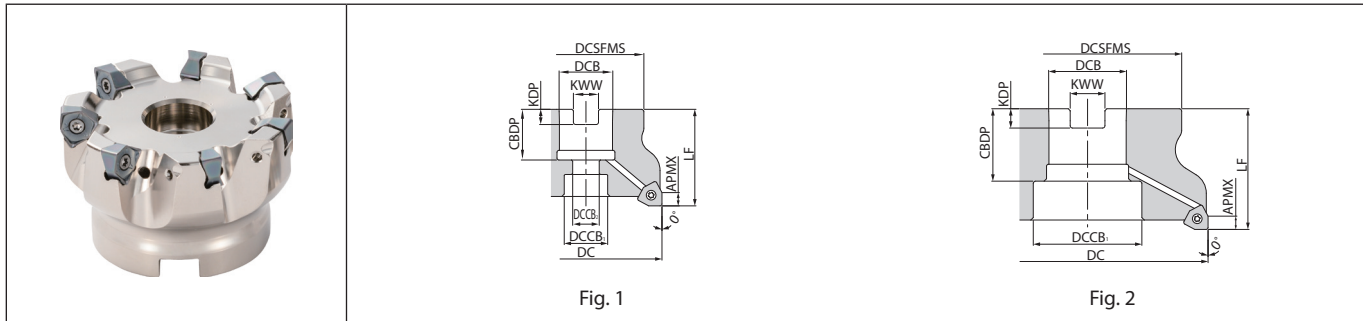


Cutting conditions: $V_c = 120$ m/min, $a_p \times a_e = 1.5 \times 30$ mm, Dry cutting, Dia.ø63 workpiece material: Mold Steel 37~43HRC

M116

MFWN Mini

MFWN Mini (Face mill)



Toolholder dimensions

Description		Availability	Dimension (mm)											A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M119					
			Inserts	DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX												
Metric	Fine pitch	●	5	50	48	22	17.5	11	40	21	6.3	10.4	5	+11	-9	Yes	13800	0.4	1	WNUMU0504...					
		●	6	63			18														-8	12300	0.5	1	
		●	7	80	70	27	20	13	50	24	7	12.4											10900	1.2	1
		●	8	100	78	32	45	-		30	8	14.4											9700	1.6	2
		●	11	125	89	40	55	-		63	33	9									16.4			8700	2.8
Metric	Extra fine pitch	●	6	50	48	22	17.5	11	40	21	6.3	10.4	5	+11	-9	Yes	13800	0.4	1	WNUMU0504...					
		●	7	63			18														-8	12300	0.5	1	
		●	9	80	70	27	20	13	50	24	7	12.4											10900	1.2	1
		●	11	100	78	32	45	-		30	8	14.4											9700	1.5	2
		●	14	125	89	40	55	-		63	33	9									16.4			8700	2.7
Bore dia. inch spec	Fine pitch	●	7	80	70	25.4	20	13	50	27	6	9.5	5	+11	-7	Yes	10900	1.3	1	WNUMU0504...					
		●	8	100	78	31.75	45	-		34	8	12.7											9700	1.6	2
		●	11	125	89	38.1	55	-		63	38	10									15.9			8700	2.9
	Extra fine pitch	●	9	80	70	25.4	20	13	50	27	6	9.5	5	+11	-7	Yes	10900	1.2	1	WNUMU0504...					
		●	11	100	78	31.75	45	-		34	8	12.7											9700	1.6	2
		●	14	125	89	38.1	55	-		63	38	10	15.9			8700	2.8	2							

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.



Spare parts

Description		Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
Fine pitch	MFWN 90050R-05-5T-M	SB-3065TRP	DTPM-8	P-37	HH10×30
	90063R-05-6T-M				HH10×30
	90080R-05-7T(-M)				HH12×35
	90100R-05-8T(-M)				-
	90125R-05-11T(-M)				-
Extra fine pitch	MFWN 90050R-05-6T-M	SB-3065TRP	DTPM-8	P-37	HH10×30
	90063R-05-7T-M				HH10×30
	90080R-05-9T(-M)				HH12×35
	90100R-05-11T(-M)				-
	90125R-05-14T(-M)				-

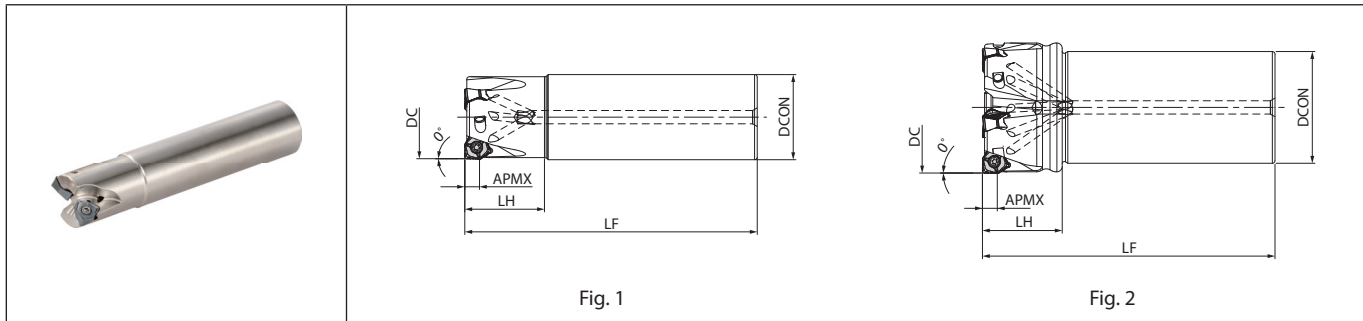
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Standard item

M117

MFWN Mini

MFWN Mini (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)						A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Spare parts			Applicable inserts ➔ M119
			R	DC	DCON	LF	LH	APMX						Screw	Wrench	Anti-seize compound	
MFWN 90025R-S25-05-2T	●	2	25	25	120	32	5	+11	Yes		19500	1	SB-306STRP	DTPM-8	P-37	WNMU0504...	
90032R-S32-05-3T	●	3	32		130	40					-14.5	17200					1
90040R-S32-05-4T	●	4	40		150	50					-12	15400					2
90050R-S32-05-5T	●	5	50	32							-10	13800					2
90063R-S32-05-6T	●	6	63		110	30					-9	12300					2
90080R-S32-05-7T	●	7	80								-8	10900					2
											-7						

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

Others

● : Standard item

M118

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t)	Recommended insert grades (Vc : m/min)			
			MEGACOAT NANO			MEGACOAT HARD
			PR1535	PR1525	PR1510	PR015S
GM	Carbon steel	0.1 – 0.2 – 0.25	☆ 120 – 180 – 250	★ 120 – 180 – 250	–	–
	Alloy steel		☆ 100 – 160 – 220	★ 100 – 160 – 220	–	–
	Mold steel	0.1 – 0.15 – 0.2	☆ 80 – 140 – 180	★ 80 – 140 – 180	–	–
	Stainless steel (Austenitic related)	0.1 – 0.15 – 0.2	☆ 100 – 160 – 200	☆ 100 – 160 – 200	–	–
	Stainless steel (Martensitic related)		☆ 150 – 200 – 250	–	–	–
	Stainless steel (Precipitation Hardening)		★ 90 – 120 – 150	–	–	–
	Gray cast iron	0.1 – 0.2 – 0.25	–	–	★ 120 – 180 – 250	–
	Nodular cast iron	0.1 – 0.15 – 0.2	–	–	★ 100 – 150 – 200	–
	Ni-base heat-resistant alloys	0.1 – 0.12 – 0.16	☆ 20 – 30 – 50	–	–	–
SM	Carbon steel	0.06 – 0.12 – 0.2	☆ 120 – 180 – 250	☆ 120 – 180 – 250	–	–
	Alloy steel		☆ 100 – 160 – 220	☆ 100 – 160 – 220	–	–
	Mold steel	0.06 – 0.08 – 0.15	☆ 80 – 140 – 180	☆ 80 – 140 – 180	–	–
	Stainless steel (Austenitic related)	0.06 – 0.12 – 0.2	★ 100 – 160 – 200	☆ 100 – 160 – 200	–	–
	Stainless steel (Martensitic related)		☆ 150 – 200 – 250	–	–	–
	Stainless steel (Precipitation Hardening)		☆ 90 – 120 – 150	–	–	–
	Gray cast iron	0.06 – 0.12 – 0.2	–	–	☆ 120 – 180 – 250	–
	Nodular cast iron	0.06 – 0.08 – 0.15	–	–	☆ 100 – 150 – 200	–
	Ni-base heat-resistant alloys	0.06 – 0.08 – 0.15	★ 20 – 30 – 50	–	–	–
Titanium alloys	0.06 – 0.08 – 0.15	★ 40 – 60 – 80	–	☆ 40 – 60 – 80	–	
GH	Carbon steel	0.15 – 0.2 – 0.3	☆ 120 – 180 – 250	☆ 120 – 180 – 250	–	–
	Alloy steel		☆ 100 – 160 – 220	☆ 120 – 160 – 220	–	–
	Mold steel	0.15 – 0.2 – 0.25	☆ 80 – 140 – 180	☆ 80 – 140 – 180	–	–
	Stainless steel (Austenitic related)	0.15 – 0.2 – 0.25	☆ 100 – 160 – 200	☆ 100 – 160 – 200	–	–
	Stainless steel (Martensitic related)		☆ 150 – 200 – 250	–	–	–
	Stainless steel (Precipitation Hardening)		☆ 90 – 120 – 150	–	–	–
	Gray cast iron	0.15 – 0.2 – 0.3	–	☆ 120 – 180 – 250	☆ 120 – 180 – 250	–
	Nodular cast iron	0.15 – 0.2 – 0.25	–	☆ 100 – 150 – 200	☆ 100 – 150 – 200	–
	Ni-base heat-resistant alloys	0.1 – 0.15 – 0.2	☆ 20 – 30 – 50	–	–	–
Hardened Material (60 HRC or less)	0.05 – 0.08 – 0.16	–	–	–	★ 50 – 80 – 100	

The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
 Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
 When using GH chipbreaker in fine pitch cutters, recommended feed is fz ≤ 0.2 (mm/t).
 GH chipbreaker is not recommended for extra fine pitch cutters.

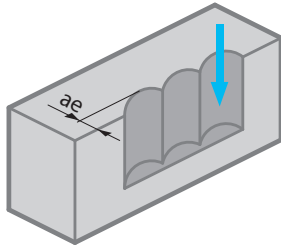
★ : 1st Recommendation
 ☆ : 2nd Recommendation



Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Vertical milling (Plunging)



Available for vertical milling (Plunging)

Cutting Dia.	Maximum width of cut (ae)
All Description	5 mm

Ramping and helical milling are not recommended due to interference between workpiece and flank face

Applicable chipbreaker

Cutter type	Chipbreaker		
	GM	SM	GH
Fine pitch	✓	✓	✓
Extra fine pitch	✓	✓	(Feed rate is recommended fz=0.2 mm/t or under)

How to mount an insert

1. Completely eliminate chips and dust from the insert mounting side.
2. Clamp Screw
 - Apply anti-seize compound on portion of taper and thread of clamp screw.
 - After mounting a clamp screw on the top edge of wrench, tighten the screw while keeping the insert pushed against the shim seat surface and holder surface (Fig.1)
3. When tightening the screw, make sure that the wrench is parallel to the screw.
Recommended tightening torque . . . 1.2N·m
4. After tightening, check that there is no gap between the insert and the surface of the shim, or between the side surface of insert and the holder surface.
If there is a gap, remount the insert using the directions above.

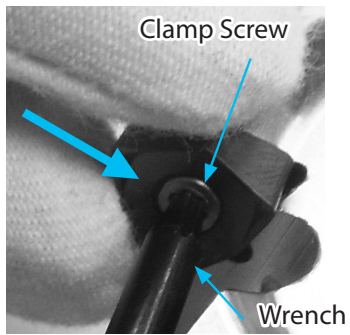


Fig. 1

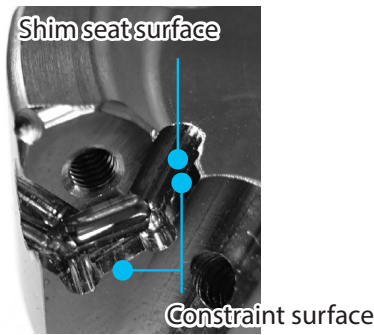


Fig. 2

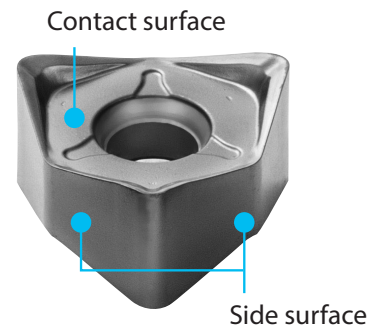


Fig. 3



Cutting edge angle 88°, high efficiency cutter

MFSN88

Economical double-sided 8-edge insert suitable for shoulder roughing

Reduces chattering with a low cutting force design

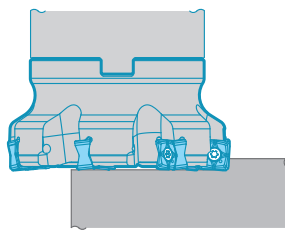
Applicable to various types of machining with product lineup from $\phi 32$

1 Economical double-sided 8-edge insert suitable for shoulder roughing

Cost reduction in approximately 90° corner cutting

Shoulder roughing

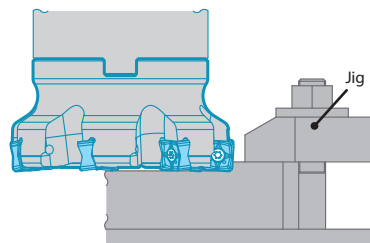
Cost reduction by switching from 90° cutter with positive inserts



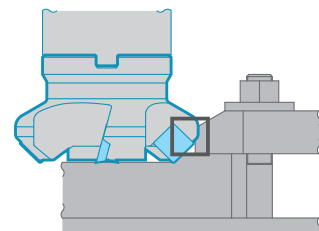
See page M127 for unmachined corner portion

Facing without interfering with fixtures

MFSN88



Conventional 45° cutter



M

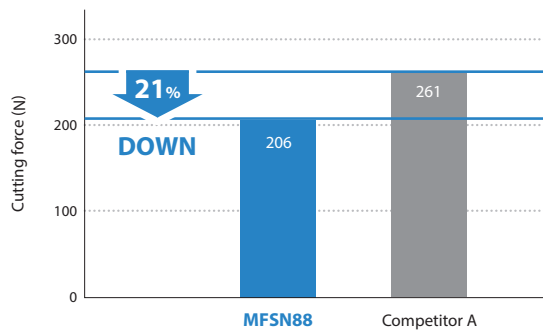


Milling

2 Reduces chattering with a low cutting force design

Chatter resistant medium to roughing machining range

Cutting force comparison (Internal evaluation)



Cutting force is thrust force

Cutting conditions: $V_c = 200$ m/min, $a_p = 3$ mm, $f_z = 0.15$ mm/t
Cutter dia. $\phi 63$; Workpiece material: S50C

3 Extended tool life by MEGACOAT NANO

Insert grade and chipbreaker lineup for various machining application



1st Recommendation
(General purpose)
GM chipbreaker



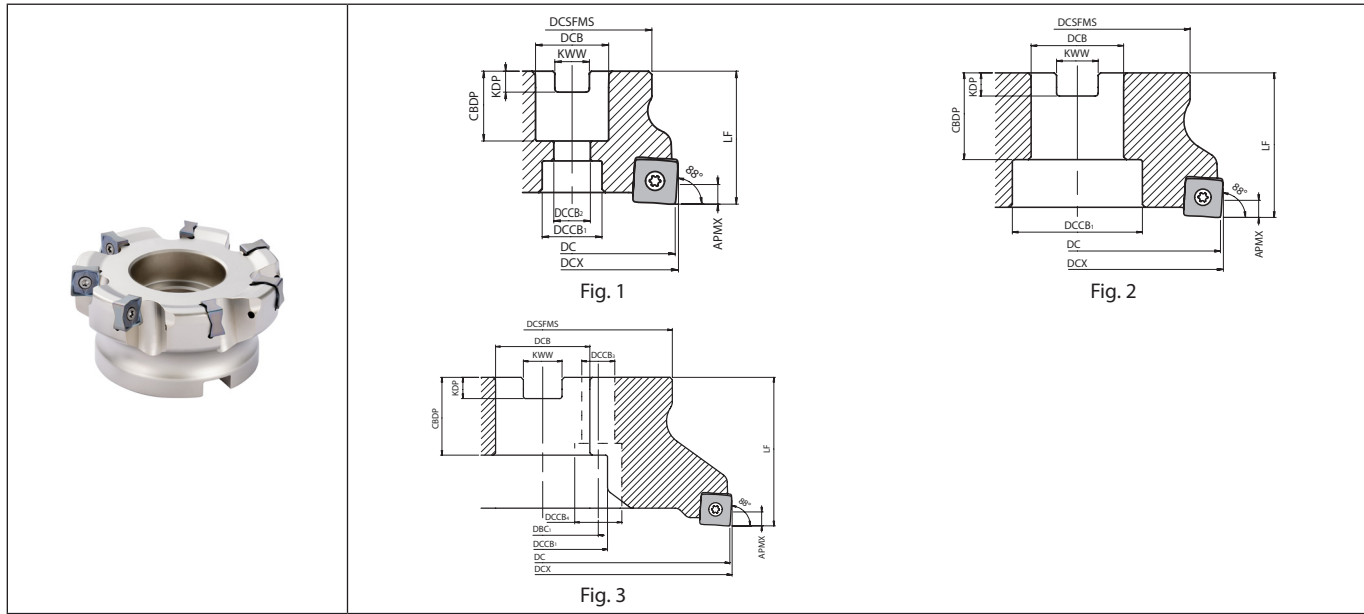
Tough edge
GH chipbreaker



For stainless steel
SM chipbreaker

M122

MFSN88 (Face mill)



Toolholder dimensions

Description		Availability	Dimension (mm)													A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts M126			
			Inserts	DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DBG	LF	CBDP	KDP							KWW		
Metric	Fine pitch	MFSN 88050R-4T-M-G	●	4	50	52	48	22	17.5	11					40	21	6.3	10.4	+10	-12	No	0.3	1	SNMU1305...
		MFSN 88063R-5T-M-G	●	5	63	65	48	22	18	11					40	21	6.3	10.4	+10	-10	No	0.4	1	
		MFSN 88080R-6T-M-G	●	6	80	82	70	27	20	13					50	24	7	12.4	+10	-9	No	1.1	1	
		MFSN 88100R-7T-M-G	●	7	100	102	78	32	45						50	30	8	14.4	+10	-8	No	1.4	2	
		MFSN 88125R-9T-M-G	●	9	125	127	89	40	55						63	33	9	16.4	+10	-7.5	No	2.4	2	
		MFSN 88160R-11T-M-G	●	11	160	162	110	40	55			14	20	66.7		63	33	9	16.4	+10	-7	No	4.2	
Metric	Extra fine pitch	MFSN 88050R-5T-M-G	●	5	50	52	48	22	17.5	11					40	21	6.3	10.4	+10	-12	No	0.3	1	SNMU1305...
		MFSN 88063R-7T-M-G	●	7	63	65	48	22	18	11					40	21	6.3	10.4	+10	-10	No	0.4	1	
		MFSN 88080R-9T-M-G	●	9	80	82	70	27	20	13					50	24	7	12.4	+10	-9	No	1.1	1	
		MFSN 88100R-11T-M-G	●	11	100	102	78	32	45						50	30	8	14.4	+10	-8	No	1.4	2	
		MFSN 88125R-13T-M-G	●	13	125	127	89	40	55						63	33	9	16.4	+10	-7.5	No	2.5	2	
		MFSN 88160R-15T-M-G	●	15	160	162	110	40	55			14	20	66.7		63	33	9	16.4	+10	-7	No	4.3	
Bore dia. inch spec	Fine pitch	MFSN 88080R-6T-G	●	6	80	82	70	25.4	20	13					50	27	6	9.5	+10	-9	No	1.1	1	SNMU1305...
		MFSN 88100R-7T-G	●	7	100	102	78	31.75	45					50	34	8	12.7	+10	-8	No	1.5	2		
		MFSN 88125R-9T-G	●	9	125	127	89	38.1	55					63	38	10	15.9	+10	-7.5	No	2.5	2		
		MFSN 88160R-11T-G	●	11	160	162	110	50.8	70					63	38	11	19.1	+10	-7	No	4.1	2		
Bore dia. inch spec	Extra fine pitch	MFSN 88080R-9T-G	●	9	80	82	70	25.4	20	13					50	27	6	9.5	+10	-9	No	1.1	1	SNMU1305...
		MFSN 88100R-11T-G	●	11	100	102	78	31.75	45					50	34	8	12.7	+10	-8	No	1.5	2		
		MFSN 88125R-13T-G	●	13	125	127	89	38.1	55					63	38	10	15.9	+10	-7.5	No	2.6	2		
		MFSN 88160R-15T-G	●	15	160	162	110	50.8	70					63	38	11	19.1	+10	-7	No	4.3	2		





APMX : 5 mm (GM, SM, GH Chipbreakers, Coated cabide), 3 mm (GM Chipbreaker, Cermet)


● : Standard item



Milling

Spare parts (common to Metric / Inch spec)

Description		Clamp screw	Wrench	Anti-seize compound	Mounting bolt
					
Fine pitch	MFSN 88050R-4T(-M)-G	SB-4090TRP	DTPM-15	P-37	HH10X30
	88063R-5T(-M)-G				HH10X30
	88080R-6T(-M)-G				HH12X35
	88100R-7T(-M)-G				-
	88125R-9T(-M)-G				-
	88160R-11T(-M)-G				-
Extra fine pitch	MFSN 88050R-5T(-M)-G	SB-4090TRP	DTPM-15	P-37	HH10X30
	88063R-7T(-M)-G				HH10X30
	88080R-9T(-M)-G				HH12X35
	88100R-11T(-M)-G				-
	88125R-13T(-M)-G				-
	88160R-15T(-M)-G				-

 Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

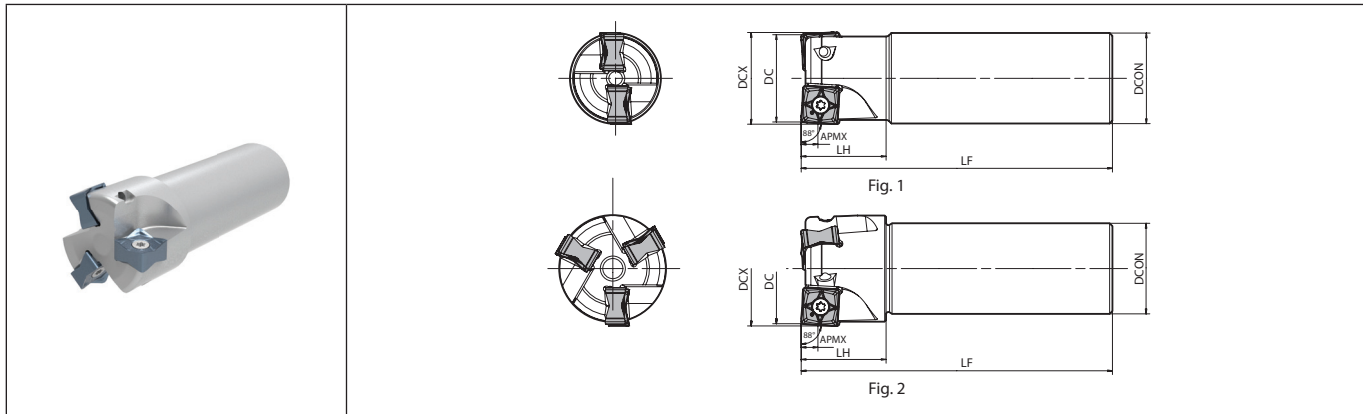
Multi-
Function

Slot Mill

Ball-nose
Radius

Others

MFSN88 (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)						A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts M126
			DC	DCX	DCON	LF	LH	Screw					Wrench	Anti-seize compound		
			R													
MFSN 88032R-S32-2T-G	●	2	32	34	32	110	30	+10	-15.5	No	1				SNMU1305...	
88040R-S32-3T-G	●	3	40	42				-13		2	SB-4090TRP	DTPM-15	P-37			

APMX : 5 mm (GM, SM, GH Chipbreakers, Coated cabide), 3 mm (GM Chipbreaker, Cermet)
 Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
 Recommended tightening torque for insert clamp : 3.5N·m

● : Standard item



Milling

SNMU

Insert		Description	Dimension (mm)					Carbide				Applicable toolholder ● M123 M125
			IC	S	D1	RE	BS	PVD			Cermet	
								PR015S	PR1510	PR1525		
 General purpose		SNMU 130508EN-GM	13	5.51	4.7	0.8	1	●	●	●	●	MFSN88...
 Low cutting force		SNMU 130508EN-SM	13	5.51	4.7	0.8	1	●	●	●	-	MFSN88...
 Tough edge		SNMU 130508EN-GH	13	5.51	4.7	0.8	1	●	●	●	●	MFSN88...

Classification of usage

★ : Roughing / 1st Choice
 ☆ : Roughing / 2nd Choice
 ■ : Finishing / 1st Choice
 □ : Finishing / 2nd Choice
 (In case hardness is 45HRC or under)

Carbon steel / Alloy steel	★	★	■	P
Mold and die steel	★	★	■	P
Austenitic stainless steel	☆	★	■	M
Martensitic stainless steel	★	■	■	M
Precipitation hardening stainless steel	★	■	■	M
Gray cast iron	★	■	■	K
Nodular cast iron	★	■	■	K
Non-ferrous metals	■	■	■	N
Heat-resistant alloy	★	■	■	S
Titanium alloy	★	■	■	S
Hard materials	★	■	■	H

Recommended cutting conditions ● M127

M

Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M126

Recommended cutting conditions

Coated carbide

Chipbreaker	Workpiece material	Feed (fz: mm/t)	Recommended insert grades (Vc: m/min)			
			MEGACOAT (PVD Coated carbide)			
			PR1535	PR1525	PR1510	PR0155
GM	Carbon steel	0.1~ 0.2 ~0.3	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-
	Alloy steel	0.1~ 0.2 ~0.3	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-
	Mold steel	0.1~ 0.15 ~0.25	★ 80~ 140 ~180	★ 80~ 140 ~180	-	-
	Stainless steel (Austenitic related)	0.1~ 0.15 ~0.25	☆ 100~ 150 ~200	☆ 100~ 150 ~200	-	-
	Stainless steel (Martensitic related)	0.1~ 0.15 ~0.25	☆ 100~ 150 ~200	-	-	-
	Stainless steel (Precipitation hardening)	0.1~ 0.15 ~0.25	★ 90~ 120 ~150	-	-	-
	Gray cast iron	0.1~ 0.2 ~0.3	-	-	★ 120~ 180 ~250	-
	Nodular cast iron	0.1~ 0.15 ~0.25	-	-	★ 100~ 150 ~200	-
	Ni-base heat-resistant alloys	0.1~ 0.12 ~0.2	☆ 20~ 30 ~50	-	-	-
SM	Carbon steel	0.06~ 0.12 ~0.2	-	☆ 120~ 180 ~250	-	-
	Alloy steel	0.06~ 0.12 ~0.2	-	☆ 100~ 160 ~220	-	-
	Mold steel	0.06~ 0.08 ~0.15	-	☆ 80~ 140 ~180	-	-
	Stainless steel (Austenitic related)	0.06~ 0.12 ~0.2	★ 100~ 150 ~200	☆ 100~ 150 ~200	-	-
	Stainless steel (Martensitic related)	0.06~ 0.12 ~0.2	★ 100~ 150 ~200	-	-	-
	Stainless steel (Precipitation hardening)	0.06~ 0.12 ~0.2	☆ 90~ 120 ~150	-	-	-
	Gray cast iron	0.06~ 0.12 ~0.2	-	-	☆ 120~ 180 ~250	-
	Nodular cast iron	0.06~ 0.1 ~0.15	-	-	☆ 100~ 150 ~200	-
	Ni-base heat-resistant alloys	0.06~ 0.08 ~0.15	★ 20~ 30 ~50	-	-	-
Titanium alloys	0.06~ 0.08 ~0.15	★ 40~ 60 ~80	-	-	-	
GH	Carbon steel	0.15~ 0.25 ~0.35	-	☆ 120~ 180 ~250	-	-
	Alloy steel	0.15~ 0.25 ~0.35	-	☆ 100~ 160 ~220	-	-
	Mold steel	0.1~ 0.2 ~0.3	-	☆ 80~ 140 ~180	-	-
	Gray cast iron	0.15~ 0.25 ~0.35	-	-	☆ 120~ 180 ~250	-
	Nodular cast iron	0.1~ 0.2 ~0.3	-	-	☆ 100~ 150 ~200	-
	Hard materials (60HRC or less)	0.1~ 0.2 ~0.3	-	-	-	★ 50~ 80 ~100

* The bold-faced number indicates a center value of recommended cutting condition.
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

★: 1st Recommendation
☆: 2nd Recommendation

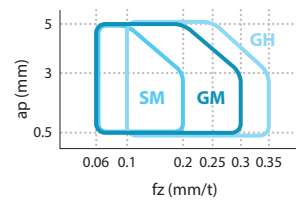
Cermet

Chipbreaker	Workpiece material	Feed (fz: mm/t)	Recommended insert grades (Vc: m/min)
			Cermet TN620M
GM	Carbon steel	0.06~ 0.12 ~0.15	★ 200~ 250 ~300
	Alloy steel	0.06~ 0.12 ~0.15	★ 180~ 220 ~250
	Mold steel	0.06~ 0.1 ~0.13	★ 150~ 180 ~220

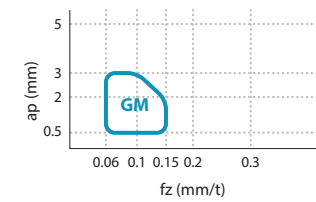
★: 1st Recommendation

Applicable chipbreaker range

Coated carbide



Cermet



Applicable chipbreaker

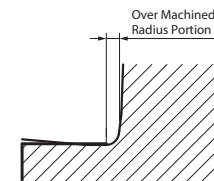
Cutter type	Chipbreaker		
	GM	SM	GH
Fine pitch	✓	✓	✓
Extra fine pitch	✓	✓	△ (Feed rate is recommended fz=0.2mm/t or under)

Not available for vertical milling (plunging).

Reference data of Over Machined Radius Portion

ap	1 mm	2 mm	3 mm	4 mm	5 mm
Over Machined Radius Portion	0.12 mm	0.24 mm	0.27 mm	0.31 mm	0.34 mm

Over machined radius portion to 90°cutter



M127



Milling

Face mills for heavy milling

MFLN

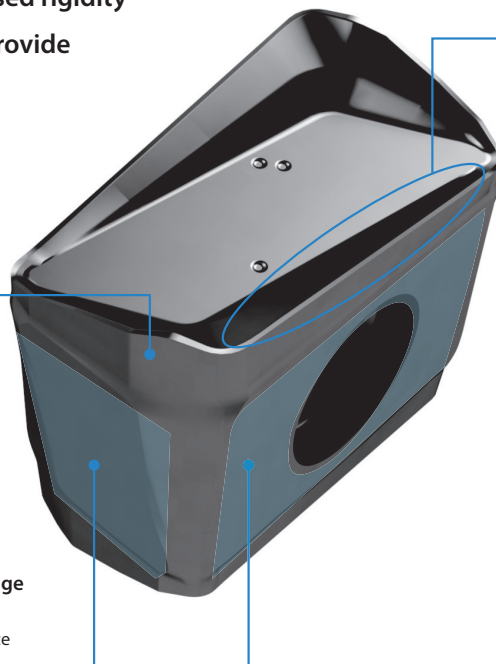
Tough 4-edge tangential inserts provide high reliability on heavy milling at large depths of cut and high feed rates.

Three cutting edge angles (incl. MFLN45 and MFLN70) optimized for various machining applications.

1 Tough and reliable inserts for stable heavy milling

22 mm long inserts offer increased rigidity

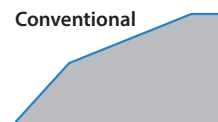
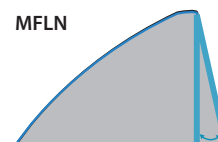
Tangentially mounted inserts provide 2 cutting edges on both sides



Obtuse edge design

Increases the cutting edge angle only at the tip to maintain both strength and sharpness

Cross-section view of cutting edge

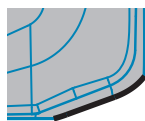


Corner chamfer

only available on MFLN90

Both general corner-R type and chamfered corner type available

Prevents chattering and insert fracturing



Convex cutting edge ridge

Reduced impact forces when entering the workpiece



Wide flat mounting surface

Hold an insert firmly in heavy milling

M



Milling

Cutting edge angle 45°~70°

Cutting edge angle 75°

Cutting edge angle 88°/90°

Cutter for Finishing

High Feed Cutter

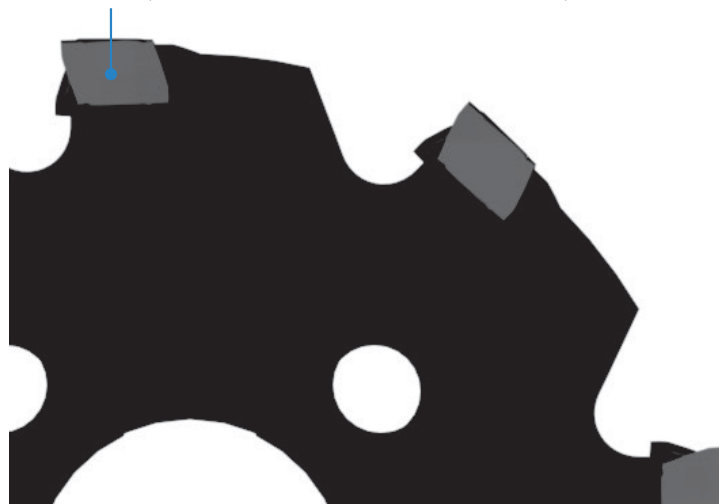
Multi-Function

Slot Mill

Ball-nose Radius

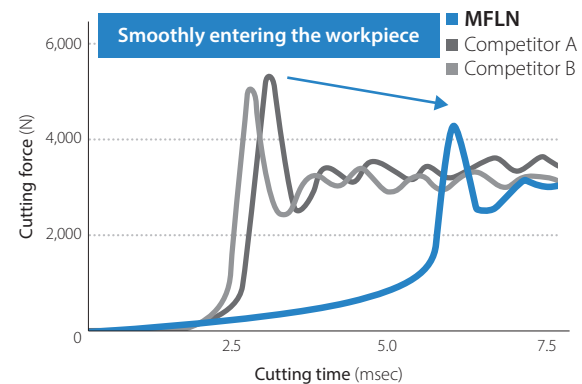
Others

Tangentially mounted inserts increase rigidity



Cutting forces when entering the workpiece (internal evaluation)

MFLN90: Insert - chamfered corner type

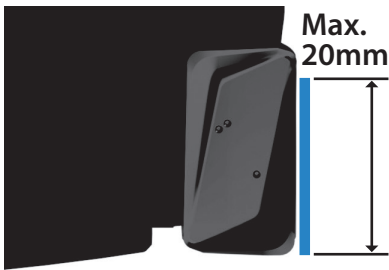


Cutting conditions: Vc = 150 m/min, ap x ae = 5 x 75 mm, fz = 0.3 mm/t ø125 (1 insert), dry, workpiece: S50C

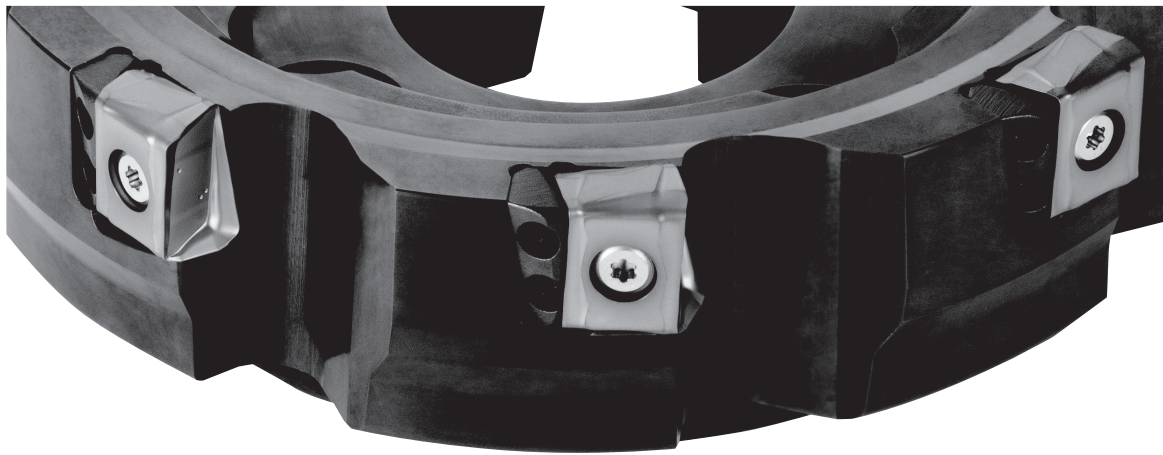
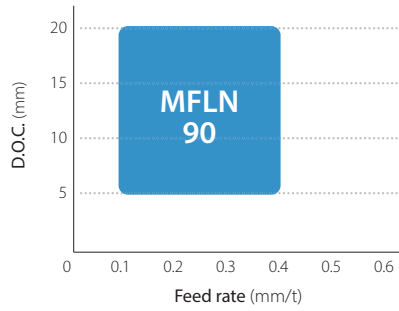
M128

2 Large D.O.C. and high feed rates

MFLN90
Cutting edge angle 90°



Applicable range

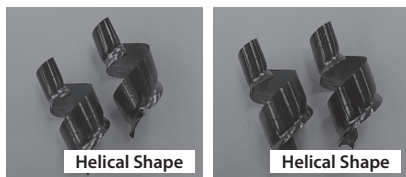


Milling

Chip comparison (Internal evaluation)

Helix-shaped chips prevent chip recutting and provide stable machining at high feed rates.

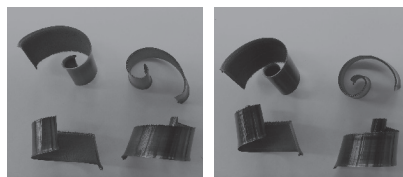
MFLN90 Stable



fz = 0.3 mm/t

fz = 0.4 mm/t

Competitor A Unstable



fz = 0.3 mm/t

fz = 0.4 mm/t

Competitor B Unstable

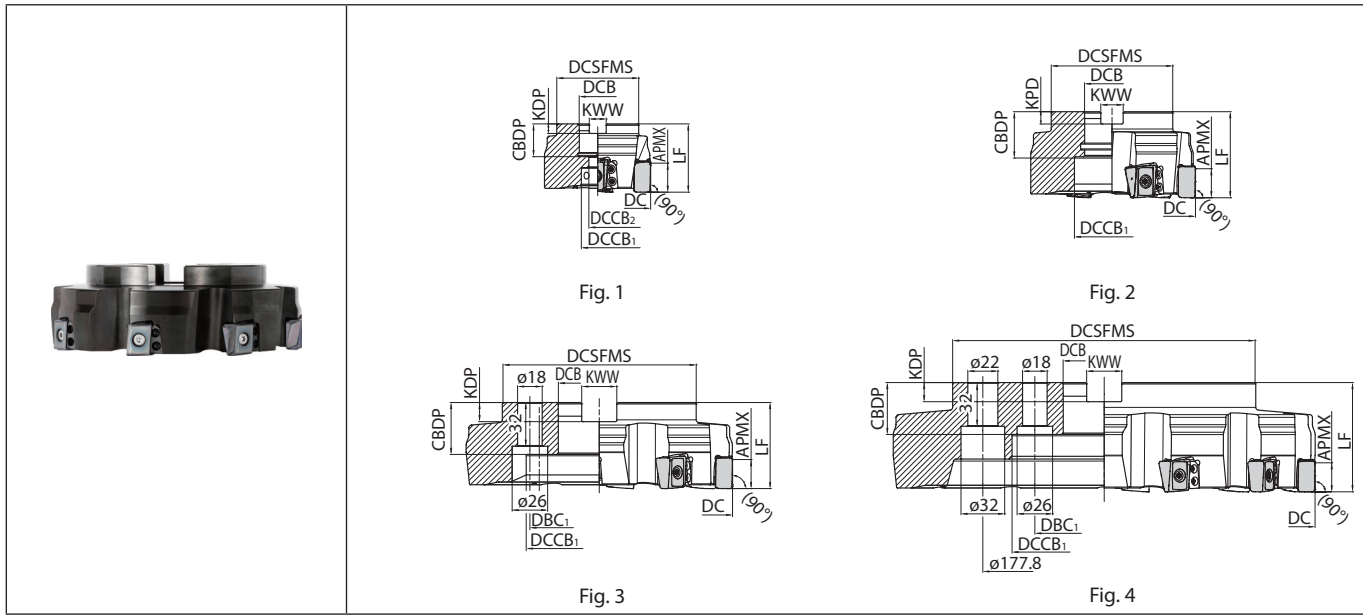


fz = 0.3 mm/t

fz = 0.4 mm/t

Cutting conditions: Vc = 150 m/min, ap x ae = 10 x 100 mm, fz = 0.3, 0.4 mm/t, ø125 (1 insert), dry, workpiece: S50C

MFLN90



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)											A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M131
			DC	DCSFMS	DCB	DCCB _h	DCCB ₂	DBC ₁	LF	CBDP	KDP	KWW	APMX							
Metric	●	4	80	60	27	24	13	-	50	24	7	12.4	20	+4.5	-13.5	Yes	5970	1	1	LOGU221616ER-GM LOGU2216PAER-GM
		6	100	70	32	45	-	30	8	14.4	4780	1.5					2			
		8	125	89	40	55	-	33	9	16.4	3820	2.9					2			
		10	160	110	40	90	66.7	63	9	16.4	2990	4.5					3			
		12	200	142	60	132	101.6	63	14	25.7	2390	6.9					3			
		15	250	180	60	172	101.6	80	14	25.7	1910	10.3					3			
		MTO	315	222	60	205	101.6	80	14	25.7	1520	20.9					4			
Bore dia. inch spec	●	4	80	60	25.4	24	13	-	50	27	6	9.5	20	+4.5	-13.5	Yes	5970	1	1	LOGU221616ER-GM LOGU2216PAER-GM
		6	100	70	31.75	45	-	34	8	12.7	4780	1.6					2			
		8	125	89	38.1	55	-	34	10	15.9	3820	3					2			
		10	160	110	50.8	90	66.7	63	11	19.1	2990	4.6					2			
		12	200	142	60	132	101.6	63	14	25.4	2390	7.2					3			
		15	250	180	60	172	101.6	80	14	25.4	1910	10.5					3			
		MTO	315	222	60	205	101.6	80	14	25.4	1520	21.8					4			

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

Spare parts

Description	Parts						
	Clamp screw	Wrench	Shim	Clamp screw	Wrench	Anti-seize compound	Arbor bolt
MFLN ○○080R-4T(-M)							
MFLN ○○100R-4T(-M)	SB-60200TRP	TTP-20	MAP-2216	SB-40140TR	DTM-15	P-37	HH12X35
MFLN ○○315R-12T(-M)	Tightening torque for clamping insert 6.0 N·m		Tightening torque for clamping shim 3.5 N·m				-

● : Standard item MTO : Made to order

M130

LOGU

Insert		Description	Dimension (mm)						Carbide		Applicable toolholder M130 M34 M35
			S	D1	RE	W1	INSL	BS	PVD		
			PRI525		PRI535						
<p>Classification of usage</p> <p>★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)</p>			Carbon steel / Alloy steel	★	☆			P			
			Mold and die steel	★	☆			P			
			Austenitic stainless steel					M			
			Martensitic stainless steel					M			
			Precipitation hardening stainless steel					M			
			Gray cast iron	★	☆			K			
			Nodular cast iron	★	☆			K			
			Non-ferrous metals					N			
			Heat-resistant alloy					S			
			Titanium alloy					S			
			Hard materials					H			
		LOGU 221616ER-GM	16.6	6.8	1.6	12.5	22.8	6.3	● ●	MFLN90... MFLN45... MFLN70...	
		LOGU 2216PAER-GM	16.9	6.8	-	12.5	22.8	4.8	● ●	MFLN90...	

Recommended cutting conditions M132

About applicable insert

	LOGU221616ER-GM (Corner-R)	LOGU2216PWER-GM (Corner chamfer)
MFLN 90	✓	✓

● : Standard item



Milling

Recommended cutting conditions

	Workpiece material	D.O.C. (mm)		fz: mm/t	Recommended insert grades (Vc: m/min)	
		Width of cut ≤0.5×DC	Width of cut >0.5×DC		MEGACOAT NANO	
					PR1535	PR1525
MFLN 90	Carbon steel	~18	~15	0.1 – 0.2 – 0.4	☆ 80 – 120 – 150	★ 100 – 150 – 180
	Alloy steel				☆ 80 – 120 – 150	★ 100 – 150 – 180
	Mold steel				☆ 70 – 100 – 120	★ 80 – 120 – 150
	Gray cast iron	~20	~18	0.1 – 0.2 – 0.4	☆ 80 – 120 – 150	★ 100 – 150 – 180
	Nodular cast iron				☆ 80 – 120 – 150	★ 100 – 150 – 180

The table above provides recommendations based on product specifications.
Before using the product, check the machine's specifications such as power.

★ : 1st recommendation ☆ : 2nd recommendation

The number in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
Dry machining is recommended.

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

Others

How to mount an insert

1. Completely eliminate chips and dust from the insert mounting side.
2. After mounting a clamp screw on the top edge of wrench, tighten the screw while keeping the insert pushed against the shim seat surface and holder surface (Fig.1,2)
3. Make sure that the identification on the top of the insert is the same in each pocket.(Fig.3)
4. Tighten the wrench (TTP-20) in while holding parallel to the clamp screw.
5. Tighten the insert clamp screw at an appropriate torque. (Recommended torque: 6.0 N·m)
6. After tightening, check that there is no gap between the insert and the surface of the shim, or between the side surface of insert and the holder surface. If there is a gap, remount the insert using the directions above.

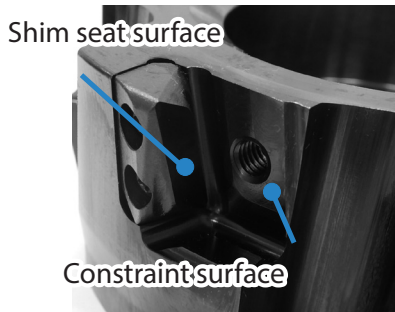


Fig.1

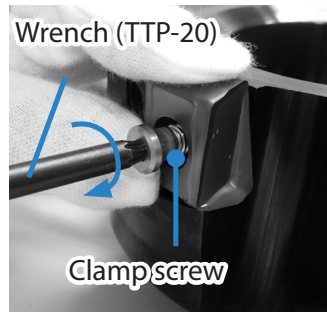


Fig.2

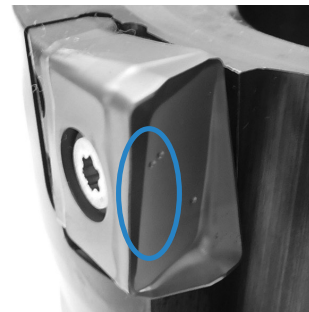


Fig.3

How to replace a shim

1. Completely eliminate chips and dust from the shim mounting side.
2. Coat medium strength screw locking adhesive on the screws.
3. Tighten the screw keeping the shim pushed against the pocket surface of toolholder.
4. After tightening both screws temporarily, tighten them with appropriate torque. (Recommended torque:3.5 N·m)
5. Please check that there is no gap between the shim and the pocket surfaces of toolholder.

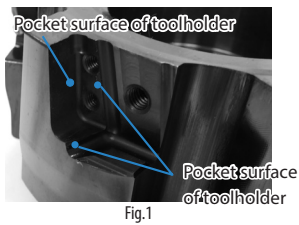


Fig.1

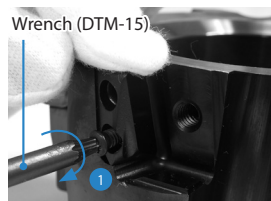


Fig.2

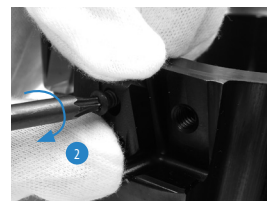


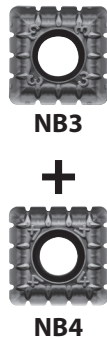
Fig.3



Fig.4

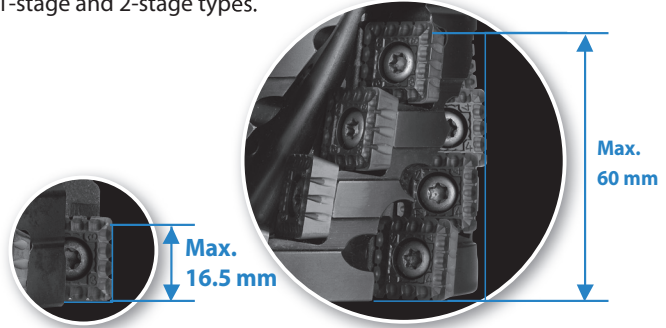


Face mill for heavy milling MSRS90



Wide selection of cutting edge length according to cutting conditions

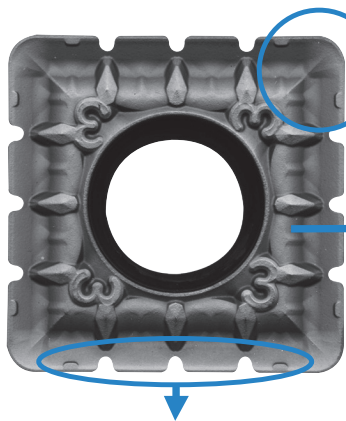
4-stage type (ø80, ø100) is added to the standard lineup as well as 1-stage and 2-stage types.



High efficiency, low cutting force and stable machining without chattering Neutral and corner-R insert

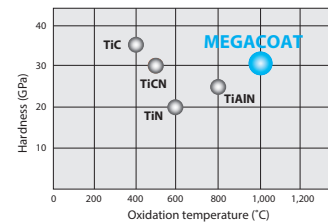
Applicable to shouldering (Cutting edge angle: 90°), high feed milling (Cutting edge angle: 30°), plunging, and side cutter.

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



Neutral insert with corner-R is available to various applications

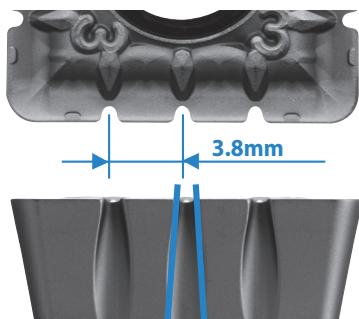
Long tool life: MEGACOAT



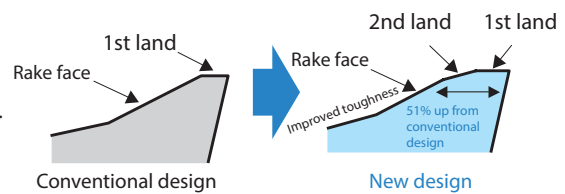
High hardness and high oxidation resistance long tool life: MEGACOAT

Notched insert SPMT180616EN

The notched insert breaks chips into small pieces and reduces cutting force. The second land near the cutting edge improves edge strength.



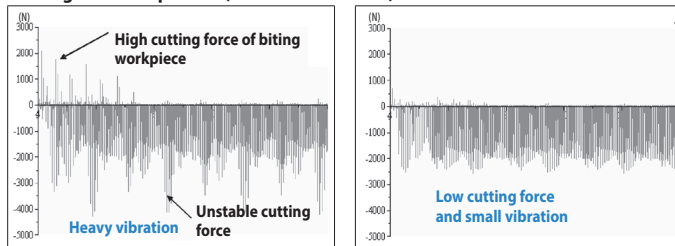
For neutral (Right/Left) hand
Applicable for various cutting edge angle.
Cutting edge length: 18mm



Edge preparation

Low cutting force (Notched insert benefit)








Cutting force comparison (Internal evaluation)



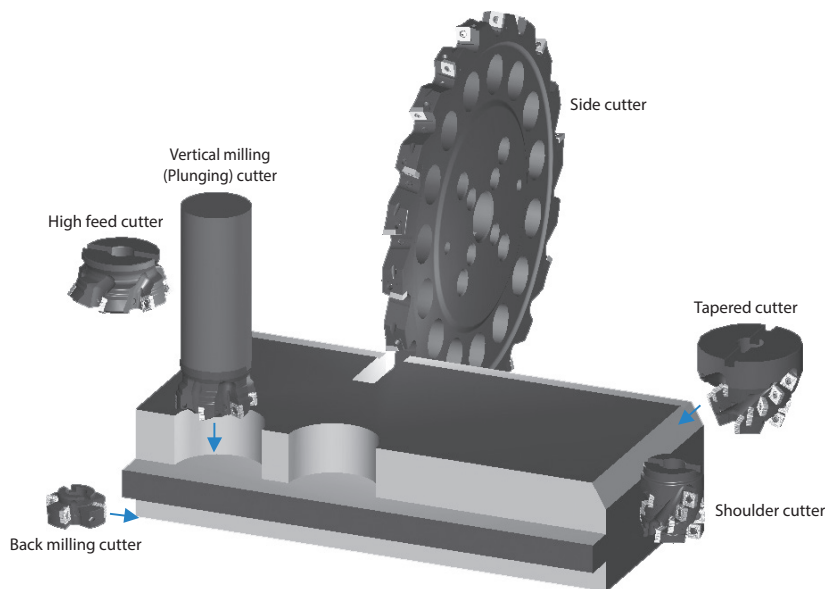
Notched insert realizes lower cutting force and smaller vibration

- M
- Milling
- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Applicable inserts: Available for various applications

Applications	Chipbreaker selection	3-notched	4-notched	Without notch
General purpose	Standard	 + 		
Low cutting force	Low cutting force	 + 		
Edge strength oriented	Without notch (Usable with notched inserts)	( or ) + 		

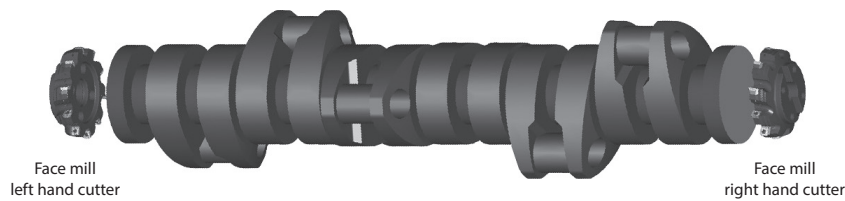
Various expansive possibilities (Custom-ordered and standard milling cutter)



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



Shaft length determination



MSRS90

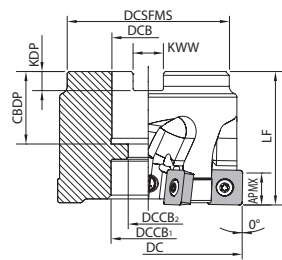


Fig. 1

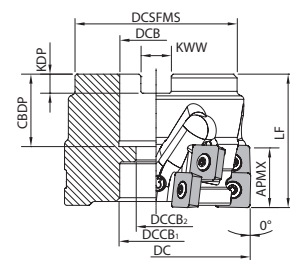


Fig. 2

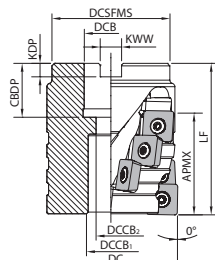


Fig. 3

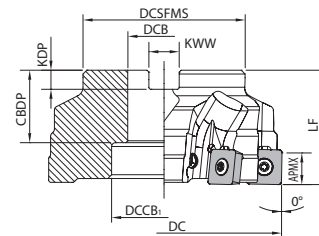


Fig. 4

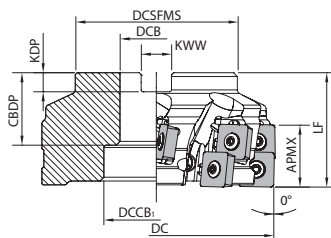


Fig. 5

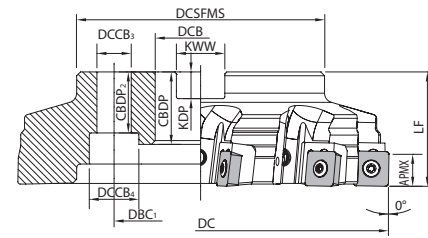


Fig. 6

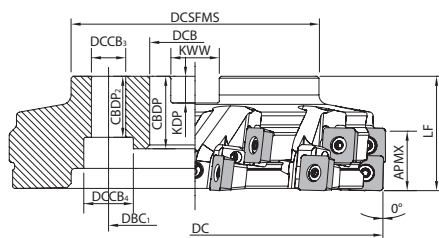


Fig. 7

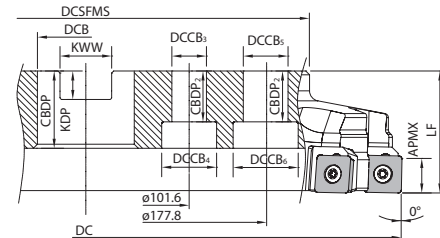


Fig. 8



Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function


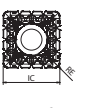

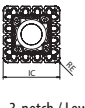

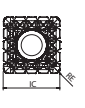

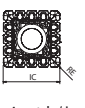

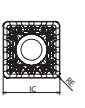
Slot Mill

Ball-nose
Radius

Others

SPMT

Insert		Description	No. of edges	Dimension (mm)					Angle (°)	Carbide		Applicable toolholder ➔ M137
				IC	S	D1	RE	AN		PVD		
										PR1210	PR1220	
Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)									★	★	P	
									★	★	M	
									★	★	K	
									★	★	N	
									★	★	S	
									★	★	H	
									□	□		

	 3-notch	SPMT 180616EN-NB3	4	18	6.35	6.8	1.6	11	●	●	MSRS90...
	 3-notch / Low cutting force	SPMT 180616EN-NB3P	4	18	6.35	6.8	1.6	11	●	●	MSRS90...
	 4-notch	SPMT 180616EN-NB4	4	18	6.35	6.8	1.6	11	●	●	MSRS90...
	 4-notch / Low cutting force	SPMT 180616EN-NB4P	4	18	6.35	6.8	1.6	11	●	●	MSRS90...
	 Without notch	SPMT 180616EN-V	4	18	6.35	6.8	1.6	11	●	●	MSRS90...

Recommended cutting conditions ➔ M139

M



Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

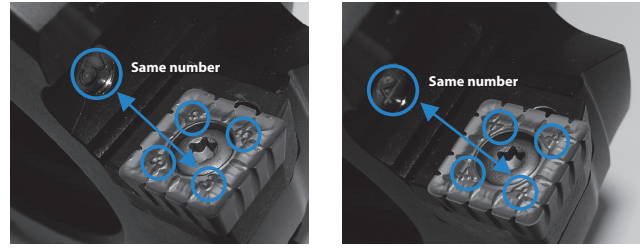
● : Standard item

M138

Caution when installing notched insert

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

When installing the inserts, match the number on the top surface of insert to the number 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

Spare parts

Description	Spare parts									
	Clamp screw	Wrench	Cartridge		Clamp screw	Wrench	Anti-seize compound	Mounting bolt		
			MAP-1806M	MAP-1806S (Bottom edge only)						
Without cartridge MSRS 90080R-○-4T-M 90100R-○-6T-M 90125R-○-8T-M	SB-60120TR	TT-25L	-	-	-	-	P-37	HH12X35		
With cartridge MSRS 90160R-○-8T-M 90315R-○-14T-M			MAP-1806M*1	MAP-1806S*2	SB-40140TR	DT-15		-		
Recommended tightening torque for cartridge clamp 3.5N·m										
Without cartridge MSRS 90080R-○-4T 90100R-○-6T 90125R-○-8T			Recommended tightening torque for insert clamp 7.5N·m		-	-		-	-	HH16X45 HH20X55
With cartridge MSRS 90160R-○-8T 90315R-○-14T					MAP-1806M*1	MAP-1806S*2		SB-40140TR	DT-15	-
Recommended tightening torque for cartridge clamp 3.5N·m										

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

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

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



Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

Recommended cutting conditions

Workpiece material	fz (mm/t)		Vc (m/min)	
	Standard NB3+NB4	Low cutting force NB3P+NB4P	MEGACOAT	
			PR1230	PR1210
Soft steel	0.1~ 0.2 ~0.25	0.1~ 0.2 ~0.25	★ 120~ 150 ~220	☆ 120~ 150 ~220
Carbon steel	0.1~ 0.2 ~0.25	0.1~ 0.2 ~0.25	★ 100~ 150 ~200	☆ 100~ 150 ~200
Alloy steel	0.1~ 0.15 ~0.2	0.1~ 0.15 ~0.2	★ 100~ 150 ~200	☆ 100~ 150 ~200
Mold steel	0.1~ 0.15 ~0.2	0.1~ 0.12 ~0.15	★ 100~ 150 ~180	☆ 100~ 150 ~180
Gray cast iron	0.1~ 0.2 ~0.3	0.1~ 0.2 ~0.25	☆ 100~ 180 ~250	★ 100~ 180 ~250
Nodular cast iron	0.1~ 0.2 ~0.25	0.1~ 0.18 ~0.2	☆ 100~ 180 ~220	★ 100~ 180 ~220
Stainless steel	Not recommended			
Aluminum/Copper	Not recommended			

★: 1st Recommendation ☆: 2nd Recommendation



Milling

Cutting conditions (Shouldering)

In case of MSRS90100R-1-6T

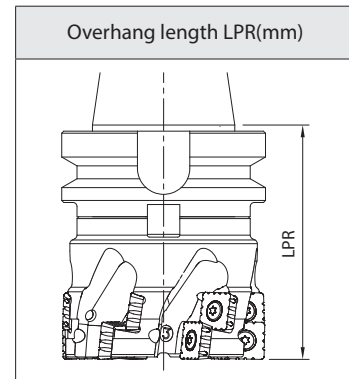
Workpiece material	Overhang length LPR(mm)	Cutting conditions		(ap × ae)	Chip evacuation rate (cc/min)
		Cutting speed Vc (m/min)	Feed fz (mm/t)		
Cast iron	Less than 120mm	180	0.2	15 × 80	826
	120~200mm	180	0.2	15 × 40	413
	201mm and over	230	0.1	15 × 40	263
Carbon steel	Less than 120mm	150	0.2	15 × 80	689
	120~200mm	150	0.2	15 × 40	344
	201mm and over	200	0.1	15 × 40	229

In case of MSRS90100R-2-6T

Workpiece material	Overhang length LPR(mm)	Cutting conditions		(ap × ae)	Chip evacuation rate (cc/min)
		Cutting speed Vc (m/min)	Feed fz (mm/t)		
Cast iron	Less than 120mm	180	0.2	30 × 50	1,032
	120~200mm	180	0.2	30 × 30	619
	201mm and over	230	0.1	30 × 25	329
Carbon steel	Less than 120mm	150	0.2	30 × 50	861
	120~200mm	150	0.2	30 × 30	517
	201mm and over	200	0.1	30 × 25	287

In case of MSRS90100R-4-6T

Workpiece material	Overhang length LPR(mm)	Cutting conditions		(ap × ae)	Chip evacuation rate (cc/min)
		Cutting speed Vc (m/min)	Feed fz (mm/t)		
Cast iron	Less than 140mm	180	0.2	60 × 20	826
	140~200mm	180	0.2	60 × 10	413
	201mm and over	230	0.1	60 × 10	263
Carbon steel	Less than 140mm	150	0.2	60 × 20	689
	140~200mm	150	0.2	60 × 10	344
	201mm and over	200	0.1	60 × 10	229



Case studies



- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

FCD450

Industrial parts

- Vc=150m/min
- ap x ae=6 x 65mm
- fz=0.15mm/t (Vf=430mm/min)

MSRS90100R-1-6T(ø100 -6 flutes)
SPMT180616EN-NB3/NB4 (PR1210)

Machined portion

MSRS90(PR1210) Chip evacuation rate = 258cc/min

Competitor B 107cc/min

- MSRS90 more than doubled the machining efficiency compared with competitor B.
- Competitor B machined with 2 passes (ap x ae=3 x 65mm). MSRS90 machined with only 1 pass.
- Cutting time was reduced. (User evaluation)

SCM420

Construction machine part

- Vc=200m/min
- ap x ae=10 x 50mm
- fz=0.1mm/t (Vf=400mm/min)

MSRS90125R-1-8T(ø125 -8 flutes)
SPMT180616EN-NB3/NB4 (PR1230)

MSRS90(PR1230) Chip evacuation rate = 200cc/min

Competitor C 153cc/min

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

Mold steel

Shipbuilding parts

- Vc=150m/min
- ap x ae=10 x 10~50mm
- fz=0.1mm/t (Vf=240mm/min)

MSRS90160R-1-8T(ø160 -8 flutes)
SPMT180616EN-NB3/NB4 (PR1230)

Machined portion

MSRS90(PR1230) Chip evacuation rate = 120cc/min

Competitor D 60cc/min

- MSRS90 more than doubled the machining efficiency compared with competitor D.
- Competitor D machined with ap x ae=5 x 10~50mm
- Low cutting force of MSRS90 enabled twice as large ap as that of competitor.
- It can double the ap as well as increase the cutting speed (Vc=100→150).
- Machining efficiency was improved by MSRS90 (by achieving reduction in cutting time). (User evaluation)

Alloy steel

Power generation parts

- Vc=160m/min
- ap x ae=10 x 0~20mm
- fz=0.15mm/t (Vf=500mm/min)

MSRS90125R-1-8T(ø125 -8 flutes)
SPMT180616EN-NB3/NB4 (PR1230)

MSRS90(PR1230) 12 surfaces/edge

Competitor E 8 surfaces/edge

- MSRS90 showed 1.5 times longer tool life than that of competitor E.
- Competitor E machined with 2 passes on a side (ap x ae=12 x 0 to 10mm).
- Competitor E was poor in feed rate (Vf=400mm/min). Machining efficiency was improved by MSRS90 (by achieving reduction in cutting time).
- Although competitor E is load due to high cutting force, MSRS90 operates fairly quietly. (User evaluation)

High efficiency heavy milling MSR

BT50 integral arbor type

PR1230
(For steel)

Low cutting force type

PR1210
(For cast iron)

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

Notched insert

Size comparison (full-scale)

Notch

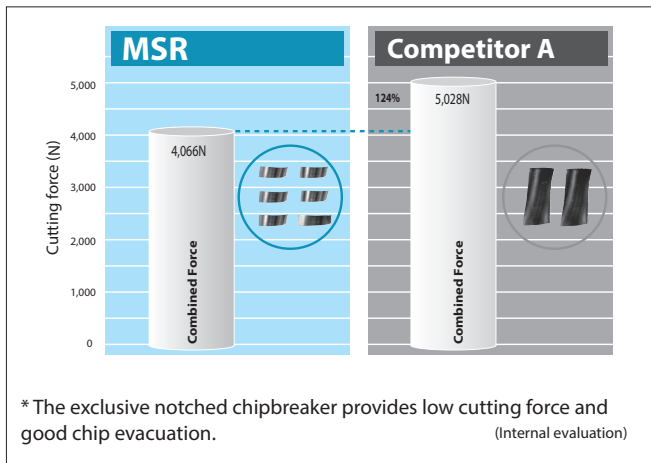
Notch

11 type

17 type

APMT25 type

Cutting force comparison



MSR (Face mill)

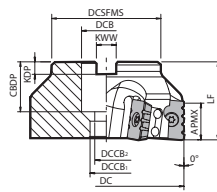
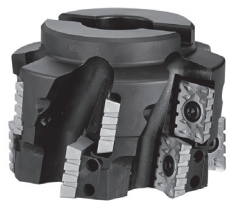


Fig. 1

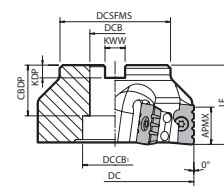


Fig. 2

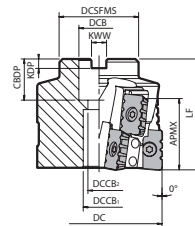


Fig. 3

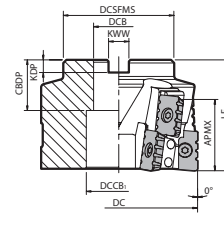


Fig. 4

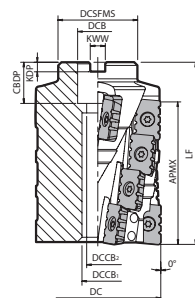


Fig. 5

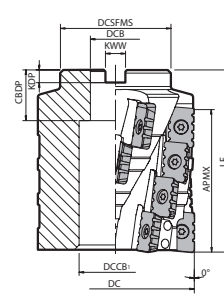


Fig. 6

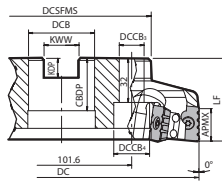


Fig. 7

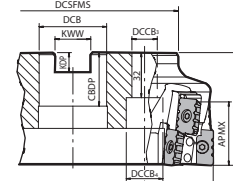


Fig. 8

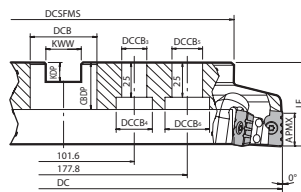


Fig. 9

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

Others

M142

Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)																A.R. (°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts M145
					DC	DCSFM5	DCB	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DCCB ₅	DCCB ₆	LF	CBDP	KDP	KWW	APMX								
Metric	MSR 063R-1M	●	4	1	63	50										65				23.5	-8	No	APMT2506...	0.7	1	
	MSR 063R-2M	●	8	2	63	50										85				45				0.9	3	
	MSR 080R-1M	●	4	4	1		27	20	14							50	22	7.2	12.4	23.5				1	1	
	MSR 080R-2M	●	8	2	80	55										70				45				1.5	3	
	MSR 080R-4M	●	16	4												115				90				2.5	5	
	MSR 100R-1M	●	6	1												50				23.5				1.5	2	
	MSR 100R-2M	●	12	2	100	70	32	42		-	-					70	28	8	14.4	45				2	4	
	MSR 100R-4M	●	24	4												115				90				3.2	6	
	MSR 125R-1M	●	6	6	1											60				23.5				3.4	2	
	MSR 125R-2M	●	12	2	125	85		58								70		9		45				3.7	4	
	MSR 125R-4M	●	24	4			40									115	30	16.4		90				6	6	
	MSR 160R-1M	●	8	8	1	160	100		68							60		10		23.5				6.1	2	
	MSR 160R-2M	●	16	2												70				45				6.8	4	
	MSR 200R-1M	●	10	10	1											60				23.5				7	7	
	MSR 200R-2M	●	20	2	200											80				45				9.9	8	
	MSR 250R-1M	●	12	12	1		130	60			18	26				60	38	15	25.4	23.5				10.3	7	
	MSR 250R-2M	●	24	2	250											80				45				14.2	8	
MSR 315R-1M	MTO	14	14	1	315	230				17	27	22	32		60	35			23.5	15.5	9					
Bore dia. inch spec	MSR 063R-1	●	4	1	63	50										65				23.5	-8	No	APMT2506...	0.8	1	
	MSR 063R-2	●	8	2	63	50	25.4	20	14							85				45				1	3	
	MSR 080R-1	●	4	1		55										50	26	6	9.5	23.5				1.1	1	
	MSR 080R-2	●	8	2		55										70				45				1.6	3	
	MSR 080R-2-31.75	●	8	4	80	70	31.75	27	18							32	8	12.7		45				1.7	3	
	MSR 080R-4	●	16	4		55	25.4	20	14							115	26	6	9.5	90				2.6	5	
	MSR 080R-4-31.75	●	16	4				27	18															2.7	5	
	MSR 100R-1	●	6	6	1		70	31.75								50				23.5				1.6	2	
	MSR 100R-2	●	12	2	100			42								70	32	8	12.7	45				2.2	4	
	MSR 100R-4	●	24	4												115				90				3.6	6	
	MSR 125R-1	●	6	6	1											60				23.5				3.5	2	
	MSR 125R-2	●	12	2	125	85	38.1	54								70		10	15.9	45				3.8	4	
	MSR 125R-4	●	24	4												115				90				6.1	6	
	MSR 160R-1	●	8	8	1											60				23.5				5.8	2	
	MSR 160R-2	●	16	8	2	160	100	50.8	68							70		11	19	45				6.4	4	
	MSR 160R-4	●	32	4												115	38			90				10.7	6	
	MSR 200R-1	●	10	10	1											60				23.5				7.5	7	
MSR 200R-2	●	20	2	200											80				45	10.4	8					
MSR 250R-1	●	12	12	1		130	47.625			18	26				60		14	25.4	23.5	10.9	7					
MSR 250R-2	●	24	2	250											80				45	14.7	8					
MSR 315R-1	MTO	14	14	1	315	220				17	27	22	32		60	35			23.5	16	9					



Spare Parts (Bore Dia. : common to Metric type / Inch type)

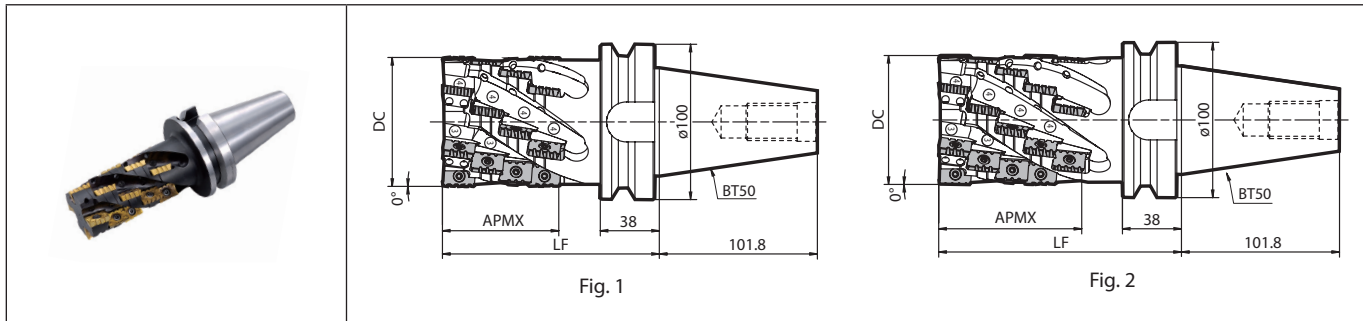
Description	Spare Parts					
	Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-seize Compound
MSR 063R-□□			-	-	-	
MSR 080R-□□	SB-60120TR	TT-25L	MAP-2506	SB-40140TR	DT-15	P-37
MSR 315R-□□	for Insert Clamp		for Shim Clamp			

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

Shim is not available for MSR063R (DC=63).
 Mounting bolt (HH12X35) is included for MSR063R / MSR080R (Metric).
 Mounting bolt (HH12X40) is included for MSR063R / MSR080R (Bore dia. inch spec).
 Mounting bolt (HH16X45) is included for MSR080R-□-31.75.
 It is not recommended using only top edge part (under ap=30mm) for 4 stages type.
 If ap is small, use 1 stage or 2 stages type.
 Deep slotting is not recommended for this cutter.

● : Standard item MTO : Made to order

MSR (Integral arbor type)



Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)			A.R. (°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Spare parts						Applicable inserts ➔ M145
					DC	LF	APMX						Anti-seize compound	Cartridge	Screw	Wrench	Screw	Wrench	
MSR 063R-BT50-4	●	16	4	4	63	160	90	+9	No		5.7	1	P-37	-	-	-	SB-60120TR	TT-25L	APMT2506...
MSR 063R-BT50-5	●	20		5		180	111												
MSR 080R-BT50-4	●	16	4	4	80	160	90	+9	No		6.9	1	P-37	-	-	-	SB-60120TR	TT-25L	APMT2506...
MSR 080R-BT50-5	●	20		5		180	111												
MSR 100R-BT50-4	●	24	6	4	100	160	90	-5			9.6	1	P-37	-	-	-	SB-60120TR	TT-25L	APMT2506...
MSR 100R-BT50-5	●	30		5		180	111												

Shim is not available for MSR063R (DC=63).

It is not recommended using only top edge part (under ap=30mm) for 4 stages / 5 stages type. If ap is small, use previous page's 1 stage type or 2 stages type.

Deep slotting is not recommended for this cutter.

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



Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M144

APMT

Insert		Description	No. of edges	Dimension (mm)					Angle (°)		Carbide PVD PH1210 PH1230	Applicable toolholder M143 M144																																
				S	D1	RE	L	W1	AN	AS																																		
Classification of usage ★: Roughing / 1st Choice ☆: Roughing / 2nd Choice ■: Finishing / 1st Choice □: Finishing / 2nd Choice (In case hardness is 45HRC or under)																																												
<table border="1"> <tr><td>Carbon steel / Alloy steel</td><td>★</td><td>P</td></tr> <tr><td>Mold and die steel</td><td>★</td><td>P</td></tr> <tr><td>Austenitic stainless steel</td><td>☆</td><td>M</td></tr> <tr><td>Martensitic stainless steel</td><td></td><td>M</td></tr> <tr><td>Precipitation hardening stainless steel</td><td></td><td>M</td></tr> <tr><td>Gray cast iron</td><td>★</td><td>K</td></tr> <tr><td>Nodular cast iron</td><td>★</td><td>K</td></tr> <tr><td>Non-ferrous metals</td><td></td><td>N</td></tr> <tr><td>Heat-resistant alloy</td><td>★</td><td>S</td></tr> <tr><td>Titanium alloy</td><td>★</td><td>S</td></tr> <tr><td>Hard materials</td><td></td><td>H</td></tr> </table>												Carbon steel / Alloy steel	★	P	Mold and die steel	★	P	Austenitic stainless steel	☆	M	Martensitic stainless steel		M	Precipitation hardening stainless steel		M	Gray cast iron	★	K	Nodular cast iron	★	K	Non-ferrous metals		N	Heat-resistant alloy	★	S	Titanium alloy	★	S	Hard materials		H
Carbon steel / Alloy steel	★	P																																										
Mold and die steel	★	P																																										
Austenitic stainless steel	☆	M																																										
Martensitic stainless steel		M																																										
Precipitation hardening stainless steel		M																																										
Gray cast iron	★	K																																										
Nodular cast iron	★	K																																										
Non-ferrous metals		N																																										
Heat-resistant alloy	★	S																																										
Titanium alloy	★	S																																										
Hard materials		H																																										
		APMT 250608ER-NB3 250616ER-NB3 250640ER-NB3	2	6.35	6.5	0.8 1.6 4	25	15.875	11	15	●●●	MSR...																																
		APMT 250616EL-NB3	2	6.35	6.5	1.6	25	15.875	11	15	●●																																	
		APMT 250608ER-NB4 250616ER-NB4 250640ER-NB4	2	6.35	6.5	0.8 1.6 4	25	15.875	11	15	●●●	MSR...																																
		APMT 250616EL-NB4	2	6.35	6.5	1.6	25	15.875	11	15	●●																																	
		APMT 250616ER-NB3P	2	6.35	6.5	1.6	25	15.875	11	15	●●	MSR...																																
		APMT 250616ER-NB4P	2	6.35	6.5	1.6	25	15.875	11	15	●●	MSR...																																

Handed insert shows Right-hand

Recommended cutting conditions M146

Caution when installing notched insert (MSR)

It is important to install the appropriate notched insert into the correct position. If it is installed in incorrect position, the tool cannot cut the workpiece and it may damage the toolholder body. For MSR, notched insert location indicator is marked at insert installed area.

Please bear the following in mind when installing inserts to toolholders.

(Indication is marked near the insert pocket for MSR.)

- (3) is for APMT2506○ER-NB3
- (4) is for APMT2506○ER-NB4

(No. of inserts – example)

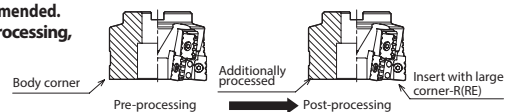
Description	No. of inserts	No. of flutes	No. of inserts	
			Notched	
			NB3	NB4
MSR 100R-1	6	6	3	3
100R-2	12		6	6
100R-4	24		12	12

Caution when installing the insert with corner-R(RE) 4.0

When using inserts with corner-R(RE) 4.0mm, additional modifications of the cutter body will be necessary. Ref. to the table below for the recommended modifications.

Insert corner-R(RE) (mm)	Additional processing dimension to body corner (mm)
4.0	R2.0

* Round-shaped additional processing is recommended. When applying chamfer shaped additional processing, do not cut away too much.



●: Standard item

M145



Milling

Recommended cutting conditions

Workpiece material	fz (mm/t)		Recommended insert grades (Cutting speed Vc: m/min)	
	Low cutting force	General purpose	MEGACOAT	
	NB3P+NB4P	NB3+NB4	PR1230	PR1210
Carbon steel	0.15	0.2	★ 100~150~200	-
Cast iron	0.15	0.2	-	★ 100~150~200
Stainless steel	Not recommended			
Aluminum/Copper	Not recommended			

* For MSR, cutting speed should be carefully adjusted depending on the length of toolholder protruding from the end of machine spindle.
 - When the overhang length of toolholder is small, > set the cutting speed to slightly higher than the recommended cutting conditions.
 - When the overhang length of toolholder is long, > set the cutting speed to slightly lower than the recommended cutting conditions.

★ : 1st Recommendation
 ☆ : 2nd Recommendation

Cutting conditions

1. Shouldering

In case of MSR100R-1

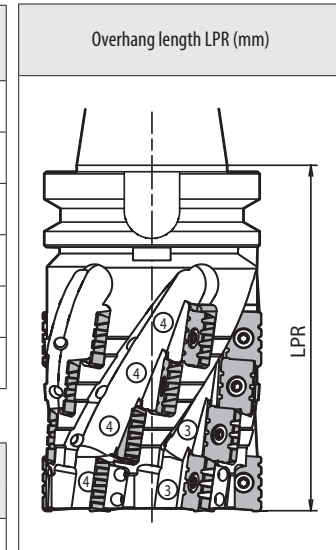
Workpiece material	Overhang length LPR (mm)	Cutting conditions		ap x ae (mm)	Chip evacuation rate (cc/min)
		Cutting speed Vc (m/min)	Feed fz (mm/t)		
Carbon steel	Less than 100mm	150	0.2	20 x 80	920
	100~200mm	150	0.2	20 x 40	460
	201mm and over	100	0.2	20 x 30	228
Cast iron	Less than 100mm	180	0.2	20 x 80	1,100
	100~200mm	180	0.2	20 x 40	550
	201mm and over	120	0.2	20 x 30	276

In case of MSR100R-2

Workpiece material	Overhang length LPR (mm)	Cutting conditions		ap x ae (mm)	Chip evacuation rate (cc/min)
		Cutting speed Vc (m/min)	Feed fz (mm/t)		
Carbon steel	Less than 130mm	150	0.2	40 x 40	920
	130~230mm	150	0.2	40 x 20	460
	231mm and over	100	0.2	40 x 20	304
Cast iron	Less than 130mm	180	0.2	40 x 40	1,100
	130~230mm	180	0.2	40 x 20	550
	231mm and over	120	0.2	40 x 20	368

In case of MSR100R-4

Workpiece material	Overhang length LPR (mm)	Cutting conditions		ap x ae (mm)	Chip evacuation rate (cc/min)
		Cutting speed Vc (m/min)	Feed fz (mm/t)		
Carbon steel	Less than 180mm	150	0.2	75 x 20	863
	180~280mm	150	0.2	75 x 10	431
	281mm and over	100	0.2	75 x 10	285
Cast iron	Less than 180mm	180	0.2	75 x 20	1,035
	180~280mm	180	0.2	75 x 10	518
	281mm and over	120	0.2	75 x 10	345



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

Others

M146

2. Slotting

In case of MSR100R-1

Workpiece material	Overhang length LPR (mm)	Cutting conditions		ap x ae (mm)	Chip evacuation rate (cc/min)
		Cutting speed Vc (m/min)	Feed fz (mm/t)		
Carbon steel	Less than 100mm	150	0.2	7 x 100	403
	100~200mm	120	0.2	4 x 100	184
	201mm and over	100	0.2	3 x 100	114
Cast iron	Less than 100mm	180	0.2	14 x 100	966
	100~200mm	150	0.2	7 x 100	403
	201mm and over	120	0.2	4 x 100	184

In case of MSR100R-2

Workpiece material	Overhang length LPR (mm)	Cutting conditions		ap x ae (mm)	Chip evacuation rate (cc/min)
		Cutting speed Vc (m/min)	Feed fz (mm/t)		
Carbon steel	Less than 130mm	150	0.2	7 x 100	403
	130~230mm	120	0.2	4 x 100	184
	231mm and over	100	0.2	3 x 100	114
Cast iron	Less than 130mm	180	0.2	14 x 100	966
	130~230mm	150	0.2	7 x 100	403
	231mm and over	120	0.2	4 x 100	184

In case of MSR160R-1

Workpiece material	Overhang length LPR (mm)	Cutting conditions		ap x ae (mm)	Chip evacuation rate (cc/min)
		Cutting speed Vc (m/min)	Feed fz (mm/t)		
Carbon steel	Less than 100mm	150	0.2	5 x 160	384
	100~200mm	120	0.2	3 x 160	182
	201mm and over	100	0.2	2 x 160	102
Cast iron	Less than 100mm	180	0.2	10 x 160	928
	100~200mm	150	0.2	5 x 160	384
	201mm and over	120	0.2	4 x 160	243

In case of MSR160R-2

Workpiece material	Overhang length LPR (mm)	Cutting conditions		ap x ae (mm)	Chip evacuation rate (cc/min)
		Cutting speed Vc (m/min)	Feed fz (mm/t)		
Carbon steel	Less than 130mm	150	0.2	5 x 160	384
	130~230mm	120	0.2	3 x 160	182
	231mm and over	100	0.2	2 x 160	102
Cast iron	Less than 130mm	180	0.2	10 x 160	928
	130~230mm	150	0.2	5 x 160	384
	231mm and over	120	0.2	4 x 160	243

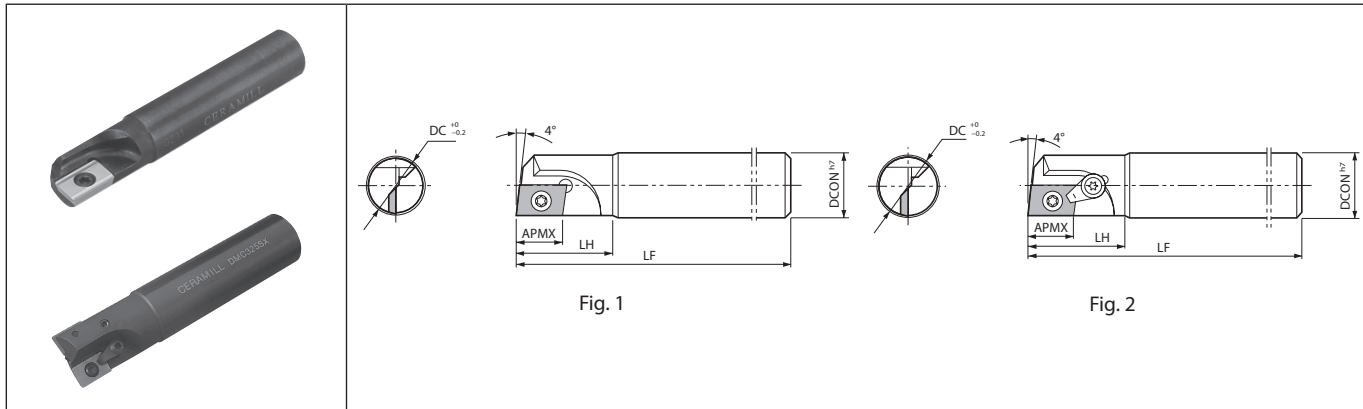
Notes: MSR...-4 (No. of stage)
Slotting is not recommended.

M



Milling

DMC-SX



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts M150
			DC	DCON	LF	LH	APMX					Clamp set	Screw	Wrench	
DMC 316SXT 320SX 325SX 332SX 340SX	●	1	16	16	90	30	14	+3	-3	No	1	-	SB-4060TR	NDCT1503... NDCW1503...	
	●	2	20	20	110						2	-	SB-4060TR		
	●	2	25	25	120	2					CPS-2TR	SB-4065TR	FT-15		
	●	2	32	32	130	2					-	SB-4065TR	FT-15		
	●	2	40	32	150	2					-	SB-4065TR	FT-15		
DMC 320SX-200 325SX-220 332SX-250	●	1	20	20	200	50	14	+3	-3	No	1	-	SB-4065TR	NDCT1503... NDCW1503...	
	●	2	25	25	220	60					1	-	SB-4065TR		FT-15
	●	2	32	32	250	80					1	-	SB-4065TR		FT-15



Milling

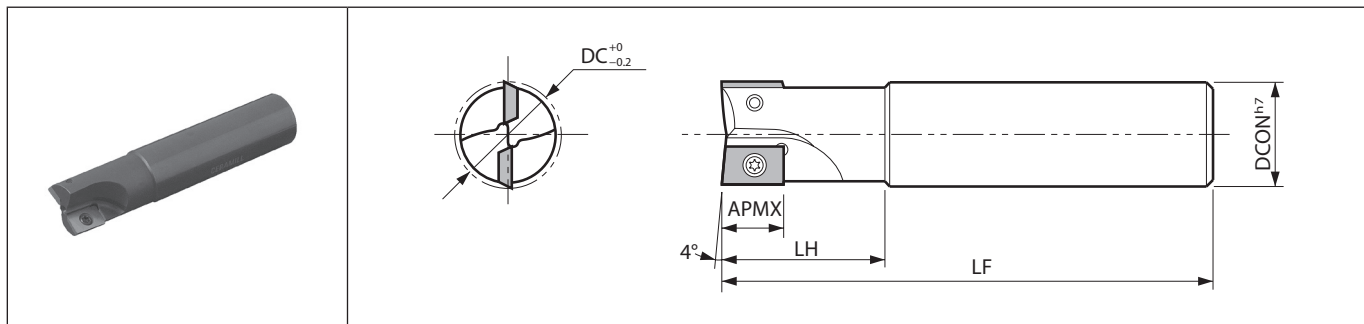
- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M148

DMC-H

DMC-H



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. (°)	R.R. (°)	Coolant hole	Spare parts		Applicable inserts ➔ M150
			DC	DCON	LF	LH	APMX				Screw	Wrench	
DMC 316H	●	1	16	16	90	30	+5	-3,5	No	SB-4060TR	FT-15	NDCT1503... NDCW1503...	
DMC 320H	●		20	20	110		+6	-2					
DMC 325H	●		25	25	120	14							
DMC 332H	●	2	32	32	130		+8	0	SB-4065TR				
DMC 340H	●		40		150								

● : Standard item



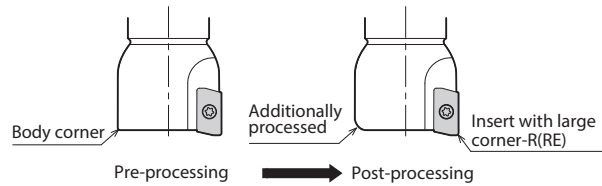
Milling

Recommended cutting conditions (DMC-SX)

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)		Max. ap (mm)		
		Cermet	Carbide	Cutting dia. (DC)	Slotting (ap)	Shouldering (apxae)
		TN100M	KW10			
Carbon steel	~0.2	★ 120~200		ø16~	3	9x3
Alloy steel	~0.2	★ 100~180		ø16~	3	9x3
Mold steel	~0.15	★ 100~180		ø16~	3	9x3
Stainless steel	~0.15	☆ 120~200		ø16~	2	6x2
Cast iron	~0.2		★ 80~150	ø16~	3	9x3
Non-ferrous metals	~0.2		★ 100~300	ø16~	3	9x3

When using inserts with corner-R(RE) 2.0 or larger, additional modifications of the cutter body will be necessary. Additional modifications for the body will be necessary. Ref. to the chart below for the recommended modifications. (Additional grind off is not necessary when corner-R(RE) is 0.8 mm or less.)

Insert corner-R(RE) (mm)	Additional processing dimension to body corner (mm)
2.0	R1.0
3.0	R1.6
4.0	R2.0



* Round-shaped additional processing is recommended. When applying chamfer shaped additional processing, do not cut away too much.

Recommended cutting conditions (DMC-H)

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)				Max. ap (mm)		
		Cermet	Carbide	PCD		Cutting Dia. (DC)	Slotting (ap)	Shouldering (apxae)
		TN100M	KW10	KPD230 (KPD001)	KPD010			
Carbon steel	~0.2	★ 120~200				~ø20	4	8x4
						ø25~	8	14x6
Alloy steel	~0.2	★ 100~180				~ø20	4	8x4
						ø25~	8	13x6
Mold steel	~0.15	★ 100~180				~ø20	3	5x2
						ø25~	6	10x3
Stainless steel	~0.15	☆ 120~200				~ø20	3	6x2
						ø25~	6	13x3
Cast iron	~0.2		★ 80~150			~ø20	4	8x4
						ø25~	6	14x6
Non-ferrous metals	~0.2	★ 100~300	★ 300~500	☆ 300~500		~ø20	4	8x4
						ø25~	6	14x6

★: 1st Recommendation ☆: 2nd Recommendation

Above inserts are also applicable to DMC○○SX, but the conventional NDCW1503○○TR insert is not applicable for this end mill.

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



High efficiency milling cutter for finishing aluminum alloys

MFAH

Low cutting force minimizes burrs and chipping for high quality machining

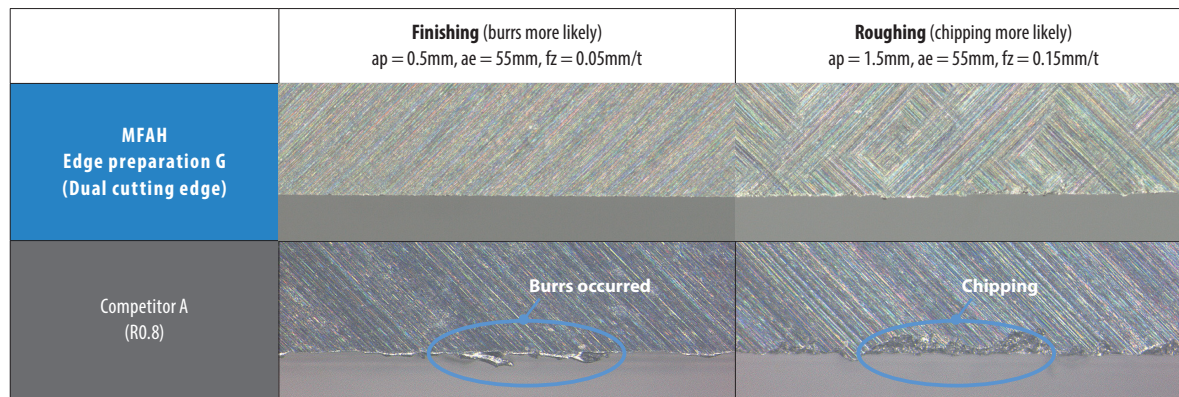
Easily adjust blade runout

2 body types and 3 inserts for a variety of milling applications

1 Low cutting force minimizes burrs for high quality machining

Large true rake angle and dual cutting edge insert designs

Burr and chipping comparison (Internal evaluation)

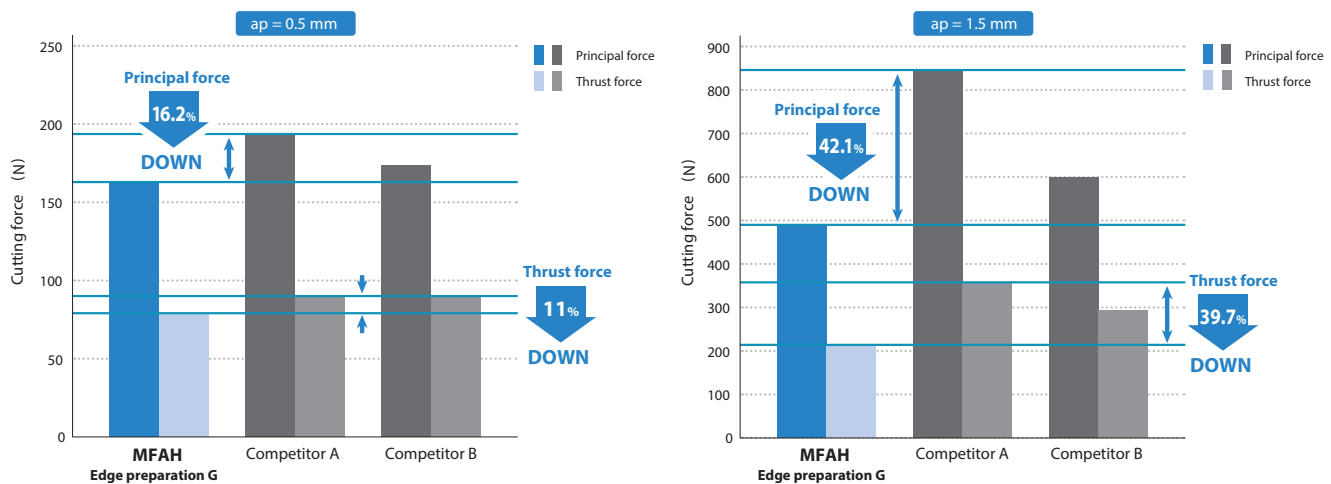


Cutting conditions: Vc = 2,500 m/min, Wet, Cutter dia. ø80
MFAH080RS-10T-SF, ENET0905PAER-G KPD001
Workpiece material: ADC12

2 Low cutting force design

Low cutting force, reduced chattering and high efficiency machining

Cutting force comparison (Internal evaluation)



Cutting conditions: Vc = 2,500 m/min, ae = 55 mm, fz = 0.1 mm/t, Wet, Cutter dia. ø80
MFAH080RS-10T-SF, ENET0905PAER-G KPD001
Workpiece material: ADC12

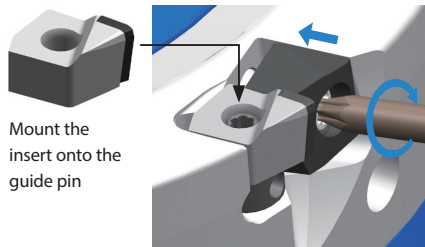
M152

3 Adjustable blade runout

Easily install inserts and adjust blade runout

Easy insert installment

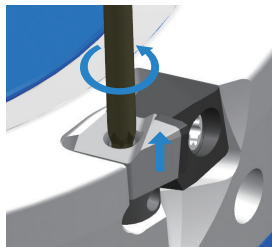
Guide pin allows for easier positioning



Mount the insert onto the guide pin

Easily adjust blade runout

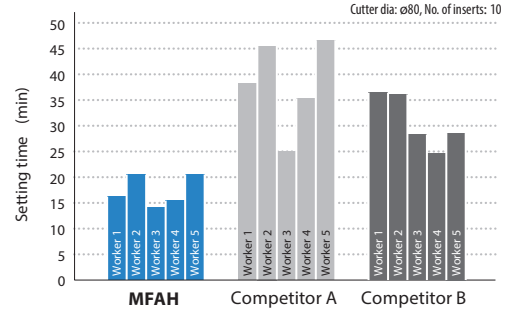
Adjustable from both the front and outer periphery



Unique design for easily adjusting from the front

Blade runout setting time comparison (Internal evaluation)

* Operation Time of 5 Workers Comparison



4 Large tooling lineup

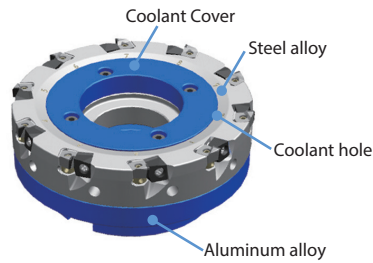
Steel body and light-weight hybrid body with internal coolant available

3 different edge designs offer a variety of machining applications

Cutter body

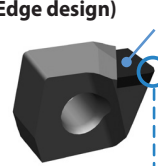


Steel body
ø50~ø125



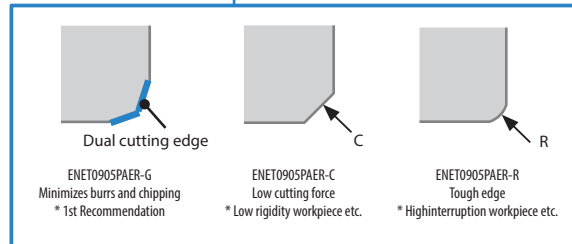
Light-weight hybrid body
ø80~ø315

Insert (Edge design)



PCD(KPD001)

3 Different edge designs offer a variety of machining applications

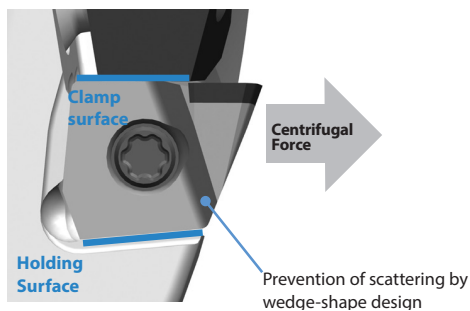


5 Safety enhancements during high-speed revolution

Scattering prevention mechanism

1 Prevention of scattering by wedge-shape design

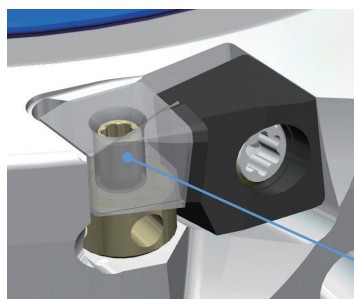
New wedge-shape feature holds insert firmly in place and reduces chattering



Prevention of scattering by wedge-shape design

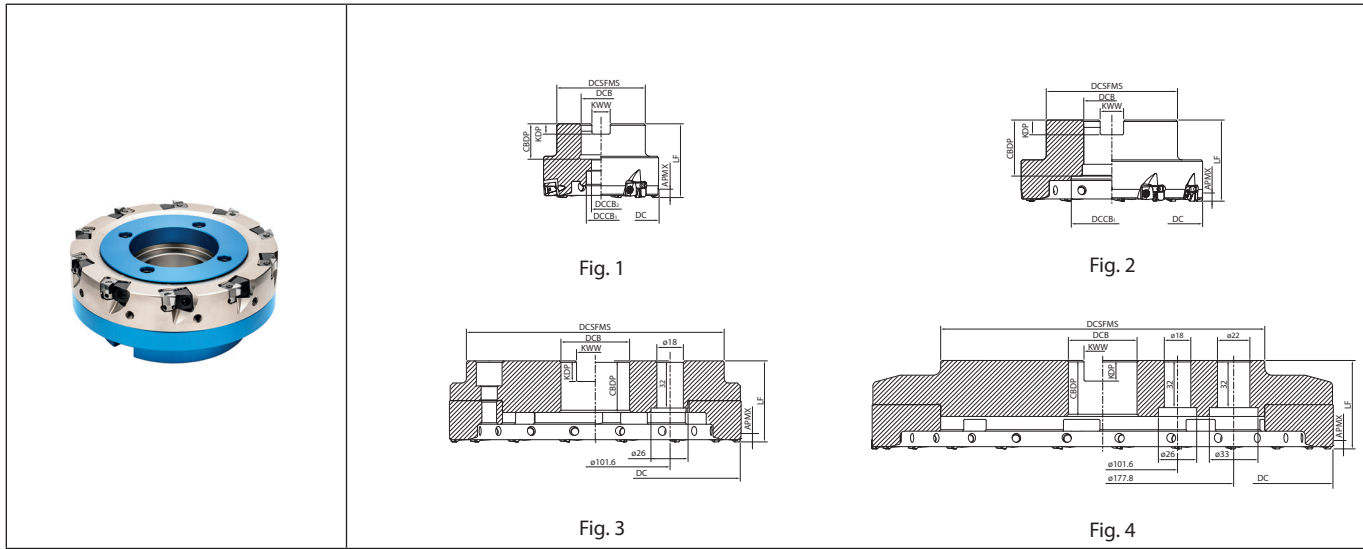
2 Prevention of scattering with guide pin

Guide pins improve safety during high-speed rotation



Prevention of scattering with guide pin

MFAH (Light-weight Hybrid body)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)										Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts ➔ M157
			DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CDBP	KDP	KWW	APMX					Mounting bolt (Attachment)	Coolant cover (Attachment)	Coolant cover (sold separately)	
MFAH 080RA-6T-M-SF	●	6	80	62	27	20	13	50	27	7	12.4	4.6	Yes	14600	0.82	1	HH12X35HC			ENET0905PAER-G ENET0905PAER-C ENET0905PAER-R
MFAH 080RA-10T-M-SF	●	10		62	27	20	13		24	7	12.4									
100RA-8T-M27-SF	●	8	100	62	27	20	13	50	24	7	12.4	4.6	Yes	13000	1.2	1	HH12X35HC			
100RA-8T-M-SF	●	8		85	32	42	-		30	8	14.4									
100RA-12T-M27-SF	●	12	100	62	27	20	13	50	24	7	12.4	4.6	Yes	13000	1.32	2	HF16X48HC			
100RA-12T-M-SF	●	12		85	32	42	-		30	8	14.4									
125RA-10T-M27-SF	●	10	125	60	27	20	13	55	24	7	12.4	4.6	Yes	11400	1.8	1	HH12X35H	CC-125-MFAH		
125RA-10T-M-SF	●	10		94	40	55	-		33	9	16.4									
125RA-16T-M27-SF	●	16	125	60	27	20	13	50	24	7	12.4	4.6	Yes	11400	1.73	1	HH12X35H	CC-125-MFAH		
125RA-16T-M-SF	●	16		94	40	55	-		33	9	16.4									
160RA-12T-M-SF	●	12	160	125	40	57		55	33	9	16.4	4.6	Yes	8000	3.5	2	HF20X53HA	CC-160-MFAH		
160RA-20T-M-SF	●	20							33	9	16.4									
200RA-16T-M-SF	MTO	16	200	175		126		55				4.6	Yes	5600	4.7	3			CC-200-MFAH	
200RA-24T-M-SF	MTO	24																		
250RA-20T-M-SF	MTO	20	250	140	60	165		55		14	25.7	4.6	Yes	4500	6.9	3			CC-250-MFAH	
250RA-32T-M-SF	MTO	32																		
315RA-24T-M-SF	MTO	24	315	220		220		60	38			4.6	Yes	3500	11.7	4			CC-315-MFAH	
315RA-40T-M-SF	MTO	40																		

Confirm the total weight of the cutter and the arbor is within the machine's acceptable range.

● : Standard item MTO : Made to order

M154

Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)												Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts ➔ M157
			R	DC	DCSFMS	DCB	DCCB _h	DCCB ₂	LF	CBDP	KDP	KWW	APMX	Mounting bolt (Attachment)					Coolant cover (Attachment)	Coolant cover (sold separately)		
																					4.6	
Bore dia. inch spec	MFAH	●	6	80	62	25.4	20	13	50	27	6	9.5	14600	0.83	1	HH12X35HC			ENET0905PAER-G ENET0905PAER-C ENET0905PAER-R			
		●	10											0.78	1							
		●	8	100	62	25.4	20	13	50	24	6	9.5	13000	1.21	1	HH12X35HC						
		●	8											85	31.75					42	-	34
		●	12	100	62	25.4	20	13	50	24	6	9.5	13000	1.16	1	HH12X35HC						
		●	12											85	31.75					42	-	34
		●	10	125	60	25.4	20	13	55	24	6	9.5	11400	1.8	1	HH12X35H	CC-125-MFAH					
		●	10											89	38.1					55	-	38
		●	16	125	60	25.4	20	13	50	24	6	9.5	11400	1.74	1	HH12X35H	CC-125-MFAH					
		●	16											89	38.1					55	-	10
		●	12	160	130	50.8	70			38	11	19.1	8000	3.4	2	HF24X60HA	CC-160-MFAH					
		●	20											3.3	2							
		MTO	16	200	175		126		55				5600	4.9	3			CC-200-MFAH				
		MTO	24											4.8	3							
		MTO	20	250	140	47.625	165			14	25.4		4500	7	3			CC-250-MFAH				
		MTO	32											6.9	3							
		MTO	24	315	220		220		60	38			3500	11.7	4			CC-315-MFAH				
		MTO	40											11.5	4							

Confirm the total weight of the cutter and the arbor is within the machine's acceptable range.

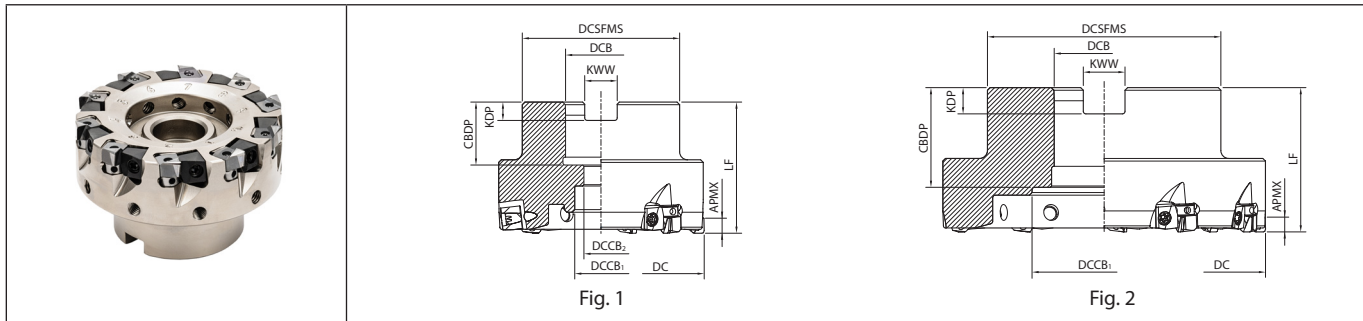
● : Standard item MTO : Made to order



Milling

MFAH

MFAH (Steel body)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)										Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts ● M157
			DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX					
Metric	●	4	50	48	16	13.6	9	40	19	5.6	8.4	No	19200	0.44	1	ENET0905PAER-G ENET0905PAER-C ENET0905PAER-R	
		5	63	61	22	23	11		21	6.3	10.4			0.43	1		
		6	80	60	27	20	13		24	7	12.4			0.69	1		
		6	100	70	32	45	55	30	8	14.4	0.68			1			
		10	125	89	40	55		33	9	16.4	1.16			1			
		10	125	89	40	55		33	9	16.4	1.11			1			
		8	100	70	32	45	55	30	8	14.4	1.56		2				
		12	125	89	40	55		33	9	16.4	1.51		2				
		12	125	89	40	55		33	9	16.4	1.51		2				
		10	125	89	40	55	55	33	9	16.4	2.6		2				
		16	125	89	40	55		33	9	16.4	2.5		2				
		16	125	89	40	55		33	9	16.4	2.5		2				
Bore dia. inch spec	●	6	80	50	25.4	20	13	50	27	6	9.5	No	14600	1.02	1	ENET0905PAER-G ENET0905PAER-C ENET0905PAER-R	
		10	100	70	31.75	45	34		8	12.7	0.98			1			
		8	100	70	31.75	45	34		8	12.7	1.59			2			
		12	125	89	38.1	55	38	10	15.9	1.55	2						
		10	125	89	38.1	55	38	10	15.9	2.63	2						
		16	125	89	38.1	55	38	10	15.9	2.56	2						

M



Milling


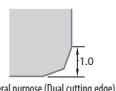

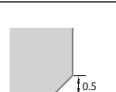

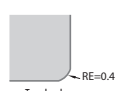
Spare parts

Description		Wedge	Wedge screw	Wrench	Adjust screw	Wrench	Anti-seize compound	Applicable inserts
Light-weight hybrid body	MFAH080RA- ... MFAH315RA- ...	C08R	W5X13L	TTW-15	AJ-4170	DTPM-8	P-37	ENET0905...
Steel body	MFAH050RS- ... MFAH125RS- ...							

● : Standard item

M156

ENET

Classification of usage			Dimension (mm)					PCD	Applicable toolholder M154~M156
			S	L	LE	W1	BS		
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)			Carbon steel / Alloy steel					P	
			Mold and die steel						
			Austenitic stainless steel					M	
			Martensitic stainless steel						
			Precipitation hardening stainless steel						
			Gray cast iron					K	
			Nodular cast iron						
			Non-ferrous metals					N	
			Heat-resistant alloy					S	
			Titanium alloy						
Hard materials					H				
Insert	Description	Dimension (mm)					PCD	Applicable toolholder M154~M156	
		S	L	LE	W1	BS			
	 General purpose (Dual cutting edge)	7.9	6.02	5.6	9.61	2.6	●	MFAH...RA...-SF MFAH...RS...-SF	
	 Low cutting force	7.9	6.02	5.6	9.61	3	●	MFAH...RA...-SF MFAH...RS...-SF	
	 Tough edge RE=0.4	7.9	6.02	5.6	9.61	3.1	●	MFAH...RA...-SF MFAH...RS...-SF	

Recommended cutting conditions M158

● : Standard item

CBN & PCD Inserts are sold in 1 piece boxes

M157

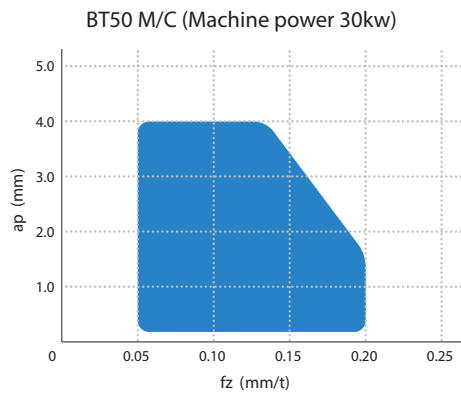


Recommended cutting conditions

Workpiece material	Property	Vc (m/min)	fz (mm/t)	Recommended insert grades
Aluminum alloys	Si Ratio 12.5% or less	1,000 - 2,500 - 3,000	0.05 - 0.10 - 0.20	KPD001
	Si Ratio 12.5% and over	400 - 600 - 800	0.05 - 0.10 - 0.20	

Recommended cutting conditions are reference values. Please adjust cutting speed and feed rate according to actual machining conditions taking into account machine and workpiece rigidity. Do not use the cutter at speeds exceeding the maximum cutting speed limit.

Cutting performance



Cutting conditions: Vc = 2,500 m/min, ae = 55mm, Wet, Cutter dia. ø80
MFAH080RS-10T-SF ENET0905PAER-G KPD001 Workpiece material: ADC12



Milling

- Cutting edge angle
45°~70°
- Cutting edge angle
75°
- Cutting edge angle
88°/90°
- Cutter for
Finishing
- High Feed
Cutter
- Multi-
Function
- Slot Mill
- Ball-nose
Radius
- Others

Cautions

While in use

! Caution

Please use within recommended cutting conditions

Do not run the cutter at revolutions exceeding the printed maximum revolution limit of the cutter body
 Inserts or cutter body may be damaged due to the centrifugal force and cutting load

Please do not use under the following conditions:

- When cutter is not fully loaded with inserts
- If the body and/or clamp is damaged
- If a clamp or clamp screw is removed
- If inserts that have different regrind amounts are mounted

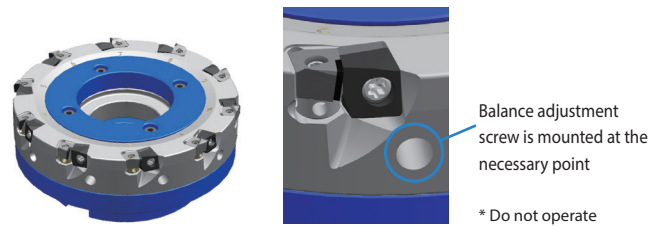
Please wear protective equipment such as protective glove when changing inserts or adjusting edge fluctuation
 Injury can occur when touching the cutting edge

Dynamic balance

Balance adjustment on the cutter is completed before shipping
 Balance adjustment has been made with special high precision inserts to be ISO balance quality grade (ISO 1940-1) G2.5

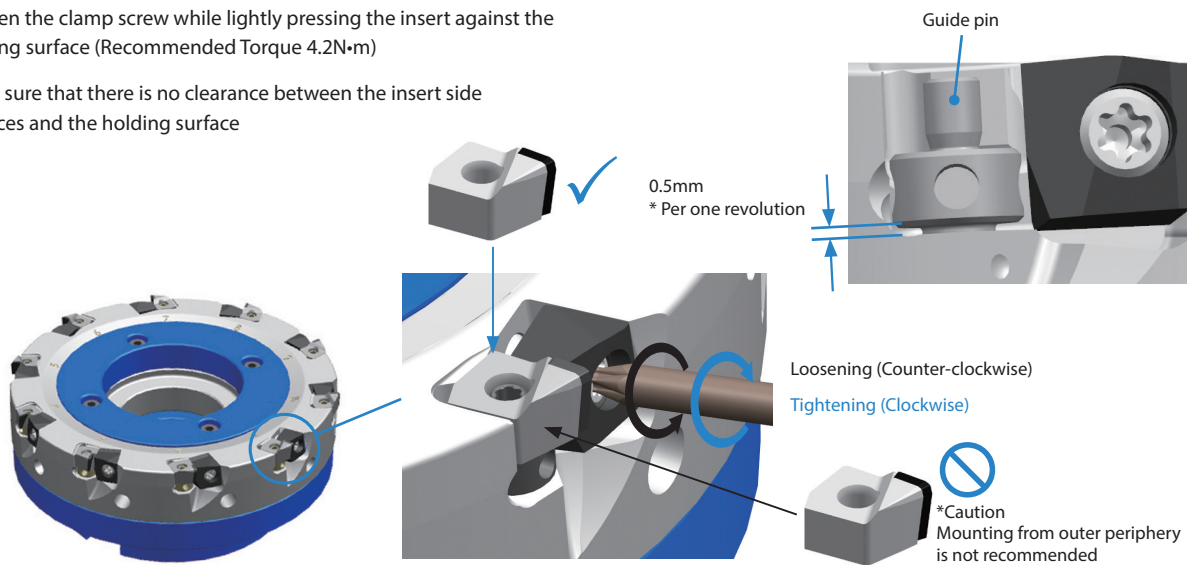
Do not operate the balance adjustment screw at the outer periphery of cutter

- ⇨ This could lead to improper dynamic balance
- Do not completely remove clamp and clamp screw from cutter
- ⇨ This requires additional balance adjustment



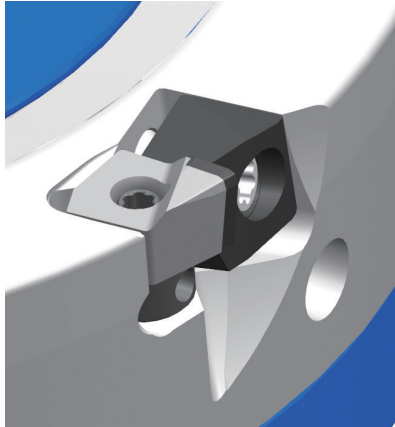
How to mount insert

- 1 Adjust the clearance between adjustment screw for cutting edge and the surface of insert to be 0.5mm
- 2 Mount insert on guide pin
 (Be sure to install from the head. Mounting from outer periphery is not recommended)
- 3 Tighten the clamp screw while lightly pressing the insert against the holding surface (Recommended Torque 4.2N·m)
- 4 Make sure that there is no clearance between the insert side surfaces and the holding surface

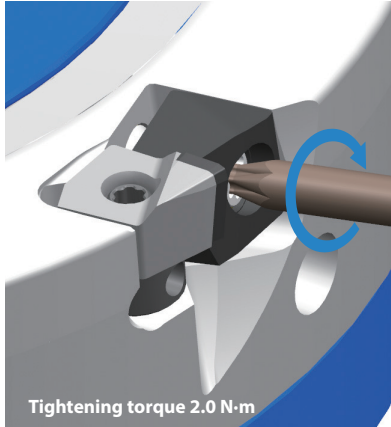


How to adjust blade runout

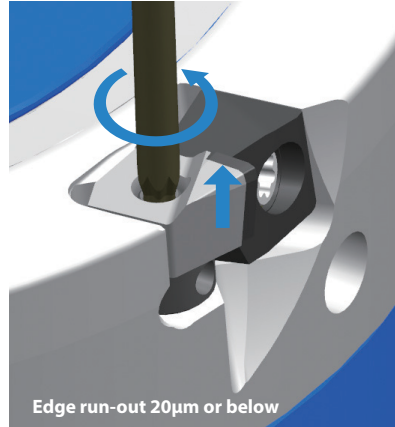
1 Install an insert



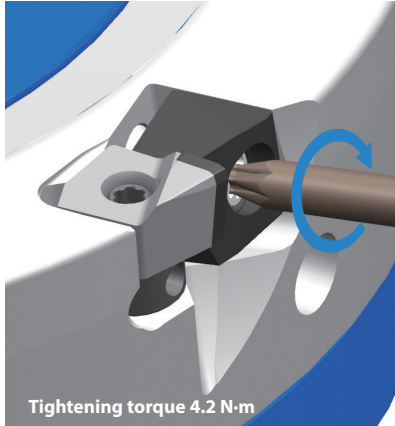
2 Partially tighten



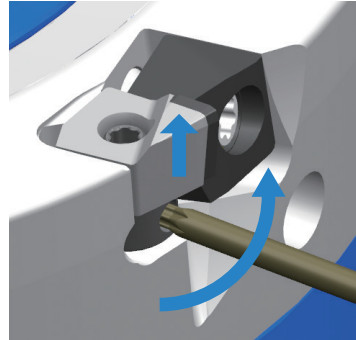
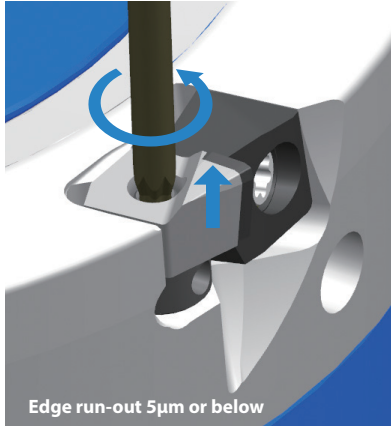
3 Adjustable blade runout



4 Fully tighten



5 Adjustable blade runout



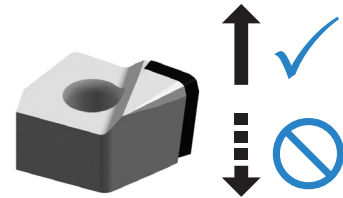
Adjustment edge run-out from outer periphery is workable

M



Milling

- 1** Install inserts into all pockets
- 2** Partially tighten the clamp screw (Recommended Torque 2.0N·m)
- 3** Turn the screw with the wrench to adjust and make sure that all screw heights are within 20µm of each other (Recommended)
- 4** Fully tighten the clamp screw with tightening torque 4.2 N·m
- 5** Slightly adjust position of cutting edge (Recommended position difference: 5µm or below)
* All inserts should be fine-tuned



* Caution
Do not adjust cutting edge to lower position

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

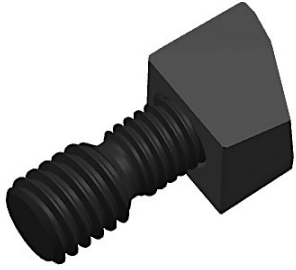
Others

M160

Precaution for changing clamp

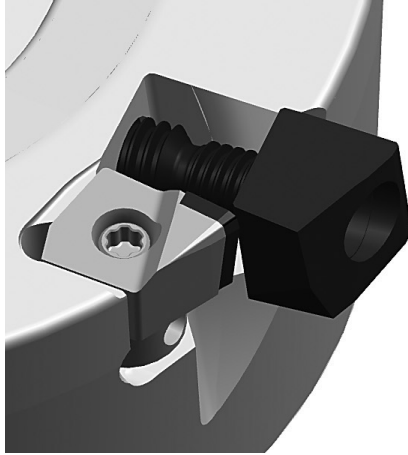
How to mount a clamp on a holder

1 Attach clamp screw into clamp first



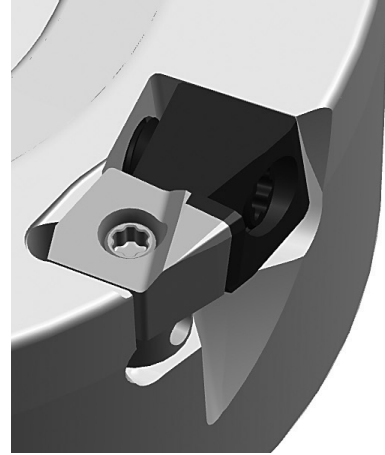
Attaching clamp screw into clamp
(about 1 revolution)

2 Mounting



Mount it to the holder

3 Fastening



Fasten with recommended torque
(Completed)

Mount position of clamp screw



Right position

(Screw head does not come out)



Wrong position

(Screw head comes out)



Confirm if clamp screw is not coming out after fastening clamp screw with recommended torque

Re-mount if the clamp screw is coming out

Adjust the balance is needed after mounting in case removing a clamp screw completely such as clamp change

M



Milling

For aluminum alloys high efficiency end mill

MEAS

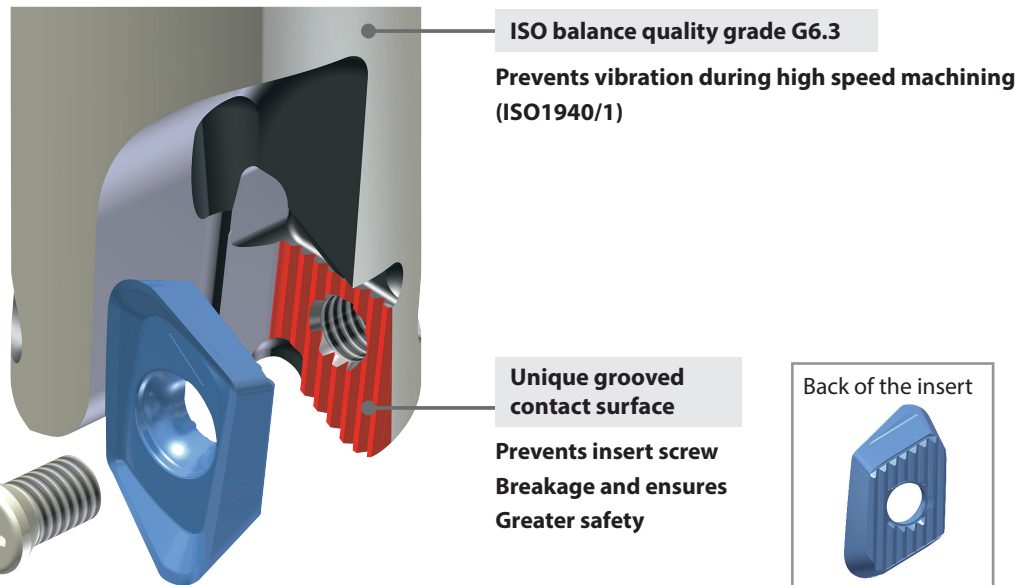
Excellent scatter prevention to ensure stable, high speed aluminum machining

Large ramping angle delivers a wide range of machining applications

1 High reliability and high efficiency machining

Grooved connection between the insert and holder

Provides high speed aluminum machining (ø32: Recommended max. cutting speed $V_c = 3,000\text{m/min}$)

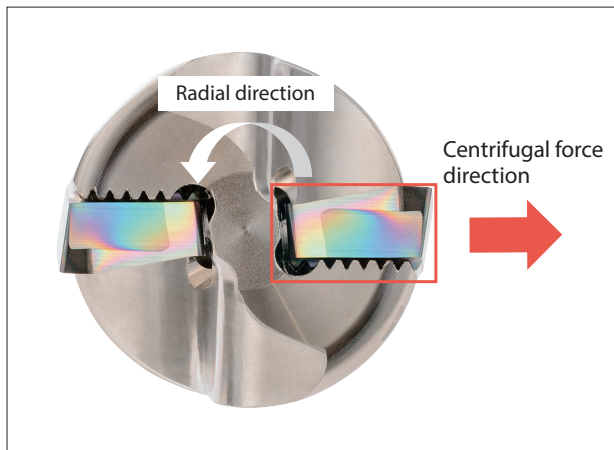


M

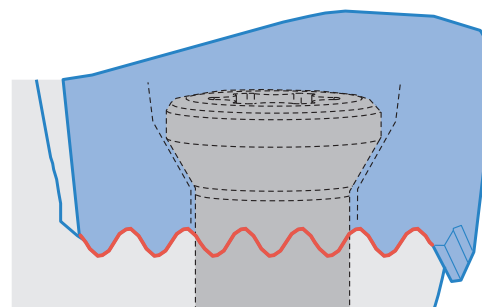
Milling

Grooved insert pocket

Centrifugal force is applied across the grooved surface to reduce pressure on the insert screw
Prevents insert screw breakage and safely secures the insert during high-speed revolutions



Grooved contact surface



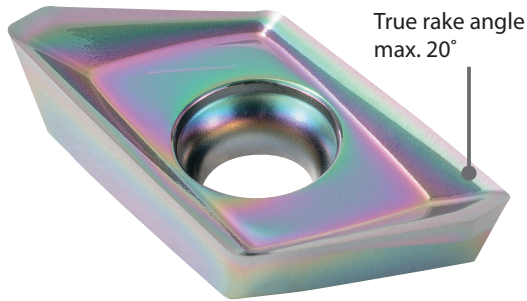
- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

M162

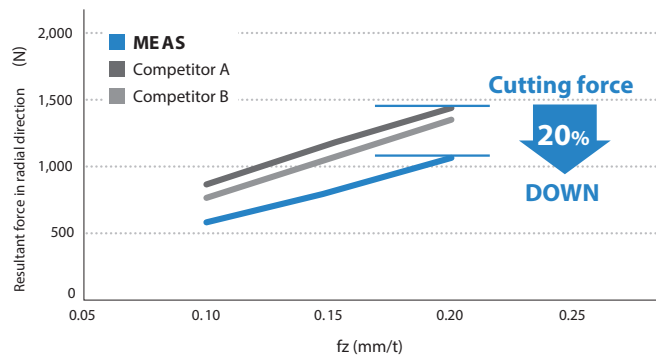
2 Low cutting force with sharp cutting edge

True rake angle max. 20°

Low cutting force and excellent chattering resistance



Cutting force comparison (Internal evaluation)

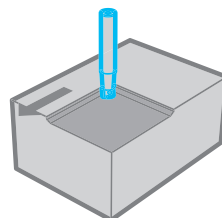


Cutting conditions: Vc = 390 m/min, ap x ae = 8 x 5mm, Dry
Cutter dia. ø25mm (2 Flutes) Workpiece material: A7075

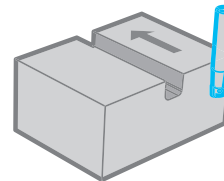
3 Applicable to a wide range of application

Max. ramping angle 20° (ø25)

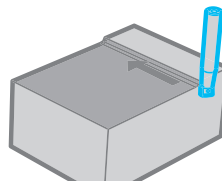
The MEAS can be used for shouldering, slotting, ramping, and helical milling applications



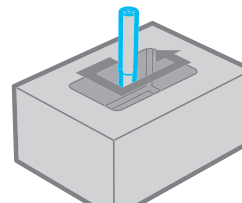
Facing, Shouldering



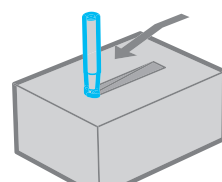
Slotting



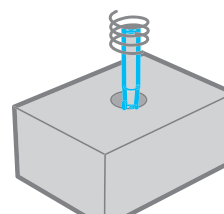
Contouring



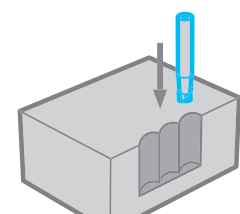
Pocketing



Ramping



Helical milling



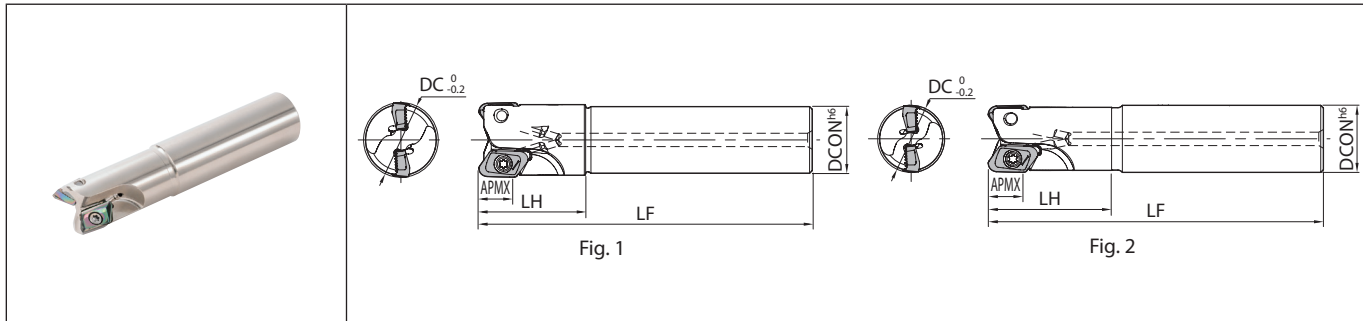
Vertical milling (Plunging)



Milling

M163

MEAS (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts ➔ M165																																																																																							
			DC	DCON	LF	LH	APMX							Anti-seize compound	Screw	Wrench																																																																																								
			<table border="1"> <tr> <td rowspan="3">Cylindrical</td> <td rowspan="3">Standard shank</td> <td>MEAS 28-S25-13-2T</td> <td>●</td> <td>2</td> <td>28</td> <td>25</td> <td>125</td> <td>40</td> <td rowspan="3">12</td> <td rowspan="3">+10</td> <td rowspan="3">-13</td> <td rowspan="3">Yes</td> <td rowspan="3">54000</td> <td rowspan="3">0.4</td> <td rowspan="3">1</td> <td rowspan="3">P-37</td> <td rowspan="3">SB-4090TRP</td> <td rowspan="3">DTPM-15</td> <td rowspan="3">KCGT1305...</td> </tr> <tr> <td>MEAS 35-S32-13-2T</td> <td>●</td> <td>3</td> <td>35</td> <td>32</td> <td>150</td> <td>50</td> <td rowspan="2">-12</td> <td rowspan="2">42000</td> <td rowspan="2">0.9</td> <td rowspan="2">1</td> </tr> <tr> <td>MEAS 40-S32-13-3T</td> <td>●</td> <td>3</td> <td>40</td> <td>32</td> <td>150</td> <td>50</td> </tr> <tr> <td rowspan="3">Same shank</td> <td rowspan="3">MEAS 25-S25-13-2T</td> <td>●</td> <td>2</td> <td>25</td> <td>25</td> <td>125</td> <td>49</td> <td rowspan="3">12</td> <td rowspan="3">+10</td> <td rowspan="3">-14</td> <td rowspan="3">Yes</td> <td rowspan="3">59000</td> <td rowspan="3">0.4</td> <td rowspan="3">2</td> <td rowspan="3">P-37</td> <td rowspan="3">SB-4075TRP</td> <td rowspan="3">DTPM-15</td> <td rowspan="3">KCGT1305...</td> </tr> <tr> <td>MEAS 32-S32-13-2T</td> <td>●</td> <td>2</td> <td>32</td> <td>32</td> <td>150</td> <td>69</td> <td rowspan="2">-13</td> <td rowspan="2">49000</td> <td rowspan="2">0.8</td> <td rowspan="2">2</td> </tr> <tr> <td>MEAS 25-S25-13-2T-170</td> <td>●</td> <td>2</td> <td>25</td> <td>25</td> <td>170</td> <td>89</td> <td rowspan="2">-14</td> <td rowspan="2">49000</td> <td rowspan="2">0.5</td> <td rowspan="2">2</td> </tr> <tr> <td rowspan="2">Long shank</td> <td rowspan="2">MEAS 32-S32-13-2T-200</td> <td>●</td> <td>2</td> <td>32</td> <td>32</td> <td>200</td> <td>119</td> <td rowspan="2">12</td> <td rowspan="2">+10</td> <td rowspan="2">-13</td> <td rowspan="2">Yes</td> <td rowspan="2">39000</td> <td rowspan="2">1.1</td> <td rowspan="2">2</td> <td rowspan="2">P-37</td> <td rowspan="2">SB-4075TRP</td> <td rowspan="2">DTPM-15</td> <td rowspan="2">KCGT1305...</td> </tr> <tr> <td>●</td> <td>2</td> <td>32</td> <td>32</td> <td>200</td> <td>119</td> </tr> </table>	Cylindrical	Standard shank	MEAS 28-S25-13-2T	●							2	28	25		125	40	12	+10	-13	Yes	54000	0.4	1	P-37	SB-4090TRP	DTPM-15	KCGT1305...	MEAS 35-S32-13-2T	●	3	35	32	150	50	-12	42000	0.9	1	MEAS 40-S32-13-3T	●	3	40	32	150	50	Same shank	MEAS 25-S25-13-2T	●	2	25	25	125	49	12	+10	-14	Yes	59000	0.4	2	P-37	SB-4075TRP	DTPM-15	KCGT1305...	MEAS 32-S32-13-2T	●	2	32	32	150	69	-13	49000	0.8	2	MEAS 25-S25-13-2T-170	●	2	25	25	170	89	-14	49000	0.5	2	Long shank	MEAS 32-S32-13-2T-200	●	2	32	32	200	119	12	+10	-13	Yes	39000	1.1	2
Cylindrical	Standard shank	MEAS 28-S25-13-2T	●			2	28	25	125	40	12	+10	-13	Yes	54000	0.4	1	P-37	SB-4090TRP												DTPM-15	KCGT1305...																																																																								
		MEAS 35-S32-13-2T	●			3	35	32	150	50																							-12	42000	0.9	1																																																																				
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Long shank	MEAS 32-S32-13-2T-200	●	2	32	32	200	119	12	+10	-13	Yes	39000	1.1	2	P-37	SB-4075TRP	DTPM-15	KCGT1305...																																																																																						
		●	2	32	32	200	119																																																																																																	

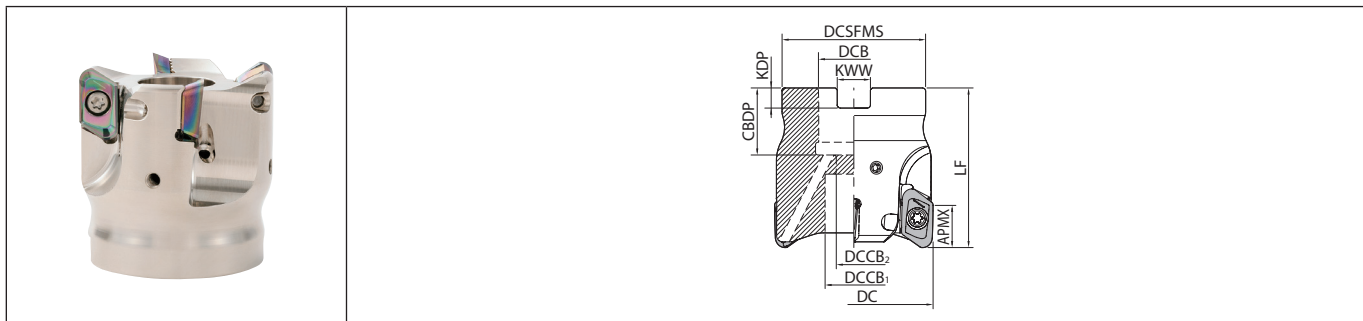
When using inserts with a corner-R(RE) of 3.2 or larger, additional modifications (R3.5 mm or larger) on the corner of cutter body is necessary.
 Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
 Recommended tightening torque for insert clamp : 3.5N·m

M

MEAS (Face mill)



Milling



Cutting edge angle 45°~70°

Cutting edge angle 75°

Cutting edge angle 88°/90°

Cutter for Finishing

High Feed Cutter

Multi-Function

Slot Mill

Ball-nose Radius

Others

Toolholder dimensions


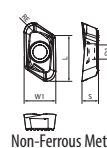

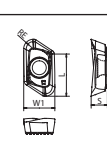
Description	Availability	Inserts	Dimension (mm)											A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Spare parts				Applicable inserts ➔ M165
			R	DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX						Anti-seize compound	Mounting bolt	Screw	Wrench	
			MEAS 050R-13-4T-M	●	4	50	45	22	18	11	50	21	6.3						10.4	12	+10	-11	

When using inserts with a corner-R(RE) of 3.2 or larger, additional modifications (R3.5 mm or larger) on the corner of cutter body is necessary.
 Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
 Recommended tightening torque for insert clamp : 3.5N·m

● : Standard item

M164

KCGT

Insert		Description	No. of edges	Dimension (mm)					DLC PDI025 Carbide	Applicable toolholder ● M164
				S	D1	RE	L	W1		
  <p>Non-Ferrous Metals</p>		KCGT 130504FR-AL 130508FR-AL 130512FR-AL 130516FR-AL 130520FR-AL 130524FR-AL 130530FR-AL 130532FR-AL 130540FR-AL 130550FR-AL	2	5.1	4.4	0.4	14.1	9.9	●	
						0.8	13.9		●	
						1.2	13.8		●	
						1.6	13.3		●	
						2	13.3		●	
						2.4	13.3		●	
						3	13.3		●	
						3.2	12.8		●	
						4	12.8		●	
						5	12.8		●	
  <p>Tough edge</p>		KCGT 130504ER-AM 130508ER-AM 130516ER-AM 130525ER-AM 130530ER-AM 130540ER-AM	2	5.1	4.4	0.4	13.7	9.9	●	
						0.8	13.7		●	
						1.6	13.3		●	
						2.5	13.3		●	
						3	13.3		●	
						4	12.8		●	

Handed insert shows Right-hand

Recommended cutting conditions

Workpiece material	Chip breaker	Vc (m/min)	ae (mm)	fz (mm/t)		
				ap = 0.5 mm (Reference value)		
			DC	Cutting Dia. ø28 or less	Cutting Dia. ø32 or more	
Aluminum alloys	Si Ratio 12.5% or less	AL	200~1,000~3,000	≤ 0.5DC	0.05~0.15~0.25	
				0.5DC <	0.05~0.15~0.25	
		AM	200~1,000~5,000	≤ 0.5DC	0.05~0.15~0.3	0.05~0.2~0.35
				0.5DC <	0.05~0.15~0.25	0.05~0.15~0.3
	Si Ratio 12.5% and over	AL	200~300~400	≤ 0.5DC	0.05~0.1~0.2	
				0.5DC <	0.05~0.1~0.2	
		AM	200~300~800	≤ 0.5DC	0.05~0.15~0.3	0.05~0.2~0.35
				0.5DC <	0.05~0.15~0.25	0.05~0.15~0.3

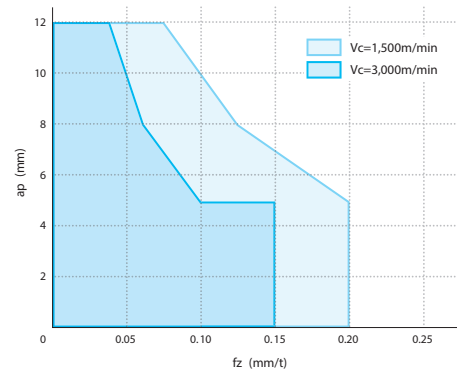
- Recommended cutting conditions are reference values. Please adjust cutting speed and feed rate according to actual machining conditions taking into account machine and workpiece rigidity
- Do not use the cutter at speeds exceeding the maximum cutting speed limit (See page M167)
- Regularly changing the insert clamp screw is recommended
- Use appropriate safety covers to protect from tool breakage and chip scattering
- When using at a higher revolution (10,000min⁻¹ or over), refer to the table below to adjust the balance of the MEAS and arbor

Revolution (min ⁻¹)	ISO balance quality grade ISO 1940-1/8821 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

● : Standard item

MEAS Cutting performance

ø50 (4 flutes) Shouldering ae = 25mm Workpiece material: A7075



Reduce the feed rate when machining at high speeds

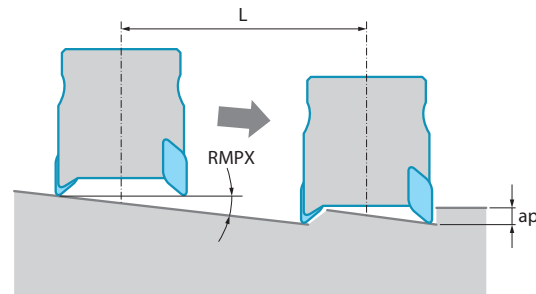


Reference data for ramping

Cutter dia. DC (mm)	25	28	32	35	40	50
Max. ramping angle RMPX	20°	16°	12.5°	11°	8.5°	6°
tan RMPX	0.363	0.287	0.221	0.194	0.149	0.105

Guide for ramping (Slant milling)

Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
Reduce recommended feed rate by 50%



Formula of the cutting length "L" at Max. ramping angle

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

Vertical milling (Plunging)

* For vertical milling (plunging), reduce feed rate to fz=0.1mm/t or less.

Insert description	Max. width of cut (ae)
KCGT13 type	8mm

Helical milling

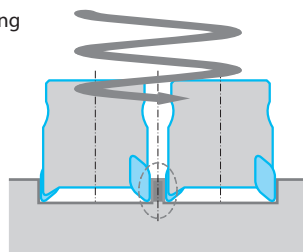
For helical milling, use between min. cutting dia. and max. cutting dia.



Milling

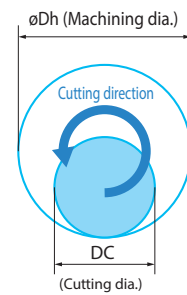
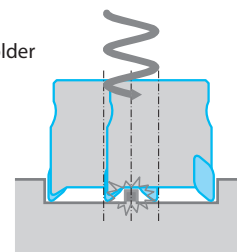
Over max. cutting dia.

Center core part remains after machining



Under min. cutting dia.

Center core part interferes with toolholder



Description	Min. cutting dia.	Max. cutting dia.	Maximum ramping depth per cycle
MEAS...13...	2×DC-16	2×DC-3	3.5

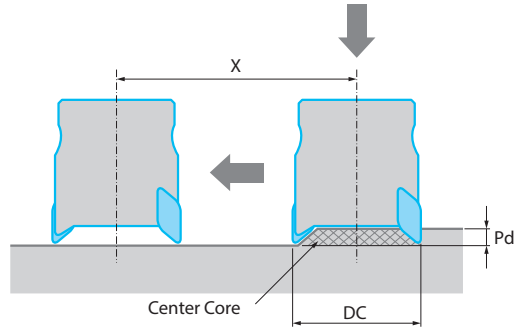
Unit: mm

- Down-cut milling is recommended (refer to the figure above)
- Feed rate should be under 50% of the recommended cutting conditions
- Use caution to eliminate incidences caused by producing long chips

Cutting edge angle 45°~70°
Cutting edge angle 75°
Cutting edge angle 88°/90°
Cutter for Finishing
High Feed Cutter
Multi-Function
Slot Mill
Ball-nose Radius
Others

M166

Guide for drilling



Drilling depth

Please refer to Pd (Max. drilling depth) in the chart.

Traversing after drilling

1. It is recommended to reduce feed by $f_z = 0.15$ (mm/t) or less until the center core is removed.
2. When drilling, reduce feed rate per revolution to $f=0.1$ mm/rev or under.

Description	Max. Cutting depth Pd	Min. cutting length X for flat bottom surface
MEAS...-13-...	3.5	DC-16

Unit: mm

How to mount inserts

1. Be sure to remove dust and chips from the insert mounting pocket.
2. Insert screw
 - Coat anti-seize compound thinly on portion of taper and thread.
 - Attach screw to the magnetized wrench tip and tighten while gently pressing the outside edge of the insert toward the insert pocket surface (grooved surface) (see the picture on the right) (Recommended Torque 3.5N·m)

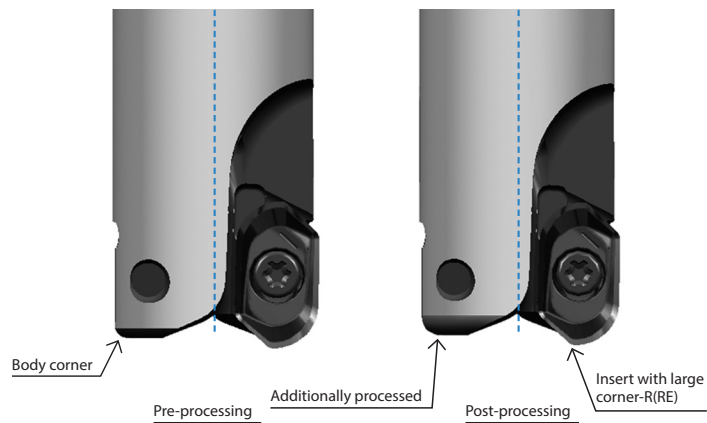


When using inserts with a corner-R(RE) of 3.2 or larger

When using inserts with corner-R(RE) 3.2 or larger, additional modifications of the cutter body will be necessary. Additional modifications for the body will be necessary. Ref. to the chart below for the recommended modifications. (If corner-R is 3.0 mm or smaller, additional modifications are not needed)

Insert Corner-R(RE) (mm)	Additional processing dimension to body corner (mm)
3.2	R2.0
4.0	R2.5
5.0	R3.0

* Round- shaped additional processing is recommended. When applying chamfer shaped additional processing, do not cut away too much.



Cautions

While in Use



Please use within recommended cutting conditions

Do not run the cutter at revolutions exceeding the printed maximum revolution limit of the cutter body

Do not use the end mill at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Please do not use under the following conditions :

- When cutter is not fully loaded with inserts
- If the body is damaged

Please wear protective equipment such as protective glove when changing inserts

Injury can occur when touching the cutting edge

Dynamic balance

Balance adjustment on the cutter is completed before shipping

Balance adjustment to be ISO balance quality grade (ISO 1940-1) G6.3

When using at a higher revolution (10,000min⁻¹ or over), refer to the table below to adjust the balance of MEAS and arbor

Do not operate the balance adjustment screw on the outer periphery of the cutter. This could lead to improper dynamic balance

Revolution (min ⁻¹)	ISO balance quality grade	
	ISO 1940-1/8821 (JIS B0905)	
~20,000	G16	
~30,000	G6.3	
30,000~	G2.5	

High-precision cutter for finishing applications

MFF

Cutter body design provides excellent reliability
Molded wiper inserts increases machining efficiency

1 Our solution for finishing operations

Designed with a unique insert combination of semi-finishing and finishing, the MFF drastically improves productivity by reducing quality issues.



SOLUTION

- Increase feed to $f = 5.0$ mm/rev
- Achieved $0.8 \mu\text{m}$ Ra surface finish
- No grinding required
- Achieved $5 \mu\text{m}$ flatness

The above is the result of a field test. Actual results will depend on machining environment, workpiece rigidity, machine, etc.

M

Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing**
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

MFF

Machining solutions

Can be used on a wide variety of parts and workpieces

Part name	Workpiece material	Industry
Plate / Frame / Case Cylinder pump / Rail Turbine housing Casing / Mold base	Rolled Steel for general structure / Gray cast iron / Spheroidal graphite cast iron Ni-resist cast iron Mold steel Carburized and hardened steel (60 HRC)	Industrial machining / Machine tools Shipbuilding / Automotive Construction machinery / Molds

M168

2 Molded wiper insert for high-quality surface finish



Kyocera's unique molded insert technology realizes high feed rates and excellent surface finish

Low cutting force with special edge preparation

Micro-honing
Good sharpness

Wiper edge

Large S-curve shape developed for higher feed rates

Edge temperature simulation comparison (Internal evaluation)

MFF Conventional tool After 2 sec machining

MEGACOAT NANO Cermet **PV60M**

For high-speed machining
Recommended $V_c \sim 350$ m/min

High-quality surface finish

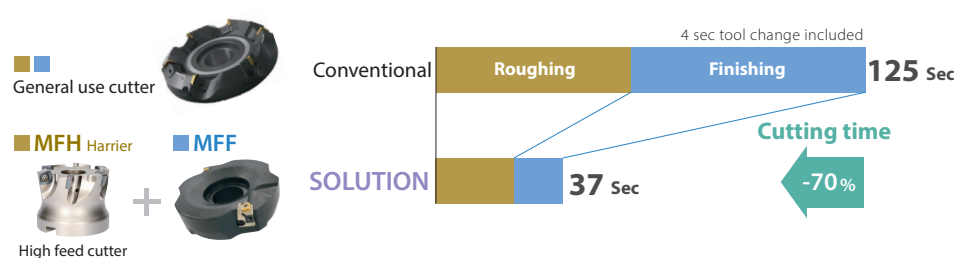
Molded TT chipbreaker

Reduces chip clogging
High feed machining

Comprehensive machining solutions

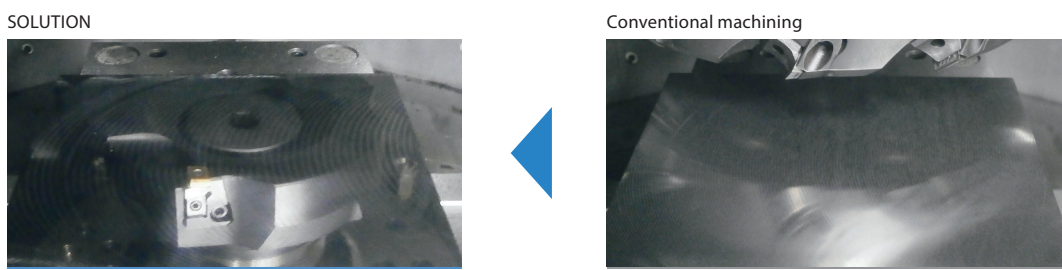
From roughing to finishing machining improvements (Internal evaluation)

Combine with Kyocera's MFH high feed cutter to improve quality and efficiency



Cutting Conditions	
Conventional ø200 (6 inserts)	
$V_c = 200$ m/min	
Roughing:	$V_f = 286$ mm/min ($f_z = 0.15$ mm/t), $a_p = 1.2$ mm
Finishing:	$V_f = 230$ mm/min ($f_z = 0.12$ mm/t), $a_p = 0.3$ mm
SOLUTION	
Roughing: MFH Harrier ø63 (6 inserts)	
$V_c = 200$ m/min	
$V_f = 7,300$ mm/min ($f_z = 1.2$ mm/t), $a_p = 0.7$ mm	
Finishing: MFF ø200 (2 inserts)	
$V_c = 300$ m/min	
$V_f = 2,400$ mm/min ($f = 5.0$ mm/rev), $a_p = 0.1$ mm	

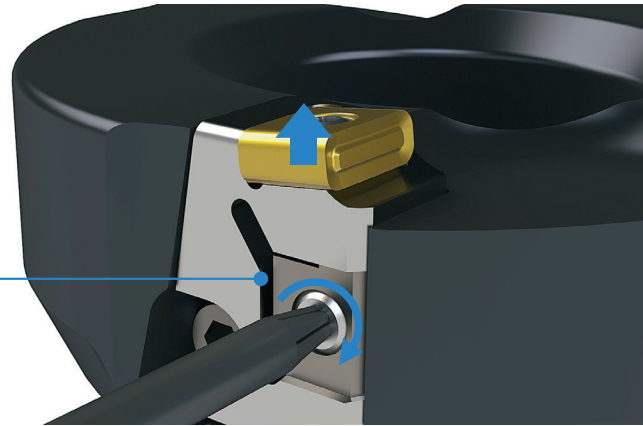
Surface finish quality after machining



3 Adjustable cutting edge for increased usability

Cartridge height comes pre-adjusted and should not be necessary.
Adjustment is not required after replacing insert.

Easy-to-adjust cutting edge
Cutting edge height can be adjusted easily with one screw

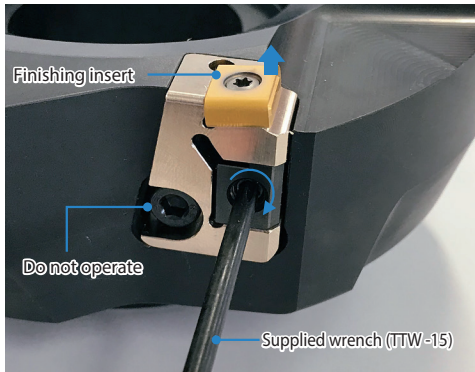


Included adjustment wrench

Edge adjustment

If D.O.C. is ap 0.1 ~ 0.2 mm, no adjustment is necessary (Pre-adjusted before holder is shipped).
Cutting edge adjustment is NOT required when replacing inserts.

If D.O.C. is less than 0.1 mm or if you prefer a different edge height, use the following method:



Adjusting the cutting edge

Use the supplied TTW-15 wrench to rotate the screw and easily adjust the cutting edge position.

Procedure

To adjust, start with the screw turned counterclockwise about two rotations (lowering the cutting edge).
Tighten the screw clockwise (raising the cutting edge) to adjust the amount of protrusion.
*Use a dial gauge to measure protrusion amount.

Precautions

Make sure to lower the cutting edge below the desired height first (turning screw counterclockwise) and then raise the edge up to the final height (turning screw clockwise).
If cutting edge is simply lowered to the final edge height, chattering or loosening of the screw may occur due to backlash.
Make sure the measurement position of the cutting edge is the same machining diameter.

Standard Cutting Edge Height

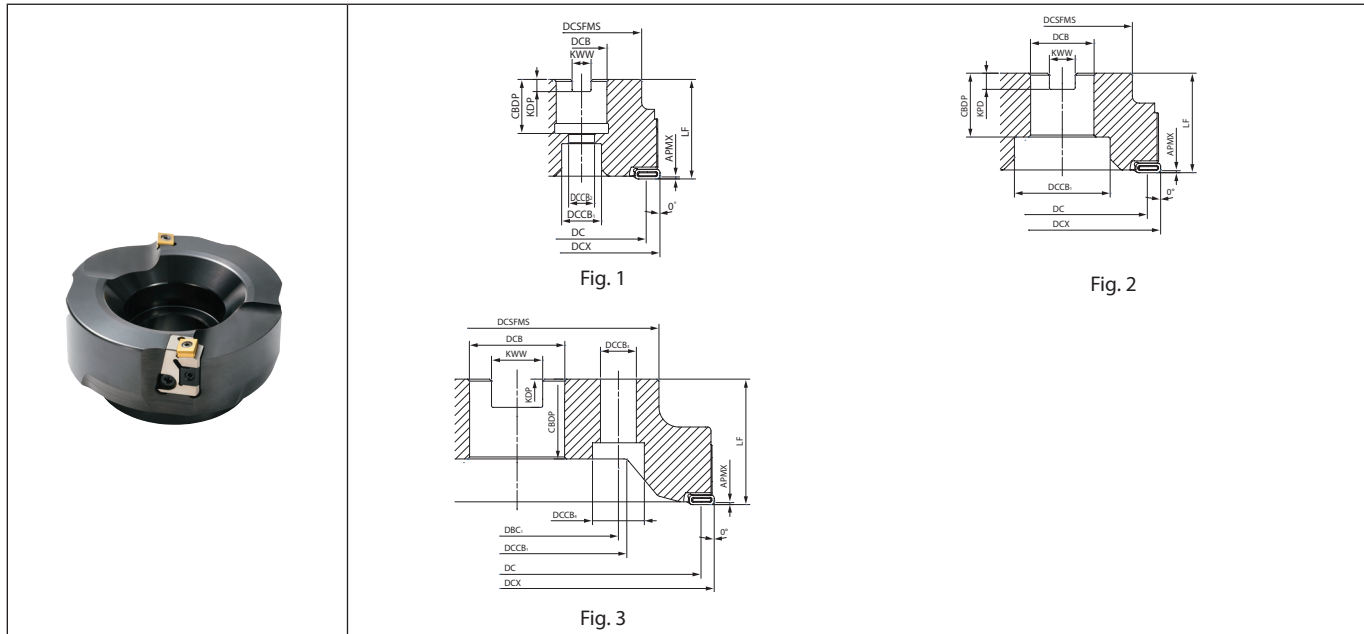
ap = 0.05 mm → protrusion against rough edge : 0.03 mm
ap = 0.10 mm ~ → protrusion against rough edge : 0.06 mm *Pre-adjusted before shipment



Cutting edge angle 45°~70°
Cutting edge angle 75°
Cutting edge angle 88°/90°
Cutter for Finishing
High Feed Cutter
Multi- Function
Slot Mill
Ball-nose Radius
Others

M170

MFF



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)														A.R. (°)	R.R. (°) (Medium-Finishing Insert)	R.R. (°) (Finishing Insert)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M172 M30			
			DC	DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	DCCB ₃	DCCB ₄	DBC ₁	LF	CBDP	KDP	KWW	APMX											
Metric	MFF 080R-M-SF	MTO	67.3	80	60	27	20	13							50	24	7	12.4	0.3	-8	-9	-20	No	2000	1.3	1	LNGX120916R-TT LNGX120916
	MFF 100R-M-SF	MTO	87.3	100	70	32	48								50	32	8	14.4						1600	1.8	2	
	MFF 125R-M-SF	MTO	112.3	125	87	40	55								63	33	9	16.4						1300	3.5	2	
	MFF 160R-M-SF	MTO	147.3	160	102	40	72								63	40	14	25.7						1000	5.9	2	
	MFF 200R-M-SF	MTO	187.3	200	142	60	110			18	26	101.6			63	40	14	25.7						800	7.7	3	
	MFF 250R-M-SF	MTO	237.3	250	142	60	110			18	26	101.6			63	40	14	25.7						800	10.5	3	
Bore dia. inch. spec	MFF 080R-SF	MTO	67.3	80	60	25.4	20	13							50	27	6	9.5	0.3	-8	-9	-20	No	2000	1.3	1	LNGX120916R-TT LNGX120916
	MFF 100R-SF	MTO	87.3	100	70	31.75	48								50	32	8	12.7						1600	1.8	2	
	MFF 125R-SF	MTO	112.3	125	87	38.1	58								63	38	10	15.9						1300	3.5	2	
	MFF 160R-SF	MTO	147.3	160	102	50.8	72								63	40	14	25.4						1000	5.9	2	
	MFF 200R-SF	MTO	187.3	200	142	47.625	110			18	26	101.6			63	40	14	25.4						800	8.1	3	
	MFF 250R-SF	MTO	237.3	250	142	47.625	110			18	26	101.6			63	40	14	25.4						800	10.8	3	

*ø250 sizes have holes for lighter weight.

Max. Revolution

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page M173. Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.


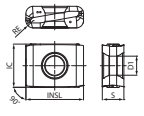

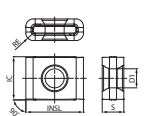
Surface Finish
The surface will be finished flat within the range of DC shown on the right.

Spare parts

Spare Parts							
Clamp screw	Wrench	Wedge	Cartridge	Cartridge clamp screw	Wrench	Adjustment screw	Anti-seize Compound
SB-3592TR <small>Recommended tightening torque for insert clamp 1.2N·m</small>	DTM-10	AD-MFF	CR-MFF	HH5X15L	TTW-15	W6X18N	P-37

MTO : Made to order

LNGX

<p>Classification of usage</p> <ul style="list-style-type: none"> ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under) 		Carbon steel / Alloy steel											P	
		Mold and die steel												
		Austenitic stainless steel												M
		Martensitic stainless steel												
		Precipitation hardening stainless steel												
		Gray cast iron												K
		Nodular cast iron												
		Non-ferrous metals												N
		Heat-resistant alloy												S
		Titanium alloy												
Hard materials												H		
Insert	Description	No. of edges	Dimension (mm)					Cermets		Carbides		Applicable toolholder M171 M28		
			IC	S	D1	RE	INSL	PVD PV60M	PVD PRI525	PVD	Carbide			
	 LNGX 120916R-TT Low cutting force	4	9.525	4.76	4.2	1.6	12.7	MT0	MT0			MFF...-SF MFSE45...-W MFSE45...-W-M		
	 LNGX 120916	4	9.525	4.76	4.2	1.6	12.7	MT0	MT0			MFF...-SF MFSE45...-W MFSE45...-W-M		

Recommended cutting conditions M173



Milling

Cutting edge angle 45°~70°
Cutting edge angle 75°
Cutting edge angle 88°/90°
Cutter for Finishing
High Feed Cutter
Multi-Function
Slot Mill
Ball-nose Radius
Others

MT0 : Made to order

M172

Recommended cutting conditions

Chipbreaker	Workpiece material	f (mm/rev)	ap (mm)	Recommended insert grades (Vc : m/min)	
				PV60M	PR1525
TT	Structural steel	1.5 – 4.0 – 5.0	0.03 – 0.1 – 0.3	★ 230 – 280 – 350	☆ 230 – 280 – 350
	Carbon steel	1.0 – 4.0 – 5.0		★ 200 – 250 – 350	☆ 200 – 250 – 350
	Alloy steel	1.0 – 4.0 – 5.0		★ 200 – 250 – 350	☆ 200 – 250 – 350
	Mold steel	1.0 – 2.0 – 4.0	0.03 – 0.1 – 0.2	☆ 120 – 200 – 250	★ 120 – 200 – 250
	Mold steel (50HRC ~)	0.6 – 1.0 – 1.2	0.03 – 0.05 – 0.1	—	★ 50 – 70 – 80
	Stainless steel (Austenitic related)*	1.0 – 2.0 – 4.0	0.03 – 0.1 – 0.2	☆ 120 – 200 – 250	★ 120 – 200 – 250
	Stainless steel (Martensitic related)*	1.0 – 3.0 – 4.0		☆ 150 – 200 – 300	★ 150 – 200 – 300
Standard	Gray cast iron	1.0 – 2.0 – 4.0	0.03 – 0.1 – 0.3	☆ 200 – 250 – 350	★ 200 – 250 – 350
	Nodular cast iron	1.5 – 2.0 – 4.0		☆ 150 – 250 – 300	★ 150 – 250 – 300

★: 1st Recommendation ☆: 2nd Recommendation

*Machining with coolant is recommended for stainless steel
 The bold-faced number indicates a center value of recommended cutting condition.
 Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

M



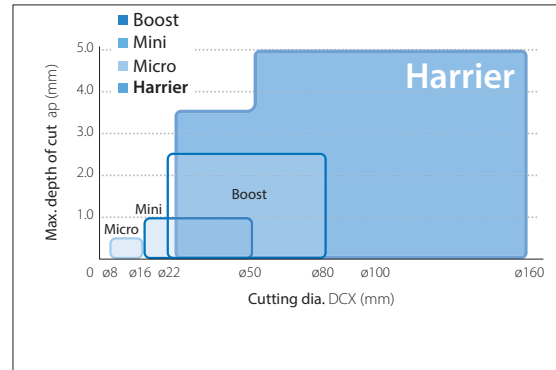
Milling

MFH Harrier

Anti chattering

Applicable to various applications with 4 types of inserts

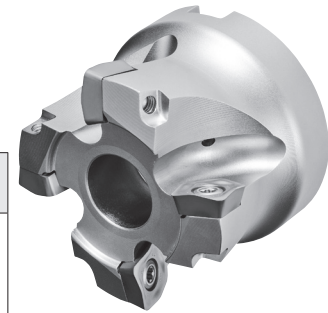
Increased chip evacuation and shortened cutting time



1 Large chipbreaker lineup for various machining applications

4 types of inserts according to your application

	GM type (General purpose)	GH type (Tough edge)	LD type (Large D.O.C.)	FL type (Low cutting force)
Shape				
Applications	1st recommendation for general purpose →Facing, Pocketing, Helical milling	Excellent fracture resistance →Available for facing, ramping and helical milling	Max. ap=5 mm →Applicable for scale removal at high efficiency	Wiper edge with low cutting force →Applicable for both roughing and finishing, for small machining center



M



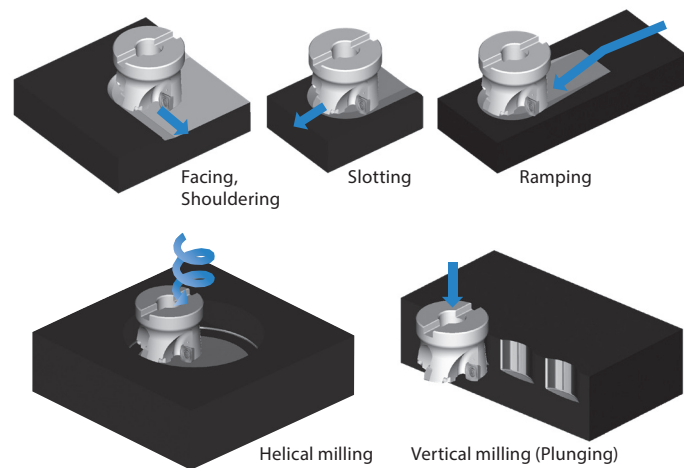
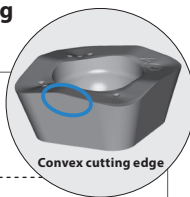
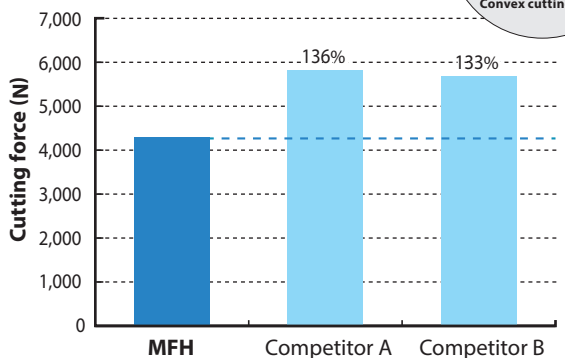
Milling

2 3D convex cutting edge reduces shock of biting workpiece

3 Multi-functional cutter

Cutting force (Shock) comparison when biting workpiece (Internal evaluation)

Cutting with the ae that receives the maximum impact



* GM type is applicable for all the above applications
* LD type and FL type are not applicable for helical milling, Plunging and contouring of rising wall (Please refer to M184)

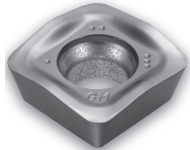
M174

4 Applicable for variety of workpieces from steel to heat-resistant alloys



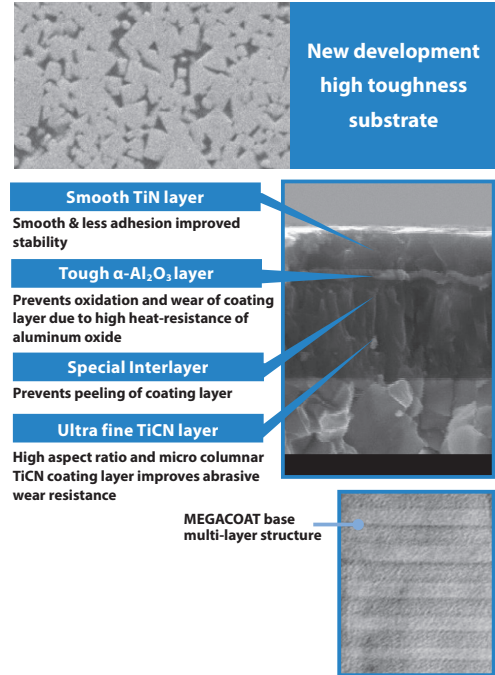
CA6535

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



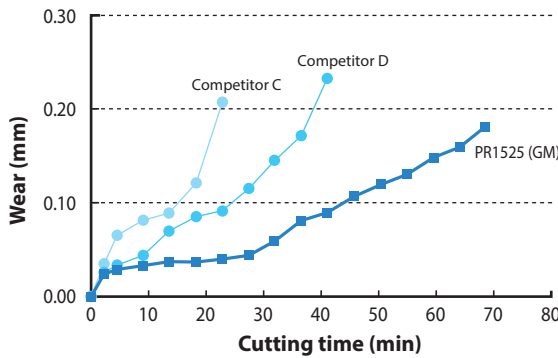
PR1535

For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel
Stable and longer tool life by special nano coating layer
MEGACOAT NANO



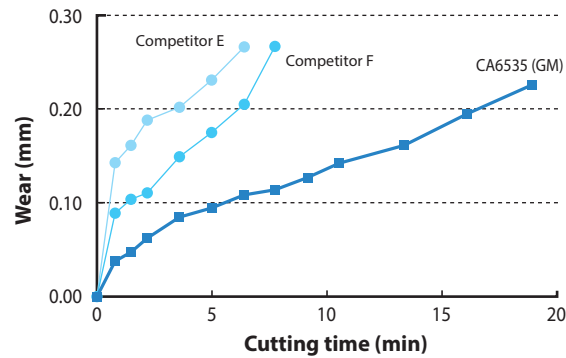
Wear resistance comparison (Internal evaluation)

SKD11



<Cutting conditions> Vc=150m/min, apxae=1.0x16mm, fz=1.5mm/t, Dry

Ni-base heat-resistant alloys



<Cutting conditions> Vc=30m/min, apxae=1.0x40mm, fz=0.8mm/t, Wet

Case studies

SFVAF22B (Forged alloy steel)

Machined portion

Machining efficiency 3 times increase

- Turbine parts • Vc=160m/min • apxae=1.5xmax.160mm
- fz=1.17mm/t • Dry
- MFH160R-14-8T (8 Flutes) • SOMT140520ER-GM (PR1525)

PR1525	Chip evacuation rate = 720cc/min
Competitor G	Chip evacuation rate = 240cc/min

- Small machining noise even at 3 times higher feed rate
- Good edge condition without chipping and stable machining

(User evaluation)

SUS304F

Chattering reduced
Machining efficiency 1.6 times

- Clutch • Vc=120m/min • apxae=1.0x20mm
- fz=1.2mm/t • Dry
- MFH32-S32-10-2T (2 Flutes) • SOMT100420ER-GM (PR1535)

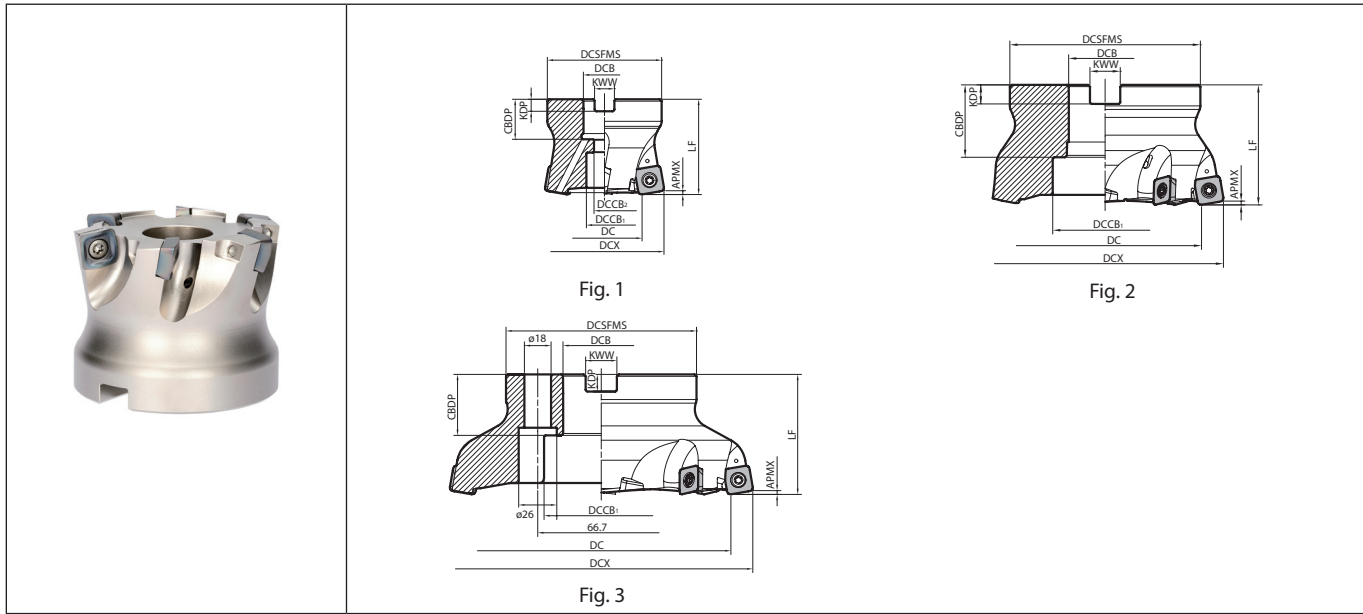
PR1535	Chip evacuation rate = 58cc/min
Competitor H	Chip evacuation rate = 36cc/min

- Competitor H caused chattering but MFH realized stable machining
- Good edge condition and long tool life

(User evaluation)



MFH Harrier (Face mill)



Toolholder dimensions

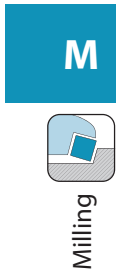
Description	Availability		Dimension (mm)														A.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M181			
	R	Inserts	DCX	DC (GM/GH)	DC (LD)	DC (FL)	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX	APMX ₂									
Metric MFH 050R-10-4T-M 050R-10-5T-M 063R-10-5T-22M 063R-10-5T-27M 063R-10-6T-22M 063R-10-6T-27M 080R-10-7T-M	●	4	50	33	37.5	36.5	47	22	19	11	50	21	6.3	10.4	1.5 (3.5)	1.2	+10	Yes	10000	0.4	1	SOMT1004...			
	●	5	63	46	50.5	49.5	60	27	20	13		24	7	12.4											
	●	6						22	19	11	21	6.3	10.4												
	●	7	80	63	67.5	66.5	76	27	20	13	63	24	7	12.4	7600	1.6									
	Bore dia. inch spec MFH 050R-10-4T 050R-10-5T 063R-10-5T 063R-10-6T 080R-10-7T	●	4	50	33	37.5	36.5	47	22.225	19	11	50	19	5	8.4	1.5 (3.5)	1.2	+10	Yes	10000			0.4	1	SOMT1004...
		●	5	63	46	50.5	49.5	60																	
●		6	27						20	13	24	7	12.4	8800	0.7										
●		7	80	63	67.5	66.5	76	31.75	26	17	63	32	8	12.7	7600	1.3									

For APMX₂, refer to the figure in M177

The values (APMX = 3.5) and (APMX₂ = 1.2) are valid in case of LD-Type usage.

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

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



- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M176

Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)													A.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M181		
			DCX	DC (GM/GH)	DC (LD)	DC (FL)	DCSFMS	DCB	DCB ₁	DCB ₂	LF	CBDP	KDP	KWW	APMX							APMX ₂	
Metric	●	4	50	27	33	32	47	22	12	-	50	21	6.3	10.4	2	2	+10	Yes	8800	0.4	1	SOMT1405...	
			60	19	11	24	7		12.4	7400		0.6	1										
			63	40	46	45	27	20	13	24	7	12.4	24	7	12.4	2	2	+10	Yes	6400	1.4		1
			5	80	57	63	62	76	27	20	13	24	7	12.4	2	2	+10	Yes	6400	1.4	1		
																							27
			6	100	77	83	82	96	32	26	17	63	28	8	14.4	2	2	+10	Yes	5600	2.4		2
			7	125	102	108	107	100	40	55	-	33	9	16.4	2	2	+10	Yes	5600	2.4	2		
																							32
8	160	137	143	142	100	40	68	-	32	9	16.4	2	2	+10	No	4200	3.7	3					
																			68	32	4200	3.7	3
Bore dia. inch spec	●	4	50	27	33	32	47	22.225	12	-	50	19	5	8.4	2	2	+10	Yes	8800	0.4	1	SOMT1405...	
			60	19	11	24	7		12.4	7400		0.6	1										
			63	40	46	45	27	20	13	24	7	12.4	24	7	12.4	2	2	+10	Yes	6400	1.3		1
			5	80	57	63	62	76	31.75	26	17	63	32	8	12.7	2	2	+10	Yes	5600	2.4		1
			6	100	77	83	82	96	38.1	55	-	38	10	15.9	2	2	+10	Yes	5600	2.4	1		
																							50.8
			7	125	102	108	107	100	50.8	72	-	38	11	19.1	2	2	+10	No	4200	3.9	2		
																							50.8
8	160	137	143	142	100	50.8	72	-	38	11	19.1	2	2	+10	No	4200	3.9	2					
																			50.8	72	-	38	11

For APMX₂, refer to the figure below

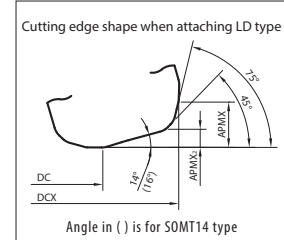
The values (APMX = 5) and (APMX₂ = 2) are valid in case of LD-Type usage.

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

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

Spare parts (MFH Harrier - Face mill)

Description	Spare parts				Applicable inserts						
	Clamp screw	Wrench		Anti-seize compound		Mounting bolt					
MFH 050R-10-... 050R-10-...-M 063R-10-... 063R-10-...-22M 063R-10-...-27M 080R-10-... 080R-10-...-M	SB-4090TRPN	DTPM-15		P-37	HH10X30	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL SOMT100420ER-GH					
Recommended tightening torque for insert clamp 3.5N-m					HH12X35						
					HH16X40						
					HH12X35						
MFH 050R-14-... 050R-14-...-M 063R-14-... 063R-14-...-22M 063R-14-...-27M 080R-14-... 080R-14-...-M 100R-14-... 100R-14-...-M 125R-14-... 125R-14-...-M 160R-14-... 160R-14-...-M					SB-50120TRP		TTP-20		P-37	W10X31	SOMT140520ER-GM SOMT140520ER-LD SOMT140514ER-FL SOMT140520ER-GH
										HH10X30	
										HH12X35	
	HH16X40										
	HH12X35										
	HH16X40										
	-										
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	-										
	-										



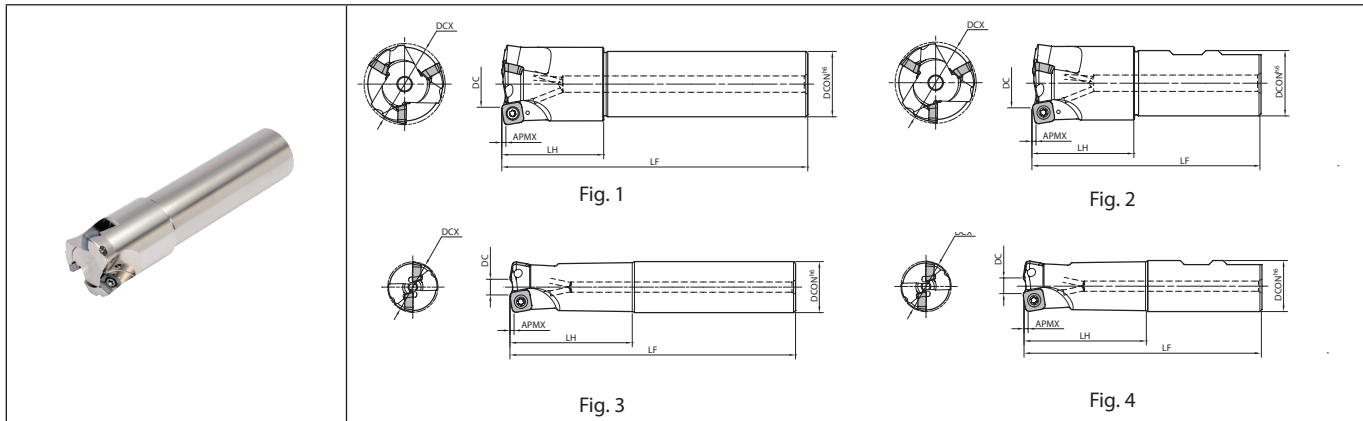
Max. revolution
Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.



● : Standard item

MFH Harrier (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)										A.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts M181
			DCX	DCON	DC (GM/GH)	DC (LD)	DC (FL)	LF	LH	APMX	APMX ₂	Anti-seize compound						Screw	Wrench		
Cylindrical MFH 25-S25-10-2T 28-S25-10-2T 32-S32-10-2T 32-S32-10-3T 35-S32-10-2T 35-S32-10-3T 40-S32-10-3T 40-S32-10-4T	●	2	25	25	8	12.5	11.5	140	60						17000	0.4	3	P-37 SB-4075TRP DTPM-15 Recommended tightening torque for insert clamp 3.5N·m	SOMT1004...		
	●	2	28	25	11	15.5	14.5	140	40						15500	0.5	1				
	●	3	32		15	19.5	18.5		70	1.5	1.2	+10	Yes		14000		3				
	●	3	32		15	19.5	18.5		70	1.5	1.2	+10	Yes		14000		3				
	●	2	35	32	18	22.5	21.5	150	50	1.5	1.2	+10	Yes		13000		1				
	●	3	35	32	18	22.5	21.5	150	50	1.5	1.2	+10	Yes		13000		1				
	●	4	40		23	27.5	26.5		50	1.5	1.2	+10	Yes		11500		1				
	●	4	40		23	27.5	26.5		50	1.5	1.2	+10	Yes		11500		1				
Weldon MFH 25-W25-10-2T 32-W32-10-3T 40-W32-10-3T 40-W32-10-4T	●	2	25	25	8	12.5	11.5	117	60						17000	0.4	4	P-37 SB-4075TRP DTPM-15 Recommended tightening torque for insert clamp 3.5N·m	SOMT1004...		
	●	3	32		15	19.5	18.5	131	70	1.5	1.2	+10	Yes		14000		4				
	●	3	40	32	23	27.5	26.5	112	50	1.5	1.2	+10	Yes		11500		2				
	●	4	40		23	27.5	26.5	112	50	1.5	1.2	+10	Yes		11500		2				
Long Shank MFH 25-S25-10-2T-200 28-S25-10-2T-200 32-S32-10-2T-200 35-S32-10-2T-200 40-S32-10-4T-250	●	2	25	25	8	12.5	11.5		120						17000	0.6	3	P-37 SB-4075TRP DTPM-15 Recommended tightening torque for insert clamp 3.5N·m	SOMT1004...		
	●	2	28	25	11	15.5	14.5		40	1.5	1.2	+10	Yes		15500	0.7	1				
	●	2	32		15	19.5	18.5		200	1.5	1.2	+10	Yes		14000	1	3				
	●	2	35	32	18	22.5	21.5		120	1.5	1.2	+10	Yes		13000	1.4	1				
	●	4	40		23	27.5	26.5	250	50	1.5	1.2	+10	Yes		11500	1.5	1				
Extra Long Shank MFH 25-S25-10-2T-300 28-S25-10-2T-300 32-S32-10-2T-300 35-S32-10-2T-300 40-S32-10-4T-300	●	2	25	25	8	12.5	11.5		180						17000	1	3	P-37 SB-4075TRP DTPM-15 Recommended tightening torque for insert clamp 3.5N·m	SOMT1004...		
	●	2	28	25	11	15.5	14.5		40	1.5	1.2	+10	Yes		15500	1.1	1				
	●	2	32		15	19.5	18.5		300	1.5	1.2	+10	Yes		14000	1.6	3				
	●	2	35	32	18	22.5	21.5		180	1.5	1.2	+10	Yes		13000	1.7	1				
	●	4	40		23	27.5	26.5		50	1.5	1.2	+10	Yes		11500	1.8	1				

For APMX₂, refer to the figure in M177

The values (APMX = 3.5) and (APMX₂ = 1.2) are valid in case of LD-Type usage.

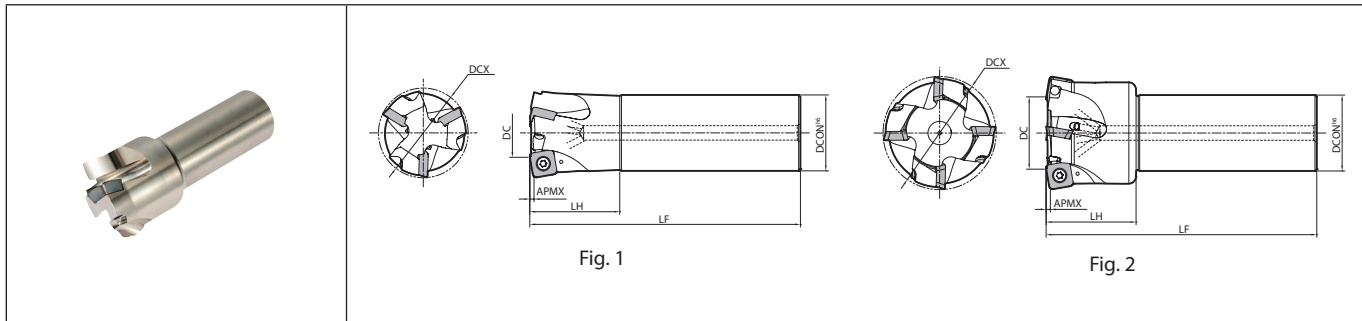
Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

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

● : Standard item

M178

MFH Harrier (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)										A.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts M181	
			DCX	DCON	DC (GM/GH)			DC (LD)	DC (FL)	LF	LH	APMX						APMX ₂	Anti-seize compound	Screw		Wrench
					27	33	32															
MFH 50-S42-14-3T	●	3	50												8800	1.4	1	P-37	SB-50120TRP	TTP-20	SOMT1405...	
63-S42-14-4T	●	4	63	42	40	46	45	150	50	2	(5)	+10	Yes	7400	1.7	2	Recommended tightening torque for insert clamp 3.5N·m					
80-S42-14-5T	●	5	80		57	63	62							6400	2.3	2						

For APMX₂, refer to the figure in M177

The values (APMX = 5) and (APMX₂ = 2) are valid in case of LD-Type usage.

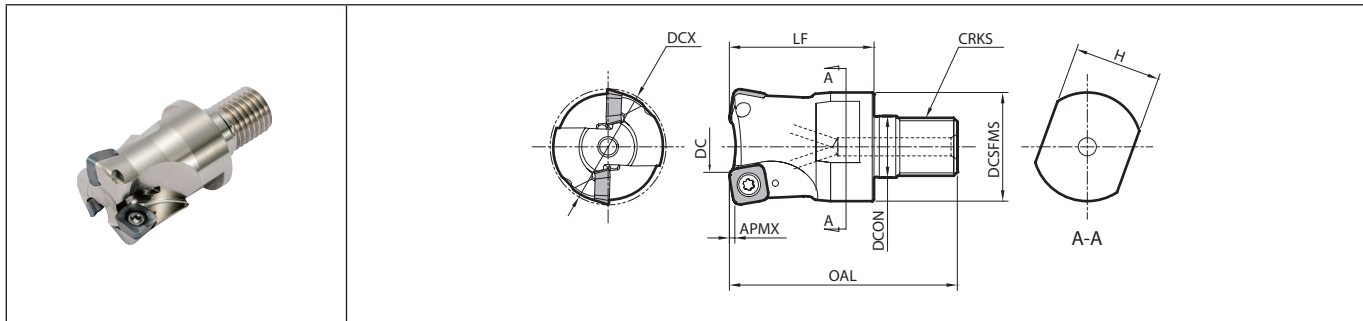
Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

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

● : Standard item



MFH Harrier (Modular type)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)													A.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Spare parts			Applicable inserts ➔ M181
			DCX	DCON	DC (GM/GH)	DC (LD)	DC (FL)	DCSFMS	OAL	LF	APMX	APMX ₂	CRKS	H	Anti-seize compound				Screw	Wrench		
MFH 25-M12-10-2T	●	2	25	12.5	8	12.5	11.5	23	57	35				M12x1.75	19	+10	Yes	17000	P-37	SB-407STRP	DTPM-15	SOMT1004...
28-M12-10-2T	●		28		11	15.5	14.5															
32-M16-10-2T	●	3	32	17	15	19.5	18.5	30	62	40	1.5 (3.5)	1.2	M16x2.0	24				14000				
32-M16-10-3T	●				18	22.5	21.5															
35-M16-10-2T	●	2	35	17	18	22.5	21.5	30	62	40	1.5 (3.5)	1.2	M16x2.0	24				13000				
35-M16-10-3T	●																					
40-M16-10-3T	●	3	40	17	18	22.5	21.5	30	62	40	1.5 (3.5)	1.2	M16x2.0	24				11500				
40-M16-10-4T	●																					

For APMX₂, refer to the figure in M177

The values (APMX = 3.5) and (APMX₂ = 1.2) are valid in case of LD-Type usage.

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

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

See page M60 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)




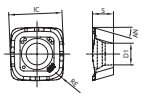

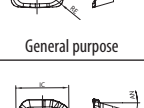
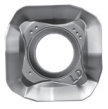
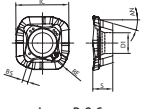

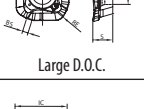

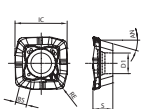

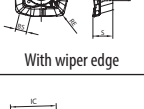
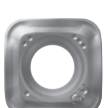
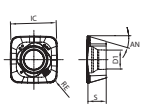
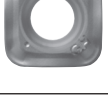
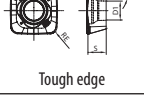
Milling

Cutting edge angle 45°~70°
Cutting edge angle 75°
Cutting edge angle 88°/90°
Cutter for Finishing
High Feed Cutter
Multi- Function
Slot Mill
Ball-nose Radius
Others

● : Standard item

M180

SOMT

Insert		Description	No. of edges	Dimension (mm)					Angle (°)	Carbide				Applicable toolholder M176~M180					
				IC	S	D1	RE	BS		AN	CVD								
											CA6535	PR0155	PR1510		PR1525	PR1535			
<p>Classification of usage</p> <p>★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)</p>		Carbon steel / Alloy steel							★	☆					P				
		Mold and die steel																	
		Austenitic stainless steel											☆	★					M
		Martensitic stainless steel							★										
		Precipitation hardening stainless steel																	
		Gray cast iron											★						K
		Nodular cast iron											★						K
		Non-ferrous metals																	
		Heat-resistant alloy							★							☆			
		Titanium alloy															★		
		Hard materials											★						
 		SOMT 100420ER-GM	4	10.3	4.58	4.6	2	-	16	●	●	●	●	●					MFH...-10-..
 		SOMT 140520ER-GM	4	14.14	5.56	5.8	2	-	16	●	●	●	●	●					MFH...-14-..
 		SOMT 100420ER-LD	4	10.45	4.58	4.6	2	0.9	16	●	●	●	●	●					MFH...-10-..
 		SOMT 140520ER-LD	4	14.76	5.56	5.8	2	1.6	16	●	●	●	●	●					MFH...-14-..
 		SOMT 100420ER-FL	4	10.44	4.58	4.6	2	1.4	16	●	●	●	●	●					MFH...-10-..
 		SOMT 140514ER-FL	4	14.57	5.56	5.8	1.4	3.1	16	●	●	●	●	●					MFH...-14-..
 		SOMT 100420ER-GH	4	10.43	4.57	4.55	2	-	16	●	●	●	●	●					MFH...-10-..
 		SOMT 140520ER-GH	4	14.17	5.56	5.8	2	-	16	●	●	●	●	●					MFH...-14-..

Handed insert shows Right-hand

Recommended cutting conditions M182, M183

● : Standard item



Recommended cutting conditions

Insert type	Workpiece material	Toolholder description and feed rate (fz: mm/t)			Recommended insert grades (Vc: m/min)					
		MFH25-...	MFH32-...	MFH40-...	MEGACOAT NANO			MEGACOAT HARD	CVD Coated carbide	
					PR1535	PR1525	PR1510	PR015S	CA6535	
GM GH	Carbon steel	0.5~ 0.8 ~1.0(ap≤1.0mm) 0.2~ 0.4 ~0.5(ap≤1.5mm)	0.5~ 1.0 ~1.5(ap≤1.0mm) 0.3~ 0.7 ~1.0(ap≤1.5mm)	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.4~ 1.0 ~1.5(ap≤1.5mm)	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-	-	
	Alloy steel	0.5~ 0.8 ~1.0(ap≤1.0mm) 0.2~ 0.4 ~0.5(ap≤1.5mm)	0.5~ 1.0 ~1.5(ap≤1.0mm) 0.3~ 0.7 ~1.0(ap≤1.5mm)	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.4~ 1.0 ~1.5(ap≤1.5mm)	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-	-	
	Mold steel (~40HRC)	0.5~ 0.8 ~1.0(ap≤1.0mm) 0.2~ 0.3 ~0.4(ap≤1.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.3~ 0.6 ~0.8(ap≤1.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.4~ 0.8 ~1.2(ap≤1.5mm)	☆ 80~ 140 ~180	☆ 80~ 140 ~180	-	GH★ 80~ 140 ~180	-	
	Mold steel (40~50HRC)	0.15~ 0.3 ~0.5(ap≤1.0mm) 0.15~ 0.2 ~0.25(ap≤1.5mm)	0.2~ 0.5 ~0.8(ap≤1.0mm) 0.2~ 0.3 ~0.45(ap≤1.5mm)	0.2~ 0.6 ~0.9(ap≤1.0mm) 0.2~ 0.5 ~0.7(ap≤1.5mm)	-	☆ 60~ 100 ~130	-	GH★ 60~ 100 ~130	-	
	Mold steel (50~55HRC)	0.15~ 0.25 ~0.4(ap≤1.0mm)	0.15~ 0.35 ~0.6(ap≤1.0mm)	0.15~ 0.4 ~0.7(ap≤1.0mm)	-	☆ 50~ 70 ~100	-	GH★ 50~ 70 ~100	-	
	Mold steel (55~60HRC)	0.03~ 0.06 ~0.1(ap≤1.0mm) Recommended only for GH chipbreaker			-	-	-	GH★ 50~ 60 ~70	-	
	Stainless steel (Austenitic related)	0.5~ 0.7 ~0.8(ap≤1.0mm) 0.2~ 0.3 ~0.4(ap≤1.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.3~ 0.6 ~0.8(ap≤1.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.4~ 0.8 ~1.2(ap≤1.5mm)	GM☆ 100~ 160 ~200	GM☆ 100~ 160 ~200	-	-	-	
	Stainless steel (Martensitic related)	0.5~ 0.7 ~0.8(ap≤1.0mm) 0.2~ 0.3 ~0.4(ap≤1.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.3~ 0.6 ~0.8(ap≤1.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.4~ 0.8 ~1.2(ap≤1.5mm)	☆ 150~ 200 ~250	-	-	-	★ 180~ 240 ~300	
	Stainless steel (Precipitation hardening)	0.5~ 0.7 ~0.8(ap≤1.0mm) 0.2~ 0.3 ~0.4(ap≤1.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.3~ 0.6 ~0.8(ap≤1.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.4~ 0.8 ~1.2(ap≤1.5mm)	★ 90~ 120 ~150	-	-	-	-	
	Gray cast iron	0.5~ 0.8 ~1.0(ap≤1.0mm) 0.2~ 0.4 ~0.5(ap≤1.5mm)	0.5~ 1.0 ~1.5(ap≤1.0mm) 0.3~ 0.7 ~1.0(ap≤1.5mm)	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.4~ 1.0 ~1.5(ap≤1.5mm)	-	-	★ 120~ 180 ~250	-	-	
	Nodular cast iron	0.5~ 0.7 ~0.8(ap≤1.0mm) 0.2~ 0.3 ~0.4(ap≤1.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.3~ 0.6 ~0.8(ap≤1.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.4~ 0.8 ~1.2(ap≤1.5mm)	-	-	★ 100~ 150 ~200	-	-	
	Ni-base heat-resistant alloys	0.2~ 0.4 ~0.6(ap≤1.0mm) 0.15~ 0.2 ~0.3(ap≤1.5mm)	0.2~ 0.5 ~0.9(ap≤1.0mm) 0.2~ 0.4 ~0.6(ap≤1.5mm)	0.2~ 0.6 ~1.0(ap≤1.0mm) 0.2~ 0.5 ~0.8(ap≤1.5mm)	☆ 20~ 30 ~50	-	-	-	★ 20~ 30 ~50	
	Titanium alloys	0.2~ 0.4 ~0.6(ap≤1.0mm) 0.15~ 0.2 ~0.3(ap≤1.5mm)	0.2~ 0.5 ~0.9(ap≤1.0mm) 0.2~ 0.4 ~0.6(ap≤1.5mm)	0.2~ 0.6 ~1.0(ap≤1.0mm) 0.2~ 0.5 ~0.8(ap≤1.5mm)	GM★ 40~ 60 ~80	-	GM☆ 30~ 50 ~70	-	-	
LD	Carbon steel	0.5~ 0.8 ~1.0(ap≤1.0mm) 0.06~ 0.1 ~0.2(ap≤3.5mm)	0.5~ 1.0 ~1.5(ap≤1.0mm) 0.06~ 0.15 ~0.3(ap≤3.5mm)	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.06~ 0.2 ~0.3(ap≤3.5mm)	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-	-	
	Alloy steel	0.5~ 0.8 ~1.0(ap≤1.0mm) 0.06~ 0.1 ~0.2(ap≤3.5mm)	0.5~ 1.0 ~1.5(ap≤1.0mm) 0.06~ 0.15 ~0.3(ap≤3.5mm)	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.06~ 0.2 ~0.3(ap≤3.5mm)	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-	-	
	Mold steel (~40HRC)	0.5~ 0.8 ~1.0(ap≤1.0mm) 0.06~ 0.08 ~0.15(ap≤3.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.06~ 0.1 ~0.2(ap≤3.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.06~ 0.15 ~0.2(ap≤3.5mm)	☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-	-	
	Mold steel (40~50HRC)	0.2~ 0.3 ~0.5(ap≤1.0mm) 0.03~ 0.08 ~0.15(ap≤3.5mm)	0.2~ 0.5 ~0.8(ap≤1.0mm) 0.03~ 0.08 ~0.15(ap≤3.5mm)	0.2~ 0.6 ~0.9(ap≤1.0mm) 0.03~ 0.1 ~0.15(ap≤3.5mm)	☆ 60~ 100 ~130	★ 60~ 100 ~130	-	-	-	
	Stainless steel (Austenitic related)	0.5~ 0.7 ~0.8(ap≤1.0mm) 0.06~ 0.08 ~0.15(ap≤3.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.06~ 0.1 ~0.2(ap≤3.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.06~ 0.15 ~0.2(ap≤3.5mm)	★ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-	
	Stainless steel (Martensitic related)	0.5~ 0.7 ~0.8(ap≤1.0mm) 0.06~ 0.08 ~0.15(ap≤3.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.06~ 0.1 ~0.2(ap≤3.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.06~ 0.15 ~0.2(ap≤3.5mm)	☆ 150~ 200 ~250	-	-	-	★ 180~ 240 ~300	
	Stainless steel (Precipitation hardening)	0.5~ 0.7 ~0.8(ap≤1.0mm) 0.06~ 0.08 ~0.15(ap≤3.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.06~ 0.1 ~0.2(ap≤3.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.06~ 0.15 ~0.2(ap≤3.5mm)	★ 90~ 120 ~150	-	-	-	-	
	Gray cast iron	0.5~ 0.8 ~1.0(ap≤1.0mm) 0.06~ 0.1 ~0.2(ap≤3.5mm)	0.5~ 1.0 ~1.5(ap≤1.0mm) 0.06~ 0.15 ~0.3(ap≤3.5mm)	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.06~ 0.2 ~0.3(ap≤3.5mm)	-	-	★ 120~ 180 ~250	-	-	
	Nodular cast iron	0.5~ 0.7 ~0.8(ap≤1.0mm) 0.06~ 0.08 ~0.15(ap≤3.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.06~ 0.1 ~0.2(ap≤3.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.06~ 0.15 ~0.2(ap≤3.5mm)	-	-	★ 100~ 150 ~200	-	-	
	Ni-base heat-resistant alloys	0.2~ 0.4 ~0.6(ap≤1.0mm) 0.03~ 0.05 ~0.1(ap≤3.5mm)	0.2~ 0.5 ~0.9(ap≤1.0mm) 0.03~ 0.08 ~0.15(ap≤3.5mm)	0.2~ 0.6 ~1.0(ap≤1.0mm) 0.03~ 0.1 ~0.15(ap≤3.5mm)	☆ 20~ 30 ~50	-	-	-	★ 20~ 30 ~50	
	Titanium alloys	0.2~ 0.4 ~0.6(ap≤1.0mm) 0.03~ 0.05 ~0.1(ap≤3.5mm)	0.2~ 0.5 ~0.9(ap≤1.0mm) 0.03~ 0.08 ~0.15(ap≤3.5mm)	0.2~ 0.6 ~1.0(ap≤1.0mm) 0.03~ 0.1 ~0.15(ap≤3.5mm)	★ 40~ 60 ~80	-	☆ 30~ 50 ~70	-	-	
	FL	Carbon steel	0.5~ 0.8 ~1.0(ap≤1.0mm) 0.2~ 0.4 ~0.5(ap≤1.5mm)	0.5~ 1.0 ~1.5(ap≤1.0mm) 0.3~ 0.7 ~1.0(ap≤1.5mm)	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.4~ 1.0 ~1.5(ap≤1.5mm)	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-	-
		Alloy steel	0.5~ 0.8 ~1.0(ap≤1.0mm) 0.2~ 0.4 ~0.5(ap≤1.5mm)	0.5~ 1.0 ~1.5(ap≤1.0mm) 0.3~ 0.7 ~1.0(ap≤1.5mm)	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.4~ 1.0 ~1.5(ap≤1.5mm)	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-	-
Mold steel (~40HRC)		0.5~ 0.8 ~1.0(ap≤1.0mm) 0.2~ 0.3 ~0.4(ap≤1.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.3~ 0.6 ~0.8(ap≤1.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.4~ 0.8 ~1.2(ap≤1.5mm)	☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-	-	
Mold steel (40~50HRC)		0.15~ 0.3 ~0.5(ap≤1.0mm) 0.15~ 0.2 ~0.25(ap≤1.5mm)	0.2~ 0.5 ~0.8(ap≤1.0mm) 0.2~ 0.3 ~0.45(ap≤1.5mm)	0.2~ 0.6 ~0.9(ap≤1.0mm) 0.2~ 0.5 ~0.7(ap≤1.5mm)	☆ 60~ 100 ~130	★ 60~ 100 ~130	-	-	-	
Stainless steel (Austenitic related)		0.5~ 0.7 ~0.8(ap≤1.0mm) 0.2~ 0.3 ~0.4(ap≤1.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.3~ 0.6 ~0.8(ap≤1.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.4~ 0.8 ~1.2(ap≤1.5mm)	★ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-	
Stainless steel (Martensitic related)		0.5~ 0.7 ~0.8(ap≤1.0mm) 0.2~ 0.3 ~0.4(ap≤1.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.3~ 0.6 ~0.8(ap≤1.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.4~ 0.8 ~1.2(ap≤1.5mm)	☆ 150~ 200 ~250	-	-	-	★ 180~ 240 ~300	
Stainless steel (Precipitation hardening)		0.5~ 0.7 ~0.8(ap≤1.0mm) 0.2~ 0.3 ~0.4(ap≤1.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.3~ 0.6 ~0.8(ap≤1.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.4~ 0.8 ~1.2(ap≤1.5mm)	★ 90~ 120 ~150	-	-	-	-	
Gray cast iron		0.5~ 0.8 ~1.0(ap≤1.0mm) 0.2~ 0.4 ~0.5(ap≤1.5mm)	0.5~ 1.0 ~1.5(ap≤1.0mm) 0.3~ 0.7 ~1.0(ap≤1.5mm)	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.4~ 1.0 ~1.5(ap≤1.5mm)	-	-	★ 120~ 180 ~250	-	-	
Nodular cast iron		0.5~ 0.7 ~0.8(ap≤1.0mm) 0.2~ 0.3 ~0.4(ap≤1.5mm)	0.5~ 0.8 ~1.2(ap≤1.0mm) 0.3~ 0.6 ~0.8(ap≤1.5mm)	0.5~ 1.0 ~1.6(ap≤1.0mm) 0.4~ 0.8 ~1.2(ap≤1.5mm)	-	-	★ 100~ 150 ~200	-	-	
Ni-base heat-resistant alloys		0.2~ 0.4 ~0.6(ap≤1.0mm) 0.15~ 0.2 ~0.3(ap≤1.5mm)	0.2~ 0.5 ~0.9(ap≤1.0mm) 0.2~ 0.4 ~0.6(ap≤1.5mm)	0.2~ 0.6 ~1.0(ap≤1.0mm) 0.2~ 0.5 ~0.8(ap≤1.5mm)	☆ 20~ 30 ~50	-	-	-	★ 20~ 30 ~50	
Titanium alloys	0.2~ 0.4 ~0.6(ap≤1.0mm) 0.15~ 0.2 ~0.3(ap≤1.5mm)	0.2~ 0.5 ~0.9(ap≤1.0mm) 0.2~ 0.4 ~0.6(ap≤1.5mm)	0.2~ 0.6 ~1.0(ap≤1.0mm) 0.2~ 0.5 ~0.8(ap≤1.5mm)	★ 40~ 60 ~80	-	☆ 30~ 50 ~70	-	-		

★: 1st Recommendation ☆: 2nd Recommendation

- * Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
- * The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
- * When finishing with LD type and FL type inserts, recommended feed rate for SOMT14 LD type: f=1.5(mm/rev) or less/for SOMT10 LD type: f=0.9(mm/rev) or less for SOMT14 FL type: f=3.0(mm/rev) or less/for SOMT10 FL type: f=1.4(mm/rev) or less
- * For machining center equivalent to BT30, reduce feed rate to 25% or less of the recommended condition.
- * For slotting, internal coolant is recommended.

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Recommended cutting conditions

Insert type	Workpiece material	Toolholder description and feed rate (fz: mm/t)		Recommended insert grades (Vc: m/min)					
		MFH...R-10-...	MFH...R-14-...	MEGACOAT NANO			MEGACOAT HARD	CVD Coated carbide	
				PR1535	PR1525	PR1510	PR015S	CA6535	
GM GH	Carbon steel	0.5~ 1.5 ~2.0		☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-	-	
	Alloy steel	0.5~ 1.5 ~2.0		☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-	-	
	Mold steel (~ 40HRC)	0.5~ 1.2 ~1.8		☆ 80~ 140 ~180	☆ 80~ 140 ~180	-	GH ★ 80~ 140 ~180	-	
	Mold steel (40 ~ 50HRC)	0.2~ 0.7 ~1.0		-	☆ 60~ 100 ~130	-	GH ★ 60~ 100 ~130	-	
	Mold steel (50 ~ 55HRC)	0.2~ 0.5 ~0.8		-	☆ 50~ 70 ~100	-	GH ★ 50~ 70 ~100	-	
	Mold steel (55 ~ 60HRC)	0.03~ 0.06 ~0.1(ap≤1.0mm) Recommended only for GH chipbreaker		-	-	-	GH ☆ 50~ 60 ~70	-	
	Stainless steel (Austenitic related)	0.5~ 1.2 ~1.8		GM ☆ 100~ 160 ~200	GM ☆ 100~ 160 ~200	-	-	-	
	Stainless steel (Martensitic related)	0.5~ 1.2 ~1.8		☆ 150~ 200 ~250	-	-	-	★ 180~ 240 ~300	
	Stainless steel (Precipitation hardening)	0.5~ 1.2 ~1.8		★ 90~ 120 ~150	-	-	-	-	
	Gray cast iron	0.5~ 1.5 ~2.0		-	-	★ 120~ 180 ~250	-	-	
	Nodular cast iron	0.5~ 1.2 ~1.8		-	-	★ 100~ 150 ~200	-	-	
	Ni-base heat-resistant alloys	0.2~ 0.8 ~1.2		☆ 20~ 30 ~50	-	-	-	★ 20~ 30 ~50	
	Titanium alloys	0.2~ 0.8 ~1.2		GM ★ 40~ 60 ~80	-	GM ☆ 30~ 50 ~70	-	-	
LD	Carbon steel	0.5~ 1.5 ~2.0(ap≤1.0mm) 0.06~ 0.2 ~0.3(ap≤3.5mm)	0.5~ 1.5 ~2.0(ap≤2.0mm) 0.06~ 0.2 ~0.4(ap≤5.0mm)	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-	-	
	Alloy steel	0.5~ 1.5 ~2.0(ap≤1.0mm) 0.06~ 0.2 ~0.3(ap≤3.5mm)	0.5~ 1.5 ~2.0(ap≤2.0mm) 0.06~ 0.2 ~0.4(ap≤5.0mm)	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-	-	
	Mold steel (~ 40HRC)	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.06~ 0.15 ~0.2(ap≤3.5mm)	0.5~ 1.2 ~1.8(ap≤2.0mm) 0.06~ 0.15 ~0.3(ap≤5.0mm)	☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-	-	
	Mold steel (40 ~ 50HRC)	0.2~ 0.7 ~1.0(ap≤1.0mm) 0.03~ 0.1 ~0.15(ap≤3.5mm)	0.2~ 0.7 ~1.0(ap≤2.0mm) 0.03~ 0.1 ~0.2(ap≤5.0mm)	☆ 60~ 100 ~130	★ 60~ 100 ~130	-	-	-	
	Stainless steel (Austenitic related)	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.06~ 0.15 ~0.2(ap≤3.5mm)	0.5~ 1.2 ~1.8(ap≤2.0mm) 0.06~ 0.15 ~0.3(ap≤5.0mm)	★ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-	
	Stainless steel (Martensitic related)	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.06~ 0.15 ~0.2(ap≤3.5mm)	0.5~ 1.2 ~1.8(ap≤2.0mm) 0.06~ 0.15 ~0.3(ap≤5.0mm)	☆ 150~ 200 ~250	-	-	-	★ 180~ 240 ~300	
	Stainless steel (Precipitation hardening)	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.06~ 0.15 ~0.2(ap≤3.5mm)	0.5~ 1.2 ~1.8(ap≤2.0mm) 0.06~ 0.15 ~0.3(ap≤5.0mm)	★ 90~ 120 ~150	-	-	-	-	
	Gray cast iron	0.5~ 1.5 ~2.0(ap≤1.0mm) 0.06~ 0.2 ~0.3(ap≤3.5mm)	0.5~ 1.5 ~2.0(ap≤2.0mm) 0.06~ 0.2 ~0.4(ap≤5.0mm)	-	-	★ 120~ 180 ~250	-	-	
	Nodular cast iron	0.5~ 1.2 ~1.8(ap≤1.0mm) 0.06~ 0.15 ~0.2(ap≤3.5mm)	0.5~ 1.2 ~1.8(ap≤2.0mm) 0.06~ 0.15 ~0.3(ap≤5.0mm)	-	-	★ 100~ 150 ~200	-	-	
	Ni-base heat-resistant alloys	0.2~ 0.8 ~1.2(ap≤1.0mm) 0.03~ 0.1 ~0.15(ap≤3.5mm)	0.2~ 0.8 ~1.2(ap≤2.0mm) 0.03~ 0.1 ~0.2(ap≤5.0mm)	☆ 20~ 30 ~50	-	-	-	★ 20~ 30 ~50	
	Titanium alloys	0.2~ 0.8 ~1.2(ap≤1.0mm) 0.03~ 0.1 ~0.15(ap≤3.5mm)	0.2~ 0.8 ~1.2(ap≤2.0mm) 0.03~ 0.1 ~0.2(ap≤5.0mm)	★ 40~ 60 ~80	-	☆ 30~ 50 ~70	-	-	
	FL	Carbon steel	0.5~ 1.5 ~2.0		☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-	-
		Alloy steel	0.5~ 1.5 ~2.0		☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-	-
Mold steel (~ 40HRC)		0.5~ 1.2 ~1.8		☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-	-	
Mold steel (40 ~ 50HRC)		0.2~ 0.7 ~1.0		☆ 60~ 100 ~130	★ 60~ 100 ~130	-	-	-	
Stainless steel (Austenitic related)		0.5~ 1.2 ~1.8		★ 100~ 160 ~200	☆ 100~ 160 ~200	-	-	-	
Stainless steel (Martensitic related)		0.5~ 1.2 ~1.8		☆ 150~ 200 ~250	-	-	-	★ 180~ 240 ~300	
Stainless steel (Precipitation hardening)		0.5~ 1.2 ~1.8		★ 90~ 120 ~150	-	-	-	-	
Gray cast iron		0.5~ 1.5 ~2.0		-	-	★ 120~ 180 ~250	-	-	
Nodular cast iron		0.5~ 1.2 ~1.8		-	-	★ 100~ 150 ~200	-	-	
Ni-base heat-resistant alloys		0.2~ 0.8 ~1.2		☆ 20~ 30 ~50	-	-	-	★ 20~ 30 ~50	
Titanium alloys		0.2~ 0.8 ~1.2		★ 40~ 60 ~80	-	☆ 30~ 50 ~70	-	-	

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys. ★: 1st Recommendation ☆: 2nd Recommendation
 * The bold-faced number indicates a center value of recommended cutting condition.
 Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
 * When finishing with LD type and FL type inserts, recommended feed rate for SOMT14 LD type: f=1.5(mm/rev) or less/for SOMT10 LD type: f=0.9(mm/rev) or less
 for SOMT14 FL type: f=3.0(mm/rev) or less/for SOMT10 FL type: f=1.4(mm/rev) or less
 * For machining center equivalent to BT30, reduce feed rate to 25% or less of the recommended condition.
 * For slotting, internal coolant is recommended.



Note for machining program (Approx. R)

Shape	Description	Insert type	Cutting edge angle γ	Approx. R (mm)	Unmachined portion K (mm)	Max. inclination angle of workpiece at contouring
	MFH...-10-...	GM / GH	10°	3.0	0.85	90°
		FL	14°	3.0	0.89	80°
		LD	14°	3.5	0.69	65°
	MFH...-14-...	GM / GH	10°	3.5	1.37	90°
		FL	13°	3.0	1.36	80°
		LD	16°	5.0	1.06	65°

Reference data for ramping

MFH...-10-...

Cutter dia. DCX (mm)	25	28	32	35	40	50	63	80
Max. ramping angle RMPX	5°	4.5°	4°	3.5°	3°	2.5°	2°	1°
tan RMPX	0.087	0.078	0.070	0.061	0.052	0.043	0.035	0.017

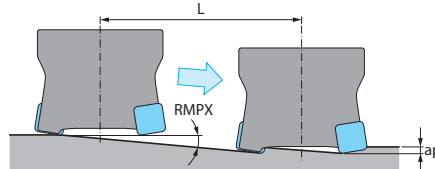
MFH...-14-...

Cutter dia. DCX (mm)	50	63	80	100	125	160
Max. ramping angle RMPX	2°	1.8°	1°	0.5°	0.4°	0.2°
tan RMPX	0.035	0.031	0.017	0.009	0.007	0.003

Guide for ramping (Slant milling)

Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
Feed rate should be 70% or under of the above cutting conditions.

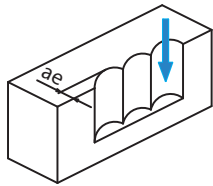
Formula of the cutting length "L" at max. ramping angle $L = \frac{ap}{\tan RMPX}$



M

Milling

Vertical milling (Plunging)



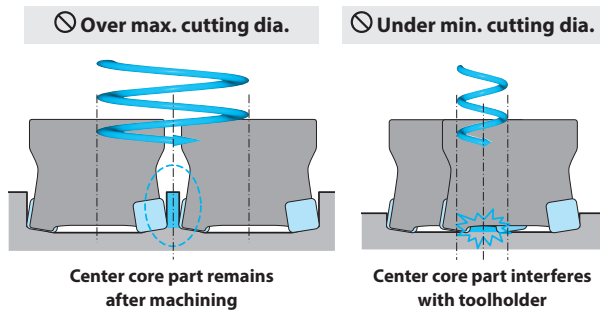
Insert description	Max. width of cut (ae)
SOMT10	8mm
SOMT14	11.5mm

*Vertical milling (Plunging) is available only with GM/GH type insert.
(LD type and FL type are not applicable)
For vertical milling (plunging), reduce feed rate to $fz=0.2\text{mm/t}$ or less.

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Guide for helical milling

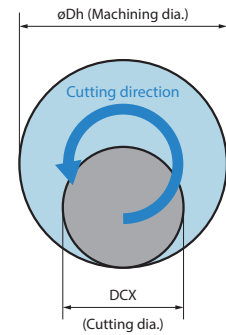
For helical milling, use between min. cutting dia. and max. cutting dia.



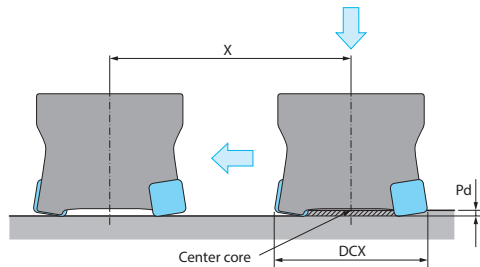
Description	Min. cutting dia.	Max. cutting dia.
MFH...-10-...	2×DCX-18	2×DCX-2
MFH...-14-...	2×DCX-25	2×DCX-2

Unit: mm

- Sinking depth (h) at helical milling should be under max. depth of cut (APMX) in the cutter dimension chart.
- Down-cut milling is recommended. (Ref. to the right figure)
- Feed rate should be under 50% of the recommended cutting conditions.
- Use caution to eliminate incidences caused by producing long chips.



Guide for drilling



3D machining

Insert type	Ramping	Contouring (Rising wall angle)	Vertical	Helical milling	Pocketing
GM / GH	✓	✓ (90°)	✓	✓	✓
LD	✓	△ (65°)	×	×	×
FL	✓	△ (80°)	×	×	×

- Some applications are not available depending on insert type.
- For FL and LD type, there is a limit of rising wall angle at contouring.

Description	GM type / GH type		LD type		FL type	
	Max. cutting depth Pd	Min. cutting length X for flat bottom surface	Max. cutting depth Pd	Min. cutting length X for flat bottom surface	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MFH...-10-...	1.5	DCX-18	1.5	DCX-14	1.5	DCX-15
MFH...-14-...	2	DCX-24	2	DCX-18	2	DCX-19

[Drilling depth] Please refer to Pd (Max. cutting depth) in the chart.

[When traversing after drilling]

1. Reduce feed rate 25% or less of the recommended conditions until the center core part (Unmachined part) is removed.
2. When drilling, reduce feed rate per revolution to $f=0.2\text{mm/rev}$ or under.

Unit: mm

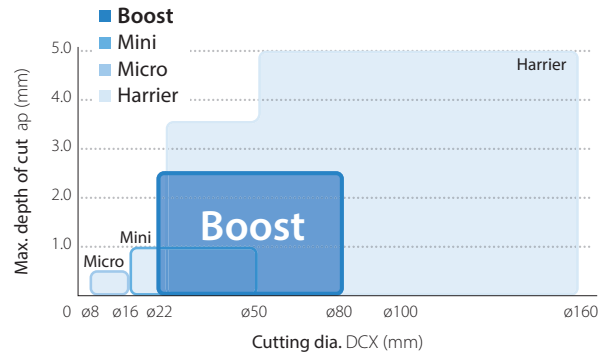


Milling

High feed and large depth of cut milling

MFH Boost

Large D.O.C. for greater milling capabilities
Excellent performance in a wide range of applications, including automotive parts, difficult-to-cut materials, and molds



1 High feed milling with large depth of cut capabilities

A small 04 size insert (4-edge, double-sided insert) supports depths of cut up to 2.5 mm with cutting dia. available from $\phi 22$ mm.

Achieves high efficiency machining in various shouldering, slotting, helical milling, and ramping applications.

4-edge, double-sided insert

Max. depth of cut
2.5 mm

MFH Boost Advantage

fz (mm/t)	90° End mill (mm)	MFH Boost (mm)	Conventional high feed cutter (mm)
0.0 - 0.2	6.0	2.5	2.5
0.2 - 0.5	6.0	2.5	2.5
0.5 - 1.3	2.5	2.5	2.5
1.3 - 1.6	0.5	0.5	0.5

M

Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter**
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

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2 Available for a variety of machining applications and environments

1 Solutions for 90° end mills (Rough to medium-finish machining)

High feed rates dramatically improve machining efficiency

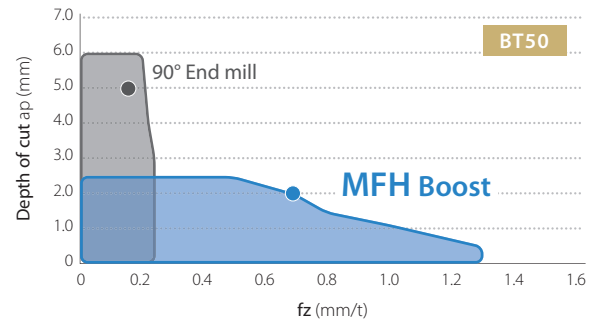
Machining efficiency simulation example

Pocketing: Vc = 150 m/min, ae = 12.5 mm

MFH Boost
 ø 25 (3 Inserts) **100 cc/min**
 ap = 2.0 mm, fz = 0.7 mm/t

Machining efficiency
 x 1.8

Conventional
 90° end mill
 ø 25 (3 Inserts) **54 cc/min**
 ap = 5.0 mm, fz = 0.15 mm/t



High efficiency and good tool life

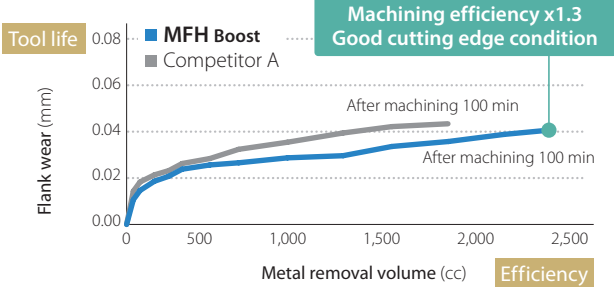
Machining efficiency and cutting edge condition comparison (Internal evaluation)

Cutting edge condition after 100 min machining

MFH Boost
 ap = 1.6 mm, fz = 0.6 mm/t



Competitor A 90° end mill
 ap = 5.0 mm, fz = 0.15 mm/t

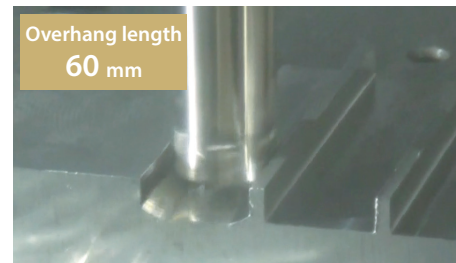


Vc = 150 m/min, ae = 12.5 mm, dry, SCM440(B), ø 25 (1 Insert) BT50

High stability in unstable machining environment

Chatter resistance comparison (Internal evaluation)

Slotting
 ø 25 (3 Inserts)
 External air
 S50C
 BT50



Video



Machining efficiency

MFH Boost **103 cc/min**
 Vc = 120 m/min, ap = 1.5 mm, fz = 0.6 mm/t

Machining efficiency
 x 4.5

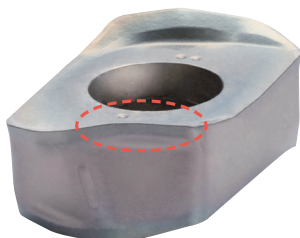
Competitor A **31 cc/min Chattering (Machining was impossible)**
 Vc = 80 m/min, ap = 2 mm, fz = 0.2 mm/t

23 cc/min
 Vc = 80 m/min, ap = 2 mm, fz = 0.15 mm/t

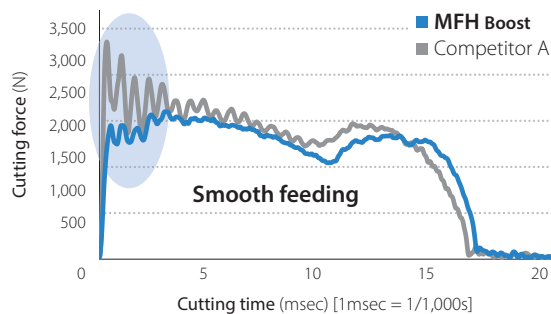
High efficiency and stable machining designs

Kyocera's original technology

Convex cutting edge design reduces impact when entering workpiece



Cutting force when entering workpiece (Internal evaluation)



Vc = 150 m/min, ap = 2.0 mm, ae = 25 mm, fz = 0.7 mm/t, dry, S50C, ø 50 (1 Insert), BT50

2 Better solution than conventional high feed cutters

Large D.O.C. dramatically improves machining efficiency

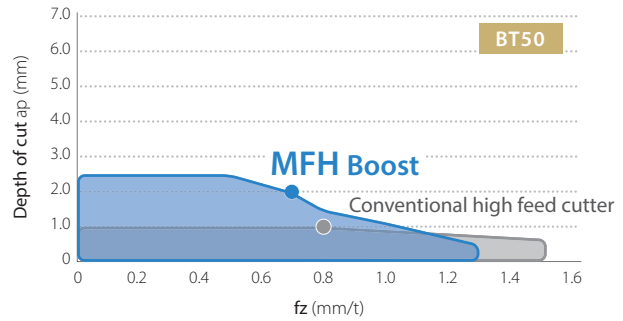
Machining efficiency simulation example

Multistage machining (Depth 30 mm): Vc = 150 m/min, ae = 12.5 mm

MFH Boost
 ø 25 (3 Inserts)
100 cc/min
 ap = 2.0 mm, fz = 0.7 mm/t

Machining efficiency
x 1.3

Conventional high feed cutter
 ø 25 (3 Inserts)
76 cc/min
 ap = 1.0 mm, fz = 0.8 mm/t



High efficiency and good tool life

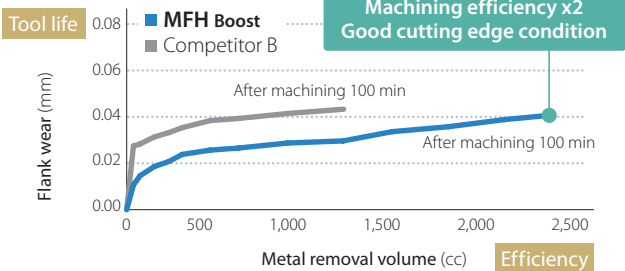
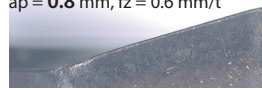
Machining efficiency and cutting edge condition comparison (Internal evaluation)

Cutting edge condition after 100 min machining

MFH Boost
 ap = 1.6 mm, fz = 0.6 mm/t



Competitor B High feed type
 ap = 0.8 mm, fz = 0.6 mm/t



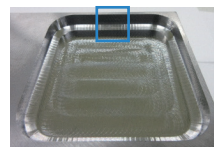
Vc = 150 m/min, ae = 12.5 mm, dry, SCM440(B), ø 25 (1 Insert), BT50

Excellent wall accuracy

Machining efficiency and wall accuracy comparison (Internal evaluation)

Pocketing (Depth 12mm)

MFH Boost
 ø 25 (3 Inserts)
 ap = 1.5 mm × 8 passes
 Q = 115 cc/min



Competitor B High feed type
 ø 25 (4 Inserts)
 ap = 0.8 mm × 15 passes
 Q = 81 cc/min



Cutting conditions: Vc = 200 m/min, ae = 12.5 mm, fz = 0.8 mm/t, dry, S50C, BT50

Superior wall accuracy



Wiper on outer periphery

Reduction of wall level variation in multi-pass machining

3 Solutions for machining difficult-to-cut materials

Dramatic improvement in machining efficiency with titanium alloy, stainless steel machining, etc.

Machining efficiency comparison (Internal evaluation)

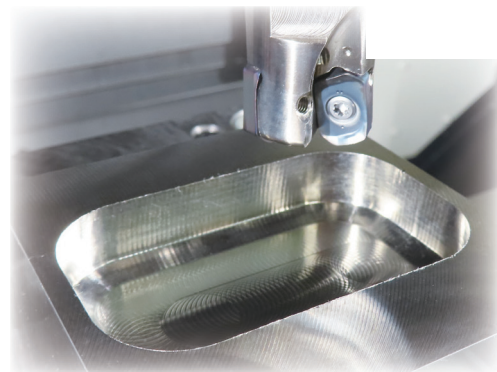
Titanium alloy pocketing (Depth 6 mm)

MFH Boost
Approx. 1' 30"
 ap = 1.5 mm × 4 passes (fz = ~0.35 mm/t)

Machining efficiency
x 1.8

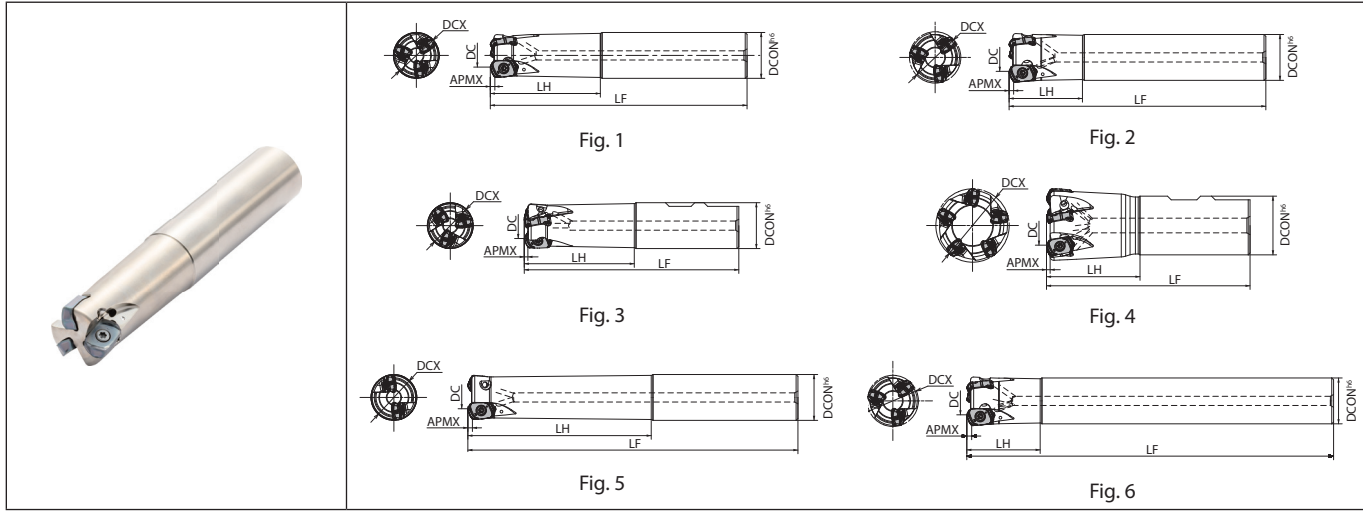
Competitor C High feed type
Approx. 2' 50"
 ap = 0.6 mm × 10 passes (fz = ~0.4 mm/t)

Vc = 50 m/min, ae = 12.5 mm (ae/DCX = 50%), Ramping angle 3°, Ti-6Al-4V, wet, ø 25 (3 inserts), BT50



- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

MFH Boost (End mill)



Toolholder dimensions

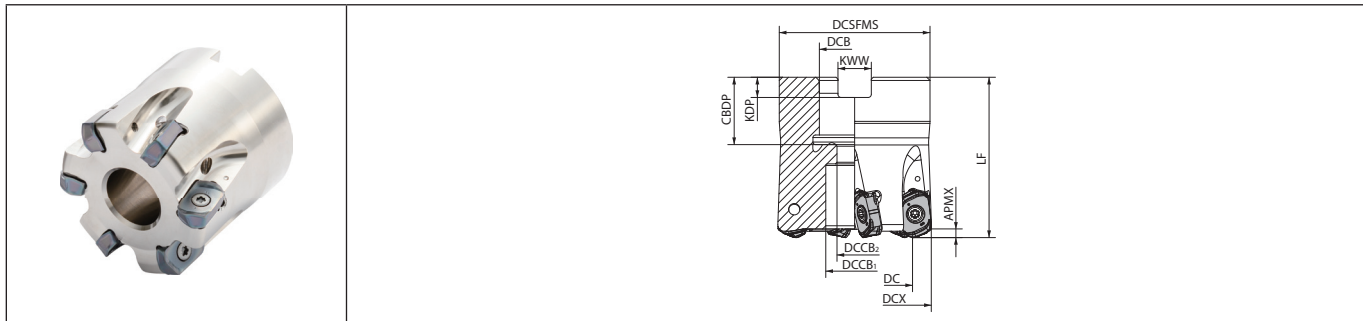
Description	Availability	Inserts	Dimension (mm)						A.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts ➔ M192		
			DC	DCX	DCON	LF	LH	APMX						Anti-seize compound	Screw	Wrench			
			P-37			SB-3575TRP								DTPM-10					
Cylindrical	Same shank	MFH 25-S25-04-2T	● 2	14	25	25	140	60	2.5	-10	Yes	12700	0.5	1	P-37	SB-3575TRP	DTPM-10	LOMU040410ER-GM	
		MFH 25-S25-04-3T	● 3																1
		MFH 32-S32-04-4T	● 4	21	32	32	150	70											1
		MFH 32-S32-04-5T	● 5																1
	Standard shank	MFH 22-S20-04-2T	● 2	11	22	20	130	30	2.5	-10	Yes	13600	0.3	2	P-37	SB-3575TRP	DTPM-10	LOMU040410ER-GM	
		MFH 28-S25-04-3T	● 3	17	28	25	140	40											2
		MFH 28-S25-04-4T	● 4	24	35														2
		MFH 35-S32-04-4T	● 4																2
		MFH 35-S32-04-5T	● 5			32	150	50											2
		MFH 40-S32-04-5T	● 5	29	40														2
	MFH 40-S32-04-6T	● 6						2											
	Long Shank	MFH 25-S25-04-2T-180	● 2	14	25	25	180	100	2.5	-10	Yes	12700	0.6	5	P-37	SB-3575TRP	DTPM-10	LOMU040410ER-GM	
MFH 25-S25-04-3T-180		● 3	17	28		40	5												
MFH 28-S25-04-3T-200		● 3	17	28		40	6												
MFH 32-S32-04-4T-200		● 4	21	32		200	120	5											
MFH 35-S32-04-4T-200		● 4	24	35	32		50	6											
MFH 40-S32-04-4T-200		● 4	24	35	32		50	6											
MFH 40-S32-04-5T-250	● 5	29	40		250		6												
Weldon	MFH 25-W25-04-2T	● 2	14	25	25	117	60	2.5	-10	Yes	12700	0.4	3	P-37	SB-3575TRP	DTPM-10	LOMU040410ER-GM		
	MFH 25-W25-04-3T	● 3																3	
	MFH 32-W32-04-4T	● 4	21	32		131	70											3	
	MFH 32-W32-04-5T	● 4			32													3	
	MFH 40-W32-04-5T	● 5																4	
	MFH 40-W32-04-6T	● 6	29	40		111	50											4	

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Standard item



MFH Boost (Face mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)											A.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Spare parts			Applicable inserts ● M192					
			DC	DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CDBP	KDP	KWW	APMX					Anti-seize compound	Screw	Wrench						
Metric MFH 040R-04-5T-M 040R-04-6T-M 050R-04-6T-M 050R-04-7T-M 052R-04-6T-M 052R-04-7T-M 063R-04-7T-M 063R-04-7T-27M 063R-04-9T-M 063R-04-9T-27M 080R-04-8T-M 080R-04-10T-M	●	5	29	40	38	16	15	9	40	19	5.6	8.4					10000	0.2	P-37	SB-3575TRP	DTPM-10	LOMU040410ER-GM				
	●	6	39	50													9000	0.4								
	●	7	41	52	47	22	18	11		21	6.3	10.4					8800	0.5 0.4								
	●	6							50								8000	0.8					Recommended tightening torque for insert clamp 2.0N·m			
	●	7				22	18	11																		
	●	8				27	20	13		24	7	12.4														
	●	9		52	63	60					21	6.3	10.4													
	●	8				27	20	13																		
	●	8		69	80	76				63	24	7	12.4													
	●	10																								
Bore dia. and spec. MFH 080R-04-8T 080R-04-10T	●	8	69	80	76	31.75	26	17	63	32	8	12.7	2.5	-10	Yes	7100	1.6	P-37	SB-3575TRP	DTPM-10	LOMU040410ER-GM					
	●	10																Recommended tightening torque for insert clamp 2.0N·m								

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

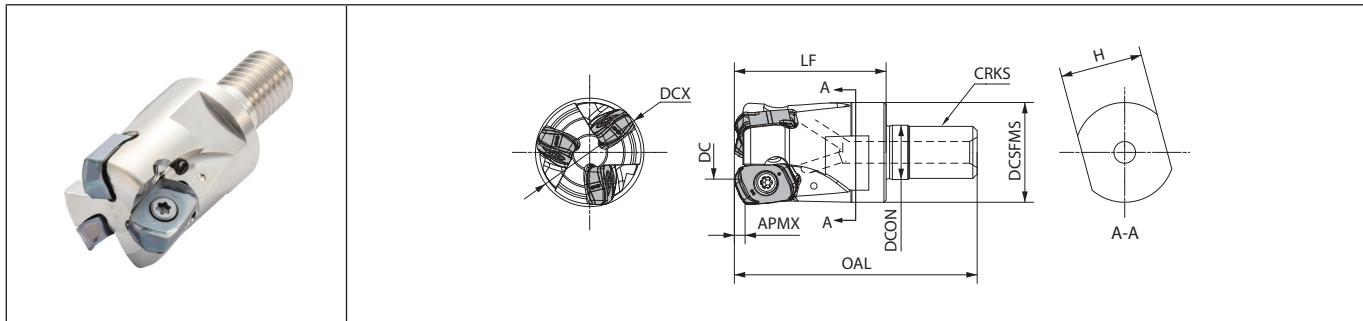


- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter**
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M190

MFH Boost (Modular type)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)								A.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Spare parts			Applicable inserts ➔ M192	
			DC	DCX	DCON	DCSFMS	OAL	LF	APMX	CRKS				H	Anti-seize compound	Screw		Wrench
MFH 22-M10-04-2T	●	2	11	22	10.5	18.7	48	30			M10X1.5	15						LOMU040410ER-GM
25-M12-04-2T	●	3	14	25	12.5	23	56	35			M12X1.75	19	13600					
25-M12-04-3T	●		12700															
28-M12-04-3T	●	4	17	28									12000					
28-M12-04-4T	●		11200															
32-M16-04-4T	●	5	21	32					2.5				11200	P-37	SB-3575TRP	DTPM-10		
32-M16-04-5T	●		10700															
35-M16-04-4T	●	5	24	35	17	30	62	40					10700	Recommended tightening torque for insert clamp 2.0N·m				
35-M16-04-5T	●		10000															
40-M16-04-5T	●	6	29	40									10000					
40-M16-04-6T	●		9800															
42-M16-04-5T	●	6	31	42									9800					
42-M16-04-6T	●																	

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

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

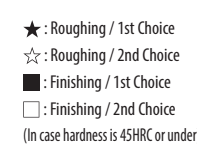
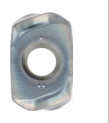
See page M60 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

● : Standard item



Milling

LOMU

Insert	Description	No. of edges	Dimension (mm)					Carbide			Applicable toolholder M189~M191	
			S	D1	RE	W1	INSL	CVD	PVD			
 <p> ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under) </p>	Carbon steel / Alloy steel							★	☆	P		
	Mold and die steel							★	☆			
	Austenitic stainless steel							☆	★	M		
	Martensitic stainless steel						★		☆			
	Precipitation hardening stainless steel								★			
	Gray cast iron							★		K		
	Nodular cast iron							★				
	Non-ferrous metals									N		
	Heat-resistant alloy							★	☆	S		
	Titanium alloy								★			
Hard materials									H			
	LOMU 040410ER-GM	4	4.4	4.1	1	9.1	14.5	●	●	●	●	MFH...-04-..

Handed insert shows Right-hand

Recommended cutting conditions M193



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

Others

● : Standard item

M192

Recommended cutting conditions ★ 1st recommendation ☆ 2nd recommendation

Chipbreaker	Workpiece	Toolholder description and feed (fz: mm/t)		Recommended insert grade (Vc: m/min)			
		ap(mm)	MFH...04...	MEGACOAT NANO			CVD Coating
				PR1535	PR1525	PR1510	CA6535
GM	Carbon steel (~ 280HB)	≤ 0.5	0.20 - 0.80 - 1.30	120 - 160 - 220	120 - 160 - 220	-	-
		≤ 1.0	0.20 - 0.70 - 1.10				
		≤ 1.5	0.20 - 0.60 - 0.80				
		≤ 2.0	0.20 - 0.40 - 0.70				
		≤ 2.5	0.20 - 0.30 - 0.50				
	Alloy steel (~ 350HB)	≤ 0.5	0.20 - 0.75 - 1.20	100 - 150 - 200 (Dry machining recommended)	100 - 150 - 200 (Dry machining recommended)	-	-
		≤ 1.0	0.20 - 0.65 - 1.00				
		≤ 1.5	0.20 - 0.55 - 0.70				
		≤ 2.0	0.20 - 0.40 - 0.55				
		≤ 2.5	0.20 - 0.25 - 0.35				
	Mold steel (~ 40HRC)	≤ 0.5	0.20 - 0.60 - 1.10	80 - 120 - 160 (Dry machining recommended)	80 - 120 - 160 (Dry machining recommended)	-	-
		≤ 1.0	0.20 - 0.50 - 0.90				
		≤ 1.5	0.20 - 0.40 - 0.65				
		≤ 2.0	0.20 - 0.30 - 0.55				
		≤ 2.5	0.20 - 0.25 - 0.35				
	Mold steel (40 ~ 50HRC)	≤ 0.5	0.10 - 0.30 - 0.50	-	60 - 100 - 130 (Dry machining recommended)	-	-
		≤ 1.0	0.10 - 0.25 - 0.40				
		≤ 1.5	0.10 - 0.20 - 0.30				
		≤ 2.0	-				
		≤ 2.5	-				
	Mold steel (50 ~ 55HRC)	≤ 0.5	0.10 - 0.20 - 0.40	-	50 - 70 - 100 (Dry machining recommended)	-	-
		≤ 1.0	0.10 - 0.15 - 0.25				
		≤ 1.5	-				
		≤ 2.0	-				
		≤ 2.5	-				
	Austenitic stainless steel	≤ 0.5	0.20 - 0.60 - 1.00	100 - 140 - 180	100 - 140 - 180	-	-
		≤ 1.0	0.20 - 0.50 - 0.90				
		≤ 1.5	0.20 - 0.45 - 0.60				
		≤ 2.0	0.20 - 0.30 - 0.50				
		≤ 2.5	0.20 - 0.25 - 0.40				
	Martensitic stainless steel	≤ 0.5	0.20 - 0.60 - 1.00	100 - 150 - 200	-	-	150 - 200 - 300
		≤ 1.0	0.20 - 0.50 - 0.90				
		≤ 1.5	0.20 - 0.45 - 0.60				
		≤ 2.0	0.20 - 0.30 - 0.50				
		≤ 2.5	0.20 - 0.25 - 0.40				
	Precipitation hardened stainless steel	≤ 0.5	0.10 - 0.30 - 0.50	90 - 120 - 150	-	-	-
		≤ 1.0	0.10 - 0.25 - 0.45				
		≤ 1.5	0.10 - 0.15 - 0.25				
		≤ 2.0	-				
		≤ 2.5	-				
	Gray cast iron	≤ 0.5	0.20 - 0.80 - 1.30	-	-	120 - 160 - 220	-
		≤ 1.0	0.20 - 0.70 - 1.10				
		≤ 1.5	0.20 - 0.60 - 0.80				
		≤ 2.0	0.20 - 0.40 - 0.70				
		≤ 2.5	0.20 - 0.30 - 0.50				
	Nodular cast iron	≤ 0.5	0.20 - 0.60 - 1.00	-	-	100 - 150 - 200	-
		≤ 1.0	0.20 - 0.50 - 0.90				
		≤ 1.5	0.20 - 0.40 - 0.70				
≤ 2.0		0.20 - 0.30 - 0.60					
≤ 2.5		0.20 - 0.25 - 0.40					
Ni-base heat-resistant alloy	≤ 0.5	0.10 - 0.30 - 0.45	20 - 30 - 50	-	-	20 - 30 - 50	
	≤ 1.0	0.10 - 0.25 - 0.40					
	≤ 1.5	0.10 - 0.15 - 0.20					
	≤ 2.0	-					
	≤ 2.5	-					
Titanium alloy	≤ 0.5	0.10 - 0.30 - 0.50	40 - 60 - 80	-	-	-	
	≤ 1.0	0.10 - 0.25 - 0.45					
	≤ 1.5	0.10 - 0.15 - 0.25					
	≤ 2.0	-					
	≤ 2.5	-					

- The number in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
- Machining with coolant is recommended for precipitation hardened stainless steel, Ni-base heat-resistant alloy and titanium alloy.
- Wet machining may have a lower tool life than dry machining. Set the cutting speed, feed rate and D.O.C. lower than recommended conditions.
- Machining with BT30 or equivalent, feed rate should be reduced to 80% or less of recommended cutting conditions. Slotting is not recommended.
- Center through air is recommended for slotting.
- Slotting or pocketing are not recommended for face mill type.
- For face mill type cutters, it is recommended that width of cut should be set to 75% or less of the cutting diameter.
- It is recommended to set the long shank to 75% or less of the recommended conditions for both ap and feed.



Approximate programming radius adjustment

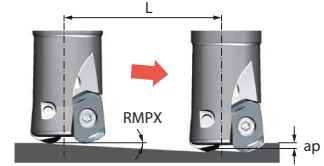
Shape	Programmable R (mm)	Over machined radius portion (mm)	Non-machined portion (mm)
	1.5	0	1.42
	2.0	0	1.24
	3.0 (Recommended)	0	0.87
	3.5	0.06	0.69

Ramping tips

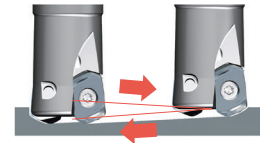
- Ramping angle should be under RMPX
- Reduce recommended feed rate in cutting conditions above by 70%

Formula for max. cutting Length (L) at max. ramping angle

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



- When ramping both forth and back direction alternately, set the maximum ramping angle RMPX to 50%.



Reference data for ramping

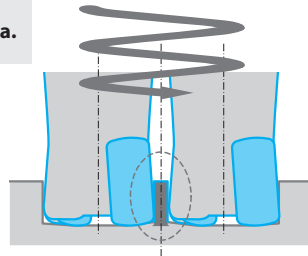
Description	Cutter dia. DCX (mm)	22	25	28	32	35	40	42	50	52	63	80
MFH...-04-...	Max. ramping angle RMPX	3.9°	3.0°	2.4°	2.0°	1.7°	1.4°	1.3°	1.0°	1.0°	0.8°	0.6°
	tan RMPX	0.068	0.052	0.042	0.035	0.029	0.024	0.022	0.018	0.017	0.013	0.010

Guide for helical milling

For helical milling, use between min. cutting dia. and max. cutting dia.

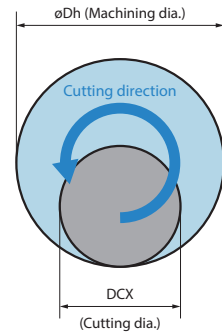
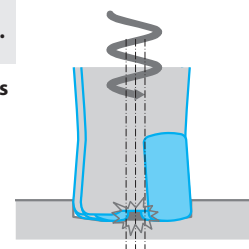
⊘ Exceeding max. cutting dia.

Center core part remains after machining



⊘ Under min. cutting dia.

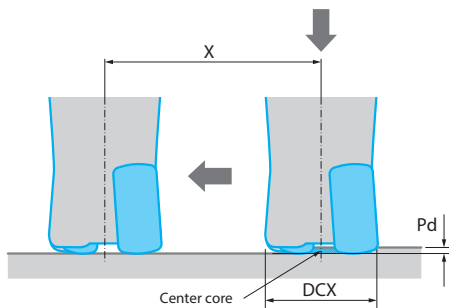
Center core part interferes with toolholder



Description	Min. cutting dia. (mm)	Max. cutting dia. (mm)
MFH...-04-...	2×DCX-11	2×DCX-2

- Maximum ramping depth per cycle to be under maximum D.O.C. ap (2.5 mm)
- Use climb milling. (Refer to the above figure)
- Feed rates should be reduced to 50% of recommended cutting conditions
- Use caution to eliminate incidences caused by producing long chips

Guide for drilling



Description	GM type	
	Max. drilling depth Pd (mm)	Min. cutting length X for flat bottom surface (mm)
MFH...-04-...	0.6	DCX-12

- It is recommended to reduce feed by 25% of recommendation until the center core is removed
- Axial feed rate recommendation per revolution is $f \leq 0.2 \text{ mm/rev}$

Vertical milling (Plunging)

Vertical milling (Plunging)

Insert description	Maximum width of cut (ae)
LOMU04 Type	5.0 mm

• Reduce feed rate to $fz \leq 0.2 \text{ mm/t}$ when plunging

M

Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

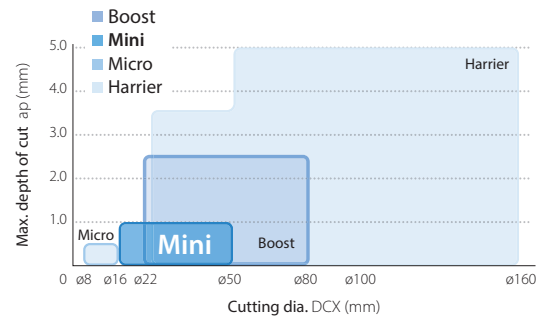
M194

MFH Mini

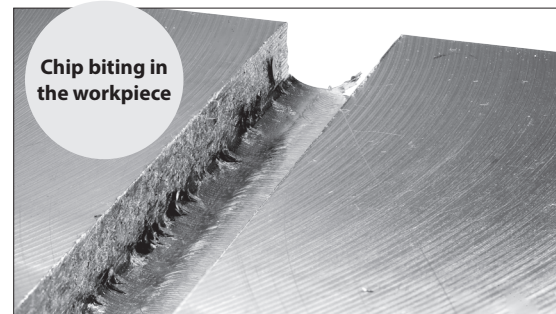
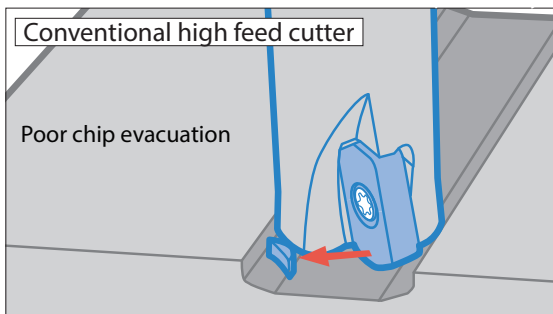
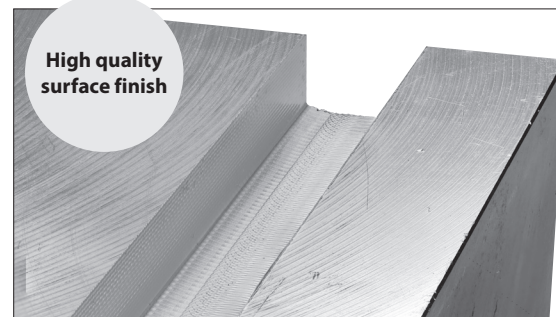
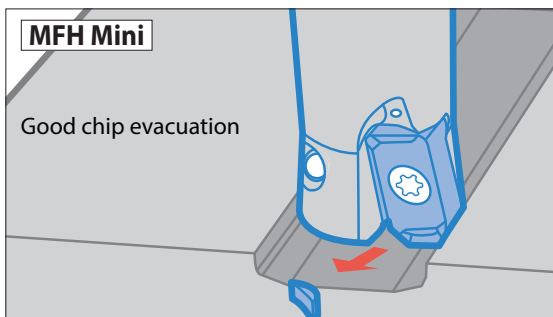
Cutter dia. $\phi 16 \sim \phi 50$

Economical double-sided 4-edge insert

High efficiency and high feed machining at small machining and small machining center



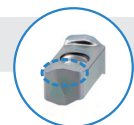
1 Excellent chip evacuation



(Internal evaluation)

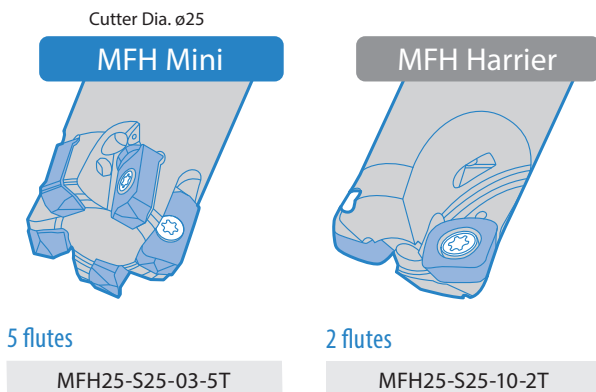
MFH Mini controls chip biting with 3D convex cutting edge

Cutting conditions: Workpiece material SS400 Cutter dia. $\phi 16$ $V_c = 150$ m/min $a_p \times a_e = 10$ mm (0.5 mm x 20 passes) $x 16$ mm $f_z = 0.6$ mm/t Dry

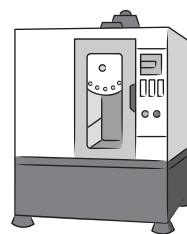


Milling

2 Multi edge design enables high efficiency machining

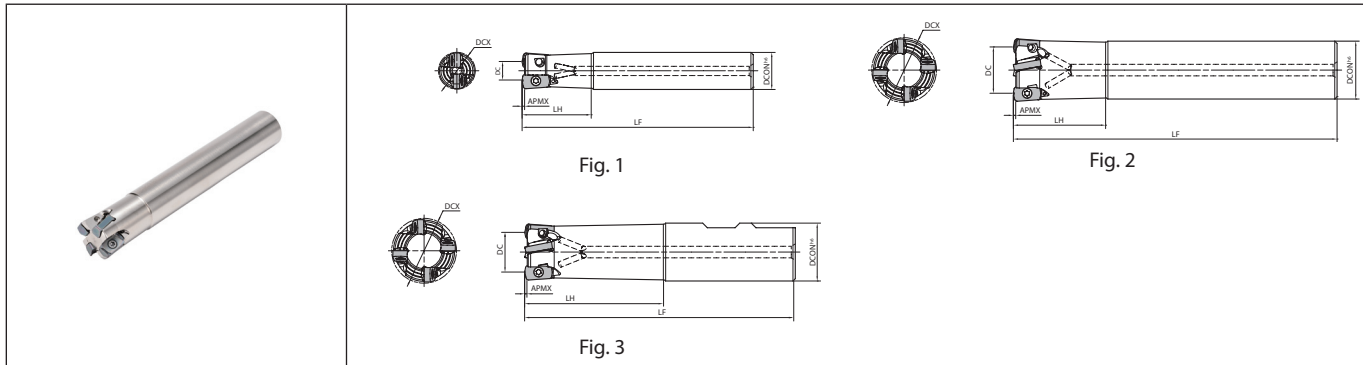


3 High efficiency and high feed machining at small machining center (BT30/BT40)



Suitable for roughing of mold

MFH Mini (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts ➔ M199			
			DC	DCX	DCON	LF	APMX						Anti-seize compound	Screw	Wrench				
			Recommended tightening torque for insert clamp 1.2N·m																
Cylindrical	Same shank	● 2	8	16	16	100	30	1	10	Yes	18800	0.1	1	P-37	SB-3065TRP	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH		
		● 3	12	20	20	130	50				15700	0.3						1	
		● 4	17	25	25	140	60				13400	0.5							1
		● 5	24	32	32	150	70				11400	0.8						1	
		● 6																	
		Standard shank	● 2	9	17	16	100				20	1						10	Yes
	● 3		14	22	20	130	30	17000	0.3	2									
	● 4		20	28	25	140	40	14700	0.5		2								
	● 5							12400	0.5	2									
	● 6																		
	Long Shank		● 2	8	16	16	150	50	1	10	Yes		18800	0.2	1	P-37	SB-3065TRP		
		● 3	12	20	20	160	80	15700				0.3	1						
● 4		17	25	25	180	100	13400	0.6				1							
● 5		24	32	32	200	120	11400	1.1					1						
● 6																			
Weldon		● 2	8	16	16	79	30	1				10	Yes	18800				0.1	3
	● 3		12	20	20	101	50		15700	0.2	3								
	● 4		17	25	25	117	60		13400	0.4				3					
	● 5		24	32	32	131	70		11400	0.7	3								
	● 6																		

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

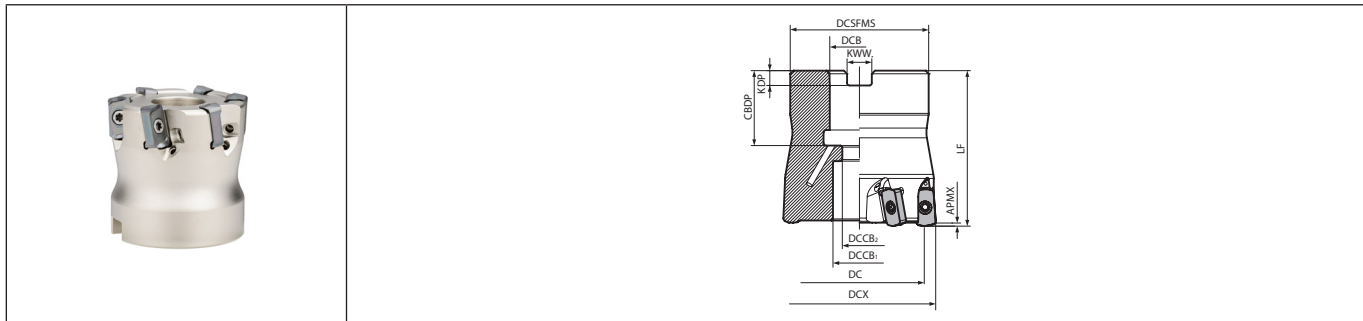


- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M196

MFH Mini (Face mill)



Toolholder dimensions

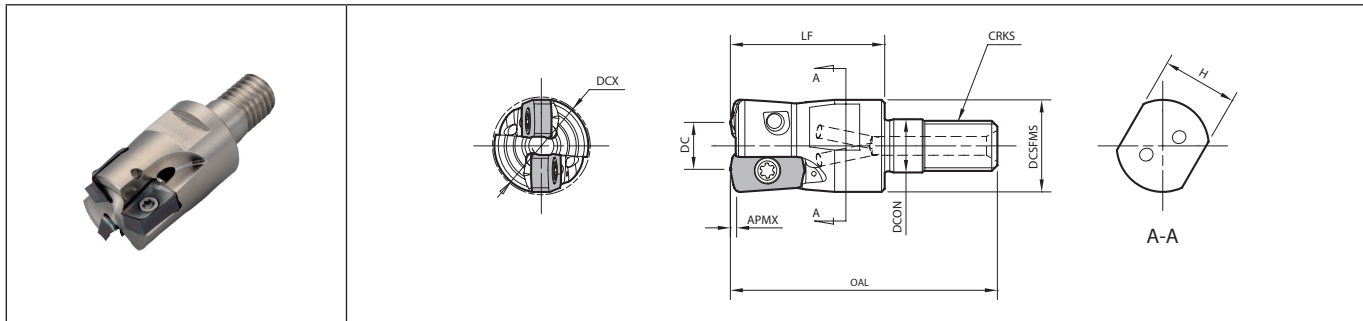
Description	Availability	Inserts	Dimension (mm)											A.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Spare parts			Applicable inserts ➔ M199	
			R	DC	DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW					APMX	Anti-seize compound	Screw		Wrench
MFH 040R-03-5T-M	●	5	32	40	38	16	15	9	40	19	5.6	8.4	1	-10	Yes	9900	0.2	P-37	SB-3065TRP	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH	
040R-03-6T-M	●	6																Recommended tightening torque for insert clamp 1.2N·m				
050R-03-8T-M	●	8	42	50	47	22	19	11	50	21	6.3	10.4										8600

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.



● : Standard item

MFH Mini (Modular type)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)									A.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Spare parts			Applicable inserts ➔ M199				
			DC	DCX	DCON	DCSFMS	OAL	LF	APMX	CRKS	H				Anti-seize compound	Screw	Wrench					
MFH 16-M08-03-2T	●	2	8	16	8.5	14.7	42	25	1	M8x1.25	12	-10	Yes	18880	P-37	SB-3065TRP	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH				
MFH 17-M08-03-2T	●		9	17										17900					Recommended tightening torque for insert clamp 1.2N·m			
MFH 18-M08-03-2T	●		10	18										17000								
MFH 20-M10-03-3T	●	3	12	20	10.5	18.7	48	30	1	M10x1.5	15	-10	Yes	15700	P-37	SB-3065TRP	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH				
MFH 20-M10-03-4T	●		4	14										22					Recommended tightening torque for insert clamp 1.2N·m			
MFH 22-M10-03-3T	●		3																14700			
MFH 22-M10-03-4T	●		4																			
MFH 25-M12-03-4T	●	4	17	25	12.5	23	56	35	1	M12x1.75	19	-10	Yes	13400	P-37	SB-3065TRP	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH				
MFH 25-M12-03-5T	●		5	20										28					Recommended tightening torque for insert clamp 1.2N·m			
MFH 28-M12-03-4T	●		4																12400			
MFH 28-M12-03-5T	●		5																			
MFH 32-M16-03-5T	●		5																24	32	17	30
MFH 32-M16-03-6T	●	6																				

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
See page M60 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)



Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M198

LOGU

Insert		Description	No. of edges	Dimension (mm)					Carbide				Applicable toolholder M196~M198
				S	D1	RE	INSL	W1	CVD		PVD		
									CA6535	PR0155	PR1510	PR1525	
		LOGU 030310ER-GM	4	3.96	3.45	1	11.9	6.2	●	●	●	●	MFH...-03-..
		LOGU 030310ER-GH	4	3.96	3.45	1	11.9	6.2	●	●	●	●	MFH...-03-..

Handed insert shows Right-hand

Recommended cutting conditions M200

Classification of usage

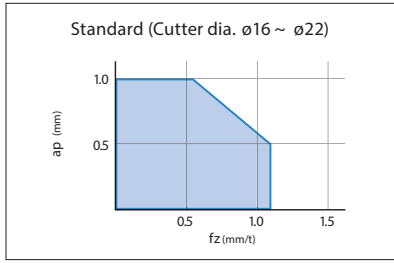
- ★ : Roughing / 1st Choice
- ☆ : Roughing / 2nd Choice
- : Finishing / 1st Choice
- : Finishing / 2nd Choice
- (In case hardness is 45HRC or under)

Carbon steel / Alloy steel				★	☆	P
Mold and die steel				★	☆	
Austenitic stainless steel				☆	★	M
Martensitic stainless steel	★				☆	
Precipitation hardening stainless steel					★	
Gray cast iron				★		K
Nodular cast iron				★		
Non-ferrous metals						N
Heat-resistant alloy	★				☆	S
Titanium alloy					★	
Hard materials		★				H

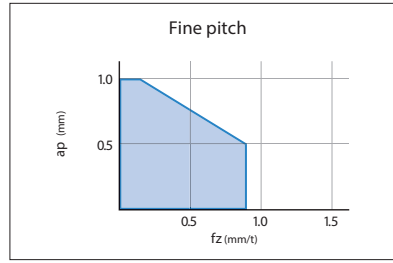
● : Standard item



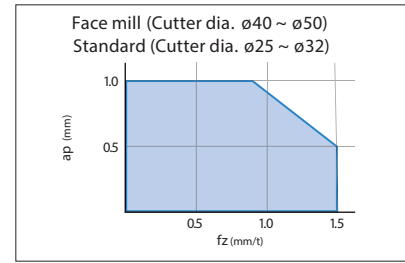
Cutting performance



MFH16-...-2T, MFH17-...-2T, MFH18-...-2T
MFH20-...-3T, MFH22-...-3T



MFH20-...-4T, MFH22-...-4T, MFH25-...-5T
MFH28-...-5T, MFH32-...-6T



MFH25-...-4T, MFH28-...-4T, MFH32-...-5T
MFH40R-..., MFH50R-...

When using fine pitch type, reduce the cutting conditions compared with standard type.

Recommended cutting conditions

Insert type	Workpiece material	Toolholder description and feed rate (fz: mm/t) * Recommended feed rate (Reference value): ap=0.5mm							Recommended insert grades (Vc: m/min)					
		MFH16 -...-2T	MFH20 -...-3T	MFH20 -...-4T	MFH25 -...-4T	MFH25 -...-5T	MFH32 -...-5T	MFH32 -...-6T	MFH -...-R-03	MEGACOAT NANO			MEGACOAT HARD	CVD Coated carbide
										PR1535	PR1525	PR1510	PR0155	CA6535
GM GH	Carbon steel	0.2~0.7~1.2	0.2~0.5~0.8	0.2~0.8~1.5	0.2~0.5~0.8	0.2~0.8~1.5	0.2~0.5~0.8	0.2~0.8~1.5	120~180~250	120~180~250	-	-	-	-
	Alloy steel	0.2~0.7~1.2	0.2~0.5~0.8	0.2~0.8~1.5	0.2~0.5~0.8	0.2~0.8~1.5	0.2~0.5~0.8	0.2~0.8~1.5	100~160~220	100~160~220	-	-	-	-
	Mold steel (~40HRC)	0.2~0.5~0.9	0.2~0.4~0.6	0.2~0.6~1.2	0.2~0.4~0.6	0.2~0.6~1.2	0.2~0.4~0.6	0.2~0.4~1.2	80~140~180	80~140~180	-	GH★	80~140~180	-
	Mold steel (40~50HRC)	0.2~0.3~0.5	0.2~0.25~0.3	0.2~0.3~0.6	0.2~0.25~0.3	0.2~0.3~0.6	0.2~0.25~0.3	0.2~0.25~0.6	-	60~100~130	-	GH★	60~100~130	-
	Mold steel (50~55HRC)	0.1~0.3~0.5	0.1~0.2~0.3	0.1~0.3~0.5	0.1~0.2~0.3	0.1~0.3~0.5	0.1~0.2~0.3	0.1~0.3~0.5	-	50~70~100	-	GH★	50~70~100	-
	Mold steel (55~60HRC)	0.03~0.06~0.1(* Recommended only for GH chipbreaker)							-	-	-	GH☆	50~60~70	-
	Stainless steel (Austenitic related)								GM★	GM☆	-	-	-	-
	Stainless steel (Martensitic related)	0.2~0.5~0.9	0.2~0.4~0.6	0.2~0.6~1.2	0.2~0.4~0.6	0.2~0.6~1.2	0.2~0.4~0.6	0.2~0.4~0.6	150~200~250	-	-	-	-	180~240~300
	Stainless steel (Precipitation hardening)								90~120~150	-	-	-	-	-
	Gray cast iron	0.2~0.7~1.2	0.2~0.5~0.8	0.2~0.8~1.5	0.2~0.5~0.8	0.2~0.8~1.5	0.2~0.5~0.8	0.2~0.5~0.8	-	-	120~180~250	-	-	-
Nodular cast iron	0.2~0.5~0.9	0.2~0.4~0.6	0.2~0.6~1.2	0.2~0.4~0.6	0.2~0.6~1.2	0.2~0.4~0.6	0.2~0.4~0.6	-	-	100~150~200	-	-	-	
Ni-base heat-resistant alloys	0.2~0.3~0.6	0.2~0.25~0.4	0.2~0.4~0.8	0.2~0.25~0.4	0.2~0.4~0.8	0.2~0.25~0.4	0.2~0.25~0.4	20~30~50	-	-	-	-	20~30~50	
Titanium alloys								GM★	-	GM☆	30~50~70	-	-	

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
The bold-faced number indicates a center value of recommended cutting condition.
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
For machining center equivalent to BT30, reduce feed rate to 25% or less of the recommended condition.
For slotting, internal coolant or center through coolant is recommended.
Slotting and pocketing are not recommended for face mill type.

Standard Fine pitch ★: 1st Recommendation ☆: 2nd Recommendation

Note for machining program (Approx. R)

Shape	Approx. R (mm)	Max. over machining of radius (mm)	Max. unmachined portion (mm)
	R1.0	0	0.51
	R1.5	0	0.41
	R1.6 (Recommended)	0	0.39
	R2.0	0.09	0.31

Cutting edge angle: 12°

M200

Reference data for ramping

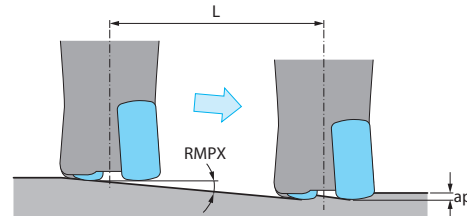
Description	Cutter dia. DCX (mm)	16	17	18	20	22	25	28	32	40	50
MFH ...-03-...	Max. ramping angle RMPX	2.8°	2.5°	2.1°	1.7°	1.4°	1.2°	1°	0.8°	0.5°	0.4°
	tan RMPX	0.049	0.042	0.037	0.03	0.024	0.021	0.017	0.014	0.009	0.007

Guide for ramping (Slant milling)

Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length "L" at max. ramping angle

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

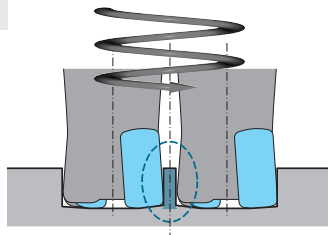


Guide for helical milling

For helical milling, use between min. cutting dia. and max. cutting dia.

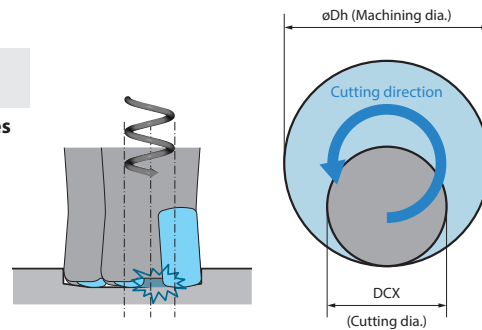
⊘ Over max. cutting dia.

Center core part remains after machining



⊘ Under min. cutting dia.

Center core part interferes with toolholder

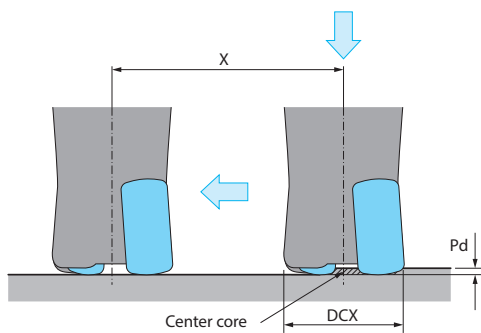


Description	Min. cutting dia.	Max. cutting dia.
MFH...-03-...	2×DCX-8	2×DCX-2

Unit: mm

- Sinking depth at helical milling should be max. ap (1mm) or under.
- Down-cut milling is recommended. (refer to the figure above)
- Feed rate should be under 50% of the recommended cutting conditions.
- Be careful to machine in a safe environment to avoid accident caused by long chips.

Guide for drilling



Description	GM type / GH type	
	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MFH...-03-...	1.0	DCX-9

Unit: mm

- * When traversing directly after drilling, set the table feed at up to 25% of the recommended cutting conditions.
- * When drilling, reduce feed rate per revolution to f=0.2 mm/rev or under.

Vertical milling (Plunging)

Vertical milling (Plunging)

Available for vertical milling (plunging).

Insert description	Max. width of cut
LOGU03 type	3.5mm

For vertical milling (plunging), reduce feed rate to fz=0.2mm/t or less.



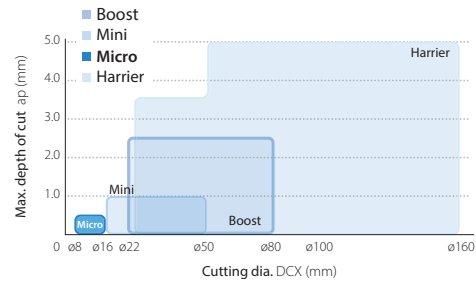
Milling

MFH Micro

Cutter dia. $\varnothing 8 \sim \varnothing 16$

Low resistance and durable against chatter for highly efficient machining. Max. ap 0.5mm.

Stable high feed machining on a wide range of applications



1 Stable machining with chattering resistance

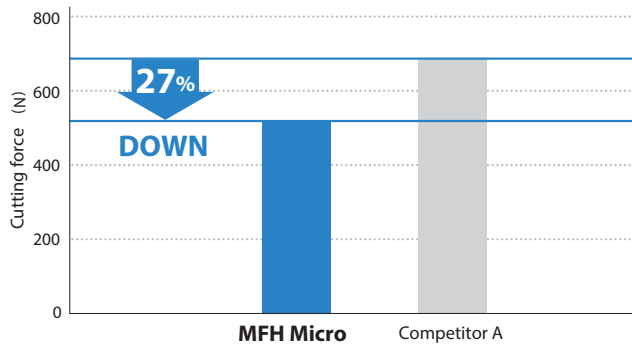
3D convex cutting edge controls initial impact when entering the workpiece

3D convex cutting edge

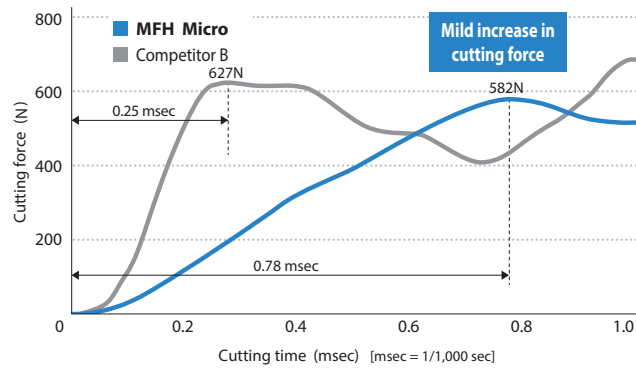


High precision G class insert

Cutting force comparison (Internal evaluation)



Increase in cutting force when entering workpiece (Internal evaluation)



Cutting conditions: $V_c = 120$ m/min, $a_p = 0.4$ mm, $f_z = 0.6$ mm/t
Cutter dia. $\varnothing 10$ mm, slotting, dry workpiece material: S50C

Cutting conditions: $V_c = 120$ m/min, $a_p \times a_e = 0.4 \times 5$ mm, $f_z = 0.6$ mm/t
Cutter dia. $\varnothing 10$ mm, dry workpiece material: S50C



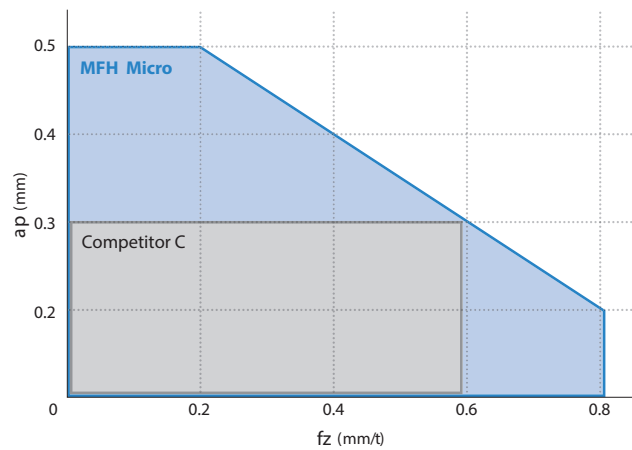
Milling

2 Wide range of machining applications

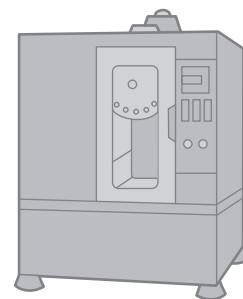
Wide range of machining applications at a maximum depth of cut of 0.5mm

Stable machining even with small machining centers

Cutting performance map (Cutter dia. $\varnothing 10$ mm)



(Internal evaluation)



Applicable for BT30/ BT40

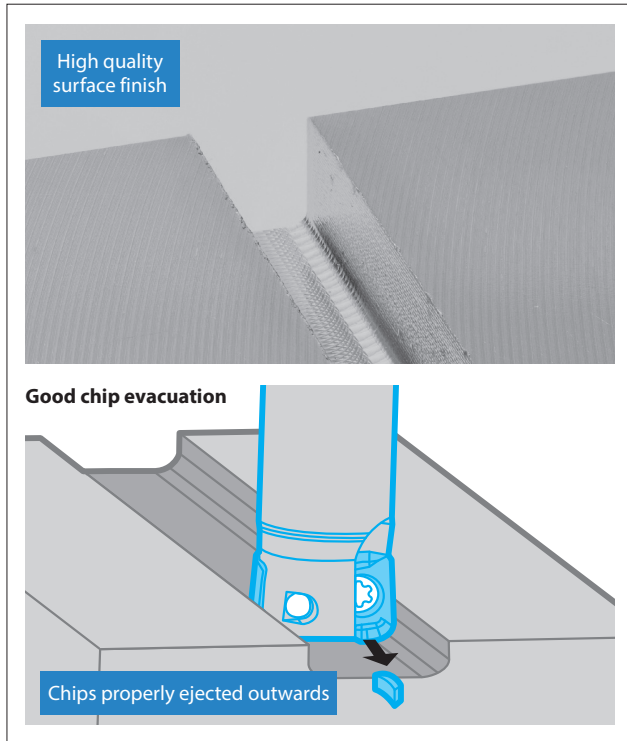
- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

M202

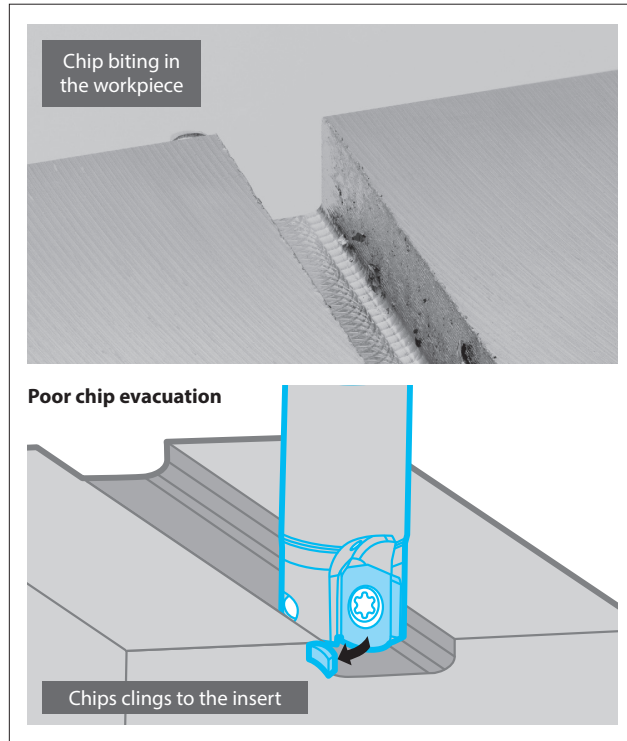
3 Excellent chip evacuation

Controls chip biting with convex cutting edge

MFH Micro



Competitor F



Cutting conditions: Cutter dia. DCX = $\phi 10\text{mm}$, $V_c = 120\text{ m/min}$, $a_p = 0.4\text{mm}$ (25pass), $f_z = 0.6\text{mm/t}$ Total 10mm, Dry workpiece material: S5400

(Internal evaluation)

4 Replaces solid end mills to reduce machining costs

Suppresses chattering and increases milling efficiency

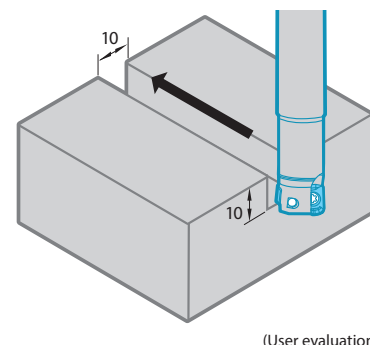
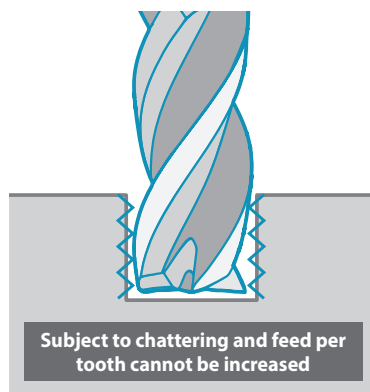
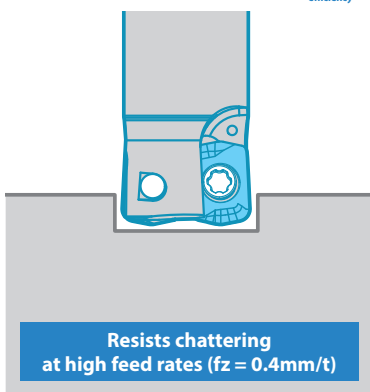
MFH Micro compared to solid end mills

MFH Micro Q = 15.3 cc/min
 $V_c = 150\text{ m/min}$, $f_z = 0.4\text{mm/t}$
 $a_p \times a_e = 0.4 \times 10\text{mm}$, dry
 MFH10-S10-01-2T (2 flutes)
 LPGT010210ER-GM (PR1525)

1.25times
 Machining
 efficiency

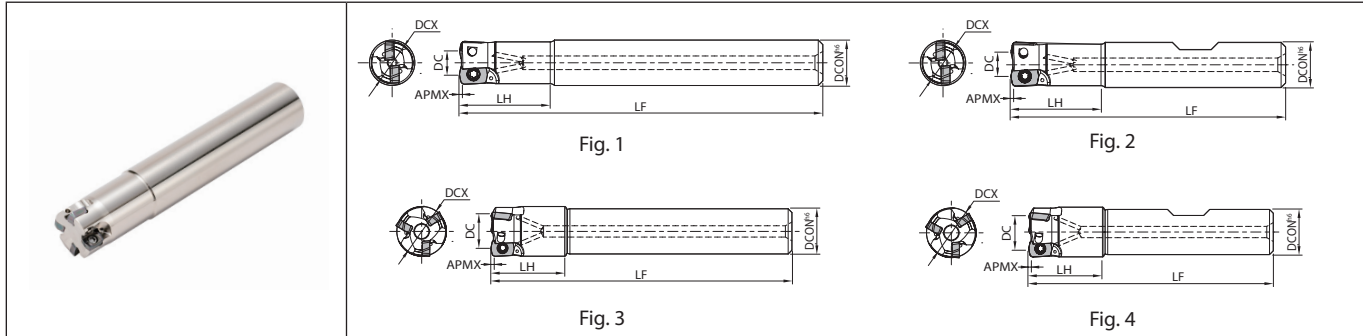
Solid end mill Q = 12.2 cc/min
 $V_c = 80\text{ m/min}$, $f_z = 0.04\text{mm/t}$
 $a_p \times a_e = 3 \times 10\text{mm}$, dry
 $\phi 10$ (4 flutes)

Machine part slotting workpiece material: S50C



M203

MFH Micro (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)							A.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Spare parts			Applicable inserts M204
			DC	DCX	DCON	LF	LH	APMX	Anti-seize compound						Screw	Wrench		
Cylindrical MFH 08-S10-01-1T 10-S10-01-2T 12-S12-01-3T 16-S16-01-4T	●	1	4.2	8	10	75	16	0.5	+5	Yes	20000	0.04	1	P-37	SB-1840TRP	FTP-6	LPGT010210ER-GM	
	●	2	6.2	10	80	20	16200				0.06	1						
	●	3	8.2	12	12	80	20				14000							0.06
	●	4	12.2	16	16	90	25				11400	0.12						1
MFH 14-S12-01-3T	●	3	10.2	14	12	80	20	0.5	+5	Yes	12500	0.07	3	P-37	SB-1840TRP	FTP-6	LPGT010210ER-GM	
Weldon MFH 08-W10-01-1T 10-W10-01-2T 12-W12-01-3T 16-W16-01-4T MFH 14-W12-01-3T	●	1	4.2	8	10	58	16	0.5	+5	Yes	20000	0.03	2	P-37	SB-1840TRP	FTP-6	LPGT010210ER-GM	
	●	2	6.2	10	60	20	16200				0.05	2						
	●	3	8.2	12	12	65	20				14000							0.05
	●	4	12.2	16	16	73	25				11400	0.1						2
	MFH 14-W12-01-3T	●	3	10.2	14	12	65				20	0.5						

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
 Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
 Recommended tightening torque for insert clamp : 0.5N·m



LPGT

Insert	Description	Dimension (mm)					Carbide			Applicable toolholder M204 M205
		S	D1	RE	W1	INSL	CVD	PVD		
							CA6535	PR1525	PR1535	
	LPGT 010210ER-GM	2.19	2.1	1	4.19	6.26	●	●	●	MFH...-01-..

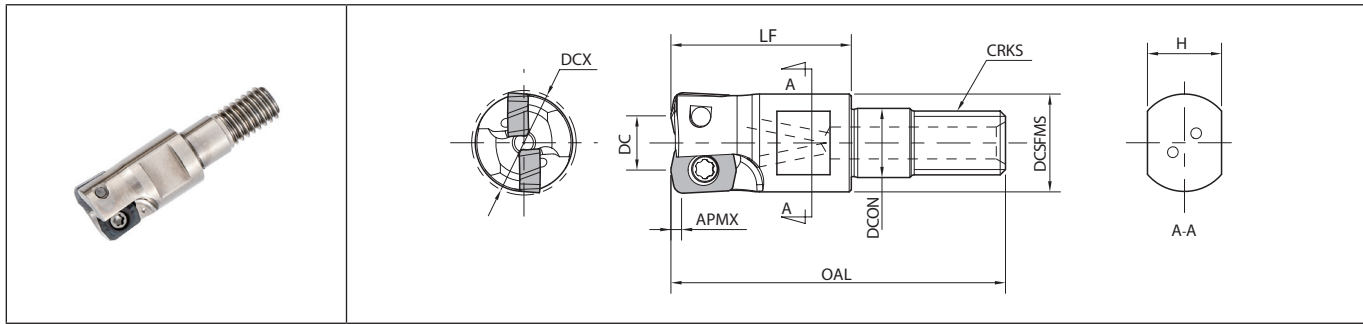
Handed insert shows Right-hand

Recommended cutting conditions M206

● : Standard item

M204

MFH Micro (Modular type)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)										A.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Spare parts			Applicable inserts ➔ M204
			DC	DCX	DCON	DCSFMS	OAL	LF	APMX	CRKS	H	Anti-seize compound				Screw	Wrench		
			MFH 08-M06-01-1T	●	1	4.2	8	6.5	9.2	30.5	17	0.5				M6x1.0	7	+5	
10-M06-01-2T	●	2	6.2	10	11.2	14000													
12-M06-01-3T	●	3	8.2	12			12500												
14-M06-01-3T	●		10.2	14															
MFH 16-M08-01-4T	●	4	12.2	16	8.5			14.7	39	22	0.5	M8x1.25	12	+5	Yes	11400	P-37	SB-1840TRP	FTP-6

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

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

Please use commercial shanks for cutting diameter from ø8 to ø14 (Screw size : M6 x 1.0)

Check screw specifications for the shank in use.

Recommended tightening torque for insert clamp : 0.5N·m

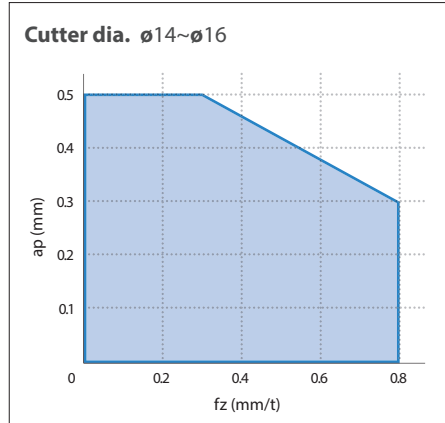
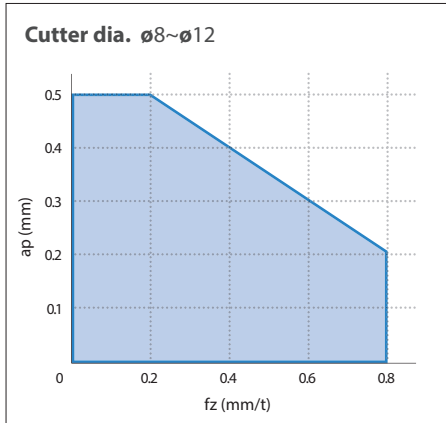
Actual End Mill depth (MFH16-M08-01-4T)

Arbor Description	Applicable End Mill (Head)			Actual End Mill depth (mm)
	Description	Cutting Dia.	Dimension	LUX
		DC	LF	
BT30K-M08-45	MFH16-M08-01-4T	16	22	28.8
BT40K-M08-55	MFH16-M08-01-4T	16	22	28.7

➔ See page M60 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

● : Standard item

Cutting performance



Recommended cutting conditions

Insert type	Workpiece material	Recommended feed rate (fz: mm/t): ap: 0.3mm (Reference value)					Recommended insert grades (Cutting speed Vc: m/min)		
		MFH08-...-1T	MFH10-...-2T	MFH12-...-3T	MFH14-...-3T	MFH16-...-4T	MEGACOAT NANO		CVD Coated carbide
							PR1525	PR1535	CA6535
GM	Carbon steel	0.2~ 0.4 ~0.6			0.2~ 0.5 ~0.8		★ 120~ 180 ~250	☆ 120~ 180 ~250	-
	Alloy steel	0.2~ 0.3 ~0.5			0.2~ 0.4 ~0.6		★ 100~ 160 ~220	☆ 100~ 160 ~220	-
	Mold steel (~ 40HRC)	0.2~ 0.25 ~0.3			0.2~ 0.25 ~0.4		★ 80~ 140 ~180	☆ 80~ 140 ~180	-
	Mold steel (40 ~ 50HRC)	0.2~ 0.3 ~0.5			0.2~ 0.4 ~0.6		★ 60~ 100 ~130	☆ 60~ 100 ~130	-
	Stainless steel (Austenitic related)	0.2~ 0.3 ~0.5			0.2~ 0.4 ~0.6		☆ 100~ 160 ~200	★ 100~ 160 ~200	-
	Stainless steel (Martensitic related)	0.2~ 0.4 ~0.6			0.2~ 0.5 ~0.8		-	☆ 150~ 200 ~250	★ 180~ 240 ~300
	Stainless steel (Precipitation hardening)	0.2~ 0.3 ~0.5			0.2~ 0.4 ~0.6		-	★ 90~ 120 ~150	-
	Gray cast iron	0.2~ 0.3 ~0.5			0.2~ 0.4 ~0.6		★ 120~ 180 ~250	-	-
	Nodular cast iron	0.2~ 0.25 ~0.3			0.2~ 0.25 ~0.4		★ 100~ 150 ~200	-	-
	Ni-base heat-resistant alloys	0.2~ 0.3 ~0.5			0.2~ 0.4 ~0.6		-	☆ 20~ 30 ~50	★ 20~ 30 ~50
	Titanium alloys	0.2~ 0.25 ~0.3			0.2~ 0.25 ~0.4		-	★ 40~ 60 ~80	-

Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys. The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation. Internal coolant is recommended for slotting.

★ : 1st Recommendation ☆: 2nd Recommendation

Note for machining program (Approx. R)

Shape	Approx. R (mm)	Max. over machining of radius (mm)	Max. unmachined portion (mm)
	R1.0	0	0.21
	R1.2 (Recommended)	0	0.17
	R1.5	0.08	0.1
	R2.0	0.28	0.01

Cutting edge angle:12°

M206

Reference data for ramping

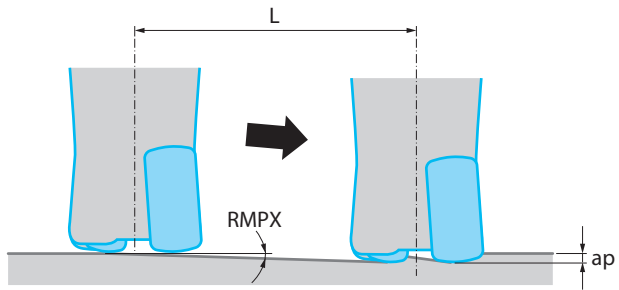
Description	Cutter dia. DCX (mm)	8	10	12	14	16
MFH...-01-...	Max. ramping angle RMPX	4.0°	3.0°	2.0°	1.5°	1.2°
	tan RMPX	0.070	0.052	0.035	0.026	0.021

Decrease ramping angle if chips become excessively long.

Guide for ramping (Slant milling)

Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length "L" at max. ramping angle $L = \frac{ap}{\tan RMPX}$

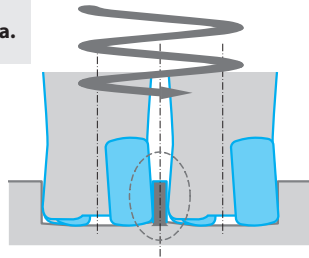


Guide for helical milling

For helical milling, use between min. cutting dia. and max. cutting dia.

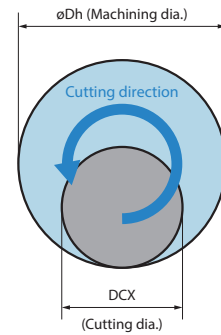
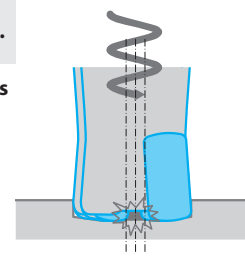
⊘ Exceeding max. cutting dia.

Center core part remains after machining



⊘ Under min. cutting dia.

Center core part interferes with toolholder

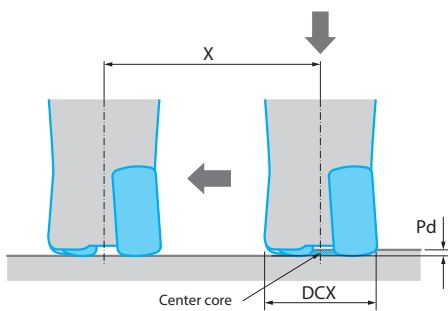


Description	Min. cutting dia.	Max. cutting dia.
MFH...-01-...	$2 \times DCX - 3.5$	$2 \times DCX - 2$

Unit: mm

- Sinking depth at helical milling should be max. ap (0.5mm) or under.
- Down-cut milling is recommended (refer to the figure above).
- Feed rate should be under 50% of the recommended cutting conditions.
- Be careful to machine in a safe environment to avoid accident caused by long chips.

Guide for drilling



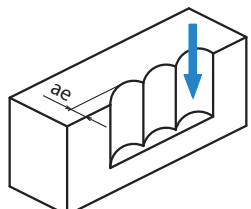
Description	GM type	
	Max. cutting depth	Min. cutting length X for flat bottom surface
MFH...-01-...	0.5	$DCX - 3.5$

Unit: mm

- * When traversing directly after drilling, set the table feed at up to 25% of the recommended cutting conditions.
- * When drilling, reduce feed rate per revolution to under $f=0.2\text{mm/rev}$.

Vertical milling (Plunging)

Vertical milling (Plunging)



Available for vertical milling (plunging).

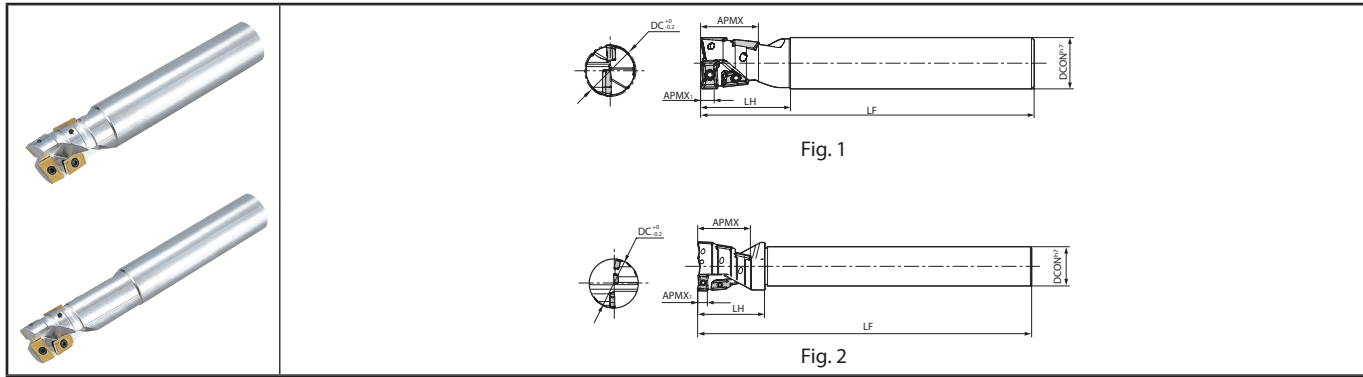
Insert description	Max. width of cut
LOGT01 type	1.7mm

For vertical milling (plunging), reduce feed rate to $fz=0.2\text{mm/t}$ or less.



Milling

MEY



Toolholder dimensions



Description	Availability	Inserts	Flutes	Dimension (mm)							A.R. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts ➔ M210			
				DC	DCON	LF	LH	APMX	APMX ₁	Anti-seize compound					Screw	Wrench					
Standard MEY 16-S16 17-S16 20-S20 21-S20 25-S25 26-S25 32-S32 33-S32 40-S32 50-S42	●	4	2	16	16	120	31	19	4.5	+11	-11	No	1	P-37				Center Edge : GOMT08T208ER-D Side Edge : JOMT08T208ER-D			
				17	16	120	31	19	4.5	+11	-11								SB-2040TRG	DTM-6	
				20	20	130	35	22	6		-9								SB-2555TRG	DT-8	Center Edge : GOMT100308ER-D Side Edge : JOMT100308ER-D
				21	20	130	35	22	6		-9								SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
				25	25	140	40	28	7.5		-11								SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
				26	25	140	40	28	7.5		-11								SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
				32	32	150	50	36	9.5	+13	-9								SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
				33	32	150	50	36	9.5	+13	-9								SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
				40	40	160	55	42	7.5		-11								SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
				50	42	170	70	54	9.5		-9								SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
Long head MEY 16-S16-140H 20-S20-150H 25-S25-170H 32-S32-180H	●	4	2	16	16	140	51	19	4.5	+11	-11	No	1	P-37				Center Edge : GOMT08T208ER-D Side Edge : JOMT08T208ER-D			
				20	20	150	53	22	6		-9								SB-2555TRG	DT-8	Center Edge : GOMT100308ER-D Side Edge : JOMT100308ER-D
				25	25	170	70	28	7.5	+13	-11								SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
				32	32	180	80	36	9.5		-9								SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
Long shank MEY 16-S16-190 17-S16-190 20-S20-200 21-S20-200 25-S25-220 26-S25-220 32-S32-230 33-S32-230 40-S32-240 50-S42-250	●	4	2	16	16	190	61	19	4.5	+11	-11	No	1	P-37				Center Edge : GOMT08T208ER-D Side Edge : JOMT08T208ER-D			
				17	16	190	61	19	4.5	+11	-11								SB-2555TRG	DT-8	Center Edge : GOMT100308ER-D Side Edge : JOMT100308ER-D
				20	20	200	63	22	6		-9								SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
				21	20	200	63	22	6		-9								SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
				25	25	220	80	28	7.5		-11								SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
				26	25	220	80	28	7.5		-11								SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
				32	32	230	90	36	9.5	+13	-9								SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
				33	32	230	90	36	9.5	+13	-9								SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
				40	40	240	55	42	7.5		-11								SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
				50	42	250	70	54	9.5		-9								SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D

APMX₁ shows the edge length of the complete 2-insert part.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Standard item

M208

Applicable Inserts

Description		Applicable Inserts → M210			
					
		Side Edge	No. of Inserts	Center Edge	No. of Inserts
MEY	16-S16(-...)	JOMT08T208ER-D	3	GOMT08T208ER-D	1
	17-S16(-...)			GOMT08T208ER-D	
	20-S20(-...)			GOMT100308ER-D	
	21-S20(-...)	JOMT100308ER-D			
	25-S25(-...)	JOMT13T308ER-D			
	26-S25(-...)	GOMT13T308ER-D			
	32-S32(-...)	JOMT160408ER-D	GOMT160408ER-D		
	33-S32(-...)	JOMT160408ER-D	GOMT160408ER-D		
	40-S32(-...)	JOMT13T308ER-D	6	GOMT13T308ER-D	
	50-S42(-...)	JOMT160408ER-D	GOMT160408ER-D		



Milling

GOMT/JOMT

Insert		Description	No. of edges	Dimension (mm)					Angle (°)		Carbide		Applicable toolholder M208 M209
				S	D1	RE	L	W1	AN	AS	PVD		
		GOMT 08T208ER-D	2	2.78	2.3	0.8	8.7	5.21	17	13	●	●	MEY16-S16(-...) MEY17-S16(-...)
		GOMT 100308ER-D	2	3.3	2.8	0.8	10.7	6.56	17	13	●	●	MEY20-S20(-...) MEY21-S20(-...)
		GOMT 13T308ER-D	2	3.85	3.4	0.8	13.2	8.36	17	13	●	●	MEY25-S25(-...) MEY26-S25(-...) MEY40-S32(-...)
		GOMT 160408ER-D	2	4.76	4.4	0.8	16.7	10.03	17	13	●	●	MEY32-S32(-...) MEY33-S32(-...) MEY50-S42(-...)
		JOMT 08T208ER-D	2	2.78	2.3	0.8	8.5	5.14	13	17	●	●	MEY16-S16(-...) MEY17-S16(-...)
		JOMT 100308ER-D	2	3.18	2.8	0.8	10.2	6.41	13	17	●	●	MEY20-S20(-...) MEY21-S20(-...)
		JOMT 13T308ER-D	2	3.7	3.4	0.8	13.2	8.07	13	17	●	●	MEY25-S25(-...) MEY26-S25(-...) MEY40-S32(-...)
		JOMT 160408ER-D	2	4.5	4.4	0.8	16.7	9.72	13	17	●	●	MEY32-S32(-...) MEY33-S32(-...) MEY50-S42(-...)

Handed insert shows Right-hand

Recommended cutting conditions M211

Classification of usage

- ★ : Roughing / 1st Choice
 - ☆ : Roughing / 2nd Choice
 - : Finishing / 1st Choice
 - : Finishing / 2nd Choice
- (In case hardness is 45HRC or under)

Carbon steel / Alloy steel	★	P
Mold and die steel	★	
Austenitic stainless steel	☆	M
Martensitic stainless steel		
Precipitation hardening stainless steel		
Gray cast iron	★	K
Nodular cast iron	★	
Non-ferrous metals		N
Heat-resistant alloy	★	S
Titanium alloy	★	
Hard materials	□	H



Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M210

Recommended cutting conditions

Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)	
			MEGACOAT	
	Drilling	Shouldering, slotting	PR1225	PR1210
Carbon steel	0.08~0.15	0.05~0.25	★ 120~250	-
Alloy steel	0.08~0.15	0.05~0.25	★ 100~220	-
Mold steel	0.08~0.12	0.05~0.15	★ 80~180	-
Stainless steel	0.08~0.12	0.05~0.15	★ 120~220	-
Cast iron	0.05~0.20	0.05~0.25	-	★ 100~220

★: 1st Recommendation ☆: 2nd Recommendation

Caution of drilling

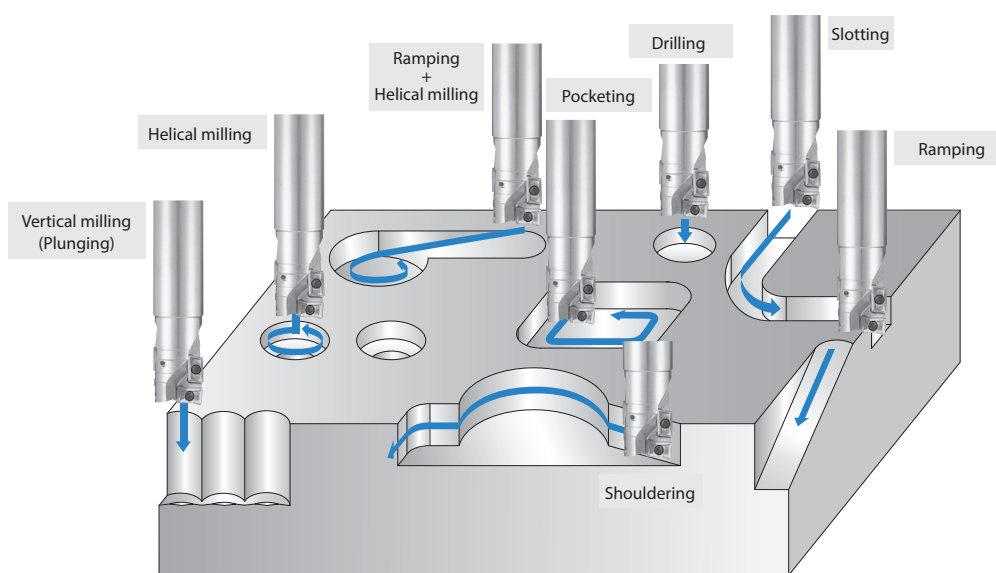
1. Drilling conditions should be calculated as one flute line.
2. Use compressed air during drilling.
3. Carbon steel other than low carbon steel can be drilled to a depth of 0.5D without step feeding.
For soft steel or sticky material such as stainless steel, Step feed drilling (0.5 ~ 1.0mm) is recommended.
4. For stainless steel drilling, coolant is recommended.
5. Please refer to right list for maximum hole depth.

Cutting dia.(DC)	Max. hole depth (mm)
ø16	13
ø17	13
ø20	17
ø21	17
ø25	22
ø26	22
ø32	29
ø33	29
ø40	36
ø50	40

Shape of the bottom of the drilled hole

Cutting dia.	a (mm)	Shape of the bottom
ø16, ø17	0.5	<p>Cutting dia. DC</p> <p>ø16 ~ ø33</p>
ø20, ø21	0.64	
ø25, ø26	0.85	
ø32, ø33	1.12	
ø40	1.54	<p>Cutting dia. DC</p> <p>ø40, ø50</p>
ø50	1.65	

Examples of MEY multi-function machining



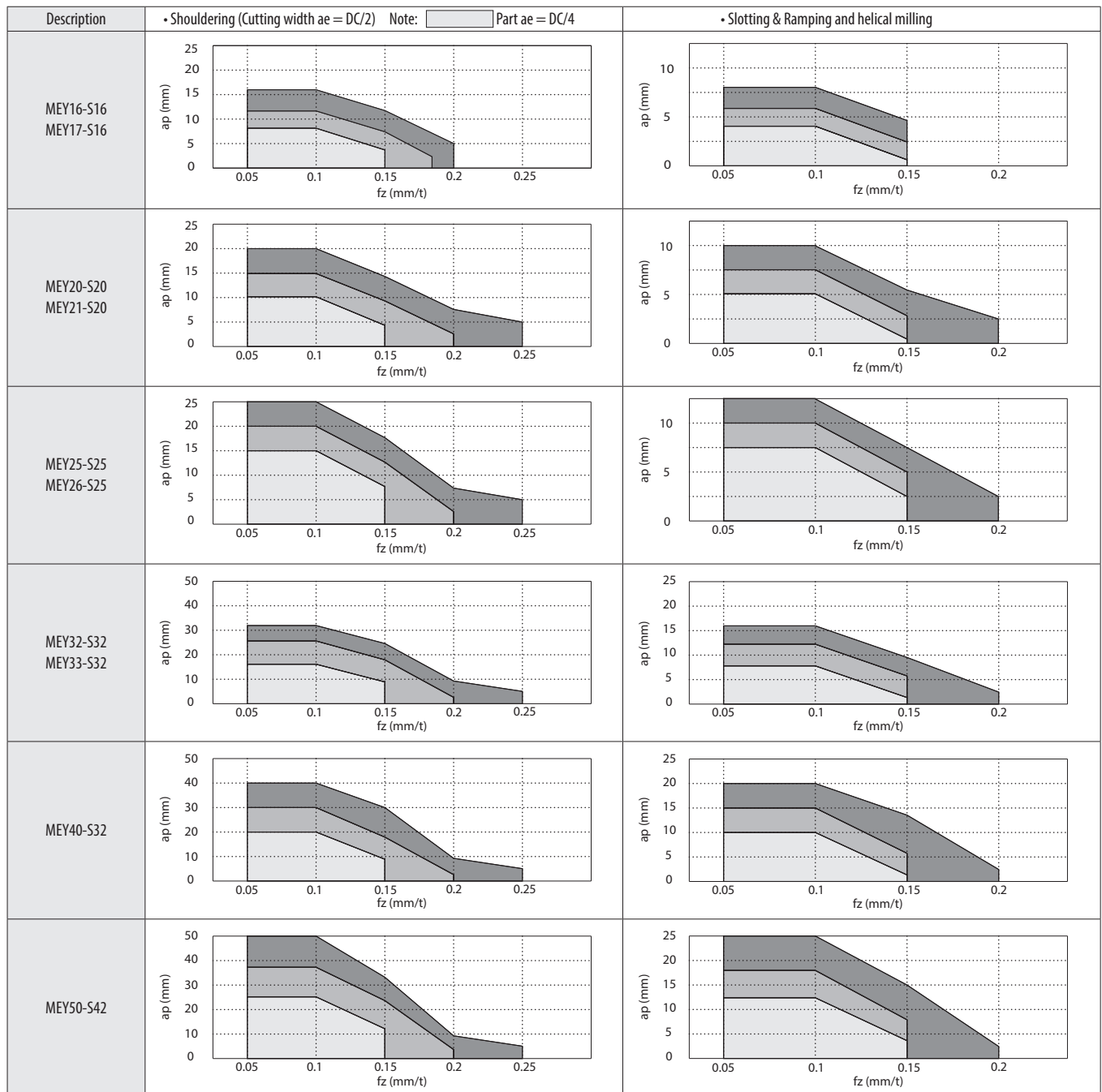
Milling

Cutting performance of MEY

Workpiece material: S50C

Cutting dia.	Description	Overhang length LPR (mm)			Cutting dia.	Description	Overhang length LPR (mm)			Shape
ø16	MEY16-S16	31	[~61]	(Not recommended)	ø25	MEY25-S25	40	[~70]	(Not recommended)	
	MEY16-S16-140H	-	~61	[~91]		MEY25-S25-170H	-	70	[~100]	
	MEY16-S16-190	-	61	~91		MEY25-S25-220	-	~80	~100	
ø17	MEY17-S16	31	[~61]	(Not recommended)	ø26	MEY26-S25	40	[~70]	(Not recommended)	
	MEY17-S16-190	31	~61	~91		MEY26-S25-220	40	~70	~100	
ø20	MEY20-S20	35	[~65]	(Not recommended)	ø32	MEY32-S32	50	[~80]	(Not recommended)	
	MEY20-S20-150H	-	~65	[~95]		MEY32-S32-180H	-	~80	[~110]	
	MEY20-S20-200	-	65	~95		MEY32-S32-230	-	90	~110	
ø21	MEY21-S20	35	[~65]	(Not recommended)	ø33	MEY33-S32	50	[~80]	(Not recommended)	
	MEY21-S20-200	35	~65	~95		MEY33-S32-230	50	~80	~110	
ø40	MEY40-S32	55	[~85]	[~115]	ø40	MEY40-S32	55	[~85]	[~115]	
	MEY40-S32-240	55	~85	~115		MEY40-S32-240	55	~85	~115	
ø50	MEY50-S42	70	[~100]	[~130]	ø50	MEY50-S42	70	[~100]	[~130]	
	MEY50-S42-250	70	~100	~130		MEY50-S42-250	70	~100	~130	

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



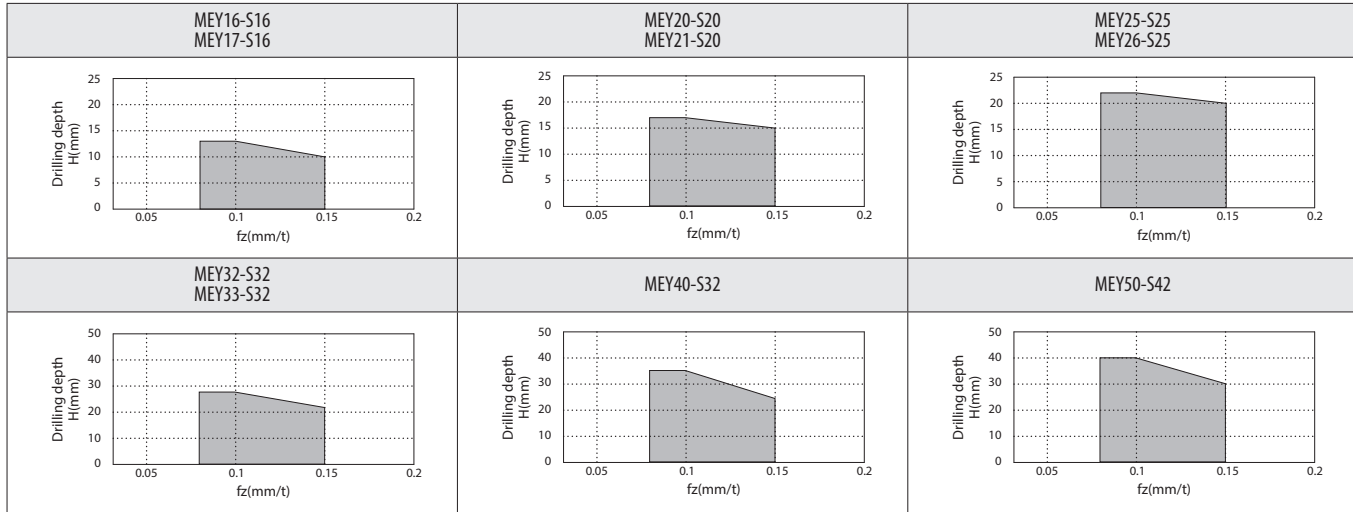
M

Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

M212

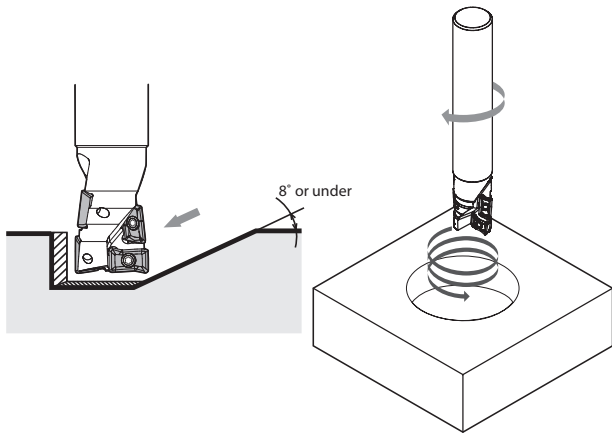
Drilling (Standard/long head/long shank: S50C)



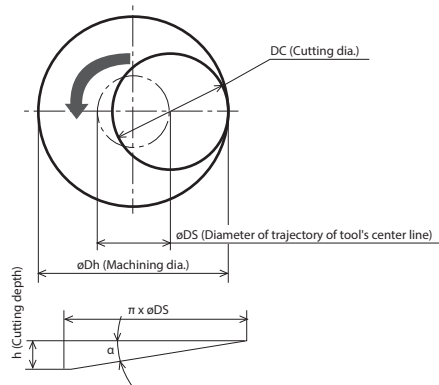
How to use MEY effectively

Ramping/Helical milling

- Ramping angle is recommended to be 8° or under.
- Sinking depth per revolution when helical milling should be 1/2DC or under.
- Use compressed air during machining.



Helical milling factors



øDS (How to find diameter of trajectory of tool's center line)

$$\text{øDS} = \text{øDh} - \text{DC}$$

h How to find "h"

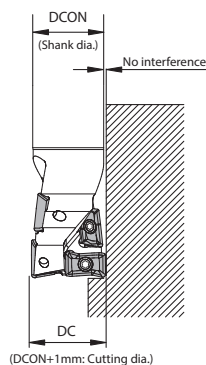
$$h = \pi \times \text{øDS} \times \tan \alpha$$

(alpha should be 8° or under)

Shouldering

- Tools with 1mm larger cutting diameter than shank diameter are available.
- High wall shouldering is possible.
- Lineup

Description	DC (mm)	DCON (mm)
MEY17-S16	17	16
MEY21-S20	21	20
MEY26-S25	26	25
MEY33-S32	33	32
MEY17-S16-190	17	16
MEY21-S20-200	21	20
MEY26-S25-220	26	25
MEY33-S32-230	33	32



Slot mill



Full range from 1.6 mm to 23.3 mm in 3 types

Lineup of MST series slot mills

Type	Applicable inserts	Features	Slot width (mm)															
			1.6	2.2 (2.25)	3.05	4.05	6	8	10	13	14	16	18	20	22	24		
MSTA	SLT..	1.6 ~ 4.05 mm fixed	●	●	●	●												
MSTB	LNEU12..	6 ~ 13 mm semi-adjustable					▶ * Adjustable in 0.5mm increments between 6mm and 13mm with the combination of inserts											
MSTC	SP.10T3..	14 ~ 18 mm full-adjustable									▶ * Adjustable between 14mm and 18mm							
	SD.1204...	18 ~ 23.3 mm full-adjustable											▶ * Adjustable between 18mm and 23.3mm					

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

Others

Slot mill MSTA (Slot width 1.6, 2.2(2.25), 3.05, 4.05 mm)

Self-clamping type slot mill

MSTA slot mills have simple self-clamping system to allow for easy attachment by just installing the insert.

High rigidity clamping system

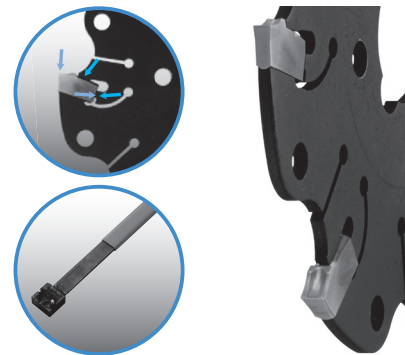
Owing to the high rigidity clamping system – with an end – stopper, the toolholder enable high operability and stable slotting by maintaining an accurate edge position.

Double-prism clamping system

High replacement precision with the double-prism clamping system

Easy replacement

The replacement of inserts is easy and quick by using special wrench.



Wrench is not attached. Please purchase it separately.

Slot mill MSTB (Slot width 6.0 ~ 13.0mm)

Up-right type/semi-adjustable slot width

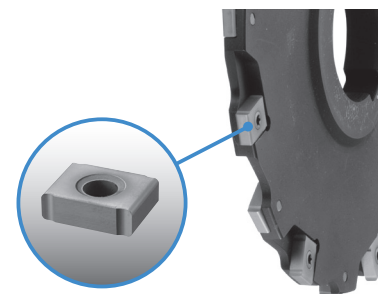
Easy and secure screw holding

Inserts can be attached to the MSTB slot mills very easily by using clamp screws.

Economical inserts with 4 cutting edges

Applicable to a variety of slotting by choosing different inserts

By changing the thickness of inserts, it's applicable to various slotting widths up to max 13mm in 0.5mm increments.



M214

Slot mill MSTC (Slot width 14.0 ~ 23.3 mm)

Lay-down type/full-adjustable slot width

Applicable to various slotting needs. Slotting widths: 14.0mm to 23.3mm.

Cutter dia.: from 100mm to 160mm

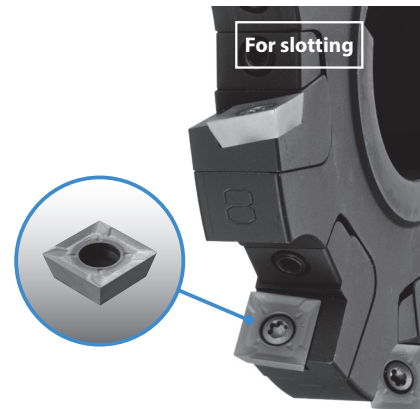
Smooth slotting width adjustment is possible owing to unique cam style adjustment mechanism.

Economical 4-edge Insert

A wide range of corner-R is suitable for various work.

Owing to the wiper edge insert, an excellent surface finish can be expected.

Owing to numerous insert geometries and grades, they are applicable for various types of workpiece machining.



Features of insert grades

Insert shape			
Symbol	SB	SD	SE
Rake angle			
Shape			

CA0835

- TiN+TiCN+Al₂O₃ based CVD coated carbide
- For carbon steel, alloy steel, stainless steel and nodular cast iron.
- For middle to high speed machining.

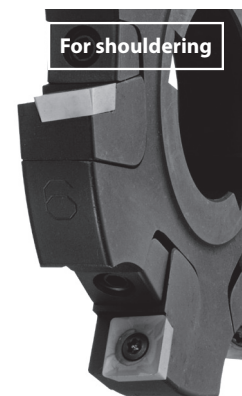
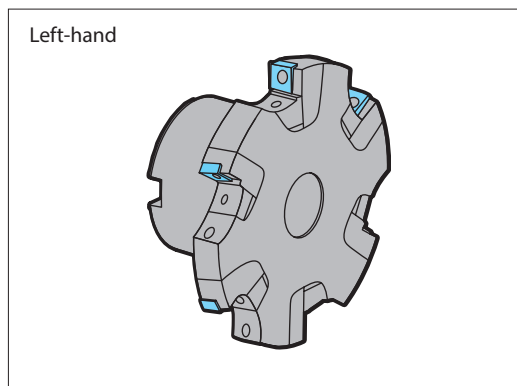
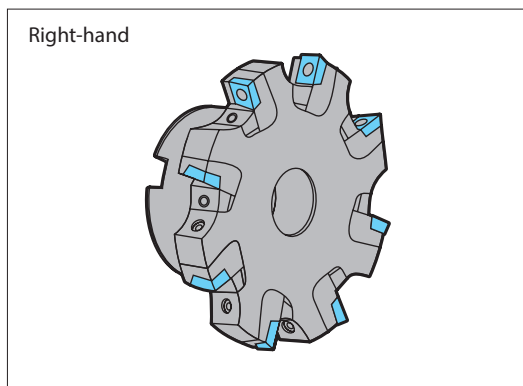
PR0725

- TiN+TiCN+TiN based multi-layer PVD coated carbide
- For carbon steel, alloy steel, stainless steel, heat-resistant alloys and cast iron.
- For middle speed machining.

PR0110

- TiB₂ based PVD coated carbide
- For non-ferrous metals such as aluminum alloys (Si<10%) and titanium alloys.
- For high speed machining.

With boss

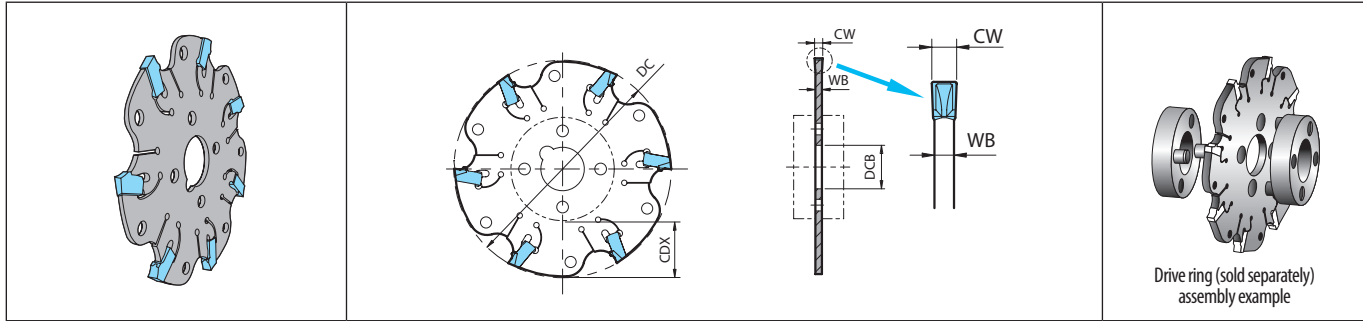


M



Milling

MSTA



Toolholder dimensions (Metric)

Description	Availability	N	Dimension (mm)					Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Applicable inserts M218
			DC	DCB	CDX	WB	CW				
MSTA 63N16-5T	●	5	63	16	15	1.3	1.6	No	5100	0.03	SLT.-...SKB SLT.-...SKD
MSTA 80N16-7T	●	7	80	16	21				4000	0.04	
MSTA 100N16-9T	●	9	100	22	27				3200	0.07	
MSTA 125N16-11T	●	11	125	32	35				2600	0.1	
MSTA 63N22-5T	●	5	63	16	15	1.8	2.2	No	5100	0.03	SLT.-...SKB SLT.-...SKD
MSTA 80N22-7T	●	7	80	16	21				4000	0.05	
MSTA 100N22-9T	●	9	100	22	27				3200	0.08	
MSTA 125N22-11T	●	11	125	32	35				2600	0.12	
MSTA 160N22-14T	●	14	160	40	40	2000	0.3				
MSTA 63N30-4T	●	4	63	16	15	2.4	3.05	No	5100	0.05	SLT.-...SKB SLT.-...SKD
MSTA 80N30-6T	●	6	80	16	21				4000	0.08	
MSTA 100N30-9T	●	9	100	22	27				3200	0.13	
MSTA 125N30-11T	●	11	125	32	35				2600	0.2	
MSTA 160N30-14T	●	14	160	40	40	2000	0.35				
MSTA 63N40-4T	●	4	63	16	15	3.4	4.05	No	5100	0.06	SLT.-...SKB SLT.-...SKD
MSTA 80N40-6T	●	6	80	16	21				4000	0.1	
MSTA 100N40-9T	●	9	100	22	27				3200	0.15	
MSTA 125N40-11T	●	11	125	32	35				2600	0.25	
MSTA 160N40-14T	●	14	160	40	40	2000	0.4				

Attach the drive ring (sold separately) to MSTA slot mill to use. Drive ring is sold singularly.
 Please purchase two drive rings per one MSTA slot mill.
 Do not exceed the max. revolution.
 Do not operate cutting on reverse revolution.
 Wrench (MS-FRW1) is not attached. Please purchase it separately.

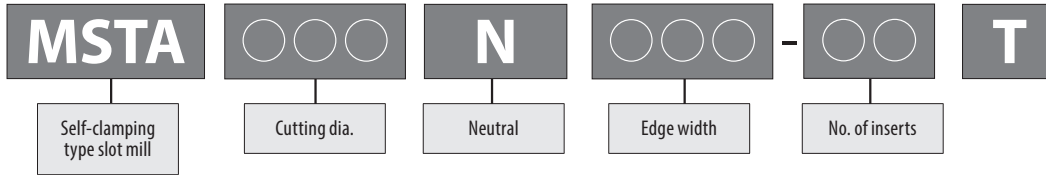
Drive ring (For Metric)

Shape	Description	Availability	Dimension (mm)					Drawing	Applicable toolholders				
			DCB	DIOUT	WB	KWW	DCON						
	DR16-32A	●	16	32	8	4.1	3	Fig. 2	MSTA 63N16-5T				
	DR16-32B	●		32					MSTA 63N22-5T				
	DR16-38	●	16	38	8	4.1	4	Fig. 1	MSTA 63N30-4T				
	DR22-46	●		22					46	6.1	5	MSTA 63N40-4T	
	DR32-55	●	16	32	8	4.1	4	Fig. 3	MSTA 80N○○-○T				
	DR40-80	●							40	80	10.1	12	MSTA 100N○○-○T
	DR22-46	●							22	46	6.1	5	MSTA 125N○○-○○T
	DR32-55	●	32	55	8.1	6			MSTA 160N○○-○○T				

● : Standard item

M216

Identification system MSTA toolholder



Toolholder dimensions (inch spec)

Description	Availability	Inserts	Dimension (in , (mm))					Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Applicable inserts M218
			DC	DCB	CDX	CW	WB				
MSTA 02N063-5T	○	5	2.5 (63.5)	0.625 (15.875)	0.625 (15.875)	0.063 (1.6)	0.051 (1.3)	No	5100	0.03	SLT...SKB SLT...SKD
MSTA 03N063-7T	○	7	3 (76.2)		0.875 (22.225)				4000	0.04	
MSTA 04N063-9T	○	9	4 (101.6)	1 (25.4)	3200				0.07		
MSTA 05N063-11T	○	11	5 (127)	1.25 (31.75)	1.375 (34.925)				2600	0.1	
MSTA 03N089-7T	○	7	3 (76.2)	0.625 (15.875)	0.875 (22.225)	0.089 (2.2)	0.071 (1.8)	No	4000	0.05	SLT...SKB SLT...SKD
MSTA 04N089-9T	○	9	4 (101.6)	1 (25.4)	1.063 (27)				3200	0.08	
MSTA 06N089-14T	○	14	6 (152.4)	1.25 (31.75)	1.438 (36.525)				2000	0.3	
MSTA 02N126-4T	○	4	2.5 (63.5)	0.625 (15.875)	0.625 (15.875)	0.120 (3.05)	0.095 (2.4)	No	5100	0.05	SLT...SKB SLT...SKD
MSTA 03N126-6T	○	6	3 (76.2)		0.875 (22.225)				4000	0.08	
MSTA 04N126-9T	○	9	4 (101.6)	1 (25.4)	1.063 (27)				3200	0.13	
MSTA 05N126-11T	○	11	5 (127)	1.25 (31.75)	1.375 (34.925)				2600	0.2	
MSTA 06N126-14T	○	14	6 (152.4)		1.438 (36.525)				2000	0.35	
MSTA 03N164-6T	○	6	3 (76.2)	0.625 (15.875)	0.875 (22.225)				0.160 (4.05)	0.134 (3.4)	
MSTA 04N164-9T	○	9	4 (101.6)	1 (25.4)	1.063 (27)	3200	0.15				
MSTA 05N164-11T	○	11	5 (127)	1.25 (31.75)	1.375 (34.925)	2600	0.25				

Attach the drive ring (sold separately) to MSTA slot mill to use. Drive ring is sold singularly.
 Please purchase two drive rings per one MSTA slot mill.
 Do not exceed the max. revolution.
 Do not operate cutting on reverse revolution.
 Wrench (MS-FRW1) is not attached. Please purchase it separately.



Drive ring (For Inch spec)

Shape	Description	Availability	Dimension (inch)					Drawing	Applicable toolholders
			DCB	DIOUT	WB	KWW	DCON		
	DR0625-1250A	○					.158 (4mm)	Fig. 1	MSTA 02N126-4T
	DR0625-1250B	○	.625 (15.875mm)	1.250 (31.75mm)	.315 (8mm)	.130 (3.3mm)	.120 (3mm)	Fig. 2	MSTA 02N063-5T
	DR0625-1250C	○						Fig. 3	MSTA 03N○○○-OT
	DR1000-1875	○	1.000 (25.4mm)	1.875 (47.625mm)		.256 (6.5mm)	.200 (5mm)		MSTA 04N○○○-OT
	DR1250-2250	○	1.250 (31.75mm)	2.250 (57.15mm)	.394 (10mm)	.319 (8.1mm)	.240 (6mm)		MSTA 05N○○○-OT
	DR1250-3125	○	1.250 (31.75mm)	3.125 (79.375mm)	.472 (12mm)	.319 (8.1mm)	.472 (12mm)		MSTA 06N○○○-OT

○ : Check Availability

SLT

Insert		Description	Dimension (mm)		Angle (°)	Tolerance (mm)		Carbide		Applicable toolholder M216 M217
			CW	RE	GAN	CW min.	CW max.	CA0835	PR0735	
	SLT	16-15SKB	1.6	0.15	5	-0.1	0	●	○	MSTA...
	SLT	22-20SKB	2.2	0.2	5	-0.05	+0.08	●	●	
	SLT	30-20SKB	3.05	0.2	5	0	+0.15	●	●	
	SLT	40-20SKB	4.05	0.2	5	0	+0.15	●	●	
 Low cutting force	SLT	16-15SKD	1.6	0.15	15	-0.1	0	●	●	
	SLT	22-20SKD	2.25	0.2	15	0	+0.15	●	●	
	SLT	30-20SKD	3.05	0.2	15	0	+0.15	●	●	
	SLT	40-20SKD	4.05	0.2	15	0	+0.15	●	●	

Classification of usage

- : 1st Choice
- : 2nd Choice

Carbon steel / Alloy steel	●	○	P
Mold and die steel			
Stainless steel	○	●	M
Gray cast iron	○		K
Nodular cast iron	○		K
Non-ferrous metals			N
Heat-resistant alloy	●		S
Titanium alloy			
Hard materials			H

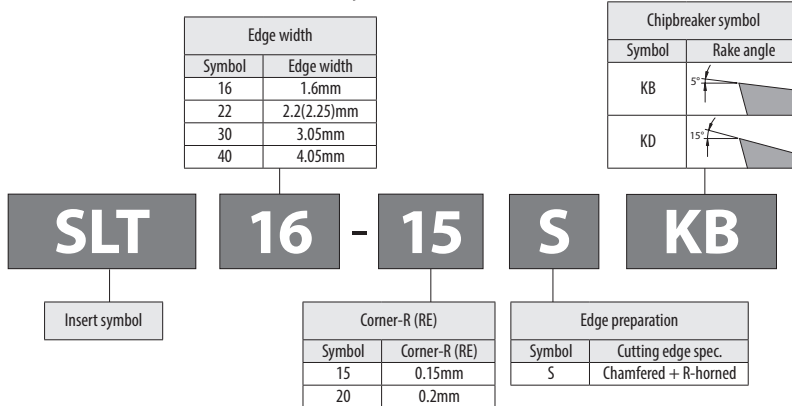
Recommended cutting conditions M219

M



Milling

Inserts identification system



Selection of chipbreaker

- KB chipbreaker ... general purpose chipbreaker for steel and cast iron
- KD chipbreaker ... low cutting force chipbreaker for stainless steel

Features of insert grades

CA0835

- TiN+TiCN+Al₂O₃ based CVD Coated carbide
- For carbon steel, alloy steel, stainless steel and cast iron
- For middle to high speed machining

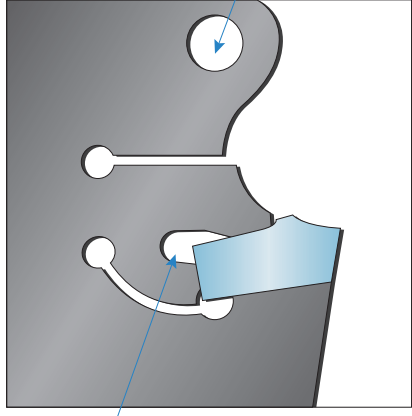
PR0735

- TiN base PVD Coated carbide
- For stainless steel, heat-resistant alloys, etc.
- For low to middle speed machining

● : Standard item

M218

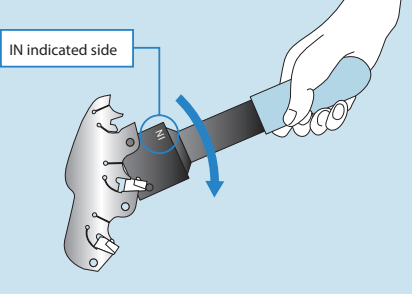
Set up



Wrench support hole

Insert removal hole for wrench

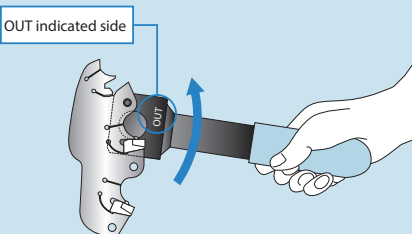
How to attach inserts



IN indicated side

1. Put insert inside the slot mill.
2. Insert one of the pins on the wrench (on IN indicated side) into the wrench support hole.
3. Using the other pin, push the front relief surface of the insert.
4. Rotate the wrench until insert's back end makes contact with slot mill.

How to detach inserts



OUT indicated side

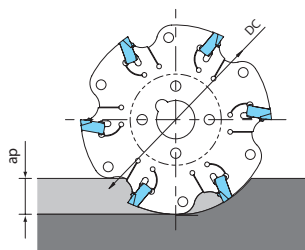
1. Insert one of the pins on the wrench (on OUT indicated side) into the wrench support hole, and insert other pin into the insert releasing hole.
2. Insert can be uninstalled by rotating the wrench counterclockwise. (A magnet is installed on OUT indicated side.)

Note: Use appropriate wrench for set up.

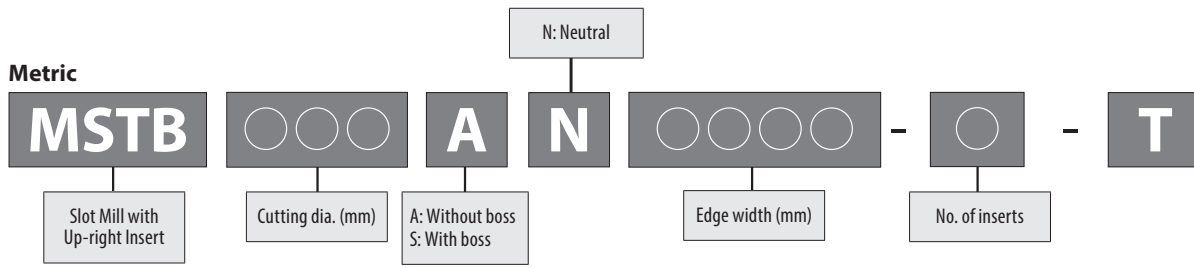
Recommended cutting conditions

Workpiece material		Hardness (HB)	Recommended insert grades (Vc: m/min)		fz (mm/t)				Remarks
			CVD coated carbide	PVD coated carbide	Edge width (mm)				
			CA0835	PR0735	1.6	2.2(2.25)	3.05	4.05	
Low carbon steel	SS400 S10C ~ S25C	125	250~310	200~250	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	Coolant
Carbon steel	S30C ~ S58C (Annealed)	190	160~190	130~160	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	
	S30C ~ S58C (Heat treated)	250	140~180	110~150	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	
Alloy steel	SCM, SCr (Annealed)	180	140~180	110~150	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	
	SCM, SCr (Heat treated)	275	120~160	100~130	0.03~0.10	0.04~0.12	0.06~0.16	0.08~0.18	
High carbon alloy	SKD11, SKD61, etc.	280	100~140	80~120	0.03~0.10	0.04~0.12	0.06~0.16	0.08~0.18	
Stainless steel	Austenitic related SUS304, SUS316, SUH310, etc.	220	150~190	80~120	0.03~0.10	0.04~0.12	0.06~0.16	0.08~0.18	
	Martensitic related SUS403, SUS410, SUH430F, 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	FC250 ~ FC350	260	160~200	-	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	Dry
Nodular cast iron	FCD400 ~ FCD500	160	130~160	-	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	
	FCD600 ~ FCD800	250	110~140	-	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	

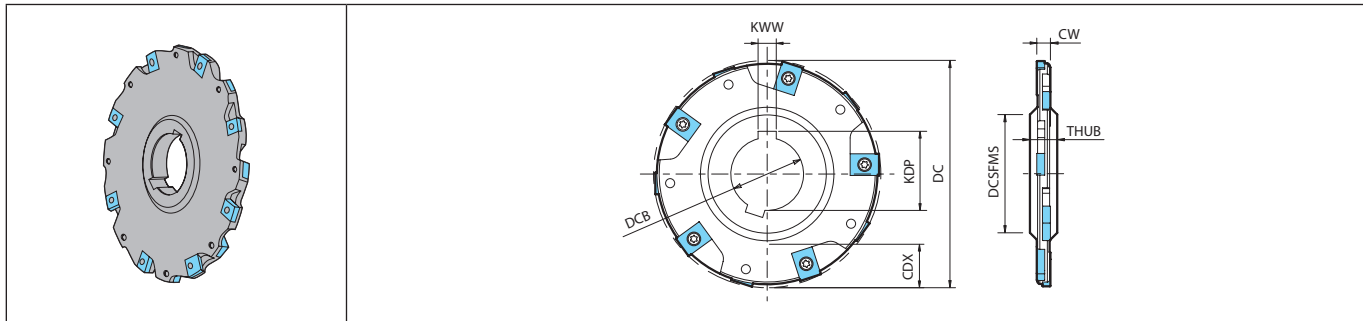
Note: 1. Use down-cut machining.
2. If ap is 1/10 or under of cutter dia.(DC), it is possible to increase feed per tooth (fz) by 40%.



Identification system toolholder MSTB



MSTB (Without Boss, Metric)



In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder dimensions

Description	Availability	Inserts	Edge line	Dimension (mm)										Coolant hole		Spare parts			Applicable inserts M223	
				DC	DCSFMS	DCB	KDP	KWW	CDX	THUB	CW min.	CW max.	Max. revolution (min ⁻¹)	Weight (kg)	Anti-seize compound	Screw	Wrench			
																		N		
MSTB 80AN0607-4T	●	8	4	80	44	27	29.8	7	15						9240	0.3	P-37	SE-40050TRN	TT-15	LNEU12...
MSTB 100AN0607-5T	●	10	5	100	52	32	34.8	8	21	12	6	7	No	8270	0.4					
MSTB 125AN0607-6T	●	12	6	125					28					7390	0.7					
MSTB 160AN0607-8T	●	16	8	160	63	40	43.5	10	45.5					6540	1.1					
MSTB 80AN0809-4T	●	8	4	80	44	27	29.8	7	16					9240	0.4	P-37	SE-40068TR	TT-15	LNEU12...	
MSTB 100AN0809-5T	●	10	5	100	52	32	34.8	8	22	12	8	9	No	8270	0.5					
MSTB 160AN0809-8T	●	16	8	160	63	40	43.5	10	45.5					6540	1.3					
MSTB 125AN1011-4T	●	12	4	125					30					7390	0.9	P-37	SE-40068TR	TT-15	LNEU12...	
MSTB 160AN1011-5T	●	15	5	160	63	40	43.5	10	47.5	12	10	11	No	6540	1.6					
MSTB 160AN1213-5T	●	15	5	160	63	40	43.5	10	48.5	12	12	13	No	6540	1.6	P-37	SE-40090TR	TT-15	LNEU12...	

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

● : Standard item

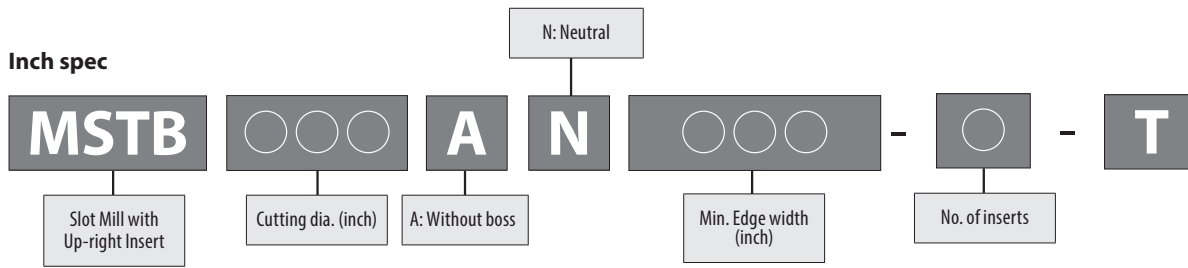
M220

M

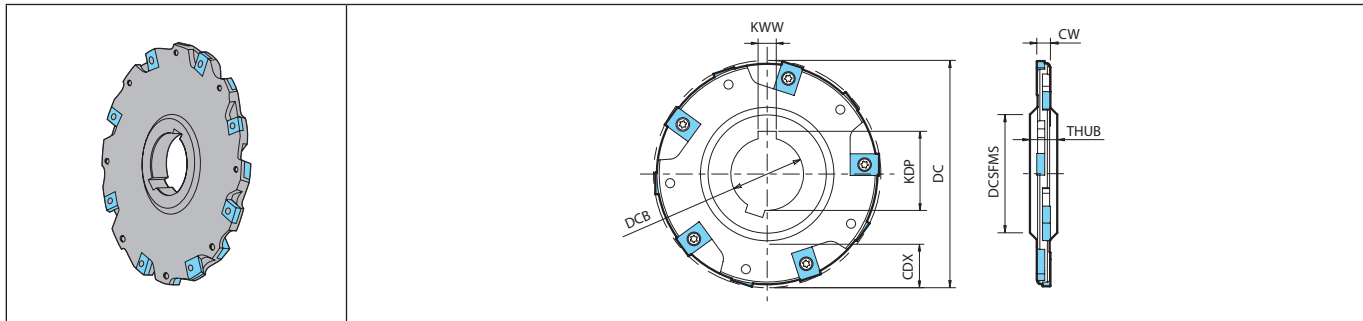
Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill**
- Ball-nose Radius
- Others

Identification system toolholder MSTB



MSTB (Without Boss, Inch spec)



In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder dimensions

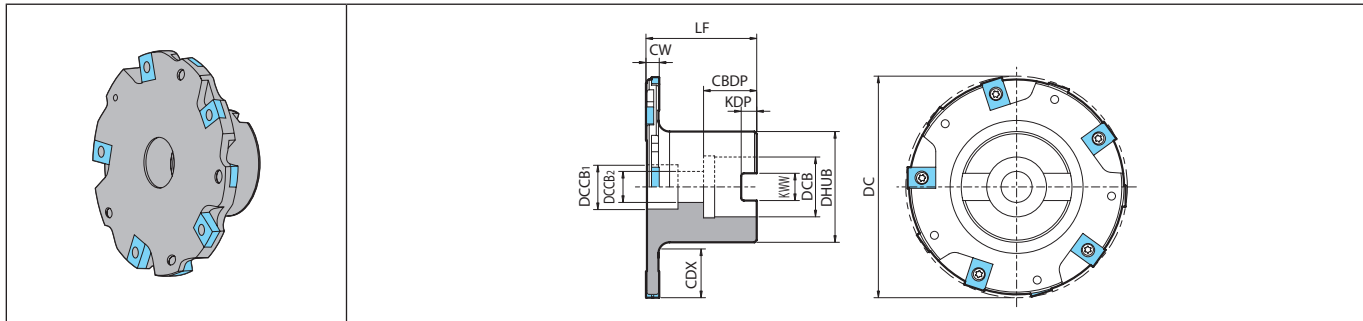
Description	Availability		Edge line	Dimension (in, (mm))										Coolant hole Max. revolution (min ⁻¹)	Weight (kg)	Spare parts			Applicable inserts M223	
	N	Inserts		DC	DCSFMS	DCB	KDP	KWW	CDX	THUB	CW min.	CW max.	Max. revolution (min ⁻¹)			Weight (kg)	Anti-seize compound	Screw		Wrench
MSTB 3000AN250-4T	○	8	4	3 (76.2)	1.5 (38.1)	1 (25.4)	1.106 (28.1)	0.25 (6.35)	0.625 (15.875)				No	9470				LNEU12...		
4000AN250-5T	○	10	5	4 (101.6)	1.88 (47.8)	1.25 (31.75)	1.386 (35.2)	0.312 (7.92)	0.935 (23.8)	0.5 (12.7)	0.25 (6.35)	0.289 (7.34)	No	8200	P-37	SE-40055TR	TT-15			
5000AN250-6T	○	12	6	5 (127)					1.435 (36.4)					7300						
6000AN250-8T	○	16	8	6 (152.4)	2.25 (57.2)	1.5 (38.1)	1.665 (42.3)	0.375 (9.52)	1.75 (44.45)					6700						
MSTB 4000AN312-5T	○	10	5	4 (101.6)	1.88 (47.8)	1.25 (31.75)	1.386 (35.2)	0.312 (7.92)	0.966 (24.5)				No	7400				LNEU12...		
5000AN312-6T	○	12	6	5 (127)					1.466 (37.2)	0.5 (12.7)	0.312 (7.92)	0.351 (8.91)	No	6600	P-37	SE-40068TR	TT-15			
6000AN312-8T	○	16	8	6 (152.4)	2.25 (57.2)	1.5 (38.1)	1.665 (42.3)	0.375 (9.52)	1.781 (45.2)					6000						
MSTB 4000AN375-3T	○	9	3	4 (101.6)	1.88 (47.8)	1.25 (31.75)	1.386 (35.2)	0.312 (7.92)	1 (25.4)				No	7400				LNEU12...		
5000AN375-4T	○	12	4	5 (127)					1.5 (38.1)	0.5 (12.7)	0.375 (9.52)	0.414 (10.52)	No	6600	P-37	SE-40068TR	TT-15			
6000AN375-5T	○	15	5	6 (152.4)	2.25 (57.2)	1.5 (38.1)	1.665 (42.3)	0.375 (9.52)	1.812 (46)					6000						
MSTB 4000AN500-3T	○	9	3	4 (101.6)	1.88 (47.8)	1.25 (31.75)	1.386 (35.2)	0.312 (7.92)	1.06 (26.9)				No	4900				LNEU12...		
5000AN500-4T	○	12	4	5 (127)					1.56 (39.6)	0.5 (12.7)	0.5 (12.7)	0.539 (13.69)	No	4400	P-37	SE-40090TR	TT-15			
6000AN500-5T	○	15	5	6 (152.4)	2.25 (57.2)	1.5 (38.1)	1.665 (42.3)	0.375 (9.52)	1.875 (47.6)					4000						

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

○ : Check Availability



MSTB (With Boss, Metric)



Toolholder dimensions

Description	Availability		Edge line	Dimension (mm)														Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Spare parts				Applicable inserts ➔ M223
	N	Inserts		DC	DCB	DCCB ₁	DCCB ₂	LF (min.)	CDBP	KDP	KWW	CDX	DHUB	CW min.	CW max.	Anti-seize compound	Mounting bolt				Screw	Wrench			
MSTB 80SN0607-4T 100SN0607-5T 160SN0607-8T	●	8	4	80	22	18	12		23	6.3	10.4	16	40			No	9240	0.7	P-37	HH10X35	SE-40050TRN	TT-15	LNEU12...		
	●	10	5	100	27	20	14	50	24	7	12.4	21	50	6	7	No	8270	1		HH12X35					
	●	16	8	160	40	33	22		28	9	16.4	41	70			No	6540	1.9		HH20X40					
MSTB 80SN0809-4T 100SN0809-5T 160SN0809-8T	●	8	4	80	22	18	12		23	6.3	10.4	16	40			No	9240	0.8	P-37	HH10X35	SE-40068TR	TT-15	LNEU12...		
	●	10	5	100	27	20	14	50	24	7	12.4	21	50	8	9	No	8270	1.2		HH12X35					
	●	16	8	160	40	33	22		28	9	16.4	41	70			No	6540	2.2		HH20X40					
MSTB 125SN1011-4T 160SN1011-5T	●	12	4	125								26				No	7390	2	P-37	HH20X40	SE-40068TR	TT-15	LNEU12...		
	●	15	5	160	40	33	22	50	28	9	16.4	43	70	10	11	No	6540	2.5							

LF (min.) dimension shows in case of minimum of edge width (CW).
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.



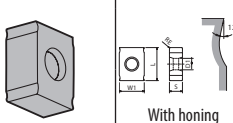
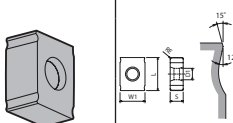
Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill**
- Ball-nose Radius
- Others

● : Standard item

M222

LNEU

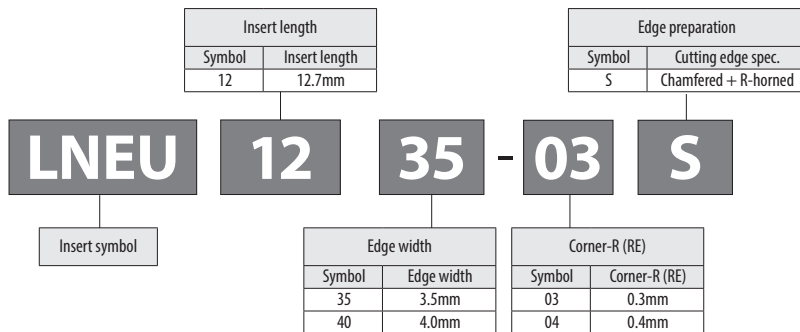
Insert		Description	No. of edges	Dimension (mm)			Material	Applicable toolholder ➔ M220~M222	Applicable clamp screw
				S	D1	RE			
 <p>With honing</p>		LNEU 1235-03-4	4	3.5	4.4	0.3	●	MSTB...	SE-40050TRN
		LNEU 1240-08-4	4	4	4.4	0.8	●		SE-40055TR
		LNEU 1245-04 1245-08	4	4.5	4.2	0.4 0.8	● ●		SE-40068TR
		LNEU 1250-04 1250-08	4	5	4.2	0.4 0.8	● ●		SE-40080TR
		LNEU 1255-04 1255-08	4	5.5	4.2	0.4 0.8	● ●		SE-40090TR
		LNEU 1260-04	4	6	4.2	0.4	●		SE-40100TR
		 <p>Tough edge</p>		LNEU 1235-03S-4	4	3.5	4.4		0.3
LNEU 1240-03S-4	4			4	4.4	0.3	●	SE-40055TR	
LNEU 1245-04S 1245-08S	4			4.5	4.2	0.4 0.8	● ●	SE-40068TR	
LNEU 1250-04S 1250-08S	4			5	4.2	0.4 0.8	● ●	SE-40080TR	

Please select the applicable clamp screw depending on each insert description.
See page M224 for insert description and applicable clamp screw depending on edge width.

Recommended cutting conditions ➔ M225



Inserts identification system



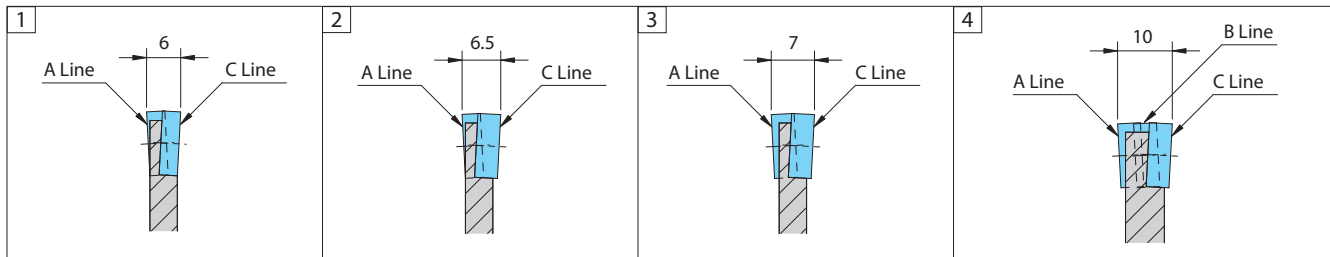
● : Standard item

Combination of applicable inserts

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

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

Slot width (Edge width) adjustment



The slot width (Edge width) of MSTB slot mills is adjustable by a maximum of 1 mm with the combination of inserts.

1. In the case of MSTB○○○AN0607-OT 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 6.5 mm.
3. By replacing A line and C line with LNEU1240 the width (W) is 7 mm.
4. If the slotting width (Edge width) is 10 mm, the B line (Middle edge) is necessary.

* Caution

1. There is no description such as "A line", "B line", and "C line" on the actual slot mill. These are only for explanation of the combination of insert.
2. Use proper clamp screws for applicable inserts on the basis of the above chart.
3. Please do not use any slot mills, that have a difference of width of more than 1 mm.

Bottom cutting shape of MSTB slot mill
Slot bottom shape will be (Fig. 1) convex shape.

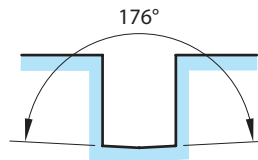
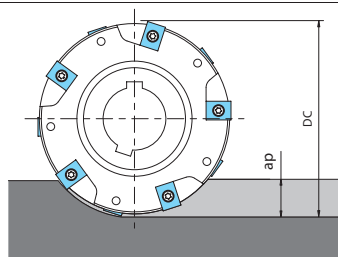


Fig. 1 Convex bottom shape

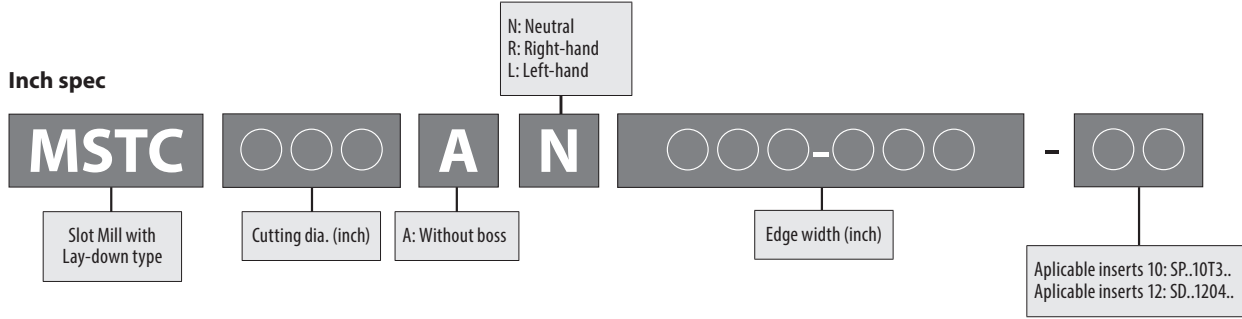
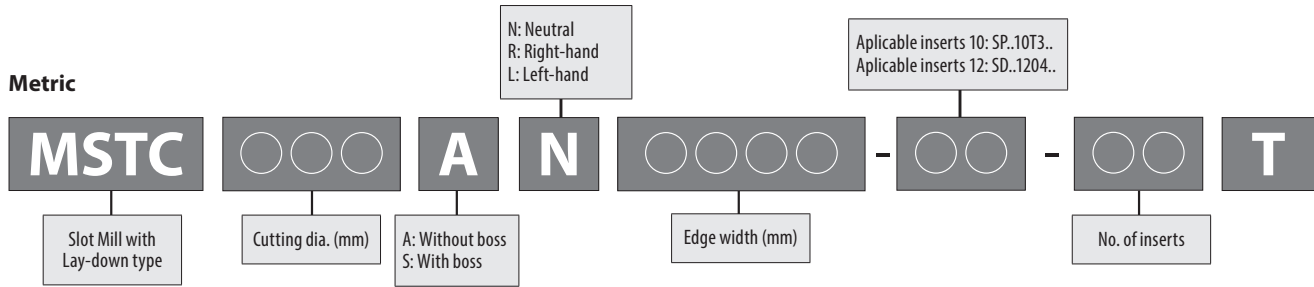
Recommended cutting conditions

Workpiece material		Hardness (HB)	Recommended insert grades (Vc: m/min)		fz (mm/t)		Remarks
			PVD Coated carbide		Insert thickness (mm)		
			PR0725		3.5~4.0	4.5~6.0	
Low carbon steel	SS400 S10C ~ S25C	125	170~210		0.07~0.20	0.10~0.22	Dry
Carbon steel	S30C ~ S58C (Annealed)	190	100~140		0.07~0.20	0.10~0.22	
	S30C ~ S58C (Heat treated)	250	90~120		0.07~0.20	0.10~0.22	
Alloy steel	SCM, SCr (Annealed)	180	90~120		0.07~0.20	0.10~0.22	
	SCM, SCr (Heat treated)	275	80~110		0.05~0.18	0.08~0.20	
High carbon alloy	SKD11, SKD61, etc.	280	70~ 90		0.05~0.18	0.08~0.20	
Stainless steel	Austenitic related SUS304, SUS316, SUH310, etc.	220	110~140		0.05~0.18	0.08~0.20	Coolant
	Martensitic related SUS403, SUS410, SUH430F, etc.	300	100~120		0.05~0.18	0.08~0.20	
Heat-resistant alloys	Ni-base heat-resistant alloys	350	15~ 30		0.05~0.18	0.08~0.20	
Titanium alloys	Ti-6Al-4V, etc.	270	20~50		0.05~0.18	0.08~0.20	
Gray cast iron	FC250 ~ FC350	260	110~130		0.07~0.22	0.10~0.25	Dry
Nodular cast iron	FCD400 ~ FCD500	160	80~100		0.07~0.22	0.10~0.25	
	FCD600 ~ FCD800	250	70~ 90		0.07~0.22	0.10~0.25	

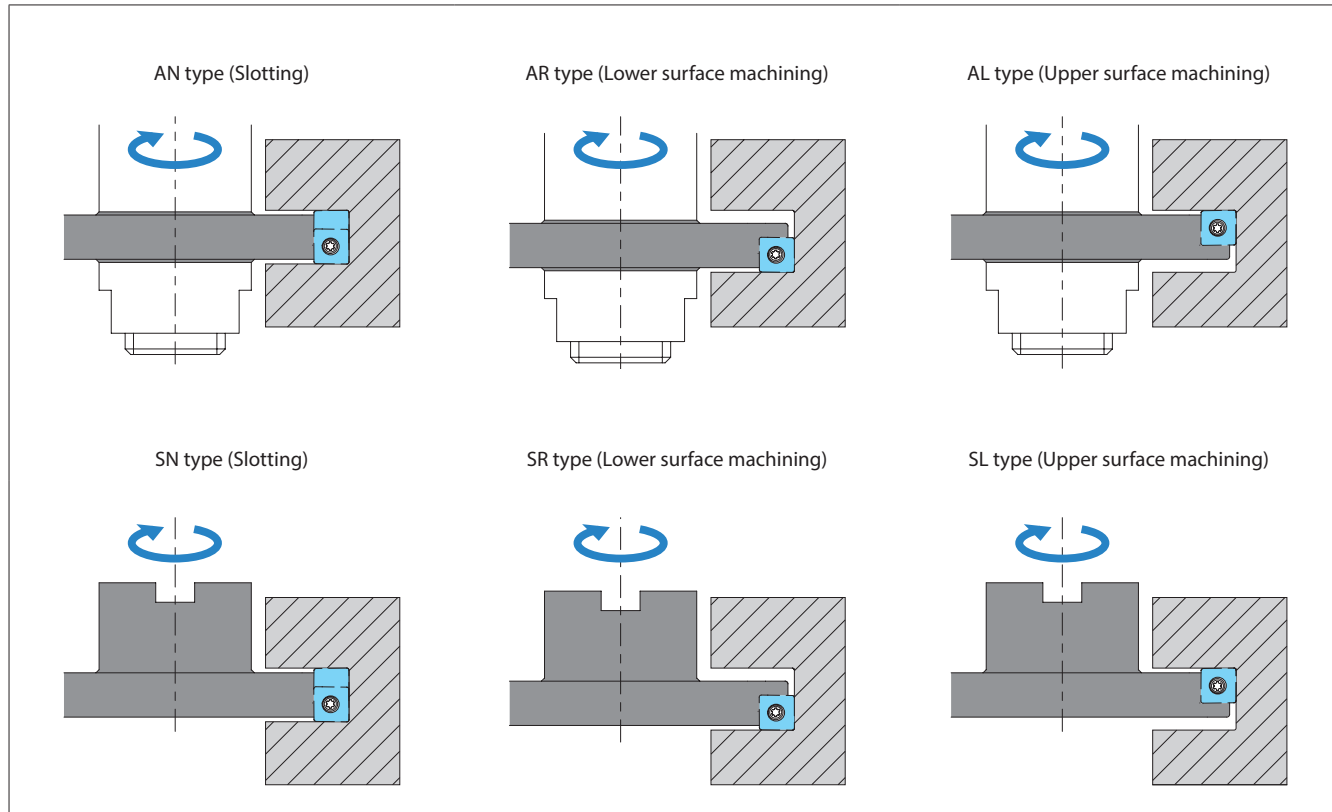
Note: 1. Use down-cut machining.
 2. If a_p is 1/10 or under of cutter dia.(DC), it is possible to increase feed per tooth (fz) by 40%.



Identification system toolholder MSTC



Cutting direction of MSTC slot mill

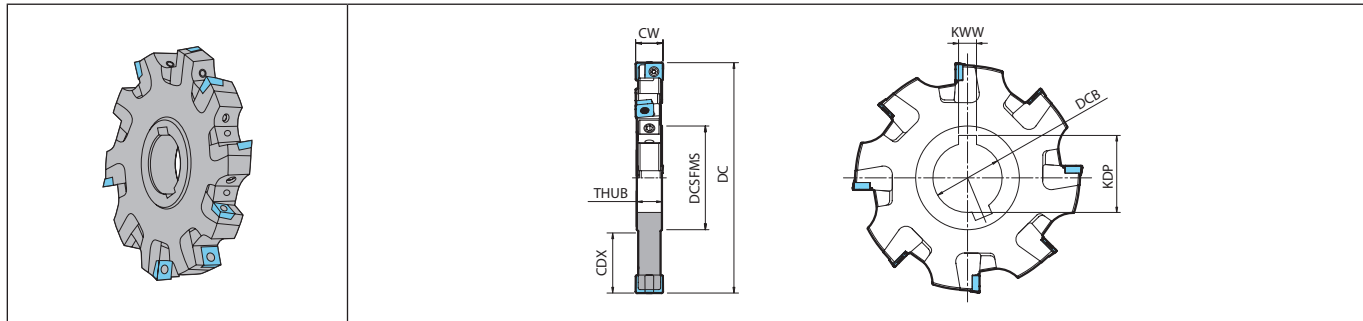


M

Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill**
- Ball-nose Radius
- Others

MSTC (Without Boss)



In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder dimensions (Without Boss, Metric)

Description	Availability	Inserts	Edge line	Dimension (mm)										Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Applicable inserts M236 M237	
				N	DC	DCSFMS	DCB	KDP	KWW	CDX	THUB	CW min.	CW max.					
MSTC 100AN1416-10-3T 125AN1416-10-4T 160AN1416-10-5T	●	6	3	100	46.8	32	34.8	8	25.9							17250	0.5	SPCT10T3... SPET10T3...
	●	8	4	125	54.8	40	43.5	10	34.4	13.9	14	16	No	15450	0.8			
	●	10	5	160	51.9				51.9					No	13650	1.5		
MSTC 125AN1618-10-4T 160AN1618-10-5T	●	8	4	125	54.8	40	43.5	10	34.4	15.9	16	18	No	15450	1	SPCT10T3... SPET10T3...		
	●	10	5	160	51.9				51.9				No	13650	1.8			
MSTC 125AN1820-12-4T 160AN1820-12-5T	●	8	4	125	54.8	40	43.5	10	34	18.2	18	20.6	No	10350	1	SDCT1204... SDET1204...		
	●	10	5	160	51.5				51.5				No	9150	1.8			
MSTC 125AN2123-12-4T 160AN2123-12-5T	●	8	4	125	54.8	40	43.5	10	34	20.8	20.6	23.3	No	10350	1.2	SDCT1204... SDET1204...		
	●	10	5	160	51.5				51.5				No	9150	2.1			

Toolholder dimensions (Without Boss, Inch spec)

Description	Availability	Inserts	Edge line	Dimension (in, (mm))										Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Applicable inserts M236 M237	
				N	DC	DCSFMS	DCB	KDP	KWW	CDX	THUB	CW min.	CW max.					
MSTC 400AN551-630-10 500AN551-630-10 600AN551-630-10	○	6	3	4 (101.6)	1.88 (47.75)	1.25 (31.75)	1.386 (35.2)	0.312 (7.92)	1.03 (26.1)							17100	0.6	SPCT10T3... SPET10T3...
	○	8	4	5 (127)	2.25 (57.15)	1.5 (38.1)	1.665 (42.3)	0.375 (9.52)	1.345 (34.1)	0.545 (13.84)	0.551 (14)	0.63 (16)	No	15300	0.9			
	○	10	5	6 (152.4)	1.845 (46.8)				1.845 (46.8)					No	14000	1.4		
MSTC 500AN630-709-10 600AN630-709-10	○	8	4	5 (127)	2.25 (57.15)	1.5 (38.1)	1.665 (42.3)	0.375 (9.52)	1.345 (34.1)	0.624 (15.85)	0.63 (16)	0.709 (18)	No	15300	1.1	SPCT10T3... SPET10T3...		
	○	10	5	6 (152.4)	1.845 (46.8)				1.845 (46.8)				No	14000	1.6			
MSTC 500AN709-813-12 600AN709-813-12	○	8	4	5 (127)	2.25 (57.15)	1.5 (38.1)	1.665 (42.3)	0.375 (9.52)	1.331 (33.8)	0.716 (18.2)	0.709 (18)	0.813 (20.6)	No	10300	1.1	SDCT1204... SDET1204...		
	○	10	5	6 (152.4)	1.831 (46.5)				1.831 (46.5)				No	9400	1.7			
MSTC 500AN813-917-12 600AN813-917-12	○	8	4	5 (127)	2.25 (57.15)	1.5 (38.1)	1.665 (42.3)	0.375 (9.52)	1.331 (33.8)	0.82 (20.8)	0.813 (20.6)	0.917 (23.2)	No	10300	1.3	SDCT1204... SDET1204...		
	○	10	5	6 (152.4)	1.831 (46.5)				1.831 (46.5)				No	9400	2			

Spare parts M234

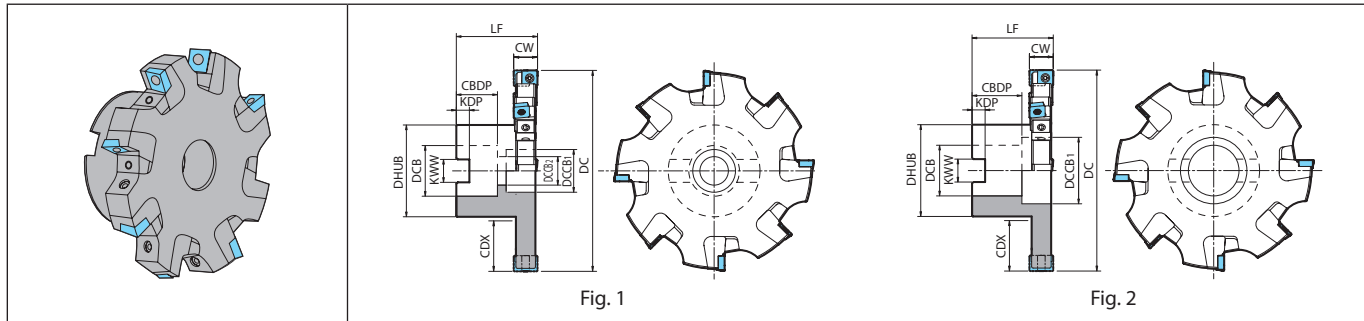
Slot width (Edge width) adjustment M239 - M241

● : Standard item ○ : Check Availability



Milling

MSTC (With Boss)



Toolholder dimensions (With Boss, Metric)

Description	Availability	Inserts	Edge line	Dimension (mm)													Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M236 M237
				N	DC	DCB	DCB ₁	DCB ₂	LF (min.)	CBDP	KDP	KWV	CDX	DHUB	CW min.	CW max.					
MSTC 100SN1416-10-3T 125SN1416-10-4T 160SN1416-10-5T	●	6	3	100	27	20	14		24	7	12.4	24.4	48				No	17250	1	1	SPCT10T3... SPET10T3...
	●	8	4	125	32	27	18	50.8	26	8	14.4	31.9	58	14	16		15450	1.6	1		
	●	10	5	160	40	56	-		30	9	16.4	43.4	70				13650	2	2		
MSTC 125SN1618-10-4T 160SN1618-10-5T	●	8	4	125	32	27	18	50.8	26	8	14.4	31.9	58	16	18	No	15450	1.7	1	SPCT10T3... SPET10T3...	
	●	10	5	160	40	56	-		30	9	16.4	43.4	70				13650	2.3	2		
MSTC 125SN1820-12-4T 160SN1820-12-5T	●	8	4	125	32	27	18	51	26	8	14.4	31.9	58	18	20.6	No	10350	1.6	1	SDCT1204... SDET1204...	
	●	10	5	160	40	56	-		30	9	16.4	43.4	70				9150	2.3	2		
MSTC 125SN2123-12-4T 160SN2123-12-5T	●	8	4	125	32	27	18	51	26	8	14.4	31.9	58	20.6	23.3	No	10350	1.7	1	SDCT1204... SDET1204...	
	●	10	5	160	40	56	-		30	9	16.4	43.4	70				9150	2.6	2		

LF (min.) dimension shows in case of minimum of edge width (CW).



Milling

Spare parts M234

Slot width (Edge width) adjustment M239 - M241

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill**
- Ball-nose Radius
- Others

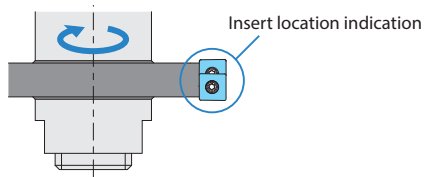
● : Standard item

M228

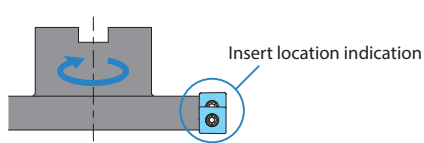
Applicable insert installation method

When installing handed inserts, it is necessary to equip same number of right-hand and left-hand inserts as shown in "No. of edge lines" respectively. Please Install as show in the figure below.

MSTC...AN... (Without boss)



MSTC...SN... (With boss)



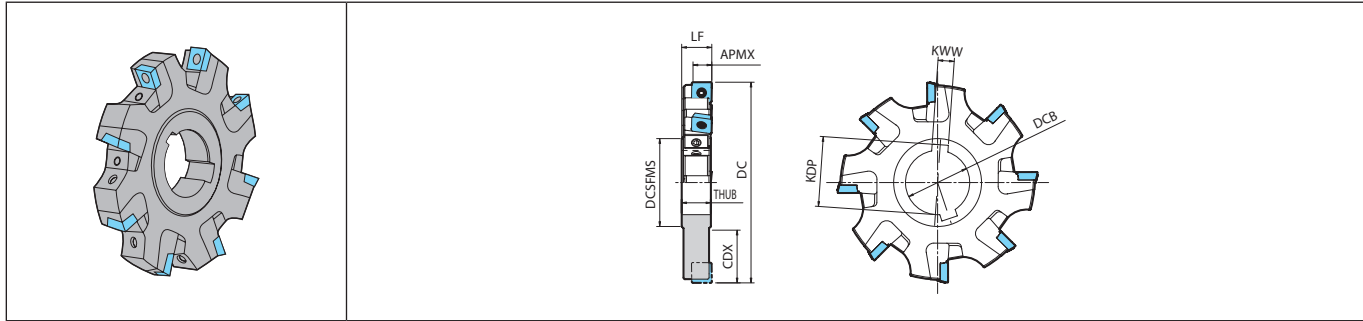
Toolholder description	Insert location indication	Applicable inserts M236, M237	
		Handed	Neutral
MSTC...AN...10.. MSTC...SN...10..		SP..10T3...L...	SP..10T3...N...
		SP..10T3...R...	
MSTC...AN...12.. MSTC...SN...12..		SD..1204...L...	SD..1204...N...
		SD..1204...R...	

Recommended cutting conditions M238



Milling

MSTC (Without Boss, Right-hand)



Right-hand shown | In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder dimensions (Without Boss, Right-hand, Metric)

Description	Availability		Dimension (mm)										Coolant hole Max. revolution (min ⁻¹)	Weight (kg)	Applicable inserts M236 M237	
	R	Inserts	DC	DCSFMS	DCB	LF min.	LF max.	KDP	KWW	APMX	CDX	THUB				
MSTC 100AR1416-10-6T	○	6	100	46.8	32			34.8	8		25.9			17250	0.5	SPCT10T3... SPET10T3...
MSTC 125AR1416-10-8T	○	8	125			13.9	14.9			9.1	34.4	13.9	No	15450	0.8	
MSTC 160AR1416-10-10T	○	10	160	54.8	40			43.5	10		51.9			13650	1.5	
MSTC 125AR1618-10-8T	○	8	125			15.9	16.9	43.5	10	9.1	34.4		No	15450	1	SPCT10T3... SPET10T3...
MSTC 160AR1618-10-10T	○	10	160	54.8	40						51.9	15.9	No	13650	1.8	
MSTC 125AR1820-12-8T	○	8	125			18.1	19.4	43.5	10	11.7	34		No	10350	1	SDCT1204... SDET1204...
MSTC 160AR1820-12-10T	○	10	160	54.8	40						51.5	18.2	No	9150	1.8	
MSTC 125AR2123-12-8T	○	8	125			20.7	22	43.5	10	11.7	34		No	10350	1.2	SDCT1204... SDET1204...
MSTC 160AR2123-12-10T	○	10	160	54.8	40						51.5	20.8	No	9150	2.1	

M

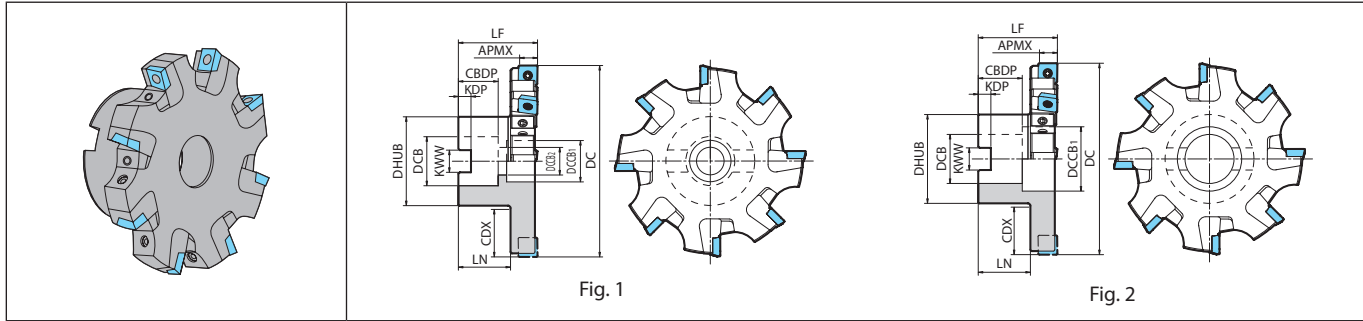
Toolholder dimensions (Without Boss, Right-hand, Inch spec)

Description	Availability		Dimension (in , mm)										Coolant hole Max. revolution (min ⁻¹)	Weight (kg)	Applicable inserts M236 M237		
	R	Inserts	DC	DCSFMS	DCB	LF min.	LF max.	KDP	KWW	APMX	CDX	THUB					
MSTC 400AR551-630-10	○	6	4 (101.6)	1.88 (47.75)	1.25 (31.75)			1.386 (35.2)	0.312 (7.92)		1.03 (26.1)			No	17100	0.6	SPCT10T3... SPET10T3...
MSTC 500AR551-630-10	○	8	5 (127)			0.548 (13.9)	0.588 (14.9)			0.359 (9.1)	1.345 (34.1)	0.545 (13.84)			15300	0.9	
MSTC 600AR551-630-10	○	10	6 (152.4)	2.25 (57.15)	1.5 (38.1)			1.665 (42.3)	0.375 (9.52)		1.845 (46.8)				14000	1.4	
MSTC 500AR630-709-10	○	8	5 (127)	2.25 (57.15)	1.5 (38.1)	0.627 (15.9)	0.667 (16.9)	1.665 (42.3)	0.375 (9.52)	0.359 (9.1)	1.345 (34.1)	0.624 (15.85)	No	15300	1.1	SPCT10T3... SPET10T3...	
MSTC 600AR630-709-10	○	10	6 (152.4)								1.845 (46.8)			14000	1.6		
MSTC 500AR709-813-12	○	8	5 (127)	2.25 (57.15)	1.5 (38.1)	0.712 (18.1)	0.764 (19.4)	1.665 (42.3)	0.375 (9.52)	0.461 (11.7)	1.331 (33.8)	0.716 (18.2)	No	10300	1.1	SDCT1204... SDET1204...	
MSTC 600AR709-813-12	○	10	6 (152.4)								1.831 (46.5)			9400	1.7		
MSTC 500AR813-917-12	○	8	5 (127)	2.25 (57.15)	1.5 (38.1)	0.816 (20.7)	0.868 (22)	1.665 (42.3)	0.375 (9.52)	0.461 (11.7)	1.331 (33.8)	0.82 (20.8)	No	10300	1.3	SDCT1204... SDET1204...	
MSTC 600AR813-917-12	○	10	6 (152.4)								1.831 (46.5)			9400	2		

○ : Check Availability

M230

MSTC (With Boss, Right-hand)



Right-hand shown

Toolholder dimensions (With Boss, Right-hand, Metric)

Description	Availability	Inserts	Dimension (mm)														Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M236 M237	
			DC	DCB	DCB ₁	DCB ₂	LF min.	LF max.	LN	CBDDP	KDP	KWW	APMX	CDX	DHUB							
MSTC 100SR1416-10-6T	<input type="radio"/>	6	100	27	20	14						24	7	12.4		24.4	48		17250	1	1	SPCT10T3... SPET10T3...
MSTC 125SR1416-10-8T	<input type="radio"/>	8	125	32	27	18	50.8	51.8	37.7			26	8	14.4	9.1	31.9	58	No	15450	1.6	1	
MSTC 160SR1416-10-10T	<input type="radio"/>	10	160	40	56	-						30	9	16.4		43.4	70		13650	2	2	
MSTC 125SR1618-10-8T	<input type="radio"/>	8	125	32	27	18						26	8	14.4	9.1	31.9	58	No	15450	1.7	1	SPCT10T3... SPET10T3...
MSTC 160SR1618-10-10T	<input type="radio"/>	10	160	40	56	-	50.8	51.8	35.7			30	9	16.4		43.4	70		13650	2.3	2	
MSTC 125SR1820-12-8T	<input type="radio"/>	8	125	32	27	18						26	8	14.4		31.9	58	No	10350	1.6	1	SDCT1204... SDET1204...
MSTC 160SR1820-12-10T	<input type="radio"/>	10	160	40	56	-	51	52.3	34			30	9	16.4	11.7	43.4	70		9150	2.3	2	
MSTC 125SR2123-12-8T	<input type="radio"/>	8	125	32	27	18						26	8	14.4		31.9	58	No	10350	1.7	1	SDCT1204... SDET1204...
MSTC 160SR2123-12-10T	<input type="radio"/>	10	160	40	56	-	51	52.3	31.4			30	9	16.4	11.7	43.4	70		9150	2.6	2	

Applicable inserts

Toolholder description	Applicable inserts M236, M237	
	Handed	Neutral
MSTC...AR...10... MSTC...SR...10...	SP..10T3...R...	SP..10T3...N...
MSTC...AR...12... MSTC...SR...12...	SD..1204...R...	SD..1204...N...

Recommended cutting conditions M238

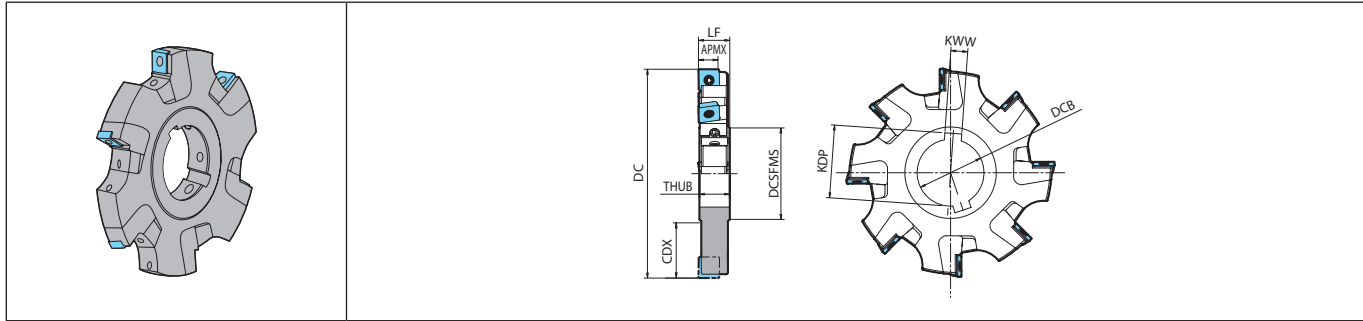
Spare parts M235

Slot width (Edge width) adjustment M239 - M241

○ : Check Availability



MSTC (Without Boss, Left-hand)



Left-hand shown | In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder dimensions (Without Boss, Left-hand, Metric)

Description	Availability	Inserts	Dimension (mm)										Coolant hole Max. revolution (min ⁻¹)	Weight (kg)	Applicable inserts M236 M237	
			L	DC	DCSFMS	DCB	LF min.	LF max.	KDP	KWW	APMX	CDX				THUB
MSTC 100AL1416-10-6T	○	6	100	46.8	32			34.8	8		25.9		17250	0.5	SPCT10T3... SPET10T3...	
MSTC 125AL1416-10-8T	○	8	125			13.9	14.9			9.1	34.4	13.9	No	15450		0.8
MSTC 160AL1416-10-10T	○	10	160	54.8	40			43.5	10		51.9			13650		1.5
MSTC 125AL1618-10-8T	○	8	125			15.9	16.9	43.5	10	9.1	34.4		No	15450	1	SPCT10T3... SPET10T3...
MSTC 160AL1618-10-10T	○	10	160	54.8	40						51.9	15.9	No	13650	1.8	
MSTC 125AL1820-12-8T	○	8	125			18.1	19.4	43.5	10	11.7	34		No	10350	1	SDCT1204... SDET1204...
MSTC 160AL1820-12-10T	○	10	160	54.8	40						51.5	18.2	No	9150	1.8	
MSTC 125AL2123-12-8T	○	8	125			20.7	22	43.5	10	11.7	34		No	10350	1.2	SDCT1204... SDET1204...
MSTC 160AL2123-12-10T	○	10	160	54.8	40						51.5	20.8	No	9150	2.1	

Toolholder dimensions (Without Boss, Left-hand, Inch spec)

Description	Availability	Inserts	Dimension (in , mm)										Coolant hole Max. revolution (min ⁻¹)	Weight (kg)	Applicable inserts M236 M237			
			L	DC	DCSFMS	DCB	LF min.	LF max.	KDP	KWW	APMX	CDX				THUB		
MSTC 400AL551-630-10	○	6	4 (101.6)	1.88 (47.75)	1.25 (31.75)					1.386 (35.2)	0.312 (7.92)		1.03 (26.1)		17100	0.6	SPCT10T3... SPET10T3...	
MSTC 500AL551-630-10	○	8	5 (127)			0.548 (13.9)	0.588 (14.9)					0.359 (9.1)	1.345 (34.1)	0.545 (13.84)	No	15300		0.9
MSTC 600AL551-630-10	○	10	6 (152.4)	2.25 (57.15)	1.5 (38.1)					1.665 (42.3)	0.375 (9.52)		1.845 (46.8)		14000	1.4		
MSTC 500AL630-709-10	○	8	5 (127)	2.25 (57.15)	1.5 (38.1)	0.627 (15.9)	0.667 (16.9)	1.665 (42.3)	0.375 (9.52)	0.359 (9.1)		1.345 (34.1)		0.624 (15.85)	No	15300	1.1	SPCT10T3... SPET10T3...
MSTC 600AL630-709-10	○	10	6 (152.4)									1.845 (46.8)			14000	1.6		
MSTC 500AL709-813-12	○	8	5 (127)	2.25 (57.15)	1.5 (38.1)	0.712 (18.1)	0.764 (19.4)	1.665 (42.3)	0.375 (9.52)	0.461 (11.7)		1.331 (33.8)		0.716 (18.2)	No	10300	1.1	SDCT1204... SDET1204...
MSTC 600AL709-813-12	○	10	6 (152.4)									1.831 (46.5)			9400	1.7		
MSTC 500AL813-917-12	○	8	5 (127)	2.25 (57.15)	1.5 (38.1)	0.816 (20.7)	0.868 (22)	1.665 (42.3)	0.375 (9.52)	0.461 (11.7)		1.331 (33.8)		0.820 (20.8)	No	10300	1.3	SDCT1204... SDET1204...
MSTC 600AL813-917-12	○	10	6 (152.4)									1.831 (46.5)			9400	2		

○ : Check Availability

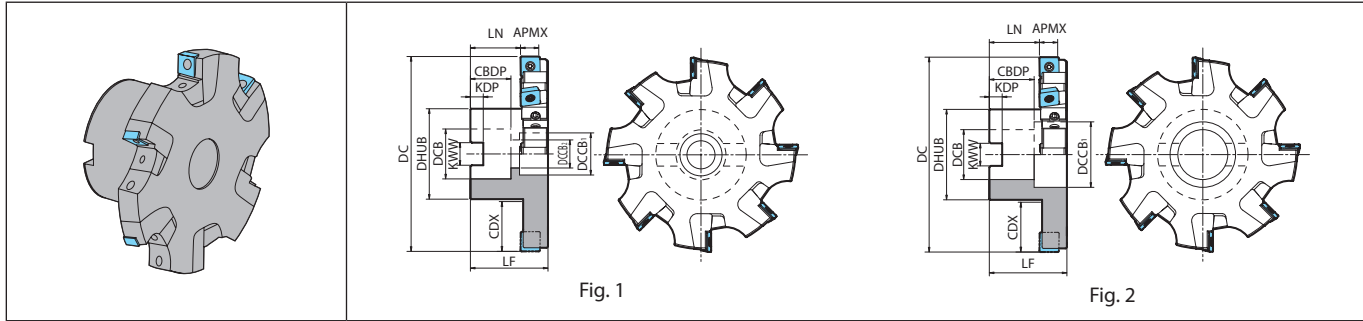
M232

M

Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

MSTC (With Boss, Left-hand)



Left-hand shown

Toolholder dimensions (With Boss, Left-hand, Metric)

Description	Availability	Inserts	Dimension (mm)													Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M236 M237
			L	DC	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX	CDX	DHUB	LN min.					
MSTC 100SL1416-10-6T	○	6	100	27	20	14		24	7	12.4	24.4	48					17250	1	1	SPCT10T3... SPET10T3...
MSTC 125SL1416-10-8T	○	8	125	32	27	18	50	26	8	14.4	9.1	31.9	58	35.8	36.8	No	15450	1.6	1	
MSTC 160SL1416-10-10T	○	10	160	40	56	-		30	9	16.4		43.4	70				13650	2	2	
MSTC 125SL1618-10-8T	○	8	125	32	27	18	50	26	8	14.4	9.1	31.9	58	33.8	34.8	No	15450	1.7	1	SPCT10T3... SPET10T3...
MSTC 160SL1618-10-10T	○	10	160	40	56	-		30	9	16.4		43.4	70				13650	2.3	2	
MSTC 125SL1820-12-8T	○	8	125	32	27	18	50	26	8	14.4	11.7	31.9	58	31.7	33	No	10350	1.6	1	SDCT1204... SDET1204...
MSTC 160SL1820-12-10T	○	10	160	40	56	-		30	9	16.4		43.4	70				9150	2.3	2	
MSTC 125SL2123-12-8T	○	8	125	32	27	18	50	26	8	14.4	11.7	31.9	58	29.1	30.4	No	10350	1.7	1	SDCT1204... SDET1204...
MSTC 160SL2123-12-10T	○	10	160	40	56	-		30	9	16.4		43.4	70				9150	2.6	2	

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

Applicable inserts

Toolholder description	Applicable inserts M236, M237	
	Handed	Neutral
MSTC...AL...10.. MSTC...SL...10..	SP..10T3...L...	SP..10T3...N...
MSTC...AL...12.. MSTC...SL...12..	SD..1204...L...	SD..1204...N...

Recommended cutting conditions M238

Spare parts M235

Slot width (Edge width) adjustment M239 - M241

○ : Check Availability





Spare parts (MSTC) (common to Metric / Inch spec)

Description		Spare parts																	
		Cartridge		Wedge	Wedge screw	Cam pin	Clamp screw	Wrench			Anti-seize compound	Mounting bolt							
		Right-hand	Left-hand					for wedge screw	for cam pin	for clamp screw									
Without boss	Metric	MSTC 100AN1416-10-3T	C90SP1416-10R	C90SP1416-10L	WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	P-37	-						
		MSTC 125AN1416-10-4T				W6X20													
		MSTC 160AN1416-10-5T			W6X20														
		MSTC 125AN1618-10-4T	C90SP1618-10R	C90SP1618-10L	WC-16	W6X20				AP-1820	SB-3590TRP			TH-3L	LW-3	DTP-15			
		MSTC 160AN1618-10-5T				W6X20													
		MSTC 125AN1820-12-4T			C90SD1820-12R	C90SD1820-12L											WC-18	W6X20	
	MSTC 160AN1820-12-5T	W6X20																	
	MSTC 125AN2123-12-4T	C90SD2023-12R	C90SD2023-12L	WC-20			W6X20												
	MSTC 160AN2123-12-5T				W6X20														
	Inch spec			MSTC 400AN551-630-10	C90SP1416-10R	C90SP1416-10L	WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L			LW-2.5	DTP-9				
		MSTC 500AN551-630-10	W6X20																
		MSTC 600AN551-630-10	W6X20																
MSTC 500AN630-709-10		C90SP1618-10R	C90SP1618-10L	WC-16	W6X20	AP-1820	SB-3590TRP	TH-3L				LW-3	DTP-15						
MSTC 600AN630-709-10					W6X20														
MSTC 500AN709-813-12				C90SD1820-12R	C90SD1820-12L									WC-18	W6X20				
MSTC 600AN709-813-12	W6X20																		
MSTC 500AN813-917-12	C90SD2023-12R	C90SD2023-12L	WC-20						W6X20										
MSTC 600AN813-917-12				W6X20															
With boss	Metric	MSTC 100SN1416-10-3T	C90SP1416-10R	C90SP1416-10L	WC-14	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	P-37	HH12X35							
		MSTC 125SN1416-10-4T										W6X20	HH16X35						
		MSTC 160SN1416-10-5T			W6X20								-						
		MSTC 125SN1618-10-4T	C90SP1618-10R	C90SP1618-10L	WC-16				AP-1820	SB-3590TRP		TH-3L	LW-3	DTP-15	HH16X35				
		MSTC 160SN1618-10-5T													W6X20	-			
		MSTC 125SN1820-12-4T			C90SD1820-12R											C90SD1820-12L	WC-18	AP-1820	SB-3590TRP
	MSTC 160SN1820-12-5T	W6X20	-																
	MSTC 125SN2123-12-4T		C90SD2023-12R	C90SD2023-12L		WC-20	AP-1820	SB-3590TRP					TH-3L	LW-3	DTP-15		HH16X35		
	MSTC 160SN2123-12-5T	W6X20			-														

 Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.


Tightening torque

Wrench	TH-3L	DTP-9	DTP-15
			
Tightening torque (N·m)	5~6	1.5	4



- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill**
- Ball-nose Radius
- Others

Spare parts (MSTC) (common to Metric / Inch spec)

Description		Spare Parts																			
		Cartridge		Wedge	Wedge Screw	Cam Pin	Clamp Screw	Wrench			Anti-seize Compound	Mounting bolt									
		Right-hand	Left-hand					for Wedge Screw	for Cam Pin	for Clamp Screw											
Without Boss	Metric	MSTC 100AR1416-10-6T 125AR1416-10-8T 160AR1416-10-10T	C90SP1416-10R	-	WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	P-37	-								
		W6X20																			
		MSTC 125AR1618-10-8T 160AR1618-10-10T			C90SP1618-10R	-	WC-16	W6X20		AP-1820	SB-3590TRP			LW-3	DTP-15						
		MSTC 125AR1820-12-8T 160AR1820-12-10T						C90SD1820-12R								-	WC-18	W6X20	AP-1820	SB-3590TRP	LW-3
		MSTC 125AR2123-12-8T 160AR2123-12-10T			C90SD2023-12R	-	WC-20			W6X20	AP-1416			SE-3070TRP	LW-2.5			DTP-9			
		MSTC 100AL1416-10-6T 125AL1416-10-8T 160AL1416-10-10T						C90SP1416-10L		-						WC-14	W6X18		AP-1416	SE-3070TRP	LW-2.5
		MSTC 125AL1618-10-8T 160AL1618-10-10T			C90SP1618-10L	-	WC-16				W6X20			AP-1820	SB-3590TRP		LW-3	DTP-15			
		MSTC 125AL1820-12-8T 160AL1820-12-10T						C90SD1820-12L		-	WC-18					W6X20			AP-1820	SB-3590TRP	LW-3
		MSTC 125AL2123-12-8T 160AL2123-12-10T			C90SD2023-12L	-	WC-20							W6X20	AP-1416	SE-3070TRP	LW-2.5	DTP-9			
		Inch spec						MSTC 400AR551-630-10 500AR551-630-10 600AR551-630-10		C90SP1416-10R	-			WC-14					W6X18	AP-1416	SE-3070TRP
					MSTC 500AR630-709-10 600AR630-709-10	C90SP1618-10R	-	WC-16							W6X20	AP-1820	SB-3590TRP	LW-3	DTP-15		
					MSTC 500AR709-813-12 600AR709-813-12									C90SD1820-12R	-					WC-18	W6X20
	MSTC 500AR813-917-12 600AR813-917-12		C90SD2023-12R	-	WC-20	W6X20	AP-1416	SE-3070TRP	LW-2.5							DTP-9					
	MSTC 400AL551-630-10 500AL551-630-10 600AL551-630-10					C90SP1416-10L								-	WC-14		W6X18	AP-1416	SE-3070TRP	LW-2.5	DTP-9
	MSTC 500AL630-709-10 600AL630-709-10		C90SP1618-10L	-	WC-16		W6X20	AP-1820	SB-3590TRP							LW-3	DTP-15				
	MSTC 500AL709-813-12 600AL709-813-12					C90SD1820-12L	-							WC-18	W6X20			AP-1820	SB-3590TRP	LW-3	DTP-15
	MSTC 500AL813-917-12 600AL813-917-12		C90SD2023-12L	-	WC-20			W6X20	AP-1416						SE-3070TRP	LW-2.5	DTP-9				
	Metric					MSTC 100SR1416-10-6T 125SR1416-10-8T 160SR1416-10-10T	C90SP1416-10R	-						WC-14				W6X20	AP-1416	SE-3070TRP	TH-3L
			MSTC 125SR1618-10-8T 160SR1618-10-10T	C90SP1618-10R	-	WC-16			W6X20						AP-1820	SB-3590TRP	LW-3	DTP-15			
			MSTC 125SR1820-12-8T 160SR1820-12-10T						C90SD1820-12R					-					WC-18	W6X20	
			MSTC 125SR2123-12-8T 160SR2123-12-10T	C90SD2023-12R	-	WC-20									W6X20	AP-1416	SE-3070TRP	LW-2.5		DTP-9	
		MSTC 100SL1416-10-6T 125SL1416-10-8T 160SL1416-10-10T	C90SP1416-10L						-	WC-14	W6X20			AP-1416	SE-3070TRP				LW-2.5		
		MSTC 125SL1618-10-8T 160SL1618-10-10T		C90SP1618-10L	-	WC-16					W6X20					AP-1820	SB-3590TRP	LW-3		DTP-15	
		MSTC 125SL1820-12-8T 160SL1820-12-10T	C90SD1820-12L						-	WC-18	W6X20			AP-1820	SB-3590TRP				LW-3		
MSTC 125SL2123-12-8T 160SL2123-12-10T		C90SD2023-12L		-	WC-20	W6X20					AP-1416	SE-3070TRP	LW-2.5			DTP-9	HH16X35				

 Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

Tightening Torque

Wrench	TH-3L	DTP-9	DTP-15
			
Tightening Torque (N m)	5~6	1.5	4



SPCT/SPET

Insert		Description	No. of edges	Dimension (mm)					Carbide			Applicable toolholder M227~M235
				IC	S	D1	RE	BS	CVD	PVD		
		Classification of usage										
		● : 1st Choice ○ : 2nd Choice										
		Carbon steel / Alloy steel		● P								
		Mold and die steel		● M								
		Stainless steel		○ M								
		Gray cast iron		○ K								
		Nodular cast iron		○ K								
		Non-ferrous metals		● N								
		Heat-resistant alloy		● S								
		Titanium alloy		○ S								
		Hard materials		● H								
		SPCT 10T316EN-SD	4	10	3.97	3.4	1.6	-	-	●	MSTC...-10..	
		SPCT 10T308ER-SD	4	10	3.97	3.4	0.8	2.5	-	●	MSTC...-10..	
		SPCT 10T308EL-SD					0.8	2.5				
		SPCT 10T312ER-SD					1.2	1.8				
		SPCT 10T312EL-SD					1.2	1.8				
		SPCT 10T316FN-SE	4	10	3.97	3.4	1.6	-	-	●	MSTC...-10..	
		SPCT 10T308FR-SE 10T308FL-SE 10T312FR-SE 10T312FL-SE	4	10	3.97	3.4	0.8	2.7	-	●	MSTC...-10..	
							0.8	2.7				
							1.2	2.2				
							1.2	2.2				
		SPET 10T308ER-SB	4	10	3.97	3.4	0.8	2.7	-	●	MSTC...-10..	
		SPET 10T308EL-SB	4	10	3.97	3.4	0.8	2.7	-	●	MSTC...-10..	
		SPET 10T308SR-SB										
		SPET 10T308SL-SB	4	10	3.97	3.4	0.8	2.7	-	●	MSTC...-10..	
		SPET 10T308SL-SB										

Handed insert shows Right-hand

Recommended cutting conditions M238

Inserts identification system

Shape		Tolerance			Edge length	Corner-R (RE)		Hand of tool	
Symbol	Shape	Symbol	Corner height	Thickness	I.C Size	Symbol	Corner-R (RE)	Symbol	Hand of tool
S	Square	C	±0.013mm	±0.025mm	±0.025mm	S	16 1.6mm 12 1.2mm 08 0.8mm	N	Neutral
E		E	±0.025mm			L		L	Left-hand
						R		R	Right-hand

S P C T 10 T3 08 E R - SD

Relief angle		Hole/Chipbreaker		Thickness		Edge Preparation		Chipbreaker symbol	
Symbol	Relief angle	Symbol	Shape	Symbol	Thickness	Symbol	Cutting edge spec.	Symbol	Rake angle
D	15°	T	Single-sided chipbreaker, with hole	T3	3.97mm	E	Honed	SB	5°
P	11°			04	4.76mm	F	Sharp edge	SD	15°
						S	Chamfered + R-honed	SE	20°

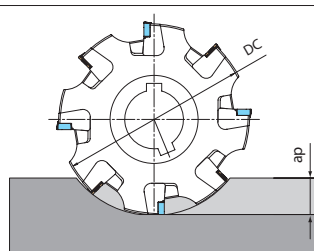
● : Standard item

M236

Recommended cutting conditions

Workpiece material		Hardness (HB)	Recommended insert grades (Vc: m/min)			fz (mm/t)				Remarks
			CVD Coated carbide	PVD Coated carbide		Chipbreaker				
			CA0835	PR0725	PR0110	EN-SD ER-SD EL-SD	ER-SB EL-SB	SN-SB SR-SB SL-SB	FN-SE FR-SE FL-SE	
Low carbon steel	SS400 S10C ~ S25C	125	250~310	170~210	-	0.07~0.20	0.10~0.22	0.15~0.3	-	Dry
Carbon steel	S30C ~ S58C (Annealed)	190	160~190	100~140	-	0.07~0.20	0.10~0.22	0.15~0.3	-	
	S30C ~ S58C (Heat treated)	250	140~180	90~120	-	0.07~0.20	0.10~0.22	0.15~0.3	-	
Alloy steel	SCM, SCr (Annealed)	180	140~180	90~120	-	0.07~0.20	0.10~0.22	0.15~0.3	-	
	SCM, SCr (Heat treated)	275	120~160	80~110	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
High carbon alloy	SKD11, SKD61, etc.	280	110~130	70~90	-	0.05~0.18	0.08~0.20	0.12~0.25	-	Coolant
Stainless steel	Austenitic related SUS304, SUS316, SUH310, etc.	220	160~200	110~140	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
	Martensitic related SUS403, SUS410, SUH430F, etc.	300	150~180	100~120	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
Heat-resistant alloys	Ni-base heat-resistant alloys	350	-	15~30	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
Titanium alloys	Ti-6Al-4V, etc.	270	-	20~50	-	0.05~0.18	0.08~0.20	0.12~0.25	-	Dry
Gray cast iron	FC250 ~ FC350	260	160~200	110~130	-	0.07~0.22	0.10~0.25	0.15~0.35	-	
Nodular cast iron	FCD400 ~ FCD500	160	130~160	80~100	-	0.07~0.22	0.10~0.25	0.15~0.35	-	
	FCD600 ~ FCD800	250	110~140	70~90	-	0.07~0.22	0.10~0.25	0.15~0.35	-	
Non-ferrous metals	AC4A, A7050, etc.	-	-	-	750~950	-	-	-	0.07~0.20	Coolant

Note: 1. Use down-cut machining.
2. If ap is 1/10 or under of cutter dia.(DC), it is possible to increase feed per tooth (fz) by 40%.

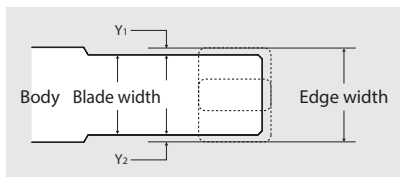
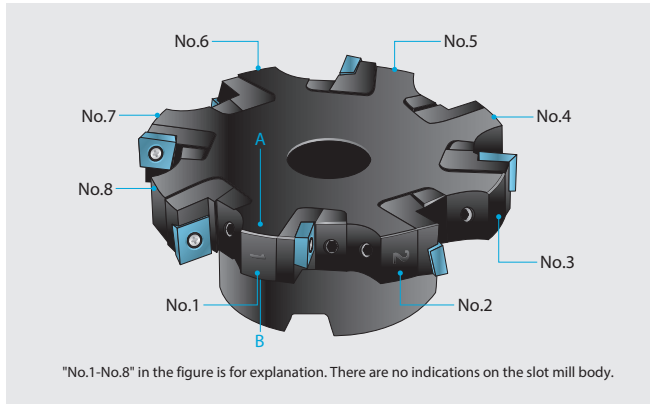


Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill**
- Ball-nose Radius
- Others

Slot width (Edge width) adjustment of MSTC slot mill

Slot width (Edge width) measurement and adjustment



1. Set up the slot mill on length measuring equipment such as tool presetters.
2. Choose any one of the edges as a reference position. (No.1)
3. Measure the blade width of the slot mill body at position No.1. (between point A and B in the figure)
4. Move the length measuring equipment to the insert corner part and measure the step (Y_1) between the point A and the insert No.1.
5. Using the same procedure, measure (Y_2) dimension based on point B.

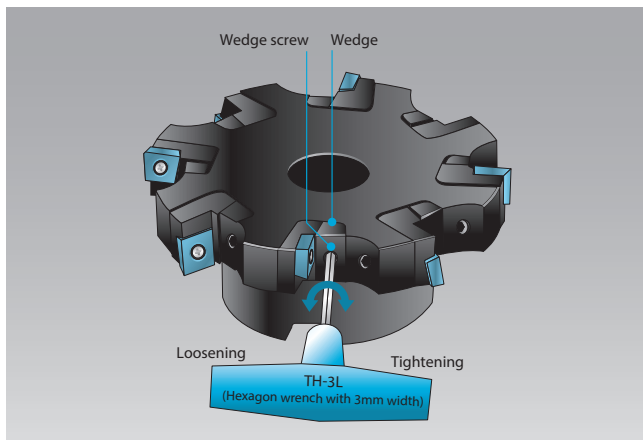
$$\text{Edge width} = \text{Blade width} + Y_1 + Y_2$$

6. Place the point A of the slot mill body near the position No.1 to "0 (zero)" of the length measuring equipment.
7. Adjust the edge position of the inserts in odd numbered positions (No. 3, 5, 7) to "0 (zero)" with the length measuring equipment.
8. Adjust the edge position of the inserts in even numbered positions (No. 2, 4, 6, 8) to the required edge width.

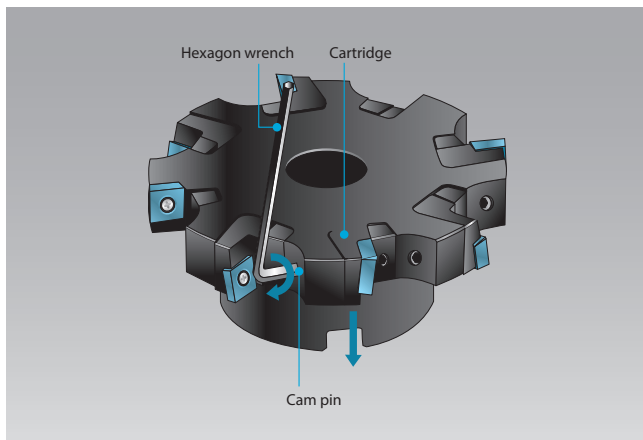
For steps 7. and 8., see "In the case of changing the slot width (Edge width)" on next page.



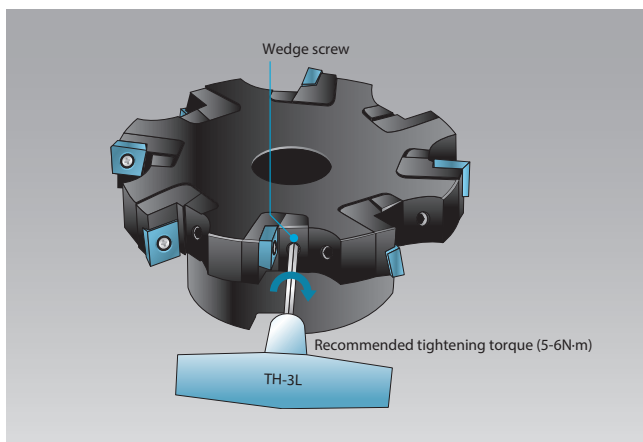
In the case of changing the slot width (Edge width)



1. Set up the slot mill on length measuring equipment such as tool presettlers.
2. Insert a hexagon wrench with 3mm width (TH-3L) into the wedge screw.
3. Turn TH-3L counterclockwise to loosen the wedge.
4. Turn TH-3L clockwise by the torque of 1 N·m to tighten the wedge lightly and make the wedge contact the cartridge and the slot mill body. In doing so, some resistance occurs against the cartridge.

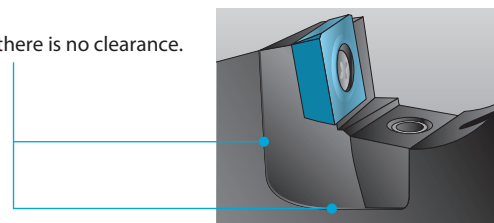


5. Insert a hexagon wrench (LW-2.5 OR LW-3) into the cam pin on the back of the cartridge.
6. Turn the wrench and adjust the position of the cartridge.
7. To secure the adjustment, back-turn the cam pin and make sure that it does not touch the groove surface of the back of the cartridge.
8. Remove the hexagon wrench from the cam pin.



9. Insert TH-3L into the wedge screw.
10. Tighten the wedge screw by the torque of 5-6N·m. (Use a torque wrench to get the correct torque.)
11. Make sure there is no clearance between the cartridge and the slot mill body.

Make sure there is no clearance.



M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

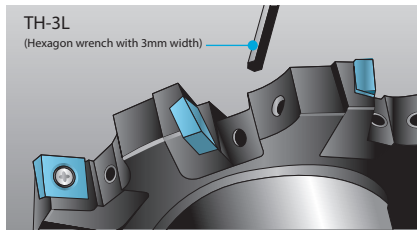
Ball-nose
Radius

Others

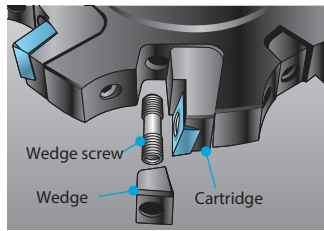
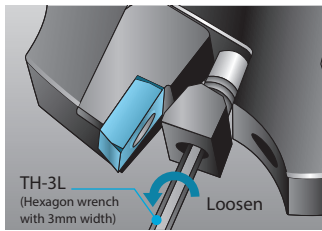
M240

Replacement of the cartridge

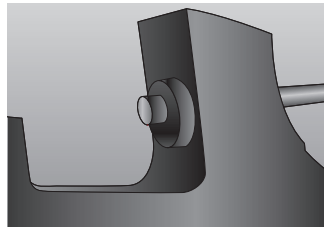
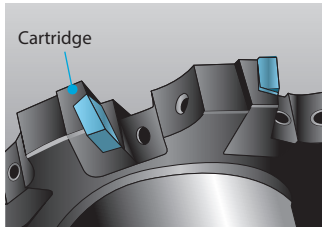
Follow the instruction below to replace the cartridge.



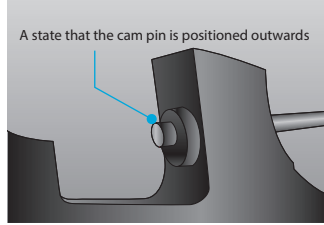
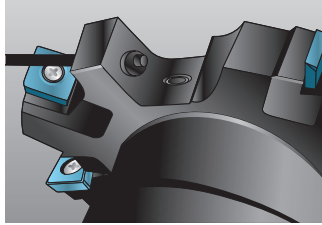
1. Insert hexagon wrench with 3mm width (TH-3L) into the wedge screw.



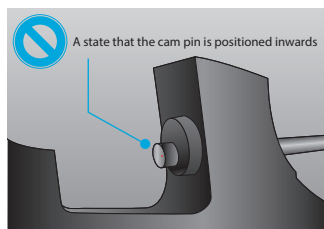
2. Loosen the wedge screw.
3. Remove the wedge screw and wedge.



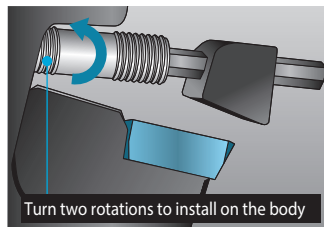
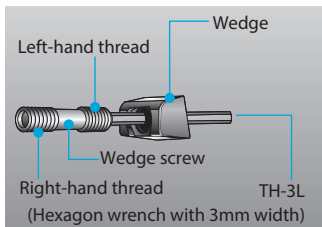
4. Remove the cartridge.



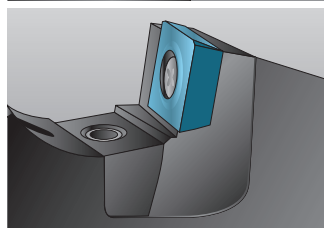
5. Before replacing the cartridge, make sure that the cam pin is positioned radially-outwards.



6. If the cam pin is in the position shown in the left diagram, assembling the cartridge is not possible.

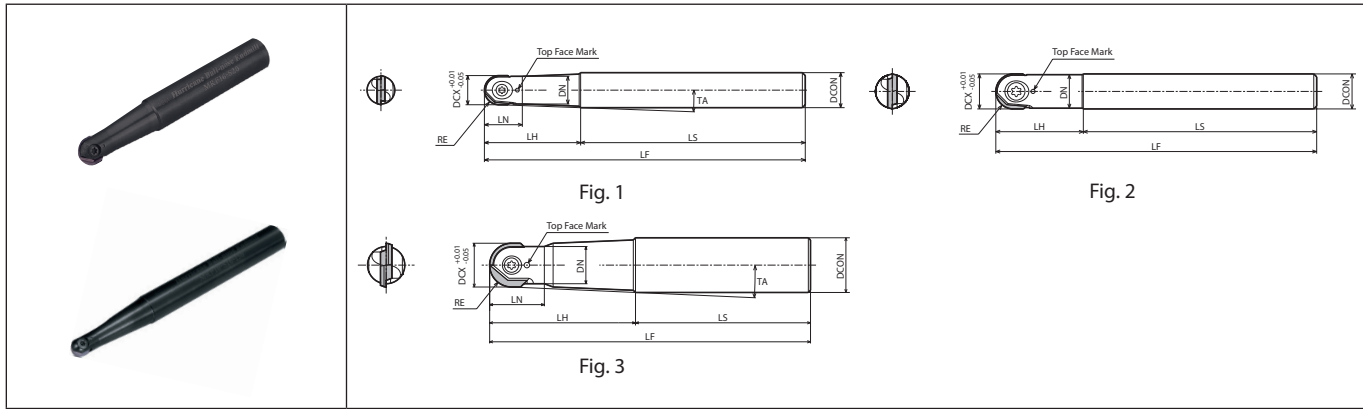


7. Place the wedge so that its larger slant surface faces toward the cartridge.
8. Turn the wedge screw two rotations to install the wedge to the body.
9. When installing the wedge screw to the body, keep the wedge from rotating and screw it in.
10. Tighten the wedge screw by the torque of 5-6N·m. Keep the screw head and the wedge even (Prevent either of those from sticking out).



Milling

MRF



Top Face Shown

Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)									TA	Coolant hole Fig.	Spare parts				Applicable inserts ➔ M244	
			RE	DCX	DCON	LF	LH	DN	LN	LS	Anti-seize compound			Screw	Wrench	Wrench			
Standard Neck MRF 08-S12 10-S12 12-S12 16-S20 20-S25 25-S32	●	1	4	8	12	100	22	7.5	10	78	6°20'	No	1	P-37	SC-30067	DT-8		RDFG08FR	
	●		5	10			25	9.5	13	75	3°00'				SC-35085	DT-10		RDFG10FR	
	●		6	12	110	30	11.5	-	-	SC-40100	DT-15				RDFG12FR				
	●		8	16	20	130	50	14	20	2°50'	SC-50130				DT-20	RDFG16FR			
	●		10	20	25	140	60	17	25	3°00'	SC-60160				-	TT-25		RDFG20FR	
	●		12.5	25	32	150	70	22	31	3°30'	SC-60210				-	TT-30		RDFG25FR	
Long Neck MRF 08-S12-130 10-S16-150 12-S16-160 16-S20-160 20-S25-180 25-S32-200	●	1	4	8	12	130	50	7.5	10	80	2°30'	No	1	P-37	SC-30067	DT-8		RDFG08FR	
	●		5	10	16	150	9.5	15	100	3°50'	SC-35085				DT-10	RDFG10FR			
	●		6	12	60	11.5	16	100	2°10'	SC-40100	DT-15				RDFG12FR				
	●		8	16	20	160	65	14	20	95	2°00'				SC-50130	DT-20		RDFG16FR	
	●		10	20	25	180	80	17	25	100	2°10'				SC-60160	-		TT-25	RDFG20FR
	●		12.5	25	32	200	90	22	31	110	2°40'				SC-60210	-		TT-30	RDFG25FR

TA (Toolholder's interference angle) is the angle formed by the tangential line from insert dia. to toolholder's shank dia.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

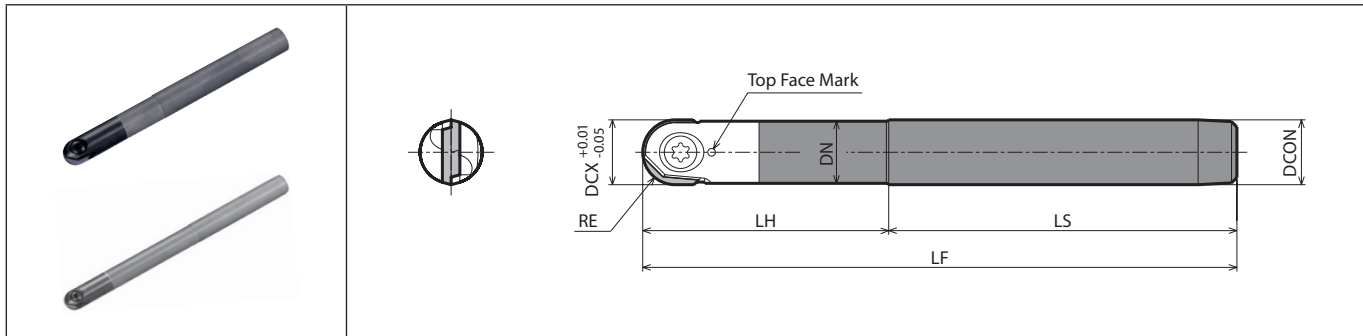


- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M242

MRFW (Carbide Shank)



Top Face Shown

Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)							Coolant hole	Spare parts			Applicable inserts ➔ M244
			RE	DCX	DCON	LF	LH	DN	LS		Anti-seize compound	Screw	Wrench	
Carbide Standard MRFW 08-S08 10-S10 12-S12	●	1	4	8	8	100	30	7.4	70	No	P-37	SC-30067	DT-8	RDFG08FR
	●		5	10	10		35	9.5				SC-35085	DT-10	RDFG10FR
	●		6	12	12	110	45	11.5	65			SC-40100	DT-15	RDFG12FR
Carbide Long Neck MRFW 08-S08-130 10-S10-140 12-S12-150	●	1	4	8	8	130	65	7.4	65	No	P-37	SC-30067	DT-8	RDFG08FR
	●		5	10	10	140	75	9.5				SC-35085	DT-10	RDFG10FR
	●		6	12	12	150	85	11.5				SC-40100	DT-15	RDFG12FR

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

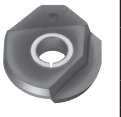
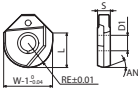
● : Standard item



Milling

M243

RDFG

Classification of usage		Carbon steel / Alloy steel		●		P			
		Mold and die steel		●		P			
● : 1st Choice ○ : 2nd Choice		Stainless steel		○		M			
		Gray cast iron		○		K			
		Nodular cast iron		○		K			
		Non-ferrous metals				N			
		Heat-resistant alloy				S			
		Titanium alloy				S			
		Hard materials				H			
Insert	Description	Dimension (mm)					Angle (°)	PVD Carbide	Applicable toolholder M242 M243
		S	D1	RE	L	W1	AN		
 	RDFG 08FR	2.1	3.1	4	6.6	8	15	●	MRF(W)08...
	10FR	2.7	3.6	5	8	10	15	●	MRF(W)10...
	12FR	3.2	4.1	6	9.4	12	15	●	MRF(W)12...
	16FR	4.2	5.1	8	11.3	16	10	●	MRF16...
	20FR	5.2	6.1	10	14.1	20	10	●	MRF20...
	25FR	6.2	6.1	12.5	15.5	25	10	●	MRF25...

Handed insert shows Right-hand

Recommended cutting conditions M245



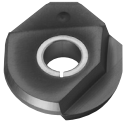
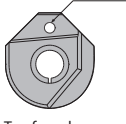
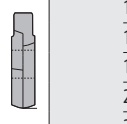
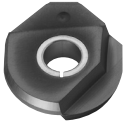
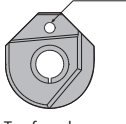
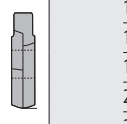
Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M244

Applicable inserts

Insert	Description
	RDFG 08FR
	10FR
	12FR
	16FR
	20FR
	25FR

Check the top face mark of both insert and toolholder.

Recommended depth of cut

Description	Depth of cut (mm)		Applications
	ap	Pf	
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. DCX)

Workpiece material	Insert grades	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)
Carbon steel	PR915	100~200	0.1~0.3	150 (5,970)	0.2 (2,390)	150 (4,770)	0.2 (1,910)	150 (3,980)	0.2 (1,590)
Alloy steel	PR915	80~180	0.1~0.3	130 (5,170)	0.2 (2,070)	130 (4,140)	0.2 (1,660)	130 (3,450)	0.2 (1,380)
Mold steel	PR915	50~150	0.1~0.2	100 (3,980)	0.15 (1,190)	100 (3,180)	0.15 (950)	100 (2,650)	0.15 (800)
Stainless steel	PR915	50~150	0.1~0.2	100 (3,980)	0.15 (1,190)	100 (3,180)	0.15 (950)	100 (2,650)	0.15 (800)
Cast iron	PR915	100~200	0.2~0.4	150 (5,970)	0.3 (3,580)	150 (4,770)	0.3 (2,860)	150 (3,980)	0.3 (2,390)
Workpiece material	Insert grades	Vc (m/min)	fz (mm/t)	ø16		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)
Carbon steel	PR915	100~200	0.1~0.3	150 (2,980)	0.2 (1,190)	150 (2,390)	0.2 (950)	150 (1,910)	0.2 (760)
Alloy steel	PR915	80~180	0.1~0.3	130 (2,590)	0.2 (1,030)	130 (2,070)	0.2 (830)	130 (1,660)	0.2 (660)
Mold steel	PR915	50~150	0.1~0.2	100 (1,990)	0.15 (600)	100 (1,590)	0.15 (480)	100 (1,270)	0.15 (380)
Stainless steel	PR915	50~150	0.1~0.2	100 (1,990)	0.15 (600)	100 (1,590)	0.15 (480)	100 (1,270)	0.15 (380)
Cast iron	PR915	100~200	0.2~0.4	150 (2,980)	0.3 (1,790)	150 (2,390)	0.3 (1,430)	150 (1,910)	0.3 (1,150)

Actual cutting speed (Vd) conversion coefficient table

- Vd varies depending on ap and slant face angle.
- Vd can be obtained by dividing the conversion coefficient into the recommended cutting speed.

Model	Tool dia. (DCX)	ø8		ø10		ø12		
	Depth of cut (t:mm)	0.1	0.2	0.1	0.2	0.2	0.5	
	Slant face angle (α)	15°	1.00	1.00	1.00	1.00	1.00	1.00
		30°	1.05	1.02	1.05	1.03	1.04	1.01
		45°	1.18	1.12	1.20	1.14	1.16	1.07
		60°	1.47	1.34	1.51	1.38	1.42	1.24
		75°	2.15	1.82	2.24	1.92	2.02	1.60
	90°(Horizontal plane)	4.48	3.22	5.06	3.57	3.92	2.50	
	Slant face angle (α)	Tool dia. (DCX)	ø16		ø20		ø25	
		Depth of cut (t:mm)	0.2	0.5	0.5	1	0.5	1
		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





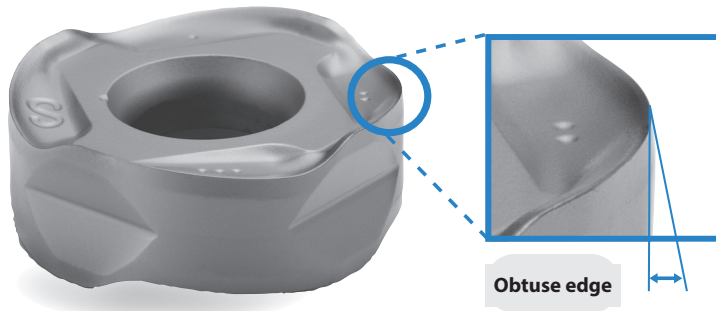
MRW

Economical and high efficiency radius cutter with double-sided insert for various types of workpieces

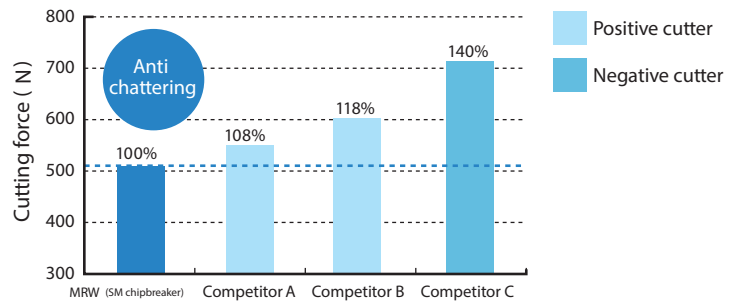
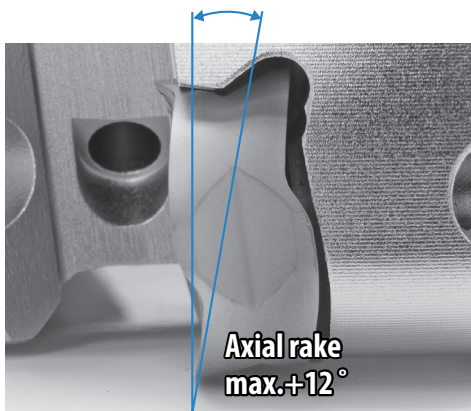
Economical double-sided 8-edge insert
Combine sharpness and cutting edge strength

Obtuse edge increases cutting edge toughness

Helical cutting edge design with maximum axial rake 12° reduces cutting force, equivalent to positive inserts.



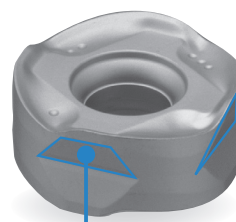
Low cutting force chipbreaker



<Cutting conditions>
Vc=120m/min, ap x ae=1 x 40mm, fz=0.2mm/t
SUS304, cutter ø50

1 Flat lock structure to hold insert firmly

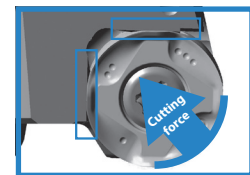
Prevent insert rotation during machining and realizes stable machining



Wide and flat constraint surface

Flat lock structure

Wide flat constraint surface
• Receives even cutting forces
• Controls insert rotation



M

Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

Long tool life by wide lineup with 4 grades and 3 chipbreakers, available for steel, stainless steel and heat-resistant alloys

Workpiece material		Applicable insert grades	Applicable chipbreaker
P Carbon steel/Alloy steel/Mold steel		PR1525	GM/SM/GH chipbreaker
K Cast iron		PR1510	GH/GM chipbreaker
S Ni-base heat-resistant alloys	M Stainless steel (Martensitic related)	CA6535	SM/GM chipbreaker
S Ni-base heat-resistant alloys S Titanium alloys	M Stainless steel (Austenitic related) M Stainless steel (Precipitation hardening)	PR1535	SM/GM chipbreaker

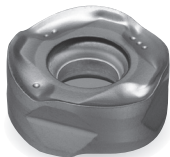
2 Insert grades for difficult-to-cut material

Controls sudden fracture and realizes stable machining
Suitable for high efficiency machining



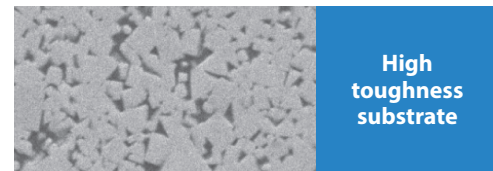
CA6535

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

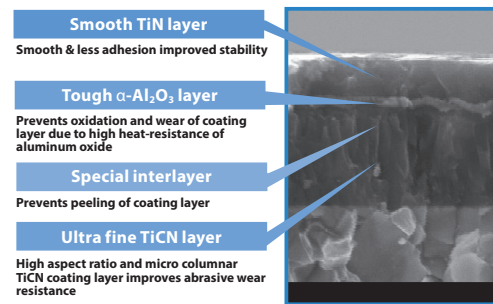


PR1535

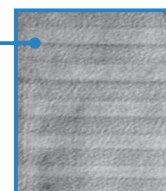
For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel
Stable and longer tool life by special nano coating layer
MEGACOAT NANO



High toughness substrate



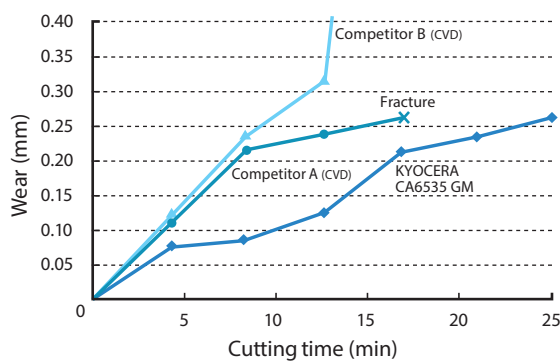
MEGACOAT base multi-layer structure



Milling

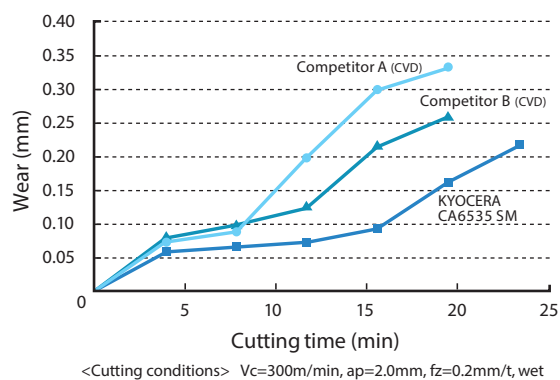
Tool life comparison (Internal evaluation)

Ni-base heat-resistant alloys



1st choice GM chipbreaker

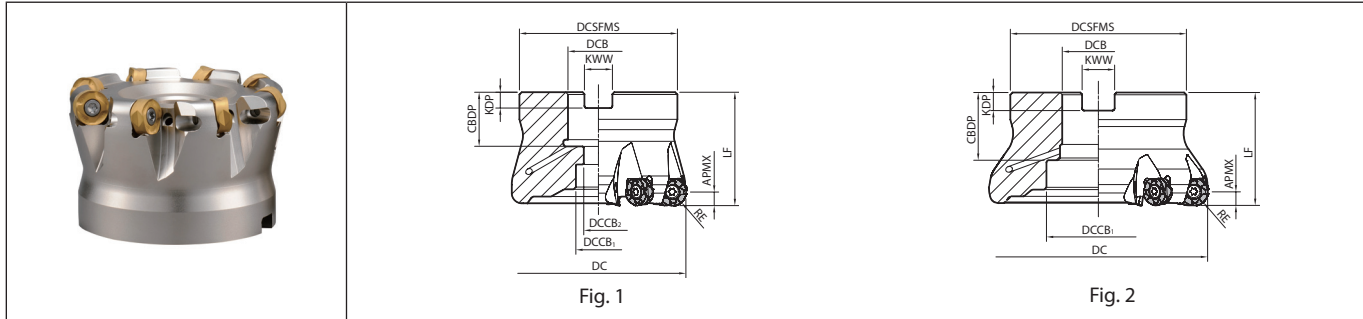
Stainless steel (Martensitic related)



1st choice SM chipbreaker

M247

MRW (Face mill)



Toolholder dimensions

Description	Availability		Inserts	Dimension (mm)										A.R. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts ➔ M251							
	R			RE	DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW								APMX						
Metric MRW 050R-12-5T-M 050R-12-6T-M 063R-12-6T-M 063R-12-7T-M 080R-12-6T-M 080R-12-8T-M 100R-12-7T-M 100R-12-9T-M	●	5	6	50	48	18								6	+12	-15.5	Yes	16000	0.3	1	ROMU1204MOER-..						
	●	6				22	11	40	21	6.3	10.4															1	
	●	6		63	60		19																	14000	0.6	1	
	●	7																								1	
	●	6		80	70	27	20	13		24	7	12.4												12000	1.1	1	
	●	8								50																1	
	●	7		100	78	32	46	-		30	8	14.4												10600	1.5	2	
Metric MRW 063R-16-5T-M 063R-16-6T-M 080R-16-6T-M 080R-16-7T-M 100R-16-6T-M 100R-16-8T-M 125R-16-8T-M 125R-16-10T-M	●	5	8	63	60	22	19	11	40	21	6.3	10.4		8	+11	-16.5	Yes	12800	0.5	1	ROMU1605MOER-..						
	●	6																								1	
	●	6		80	70	27	20	13		24	7	12.4												11000	1.1	1	
	●	7								50																1	
	●	6		100	78	32	46			30	8	14.4												9600	1.4	2	
	●	8																								1.3	2
	●	8		125	89	40	55	-		63	33	9	16.4											8500	2.6	2	
Bore dia. inch spec MRW 080R-12-6T 080R-12-8T 100R-12-7T 100R-12-9T MRW 080R-16-6T 080R-16-7T 100R-16-6T 100R-16-8T 125R-16-8T 125R-16-10T	●	6	6	80	70	25.4	20	13		27	6	9.5		6	+12	-15.5	Yes	12000	1.2	1	ROMU1204MOER-..						
	●	8																								1.1	1
	●	7		100	78	31.75	46	-		34	8	12.7												10600	1.5	2	
	●	9																								1.4	2
	●	6	8	80	70	25.4	20	13		27	6	9.5		8	+11	-16.5	Yes	11000	1.1	1	ROMU1605MOER-..						
	●	7																								1	
	●	6		100	78	31.75	46			34	8	12.7												9600	1.4	2	
●	8																			2							
●	8	125	89	38.1	55	-		63	38	10	15.9							8560	2.6	2							
●	10																			2							

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.




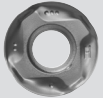



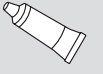

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

APMX is Maximum ap. For more details, see page M252 below.

● : Standard item

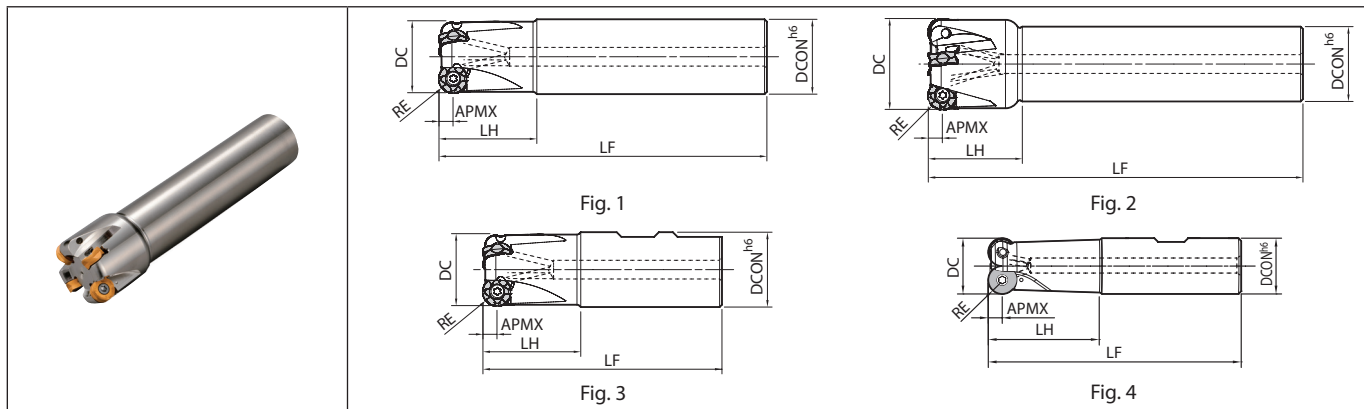
M248

Spare parts and applicable inserts

Description	Spare parts					Applicable Inserts 		
	Clamp screw	Wrench		Anti-seize compound	Mounting bolt			
		DTPM-15 	TTP-20 			General purpose	Low cutting force	Tough Edge (For Heavy Milling)
MRW 050R-12... 063R-12... 080R-12... 100R-12...	SB-4085TRP	DTPM-15		P-37	HH10X30	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
Recommended tightening torque for insert clamp 3.5N·m					HH12X35			
					-			
					Recommended tightening torque for insert clamp 4.5N·m			
HH12X35								
-								



MRW (End mill)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)						A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Applicable inserts ➔ M251
			RE	DC	DCON	LF	LH	APMX						
Cylindrical MRW 32-S32-12-3T 40-S32-12-4T 50-S42-12-5T	●	3	32	32	140	40	6	+12	-20	Yes	22000	1	ROMU1204MOER-..	
	●	4	6	40	32	160	40	+12	-16.5	Yes	18800	2		
	●	5	50	42	170	40	6	+12	-15.5	Yes	16000	2		
Cylindrical MRW 40-S32-16-3T 50-S42-16-4T 63-S42-16-5T	●	3	40	32	160	40	8	+11	-18	Yes	17200	2	ROMU1605MOER-..	
	●	4	8	50	42	170	40	+11	-16.5	Yes	14800	2		
	●	5	63	42	170	50	8	+11	-16.5	Yes	12800	2		
Long Shank MRW 32-S32-12-2T-200 40-S32-12-3T-200 50-S42-12-4T-300	●	2	32	32	200	40	6	+12	-20	Yes	22000	1	ROMU1204MOER-..	
	●	3	6	40	32	200	40	+12	-16.5	Yes	18800	2		
	●	4	50	42	300	40	6	+12	-15.5	Yes	16000	2		
Long Shank MRW 40-S32-16-2T-200 50-S42-16-3T-300 63-S42-16-4T-300	●	2	40	32	200	40	8	+11	-18	Yes	17200	2	ROMU1605MOER-..	
	●	3	8	50	42	300	40	+11	-16.5	Yes	14800	2		
	●	4	63	42	300	50	8	+11	-16.5	Yes	12800	2		
Weldon MRW 32-W32-12-3T 40-W32-12-4T 50-W40-12-5T	●	3	32	32	102	40	6	+12	-20	Yes	22000	3	ROMU1204MOER-..	
	●	4	6	40	32	100	40	+12	-16.5	Yes	18800	4		
	●	5	50	40	110	40	6	+12	-15.5	Yes	16000	4		
Weldon MRW 40-W32-16-3T 50-W40-16-4T 63-W40-16-5T	●	3	40	32	100	40	8	+11	-18	Yes	17200	4	ROMU1605MOER-..	
	●	4	8	50	40	110	40	+11	-16.5	Yes	14800	4		
	●	5	63	40	120	50	8	+11	-16.5	Yes	12800	4		

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

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

APMX is Maximum ap. For more details, see page M252 below.

Spare parts and applicable inserts

Description	Spare parts			Anti-seize compound	Applicable Inserts ➔ M251		
	Clamp screw	Wrench			General purpose	Low cutting force	Tough Edge (For Heavy Milling)
MRW ...-12...	SB-4085TRP	DTPM-15		P-37	ROMU1204MOER-GM	ROMU1204MOER-SM	ROMU1204MOER-GH
	Recommended tightening torque for insert clamp 3.5N·m						
MRW ...-16...	SB-50140TRP	TTP-20		P-37	ROMU1605MOER-GM	ROMU1605MOER-SM	ROMU1605MOER-GH
	Recommended tightening torque for insert clamp 4.5N·m						

● : Standard item

M250

ROMU

Insert		Description	Dimension (mm)					Carbide			Applicable toolholder M248 M250
			IC	S	D1	RE	INSL	CVD			
								CA6335	PRI1510	PRI1525	
<p>Classification of usage</p> <p>★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)</p>		Carbon steel / Alloy steel						★	☆	P	
		Mold and die steel						★	☆		
		Austenitic stainless steel						☆	★	M	
		Martensitic stainless steel					★	☆			
		Precipitation hardening stainless steel							★		
		Gray cast iron						★		K	
		Nodular cast iron						★			
		Non-ferrous metals								N	
		Heat-resistant alloy					★		☆	S	
		Titanium alloy							★		
		Hard materials								H	

		ROMU 1204MOER-GM	12	4.75	4.6	6	11.8	●	●	●	●	MRW...-12..
		ROMU 1605MOER-GM	16	5.48	6.2	8	15.8	●	●	●	●	MRW...-16..
		ROMU 1204MOER-SM	12	4.75	4.6	6	11.8	●	●	●	●	MRW...-12..
		ROMU 1605MOER-SM	16	5.48	6.2	8	15.8	●	●	●	●	MRW...-16..
		ROMU 1204MOER-GH	12	4.75	4.6	6	11.8	●	●	●	●	MRW...-12..
		ROMU 1605MOER-GH	16	5.48	6.2	8	15.8	●	●	●	●	MRW...-16..

Handed insert shows Right-hand

Recommended cutting conditions M252

● : Standard item



Ball-nose / radius type cutters

Recommended cutting conditions

Workpiece material	Recommended chipbreaker (fz: mm/t) *Recommended feed rate (Reference value) for ROMU12 type: ap=3 mm/for ROMU16 type: ap=4 mm			Recommended insert grades (Vc: m/min)			
	GM	SM	GH	MEGACOAT NANO			CVD Coated carbide
				PR1535	PR1525	PR1510	CA6535
Carbon steel	★ 0.1~ 0.2 ~0.3	☆ 0.06~ 0.15 ~0.2	☆ 0.15~ 0.3 ~0.35	☆ 120~ 180 ~250	★ 120~ 180 ~250	-	-
Alloy steel	★ 0.1~ 0.2 ~0.3	☆ 0.06~ 0.15 ~0.2	☆ 0.15~ 0.3 ~0.35	☆ 100~ 160 ~220	★ 100~ 160 ~220	-	-
Mold steel	★ 0.1~ 0.15 ~0.25	☆ 0.06~ 0.12 ~0.2	☆ 0.15~ 0.2 ~0.3	☆ 80~ 140 ~180	★ 80~ 140 ~180	-	-
Stainless steel (Austenitic related)	☆ 0.1~ 0.15 ~0.2	★ 0.06~ 0.12 ~0.2	☆ 0.15~ 0.2 ~0.25	★ 100~ 160 ~200	☆ 100~ 160 ~200	-	-
Stainless steel (Martensitic related)	☆ 0.1~ 0.15 ~0.2	★ 0.06~ 0.12 ~0.2	☆ 0.15~ 0.2 ~0.25	☆ 150~ 200 ~250	-	-	★ 180~ 240 ~300
Stainless steel (Precipitation Hardening)	★ 0.1~ 0.15 ~0.2	☆ 0.06~ 0.12 ~0.2	☆ 0.15~ 0.2 ~0.25	★ 90~ 120 ~150	-	-	-
Gray cast iron	★ 0.1~ 0.2 ~0.3	-	☆ 0.15~ 0.3 ~0.35	-	-	★ 120~ 180 ~250	-
Nodular cast iron	★ 0.1~ 0.15 ~0.25	-	☆ 0.15~ 0.2 ~0.3	-	-	★ 100~ 150 ~200	-
Ni-base heat-resistant alloys	★ 0.1~ 0.12 ~0.15	☆ 0.06~ 0.1 ~0.15	☆ 0.12~ 0.15 ~0.2	☆ 20~ 30 ~50	-	-	★ 20~ 30 ~50
Titanium alloys	☆ 0.1~ 0.12 ~0.15	★ 0.06~ 0.1 ~0.15	-	★ 40~ 60 ~80	-	☆ 30~ 50 ~70	-

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys. ★: 1st Recommendation ☆: 2nd Recommendation
 * The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
 * Recommended feed rate is the reference value when ap is RE/2 (3mm for ROMU12, 4mm for ROMU16).
 For lower ap than the above conditions, the conversion factor in the following table is recommended.



Insert	ap (Recommended)	Max. ap	Conversion factor for feed per tooth fz				
			ap=0.5mm	ap=1mm	ap=2mm	ap=3mm	ap=4mm
ROMU12 type	3mm or less	6mm	2.1	1.5	1.1	1.0 (Standard)	-
ROMU16 type	4mm or less	8mm	2.4	1.7	1.3	1.1	1.0 (Standard)

* Example (ROMU12 type, carbon steel, GM chipbreaker, ap=1 mm)

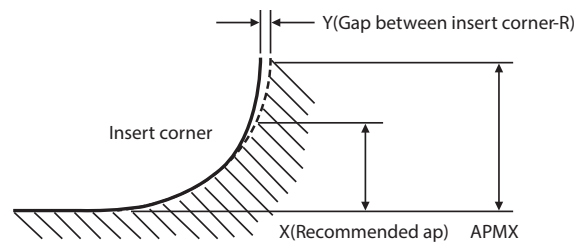
$$\boxed{fz=0.2\text{mm/t (Reference value for carbon steel and GM chipbreaker)}} \times \boxed{1.5 \text{ (Conversion factor for ROMU12 type, ap=1mm)}} = \boxed{fz = 0.3 \text{ mm/t (Recommended feed rate)}}$$

* Recommended ap: 3mm or less for ROMU12, 4mm or less for ROMU16
 Except the case that ap temporarily surpass the recommended ap, machining under the recommended ap is recommended.

Corner-R shape during processing

Corner-R shape during processing with MRW (Ref. to the right figure)

Insert	APMX	X	Y
ROMU12 type	6 mm	3 mm	0.1 mm
ROMU16 type	8 mm	4 mm	0.1 mm



* When machining with larger ap than recommended ap (X), there is a gap (Y) between the workpiece corner and Insert corner-R(RE).
 * The above figure is estimation. There would be ±0.2mm variation depending on the cutting conditions.

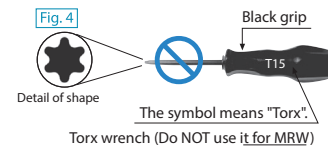
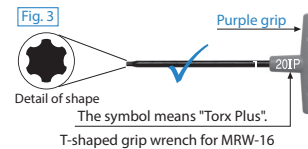
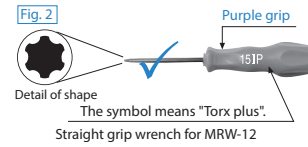
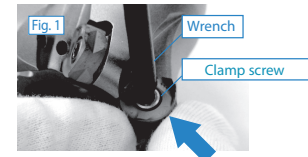
M252

How to mount an insert

- Be sure to remove dust and chips from the insert mounting pocket.
- Clamp screw
 - Apply anti-seize compound on portion of taper and thread of clamp screw.
 - Attach the screw to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
- Wrenches and clamp screws are "Torx Plus".
 - Fig. 2 wrench is for MRW-12. (Straight grip)
 - Fig. 3 wrench is for MRW-16. (T-shaped grip)

Please use a "Torx Plus" Wrench for tightening clamp screw.

* If a "Torx" wrench (Fig. 4) is used to tighten, the screw head might become damaged and then the screw cannot be removed.
- When tightening the screw, make sure that the wrench is parallel to the screw.
Recommended Tightening torque, See spare parts table.
- After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder or between the insert side surfaces and the constraint surface of the toolholder. If there is any clearance, remove the insert and mount it again according to the above steps.



Case studies

12Cr Steel

Machining efficiency 1.2 times
Economical double-sided insert

- Turbine blade • Vc=270m/min • fz=0.278mm/t
- ap=0.5~1.0mm ae=max.35mm • Dry
- MRW050R-12-6T-M (6 flutes) • ROMU1204M0ER-SM (CA6535)

CA6535	Stable machining
Competitor A (Positive cutter)	Unstable machining with large noise

• MRW improved machining efficiency by 1.2 times with same tool life compared with competitor A.
• MRW has cost advantage due to double-sided inserts.

(User evaluation)

12Cr Steel

Same or longer tool life
Economical double-sided insert

- Turbine Blade • Vc=250m/min • fz=0.16mm/t
- ap=2.0mm ae=5~30mm • Wet
- MRW050R-12-5T-M (5 flutes) • ROMU1204M0ER-SM (CA6535)

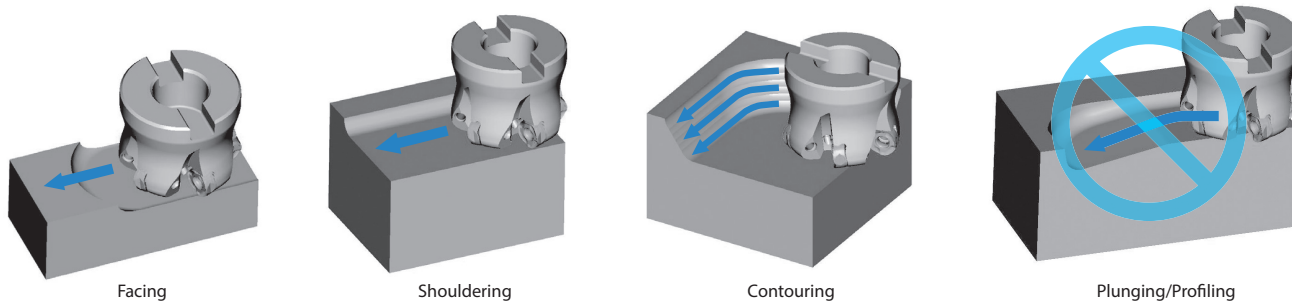
CA6535	Stable, available for further machining
Competitor B (Positive cutter)	Unstable machining with large noise

• MRW showed less damage on the cutting edge and reduced machining noise.
• MRW has equal or longer tool life and cost advantage due to double sided inserts.

(User evaluation)



Applications



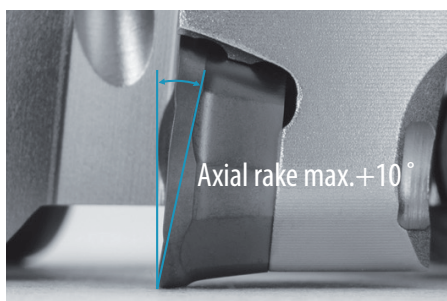
MRX

Excellent cutting performance with low cutting force design
High efficiency radius cutter

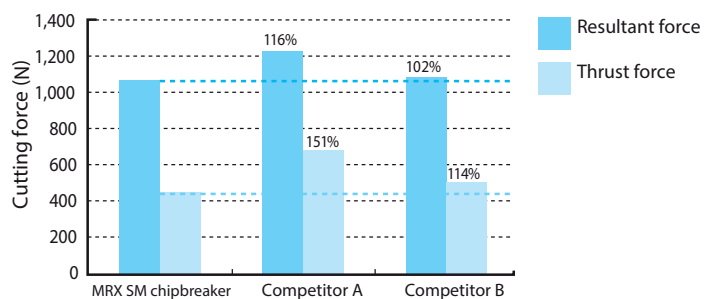


1 Low cutting force design

Low cutting force with helical cutting-edge design



Cutting force comparison (Internal evaluation)



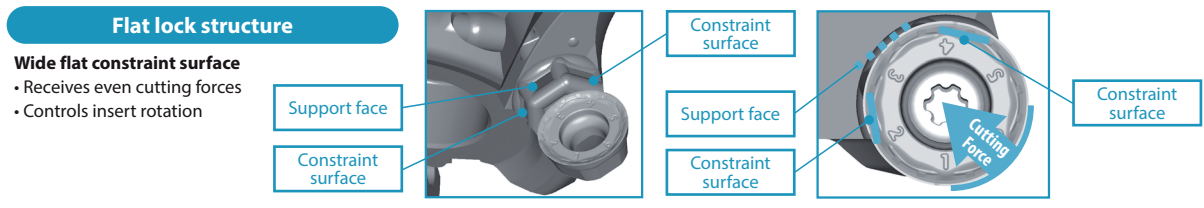
<Cutting conditions>
Vc=120m/min, ap.ae=2.25mm, fz=0.2mm/t, SUS304, Cutterø50

2 Flat lock structure to hold insert firmly

Prevent insert rotation during machining and realizes stable machining

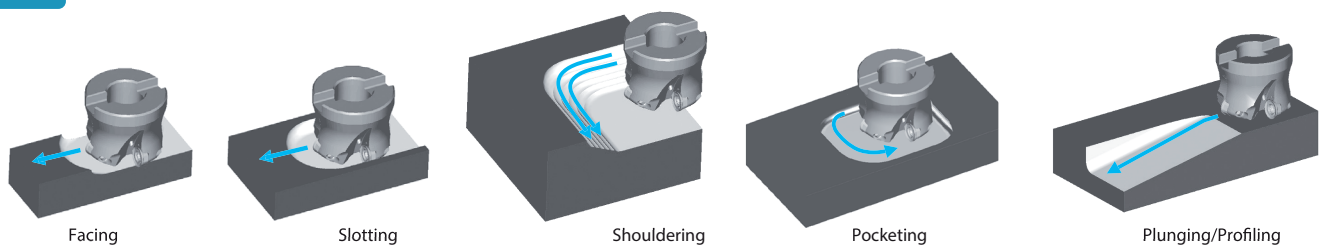
M

Milling



3 Various applications

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others



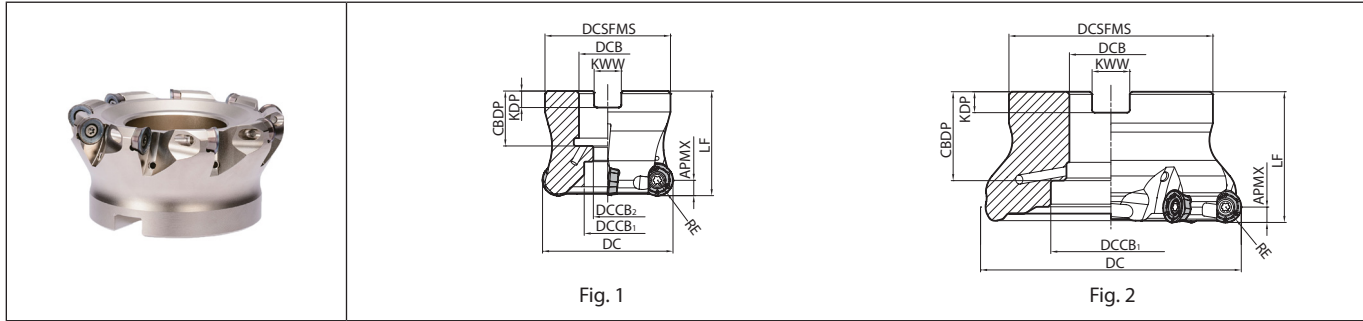
4 Machining of various materials possible

Insert grades **CA6535/PR1535** for difficult-to-cut material are available. Long tool life by wide lineup with 4 grades and 3 chipbreakers, available for steel, stainless steel and heat-resistant alloys.

Cost-effective M class inserts are available

M254

MRX (Face mill)



Toolholder dimensions






Description	Availability		Dimension (mm)											A.R. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Weight (kg)	Fig.	Applicable inserts M260						
	R	Inserts	RE	DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX													
Metric	MRX	●	5	40	38	16	15	9		19	5.6	8.4	5	+10	-5.5	Yes	20000	0.2	1	RPGT10T3... RPMT10T3...						
		●	6	50	48		22	18	11	40	21	6.3					10.4	17500	0.3		1					
		●	7	63	60													15000	0.6		1					
	MRX	●	4	5	40	38	16	13.5	9		19	5.6	8.4	6	+10	-5.5	Yes	21000	0.2	1	RPGT1204... RPMT1204...					
					50	48				40										18000		0.3	1			
					63	60						21	6.3					10.4					1			
		●	5	6	63										8	+10	-5.5	Yes	15500	0.6		1				
					80	70	27	20	13			24	7	12.4									13500	1.2	1	
										50													1.1	1		
		MRX	●	4	8	100	78	32	46	-		30	8	14.4	8	+10	-5.5	Yes	12000	1.4		2	RPGT1605... RPMT1605...			
						63	60	22	18	11	40	21	6.3	10.4										13500	0.5	1
						80	70	27	20	13			24	7					12.4						11500	1.1
100	78		32	46		50		30	8	14.4				10000	1.4	2										
125R-16-6T-M	●		6											8	+10	-5.5	Yes	9000	2.6	2						
125R-16-8T-M	●		8	125	89	40	55		63	33	9	16.4								9000	2.6	2				
Bore dia. inch spec	MRX	●	6	6	80	70	25.4	20	13		27	6	9.5	6	+10	-5.5	Yes	13500	1.2	1	RPGT1204... RPMT1204...					
		●	8																			1.1	1			
		●	7		100	78	31.75	46	-		34	8	12.7									12000	1.5	2		
		●	9																				2	2		
	MRX	●	5	8	80	70	25.4	20	13		27	6	9.5	8	+10	-5.5	Yes	11500	1.1	1	RPGT1605... RPMT1605...					
					100R-16-6T	●	6																			1
					100R-16-7T	●	7	100	78	31.75	46		34					8	12.7					10000	1.4	2
					125R-16-6T	●	6																			2
		125R-16-8T	●	8	125	89	38.1	55		63	38	10	15.9				9000	2.7	2							

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Standard item




Spare parts and applicable inserts

Description	Spare parts				Applicable inserts M260	
	Clamp screw	Wrench		Anti-seize compound		Mounting bolt
		DTPM 	TTP 			
MRX 040R-10... 050R-10... 063R-10...	SB-3070TRP	DTPM-10		P-37	HH8X25 HH10X30	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH * 1
Recommended tightening torque for insert clamp 2.0N•m						
MRX 040R-12... 050R-12... 063R-12... 080R-12... 100R-12...	SB-4090TRPN	DTPM-15		P-37	HH8X25 HH10X30 HH12X35 -	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH * 2
Recommended tightening torque for insert clamp 3.5N•m						
MRX 063R-16... 080R-16... 100R-16... 125R-16...	SB-50120TRP	TTP-20		P-37	HH10X30 HH12X35 -	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH * 3
Recommended tightening torque for insert clamp 4.5N•m						

Max. Revolution

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

 Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

*1... Not compatible with the conventional RPMT10T3M0.

*2... Not compatible with the conventional RPMT1204M0 and RPMT1204M0-H.

*3... Not compatible with the conventional RPMT1606M0-H.

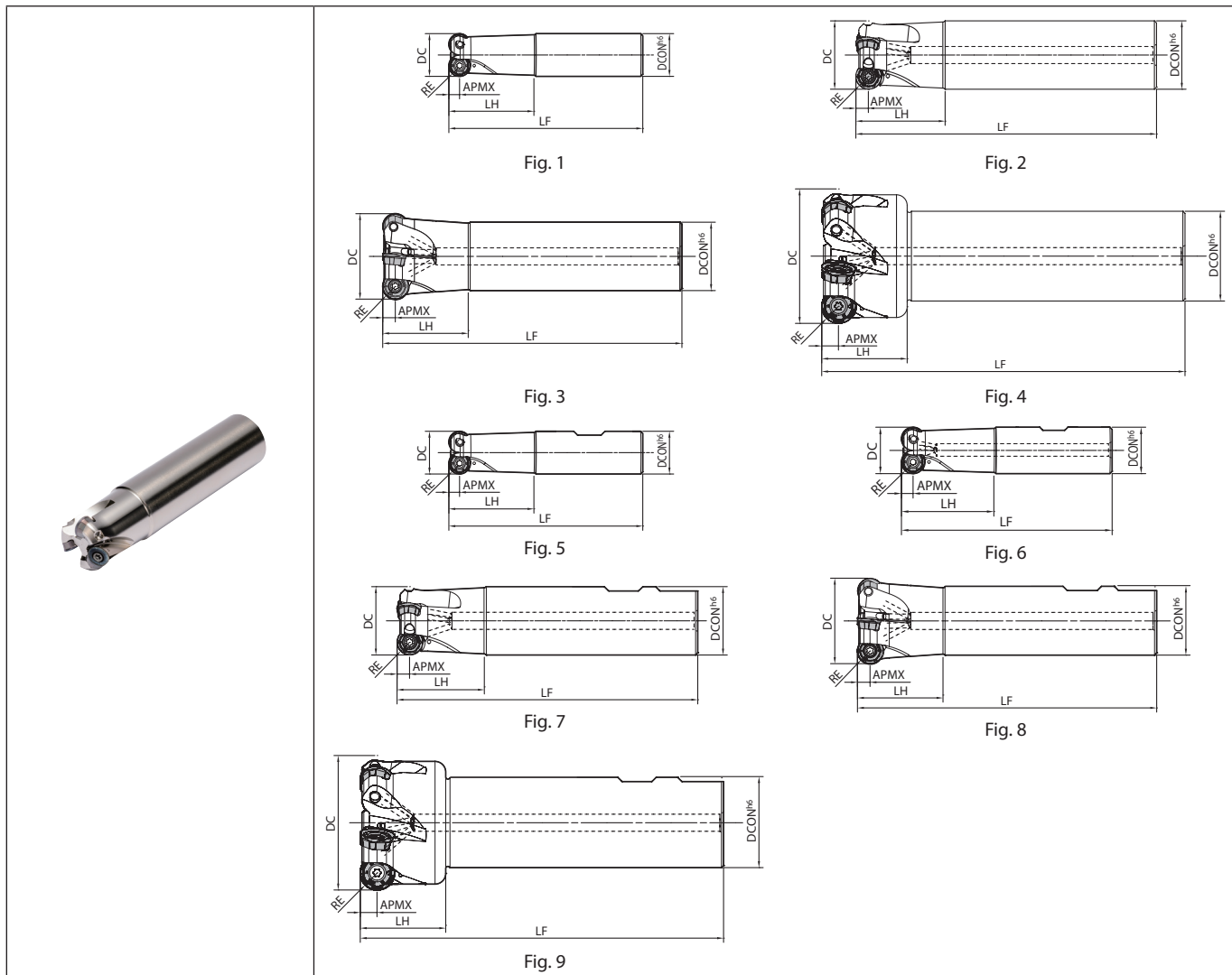


Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius**
- Others

M256

MRX (End mill)



Milling

Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)						A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Fig.	Applicable inserts M260	
			RE	DC	DCON	LF	LH	APMX							
Cylindrical	MRX 16-S16-08-2T 20-S20-08-2T 25-S25-08-4T	● 2	4	16	16	110	40	4	+3	No	38000	1	RDGT0803... RDMT0803...		
		● 4		20	20	120			+10	Yes	32000	2			
		● 4		25	25	120			+10	Yes	28000	2			
	MRX 20-S20-10-2T 25-S25-10-3T 32-S32-10-4T	● 2	5	20	20	120	40	5	+5	-8	No	30000	1	RPGT10T3... RPMT10T3...	
		● 3		25	25				+10	-5.5	Yes	28000	2		
		● 4		32	32				140	+10	-5.5	Yes	22500		2
	MRX 32-S32-12-3T 40-S32-12-4T 50-S42-12-5T	● 3	6	32	32	140	40	6	+10	-5.5	Yes	24500	2	RPGT1204... RPMT1204...	
		● 4		40	42				170	+10	-5.5	Yes	21000		3
		● 5		50	42				170	+10	-5.5	Yes	18000		3
	MRX 40-S32-16-2T 50-S42-16-4T 63-S42-16-5T	● 2	8	40	32	140	40	8	+10	-5.5	Yes	18000	3	RPGT1605... RPMT1605...	
		● 4		50	42				170	+10	-5.5	Yes	15500		3
		● 5		63	42				170	+10	-5.5	Yes	13500		4
Weldon	MRX 16-W16-08-2T 20-W20-08-2T 25-W25-08-4T	● 2	4	16	16	89	40	4	+3	No	38000	5	RDGT0803... RDMT0803...		
		● 4		20	20	91			+10	Yes	32000	6			
		● 4		25	25	97			+10	Yes	28000	7			
	MRX 20-W20-10-2T 25-W25-10-3T 32-W32-10-4T	● 2	5	20	20	91	40	5	+5	-8	No	30000	5	RPGT10T3... RPMT10T3...	
		● 3		25	25	97			+10	-5.5	Yes	28000	7		
		● 4		32	32	101			+10	-5.5	Yes	22500	7		
	MRX 32-W32-12-3T 40-W32-12-4T 50-W40-12-5T	● 3	6	32	32	101	40	6	+10	-5.5	Yes	24500	7	RPGT1204... RPMT1204...	
		● 4		40	40	111			+10	-5.5	Yes	21000	8		
		● 5		50	40	111			+10	-5.5	Yes	18000	8		
	MRX 40-W32-16-2T 50-W40-16-4T 63-W40-16-5T	● 2	8	40	32	101	40	8	+10	-5.5	Yes	18000	8	RPGT1605... RPMT1605...	
		● 4		50	40	111			+10	-5.5	Yes	15500	8		
		● 5		63	40	112			+10	-5.5	Yes	13500	9		
Long Shank	MRX 16-S16-08-2T-160 20-S20-08-2T-180 25-S25-08-4T-180	● 2	4	16	16	160	70	4	+3	No	38000	1	RDGT0803... RDMT0803...		
		● 4		20	20	180	80		+10	-5.5	Yes	32000		2	
		● 4		25	25	180	80		+10	-5.5	Yes	28000		2	
	MRX 20-S20-10-2T-180 25-S25-10-2T-180 32-S32-10-4T-200	● 2	5	20	20	180	80	5	+5	-8	No	30000	1	RPGT10T3... RPMT10T3...	
		● 4		25	25	180			+10	-5.5	Yes	28000	2		
		● 4		32	32	200			+10	-5.5	Yes	22500	2		
	MRX 32-S32-12-2T-200 40-S32-12-4T-200 50-S42-12-4T-300	● 2	6	32	32	200	80	6	+10	-5.5	Yes	24500	2	RPGT1204... RPMT1204...	
		● 4		40	42	300			+10	-5.5	Yes	21000	3		
		● 4		50	42	300			+10	-5.5	Yes	18000	3		
	MRX 40-S32-16-2T-200 50-S42-16-4T-300 63-S42-16-4T-300	● 2	8	40	32	200	80	8	+10	-5.5	Yes	18000	3	RPGT1605... RPMT1605...	
		● 4		50	42	300			+10	-5.5	Yes	15500	3		
		● 4		63	42	300			+10	-5.5	Yes	13500	4		

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

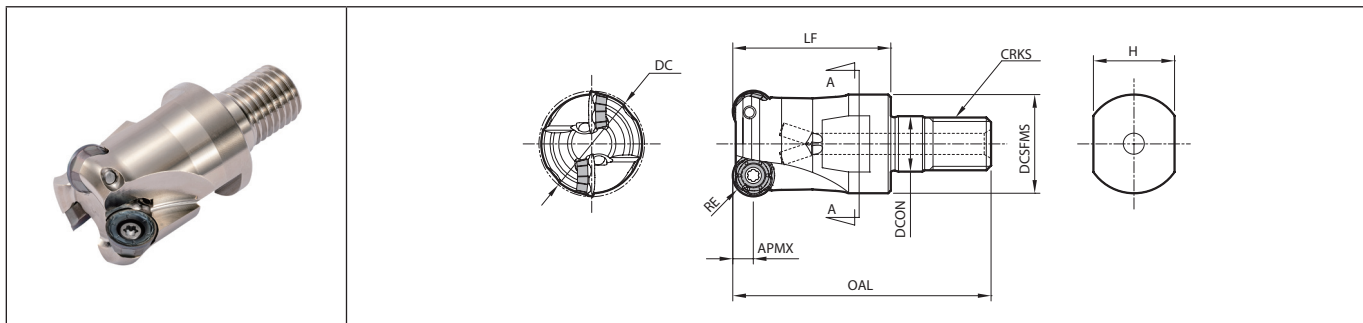
Ball-nose
Radius

Others

● : Standard item

M258

MRX (Modular type)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)								A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min ⁻¹)	Applicable inserts M260	
			RE	DC	DCON	DCSFMS	OAL	LF	APMX	CRKS						H
MRX 16-M08-08-2T	●	2	16	8.5	14.7	42	25		M8x1.25	12	+3	No	38000	RDGT0803... RDMT0803...		
MRX 20-M10-08-2T	●	4	20	10.5	18.7	48	30	4	M10x1.5	15	-5.5	Yes	32000			
MRX 25-M12-08-4T	●	4	25	12.5	23	56	35		M12x1.75	19	+10	Yes	28000			
MRX 20-M10-10-2T	●	2	20	10.5	18.7	48	30		M10x1.5	15	+5	-8	No	30000	RPGT10T3... RPMT10T3...	
MRX 25-M12-10-3T	●	3	25	12.5	23	56	35	5	M12x1.75	19	+10	-5.5	Yes	28000		
MRX 32-M16-10-4T	●	4	32	17	30	62	40		M16x2.0	24	+10	-5.5	Yes	22500		
MRX 32-M16-12-3T	●	3	32	17	30	62	40	6	M16x2.0	24	+10	-5.5	Yes	24500	RPGT1204... RPMT1204...	
MRX 40-M16-12-4T	●	4	40	17	30	62	40		M16x2.0	24	+10	-5.5	Yes	21000		
MRX 40-M16-16-2T	●	2	8	40	17	30	62	40	8	M16x2.0	24	+10	-5.5	Yes	18000	RPGT1605... RPMT1605...

Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

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

See page M60 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

Spare parts and applicable inserts

Description	Clamp screw	Wrench		Anti-seize compound	Applicable inserts M260
		DTPM	TTP		
MRX ...-08...	SB-2555TRP	DTPM-8		P-37	RDMT0803MOER-GM RDGT0803MOER-GM RDGT0803MOER-SM RDMT0803MOEN-GH * 1
	Recommended tightening torque for insert clamp 1.2N·m				
MRX ...-10...	SB-3070TRP	DTPM-10		P-37	RPMT10T3MOER-GM RPGT10T3MOER-GM RPGT10T3MOER-SM RPMT10T3MOEN-GH * 2
	Recommended tightening torque for insert clamp 2.0N·m				
MRX ...-12...	SB-4090TRPN	DTPM-15		P-37	RPMT1204MOER-GM RPGT1204MOER-GM RPGT1204MOER-SM RPMT1204MOEN-GH * 3
	Recommended tightening torque for insert clamp 3.5N·m				
MRX ...-16...	SB-50120TRP	TTP-20		P-37	RPMT1605MOER-GM RPGT1605MOER-GM RPGT1605MOER-SM RPMT1605MOEN-GH * 4
	Recommended tightening torque for insert clamp 4.5N·m				

Max. Revolution

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

*1... Not compatible with the conventional RDMT08T2M0-H.

*2... Not compatible with the conventional RPMT10T3M0.

*3... Not compatible with the conventional RPMT1204M0 and RPMT1204M0-H.

*4... Not compatible with the conventional RPMT1606M0-H.

● : Standard item



Milling

RDMT/RDGT/RPMT/RPGT

Insert		Description	Dimension (mm)					Angle (°)	Carbide				Applicable toolholder M255 M258 M259																																													
			IC	S	D1	RE	AN		CVD		PVD																																															
			CA6535	PRI1510	PRI1525	PRI1535																																																				
<p>Classification of usage</p> <p>★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)</p>		<table border="1"> <tr><td>Carbon steel / Alloy steel</td><td>★</td><td>☆</td><td>P</td></tr> <tr><td>Mold and die steel</td><td>★</td><td>☆</td><td>P</td></tr> <tr><td>Austenitic stainless steel</td><td>☆</td><td>★</td><td>M</td></tr> <tr><td>Martensitic stainless steel</td><td>★</td><td>☆</td><td>M</td></tr> <tr><td>Precipitation hardening stainless steel</td><td>★</td><td></td><td>M</td></tr> <tr><td>Gray cast iron</td><td>★</td><td></td><td>K</td></tr> <tr><td>Nodular cast iron</td><td>★</td><td></td><td>K</td></tr> <tr><td>Non-ferrous metals</td><td></td><td></td><td>N</td></tr> <tr><td>Heat-resistant alloy</td><td>★</td><td>☆</td><td>S</td></tr> <tr><td>Titanium alloy</td><td></td><td>★</td><td>S</td></tr> <tr><td>Hard materials</td><td></td><td></td><td>H</td></tr> </table>													Carbon steel / Alloy steel	★	☆	P	Mold and die steel	★	☆	P	Austenitic stainless steel	☆	★	M	Martensitic stainless steel	★	☆	M	Precipitation hardening stainless steel	★		M	Gray cast iron	★		K	Nodular cast iron	★		K	Non-ferrous metals			N	Heat-resistant alloy	★	☆	S	Titanium alloy		★	S	Hard materials			H
		Carbon steel / Alloy steel	★	☆	P																																																					
		Mold and die steel	★	☆	P																																																					
		Austenitic stainless steel	☆	★	M																																																					
		Martensitic stainless steel	★	☆	M																																																					
		Precipitation hardening stainless steel	★		M																																																					
		Gray cast iron	★		K																																																					
		Nodular cast iron	★		K																																																					
		Non-ferrous metals			N																																																					
		Heat-resistant alloy	★	☆	S																																																					
Titanium alloy		★	S																																																							
Hard materials			H																																																							
<p>General purpose</p>	RDGT 0803M0ER-GM	8	3.18	3	4	15	●	●	●	●	MRX...-08-..																																															
	RPGT 10T3M0ER-GM	10	3.97	3.5	5	11	●	●	●	●	MRX...-10-..																																															
	RPGT 1204M0ER-GM	12	4.76	4.6	6	11	●	●	●	●	MRX...-12-..																																															
	RPGT 1605M0ER-GM	16	5.56	5.8	8	11	●	●	●	●	MRX...-16-..																																															
<p>General purpose</p>	RDMT 0803M0ER-GM	8	3.18	3	4	15	●	●	●	●	MRX...-08-..																																															
	RPMT 10T3M0ER-GM	10	3.97	3.5	5	11	●	●	●	●	MRX...-10-..																																															
	RPMT 1204M0ER-GM	12	4.76	4.6	6	11	●	●	●	●	MRX...-12-..																																															
	RPMT 1605M0ER-GM	16	5.56	5.8	8	11	●	●	●	●	MRX...-16-..																																															
<p>Low cutting force</p>	RDGT 0803M0ER-SM	8	3.18	3	4	15	●	●	●	●	MRX...-08-..																																															
	RPGT 10T3M0ER-SM	10	3.97	3.5	5	11	●	●	●	●	MRX...-10-..																																															
	RPGT 1204M0ER-SM	12	4.76	4.6	6	11	●	●	●	●	MRX...-12-..																																															
	RPGT 1605M0ER-SM	16	5.56	5.8	8	11	●	●	●	●	MRX...-16-..																																															
<p>Tough edge</p>	RDMT 0803M0EN-GH	8	3.18	3	4	15	●	●	●	●	MRX...-08-..																																															
	RPMT 10T3M0EN-GH	10	3.97	3.5	5	11	●	●	●	●	MRX...-10-..																																															
	RPMT 1204M0EN-GH	12	4.76	4.6	6	11	●	●	●	●	MRX...-12-..																																															
	RPMT 1605M0EN-GH	16	5.56	5.8	8	11	●	●	●	●	MRX...-16-..																																															

Handed insert shows Right-hand

Recommended cutting conditions M261



- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M260

Recommended cutting conditions

Workpiece material	Recommended chipbreaker (fz: mm/t)				Recommended insert grades (Vc: m/min)			
	* RD**08 type: ap=2mm, RP**10 type: ap=2.5mm RP**12 type: ap=3mm, RP**16 type: ap=4mm				MEGACOAT NANO			CVD Coated carbide
	RDMT-GM RPMT-GM	RDGT-GM RPGT-GM	RDGT-SM RPGT-SM	RDMT-GH RPMT-GH	PR1535	PR1525	PR1510	CA6535
Carbon steel	★ 0.1~0.2~0.3	☆ 0.1~0.2~0.3	☆ 0.06~0.15~0.2	☆ 0.15~0.3~0.35	☆ 120~180~250	★ 120~180~250	-	-
Alloy steel	★ 0.1~0.2~0.3	☆ 0.1~0.2~0.3	☆ 0.06~0.15~0.2	☆ 0.15~0.3~0.35	☆ 100~160~220	★ 100~160~220	-	-
Mold steel	★ 0.1~0.15~0.25	☆ 0.1~0.15~0.25	☆ 0.06~0.12~0.2	☆ 0.15~0.2~0.3	☆ 80~140~180	★ 80~140~180	-	-
Stainless steel (Austenitic related)	☆ 0.1~0.15~0.2	☆ 0.1~0.15~0.2	★ 0.06~0.12~0.2	☆ 0.15~0.2~0.25	★ 100~160~200	☆ 100~160~200	-	-
Stainless steel (Martensitic related)	☆ 0.1~0.15~0.2	☆ 0.1~0.15~0.2	★ 0.06~0.12~0.2	☆ 0.15~0.2~0.25	☆ 150~200~250	-	-	★ 180~240~300
Stainless steel (Precipitation Hardening)	☆ 0.1~0.15~0.2	★ 0.1~0.15~0.2	☆ 0.06~0.12~0.2	☆ 0.15~0.2~0.25	★ 90~120~150	-	-	-
Gray cast iron	★ 0.1~0.2~0.3	☆ 0.1~0.2~0.3	-	☆ 0.15~0.3~0.35	-	-	★ 120~180~250	-
Nodular cast iron	★ 0.1~0.15~0.25	☆ 0.1~0.15~0.25	-	☆ 0.15~0.2~0.3	-	-	★ 100~150~200	-
Ni-base heat-resistant alloys	☆ 0.1~0.12~0.15	★ 0.1~0.12~0.15	☆ 0.06~0.1~0.15	☆ 0.12~0.15~0.2	☆ 20~30~50	-	-	★ 20~30~50
Titanium alloys	☆ 0.1~0.12~0.15	★ 0.1~0.12~0.15	★ 0.06~0.1~0.15	-	★ 40~60~80	-	☆ 30~50~70	-

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys. ★: 1st Recommendation ☆: 2nd Recommendation
 * RDGT/RPGT are recommended for stainless steel, Ni-base heat-resistant alloys and titanium alloy.
 * The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
 * Recommended feed rate in the table is the reference value when ap is RE/2. (2 mm for RD**08/2.5 mm for RP**10/3mm for RP**12/4 mm for RP**16)
 For other ap, calculate the recommended feed rate based on the conversion factor below.
 * For MRX16-S16-08-2T(-160), MRX16-W-08-2T, MRX20-S20-10-2T(-180) and MRX20-W20-10-2T, set the feed rate not higher than 50% of the recommended cutting conditions.

Conversion factor for feed per tooth by depth of cut (ap)

Insert	Max. ap	Conversion factor for feed per tooth fz									
		ap=0.5 mm	ap=1 mm	ap=1.5 mm	ap=2 mm	ap=2.5 mm	ap=3 mm	ap=4 mm	ap=5 mm	ap=6 mm	ap=8 mm
RD**08 type (GM/SM/GH chipbreaker)	4mm	1.7	1.3	1.1	1 (Standard)	0.9	0.8	0.8	-	-	-
RP**10 type (GM/SM/GH chipbreaker)	5mm	1.9	1.4	1.2	1	1 (Standard)	0.9	0.8	0.8	-	-
RP**12 type (GM/SM/GH chipbreaker)	6mm	2.1	1.5	1.3	1.1	1	1 (Standard)	0.9	0.8	0.8	-
RP**16 type (GM/SM/GH chipbreaker)	8mm	2.4	1.7	1.4	1.3	1.1	1.1	1 (Standard)	0.9	0.8	0.8

* Example (ROMU12 type, carbon steel, GM chipbreaker, ap=1mm)

$$\begin{matrix} fz=0.2 \text{ mm/t} \\ \text{(Reference value for carbon steel and GM chipbreaker)} \end{matrix} \times \begin{matrix} 1.5 \\ \text{(Conversion factor for ROMU12 type, ap=1mm)} \end{matrix} = \begin{matrix} fz=0.3 \text{ mm/t} \\ \text{(Recommended feed rate)} \end{matrix}$$

Recommended cutting conditions for drilling/ramping/helical milling

Tool spec.		Max. ap	Drilling		Ramping (Slant milling)			Helical milling		
Insert	Tool dia.	ap	Max. cutting depth Pd	Min. Cutting length X for flat bottom surface	Max. ramping angle RMPX	tan RMPX	Cutting length L at max. ramping angle	Min. cutting dia. øDh1	Min. cutting dia. for flat bottom facing øDh2	Max. cutting dia. øDh3
RD**08 type	16	4	0.7	9	8°	0.141	28	20	24	30
	20			13	9°	0.158	25	26	32	38
	25			18	5°	0.087	45	36	42	48
RP**10 type	20	5	0.6	11	5°	0.087	57	26	30	38
	25			16	10°	0.176	28	33	40	48
	32			23	6°	0.105	47	47	54	62
	40			31	4°	0.070	71	63	70	78
	50			41	3°	0.052	95	83	90	98
RP**12 type	63	6	2.4	54	2°	0.035	143	109	116	124
	32			21	9°	0.158	37	43	52	62
	40			29	5°	0.087	68	59	68	78
	50			39	4°	0.070	85	79	88	98
	63			52	2°	0.035	171	105	114	124
80	69	139	148	158						
100	89	179	188	198						
RP**16 type	40	8	3.4	25	11°	0.194	41	51	64	78
	50			35	7°	0.123	65	71	84	98
	63			48	4°	0.070	114	97	110	124
	80			65	3°	0.052	152	131	144	158
	100			85	2°	0.035	229	171	184	198
125	110	1°	0.017	458	221	234	248			

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

Unit: mm



Milling

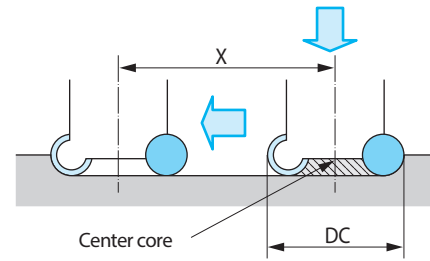
Guide for drilling

Depth of drilling

Refer to max. cutting depth (Pd) shown in the lower table of M261. (Pd Shows the maximum plunge depth.)

When traversing after drilling

1. Reduce the table feed by 50% until the center core part (do not forget to grind) is completely cut off.
(The internal cutting edge's radial rake angle is large in the negative direction)
2. The min. cutting length "X" for flat bottom surface is as follows M261.

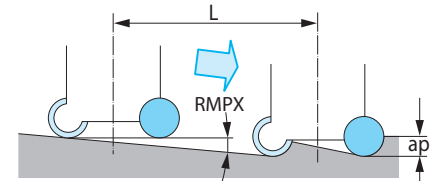


Guide for ramping (Slant milling)

- Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
- Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length "L" at max. ramping angle

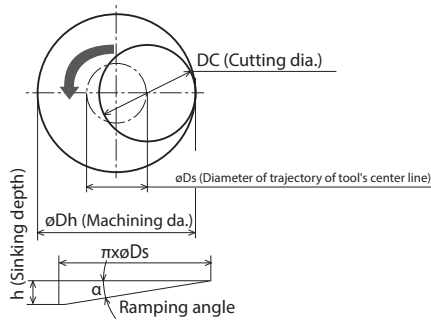
$$L = \frac{ap}{\tan RMPX}$$



Guide for helical milling

- Sinking depth (h) per revolution when helical milling should be max. ap or under in the above cutting conditions.
- Ramping angle (with trajectory of the center line of tool) should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
- Feed rate should be 70% or under of the above cutting conditions.
- Down-cut machining is recommended.

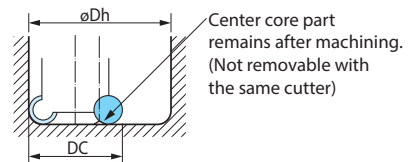
Helical milling factors



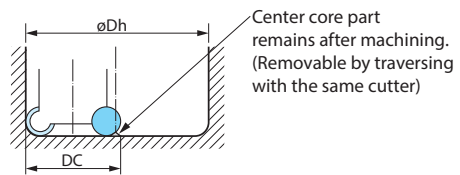
ϕD_s (How to find diameter of trajectory of tool's center line)
 $\phi D_s = \phi Dh - DC$

Formula for sinking depth (h)
 $h = \pi \times \phi D_s \times \tan \alpha$
(h should be ap or under)
(α should be RMPX or under)

[When cutting dia. $\phi Dh1 \leq \phi Dh < \phi Dh2$]



[When cutting dia. $\phi Dh2 \leq \phi Dh \leq \phi Dh3$]



Please refer to M261 the list for $\phi Dh1 \sim Dh3$.

Max. ap and usable edges

Usable edges	Insert corner-R (mm)			
	R4	R5	R6	R8
3 edges	ap=2.0~4.0	ap=2.5~5.0	ap=3.0~6.0	ap=4.0~8.0
6 edges	ap=2.0 Less than	ap=2.5 Less than	ap=3.0 Less than	ap=4.0 Less than

Case studies

SUS304

- Nozzle parts
- Vc = 113m/min
- ap x ae = 1.0 x 65mm
- fz = 0.14mm/t
- Dry
- MRX100R-12-9T-M (9 flutes)
- RPGT1204M0ER-SM (PR1535)

PR1535	450 pcs/edge
Conventional	100 pcs/edge

• High cost efficiency with 4.5 times longer tool life and 1.5 times more insert edges.
• MRX prevented burr formation and improved surface finish.
(User evaluation)

SKD61 (47~49HRC)

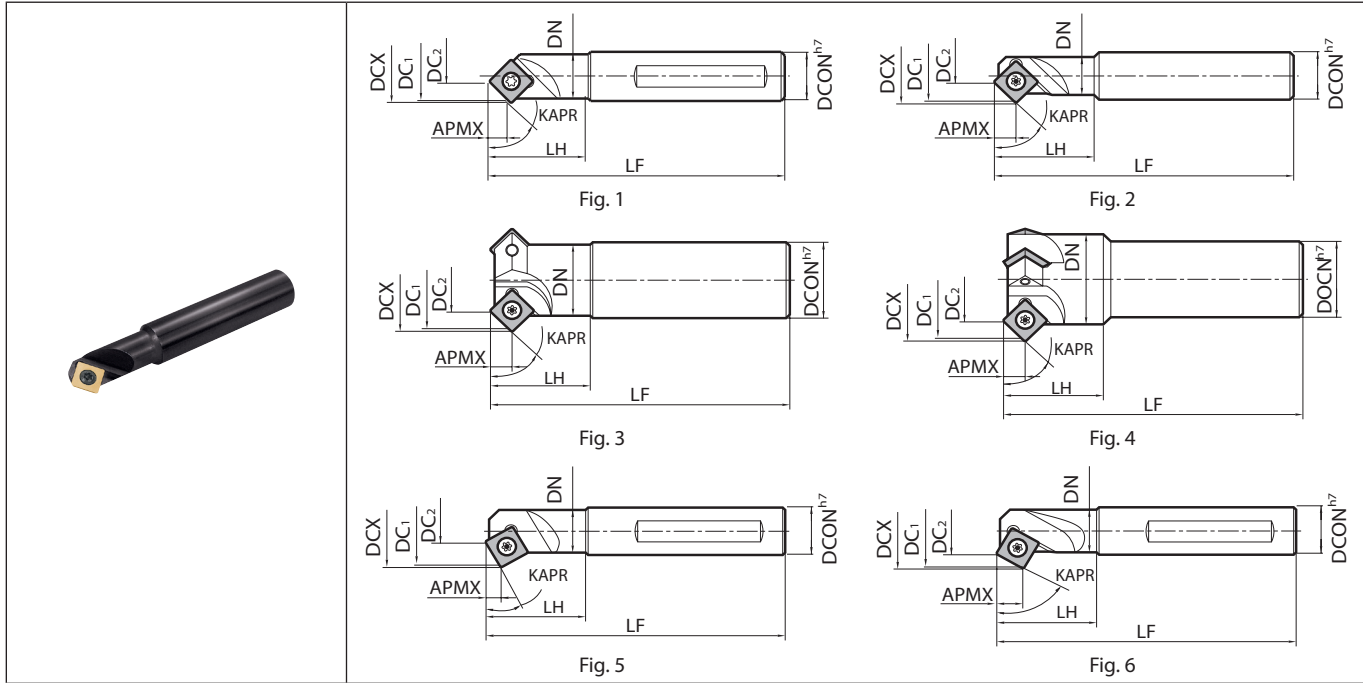
- Mold part
- Vc = 125m/min
- ap x ae = 1.0~2.0x 10mm
- fz = 0.25mm/t
- Dry
- MRX20-S20-08-2T (2 flutes)
- RDGT0803M0ER-GM (PR1525)

PR1525	2 pcs and more Stable tool life
Conventional	1 pc unstable tool life

• Conventional tool machined only 1 pc of workpiece due to unstable tool life, but MRX doubled the tool life with stable machining.
(User evaluation)

M262

MCSE



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)								Standard corner-R(RE)	KAPR (°)	A.R. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts M264
			DCX	DC1	DC2	DCON	LF	LH	APMX	DN							Screw	Wrench	Wrench	
MCSE 104 106 115 227 336	●	1	16	15	4	16	85	31	6.5	15	0.4	45	0	-4.5	No	1	SB-3060TR	DT-10	-	SDKW09T2... SDMT09T204C
			22	21	6	20	121	41	8.6	16	2					SB-5090TR	-	LTW-20		
			31	30	15					18	2									
			43	42	27	30	3													
			52	51	36	32	38	4												
MCSE 104-30D 108-30D 110-30D	●	1	19	18	4	16	85	31	4.7	15	0.4	30	0	-4	No	5	SB-3060TR	DT-10	-	SDKW09T2... SDMT09T204C
			28	27	8	20	110	41	6.3	19	5					SB-5090TR	-	LTW-20		
			30	28	10					18	5									
MCSE 108-60D 120-60D	●	1	19.5	19	8	20	110	41	10	19	60	0	-3.5	No	6	SB-5070TR	-	LTW-20	SEKW1203... SEMT120304C	
			31	30	20					18					6					

● : Standard item



SDKW/SDMT/SEKW/SEMT

Insert		Description	Dimension (mm)				Angle (°)	Carbide / Cermet			Applicable toolholder M263
			IC	S	D1	RE		AN	PVD	KV10	
<p>Low cutting force</p>		SDKW 09T204FN	9.525	2.78	3.4	0.4	15	●	●	●	MCSE104-30D MCSE104
		SDKW 09T204TN	9.525	2.78	3.4	0.4	15	●	●	●	MCSE104-30D MCSE104
		SEKW 120304FN 120308FN	12.7	3.18	5.5	0.4 0.8	20	●	●	●	MCSE106, MCSE108-..D MCSE110-30D, MCSE115 MCSE120-60D, MCSE227 MCSE336
		SEKW 120304TN 120308TN	12.7	3.18	5.5	0.4 0.8	20	●	●	●	MCSE106, MCSE108-..D MCSE110-30D, MCSE115 MCSE120-60D, MCSE227 MCSE336
		SDMT 09T204C	9.525	2.78	3.4	0.4	15	●	●	●	MCSE104-30D MCSE104
		SEMT 120304C	12.7	3.18	5.5	0.4	20	●	●	●	MCSE106, MCSE108-..D MCSE110-30D, MCSE115 MCSE120-60D, MCSE227 MCSE336

Recommended cutting conditions M265

Classification of usage

- ★ : Roughing / 1st Choice
- ☆ : Roughing / 2nd Choice
- : Finishing / 1st Choice
- : Finishing / 2nd Choice
(In case hardness is 45HRC or under)

Carbon steel / Alloy steel	★	■	P
Mold and die steel	★	■	P
Stainless steel	★	■	M
Gray cast iron	☆	■	K
Nodular cast iron	☆	■	K
Non-ferrous metals	★	■	N
Heat-resistant alloy	★	■	S
Titanium alloy	☆	■	S
Hard materials	□	■	H

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill




Ball-nose
Radius

Others

● : Standard item

M264

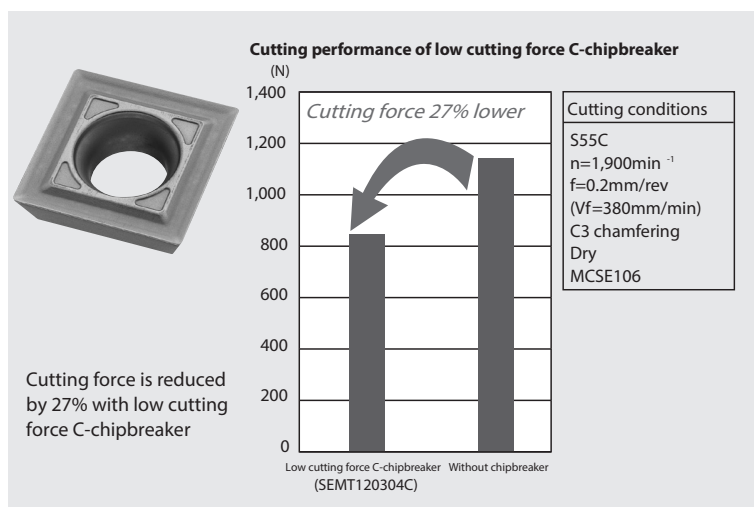
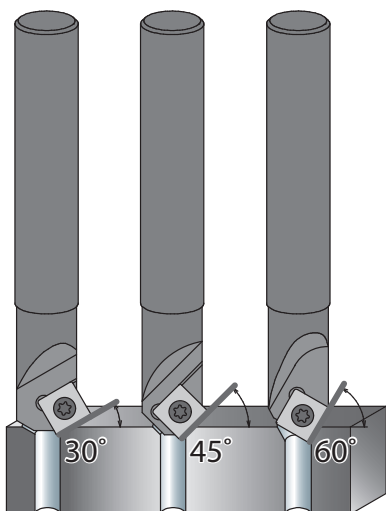
Applicable inserts

Description		Applicable inserts  M264		
				
MCSE	104 104-30D	SDKW 09T204TN	SDKW 09T204FN	SDMT 09T204C
MCSE	106 115 227 336	SEKW 120304TN 120308TN	SEKW 120304FN 120308FN	SEMT 120304C
MCSE	108-30D 110-30D			
MCSE	108-60D 120-60D			

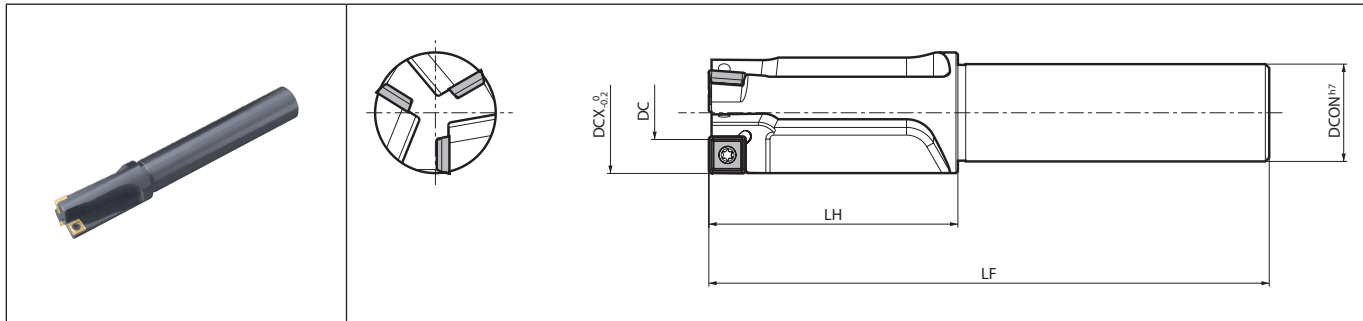
Recommended cutting conditions

Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)		
			Cermet	MEGACOAT	Carbide
	DC ₂ (ø4~ø20)	DC ₂ (ø27~ø36)	TN100M	PR1225	KW10
Carbon steel	0.05~0.25	0.2~0.4	★ 100~180	★ 120~250	-
Alloy steel	0.05~0.25	0.2~0.4	★ 100~180	★ 100~220	-
Mold steel	0.05~0.25	0.2~0.4	★ 100~150	★ 80~180	-
Stainless steel	0.05~0.2	0.1~0.3	☆ 100~180	★ 120~220	-
Cast iron	0.1~0.3	0.3~0.5	-	-	☆ 80~150
Non-ferrous metals	0.1~0.3	0.3~0.5	-	-	★ 100~300



★: 1st Recommendation ☆: 2nd Recommendation



MEF



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					Standard corner-R(RE)	A.R. (°)	R.R. (°)	Objective bolt size	Spare parts		Applicable inserts ➔ M267	
			DC	DCX	DCON	LF	LH					Screw	Wrench		
												Coolant hole			
MEF 11-S10 14-S12 17-S16 18-S16 20-S16 22-S20 23-S20 24-S20 25-S20	●	1	3	11	10	103	23	0.4	+5	-13	M6	No	SB-2250TR	DT-7	SPMT060204E-Z SPMT060208E-Z
			4.5	14	12	108	28				M8				
			7.3	17.5		115	35				M10				
	●	2	7.7	18	16	117	38			-					
			9.5	20		120	40			M12					
			11.4	22		124	44			-					
	●	3	12.4	23	20	126	46			-12	M14				
			13.4	24		128	48			-					
			14.4	25		130	50			-					
MEF 26-S25 27-S25 28-S25 29-S25 30-S25 32-S25 35-S32 39-S32 43-S32 48-S32	●	3	9.8	26	25	132	52	0.8	+5	-13	M16	No	SB-3080TR	DT-10	SPMT090304E-Z SPMT090308E-Z
			10.6	27		134	54				-				
			11.5	28		136	56				-				
	●	4	12.6	29	138	58	-12			M18					
			13.5	30	140	60	-								
			15.5	32	144	64	M20								
	●	4	18.4	35	32	150	70			M22					
			22.5	39		158	78			M24					
			26.2	43		166	86			M27					
	●	31.3	48	176	96	M30									

Although Corner-R(RE) pertains to MEF11-S10, DC = 3.0 mm.



Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

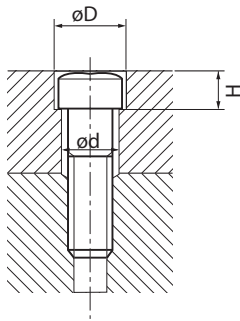
M266

SPMT

Classification of usage ★: Roughing / 1st Choice ☆: Roughing / 2nd Choice ■: Finishing / 1st Choice □: Finishing / 2nd Choice (In case hardness is 45HRC or under)		Carbon steel / Alloy steel	★		P						
		Mold and die steel	★								
		Stainless steel	★		M						
		Gray cast iron	★	☆	K						
		Nodular cast iron	★								
		Non-ferrous metals		★	N						
		Heat-resistant alloy		★	S						
		Titanium alloy	★	☆							
		Hard materials		□	H						
Insert	Description	Dimension (mm)					Angle (°)	Carbide			Applicable toolholder ➡ M266
		IC	S	D1	RE	AN		PVD	-		
	SPMT 060204E-Z 060208E-Z	6.35	2.38	2.5	0.4 0.8	11	●	●	●	MEF(11~25)-S..	
	SPMT 090304E-Z 090308E-Z	9.525	3.18	3.4	0.4 0.8	11	●	●	●	MEF(26~48)-S..	

Recommended cutting conditions ➡ M267

Bolt countersink (Hexagon socket head cap screw)



Nominal screw size	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30
øD (mm)	11	14	17.5	20	23	26	29	32	35	39	43	48
H (mm)	6.5	8.6	10.8	13	15.2	17.5	19.5	21.5	23.5	25.5	29	32
ød (mm)	6.6	9	11	14	16	18	20	22	24	26	30	33
Applicable end mill	MEF11	MEF14	MEF17	MEF20	MEF23	MEF26	MEF29	MEF32	MEF35	MEF39	MEF43	MEF48



Milling

Recommended cutting conditions

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)		
		MEGACOAT		Carbide
		PR1225	PR1210	KW10
Carbon steel	0.1~0.15	★ 120~220	-	-
Alloy steel	0.1~0.15	★ 120~220	-	-
Mold steel	0.05~0.1	★ 100~180	-	-
Stainless steel	0.05~0.1	★ 80~180	-	-
Cast iron	0.1~0.2	-	★ 100~220	☆ 80~120
Non-ferrous metals	0.1~0.2	-	-	★ 100~300

★: 1st Recommendation ☆: 2nd Recommendation

●: Standard item

M267

Points at bolt countersinking

1. Carbon steel

Increase the feed rate to **fz=0.1 ~ 0.15 (mm/t)** for preventing long chips at low feed rates.

Chip control is good when setting (**Vc=80m/min**) for **MEF11~MEF25**, and (**Vc=120m/min**) for **MEF26~MEF48**.

Toolholder description	Vc(m/min)	fz(mm/t)
MEF11~MEF25	80	0.1~0.15
MEF26~MEF48	120	0.1~0.15

2. Sticky materials

Step feed is recommended for good chip control

Increase the feed rate to **fz=0.1 ~ 0.15 (mm/t)** for preventing long chips at low feed rate (**fz=0.05mm/t**).

Use cover to prevent accidents or injury by thick chips at higher feed rates.

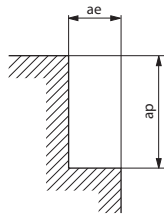
Toolholder description	Vc(m/min)	fz(mm/t)	Step feed (mm)
MEF11~MEF48	80~150	0.1~0.15	0.5~1.5

3. Stainless steel

Use a lower cutting speed. high cutting speeds cause chattering.

Cutting performance when shouldering

MEF bolt countersink end mill is also recommended of shouldering.



Vc=80~120m/min

C55

Dry

Overhang length:
Same as LH in the dimension table

- When shouldering, both side edge and bottom edges function.
- Both edges wear at the same time depending on ap. The insert uses 2 edges instead of 4. (Fig. 1)

- MEF type's side edge is designed to have a slight clearance for the countersinking. Therefore, worked side wall is approx. 1° inclined against the vertical face. (Fig. 2)

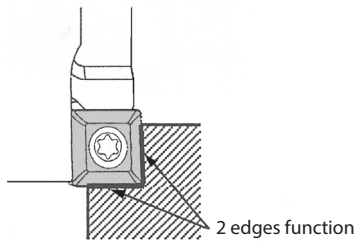


Fig. 1

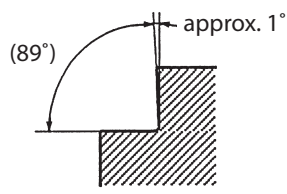


Fig. 2

Description	Cutting range
MEF11-S12 MEF14-S12 MEF17-S16 MEF18-S16	
MEF20-S16 MEF22-S20 MEF25-S20	
MEF26-S25 MEF32-S25 MEF35-S32	
MEF39-S32 MEF43-S32 MEF48-S32	

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

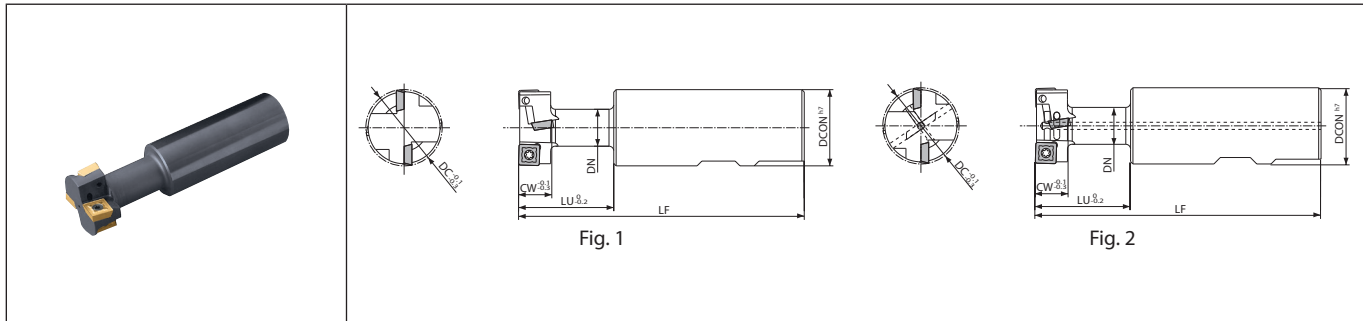
Slot Mill

Ball-nose
Radius

Others

M268

METS



Toolholder dimensions

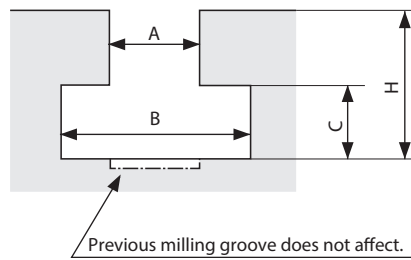
Description	Availability	Inserts	Flutes	Dimension (mm)						A.R. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts		Applicable inserts M270
				DC	DCON	LF	LU	CW	DN					Screw	Wrench	
METS 21-S25	●	2	1	21	25	109	29	9	10.5	+9	-10	No	1	SB-2560TR	DT-8	SDMT060304E-K
METS 25-S25	●	4	2	25	25	112	32	11	12.5				1	SB-3060TR	DT-10	SDMT080308E-K
METS 32-S32	●			32	32	120	38	14	15.5				1	SB-4085TR	DT-15	SDMT120408E-K
METS 40-S32	●	4	2	40	32	130	50	18	20.5	+9	-12	Yes	1	SB-4085TR	DT-15	SDMT120408E-K
METS 50-S32	●			50	32	140	60	22	26.5				2	SB-2560TR	DT-8	SDMT060304E-K
METS 21-S25-H	●			2	1	21	25	109	29				9	10.5	2	SB-3060TR
METS 25-S25-H	●	4	2	25	25	112	32	11	12.5	+9	-10	Yes	2	SB-3060TR	DT-10	SDMT080308E-K
METS 32-S32-H	●			32	32	120	38	14	15.5				2	SB-4085TR	DT-15	SDMT120408E-K
METS 40-S32-H	●			40	32	130	50	18	20.5				2	SB-4085TR	DT-15	SDMT120408E-K
METS 50-S32-H	●	50	32	140	60	22	26.5			-12	Yes	2	SB-4085TR	DT-15	SDMT120408E-K	

METS...-H has air holes

JIS standard of T-slot (Extracted from B0952)

(Unit: mm)


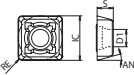
A (Nominal size)	B	C	H	
			Max.	Min.
12	19 ⁺² ₀	8 ⁺¹ ₀	25	20
14	23 ⁺² ₀	9 ⁺² ₀	28	23
18	30 ⁺² ₀	12 ⁺² ₀	36	30
22	37 ⁺³ ₀	16 ⁺² ₀	45	38
28	46 ⁺⁴ ₀	20 ⁺² ₀	56	48



● : Standard item



SDMT

Classification of usage		Carbon steel / Alloy steel		★		P				
		Mold and die steel		★		M				
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Stainless steel		★		K				
		Gray cast iron		★		☆				
■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Nodular cast iron		★		N				
		Non-ferrous metals		★		S				
■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)		Heat-resistant alloy		★		H				
		Titanium alloy		★		☆				
Hard materials		□		□		H				
Insert	Description	Dimension (mm)				Angle (°)	Carbide			Applicable toolholder ➔ M269
		IC	S	D1	RE		AN	PVD	-	
 	SDMT 060304E-K	6.35	3.18	2.8	0.4	15	●	●	●	METS21-S25(-H) METS25-S25(-H)
	SDMT 080308E-K	8	3.18	3.4	0.8	15	●	●	●	METS32-S32(-H)
	SDMT 120408E-K	12.7	4.76	4.4	0.8	15	●	●	●	METS40-S32(-H) METS50-S32(-H)

Recommended cutting conditions ➔ M271

M



Milling

Cutting edge angle
45°~70°

Cutting edge angle
75°

Cutting edge angle
88°/90°

Cutter for
Finishing

High Feed
Cutter

Multi-
Function

Slot Mill

Ball-nose
Radius

Others

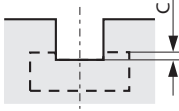
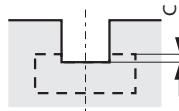
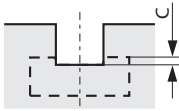
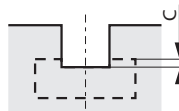
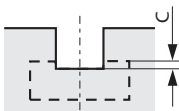
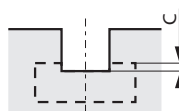
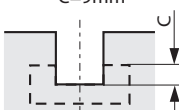
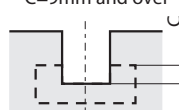
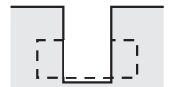
● : Standard item

M270

Recommended cutting conditions

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)		
		MEGACOAT		Carbide
		PR1230	PR1210	KW10
Carbon steel	0.1~0.15	★ 100~200	-	-
Alloy steel	0.08~0.12	★ 100~200	-	-
Mold steel	0.05~0.1	★ 80~150	-	-
Cast iron	0.1~0.15	-	★ 100~200	☆ 80~120
Non-ferrous metals	0.1~0.15	-	-	★ 100~300

★: 1st Recommendation ☆: 2nd Recommendation

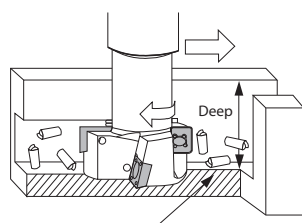
Description (T-Slot nominal size)	Steel			Cast iron		
	Groove shape at pre-process	T-Slotting conditions	Conditions to prevent chattering	Groove shape at pre-process	T-Slotting conditions	Conditions to prevent chattering
METS21-S25(-H) (Nominal size 12)	C=1~3mm 	Vc= 120 fz= 0.1 (n= 1,820) (Vf= 182)	Vc= 60 fz= 0.15 (n= 920) (Vf= 137)	C=1mm and over 	Vc= 120 fz= 0.12 (n= 1,820) (Vf= 218)	Vc= 80 fz= 0.15 (n= 1,210) (Vf= 182)
METS25-S25(-H) (Nominal size 14)	C=1~3mm 	Vc= 120 fz= 0.1 (n= 1,530) (Vf= 306)	Vc= 60 fz= 0.15 (n= 760) (Vf= 228)	C=1mm and over 	Vc= 120 fz= 0.12 (n= 1,530) (Vf= 367)	Vc= 80 fz= 0.15 (n= 1,020) (Vf= 306)
METS32-S32(-H) (Nominal size 18)	C=1~3mm 	Vc= 100 fz= 0.1 (n= 1,000) (Vf= 200)	Vc= 60 fz= 0.15 (n= 600) (Vf= 180)	C=1mm and over 	Vc= 120 fz= 0.12 (n= 1,190) (Vf= 286)	Vc= 80 fz= 0.15 (n= 800) (Vf= 240)
METS40-S32(-H) (Nominal size 22)	C=9mm 	Vc= 80 fz= 0.15 Chattering is likely when set to shallower than C=9mm.	Vz= 60 fz= 0.15 (n= 480) (Vf= 144)	C=9mm and over 	Vc= 120 fz= 0.15 (n= 960) (Vf= 228)	Vc= 80 fz= 0.15 (n= 640) (Vf= 192)
METS50-S32(-H) (Nominal size 28)	Not recommended for steel because of chattering				Vc= 120 fz= 0.15 (n= 760) (Vf= 228)	Vc= 80 fz= 0.15 (n= 510) (Vf= 153)

Cutting speed: Vc(m/min), Revolution: n(min⁻¹), Feed rate fz(mm/t), Table feed Vf(mm/min)

Chattering is likely when fz is less than fz=0.1mm/t. Keep feed rate between fz=0.1 ~ 0.15mm/t.

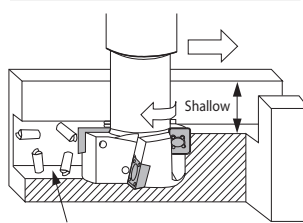
How to prevent damaging chips when steel machining

Before Improvement (Deep Groove at Pre-Process)



Chips stay in the pre-process groove.

After Improvement (Shallow Groove at Pre-Process)



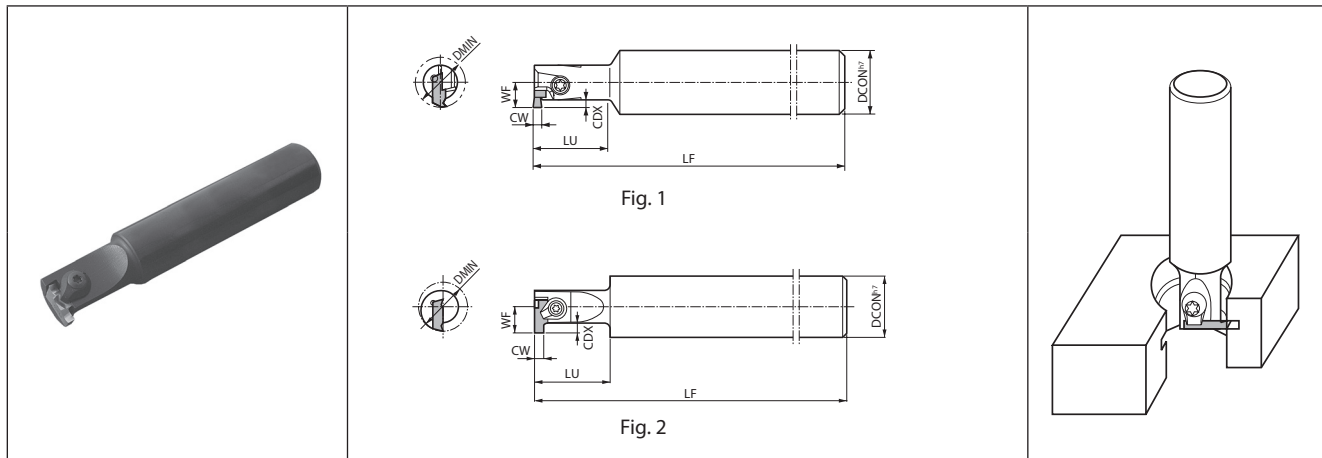
Chips are evacuated backward and chances of damaging chips are less.

Improvement of chip biting

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



MGI



Toolholder dimensions

Description	Availability	Dimension (mm)									Coolant hole	Fig.	Spare parts					Applicable inserts ➔ M273
		DMIN	DCON	LF	LU	CDX	WF	CW min.	CW max.	Clamp set			Clamp set	Screw	Wrench	Wrench		
MGI 1420-1SS	●	14	20	100	20	2.2	6.8	1	3	No	1	-	-	SB-4065TR	-	FT-15	GVR...-020SS	
MGI 1620-1S	●	16	20	110	25	2.2	7.8	1	3.4	No	1	-	-	SB-4085TR	-	FT-15	GVR...-020S	
MGI 2020-1A	●	20	20	110	30	2.2	9.8	1	3.4	No	2	CPS-5F	-	-	-	FT-15	GVR...-020A, GVR...-...AR	
MGI 2220-1B	●	22	20	110	30	2.8	11	1.45	4	No	2	CPS-5F	-	-	-	FT-15	GVR...-020B, GVR...-...BR	
MGI 3225-1C	●	32	25	120	35	5.5 (4.5)	16	2.8	4	No	2	-	CPS-6F	-	LW-3	-	GVR...-020C	

CDX shows available grooving depth.

GVR280-020C, GVR300-020C is available to the groove depth up to 4.5mm.

GVR430 ~ 500-020C can be installed to MGI3225-1C, but not recommended for steel machining because of toolholder's rigidity.



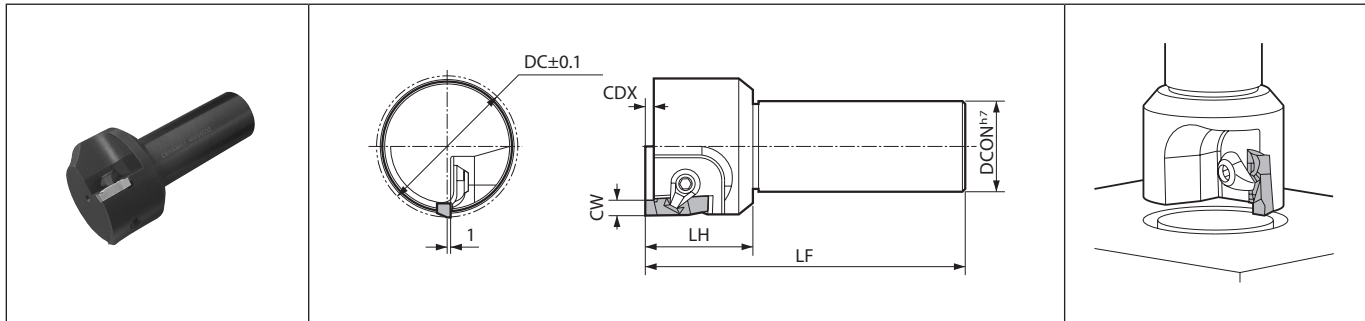
Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M272

MVG



Toolholder dimensions

Description	Availability	Dimension (mm)							Coolant hole	Spare parts		Applicable inserts ➔ M274
		DC	DCON	LF	LH	CDX	CW min.	CW max.		Clamp set	Wrench	
MVG 3032	●	30										GVFR400-020B GVFR430-020B GVFR460-020B GVFR490-020B
3532	●	35										
4032	●	40										
4532	●	45	32	120	40	5.2	4	4.9	No	CPS-6V	LW-3	
5032	●	50										
5532	●	55										
6032	●	60										

CDX shows available grooving depth.

M

GVFR



Milling

Classification of usage		Dimension (mm)							Tolerance (mm)		Carbide		Cermet	Applicable toolholder ➔ M274	
<ul style="list-style-type: none"> ● : Continuous ~Light interruption / 1st Choice ☺ : Continuous ~Light interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice 		No. of edges	CW	CDX	S	RE	INSL	W1	CW min.	CW max.	PVD	-	-		
Carbon steel / Alloy steel		●	●	●	●	●	●	●	●	●	●	●	●	●	P
Stainless steel		●	●	●	●	●	●	●	●	●	●	●	●	●	M
Gray cast iron		●	●	●	●	●	●	●	●	●	●	●	●	●	K
Non-ferrous metals		●	●	●	●	●	●	●	●	●	●	●	●	●	N
Titanium alloy		●	●	●	●	●	●	●	●	●	●	●	●	●	S
Hard materials (~ 40HRC)		●	●	●	●	●	●	●	●	●	●	●	●	●	H
Hard materials (40HRC ~)		●	●	●	●	●	●	●	●	●	●	●	●	●	H
Insert	Description	No. of edges	CW	CDX	S	RE	INSL	W1	CW min.	CW max.	PR1225	PR930	KW10	TC60N	TC60M
	GVFR 400-020B 430-020B 460-020B 490-020B	2	4 4.3 4.6 4.9	5.3	5	0.2	20	5.8	-0.03	+0.03	●	●	●	●	●

CDX shows available grooving depth.

Right-hand shown

Recommended cutting conditions ➔ M275

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M274

MGI

Recommended cutting conditions

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)				
		Cermet		MEGA COAT	PVD Coated carbide	Carbide
		TC40	TC60	PR1225	PR930	KW10
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	-
Stainless steel	0.03~0.12	☆ 100~180	★ 80~150	★ 60~130	☆ 60~130	-
Cast iron	0.05~0.2	☆ 100~150	-	-	-	★ 80~150
Non-ferrous metals	0.05~0.2	-	-	-	-	★ 100~300

Use down-cut machining.

★: 1st Recommendation ☆: 2nd Recommendation

MVG

Recommended cutting conditions

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)				
		Cermet		MEGACOAT	PVD coated carbide	Carbide
		TC40	TC60	PR1225	PR930	KW10
Carbon steel	0.05~0.15	★ 120~200	☆ 100~180	★ 80~170	☆ 80~150	-
Alloy steel	0.05~0.15	★ 120~200	☆ 100~180	★ 80~170	☆ 80~150	-
Mold steel	0.03~0.12	★ 100~180	☆ 80~150	★ 60~150	☆ 60~130	-
Stainless steel	0.03~0.12	☆ 100~180	☆ 80~150	★ 60~150	☆ 60~130	-
Cast iron	0.05~0.2	-	-	-	-	★ 80~150
Non-ferrous metals	0.05~0.2	-	-	-	-	★ 100~300

★1st Recommendation ☆2nd Recommendation



Milling

S-type inserts

Insert		Description	No. of edges	Dimension (mm)							Angle (°)		Carbide				Cermets	Applicable toolholder		
				IC	S	BCH	INSL	RE	BS	AN	AS	CVD	PVD	-	-					
				CA420M	PR1210	PR1225	KW10	TN100M												
		<p>Classification of usage</p> <p>★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)</p>																		
		<p>Carbon steel / Alloy steel</p> <p>Mold and die steel</p> <p>Stainless steel</p> <p>Gray cast iron</p> <p>Nodular cast iron</p> <p>Non-ferrous metals</p> <p>Heat-resistant alloy</p> <p>Titanium alloy</p> <p>Hard materials</p>																		
		<p>P</p> <p>M</p> <p>K</p> <p>N</p> <p>S</p> <p>H</p>																		
		SDKN 1203AUFN	4	12.7	3.18	0.5	-	-	1.2	15	23									
		SDKN 1203AUTN	4	12.7	3.18	0.5	-	-	1.2	15	23									
		SDKN 1504AUTN	4	15.875	4.76	0.5	-	-	1.2	15	23									
		SDKR 1203AUFN-S	4	12.7	3.18	0.5	-	-	1.7	15	23									
		SDMR 1203AUFN-H	4	12.7	3.18		-	1	0.8	15	23									
		SEEN 1203AFTN	4	12.7	3.18	0.5	-	-	1.4	20	25									
		SEKN 1203AFFN	4	12.7	3.18	0.5	-	-	1.4	20	25									
		SEKN 1203AFTN	4	12.7	3.18	0.5	-	-	1.4	20	25									
		SEKN 1204AFTN	4	12.7	4.76	0.5	-	-	1.4	20	25									
		SEKN 1504AFTN	4	15.875	4.76	0.5	-	-	1.4	20	25									
		SEEN 1203AFFR-W	1	12.7	3.18	-	14.56	-	3.5	20	25									
		SEEN 1203AFTR-W	1	12.7	3.18	-	14.56	-	3.5	20	25									
		SEKN 1203EFTR	4	12.7	3.18	1.2	-	-	1.4	20	25									
		SEKR 1203AFEN-S	4	12.7	3.18	0.5	-	-	1.7	20	25									
		SEMR 1203AFER-H	4	12.7	3.18	-	-	1	1	20	25									

Handed insert shows Right-hand

M

Milling









- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M276

SEEN-W inserts are sold in 5 piece boxes

S-type inserts


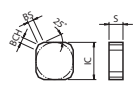

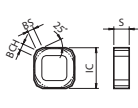

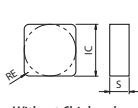
Insert		Description	Dimension (mm)					Angle (°)		Carbide				Cermet	Applicable toolholder		
			IC	S	BCH	RE	BS	AN	AS	CVD	PVD	-	-				
										CA420M	PR1210	PR1225	KW10	TN100M		TN60	
		SPCN 1203EDTR	12.7	3.18	-	1	2	11	15					★		P	
		SPKN 1203EDER	12.7	3.18	1	-	1.6	11	15	●					★		M
		SPKN 1203EDFR	12.7	3.18	1	-	1.6	11	15						★		M
		SPKN 1203EDTR 1203EDTL	12.7	3.18	1	-	2	11	15		●	●			★		K
		SPKN 1504EDFR	15.875	4.76	1	-	2.2	11	15						★		N
		SPKN 1504EDTR	15.875	4.76	1	-	2.2	11	15		●	●			★		S
		SPEN 1203EEER	12.7	3.18	1	-	1.4	11	20	●							
		SPEN 1203EESR	12.7	3.18	1	-	1.4	11	20		●						
		SPCN 1203XPTR	12.7	3.18	-	1	2	11	11						●		
		SPKN 1203XPFR	12.7	3.18	1	-	2	11	11						●		
		SPKN 1203XPTR	12.7	3.18	-	1	2	11	11						●		
		SPKN 1504XETR	15.875	4.76	1	-	2	11	20						●		
		SPCN 1904EETR1	19.05	4.76	0.7	-	1.2	11	20						●		
		SPKR 1203EDER-S	12.7	3.18	-	2	1	11	15					●			
		SPMR 1203EDER-H	12.7	3.18	-	1	2	11	15					●			
		SPGN 090304 090308	9.525	3.18	-	0.4 0.8	-	11	-						● ●		
		SPGN 120304 120308	12.7	3.18	-	0.4 0.8	-	11	-						● ●		
		SPMN 120308 120312	12.7	3.18	-	0.8 1.2	-	11							● ●		
		SPMN 120408 120412	12.7	4.76	-	0.8 1.2	-	11		●	●				● ●		

Handed insert shows Right-hand

● : Standard item



S-type inserts

Insert		Description	No. of edges	Dimension (mm)					Angle (°)		Carbide			Applicable toolholder
				IC	S	RE	BCH	BS	AN	AS	CVD	PVD	Cermat	
<p>Classification of usage</p> <p>★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)</p>														
Carbon steel / Alloy steel														P
Mold and die steel														
Stainless steel														M
Gray cast iron											★	☆		K
Nodular cast iron											★	☆		
Non-ferrous metals														N
Heat-resistant alloy														S
Titanium alloy											★			
Hard materials														H
		SNCN 1204XNTN	8	12.7	4.76	-	2	2	-	-			●	-
		SNKN 1204XNTN	8	12.7	4.76	-	2	2	-	-			●	-
		SNMF 1204XNTN	8	12.7	4.76	-	2	2	-	-			●	-
		SNMN 120408	8	12.7	4.76	0.8	-	-	-	-			●	-
		SNMN 120412				1.2						●		
		SNMN 120424				2.4						●		

Handed insert shows Right-hand



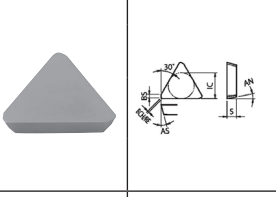
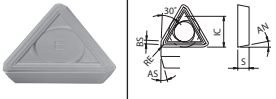
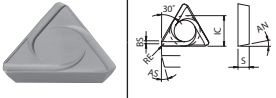
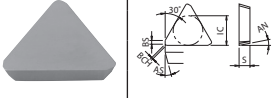
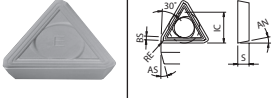
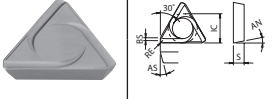
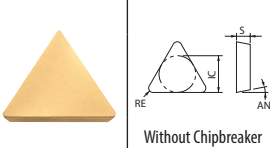
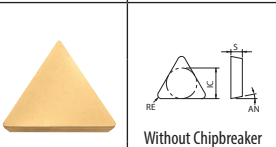
Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M278

T type inserts

Insert		Description	No. of edges	Dimension (mm)					Angle (°)		Carbide		Cermet	Applicable toolholder
				IC	S	BCH	RE	BS	AN	AS	PVD	-	-	
											PR1210 PR1225	KW10	TN100M Ti60	
		TEKN 1603PTFR	3	9.525	3.18	0.7	-	1.4	20	22		●		-
		TEKN 1603PTTR	3	9.525	3.18	0.7	-	1.4	20	22	●	●	●	
		TEEN 2204PTTR	3	12.7	4.76	-	1	1.4	20	22		●		
		TEKN 2204PTFR	3	12.7	4.76	0.7	-	1.4	20	22	●	●		
		TEKN 2204PTTR	3	12.7	4.76	0.7	-	1	1.4	20	22	●	●	
		TEKR 2204PTER-S	3	12.7	4.76	-	1	1.4	20	22	●			-
		TEMR 1603PTER-H	3	9.525	3.18	-	0.8	1.2	20	22	●			-
		TEMR 2204PTER-H	3	12.7	4.76	-	1	1.4	20	22	●			-
		TPKN 1603PDFR	3	9.525	3.18	0.7	-	1.2	11	15		●		-
		TPKN 1603PDTR	3	9.525	3.18	0.7	-	1.2	11	15	●	●	●	
		TPKN 2204PDFR	3	12.7	4.76	0.7	-	1.6	11	15		●		
		TPKN 2204PDTR	3	12.7	4.76	0.7	-	1.6	11	15	●	●	●	
		TPKR 2204PDER-S	3	12.7	4.76	-	1	1.4	11	15	●			-
		TPMR 1603PDER-H	3	9.525	3.18	-	0.8	1.2	11	15	●			-
		TPMR 2204PDER-H	3	12.7	4.76	-	1	1.4	11	15	●			-
 <p>Without Chipbreaker</p>		TPGN 090202 090204	3	5.56	2.38	-	0.2 0.4	-	11	-		●	●	-
		TPGN 110302 110304 110308	3	6.35	3.18	-	0.2 0.4 0.8	-	11	-		●	●	
		TPGN 160304 160308	3	9.525	3.18	-	0.4 0.8	-	11	-		●	●	
		TPGN 160304 160308 160312	3	9.525	3.18	-	0.4 0.8 1.2	-	11	-		●	●	
 <p>Without Chipbreaker</p>		TPMN 110304 110308	3	6.35	3.18	-	0.4 0.8	-	11	-		●	●	-
		TPMN 160304 160308 160312	3	9.525	3.18	-	0.4 0.8 1.2	-	11	-		●	●	
		TPMN 220408	3	12.7	4.76	-	0.8	-	11	-		●		

Handed insert shows Right-hand

● : Standard item



PCD inserts

Classification of usage			Carbon steel / Alloy steel											P				
			Mold and die steel											M				
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)			Stainless steel											K				
			Gray cast iron											N				
			Nodular cast iron											S				
			Non-ferrous metals											H				
			Heat-resistant alloy															
			Titanium alloy															
			Hard materials															
			Insert	Description	No. of edges	Dimension (mm)										Angle (°)		PCD
IC	W1	S				D1	RE	INSL	LE	BCH	BS	AN	AS	KPD001	KPD010	KPD230		
		NDCW 150302FRX 150302FRX-NE	1	-	9.525	3.18	4.4	0.2	15	5.7 5.1	-	-	-	15	●	●	●	DMC...SX(...) DMC...H
		SDKN 1203AUFN 1203AUFN-NE	1	12.7	-	3.18	-	-	-	3.6 3.1	0.5	1.2	15	23	●	●	●	-
		SEEN 1203AFFN 1203AFFN-NE	1	12.7	-	3.18	-	-	-	3.5 3	0.5	1.4	20	25	●	●	●	-
		TEEN 1603PTFR 1603PTFR-NE	1	9.525	-	3.18	-	-	-	4.7 4.1	0.6	1.4	20	22	●	●	●	-
		TEKN 2204PTFR 2204PTFR-NE	1	12.7	-	4.76	-	-	-	4.8 4.2	0.7	1.8	20	22	●	●	●	-
		TPGN 110302 110304	1	6.35	-	3.18	-	0.2 0.4	-	3.9 3.7			11		●	●	●	-

Handed insert shows Right-hand



Milling

- Cutting edge angle 45°~70°
- Cutting edge angle 75°
- Cutting edge angle 88°/90°
- Cutter for Finishing
- High Feed Cutter
- Multi-Function
- Slot Mill
- Ball-nose Radius
- Others

● : Standard item

M280

CBN & PCD Inserts are sold in 1 piece boxes

