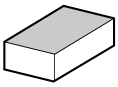
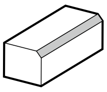
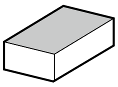
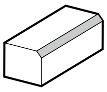
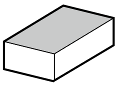
Milling

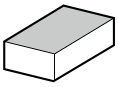
M

Cutting edge angle 45˚/66°/70°/75°

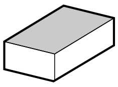
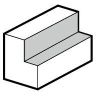
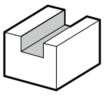
Cutting edge angle	Applications Shape	Facing	Chamfering
			
45°	MB45  M16~M18	• Economical double-sided 8-edge insert • Delivers the "low cutting force" benefits of positive inserts and the "fracture resistance" benefits of negative inserts • End mills have ø32 cylindrical shank	
	MFPN45  M22~M25	• 10-edge pentagonal inserts (double-sided) • Low cutting force with helical cutting-edge design • Dual cutting edge design (High toughness) • End mills have ø32 cylindrical shank	
	MFSE45  With Wiper Insert M38	• Roughing condition (fz = 0.25 mm/t) Provides Excellent surface finish (0.8 μmRa 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 Shape	Facing	Chamfering
			
45°	MFLN45  M44	• For heavy milling • Tough 4-edge vertical inserts • For large depths of cut and high feed rates • Max. ap 12 mm	

Cutting edge angle	Applications Shape	Facing
		
66°	MFPN66  M31~M33	• Double-sided 10-edge insert • Cutting edge angle 66˚ • Reduces chattering with low cutting force design • End mills have ø32 cylindrical shank
75°	MSRS15  M59	• For heavy milling • Max. ap 12 mm • High chip evacuation rate per unit

Cutting edge angle	Applications Shape	Facing
		
70°	MFLN70  M45	• For heavy milling • Tough 4-edge vertical inserts • For large depths of cut and high feed rates • Max. ap 17 mm
	MFK  M50	• 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)
	MFK-SF  M52	• 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)

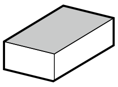
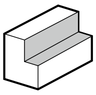
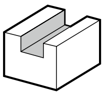
<table>
<tr><th rowspan="2">Cutting edge angle</th><th rowspan="2">Applications
Shape</th><th>Facing</th><th>Shouldering</th><th>Slotting</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td rowspan="4">90°</td><td>MA90

➡ M66~M68</td><td colspan="3" rowspan="2">• Economical double-sided 4-edge insert
• Original tangential 90° end mill
• Newly designed inserts high quality surface finish and excellent wall accuracy
• Supports multi-functional machining such as 3D milling</td></tr>
<tr><td>MA90 head
(Modular type)

➡ M69</td></tr>
<tr><td>MEW

➡ M76~M78</td><td colspan="3" rowspan="2">• Economical double-sided 4-edge insert
• Obtuse edge increases cutting edge toughness
• Smooth surface wall with low cutting force and reduced chattering</td></tr>
<tr><td>MEW head
(Modular type)

➡ M79</td></tr>
</table>

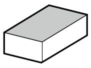
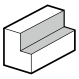
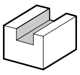
<table>
<tr><th rowspan="2">Cutting edge angle</th><th rowspan="2">Applications
Shape</th><th>Facing</th><th>Shouldering</th><th>Slotting</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td rowspan="2">90°</td><td>MFWN

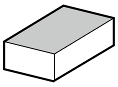
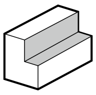
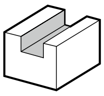
➡ M131, M132, M134</td><td colspan="3">• Economical double-sided 6-edge insert
• Superior fracture resistance with thick edge design
• “Large slant edge” design reduces shock when cutting edge enters the workpiece
• Low cutting force and reduce chattering
• End mills have ø32 cylindrical shank</td></tr>
<tr><td>MFWN Mini

➡ M139, M140</td><td colspan="3">• 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</td></tr>
<tr><td>88°</td><td>MFSN88

➡ M145, M147</td><td colspan="3">• Economical double-sided 8-edge insert
• Reduces chattering with low cutting force design
• Contribute to cost-cutting for Shoulder Roughing
• End mills have ø32, ø40 cylindrical shank</td></tr>
</table>

Cutting edge angle 90˚

Cutting edge angle	Applications Shape	Facing	Shouldering	Slotting
				
90°	MEC  M86~M89	• Good squareness • Low cutting force • The silver coating prevents chip wear on the tool body • With coolant hole (Over shank size ⌀16) • The twisted cutting edge improves cutting performance • Smooth surface of shoulder wall		
	MEC head (Modular type)  M90			
	MECX  M98, M99	• Good squareness • Small size insert with multi-edge specification • Recommended for small machines: low cutting force and high strength design • The silver coating prevents chip wear on the tool body • With coolant hole		

Cutting edge angle	Applications Shape	Facing	Shouldering	Slotting
				
90°	MEV  M106, M107	• Newly developed vertical triangle inserts • Economical 3-edge insert • The MEV can perform a wide variety of machining processes		
	MEV head (Modular)  M108			
	DMC-H  M171	• High Rake • For small milling machine and M/C		
	DMC-SX  M170	• For small milling machine and M/C		

Cutting edge angle 90˚ (Heavy milling)

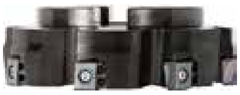
<table>
<tr><th rowspan="2">Cutting edge angle</th><th rowspan="2">Applications
Shape</th><th>Facing</th><th>Shouldering</th><th>Slotting</th></tr>
<tr><th></th><th></th><th></th></tr>
<tr><td rowspan="6">90°(Long cutting edge)</td><td>MEWH

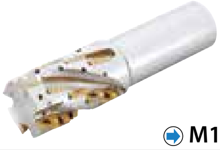
M112</td><td colspan="3">• Low cutting force and sharp cutting performance
• Excellent surface finish quality
• Economical double-sided 4-edge insert
• High quality and stable machining with heavy milling</td></tr>
<tr><td>MEWH shell mill

M113</td><td colspan="3">• MEWH shell mill</td></tr>
<tr><td>MSRS90

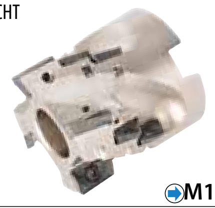
M159</td><td colspan="3">• High efficiency, low cutting force and stable machining without chatter
• Various expansive possibilities with combining neutral insert and custom-ordered cutter</td></tr>
<tr><td>MSR

M165</td><td colspan="3">• Low cutting force and restrain chattering with notched insert
• Chipbreaker design with specialized notches improves chip evacuation
• Chipbreaker achieves stabilized machining for heavy milling</td></tr>
<tr><td>MSR-BT50

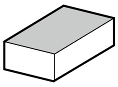
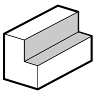
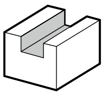
M166</td><td colspan="3">• Highly rigid BT50 Arbor integrated for MSR</td></tr>
<tr><td>MFLN90

M152</td><td colspan="3">• 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</td></tr>
</table>

<table>
<tr><th rowspan="2">Cutting edge angle</th><th rowspan="2">Applications
Shape</th><th>Facing</th><th>Shouldering</th><th>Slotting</th></tr>
<tr><th></th><th></th><th></th></tr>
<tr><td rowspan="4">90°(Long cutting edge)</td><td>MECH

M116</td><td colspan="3">• Notched insert improves higher productivity</td></tr>
<tr><td>MECH shell mill

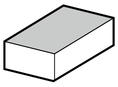
M117</td><td colspan="3">• MECH shell mill</td></tr>
<tr><td>MECH-BT50
MECH-BT50SA

M118, M119</td><td colspan="3">• Highly rigid BT50 Arbor integrated for MECH
• Head exchangeable type is available (MECH-BT50SA)</td></tr>
<tr><td>MECHT

M127</td><td colspan="3">• Excellent chattering resistance and good chip control with special design for titanium alloys
• End mills have ø32, cylindrical shank</td></tr>
</table>

Cutting edge angle 90° (For aluminum alloys)

Cutting edge angle	Applications / Shape	Facing	Shouldering	Slotting
				
90°	MFAH  ➡ **M176~M178**	• High efficiency milling cutter for finishing aluminum alloys • Light-weight hybrid body with internal coolant available/Steel body • Adjustable cutting edge height • 3 different cutting edge design		
	MEAS  ➡ **M186**	• High efficiency milling cutter for finishing aluminum alloys • Excellent scatter prevention to ensure stable		

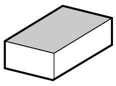
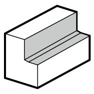
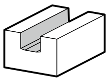
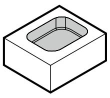
For finishing operations

Applications / Shape	Facing
	
MFF  ➡ **M193**	• High-quality surface finish • Molded wiper insert • Cutter body design provides excellent reliability • Easy-to-adjust cutting edge

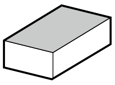
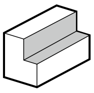
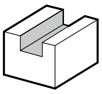
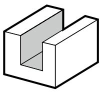
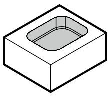
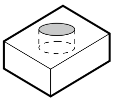
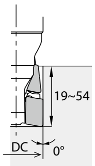
M

Milling

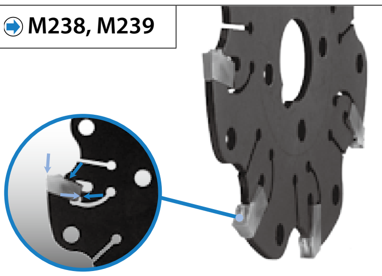
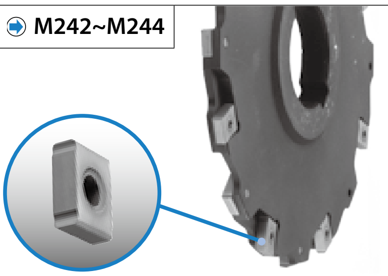
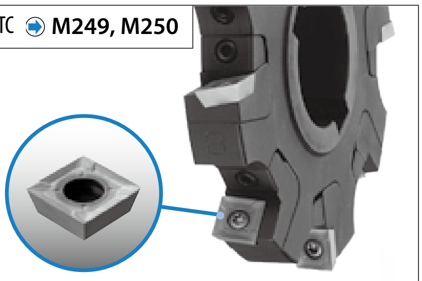
High feed cutter

Applications Shape	Facing	Shouldering	Slotting	Pocketing	Cutting diameter DC
					ø8 ø16 ø25 ø32 ø40 ø50 ø80 ø160
MFH Harrier (Face mill)  M198,M199	• Various applications with 4 types of inserts  GM type (General purpose)  GH type (Tough edge)  LD type (Large D.O.C.) MAX. ap = 5mm  FL type (With wiper edge) Roughing and finishing • 3D convex cutting edge reduces shock of biting workpiece • Multi-functional cutter for ramping, helical milling vertical milling (plunging) etc. (GM/GH type)				(SOMT10 type) ø50 ø80 ø50 ø160 (SOMT14 type)
MFH Harrier (End mill)  M200,M201					(SOMT10 type) ø25 ø40 (SOMT14 type) ø50 ø80
MFH Harrier (Modular type)  M202					(SOMT10 type) ø25 ø40
MFH Boost (Face mill)  M212	• Economical double-sided 4-edge insert • High feed milling with large depth of cut capabilities  GM type (General purpose) • Achieves high efficiency machining in various shouldering, slotting, helical milling, and ramping applications				ø40 ø80
MFH Boost (End mill)  M211					ø22 ø40
MFH Boost (Modular type)  M213					ø22 ø42
MFH mini (Face mill)  M219	• Economical double-sided 4-edge insert  GM type (General purpose)  GH type (Tough edge) • High efficiency and high feed machining at small dia. machining and small machining center				ø40 ø50
MFH mini (End mill)  M218					ø16 ø32
MFH mini (Modular type)  M220					ø16 ø32
MFH micro (end mill)  M226	• Micro diameter cutter for high feed machining • High efficiency machining with low cutting force and reduced chattering 				ø8 ø16
MFH micro (modular type)  M227					ø8 ø16

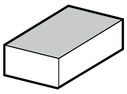
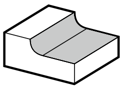
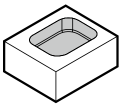
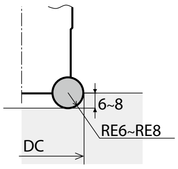
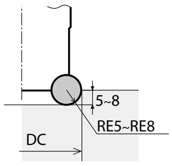
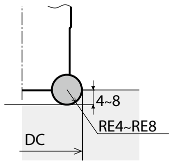
Multi-function machining end mill

Applications / Shape	Facing	Shouldering	Slotting	Deep slotting	Pocketing	Drilling	Lead angle and max. ap	Cutting dia. DC
								ø16 ø25 ø50
MEY  ➡ **M230**	• Multi-function machining (Drilling/Ramping/ Shouldering/Grooving) • High efficiency mold machining • Low cutting force, Good chip evacuation		• Full 2-insert structure and high stability • Good chip control when Ramping		• Cutting diameters that are larger than the shank diameters enables wall shouldering • The silver coating prevents chip wear on the tool body			

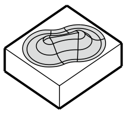
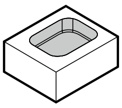
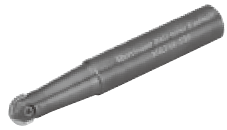
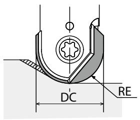
Slot mill MST

MSTA ➡ **M238, M239**	MSTB ➡ **M242~M244**	MSTC ➡ **M249, M250**
		
• Self-clamping type • Remove insert with appropriate wrench	• Easy screw on tangential clamped insert	• Adjustable slotting width due to unique cam adjustment structure

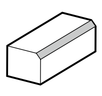
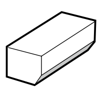
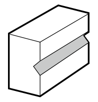
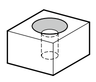
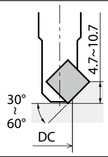
Radius

Applications / Shape	Facing	Shouldering	Pocketing	Lead angle and max. ap	Cutting dia. DC ø12 ø16 ø32 ø40 ø50 ø63 ø80 ø100 ø125
					
MRW  M264 M266	• 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				ø32 ø125
MRX face mill  M271	• 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				ø40 ø125
MRX end mill  M274					ø16 ø63
MRX head (Modular type)  M275					ø16 ø40

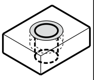
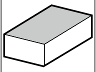
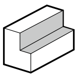
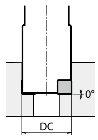
Ball-nose end mill

Applications / Shape	Contouring/Profiling	Pocketing	Lead angle and max. ap	Cutting dia. DC ø8 ø25 ø50 ø80
				
MRF  M258	• For high quality mold finishing • High R-accuracy (Insert's R-accuracy: ±0.01mm or under) • The bushing ensures insert installation accuracy			ø8 ø25
MRFW  M259	• 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

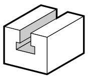
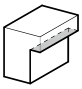
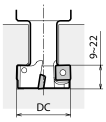
Chamfering

Applications / Shape	Chamfering	Back chamfering	V shape slotting	Countersinking	Lead angle and max. ap
					
MCSE  **M280**	For 30˚, 45˚, 60˚ chamfering Economical 4-edge insert Available back chamfering				

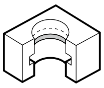
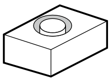
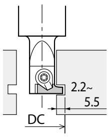
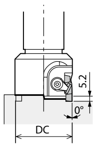
Bolt countersinking

Applications / Shape	Bolt countersinking	Facing	Shouldering	Lead angle and max. ap
				
MEF  **M284**	Countersink for hexagon socket bolt (M6 ~ M30) Economical 4-edge insert			

T-Slotting

Applications / Shape	T-Slotting	Back side milling	Lead angle and max. ap
			
METS  **M287**	T-Slotting Recommended for high feed machining with 2 flute design Economical 4-edge insert		

Grooving

Applications / Shape	Internal grooving	Ring grooving	Lead angle and max. ap
			
MGI  **M290**	Edge width 1.0 ~ 4.0mm Grooving for M/C		
MVG  **M292**		Cutting dia. ø30 ~ ø75 Edge width 4.0 ~ 4.9mm O-Ring grooving	

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.

Shape

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

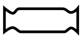
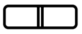
Relief angle

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

Insert's periphery is as fired.

* Tolerance difference is depending on insert size.

Tolerance

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

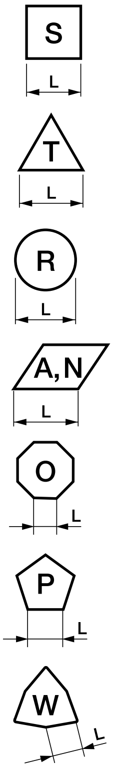
Chipbreaker / Hole

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

Edge preparation

S E K N 12 03 A F T N -

Edge length

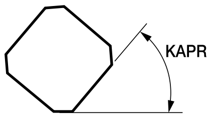


Tickness

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

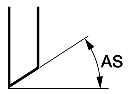
Cutting edge angle

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°



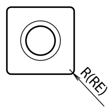
Hand of tool

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	

New 45° General purpose milling series

MB45

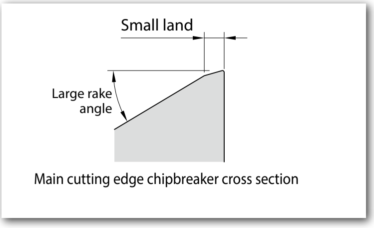
Provides high quality and high performance machining solutions with long tool life
Delivers the "low cutting force" benefits of positive inserts and the "fracture resistance" benefits of negative inserts, and provides excellent surface finish

1 "Versatility" + "Quality" Large insert lineup
Supports a wide variety of machining applications

Five types of inserts for various machining applications
Economical inserts with 8 cutting edges
General purpose GM insert with E-Class and M-Class options based on required machining accuracy

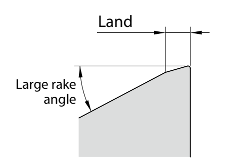
Low cutting force SM (E-Class)

Sharpness oriented with a low cutting force design
-10% cutting resistance compared to general purpose GM insert
Recommended for small machines (BT30)



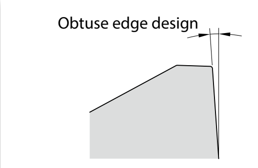
General GM (E-Class / M-Class)

1st recommendation for steel machining
Low cutting force and fracture resistance
E-Class or M-Class selectable



Tough edge GH (M-Class)

Tough cutting edge and excellent fracture resistance
Obtuse edge design is resistant to chipping
Recommended for intermittent machining



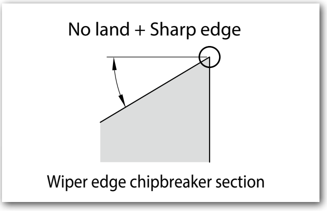
Wiper insert W (E-Class)

Ultra-long wiper edge (Wiper edge length approx. 8 mm)

* Double-sided
2-edge insert

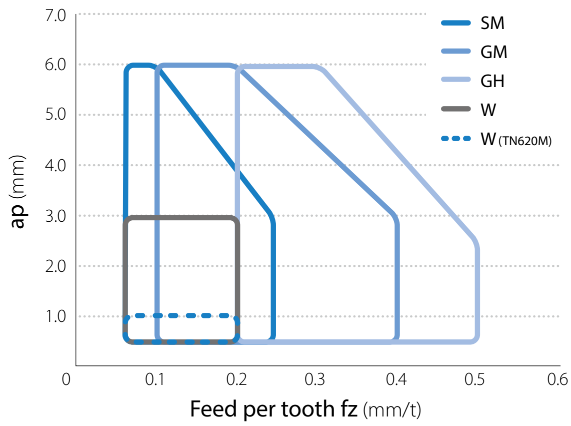
for Aluminum Alloys AM

No land + Sharp edge specifications
Excellent sharpness

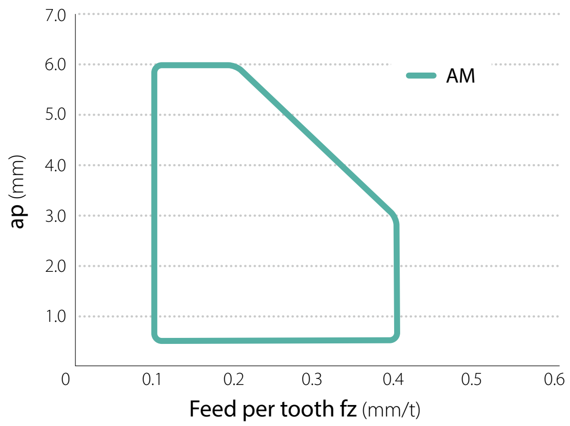


Applicable insert range

Steel



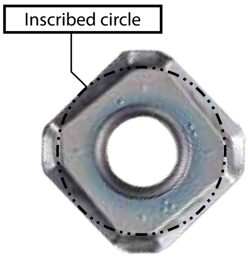
Aluminum alloy



When to use GM (Class E/M)

Selection by machining application

Surface finish oriented : GM (E-Class)
Cost-effective and surface finish oriented : GM (M-Class)
Efficiency and surface roughness oriented: W (E-Class)



Criteria	GM (E-Class)	GM (M-Class)	W (E-Class) * Wiper
Tolerance	Inscribed circle tolerance ±0.013mm	Inscribed circle tolerance ±0.005mm	Inscribed circle tolerance ±0.013mm
Surface finish	○ Approx. 1.6μmRa	△ Approx. 3.2μmRa	◎ Approx. 0.8μmRa or less
(Gloss)	(○)	(◎)	(◎)
Machining efficiency	○	○	◎
Economy	○	◎	△

*Surface finish is based on internal assessment and varies depending on the machining environment

Toolholder Lineup

Coarse pitch	Fine pitch	Extra fine pitch	Shank type
 Recommended for workpieces or machines with low rigidity (such as sheet machining or BT30) Economical	 1st recommendation Good balance of stability, machining accuracy and efficiency Supports a wide range of machining areas	 Recommended for high rigid workpiece and machine	 Compatible with milling chucks (face mill recommended basically) *Shank size: ø32
Cutting diameter ø80 to ø315 (inch spec) Cutting diameter ø40 to ø315 (metrics) *ø315: Made to order	Cutting diameter ø80 to ø315 (inch spec) Cutting diameter ø40 to ø315 (metrics) *ø315: Made to order	Cutting diameter ø80 to ø250 (inch spec) Cutting diameter ø40 to ø250 (metrics)	Cutting diameter ø40 to ø80

2 "Versatility" + "Long tool life" Large lineup of insert grades
Steel, stainless steel, cast iron, heat-resistant alloys to aluminum alloy machining

For steel, stainless steel and cast iron

PR1825/PR1835/PR1810 New development MEGACOAT NANO EX

PR1825 **P**
For Steel (Wear resistance oriented)

PR1835 **M**
For Steel (Stability oriented)
1st Recommendation for stainless steel

PR1810 **K**
For Cast iron

Workpiece	P Steel					M Stainless steel					K Cast iron				
ISO	01	10	20	30	40	01	10	20	30	40	01	10	20	30	40
Grade		Wear resistance oriented PR1825 Stability oriented PR1835					1st Recommendation PR1835				1st Recommendation PR1810				

For hardened material

PR015S MEGACOAT HARD PVD coating

For steel Surface finish oriented

TN620M Cermet

For stainless steel and heat-resistant alloys

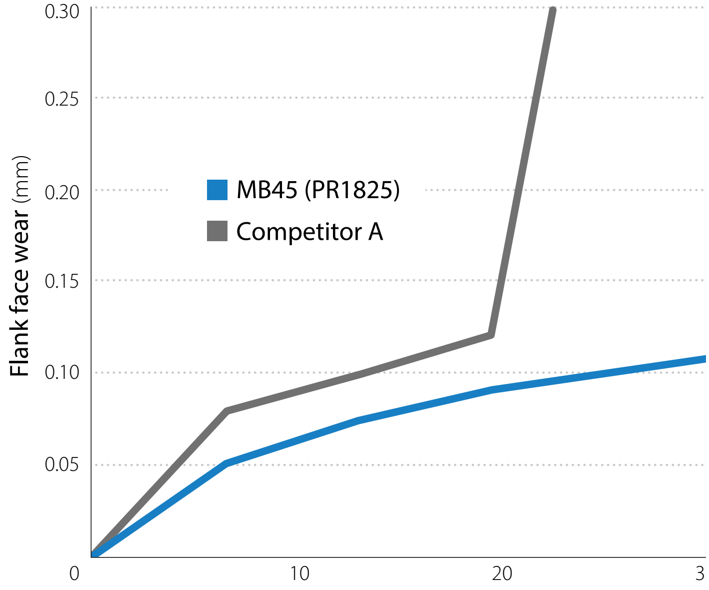
CA6535 CVD coating

For aluminum machining

PDL025 DLC coating
GW25 Non-coated carbide

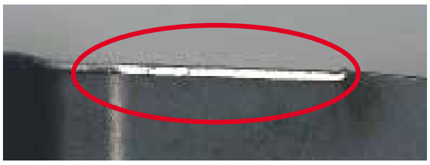
PR1825 with PVD coating MEGACOAT NANO EX provides long tool life

Wear resistance comparison (Internal evaluation)



Cutting edge condition (after 20 min machining)

MB45(PR1825)



Competitor A

Cutting conditions: Vc = 120 m/min, ap = 2.0 mm, ae/DC = 80 %, fz = 0.20 mm/t, Dry ,Workpiece material: SKD11, ø125 BT50

3 “Versatility” + “High Performance” New design utilizes unique technology
Low cutting force and excellent fracture resistance with excellent surface finish

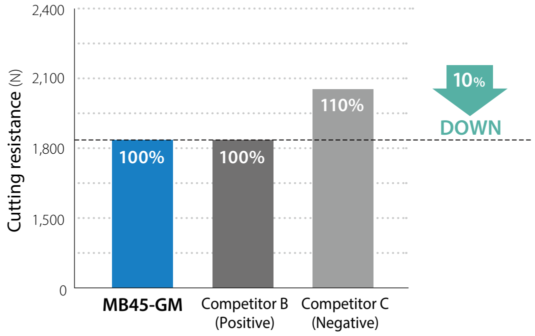
Low cutting force and excellent fracture resistance

Unique helical cutting edge and double-edge structure

A unique helical cutting edge

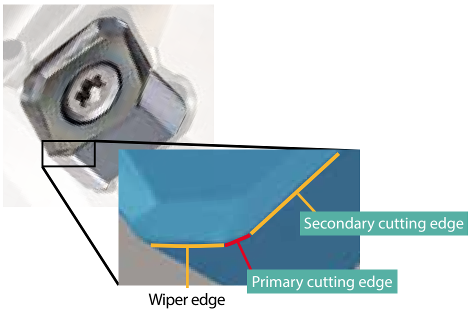
A.R. Ensures a maximum of 13° and suppresses chatter with low cutting force.

Cutting resistance comparison (Internal evaluation)



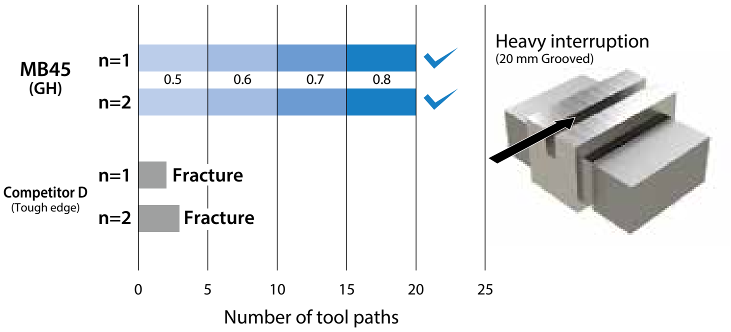
Cutting conditions: Vc = 180 m/min, ap = 3.0 mm, ae/DC = 80 % Center cut, fz = 0.30 mm/t, Workpiece material: S50C

Double edge structure



Primary cutting edge generates thin chips Reduces impact load and greatly reduces vibration when exiting the part

Fracture resistance comparison (Internal evaluation) fz = 0.5~0.8 mm/t



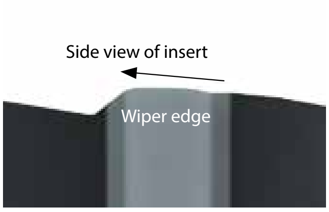
Cutting conditions: Vc = 100 m/min, ap × ae = 2 × 100 mm Center cut, BT50
Workpiece material: SCM440HT ø125 (10 inserts)

High quality

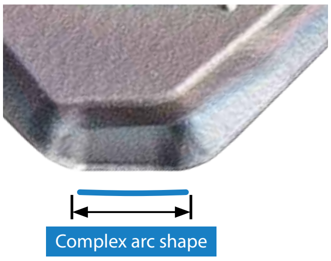
Long arc wiper edge utilizing unique technology

Unique long arc wiper edge

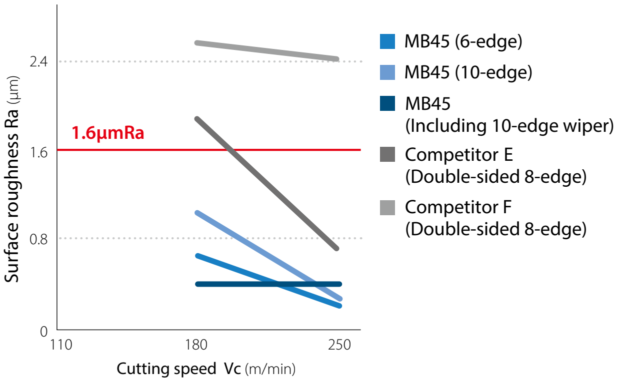
Reduces variation in mounting accuracy and provides superior finished surface quality



Convex curved shape with wiper edge protruding upward
*GM/SM/AM (E-Class)

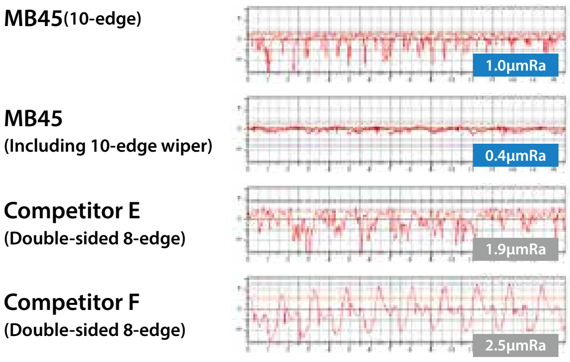


Surface roughness comparison (Internal evaluation)



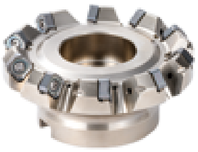
Cutting conditions: ap × ae = 1 × 100 mm (Center cut), fz = 0.20 mm/t, Dry
Workpiece material: S50C ø125 (6 inserts/10 inserts) GM (PR1825) BT50

Finishing surface condition (Vc = 180 m/min)



Proprietary long arc wiper edge provides excellent finishing surface quality

MB45 (Face mill)



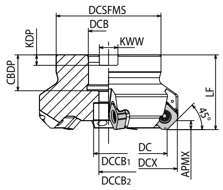


Fig. 1

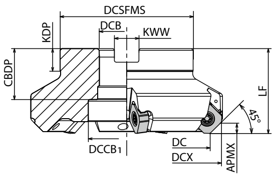


Fig. 2

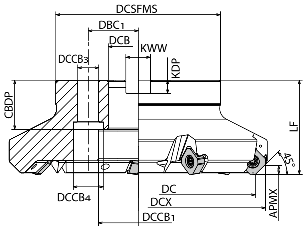


Fig. 3

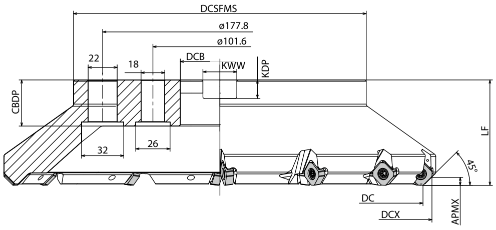


Fig. 4

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)														A.R. max.(°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Applicable inserts ➡ **M20**
			R		DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DBC1	LF	CBDP	KDP	KWW	APMX							
Metric	Coarse pitch	MB45- 040R-14T2C-M	●	2	40	54	38	16	13.5	9	-	-	-	40	19	5.6	8.4		6	+13	-12	Yes	12700	0.4	1	SN□U1406...
		050R-14T3C-M	●	3	50	64	48	22	18	11					21	6.3	10.4						11400	0.5		
		063R-14T4C-M	●	4	63	77	50																10100	0.7		
		080R-14T5C-M	●	5	80	94	70	27	20	13				50	24	7	12.4						9000	1.4		
		100R-14T5C-M	●		100	114	78	32	45	-					30	8	14.4						8000	1.9	2	
		125R-14T6C-M	●	6	125	139	89	40	55					63	33	9	16.4						7200	3.2		
		160R-14T7-M	●	7	160	174	110				14	20	66.7									No	6300	5.1	3	
		200R-14T8-M	●	8	200	214	142	60	110		18	26	101.6		35	14	25.7						5700	7.3		
		250R-14T10-M	●	10	250	264																	5100	10.5		
		315R-14T14-M	MTO	14	315	329	222		-		-	-	-	80									4500	19.4	4	
	Fine pitch	MB45- 040R-14T3C-M	●	3	40	54	38	16	13.5	9	-	-	-	40	19	5.6	8.4		6	+13	-12	Yes	12700	0.3	1	SN□U1406...
		040R-14T3C-22M	●				47	22	12	-				50	21	6.3	10.4							0.5		
		050R-14T4C-M	●	4	50	64	48		18	11				40									11400	0.4		
		063R-14T5C-M	●	5	63	77	50																10100	0.6		
		080R-14T6C-M	●	6	80	94	70	27	20	13				50	24	7	12.4						9000	1.4		
		100R-14T8C-M	●	8	100	114	78	32	45	-					30	8	14.4						8000	1.8	2	
		125R-14T10C-M	●	10	125	139	89	40	55					63	33	9	16.4						7200	3		
		160R-14T12-M	●	12	160	174	110				14	20	66.7									No	6300	4.9	3	
		200R-14T14-M	●	14	200	214	142	60	110		18	26	101.6		35	14	25.7						5700	7		
		250R-14T16-M	●	16	250	264																	5100	10.2		
		315R-14T18-M	MTO	18	315	329	222		-		-	-	-	80									4500	19.2	4	
	Extra fine pitch	MB45- 040R-14T4C-M	●	4	40	54	38	16	13.5	9	-	-	-	40	19	5.6	8.4		6	+13	-12	Yes	12700	0.3	1	SN□U1406...
		040R-14T4C-22M	●				47	22	12	-				50	21	6.3	10.4							0.4		
		050R-14T5C-M	●	5	50	64	48	22	18	11				40									11400	0.4		
		063R-14T6C-M	●	6	63	77	50																10100	0.6		
		080R-14T8C-M	●	8	80	94	70	27	20	13				50	24	7	12.4						9000	1.3		
		100R-14T10C-M	●	10	100	114	78	32	45	-					30	8	14.4						8000	1.7	2	
		125R-14T13C-M	●	13	125	139	89	40	55					63	33	9	16.4						7200	2.9		
		160R-14T16-M	●	16	160	174	110				14	20	66.7								-13	No	6300	4.8	3	
		200R-14T18-M	●	18	200	214	142	60	110		18	26	101.6		35	14	25.7						5700	6.9		
		250R-14T20-M	●	20	250	264															-12		5100	10.1		

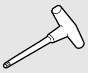
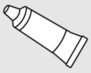
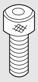
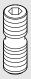
● : Standard item MTO : Made to order

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)														A.R. max.(°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Applicable inserts ➡ M20
			R		DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DBC1	LF	CBDP	KDP	KWW	APMX							
Bore dia. inch spec	Coarse pitch	MB45- 080R-14T5C	●	5	80	94	70	25.4	20	13	-	-	-	50	27	6	9.5	6	+13	-12	Yes	9000	1.4	1	SN□U1406...
		100R-14T5C	●		100	114	78	31.75	45	-					34	8	12.7					8000	2	2	
		125R-14T6C	●	6	125	139	89	38.1	55					63	38	10	15.9					7200	3.3		
		160R-14T7	●	7	160	174	110	50.8	70							11	19.1				No	6300	5.1		
		200R-14T8	●	8	200	214	140	47.625	110		18	26	101.6			14	25.4					5700	7.6	3	
		250R-14T10	●	10	250	264																5100	10.8		
		315R-14T14	MTO	14	315	329	222		-		-	-	-	80								4500	20.4	4	
	Fine pitch	MB45- 080R-14T6C	●	6	80	94	70	25.4	20	13	-	-	-	50	27	6	9.5	6	+13	-12	Yes	9000	1.4	1	SN□U1406...
		100R-14T8C	●	8	100	114	78	31.75	45	-					34	8	12.7					8000	1.8	2	
		125R-14T10C	●	10	125	139	89	38.1	55					63	38	10	15.9					7200	3.1		
		160R-14T12	●	12	160	174	110	50.8	70							11	19.1				No	6300	4.9		
		200R-14T14	●	14	200	214	140	47.625	110		18	26	101.6			14	25.4					5700	7.4	3	
		250R-14T16	●	16	250	264																5100	10.5		
		315R-14T18	MTO	18	315	329	222		-		-	-	-	80								4500	20.2	4	
	Extra fine pitch	MB45- 080R-14T8C	●	8	80	94	70	25.4	20	13	-	-	-	50	27	6	9.5	6	+13	-12	Yes	9000	1.3	1	SN□U1406...
		100R-14T10C	●	10	100	114	78	31.75	45	-					34	8	12.7					8000	1.8	2	
		125R-14T13C	●	13	125	139	89	38.1	55					63	38	10	15.9					7200	3		
		160R-14T16	●	16	160	174	110	50.8	70							11	19.1			-13	No	6300	4.8		
		200R-14T18	●	18	200	214	140	47.625	110		18	26	101.6			14	25.4					5700	7.2	3	
		250R-14T20	●	20	250	264														-12		5100	10.4		

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.

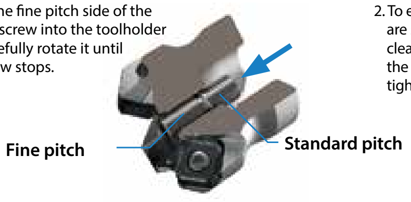
Spare parts

Description			Spare parts				
			Clamp screw	Wrench	Anti-seize compound	Mounting bolt	
							
Face mill	MB45-	040R/050R-14T...-M	SB-50110TRP	TTP-20 Tightening torque 4.5N·m	P-37	HH8X25	-
		040R/050R-14T...-22M				-	W10X31
		063R-14T...				HH10X30	-
		080R-14T...				HH12X35	-
		100R-14T... ≀ 315R-14T...				-	-

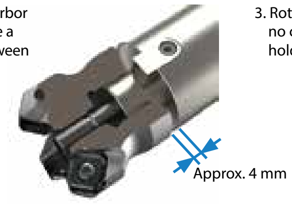
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

How to install double screw

1. Insert the fine pitch side of the double screw into the toolholder and carefully rotate it until the screw stops.



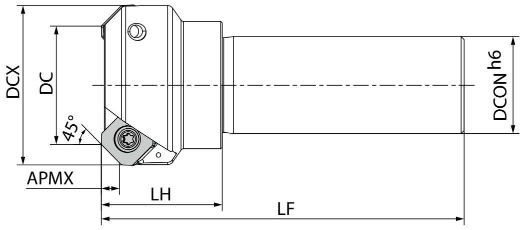
2. To ensure that the holder and arbor are securely connected, provide a clearance of approx. 4 mm between the holder and arbor before tightening the screws.



3. Rotate the screw until there is no clearance, and check the holder is attached to the arbor.

● : Standard item MTO : Made to order

MB45 (End mill)



Toolholder dimensions

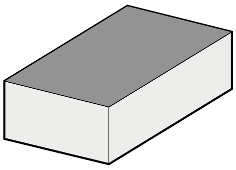
Description	Availability	Inserts	Dimension (mm)						A.R. max.(°)	R.R.(°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Spare parts			Applicable inserts ➡ **M20**
			DC	DCX	DCON	LF	LH	APMX						Anti-seize compound	Screw	Wrench	
MB45- 40S32-14T2C	●	2	40	54	32	120	40	6	+13	-12	Yes	12700	0.9	P-37	SB-50110TRP Tightening torque 4.5N·m	TTP-20	SN□U1406...
50S32-14T3C	●	3	50	64								11400	1				
63S32-14T4C	●	4	63	77								10100	1.1				
80S32-14T5C	●	5	80	94								9000	1.5				

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.

● : Standard item

Precautions

Applications



Facing

How to mount inserts

1. Completely eliminate chips and dust from the insert mounting side.
2. Coat anti-seize compound thinly on portion of taper and thread of clamp screw prior to installation.
3. 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).
4. Tighten the wrench in a direction parallel to the clamp screw. Recommended tightening torque···4.5 N·m
5. After tightening, check that there is no gap between the contact surface of the insert and the surface of the shim, or between the side surface of insert and the holder surface.

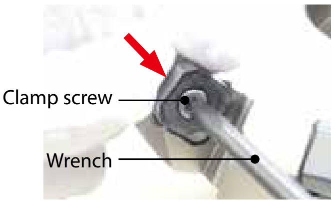


Fig.1

Defining the machining diameter (DC)

With respect to the machining diameter (DC) specified in ISO*, the numerical value of the machining diameter (Fig. 2) where the plane surface is finished depends on the insert. Please be careful.

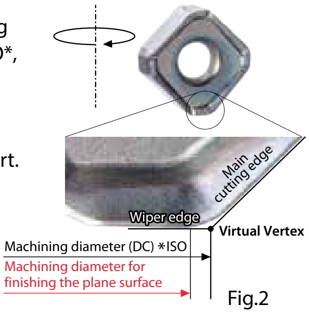


Fig.2

Machining diameter at which the plane surface is finished (for ø125mm)

	GM	GH	SM	AM
Difference to machining diameter (DC)	-1.1	-2.0	-1.1	-1.1
Machining diameter (mm) at which the plane surface is finished *Dimensional tolerance $^{0}_{-0.2}$	123.9	123.0	123.9	123.9

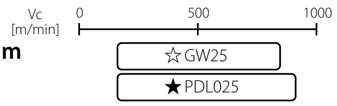
* GH has a larger double-edge size, so the machining diameter at which the plane surface is finished is smaller than other inserts.

Precautions when machining

Precautions when machining aluminum

- · Be sure to use within recommended conditions.
- · Do not rotate more than the maximum speed listed on the main unit.

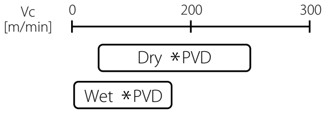
* The number of revolutions listed on the holder is the maximum number of revolutions without load.



	Recommended cutting speed [m/min]
PDL025	200～600～900
GW25	200～500～800

Precautions for wet machining of steel

For wet machining, select PR1835 and use a cutting speed of 70% or less of the recommended condition as a guide.



MB45-125R-14T10C

SCREW:SB-50110TRP WRENCH:

MAX 7,200 RPM

Rotating at maximum speed is prohibited.

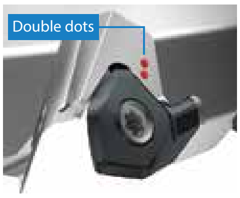
How to use a wiper insert

1. Use when the feed amount per revolution [mm/rev] becomes large. The table below shows the standard feed amount per revolution and the number of wipers installed.

Feed per rotation	Number of wiper inserts	Pocket for wiper insert
2.0<f[mm/rev]≤4.0	1 pc	Pocket with "Single dot" (Fig. 3)
4.0<f[mm/rev]	2 pcs	"Single dot" and "Double dots" pockets (Figs. 3, 4) * Only holders with 12 or more inserts have "Double dots"

Fig.3

Fig.4



"Double dots" are placed in the diagonal pocket of "Single dot"
* For only holders with 12 or more inserts

2. Chipbreaker recommended for use with wiper insert

	GM chipbreaker	GH chipbreaker	SM chipbreaker	AM chipbreaker
Wiper insert	✓	Not recommended	✓	Not recommended

3. Install the wiper insert correctly as shown in Fig. 5.

* Fig. 6 shows the insert incorrectly attached to the holder.

Fig.5

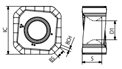
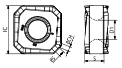
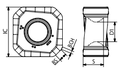
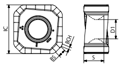
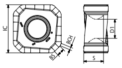
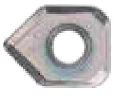
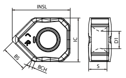
Fig.6

SNMU/SNEU

Classification of usage

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

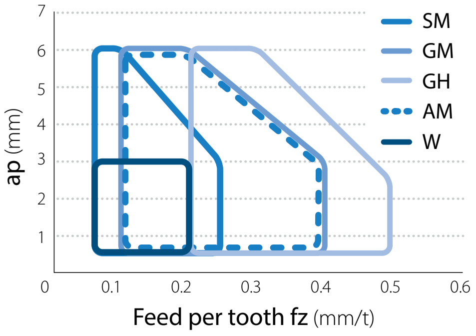
	CA6535	PDL025	PR015S	PR1810	PR1825	PR1835	GW25	TN620M	
Carbon steel / Alloy steel					★	☆		■	P
Mold and die steel					★	☆		■	
Austenitic stainless steel					☆	★			M
Martensitic stainless steel	★					☆			
Precipitation hardening stainless steel						★			
Gray cast iron				★					K
Nodular cast iron				★					
Non-ferrous metals		★					☆		N
Heat-resistant alloy	★					☆			S
Titanium alloy						★			
Hard materials			★						H

Insert		Description	No. of edges	Dimension (mm)					Carbide							Cermet	Applicable toolholder ➡ M16 M17 M18
									CVD	DLC	PVD				-	-	
				IC	S	D1	BCH	BS	CA6535	PDL025	PR015S	PR1810	PR1825	PR1835	GW25	TN620M	
	 General purpose (M class)	SNMU 1406ANER-GM	8	14.7	6.07	5.8	0.8	2.3	●			●	●	●		●	MB45-...
	 Tough edge (M class)	SNMU 1406ANER-GH	8	14.7	5.89	5.8	1.4	1.7	●		●	●	●	●			MB45-...
	 General purpose (Precision class)	SNEU 1406ANER-GM	8	14.7	6.07	5.8	0.8	2.3	●			●	●	●		●	MB45-...
	 Low cutting force (Precision class)	SNEU 1406ANER-SM	8	14.7	6.07	5.8	0.8	2.3	●				●	●			MB45-...
	 Non-ferrous metals (Precision class)	SNEU 1406ANFR-AM	8	14.7	6.07	5.8	0.8	2.3		●					●		MB45-...
	 2-edge / With wiper edge	SNEU 1406ANEN-W	2	14.7	6.15	5.8	1.1	8.8	●			●	●	●		●	MB45-...

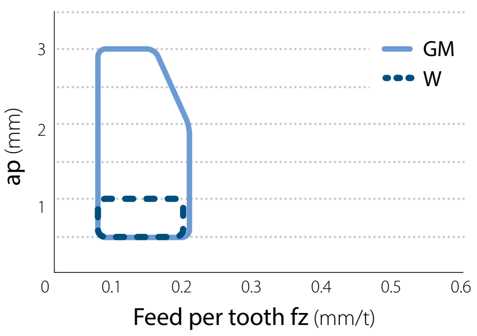
Recommended cutting conditions ➡ **M21**

Applicable chipbreaker range

Coated carbide



Cermet



SNEU1406ANEN-W inserts are sold in 5 piece boxes

● : Standard item

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t) ( ): TN620M	Recommended insert grades (Vc: m/min)							
			MEGACOAT(PVD coated carbide)				PVD coated carbide	Cermet	DLC coated carbide	Carbide
			PR1835	PR1825	PR1810	PR015S	CA6535	TN620M	PDL025	GW15
GM	Carbon steel	0.1~**0.2**~0.4 (0.06~**0.12**~0.20)	☆ 120~**180**~250	★ 120~**180**~250	-	-	-	★ 200~**250**~300	-	-
	Alloy steel	0.1~**0.2**~0.4 (0.06~**0.12**~0.20)	☆ 100~**160**~220	★ 100~**160**~220	-	-	-	★ 180~**220**~250	-	-
	Mold steel	0.1~**0.2**~0.35 (0.06~**0.08**~0.15)	☆ 80~**140**~180	★ 80~**140**~180	-	-	-	★ 150~**180**~220	-	-
	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	Carbon steel	0.06~**0.12**~0.25	☆ 120~**180**~250	☆ 120~**180**~250	-	-	-	-	-	-
	Alloy steel	0.06~**0.12**~0.25	☆ 100~**160**~220	☆ 100~**160**~220	-	-	-	-	-	-
	Mold steel	0.06~**0.1**~0.2	☆ 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	-	-	-	-	-	-	-
GH	Carbon steel	0.2~**0.3**~0.5	☆ 120~**180**~250	☆ 120~**180**~250	-	-	-	-	-	-
	Alloy steel	0.2~**0.3**~0.5	☆ 100~**160**~220	☆ 100~**160**~220	-	-	-	-	-	-
	Mold steel	0.2~**0.3**~0.45	☆ 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~**0.3**~0.5	-	-	☆ 120~**180**~250	-	-	-	-	-
	Nodular cast iron	0.2~**0.3**~0.45	-	-	☆ 100~**150**~200	-	-	-	-	-
	Ni-base heat-resistant alloys	0.1~**0.2**~0.3	☆ 20~**30**~50	-	-	-	☆ 20~**30**~50	-	-	-
	Hard materials (40HRC or less)	0.05~**0.1**~0.2	-	-	-	★ 50~**80**~100	-	-	-	-
AM	Aluminum alloys	0.1~**0.2**~0.4							★ 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. When choosing wet machining for other workpieces, reduce the cutting speed to 70% or less.
When machining aluminum, be sure to use within recommended conditions. Do not rotate more than the maximum speed listed on the main unit.
Dry machining is recommended for cermet.

MFPN45 (Face mill)

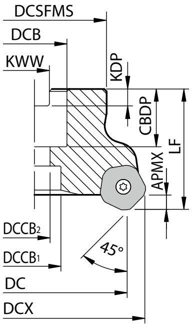


Fig. 1

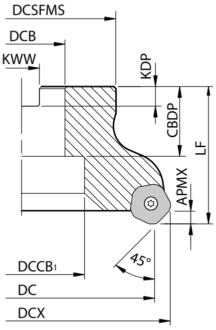


Fig. 2

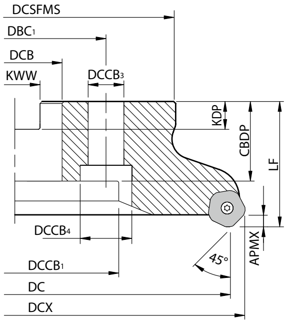


Fig. 3

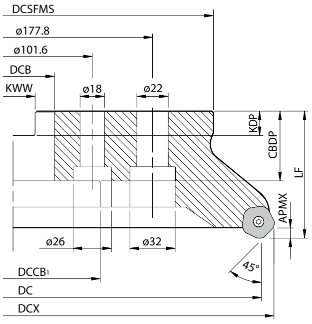


Fig. 4

Toolholder dimensions

Description				Availability		Inserts	Dimension (mm)														A.R. max.(°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts ➡ M26
				R	L		DC	DCX	DCSFMS	DCB	DCCB$_1$	DCCB$_2$	DCCB$_3$	DCCB$_4$	DBC$_1$	LF	CBDP	KDP	KWW	APMX						
Metric	Coarse pitch	MFPN	45063R-4T-M	●		4	63	76	47	22	19	11	-	-	-	40	21	6.3	10.4	6	+10	-10	No	0.5	1	PN□U1205ANER-..
			45080R-5T-M	●		5	80	93	60	27	22	13				50	24	7	12.4			-8		1.1	1	
			45100R-6T-M	●		6	100	113	70	32	48	-					30	8	14.4			-6		1.4	2	
			45125R-7T-M	●		7	125	138	87	40	58					63	32	9	16.4					2.6	2	
			45160R-8T-M	●		8	160	173	102		68		14	20	66.7									3.8	3	
			45200R-10T-M	●		10	200	213	142	60	110		18	26	101.6		40	14	25.7					6.4	3	
			45250R-12T-M	●		12	250	263																9.1	3	
			45315R-14T-M	MTO		14	315	328	220				-	-	-	80								21.3	4	
	Fine pitch	MFPN	45063R-5T-M	●		5	63	76	47	22	19	11	-	-	-	40	21	6.3	10.4	6	+10	-10	No	0.5	1	PN□U1205ANER-..
			45080R-6T-M	●		6	80	93	60	27	22	13				50	24	7	12.4			-8		1	1	
			45100R-8T-M	●		8	100	113	70	32	48	-					30	8	14.4			-6		1.4	2	
			45125R-10T-M	●		10	125	138	87	40	58					63	32	9	16.4					2.5	2	
			45160R-12T-M	●		12	160	173	102		68		14	20	66.7									3.8	3	
			45200R-14T-M	●		14	200	213	142	60	110		18	26	101.6		40	14	25.7					6.5	3	
			45250R-16T-M	●		16	250	263																9.1	3	
			45315R-18T-M	MTO		18	315	328	220				-	-	-	80								21.7	4	
	Extra fine pitch	MFPN	45063R-6T-M	●		6	63	76	47	22	19	11	-	-	-	40	21	6.3	10.4	6	+10	-10	No	0.5	1	PN□U1205ANER-..
			45080R-8T-M	●		8	80	93	60	27	22	13				50	24	7	12.4			-8		1.1	1	
			45100R-10T-M	●		10	100	113	70	32	48	-					30	8	14.4			-6		1.3	2	
			45125R-13T-M	●		13	125	138	87	40	58					63	32	9	16.4					2.6	2	

APMX : 6 mm (GM, SM, GH chipbreakers), 5 mm (GL chipbreaker), 3 mm (Wiper insert)

● : Standard item MTO : Made to order

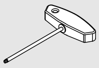
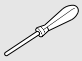
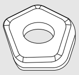
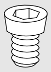
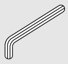
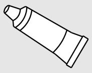
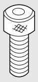
Toolholder dimensions

Description				Availability		Inserts	Dimension (mm)														A.R. max.(°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts ➡ **M26**
				R	L		DC	DCX	DCSFMS	DCB	DCCB$_1$	DCCB$_2$	DCCB$_3$	DCCB$_4$	DBC$_1$	LF	CBDP	KDP	KWW	APMX						
Bore dia. inch spec	Coarse pitch	MFPN	45080R/L-5T	●	●	5	80	93	60	25.4	22	13	-	-	-	50	27	6	9.5	6	+10	-8	No	1.1	1	PN□U1205ANER/L-..
			45100R/L-6T	●	●	6	100	113	70	31.75	48	-					32	8	12.7			-6		1.4	2	
			45125R/L-7T	●	●	7	125	138	87	38.1	58					63	36	10	15.9					2.6	2	
			45160R/L-8T	●	●	8	160	173	102	50.8	72						38	11	19.1					4	2	
			45200R-10T	●		10	200	213	142	47.625	110		18	26	101.6		40	14	25.4					6.7	3	
			45250R-12T	●		12	250	263																9.4	3	
			45315R-14T	MTO		14	315	328	220				-	-	-	80								21.2	4	
	Fine pitch	MFPN	45080R-6T	●		6	80	93	60	25.4	22	13	-	-	-	50	27	6	9.5	6	+10	-8	No	1.1	1	PN□U1205ANER-..
			45100R-8T	●		8	100	113	70	31.75	48	-					32	8	12.7			-6		1.4	2	
			45125R-10T	●		10	125	138	87	38.1	58					63	36	10	15.9					2.7	2	
			45160R-12T	●		12	160	173	102	50.8	72						38	11	19.1					4	2	
			45200R-14T	●		14	200	213	142	47.625	110		18	26	101.6		40	14	25.4					6.9	3	
			45250R-16T	●		16	250	263																9.6	3	
			45315R-18T	MTO		18	315	328	220				-	-	-	80								21.5	4	
	Extra fine pitch	MFPN	45080R-8T	●		8	80	93	60	25.4	22	13	-	-	-	50	27	6	9.5	6	+10	-8	No	1.1	1	PN□U1205ANER-..
			45100R-10T	●		10	100	113	70	31.75	48	-					32	8	12.7			-6		1.3	2	
			45125R-13T	●		13	125	138	87	38.1	58					63	36	10	15.9					2.7	2	
			45160R-16T	●		16	160	173	102	50.8	72						38	11	19.1					4	2	
			45200R-18T	●		18	200	213	142	47.625	110		18	26	101.6		40	14	25.4					6.9	3	
			45250R-20T	●		20	250	263																9.6	3	

APMX : 6 mm (GM, SM, GH chipbreakers), 5 mm (GL chipbreaker), 3 mm (Wiper insert)

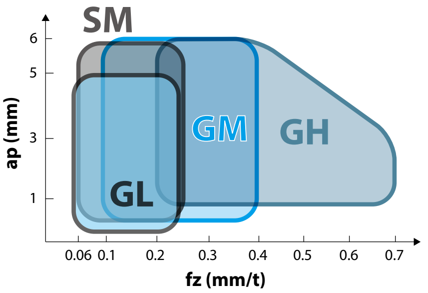
● : Standard item MTO : Made to order

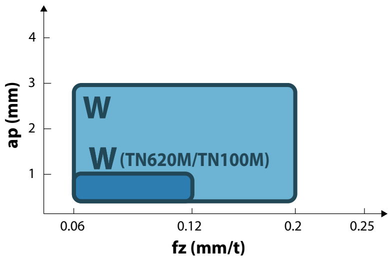
Spare parts (common to Metric / Inch spec)

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 for insert clamp tightening torque 4.2N·m	TTW-15	-	MFPN-45	SPW-7050 for shim clamp tightening torque 6.0N·m	LW-5	P-37	HH10X30
	MFPN	45080R/L-5T(-M)								HH12X35
	MFPN	45100R/L-6T(-M) ~ 45315R-14T(-M)								-
Fine pitch	MFPN	45063R-5T-M	SB-50140TR for insert clamp tightening torque 4.2N·m	TTW-15	-	-	-	-	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 for insert clamp tightening torque 3.5N·m	-	-	-	P-37	HH10X30
	MFPN	45080R-8T(-M)								HH12X35
	MFPN	45100R-10T(-M) ~ 45250R-20T								-

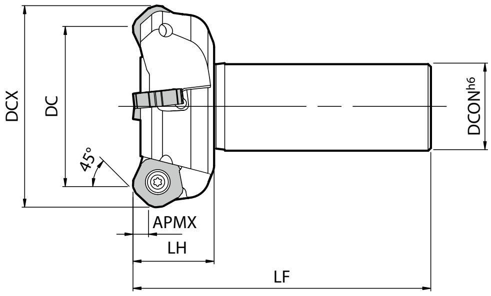
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

Applicable chipbreaker range

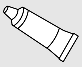
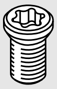
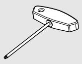




MFPN45 (End mill)



Toolholder dimensions

Description		Availability	Inserts	Dimension (mm)					A.R. max.(°)	R.R. (°)	Coolant hole	Spare parts			Applicable inserts ➡ **M26**
												Anti-seize compound	Screw	Wrench	
		R		DC	DCX	DCON	LF	LH							
MFPN	45050R-S32-3T	●	3	50	63	32	110	30	+10	-12	No	P-37	SB-50140TR Tightening torque 4.2N·m	TTW-15	PN□U1205ANER-..
	45063R-S32-4T	●	4	63	76					-10					
	45080R-S32-5T	●	5	80	93					-8					

APMX : 6 mm (GM, SM, GH chipbreakers), 5 mm (GL chipbreaker), 3 mm (Wiper insert)
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

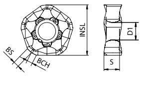
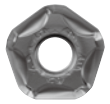
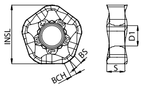
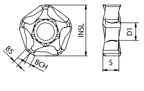
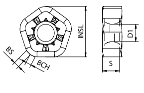
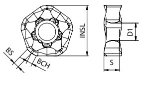
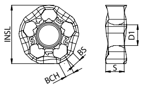
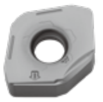
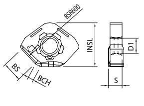
● : Standard item

PNMU/PNEU

Classification of usage

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

	CA6535	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	TN100M	TN620M	
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								Cer-met		Applicable toolholder ➡ M22 M23 M25
					S	D1	INSL	BCH	BS	CVD	PVD							-		
										CA6535	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	TN100M	TN620M	
	 General purpose	PNMU	1205ANER-GM	10	5.56	6.2	17.88	2	2	●		☐	○	●	●	●	●		●	MFPN45...R-..
	 General purpose	PNMU	1205ANEL-GM	10	5.56	6.2	17.88	2	2	●		☐	○	●	●	●	●		●	MFPN45...L-..
	 Low cutting force	PNMU	1205ANER-SM	10	5.56	6.2	17.88	2	2	●		☐	○	●	●	●	●			MFPN45...R-..
	 Tough edge	PNMU	1205ANER-GH	10	6.17	6.2	17.98	2	2	●	●	☐	○	●	●	●	●			MFPN45...R-..
	 Surface finish oriented	PNEU	1205ANER-GL	10	5.56	6.2	17.51	2.7	2.7	●		☐	○	●	●	●	●		●	MFPN45...R-..
	 Surface finish oriented	PNEU	1205ANEL-GL	10	5.56	6.2	17.51	2.7	2.7	●		☐	○	●	●	●	●		●	MFPN45...L-..
	 2-edge / With wiper edge	PNEU	1205ANER-W	2	5.56	6.2	17.85	2.3	8.1	●		☐	○	●	●	●	●	●	●	MFPN45...R-..

Recommended cutting conditions ➡ **M27**

● : Standard item ○ : Will be replaced with a new product ☐ : Expected to be discontinued in September 2026

PNEU1205ANER-W inserts are sold in 5 piece boxes

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t) ( ): TN620M	Recommended insert grades (Vc: m/min)					
			Cermet	MEGACOAT(PVD coated carbide)				CVD coated carbide
			TN620M	PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	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 *[1]GL	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	-	-	-	-
*[2]GH	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

Cutter type and chipbreaker selection

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

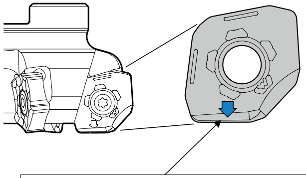
How to use wiper insert

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

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

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

How to attach wiper inserts on MFPN cutter



⬇ The down arrow symbol indicates wiper cutting edge.

⬇ When attaching inserts, make sure that the arrow symbol points downward.

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

Applicable chipbreaker

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

Precautions for use (How to mount an insert)

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

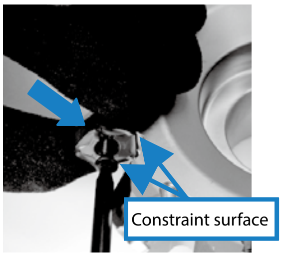


Fig. 1

Fig. 2

Fig. 3

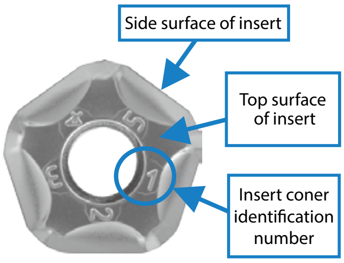


Fig. 4 (Right-hand insert)

How to replace a shim (for coarse pitch)

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

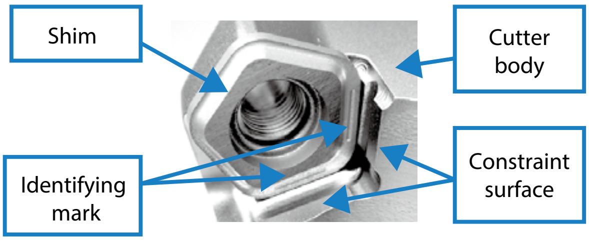


Fig. 5

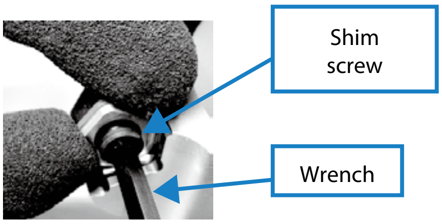


Fig. 6

Cutting edge angle 66˚

MFPN66

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

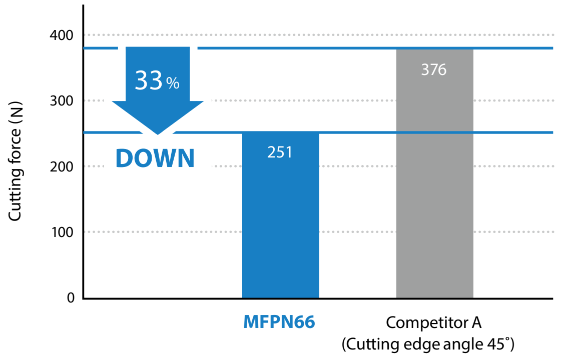
1 Economical double-sided 10-edge insert
Applicable to various machining applications with wide size range from ø32

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

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

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

Cutting force comparison (Internal evaluation)



Cutting force is thrust force

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

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

Excellent surface finish with low workpiece clamping rigidity

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

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

General purpose
GM chipbreaker

Tough edge
GH chipbreaker

For stainless steel
SM chipbreaker

MFPN66 (Face mill)

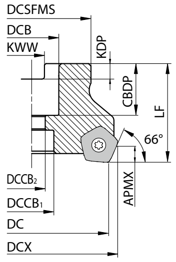


Fig. 1

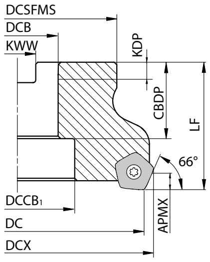


Fig. 2

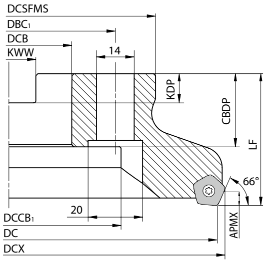


Fig. 3

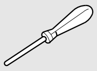
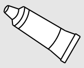
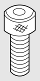
Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)											A.R. max.(°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts ➡ **M34**
			R		DC	DCX	DCSFMS	DCB	DCCB₁	DCCB₂	DBC₁	LF	CBDP	KDP	KWW						
Metric	Fine pitch	MFPN 66050R-4T-M-G	●	4	50	58	48	22	18	11	-	40	21	6.3	10.4	+12	-9	No	0.3	1	PNMU0905...
		66063R-5T-M-G	●	5	63	71											-8		0.5		
		66080R-6T-M-G	●	6	80	88	70	27	20	13		50	24	7	12.4		-7		1.2		
		66100R-7T-M-G	●	7	100	107	78	32	45	-			30	8	14.4		-6		1.6	2	
		66125R-9T-M-G	●	9	125	132	89	40	55			63	33	9	16.4				2.8		
		66160R-11T-M-G	●	11	160	167					66.7								3.8	3	
	Extra fine pitch	MFPN 66050R-5T-M-G	●	5	50	58	48	22	18	11	-	40	21	6.3	10.4	+12	-9	No	0.4	1	PNMU0905...
		66063R-7T-M-G	●	7	63	71											-8		0.5		
		66080R-9T-M-G	●	9	80	88	70	27	20	13		50	24	7	12.4		-7		1.2		
		66100R-11T-M-G	●	11	100	107	78	32	45	-			30	8	14.4		-6		1.6	2	
		66125R-13T-M-G	●	13	125	132	89	40	55			63	33	9	16.4				3		
		66160R-15T-M-G	●	15	160	167					66.7								4	3	
Bore dia. inch spec	Fine pitch	MFPN 66080R-6T-G	●	6	80	88	70	25.4	20	13	-	50	27	6	9.5	+12	-7	No	1.2	1	PNMU0905...
		66100R-7T-G	●	7	100	107	78	31.75	45	-			34	8	12.7		-6		1.7	2	
		66125R-9T-G	●	9	125	132	89	38.1	55			63	38	10	15.9				2.9		
		66160R-11T-G	●	11	160	167	110	50.8	72					11	19.1				4.5		
	Extra fine pitch	MFPN 66080R-9T-G	●	9	80	88	70	25.4	20	13	-	50	27	6	9.5	+12	-7	No	1.2	1	PNMU0905...
		66100R-11T-G	●	11	100	107	78	31.75	45	-			34	8	12.7		-6		1.7	2	
		66125R-13T-G	●	13	125	132	89	38.1	55			63	38	10	15.9				3		
		66160R-15T-G	●	15	160	167	110	50.8	72					11	19.1				4.8		

APMX : 5 mm (GM, SM, GH chipbreakers, Coated cabide), 3 mm (GM chipbreaker, Cermet)

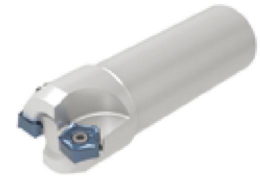
● : Standard item

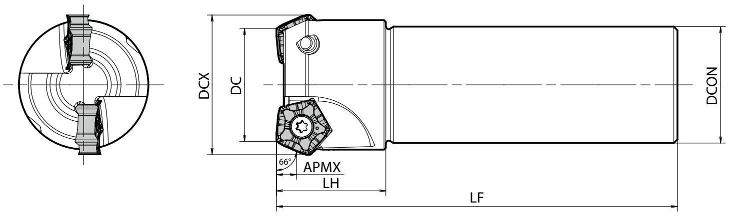
Spare parts (common to Metric / Inch spec)

Description			Clamp screw	Wrench	Anti-seize compound	Mounting bolt
						
Fine pitch	MFPN	66050R-4T-M-G	SB-4090TRP	DTPM-15 Recommended tightening torque for insert clamp 3.5N·m	P-37	HH10X30
		66063R-5T-M-G				HH10X30
		66080R-6T(-M)-G				HH12X35
		66100R-7T(-M)-G				-
		66125R-9T(-M)-G				
		66160R-11T(-M)-G				
Extra fine pitch	MFPN	66050R-5T-M-G	SB-4090TRP	DTPM-15 Recommended tightening torque for insert clamp 3.5N·m	P-37	HH10X30
		66063R-7T-M-G				HH10X30
		66080R-9T(-M)-G				HH12X35
		66100R-11T(-M)-G				-
		66125R-13T(-M)-G				
		66160R-15T(-M)-G				

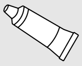
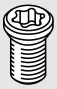
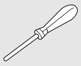
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

MFPN66 (End mill)





Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max.(°)	R.R.(°)	Coolant hole	Spare parts			Applicable inserts ➡ M34
											Anti-seize compound	Screw	Wrench	
	R		DC	DCX	DCON	LF	LH							
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					-12					

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

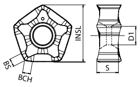
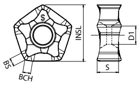
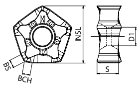
● : Standard item

PNMU

Classification of usage

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

	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	TN620M	
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 ➡ M31 M33
									PVD							-	
				S	D1	INSL	BCH	BS	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	TN620M	
	 General purpose	PNMU 0905XNER-GM	10	5.56	4.7	14.6	2	2		☐	○	●	●	●	●	●	MFPN66...
	 Low cutting force	PNMU 0905XNER-SM	10	5.56	4.7	14.6	2	2		☐	○	●	●	●	●		MFPN66...
	 Tough edge	PNMU 0905XNER-GH	10	5.56	4.7	14.6	2	2	●	☐	○	●	●	●	●		MFPN66...

Recommended cutting conditions ➡ **M35**

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 ○ : Will be replaced with a new product ☐ : Expected to be discontinued in September 2026

Recommended cutting conditions

Coated carbide

Chipbreaker	Workpiece material	Feed (fz: mm/t)	Recommended insert grades (Vc: m/min)			
			MEGACOAT (PVD coated carbide)			
			PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S
GM	Carbon steel	0.1~**0.2**~0.3	☆ 120~**180**~250	★ 120~**180**~250	-	-
	Alloy steel	0.1~**0.2**~0.3	☆ 100~**160**~220	★ 100~**160**~220	-	-
	Mold steel	0.1~**0.18**~0.25	☆ 80~**140**~180	★ 80~**140**~180	-	-
	Stainless steel (Austenitic related)	0.1~**0.18**~0.25	☆ 100~**150**~200	☆ 100~**150**~200	-	-
	Stainless steel (Martensitic related)	0.1~**0.18**~0.25	☆ 100~**150**~200	-	-	-
	Stainless steel (Precipitation hardening)	0.1~**0.18**~0.25	★ 90~**120**~150	-	-	-
	Gray cast iron	0.1~**0.2**~0.3	-	-	★ 120~**180**~250	-
	Nodular cast iron	0.1~**0.18**~0.25	-	-	★ 100~**150**~200	-
	Ni-base heat-resistant alloys	0.1~**0.12**~0.2	☆ 20~**30**~50	-	-	-
SM	Carbon steel	0.06~**0.12**~0.2	-	☆ 120~**180**~250	-	-
	Alloy steel	0.06~**0.12**~0.2	-	☆ 100~**160**~220	-	-
	Mold steel	0.06~**0.1**~0.15	-	☆ 80~**140**~180	-	-
	Stainless steel (Austenitic related)	0.06~**0.12**~0.2	★ 100~**150**~200	☆ 100~**150**~200	-	-
	Stainless steel (Martensitic related)	0.06~**0.12**~0.2	★ 100~**150**~200	-	-	-
	Stainless steel (Precipitation hardening)	0.06~**0.12**~0.2	☆ 90~**120**~150	-	-	-
	Gray cast iron	0.06~**0.12**~0.2	-	-	☆ 120~**180**~250	-
	Nodular cast iron	0.06~**0.1**~0.15	-	-	☆ 100~**150**~200	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.15	★ 20~**30**~50	-	-	-
	Titanium alloys	0.06~**0.08**~0.15	★ 40~**60**~80	-	-	-
GH	Carbon steel	0.15~**0.25**~0.35	-	☆ 120~**180**~250	-	-
	Alloy steel	0.15~**0.25**~0.35	-	☆ 100~**160**~220	-	-
	Mold steel	0.1~**0.2**~0.3	-	☆ 80~**140**~180	-	-
	Gray cast iron	0.15~**0.25**~0.35	-	-	☆ 120~**180**~250	-
	Nodular cast iron	0.1~**0.2**~0.3	-	-	☆ 100~**150**~200	-
	Hard materials (60HRC or less)	0.05~**0.08**~0.16	-	-	-	★ 50~**80**~100

★: 1st Recommendation ☆: 2nd Recommendation

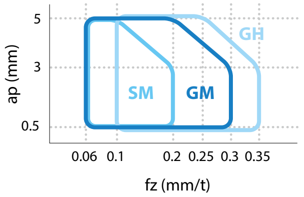
Cermet

Chipbreaker	Workpiece material	Feed (fz: mm/t)	Recommended insert grades 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

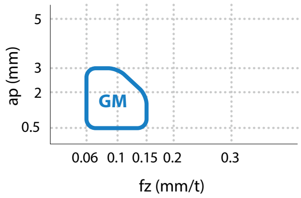
★: 1st Recommendation

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

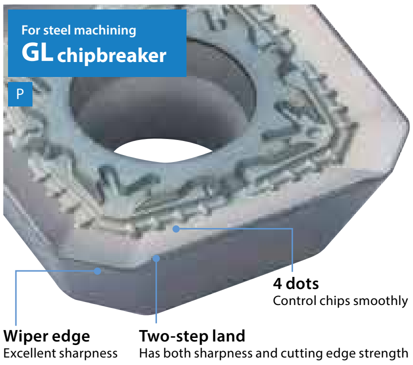
MFSE45

Rough and finish in 1 pass with excellent surface finish
Roughing condition (fz = 0.25 mm/t) provides excellent surface finish (0.8 μmRa or less)

1 The MFSE45 milling solution

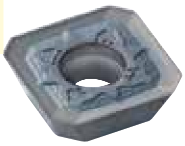
Delivers high-quality surfaces by roughing and finishing simultaneously

Kyocera's newly developed unique molded chipbreaker



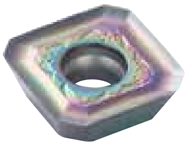
For stainless steel machining
SL chipbreaker

M
Micro-horning



For aluminum machining
AL chipbreaker

N
Sharp edge



Machining comparison simulation (example)

MFSE45 1 Pass and cutting time was cut by 1/3, with a good surface finish (0.8 μmRa or less)

fz = 0.25 mm/t (ap = 1.0 mm)

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

Cutting time Roughing + Finishing

Cutting conditions: Vc = 300 m/min, Dry S50C (Internal evaluation)

SOLUTION

1 Pass

Time = 1/3

Surface finish ✓

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

fz = 0.15 mm/t (ap = 0.8 mm)

ø160-8T

fz = 0.125 mm/t (ap = 0.2 mm)

ø160-8T

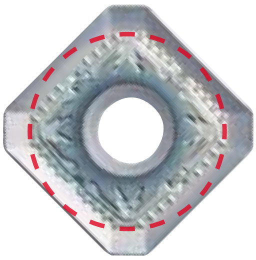
Cutting time Roughing Finishing

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

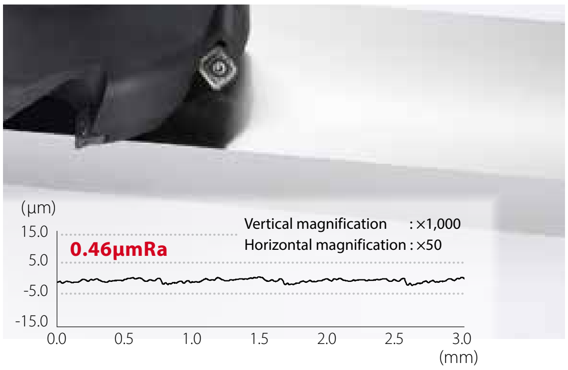
(Class E standard ± 0.025 mm or less)

Excellent front edge runout accuracy

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

Front edge runout: Small ⇒ Surface roughness: Good

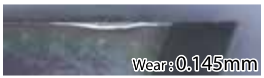
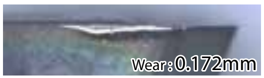
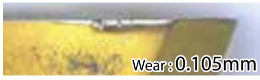
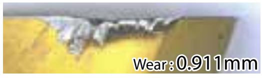
Surface roughness in stainless steel machining (Internal evaluation)



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

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

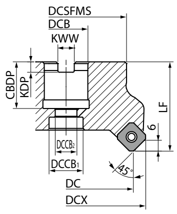


Fig. 1

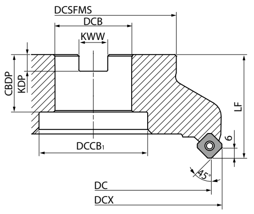


Fig. 2

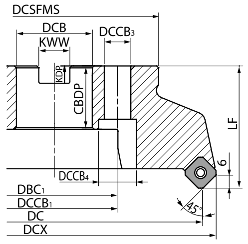
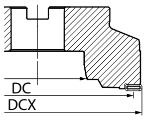


Fig. 3



Wiper insert pocket

Toolholder dimensions

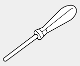
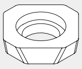
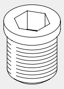
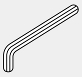
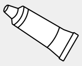
Description				Availability		Inserts	Dimension (mm)													Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Applicable inserts ➡ **M40** **M194**
				R	L		DC	DCX	DCB	DCSFMS	DCCB₁	DCCB₂	DCCB₃	DCCB₄	DBC₁	LF	CBDP	KDP	KWW					
Standard	Metric	MFSE	45063R-5T-M	MTO		5	63	71.7	22	48	-	5	-	-	-	40	21	6.3	10.4	No	14400	0.6	1	SEET13T3...
			45080R-5T-M	MTO			80	88.7	27	70						50	24	7	12.4		12800	1.4	1	
			45100R-5T-M	MTO			100	108.7	32	78							30	8	14.4		11500	1.8	2	
			45125R-6T-M	MTO		6	125	133.7	40	89		6				63	33	9	16.4		10200	3.2	2	
			45160R-7T-M	MTO		7	160	168.7		110		7	14	20	66.7		32				9000	5.4	3	
			45200R-8T-M	MTO		8	200	208.7	60	142		8	18	26	101.6		40	14	25.7		8100	7	3	
			45250R-10T-M	MTO		10	250	258.7		222		10									7200	15.5	3	
	Bore dia. inch spec	MFSE	45080R-5T	MTO		5	80	88.7	25.4	70	20	13	-	-	-	50	27	6	9.5	No	12800	1.4	1	SEET13T3...
			45100R-5T	MTO			100	108.7	31.75	78	48	-					32	8	12.7		11500	1.9	2	
			45125R-6T	MTO		6	125	133.7	38.1	89	55					63	38	10	15.9		10200	3.3	2	
			45160R/L-7T	MTO	MTO	7	160	168.7	50.8	110	72							11	19.1		9000	5.3	2	
			45200R/L-8T	MTO	MTO	8	200	208.7	47.625	142	100		18	26	101.6		40	14	25.4		8100	7.3	3	
			45250R/L-10T	MTO	MTO	10	250	258.7		222	110										7200	15.8	3	
Wiper insert	Metric	MFSE	45160R-8T-W-M	MTO		8	160	168.7	40	110	1	8	-	-	-	63	33	9	16.4	No	1000	5.5	2	SEET13T3... LNGX1209...
			45200R-9T-W-M	MTO		9	200	212.8	60	142		9	18	26	101.6		40	14	25.7		800	7.3	3	
			45250-11T-W-M	MTO		11	250	262.7		222		11					38					12	3	
	Bore dia. inch spec	MFSE	45160R-8T-W	MTO		8	160	168.7	50.8	102	72	-	-	-	-	63	38	11	19.1	No	1000	5.5	3	SEET13T3... LNGX1209...
			45200R-9T-W	MTO		9	200	208.7	47.625	142	133		18	26	101.6		40	14	25.4		800	7.6	3	
			45250R-11T-W	MTO		11	250	258.7		222							38					12.3	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

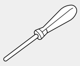
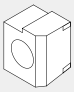
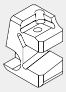
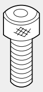
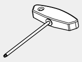
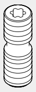
Spare parts

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		

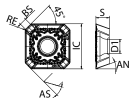
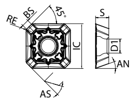
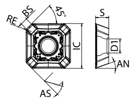
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

For Wiper insert

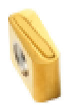
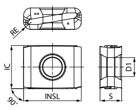
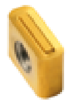
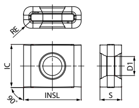
Clamp screw	Wrench	Wedge	Cartridge	Cartridge clamp screw	Wrench	Adjustment Screw
						
SB-3592TR	DTM-10	AD-MFF	CR-MFF	HH5X15L	TTW-15	W6X18N
Recommended tightening torque for wiper insert clamp 1.2N·m						

SEET

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice ☐ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	CA6535	PDL025	PR1525	PR1535	PR1825	PR1835	
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 ➡ M38
												CVD	DLC	PVD				
					IC	S	D1	RE	BS	AN	AS	CA6535	PDL025	PR1525	PR1535	PR1825	PR1835	
	 General purpose	SEET	13T3AGSN-GL	4	13.4	3.97	4.2	1.5	2.1	20	29	●		○	●	●	●	MFSE45...
	 Stainless steel	SEET	13T3AGSN-SL	4	13.4	3.97	4.2	1.5	2.1	20	29	●		○	●	●	●	MFSE45...
	 Non-ferrous metals	SEET	13T3AGFN-AL	4	13.4	3.97	4.2	1.5	2.1	20	29		●					MFSE45...

LNGX

Insert		Description		No. of edges	Dimension (mm)					Carbide		Cermet	Applicable toolholder ➡ M38 M193
										PVD		PVD	
					IC	S	D1	RE	INSL	PR1525	PR1825	PV60M	
	 Low cutting force	LNGX	120916R-TT	4	9.525	4.76	4.2	1.6	12.7	MTO	MTO	MTO	MFSE45...-W MFSE45...-W-M MFF...-SF
		LNGX	120916	4	9.525	4.76	4.2	1.6	12.7	MTO	MTO	MTO	MFSE45...-W MFSE45...-W-M MFF...-SF

Recommended cutting conditions ➡ M41

● : Standard item ○ : Will be replaced with a new product MTO : Made to order

Recommended cutting conditions

Chipbreaker	Workpiece	Feed (fz: mm/t)	Recommended insert grade (Vc: m/min)			
			MEGACOAT NANO EX (MEGACOAT NANO)		CVD coating	DLC coated carbide
			PR1835 (PR1535)	PR1825 (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 Ratio13% 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

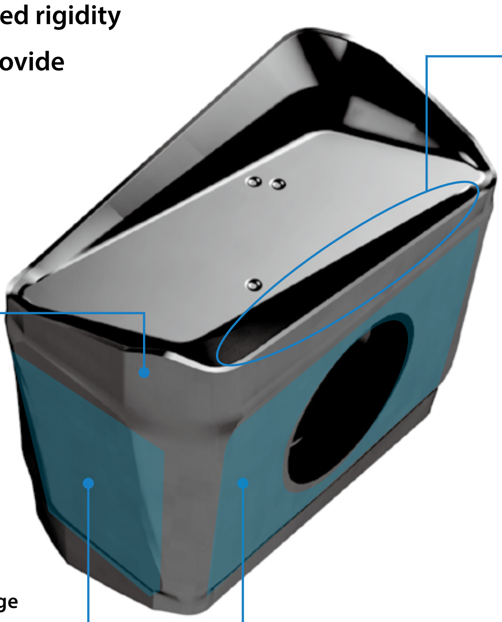
Tough 4-edge tangencial inserts provide high reliability on heavy milling at large depths of cut and high feed rates.

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

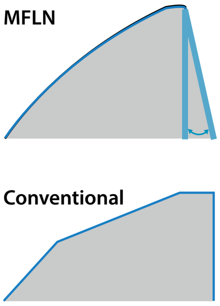
Tangentially mounted inserts provide 2 cutting edges on both sides



Obtuse edge design

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

Cross-section view of cutting edge

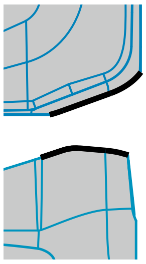


Corner chamfer

only available on MFLN90

Both general corner-R type and chamfered corner type available

Prevents chattering and insert fracturing



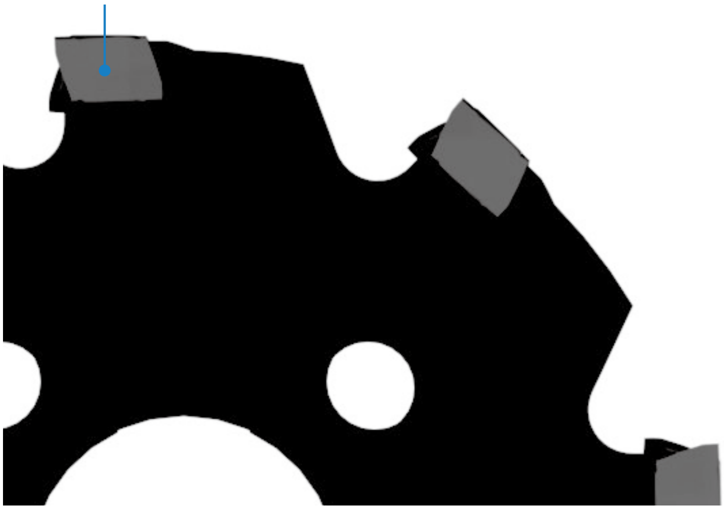
Convex cutting edge ridge

Reduced impact forces when entering the workpiece

Wide flat mounting surface

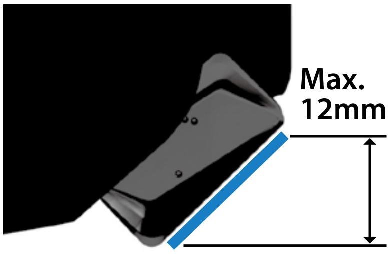
Hold an insert firmly in heavy milling

Tangentially mounted inserts increase rigidity

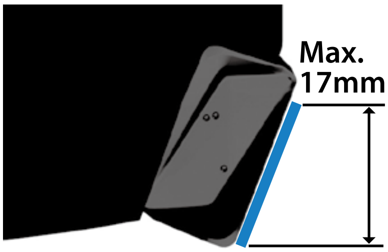


2 Large D.O.C. and high feed rates

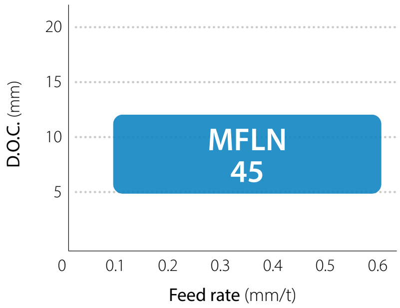
MFLN45
Cutting edge angle 45°

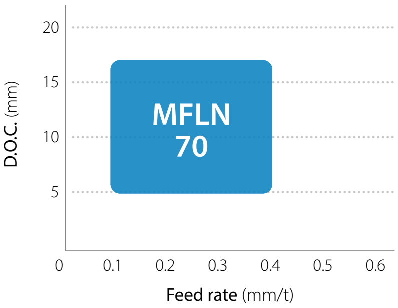


MFLN70
Cutting edge angle 70°



Applicable range

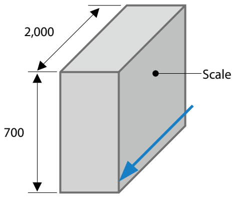




Case Studies

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=416cc/min

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

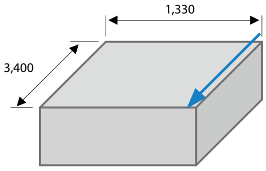
Machining efficiency x1.2

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

(User Evaluation)

Machining base FCD600

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



Chip Evacuation Rate

	Roughing	Finishing
MFLN70	Q=2,340cc/min	Q=2,340cc/min
	Roughing (Competitor F)	Finishing (Competitor G)
Competitor	Q=2,100cc/min	Q=1,970cc/min

Machining efficiency x1.1

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

(User Evaluation)

MFLN45

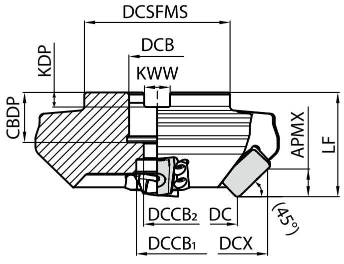


Fig. 1

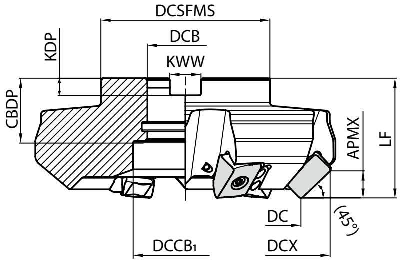


Fig. 2

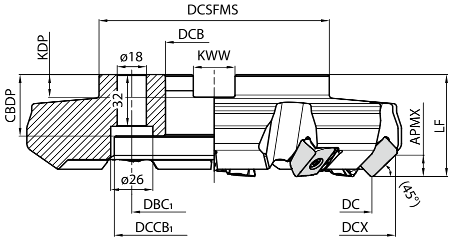


Fig. 3

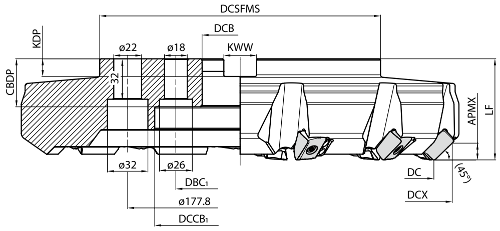


Fig. 4

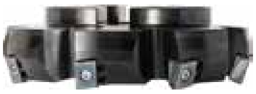
Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)												A.R. max.(°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Applicable inserts ➡ M46
			R		DC	DCX	DCSFMS	DCB	DCCB$_1$	DCCB$_2$	DBC$_1$	LF	CBDP	KDP	KWW	APMX							
Metric	MFLN	45080R-4T-M	●	4	80	104	70	27	20	13	-	50	24	7	12.4	12	+2	-15.5	Yes	5970	2	1	LOGU221616ER-GM
		45100R-4T-M	●		100	124	78	32	45	-			30	8	14.4			-14.5		4780	2.7	2	
		45125R-6T-M	●	6	125	149	89	40	55			63	33	9	16.4			-13.5		3820	4.6	2	
		45160R-7T-M	●	7	160	184	110		90		66.7								No	2990	6.7	3	
		45200R-8T-M	●	8	200	224	142	60	124		101.6		38	14	25.7					2390	9.7	3	
		45250R-10T-M	●	10	250	274	222		160											1910	16.9	3	
		45315R-12T-M	MTO	12	315	339			215			80								1520	25.1	4	
Bore dia. inch spec	MFLN	45080R-4T	●	4	80	104	70	25.4	20	13	-	50	27	6	9.5	12	+2	-15.5	Yes	5970	2	1	LOGU221616ER-GM
		45100R-4T	●		100	124	78	31.75	45	-			34	8	12.7			-14.5		4780	2.7	2	
		45125R-6T	●	6	125	149	89	38.1	55			63	38	10	15.9			-13.5		3820	4.6	2	
		45160R-7T	●	7	160	184	110	50.8	90					11	19.1				No	2990	6.8	2	
		45200R-8T	●	8	200	224	142	47.625	124		101.6			14	25.4					2390	10	3	
		45250R-10T	●	10	250	274	222		160											1910	17.1	3	
		45315R-12T	MTO	12	315	339			215			80								1520	25.3	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

MFLN70



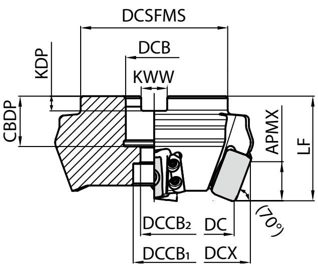


Fig. 1

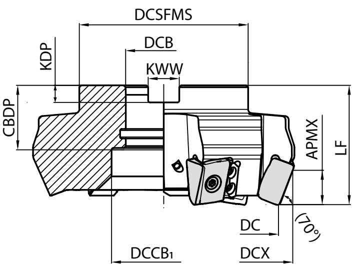


Fig. 2

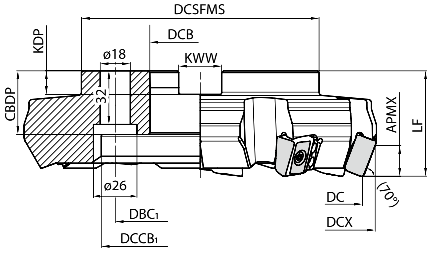


Fig. 3

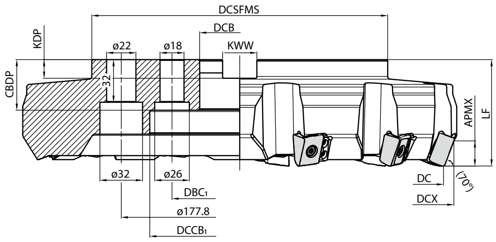


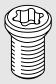
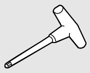
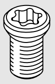
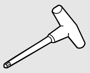
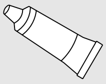
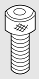
Fig. 4

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)												A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min⁻¹)	Weight (kg)	Fig.	Applicable inserts ➡ M46
			R		DC	DCX	DCSFMS	DCB	DCCB₁	DCCB₂	DBC₁	LF	CBDP	KDP	KWW	APMX							
Metric	MFLN	70080R-4T-M	●	4	80	93	70	27	20	13	-	50	24	7	12.4	17	+1	-16.5	Yes	5970	1.4	1	LOGU221616ER-GM
		70100R-4T-M	●		100	113	78	32	45	-			30	8	14.4			-14.5		4780	1.9	2	
		70125R-6T-M	●	6	125	138	89	40	55			63	33	9	16.4			-13.5		3820	3.4	2	
		70160R-7T-M	●	7	160	173	110		90		66.7								No	2990	5.3	3	
		70200R-8T-M	●	8	200	213	142	60	120		101.6		38	14	25.7					2390	8.2	3	
		70250R-10T-M	●	10	250	263	222		160											1910	14.8	3	
		70315R-12T-M	MTO	12	315	328			215			80								1520	21.9	4	
Bore dia. inch spec	MFLN	70080R-4T	●	4	80	93	70	25.4	20	13	-	50	27	6	9.5	17	+1	-16.5	Yes	5970	1.4	1	LOGU221616ER-GM
		70100R-4T	●		100	113	78	31.75	45	-			34	8	12.7			-14.5		4780	2	2	
		70125R-6T	●	6	125	138	89	38.1	55			63	38	10	15.9			-13.5		3820	3.5	2	
		70160R-7T	●	7	160	173	110	50.8	70					11	19.1				No	2990	5.8	2	
		70200R-8T	●	8	200	213	142	47.625	120		101.6			14	25.4					2390	8.5	3	
		70250R-10T	●	10	250	263	222		160											1910	15.1	3	
		70315R-12T	MTO	12	315	328			215			80								1520	22.2	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.

Spare parts

Description		Parts						
		Clamp screw	Wrench	Shim	Clamp screw	Wrench	Anti-seize compound	Arbor bolt
								
MFLN	○○080R-4T(-M)	SB-60200TRP	TTP-20	MAP-2216	SB-40140TR	DTM-15	P-37	HH12X35
	○○100R-4T(-M) ~ ○○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.

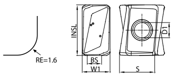
● : Standard item MTO : Made to order

LOGU

Classification of usage

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

	PR1525	PR1535	PR1825	PR1835	
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				Applicable toolholder ➡ **M44** **M45** **M152**
											PVD				
					S	D1	RE	W1	INSL	BS	PR1525	PR1535	PR1825	PR1835	
	 Corner-R	LOGU	221616ER-GM	4	16.6	6.8	1.6	12.5	22.8	6.3	○	●	●	●	MFLN45... MFLN70... MFLN90...

Recommended cutting conditions ➡ **M47**

About applicable insert

	LOGU221616ER-GM (Corner-R)	LOGU2216PAER-GM (Corner Chamfer)
MFLN 45	✓	not applicable
MFLN 70	✓	not applicable

● : Standard item ○ : Will be replaced with a new product

Recommended cutting conditions

	Workpiece	D.O.C. (mm)		fz: mm/t	Recommended insert grades (Vc: m/min)	
					MEGACOAT NANO EX (MEGACOAT NANO)	
		Width of cut ≦0.5×DC	Width of cut >0.5×DC		PR1825 (PR1525)	PR1835 (PR1535)
MFLN 45	Carbon steel	~10	~8	0.1 – **0.3** – 0.6	★ 100 – **150** – 180	☆ 80 – **120** – 150
	Alloy steel				★ 100 – **150** – 180	☆ 80 – **120** – 150
	Mold steel				★ 80 – **120** – 150	☆ 70 – **100** – 120
	Gray cast iron	~12	~10	0.1 – **0.3** – 0.6	★ 100 – **150** – 180	☆ 80 – **120** – 150
	Nodular cast iron				★ 100 – **150** – 180	☆ 80 – **120** – 150
MFLN 70	Carbon steel	~15	~12	0.1 – **0.2** – 0.4	★ 100 – **150** – 180	☆ 80 – **120** – 150
	Alloy steel				★ 100 – **150** – 180	☆ 80 – **120** – 150
	Mold steel				★ 80 – **120** – 150	☆ 70 – **100** – 120
	Gray cast iron	~17	~15	0.1 – **0.2** – 0.4	★ 100 – **150** – 180	☆ 80 – **120** – 150
	Nodular cast iron				★ 100 – **150** – 180	☆ 80 – **120** – 150

★ : 1st recommendation ☆ : 2nd recommendation

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.

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.

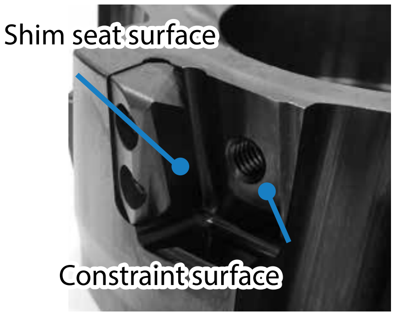


Fig.1

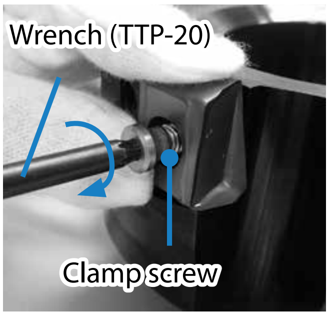


Fig.2

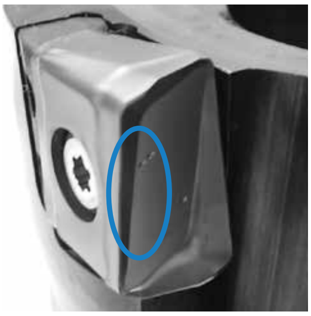


Fig.3

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)
Perform temporarily tightening and tightening in the order of (1) and (2) (See Figs. 2 and 3).
5. Please check that there is no gap between the shim and the pocket surfaces of toolholder.

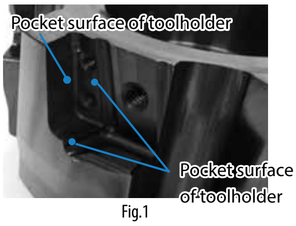


Fig.1

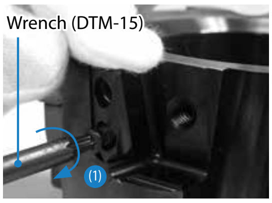


Fig.2

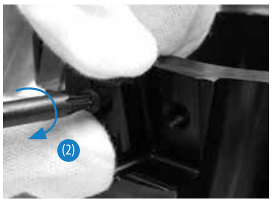


Fig.3

Fig.4

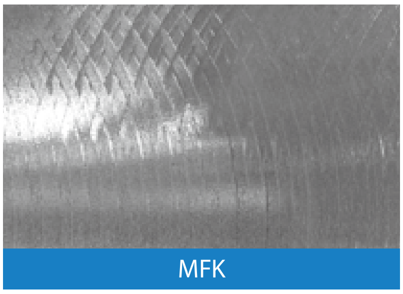
High efficiency cast iron machining

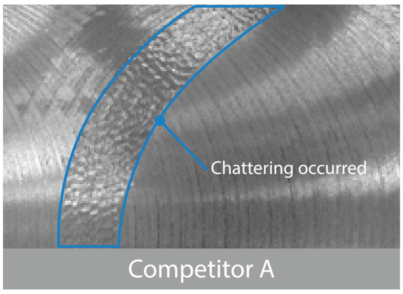
MFK

10-edge pentagonal inserts for stable and economical machining

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

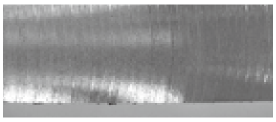
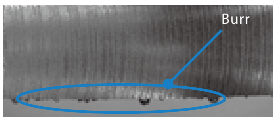
Surface finish comparison (Internal evaluation)





Cutting conditions:
Workpiece material: FCD600, Dry, V_c=180m/min, ap×ae=3×78mm, f_z=0.3mm/t

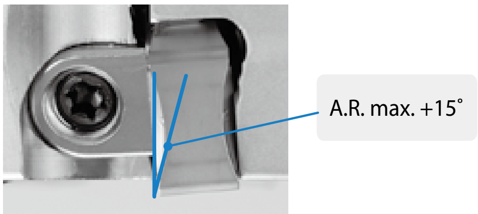
Burr comparison (Internal evaluation)

MFK	
Competitor B	

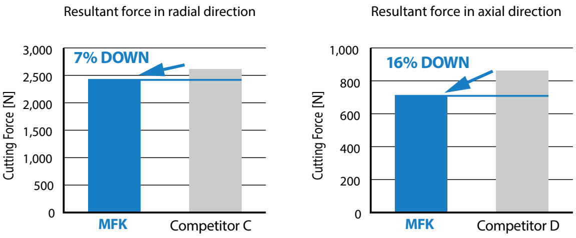
Sharp cutting prevents burr formation

Two special insert structures reduce cutting force and improve edge strength

1 Low cutting force with helical cutting-edge design

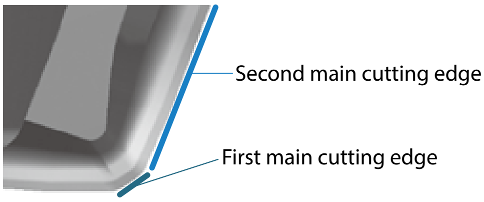


Cutting force comparison (Internal evaluation)

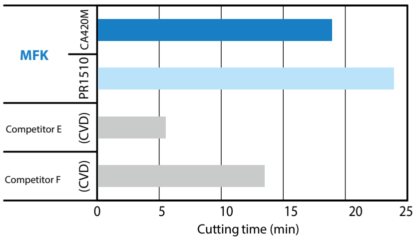


Cutting conditions:
Workpiece material: FCD600, dry, ø125
V_c=180 m/min, ap×ae=3.0×62 mm, f_z=0.3 mm/t

2 Dual cutting edge design (High toughness)



Fracture resistance comparison (Internal evaluation)

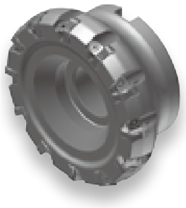


Cutting conditions:
Workpiece material:
FCD450 with 4 bores
VC=300 m/min
ap=2.0 mm
fZ=0.5 mm/t
Wet

Reducing impact load when biting into the workpiece

Toolholder lineup to meet various applications

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



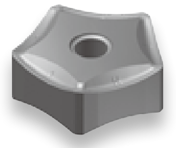
Fine pitch (Example: ø125 12 flutes)

- Recommended for low rigid workpiece
- For wide application range

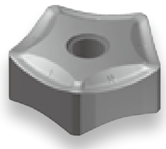
Extra fine pitch (Example: ø125 18 flutes)

- Recommended for high rigid workpiece
- For high efficiency machining

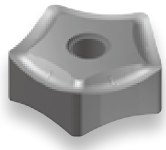
Applicable to various applications with wide range lineup of chipbreakers



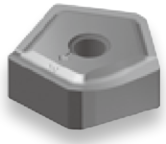
General purpose:
GM chipbreaker



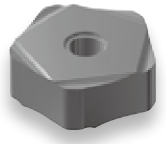
Tough edge:
GH chipbreaker



Finishing:
GL ground chipbreaker

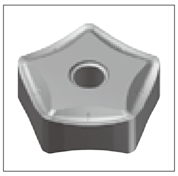


With wiper edge:
W ground chipbreaker

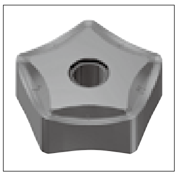


High speed machining:
Ceramic with chipbreaker

Insert grade lineup

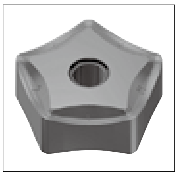


Long tool life
(1st Recommendation)
CA420M
(CVD)

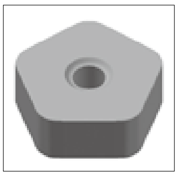


Stable machining

PR1510
(PVD)

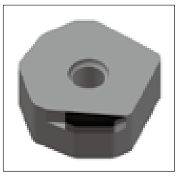


Fracture resistance
oriented
PR1525
(PVD)



High speed machining

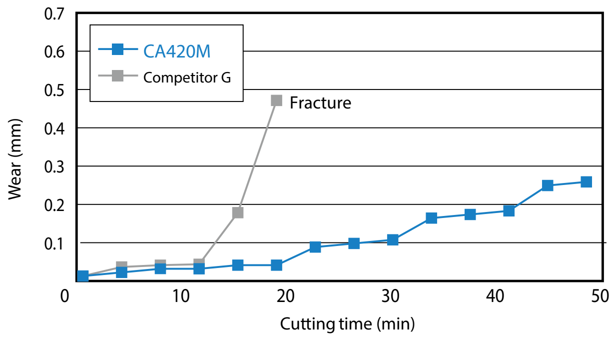
KS6050/CS7050
(Ceramic)



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

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

Wear resistance comparison (Internal evaluation)



Cutting conditions:
Workpiece material: FCD450, dry
Vc =200 m/min, apxae=2.0x80 mm, fz=0.3 mm/t

MFK

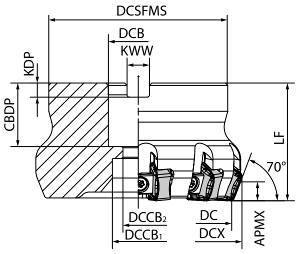


Fig. 1

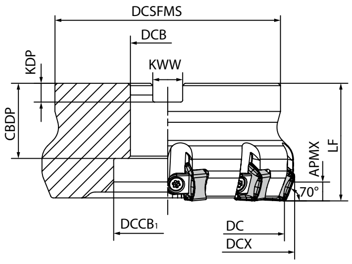


Fig. 2

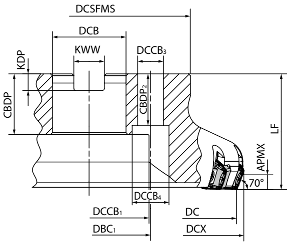


Fig. 3

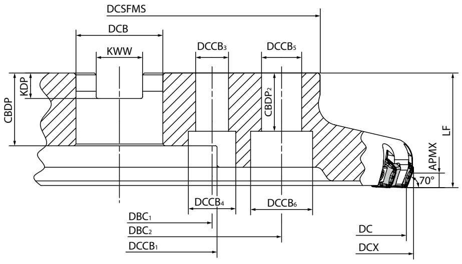


Fig. 4

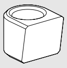
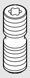
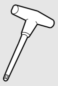
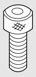
Toolholder dimensions

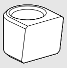
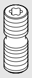
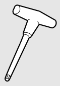
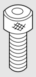
Description				Availability	Inserts	Dimension (mm)																		A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min-1)	Weight (kg)	Fig.
				R		DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DCCB5	DCCB6	DBC1	DBC2	LF	CBDP	KDP	KWW	APMX	CBDP2						
Metric	Fine pitch	MFK	080R-11-8T-M	●	8	80	89	76	27	20	13	-	-	-	-	-	-	63	24	7	12.4	6	-	+15	-7	No	8000	1.87	1
			100R-11-10T-M	●	10	100	109	96	32	26	17								28	8	14.4				-6		7000	2.99	1
			125R-11-12T-M	●	12	125	134	100	40	55	-								33	9	16.4				-5		6100	3.56	2
			160R-11-16T-M	●	16	160	169			70		14	20			66.7							28				5300	4.51	3
			200R-11-20T-M	●	20	200	209	142	60	110		18	26			101.6			40	14	25.7		32				4700	7.35	3
			250R-11-24T-M	●	24	250	259																				4200	10.43	3
			315R-11-28T-M	MTO	28	315	324	220						22	32		177.8										3700	19.41	4
	Extra fine pitch	MFK	080R-11-10T-M	●	10	80	89	76	27	20	13	-	-	-	-	-	-	63	24	7	12.4	6	-	+15	-7	No	8000	1.81	1
			100R-11-14T-M	●	14	100	109	96	32	26	17								28	8	14.4				-6		7000	2.86	1
			125R-11-18T-M	●	18	125	134	100	40	55	-								33	9	16.4				-5		6100	3.38	2
			160R-11-22T-M	●	22	160	169			70		14	20			66.7							28				5300	4.32	3
			200R-11-28T-M	●	28	200	209	142	60	110		18	26			101.6			40	14	25.7		32				4700	7.1	3
			250R-11-36T-M	●	36	250	259																				4200	10.07	3
			315R-11-44T-M	MTO	44	315	324	220						22	32		177.8										3700	18.92	4
Bore dia. inch spec	Fine pitch	MFK	080R-11-8T	●	8	80	89	76	31.75	26	17	-	-	-	-	-	-	63	32	8	12.7	6	-	+15	-7	No	8000	1.76	1
			100R-11-10T	●	10	100	109	96																	-6		7000	2.98	1
			125R-11-12T	●	12	125	134	100	38.1	55	-								38	10	15.9				-5		6100	3.65	2
			160R-11-16T	●	16	160	169		50.8	70										11	19.1						5300	4.62	2
			200R-11-20T	●	20	200	209	142	47.625	110		18	26			101.6			40	14	25.4		32				4700	7.65	3
			250R-11-24T	●	24	250	259																				4200	10.73	3
			315R-11-28T	MTO	28	315	324	220						22	32		177.8										3700	19.71	4
	Extra fine pitch	MFK	080R-11-10T	●	10	80	89	76	31.75	26	17	-	-	-	-	-	-	63	32	8	12.7	6	-	+15	-7	No	8000	1.7	1
			100R-11-14T	●	14	100	109	96																	-6		7000	2.85	1
			125R-11-18T	●	18	125	134	100	38.1	55	-								38	10	15.9				-5		6100	3.44	2
			160R-11-22T	●	22	160	169		50.8	70										11	19.1						5300	4.44	2
			200R-11-28T	●	28	200	209	142	47.625	110		18	26			101.6			40	14	25.4		32				4700	7.4	3
			250R-11-36T	●	36	250	259																				4200	10.36	3
			315R-11-44T	MTO	44	315	324	220						22	32		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

Spare parts and applicable inserts (MFK)

Description	Spare parts				Applicable inserts ➡ M54
	Wedge	Wedge screw	Wrench	Mounting bolt	
					
MFK 080R-11-8T-M	C09N	W6X18N	TT-15	HH12X35	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
100R-11-10T-M				HH16X40	
125R-11-12T-M				-	
160R-11-16T-M					
200R-11-20T-M					
250R-11-24T-M					
315R-11-28T-M					
MFK 080R-11-10T-M	C09N	W6X18N	TT-15	HH12X35	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
100R-11-14T-M				HH16X40	
125R-11-18T-M				-	
160R-11-22T-M					
200R-11-28T-M					
250R-11-36T-M					
315R-11-44T-M					

Description	Spare parts				Applicable inserts ➡ M54
	Wedge	Wedge screw	Wrench	Mounting bolt	
					
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100R-11-10T					
125R-11-12T				-	
160R-11-16T					
200R-11-20T					
250R-11-24T					
315R-11-28T					
MFK 080R-11-10T	C09N	W6X18N	TT-15	HH16X40	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
100R-11-14T					
125R-11-18T				-	
160R-11-22T					
200R-11-28T					
250R-11-36T					
315R-11-44T					

MFK-SF

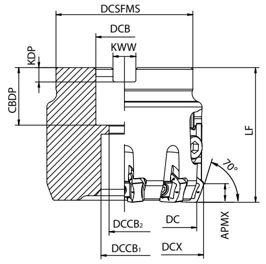


Fig. 1

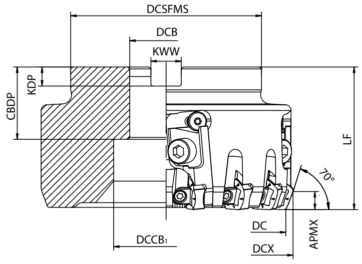


Fig. 2

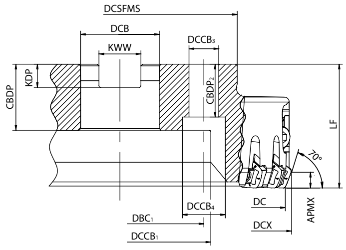


Fig. 3

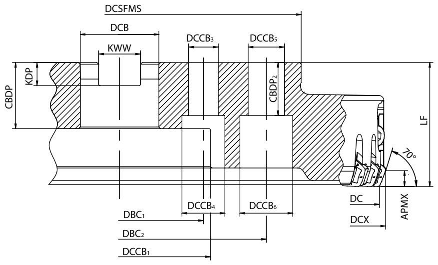


Fig. 4

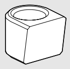
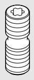
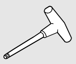
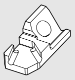
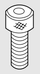
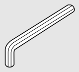
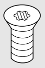
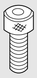
Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)																		A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.
			R		DC	DCX	DCSFMS	DCB	DCCB₁	DCCB₂	DCCB₃	DCCB₄	DCCB₅	DCCB₆	DBC₁	DBC₂	LF	CBDP	KDP	KWW	APMX	CBDP₂						
Metric	MFK	080R-11-9T-M-SF	●	9 (3)	80	89	76	27	20	13	-	-	-	-	-	-	75	24	7	12.4	6	-	+15	-7	No	8000	2.21	1
		100R-11-12T-M-SF	●	12 (4)	100	109	96	32	26	17								28	8	14.4				-6		7000	3.49	1
		125R-11-15T-M-SF	●	15 (5)	125	134	100	40	55	-								33	9	16.4				-5		6100	4.47	2
		160R-11-18T-M-SF	●	18 (6)	160	169					14	20			66.7							28				5300	6.99	3
		200R-11-24T-M-SF	●	24 (8)	200	209	142	60	110		18	26			101.6			35	14	25.7		32				4700	9.89	3
		250R-11-30T-M-SF	MTO	30 (10)	250	259																				4200	16.35	3
		315R-11-39T-M-SF	MTO	39 (13)	315	324	220						22	32		177.8										3700	28.14	4
Bore dia. inch spec	MFK	080R-11-9T-SF	●	9 (3)	80	89	76	31.75	26	17	-	-	-	-	-	-	75	32	8	12.7	6	-	+15	-7	No	8000	2.08	1
		100R-11-12T-SF	●	12 (4)	100	109	96																	-6		7000	3.49	1
		125R-11-15T-SF	●	15 (5)	125	134	100	38.1	55	-								38	10	15.9				-5		6100	4.54	2
		160R-11-18T-SF	●	18 (6)	160	169		50.8	70										11	19.1						5300	6.82	2
		200R-11-24T-SF	●	24 (8)	200	209	142	47.625	110		18	26			101.6			40	14	25.4		32				4700	10.39	3
		250R-11-30T-SF	MTO	30 (10)	250	259																				4200	16.85	3
		315R-11-39T-SF	MTO	39 (13)	315	324	220						22	32		177.8										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.

● : Standard item MTO : Made to order

Spare parts and applicable inserts (MFK-SF)

Description		Spare parts								Applicable inserts ➡ **M54**
		Wedge 	Wedge screw 	Wrench 	Cartridge 	Cartridge clamp screw 	Wrench 	Adjustment screw 	Mounting bolt 	
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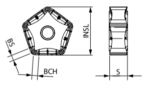
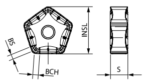
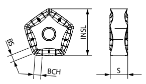
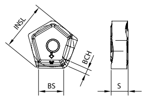
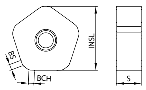
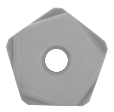
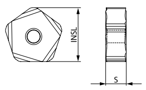
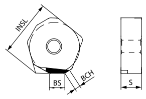
	100R-11-12T-M-SF								HH16X40	
	125R-11-15T-M-SF								-	
	160R-11-18T-M-SF									
	200R-11-24T-M-SF									
	250R-11-30T-M-SF									
	315R-11-39T-M-SF									
MFK	080R-11-9T-SF	C09N	W6X18N	TT-15	CR-MFK70R	HH8X25	LW-6	AJ-519TR	HH16X40	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W 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									

PNMG/PNEG/PNEA

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					Cera-mic		CBN	Applicable toolholder ➡ M50 M52
				S	INSL	BCH	BS	CVD	PVD				CVD	-	-	
								CA420M	PR1510	PR1525	PR1810	PR1825	CS7050	KS6050	KBN475	
	 General purpose	PNMG 1106XNEN-GM	10	6.35	17.23	2	2	●	□	○	●	●				MFK... MFK...-M MFK...-SF
	 Tough edge	PNMG 1106XNEN-GH	10	6.35	17.23	2	2	●	□	○	●	●				MFK... MFK...-M MFK...-SF
	 Surface finish oriented	PNEG 1106XNEN-GL	10	6.35	17.18	2.6	2.6	●	□	○	●	●				MFK... MFK...-M MFK...-SF
	 2-edge / With wiper edge	PNEG 1106XNER-W	2	6.35	18.02	2	10	●	□	○	●	●				MFK... MFK...-M MFK...-SF
	 High speed machining	PNEA 1106XNTN-T01020	10	6.5	16.94	1.5	1.5						●	●		MFK... MFK...-M MFK...-SF
	 High speed machining (With chipbreaker)	PNEG 1106XNTR-T00515	10	6.35	17.07	-	-						●	●		MFK... MFK...-M MFK...-SF
	 2-edge / Wiper insert	PNMG 1106XNTR-T01015W	2	6.5	18.06	1.7	4.8								●	MFK... MFK...-M MFK...-SF

Handed insert shows Right-hand

Recommended cutting conditions ➡ **M55, M56**

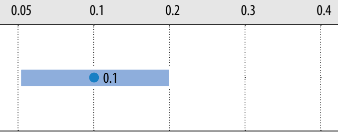
PNEG1106XNER-W inserts are sold in 5 piece boxes

PNEG1106XNTR-T01015W inserts are sold in 1 piece boxes

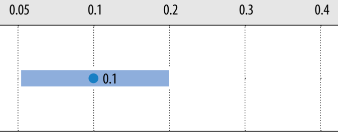
● : Standard item ○ : Will be replaced with a new product □ : Expected to be discontinued in September 2026

Recommended cutting conditions (Ceramic/CBN)

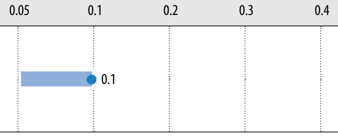
Without chipbreaker

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

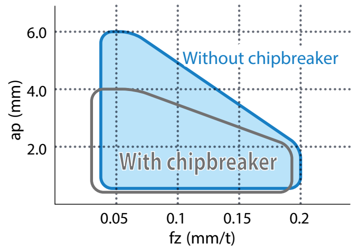
CBN wiper insert

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

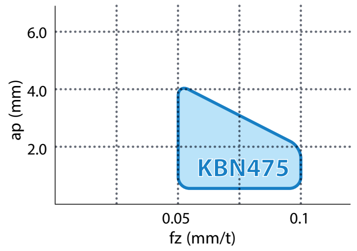
★: 1st Recommendation ☆: 2nd Recommendation

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.

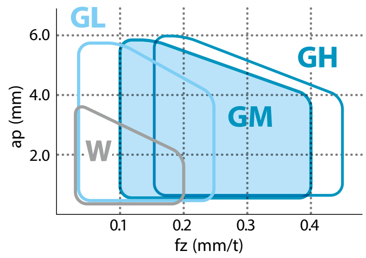
Recommended cutting conditions (Coated carbide)

Workpiece material	Insert grades	Vc (m/min)	Chipbreaker	fz(mm/t)
Gray cast iron	**CA420M**	170~**230**~300	GM★	0.25
	PR1810	120~**180**~250	GH☆	0.3
	PR1825		GL	0.12
	PR1510	120~**180**~250	GH	0.3
	PR1525		GL	0.12
Nodular cast iron	**CA420M**	150~**200**~250	GM★	0.2
	PR1810	100~**150**~200	GH ☆	0.25
	PR1825		GL	0.1
	PR1510	100~**150**~200	GH	0.25
	PR1525		GL	0.1

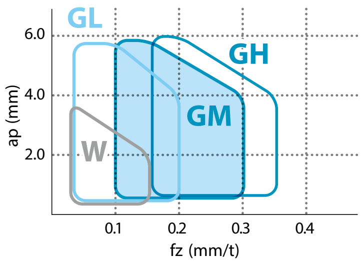
★: 1st Recommendation ☆: 2nd Recommendation

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.

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 adjust cutting edge height

1. Assemble all related parts into the cutter.

2. Make sure the back end of cartridge makes contact with adjustment screw (Fig. 1), and pull them lightly inwards (Fig. 2).
   Tighten the cartridge clamp screw temporary.

3. Install the insert (Fig. 3), and tighten the wedge screw temporary.
   Temporarily tighten the screw with a 40 to 45 degree rotation after the wedge contacts the insert.

4. Loosen the cartridge clamp screw. (Fig. 4)

5. Adjust the extruding amount with adjustment screw. (Fig. 5)

6. Tighten the wedge screw and firmly fix the insert.
   (Recommended tightening torque: 6N·m)

7. Tighten the cartridge clamp screw firmly.
   (Recommended tightening torque: 10N·m)

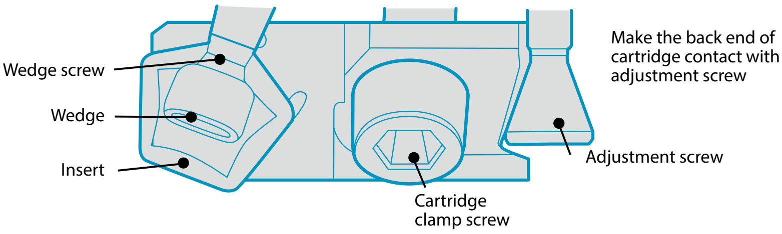


Fig. 1

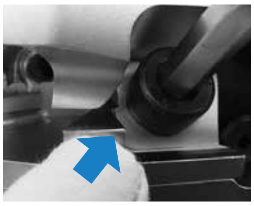


Fig. 2

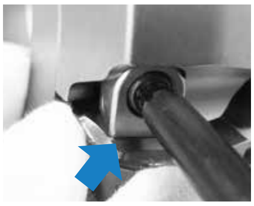


Fig. 3

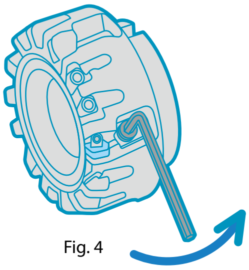


Fig. 4

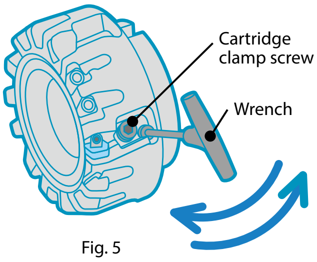


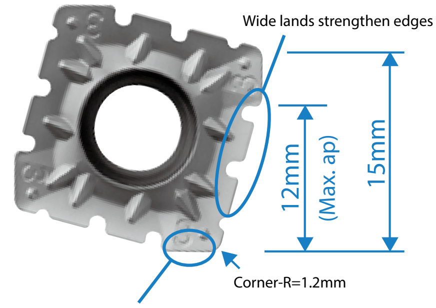
Fig. 5

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

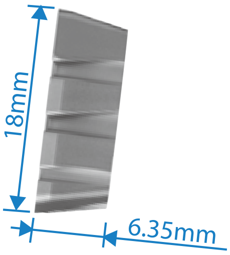
MSRS15 face mill for heavy milling

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

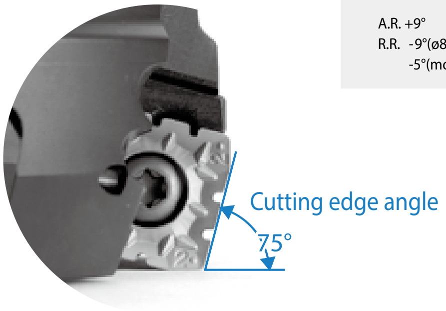
Recommended ap: 5 ~ 10mm



Large wiper edges achieve high feed rate.

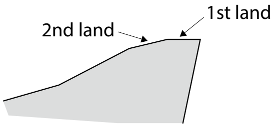
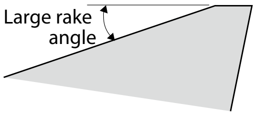
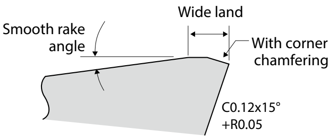


Inserts are strengthened with 6.35mm thickness.

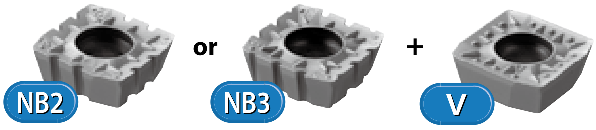


A.R. +9°
R.R. -9°(ø80)
-5°(more than ø100)

Selection of chipbreaker

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

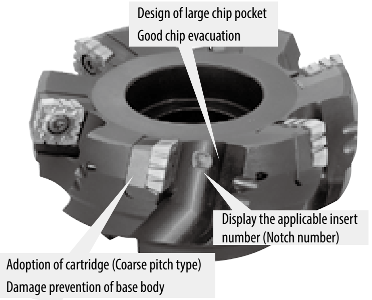
A supplemental chipbreaker is used when it is necessary to increase strength and bite while focusing on resistance, as when machining welded areas.



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

Features of toolholder

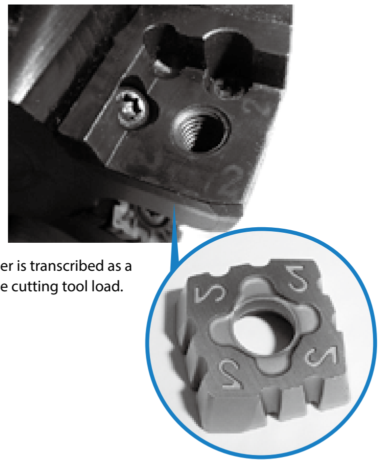
Coarse pitch



Fine pitch

Higher productivity with fine pitch design

Insert replacement identification



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

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

MSRS15

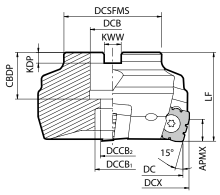


Fig. 1

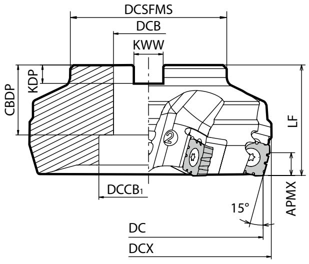


Fig. 2

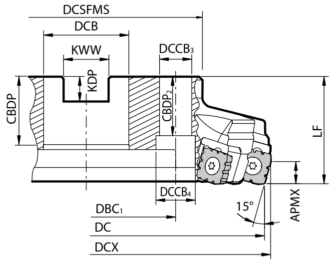


Fig. 3

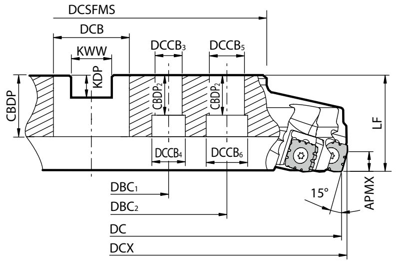


Fig. 4

Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)																		A.R. (°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts ➡ M60
				R		DC	DCX	DCSFMS	DCB	DCCB₁	DCCB₂	DCCB₃	DCCB₄	DCCB₅	DCCB₆	DBC₁	DBC₂	LF	CBDP	KDP	KWW	APMX	CBDP₂						
Metric	Coarse pitch	MSRS	15080R-4T-M	●	4	80	87	70	27	20	13	-	-	-	-	-	-	50	24	7	12.4	12	-	+9	-9	No	1.3	1	SPMT1806EDER... SPMT1806EDSR...
			15100R-4T-M	●		100	107	85	32	45	-								29	8	14.4				-5		2	2	
			15125R-6T-M	●	6	125	132		40	55								60	33	9	16.4						3.6	2	
			15160R-8T-M	●	8	160	167	110		68		14	20			66.7							28				5	3	
			15200R-10T-M	●	10	200	207	140	60	-		18	26			101.6			38	15	25.7		32				7.7	3	
			15250R-12T-M	●	12	250	257																				12	3	
			15315R-14T-M	●	14	315	322	230						22	32		177.8										17	4	
	Fine pitch	MSRS	15080R-6T-M	●	6	80	87	70	27	20	13	-	-	-	-	-	-	50	24	7	12.4	12	-	+9	-9	No	1.3	1	SPMT1806EDER... SPMT1806EDSR...
			15100R-6T-M	●		100	107	85	32	45	-								29	8	14.4				-5		1.9	2	
			15125R-8T-M	●	8	125	132		40	55								60	33	9	16.4						3.5	2	
			15160R-10T-M	●	10	160	167	110		68		14	20			66.7							28				4.9	3	
			15200R-12T-M	●	12	200	207	140	60	-		18	26			101.6			38	15	25.7		32				7.6	3	
			15250R-14T-M	●	14	250	257																				11.9	3	
			15315R-16T-M	MTO	16	315	322	230						22	32		177.8										17	4	
Bore dia. inch spec	Coarse pitch	MSRS	15080R-4T	●	4	80	87	55	25.4	20	13	-	-	-	-	-	-	50	26	6	9.5	12	-	+9	-9	No	1.3	1	SPMT1806EDER... SPMT1806EDSR...
			15100R-4T	●		100	107	70	31.75	42	-								32	8	12.7				-5		2	2	
			15125R-6T	●	6	125	132	85	38.1	54								60	38	10	15.9						3.6	2	
			15160R-8T	●	8	160	167	100	50.8	68										11	19						5	2	
			15200R-10T	●	10	200	207	130	47.625	-		18	26			101.6				14	25.4		32				7.7	3	
			15250R-12T	●	12	250	257																				12	3	
			15315R-14T	●	14	315	322	220						22	32		177.8						25				17	4	
	Fine pitch	MSRS	15080R-6T	●	6	80	87	55	25.4	20	13	-	-	-	-	-	-	50	26	6	9.5	12	-	+9	-9	No	1.3	1	SPMT1806EDER... SPMT1806EDSR...
			15100R-6T	●		100	107	70	31.75	42	-								32	8	12.7				-5		1.9	2	
			15125R-8T	●	8	125	132	85	38.1	54								60	38	10	15.9						3.5	2	
			15160R-10T	●	10	160	167	100	50.8	68										11	19						4.9	2	
			15200R-12T	●	12	200	207	130	47.625	-		18	26			101.6				14	25.4		32				7.6	3	
			15250R-14T	●	14	250	257																				11.9	3	
			15315R-16T	MTO	16	315	322	220						22	32		177.8						25				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.

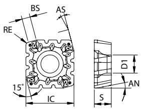
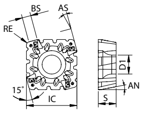
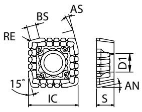
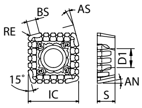
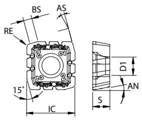
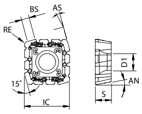
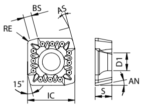
● : Standard item MTO : Made to order

SPMT

Classification of usage

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

	PR1810	PR1825	PR1835	
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

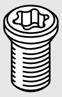
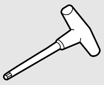
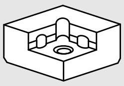
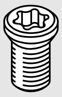
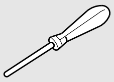
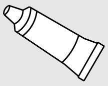
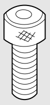
Insert		Description	No. of edges	Dimension (mm)					Angle (°)		Carbide			Applicable toolholder ➡ M59
											PVD			
				IC	S	D1	RE	BS	AN	AS	PR1810	PR1825	PR1835	
	 2-notch	SPMT 1806EDER-NB2	4	18	6.35	6.8	1.2	3.1	11	15	●	●	●	MSRS15...
	 3-notch	SPMT 1806EDER-NB3	4	18	6.35	6.8	1.2	3.1	11	15	●	●	●	MSRS15...
	 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 ➡ M61

● : Standard item

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) ~ 15315R-◯◯(M)	Recommended tightening torque for insert clamp 7.5N·m		Recommended tightening torque for cartridge clamp 3.5N·m				-
Fine pitch	MSRS 15080R-◯◯(M)	SB-60120TR	TT-25L	-	-	-	P-37	HH12X35
	MSRS 15100R-◯◯(M) ~ 15315R-◯◯(M)	Recommended tightening torque for insert clamp 7.5N·m						-

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

Recommended cutting conditions

Workpiece material	fz (mm/t)			Recommended insert grades (Vc: m/min)		
				MEGACOAT NANO EX		
	NB2P + NB3P	NB2 + NB3	NB2T + NB3T	PR1810	PR1825	PR1835
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

Tangential 90° end mill with 4-edge inserts

MA90

Original tangential 90° end mill with economical 4-edge inserts. New grade PR18 Series and unique insert cutting edge design creates high-quality machining with longer tool life

1 The MA90 tangential end mills provide a large variety of machining operations

Challenges	Conventional end mill - Sudden fractures can cause damage to the holder - Insert defects preventing use of all four corners Tangential end mill - Premature tool wear can quickly deteriorate the surface finish quality - Poor wall accuracy
SOLUTION	**Kyocera's MA90 tangential end mill solves these problems with a unique insert shape and PR18 Series grade technology.**

Large web thickness

High rigidity

Peripheral grinding specifications

Excellent wall accuracy

Special wiper edge

Large relief angle suppresses wear

High-quality surface finish

Multifunctional (G-class insert)

Supports three-dimensional machining
(Excluding R4-R6)

Unique cutting edge design

Excellent fracture resistance and low cutting force design

Newly developed insert grade

MEGACOAT NANO EX
PR18 Series delivers longer tool life

2 New insert grade PR18 Series provides a significantly longer tool life

Extensive lineup of insert grades covers a variety of machining materials and applications

Workpiece material	P Steel					M Stainless steel					K Cast iron				
ISO	01	10	20	30	40	01	10	20	30	40	01	10	20	30	40
Lineup		1st recommendation PR1825 Wet PR1835				High-speed machining CA6535	1st recommendation PR1835				1st recommendation PR1810				

H Hard materials **PR015S (GH)**

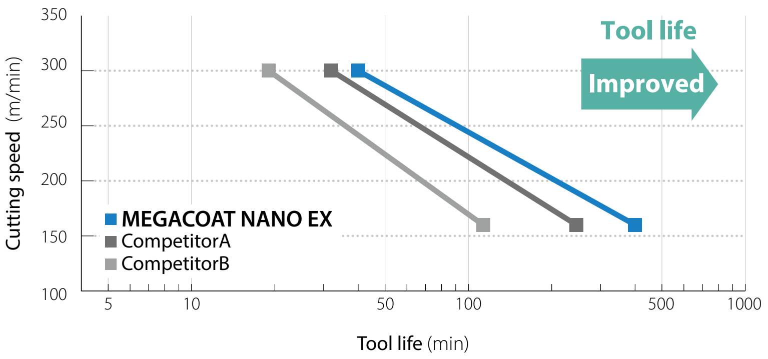
S Heat-resistant alloy **CA6535 (PR1835)** Titanium alloy **PR1835**

PR1825 Wear resistance comparison (Internal evaluation)

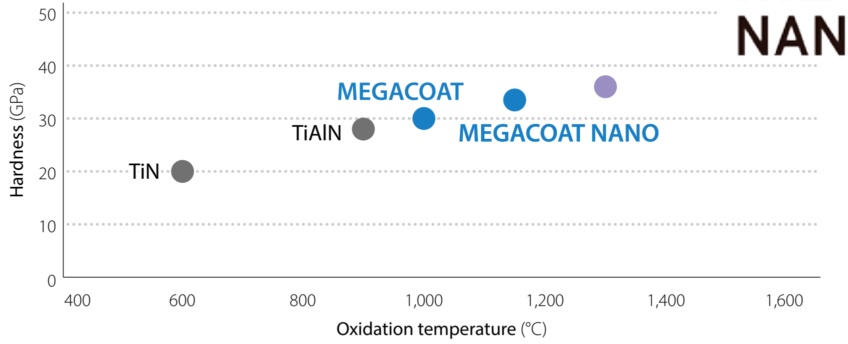
V-T graph

Life criteria:
Flank face wear = 0.10 mm

Cutting conditions:
Vc = 160 / 300 m/min
ap × ae = 2.0 × 110 mm, fz = 0.12 mm/t
SCM440 Dry
PNMU1205ANER-GM (MFPN)



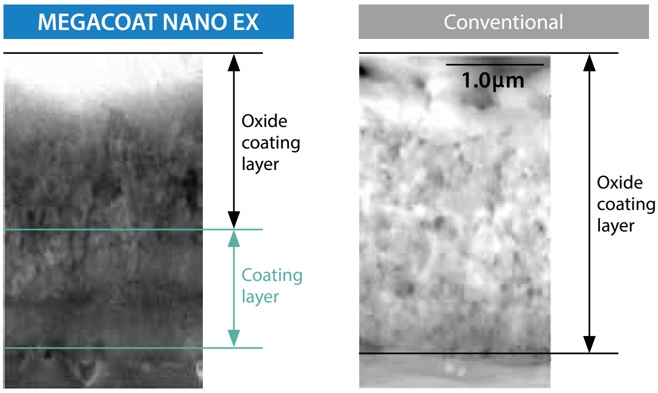
Coating characteristics (Internal evaluation)



MEGACOAT NANO EX | Milling

Oxidation progression comparison (Internal evaluation)

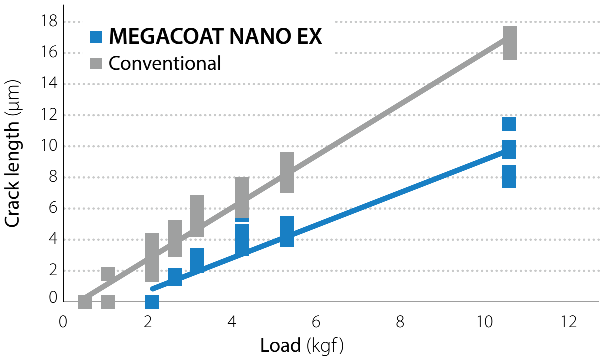
Suppresses oxidation progression with excellent oxidation resistance



*Section after holding at 1,200 degrees for 30 minutes in air

Coating layer toughness evaluation (Internal evaluation)

Excellent coating toughness with small crack length



*Micro-Vickers measurement

3 Achieve reliable results with an insert shape designed for high quality machining and long tool life

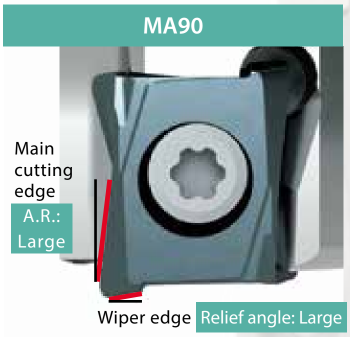
Unique cutting edge design delivers high fracture resistance and low cutting forces

Special wiper edge and peripheral grinding specifications provide high quality finish and long tool life

Advantage

Both the A.R. and the relief angle of the wiper edge are large.
Low resistance and excellent surface finish

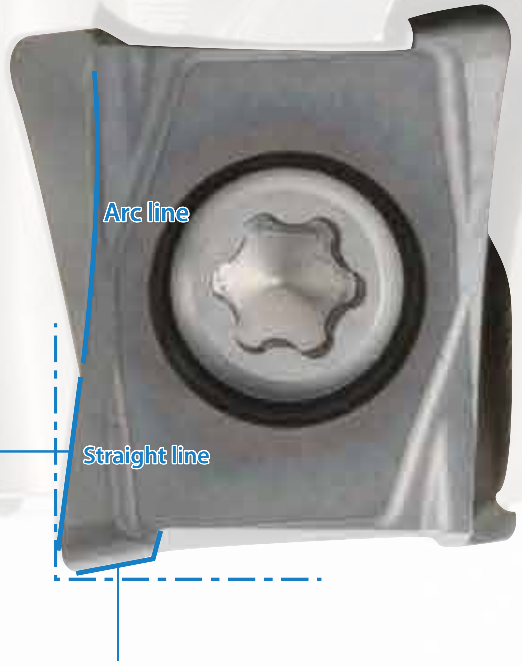
MA90



Conventional tangential type

Unique cutting edge design

Superior fracture resistance and low cutting force



Special wiper edge

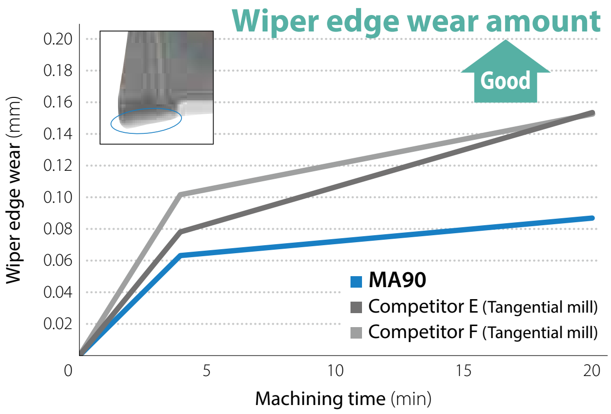
Large relief angle: Excellent surface finish and wear suppression
Stepped corners: Designed to prevent seat damage

Excellent Excellent surface finish

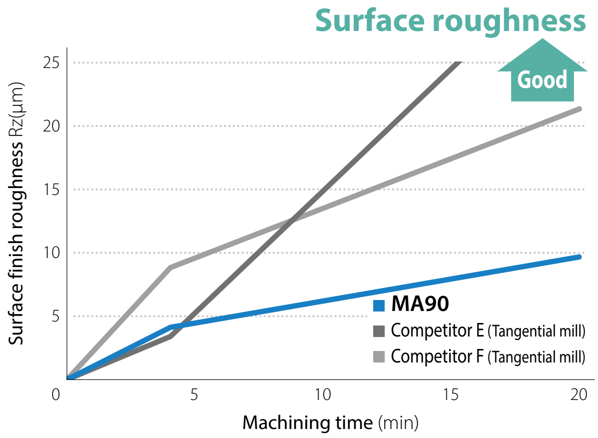
Special wiper edge design suppresses abrasion progress of the edge. Maintains high-quality finished surface

Wear and surface finish comparison (Internal evaluation)

Wiper edge wear



Surface finish roughness (Bottom surface)



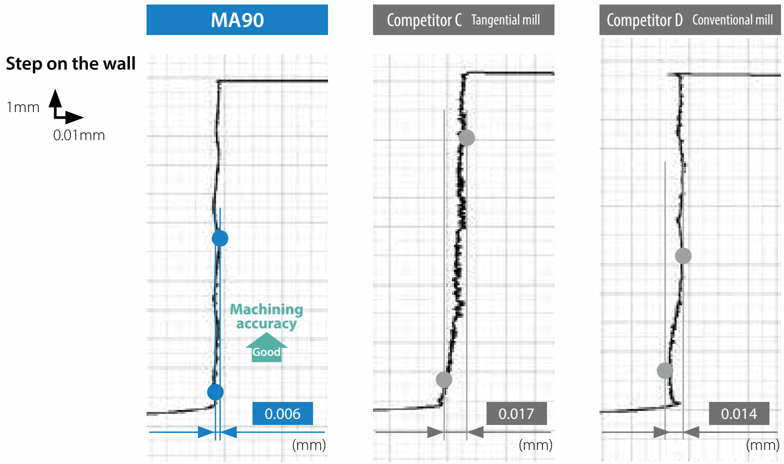
Cutting conditions: Vc = 200 m/min, ap × ae = 1 × 37.5 mm, fz = 0.1/0.12 mm/t, Dry S50C ø50 (6/7 inserts) BT50

Excellent wall accuracy **Excellent**

Peripheral grinding specifications

Unique, sloped, edge shape
Grounded peripheral provides higher precision

Wall accuracy comparison (Internal evaluation)



Wall condition

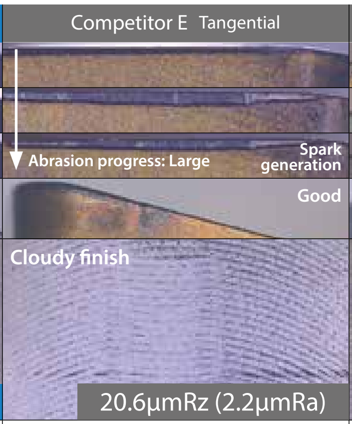
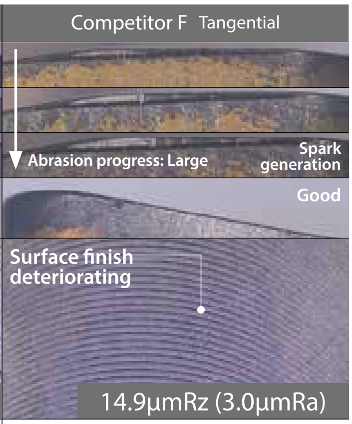
Cutting conditions: Vc = 150 m/min, ap × ae = 3 × 5 mm 4passes, fz = 0.1 mm/t, Dry S50C ø20 (3 inserts) BT50

››› Long tool life and high-speed machining

CASE Even if the main cutting edge is in good condition, the tool reached the end of life due to deterioration of the finished surface. MA90 ✓

CASE Machined with reduced cutting speed because the surface finish deteriorated early. MA90 ✓

Edge condition and finished surface (Internal evaluation)

		MA90	Competitor E Tangential	Competitor F Tangential
Wiper edge	After 3.8 min			
	After 6.5 min			
	After 13.1 min	Abrasion progress: Small	Abrasion progress: Large Spark generation	Abrasion progress: Large Spark generation
Main cutting edge		Good	Good	Good
Finished surface		Good 8.0μmRz (1.3μmRa)	Cloudy finish 20.6μmRz (2.2μmRa)	Surface finish deteriorating 14.9μmRz (3.0μmRa)
Results		Main cutting edge: Good Wiper edge wear: Small wear Good finished surface and can continue to use	Main cutting edge: Good Wiper edge wear: Progressive Worse finished surface	Main cutting edge: Good Wiper edge wear: Progressive Worse finished surface

MA90 (End mill)

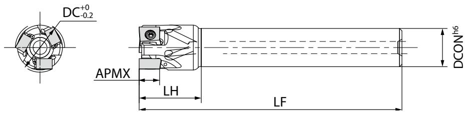


Fig. 1

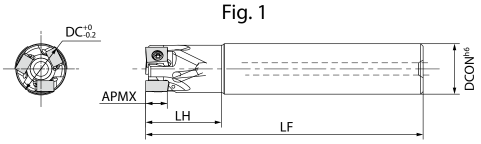


Fig. 2

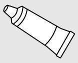
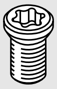
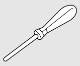
Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)					Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Spare parts			Applicable inserts
						DC	DCON	LF	LH	APMX					Anti-seize compound	Screw	Wrench	
Cylindrical	Standard shank	MA90	-16S12-09T2C	●	2	16	12	100	23	8	Yes	29500	0.1	1	P-37	SB-44865UTRP	DTPM-8	LOGU0904...
			-18S16-09T2C	●		18	16					27900						
			-20S16-09T2C	●		20		110	26			26600	0.2			SB-44880UTRP		
			-20S16-09T3C	●	3													
			-22S20-09T3C	●		22	20					25400						
			-25S20-09T3C	●		25		120	29			23900	0.3					
			-25S20-09T4C	●	4													
			-28S25-09T3C	●	3	28	25					22600						
			-30S25-09T4C	●	4	30		130	32			21900	0.5					
			-32S25-09T4C	●		32						21200						
			-32S25-09T5C	●	5													
			-35S32-09T4C	●	4	35	32	150	50			20300	0.9					
			-35S32-09T5C	●	5													
			-40S32-09T4C	●	4	40						19000	1					
			-40S32-09T6C	●	6													
			-50S32-09T5C	●	5	50		120	40			17000	0.9					
			-50S32-09T7C	●	7													
	Same shank	MA90	-16S16-09T2C	●	2	16	16	100	26	8	Yes	29500	0.1	2	P-37	SB-44865UTRP	DTPM-8	LOGU0904...
			-20S20-09T2C	●		20	20	110	30			26600	0.2			SB-44880UTRP		
			-20S20-09T3C	●	3													
			-25S25-09T3C	●		25	25	120	32			23900	0.4					
			-25S25-09T4C	●	4													
			-32S32-09T4C	●		32	32	130	40			21200	0.7					
			-32S32-09T5C	●	5													
	Long shank	MA90	-20S18-09T2CL	●	2	20	18	150	30	8	Yes	26600	0.3	1	P-37	SB-44880UTRP	DTPM-8	LOGU0904...
			-20S20-09T2CL	●			20		40					2				
			-25S25-09T2CL	●		25	25	170	50			23900	0.6					
			-32S32-09T2CL	●		32	32	200	65			21200	1.1					

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.

● : Standard item

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)					Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Spare parts			Applicable inserts
					DC	DCON	LF	LH	APMX					Anti-seize compound 	Screw 	Wrench 	
Cylindrical	Standard shank	MA90 -25S20-12T2C	●	2	25	20	120	29	12	Yes	18300	0.3	1	P-37	SB-40104TRP	DTPM-15	LOGT1206... LOGU1206...
		-28S25-12T2C	●		28	25					17300	0.4					
		-30S25-12T2C	●		30		130	32			16800	0.5					
		-30S25-12T3C	●	3													
		-32S25-12T2C	●	2	32						16300						
		-32S25-12T3C	●	3													
		-35S32-12T3C	●		35	32	150	50			15600	0.9					
		-40S32-12T3C	●		40						14600						
		-40S32-12T4C	●	4													
		-50S32-12T4C	●		50		120	40			13100						
		-50S32-12T6C	●	6								0.8					
	Same shank	MA90 -25S25-12T2C	●	2	25	25	120	32	12	Yes	18300	0.4	2	P-37	SB-40104TRP	DTPM-15	LOGT1206... LOGU1206...
		-32S32-12T2C	●		32	32	130	40			16300	0.7					
		-32S32-12T3C	●	3													
	Long shank	MA90 -25S25-12T2CL	●	2	25	25	170	50	12	Yes	18300	0.6	2	P-37	SB-40104TRP	DTPM-15	LOGT1206... LOGU1206...
		-32S32-12T2CL	●		32	32	200	65			16300	1.1					

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.

● : Standard item

MA90 (Face mill)

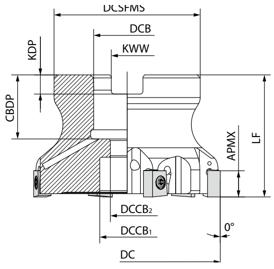


Fig. 1

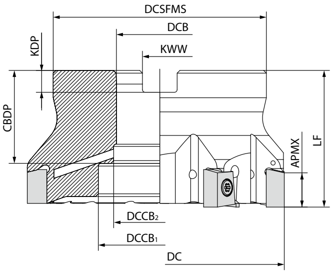
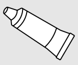
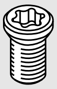
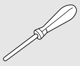


Fig. 2

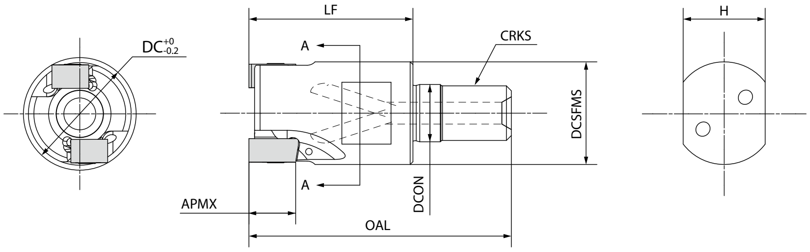
Toolholder dimensions

	Description	Availability	Inserts	Dimension (mm)										Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Spare parts			Applicable inserts
		R		DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX					Anti-seize compound 	Screw 	Wrench 	
Metric	MA90 -040R-09T4C-M	●	4	40	38	16	15	9	40	19	5.6	8.4	8	Yes	26600	0.2	1	P-37	SB-44880UTRP	DTPM-8	LOGU0904...
	-040R-09T6C-M	●	6																		
	-050R-09T5C-M	●	5	50	48	22	18	11		21	6.3	10.4			23900	0.4					
	-050R-09T7C-M	●	7																		
	-063R-09T6C-M	●	6	63											21200	0.5					
	-063R-09T9C-M	●	9													0.4					
	MA90 -040R-12T3C-M	●	3	40	38	16	14	9	40	19	5.6	8.4	12	Yes	14600	0.2	1	P-37	SB-40104TRP	DTPM-15	LOGT1206... LOGU1206...
	-040R-12T4C-M	●	4																		
	-050R-12T4C-M	●		50	48	22	18	11		21	6.3	10.4			13100	0.3					
	-050R-12T6C-M	●	6																		
	-063R-12T6C-M	●		63											11700	0.4					
	-063R-12T8C-M	●	8																		
	-080R-12T7C-M	●	7	80	70	27	20	13	50	24	7	12.4			10400	1.2					
	-080R-12T10C-M	●	10																		
	-100R-12T9C-M	●	9	100	78	32	45	-		30	8	14.4			9300	1.5	2				
	-100R-12T13C-M	●	13																		
	-125R-12T12C-M	●	12	125	89	40	55		63	33	9	16.4			8300	2.5					
	-125R-12T16C-M	●	16																		
Bore dia. inch spec	MA90 -080R-12T7C	●	7	80	70	25.4	20	13	50	27	6	9.5	12	Yes	10400	1.2	1	P-37	SB-40104TRP	DTPM-15	LOGT1206... LOGU1206...
	-080R-12T10C	●	10																		
	-100R-12T9C	●	9	100	78	31.75	45	-		34	8	12.7			9300	1.5	2				
	-100R-12T13C	●	13																		
	-125R-12T12C	●	12	125	89	38.1	55		63	38	10	15.9			8300	2.6					
	-125R-12T16C	●	16																		

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

● : Standard item

MA90 (Modular type)



Toolholder dimensions

Description		Availability	Inserts	Dimension (mm)								Coolant hole	Max. revolution (min^{-1})	Spare parts			Applicable inserts
														Anti-seize compound	Screw	Wrench	
				DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H						
MA90	-20M10-09T2C	●	2	20	10.5	18.8	48	30	8	M10×1.5	15	Yes	19000	P-37	SB-44880UTRP	DTPM-8	LOGU0904...
	-20M10-09T3C	●	3														
	-25M12-09T3C	●		25	12.5	23	56	35		M12×1.75	19		17000				
	-25M12-09T4C	●	4														
	-32M16-09T4C	●		32	17	30	62	40		M16×2.0	24		15100				
	-32M16-09T5C	●	5														
MA90	-25M12-12T2C	●	2	25	12.5	23	56	35	12	M12×1.75	19	Yes	18300	P-37	SB-40104TRP	DTPM-15	LOGT1206... LOGU1206...
	-32M16-12T2C	●		32	17	30	62	40		M16×2.0	24		16300				
	-32M16-12T3C	●	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.

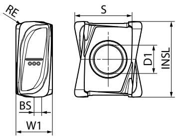
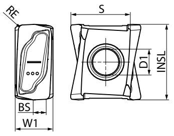
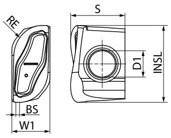
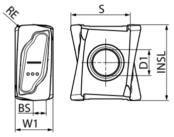
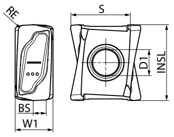
● : Standard item

LOGU

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					★	
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					Applicable toolholder
										CVD	PVD				
				S	D1	RE	INSL	W1	BS	CA6535	PR015S	PR1810	PR1825	PR1835	
 General purpose		LOGU 090404ER-GM	4	6.77	3.33	0.4	8.89	4.3	1.29	●		●	●	●	MA90-...-09T...
		090408ER-GM		6.71		0.8			0.9	●		●	●	●	
		090412ER-GM		6.65		1.2			0.49	●		●	●	●	
		090416ER-GM		6.59		1.6			0.1	●		●	●	●	
 Low cutting force		LOGU 090404ER-SM	4	6.77	3.33	0.4	8.89	4.3	1.29	●			●	●	MA90-...-09T...
		090408ER-SM		6.71		0.8			0.89	●			●	●	
		090412ER-SM		6.65		1.2			0.49	●			●	●	
		090416ER-SM		6.59		1.6			0.1	●			●	●	
 Tough edge		LOGU 090408ER-GH	4	6.71	3.33	0.8	8.89	4.3	0.9		●	●	●	●	MA90-...-09T...
 General purpose		LOGU 120604ER-GM	4	10.1	4.55	0.4	13.28	6.6	2.5	●		●	●	●	MA90-...-12T...
		120608ER-GM		10.04		0.8			2.14	●		●	●	●	
		120612ER-GM		9.97		1.2			1.79	●		●	●	●	
		120616ER-GM		9.92		1.6			1.44	●		●	●	●	
		120620ER-GM		9.85		2			1.08	●		●	●	●	
		120624ER-GM		9.79		2.4			0.72	●		●	●	●	
		120630ER-GM		9.69		3			0.2	●		●	●	●	
 General purpose (Single-sided)		LOGT 120640ER-GM	2	9.56	4.55	4	13.28	6.6	1.69	●		●	●	●	MA90-...-12T...
		120650ER-GM		9.40		5			0.63	●		●	●	●	
		120660ER-GM		9.24		6			0.37	●		●	●	●	
 Low cutting force		LOGU 120604ER-SM	4	10.1	4.55	0.4	13.28	6.6	2.5	●			●	●	MA90-...-12T...
		120608ER-SM		10.04		0.8			2.14	●			●	●	
		120612ER-SM		9.97		1.2			1.79	●			●	●	
		120616ER-SM		9.92		1.6			1.44	●			●	●	
		120620ER-SM		9.85		2			1.08	●			●	●	
		120624ER-SM		9.79		2.4			0.72	●			●	●	
		120630ER-SM		9.69		3			0.2	●			●	●	
 Tough edge		LOGU 120608ER-GH	4	10.16	4.55	0.8	13.25	6.6	2.26		●	●	●	●	MA90-...-12T...

● : Standard item

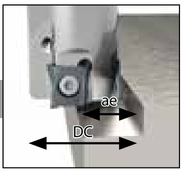
Recommended cutting conditions

Chipbreaker	Workpiece material	Toolholder description and Feed fz (mm/t)				Recommended insert grade (Cutting speed Vc: m/min)				
		09 Size (LOGU09...)		12 Size (LOG□12...)		CVD coated carbide	MEGACOAT HARD	MEGACOAT NANO EX		
		MA90-16~18	MA90-20~50 MA90-040~063	MA90-25~30	MA90-32~50 MA90-040~125	CA6535	PR015S	PR1810	PR1825	PR1835
GM	Carbon steel	0.05 ~ **0.1** ~ 0.14	0.05 ~ **0.1** ~ 0.16	0.05 ~ **0.1** ~ 0.18	0.06 ~ **0.15** ~ 0.23	-	-	-	★ 120 ~ **180** ~ 250	☆ 120 ~ **180** ~ 250
	Alloy steel	0.05 ~ **0.08** ~ 0.12	0.05 ~ **0.1** ~ 0.14	0.05 ~ **0.1** ~ 0.16	0.06 ~ **0.13** ~ 0.2	-	-	-	★ 100 ~ **160** ~ 220	☆ 100 ~ **160** ~ 220
	Mold steel	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.1** ~ 0.12	0.05 ~ **0.1** ~ 0.14	0.06 ~ **0.12** ~ 0.18	-	-	-	★ 80 ~ **140** ~ 180	☆ 80 ~ **140** ~ 180
	Stainless steel (Austenitic related)	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.1** ~ 0.12	0.05 ~ **0.1** ~ 0.14	0.06 ~ **0.12** ~ 0.18	-	-	-	☆ 100 ~ **160** ~ 200	★ 100 ~ **160** ~ 200
	Stainless steel (Martensitic related)	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.1** ~ 0.12	0.05 ~ **0.1** ~ 0.14	0.06 ~ **0.12** ~ 0.18	★ 180 ~ **240** ~ 300	-	-	-	☆ 150 ~ **200** ~ 250
	Stainless steel (Precipitation hardening)	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.1** ~ 0.12	0.05 ~ **0.1** ~ 0.14	0.06 ~ **0.12** ~ 0.18	-	-	-	-	★ 90 ~ **120** ~ 150
	Gray cast iron	0.05 ~ **0.1** ~ 0.14	0.05 ~ **0.1** ~ 0.16	0.05 ~ **0.1** ~ 0.18	0.06 ~ **0.15** ~ 0.23	-	-	☆ 120 ~ **180** ~ 250	-	-
	Nodular cast iron	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.1** ~ 0.12	0.05 ~ **0.1** ~ 0.14	0.06 ~ **0.12** ~ 0.18	-	-	☆ 100 ~ **150** ~ 200	-	-
	Ni-base heat-resistant alloys	0.05 ~ **0.06** ~ 0.08	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.08** ~ 0.12	0.06 ~ **0.1** ~ 0.15	★ 20 ~ **30** ~ 50	-	-	-	☆ 20 ~ **30** ~ 50
	Titanium alloys	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.09** ~ 0.12	0.05 ~ **0.09** ~ 0.12	0.06 ~ **0.1** ~ 0.15	-	-	-	-	☆ 30 ~ **50** ~ 70
SM	Carbon steel	0.05 ~ **0.08** ~ 0.11	0.05 ~ **0.1** ~ 0.14	0.05 ~ **0.1** ~ 0.14	0.06 ~ **0.1** ~ 0.18	-	-	-	★ 120 ~ **180** ~ 250	☆ 120 ~ **180** ~ 250
	Alloy steel	0.05 ~ **0.07** ~ 0.1	0.05 ~ **0.08** ~ 0.12	0.05 ~ **0.08** ~ 0.12	0.06 ~ **0.1** ~ 0.14	-	-	-	★ 100 ~ **160** ~ 220	☆ 100 ~ **160** ~ 220
	Mold steel	0.05 ~ **0.07** ~ 0.1	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.08** ~ 0.12	0.06 ~ **0.1** ~ 0.14	-	-	-	★ 80 ~ **140** ~ 180	☆ 80 ~ **140** ~ 180
	Stainless steel (Austenitic related)	0.05 ~ **0.08** ~ 0.11	0.05 ~ **0.08** ~ 0.12	0.05 ~ **0.08** ~ 0.12	0.06 ~ **0.1** ~ 0.14	-	-	-	☆ 100 ~ **160** ~ 200	★ 100 ~ **160** ~ 200
	Stainless steel (Martensitic related)	0.05 ~ **0.08** ~ 0.11	0.05 ~ **0.08** ~ 0.12	0.05 ~ **0.08** ~ 0.12	0.06 ~ **0.1** ~ 0.14	★ 180 ~ **240** ~ 300	-	-	-	☆ 150 ~ **200** ~ 250
	Stainless steel (Precipitation hardening)	0.05 ~ **0.08** ~ 0.11	0.05 ~ **0.08** ~ 0.12	0.05 ~ **0.08** ~ 0.12	0.06 ~ **0.1** ~ 0.14	-	-	-	-	★ 90 ~ **120** ~ 150
	Ni-base heat-resistant alloys	0.05 ~ **0.06** ~ 0.08	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.08** ~ 0.1	0.06 ~ **0.08** ~ 0.12	★ 20 ~ **30** ~ 50	-	-	-	☆ 20 ~ **30** ~ 50
	Titanium alloys	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.08** ~ 0.12	0.05 ~ **0.08** ~ 0.12	0.06 ~ **0.09** ~ 0.12	-	-	-	-	★ 30 ~ **50** ~ 70
GH	Carbon steel	0.05 ~ **0.1** ~ 0.14	0.05 ~ **0.1** ~ 0.16	0.05 ~ **0.1** ~ 0.18	0.06 ~ **0.15** ~ 0.23	-	-	-	★ 120 ~ **180** ~ 250	☆ 120 ~ **180** ~ 250
	Alloy steel	0.05 ~ **0.08** ~ 0.12	0.05 ~ **0.1** ~ 0.14	0.05 ~ **0.1** ~ 0.16	0.06 ~ **0.13** ~ 0.2	-	-	-	★ 100 ~ **160** ~ 220	☆ 100 ~ **160** ~ 220
	Mold steel	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.1** ~ 0.12	0.05 ~ **0.1** ~ 0.14	0.06 ~ **0.12** ~ 0.18	-	-	-	★ 80 ~ **140** ~ 180	☆ 80 ~ **140** ~ 180
	Stainless steel (Austenitic related)	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.1** ~ 0.12	0.05 ~ **0.1** ~ 0.14	0.06 ~ **0.12** ~ 0.18	-	-	-	☆ 100 ~ **160** ~ 200	☆ 100 ~ **160** ~ 200
	Stainless steel (Martensitic related)	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.1** ~ 0.12	0.05 ~ **0.1** ~ 0.14	0.06 ~ **0.12** ~ 0.18	-	-	-	-	☆ 150 ~ **200** ~ 250
	Stainless steel (Precipitation hardening)	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.1** ~ 0.12	0.05 ~ **0.1** ~ 0.14	0.06 ~ **0.12** ~ 0.18	-	-	-	-	☆ 90 ~ **120** ~ 150
	Gray cast iron	0.05 ~ **0.1** ~ 0.14	0.05 ~ **0.1** ~ 0.16	0.05 ~ **0.1** ~ 0.18	0.06 ~ **0.15** ~ 0.23	-	-	★ 120 ~ **180** ~ 250	-	-
	Nodular cast iron	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.1** ~ 0.12	0.05 ~ **0.1** ~ 0.14	0.06 ~ **0.12** ~ 0.18	-	-	★ 100 ~ **150** ~ 200	-	-
	Ni-base heat-resistant alloys	0.05 ~ **0.06** ~ 0.08	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.08** ~ 0.12	0.06 ~ **0.1** ~ 0.15	-	-	-	-	☆ 20 ~ **30** ~ 50
	Titanium alloys	0.05 ~ **0.08** ~ 0.1	0.05 ~ **0.09** ~ 0.12	0.05 ~ **0.09** ~ 0.12	0.06 ~ **0.1** ~ 0.15	-	-	-	-	☆ 30 ~ **50** ~ 70

★: 1st Recommendation ☆: 2nd Recommendation

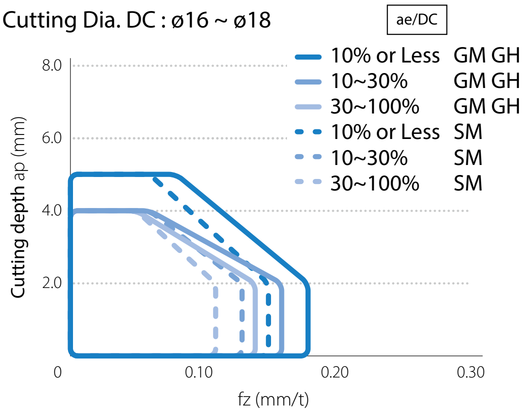
* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys. When choosing wet machining for other workpiece materials, reduce the cutting speed to 70% or less.
* Face milling does not recommend slotting or pocketing. We recommend setting the ae to 75% or less. We recommend the small number insert type for ae of 30% or more.
* Working above recommended conditions or long-term use can damage the screws. It is recommended to replace the screws regularly.
* Ramping and Helical milling are not recommended if the corner R is R4.0/R5.0/R6.0.

Cutting Performance

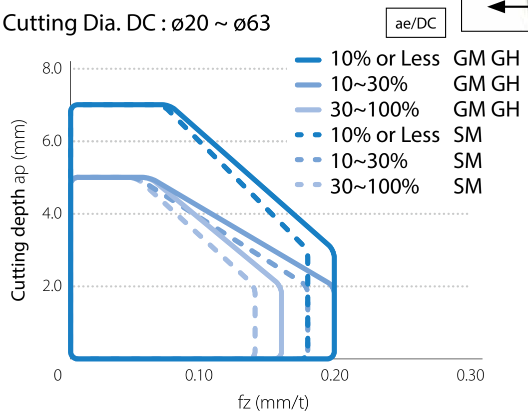


09 Size (LOGU09...) Machining for Steel (Dry)

Cutting Dia. DC : ø16 ~ ø18



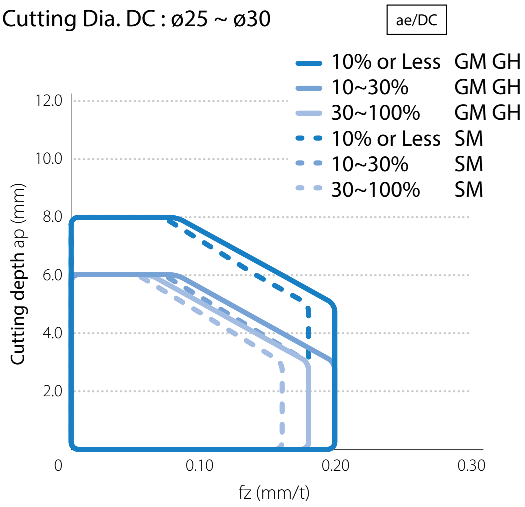
Cutting Dia. DC : ø20 ~ ø63



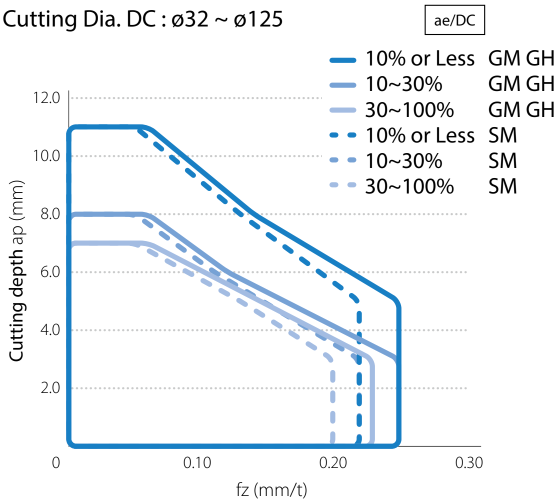
For other workpiece material, set ap and fz appropriately for each ae.

12 Size (LOG□12...) Machining for Steel (Dry)

Cutting Dia. DC : ø25 ~ ø30



Cutting Dia. DC : ø32 ~ ø125



For other workpiece material, set ap and fz appropriately for each ae.

Case studies

Brake parts FCD500

Vc = 135 m/min
n = 535 min^{-1}
ap x ae = 3.4 x 25 mm
fz = 0.15 mm/t
Vf = 560 mm/min
Wet
MA90-080R-12T7C-M
LOGU120616ER-GM (PR1810)

Number of Workpieces

MA90 (7 inserts) **1,000pcs**

Competitor G (7 inserts) **600pcs**

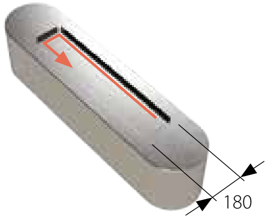
Tool life x1.6

MA90 showed good cutting edge condition and stable machining. Achieved 1.6 times longer tool life.

(User evaluation)

Mold parts Stainless steel

Vc = 125 m/min
n = 1,600 min^{-1}
ap x ae = 1.0 x 25 mm
fz = 0.12 mm/t
Vf = 570 mm/min
Dry
MA90-25S20-09T3C
LOGU090408ER-GM (PR1835)



Machining efficiency

MA90 (3 inserts) **Q = 14.5cc/min**

Competitor H (3 inserts) **Q = 9.5cc/min**

x1.5 **Machining efficiency**

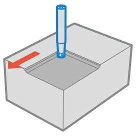
MA90 showed 1.5 times higher machining efficiency than its competitors. Improved tool life (3 to 4 pcs)

(User evaluation)

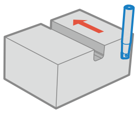
M
Milling
Cutting edge angle 45°~70°
Cutting edge angle 75°
Cutting edge angle 88°/90°
Cutter for Finishing
High Feed Cutter
Multi-Function
Slot Mill
Ball-nose Radius
Others

Notes

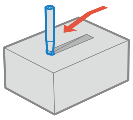
Applications



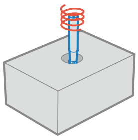
Face milling & Shouldering



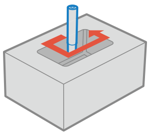
Slotting



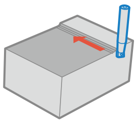
Ramping



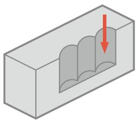
Helical milling



Pocketing



Contouring



Plunging

Ramping reference table

Description	Cutter diameter DC (mm)	16	20	25	32	40	50
MA… - 09 - …	Max. ramping angle RMPX	1.16°	0.97°	0.64°	0.4°	0.23°	0.11°
	tan RMPX	0.020	0.017	0.011	0.007	0.004	0.002
Description	Cutter diameter DC (mm)	25	28	30	32	35	40
MA… - 12 - …	Max. ramping angle RMPX	2°	1.7°	1.6°	1.5°	1.2°	1°
	tan RMPX	0.034	0.030	0.027	0.026	0.021	0.017

Decrease the angle of inclination when the chips extend longer.
Ramping is not recommended if the corner R is R4.0/R5.0/R6.0.

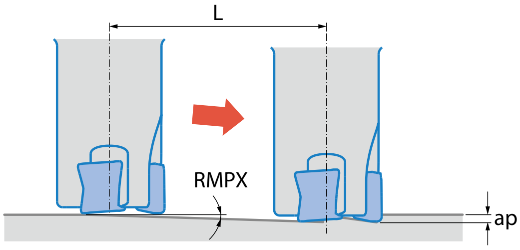
Guide for Ramping

Ramping angle should be under RMPX.
Reduce recommended feed rate by 70%

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

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

Ramping is not recommended if the corner R is R4.0/R5.0/R6.0.

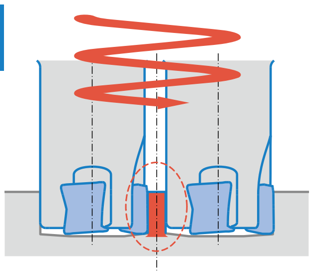


Guide for Helical milling

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

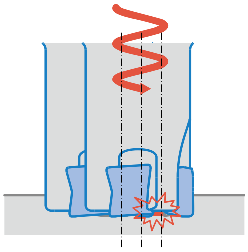
🚫 Exceeding Max. cutting dia.

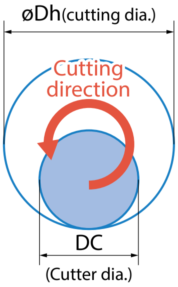
Center core part remains after machining



🚫 Under Min. cutting dia.

Center core part interferes with toolholder





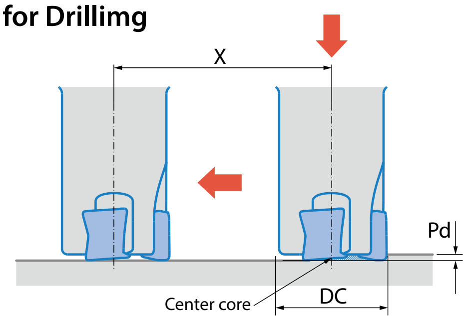
Unit : mm

Description	Min. cutting dia. øDh1	Max. cutting dia. øDh2
MA… - 09 - …	2×DC-4	2×DC-2
MA… - 12 - …	2×DC-6	2×DC-2

Helical milling is not recommended if the corner R is R4.0/R5.0/R6.0.

For helical milling, use between min. cutting dia. and max. cutting dia.
The cutter direction should be counterclockwise (down cut) (see above).
Please machining in a safe environment as long chips may be produced..

Guide for Drillimg

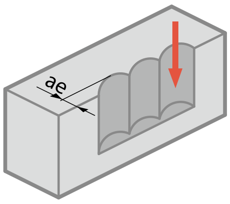


Unit : mm

Description	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MA… - 09 - …	0.25	DC-3
MA… - 12 - …	0.5	DC-5

It is recommended to reduce feed by 25% of recommendation until the center core is removed when traversing after drilling.

Guide for Plunging



Available for vertical milling (plunging)
Feed should be set within fz = 0.1 (mm/t)
when plunging.

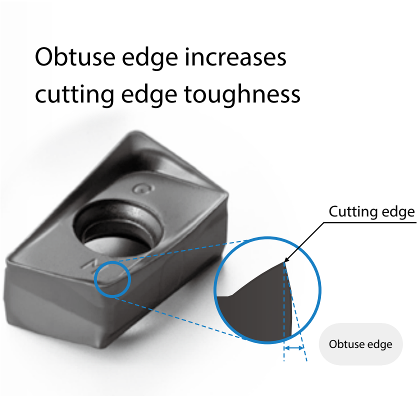
Unit : mm

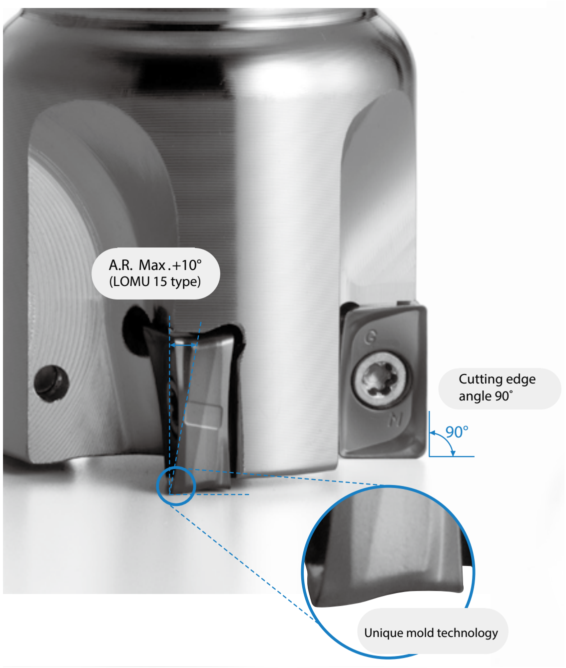
Description	Maximum width of cut (ae)
MA… - 09 - …	2
MA… - 12 - …	3

Double-sided 4-edge insert

MEW

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

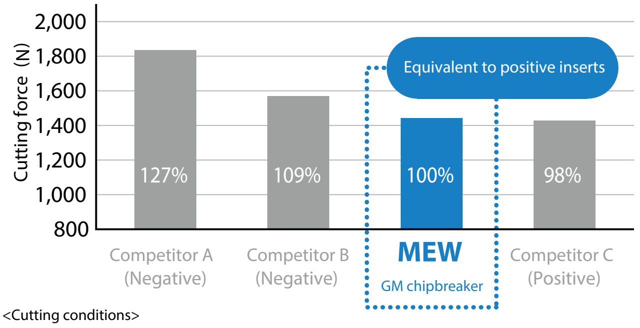




Low cutting force equivalent to positive inserts

Cutting force comparison (Internal evaluation)

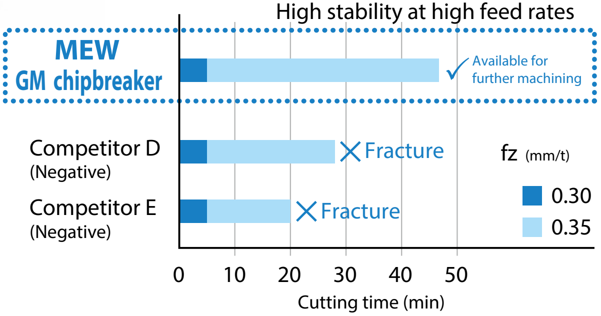
* Cutting force is the resultant force of the principal force and the feed force.



<Cutting conditions>
Vc=150m/min apxae=3x15mm fz=0.15mm/t S50C Cutting dia. ø20

Fracture resistance comparison (Internal evaluation)

High stability at high feed rates



<Cutting conditions>
Vc=120m/min apxae=3x10mm fz=0.3~0.35mm/t
SCM440H (37~39HS) Cutting dia. ø20

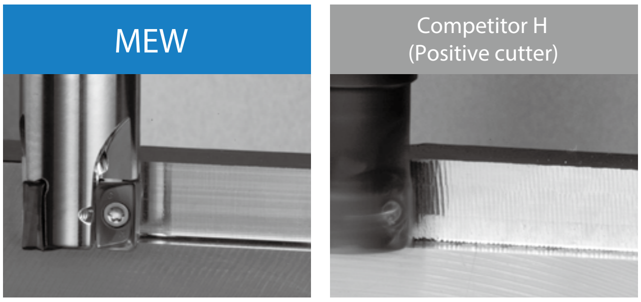
Improved surface finish, minimizing chattering

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

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

Large actual rake angle lowers cutting force

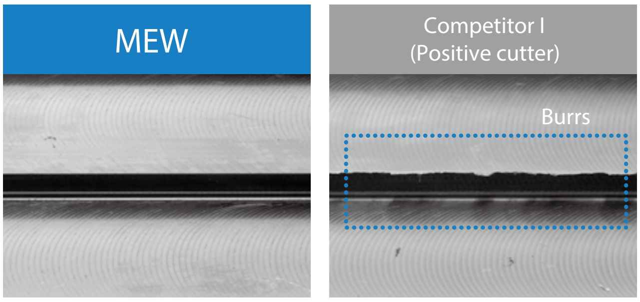
Surface of shoulder wall (Internal evaluation)



Smooth surface of MEW without chattering

<Cutting conditions>
Vc=240m/min apxae= 4 (3passes) x5mm fz=0.12mm/t Dry SS400 Cutting dia. ø20

Burr comparison with positive cutters (Internal evaluation)



Sharp cutting enables less burrs than positive cutters

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

Long tool life by MEGACOAT NANO technology

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

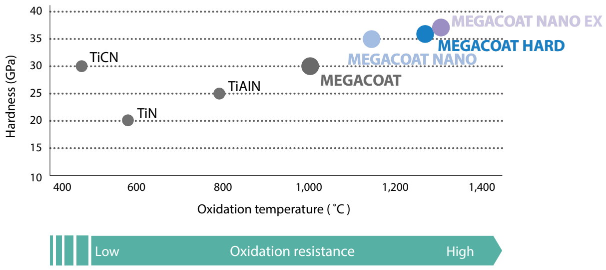
PR1825
For steel and stainless steel (austenitic related)

PR1810
For cast iron

PR1835(PR1535)
For heat-resistant alloys, titanium and stainless steel (precipitation hardening)

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

Properties of coating



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

PDL025
DLC coated carbide for non-ferrous metals

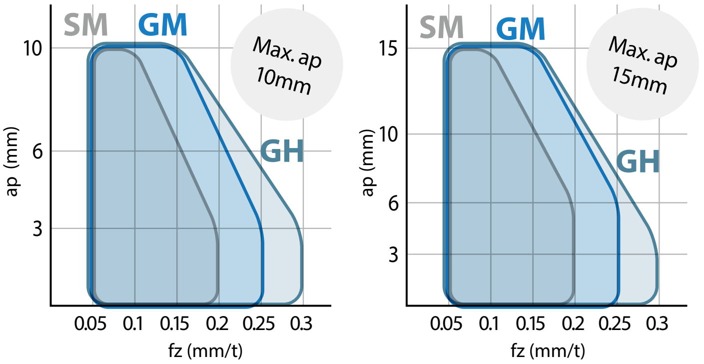
PR015S
MEGACOAT HARD for hard materials

GW25
Carbide for non-ferrous metals

Various chipbreaker lineup

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

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



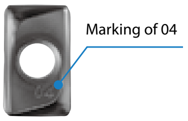
<Cutting conditions> Vc=150m/min ae=DC/2mm Workpiece material: S50C


Chips (Slotting)

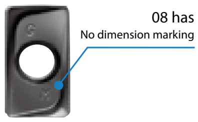

Chips (Shouldering)

Lineup of corner-R(RE)

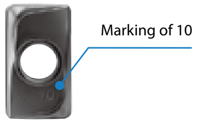
Corner-R(RE) 0.4 ,1.0 ,1.2 ,1.6 and 2.0 added to GM chipbreaker lineup



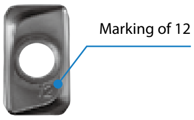
LOMU100404ER-GM
LOMU150504ER-GM



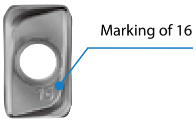
LOMU100408ER-GM
LOMU150508ER-GM



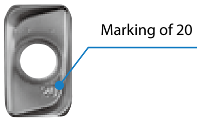
LOMU150510ER-GM



LOMU100412ER-GM
LOMU150512ER-GM



LOMU100416ER-GM
LOMU150516ER-GM



LOMU100420ER-GM
LOMU150520ER-GM

MEW (End mill)

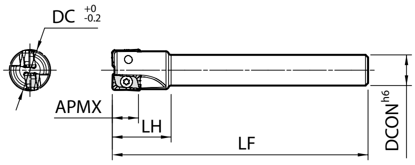


Fig. 1

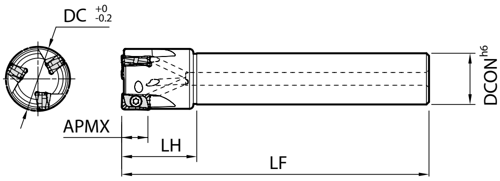


Fig. 2

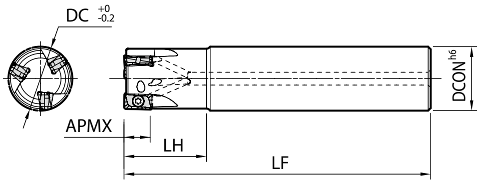
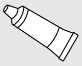
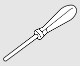


Fig. 3

Toolholder dimensions

		Description		Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Fig.	Spare parts			Applicable inserts ➔ **M81**
						DC	DCON	LF	LH	APMX						Anti-seize compound	Screw	Wrench	
																			
Cylindrical	Standard shank	MEW	16-S12-10-2T	●	2	16	12	100	23	10	+7	-22	No	43750	1	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
			18-S16-10-2T	●		18	16		25			-21	Yes	43000	2				
			20-S16-10-2T	●		20		110	26			-20		41000	2				
			22-S20-10-3T	●	3	22	20							39600	2				
			25-S20-10-3T	●		25		120	29					37500	2				
			28-S25-10-3T	●		28	25							35800	2				
			30-S25-10-4T	●	4	30		130	32					34800	2				
			32-S25-10-4T	●		32								33900	2				
			40-S32-10-5T	●	5	40	32	150	50			-19		30000	2				
			50-S32-10-5T	●		50		120	40					22500	2				
	Same shank	MEW	16-S16-10-2T	●	2	16	16	100	26	10	+7	-22	Yes	43750	3	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
			20-S20-10-2T	●		20	20	110	30			-20		41000	3				
			20-S20-10-3T	●	3										3				
			25-S25-10-2T	●	2	25	25	120	32					37500	3				
			25-S25-10-3T	●	3										3				
			32-S32-10-3T	●		32	32	130	40					33900	3				
			32-S32-10-4T	●	4										3				
	Long shank	MEW	20-S20-10-150-2T	●	2	20	20	150	40	10	+7	-20	Yes	41000	3	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
			25-S25-10-170-2T	●		25	25	170	50					37500	3				
	Standard shank	MEW	25-S20-15-2T	●	2	25	20	120	29	15	+10	-22	Yes	35000	2	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...
			32-S25-15-2T	●		32	25	130	32					30000	2				
			40-S32-15-3T	●	3	40	32	150	50			-21		25000	2				
			40-S32-15-4T	●	4										2				
			50-S32-15-4T	●		50		120	40					17000	2				
	Same shank	MEW	25-S25-15-2T	●	2	25	25	120	32	15	+10	-22	Yes	35000	3	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...
			32-S32-15-2T	●		32	32	130	40					30000	3				
			32-S32-15-3T	●	3										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

MEW (End mill)

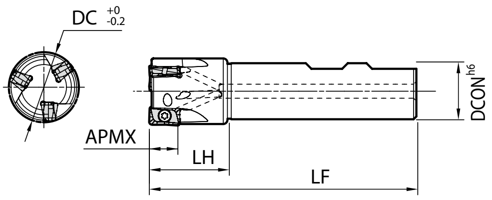


Fig. 1

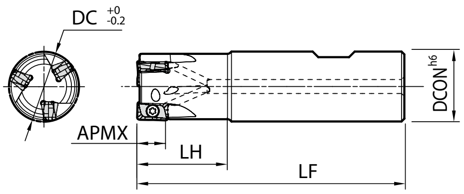


Fig. 2

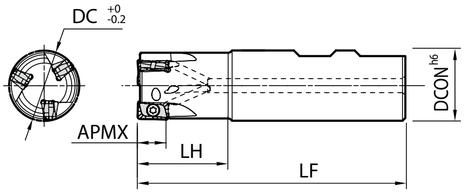


Fig. 3

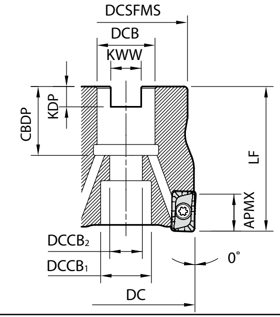
Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Fig.	Spare parts			Applicable inserts ➡ M81
						DC	DCON	LF	LH	APMX						Anti-seize compound	Screw	Wrench	
Weldon	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...
	Same Shank	MEW	16-W16-10-2T	MTO	2	16	16	75	25	10	+7	-22	Yes	43750	2	P-37	SB-3065TRP	DTPM-8	LOGT1004... LOMU1004...
			20-W20-10-2T	MTO		20	20	77				-20		41000	2				
			20-W20-10-3T	MTO	3										2				
			25-W25-10-3T	MTO		25	25	90	32					37500	3				
			32-W32-10-4T	MTO	4	32	32	102	40					33900	3				
		MEW	25-W25-15-2T	MTO	2	25	25	90	32	15	+10	-22	Yes	35000	3	P-37	SB-4090TRP	DTPM-15	LOGT1505... LOMU1505...
			32-W32-15-3T	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

MEW (Face mill)

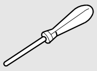
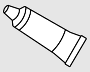
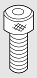


Toolholder dimensions

Description		Availability	Inserts	Dimension (mm)										A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Applicable inserts ➡ M81
		R		DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX						
MEW	032R-10-4T-M	●	4	32	30	16	14	9	35	19	5.6	8.4	10	+7	-20	Yes	33900	0.1	LOGT1004... LOMU1004...
	040R-10-5T-M	●	5	40	34				40						-19		30000	0.2	
	050R-10-5T-M	●		50	45	22	18	11		21	6.3	10.4					22500	0.4	
	063R-10-6T-M	●	6	63	47												20500	0.5	
MEW	040R-15-4T-M	●	4	40	34	16	14	9	40	19	5.6	8.4	15	+10	-21	Yes	25000	0.2	LOGT1505... LOMU1505...
	050R-15-4T-M	●		50	45	22	18	11		21	6.3	10.4					17000	0.3	
	063R-15-5T-M	●	5	63	47												14500	0.5	
	080R-15-6T-M	●	6	80	60	27	20	13	50	25	7	12.4			-20		12000	1	
	080R-15-6T	●				25.4				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 ➡ M81			
		Clamp screw	Wrench	Anti-seize compound	Mounting bolt	 General purpose	 Low cutting force	 Tough edge (For heavy milling)	 Non-ferrous metals
									
MEW	…-10-_T	SB-3065TRP	DTPM-8	P-37	-	LOMU10…-GM	LOMU10…-SM	LOMU10…-GH	LOGT10…-AM
MEW	032R-10_-M				HH8X25				
	040R-10_-M								
	050R-10_-M	Recommended tightening torque for insert clamp 1.2N·m			HH10X30				
	063R-10_-M								
MEW	…-15-_T	SB-4090TRP	DTPM-15	P-37	-	LOMU15…-GM	LOMU15…-SM	LOMU15…-GH	LOGT15…-AM
MEW	040R-15_-M				HH8X25				
	050R-15_-M				HH10X30				
	063R-15_-M	Recommended tightening torque for insert clamp 3.5N·m							
	080R-15_(-M)				HH12X35				

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.

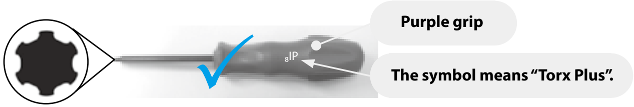


Fig. 1 "Torx Plus" Wrench (For MEW)

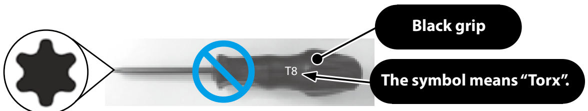
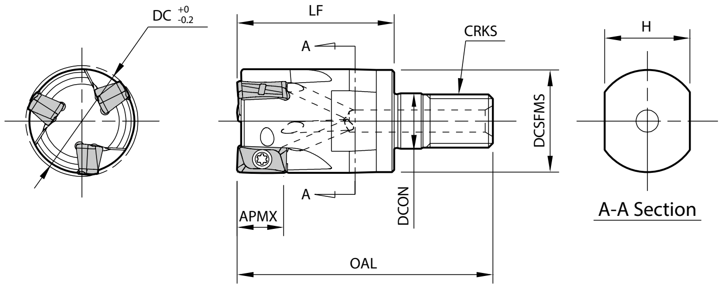


Fig. 2 "Torx" Wrench (Do NOT use it for MEW)

● : Standard item

MEW (Modular type)

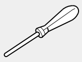
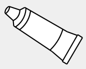


Toolholder dimensions

Description		Availability	Inserts	Dimension (mm)								A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Applicable inserts ➡ **M81**
				DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H					
MEW	16-M08-10-2T	●	2	16	8.5	14.7	42	25	10	M8x1.25	12	+7	-22	Yes	43750	LOGT1004... LOMU1004...
	20-M10-10-2T	●		20	10.5	18.7	48	30		M10x1.5	15		-20		41000	
	20-M10-10-3T	●	3													
	25-M12-10-3T	●		25	12.5	23	56	35		M12x1.75	19				37500	
	32-M16-10-4T	●	4	32	17	30	62	40		M16x2.0	24				33900	
MEW	25-M12-15-2T	●	2	25	12.5	23	56	35	15	M12x1.75	19	+10	-22	Yes	35000	LOGT1505... LOMU1505...
	32-M16-15-3T	●	3	32	17	30	62	40		M16x2.0	24				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.
See page **M82** 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 ➡ **M81**			
		Clamp screw	Wrench	Anti-seize compound	 General purpose	 Low cutting force	 Tough edge (For heavy milling)	 Non-ferrous metals
								
MEW	16-M08-10-2T	SB-3065TRP Recommended tightening torque for insert clamp 1.2N·m	DTPM-8	P-37	LOMU10. . .-GM	LOMU10. . .-SM	LOMU10. . .-GH	LOGT10. . .-AM
	20-M10-10-2T							
	20-M10-10-3T							
	25-M12-10-3T							
	32-M16-10-4T							
MEW	25-M12-15-2T	SB-4090TRP Recommended tightening torque for insert clamp 3.5N·m	DTPM-15	P-37	LOMU15. . .-GM	LOMU15. . .-SM	LOMU15. . .-GH	LOGT15. . .-AM
	32-M16-15-3T							

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

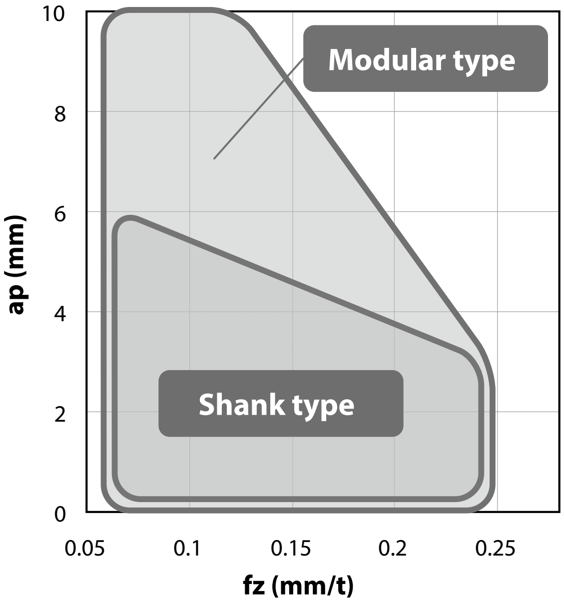
Modular end mill head identification system

MEW	16	-	M08	-	10	-	2T
Series	Cutting dia.		Thread size for clamping		Insert size		No. of inserts

● : Standard item

Feature of modular type

Applicable to a wide range of applications



<Cutting conditions>

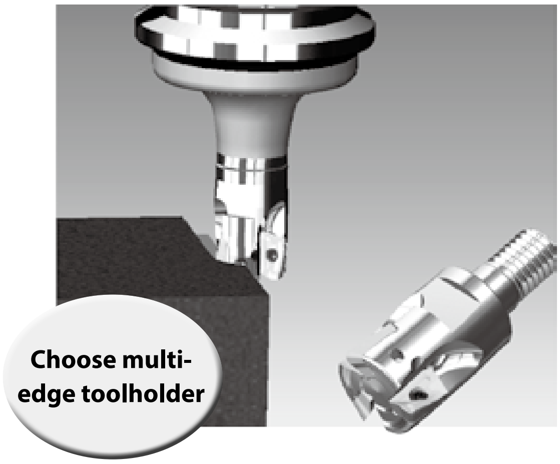
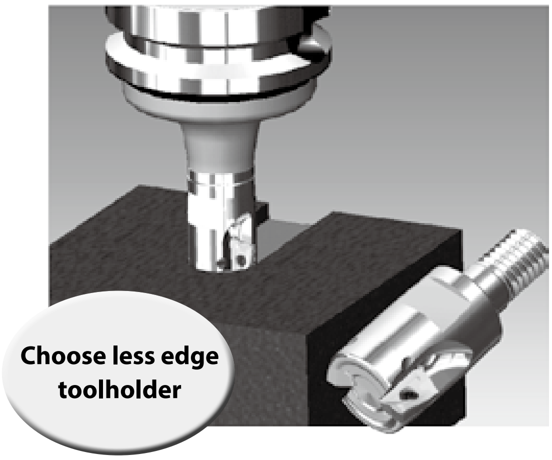
- Cutting speed: Vc=150m/min (n=2,390min^{-1})
- Width of cut: ae=10mm (Shouldering)
- Workpiece material: S55C,Dry
- **Machine: BT30 M/C**

<Cutting tool>

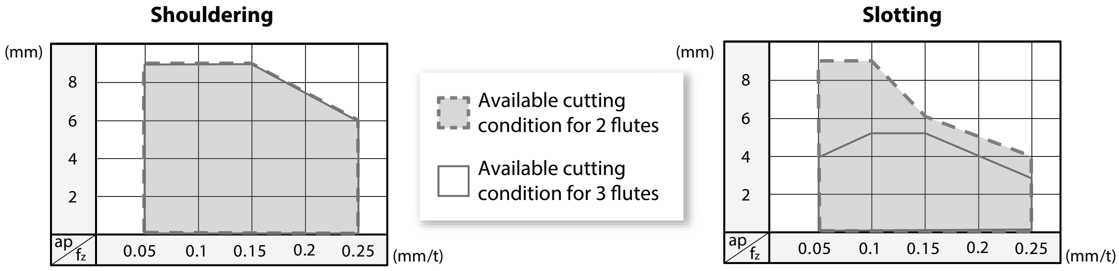
- Modular type
  Head: MEW20-M10-10-3T
  Arbor: BT30K-M10-45
  Insert: LOMU100408ER-GM (PR1525)
- Shank type
  Toolholder: MEW20-S20-10-3T
  Arbor: BT30 Milling Chuck (Double-face clamping)
  Insert: LOMU100408ER-GM (PR1525)

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 (ae=10mm)	Slotting
	

Available cutting condition of modular type



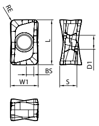
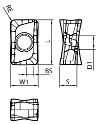
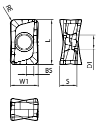
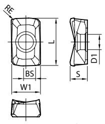
Choose multi-edge toolholder for shouldering; higher efficiency in machining by higher feed rate.
For grooving, choose less edge toolholder to lower cutting force.

LOMU/LOGT

Classification of usage

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

	CA6535	PDL025	PR015S	PR1510	PR1525	PR1535	PR1510	PR1525	PR1535	GW25	
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

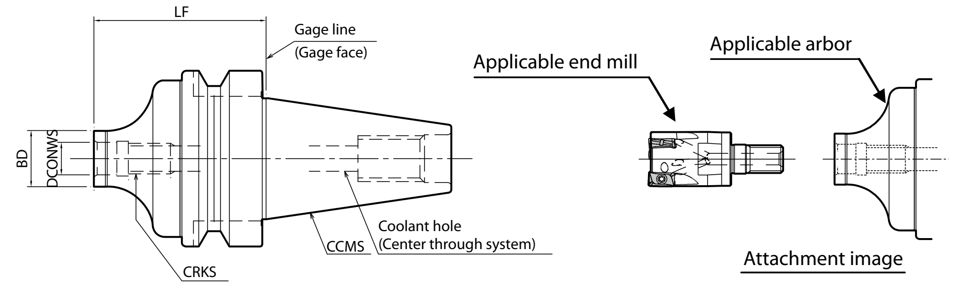
Insert		Description	No. of edges	Dimension (mm)						Carbide										Applicable toolholder ➡ M76~M79
				S	D1	RE	L	W1	BS	CVD	DLC	PVD							-	
										CA6535	PDL025	PR015S	PR1510	PR1525	PR1535	PR1510	PR1525	PR1535	GW25	
	 General purpose	LOMU 100404ER-GM	4	4	3.4	0.4	10.9	6.6	2.1	●			☐	○	●	●	●	●		MEW...-10-... 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	●			☐	○	●	●	●	●		
		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	●			☐	○	●	●	●	●		
		LOMU 150520ER-GM				2			0.6	●			☐	○	●	●	●	●		
	 Low cutting force	LOMU 100408ER-SM	4	4	3.4	0.8	10.9	6.6	1.7	●			☐	○	●	●	●	●		MEW...-10-... MEWH...-10-...
		LOMU 150508ER-SM	4	5.6	4.8	0.8	15.7	9.2	1.8	●			☐	○	●	●	●	●		MEW...-15-... MEWH...-15-...
	 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 ➡ **M84**

● : Standard item ○ : Will be replaced with a new product ☐ : Expected to be discontinued in September 2026

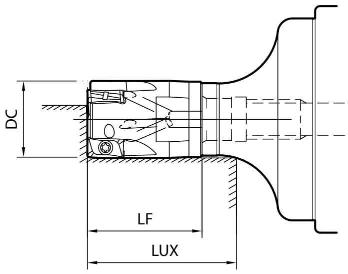
BT Arbor (for exchangeable head / double-face clamping spindle)



Dimensions

Description		Availability	Dimension (mm)				Coolant hole	Arbor (Double-face clamping)	Applicable end mill (Head) MA90, MEW, MEC, MEV, MFH Harrier, MFH Boost, MFH Mini, MFH Micro, MRX
			LF	BD	DCONWS	CRKS		CCMS	➡ **M69(MA90), M79(MEW), M90(MEC) M108(MEV), M202(MFH Harrier) M213(MFH Boost), M220(MFH Mini) M227(MFH Micro), M275(MRX)**
BT30K-	M08-45	●	45	14.7	8.5	M8×1.25	Yes	BT30	(MEW/MEC/MFH/MRX)..-M08-..
	M10-45	●		18.7	10.5	M10×1.5			(MA90/MEW/MEC/MEV/MFH/MRX)..-M10-..
	M12-45	●		23	12.5	M12×1.75			(MA90/MEW/MEC/MEV/MFH/MRX)..-M12-..
BT40K-	M08-55	●	55	14.7	8.5	M8×1.25	Yes	BT40	(MEW/MEC/MFH/MRX)..-M08-..
	M10-60	●	60	18.7	10.5	M10×1.5			(MA90/MEW/MEC/MEV/MFH/MRX)..-M10-..
	M12-55	●	55	23	12.5	M12×1.75			(MA90/MEW/MEC/MEV/MFH/MRX)..-M12-..
	M16-65	●	65	30	17	M16×2.0			(MA90/MEW/MEC/MEV/MFH/MRX)..-M16-..

Actual end mill depth (See page **M227** for MFH Micro)



Arbor description		Applicable end mill (Head)			Actual end mill depth (mm)
		Description	Cutting dia. (mm)	Dimension (mm)	LUX
			DC	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	35	42.8
		...28-M12-...	28		45.5
BT40K-	M08-55	...16-M08-...	16	25	31.7
		...17-M08-...	17		33.2
		...18-M08-...	18		34.3
	M10-60	...20(-)M10-...	20	30	38.7
		...22-M10-...	22		44.5
	M12-55	...25(-)M12-...	25	35	44.6
		...28-M12-...	28		47.6
	M16-65	...32(-)M16-...	32	40	51.2
		...35-M16-...	35		60.2
		...40-M16-...	40		64

● : Standard item

Arbor identification system

BT30	K	-	M08	-	45
Arbor size	Double-face clamping spindle		Thread size for clamping		Length from gauge line

How to attach head

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

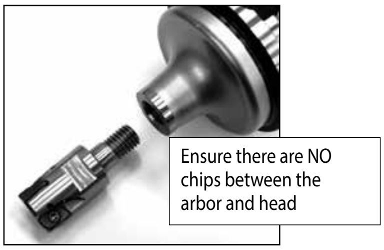

Ensure there are NO chips between the arbor and head

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.

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

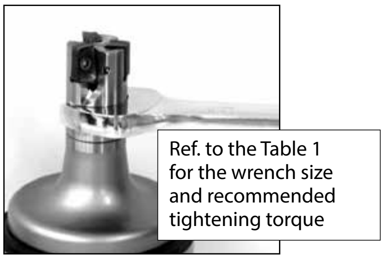

Ref. to the Table 1 for the wrench size and recommended tightening torque

Fig. 2

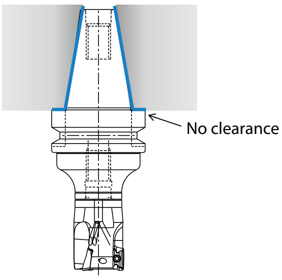
3. Confirm that the head is fixed firmly on the arbor. (Fig. 3)


No clearance in between

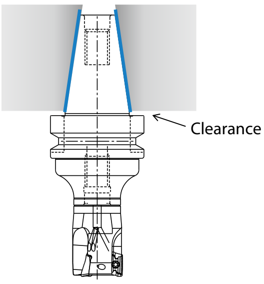
Fig. 3

Frequently asked question

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



Double-face clamping arbor mounted on double-face clamping spindle



Double-face clamping arbor mounted on general spindle

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

How to mount an insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. Clamp screw
   1. Apply anti-seize compound on portion of taper and thread of clamp screw.
   2. Attach the screw (magnetic head) to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1) Tighten M3 screws (SB-3065TRP) slightly inclined from the insert surface.(Ref. to Fig. 2)
3. When tightening the screw, make sure that the wrench is parallel to the screw.
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.

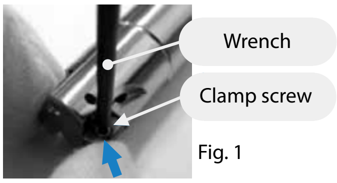


Fig. 1

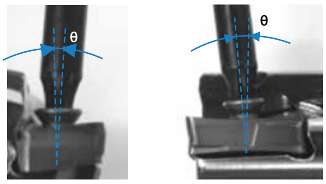


Fig. 2

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)				
		Toolholder description		MEGACOAT (PVD coated carbide)				CVD coated carbide
		MEW16~MEW18	MEW20~MEW40 MEW040R~MEW080R	PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S	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

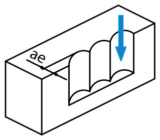
☆: 2nd Recommendation

* 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.

Ramping, helical milling and vertical milling (Plunging)

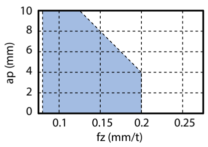
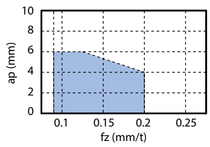
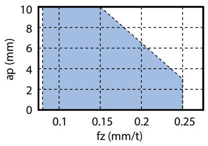
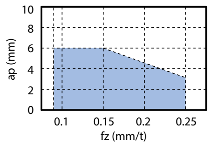
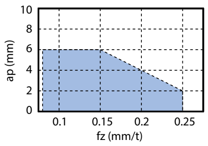
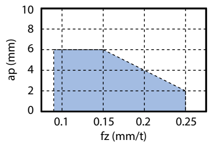
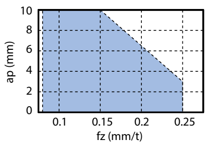
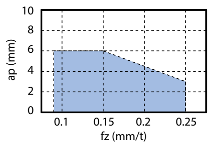
1. Available for vertical milling (plunging).
2. NOT available for ramping and helical milling, because interference between workpiece and insert may occur.

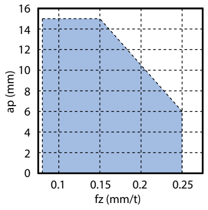
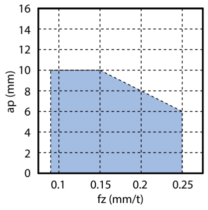
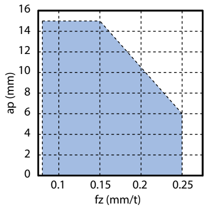
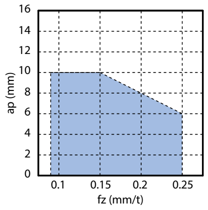
Vertical milling (Plunging)



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

Cutting performance

Description	Shouldering (Cutting width ae=DC/2)	Slotting
MEW16...-10 MEW18...-10		
MEW20...-10 ~ MEW50...-10		
MEW20-S20 -10-150-2T MEW25-S25 -10-170-2T (Long shank)		
MEW032R...-10 ~ MEW063R...-10		

Description	Shouldering (Cutting width ae=DC/2)	Slotting
MEW25...-15 ~ MEW50...-15		
MEW040R...-15 ~ MEW080R...-15		

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

Case studies

SS400

· Construction machine part
· Vc=250m/min
· apxae=4x20mm
· fz=0.14mm/t (Vf=1,350mm/min)
· Wet
· MEW32-S32-10-4T(4 flutes)
· LOMU100408ER-GM (PR1525)

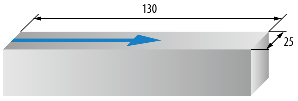
PR1525	Chip evacuation rate =108cc/min
Competitor A (Positive cutter)	Chip evacuation rate =72cc/min

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

(User Evaluation)

15-5PH (42HRC)

· Aircraft part
· Vc=180m/min
· apxae=2x25mm
· fz=0.1mm/t (Vf=716mm/min)
· Wet
· MEW32-S32-10-4T(4 flutes)
· LOMU100408ER-GM (PR1525)



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

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

(User evaluation)

MEC (End mill)

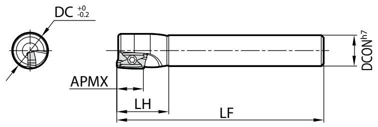


Fig. 1

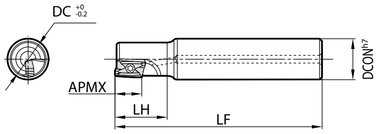


Fig. 2

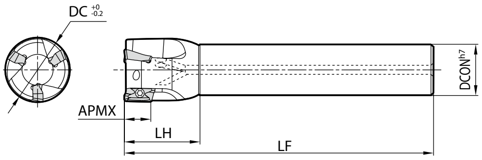


Fig. 3

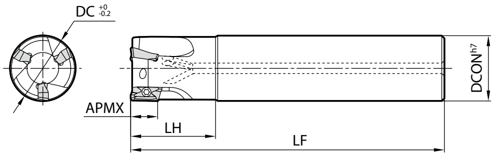


Fig. 4

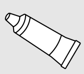
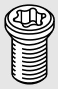
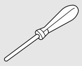
Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Fig.	Spare parts			Applicable inserts ➔ M91
						DC	DCON	LF	LH	APMX						Anti-seize compound	Screw	Wrench	
Cylindrical	Standard shank	MEC	10-S10-11	●	1	10	10	80	17	10	+10	-24	No	54800	1	P-37	SB-2545TR	DTM-8	BDMT1103...
			10-S16-11	●			16						Yes		2				
			12-S10-11	●		12	10		20		+12	-21	No	50800	1				
			12-S12-11	●			12								1				
			12-S16-11	●			16						Yes		2				
			13-S12-11	●		13	12					-19	No	49200	1				
			14-S12-11	●		14								47700	1				
			14-S16-11	●			16						Yes		2				
		MEC	16-S12-11T	●	2	16	12	100	23	10	+18	-14	No	43750	1	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
			17-S16-11T	●		17	16					-13	Yes	43500	3				
			18-S16-11T	●		18					+19			43000	3				
			19-S16-11T	●	3	19		110	26		+20	-10		42000	3				
			20-S16-11T	●		20								41000	3				
			21-S20-11T	●		21	20					-9		40300	3				
			22-S20-11T	●		22					+21	-10		39600	3				
			24-S20-11T	●		24		120	29					38200	3				
			25-S20-11T	●		25								37500	3				
			25-S20-11T-4	●	4										3				
			28-S25-11T	●	3	28	25				+22	-9		35800	3				
			30-S25-11T	●	4	30		130	32		+23			34800	3				
			32-S25-11T	●		32								33900	3				
			32-S25-11T-5	●	5										3				
			40-S32-11T	●		40	32	150	50			-8		30000	3				
			50-S32-11T	●		50						-7		22500	3				
	Same shank	MEC	16-S16-11T	●	2	16	16	100	30	10	+18	-14	Yes	43750	4	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
			20-S20-11T	●	3	20	20	110			+20	-10		41000	4				
			25-S25-11T	●		25	25	120	32		+21			37500	4				
			25-S25-11T-4	●	4										4				
			32-S32-11T	●		32	32	130	40		+23	-9		33900	4				
			32-S32-11T-5	●	5										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 **M93**.
Coat anti-seize compound(P-37) thinly on portion of taper and thread when insert is fixed.

● : Standard item

Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min⁻¹)	Fig.	Spare parts			Applicable inserts ➡ **M91**
						DC	DCON	LF	LH	APMX						Anti-seize compound 	Screw 	Wrench 	
Cylindrical	Long shank	MEC	20-S18-170-11T	●	2	20	18	170	30	10	+20	-10	Yes	41000	3	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
			20-S20-140-11T	●			20	140	60						4				
			20-S20-170-11T	●				170							4				
			22-S20-170-11T	●		22			30		+21			39600	3				
			25-S23-210-11T	●		25	23	210	32					37500	3				
			25-S25-160-11T	●			25	160	60						4				
			25-S25-210-11T	●				210							4				
			28-S25-210-11T	●		28			32		+22	-9		35800	3				
			32-S30-250-11T	●		32	30	250	40		+23			33900	3				
			32-S32-200-11T	●			32	200	65						4				
			32-S32-250-11T	●				250							4				
			35-S32-250-11T	●		35			40					32600	3				
			40-S32-240-11T	●		40		240	65			-8		30000	3				
		MEC	20-S20-150-11T-3	●	3	20	20	150	60	10	+20	-10	Yes	41000	4	P-37	SB-2555TRG	DTM-8	BDGT11T3... BDMT11T3...
			25-S25-170-11T-3	●		25	25	170			+21			37500	4				
			25-S25-170-11T-4	●	4										4				
			30-S25-180-11T-3	●	3	30		180	32		+23	-9		34800	3				
			32-S32-200-11T-3	●		32	32	200	65					33900	4				
			32-S32-200-11T-4	●	4										4				
			32-S32-200-11T-5	●	5										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 **M93**.
Coat anti-seize compound(P-37) thinly on portion of taper and thread when insert is fixed.

● : Standard item

MEC (End mill)

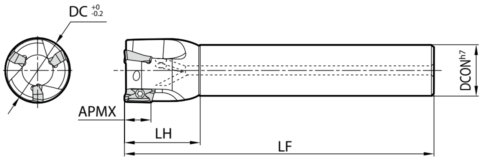


Fig. 1

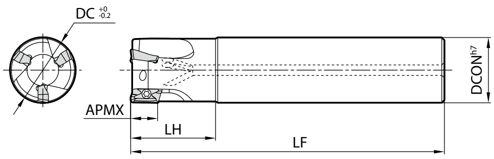
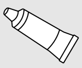
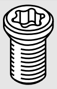
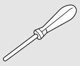


Fig. 2

Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Fig.	Spare parts			Applicable inserts ➔ **M91**
																Anti-seize compound	Screw	Wrench	
						DC	DCON	LF	LH	APMX									
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		+17	-7		30000	1				
			40-S32-17	●	4	40	32	150	50		+19			25000	1				
			50-S32-17	●		50								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		+17	-7		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							2				
			28-S25-210-17	●		28			36					32500	1				
			32-S32-200-17	●		32	32	200	65		+17	-7		30000	2				
			32-S32-250-17	●				250							2				
			35-S32-250-17	●		35			40					27700	1				
			40-S32-240-17	●		40		240	65		+19			25000	1				
		MEC	32-S32-250-17-3	●	3	32	32	250	65	15.7	+17	-7	Yes	30000	2	P-37	SB-4070TRN	DTM-15	BDGT1704... BDMT1704...
			40-S32-250-17-3	●		40					+19			25000	1				
			40-S32-250-17-4	●	4										1				
			50-S42-250-17-4	●		50	42		64			-6		17000	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 **M93**.
Coat anti-seize compound(P-37) thinly on portion of taper and thread when insert is fixed.

●: Standard item

MEC (Face mill)

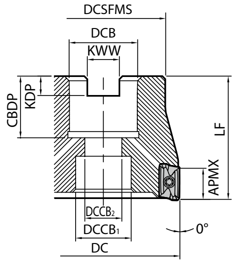


Fig. 1

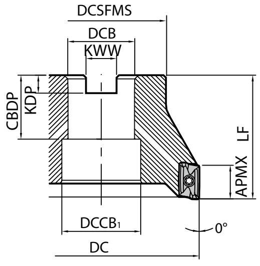


Fig. 2

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 ➡ M91
				R		DC	DCSFMS	DCB	DCCB₁	DCCB₂	LF	CBDP	KDP	KWW	APMX							Anti-seize compound	Screw	Wrench	
Metric	Coarse pitch	MEC	040R-11-5T-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...
			050R-11-5T-M	●		50	40	22	18	12		22	6.3	10.4					22500	0.3	1				
			063R-11-6T-M	●	6	63													20500	0.7	1				
			080R-11-7T-M	●	7	80	52.5	27	20	14	50	26	7	12.4					18500	1	1				
			100R-11-9T-MN	●	9	100	65	32	26	17.6	55		8	14.4					17000	1.6	1				
			125R-11-11T-M	●	11	125	85	40	45	32	63	33	9.5	16.4					15000	3.1	1				
	Fine pitch	MEC	032R-11-5T-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...
			040R-11-6T-M	●	6	40	34		14		40								30000	0.2	1				
			080R-11-10T-M	●	10	80	52.5	27	20	14	50	26.5	7	12.4					18500	0.9	1				
			100R-11-11T-M	●	11	100	65	32	26	17.6	55	26	8	14.4					17000	1.7	1				
	Coarse pitch	MEC	040R-17-4T-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...
			050R-17-4T-M	●		50	40	22	18	12		22	6.3	10.4					17000	0.4	1				
			063R-17-5T-M	●	5	63													14500	0.6	1				
			080R-17-6T-M	●	6	80	52.5	27	20	14	50	26	7	12.4					12000	1	1				
			100R-17-7T-MN	●	7	100	65	32	26	17.6	55		8						10500	1.8	1				
			125R-17-9T-M	●	9	125	85	40	45	32	63	33	9.5	16.4					8900	3.1	1				
			160R-17-12T-M	●	12	160	110		68	-								No	7400	4.5	2				
Bore dia. inch spec	Coarse pitch	MEC	063R-11-6T	●	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...
			080R-11-7T	●	7	80	52.5												18500	1	1				
			100R-11-9TN	●	9	100	65	31.75	26	17.6	63	32	8	12.7					17000	1.8	1				
			125R-11-11T	●	11	125	80	38.1	45	32		38	10	15.9					15000	3.4	1				
	Fine pitch	MEC	063R-11-8T	●	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...
			080R-11-10T	●	10	80	52.5												18500	1	1				
	Coarse pitch	MEC	063R-17-5T	●	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...
			080R-17-6T	●	6	80	52.5												12000	1	1				
			100R-17-7TN	●	7	100	65	31.75	26	17.6	63	32	8	12.7					10500	1.8	1				
			125R-17-9T	●	9	125	80	38.1	45	32		38	10	15.9					8900	3.4	1				
	Fine pitch	MEC	063R-17-6T	●	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...
			080R-17-8T	●	8	80	52.5												12000	1	1				
			100R-17-9TN	●	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 **M93**.
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.

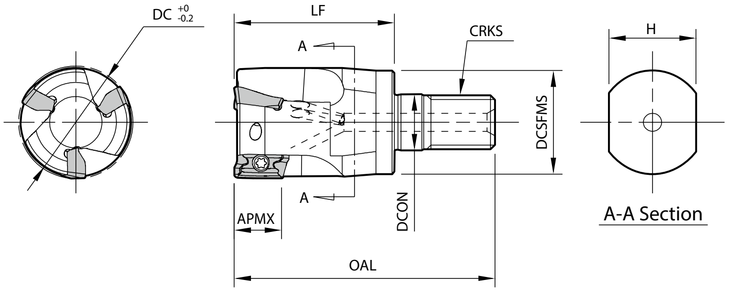
● : Standard item

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 MEC063R·····M	HH10X30H	LW-6 (Double width 6 mm)
MEC063R···· MEC080R····(-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)



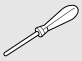
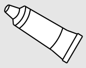
Toolholder dimensions

Description	Availability	Inserts	Dimension (mm) DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H	A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Applicable inserts ➡ **M91**
MEC 16-M08-11T-2T	●	2	16	8.5	14.7	42	25	10	M8x1.25	12	+18	-14	Yes	43750	BDGT11T3... BDMT11T3...
20-M10-11T-2T	●		20	10.5	18.7	48	30		M10x1.5	15	+20	-10		41000	
20-M10-11T-3T	●	3													
25-M12-11T-3T	●		25	12.5	23	56	35		M12x1.75	19	+21			37500	
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	Yes	35000	BDGT1704... BDMT1704...
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 **M93**.
See page **M82** 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

Spare parts (MEC modular type)

Description	Spare parts Clamp screw	Wrench	Anti-seize compound
			
MEC 16-M08-11T-2T	SB-2555TRG Recommended tightening torque for insert clamp 1.2N·m	DTM-8	P-37
20-M10-11T-2T			
20-M10-11T-3T			
25-M12-11T-3T			
32-M16-11T-4T			
MEC 25-M12-17-2T	SB-4070TRN Recommended tightening torque for insert clamp 3.5N·m	DTM-15	P-37
32-M16-17-3T			

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

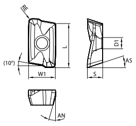
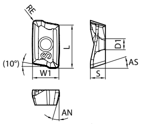
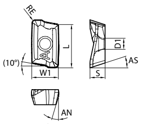
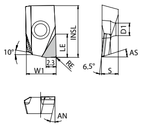
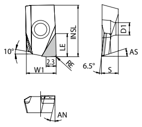
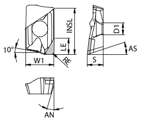
● : Standard item

BDGT/BDMT

Classification of usage

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

	CA6535	PDL025	PR1535	PR1810	PR1825	PR1835	GW25	TN100M	KPD001	KPD230	
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							Cermet	PCD		Applicable toolholder ➡ M86~M90
												CVD	DLC	PVD				-	-	-		
			S	D1	RE	L	INSL	LE	W1	AN	AS	CA6535	PDL025	PR1535	PR1810	PR1825	PR1835	GW25	TN100M	KPD001	KPD230	
 	BDMT 110302ER-JT	2	3	2.8	0.2	11	-	-	6.3	15	18	●		●	●	●	●					MEC...-11
	110304ER-JT				0.4							●		●	●	●	●					
	110308ER-JT				0.8							●		●	●	●	●					
	BDMT 11T302ER-JT	2	3.8	2.8	0.2	11	-	-	6.7	13	18			●	●	●	●					MEC...-11T(...) MEC...-11-...
	11T304ER-JT				0.4							●		●	●	●	●		●			
	11T308ER-JT				0.8							●		●	●	●	●		●			
	11T312ER-JT				1.2							●		●	●	●	●					
	11T316ER-JT				1.6							●		●	●	●	●					
	11T320ER-JT				2							●		●	●	●	●					
	11T324ER-JT				2.4							●		●	●	●	●					
	11T331ER-JT				3.1							●		●	●	●	●					
	BDMT 170404ER-JT	2	4.9	4.4	0.4	17	-	-	9.6	13	18	●		●	●	●	●					MEC...-17(...) MEC...-17-...
	170408ER-JT				0.8							●		●	●	●	●		●			
	170412ER-JT				1.2							●		●	●	●	●					
	170416ER-JT				1.6							●		●	●	●	●					
	170420ER-JT				2							●		●	●	●	●					
	170424ER-JT				2.4							●		●	●	●	●					
	170431ER-JT				3.1							●		●	●	●	●					
	170440ER-JT				4									●	●	●	●					
  Low cutting force / Stainless steel	BDMT 110302ER-JS	2	3	2.8	0.2	11	-	-	6.3	15	18	●		●		●	●					MEC...-11
	110304ER-JS				0.4							●		●		●	●					
	110308ER-JS				0.8							●		●		●	●					
	BDMT 11T302ER-JS	2	3.8	2.8	0.2	11	-	-	6.7	13	18	●		●		●	●					MEC...-11T(...) MEC...-11-...
	11T304ER-JS				0.4							●		●		●	●					
	11T308ER-JS				0.8							●		●		●	●					
	BDMT 170404ER-JS	2	4.9	4.4	0.4	17	-	-	9.6	13	18	●		●		●	●					MEC...-17(...) MEC...-17-...
	170408ER-JS				0.8							●		●		●	●					
  Non-ferrous metals	BDGT 11T302FR-JA	2	3.8	2.8	0.2	11	-	-	6.7	13	18		●					●				MEC...-11T(...) MEC...-11-...
	11T304FR-JA				0.4								●					●				
	11T308FR-JA				0.8								●					●				
	BDGT 170404FR-JA	2	4.9	4.4	0.4	17	-	-	9.6	13	18		●					●				MEC...-17(...) MEC...-17-...
	170408FR-JA				0.8								●					●				
	170420FR-JA				2								●					●				
	170431FR-JA				3.1								●					●				
 	BDGT 11T302FR	1	3.8	2.8	0.2	-	11.5	3.8	6.7	13	18									●	●	MEC...-11T(...) MEC...-11-...
	11T304FR				0.4															●	●	
	11T308FR				0.8															●	●	
 	BDGT 11T302FR-LE	1	3.8	2.8	0.2	-	11.5	5.2	6.7	13	18									●	●	MEC...-11T(...) MEC...-11-...
	11T304FR-LE				0.4															●	●	
	11T308FR-LE				0.8															●	●	
 	BDMT 11T302FR	1	3.8	2.8	0.2	-	11	3.6	6.7	13	18									●	●	MEC...-11T(...) MEC...-11-...
	11T304FR				0.4															●	●	
	BDMT 170402FR	1	4.9	4.4	0.2	-	17	4.4	9.6	13	18									●	●	MEC...-17(...) MEC...-17-...
	170404FR				0.4															●	●	

Handed insert shows Right-hand

Recommended cutting conditions ➡ M92, M93

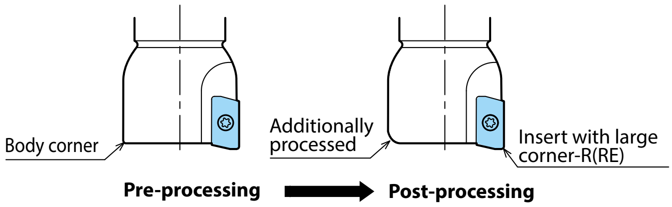
● : Standard item

CBN & PCD Inserts are sold in 1 piece boxes

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.)

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

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



Recommended cutting conditions

JT chipbreaker

Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)				
	Toolholder description		Cermet	MEGACOAT NONA EX (MEGACOAT NANO)			CVD coated carbide
	MEC10~ MEC19	MEC20~MEC40 MEC032R~MEC160R	TN100M	PR1835 (PR1535)	PR1825	PR1810	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	-	-	-

* 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 NONA EX (MEGACOAT NANO)			CVD coated carbide
	MEC10~ MEC19	MEC20~MEC40 MEC032R~MEC160R	PR1835 (PR1535)	PR1825	PR1810	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

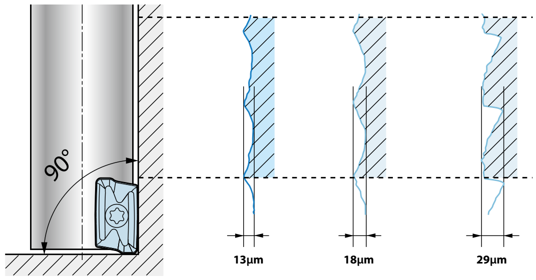
1. Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter or the body may be damaged even under no load.
2. For actual practical revolution, please set within recommended cutting condition.
3. When using at a higher revolution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

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

Features of MEC

Good squareness

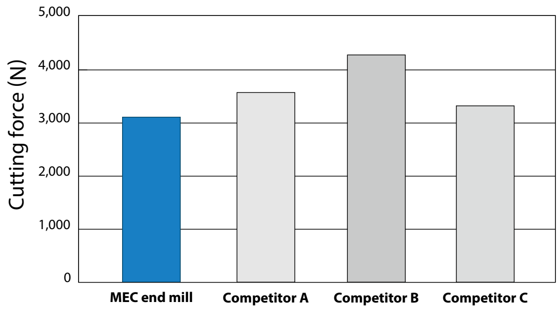
Cutting Surface Comparison



(Internal evaluation)

Low cutting force

Cutting force comparison



Tool dia. ø20 S50C

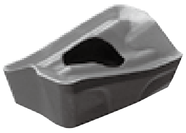
Vc = 100 m/min Shouldering ap x ae = 9 x 10 mm

fz = 0.2 mm/t Dry

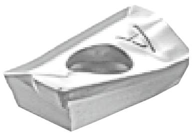
(Internal evaluation)

Chipbreaker

JT chipbreaker
(General purpose)

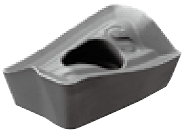


JA chipbreaker
(For aluminum)



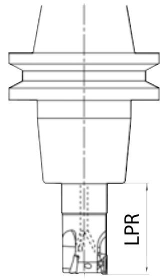
JS chipbreaker
(Low cutting force)

Cutting force
20% lower

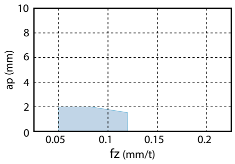
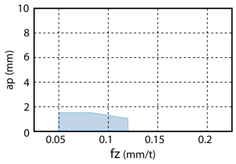
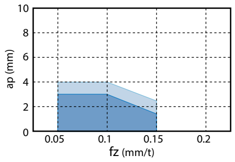
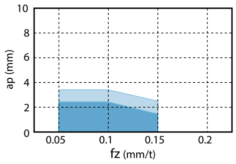
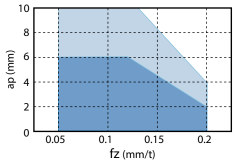
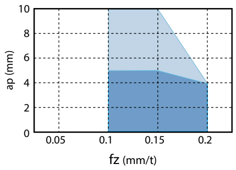
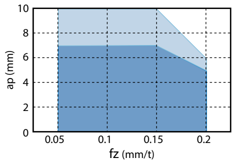
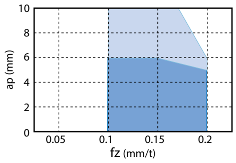
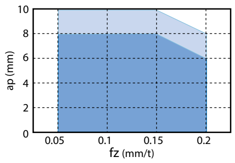
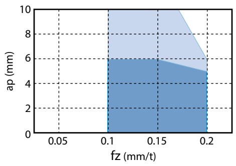
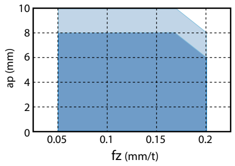
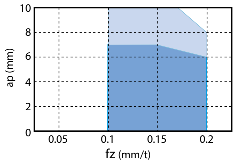


Cutting performance of mec end mill

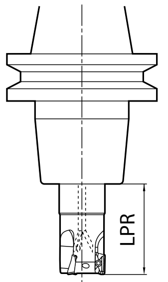
1. Cutting edge length 10mm type (Standard/Same shank with JT chipbreaker)

Cutting dia.	Description	Overhang length LPR (mm)		Shape
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	

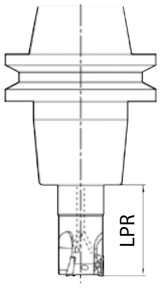
(Vc=120m/min Workpiece material: S50C)

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

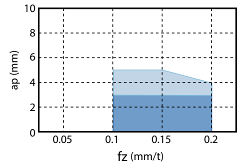
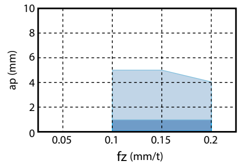
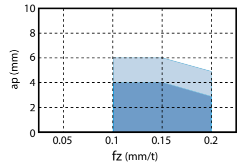
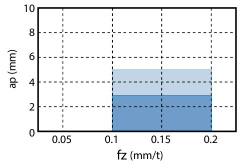
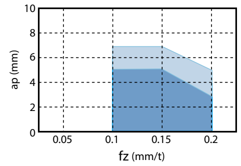
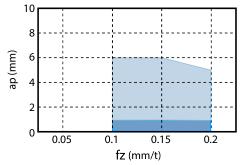
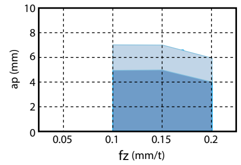
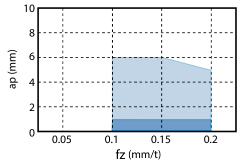
2. Cutting edge length 10 mm type (Long shank with JT chipbreaker)

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	

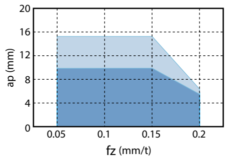
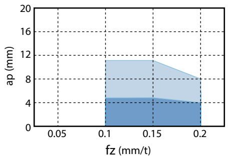
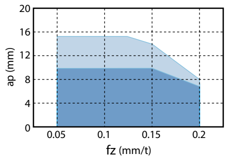
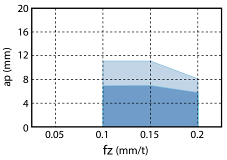
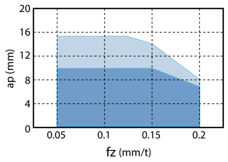
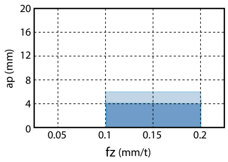
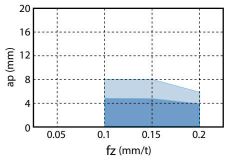
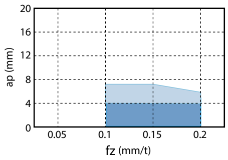
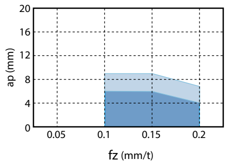
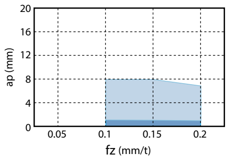
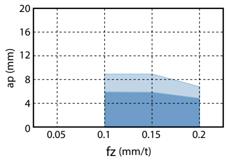
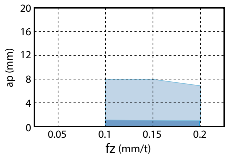
3. Cutting edge length 15.7 mm type (JT chipbreaker)

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
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
MEC25-S25-17		
MEC32-S32-17		
MEC40-S32-17		
MEC25 -S25-160-17 Long shank		
MEC32 -S32-200-17 Long shank		
MEC40 -S32-240-17 Long shank		

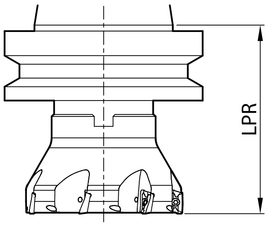
Cutting performance of MEC face mill

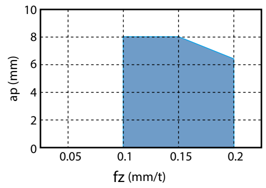
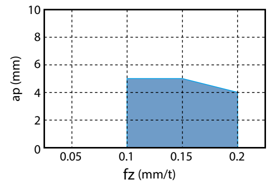
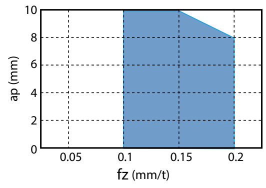
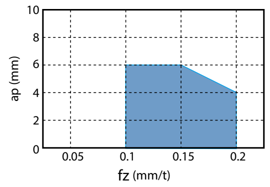
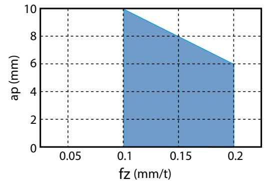
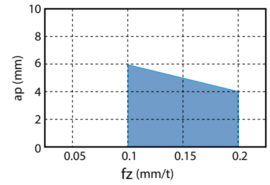
Cutting edge length 10 mm type (JT chipbreaker)

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

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

Shape



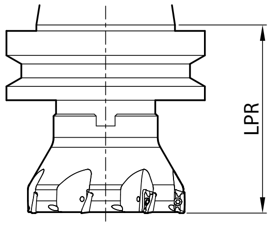
Description	Shouldering (Cutting width ae=DC/2)	Slotting
MEC040R -11-◯T-M		
MEC050R-11 -◯T-M ~ MEC100R-11 -9TN(-MN)		
MEC125R -11-11T(-M)		

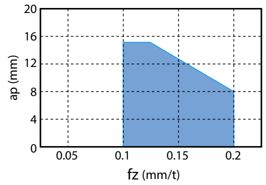
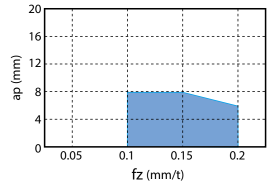
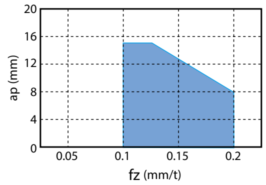
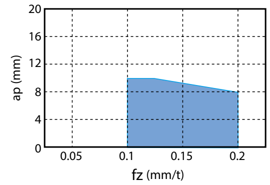
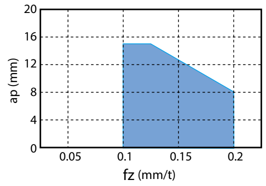
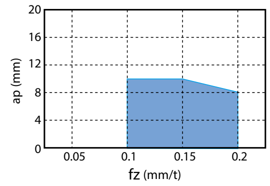
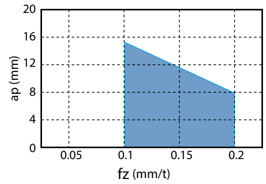
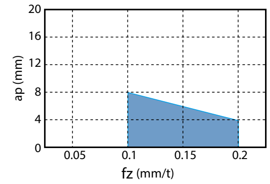
Cutting edge length 15.7 mm type (JT chipbreaker)

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

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

Shape



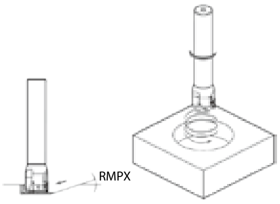
Description	Shouldering (Cutting width ae=DC/2)	Slotting
MEC040R -17-4T-M		
MEC050R -17-◯T-M		
MEC063R -17-◯T(-M) ~ MEC100R -17-◯TN(-MN)		
MEC125R -17-9T(-M) MEC160R -17-12T(-M)		

Ramping, helical milling and vertical milling (Plunging)

Ramping/Helical milling

Ramping angle is recommended under RMPX.

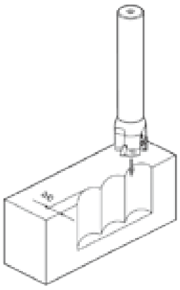
Refer to each tool's cutting performance list for sinking depth per revolution when helical milling.
Use compressed air when during machining.



Cutting dia.	Applicable inserts	Max. ramping angle (RMPX)
ø16~ø18	BDMT11T3 type BDGT11T3 type	3°
ø19~ø21		5°
ø22~ø25		2.5°
ø28~ø32		1.5°
ø40		0.7°
ø50 and over		Not recommended
ø25	BDMT1704 type BDGT1704 type	8°
ø32		5°
ø40		2.5°
ø50 and over		Not recommended

BDMT1103 type is not recommended for ramping and helical milling.

Vertical milling (Plunging)



Cutting dia.	Applicable inserts	Max. width of cut (ae)
ø16 ~ ø19	BDMT11T3 type BDGT11T3 type	1.5 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

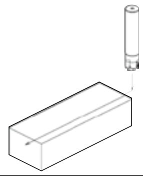
MEC	Cutting dia.	ø16	ø18	ø20	ø22	ø25	ø28	ø30	ø32	ø40	ø50
BD_T11T3 type	Guidance of minimum cutting dia. by helical milling	ø21	ø25	ø29	ø33	ø39	ø45	ø49	ø53	ø69	Helical milling is not recommended.
	Guidance of minimum cutting dia. in case of flatting bottom after helical milling.	ø28	ø32	ø36	ø40	ø46	ø52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

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

Case studies

RC55 (Pre-hardened Tool Steel)

- Test piece (54~56HRC)
- Vc = 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 (PR830)



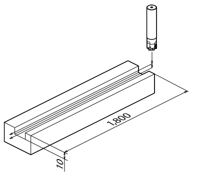
MEC	Chip removal amount =71.3cm^3 (Further machining possible)
Competitor's end mill A	Chip removal amount = 2.9 cm^3 (Chipping occurred)

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)

SS400

- Plate
- Vc = 88 m/min (n = 1,400min^{-1})
- ap = 5 mm x 2 passes
- fz = 0.12 mm/t (Vf = 500 mm/min)
- Dry
- MEC20-S20-11T
- 3 flutes
- BDMT11T308ER-JT (PR830)



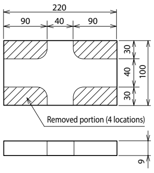
MEC	23 pcs/edge
Competitor's end mill B	10~11pcs/edge

MEC extended the tool life for more than twice.

(User evaluation)

SUS304

- 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 (PR830)



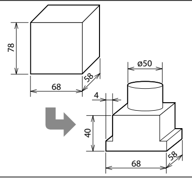
MEC	4pcs/edge or more
Competitor's end mill C	1pc/edge or less

Competitor's end mill C (indexable end mill) had high cutting force and had insert breakage, but MEC had no insert breakage and was still usable for further machining after machining 4 pieces (16 points).

(User evaluation)

SKD61 (Hot work tool steel)

- Mold
- Vc = 130 m/min (n = 1,040 min^{-1})
- ap × ae =(~3)×(~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 (PR830)



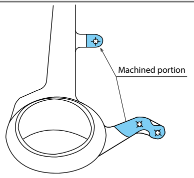
MEC	2 hours (Small wear: extendible)
Competitor's end mill D	2 hours (Halted due to insert breakage)

MEC had better cutting performance/insert life comparing to competitor's end mill D, and the insert had only small wear and was usable for further machining after used for machining of the same duration as competitor's end mill D.
Competitor's end mill D (6 flutes type) was used with Vf = 936 mm/min (fz = 0.15 mm/t).

(User evaluation)

SCM420

- 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 (PR830)



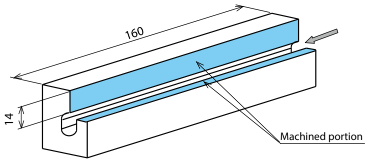
MEC	150 pcs/edge
Competitor's end mill E	40pcs/edge

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

(User evaluation)

Ni-base heat-resistant alloys

- Turbine parts
- Vc = 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 (PR1025)



MEC	9pcs/edge
Competitor's end mill F	1pc/edge or less

Competitor's end mill F (Coated carbide Insert) could not finish machining of 1 workpiece, but MEC could cut 9pcs/edge and the finished surface was good.

(User evaluation)

MECX (End mill)

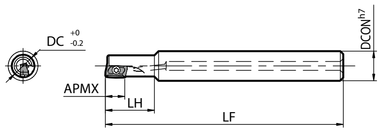


Fig. 1

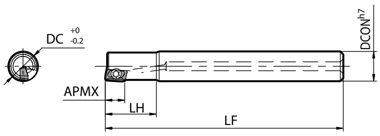


Fig. 2

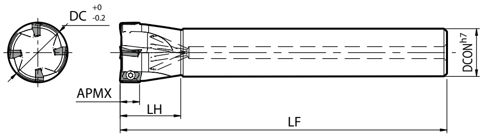


Fig. 3

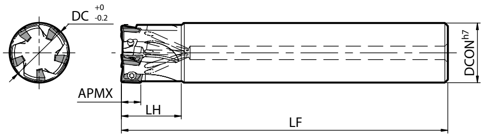
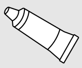
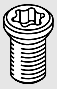
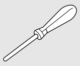


Fig. 4

Toolholder dimensions

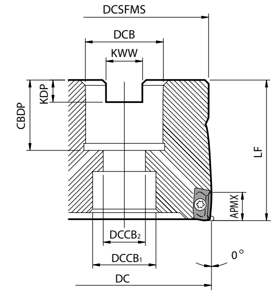
Description				Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Fig.	Spare parts			Applicable inserts ➡ M100
						DC	DCON	LF	LH	APMX						Anti-seize compound	Screw	Wrench	
																			
Standard shank	Standard	MECX	08-S10-07-1T	●	1	8	10	80	16	6	+11.7	-24	Yes	48100	1	P-37	SB-2035TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
			14-S12-07-2T	●	2	14	12		18		+16.3	-12.1		44800	3				
			17-S16-07-3T	●	3	17	16	100	20			-11		42400	3		SB-2042TRG		
			18-S16-07-3T	●		18						-10.9		41600	3				
			20-S16-07-4T	●	4	20		110				-10.4		40200	3				
			21-S20-07-4T	●		21	20					-10.1		39500	3				
			25-S20-07-5T	●	5	25		120	25			-9.7		37000	3				
			26-S25-07-5T	●		26	25					-9.5		36500	3				
			33-S32-07-6T	●	6	33	32	130	30			-8.8		33100	3				
	Fine pitch	MECX	20-S16-07-5T	●	5	20	16	110	20	6	+16.3	-10.4	Yes	40200	3	P-37	SB-2042TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
			25-S20-07-7T	●	7	25	20	120	25			-9.7		37000	3				
Same shank	Standard	MECX	10-S10-07-1T	●	1	10	10	80	17	6	+12.8	-18.7	Yes	47100	2	P-37	SB-2035TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
			12-S12-07-2T	●	2	12	12		18		+14.3	-13.7		46200	4				
			16-S16-07-3T	●	3	16	16	100	20		+16.3	-11.3		43200	4		SB-2042TRG		
			20-S20-07-4T	●	4	20	20	110				-10.4		40200	4				
			25-S25-07-5T	●	5	25	25	120	25			-9.7		37000	4				
	Fine pitch	MECX	16-S16-07-4T	●	4	16	16	100	20	6	+16.3	-11.3	Yes	43200	4	P-37	SB-2042TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
			20-S20-07-5T	●	5	20	20	110				-10.4		40200	4				
			25-S25-07-7T	●	7	25	25	120	25			-9.7		37000	4				
			32-S32-07-8T	●	8	32	32	130	30			-8.9		33600	4				
Long shank	Standard	MECX	17-S16-130-07-3T	●	3	17	16	130	20	6	+16.3	-11	Yes	42400	3	P-37	SB-2042TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
			21-S20-140-07-4T	●	4	21	20	140				-10.1		39500	3				
			26-S25-160-07-5T	●	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.

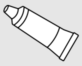
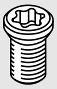
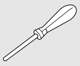
Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
For more details, see„Warning" on page **M101**.

● : Standard item

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 ➡ **M100**
	R		DC	DCSFMS	DCB	DCCB$_1$	DCCB$_2$	LF	CBDP	KDP	KWW	APMX						Anti-seize compound	Screw	Wrench	
																					
MECX 032R-07-8T-M	●	8	32	30	16	14	8.5	40	20	5.5	8.5	6	+7	-8.9	Yes	33600	0.15	P-37	SB-2042TRG	DTM-6	BDMT0703...-JT BDMT0703...-JS
040R-07-10T-M	●	10	40	38	22	18	12		22	6.3	10.4			-8.4		30500	0.25				

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 **M101**.

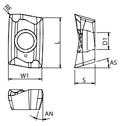
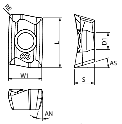
● : Standard item

BDMT

Classification of usage

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

	CA6535	PR1535	PR1810	PR1825	PR1835	
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

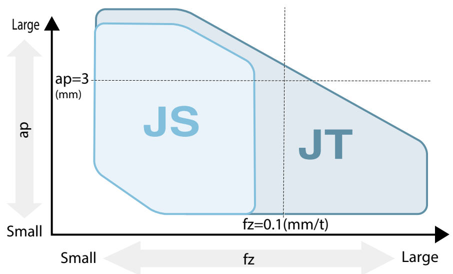
Insert		Description	No. of edges	Dimension (mm)					Angle (°)		Carbide					Applicable toolholder ➡ M98 M99
											CVD	PVD				
				S	D1	RE	L	W1	AN	AS	CA6535	PR1535	PR1810	PR1825	PR1835	
		BDMT 070302ER-JT 070304ER-JT 070308ER-JT	2	2.6	2.3	0.2 0.4 0.8	6.7	4.6	15	16	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	MECX...-07-...
	 Low cutting force / Stainless steel	BDMT 070302ER-JS 070304ER-JS 070308ER-JS	2	2.6	2.3	0.2 0.4 0.8	6.7	4.6	15	16	● ● ●	● ● ●		● ● ●	● ● ●	MECX...-07-...

Handed insert shows Right-hand

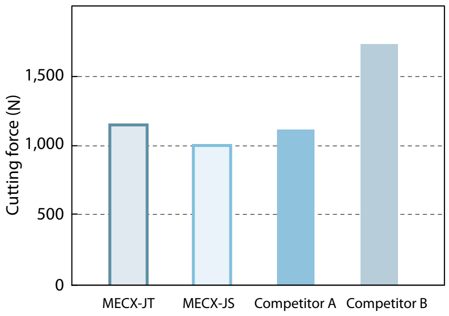
Recommended cutting conditions ➡ **M101**

● : Standard item

Chipbreaker selection



Cutting force comparison (Internal evaluation)



S45C
Vc = 150 m/min
ap x ae = 5x5 mm
fz = 0.07 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

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

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

Recommended cutting conditions

Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)			
	JS chipbreaker	JT chipbreaker	MEGACOAT NANO EX (MEGACOAT NANO)			CVD coated carbide
			PR1835 (PR1535)	PR1825	PR1810	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	-	-	-

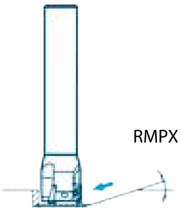
* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

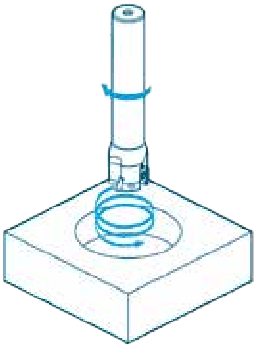
★: 1st Recommendation ☆: 2nd Recommendation

Ramping/Helical milling

Ramping angle is recommended under RMPX.

Refer to each tool's cutting performance list for sinking depth per revolution when helical milling. Use compressed air during machining.





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

Guidance of minimum cutting dia. by helical milling

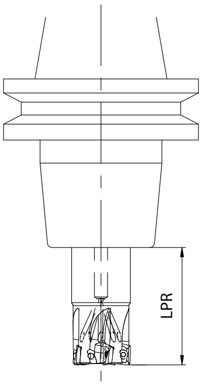
MECX	Cutting dia.	ø8	ø10	ø12	ø14	ø16	ø17	ø18	ø20
BDMT0703 type	Guidance of minimum cutting dia. by helical milling	Helical milling is not recommended	ø14	ø18	ø22	ø26	ø28	ø30	ø34
	Guidance of minimum cutting dia. in case of flatting bottom after helical milling		ø17	ø21	ø25	ø29	ø31	ø33	ø37

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

Cutting performance of MECX end mill

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.

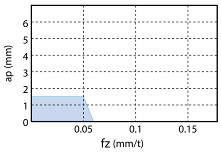
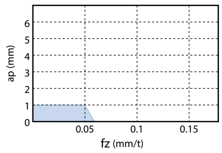
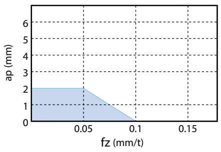
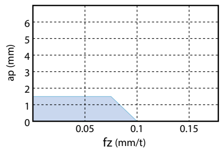
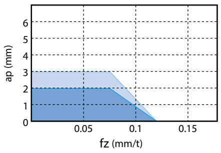
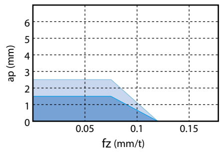
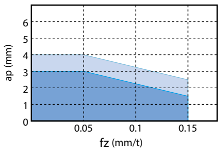
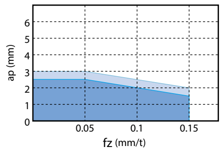
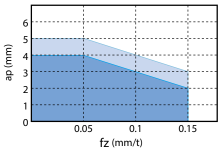
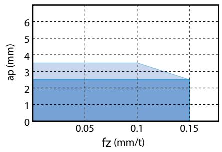
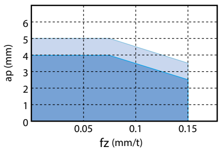
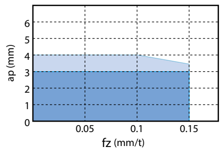
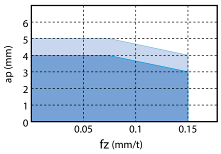
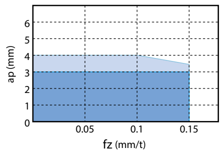
* The cutting performance list shows applicable range of JT chipbreaker with Standard flute-number type.

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.

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

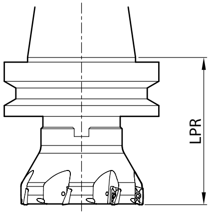
Description	Shouldering (Cutting width ae = DC/2)	Slotting Ramping and helical milling
MECX08-S10-07-1T		
MECX10-S10-07-1T		
MECX12-S12-07-2T		
MECX16-S16-07-3T		
MECX20-S20-07-4T		
MECX25-S25-07-5T		
MECX32-S32-07-6T		

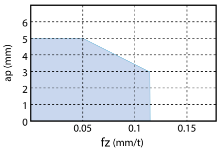
Cutting performance of MECX face mill

(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.

High performance milling

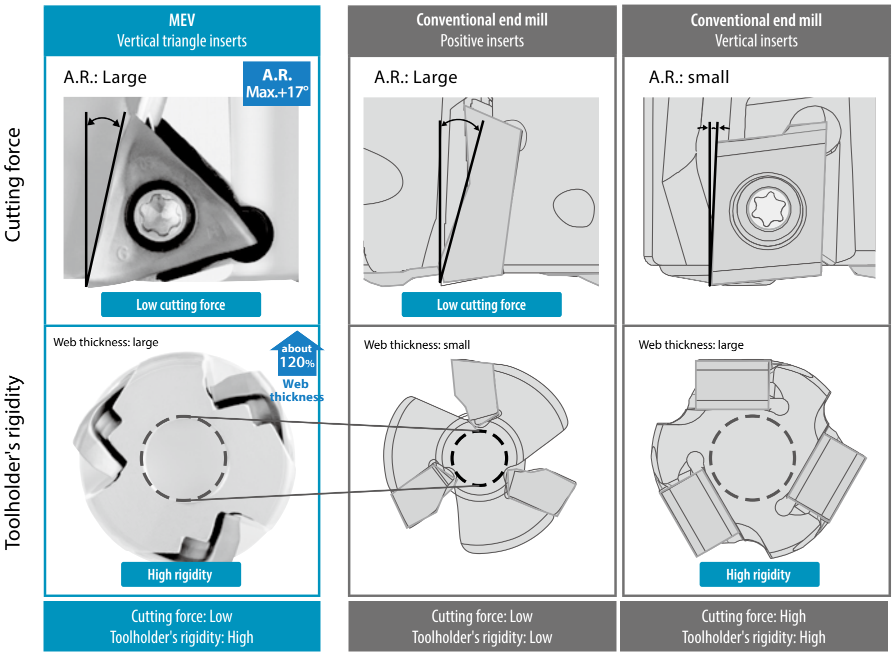
MEV

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

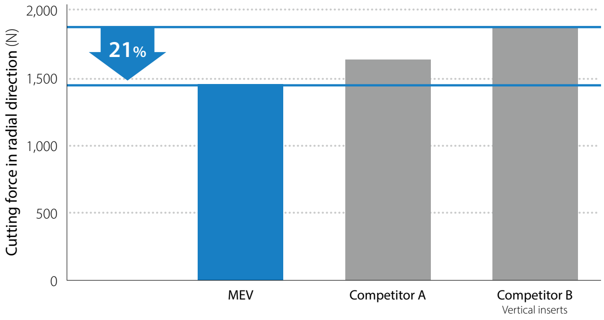
Newly developed vertical triangle inserts with 3 cutting edges achieve stable machining with reduced chattering.

MEV vs. competitor



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

Cuttting force comparison (internal evaluation)

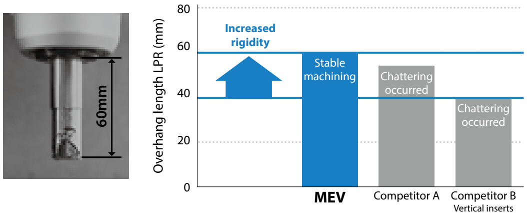


Cutting conditions: Vc = 200 m/min, ap × ae = 3 × 18 mm, fz = 0.10 mm/t, ø20 (3 inserts), Dry, Workpiece material: SCM440Ⓗ

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

Chattering resistance comparison (internal evaluation)

Shouldering



Cutting conditions: Vc = 200 m/min, ap × ae = 3 × 18 mm, fz = 0.10 mm/t, ø20 (3 inserts), Dry, Workpiece material: SCM440Ⓗ

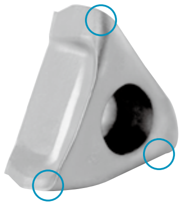
Slotting

Cutting conditions: Vc = 220 m/min, ap = 3 mm (Slotting), fz = 0.10 mm/t, ø20 (3 inserts), Dry, Workpiece material: SCM440Ⓗ

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

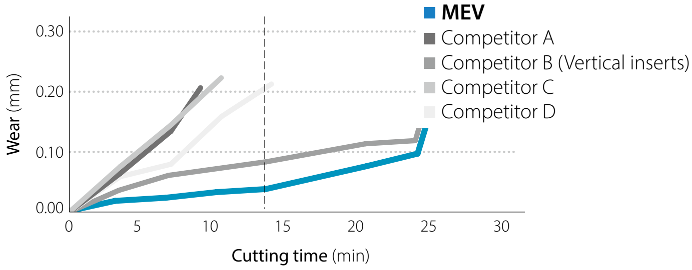
Insert

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



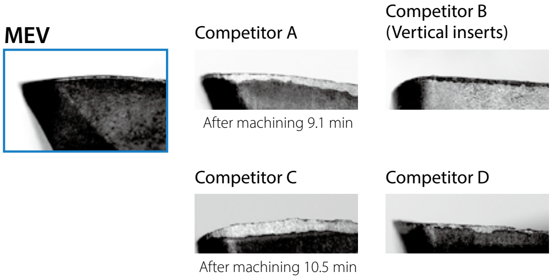
Long tool life with excellent wear resistance

Wear resistance comparison (internal evaluation)



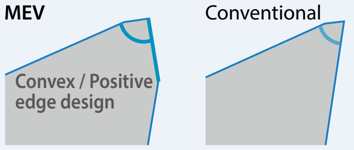
Cutting conditions: Vc = 180 m/min, ap × ae = 3 × 10 mm, fz = 0.1 mm/t, ø20, Dry,
Workpiece material: SKD11 (30~35HS)

Cutting edge (after machining 14 min)



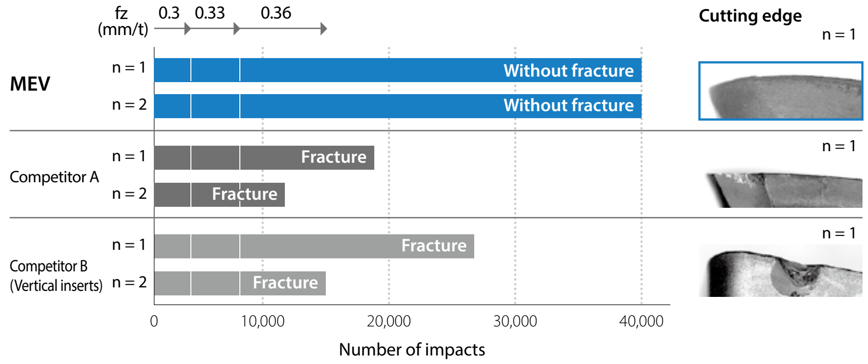
Improved stability with superior fracture resistance

Cutting edge cross-section



The MEV features a larger cutting edge to increase strength

Wear resistance comparison (internal evaluation)



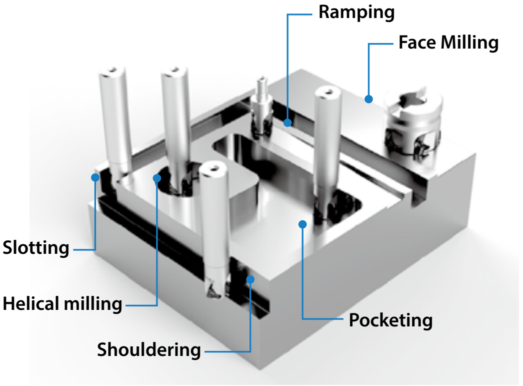
Cutting conditions: Vc = 120 m/min, ap × ae = 2 × 10 mm, fz = 0.3 - 0.36 mm/t, ø20 (1 insert), Dry,
Workpiece material: SCM440Ⓗ (37~39HS)

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: Vc = 150 m/min,
ap = 6 mm (Slotting)
fz = 0.2 mm/t, ø20 (3 insert), Dry,
Workpiece material: SS400



MEV (End mill)

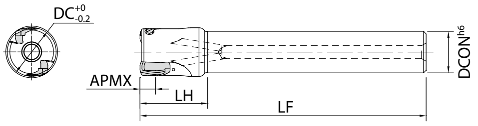


Fig. 1

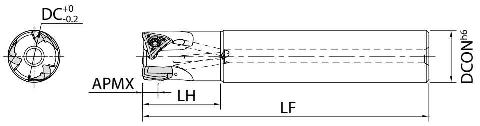
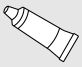
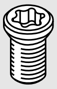
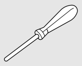


Fig. 2

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 ➡ M109
						DC	DCON	LF	LH	APMX							Anti-seize compound	Screw	Wrench	
																				
Cylindrical	Standard shank	MEV	20-S16-06-2T	●	2	20	16	110	26	6	+17	-38	Yes	32000	0.2	1	P-37	SB-3076TRP Recommended tightening torque for insert clamp 2.0N·m	DTPM-10	TOMT0605...-GM TOMT0605...-SM
			22-S20-06-3T	●	3	22	20	120	29			-37		29000		1				
			25-S20-06-3T	●		25								25000	0.3	1				
			28-S25-06-3T	●		28	25					-36		23000	0.4	1				
			30-S25-06-4T	●	4	30		130	32					21500	0.5	1				
			32-S25-06-4T	●		32								20000		1				
			40-S32-06-5T	●	5	40	32	150	50					16000	1	1				
			50-S32-06-5T	●		50		120	40		+16			13000	0.9	1				
	Same shank	MEV	20-S20-06-2T	●	2	20	20	110	30	6	+17	-38	Yes	32000	0.2	2	P-37	SB-3076TRP Recommended tightening torque for insert clamp 2.0N·m	DTPM-10	TOMT0605...-GM TOMT0605...-SM
			20-S20-06-3T	●	3											2				
			25-S25-06-2T	●	2	25	25	120	32			-37		25000	0.4	2				
			25-S25-06-3T	●	3											2				
			32-S32-06-3T	●		32	32	130	40			-36		20000	0.7	2				
			32-S32-06-4T	●	4											2				
	Long shank	MEV	20-S18-06-150-2T	●	2	20	18	150	30	6	+17	-38	Yes	32000	0.3	1	P-37	SB-3076TRP Recommended tightening torque for insert clamp 2.0N·m	DTPM-10	TOMT0605...-GM TOMT0605...-SM
			20-S18-06-150-3T	●	3											1				
			20-S20-06-150-2T	●	2		20		40							2				
			20-S20-06-150-3T	●	3											2				
			25-S25-06-170-2T	●	2	25	25	170	50			-37		25000	0.6	2				
			25-S25-06-170-3T	●	3											2				
			32-S32-06-200-2T	●	2	32	32	200	65			-36		20000	1.1	2				
			32-S32-06-200-3T	●	3							-35				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

MEV (Face mill)

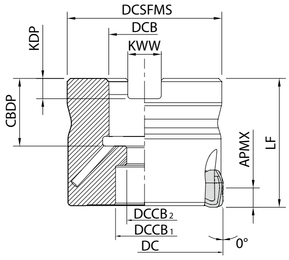


Fig. 1

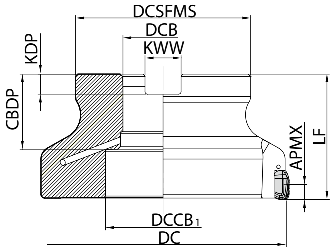
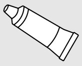
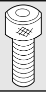
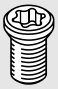
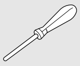


Fig. 2

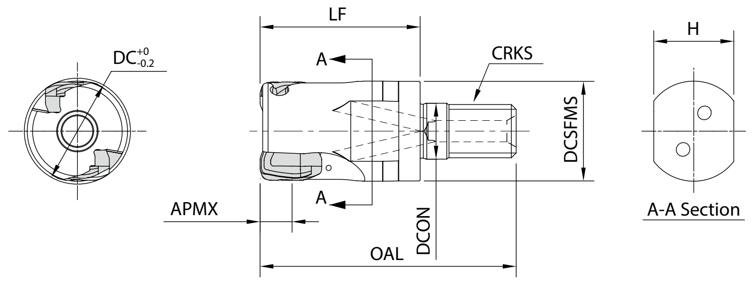
Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)										A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Spare parts				Applicable inserts ➡ M109
	R		DC	DCSFMS	DCB	DCCB₁	DCCB₂	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
040R-06-5T-M	●	5	40	38		15		40								16000	0.2	1					
050R-06-5T-M	●		50	48	22	18	11		21	6.3	10.4		+16			13000	0.4	1		HH10X30			
063R-06-6T-M	●	6	63											-35		10000	0.6	1					
080R-06-7T-M	●	7	80	60	27	20	13	50	24	7	12.4		+15			7900	1.1	1		HH12X35			
080R-06-7T	●				25.4				27	6	9.5							1			Recommended tightening torque for insert clamp 2.0N·m		
100R-06-9T-M	●	9	100	70	32	46	-	50	30	8	14.4					6300	1.4	2		-			
100R-06-9T	●				31.75			63	34		12.7							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

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 ➡ **M109**
			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 Recommended tightening torque for insert clamp 2.0N·m	DTPM-10	TOMT0605...-GM TOMT0605...-SM
20-M10-06-3T	●	3																
25-M12-06-3T	●		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		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 **M82** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

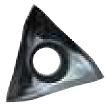
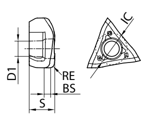
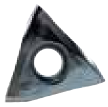
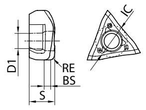
● : Standard item

TOMT

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				Applicable toolholder ➡ M106~M108
					IC	S	D1	RE	BS	CVD	PVD			
										CA6535	PR1510	PR1525	PR1535	
	 General purpose	TOMT	060504ER-GM 060508ER-GM	3	7.2	5.7	3.4	0.4 0.8	1.9 1.5	● ●	● ●	● ●	● ●	MEV...-06-...
	 Low cutting force	TOMT	060508ER-SM	3	7.2	5.7	3.4	0.8	1.5	●		●	●	MEV...-06-...

Handed insert shows Right-hand

Recommended cutting conditions ➡ M110

● : 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	–	–	–

★ : 1st recommendation ☆ : 2nd recommendation

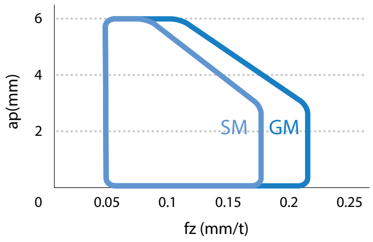
The number in **bold font** is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
Cutting with coolant is recommended for ni-base heat resistant alloy and titanium alloy.
Cutting with coolant is recommended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

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

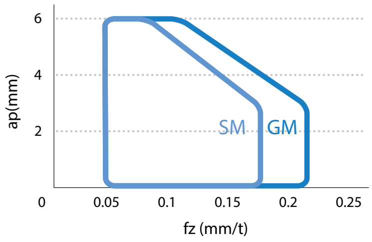
DC : ø20~ø50

Shouldering



Cutting conditions : Vc = 150 m/min, ae = DC/2 mm, Workpiece material : S50C

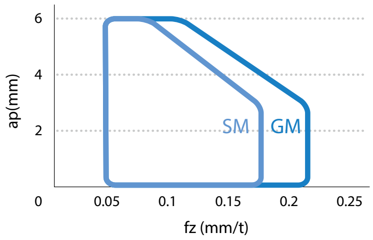
Slotting



Cutting conditions : Vc = 150 m/min, ae = DC mm, Workpiece material : S50C

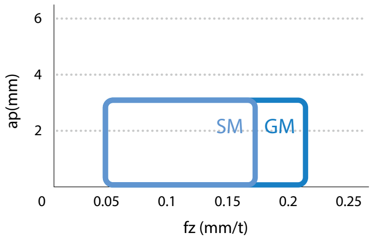
DC : ø63~ø100

Shouldering (ae≤DC/4)



Cutting conditions : Vc = 150 m/min, ae = DC/4 mm, Workpiece material : S50C

Shouldering (ae>DC/4), Slotting



Cutting conditions : Vc = 150 m/min, ae = DC mm, Workpiece material : S50C

Reference data for Ramping

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

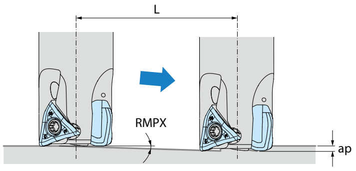
Decrease ramping angle if chips become excessively long.

Guide for Ramping (Slant Milling)

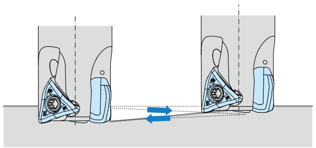
Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
Feed rate should be 70% or under of the above cutting conditions.

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

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



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

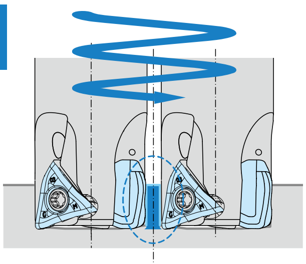


Guide for Helical milling

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

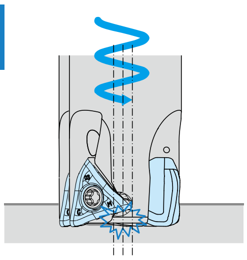
🚫 Exceeding Max. Cutting Dia.

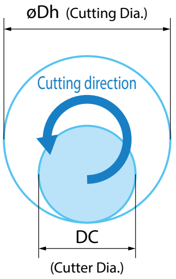
Center core part remains after machining



🚫 Under Min. Cutting Dia.

Center core part interferes with toolholder



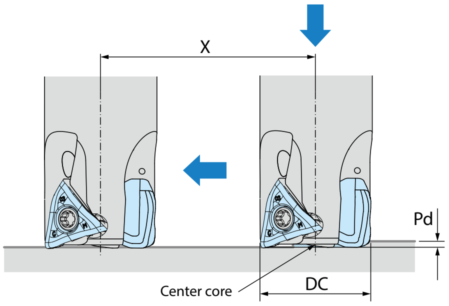


Unit : mm

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

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

Guide for Drilling



Unit : mm

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

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

MEWH (End mill)

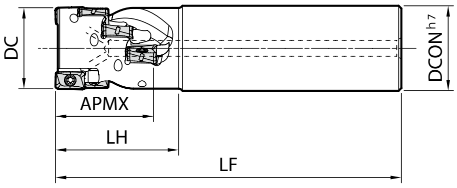


Fig. 1

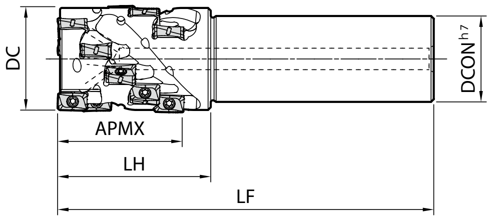


Fig. 2

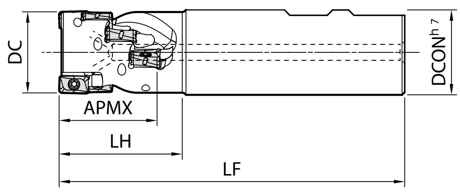


Fig. 3

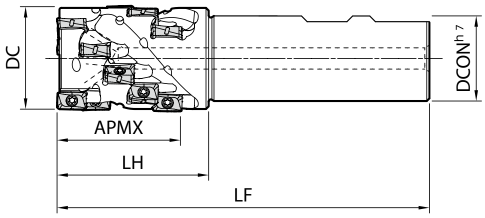


Fig. 4

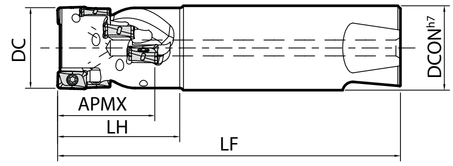


Fig. 5

Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts ➔ M114
					DC	DCON	LF	LH	APMX					Anti-seize compound	Screw	Wrench	
MEWH 025-S25-10-3-2T	●	6	2	3	25	25	120	37	28	+13	-20	Yes	1	P-37	SB-3065TRP	DTPM-8 Recommended tightening torque for insert clamp 1.2N·m	LOMU1004...
032-S32-10-4-2T	●	8		4	32	32	130	46	37				1				
040-S32-10-5-2T	●	10		5	40		140	57	46				2				
040-S32-10-5-3T	●	15	3										2				
MEWH 040-S32-15-4-2T	●	8	2	4	40	32	160	63	53	+13	-20	Yes	2	P-37	SB-4090TRP	DTPM-15 Recommended tightening torque for insert clamp 3.5N·m	LOMU1505...
050-S42-15-4-2T	●				50	42							2				
050-S42-15-4-3T	●	12	3										2				
MEWH 025-W25-10-3-2T	●	6	2	3	25	25	95	37	28	+13	-20	Yes	3	P-37	SB-3065TRP	DTPM-8 Recommended tightening torque for insert clamp 1.2N·m	LOMU1004...
032-W32-10-4-2T	●	8		4	32	32	108	46	37				3				
040-W32-10-5-2T	●	10		5	40		119	57	46				4				
040-W32-10-5-3T	●	15	3										4				
MEWH 040-W32-15-4-2T	●	8	2	4	40	32	125	63	53	+13	-20	Yes	4	P-37	SB-4090TRP	DTPM-15 Recommended tightening torque for insert clamp 3.5N·m	LOMU1505...
050-W40-15-4-2T	●				50	40	135						4				
050-W40-15-4-3T	●	12	3										4				
MEWH 025S25-10-3-2TXT	●	6	2	3	25	25	118	37	28	+13	-20	Yes	5	P-37	SB-3065TRP	DTPM-8 Recommended tightening torque for insert clamp 1.2N·m	LOMU1004...
032S32-10-4-2TXT	●	8		4	32	32	133	46	37				5				

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

MEWH (Shell mill)

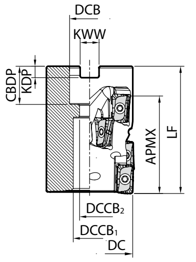


Fig. 1

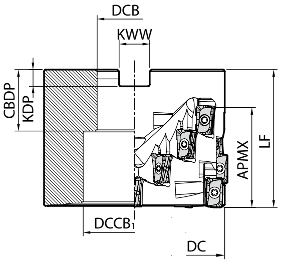
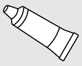
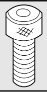
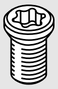
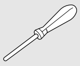


Fig. 2

Toolholder dimensions

Description		Availability	Inserts	Flutes	Stages	Dimension (mm)									A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts				Applicable inserts ➡ M114
																			Anti-seize compound	Mounting bolt	Screw	Wrench	
		R				DC	DCB	DCCB$_1$	DCCB$_2$	LF	CBDP	KDP	KWW	APMX									
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...
	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...
	063R-15-3-3T-M	●	9		3	63	27	20	13	58	24	7	12.4	41				1		HH12X35	Recommended tightening torque for insert clamp 3.5N·m		
	080R-15-4-4T-M	●	16	4	4	80	32	26	18	70	28	8	14.4	53				1		HH16X45			
	100R-15-4-5T-M	●	20	5		100	40	55	-	74	33	9	16.4					2		-			

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

Guidance of applicable inserts for MEWH

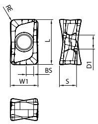
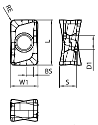
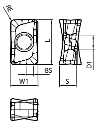
Insert location indication	Toolholder description										
	MEWH...10...					MEWH...15...					
	Corner-R(RE) (mm)					Corner-R(RE) (mm)					
Bottom inserts	0.4	0.8	1.2	1.6	2.0	0.4	0.8	1.0	1.2	1.6	2.0
*Middle inserts	0.4 / 0.8	0.4 / 0.8	0.4 / 0.8	0.4	0.4	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6

* 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

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice ☐ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	CA6535	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
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

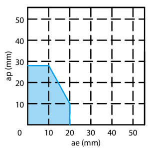
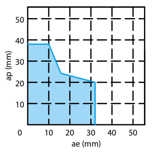
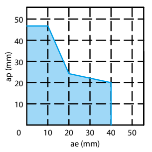
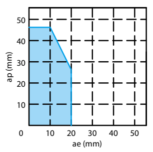
Insert		Description		Dimension (mm)						Carbide								Applicable toolholder ➡ M112 M113
										CVD	PVD							
				S	D1	RE	L	W1	BS	CA6535	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
	 General purpose	LOMU	100404ER-GM	4	3.4	0.4	10.9	6.6	2.1	●		☐	○	●	●	●	●	MEWH...-10-.. MEW...-10-...
			100408ER-GM			0.8			1.7	●		☐	○	●	●	●	●	
			100412ER-GM			1.2			1.3	●		☐	○	●	●	●	●	
			100416ER-GM			1.6			1	●		☐	○	●	●	●	●	
			100420ER-GM			2			1	●		☐	○	●	●	●	●	
		LOMU	150504ER-GM	5.6	4.8	0.4	15.7	9.2	2.2	●		☐	○	●	●	●	●	MEWH...-15-... MEW...-15-...
			150508ER-GM			0.8			1.8	●		☐	○	●	●	●	●	
			150510ER-GM			1			1.6				○			●		
			150512ER-GM			1.2			1.4	●		☐	○	●	●	●	●	
			150516ER-GM			1.6			1	●		☐	○	●	●	●	●	
			150520ER-GM			2			0.6	●		☐	○	●	●	●	●	
	 Low cutting force	LOMU	100408ER-SM	4	3.4	0.8	10.9	6.6	1.7	●		☐	○	●	●	●	●	MEWH...-10-... MEW...-10-...
		LOMU	150508ER-SM	5.6	4.8	0.8	15.7	9.2	1.8	●		☐	○	●	●	●	●	MEWH...-15-... MEW...-15-...
	 Tough edge	LOMU	100408ER-GH	4	3.4	0.8	10.9	6.6	1.7	●	●	☐	○	●	●	●	●	MEWH...-10-... MEW...-10-...
		LOMU	150508ER-GH	5.6	4.8	0.8	15.7	9.2	1.8	●	●	☐	○	●	●	●	●	MEWH...-15-... MEW...-15-...

Handed insert shows Right-hand

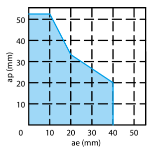
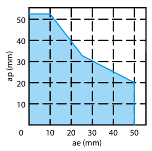
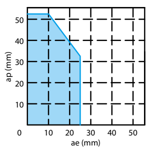
Recommended cutting conditions ➡ **M115**

Cutting performance

LOMU1004 type

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

LOMU1505 type

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

Cutting conditions>
- Vc = 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 ○ : Will be replaced with a new product ☐ : Expected to be discontinued in September 2026

Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)			
		Toolholder description	MEGACOAT NANO EX (MEGACOAT NANO)			CVD coated carbide
		MEWH025~MEWH050 (Helical end mill)	PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (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)

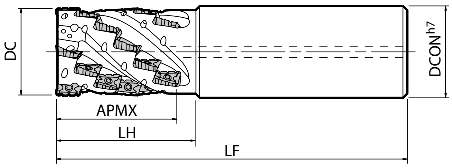


Fig. 1

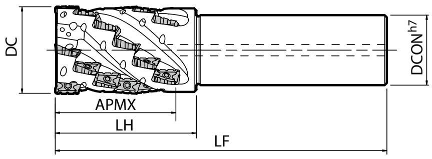


Fig. 2

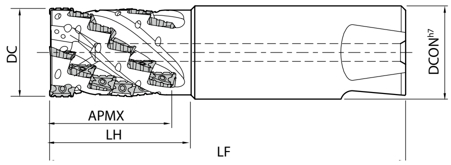
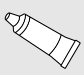
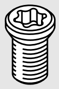
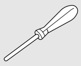


Fig. 3

Toolholder dimensions

Description		Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts ➡ **M121**
						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	Yes	1	P-37	SB-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
	032-S32-11-5-2T	●	10		5	32	32	140	55	46	+23	-9		1				
	032-S32-11-5-4T	●	20	4										1				
	040-S32-11-6-4T	●	24		6	40		150	64	55		-8		2				
	040-S42-11-6-4T	●					42	160						1				
	050-S42-11-7-4T	●	28		7	50		172	75	64		-7		2				
	050-S42-11-7-6T	●	42	6										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	●					42	170						1				
	050-S42-17-5-4T	●	20	4	5	50		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		5	32	32	142	55	46	+23	-9		3				
	032S32-11-5-4TXT	●	20	4										3				

For installation of notched insert, see page **M122**.

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.

● : Standard item

MECH (Shell mill, without coolant hole)

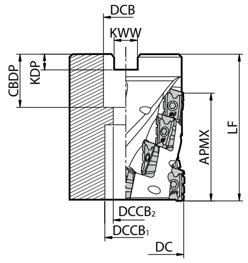


Fig. 1

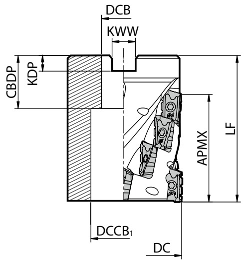


Fig. 2

Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)									A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts				Applicable inserts ➡ **M121**
	R				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-2555TRG	DTM-8	BDMT11T3...-N2 + BDMT11T3...-N3
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	4	2	50	22	18	11	52	21	6.3	10.4	30	+19	-7	No	1	P-37	HH10X30	SB-4070TRN	DTM-15	BDMT1704...-N3 + BDMT1704...-N4
050R-17-4-4T-M	●	16		4					78				59				1		HH10X40			
063R-17-3-4T-M	●	12		3	63	27	20	14	70	24	7	12.4	45				1		HH12X35			
080R-17-4-6T-M	●	24	6	4	80	32	26	18	85	28	8	14.4	59				1		HH16X45			
100R-17-4-6T-M	●				100	40	56	-		30	9	16.4					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
080R-17-4-6T	●	24	6	4	80	31.75	26	18	85	32	8	12.7	59				1		HH16X45			
100R-17-4-6T	●				100	38.1	56	-		38	10	15.9					2		-			

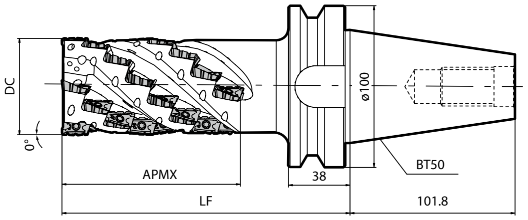
For installation of notched insert, see page **M122**.
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

X-Treme Chuck [NIKKEN]

Description	See Page	Shank Dia. (DCON)	X-Treme Chuck			
			BT		HSK	
			BT40	BT50	HSK63A	HSK100A
4TFR 120-260-R○○-XT	**L9**	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	**M112**	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	**M116**	25.0	-	NBT50-C25EX-116	-	HSK100A-C25EX-116
032S32-11-5-○TXT		32.0	-	NBT50-C32EX-121	-	HSK100A-C32EX-121

● : Standard item

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

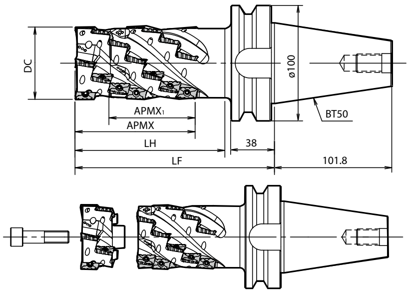


Toolholder dimensions

Description		Availability	Inserts	Flutes	Stages	Dimension (mm)			A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Spare parts			Applicable inserts ➡ **M121**
		R				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
	063R17-7-4T-BT50	●				63						5.9				
	080R17-7-4T-BT50	●				80						7.8				
	100R17-7-6T-BT50	●	42	6		100						10.2				

For installation of notched insert, see page **M122**.
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)



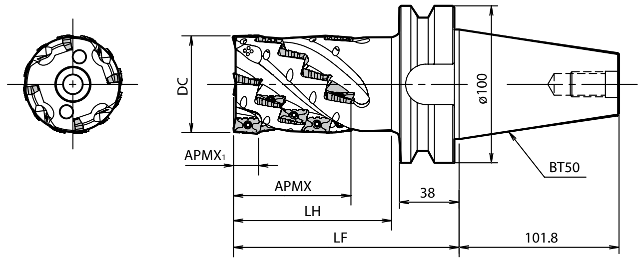
Toolholder dimensions

Description		Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Spare parts					Applicable inserts ➡ **M121**
		R				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
	080R17-4T-BT50SA	MTO				80								7.6		HH16X40	LW-14			
	100R17-6T-BT50SA	MTO	42	6		100								9.8		HH20X40	LW-17			

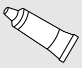
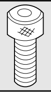
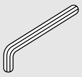
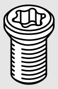
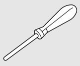
For installation of notched insert, see page **M122**.
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

● : Standard item MTO : Made to order

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



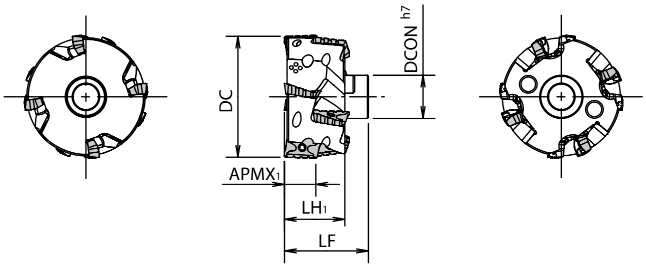
Toolholder dimensions

Description	Availability	Inserts	Flutes	Stages	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Spare parts					Applicable inserts ➡ **M121**
														Anti-seize compound	Mounting bolt	Wrench (for Mounting bolt)	Screw	Wrench	
	R				DC	LF	LH	APMX	APMX1										
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
080R17-4T-BT50-A	MTO				80								6.8		HH16X40	LW-14			
100R17-6T-BT50-A	MTO	30	6		100								8.5		HH20X40	LW-17			

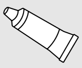
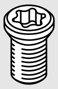
For installation of notched insert, see page **M122**.

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 ➡ **M121**
														Anti-seize compound	Screw	
	R				DC	LF	LH	APMX1	DCON							
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	22	+19	-7	No	0.4	P-37	SB-4070TRN	BDMT1704...-N3 + BDMT1704...-N4
080R17-4T-F	●				80				32				0.8			
100R17-6T-F	●	12	6		100				45				1.3			

For installation of notched insert, see page **M122**.

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 ➡ **M119**		Front Piece (1pc) ➡ **M119**		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 ➡ **M119**	Front Piece ➡ **M119**	Applicable Inserts ➡ **M121**
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 ➡ **M122**

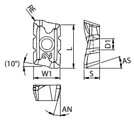
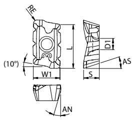
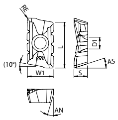
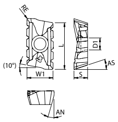
M
Milling
Cutting edge angle 45°~70°
Cutting edge angle 75°
Cutting edge angle 88°/90°
Cutter for Finishing
High Feed Cutter
Multi-Function
Slot Mill
Ball-nose Radius
Others

BDMT

Classification of usage

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

	PR1535	PR1810	PR1825	PR1835	
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 PVD				Applicable toolholder ➡ M116~M119
				S	D1	RE	L	W1	AN	AS	PR1535	PR1810	PR1825	PR1835	
	 2-notch	BDMT 11T308ER-N2	2	3.8	2.8	0.8	11	6.7	13	18	●	●	●	●	MECH...11...
	 3-notch	BDMT 11T308ER-N3	2	3.8	2.8	0.8	11	6.7	13	18	●	●	●	●	MECH...11...
	 3-notch	BDMT 170408ER-N3	2	4.9	4.4	0.8	17	9.6	13	18	●	●	●	●	MECH...17...
	 4-notch	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 ➡ M123

Applicable Inserts

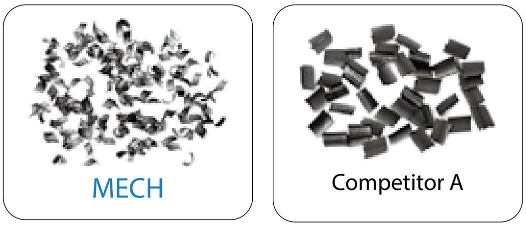
Description	Applicable Inserts					
	2-Notched	+	3-Notched	3-Notched	+	4-Notched
MECH...-11-	BDMT 11T308ER-N2	+	BDMT 11T308ER-N3	-		
MECH...-17-	-			BDMT 170408ER-N3	+	BDMT 170408ER-N4

● : Standard item

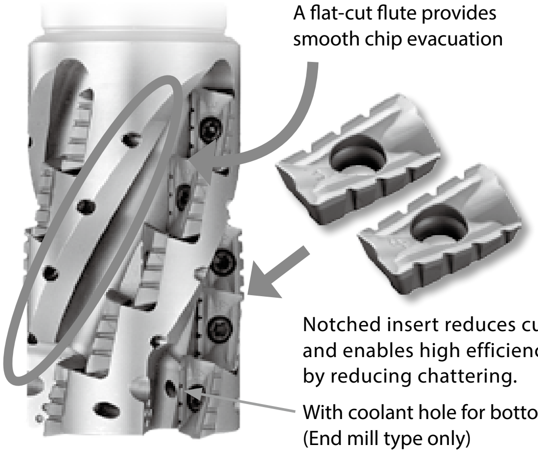
Smooth chip evacuation

Smooth chip evacuation

Notched insert breaks chips into small pieces



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



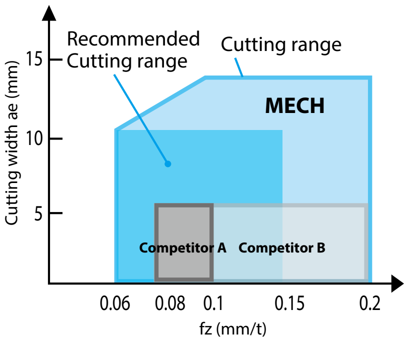
A flat-cut flute provides smooth chip evacuation

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

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

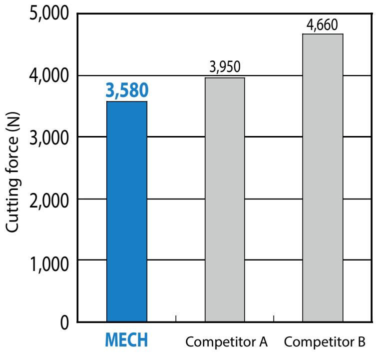
Low cutting force

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)

Number of inserts installed

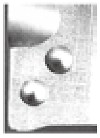
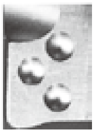
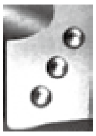
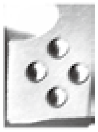
Description		No. of flutes	No. of inserts	No. of inserts			
				BDMT11T308ER-		BDMT170408ER-	
				N2	N3	N3	N4
MECH	025-S25-11-4-2T	2	8	4	4	-	-
	032-S32-11-5-2T		10	5	5		
	032-S32-11-5-4T	4	20	10	10		
	040-S32-11-6-4T		24	12	12		
	040-S42-11-6-4T						
	050-S42-11-7-4T		28	14	14		
	050-S42-11-7-6T	6	42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

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

Caution when installing notched insert

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

<Insert number and toolholder marks>

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

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

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

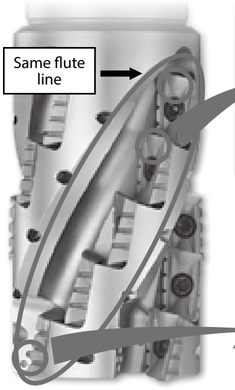


Fig. 1 Same flute line

Fig. 2 Insert no.

Fig. 3 Marks

Recommended cutting conditions (When using a notched insert)

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)			
		MEGACOAT NANO	MEGACOAT NANO EX		
		PR1535	PR1810	PR1825	PR1835
Carbon steel	0.08~**0.1**~0.15	☆ 120~**180**~250	-	★ 120~**180**~250	☆ 120~**180**~250
Alloy steel	0.08~**0.1**~0.15	☆ 100~**160**~220	-	★ 100~**160**~220	☆ 100~**160**~220
Mold steel	0.08~**0.1**~0.15	☆ 80~**140**~180	-	★ 80~**140**~180	☆ 80~**140**~180
Gray cast iron	0.08~**0.15**~0.18	-	★ 120~**180**~250	-	-
Nodular cast iron	0.08~**0.15**~0.18	-	★ 100~**150**~200	-	-
*Titanium alloys	0.08~**0.1**~0.15	☆ 40~**60**~80	-	-	★ 40~**60**~80-

* Machining with coolant is recommended for titanium alloys.

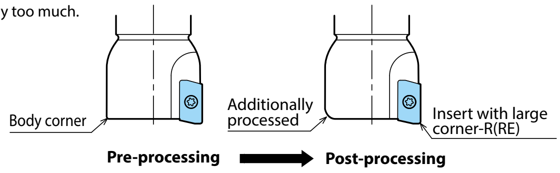
★: 1st Recommendation ☆: 2nd Recommendation

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

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

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

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

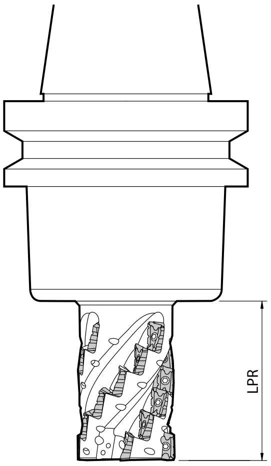


Cutting performance
(Used machine: Machining center equivalent to AC15/18.5kW)

MECH end mill

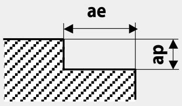
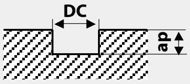
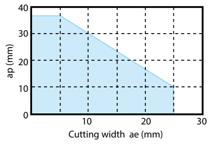
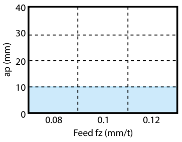
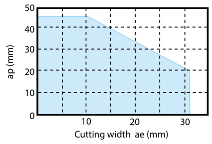
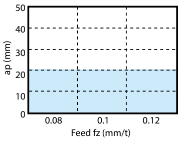
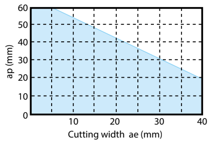
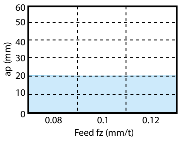
Cutting dia.	Description	Overhang length LPR (mm)
ø25	MECH025-S25-11-4-2T	48
ø32	MECH032-S32-11-5-2T	57
	MECH032-S32-11-5-4T	
ø40	MECH040-S32-11-6-4T	65
	MECH040-S42-11-6-4T	
ø50	MECH050-S42-11-7-4T	76
	MECH050-S42-11-7-6T	
ø40	MECH040-S32-17-4-2T	74
	MECH040-S42-17-4-2T	
ø50	MECH050-S42-17-5-4T	89

Shape

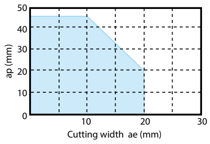
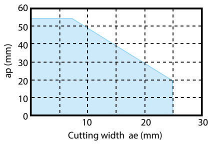
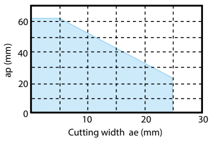
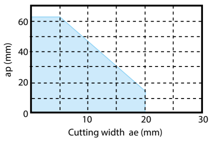
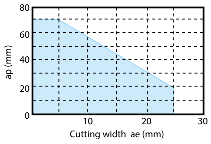


2 flute type

(Workpiece material: S50C)

Description	Shouldering	Slotting
		
	Cutting speed: Vc = 100~180 m/min Feed: fz = 0.08~0.15 mm/t	Cutting speed: Vc = 100~120 m/min Feed: fz = 0.08~0.12 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	

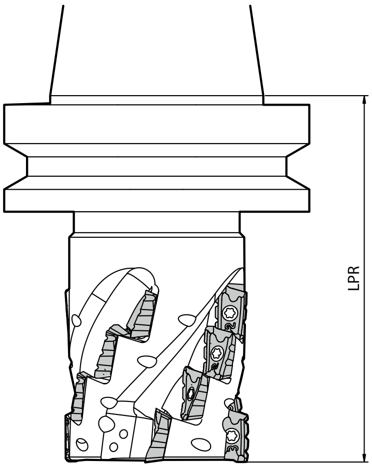
4 flute/6 flute type are not recommended for slotting.

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

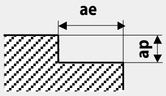
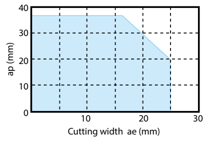
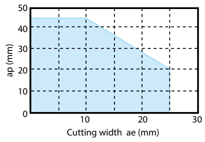
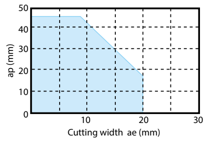
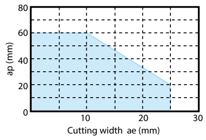
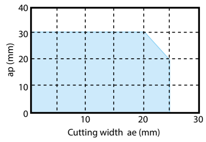
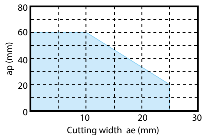
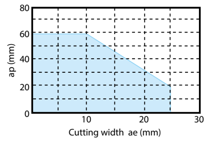
MECH shell mill

Cutting dia.	Description	Overhang length LPR (mm)
ø40	MECH040R-11-4-4T-M	125
ø50	MECH050R-11-5-6T-M	123
	MECH050R-17-2-4T-M	112
	MECH050R-17-4-4T-M	138
ø63	MECH063R-17-3-4T-☐	115
ø80	MECH080R-17-4-6T-☐	130
ø100	MECH100R-17-4-6T-☐	130

Shape



(Workpiece material: S50C)

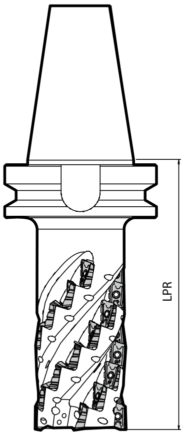
Shouldering			
			
Cutting speed: Vc = 100~180 m/min Feed: fz = 0.08~0.15 mm/t			
MECH040R -11-4-4T-M		MECH063R -17-3-4T-☐	
MECH050R -11-5-6T-M		MECH080R -17-4-6T-☐	
MECH050R -17-2-4T-M		MECH100R -17-4-6T-☐	
MECH050R -17-4-4T-M			

Slotting is not recommended.

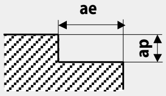
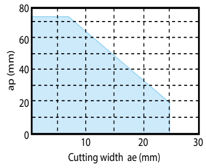
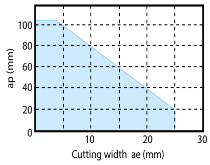
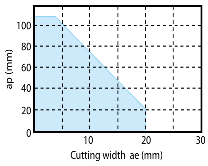
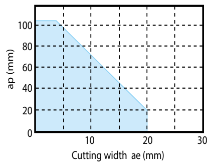
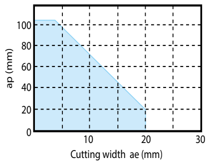
MECH-BT50 (Integral arbor type)
MECH-BT50SA (Head exchangeable type/Integral arbor type)

Cutting dia.	Description	Overhang length LPR (mm)
ø50	MECH050R11-8-4T-BT50 MECH050R11-4T-BT50SA	143
	MECH050R17-7-4T-BT50	173
ø63	MECH063R17-7-4T-BT50 MECH063R17-4T-BT50SA	
ø80	MECH080R17-7-4T-BT50 MECH080R17-4T-BT50SA	
ø100	MECH100R17-7-6T-BT50 MECH100R17-6T-BT50SA	

Shape



(Workpiece material: S50C)

Shouldering			
			
Cutting speed: Vc = 100~180 m/min Feed: fz = 0.08~0.15 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

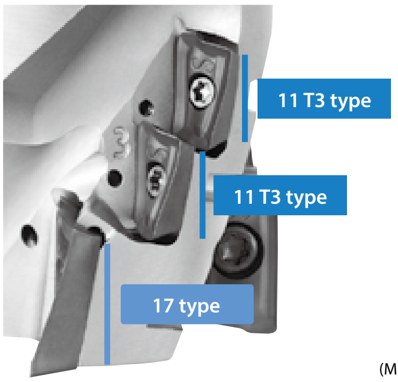
Insert size combination improves roughing capabilities
Maintains stable machining and long tool life

1 Developed to reduce chattering and chip recutting issues

Unique insert combination

The larger bottom inserts are positioned to handle larger cutting forces (excluding ø32)

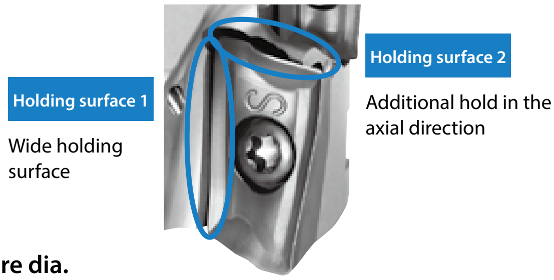
Stable machining with improved fracture resistance



(MECHT50R-1711 type)

New design for higher reliability

Bottom inserts are held in place by double-faced contacts



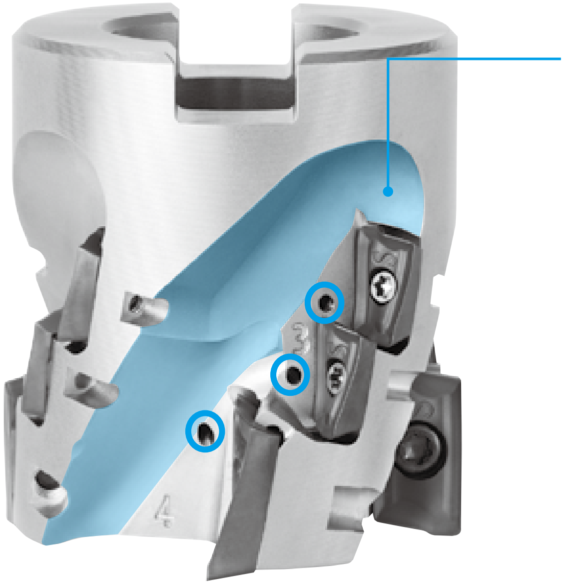
Bore dia.

Larger bore diameter improves fastening power and reduces chattering

ø50 mm cutter with a ø27 mm bore (conventional bore: ø22 mm)

Toolholder hardness Hardened 15% more than conventional holders

Toolholder spec Custom ordering available
Custom number of inserts and stages

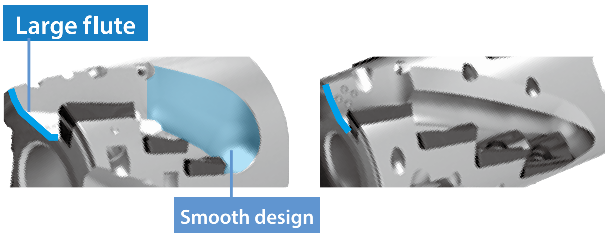


Excellent chip evacuation

New flute design

Large, smooth flutes prevent chip clogging

MECHT (ø50-4T 3 stages) Conventional (ø50-4T 4 stages)



All inserts have coolant holes

Optimized hole diameter controls flow amount and pressure

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

Chips example

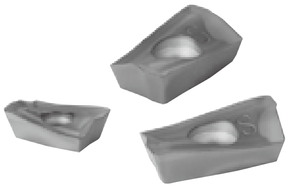
2 Longer tool life with low-resistance JS chipbreaker and tough PVD coating

Low cutting force **JS chipbreaker**

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

Greater toughness **PR1835**

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



MECHT

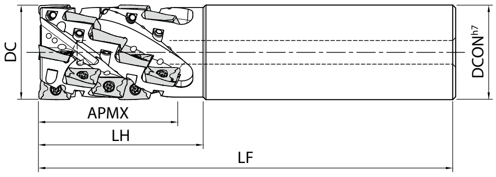


Fig. 1

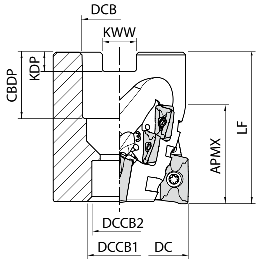


Fig. 2

Toolholder dimensions

Description		Availability	Inserts	Flutes	Stages	Dimension (mm)											A.R. max. (°)	R.R. max. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts ➡ M128	
																					Mounting bolt	Screw	Wrench	Stages	
						DC	DCON	DCB	DCCB1	DCCB2	LF	LH	CBDP	KDP	KWW	APMX								1st	2nd or higher
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	-	27	20	14	55	-	24	7	12.4	34	+19	-7	Yes	2	HH12X40	SB-2555TRG SB-4070TRN	DTM-8 DTM-15	BDMT1704..	BDMT11T308..
	50R-1711-4-5T-M	●	20	5	4						65					43				2	HH12X50				
	63R-17-4-5T-M	●				63					80					60				2	HH12X65	SB-4070TRN	DTM-15	BDMT1704..	BDMT170408..
	80R-17-4-6T-M	●	24	6		80		32	26	17			28	8	14.4					2	HH16X65				

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.

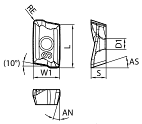
● : Standard item

BDMT

Classification of usage

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

		PR1535	PR1835
P	Carbon steel / Alloy steel		
	Mold and die steel		
M	Austenitic stainless steel		
	Martensitic stainless steel		
	Precipitation hardening stainless steel		
K	Gray cast iron		
	Nodular cast iron		
N	Non-ferrous metals		
S	Heat-resistant alloy		
	Titanium alloy	☆	★
H	Hard materials		

Insert		Description		No. of edges	Dimension (mm)					Angle (°)		Carbide PVD		Applicable toolholder ➡ M127
					S	D1	RE	L	W1	AN	AS	PR1535	PR1835	
	 Low cutting force	BDMT	11T302ER-JS	2	3.8	2.8	0.2	11	6.7	13	18	●	●	MECHT...11...
			11T304ER-JS				0.4					●	●	
			11T308ER-JS				0.8					●	●	
		BDMT	170404ER-JS	2	4.9	4.4	0.4	17	9.6	13	18	●	●	MECHT...17...
			170408ER-JS				0.8					●	●	

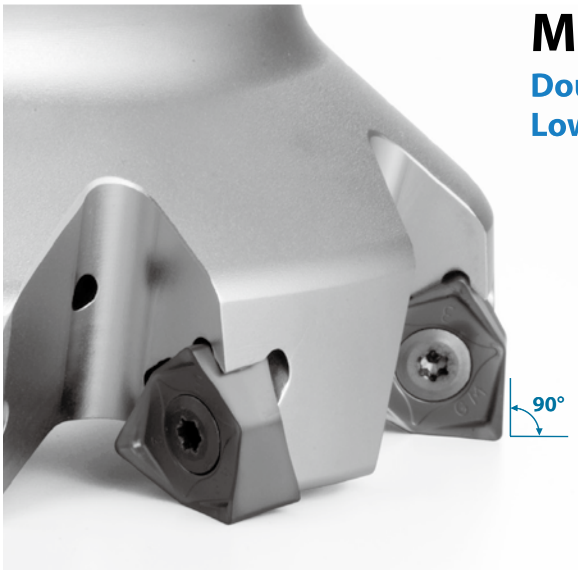
Handed insert shows Right-hand

Recommended cutting conditions ➡ **M129**

● : Standard item

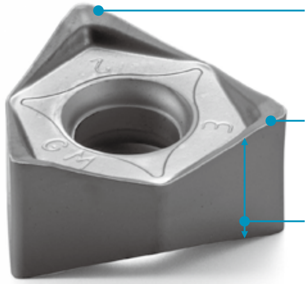
Recommended cutting conditions

Workpiece	Applications	Depth of cut (mm)		fz (mm/t)	Recommended insert grade (Vc: m/min)
					MEGACOAT NANO EX (MEGACOAT NANO)
		ap	ae		PR1835 (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



MFWN

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



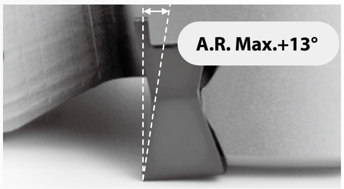
"Large slant edge" design

Economical
Double-sided
6-edge insert

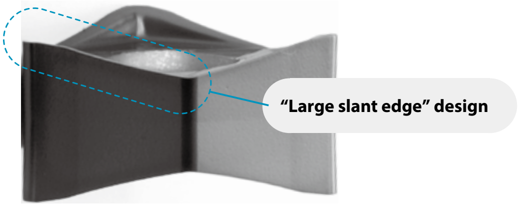
Tough cutting
Edge with
thick edge design

1 Sharp cutting with low cutting force

Sharp cutting by large rake angle



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

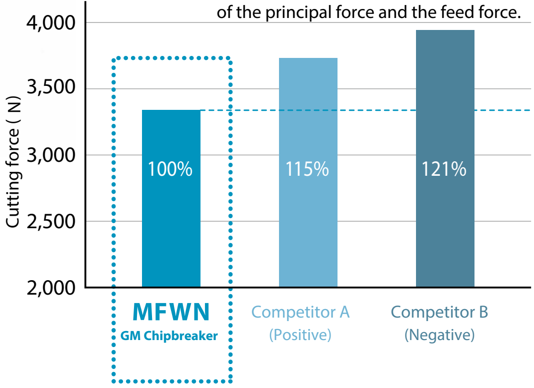


Cutting force comparison
(Internal evaluation)

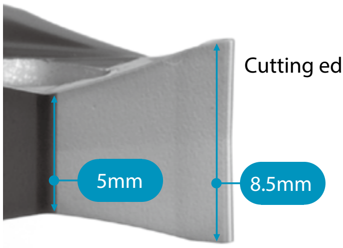
<Cutting conditions>

Vc = 180m/min
ap×ae = 7× 110mm
fz = 0.2mm/t
Workpiece material: S50C
ø125mm Cutter

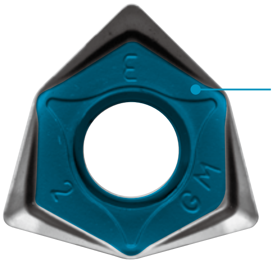
* Cutting force is the resultant force of the principal force and the feed force.



2 Superior fracture resistance with thick edge design



Cutting edge thickness 8.5 ~ 5mm

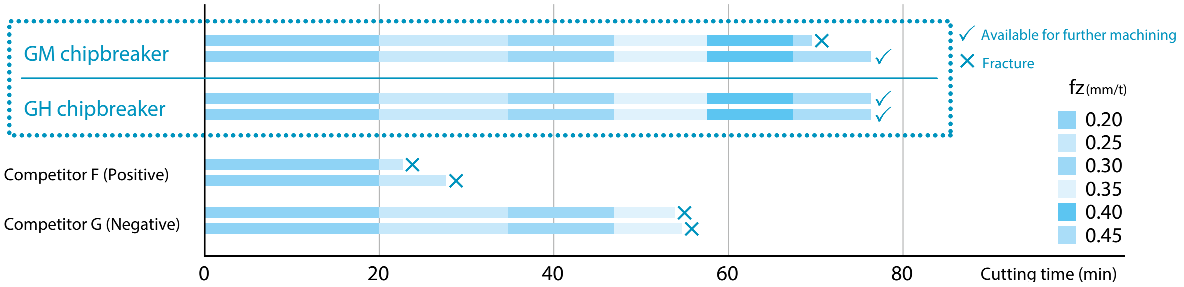


Stable clamping with the optimum insert face design

Fracture resistance comparison (Internal evaluation)

<Cutting conditions>

Workpiece material : SCM440H(38~42HS) Interruption with a slot on the workpiece
Vc = 100m/min ap×ae = 2×100mm fz = 0.2~0.45 mm/t Dry



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)

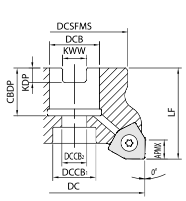


Fig. 1

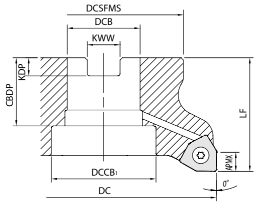


Fig. 2

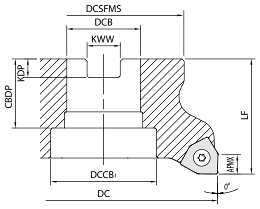


Fig. 3

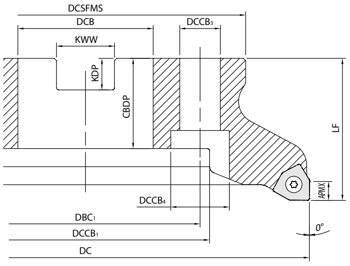


Fig. 4

Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)													A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Applicable inserts ➡ M135
				R		DC	DCSFMS	DCB	DCCB$_1$	DCCB$_2$	DCCB$_3$	DCCB$_4$	DBC$_1$	LF	CBDP	KDP	KWW	APMX							
Metric	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...
			90080R-4T-M	●	4	80	60	27	20	13				50	24	7	12.4			-9		12000	1	1	
			90100R-5T-M	●	5	100	70	32	46	-					30	8	14.4			-8		10500	1.3	2	
			90125R-6T-M	●	6	125	87	40	55					63	33	9	16.4			-7.5		9500	2.5	2	
			90160R-8T-M	●	8	160	102		68		14	20	66.7		32					-7	No	8000	3.8	4	
			90200R-10T-M	●	10	200	142	60	110		18	26	101.6		40	14	25.7					7500	6	4	
			90250R-12T-M	●	12	250																6500	8.4	4	
	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...
			90080R-5T-M	●	5	80	60	27	20	13				50	24	7	12.4			-9		13500	1	1	
			90100R-7T-M	●	7	100	70	32	46	-					30	8	14.4			-8		12000	1.3	2	
			90125R-8T-M	●	8	125	87	40	55					63	33	9	16.4			-7.5		10500	2.6	2	
			90160R-10T-M	●	10	160	102		68		14	20	66.7		32					-7	No	9000	3.9	4	
			90200R-12T-M	●	12	200	142	60	110		18	26	101.6		40	14	25.7					8000	6.3	4	
			90250R-14T-M	●	14	250																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...
			90080R-7T-M	●	7	80	60	27	20	13				50	24	7	12.4			-9		10500	1.1	1	
			90100R-9T-M	●	9	100	70	32	46	-					30	8	14.4			-8		9500	1.3	2	
			90125R-12T-M	●	12	125	87	40	55					63	33	9	16.4			-7.5		8000	2.6	2	
			90160R-14T-M	●	14	160	102		68		14	20	66.7		32					-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

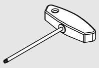
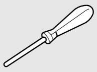
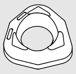
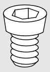
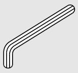
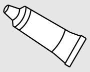
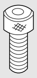
Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)													A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Applicable inserts ➡ M135
			R		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	Yes	12000	1	1	WNEU0806... WNGT0806... WNMU0806...
		90100R-5T	●	5	100	70	31.75	46	-					34	8	12.7			-8		10500	1.3	2	
		90125R-6T	●	6	125	87	38.1	55					63	38	10	15.9			-7.5		9500	2.6	2	
		90160R-8T	●	8	160	102	50.8	72							11	19.1			-7	No	8000	3.9	3	
		90200R-10T	●	10	200	142	47.625	110		18	26	101.6		40	14	25.4					7500	6.3	4	
		90250R-12T	●	12	250																6500	8.7	4	
	Fine pitch	MFWN 90080R-5T	●	5	80	60	25.4	20	13	-	-	-	50	27	6	9.5	8	+13	-9	Yes	13500	1	1	WNEU0806... WNGT0806... WNMU0806...
		90100R-7T	●	7	100	70	31.75	46	-					34	8	12.7			-8		12000	1.4	2	
		90125R-8T	●	8	125	87	38.1	55					63	38	10	15.9			-7.5		10500	2.7	2	
		90160R-10T	●	10	160	102	50.8	72							11	19.1			-7	No	9000	4	3	
		90200R-12T	●	12	200	142	47.625	110		18	26	101.6		40	14	25.4					8000	6.6	4	
		90250R-14T	●	14	250																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	Yes	10500	1.1	1	WNEU0806... WNGT0806... WNMU0806...
		90100R-9T	●	9	100	70	31.75	46	-					34	8	12.7			-8		9500	1.3	2	
		90125R-12T	●	12	125	87	38.1	55					63	38	10	15.9			-7.5		8000	2.7	2	
		90160R-14T	●	14	160	102	50.8	72							11	19.1			-7	No	7000	4.1	3	
		90200R-16T	●	16	200	142	47.625	110		18	26	101.6		40	14	25.4					6500	6.7	4	
		90250R-18T	●	18	250																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.

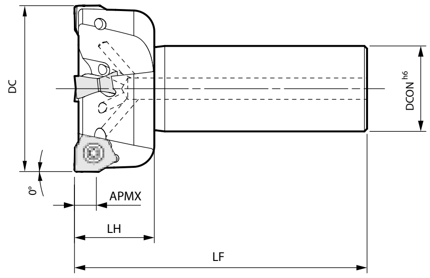
● : Standard item

Spare parts

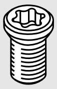
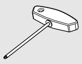
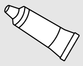
Description			Spare parts							
			Clamp screw	Wrench		Shim	Shim screw	Wrench	Anti-seize compound	Mounting bolt
				TTW	DTM					
										
Coarse pitch	MFWN	90063R-3T-M	SB-50140TR	TTW-15	-	MFWN-90	SPW-7050	LW-5	P-37	HH10X30
	MFWN	90080R-4T(-M)								HH12X35
	MFWN	90100R-5T(-M) ≀ 90250R-12T(-M)	Recommended tightening torque for insert clamp 4.2N•m			Recommended tightening torque for shim clamp 6.0N•m				-
Fine pitch	MFWN	90063R-4T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30
	MFWN	90080R-5T(-M)								HH12X35
	MFWN	90100R-7T(-M) ≀ 90250R-14T(-M)	Recommended tightening torque for insert clamp 4.2N•m							-
Extra fine pitch	MFWN	90063R-5T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30
	MFWN	90080R-7T(-M)	SB-40140TRN	-	DTM-15					HH12X35
	MFWN	90100R-9T(-M) ≀ 90250R-18T		Recommended tightening torque for insert clamp 3.5N•m						-

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

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 ➡ M135
													Screw	Wrench	Anti-seize compound	
		R		DC	DCON	LF	LH	APMX								
MFWN	90050R-S32-3T	●	3	50	32	110	30	8	+13	-12	Yes	18500	SB-50140TR	TTW-15	P-37	WNEU0806...
	90063R-S32-4T	●	4	63						-10		16000	Recommended tightening torque for insert clamp 4.2N·m			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

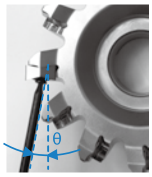


Fig. 2

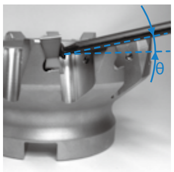


Fig. 3

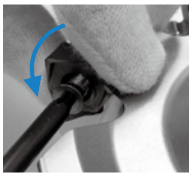


Fig. 4

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.

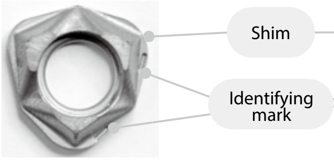


Fig. 1

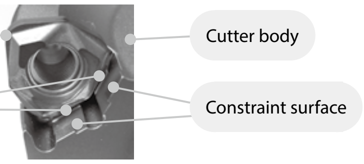


Fig. 2

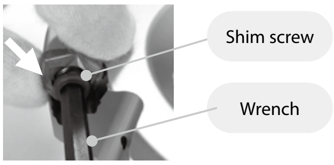


Fig. 3

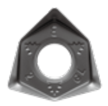
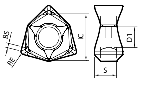
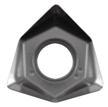
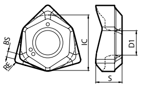
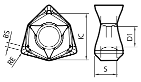
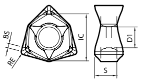
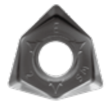
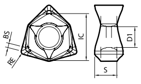
●: Standard item

WNEU/WNMU/WNGT

Classification of usage

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

Work material	CA6535	PDL025	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	GW25	TN620M	
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 ➡ M131 M132 M134
									CVD	DLC	PVD							-	-	
				IC	S	D1	RE	BS	CA6535	PDL025	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	GW25	TN620M	
	 Surface finish oriented	WNEU 080608EN-GL	6	14.02	6.65	6.2	0.8	1.5	●			☐	○	●	●	●	●		●	MFWN90...
	 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 ➡ **M136**

M

Milling

● : Standard item ○ : Will be replaced with a new product ☐ : Expected to be discontinued in September 2026

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	PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (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.

★: 1st Recommendation
☆: 2nd Recommendation

*1 . GL Chipbreaker is recommended for Surface finish oriented milling.

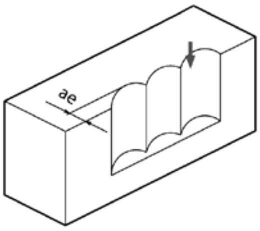
*2. GH Chipbreaker:

	Fine pitch	→ fz≤0.3 (mm/t)
	Extra fine pitch	→ Not recommended

Applicable chipbreaker

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

Vertical milling (Plunging)



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

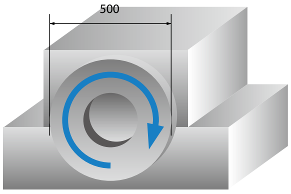
Cutter type and chipbreaker selection

Milling purpose	Cutter type			Chipbreaker				
	Coarse pitch	Fine pitch	Extra fine pitch	GM	SM	GH	GL	AM
General milling for steel and alloy steel		●		●				
Steel and alloy steel (At chattering due to low rigidity machine or poor clamping power)	●				●			
Productivity oriented (Running cost decrease) (ap=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)



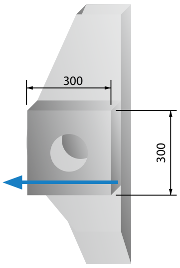
PR1510	Chip evacuation rate = 163cc/min
Competitor A (Positive cutter)	Chip evacuation rate = 68cc/min

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

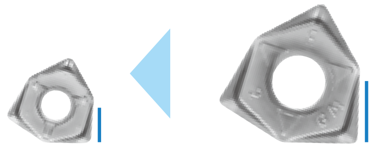
1 Cost-efficient 6-edge inserts

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

MFWN
08 size



D.O.C. ~5 mm

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

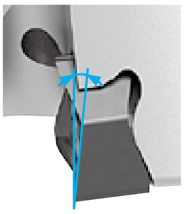
Face Mill ø50
End Mill ø25 ~ ø40

2 Inherits previous MFWN series design elements and features

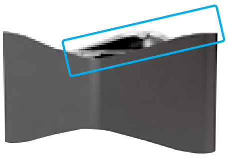
Low cutting force and high chattering-resistance

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

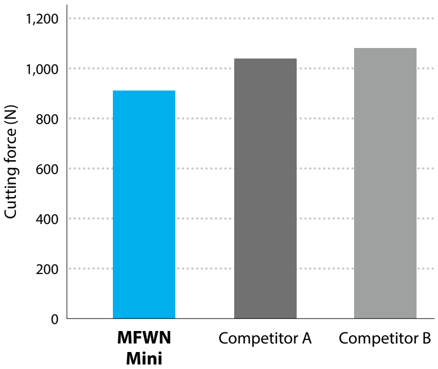
A.R. Max +11°



"Large slant edge" design



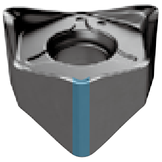
Cutting force comparison (Internal evaluation)



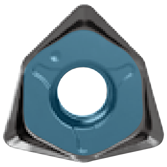
Cutting conditions : Vc = 150 m/min, fz = 0.15 mm/t,
ap × ae = 1.5 ×35 mm, Dry, Cutting dia. ø63, Workpiece material: SCM440

Superior fracture resistance with thick edge design

Stable clamping strength with unique insert face Design

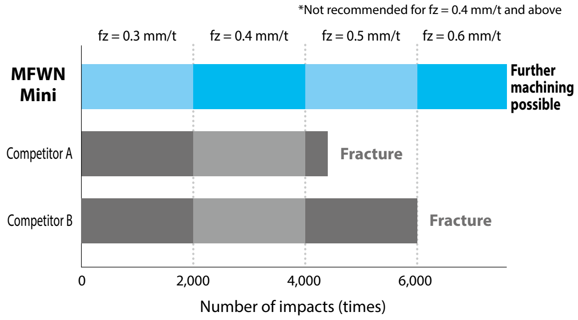


Cutting edge thickness: 5.2 mm
(3.1 mm at the thinnest point)



Optimized seating surface

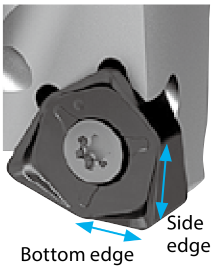
Fracture resistance comparison (Internal evaluation)



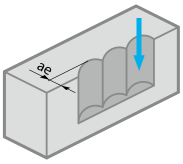
Cutting conditions : Vc = 120 m/min, ap × ae = 1.5 × 30 mm,
Dry, Cutting dia. ø63, Workpiece material: Mold steel 37~43HRC

Neutral inserts for various uses

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



Plunging possible



Left-handed toolholders are also available (Custom order)

MFWN Mini (Face mill)

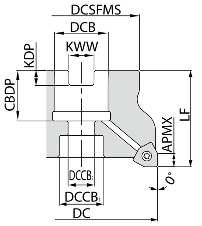


Fig. 1

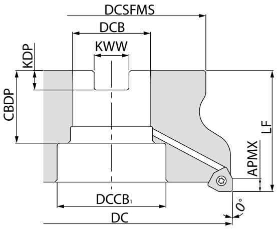


Fig. 2

Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)										A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min⁻¹)	Weight (kg)	Fig.	Applicable inserts ➡ M141
				R		DC	DCSFMS	DCB	DCCB₁	DCCB₂	LF	CBDP	KDP	KWW	APMX							
Metric	Fine pitch	MFWN	90050R-05-5T-M	●	5	50	48	22	17.5	11	40	21	6.3	10.4	5	+11	-9	Yes	13800	0.4	1	WNMU0504...
			90063R-05-6T-M	●	6	63			18								-8		12300	0.5	1	
			90080R-05-7T-M	●	7	80	70	27	20	13	50	24	7	12.4			-7		10900	1.2	1	
			90100R-05-8T-M	●	8	100	78	32	45	-		30	8	14.4					9700	1.6	2	
			90125R-05-11T-M	●	11	125	89	40	55		63	33	9	16.4					8700	2.8	2	
	Extra fine pitch	MFWN	90050R-05-6T-M	●	6	50	48	22	17.5	11	40	21	6.3	10.4	5	+11	-9	Yes	13800	0.4	1	WNMU0504...
			90063R-05-7T-M	●	7	63			18								-8		12300	0.5	1	
			90080R-05-9T-M	●	9	80	70	27	20	13	50	24	7	12.4			-7		10900	1.2	1	
			90100R-05-11T-M	●	11	100	78	32	45	-		30	8	14.4					9700	1.5	2	
			90125R-05-14T-M	●	14	125	89	40	55		63	33	9	16.4					8700	2.7	2	
Bore dia. inch spec	Fine pitch	MFWN	90080R-05-7T	●	7	80	70	25.4	20	13	50	27	6	9.5	5	+11	-7	Yes	10900	1.3	1	WNMU0504...
			90100R-05-8T	●	8	100	78	31.75	45	-		34	8	12.7					9700	1.6	2	
			90125R-05-11T	●	11	125	89	38.1	55		63	38	10	15.9					8700	2.9	2	
	Extra fine pitch	MFWN	90080R-05-9T	●	9	80	70	25.4	20	13	50	27	6	9.5	5	+11	-7	Yes	10900	1.2	1	WNMU0504...
			90100R-05-11T	●	11	100	78	31.75	45	-		34	8	12.7					9700	1.6	2	
			90125R-05-14T	●	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	HH10X30
		90063R-05-6T-M				HH10X30
		90080R-05-7T(-M)	Recommended tightening torque for insert clamp 1.2N•m			HH12X35
		90100R-05-8T(-M)				-
		90125R-05-11T(-M)				
Extra fine pitch	MFWN	90050R-05-6T-M	SB-3065TRP	DTPM-8	P-37	HH10X30
		90063R-05-7T-M				HH10X30
		90080R-05-9T(-M)	Recommended tightening torque for insert clamp 1.2N•m			HH12X35
		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

MFWN Mini (End mill)

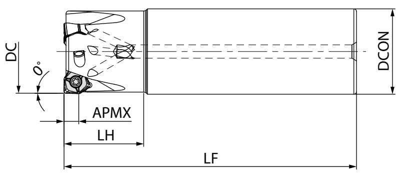


Fig. 1

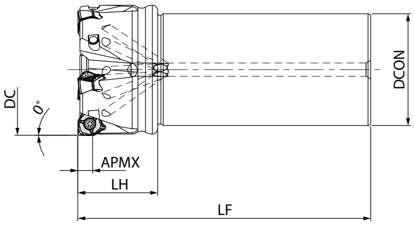
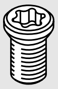
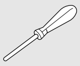
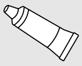


Fig. 2

Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Fig.	Spare parts			Applicable inserts ➡ M141
													Screw	Wrench	Anti-seize compound	
	R		DC	DCON	LF	LH	APMX									
MFWN 90025R-S25-05-2T	●	2	25	25	120	32	5	+11	-14.5	Yes	19500	1	SB-3065TRP	DTPM-8 Recommended tightening torque for insert clamp 1.2N•m	P-37	WNMU0504...
90032R-S32-05-3T	●	3	32	32	130	40			-12		17200	1				
90040R-S32-05-4T	●	4	40		150	50			-10		15400	2				
90050R-S32-05-5T	●	5	50		110	30			-9		13800	2				
90063R-S32-05-6T	●	6	63						-8		12300	2				
90080R-S32-05-7T	●	7	80						-7		10900	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.

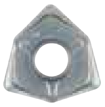
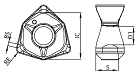
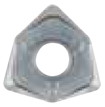
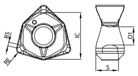
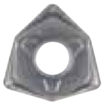
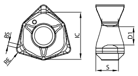
● : Standard item

WNMU

Classification of usage

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

	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
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							Applicable toolholder ➡ **M139** **M140**
				IC	S	D1	RE	BS	PVD							
									PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
	 General purpose	WNMU 050408EN-GM	6	8.8	4.2	3.4	0.8	0.7		□	○	●	●	●	●	MFWN90...-05-...
	 Low cutting force	WNMU 050408EN-SM	6	8.8	4.2	3.4	0.8	0.7		□	○	●	●	●	●	MFWN90...-05-...
	 Tough edge	WNMU 050408EN-GH	6	8.8	4.2	3.4	0.8	0.7	●	□	○	●	●	●	●	MFWN90...-05-...

Recommended cutting conditions ➡ **M142**

●: Standard item ○: Will be replaced with a new product □: Expected to be discontinued in September 2026

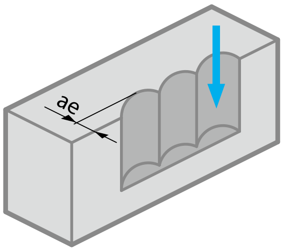
Recommended cutting conditions

Chipbreaker	Workpiece material	fz (mm/t)	Recommended insert grades (Vc : m/min)			
			MEGACOAT NANO EX (MEGACOAT NANO)			MEGACOAT HARD
			PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S
GM	Carbon steel	0.1 – **0.2** – 0.25	☆ 120 – **180** – 250	★ 120 – **180** – 250	–	–
	Alloy steel		☆ 100 – **160** – 220	★ 100 – **160** – 220	–	–
	Mold steel	0.1 – **0.15** – 0.2	☆ 80 – **140** – 180	★ 80 – **140** – 180	–	–
	Stainless steel (Austenitic related)	0.1 – **0.15** – 0.2	☆ 100 – **160** – 200	☆ 100 – **160** – 200	–	–
	Stainless steel (Martensitic related)		☆ 150 – **200** – 250	–	–	–
	Stainless steel (Precipitation Hardening)		★ 90 – **120** – 150	–	–	–
	Gray cast iron	0.1 – **0.2** – 0.25	–	–	★ 120 – **180** – 250	–
	Nodular cast iron	0.1 – **0.15** – 0.2	–	–	★ 100 – **150** – 200	–
	Ni-base heat-resistant alloys	0.1 – **0.12** – 0.16	☆ 20 – **30** – 50	–	–	–
SM	Carbon steel	0.06 – **0.12** – 0.2	☆ 120 – **180** – 250	☆ 120 – **180** – 250	–	–
	Alloy steel		☆ 100 – **160** – 220	☆ 100 – **160** – 220	–	–
	Mold steel	0.06 – **0.08** – 0.15	☆ 80 – **140** – 180	☆ 80 – **140** – 180	–	–
	Stainless steel (Austenitic related)	0.06 – **0.12** – 0.2	★ 100 – **160** – 200	☆ 100 – **160** – 200	–	–
	Stainless steel (Martensitic related)		☆ 150 – **200** – 250	–	–	–
	Stainless steel (Precipitation Hardening)		☆ 90 – **120** – 150	–	–	–
	Gray cast iron	0.06 – **0.12** – 0.2	–	–	☆ 120 – **180** – 250	–
	Nodular cast iron	0.06 – **0.08** – 0.15	–	–	☆ 100 – **150** – 200	–
	Ni-base heat-resistant alloys	0.06 – **0.08** – 0.15	★ 20 – **30** – 50	–	–	–
	Titanium alloys	0.06 – **0.08** – 0.15	★ 40 – **60** – 80	–	☆ 40 – **60** – 80	–
GH	Carbon steel	0.15 – **0.2** – 0.3	☆ 120 – **180** – 250	☆ 120 – **180** – 250	–	–
	Alloy steel		☆ 100 – **160** – 220	☆ 120 – **160** – 220	–	–
	Mold steel	0.15 – **0.2** – 0.25	☆ 80 – **140** – 180	☆ 80 – **140** – 180	–	–
	Stainless steel (Austenitic related)	0.15 – **0.2** – 0.25	☆ 100 – **160** – 200	☆ 100 – **160** – 200	–	–
	Stainless steel (Martensitic related)		☆ 150 – **200** – 250	–	–	–
	Stainless steel (Precipitation Hardening)		☆ 90 – **120** – 150	–	–	–
	Gray cast iron	0.15 – **0.2** – 0.3	–	☆ 120 – **180** – 250	☆ 120 – **180** – 250	–
	Nodular cast iron	0.15 – **0.2** – 0.25	–	☆ 100 – **150** – 200	☆ 100 – **150** – 200	–
	Ni-base heat-resistant alloys	0.1 – **0.15** – 0.2	☆ 20 – **30** – 50	–	–	–
	Hardened Material (60 HRC or less)	0.05 – **0.08** – 0.16	–	–	–	★ 50 – **80** – 100

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

★ : 1st Recommendation
☆ : 2nd Recommendation

Vertical milling (Plunging)



Available for vertical milling (Plunging)

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

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

Applicable chipbreaker

Cutter type	Chipbreaker		
	GM	SM	GH
Fine pitch	✓	✓	✓
Extra fine pitch	✓	✓	(Feed rate is recommended fz=0.2 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.

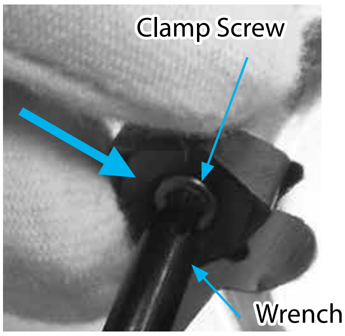


Fig. 1

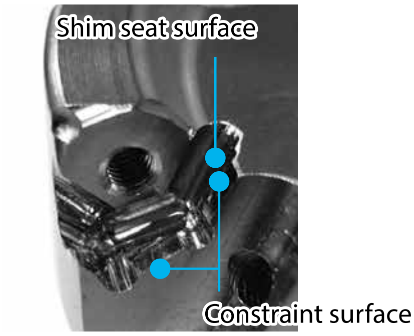


Fig. 2

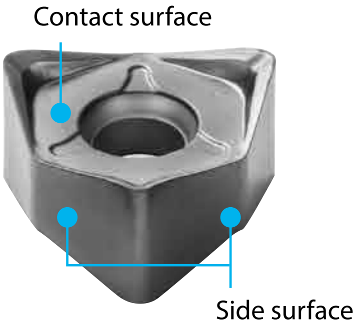


Fig. 3

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

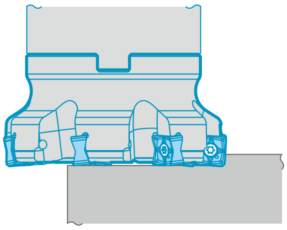
Applicable to various types of machining with product lineup from ø32

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

Cost reduction in approximately 90˚corner cutting

Shoulder roughing

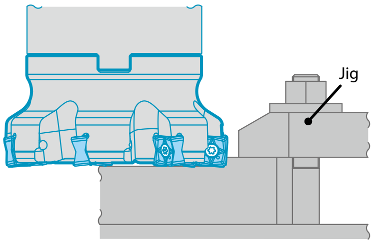
Cost reduction by switching from 90˚ cutter with positive inserts



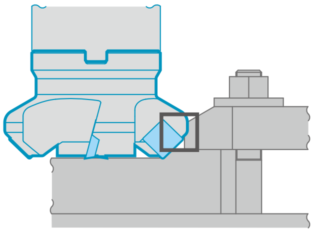
See page **M149** for unmachined corner portion

Facing without interfering with fixtures

MFSN88



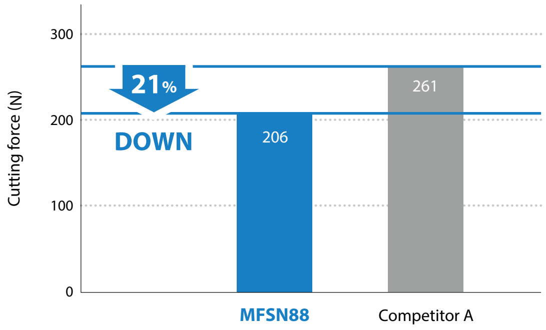
Conventional 45˚ cutter



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

3 Extended tool life by MEGACOAT NANO EX

Insert grade and chipbreaker lineup for various machining application

1st Recommendation
(General purpose)
GM chipbreaker

Tough edge

GH chipbreaker

For stainless steel

SM chipbreaker

MFSN88 (Face mill)

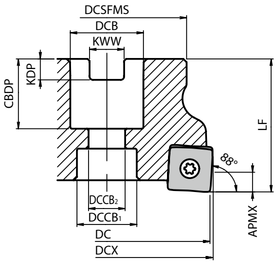


Fig. 1

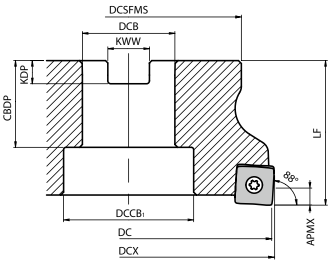


Fig. 2

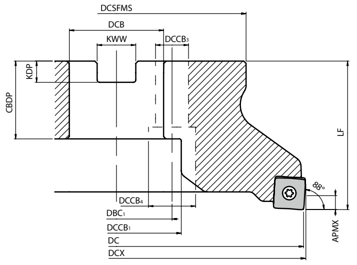


Fig. 3

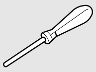
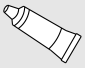
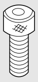
Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)													A.R. max. (°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts ➡ M148
				R		DC	DCX	DCSFMS	DCB	DCCB$_1$	DCCB$_2$	DCCB$_3$	DCCB$_4$	DBC$_1$	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...
			88063R-5T-M-G	●	5	63	65			18										-10		0.4	1	
			88080R-6T-M-G	●	6	80	82	70	27	20	13				50	24	7	12.4		-9		1.1	1	
			88100R-7T-M-G	●	7	100	102	78	32	45	-					30	8	14.4		-8		1.4	2	
			88125R-9T-M-G	●	9	125	127	89	40	55					63	33	9	16.4		-7.5		2.4	2	
			88160R-11T-M-G	●	11	160	162	110				14	20	66.7						-7		4.2	3	
	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...
			88063R-7T-M-G	●	7	63	65			18										-10		0.4	1	
			88080R-9T-M-G	●	9	80	82	70	27	20	13				50	24	7	12.4		-9		1.1	1	
			88100R-11T-M-G	●	11	100	102	78	32	45	-					30	8	14.4		-8		1.4	2	
			88125R-13T-M-G	●	13	125	127	89	40	55					63	33	9	16.4		-7.5		2.5	2	
			88160R-15T-M-G	●	15	160	162	110				14	20	66.7						-7		4.3	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...
			88100R-7T-G	●	7	100	102	78	31.75	45	-					34	8	12.7		-8		1.5	2	
			88125R-9T-G	●	9	125	127	89	38.1	55					63	38	10	15.9		-7.5		2.5	2	
			88160R-11T-G	●	11	160	162	110	50.8	70							11	19.1		-7		4.1	2	
	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...
			88100R-11T-G	●	11	100	102	78	31.75	45	-					34	8	12.7		-8		1.5	2	
			88125R-13T-G	●	13	125	127	89	38.1	55					63	38	10	15.9		-7.5		2.6	2	
			88160R-15T-G	●	15	160	162	110	50.8	70							11	19.1		-7		4.3	2	

APMX : 5 mm (GM, SM, GH chipbreakers, Coated cabide), 3 mm (GM chipbreaker, Cermet)

● : Standard item

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 Recommended tightening torque for insert clamp 3.5N•m	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 Recommended tightening torque for insert clamp 3.5N•m	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.

MFSN88 (End mill)

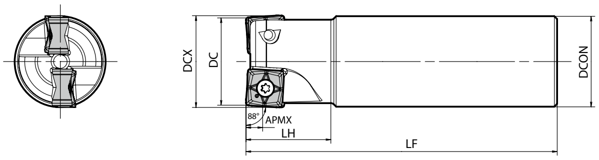


Fig. 1

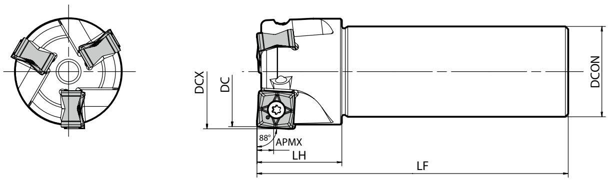
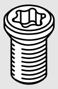
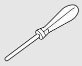
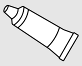


Fig. 2

Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts ➡ **M148**
	R		DC	DCX	DCON	LF	LH					Screw	Wrench	Anti-seize compound	
															
MFSN 88032R-S32-2T-G	●	2	32	34	32	110	30	+10	-15.5	No	1	SB-4090TRP	DTPM-15	P-37	SNMU1305...
88040R-S32-3T-G	●	3	40	42					-13		2				

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

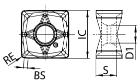
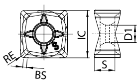
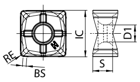
● : Standard item

SNMU

Classification of usage

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

Classification of usage	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	TN620M	
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)					Carbide							Cermet	Applicable toolholder ➡ M145 M147
								PVD							-	
			IC	S	D1	RE	BS	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	TN620M	
	 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...

Recommended cutting conditions ➡ **M149**

● : Standard item ○ : Will be replaced with a new product ☐ : Expected to be discontinued in September 2026

Recommended cutting conditions

Coated carbide

Chipbreaker	Workpiece material	Feed (fz: mm/t)	Recommended insert grades (Vc: m/min)			
			MEGACOAT (PVD Coated carbide)			
			PR1835 (PR1535)	PR1825 (PR1525)	PR1810 (PR1510)	PR015S
GM	Carbon steel	0.1~**0.2**~0.3	☆ 120~**180**~250	★ 120~**180**~250	-	-
	Alloy steel	0.1~**0.2**~0.3	☆ 100~**160**~220	★ 100~**160**~220	-	-
	Mold steel	0.1~**0.15**~0.25	★ 80~**140**~180	★ 80~**140**~180	-	-
	Stainless steel (Austenitic related)	0.1~**0.15**~0.25	☆ 100~**150**~200	☆ 100~**150**~200	-	-
	Stainless steel (Martensitic related)	0.1~**0.15**~0.25	☆ 100~**150**~200	-	-	-
	Stainless steel (Precipitation hardening)	0.1~**0.15**~0.25	★ 90~**120**~150	-	-	-
	Gray cast iron	0.1~**0.2**~0.3	-	-	★ 120~**180**~250	-
	Nodular cast iron	0.1~**0.15**~0.25	-	-	★ 100~**150**~200	-
	Ni-base heat-resistant alloys	0.1~**0.12**~0.2	☆ 20~**30**~50	-	-	-
SM	Carbon steel	0.06~**0.12**~0.2	-	☆ 120~**180**~250	-	-
	Alloy steel	0.06~**0.12**~0.2	-	☆ 100~**160**~220	-	-
	Mold steel	0.06~**0.08**~0.15	-	☆ 80~**140**~180	-	-
	Stainless steel (Austenitic related)	0.06~**0.12**~0.2	★ 100~**150**~200	☆ 100~**150**~200	-	-
	Stainless steel (Martensitic related)	0.06~**0.12**~0.2	★ 100~**150**~200	-	-	-
	Stainless steel (Precipitation hardening)	0.06~**0.12**~0.2	☆ 90~**120**~150	-	-	-
	Gray cast iron	0.06~**0.12**~0.2	-	-	☆ 120~**180**~250	-
	Nodular cast iron	0.06~**0.1**~0.15	-	-	☆ 100~**150**~200	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.15	★ 20~**30**~50	-	-	-
	Titanium alloys	0.06~**0.08**~0.15	★ 40~**60**~80	-	-	-
GH	Carbon steel	0.15~**0.25**~0.35	-	☆ 120~**180**~250	-	-
	Alloy steel	0.15~**0.25**~0.35	-	☆ 100~**160**~220	-	-
	Mold steel	0.1~**0.2**~0.3	-	☆ 80~**140**~180	-	-
	Gray cast iron	0.15~**0.25**~0.35	-	-	☆ 120~**180**~250	-
	Nodular cast iron	0.1~**0.2**~0.3	-	-	☆ 100~**150**~200	-
	Hard materials (60HRC or less)	0.1~**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

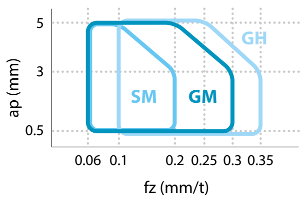
Cermet

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

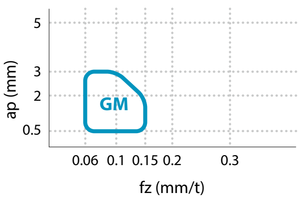
★: 1st Recommendation

Applicable chipbreaker range

Coated carbide



Cermet



Applicable chipbreaker

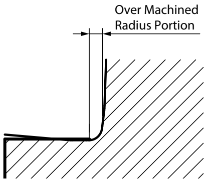
Cutter type	Chipbreaker		
	GM	SM	GH
Fine pitch	✓	✓	✓
Extra fine pitch	✓	✓	△ (Feed rate is recommended fz=0.2mm/t or under)

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



Face mills for heavy milling

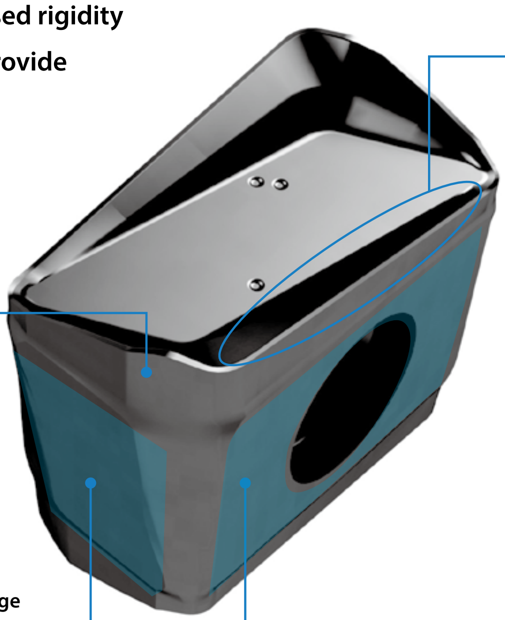
MFLN

Tough 4-edge tangencial 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

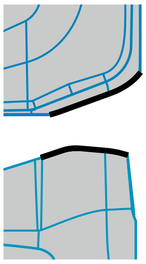


Corner chamfer

only available on MFLN90

Both general corner-R type and chamfered corner type available

Prevents chattering and insert fracturing



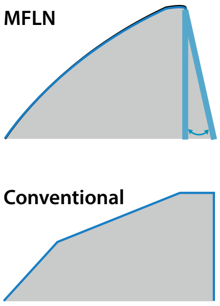
Convex cutting edge ridge

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

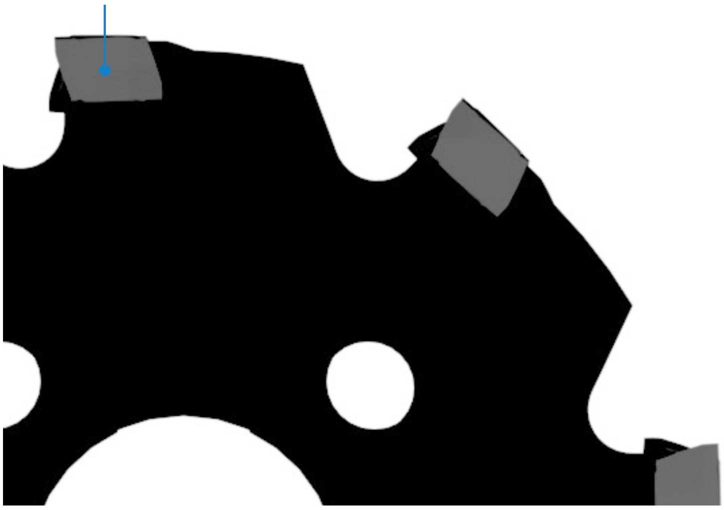
Cross-section view of cutting edge



Wide flat mounting surface

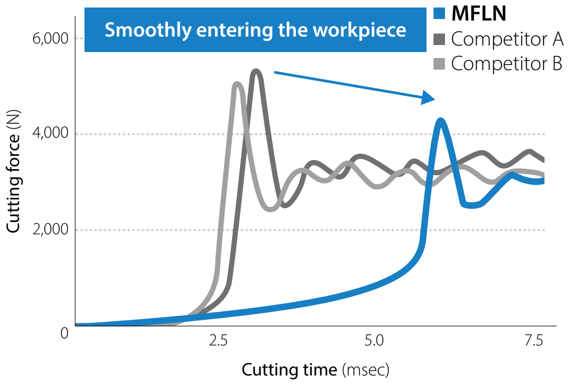
Hold an insert firmly in heavy milling

Tangentially mounted inserts increase rigidity



Cutting forces when entering the workpiece (internal evaluation)

MFLN90: Insert - chamfered corner type

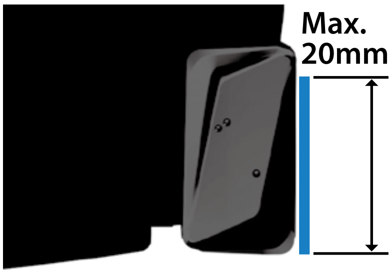


Cutting conditions: Vc = 150 m/min, ap × ae = 5 × 75 mm, fz = 0.3 mm/t
ø125 (1 insert), dry, workpiece: S50C

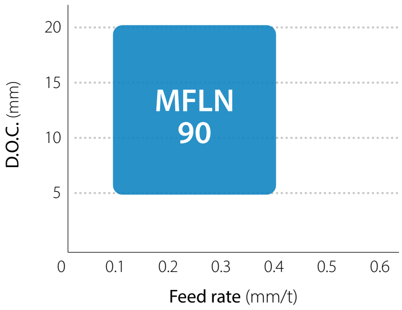
2 Large D.O.C. and high feed rates

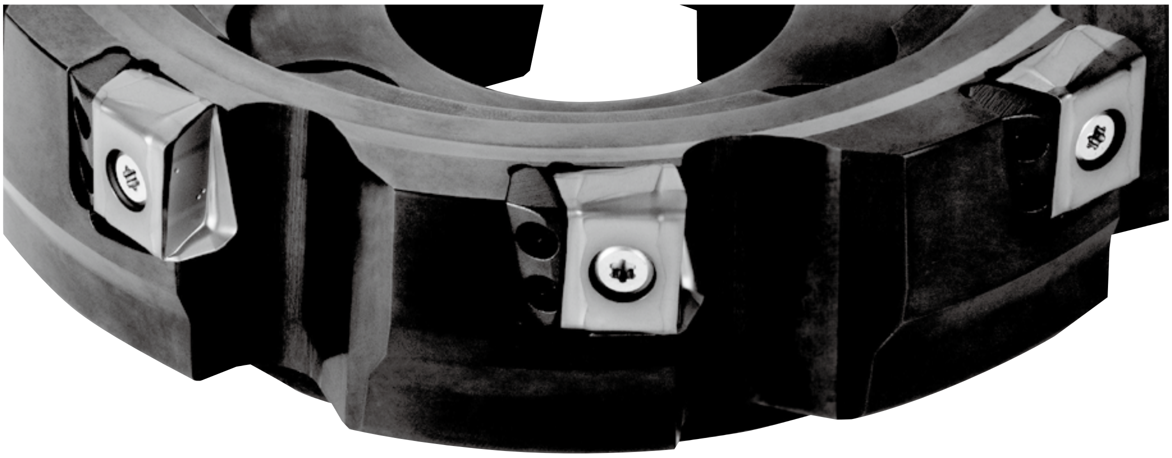
MFLN90

Cutting edge angle 90°



Applicable range



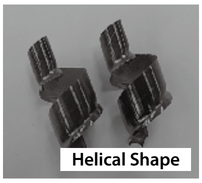


Chip comparison (Internal evaluation)

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

MFLN90 **Stable**

fz = 0.3 mm/t



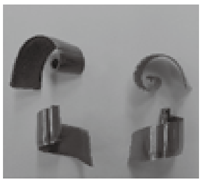
fz = 0.4 mm/t

Competitor A **Unstable**

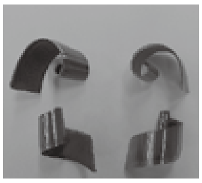
fz = 0.3 mm/t

fz = 0.4 mm/t

Competitor B **Unstable**



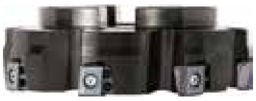
fz = 0.3 mm/t



fz = 0.4 mm/t

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

MFLN90



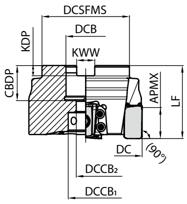


Fig. 1

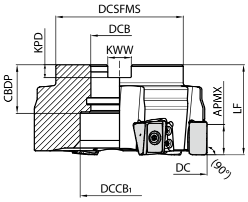


Fig. 2

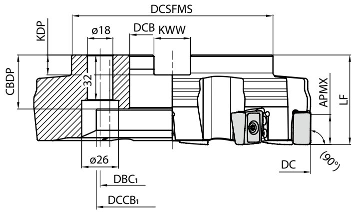


Fig. 3

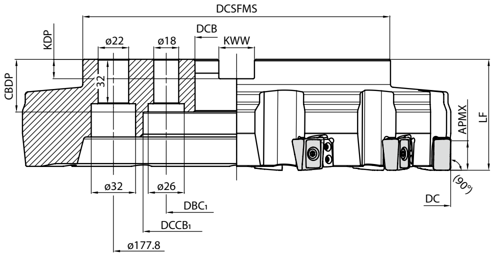


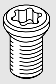
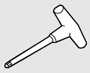
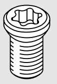
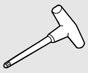
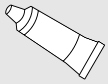
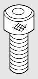
Fig. 4

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)											A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Applicable inserts ➡ M153
			R		DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	DBC_1	LF	CBDP	KDP	KWW	APMX							
Metric	MFLN	90080R-4T-M	●	4	80	60	27	24	13	-	50	24	7	12.4	20	+4.5	-16.5	Yes	5970	1	1	LOGU221616ER-GM LOGU2216PAER-GM
		90100R-4T-M	●		100	70	32	45	-			30	8	14.4			-14.5		4780	1.5	2	
		90125R-6T-M	●	6	125	89	40	55			63	33	9	16.4			-13.5	No	3820	2.9	2	
		90160R-7T-M	●	7	160	110		90		66.7									2990	4.5	3	
		90200R-8T-M	●	8	200	142	60	132		101.6		38	14	25.7					2390	6.9	3	
		90250R-10T-M	●	10	250			172									-13		1910	10.3	3	
		90315R-12T-M	MTO	12	315	222		205			80								1520	20.9	4	
Bore dia. inch spec	MFLN	90080R-4T	●	4	80	60	25.4	24	13	-	50	27	6	9.5	20	+4.5	-16.5	Yes	5970	1	1	LOGU221616ER-GM LOGU2216PAER-GM
		90100R-4T	●		100	70	31.75	45	-			34	8	12.7			-14.5		4780	1.6	2	
		90125R-6T	●	6	125	89	38.1	55			63	38	10	15.9			-13.5	No	3820	3	2	
		90160R-7T	●	7	160	110	50.8	90					11	19.1					2990	4.6	2	
		90200R-8T	●	8	200	142	47.625	132		101.6			14	25.4					2390	7.2	3	
		90250R-10T	●	10	250			172									-13		1910	10.5	3	
		90315R-12T	MTO	12	315	222		205			80								1520	21.8	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.

Spare parts

Description		Parts						
		Clamp screw	Wrench	Shim	Clamp screw	Wrench	Anti-seize compound	Arbor bolt
								
MFLN	○○080R-4T(-M)	SB-60200TRP	TTP-20	MAP-2216	SB-40140TR	DTM-15	P-37	HH12X35
	○○100R-4T(-M) ~ ○○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.

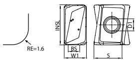
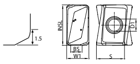
● : Standard item MTO : Made to order

LOGU

Classification of usage

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

	PR1525	PR1535	PR1825	PR1835	
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)						Carbide				Applicable toolholder ➡ M152 M44 M45
									PVD				
			S	D1	RE	W1	INSL	BS	PR1525	PR1535	PR1825	PR1835	
	 Corner-R	LOGU 221616ER-GM	16.6	6.8	1.6	12.5	22.8	6.3	○	●	●	●	MFLN90... MFLN45... MFLN70...
	 Corner Chamfer	LOGU 2216PAER-GM	16.9	6.8	-	12.5	22.8	4.8	○	●	●	●	MFLN90...

Recommended cutting conditions ➡ M154

About applicable insert

	LOGU221616ER-GM (Corner-R)	LOGU2216PAER-GM (Corner chamfer)
MFLN 90	✓	✓

● : Standard item ○ : Will be replaced with a new product

Recommended cutting conditions

	Workpiece material	D.O.C. (mm)		fz: mm/t	Recommended insert grades (Vc: m/min)	
					MEGACOAT NANO EX (MEGACOAT NANO)	
		Width of cut ≦0.5×DC	Width of cut >0.5×DC		PR1825 (PR1525)	PR1835 (PR1535)
MFLN 90	Carbon steel	~18	~15	0.1 – **0.2** – 0.4	★ 100 – **150** – 180	☆ 80 – **120** – 150
	Alloy steel				★ 100 – **150** – 180	☆ 80 – **120** – 150
	Mold steel				★ 80 – **120** – 150	☆ 70 – **100** – 120
	Gray cast iron	~20	~18	0.1 – **0.2** – 0.4	★ 100 – **150** – 180	☆ 80 – **120** – 150
	Nodular cast iron				★ 100 – **150** – 180	☆ 80 – **120** – 150

★ : 1st recommendation ☆ : 2nd recommendation

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.

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.

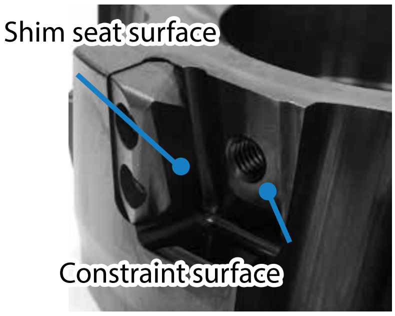


Fig.1

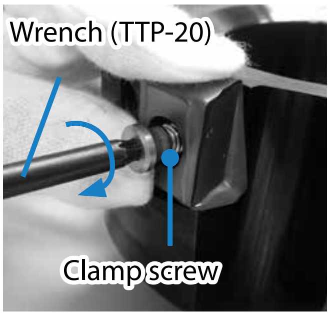


Fig.2

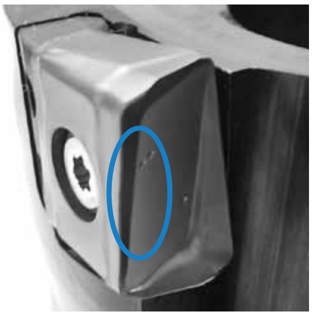


Fig.3

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.

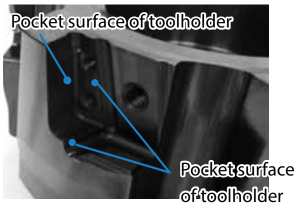


Fig.1

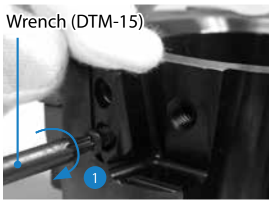


Fig.2

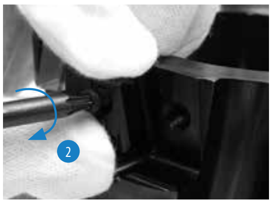
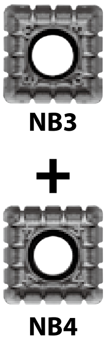


Fig.3

Fig.4

Face mill for heavy milling MSRS90

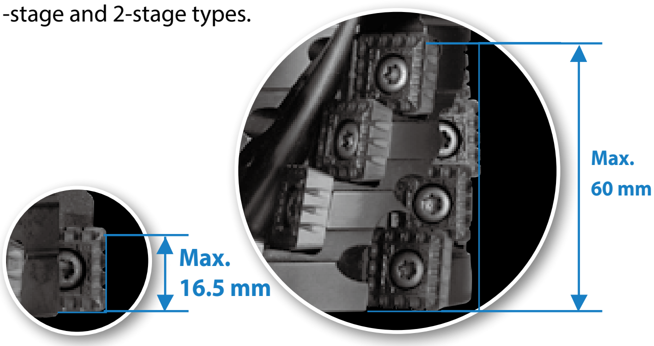


High efficiency, low cutting force and stable machining without chattering
Neutral and corner-R insert

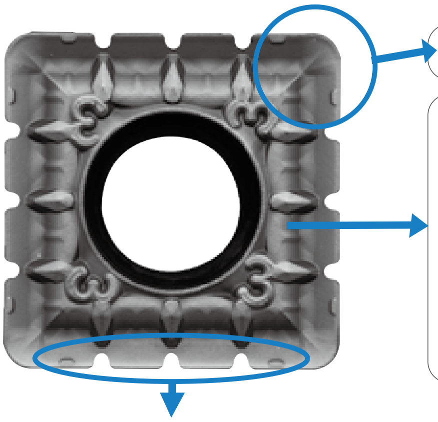
Applicable to shouldering (Cutting edge angle: 90˚),
high feed milling (Cutting edge angle: 30˚), plunging, and side cutter.

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.

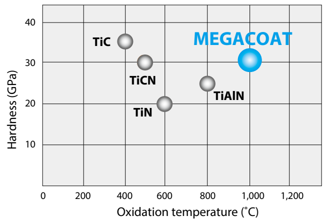


Custom-ordered milling cutter with high performance notched neutral inserts provides various applications



Neutral insert with corner-R is available to various applications

Long tool life: MEGACOAT

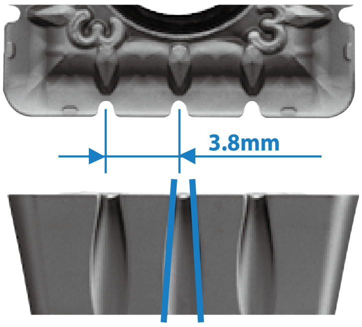


High hardness and high oxidation resistance long tool life: MEGACOAT

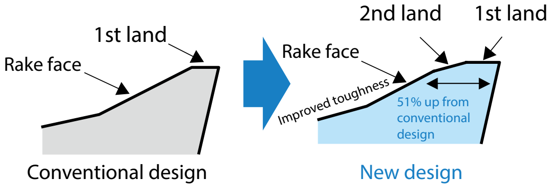
Notched insert SPMT180616EN

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

The second land near the cutting edge improves edge strength.



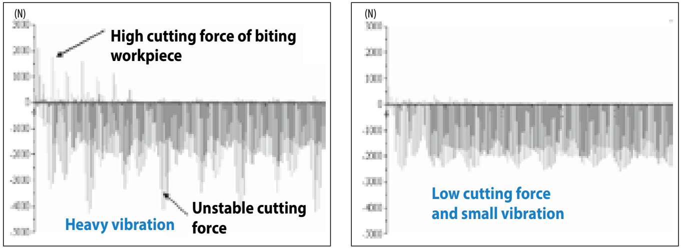
For neutral (Right/Left) hand
Applicable for various cutting edge angle.
Cutting edge length: 18mm



Edge preparation

Low cutting force (Notched insert benefit)

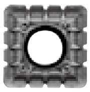
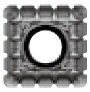
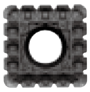
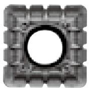
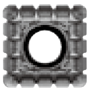
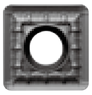
Cutting force comparison (Internal evaluation)



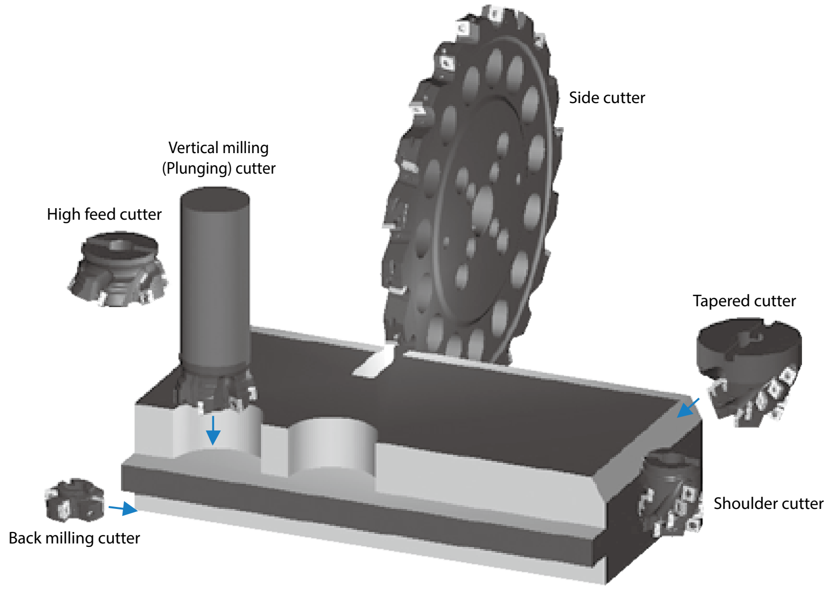
Competitor A **MSRS90**

Notched insert realizes lower cutting force and smaller vibration

Applicable inserts: Available for various applications

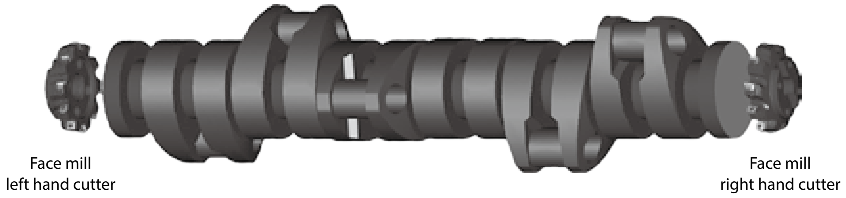
Applications	Chipbreaker selection	3-notched		4-notched		Without notch
General purpose	Standard	 NB3	+	 NB4		
Low cutting force	Low cutting force	 NB3P	+	 NB4P		
Edge strength oriented	Without notch (Usable with notched inserts)	( NB3	or	) NB4	+	

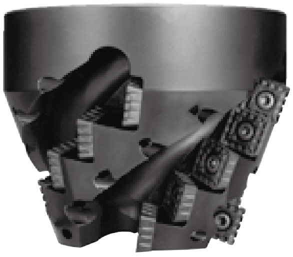
Various expansive possibilities (Custom-ordered and standard milling cutter)



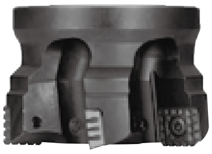
The custom-ordered milling cutter can be customized for your requirements such as diameter, Cutting edge angle, number of insert stages.

Shaft length determination

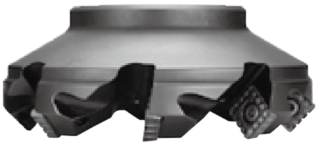




Tapered cutter



Vertical milling (Plunging) cutter



45° Face mill

High feed cutter

Shoulder cutter

MSRS90

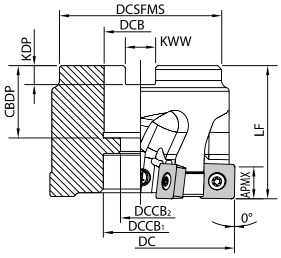


Fig. 1

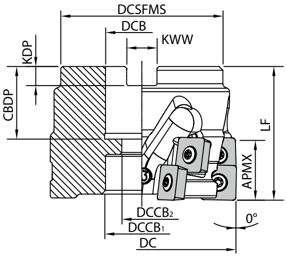


Fig. 2

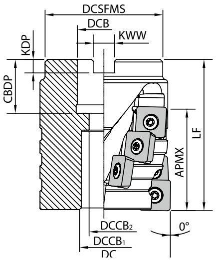


Fig. 3

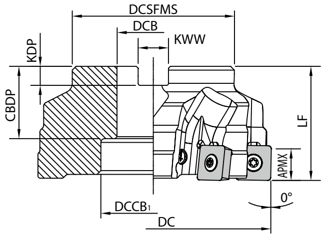


Fig. 4

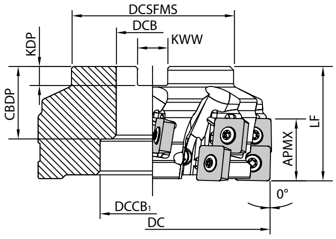


Fig. 5

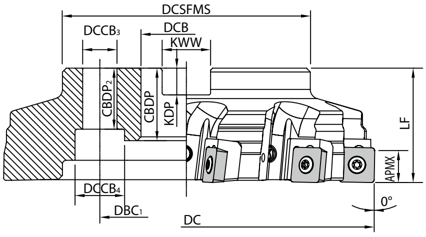


Fig. 6

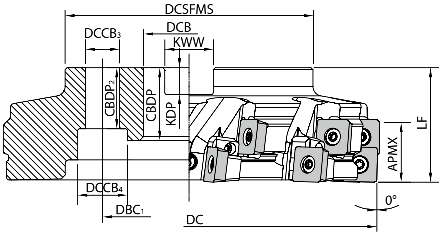


Fig. 7

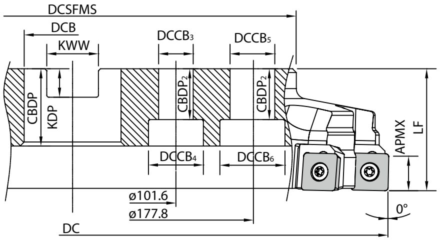


Fig. 8

Toolholder dimensions

Description			Availability	Inserts	Flutes	Stages	Dimension (mm)																A.R. (°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts ➡ **M160**
			R				DC	DCSFMS	DCB	DCCB$_1$	DCCB$_2$	DCCB$_3$	DCCB$_4$	DCCB$_5$	DCCB$_6$	DBC$_1$	LF	CBDP	CBDP$_2$	KDP	KWW	APMX						
Metric	MSRS	90080R-1-4T-M	●	4	4	1	80	70	27	20	13	-	-	-	-	-	60	24	-	7	12.4	16.5	+7	-10	No	1.3	1	SPMT180616EN-...
		90080R-2-4T-M	●	8		2																31				1.1	2	
		90080R-4-4T-M	●	16		4											85					60				1.4	3	
		90100R-1-6T-M	●	6	6	1	100	85	32	45	-						70	30		8	14.4	16.5				2.2	1	
		90100R-2-6T-M	●	12		2																31				2	2	
		90100R-4-6T-M	MTO	24		4											90					60				3.1	3	
		90125R-1-8T-M	●	8	8	1	125		40	55							60	33		9	16.4	16.5				2.6	4	
		90125R-2-8T-M	MTO	16		2																31				2.4	5	
		90160R-1-8T-M	●	8		1	160	110				14	20			66.7			28			16.5				4.2	6	
		90160R-2-8T-M	MTO	16		2																31				4	7	
		90200R-1-10T-M	●	10	10	1	200	140	60	-		18	26			101.6		40	32	14	25.7	16.5				6.7	6	
		90200R-2-10T-M	MTO	20		2																31				6.6	7	
		90250R-1-12T-M	●	12	12	1	250															16.5				12.6	6	
		90250R-2-12T-M	MTO	24		2																31				12.5	7	
		90315R-1-14T-M	●	14	14	1	315	220				17	27	22	32	-			25			16.5				16.1	8	
		90315R-2-14T-M	MTO	28		2																31				16		
Bore dia. inch spec	MSRS	90080R-1-4T	●	4	4	1	80	70	31.75	27	18	-	-	-	-	-	60	32	-	8	12.7	16.5	+7	-10	No	1.4	1	SPMT180616EN-...
		90080R-2-4T	●	8		2																31				1.2	2	
		90080R-4-4T	●	16		4											85					60				1.5	3	
		90100R-1-6T	●	6	6	1	100	85	38.1	39	21						70	38		10	15.9	16.5				2.3	1	
		90100R-2-6T	●	12		2																31				2.1	2	
		90100R-4-6T	MTO	24		4											90					60				3.2	3	
		90125R-1-8T	●	8	8	1	125			55	-						60					16.5				2.6	4	
		90125R-2-8T	MTO	16		2																31				2.4	5	
		90160R-1-8T	●	8		1	160	100	50.8	70										11	19.1	16.5				4.3	4	
		90160R-2-8T	MTO	16		2																31				4.1	5	
		90200R-1-10T	●	10	10	1	200	130	47.625	-		18	26			101.6			32	14	25.4	16.5				6.7	6	
		90200R-2-10T	MTO	20		2																31				6.6	7	
		90250R-1-12T	●	12	12	1	250															16.5				12.6	6	
		90250R-2-12T	MTO	24		2																31				12.5	7	
		90315R-1-14T	●	14	14	1	315	220				17	27	22	32	-			25			16.5				16.1	8	
		90315R-2-14T	MTO	28		2																31				16		

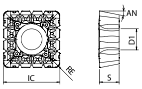
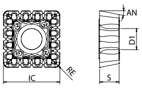
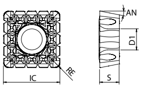
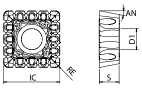
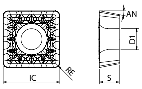
● : Standard item MTO : Made to order

SPMT

Classification of usage

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

	PR1810	PR1835	
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 ➡ **M159**
									PVD		
				IC	S	D1	RE	AN	PR1810	PR1835	
	 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 ➡ **M161**

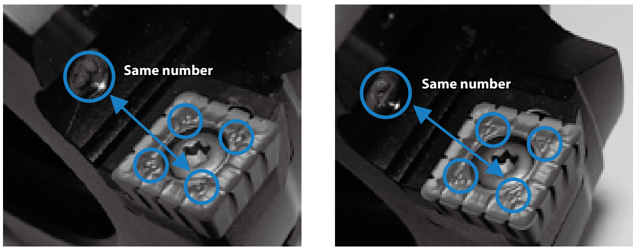
● : Standard item

Caution when installing notched insert

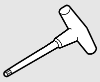
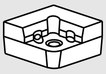
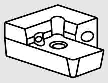
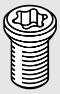
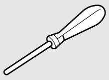
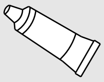
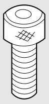
It is important to install the appropriate notched insert into the correct position. If it is installed in incorrect position, the tool cannot cut the workpiece and it may damage the toolholder body. For MSRS90, notched insert location indicator is marked at insert installed pocket of the cutter body.

Description		No. of inserts	No. of flutes	No. of stages	No. of inserts	
					Notched	
					NB3(P)	NB4(P)
MSRS	90100R-1-6T	6	6	1	3	3
	90100R-2-6T	12		2	6	6
	90100R-4-6T	24		4	12	12

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



Spare parts

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

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)	
			MEGACOAT NANO EX	
	Standard NB3+NB4	Low cutting force NB3P+NB4P	PR1810	PR1835
Soft steel	0.1~**0.2**~0.25	0.1~**0.2**~0.25	-	★ 120~**150**~220
Carbon steel	0.1~**0.2**~0.25	0.1~**0.2**~0.25	-	★ 100~**150**~200
Alloy steel	0.1~**0.15**~0.2	0.1~**0.15**~0.2	-	★ 100~**150**~200
Mold steel	0.1~**0.15**~0.2	0.1~**0.12**~0.15	-	★ 100~**150**~180
Gray cast iron	0.1~**0.2**~0.3	0.1~**0.2**~0.25	★ 100~**180**~250	-
Nodular cast iron	0.1~**0.2**~0.25	0.1~**0.18**~0.2	★ 100~**180**~220	-
Stainless steel	Not recommended			
Aluminum/Copper	Not recommended			

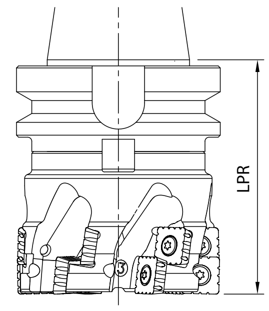
★: 1st Recommendation ☆: 2nd Recommendation

Cutting conditions (Shouldering)

In case of MSRS90100R-1-6T

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

Overhang length LPR(mm)



In case of MSRS90100R-2-6T

Workpiece material	Overhang length LPR(mm)	Cutting conditions		(ap × ae)	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

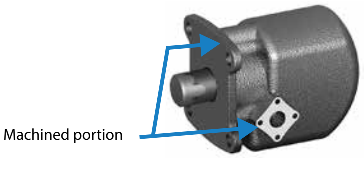
Workpiece material	Overhang length LPR(mm)	Cutting conditions		(ap × ae)	Chip evacuation rate (cc/min)
		Cutting speed Vc (m/min)	Feed fz (mm/t)		
Cast iron	Less than 140mm	180	0.2	60 × 20	826
	140~200mm	180	0.2	60 × 10	413
	201mm and over	230	0.1	60 × 10	263
Carbon steel	Less than 140mm	150	0.2	60 ×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

Case studies

FCD450

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

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



MSRS90(PR1210)	Chip evacuation rate = 258cc/min
Competitor B	107cc/min

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

(User evaluation)

SCM420

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

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

MSRS90(PR1230)	Chip evacuation rate = 200cc/min
Competitor C	153cc/min

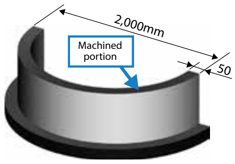
- MSRS90 improved the machining efficiency to 1.3 times that of competitor C.
- Competitor C machined with ap x ae=5 x 50mm
- Tool cost is reduced to 1/3 although competitor C is expensive using 2-corner insert.
MSRS90 reduced machining cost as well as improved machining efficiency.

(User evaluation)

Mold steel

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

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



MSRS90(PR1230)	Chip evacuation rate = 120cc/min
Competitor D	60cc/min

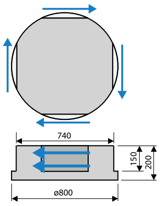
- MSRS90 more than doubled the machining efficiency compared with competitor D.
- Competitor D machined with ap x ae=5 x 10~50mm
→ Low cutting force of MSRS90 enabled twice as large ap as that of competitor.
- It can double the ap as well as increase the cutting speed (Vc=100 → 150).
→ Machining efficiency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

(User evaluation)

Alloy steel

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

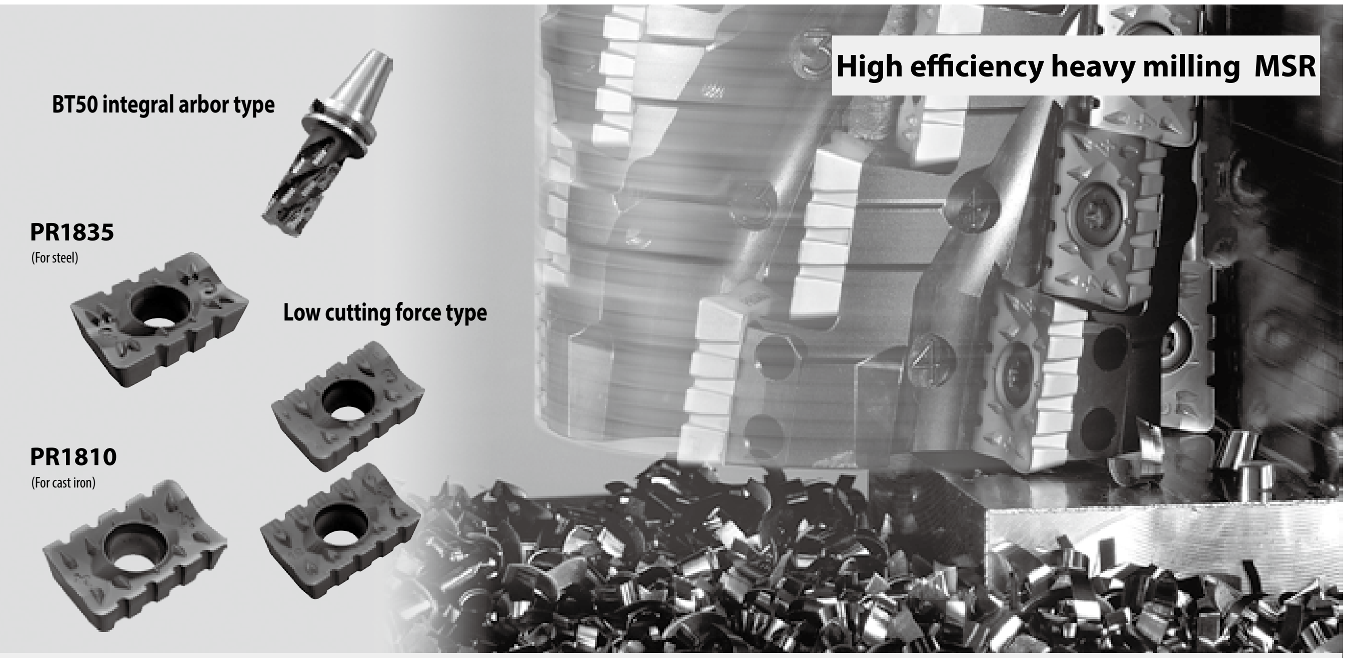
MSRS90125R-1-8T(ø125 ·8 flutes)
SPMT180616EN-NB3/NB4
(PR1230)



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

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

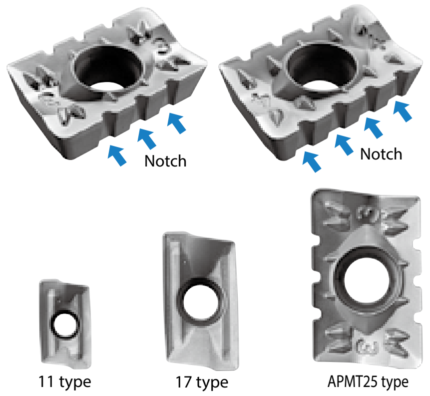
(User evaluation)



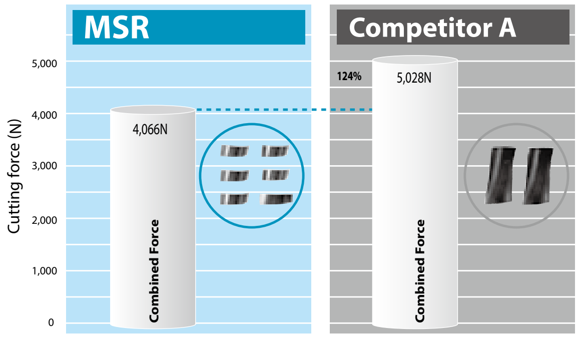
Notched insert reduces cutting force, and enables high feed rates by reducing chattering.
Improved chip evacuation and low cutting force with the special chipbreaker.
Enables heavy milling and deep cutting, and also drastically improves machining efficiency. (Reduction of cutting time)

Notched insert

Size comparison (full-scale)



Cutting force comparison



* The exclusive notched chipbreaker provides low cutting force and good chip evacuation. (Internal evaluation)

MSR (Face mill)

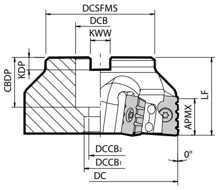


Fig. 1

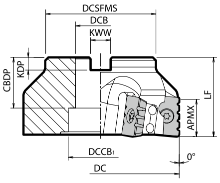


Fig. 2

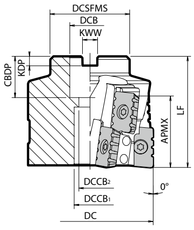


Fig. 3

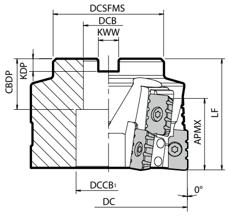


Fig. 4

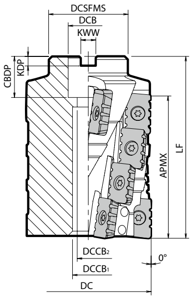


Fig. 5

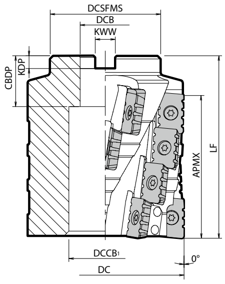


Fig. 6

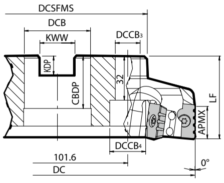


Fig. 7

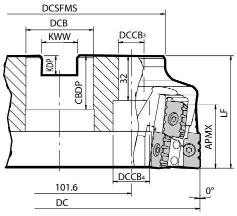


Fig. 8

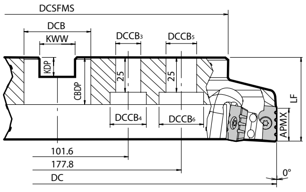


Fig. 9

Toolholder dimensions

Description			Availability	Inserts	Flutes	Stages	Dimension (mm)														A.R. (°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Applicable inserts ➡ M167
			R				DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	$DCCB_3$	$DCCB_4$	$DCCB_5$	$DCCB_6$	LF	CBDP	KDP	KWW	APMX						
Metric	MSR	063R-1M	●	4	4	1	63	50	27	20	14	-	-	-	-	65	22	7.2	12.4	23.5	+9	-8	No	0.7	1	APMT2506...
		063R-2M	●	8		2										85				45				0.9	3	
		080R-1M	●	4		1	80	55								50				23.5				1	1	
		080R-2M	●	8		2										70				45				1.5	3	
		080R-4M	●	16		4										115				90				2.5	5	
		100R-1M	●	6	6	1	100	70	32	42	-					50	28	8	14.4	23.5		-5		1.5	2	
		100R-2M	●	12		2										70				45				2	4	
		100R-4M	●	24		4										115				90				3.2	6	
		125R-1M	●	6		1	125	85	40	58						60	30	9	16.4	23.5				3.4	2	
		125R-2M	●	12		2										70				45				3.7	4	
		125R-4M	●	24		4										115				90				6	6	
		160R-1M	●	8	8	1	160	100		68						60		10		23.5				6.1	2	
		160R-2M	●	16		2										70				45				6.8	4	
		200R-1M	●	10	10	1	200	130	60	-		18	26			60	38	15	25.4	23.5				7	7	
		200R-2M	●	20		2										80				45				9.9	8	
		250R-1M	●	12	12	1	250									60				23.5				10.3	7	
		250R-2M	●	24		2										80				45				14.2	8	
		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	4	1	63	50	25.4	20	14	-	-	-	-	65	26	6	9.5	23.5	+9	-8	No	0.8	1	APMT2506...
		063R-2	●	8		2										85				45				1	3	
		080R-1	●	4		1	80	55								50				23.5				1.1	1	
		080R-2	●	8		2										70				45				1.6	3	
		080R-2-31.75	●					70	31.75	27	18						32	8	12.7					1.7	3	
		080R-4	●	16		4		55	25.4	20	14					115	26	6	9.5	90				2.6	5	
		080R-4-31.75	●					70	31.75	27	18						32	8	12.7					2.7	5	
		100R-1	●	6	6	1	100			42	-					50				23.5		-5		1.6	2	
		100R-2	●	12		2										70				45				2.2	4	
		100R-4	●	24		4										115				90				3.6	6	
		125R-1	●	6		1	125	85	38.1	54						60	38	10	15.9	23.5				3.5	2	
		125R-2	●	12		2										70				45				3.8	4	
		125R-4	●	24		4										115				90				6.1	6	
		160R-1	●	8	8	1	160	100	50.8	68						60		11	19	23.5				5.8	2	
		160R-2	●	16		2										70				45				6.4	4	
		160R-4	●	32		4										115				90				10.7	6	
		200R-1	●	10	10	1	200	130	47.625	-		18	26			60		14	25.4	23.5				7.5	7	
		200R-2	●	20		2										80				45				10.4	8	
		250R-1	●	12	12	1	250									60				23.5				10.9	7	
		250R-2	●	24		2										80				45				14.7	8	
		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-○☐	SB-60120TR	TT-25L	-	-	-	P-37
MSR 080R-○☐ ~ 315R-○☐			MAP-2506	SB-40140TR	DT-15	
	for Insert Clamp		for Shim Clamp			

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

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)

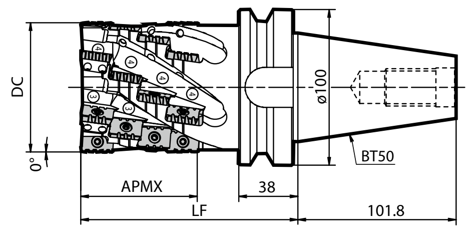


Fig. 1

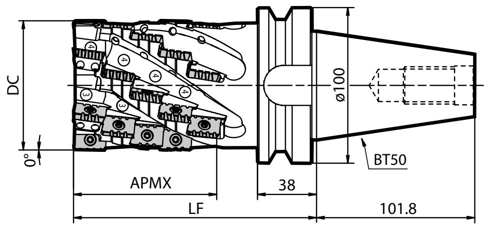
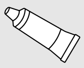
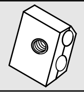
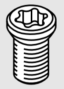
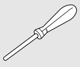
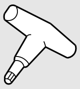


Fig. 2

Toolholder dimensions

Description		Availability	Inserts	Flutes	Stages	Dimension (mm)			A.R. (°)	R.R. (°)	Coolant hole	Weight (kg)	Fig.	Spare parts						Applicable inserts ➡ M167
		R				DC	LF	APMX						Anti-seize compound	Cartridge	Screw	Wrench	Screw	Wrench	
																				
MSR	063R-BT50-4	●	16	4	4	63	160	90	+9	-8	No	5.7	1	P-37	-	-	-	SB-60120TR	TT-25L	APMT2506...
	063R-BT50-5	●	20		5		180	111				6.2	2							
	080R-BT50-4	●	16		4	80	160	90				6.9	1		MAP-2506	SB-40140TR	DT-15	SB-60120TR		
	080R-BT50-5	●	20		5		180	111				7.4	2							
	100R-BT50-4	●	24	6	4	100	160	90		-5		9.6	1							
	100R-BT50-5	●	30		5		180	111				10.5	2							

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.

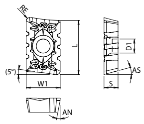
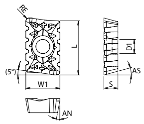
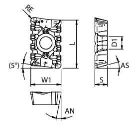
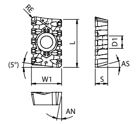
● : Standard item

APMT

Classification of usage

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

	PR1810	PR1835	
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 ➡ M165 M166
												PVD		
					S	D1	RE	L	W1	AN	AS	PR1810	PR1835	
	 3-notch	APMT	250608ER-NB3	2	6.35	6.5	0.8	25	15.875	11	15	●	●	MSR...
			250616ER-NB3				1.6					●	●	
			250640ER-NB3				4						●	
		APMT	250616EL-NB3	2	6.35	6.5	1.6	25	15.875	11	15		●	-
	 4-notch	APMT	250608ER-NB4	2	6.35	6.5	0.8	25	15.875	11	15	●	●	MSR...
			250616ER-NB4				1.6					●	●	
			250640ER-NB4				4						●	
		APMT	250616EL-NB4	2	6.35	6.5	1.6	25	15.875	11	15		●	-
	 3-notch / Low cutting force	APMT	250616ER-NB3P	2	6.35	6.5	1.6	25	15.875	11	15	●	●	MSR...
	 4-notch / Low cutting force	APMT	250616ER-NB4P	2	6.35	6.5	1.6	25	15.875	11	15	●	●	MSR...

Handed insert shows Right-hand

Recommended cutting conditions ➡ **M168**

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.)

1 . (3) is for APMT2506○○ER-NB3

2. (4) is for APMT2506○○ER-NB4

(No. of inserts – example)

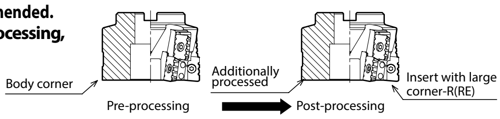
Description		No. of inserts	No. of flutes	No. of inserts	
				Notched	
				NB3	NB4
MSR	100R-1	6	6	3	3
	100R-2	12		6	6
	100R-4	24		12	12

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

Recommended cutting conditions

Workpiece material	fz (mm/t)		Recommended insert grades (Cutting speed Vc: m/min)	
	Low cutting force	General purpose	MEGACOAT NANO EX	
	NB3P+NB4P	NB3+NB4	PR1810	PR1835
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

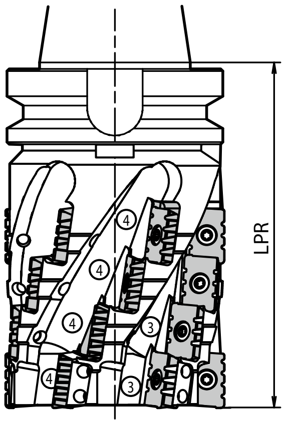
Cutting conditions

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

Overhang length LPR (mm)



In case of MSR100R-2

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

In case of MSR100R-4

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

2. Slotting

In case of MSR100R-1

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

In case of MSR100R-2

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

In case of MSR160R-1

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

In case of MSR160R-2

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

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

DMC-SX

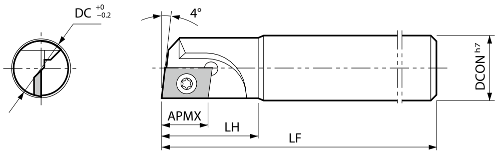


Fig. 1

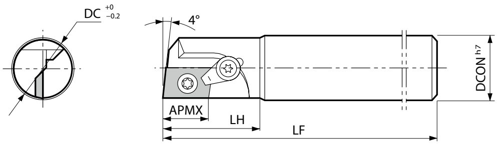
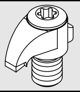
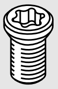
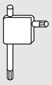


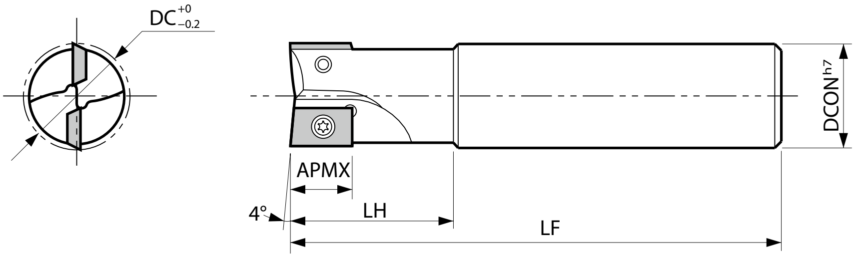
Fig. 2

Toolholder dimensions

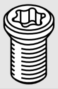
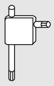
Description		Availability	Inserts	Dimension (mm)					A.R. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts ➡ M172
				DC	DCON	LF	LH	APMX					Clamp set	Screw	Wrench	
																
DMC	316SXT	●	1	16	16	90	30	14	+3	-3	No	1	-	SB-4060TR	FT-15	NDCT1503... NDCW1503...
	320SX	●		20	20	110						2	CPS-2TR	SB-4065TR		
	325SX	●	2	25	25	120	40			-2		2				
	332SX	●		32	32	130				0		2				
	340SX	●		40		150						2				
DMC	320SX-200	●	1	20	20	200	50	14	+3	-3	No	1	-	SB-4065TR	FT-15	NDCT1503... NDCW1503...
	325SX-220	●	2	25	25	220	60			-2		1				
	332SX-250	●		32	32	250	80			0		1				

●: Standard item

DMC-H



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					A.R. (°)	R.R. (°)	Coolant hole	Spare parts		Applicable inserts ➡ **M172**
			DC	DCON	LF	LH	APMX				Screw 	Wrench 	
DMC 316H	●	1	16	16	90	30	14	+5	-3.5	No	SB-4060TR	FT-15	NDCT1503...X NDCW1503...X...
320H	●		20	20	110			+6	-2				
325H	●	2	25	25	120	40		+8			SB-4065TR		
332H	●		32	32	130				0				
340H	●		40		150								

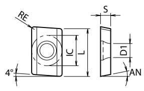
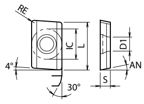
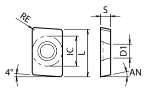
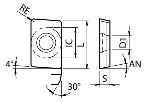
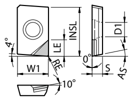
● : Standard item

NDCT/NDCW

Classification of usage

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

	KW10	TN100M	KPD001	KPD010	KPD230	
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	Cermet	PCD			Applicable toolholder ➡ M170 M171
														-	-	-			
				IC	S	D1	RE	L	INSL	LE	W1	AN	AS	KW10	TN100M	KPD001	KPD010	KPD230	
		NDCT 150308FR	2	9.525	3.18	4.5	0.8	15	-	-	-	15	-	●					DMC...SX(...)
		NDCT 150308TR	2	9.525	3.18	4.5	0.8	15	-	-	-	15	-		●				
		NDCT 150308TRX	2	9.525	3.18	4.4	0.8	15	-	-	-	15	-		●				DMC...SX(...) DMC...H
		NDCW 150302TR 150304TR 150308TR 150320TR 150330TR 150340TR	2	9.525	3.18	4.5	0.2 0.4 0.8 2 3 4	15	-	-	-	15	-		● ● ● ● ● ●				DMC...SX(...)
		NDCW 150308TRX	2	9.525	3.18	4.4	0.8	15	-	-	-	15	-		●				DMC...SX(...) DMC...H
		NDCW 150308FRX	2	9.525	3.18	4.4	0.8	15	-	-	-	15	-	●					
		NDCW 150302FRX 150302FRX-NE	1	-	3.18	4.4	0.2	-	15	5.7 5.1	9.525	-	15			● ●	●	 ●	DMC...SX(...) DMC...H

Handed insert shows Right-hand

Recommended cutting conditions ➡ M173

● : Standard item

CBN & PCD Inserts are sold in 1 piece boxes

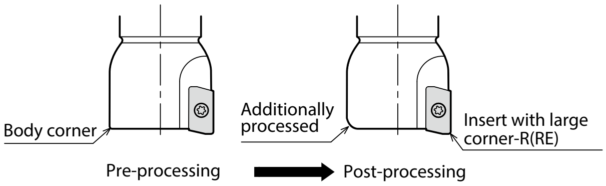
Recommended cutting conditions (DMC-SX)

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)		Max. ap (mm)		
		Cermet	Carbide			
		TN100M	KW10	Cutting dia. (DC)	Slotting (ap)	Shouldering (apxae)
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.

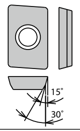
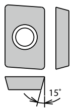
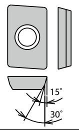
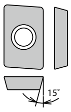
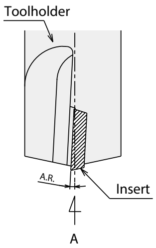
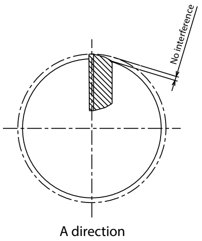
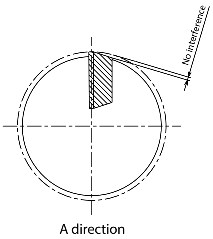
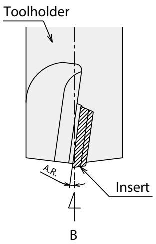
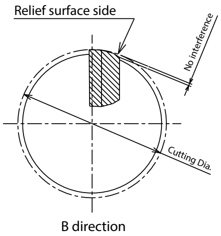
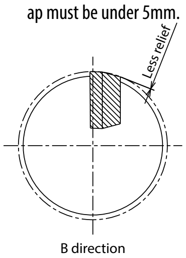


Recommended cutting conditions (DMC-H)

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

★: 1st Recommendation ☆: 2nd Recommendation

NDCW1503○○TR and NDCT1503○○(T/F)R inserts are not applicable for DMC-H end mill.

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

High efficiency milling cutter for finishing aluminum alloys

MFAH

Low cutting force minimizes burrs and chipping for high quality machining

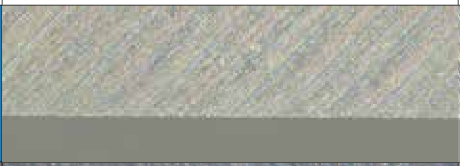
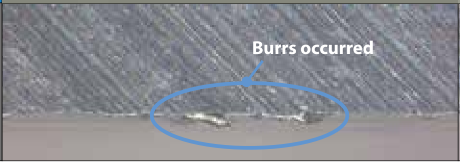
Easily adjust blade runout

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)

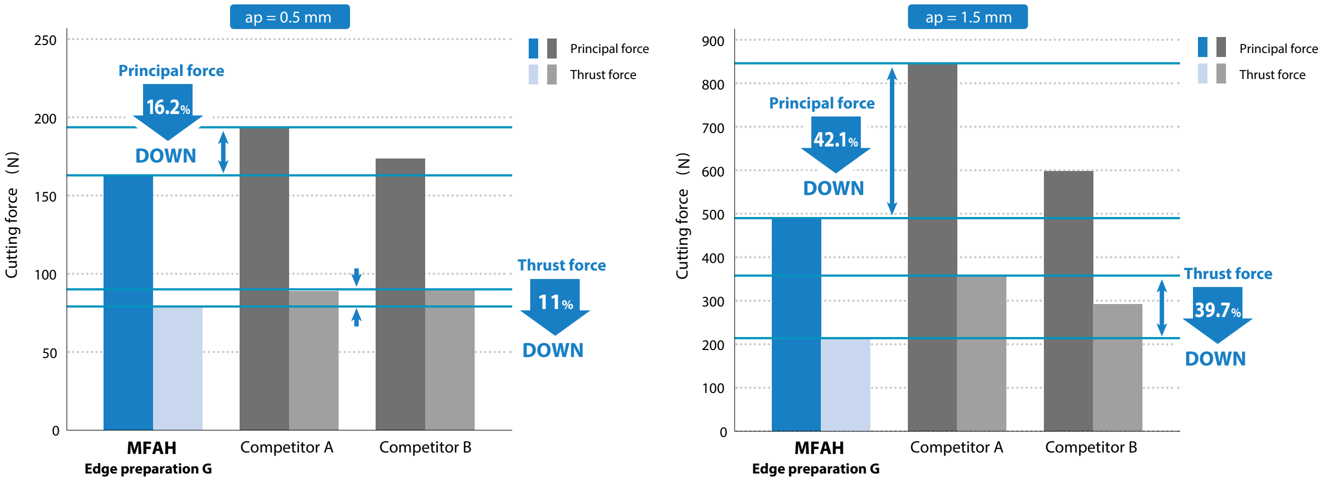
	Finishing (burrs more likely) ap = 0.5mm, ae = 55mm, fz = 0.05mm/t	**Roughing** (chipping more likely) ap = 1.5mm, ae = 55mm, fz = 0.15mm/t
MFAH Edge preparation G (Dual cutting edge)		
Competitor A (R0.8)	 	

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

2 Low cutting force design

Low cutting force, reduced chattering and high efficiency machining

Cutting force comparison (Internal evaluation)



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

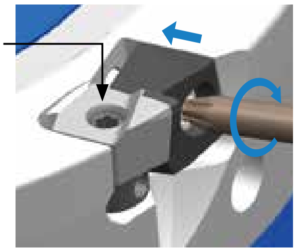
3 Adjustable blade runout

Easily install inserts and adjust blade runout

Easy insert installment

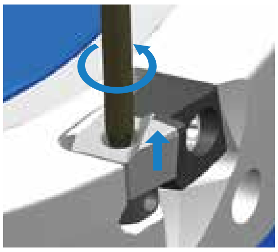
Guide pin allows for easier positioning

Mount the insert onto the guide pin



Easily adjust blade runout

Adjustable froma both the front and outer periphery

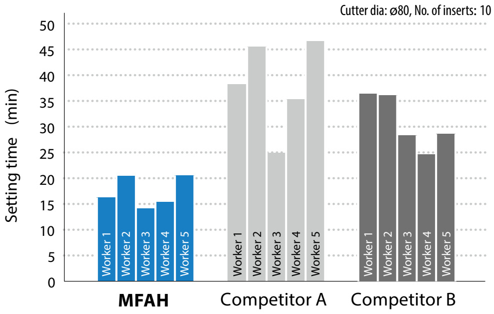


Unique design for easily adjusting from the front

Blade runout setting time comparison

(Internal evaluation)

* Operation Time of 5 Workers Comparison



The MFAH can drastically shorten the setting time

4 Large tooling lineup

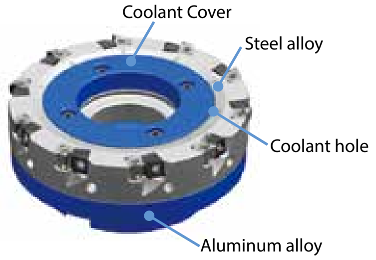
Steel body and light-weight hybrid body with internal coolant available

3 different edge designs offer a variety of machining applications

Cutter body

Steel body

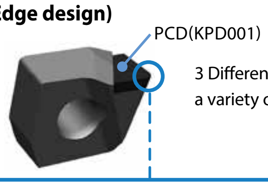
ø50~ø125



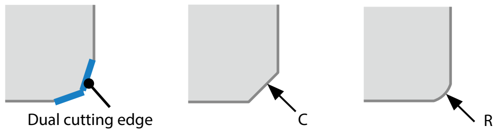
Light-weight hybrid body

ø80~ø315

Insert (Edge design)



3 Different edge designs offer a variety of machining applications



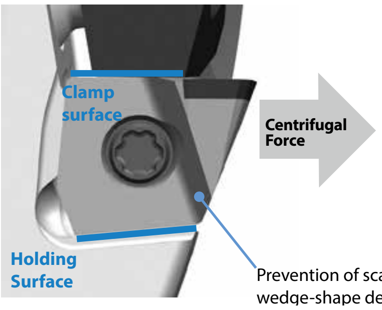
ENET0905PAER-G Minimizes burrs and chipping * 1st Recommendation	ENET0905PAER-C Low cutting force * Low rigidity workpiece etc.	ENET0905PAER-R Tough edge * Highinterruption workpiece etc.

5 Safety enhancements during high-speed revolution

Scattering prevention mechanism

1 Prevention of scattering by wedge-shape design

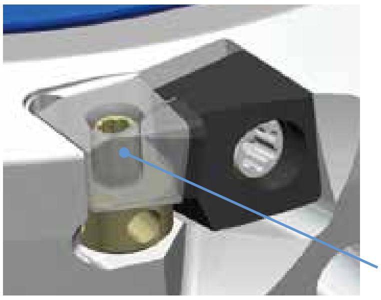
New wedge-shape feature holds insert
Firmly in place and reduces chattering



Prevention of scattering by wedge-shape design

2 Prevention of scattering with guide pin

Guide pins improve safety
During high-speed rotation



Prevention of scattering with guide pin

MFAH (Light-weight Hybrid body)

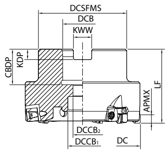


Fig. 1

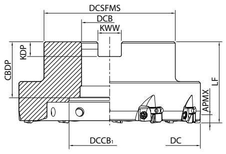


Fig. 2

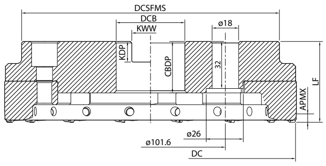


Fig. 3

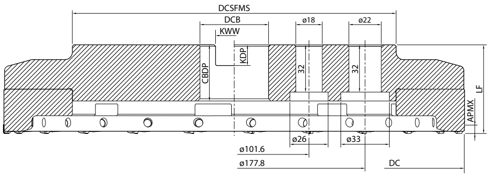


Fig. 4

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)										Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Spare parts			Applicable inserts ➡ M179
			R		DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX					Mounting bolt (Attachment)	Coolant cover (Attachment)	Coolant cover (sold separately)	
Metric	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
		080RA-10T-M-SF	●	10													0.78	1				
		100RA-8T-M27-SF	●	8	100	62	27	20	13		24	7	12.4			13000	1.2	1	HH12X35HC			
		100RA-8T-M-SF	●	8		85	32	42	-		30	8	14.4				1.32	2	HF16X48HC			
		100RA-12T-M27-SF	●	12		62	27	20	13		24	7	12.4				1.15	1	HH12X35HC			
		100RA-12T-M-SF	●	12		85	32	42	-		30	8	14.4				1.27	2	HF16X48HC			
		125RA-10T-M27-SF	●	10	125	60	27	20	13		24	7	12.4			11400	1.8	1	HH12X35H	CC-125-MFAH		
		125RA-10T-M-SF	●	10		94	40	55	-	55	33	9	16.4				2.1	2	HF20X53HA			
		125RA-16T-M27-SF	●	16		60	27	20	13	50	24	7	12.4				1.73	1	HH12X35H			
		125RA-16T-M-SF	●	16		94	40	55	-	55	33	9	16.4				2.1	2	HF20X53HA			
		160RA-12T-M-SF	●	12	160	125	40	57	-		33	9	16.4			8000	3.5	2	HF20X53HA	CC-160-MFAH		
		160RA-20T-M-SF	●	20													3.4	2				
		200RA-16T-M-SF	MTO	16	200	175	60	126			35	14	25.7			5600	4.7	3	-	-	CC-200-MFAH	
		200RA-24T-M-SF	MTO	24													4.6	3				
		250RA-20T-M-SF	MTO	20	250	140		165								4500	6.9	3			CC-250-MFAH	
		250RA-32T-M-SF	MTO	32													6.8	3				
		315RA-24T-M-SF	MTO	24	315	220		220		60	38					3500	11.7	4			CC-315-MFAH	
		315RA-40T-M-SF	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

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)										Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Spare parts			Applicable inserts ➡ M179
			R		DC	DCSFMS	DCB	DCCB$_1$	DCCB$_2$	LF	CBDP	KDP	KWW	APMX					Mounting bolt (Attachment)	Coolant cover (Attachment)	Coolant cover (sold separately)	
Bore dia. inch spec	MFAH	080RA-6T-SF	●	6	80	62	25.4	20	13	50	27	6	9.5	4.6	Yes	14600	0.83	1	HH12X35HC	-	-	ENET0905PAER-G ENET0905PAER-C ENET0905PAER-R
		080RA-10T-SF	●	10													0.78	1				
		100RA-8T-254-SF	●	8	100	62	25.4	20	13		24	6	9.5			13000	1.21	1	HH12X35HC			
		100RA-8T-SF	●	8		85	31.75	42	-		34	8	12.7				1.33	2	HF16X44HC			
		100RA-12T-254-SF	●	12		62	25.4	20	13		24	6	9.5				1.16	1	HH12X35HC			
		100RA-12T-SF	●	12		85	31.75	42	-		34	8	12.7				1.29	2	HF16X44HC			
		125RA-10T-254-SF	●	10	125	60	25.4	20	13		24	6	9.5			11400	1.8	1	HH12X35H	CC-125-MFAH		
		125RA-10T-SF	●			89	38.1	55	-	55	38	10	15.9				2	2	HF20X53HA			
		125RA-16T-254-SF	●	16		60	25.4	20	13	50	24	6	9.5				1.74	1	HH12X35H			
		125RA-16T-SF	●			89	38.1	55	-	55	38	10	15.9				1.95	2	HF20X53HA			
		160RA-12T-SF	●	12	160	130	50.8	70				11	19.1			8000	3.4	2	HF24X60HA	CC-160-MFAH		
		160RA-20T-SF	●	20													3.3	2				
		200RA-16T-SF	MTO	16	200	175	47.625	126			35	14	25.4			5600	4.9	3	-	-	CC-200-MFAH	
		200RA-24T-SF	MTO	24													4.8	3				
		250RA-20T-SF	MTO	20	250	140		165								4500	7	3			CC-250-MFAH	
		250RA-32T-SF	MTO	32													6.9	3				
		315RA-24T-SF	MTO	24	315	220		220		60	38					3500	11.7	4			CC-315-MFAH	
		315RA-40T-SF	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

M

Milling

MFAH (Steel body)

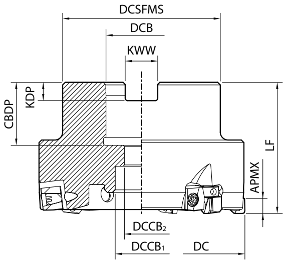


Fig. 1

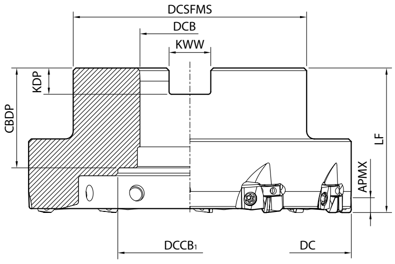
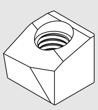
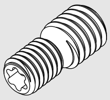
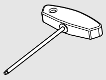
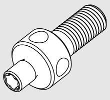
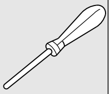
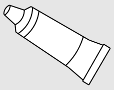


Fig. 2

Toolholder dimensions

Description		Availability	Inserts	Dimension (mm)										Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Applicable inserts ➡ M179
		R		DC	DCSFMS	DCB	DCCB$_1$	DCCB$_2$	LF	CBDP	KDP	KWW	APMX					
Metric	MFAH 050RS-4T-M-SF	●	4	50	48	16	13.6	9	40	19	5.6	8.4	4.6	No	19200	0.44	1	ENET0905PAER-G ENET0905PAER-C ENET0905PAER-R
	050RS-5T-M-SF	●	5													0.43	1	
	063RS-5T-M-SF	●		63	61	22	23	11		21	6.3	10.4			16800	0.69	1	
	063RS-6T-M-SF	●	6													0.68	1	
	080RS-6T-M-SF	●	6	80	60	27	20	13	50	24	7	12.4			14600	1.16	1	
	080RS-10T-M-SF	●	10													1.11	1	
	100RS-8T-M-SF	●	8	100	70	32	45	-		30	8	14.4			13000	1.56	2	
	100RS-12T-M-SF	●	12													1.51	2	
	125RS-10T-M-SF	●	10	125	89	40	55		55	33	9	16.4			11400	2.6	2	
	125RS-16T-M-SF	●	16													2.5	2	
Bore dia. inch spec	MFAH 080RS-6T-SF	●	6	80	50	25.4	20	13	50	27	6	9.5	4.6	No	14600	1.02	1	
	080RS-10T-SF	●	10													0.98	1	
	100RS-8T-SF	●	8	100	70	31.75	45	-		34	8	12.7			13000	1.59	2	
	100RS-12T-SF	●	12													1.55	2	
	125RS-10T-SF	●	10	125	89	38.1	55		55	38	10	15.9			11400	2.63	2	
	125RS-16T-SF	●	16													2.56	2	

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- …							

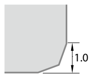
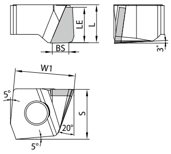
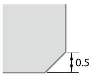
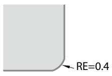
● : Standard item

ENET

Classification of usage

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

	KPD001	
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 ➡ M176~M178
					S	L	LE	W1	BS	- KPD001	
	 General purpose (Dual cutting edge)		ENET	0905PAER-G	7.9	6.02	5.6	9.61	2.6	●	MFAH...RA...-SF MFAH...RS...-SF
	 Low cutting force		ENET	0905PAER-C	7.9	6.02	5.6	9.61	3	●	MFAH...RA...-SF MFAH...RS...-SF
	 Tough edge		ENET	0905PAER-R	7.9	6.02	5.6	9.61	3.1	●	MFAH...RA...-SF MFAH...RS...-SF

Recommended cutting conditions ➡ M180

● : Standard item

CBN & PCD Inserts are sold in 1 piece boxes

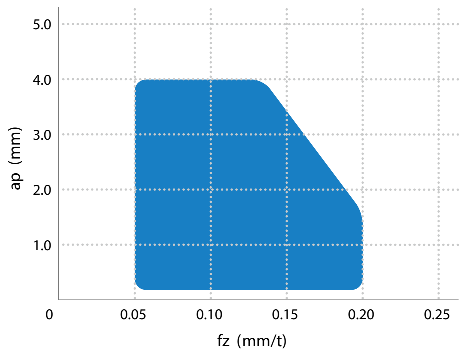
Recommended cutting conditions

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

BT50 M/C (Machine power 30kw)



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

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

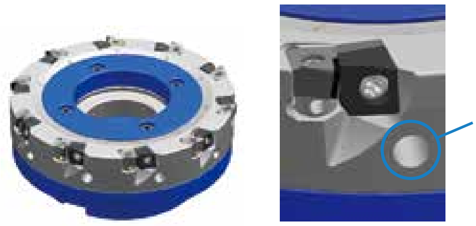
Please do not use under the following conditions:
When cutter is not fully loaded with inserts
If the body and/or clamp is damaged
If a clamp or clamp screw is removed
If inserts that have different regrind amounts are mounted

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

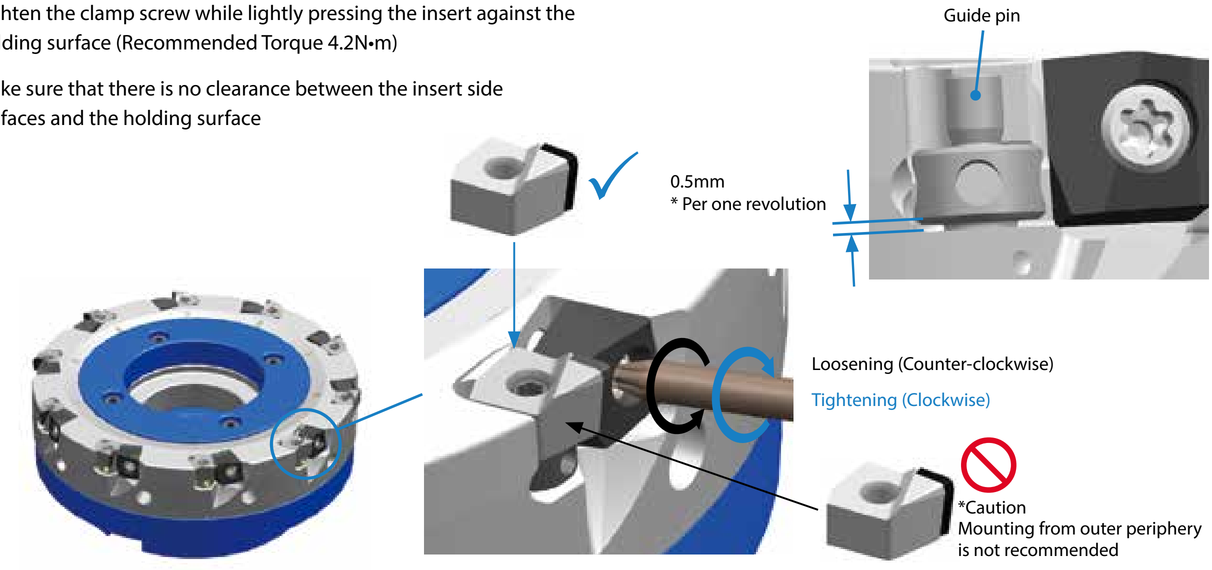


Balance adjustment screw is mounted at the necessary point

* Do not operate

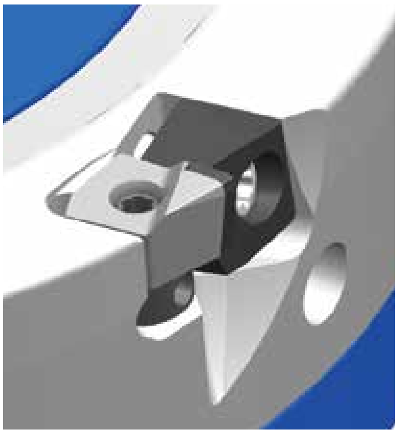
How to mount insert

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



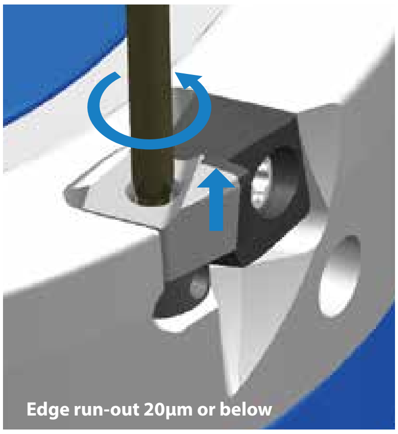
How to adjust blade runout

1 Install an insert



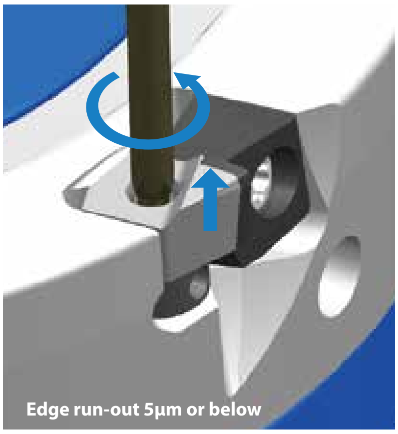
2 Partially tighten

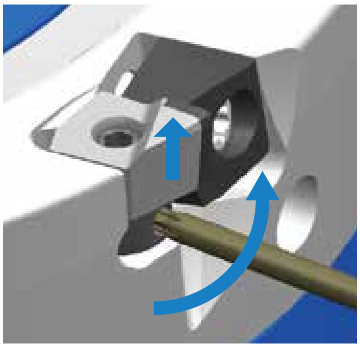
3 Adjustable blade runout



4 Fully tighten

5 Adjustable blade runout





Adjustment edge run-out from
outer periphery is workable

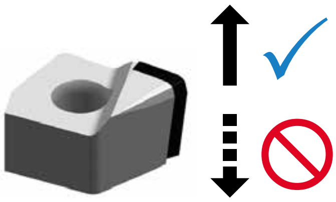
1 Install inserts into all pockets

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



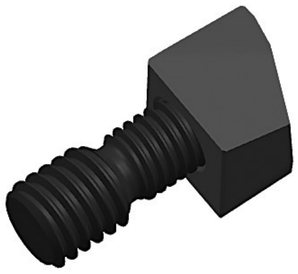
* Caution
Do not adjust cutting edge
to lower position

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

Precaution for changing clamp

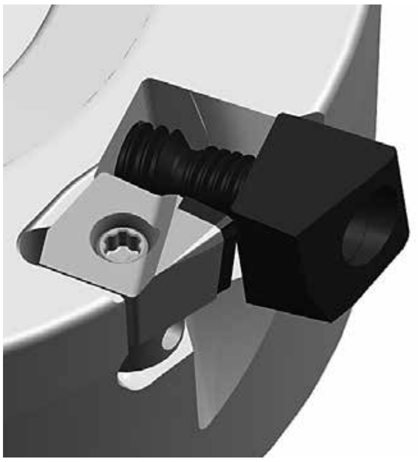
How to mount a clamp on a holder

1 Attach clamp screw into clamp first



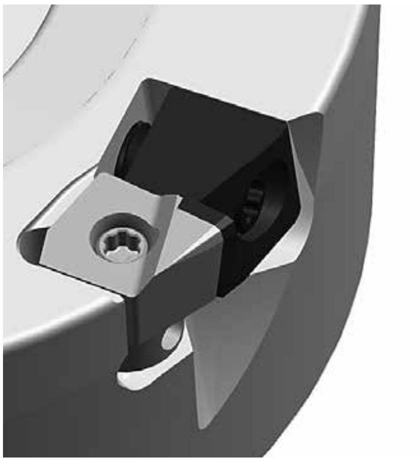
Attaching clamp screw into clamp
(about 1 revolution)

2 Mounting



Mount it to the holder

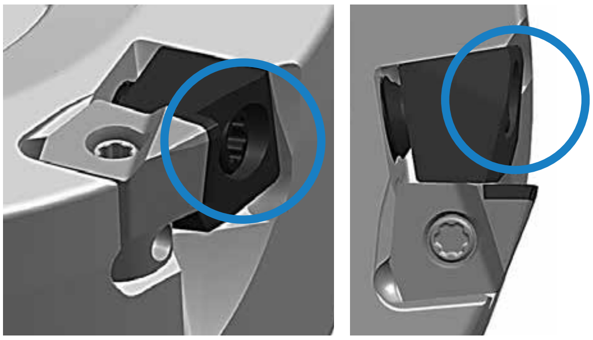
3 Fastening



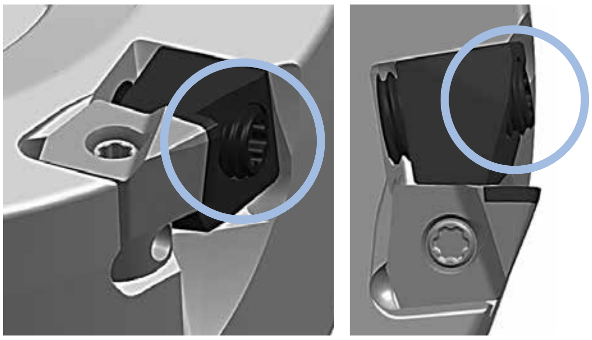
Fasten with recommended torque
(Completed)

Mount position of clamp screw

✓ **Right position**
(Screw head does not come out)



🚫 **Wrong position**
(Screw head comes out)



Confirm if clamp screw is not coming out after fastening clamp screw with recommended torque
Re-mount if the clamp screw is coming out
Adjust the balance is needed after mounting in case removing a clamp screw completely such as clamp change

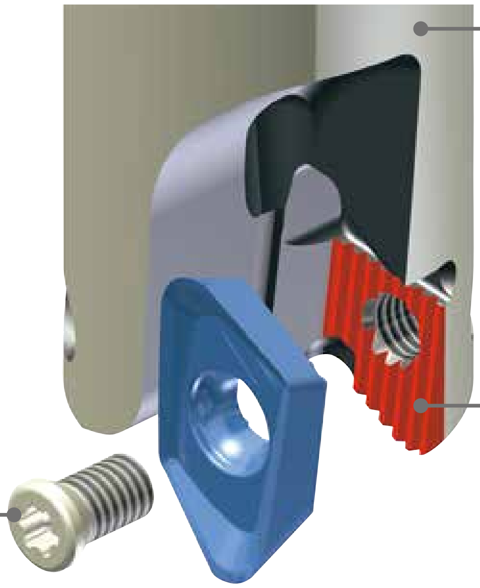
For aluminum alloys high efficiency end mill

MEAS

Excellent scatter prevention to ensure stable, high speed aluminum machining
Large ramping angle delivers a wide range of machining applications

1 High reliability and high efficiency machining

Grooved connection between the insert and holder
Provides high speed aluminum machining (ø32: Recommended max. cutting speed Vc = 3,000m/min)



ISO balance quality grade G6.3

Prevents vibration during high speed machining (ISO1940/1)

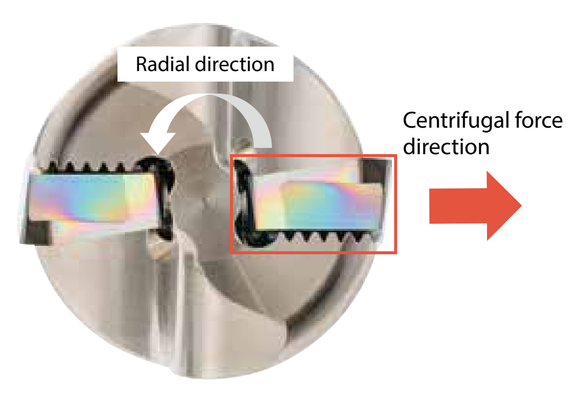
M4 Clamp screw

Unique grooved contact surface

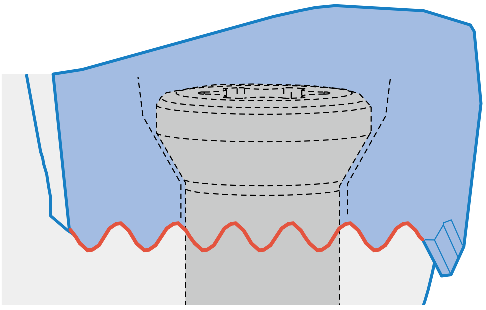
Prevents insert screw Breakage and ensures Greater safety

Grooved insert pocket

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



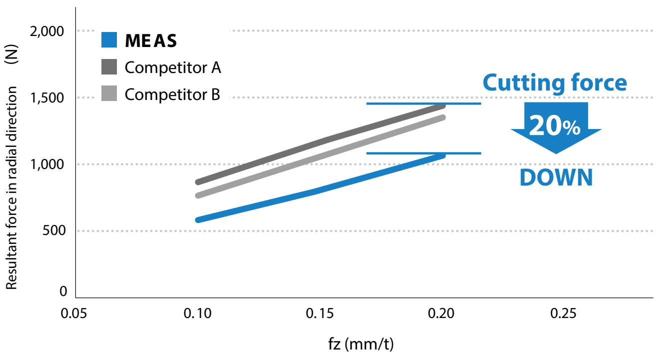
Grooved contact surface



2 Low cutting force with sharp cutting edge

True rake angle max. 20°
Low cutting force and excellent chattering resistance

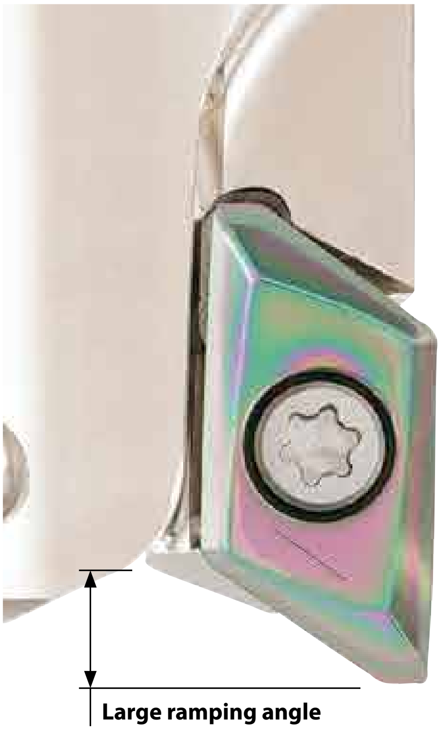
Cutting force comparison (Internal evaluation)

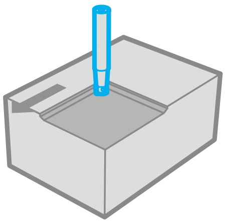


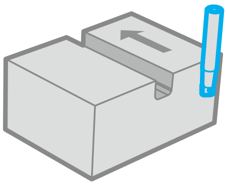
Cutting conditions: Vc = 390 m/min, ap × ae = 8 × 5mm, Dry
Cutter dia. ø25mm (2 Flutes) Workpiece material: A7075

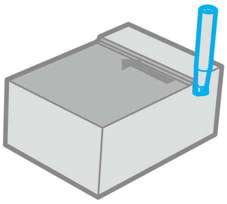
3 Applicable to a wide range of application

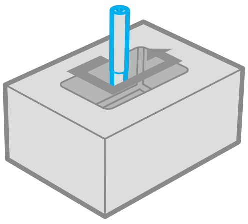
Max. ramping angle 20° (ø25)
The MEAS can be used for shouldering, slotting, ramping, and helical milling applications

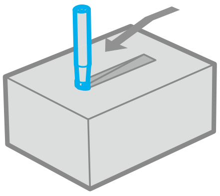


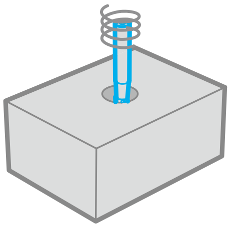

Facing, Shouldering

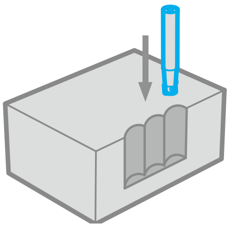

Slotting


Contouring


Pocketing


Ramping


Helical milling


Vertical milling (Plunging)

MEAS (End mill)

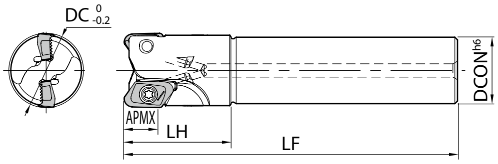


Fig. 1

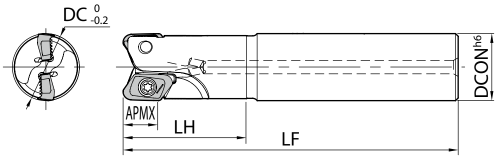
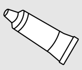
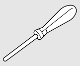


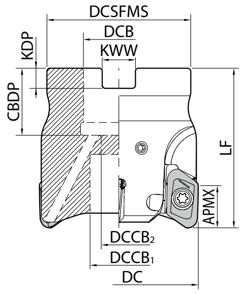
Fig. 2

Toolholder dimensions

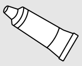
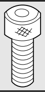
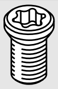
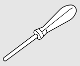
Description			Availability	Inserts	Dimension (mm)					A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Spare parts			Applicable inserts ➡ **M187**
																Anti-seize compound	Screw	Wrench	
					DC	DCON	LF	LH	APMX										
Cylindrical	Standard shank	MEAS 28-S25-13-2T	●	2	28	25	125	40	12	+10	-13	Yes	54000	0.4	1	P-37	SB-4090TRP	DTPM-15	KCGT1305...
		35-S32-13-2T	●		35	32	150	50					46000	0.9	1				
		40-S32-13-3T	●	3	40						-12		42000		1				
	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...
		32-S32-13-2T	●		32	32	150	69			-13		49000	0.8	2		SB-4090TRP		
	Long shank	MEAS 25-S25-13-2T-170	●	2	25	25	170	89	12	+10	-14	Yes	49000	0.5	2	P-37	SB-4075TRP	DTPM-15	KCGT1305...
		32-S32-13-2T-200	●		32	32	200	119			-13		39000	1.1	2		SB-4090TRP		

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

MEAS (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 ➡ **M187**
																		Anti-seize compound	Mounting bolt	Screw	Wrench	
	R		DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX										
MEAS 050R-13-4T-M	●	4	50	45	22	18	11	50	21	6.3	10.4	12	+10	-11	Yes	36000	0.4	P-37	HH10X30H	SB-4090TRP	DTPM-15	KCGT1305...

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

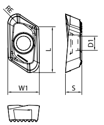
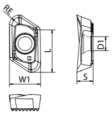
● : Standard item

KCGT

Classification of usage

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

Workpiece material	DLC PDL025	
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) S	D1	RE	L	W1	Carbide DLC PDL025	Applicable toolholder ➡ **M186**
	 Non-ferrous metals	KCGT	130504FR-AL	2	5.1	4.4	0.4	14.1	9.9	●	MEAS...
			130508FR-AL				0.8	13.9		●	
			130512FR-AL				1.2	13.8		●	
			130516FR-AL				1.6	13.3		●	
			130520FR-AL				2	13.3		●	
			130524FR-AL				2.4	13.3		●	
			130530FR-AL				3	13.3		●	
			130532FR-AL				3.2	12.8		●	
			130540FR-AL				4	12.8		●	
			130550FR-AL				5	12.8		●	
	 Tough edge	KCGT	130504ER-AM	2	5.1	4.4	0.4	13.7	9.9	●	MEAS...
			130508ER-AM				0.8	13.7		●	
			130516ER-AM				1.6	13.3		●	
			130525ER-AM				2.5	13.3		●	
			130530ER-AM				3	13.3		●	
			130540ER-AM				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 <		
		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 <		
		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

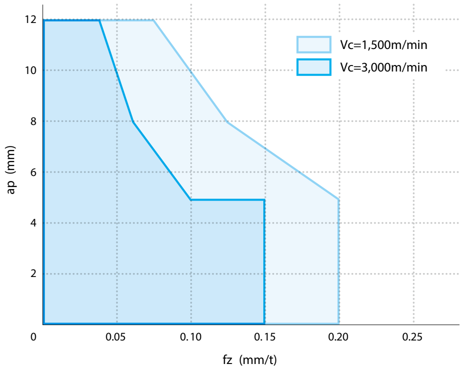
- Recommended cutting conditions are reference values.
  Please adjust cutting speed and feed rate according to actual machining conditions taking into account machine and workpiece rigidity
- Do not use the cutter at speeds exceeding the maximum cutting speed limit (See page **M189**)
- Regularly changing 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

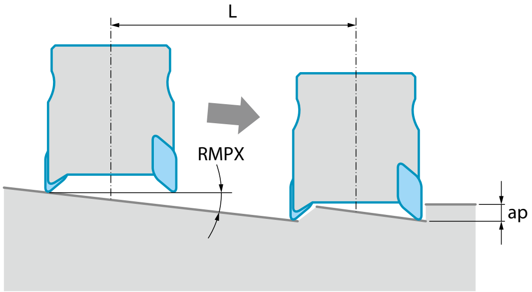
Reference data for ramping

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.

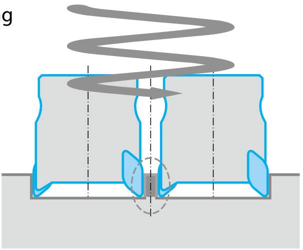
Insert description	Max. width of cut (ae)
KCGT13 type	8mm

Helical milling

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

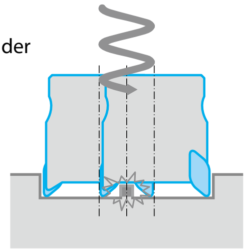
🚫 Over max. cutting dia.

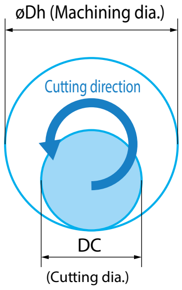
Center core part remains after machining



🚫 Under min. cutting dia.

Center core part
interferes with toolholder



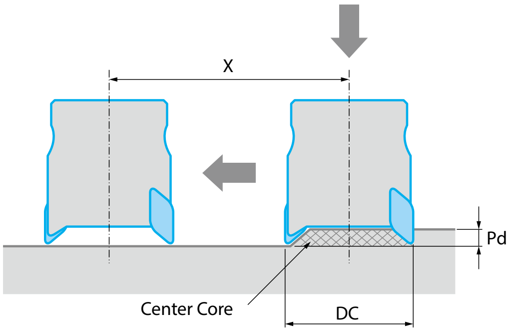


Description	Min. cutting dia.	Max. cutting dia.	Maximum ramping depth per cycle
MEAS…13…	2×DC-16	2×DC-3	3.5

Unit: mm

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

Guide for drilling



Drilling depth

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

Traversing after drilling

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

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

Unit: mm

How to mount inserts

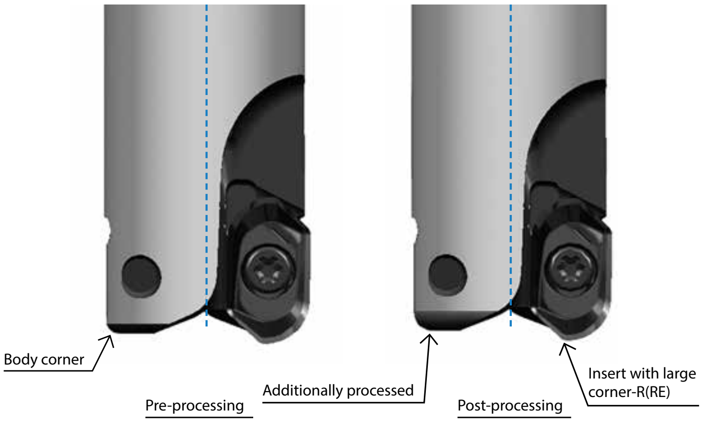
1. Be sure to remove dust and chips from the insert mounting pocket.
2. Insert screw
   - Coat anti-seize compound thinly on portion of taper and thread.
   - Attach screw to the magnetized wrench tip and tighten while gently pressing the outside edge of the insert toward the insert pocket surface (grooved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

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

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

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

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



Cautions

While in Use

⚠Caution

Please use within recommended cutting conditions

Do not run the cutter at revolutions exceeding the printed maximum revolution limit of the cutter body
Do not use the end mill at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Please do not use under the following conditions :
When cutter is not fully loaded with inserts
If the body is damaged

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

Dynamic balance

Balance adjustment on the cutter is completed before shipping

Balance adjustment to be ISO balance quality grade (ISO 1940-1) G6.3
When using at a higher revolution (10,000min^{-1} or over), refer to the table below to adjust the balance of MEAS and arbor

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

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

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.

Semi-finishing insert

To flatten ruggedness when roughing

Finishing insert

Provides excellent surface finish
Adjustable cutting edge and a single insert eliminates runout

SOLUTION

Increase feed to f = 5.0 mm/rev
Achieved 0.8 µm Ra surface finish
No grinding required
Achieved 5 µm flatness

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

MFF
Machining solutions

Can be used on a wide variety or 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






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

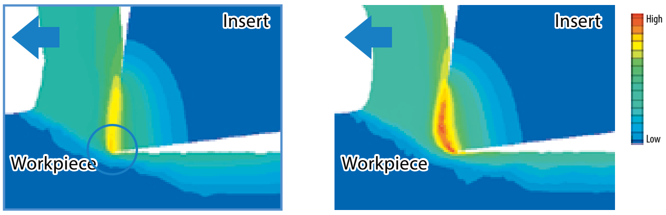
Micro-honing
Good sharpness

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 Vc = ~ 350 m/min

High-quality surface finish

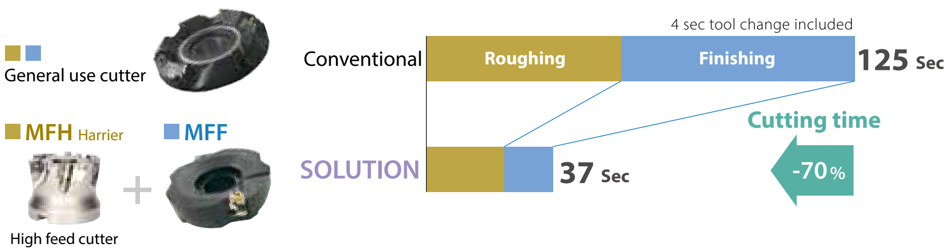
Molded TT chipbreaker

Reduces chip clogging
High feed machining

Comprehensive machining solutions

From roughing to finishing machining improvements (Internal evaluation)

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



Cutting Conditions
Conventional ø200 (6 inserts)
Vc = 200 m/min
Roughing : Vf = 286 mm/min (fz = 0.15 mm/t), ap = 1.2 mm
Finishing : Vf = 230 mm/min (fz = 0.12 mm/t), ap = 0.3 mm

SOLUTION
Roughing : MFH Harrier ø63 (6 inserts)
Vc = 200 m/min
Vf = 7,300 mm/min (fz = 1.2 mm/t), ap = 0.7 mm
Finishing : MFF ø200 (2 inserts)
Vc = 300 m/min
Vf = 2,400 mm/min (f = 5.0 mm/rev), ap = 0.1 mm

Surface finish quality after machining

SOLUTION

Excellent surface finish (0.27 µm Ra)

Conventional machining

Cloudy surface finish (1.01 µm Ra)

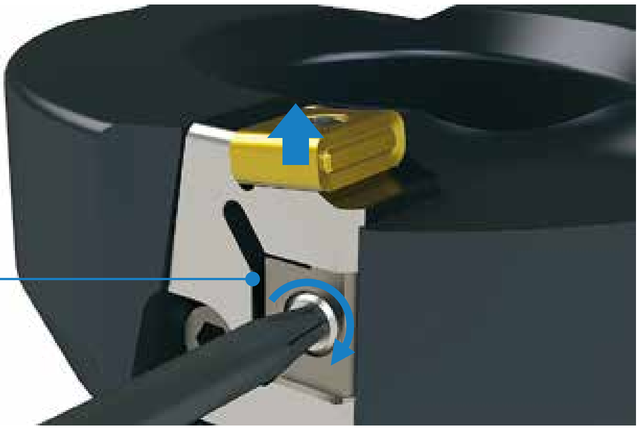
3 Adjustable cutting edge for increased usability

Cartridge height comes pre-adjusted and should not be necessary.

Adjustment is not required after replacing insert.

Easy-to-adjust cutting edge

Cutting edge height can be adjusted easily with one screw

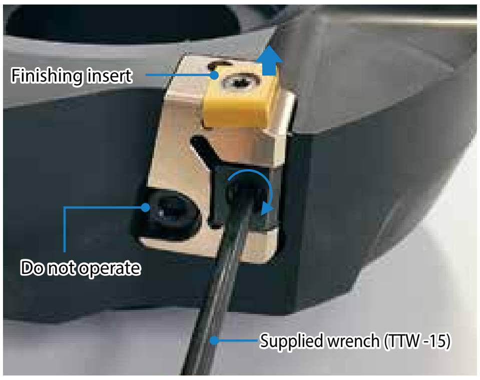


Included adjustment wrench

Edge adjustment

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

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



Adjusting the cutting edge

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

Procedure

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

Precautions

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

Standard Cutting Edge Height

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

MFF

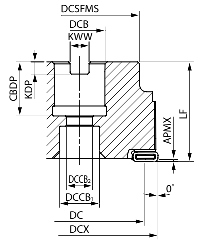


Fig. 1

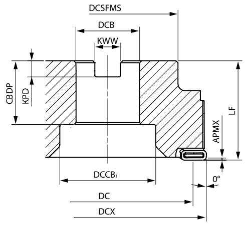


Fig. 2

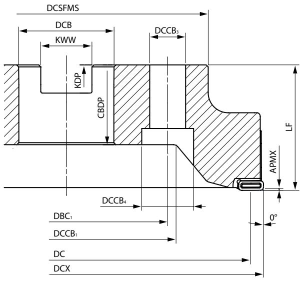


Fig. 3

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 ➡ **M194**
			R		DC	DCX	DCSFMS	DCB	DCCB₁	DCCB₂	DCCB₃	DCCB₄	DBC₁	LF	CBDP	KDP	KWW	APMX								
Metric	MFF	080R-M-SF	MTO	2	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
		100R-M-SF	MTO		87.3	100	70	32	48	-					32	8	14.4						1600	1.8	2	
		125R-M-SF	MTO		112.3	125	87	40	55					63	33	9	16.4						1300	3.5	2	
		160R-M-SF	MTO		147.3	160	102		72														1000	5.9	2	
		200R-M-SF	MTO		187.3	200	142	60	110		18	26	101.6		40	14	25.7						800	7.7	3	
		250R-M-SF	MTO		237.3	250																		10.5	3	
Bore dia. inch spec	MFF	080R-SF	MTO	2	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
		100R-SF	MTO		87.3	100	70	31.75	48	-					32	8	12.7						1600	1.8	2	
		125R-SF	MTO		112.3	125	87	38.1	58					63	38	10	15.9						1300	3.5	2	
		160R-SF	MTO		147.3	160	102	50.8	72							11	19.1						1000	5.9	2	
		200R-SF	MTO		187.3	200	142	47.625	110		18	26	101.6		40	14	25.4						800	8.1	3	
		250R-SF	MTO		237.3	250																		10.8	3	

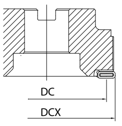
*ø250 sizes have holes for lighter weight.

Max. Revolution

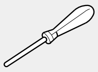
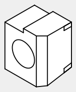
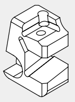
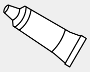
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page **M195**.
Do not use the end mill or cutter at the maximum revolution or higher since
the centrifugal force may cause inserts and parts to scatter even under no load.

Surface Finish

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

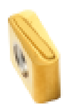
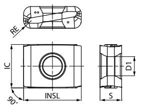
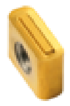
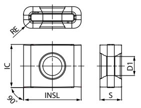


Spare parts

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

MTO : Made to order

LNGX

Insert		Description	No. of edges	Dimension (mm)					Cermet	Carbide		Applicable toolholder ➡ M193 M38
									PVD	PVD		
				IC	S	D1	RE	INSL	PV60M	PR1525	PR1825	
	 Low cutting force	LNGX 120916R-TT	4	9.525	4.76	4.2	1.6	12.7	MTO	MTO	MTO	MFF...-SF MFSE45...-W MFSE45...-W-M
		LNGX 120916	4	9.525	4.76	4.2	1.6	12.7	MTO	MTO	MTO	MFF...-SF MFSE45...-W MFSE45...-W-M

Recommended cutting conditions ➡ **M195**

MTO : Made to order

Recommended cutting conditions

Chipbreaker	Workpiece material	f (mm/rev)	ap (mm)	Recommended insert grades (Vc : m/min)	
				PV60M	PR1825 (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

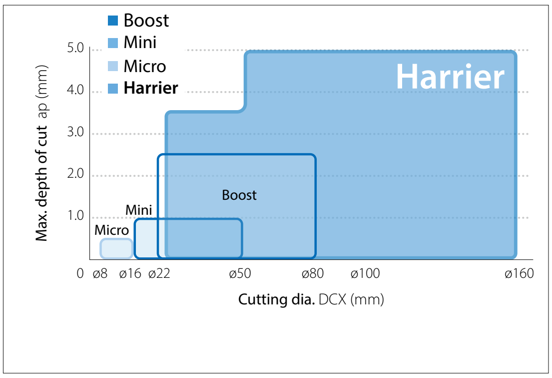
*Machining with coolant is recommended for stainless steel
The bold-faced number indicates a center value of recommended cutting condition.
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

MFH Harrier

Anti chattering

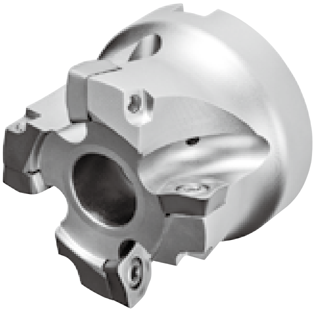
Applicable to various applications with 4 types of inserts

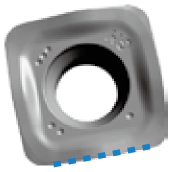
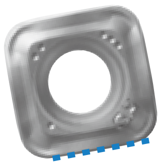
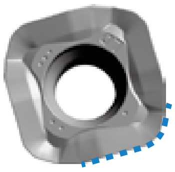
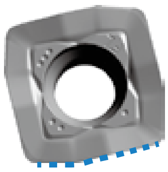
Increased chip evacuation and shortened cutting time



1 Large chipbreaker lineup for various machining applications

4 types of inserts according to your application

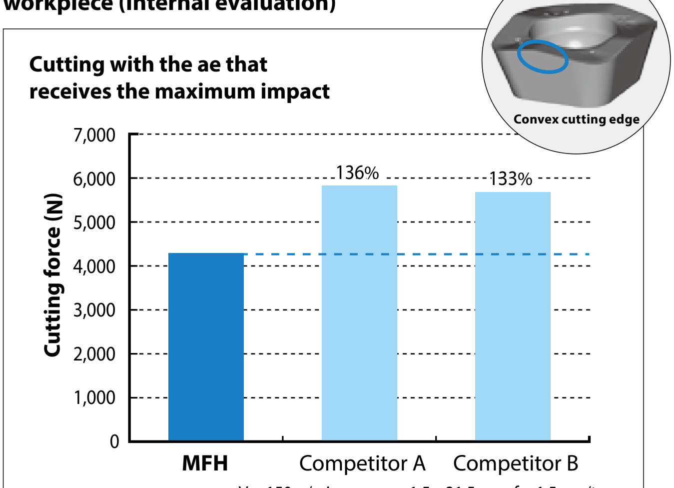


	GM type (General purpose)	GH type (Tough edge)	LD type (Large D.O.C.)	FL type (Low cutting force)
Shape				
Applications	1st recommendation for general purpose →Facing, Pocketing, Helical milling	Excellent fracture resistance →Available for facing, ramping and helical milling	Max. ap=5 mm →Applicable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

2 3D convex cutting edge reduces shock of biting workpiece

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

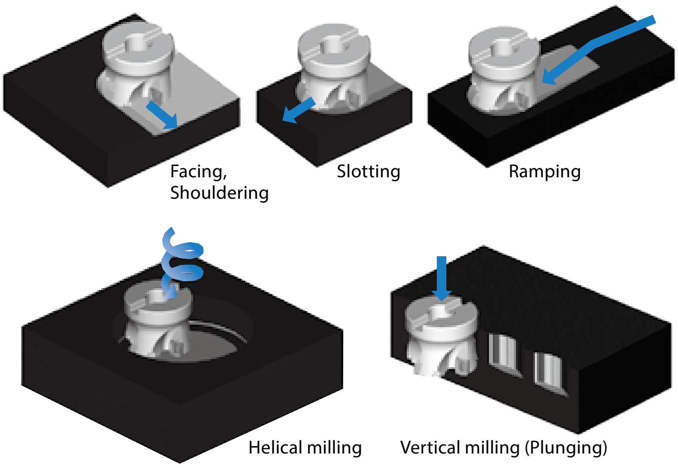
Cutting with the ae that receives the maximum impact



Vc=150m/min , ap ×ae=1.5 ×31.5mm , fz=1.5mm/t
S50C, Dry, Cutter dia. ø63

Chart shows resultant cutting force

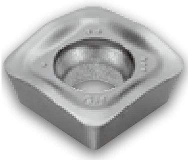
3 Multi-functional cutter



* GM type is applicable for all the above applications

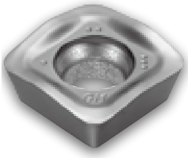
* LD type and FL type are not applicable for helical milling, Plunging and contouring of rising wall (Please refer to **M206, M207**)

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



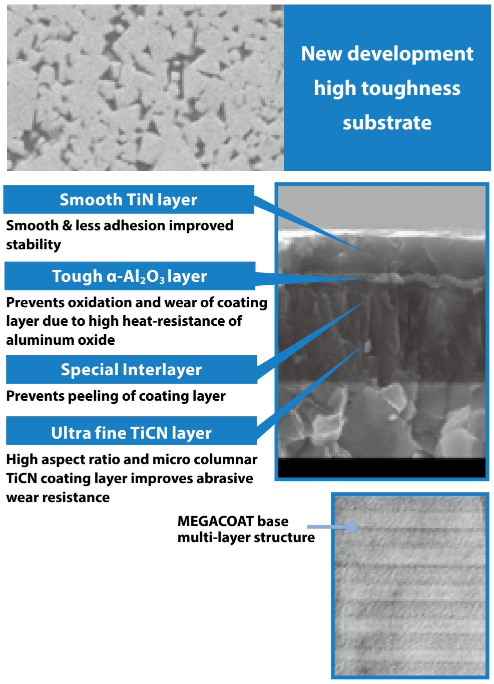
CA6535

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



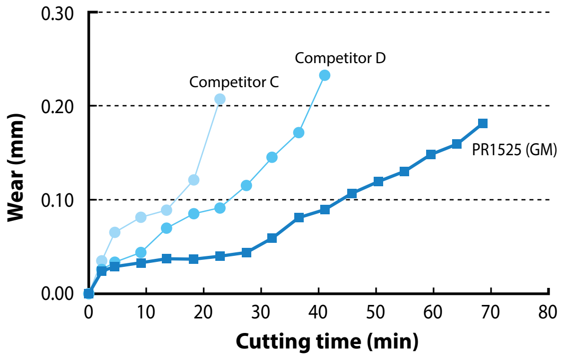
PR1835

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 EX



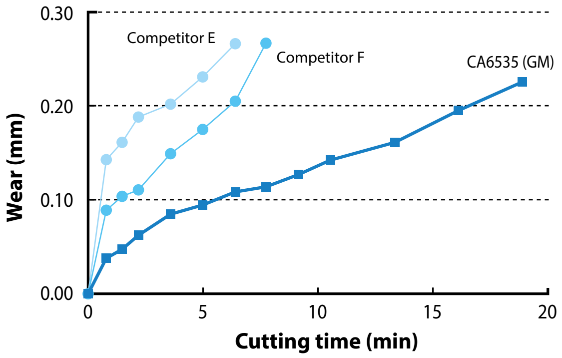
Wear resistance comparison (Internal evaluation)

SKD11



<Cutting conditions> Vc=150m/min, ap×ae=1.0×16mm, fz=1.5mm/t, Dry

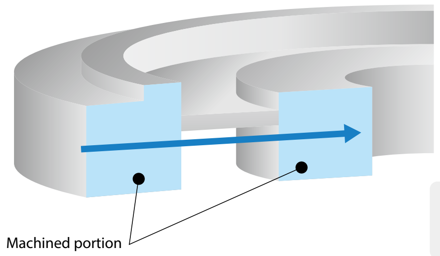
Ni-base heat-resistant alloys



<Cutting conditions> Vc=30m/min, ap×ae=1.0×40mm, fz=0.8mm/t, Wet

Case studies

SFVAF22B (Forged alloy steel)



Machining efficiency 3 times increase

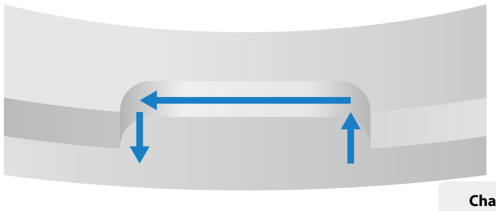
- Turbine parts • Vc=160m/min • ap×ae=1.5×max.160mm
- fz=1.17mm/t • Dry
- MFH160R-14-8T (8 Flutes) • SOMT140520ER-GM (PR1525)

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 • ap×ae=1.0×20mm
- fz=1.2mm/t • Dry
- MFH32-S32-10-2T (2 Flutes) • SOMT100420ER-GM (PR1535)

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

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

(User evaluation)

MFH Harrier (Face mill)

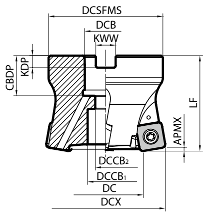


Fig. 1

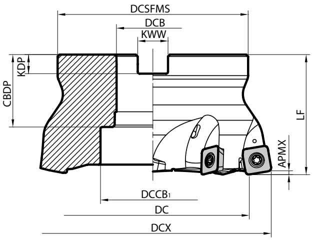


Fig. 2

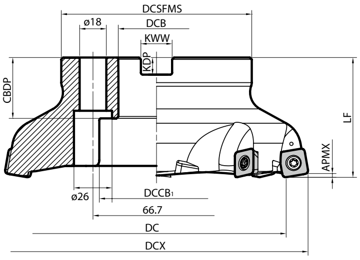


Fig. 3

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)																A.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Applicable inserts ➡ **M203**
			R		DCX	DC (GM/GH)	DC (LD)	DC (FL)	DCSFMS	DCB	DCCB₁	DCCB₂	LF	CBDP	KDP	KWW	APMX	APMX₂						
Metric	MFH	050R-10-4T-M	●	4	50	33	37.5	36.5	47	22	19	11	50	21	6.3	10.4	1.5 (3.5)	1.2	+10	Yes	10000	0.4	1	SOMT1004...
		050R-10-5T-M	●	5																				
		063R-10-5T-22M	●	5	63	46	50.5	49.5	60												8800	0.7		
		063R-10-5T-27M	●							27	20	13		24	7	12.4								
		063R-10-6T-22M	●	6						22	19	11		21	6.3	10.4								
		063R-10-6T-27M	●							27	20	13		24	7	12.4								
		080R-10-7T-M	●	7	80	63	67.5	66.5	76				63								7600	1.6		
Bore dia. inch spec	MFH	050R-10-4T	●	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...
		050R-10-5T	●	5																				
		063R-10-5T	●		63	46	50.5	49.5	60												8800	0.7		
		063R-10-6T	●	6																				
		080R-10-7T	●	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 **M199**

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

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)														A.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Applicable inserts ➡ M203
			R		DCX	DC (GM/GH)	DC (LD)	DC (FL)	DCSFMS	DCB	DCCB$_1$	DCCB$_2$	LF	CBDP	KDP	KWW	APMX	APMX$_2$						
Metric	MFH	050R-14-4T-M	●	4	50	27	33	32	47	22	12	-	50	21	6.3	10.4	2 (5)	2	+10	Yes	8800	0.4	1	SOMT1405...
		063R-14-4T-22M	●		63	40	46	45	60		19	11									7400	0.6	1	
		063R-14-4T-27M	●							27	20	13		24	7	12.4							1	
		063R-14-5T-22M	●	5						22	19	11		21	6.3	10.4							1	
		063R-14-5T-27M	●							27	20	13		24	7	12.4							1	
		080R-14-5T-M	●	5	80	57	63	62	76	27	20	13	63	24	7	12.4					6400	1.4	1	
		080R-14-6T-M	●	6																			1	
		100R-14-6T-M	●		100	77	83	82	96	32	26	17		28	8	14.4					5600	2.4	2	
		100R-14-7T-M	●	7																			2	
		125R-14-7T-M	●		125	102	108	107	100	40	55	-		33	9	16.4					4800	2.8	2	
		160R-14-8T-M	●	8	160	137	143	142			68			32						No	4200	3.7	3	
Bore dia. inch spec	MFH	050R-14-4T	●	4	50	27	33	32	47	22.225	12	-	50	19	5	8.4	2 (5)	2	+10	Yes	8800	0.4	1	SOMT1405...
		063R-14-4T	●		63	40	46	45	60		19	11									7400	0.6	1	
		063R-14-5T	●	5																			1	
		080R-14-5T	●		80	57	63	62	76	31.75	26	17	63	32	8	12.7					6400	1.3	1	
		080R-14-6T	●	6																			1	
		100R-14-6T	●		100	77	83	82	96												5600	2.4	1	
		100R-14-7T	●	7																			1	
		125R-14-7T	●		125	102	108	107	100	38.1	55	-		38	10	15.9					4800	2.9	2	
		160R-14-8T	●	8	160	137	143	142		50.8	72				11	19.1				No	4200	3.9	2	

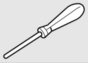
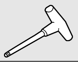
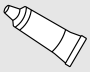
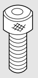
For APMX$_2$, refer to the figure below

The values (APMX = 5) and (APMX$_2$ = 2) are valid in case of LD-Type usage.

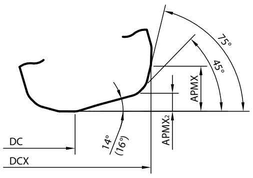
Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

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	
			DTPM	TTP			
							
MFH	050R-10-...	SB-4090TRPN	DTPM-15		P-37	HH10X30	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL SOMT100420ER-GH
	050R-10-...-M						
	063R-10-...						
	063R-10-...-22M						
	063R-10-...-27M					HH12X35	
	080R-10-...	Recommended tightening torque for insert clamp 3.5N•m				HH16X40	
	080R-10-...-M					HH12X35	
MFH	050R-14-...	SB-50120TRP	TTP-20		P-37	W10X31	SOMT140520ER-GM SOMT140520ER-LD SOMT140514ER-FL SOMT140520ER-GH
	050R-14-...-M						
	063R-14-...					HH10X30	
	063R-14-...-22M						
	063R-14-...-27M					HH12X35	
	080R-14-...					HH16X40	
	080R-14-...-M					HH12X35	
	100R-14-...					HH16X40	
	100R-14-...-M	Recommended tightening torque for insert clamp 4.5N•m				-	
	125R-14-...					-	
	125R-14-...-M					-	
	160R-14-...					-	
	160R-14-...-M					-	

Cutting edge shape when attaching LD type



Angle in ( ) is for SOMT14 type

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)

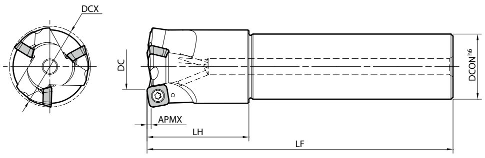


Fig. 1

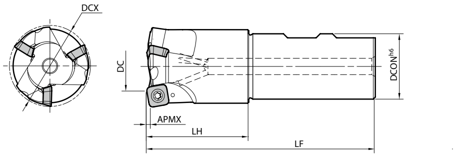


Fig. 2

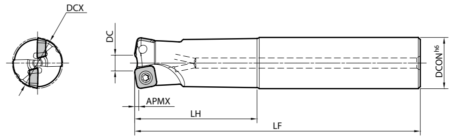


Fig. 3

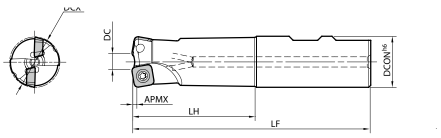


Fig. 4

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)									A.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Spare parts			Applicable inserts ➡ **M203**
					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	●	2	25	25	8	12.5	11.5	140	60	1.5 (3.5)	1.2	+10	Yes	17000	0.4	3	P-37	SB-4075TRP Recommended tightening torque for insert clamp 3.5N•m	DTPM-15	SOMT1004...
		28-S25-10-2T	●		28		11	15.5	14.5		40					15500	0.5	1				
		32-S32-10-2T	●		32	32	15	19.5	18.5	150	70					14000	0.8	3				
		32-S32-10-3T	●	3														3				
		35-S32-10-2T	●	2	35		18	22.5	21.5		50					13000		1				
		35-S32-10-3T	●	3														1				
		40-S32-10-3T	●		40		23	27.5	26.5							11500	0.9	1				
		40-S32-10-4T	●	4														1				
Weldon	MFH	25-W25-10-2T	●	2	25	25	8	12.5	11.5	117	60	1.5 (3.5)	1.2	+10	Yes	17000	0.4	4	P-37	SB-4075TRP Recommended tightening torque for insert clamp 3.5N•m	DTPM-15	SOMT1004...
		32-W32-10-3T	●	3	32	32	15	19.5	18.5	131	70					14000	0.7	4				
		40-W32-10-3T	●		40		23	27.5	26.5	112	50					11500		2				
		40-W32-10-4T	●	4														2				
Long Shank	MFH	25-S25-10-2T-200	●	2	25	25	8	12.5	11.5	200	120	1.5 (3.5)	1.2	+10	Yes	17000	0.6	3	P-37	SB-4075TRP Recommended tightening torque for insert clamp 3.5N•m	DTPM-15	SOMT1004...
		28-S25-10-2T-200	●		28		11	15.5	14.5		40					15500	0.7	1				
		32-S32-10-2T-200	●		32	32	15	19.5	18.5		120					14000	1	3				
		35-S32-10-2T-200	●		35		18	22.5	21.5		50					13000	1.4	1				
		40-S32-10-4T-250	●	4	40		23	27.5	26.5	250						11500	1.5	1				
Extra Long Shank	MFH	25-S25-10-2T-300	●	2	25	25	8	12.5	11.5	300	180	1.5 (3.5)	1.2	+10	Yes	17000	1	3	P-37	SB-4075TRP Recommended tightening torque for insert clamp 3.5N•m	DTPM-15	SOMT1004...
		28-S25-10-2T-300	●		28		11	15.5	14.5		40					15500	1.1	1				
		32-S32-10-2T-300	●		32	32	15	19.5	18.5		180					14000	1.6	3				
		35-S32-10-2T-300	●		35		18	22.5	21.5		50					13000	1.7	1				
		40-S32-10-4T-300	●	4	40		23	27.5	26.5							11500	1.8	1				

For APMX$_2$, refer to the figure in **M199**

The values (APMX = 3.5) and (APMX$_2$ = 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

MFH Harrier (End mill)

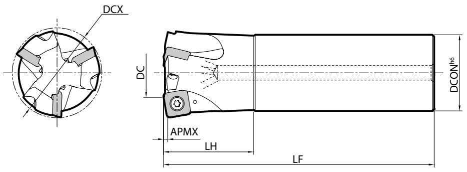


Fig. 1

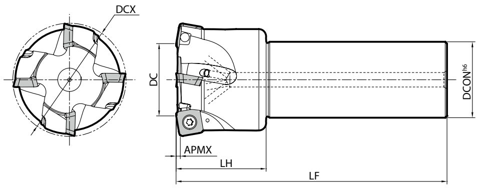


Fig. 2

Toolholder dimensions

Description		Availability	Inserts	Dimension (mm)									A.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Spare parts			Applicable inserts ➡ **M203**
				DCX	DCON	DC (GM/GH)	DC (LD)	DC (FL)	LF	LH	APMX	$APMX_2$						Anti-seize compound	Screw	Wrench	
MFH	50-S42-14-3T	●	3	50	42	27	33	32	150	50	2 (5)	2	+10	Yes	8800	1.4	1	P-37	SB-50120TRP	TTP-20	SOMT1405...
	63-S42-14-4T	●	4	63		40	46	45							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 $APMX_2$, refer to the figure in **M199**

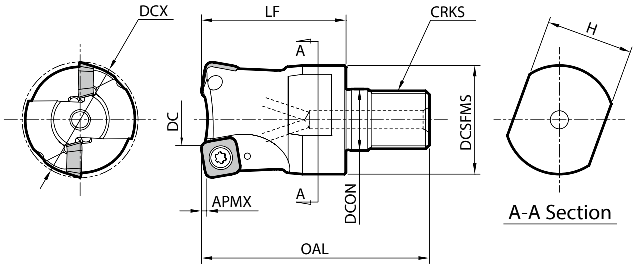
The values (APMX = 5) and ($APMX_2$ = 2) are valid in case of LD-Type usage.

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.

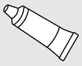
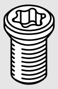
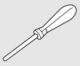
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

● : 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 ➡ **M203**
				DCX	DCON	DC (GM/GH)	DC (LD)	DC (FL)	DCSFMS	OAL	LF	APMX	APMX2	CRKS	H				Anti-seize compound	Screw	Wrench	
																						
MFH	25-M12-10-2T	●	2	25	12.5	8	12.5	11.5	23	57	35	1.5 (3.5)	1.2	M12x1.75	19	+10	Yes	17000	P-37	SB-4075TRP Recommended tightening torque for insert clamp 3.5N•m	DTPM-15	SOMT1004...
	28-M12-10-2T	●		28		11	15.5	14.5										15500				
	32-M16-10-2T	●		32	17	15	19.5	18.5	30	62	40			M16x2.0	24			14000				
	32-M16-10-3T	●	3																			
	35-M16-10-2T	●	2	35		18	22.5	21.5										13000				
	35-M16-10-3T	●	3																			
	40-M16-10-3T	●		40		23	27.5	26.5										11500				
	40-M16-10-4T	●	4																			

For APMX₂, refer to the figure in **M199**

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 **M82** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

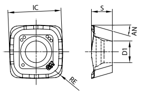
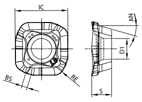
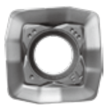
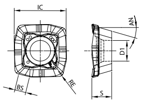
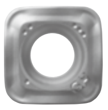
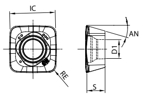
● : Standard item

SOMT

Classification of usage

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

	CA6535	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
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 ➡ **M198~M202**
										CVD	PVD							
				IC	S	D1	RE	BS	AN	CA6535	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
	 General purpose	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-..
	 Large D.O.C.	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-..
	 With wiper edge	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-..
	 Tough edge	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 ➡ **M204, M205**

● : Standard item ○ : Will be replaced with a new product ☐ : Expected to be discontinued in September 2026

Recommended cutting conditions

Insert type	Workpiece material	Toolholder description and feed rate (fz: mm/t)			Recommended insert grades (Vc: m/min)				
					MEGACOAT NANO EX (MEGACOAT NANO)			MEGACOAT HARD	CVD Coated carbide
		MFH25-...	MFH32-...	MFH40-...	PR1810 (PR1510)	PR1825 (PR1525)	PR1835 (PR1535)	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~**0.7**~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)	-	☆ 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☆ 30~**50**~70	-	GM★ 40~**60**~80	-	-
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~**0.7**~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)	-	★ 80~**140**~180	☆ 80~**140**~180	-	-
	Mold steel (40 ~ 50HRC)	0.2~**0.3**~0.5(ap≤1.0mm) 0.03~**0.05**~0.1(ap≤3.5mm)	0.2~**0.5**~0.8(ap≤1.0mm) 0.03~**0.08**~0.15(ap≤3.5mm)	0.2~**0.6**~0.9(ap≤1.0mm) 0.03~**0.1**~0.15(ap≤3.5mm)	-	★ 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)	☆ 30~**50**~70	-	★ 40~**60**~80	-	-
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~**0.7**~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)	-	★ 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)	☆ 30~**50**~70	-	★ 40~**60**~80	-	-

★ : 1st Recommendation ☆: 2nd Recommendation

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

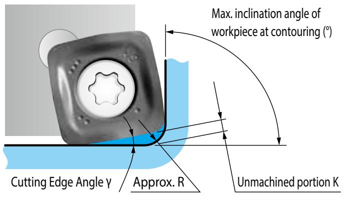
Recommended cutting conditions

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 EX (MEGACOAT NANO)			MEGACOAT HARD	CVD Coated carbide
				PR1810 (PR1510)	PR1825 (PR1525)	PR1835 (PR1535)	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☆ 30~**50**~70	-	GM★ 40~**60**~80	-	-
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)	☆ 30~**50**~70	-	★ 40~**60**~80	-	-
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		☆ 30~**50**~70	-	★ 40~**60**~80	-	-

★: 1st Recommendation ☆: 2nd Recommendation

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

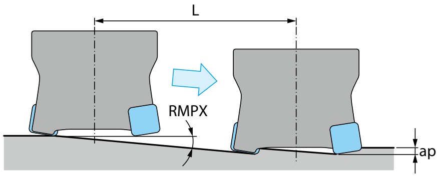
MFH...-14-...

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

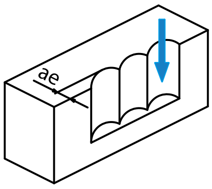
Guide for ramping (Slant milling)

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



Vertical milling (Plunging)



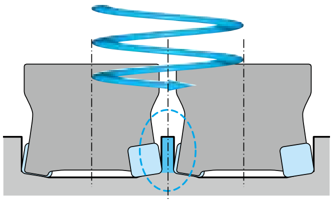
Insert description	Max. width of cut (ae)
SOMT10	8mm
SOMT14	11.5mm

*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=0.2mm/t or less.

Guide for helical milling

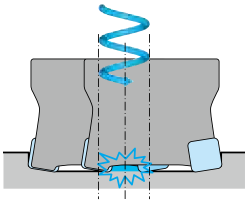
For helical milling, use between min. cutting dia. and max. cutting dia.

🚫 Over max. cutting dia.



Center core part remains after machining

🚫 Under min. cutting dia.

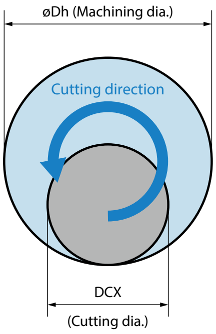


Center core part interferes with toolholder

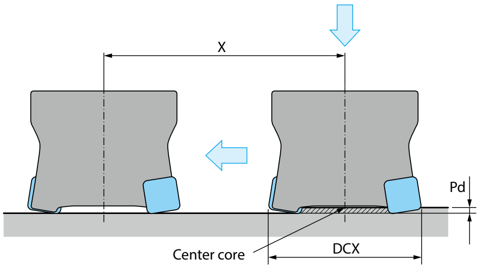
Description	Min. cutting dia.	Max. cutting dia.
MFH...-10-...	2×DCX-18	2×DCX-2
MFH...-14-...	2×DCX-25	2×DCX-2

Unit: mm

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



Guide for drilling



3D machining

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

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

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

Unit: mm

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

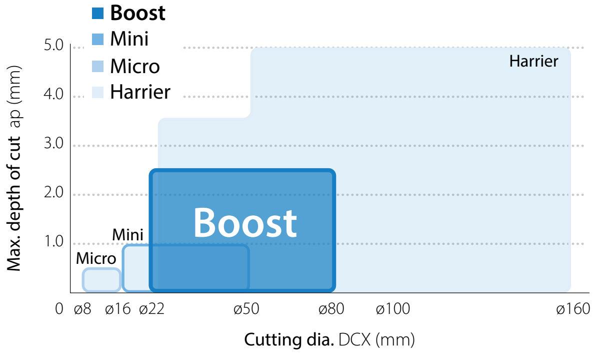
[When traversing after drilling]

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=0.2mm/rev or under.

High feed and large depth of cut milling

MFH Boost

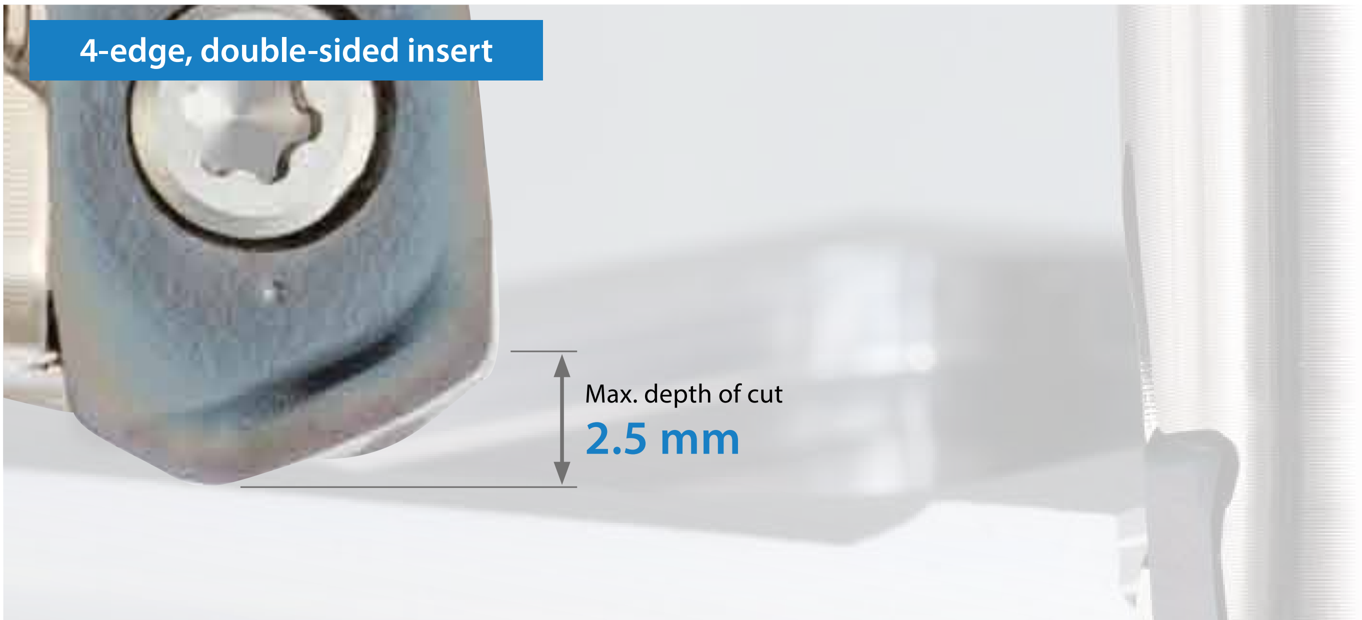
Large D.O.C. for greater milling capabilities
Excellent performance in a wide range of applications, including automotive parts, difficult-to-cut materials, and molds



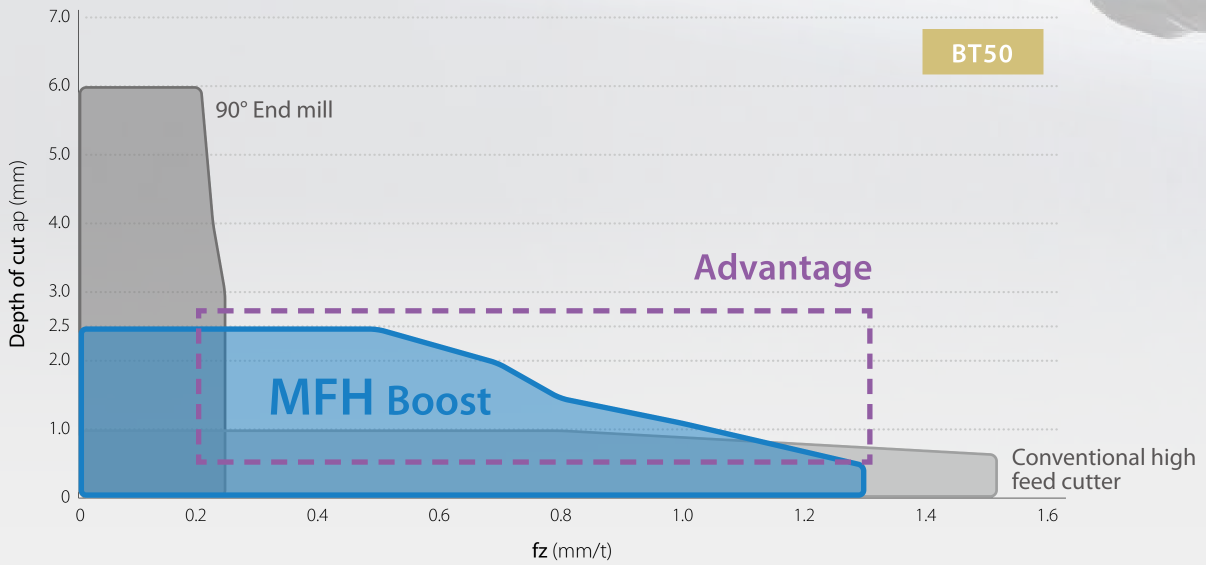
1 High feed milling with large depth of cut capabilities

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

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



MFH Boost Advantage



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

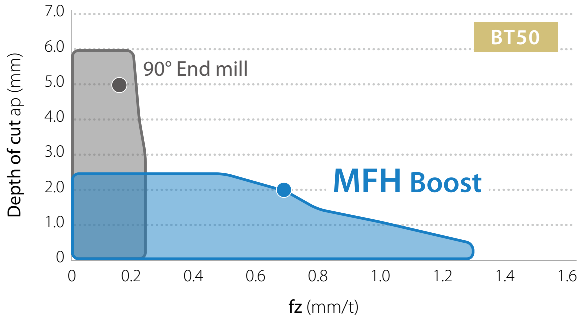
Machining efficiency simulation example

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



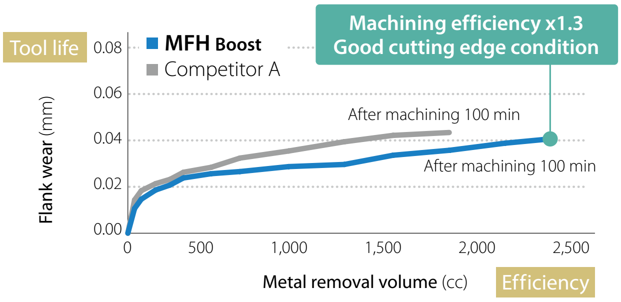
High efficiency and good tool life

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



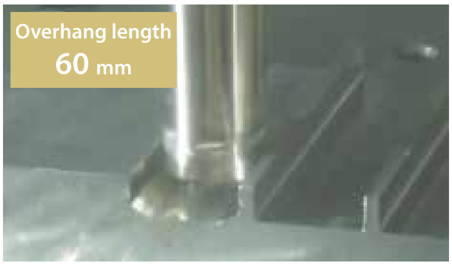
Cutting conditions: Vc = 150 m/min, ae = 12.5 mm, dry, SCM440Ⓗ, ø 25 (1 Insert) BT50

High stability in unstable machining environment

Chatter resistance comparison (Internal evaluation)

Slotting
ø 25 (3 Inserts)
External air
S50C
BT50

Video



Machining efficiency

Machining efficiency
x 4.5

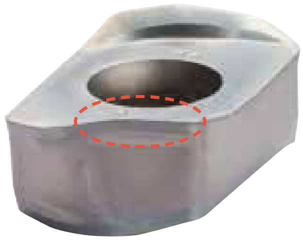
MFH Boost
103 cc/min
Vc = 120 m/min, ap = 1.5 mm, fz = **0.6** mm/t

Competitor A
90 ° End Mill
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

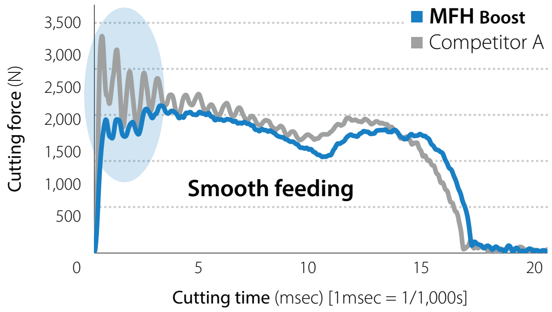
High efficiency and stable machining designs

Kyocera's original technology

Convex cutting edge design reduces impact when entering workpiece



Cutting force when entering workpiece (Internal evaluation)



Cutting conditions:
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

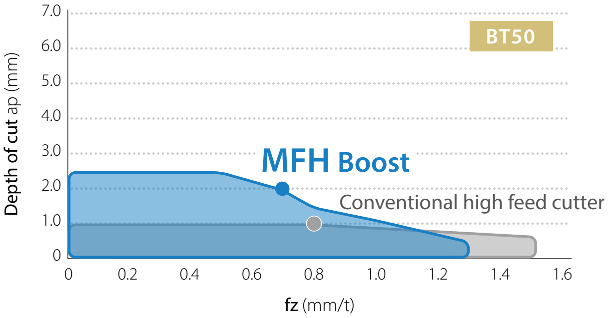
ap = 2.0 mm, fz = 0.7 mm/t

Machining efficiency x 1.3

Conventional
high feed cutter
ø 25 (3 Inserts)

76 cc/min

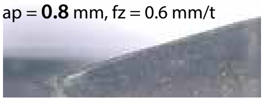
ap = 1.0 mm, fz = 0.8 mm/t

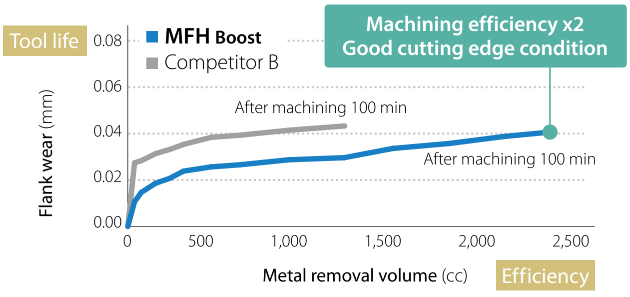


High efficiency and good tool life

Machining efficiency and cutting edge condition comparison
(Internal evaluation)

Cutting edge condition after 100 min machining

MFH Boost	Competitor B High feed type
ap = 1.6 mm, fz = 0.6 mm/t	ap = 0.8 mm, fz = 0.6 mm/t
	

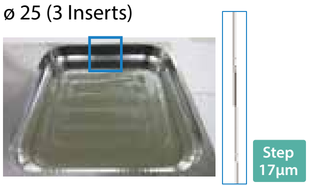
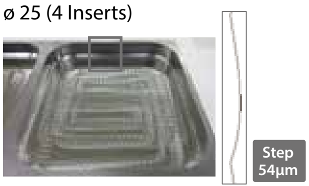


Cutting conditions: Vc = 150 m/min, ae = 12.5 mm, dry, SCM440Ⓗ, ø 25 (1 Insert), BT50

Excellent wall accuracy

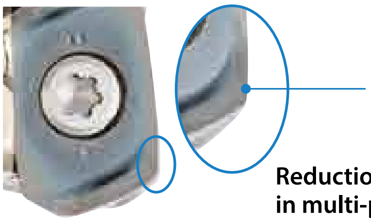
Machining efficiency and wall accuracy comparison
(Internal evaluation)

Pocketing (Depth 12mm)

MFH Boost ø 25 (3 Inserts)	Competitor B High feed type ø 25 (4 Inserts)
	
ap = 1.5 mm × 8 passes Q = 115 cc/min	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)

Machining efficiency x 1.8

MFH Boost

Approx. 1' 30"

ap = 1.5 mm × 4 passes (fz = ~0.35 mm/t)

Competitor C
High feed type

Approx. 2' 50"

ap = 0.6 mm × 10 passes (fz = ~0.4 mm/t)

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

MFH Boost (End mill)

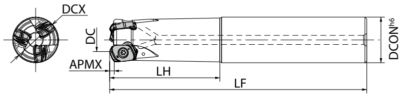


Fig. 1

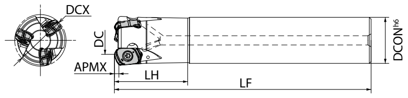


Fig. 2

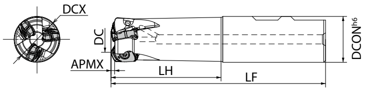


Fig. 3

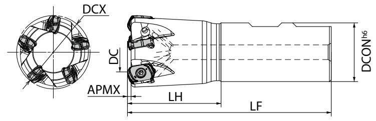


Fig. 4

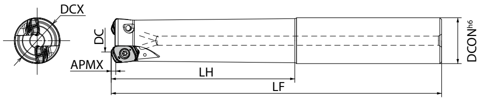


Fig. 5

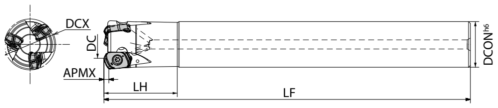
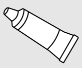
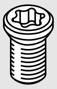
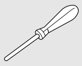


Fig. 6

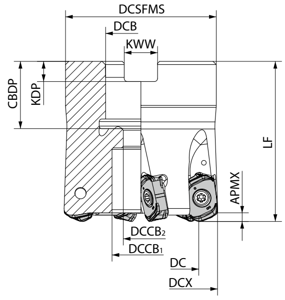
Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)						A.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Spare parts			Applicable inserts ➡ M214
						DC	DCX	DCON	LF	LH	APMX						Anti-seize compound 	Screw 	Wrench 	
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 Recommended tightening torque for insert clamp 2.0N•m	DTPM-10	LOMU040410ER-GM
			25-S25-04-3T	●	3											1				
			32-S32-04-4T	●	4	21	32	32	150	70				11200	0.8	1				
			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 Recommended tightening torque for insert clamp 2.0N•m	DTPM-10	LOMU040410ER-GM
			28-S25-04-3T	●	3	17	28	25	140	40				12000	0.5	2				
			28-S25-04-4T	●	4											2				
			35-S32-04-4T	●		24	35	32	150	50				10700	0.8	2				
			35-S32-04-5T	●	5											2				
			40-S32-04-5T	●		29	40							10000	0.9	2				
			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 Recommended tightening torque for insert clamp 2.0N•m	DTPM-10	LOMU040410ER-GM
			25-S25-04-3T-180	●	3											5				
			28-S25-04-3T-200	●		17	28		200	40				12000	0.7	6				
			32-S32-04-4T-200	●	4	21	32	32		120				11200	1.1	5				
			35-S32-04-4T-200	●		24	35			50				10700		6				
			40-S32-04-5T-250	●	5	29	40		250					10000	1.5	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 Recommended tightening torque for insert clamp 2.0N•m	DTPM-10	LOMU040410ER-GM
			25-W25-04-3T	●	3											3				
			32-W32-04-4T	●	4	21	32	32	131	70				11200	0.7	3				
			32-W32-04-5T	●	5											3				
			40-W32-04-5T	●		29	40		111	50				10000		4				
			40-W32-04-6T	●	6											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)



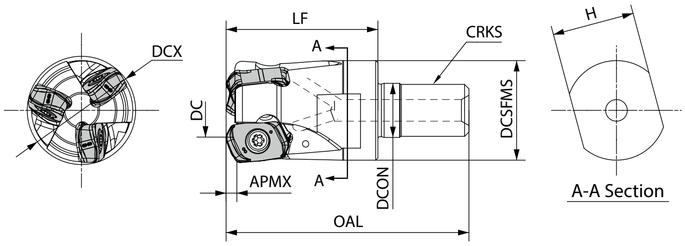
Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)											A.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Spare parts			Applicable inserts ➡ M214
			R		DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX					Anti-seize compound	Screw	Wrench	
Metric	MFH	040R-04-5T-M	●	5	29	40	38	16	15	9	40	19	5.6	8.4	2.5	-10	Yes	10000	0.2	P-37	SB-3575TRP Recommended tightening torque for insert clamp 2.0N•m	DTPM-10	LOMU040410ER-GM
		040R-04-6T-M	●	6																			
		050R-04-6T-M	●		39	50	47	22	18	11	50	21	6.3	10.4				9000	0.4				
		050R-04-7T-M	●	7																			
		052R-04-6T-M	●	6	41	52												8800	0.5				
		052R-04-7T-M	●	7															0.4				
		063R-04-7T-M	●		52	63	60	22	18	11								8000	0.8				
		063R-04-7T-27M	●					27	20	13		24	7	12.4									
		063R-04-9T-M	●	9				22	18	11		21	6.3	10.4									
		063R-04-9T-27M	●					27	20	13		24	7	12.4					0.7				
		080R-04-8T-M	●	8	69	80	76				63							7100	1.8				
		080R-04-10T-M	●	10															1.7				
Bore dia. inch spec	MFH	080R-04-8T	●	8	69	80	76	31.75	26	17	63	32	8	12.7	2.5	-10	Yes	7100	1.6	P-37	SB-3575TRP Recommended tightening torque for insert clamp 2.0N•m	DTPM-10	LOMU040410ER-GM
		080R-04-10T	●	10																			

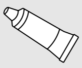
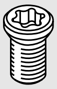
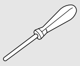
Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

● : Standard item

MFH Boost (Modular type)



Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)									A.R. (°)	Coolant hole	Max. revolution (min^{-1})	Spare parts			Applicable inserts ➡ **M214**
			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	2.5	M10X1.5	15	-10	Yes	13600	P-37	SB-3575TRP Recommended tightening torque for insert clamp 2.0N•m	DTPM-10	LOMU040410ER-GM
25-M12-04-2T	●		14	25	12.5	23	56	35		M12X1.75	19			12700				
25-M12-04-3T	●	3																
28-M12-04-3T	●		17	28										12000				
28-M12-04-4T	●	4																
32-M16-04-4T	●		21	32	17	30	62	40		M16X2.0	24			11200				
32-M16-04-5T	●	5																
35-M16-04-4T	●	4	24	35										10700				
35-M16-04-5T	●	5																
40-M16-04-5T	●		29	40										10000				
40-M16-04-6T	●	6																
42-M16-04-5T	●	5	31	42										9800				
42-M16-04-6T	●	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 **M82** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

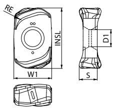
● : Standard item

LOMU

Classification of usage

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

	CA6535	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
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							Applicable toolholder ➡ M211~M213
									CVD	PVD						
				S	D1	RE	W1	INSL	CA6535	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
	 General purpose	LOMU 040410ER-GM	4	4.4	4.1	1	9.1	14.5	●	☐	○	●	●	●	●	MFH...-04-..

Handed insert shows Right-hand

Recommended cutting conditions ➡ **M215**

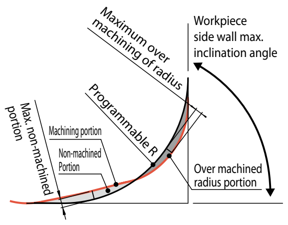
● : Standard item ○ : Will be replaced with a new product ☐ : Expected to be discontinued in September 2026

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 EX (MEGACOAT NANO)			CVD Coating
					PR1810 (PR1510)	PR1825 (PR1525)	PR1835 (PR1535)	CA6535
GM	Carbon steel Alloy 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				
		(~ 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				
		(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					
		(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

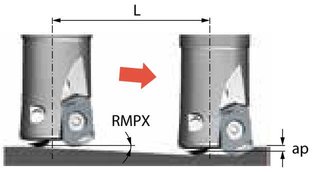
Shape	Programmable R (mm)	Over machined radius portion (mm)	Non-machined portion (mm)
	1.5	0	1.42
	2.0	0	1.24
	3.0 (Recommended)	0	0.87
	3.5	0.06	0.69

Ramping tips

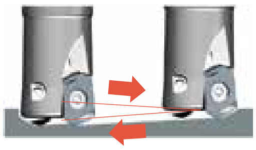
- Ramping angle should be under RMPX
- Reduce recommended feed rate in cutting conditions above by 70%

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

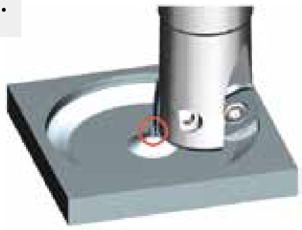
Description	Cutter dia. DCX (mm)	22	25	28	32	35	40	42	50	52	63	80
MFH… -04- …	Max. ramping angle RMPX	3.9°	3.0°	2.4°	2.0°	1.7°	1.4°	1.3°	1.0°	1.0°	0.8°	0.6°
	tan RMPX	0.068	0.052	0.042	0.035	0.029	0.024	0.022	0.018	0.017	0.013	0.010

Guide for helical milling

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

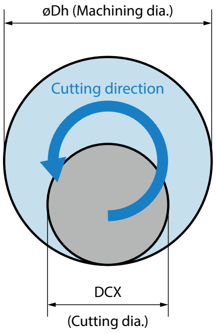
⊘ Exceeding max. cutting dia.

Center core part remains after machining



⊘ Under min. cutting dia.

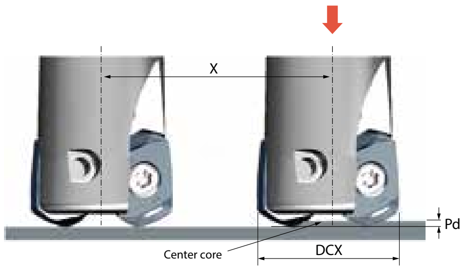
Center core part interferes with toolholder



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

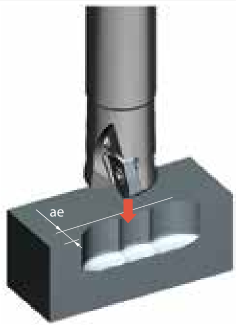


Description	GM type	
	Max. drilling depth Pd (mm)	Min. cutting length X for flat bottom surface (mm)
MFH… -04- …	0.6	DCX-12

- It is recommended to reduce feed by 25% of recommendation until the center core is removed
- Axial feed rate recommendation per revolution is f ≤ 0.2 mm/rev

Vertical milling (Plunging)

Vertical milling (Plunging)



Insert description	Maximum width of cut (ae)
LOMU04 Type	5.0 mm

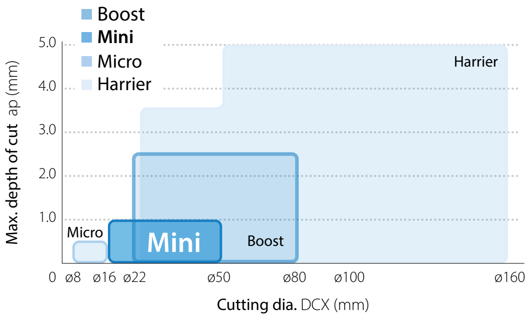
- Reduce feed rate to fz ≤ 0.2mm/t when plunging

MFH Mini

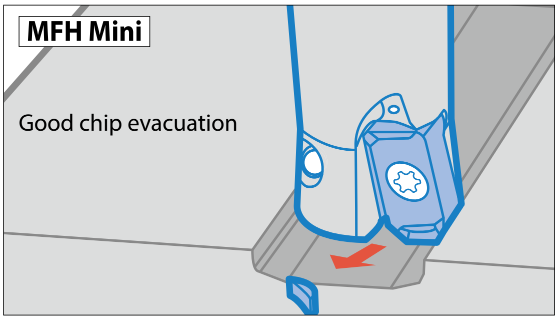
Cutter dia. ø16~ø50

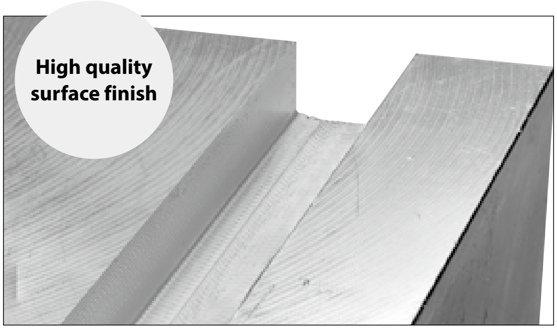
Economical double-sided 4-edge insert

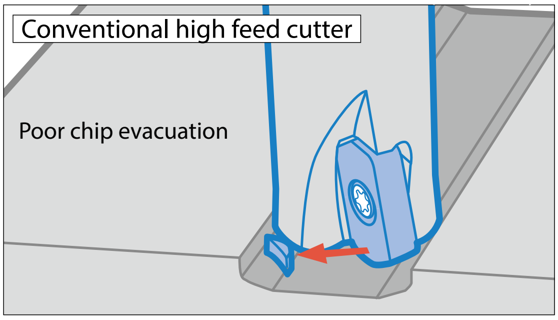
High efficiency and high feed machining at small dia. machining and small machining center



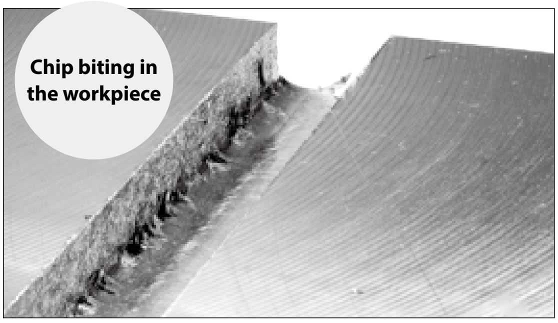
1 Excellent chip evacuation





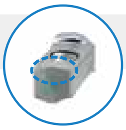


Chips clings to the insert



(Internal evaluation)

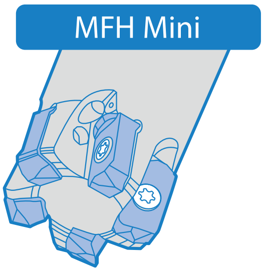
MFH Mini controls chip biting with 3D convex cutting edge



Cutting conditions: Workpiece material SS400 Cutter dia. ø16 Vc = 150 m/min ap x ae = 10 mm (0.5 mm x 20 passes) x16 mm fz = 0.6 mm/t Dry

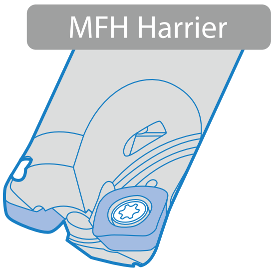
2 Multi edge design enables high efficiency machining

Cutter Dia. ø25



5 flutes

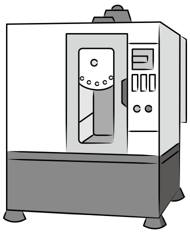
MFH25-S25-03-5T



2 flutes

MFH25-S25-10-2T

3 High efficiency and high feed machining at small machining center (BT30/BT40)



Suitable for roughing of mold

MFH Mini (End mill)

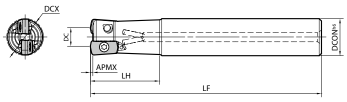


Fig. 1

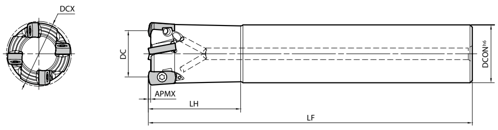


Fig. 2

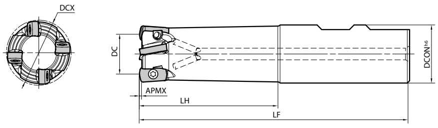
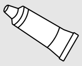
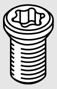
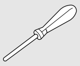


Fig. 3

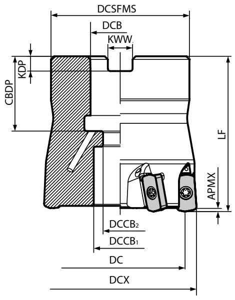
Toolholder dimensions

Description				Availability	Inserts	Dimension (mm)						A.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Spare parts			Applicable inserts ➔ M221
						DC	DCX	DCON	LF	LH	APMX						Anti-seize compound 	Screw 	Wrench 	
Cylindrical	Same shank	MFH	16-S16-03-2T	●	2	8	16	16	100	30	1	-10	Yes	18800	0.1	1	P-37	SB-3065TRP Recommended tightening torque for insert clamp 1.2N•m	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
			20-S20-03-3T	●	3	12	20	20	130	50				15700	0.3	1				
			20-S20-03-4T	●	4											1				
			25-S25-03-4T	●		17	25	25	140	60				13400	0.5	1				
			25-S25-03-5T	●	5											1				
			32-S32-03-5T	●		24	32	32	150	70				11400	0.8	1				
			32-S32-03-6T	●	6											1				
	Standard shank	MFH	17-S16-03-2T	●	2	9	17	16	100	20	1	-10	Yes	17900	0.1	2	P-37	SB-3065TRP Recommended tightening torque for insert clamp 1.2N•m	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
			18-S16-03-2T	●		10	18							17000		2				
			22-S20-03-3T	●	3	14	22	20	130	30				14700	0.3	2				
			22-S20-03-4T	●	4											2				
			28-S25-03-4T	●		20	28	25	140	40				12400	0.5	2				
			28-S25-03-5T	●	5											2				
	Long Shank	MFH	16-S16-03-2T-150	●	2	8	16	16	150	50	1	-10	Yes	18800	0.2	1	P-37	SB-3065TRP Recommended tightening torque for insert clamp 1.2N•m	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
			20-S20-03-3T-160	●	3	12	20	20	160	80				15700	0.3	1				
			25-S25-03-4T-180	●	4	17	25	25	180	100				13400	0.6	1				
			32-S32-03-5T-200	●	5	24	32	32	200	120				11400	1.1	1				
Weldon		MFH	16-W16-03-2T	●	2	8	16	16	79	30	1	-10	Yes	18800	0.1	3	P-37	SB-3065TRP Recommended tightening torque for insert clamp 1.2N•m	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
			20-W20-03-3T	●	3	12	20	20	101	50				15700	0.2	3				
			20-W20-03-4T	●	4											3				
			25-W25-03-4T	●		17	25	25	117	60				13400	0.4	3				
			25-W25-03-5T	●	5											3				
			32-W32-03-5T	●		24	32	32	131	70				11400	0.7	3				
			32-W32-03-6T	●	6											3				

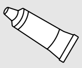
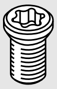
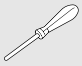
Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

● : Standard item

MFH Mini (Face mill)



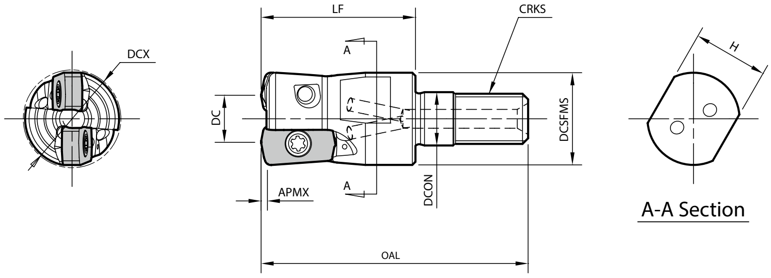
Toolholder dimensions

Description		Availability	Inserts	Dimension (mm)											A.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Spare parts			Applicable inserts ➡ **M221**
		R		DC	DCX	DCSFMS	DCB	DCCB₁	DCCB₂	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	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.

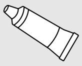
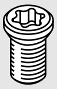
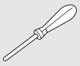
● : Standard item

MFH Mini (Modular type)



A-A Section

Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)									A.R. (°)	Coolant hole	Max. revolution (min^{-1})	Spare parts			Applicable inserts ➡ **M221**
			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 Recommended tightening torque for insert clamp 1.2N•m	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
17-M08-03-2T	●		9	17										17900				
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 Recommended tightening torque for insert clamp 1.2N•m	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
20-M10-03-4T	●	4																
22-M10-03-3T	●	3	14	22										14700				
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 Recommended tightening torque for insert clamp 1.2N•m	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
25-M12-03-5T	●	5																
28-M12-03-4T	●	4	20	28										12400				
28-M12-03-5T	●	5																
MFH 32-M16-03-5T	●	5	24	32	17	30	62	40	1	M16x2.0	24	-10	Yes	11400	P-37	SB-3065TRP Recommended tightening torque for insert clamp 1.2N•m	DTPM-8	LOGU030310ER-GM LOGU030310ER-GH
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 **M82** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

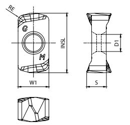
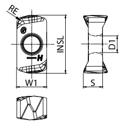
● : Standard item

LOGU

Classification of usage

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

	CA6535	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
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

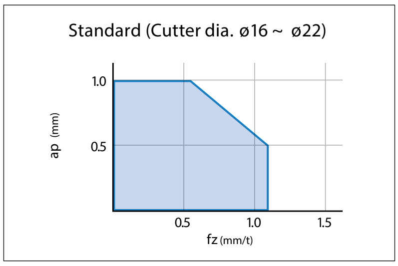
Insert		Description	No. of edges	Dimension (mm)					Carbide								Applicable toolholder ➡ **M218~M220**
									CVD	PVD							
				S	D1	RE	INSL	W1	CA6535	PR015S	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
	 General purpose	LOGU 030310ER-GM	4	3.96	3.45	1	11.9	6.2	●		□	○	●	●	●	●	MFH...-03-..
	 Tough edge	LOGU 030310ER-GH	4	3.96	3.45	1	11.9	6.2		●	□	○	●	●	●	●	MFH...-03-..

Handed insert shows Right-hand

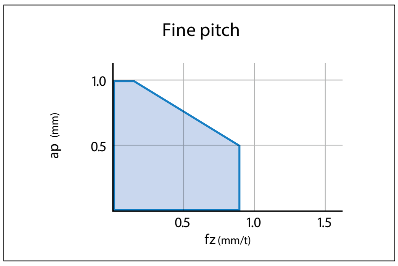
Recommended cutting conditions ➡ **M222**

● : Standard item ○ : Will be replaced with a new product □ : Expected to be discontinued in September 2026

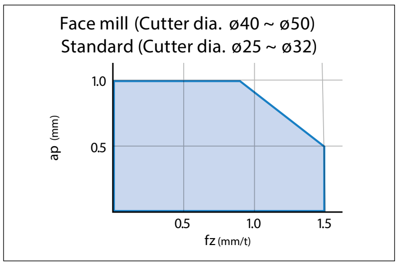
Cutting performance


Standard (Cutter dia. ø16 ~ ø22)

MFH16-...-2T, MFH17-...-2T, MFH18-...-2T
MFH20-...-3T, MFH22-...-3T


Fine pitch

MFH20-...-4T, MFH22-...-4T, MFH25-...-5T
MFH28-...-5T, MFH32-...-6T


Face mill (Cutter dia. ø40 ~ ø50)
Standard (Cutter dia. ø25 ~ ø32)

MFH25-...-4T, MFH28-...-4T, MFH32-...-5T
MFH040R-..., MFH050R-...

When using fine pitch type, reduce the cutting conditions compared with standard type.

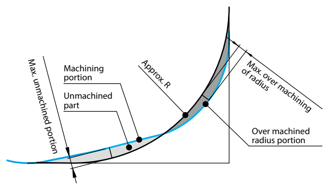
Recommended cutting conditions

Insert type	Workpiece material	Toolholder description and feed rate (fz: mm/t) * Recommended feed rate (Reference value): ap=0.5mm								Recommended insert grades (Vc: m/min)				
										MEGACOAT NANO EX (MEGACOAT NANO)			MEGACOAT HARD	CVD Coated carbide
		MFH16 -...-2T	MFH20 -...-3T	MFH20 -...-4T	MFH25 -...-4T	MFH25 -...-5T	MFH32 -...-5T	MFH32 -...-6T	MFH -...-R-03	PR1810 (PR1510)	PR1825 (PR1525)	PR1835 (PR1535)	PR015S	CA6535
GM GH	Carbon steel	0.2~**0.7**~1.2		0.2~**0.5**~0.8	0.2~**0.8**~1.5	0.2~**0.5**~0.8	0.2~**0.8**~1.5	0.2~**0.5**~0.8	0.2~**0.8**~1.5	-	★ 120~**180**~250	☆ 120~**180**~250	-	-
	Alloy steel									-	★ 100~**160**~220	☆ 100~**160**~220	-	-
	Mold steel (~ 40HRC)	0.2~**0.5**~0.9		0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	0.2~**0.4**~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)	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	-	GM☆ 100~**160**~200	GM★ 100~**160**~200	-	-
	Stainless steel (Martensitic related)									-	-	☆ 150~**200**~250	-	★ 180~**240**~300
	Stainless steel (Precipitation hardening)									-	-	★ 90~**120**~150	-	-
	Gray cast iron	0.2~**0.7**~1.2		0.2~**0.5**~0.8	0.2~**0.8**~1.5	0.2~**0.5**~0.8	0.2~**0.8**~1.5	0.2~**0.5**~0.8	0.2~**0.5**~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☆ 30~**50**~70	-	GM★ 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.
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°

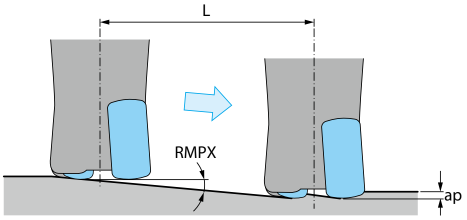
Reference data for ramping

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 undear of the above cutting conditions.

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

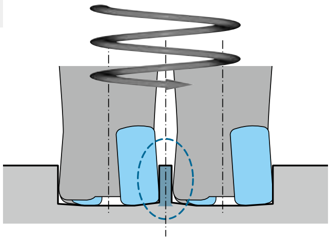


Guide for helical milling

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

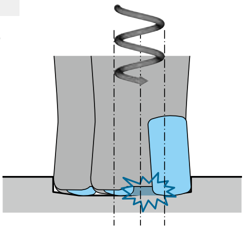
🚫 Over max. cutting dia.

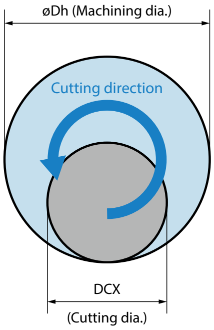
Center core part remains after machining



🚫 Under min. cutting dia.

Center core part interferes with toolholder



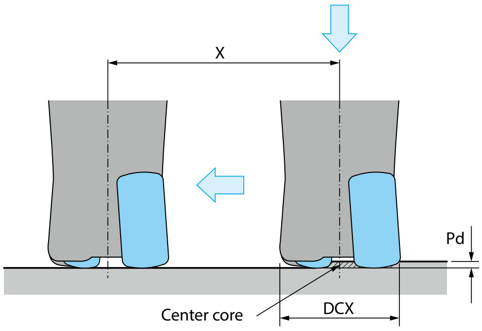


Description	Min. cutting dia.	Max. cutting dia.
MFH...-03-...	2×DCX-8	2×DCX-2

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



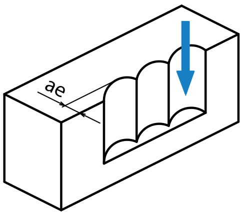
Description	GM type / GH type	
	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MFH...-03-...	1.0	DCX-9

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

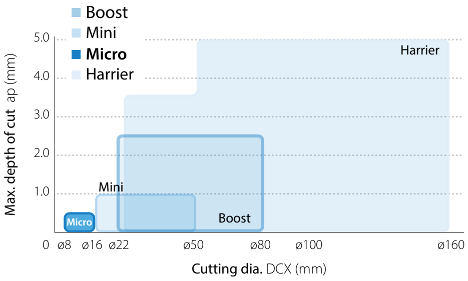
For vertical milling (plunging),
reduce feed rate to fz=0.2mm/t or less.

MFH Micro

Cutter dia. ø8~ø16

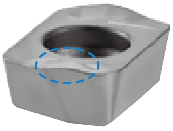
Low resistance and durable against chatter for highly efficient machining. Max. ap 0.5mm.

Stable high feed machining on a wide range of applications



1 Stable machining with chattering resistance

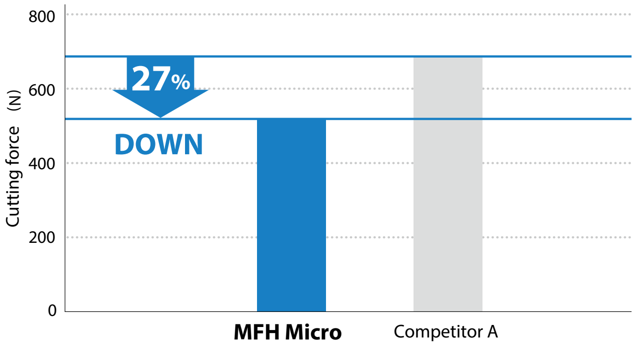
3D convex cutting edge



High precision G class insert

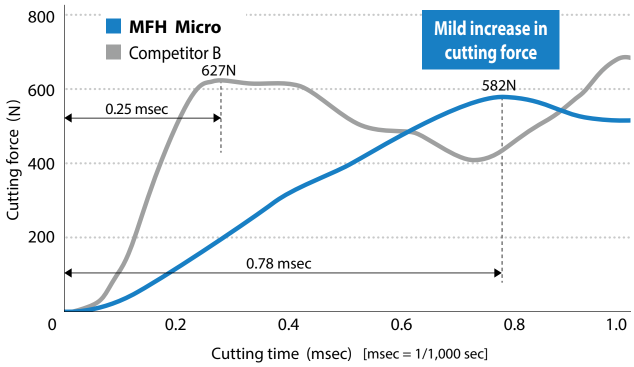
3D convex cutting edge controls initial impact when entering the workpiece

Cutting force comparison (Internal evaluation)



Cutting conditions: Vc = 120 m/min, ap = 0.4mm, fz = 0.6mm/t
Cutter dia. ø10mm, slotting, dry workpiece material: S50C

Increase in cutting force when entering workpiece (Internal evaluation)



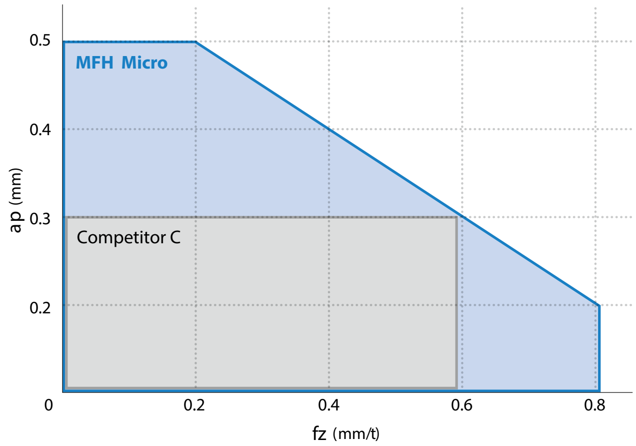
Cutting conditions: Vc = 120 m/min, ap × ae = 0.4 × 5mm, fz = 0.6mm/t
Cutter dia. ø10mm, dry workpiece material: S50C

2 Wide range of machining applications

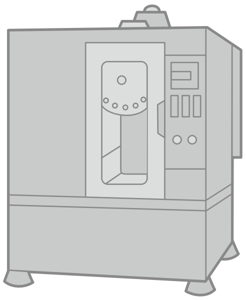
Wide range of machining applications at a maximum depth of cut of 0.5mm

Stable machining even with small machining centers

Cutting performance map (Cutter dia. ø10mm)



(Internal evaluation)

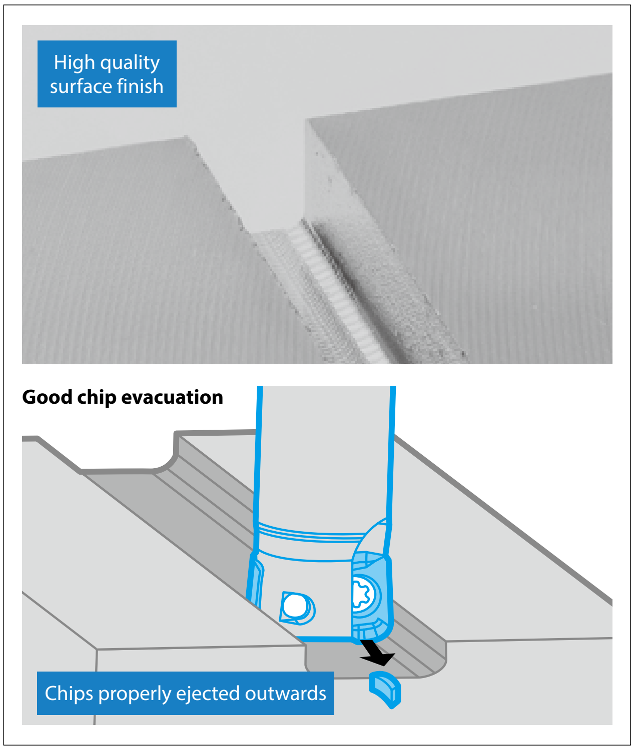


Applicable for BT30/ BT40

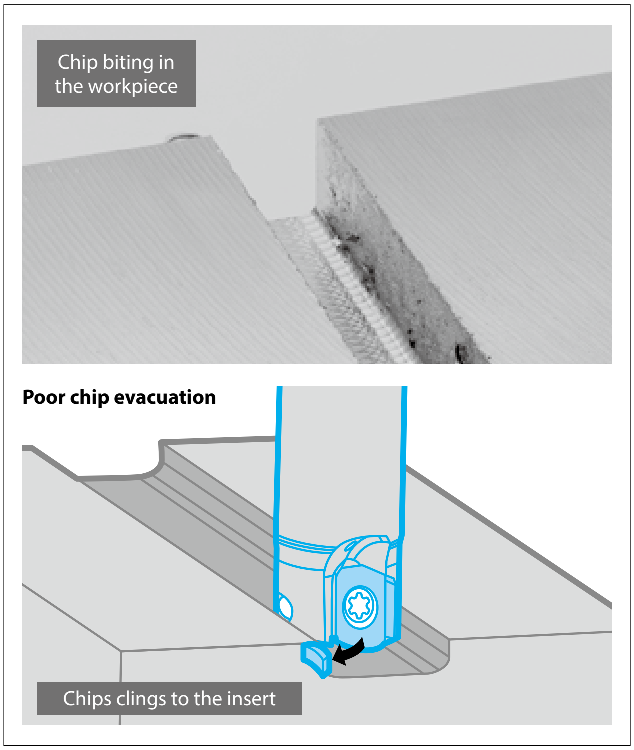
3 Excellent chip evacuation

Controls chip biting with convex cutting edge

MFH Micro



Competitor F



Cutting conditions: Cutter dia. DCX = ø10mm, Vc = 120 m/min, ap = 0.4mm (25pass), fz = 0.6mm/t Total 10mm, Dry workpiece material: SS400 (Internal evaluation)

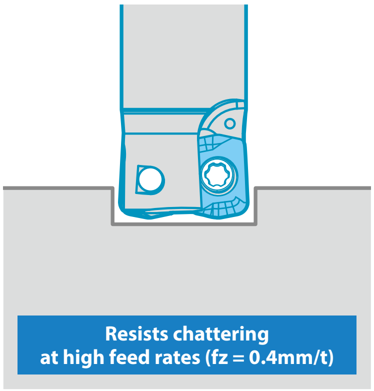
4 Replaces solid end mills to reduce machining costs

Suppresses chattering and increases milling efficiency

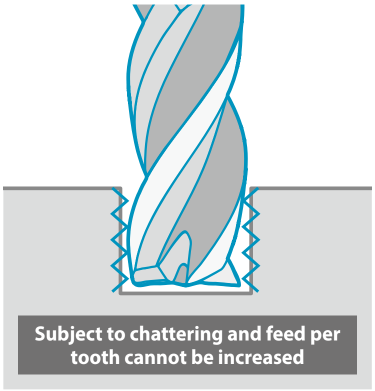
MFH Micro compared to solid end mills

MFH Micro Q = 15.3 cc/min
Vc = 150 m/min, fz = 0.4mm/t
ap × ae = 0.4 × 10mm, dry
MFH10-S10-01-2T (2 flutes)
LPGT010210ER-GM (PR1525)

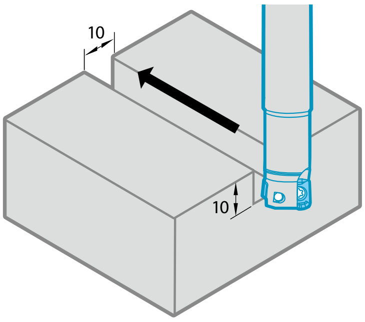
1.25times
Machining efficiency



Solid end mill Q = 12.2 cc/min
Vc = 80 m/min, fz = 0.04mm/t
ap × ae = 3 × 10mm, dry
ø10 (4 flutes)



Machine part slotting workpiece material: S50C



(User evaluation)

MFH Micro (End mill)

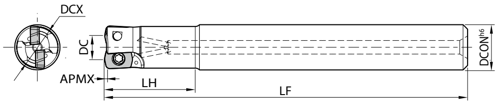


Fig. 1

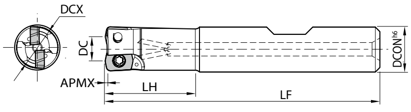


Fig. 2

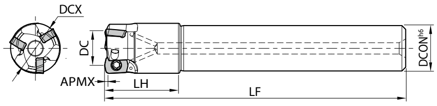


Fig. 3

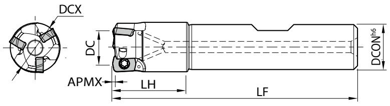
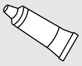
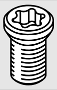
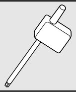


Fig. 4

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)						A.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Spare parts			Applicable inserts ➡ M226
					DC	DCX	DCON	LF	LH	APMX						Anti-seize compound 	Screw 	Wrench 	
Cylindrical	MFH	08-S10-01-1T	●	1	4.2	8	10	75	16	0.5	+5	Yes	20000	0.04	1	P-37	SB-1840TRP	FTP-6	LPGT010210ER-GM
		10-S10-01-2T	●	2	6.2	10		80	20				16200		1				
		12-S12-01-3T	●	3	8.2	12	12						14000	0.06	1				
		16-S16-01-4T	●	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	
Weldon	MFH	08-W10-01-1T	●	1	4.2	8	10	58	16	0.5	+5	Yes	20000	0.03	2	P-37	SB-1840TRP	FTP-6	LPGT010210ER-GM
		10-W10-01-2T	●	2	6.2	10		60	20				16200		2				
		12-W12-01-3T	●	3	8.2	12	12	65					14000	0.05	2				
		16-W16-01-4T	●	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	+5	Yes	12500	0.05	4	P-37	SB-1840TRP	FTP-6	

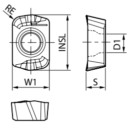
Max. revolution : Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.
Recommended tightening torque for insert clamp : 0.5N·m

LPGT

Classification of usage

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

	CA6535	PR1525	PR1535	PR1825	PR1835	
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)					Carbide					Applicable toolholder ➡ M226 M227
									CVD	PVD				
				S	D1	RE	W1	INSL	CA6535	PR1525	PR1535	PR1825	PR1835	
	 General purpose	LPGT	010210ER-GM	2.19	2.1	1	4.19	6.26	●	○	●	●	●	MFH...-01-..

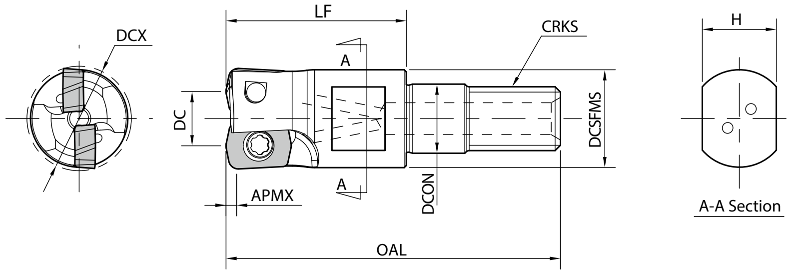
Handed insert shows Right-hand

Recommended cutting conditions ➡ M228

● : Standard item ○ : Will be replaced with a new product

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

MFH Micro (Modular type)

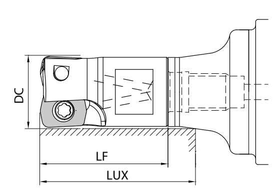


Toolholder dimensions

Description		Availability	Inserts	Dimension (mm)									A.R. (°)	Coolant hole	Max. revolution (min^{-1})	Spare parts			Applicable inserts ➡ M226
				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	Yes	20000	P-37	SB-1840TRP	FTP-6	LPGT010210ER-GM
	10-M06-01-2T	●	2	6.2	10										16200				
	12-M06-01-3T	●	3	8.2	12		11.2								14000				
	14-M06-01-3T	●		10.2	14										12500				
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

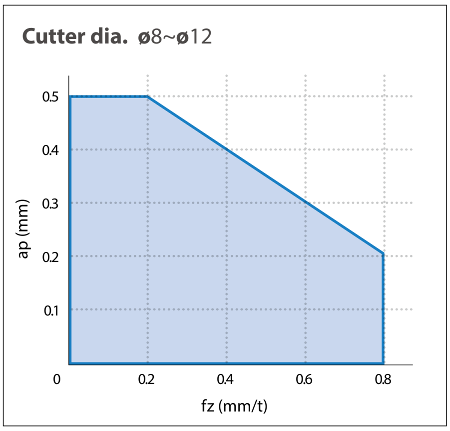
Actual End Mill depth **(MFH16-M08-01-4T)**

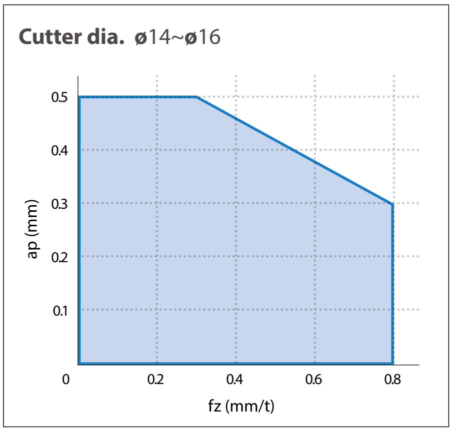
 DC LF LUX	Arbor Description	Applicable End Mill (Head)			Actual End Mill depth (mm)
		Description	Cutting Dia.	Dimension	LUX
			DC	LF	
	BT30K-M08-45	MFH16-M08-01-4T	16	22	28.8
	BT40K-M08-55	MFH16-M08-01-4T	16	22	28.7

➡ See page **M82** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

● : Standard item

Cutting performance


Cutter dia. ø8~ø12


Cutter dia. ø14~ø16

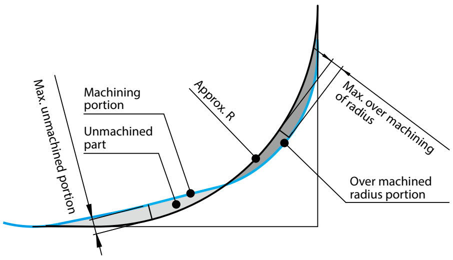
Recommended cutting conditions

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 EX (MEGACOAT NANO)		CVD Coated carbide
							PR1825 (PR1525)	PR1835 (PR1535)	CA6535
GM	Carbon steel	0.2~**0.4**~0.6			0.2~**0.5**~0.8		★ 120~**180**~250	☆ 120~**180**~250	-
	Alloy steel						★ 100~**160**~220	☆ 100~**160**~220	-
	Mold steel (~ 40HRC)	0.2~**0.3**~0.5			0.2~**0.4**~0.6		★ 80~**140**~180	☆ 80~**140**~180	-
	Mold steel (40 ~ 50HRC)	0.2~**0.25**~0.3			0.2~**0.25**~0.4		★ 60~**100**~130	☆ 60~**100**~130	-
	Stainless steel (Austenitic related)	0.2~**0.3**~0.5			0.2~**0.4**~0.6		☆ 100~**160**~200	★ 100~**160**~200	-
	Stainless steel (Martensitic related)						-	☆ 150~**200**~250	★ 180~**240**~300
	Stainless steel (Precipitation hardening)						-	★ 90~**120**~150	-
	Gray cast iron	0.2~**0.4**~0.6			0.2~**0.5**~0.8		★ 120~**180**~250	-	-
	Nodular cast iron	0.2~**0.3**~0.5			0.2~**0.4**~0.6		★ 100~**150**~200	-	-
	Ni-base heat-resistant alloys	0.2~**0.25**~0.3			0.2~**0.25**~0.4		-	☆ 20~**30**~50	★ 20~**30**~50
	Titanium alloys						-	★ 40~**60**~80	-

★: 1st Recommendation ☆: 2nd Recommendation

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

Note for machining program (Approx. R)

Shape	Approx. R (mm)	Max. over machining of radius (mm)	Max. unmachined portion (mm)
	R1.0	0	0.21
	R1.2 (Recommended)	0	0.17
	R1.5	0.08	0.1
	R2.0	0.28	0.01

Cutting edge angle:12°

Reference data for ramping

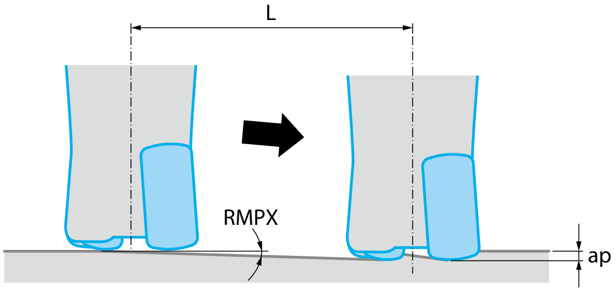
Description	Cutter dia. DCX (mm)	8	10	12	14	16
MFH...-01-...	Max. ramping angle RMPX	4.0°	3.0°	2.0°	1.5°	1.2°
	tan RMPX	0.070	0.052	0.035	0.026	0.021

Decrease ramping angle if chips become excessively long.

Guide for ramping (Slant milling)

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

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

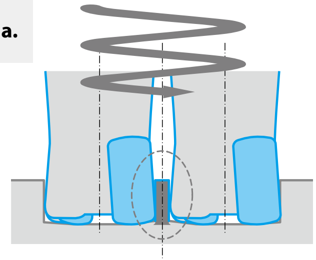


Guide for helical milling

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

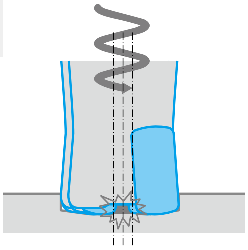
Exceeding max. cutting dia.

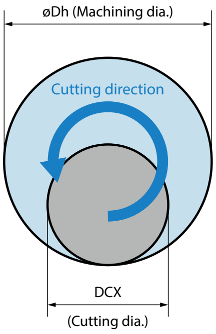
Center core part remains after machining



Under min. cutting dia.

Center core part interferes with toolholder



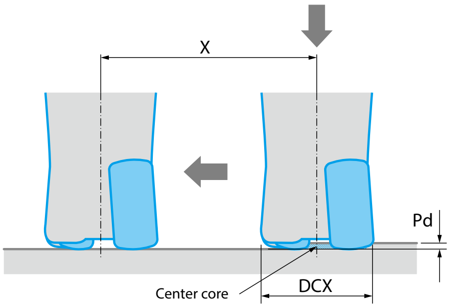


Description	Min. cutting dia.	Max. cutting dia.
MFH...-01-...	2×DCX-3.5	2×DCX-2

Unit: mm

- Sinking depth at helical milling should be max. ap (0.5mm) or under.
- Down-cut milling is recommended (refer to the figure above).
- Feed rate should be under 50% of the recommended cutting conditions.
- Be careful to machine in a safe environment to avoid accident caused by long chips.

Guide for drilling



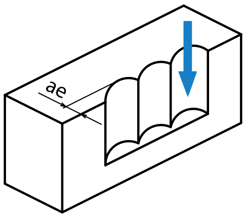
Description	GM type	
	Max. cutting depth	Min. cutting length X for flat bottom surface
MFH...-01-...	0.5	DCX-3.5

Unit: mm

* When traversing directly after drilling, set the table feed at up to 25% of the recommended cutting conditions.
* When drilling, reduce feed rate per revolution to under f=0.2mm/rev.

Vertical milling (Plunging)

Vertical milling (Plunging)



Available for vertical milling (plunging).

Insert description	Max. width of cut
LOGT01 type	1.7mm

For vertical milling (plunging),
reduce feed rate to fz=0.2mm/t or less.

MEY

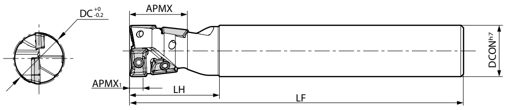


Fig. 1

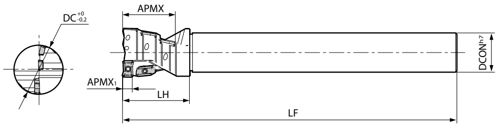


Fig. 2

Toolholder dimensions

Description			Availability	Inserts	Flutes	Dimension (mm)						A.R. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts ➡ M232
						DC	DCON	LF	LH	APMX	$APMX_1$					Anti-seize compound	Screw	Wrench	
Standard	MEY	16-S16	●	4	2	16	16	120	31	19	4.5	+11	-11	No	1	P-37	SB-2040TRG	DTM-6	Center Edge : GOMT08T208ER-D Side Edge : JOMT08T208ER-D
		17-S16	●			17									1				
		20-S20	●			20	20	130	35	22	6	+13	-9		1		SB-2555TRG	DT-8	Center Edge : GOMT100308ER-D Side Edge : JOMT100308ER-D
		21-S20	●			21									1				
		25-S25	●			25	25	140	40	28	7.5		-11		1		SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
		26-S25	●			26									1				
		32-S32	●			32	32	150	50	36	9.5		-9		1		SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
		33-S32	●			33									1				
		40-S32	●	7		40		160	55	42	7.5		-11		2		SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
		50-S42	●			50	42	170	70	54	9.5		-9		2		SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
Long head	MEY	16-S16-140H	●	4	2	16	16	140	51	19	4.5	+11	-11	No	1	P-37	SB-2040TRG	DTM-6	Center Edge : GOMT08T208ER-D Side Edge : JOMT08T208ER-D
		20-S20-150H	●			20	20	150	53	22	6	+13	-9		1		SB-2555TRG	DT-8	Center Edge : GOMT100308ER-D Side Edge : JOMT100308ER-D
		25-S25-170H	●			25	25	170	70	28	7.5		-11		1		SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
		32-S32-180H	●			32	32	180	80	36	9.5		-9		1		SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
Long shank	MEY	16-S16-190	●	4	2	16	16	190	61	19	4.5	+11	-11	No	1	P-37	SB-2040TRG	DTM-6	Center Edge : GOMT08T208ER-D Side Edge : JOMT08T208ER-D
		17-S16-190	●			17			31						1				
		20-S20-200	●			20	20	200	63	22	6	+13	-9		1		SB-2555TRG	DT-8	Center Edge : GOMT100308ER-D Side Edge : JOMT100308ER-D
		21-S20-200	●			21			35						1				
		25-S25-220	●			25	25	220	80	28	7.5		-11		1		SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
		26-S25-220	●			26			40						1				
		32-S32-230	●			32	32	230	90	36	9.5		-9		1		SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D
		33-S32-230	●			33			50						1				
		40-S32-240	●	7		40		240	55	42	7.5		-11		2		SB-3070TRG	DT-10	Center Edge : GOMT13T308ER-D Side Edge : JOMT13T308ER-D
		50-S42-250	●			50	42	250	70	54	9.5		-9		2		SB-4070TRG	DT-15	Center Edge : GOMT160408ER-D Side Edge : JOMT160408ER-D

$APMX_1$ 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

Applicable Inserts

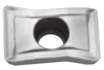
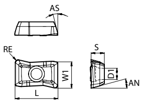
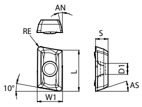
Description		Applicable Inserts ➡ **M232**			
					
		Side Edge	No. of Inserts	Center Edge	No. of Inserts
MEY	16-S16(-...)	JOMT08T208ER-D	3	GOMT08T208ER-D	1
	17-S16(-...)				
	20-S20(-...)	JOMT100308ER-D		GOMT100308ER-D	
	21-S20(-...)				
	25-S25(-...)	JOMT13T308ER-D		GOMT13T308ER-D	
	26-S25(-...)				
	32-S32(-...)	JOMT160408ER-D		GOMT160408ER-D	
	33-S32(-...)				
	40-S32(-...)	JOMT13T308ER-D	6	GOMT13T308ER-D	
	50-S42(-...)	JOMT160408ER-D		GOMT160408ER-D	

GOMT/JOMT

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)					Angle (°)		Carbide PVD		Applicable toolholder ➡ M230
				S	D1	RE	L	W1	AN	AS	PR1810	PR1825	
		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 ➡ **M233**

● : Standard item

Recommended cutting conditions

Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)	
			MEGACOAT NANO EX	
	Drilling	Shouldering, slotting	PR1810	PR1825
Carbon steel	0.08~0.15	0.05~0.25	-	★ 120~250
Alloy steel	0.08~0.15	0.05~0.25	-	★ 100~220
Mold steel	0.08~0.12	0.05~0.15	-	★ 80~180
Stainless steel	0.08~0.12	0.05~0.15	-	★ 120~220
Cast iron	0.05~0.20	0.05~0.25	★ 100~220	-

★: 1st Recommendation ☆: 2nd Recommendation

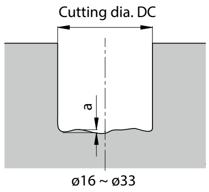
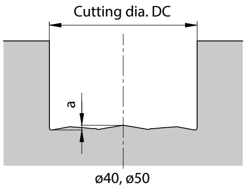
Caution of drilling

1. Drilling conditions should be calculated as one flute line.
2. Use compressed air during drilling.
3. Carbon steel other than low carbon steel can be drilled to a depth of 0.5D without step feeding.
   For soft steel or sticky material such as stainless steel, Step feed drilling (0.5 ~ 1.0mm) is recommended.
4. For stainless steel drilling, coolant is recommended.
5. Please refer to right list for maximum hole depth.

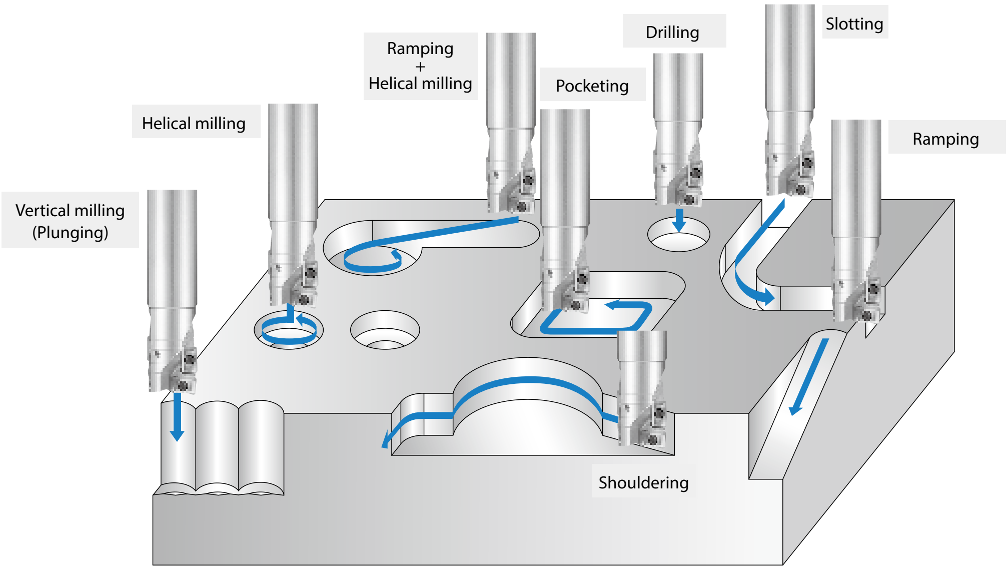
Cutting dia.(DC)	Max. hole depth (mm)
ø16	13
ø17	13
ø20	17
ø21	17
ø25	22
ø26	22
ø32	29
ø33	29
ø40	36
ø50	40

]

Shape of the bottom of the drilled hole

Cutting dia.	a (mm)	Shape of the bottom
ø16, ø17	0.5	
ø20, ø21	0.64	
ø25, ø26	0.85	
ø32, ø33	1.12	
ø40	1.54	
ø50	1.65	

Examples of MEY multi-function machining

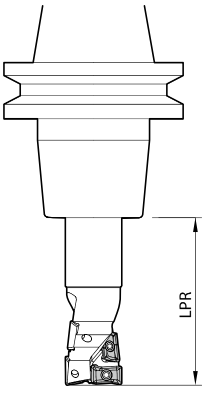


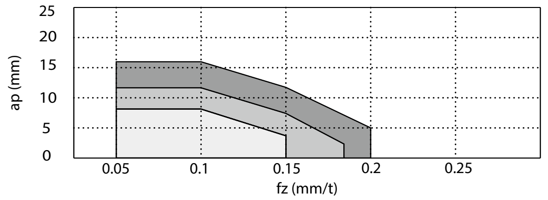
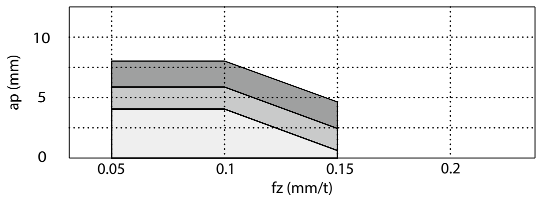
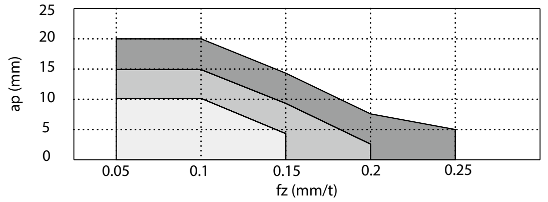
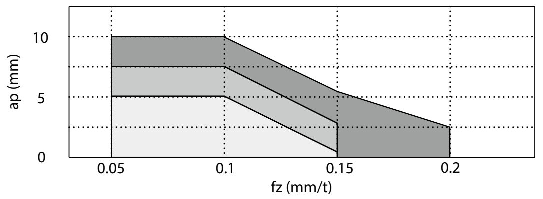
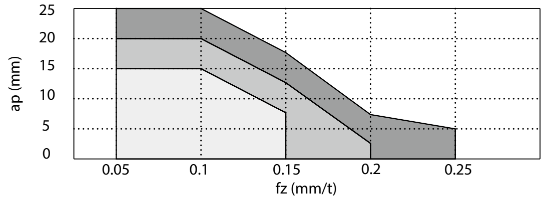
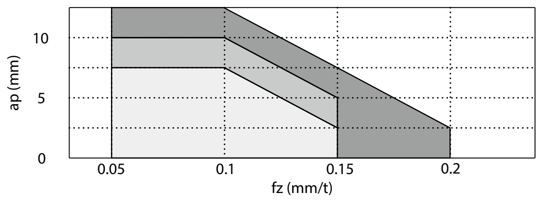
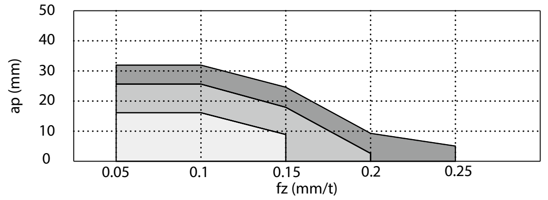
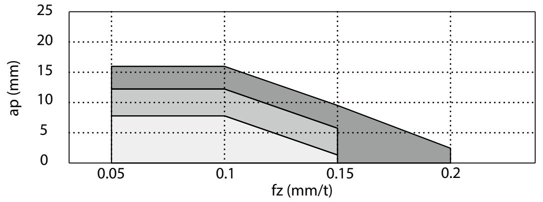
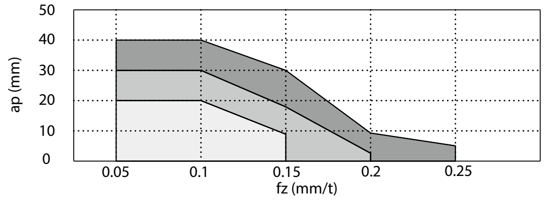
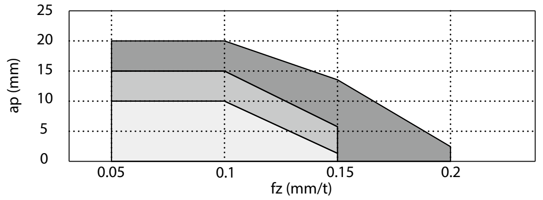
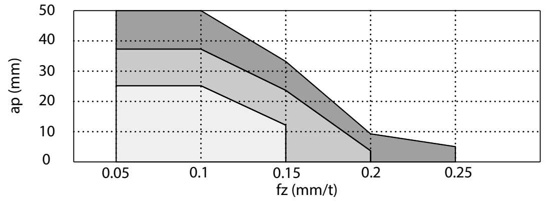
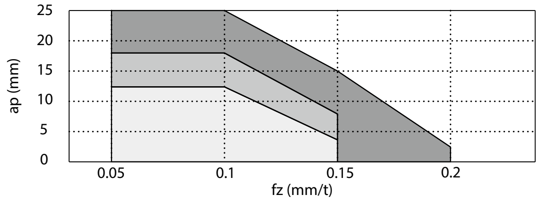
Cutting performance of MEY

Workpiece material: S50C

Cutting dia.	Description	Overhang length LPR (mm)		
		▓	▒	□
ø16	MEY16-S16	31	[~61]	(Not recommended)
	MEY16-S16-140H	-	~61	[~91]
	MEY16-S16-190	-	61	~91
ø17	MEY17-S16	31	[~61]	(Not recommended)
	MEY17-S16-190	31	~61	~91
ø20	MEY20-S20	35	[~65]	(Not recommended)
	MEY20-S20-150H	-	~65	[~95]
	MEY20-S20-200	-	65	~95
ø21	MEY21-S20	35	[~65]	(Not recommended)
	MEY21-S20-200	35	~65	~95

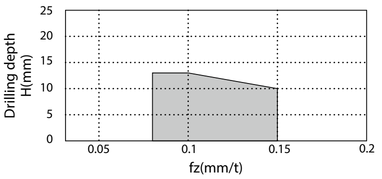
When using in [ ] dimension, be careful that the chucking length to the shank may get too short.

Cutting dia.	Description	Overhang length LPR (mm)			Shape
		▓	▒	□	
ø25	MEY25-S25	40	[~70]	(Not recommended)	
	MEY25-S25-170H	-	70	[~100]	
	MEY25-S25-220	-	~80	~100	
ø26	MEY26-S25	40	[~70]	(Not recommended)	
	MEY26-S25-220	40	~70	~100	
ø32	MEY32-S32	50	[~80]	(Not recommended)	
	MEY32-S32-180H	-	~80	[~110]	
	MEY32-S32-230	-	90	~110	
ø33	MEY33-S32	50	[~80]	(Not recommended)	
	MEY33-S32-230	50	~80	~110	
ø40	MEY40-S32	55	[~85]	[~115]	
	MEY40-S32-240	55	~85	~115	
ø50	MEY50-S42	70	[~100]	[~130]	
	MEY50-S42-250	70	~100	~130	

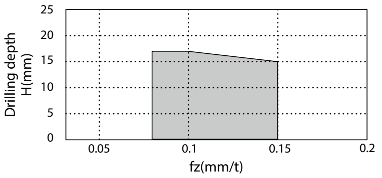
Description	• Shouldering (Cutting width ae = DC/2) Note: □ Part ae = DC/4	• Slotting & Ramping and helical milling
MEY16-S16 MEY17-S16		
MEY20-S20 MEY21-S20		
MEY25-S25 MEY26-S25		
MEY32-S32 MEY33-S32		
MEY40-S32		
MEY50-S42		

Drilling (Standard/long head/long shank: S50C)

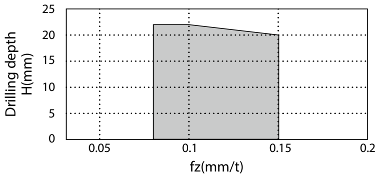
MEY16-S16
MEY17-S16



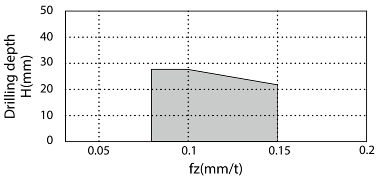
MEY20-S20
MEY21-S20



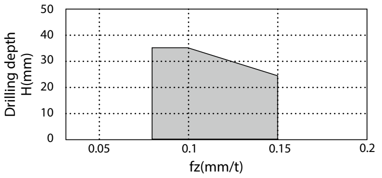
MEY25-S25
MEY26-S25



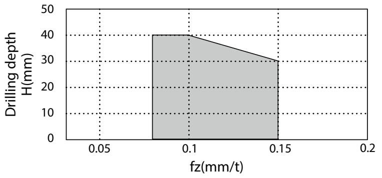
MEY32-S32
MEY33-S32



MEY40-S32



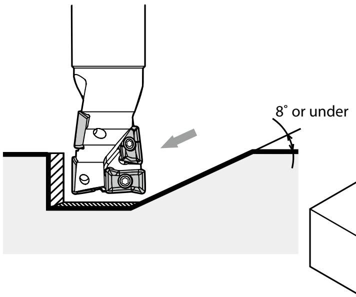
MEY50-S42

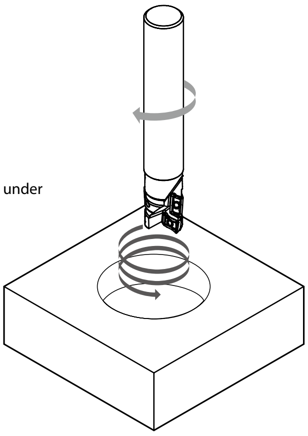


How to use MEY effectively

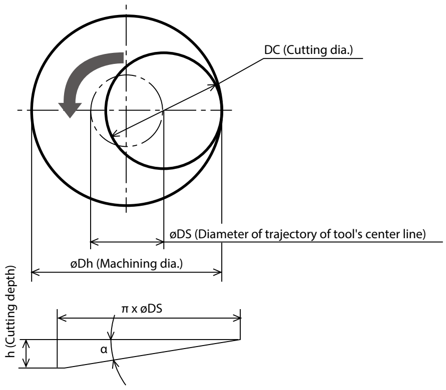
Ramping/Helical milling

- Ramping angle is recommended to be 8˚ or under. Sinking depth per revolution when helical milling should be 1/2DC or under.
- Use compressed air during machining.





Helical milling factors



øDS (How to find diameter of trajectory of tool's center line)

øDS = øDh - DC

h How to find "h"

h = π X ø DS X tan α

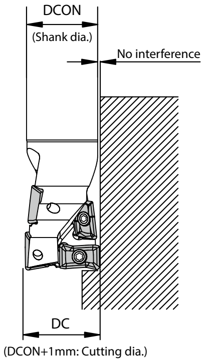
(α should be 8˚ or under)

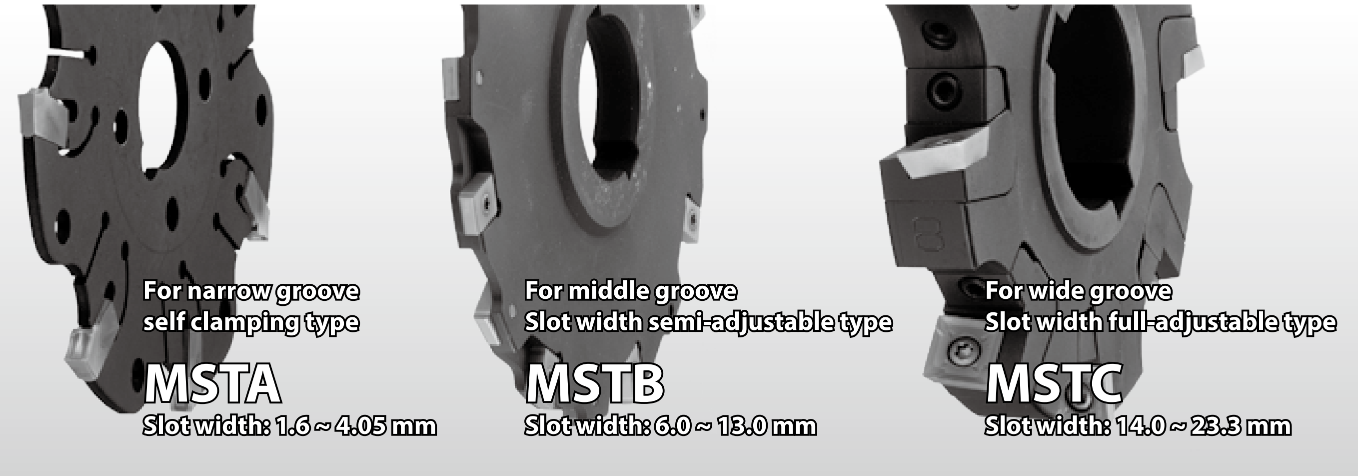
Shouldering

- Tools with 1mm larger cutting diameter than shank diameter are available. High wall shouldering is possible.

Lineup (mm)

Description	DC	DCON
MEY17-S16	17	16
MEY21-S20	21	20
MEY26-S25	26	25
MEY33-S32	33	32
MEY17-S16-190	17	16
MEY21-S20-200	21	20
MEY26-S25-220	26	25
MEY33-S32-230	33	32





For narrow groove
self clamping type
MSTA
Slot width: 1.6 ~ 4.05 mm

For middle groove
Slot width semi-adjustable type
MSTB
Slot width: 6.0 ~ 13.0 mm

For wide groove
Slot width full-adjustable type
MSTC
Slot width: 14.0 ~ 23.3 mm

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	⟷	⟷	

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

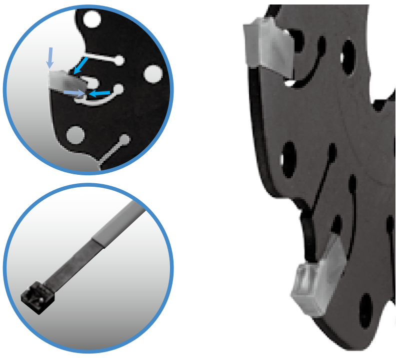
Owing to the high rigidity clamping system – with an end – stopper, the toolholder enable high operability and stable slotting by maintaining an accurate edge position.

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

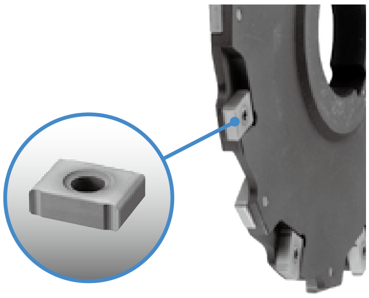
Easy and secure screw holding

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 a applicable to various slotting widths up to max 13mm in 0.5mm increments.



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

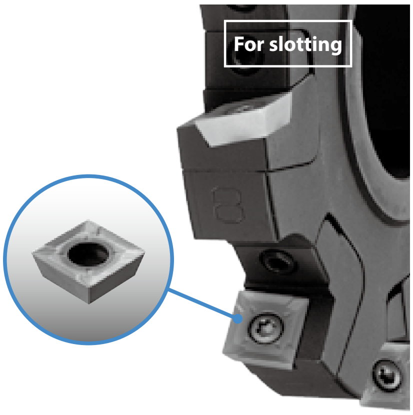
Smooth slotting width adjustment is possible owing to unique cam style adjustment mechanism.

Economical 4-edge Insert

A wide range of corner-R is suitable for various work.

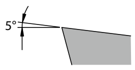
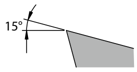
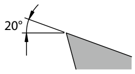
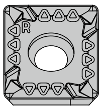
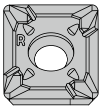
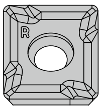
Owing to the wiper edge insert, an excellent surface finish can be expected.

Owing to numerous insert geometries and grades, they are applicable for various types of workpiece machining.



*Change to silver coating in sequence.

Features of insert grades

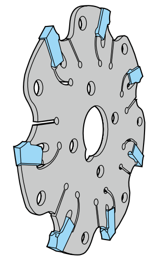
Insert shape			
Symbol	SB	SD	SE
Rake angle			
Shape			

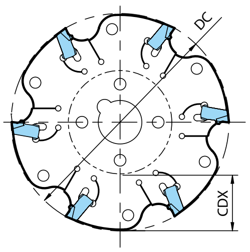
CA0835
- $TiN+TiCN+Al_2O_3$ based CVD coated carbide
- For carbon steel, alloy steel, stainless steel and nodular cast iron.
- For middle to high speed machining.

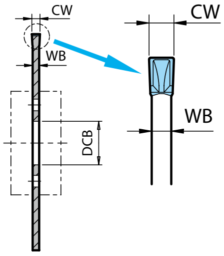
PR0725
- TiN+TiCN+TiN based multi-layer PVD coated carbide
- For carbon steel, alloy steel, stainless steel, heat-resistant alloys and cast iron.
- For middle speed machining.

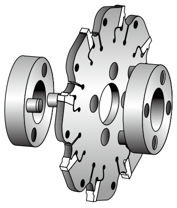
PR0110
- TiB_2 based PVD coated carbide
- For non-ferrous metals such as aluminum alloys (Si<10%) and titanium alloys.
- For high speed machining.

MSTA









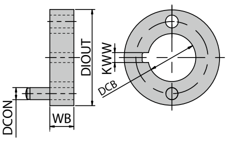
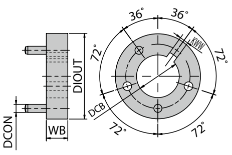
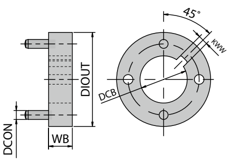
Drive ring (sold separately)
assembly example

Toolholder dimensions (Metric)

Description		Availability	Inserts	Dimension (mm)					Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Applicable inserts ➡ M240
		N		DC	DCB	CDX	WB	CW				
MSTA	63N16-5T	●	5	63	16	15	1.3	1.6	No	5100	0.03	SLT..-..SKB SLT..-..SKD
	80N16-7T	●	7	80		21				4000	0.04	
	100N16-9T	●	9	100	22	27				3200	0.07	
	125N16-11T	●	11	125	32	35				2600	0.1	
MSTA	63N22-5T	●	5	63	16	15	1.8	2.2 (2.25)	No	5100	0.03	SLT..-..SKB SLT..-..SKD
	80N22-7T	●	7	80		21				4000	0.05	
	100N22-9T	●	9	100	22	27				3200	0.08	
	125N22-11T	●	11	125	32	35				2600	0.12	
	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
	80N30-6T	●	6	80		21				4000	0.08	
	100N30-9T	●	9	100	22	27				3200	0.13	
	125N30-11T	●	11	125	32	35				2600	0.2	
	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
	80N40-6T	●	6	80		21				4000	0.1	
	100N40-9T	●	9	100	22	27				3200	0.15	
	125N40-11T	●	11	125	32	35				2600	0.25	
	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			
 Fig. 1  Fig. 2  Fig. 3	DR16-32A	●	16	32	8	4.1	3	Fig. 2	MSTA	63N16-5T 63N22-5T
	DR16-32B	●					4	Fig. 1	MSTA	63N30-4T 63N40-4T
	DR16-38	●		38				Fig. 3	MSTA	80N○○-○T
	DR22-46	●	22	46	10	6.1	5		MSTA	100N○○-○T
	DR32-55	●	32	55		8.1	6		MSTA	125N○○-○○T
	DR40-80	●	40	80	12	10.1	12		MSTA	160N○○-○○T

● : Standard item

Identification system MSTA toolholder

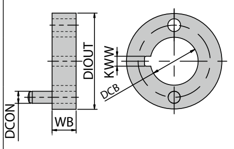
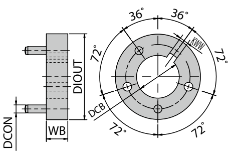
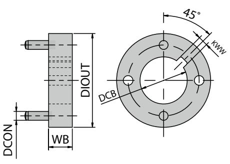
MSTA	○○○	N	○○○	-	○○	T
Self-clamping type slot mill	Cutting dia.	Neutral	Edge width		No. of inserts	

Toolholder dimensions (inch spec)

Description		Availability	Inserts	Dimension (in , (mm))					Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Applicable inserts ➡ M240
		N		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
	03N063-7T	○	7	3 (76.2)		0.875 (22.225)				4000	0.04	
	04N063-9T	○	9	4 (101.6)	1 (25.4)	1.063 (27)				3200	0.07	
	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) (2.25)	0.071 (1.8)	No	4000	0.05	SLT..-..SKB SLT..-..SKD
	04N089-9T	○	9	4 (101.6)	1 (25.4)	1.063 (27)				3200	0.08	
	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
	03N126-6T	○	6	3 (76.2)		0.875 (22.225)				4000	0.08	
	04N126-9T	○	9	4 (101.6)	1 (25.4)	1.063 (27)				3200	0.13	
	05N126-11T	○	11	5 (127)	1.25 (31.75)	1.375 (34.925)				2600	0.2	
	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)	No	4000	0.1	SLT..-..SKB SLT..-..SKD
	04N164-9T	○	9	4 (101.6)	1 (25.4)	1.063 (27)				3200	0.15	
	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		
 Fig. 1  Fig. 2  Fig. 3	DR0625-1250A	○	.625 (15.875mm)	1.250 (31.75mm)	.315 (8mm)	.130 (3.3mm)	.158 (4mm)	Fig. 1	MSTA 02N126-4T
	DR0625-1250B	○					.120 (3mm)	Fig. 2	MSTA 02N063-5T
	DR0625-1250C	○						Fig. 3	MSTA 03N○○○-○T
	DR1000-1875	○	1.000 (25.4mm)	1.875 (47.625mm)	.394 (10mm)	.256 (6.5mm)	.200 (5mm)		MSTA 04N○○○-○T
	DR1250-2250	○	1.250 (31.75mm)	2.250 (57.15mm)		.319 (8.1mm)	.240 (6mm)		MSTA 05N○○○-○T
	DR1250-3125	○	1.250 (31.75mm)	3.125 (79.375mm)	.472 (12mm)	.319 (8.1mm)	.472 (12mm)		MSTA 06N○○○-○T

○ : Will be replaced with a new product

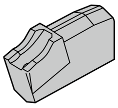
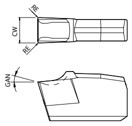
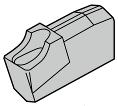
SLT

Classification of usage

● : 1st Choice

○ : 2nd Choice

	CA0835	PR0735	
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 (°)	Tolerance (mm)		Carbide		Applicable toolholder ➡ M238 M239
									CVD	PVD	
				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	●	●	

Recommended cutting conditions ➡ **M241**

Inserts identification system

SLT 16 - 15 S KB

Insert symbol

Edge width

Symbol	Edge width
16	1.6mm
22	2.2(2.25)mm
30	3.05mm
40	4.05mm

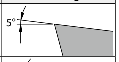
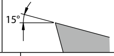
Corner-R (RE)

Symbol	Corner-R (RE)
15	0.15mm
20	0.2mm

Edge preparation

Symbol	Cutting edge spec.
S	Chamfered + R-horned

Chipbreaker symbol

Symbol	Rake angle
KB	
KD	

Selection of chipbreaker

KB chipbreaker ··· general purpose chipbreaker for steel and cast iron

KD chipbreaker ··· low cutting force chipbreaker for stainless steel

Features of insert grades

CA0835

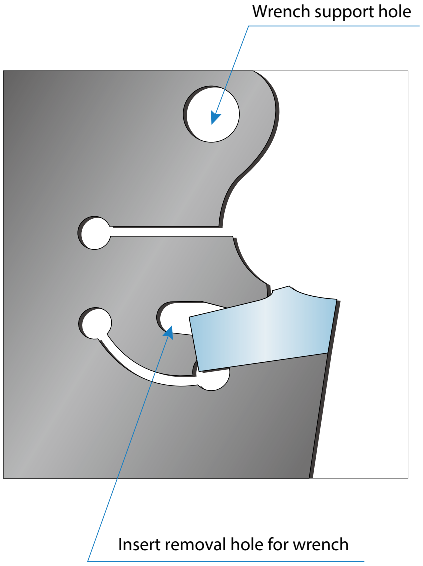
- $TiN+TiCN+Al_2O_3$ based CVD Coated carbide
- For carbon steel, alloy steel, stainless steel and cast iron
- For middle to high speed machining

PR0735

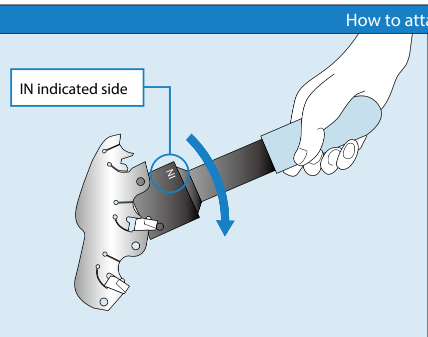
- TiN base PVD Coated carbide
- For stainless steel, heat-resistant alloys, etc.
- For low to middle speed machining

● : Standard item

Set up

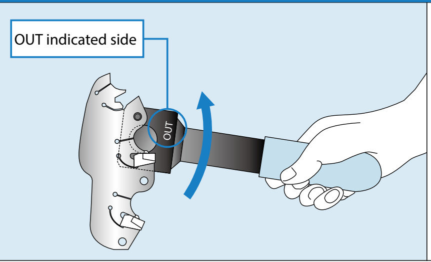


How to attach inserts



1. Put insert inside the slot mill.
2. Insert one of the pins on the wrench (on IN indicated side) into the wrench support hole.
3. Using the other pin, push the front relief surface of the insert.
4. Rotate the wrench until insert's back end makes contact with slot mill.

How to detach inserts



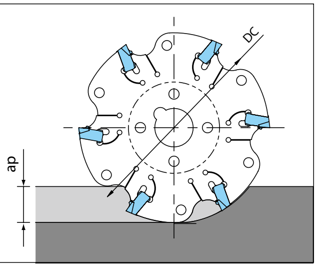
1. Insert one of the pins on the wrench (on OUT indicated side) into the wrench support hole, and insert other pin into the insert releasing hole.
2. Insert can be uninstalled by rotating the wrench counterclockwise. (A magnet is installed on OUT indicated side.)

Note: Use appropriate wrench for set up.

Recommended cutting conditions

Workpiece material		Hardness (HB)	Recommended insert grades (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%.

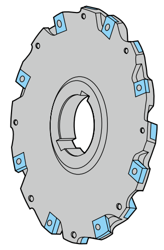


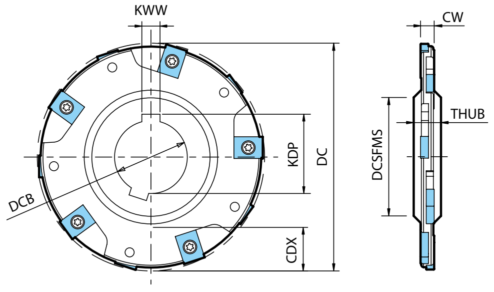
Identification system toolholder MSTB

Metric

			N: Neutral				
MSTB	○○○	**A**	**N**	○○○○	-	○	**T**
Slot Mill with Up-right Insert	Cutting dia. (mm)	A: Without boss S: With boss		Edge width (mm)		No. of inserts	

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	Max. revolution (min^{-1})	Weight (kg)	Spare parts			Applicable inserts ➡ **M245**
		N			DC	DCSFMS	DCB	KDP	KWW	CDX	THUB	CW min.	CW max.				Anti-seize compound	Screw	Wrench	
MSTB	80AN0607-4T	●	8	4	80	44	27	29.8	7	15	12	6	7	No	9240	0.3	P-37	SE-40050TRN	TT-15	LNEU12...
	100AN0607-5T	●	10	5	100	52	32	34.8	8	21					8270	0.4				
	125AN0607-6T	●	12	6	125	63	40	43.5	10	28					7390	0.7				
	160AN0607-8T	●	16	8	160					45.5					6540	1.1				
MSTB	80AN0809-4T	●	8	4	80	44	27	29.8	7	16	12	8	9	No	9240	0.4	P-37	SE-40068TR	TT-15	LNEU12...
	100AN0809-5T	●	10	5	100	52	32	34.8	8	22					8270	0.5				
	160AN0809-8T	●	16	8	160	63	40	43.5	10	45.5					6540	1.3				
MSTB	125AN1011-4T	●	12	4	125	63	40	43.5	10	30	12	10	11	No	7390	0.9	P-37	SE-40068TR	TT-15	LNEU12...
	160AN1011-5T	●	15	5	160					47.5					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.

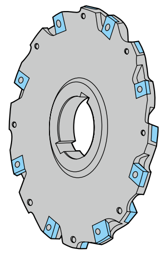
● : Standard item

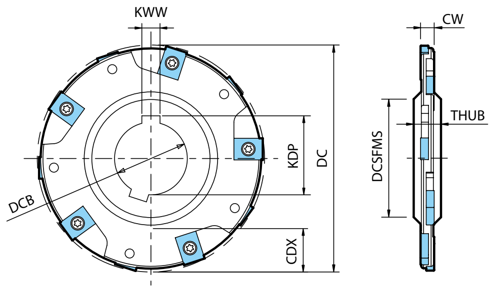
Identification system toolholder MSTB

Inch spec

MSTB	○○○	A	N	○○○	-	○	T
Slot Mill with Up-right Insert	Cutting dia. (inch)	A: Without boss	N: Neutral	Min. Edge width (inch)		No. of inserts	

MSTB (Without Boss, Inch spec)





In order to be used in combination with two or more mills, this slot mill has 2 key slots.

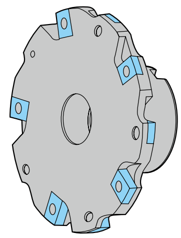
Toolholder dimensions

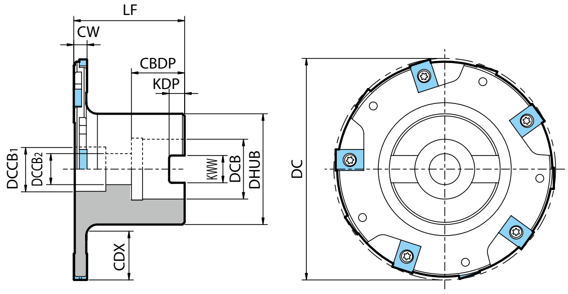
Description	Availability	Inserts	Edge line	Dimension (in , (mm))									Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Spare parts			Applicable inserts ➔ M245
	N			DC	DCSFMS	DCB	KDP	KWW	CDX	THUB	CW min.	CW max.				Anti-seize compound	Screw	Wrench	
MSTB 3000AN250-4T	○	8	4	3 (76.2)	1.5 (38.1)	1 (25.4)	1.106 (28.1)	0.25 (6.35)	0.625 (15.875)	0.5 (12.7)	0.25 (6.35)	0.289 (7.34)	No	9470	0.3	P-37	SE-40055TR	TT-15	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)					8200					
5000AN250-6T	○	12	6	5 (127)					1.435 (36.4)					7300	0.7				
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	1				
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)	0.5 (12.7)	0.312 (7.92)	0.351 (8.91)	No	7400	0.5	P-37	SE-40068TR	TT-15	LNEU12...
5000AN312-6T	○	12	6	5 (127)					1.466 (37.2)					6600	0.8				
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	1.1				
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)	0.5 (12.7)	0.375 (9.525)	0.414 (10.52)	No	7400	0.5	P-37	SE-40068TR	TT-15	LNEU12...
5000AN375-4T	○	12	4	5 (127)					1.5 (38.1)					6600	0.8				
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	1.3				
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)	0.5 (12.7)	0.5 (12.7)	0.539 (13.69)	No	4900	0.6	P-37	SE-40090TR	TT-15	LNEU12...
5000AN500-4T	○	12	4	5 (127)					1.56 (39.6)					4400	1.1				
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	1.7				

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

○ : Will be replaced with a new product

MSTB (With Boss, Metric)





Toolholder dimensions

Description		Availability	Inserts	Edge line	Dimension (mm)													Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Spare parts				Applicable inserts ➡ M245
		N			DC	DCB	DCCB$_1$	DCCB$_2$	LF (min.)	CBDP	KDP	KWW	CDX	DHUB	CW min.	CW max.					Anti-seize compound	Mounting bolt	Screw	Wrench	
MSTB	80SN0607-4T	●	8	4	80	22	18	12	50	23	6.3	10.4	16	40	6	7	No	9240	0.7	P-37	HH10X35	SE-40050TRN	TT-15	LNEU12...
	100SN0607-5T	●	10	5	100	27	20	14		24	7	12.4	21	50				8270	1		HH12X35			
	160SN0607-8T	●	16	8	160	40	33	22		28	9	16.4	41	70				6540	1.9		HH20X40			
MSTB	80SN0809-4T	●	8	4	80	22	18	12	50	23	6.3	10.4	16	40	8	9	No	9240	0.8	P-37	HH10X35	SE-40068TR	TT-15	LNEU12...
	100SN0809-5T	●	10	5	100	27	20	14		24	7	12.4	21	50				8270	1.2		HH12X35			
	160SN0809-8T	●	16	8	160	40	33	22		28	9	16.4	41	70				6540	2.2		HH20X40			
MSTB	125SN1011-4T	●	12	4	125	40	33	22	50	28	9	16.4	26	70	10	11	No	7390	2	P-37	HH20X40	SE-40068TR	TT-15	LNEU12...
	160SN1011-5T	●	15	5	160								43					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.

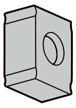
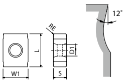
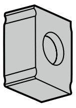
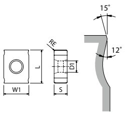
● : Standard item

LNEU

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	○	
Non-ferrous metals		N
Heat-resistant alloy	●	S
Titanium alloy	○	
Hard materials		H

Insert		Description		No. of edges	Dimension (mm)			Carbide	Applicable toolholder ➔ M242~M244	Applicable clamp screw
					S	D1	RE	PVD		
								PR0725		
	 With honing	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
	 Tough edge	LNEU	1235-03S-4	4	3.5	4.4	0.3	●	MSTB...	SE-40050TRN
		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 **M246** for insert description and applicable clamp screw depending on edge width.

Recommended cutting conditions ➔ **M247**

Inserts identification system

LNEU 12 35 - 03 S

Insert symbol: LNEU

Insert length

Symbol	Insert length
12	12.7mm

Edge width

Symbol	Edge width
35	3.5mm
40	4.0mm

Corner-R (RE)

Symbol	Corner-R (RE)
03	0.3mm
04	0.4mm

Edge preparation

Symbol	Cutting edge spec.
S	Chamfered + R-horned

● : Standard item

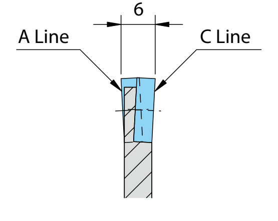
Combination of applicable inserts

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-○T	SE-40050TRN	6	-	LNEU1235..	SE-40050TRN	-	-	LNEU1235..	SE-40050TRN	TT-15	3
				6.5						LNEU1240..	SE-40055TR		
		○○○SN0607-○T		7		LNEU1240..	SE-40055TR						
	MSTB	○○○AN0809-○T	SE-40068TR	8	-	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR		
				8.5						LNEU1250..	SE-40080TR		
		○○○SN0809-○T		9		LNEU1250..	SE-40080TR						
	MSTB	○○○AN1011-○T	SE-40068TR	10	-	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR		
				10.5						LNEU1250..	SE-40080TR		
		○○○SN1011-○T		11		LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR				
	MSTB	○○○AN1213-○T	SE-40090TR	12	-	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR		
				12.5						LNEU1260...	SE-40100TR		
				13		LNEU1260...	SE-40100TR	LNEU1260...	SE-40100TR				
Inch spec	MSTB	○○○○AN250-○T	SE-40055TR	-	.250 (6.35mm)	LNEU1240..	SE-40055TR	-	-	LNEU1240..	SE-40055TR		
					.270 (6.86mm)					LNEU1245..	SE-40068TR		
					.289 (7.34mm)	LNEU1245..	SE-40068TR						
	MSTB	○○○○AN312-○T	SE-40068TR	-	.312 (7.92mm)	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR		
					.332 (8.43mm)					LNEU1250..	SE-40080TR		
					.351 (8.91mm)	LNEU1250..	SE-40080TR						
	MSTB	○○○○AN375-○T	SE-40068TR	-	.375 (9.525mm)	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR		
					.395 (10.33mm)					LNEU1250..	SE-40080TR		
					.414 (10.52mm)	LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR				
	MSTB	○○○○AN500-○T	SE-40090TR	-	.500 (12.7mm)	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR		
					.520 (13.21mm)					LNEU1260...	SE-40100TR		
					.539 (13.69mm)	LNEU1260...	SE-40100TR	LNEU1260...	SE-40100TR				

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

Slot width (Edge width) adjustment

1



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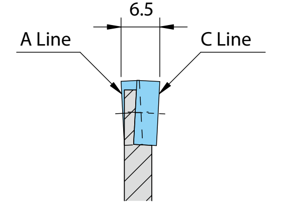

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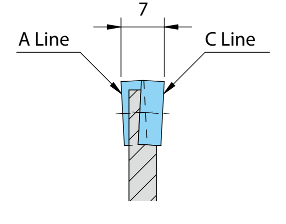

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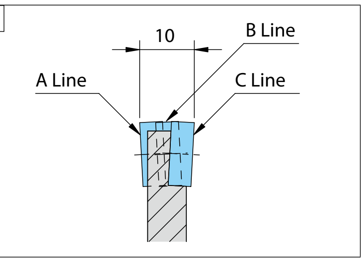


The slot width (Edge width) of MSTB slot mills is adjustable by a maximum of 1 mm with the combination of inserts.

1. In the case of MSTB○○○AN0607-○T the width (W) is 6mm by installing LNEU1235 on both A line and C line.
2. By replacing C line only with LNEU1240 the width (W) is 6.5 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.

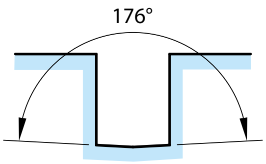
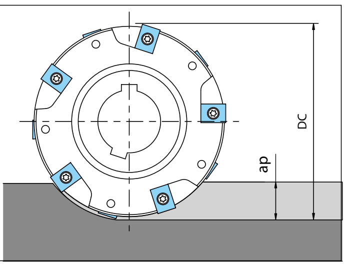


Fig. 1 Convex bottom shape

Recommended cutting conditions

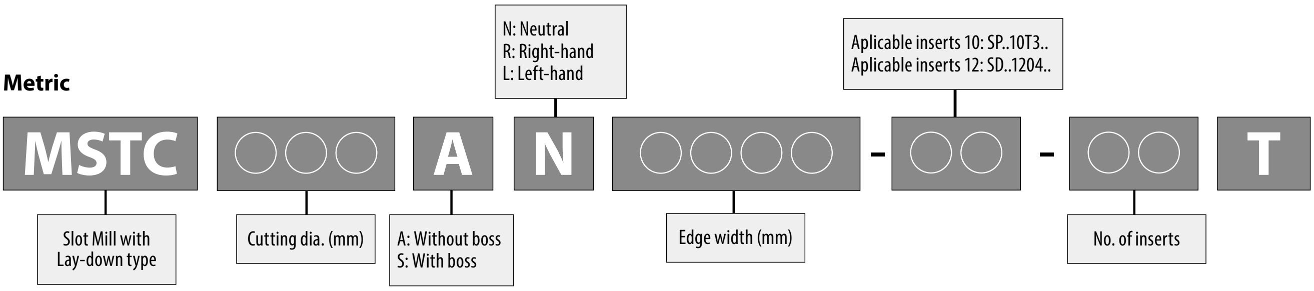
Workpiece material		Hardness (HB)	Recommended insert grades (Vc: m/min)	fz (mm/t)		Remarks
			PVD Coated carbide	Insert thickness (mm)		
			PR0725	3.5~4.0	4.5~6.0	
Low carbon steel	SS400 S10C ~ S25C	125	170~210	0.07~0.20	0.10~0.22	Dry
Carbon steel	S30C ~ S58C (Annealed)	190	100~140	0.07~0.20	0.10~0.22	
	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 ap is 1/10 or under of cutter dia.(DC), it is possible to increase feed per tooth (fz) by 40%.

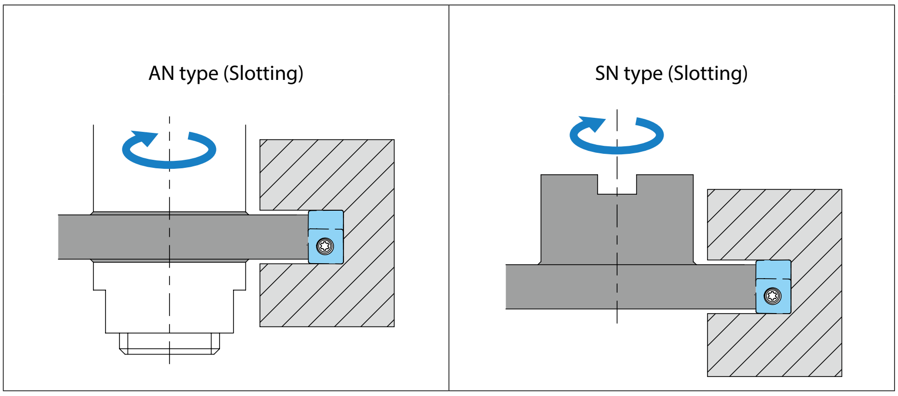


Identification system toolholder MSTC

Metric

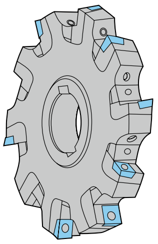


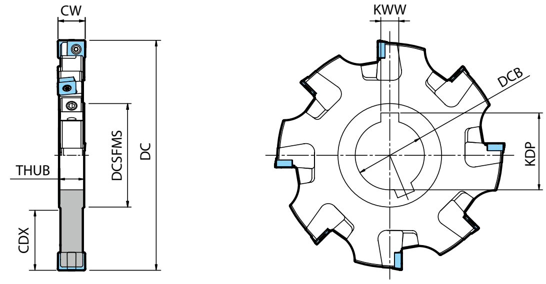
Cutting direction of MSTC slot mill


AN type (Slotting)

SN type (Slotting)

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)

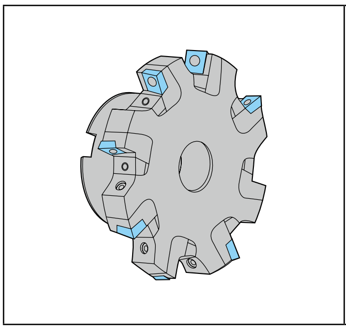
Description	Availability	Inserts	Edge line	Dimension (mm)									Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Applicable inserts ➡ **M252** **M253**
	N			DC	DCSFMS	DCB	KDP	KWW	CDX	THUB	CW min.	CW max.				
MSTC 100AN1416-10-3T	●	6	3	100	46.8	32	34.8	8	25.9	13.9	14	16	No	17250	0.5	SPCT10T3... SPET10T3...
125AN1416-10-4T	●	8	4	125	54.8	40	43.5	10	34.4					15450	0.8	
160AN1416-10-5T	●	10	5	160					51.9					13650	1.5	
MSTC 125AN1618-10-4T	●	8	4	125	54.8	40	43.5	10	34.4	15.9	16	18	No	15450	1	SPCT10T3... SPET10T3...
160AN1618-10-5T	●	10	5	160					51.9					13650	1.8	
MSTC 125AN1820-12-4T	●	8	4	125	54.8	40	43.5	10	34	18.2	18	20.6	No	10350	1	SDCT1204... SDET1204...
160AN1820-12-5T	●	10	5	160					51.5					9150	1.8	
MSTC 125AN2123-12-4T	●	8	4	125	54.8	40	43.5	10	34	20.8	20.6	23.3	No	10350	1.2	SDCT1204... SDET1204...
160AN2123-12-5T	●	10	5	160					51.5					9150	2.1	

Spare parts ➡ **M251**

Slot width (Edge width) adjustment ➡ **M255 - M257**

● : Standard item

MSTC (With Boss)



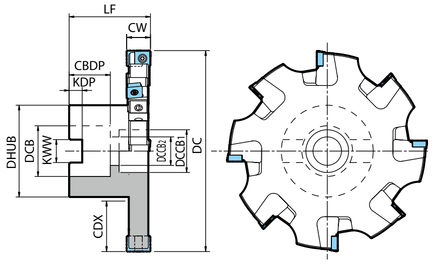


Fig. 1

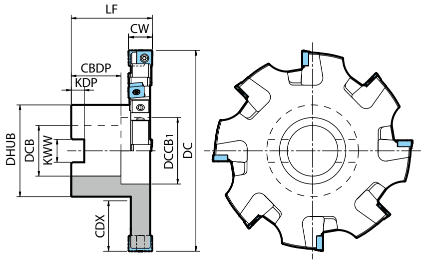


Fig. 2

Toolholder dimensions (With Boss, Metric)

Description	Availability	Inserts	Edge line	Dimension (mm)												Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Applicable inserts ➡ M252 M253
	N			DC	DCB	$DCCB_1$	$DCCB_2$	LF (min.)	CBDP	KDP	KWW	CDX	DHUB	CW min.	CW max.					
MSTC 100SN1416-10-3T	●	6	3	100	27	20	14	50.8	24	7	12.4	24.4	48	14	16	No	17250	1	1	SPCT10T3... SPET10T3...
125SN1416-10-4T	●	8	4	125	32	27	18		26	8	14.4	31.9	58				15450	1.6	1	
160SN1416-10-5T	●	10	5	160	40	56	-		30	9	16.4	43.4	70				13650	2	2	
MSTC 125SN1618-10-4T	●	8	4	125	32	27	18	50.8	26	8	14.4	31.9	58	16	18	No	15450	1.7	1	SPCT10T3... SPET10T3...
160SN1618-10-5T	●	10	5	160	40	56	-		30	9	16.4	43.4	70				13650	2.3	2	
MSTC 125SN1820-12-4T	●	8	4	125	32	27	18	51	26	8	14.4	31.9	58	18	20.6	No	10350	1.6	1	SDCT1204... SDET1204...
160SN1820-12-5T	●	10	5	160	40	56	-		30	9	16.4	43.4	70				9150	2.3	2	
MSTC 125SN2123-12-4T	●	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...
160SN2123-12-5T	●	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).

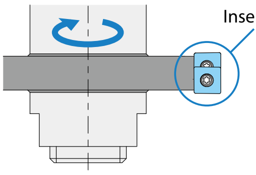
Spare parts ➡ **M251**

Slot width (Edge width) adjustment ➡ **M255 - M257**

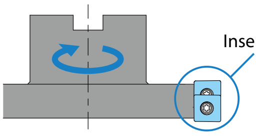
Applicable insert installation method

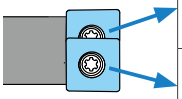
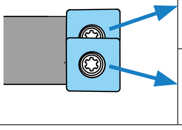
When installing handed inserts, it is necessary to equip same number of right-hand and left-hand inserts as shown in "No. of edge lines" respectively. Please Install as show in the figure below.

MSTC...AN...**(Without boss)**



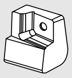
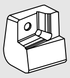
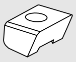
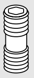
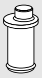
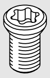
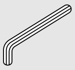
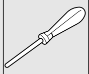
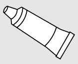
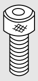
MSTC...SN...**(With boss)**



Toolholder description	Insert location indication	Applicable inserts ➡ M252, M253	
		Handed	Neutral
MSTC...AN...10.. MSTC...SN...10..		SP..10T3...**L**... SP..10T3...**R**...	SP..10T3...N...
MSTC...AN...12.. MSTC...SN...12..		SD..1204...**L**... SD..1204...**R**...	SD..1204...N...

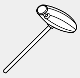
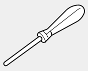
● : Standard item

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	-
			125AN1416-10-4T				W6X20							
			160AN1416-10-5T											
		MSTC	125AN1618-10-4T	C90SP1618-10R	C90SP1618-10L	WC-16	W6X20							
			160AN1618-10-5T											
		MSTC	125AN1820-12-4T	C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		
			160AN1820-12-5T											
		MSTC	125AN2123-12-4T	C90SD2023-12R	C90SD2023-12L	WC-20								
			160AN2123-12-5T											
With boss	Metric	MSTC	100SN1416-10-3T	C90SP1416-10R	C90SP1416-10L	WC-14	W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	P-37	HH12X35
			125SN1416-10-4T											HH16X35
			160SN1416-10-5T											-
		MSTC	125SN1618-10-4T	C90SP1618-10R	C90SP1618-10L	WC-16								HH16X35
			160SN1618-10-5T											-
		MSTC	125SN1820-12-4T	C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15	P-37	HH16X35
			160SN1820-12-5T											-
		MSTC	125SN2123-12-4T	C90SD2023-12R	C90SD2023-12L	WC-20								HH16X35
			160SN2123-12-5T											-

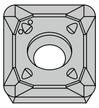
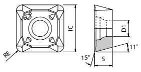
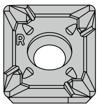
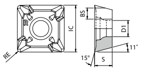
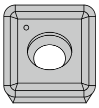
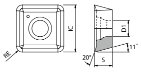
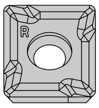
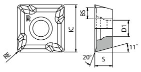
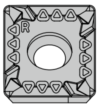
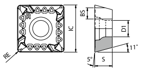
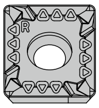
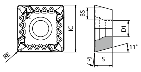
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

Tightening torque

Wrench	TH-3L	DTP-9	DTP-15
			
Tightening torque (N•m)	5~6	1.5	4

SPCT/SPET

Classification of usage ● : 1st Choice ○ : 2nd Choice	CA0835	PR0110	PR0725	
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	No. of edges	Dimension (mm)					Carbide			Applicable toolholder ➡ **M249, M250**
									CVD	PVD		
				IC	S	D1	RE	BS	CA0835	PR0110	PR0725	
		SPCT 10T316EN-SD	4	10	3.97	3.4	1.6	-			●	MSTC...-10-..
	 With wiper edge	SPCT 10T308ER-SD 10T308EL-SD 10T312ER-SD 10T312EL-SD	4	10	3.97	3.4	0.8 0.8 1.2 1.2	2.5 2.5 1.8 1.8			● ● ● ●	MSTC...-10-..
	 Sharp edge	SPCT 10T316FN-SE	4	10	3.97	3.4	1.6	-		●		MSTC...-10-..
	 Sharp edge / With wiper edge	SPCT 10T308FR-SE 10T308FL-SE 10T312FR-SE 10T312FL-SE	4	10	3.97	3.4	0.8 0.8 1.2 1.2	2.7 2.7 2.2 2.2		● ● ● ●		MSTC...-10-..
	 With wiper edge	SPET 10T308ER-SB 10T308EL-SB	4	10	3.97	3.4	0.8	2.7	● ●		● ●	MSTC...-10-..
	 Tough edge / With wiper edge	SPET 10T308SR-SB 10T308SL-SB	4	10	3.97	3.4	0.8	2.7	● ●		● ●	MSTC...-10-..

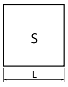
Handed insert shows Right-hand

Recommended cutting conditions ➡ **M254**

Inserts identification system

Shape	
Symbol	Shape
S	Square

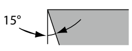
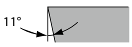
Tolerance			
Symbol	Corner height	Thickness	I.C Size
C	±0.013mm	±0.025mm	±0.025mm
E	±0.025mm		

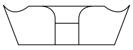
Edge length


Corner-R (RE)	
Symbol	Corner-R (RE)
16	1.6mm
12	1.2mm
08	0.8mm

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

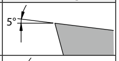
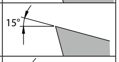
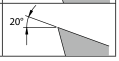
S P C T 10 T3 08 E R - SD

Relief angle	
Symbol	Relief angle
D	
P	

Hole/Chipbreaker	
Symbol	Shape
T	 Single-sided chipbreaker, with hole

Thickness	
Symbol	Thickness
T3	3.97mm
04	4.76mm

Edge Preparation	
Symbol	Cutting edge spec.
E	Honed
F	Sharp edge
S	Chamfered + R-honed

Chipbreaker symbol	
Symbol	Rake angle
SB	
SD	
SE	

● : Standard item

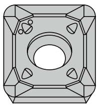
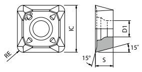
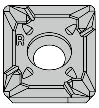
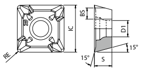
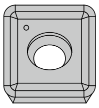
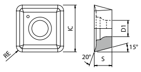
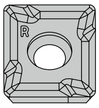
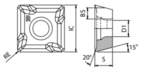
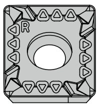
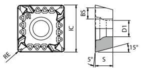
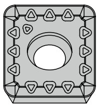
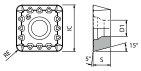
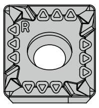
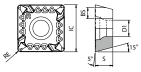
SDCT/SDET

Classification of usage

● : 1st Choice

○ : 2nd Choice

	CA0835	PR0110	PR0725	
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		No. of edges	Dimension (mm)					Carbide			Applicable toolholder ➡ **M249, M250**
					IC	S	D1	RE	BS	CVD	PVD		
										CA0835	PR0110	PR0725	
		SDCT	120416EN-SD	4	12.7	4.76	4.4	1.6	-			●	MSTC...-12-..
	 With wiper edge	SDCT	120408ER-SD	4	12.7	4.76	4.4	0.8	2.5			●	MSTC...-12-..
			120408EL-SD					0.8	2.5			●	
			120412ER-SD					1.2	1.8			●	
			120412EL-SD					1.2	1.8			●	
	 Sharp edge	SDCT	120416FN-SE	4	12.7	4.76	4.4	1.6	-		●		MSTC...-12-..
	 Sharp edge / With wiper edge	SDCT	120408FR-SE	4	12.7	4.76	4.4	0.8	2.7		●		MSTC...-12-..
			120408FL-SE					0.8	2.7		●		
			120412FR-SE					1.2	1.9		●		
			120412FL-SE					1.2	1.9		●		
	 With wiper edge	SDET	120408ER-SB	4	12.7	4.76	4.4	0.8	2.5	●		●	MSTC...-12-..
			120408EL-SB					0.8	2.5	●		●	
			120412ER-SB					1.2	1.8	●		●	
			120412EL-SB					1.2	1.8	●		●	
	 Tough edge	SDET	120416SN-SB	4	12.7	4.76	4.4	1.6	-	●		●	MSTC...-12-..
	 Tough edge / With wiper edge	SDET	120408SR-SB	4	12.7	4.76	4.4	0.8	2.5	●		●	MSTC...-12-..
			120408SL-SB							●		●	

Handed insert shows Right-hand

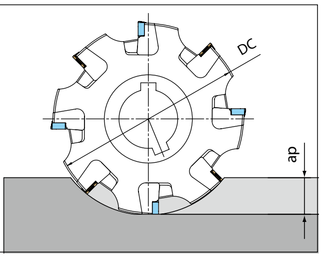
Recommended cutting conditions ➡ **M254**

● : Standard item

Recommended cutting conditions

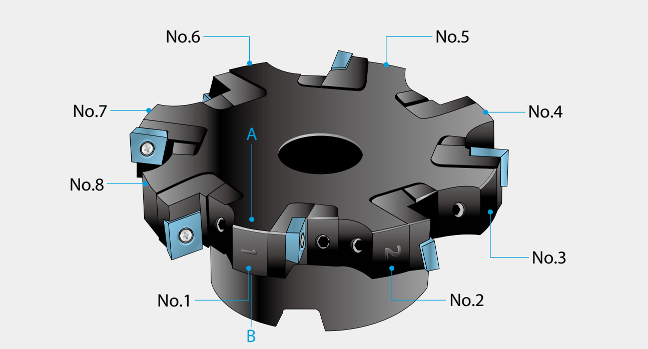
Workpiece material		Hardness (HB)	Recommended insert grades (Vc: m/min)			fz (mm/t)				Remarks
			CVD Coated carbide	PVD Coated carbide		Chipbreaker				
			CA0835	PR0725	PR0110	EN-SD ER-SD EL-SD	ER-SB EL-SB	SN-SB SR-SB SL-SB	FN-SE FR-SE FL-SE	
Low carbon steel	SS400 S10C ~ S25C	125	250~310	170~210	-	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	-	
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	-	Coolant
	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	-	
Gray cast iron	FC250 ~ FC350	260	160~200	110~130	-	0.07~0.22	0.10~0.25	0.15~0.35	-	Dry
Nodular cast iron	FCD400 ~ FCD500	160	130~160	80~100	-	0.07~0.22	0.10~0.25	0.15~0.35	-	
	FCD600 ~ FCD800	250	110~140	70~ 90	-	0.07~0.22	0.10~0.25	0.15~0.35	-	
Non-ferrous metals	AC4A, A7050, etc.	-	-	-	750~950	-	-	-	0.07~0.20	Coolant

Note: 1. Use down-cut machining.
2. If ap is 1/10 or under of cutter dia.(DC), it is possible to increase feed per tooth (fz) by 40%.

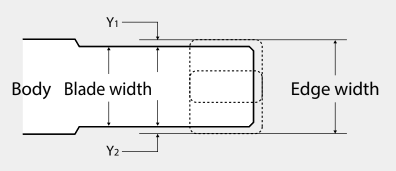


Slot width (Edge width) adjustment of MSTC slot mill

Slot width (Edge width) measurement and adjustment



"No.1-No.8" in the figure is for explanation. There are no indications on the slot mill body.



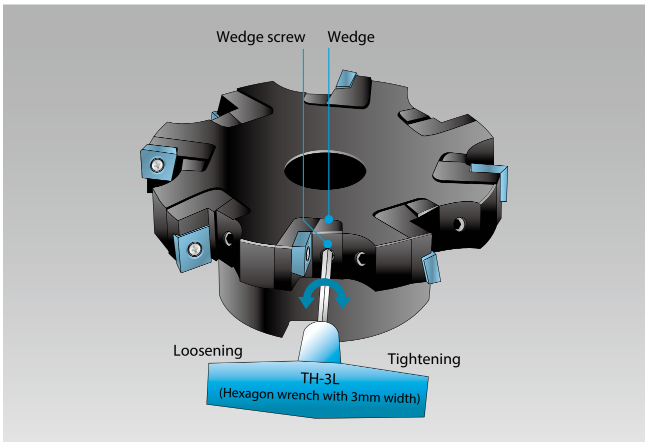
1. Set up the slot mill on length measuring equipment such as tool presetters.
2. Choose any one of the edges as a reference position. (No.1)
3. Measure the blade width of the slot mill body at position No.1. (between point A and B in the figure)
4. Move the length measuring equipment to the insert corner part and measure the step (Y_1) between the point A and the insert No.1.
5. Using the same procedure, measure (Y_2) dimension based on point B.

Edge width = Blade width + Y_1 + Y_2

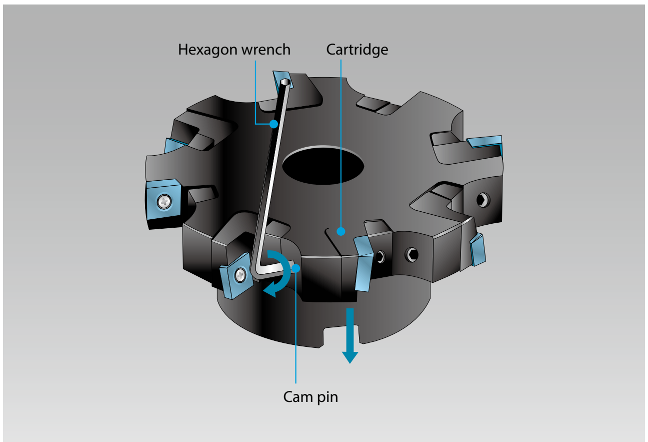
6. Place the point A of the slot mill body near the position No.1 to "0 (zero)" of the length measuring equipment.
7. Adjust the edge position of the inserts in odd numbered positions (No. 3, 5, 7) to "0 (zero)" with the length measuring equipment.
8. Adjust the edge position of the inserts in even numbered positions (No. 2, 4, 6, 8) to the required edge width.

For steps 7. and 8., see "In the case of changing the slot width (Edge width)" on next page.

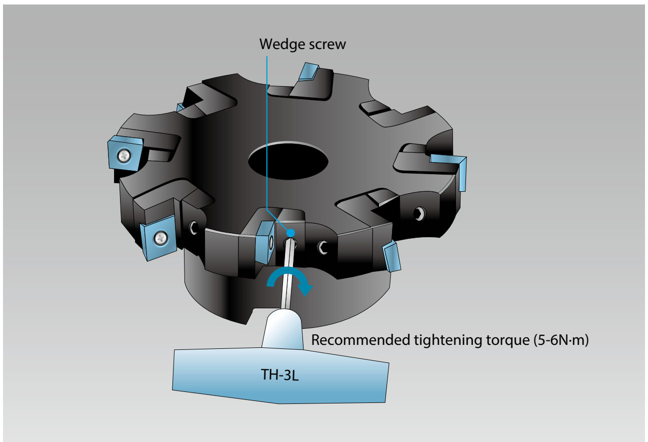
In the case of changing the slot width (Edge width)



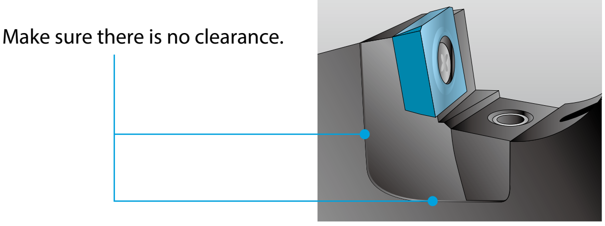
1. Set up the slot mill on length measuring equipment such as tool presetters.
2. Insert a hexagon wrench with 3mm width (TH-3L) into the wedge screw.
3. Turn TH-3L counterclockwise to loosen the wedge.
4. Turn TH-3L clockwise by the torque of 1 N·m to tighten the wedge lightly and make the wedge contact the cartridge and the slot mill body.
   In doing so, some resistance occurs against the cartridge.



5. Insert a hexagon wrench (LW-2.5 OR LW-3) into the cam pin on the back of the cartridge.
6. Turn the wrench and adjust the position of the cartridge.
7. To secure the adjustment, back-turn the cam pin and make sure that it does not touch the groove surface of the back of the cartridge.
8. Remove the hexagon wrench from the cam pin.

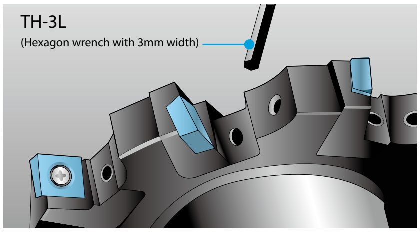


9. Insert TH-3L into the wedge screw.
10. Tighten the wedge screw by the torque of 5-6N·m.
    (Use a torque wrench to get the correct torque.)
11. Make sure there is no clearance between the cartridge and the slot mill body.

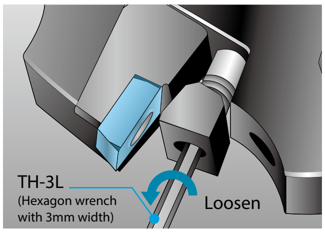


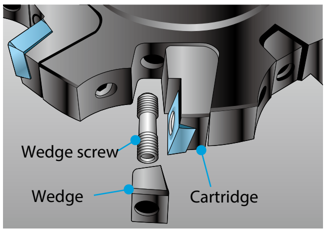
Replacement of the cartridge

Follow the instruction below to replace the cartridge.

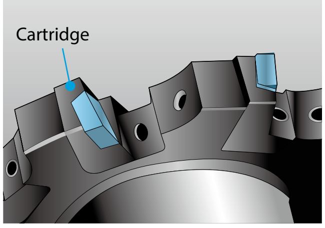


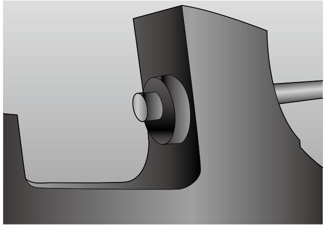
1. Insert hexagon wrench with 3mm width (TH-3L) into the wedge screw.



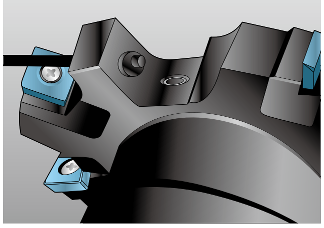


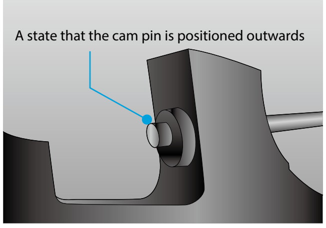
2. Loosen the wedge screw.
3. Remove the wedge screw and wedge.



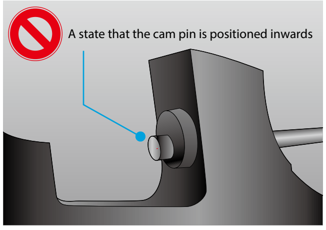


4. Remove the cartridge.

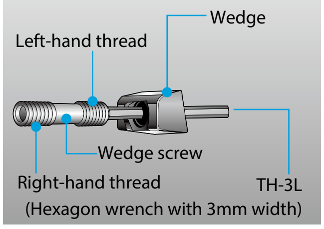


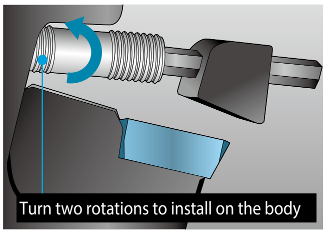


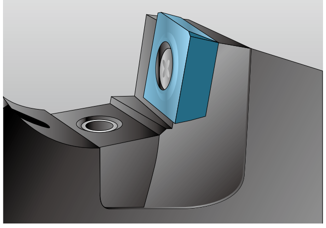
5. Before replacing the cartridge, make sure that the cam pin is positioned radially-outwards.



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).

MRF

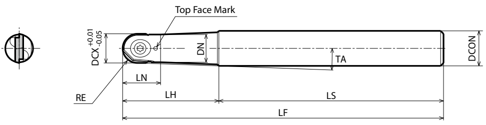


Fig. 1

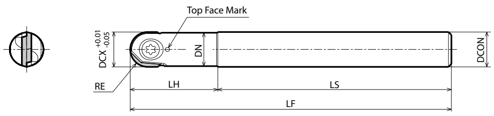


Fig. 2

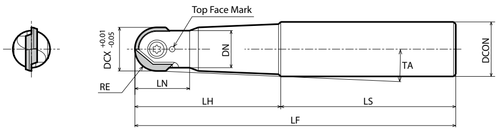


Fig. 3

Top Face Shown

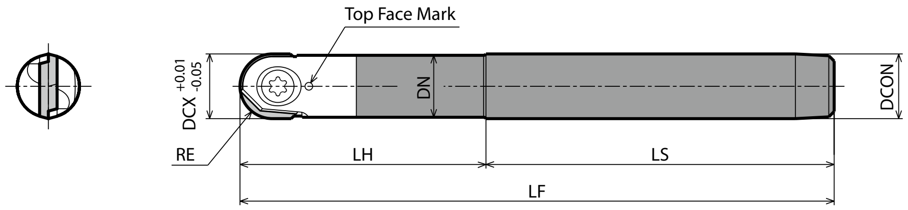
Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)								TA	Coolant hole	Fig.	Spare parts				Applicable inserts ➡ M260
					RE	DCX	DCON	LF	LH	DN	LN	LS				Anti-seize compound	Screw	Wrench	Wrench	
Standard Neck	MRF	08-S12	●	1	4	8	12	100	22	7.5	10	78	6°20´	No	1	P-37	SC-30067	DT-8	-	RDFG08FR
		10-S12	●		5	10			25	9.5	13	75	3°00´		1		SC-35085	DT-10		RDFG10FR
		12-S12	●		6	12		110	30	11.5	-	80	-		2		SC-40100	DT-15		RDFG12FR
		16-S20	●		8	16	20	130	50	14	20		2°50´		1		SC-50130	DT-20		RDFG16FR
		20-S25	●		10	20	25	140	60	17	25		3°00´		3		SC-60160	-	TT-25	RDFG20FR
		25-S32	●		12.5	25	32	150	70	22	31		3°30´		3		SC-60210		TT-30	RDFG25FR
Long Neck	MRF	08-S12-130	●	1	4	8	12	130	50	7.5	10	80	2°30´	No	1	P-37	SC-30067	DT-8	-	RDFG08FR
		10-S16-150	●		5	10	16	150		9.5	15	100	3°50´		1		SC-35085	DT-10		RDFG10FR
		12-S16-160	●		6	12		160	60	11.5	16		2°10´		1		SC-40100	DT-15		RDFG12FR
		16-S20-160	●		8	16	20		65	14	20	95	2°00´		1		SC-50130	DT-20		RDFG16FR
		20-S25-180	●		10	20	25	180	80	17	25	100	2°10´		3		SC-60160	-	TT-25	RDFG20FR
		25-S32-200	●		12.5	25	32	200	90	22	31	110	2°40´		3		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.

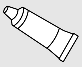
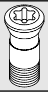
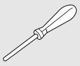
●: Standard item

MRFW (Carbide Shank)



Top Face Shown

Toolholder dimensions

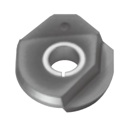
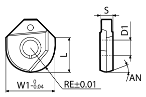
Description			Availability	Inserts	Dimension (mm)							Coolant hole	Spare parts			Applicable inserts ➔ **M260**
					RE	DCX	DCON	LF	LH	DN	LS		Anti-seize compound 	Screw 	Wrench 	
Carbide Standard	MRFW	08-S08	●	1	4	8	8	100	30	7.4	70	No	P-37	SC-30067	DT-8	RDFG08FR
		10-S10	●		5	10	10		35	9.5	65			SC-35085	DT-10	RDFG10FR
		12-S12	●		6	12	12	110	45	11.5				SC-40100	DT-15	RDFG12FR
Carbide Long Neck	MRFW	08-S08-130	●	1	4	8	8	130	65	7.4	65	No	P-37	SC-30067	DT-8	RDFG08FR
		10-S10-140	●		5	10	10	140	75	9.5				SC-35085	DT-10	RDFG10FR
		12-S12-150	●		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

RDFG

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	○	
	Non-ferrous metals		N
	Heat-resistant alloy		S
	Titanium alloy		
	Hard materials		H

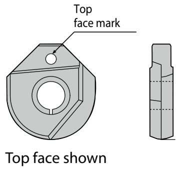
Insert		Description		Dimension (mm)					Angle (°)	Carbide	Applicable toolholder ➡ **M258** **M259**
										PVD	
				S	D1	RE	L	W1	AN	PR915	
		RDFG	08FR	2.1	3.1	4	6.6	8	15	●	MRF(W)08...
			10FR	2.7	3.6	5	8	10	15	●	MRF(W)10...
			12FR	3.2	4.1	6	9.4	12	15	●	MRF(W)12...
			16FR	4.2	5.1	8	11.3	16	10	●	MRF16...
			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 ➡ **M261**

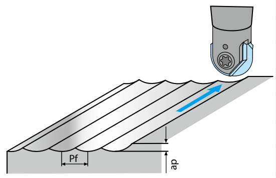
● : Standard item

Applicable inserts

Insert		Description	
		RDFG	08FR
			10FR
			12FR
			16FR
			20FR
			25FR

Check the top face mark of both insert and toolholder.

Recommended depth of cut

Description		Depth of cut (mm)		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	

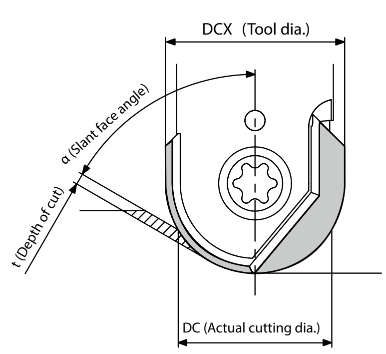
For ø8, holder may be broken because of over load if ap exceeds 0.3mm.

Recommended cutting conditions (At cutting dia. DCX)

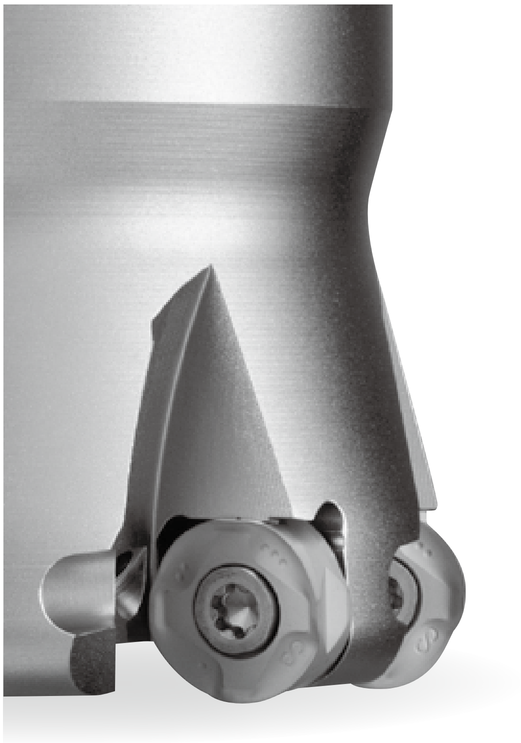
Workpiece material	Insert grades	Vc (m/min)	fz (mm/t)	ø8		ø10		ø12	
				Vc(m/min) (n:min^{-1})	fz(mm/t) (Vf:mm/min)	Vc(m/min) (n:min^{-1})	fz(mm/t) (Vf:mm/min)	Vc(m/min) (n:min^{-1})	fz(mm/t) (Vf:mm/min)
Carbon steel	PR915	100~200	0.1~0.3	150 (5,970)	0.2 (2,390)	150 (4,770)	0.2 (1,910)	150 (3,980)	0.2 (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
	Tool dia. (DCX)		ø16		ø20		ø25	
	Depth of cut (t:mm)		0.2	0.5	0.5	1	0.5	1
	Slant face angle (α)	15°	1.00	1.00	1.00	1.02	1.00	1.01
		30°	1.05	1.01	1.02	1.00	1.03	1.00
		45°	1.18	1.10	1.12	1.06	1.14	1.08
		60°	1.47	1.30	1.34	1.21	1.38	1.25
		75°	2.14	1.73	1.83	1.53	1.93	1.62
		90°(Horizontal plane)	4.48	2.87	3.20	2.29	3.57	2.55

e.g.) Suppose tool dia. 8mm, ap=0.1mm, slant face angle 90°: The actual Cutting speed Vd for carbon steel machining,
when Vc is 150m/min at the biggest diameter, Vd can be obtained as Vd=150 / 4.48=33.5m/min



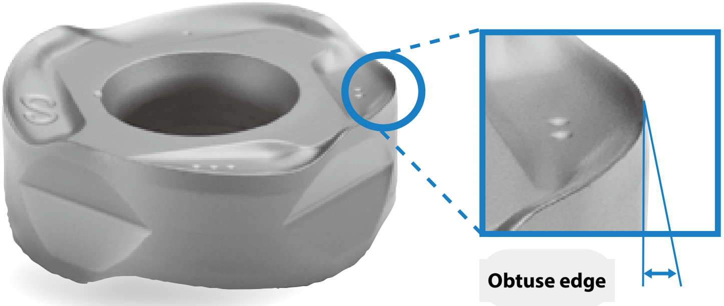
MRW

Economical and high efficiency radius cutter
with double-sided insert for various types of workpieces

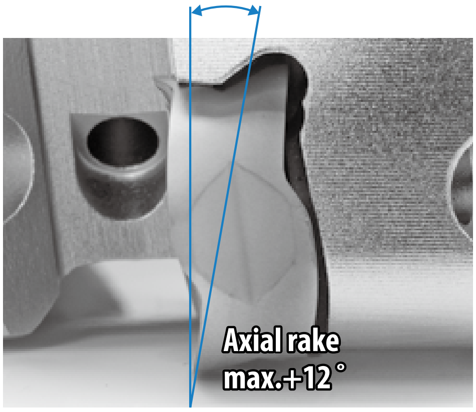
Economical double-sided 8-edge insert
Combine sharpness and cutting edge strength

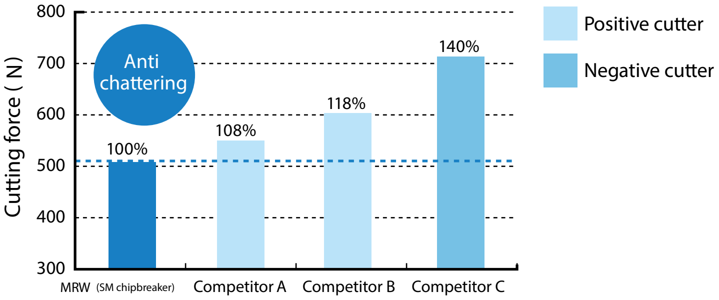
Obtuse edge increases cutting edge toughness

Helical cutting edge design with maximum axial rake 12˚ reduces cutting force, equivalent to positive inserts.



Low cutting force chipbreaker

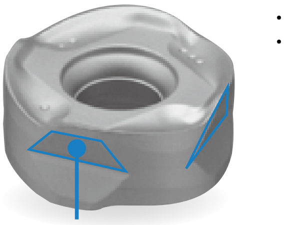




<Cutting conditions>
Vc=120m/min, ap × ae=1× 40mm, fz=0.2mm/t
SUS304, cutter ø50

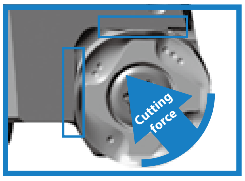
1 Flat lock structure to hold insert firmly

Prevent insert rotation during machining and realizes stable machining



Flat lock structure

Wide flat constraint surface
- Receives even cutting forces
- Controls insert rotation



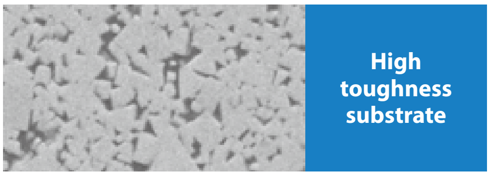
Long tool life by wide lineup with 4 grades and 3 chipbreakers, available for steel, stainless steel and heat-resistant alloys

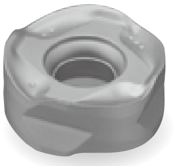
Workpiece material		Applicable insert grades	Applicable chipbreaker
P Carbon steel/Alloy steel/Mold steel		PR1825	GM/SM/GH chipbreaker
K Cast iron		PR1810	GH/GM chipbreaker
S Ni-base heat-resistant alloys	**M** Stainless steel (Martensitic related)	CA6535	SM/GM chipbreaker
S Ni-base heat-resistant alloys **S** Titanium alloys	**M** Stainless steel (Austenitic related) **M** Stainless steel (Precipitation hardening)	PR1835	SM/GM chipbreaker

2

Insert grades for difficult-to-cut material

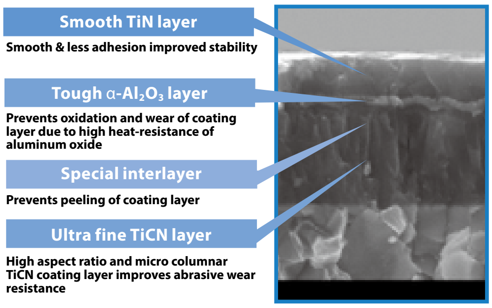
Controls sudden fracture and realizes stable machining
Suitable for high efficiency machining





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

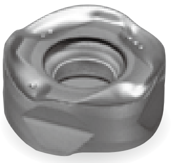


Smooth TiN layer
Smooth & less adhesion improved stability

Tough α-Al_2O_3 layer
Prevents oxidation and wear of coating layer due to high heat-resistance of aluminum oxide

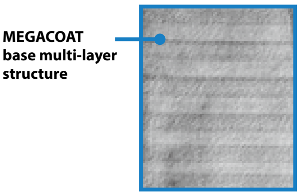
Special interlayer
Prevents peeling of coating layer

Ultra fine TiCN layer
High aspect ratio and micro columnar TiCN coating layer improves abrasive wear resistance



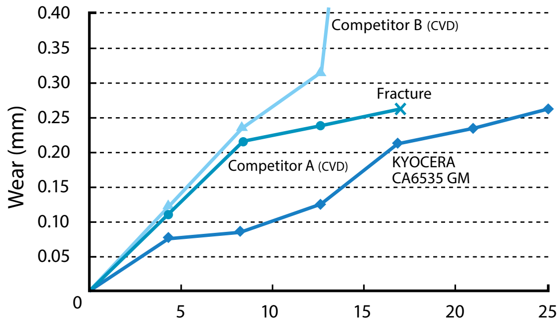
PR1835

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 EX



Tool life comparison (Internal evaluation)

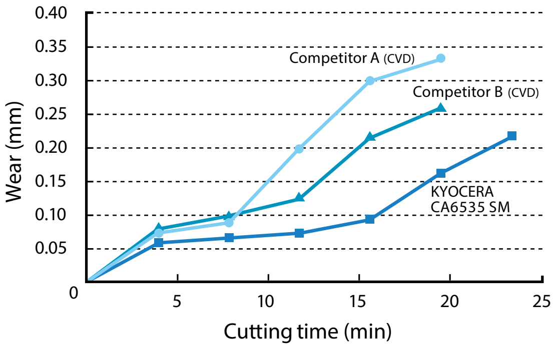
Ni-base heat-resistant alloys



<Cutting conditions> Vc=50m/min, ap=1.0mm, fz=0.15mm/t, wet

1st choice GM chipbreaker

Stainless steel (Martensitic related)



<Cutting conditions> Vc=300m/min, ap=2.0mm, fz=0.2mm/t, wet

1st choice SM chipbreaker

MRW (Face mill)

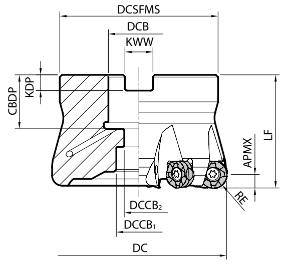


Fig. 1

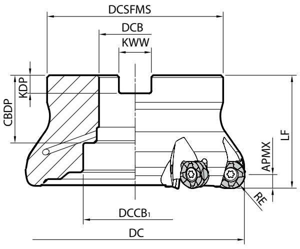


Fig. 2

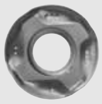
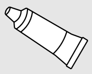
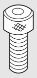
Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)											A.R. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Applicable inserts ➡ M267
			R		RE	DC	DCSFMS	DCB	DCCB₁	DCCB₂	LF	CBDP	KDP	KWW	APMX							
Metric	MRW	050R-12-5T-M	●	5	6	50	48	22	18	11	40	21	6.3	10.4	6	+12	-15.5	Yes	16000	0.3	1	ROMU1204M0ER-..
		050R-12-6T-M	●	6																	1	
		063R-12-6T-M	●	6		63	60		19										14000	0.6	1	
		063R-12-7T-M	●	7																	1	
		080R-12-6T-M	●	6		80	70	27	20	13	50	24	7	12.4					12000	1.1	1	
		080R-12-8T-M	●	8																	1	
		100R-12-7T-M	●	7		100	78	32	46	-		30	8	14.4					10600	1.5	2	
		100R-12-9T-M	●	9																1.4	2	
	MRW	063R-16-5T-M	●	5	8	63	60	22	19	11	40	21	6.3	10.4	8	+11	--16.5	Yes	12800	0.5	1	ROMU1605M0ER-..
		063R-16-6T-M	●	6																	1	
		080R-16-6T-M	●	6		80	70	27	20	13	50	24	7	12.4					11000	1.1	1	
		080R-16-7T-M	●	7																1	1	
		100R-16-6T-M	●	6		100	78	32	46	-		30	8	14.4					9600	1.4	2	
		100R-16-8T-M	●	8																1.3	2	
		125R-16-8T-M	●	8		125	89	40	55		63	33	9	16.4					8500	2.6	2	
		125R-16-10T-M	●	10																2.5	2	
Bore dia. inch spec	MRW	080R-12-6T	●	6	6	80	70	25.4	20	13	50	27	6	9.5	6	+12	-15.5	Yes	12000	1.2	1	ROMU1204M0ER-..
		080R-12-8T	●	8																1.1	1	
		100R-12-7T	●	7		100	78	31.75	46	-		34	8	12.7					10600	1.5	2	
		100R-12-9T	●	9																1.4	2	
	MRW	080R-16-6T	●	6	8	80	70	25.4	20	13	50	27	6	9.5	8	+11	-16.5	Yes	11000	1.1	1	ROMU1605M0ER-..
		080R-16-7T	●	7																	1	
		100R-16-6T	●	6		100	78	31.75	46	-		34	8	12.7					9600	1.4	2	
		100R-16-8T	●	8																	2	
		125R-16-8T	●	8		125	89	38.1	55		63	38	10	15.9					8560	2.6	2	
		125R-16-10T	●	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 **M268** below.

● : Standard item

Spare parts and applicable inserts (MRW face mill)

Description		Spare parts					Applicable Inserts ➡ **M267**		
		Clamp screw	Wrench		Anti-seize compound	Mounting bolt			
			DTPM-15 	TTP-20 			General purpose	Low cutting force	Tough Edge (For Heavy Milling)
MRW	050R-12...	SB-4085TRP	DTPM-15 Recommended tightening torque for insert clamp 3.5N•m		P-37	HH10X30	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
	063R-12...								
	080R-12...					HH12X35			
	100R-12...					-			
MRW	063R-16...	SB-50140TRP	TTP-20 Recommended tightening torque for insert clamp 4.5N•m		P-37	HH10X30	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
	080R-16...					HH12X35			
	100R-16...					-			
	125R-16...								

MRW (End mill)

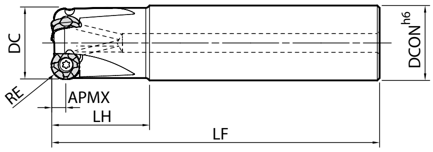


Fig. 1

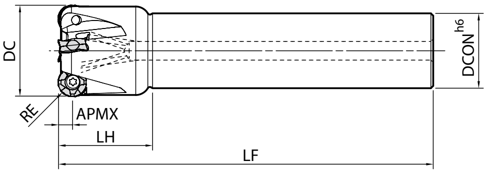


Fig. 2

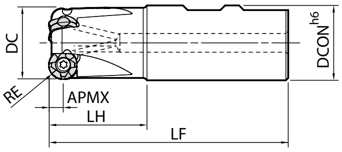


Fig. 3

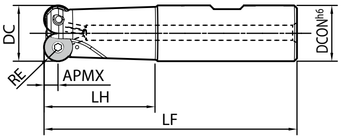


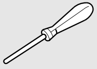
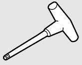
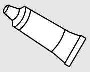
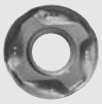
Fig. 4

Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)						A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Fig.	Applicable inserts ➡ **M267**
					RE	DC	DCON	LF	LH	APMX						
Cylindrical	MRW	32-S32-12-3T	●	3	6	32	32	140	40	6	+12	-20	Yes	22000	1	ROMU1204M0ER-..
		40-S32-12-4T	●	4		40		160				-16.5		18800	2	
		50-S42-12-5T	●	5		50	42	170				-15.5		16000	2	
	MRW	40-S32-16-3T	●	3	8	40	32	160	40	8	+11	-18	Yes	17200	2	ROMU1605M0ER-..
		50-S42-16-4T	●	4		50	42	170				-16.5		14800	2	
		63-S42-16-5T	●	5		63			50					12800	2	
Long Shank	MRW	32-S32-12-2T-200	●	2	6	32	32	200	40	6	+12	-20	Yes	22000	1	ROMU1204M0ER-..
		40-S32-12-3T-200	●	3		40						-16.5		18800	2	
		50-S42-12-4T-300	●	4		50	42	300				-15.5		16000	2	
	MRW	40-S32-16-2T-200	●	2	8	40	32	200	40	8	+11	-18	Yes	17200	2	ROMU1605M0ER-..
		50-S42-16-3T-300	●	3		50	42	300				-16.5		14800	2	
		63-S42-16-4T-300	●	4		63			50					12800	2	
Weldon	MRW	32-W32-12-3T	●	3	6	32	32	102	40	6	+12	-20	Yes	22000	3	ROMU1204M0ER-..
		40-W32-12-4T	●	4		40		100				-16.5		18800	4	
		50-W40-12-5T	●	5		50	40	110				-15.5		16000	4	
	MRW	40-W32-16-3T	●	3	8	40	32	100	40	8	+11	-18	Yes	17200	4	ROMU1605M0ER-..
		50-W40-16-4T	●	4		50	40	110				-16.5		14800	4	
		63-W40-16-5T	●	5		63		120	50					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 **M268** below.

Spare parts and applicable inserts (MRW end mill)

Description		Spare parts				Applicable Inserts ➡ **M267**		
		Clamp screw	Wrench		Anti-seize compound			
			DTPM-15 	TTP-20 		 General purpose	 Low cutting force	 Tough Edge (For Heavy Milling)
MRW	...-12...	SB-4085TRP	DTPM-15 Recommended tightening torque for insert clamp 3.5N•m		P-37	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
MRW	...-16...	SB-50140TRP	TTP-20 Recommended tightening torque for insert clamp 4.5N•m		P-37	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH

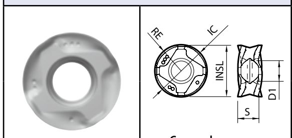
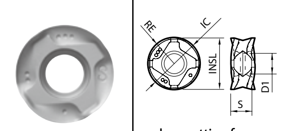
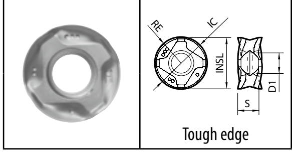
● : Standard item

ROMU

Classification of usage

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

	CA6535	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
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)					Carbide							Applicable toolholder ➡ M264 M266
							CVD	PVD						
		IC	S	D1	RE	INSL	CA6535	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
 General purpose	ROMU 1204M0ER-GM	12	4.75	4.6	6	11.8	●	☐	○	●	●	●	●	MRW...-12-..
	ROMU 1605M0ER-GM	16	5.48	6.2	8	15.8	●	☐	○	●	●	●	●	MRW...-16-..
 Low cutting force	ROMU 1204M0ER-SM	12	4.75	4.6	6	11.8	●		○	●		●	●	MRW...-12-..
	ROMU 1605M0ER-SM	16	5.48	6.2	8	15.8	●		○	●		●	●	MRW...-16-..
 Tough edge	ROMU 1204M0ER-GH	12	4.75	4.6	6	11.8	●	☐	○	●	●	●	●	MRW...-12-..
	ROMU 1605M0ER-GH	16	5.48	6.2	8	15.8	●	☐	○	●	●	●	●	MRW...-16-..

Handed insert shows Right-hand

Recommended cutting conditions ➡ **M268**

● : Standard item ○ : Will be replaced with a new product ☐ : Expected to be discontinued in September 2026

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)			
				MEGACOAT NANO EX (MEGACOAT NANO)			CVD Coated carbide
	GM	SM	GH	PR1810 (PR1510)	PR1825 (PR1525)	PR1835 (PR1535)	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	-	☆ 30~**50**~70	-	★ 40~**60**~80	-

★: 1st Recommendation ☆: 2nd Recommendation

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Recommended feed rate is the reference value when ap is RE/2 (3mm for ROMU12, 4mm for ROMU16).
For lower ap than the above conditions, the conversion factor in the following table is recommended.

Insert	ap (Recommended)	Max. ap	Conversion factor for feed per tooth fz				
			ap=0.5mm	ap=1mm	ap=2mm	ap=3mm	ap=4mm
ROMU12 type	3mm or less	6mm	2.1	1.5	1.1	1.0 (Standard)	-
ROMU16 type	4mm or less	8mm	2.4	1.7	1.3	1.1	1.0 (Standard)

* Example (ROMU12 type, carbon steel, GM chipbreaker, ap=1mm)

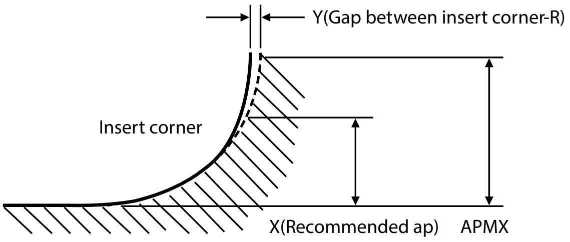
fz=0.2mm/t (Reference value for carbon steel and GM chipbreaker)	×	1.5 (Conversion factor for ROMU12 type, ap=1mm)	=	fz = 0.3 mm/t (Recommended feed rate)

* Recommended ap: 3mm or less for ROMU12, 4mm or less for ROMU16
Except the case that ap temporally surpass the recommended ap, machining under the recommended ap is recommended.

Corner-R shape during processing

Corner-R shape during processing with MRW (Ref. to the right figure)

Insert	APMX	X	Y
ROMU12 type	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.

How to mount an insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. Clamp screw
   1. Apply anti-seize compound on portion of taper and thread of clamp screw.
   2. Attach the screw to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
3. Wrenches and clamp screws are "Torx Plus".
   1. Fig. 2 wrench is for MRW-12. (Straight grip)
   2. Fig. 3 wrench is for MRW-16. (T-shaped grip)

      Please use a "Torx Plus" Wrench for tightening cramp screw.

      * If a "Torx" wrench (Fig. 4) is used to tighten, the screw head might become damaged and then the screw cannot be removed.
4. When tightening the screw, make sure that the wrench is parallel to the screw.
   Recommended Tightening torque, See spare parts table.
5. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder or between the insert side surfaces and the constraint surface of the toolholder. If there is any clearance, remove the insert and mount it again according to the above steps.

Fig. 1

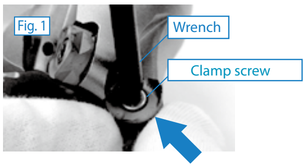
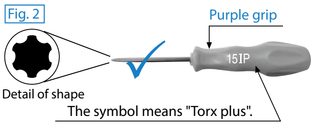
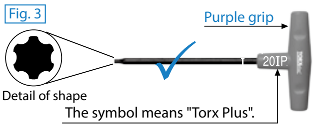


Fig. 2



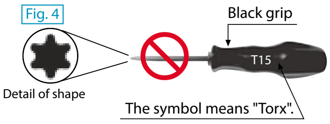
Straight grip wrench for MRW-12

Fig. 3



T-shaped grip wrench for MRW-16

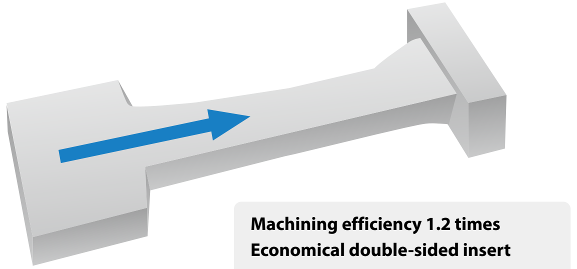
Fig. 4



Torx wrench (Do NOT use it for MRW)

Case studies

12Cr Steel



Machining efficiency 1.2 times
Economical double-sided insert

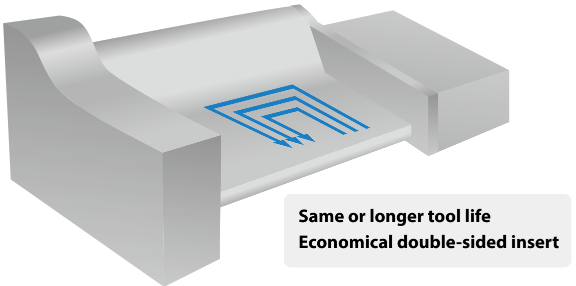
- Turbine blade
- Vc=270m/min
- fz=0.278mm/t
- ap=0.5~1.0mm
- ae=max.35mm
- Dry
- MRW050R-12-6T-M (6 flutes)
- ROMU1204M0ER-SM (CA6535)

CA6535	**Stable machining**
Competitor A (Positive cutter)	**Unstable machining with large noise**

- MRW improved machining efficiency by 1.2 times with same tool life compared with competitor A.
- MRW has cost advantage due to double-sided inserts.

(User evaluation)

12Cr Steel



Same or longer tool life
Economical double-sided insert

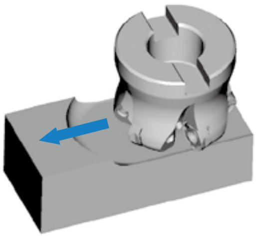
- Turbine Blade
- Vc=250m/min
- fz=0.16mm/t
- ap=2.0mm
- ae=5~30mm
- Wet
- MRW050R-12-5T-M (5 flutes)
- ROMU1204M0ER-SM (CA6535)

CA6535	**Stable, available for further machining**
Competitor B (Positive cutter)	**Unstable machining with large noise**

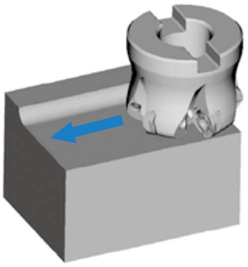
- MRW showed less damage on the cutting edge and reduced machining noise.
- MRW has equal or longer tool life and cost advantage due to double sided inserts.

(User evaluation)

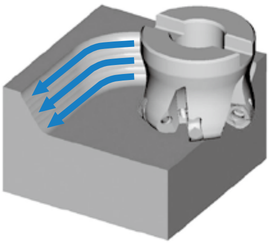
Applications



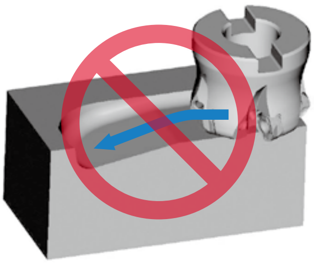
Facing



Shouldering



Contouring



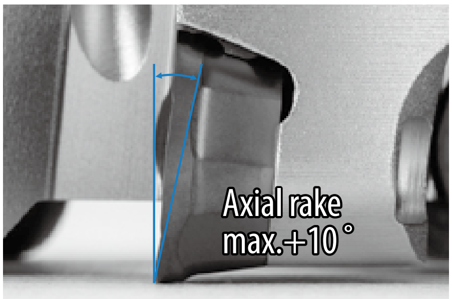
Plunging/Profiling

MRX

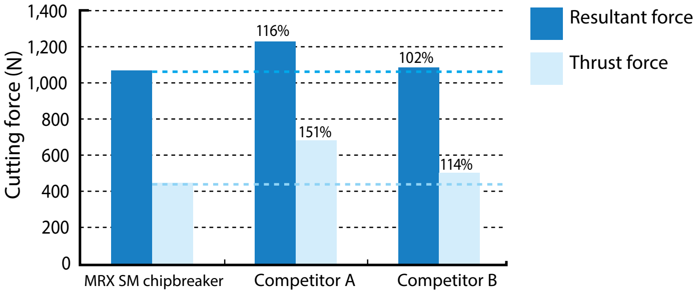
Excellent cutting performance with low cutting force design

High efficiency radius cutter

1 Low cutting force design 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

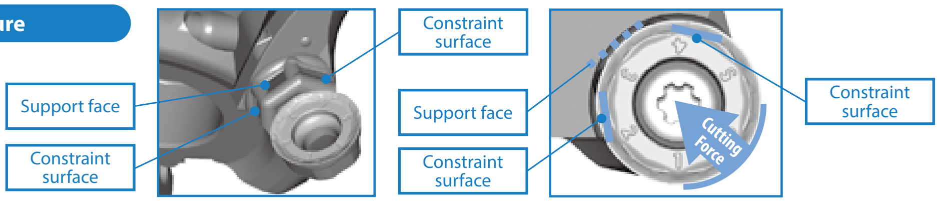
2 Flat lock structure to hold insert firmly

Prevent insert rotation during machining and realizes stable machining

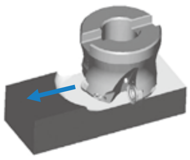
Flat lock structure

Wide flat constraint surface

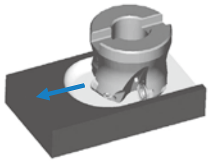
- Receives even cutting forces
- Controls insert rotation



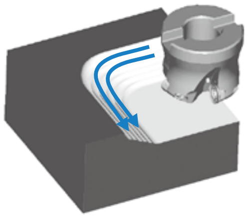
3 Various applications



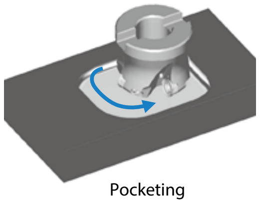
Facing



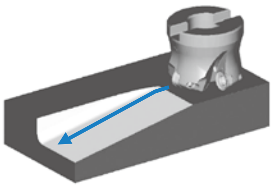
Slotting



Shouldering



Pocketing



Plunging/Profiling

4 Machining of various materials possible

Insert grades **CA6535/PR1835(PR1535)** for difficult-to-cut material are available.
Long tool life by wide lineup with 4 grades and 3 chipbreakers, available for steel, stainless steel and heat-resistant alloys.

Cost-effective M class inserts are available

MRX (Face mill)

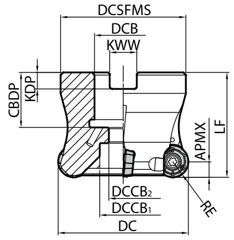


Fig. 1

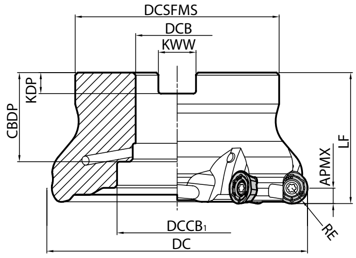


Fig. 2

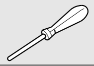
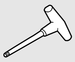
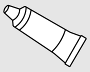
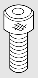
Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)											A.R. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Weight (kg)	Fig.	Applicable inserts ➡ M276
			R		RE	DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX							
Metric	MRX	040R-10-5T-M	●	5	5	40	38	16	15	9	40	19	5.6	8.4	5	+10	-5.5	Yes	20000	0.2	1	RPGT10T3... RPMT10T3...
		050R-10-6T-M	●	6		50	48	22	18	11		21	6.3	10.4					17500	0.3	1	
		063R-10-7T-M	●	7		63	60												15000	0.6	1	
	MRX	040R-12-4T-M	●	4	6	40	38	16	13.5	9	40	19	5.6	8.4	6	+10	-5.5	Yes	21000	0.2	1	RPGT1204... RPMT1204...
		050R-12-4T-M	●			50	48	22	18	11		21	6.3	10.4					18000	0.3	1	
		050R-12-5T-M	●	5																	1	
		063R-12-5T-M	●			63	60												15500	0.6	1	
		063R-12-6T-M	●	6																	1	
		080R-12-6T-M	●			80	70	27	20	13	50	24	7	12.4					13500	1.2	1	
		080R-12-8T-M	●	8																1.1	1	
		100R-12-7T-M	●	7		100	78	32	46	-		30	8	14.4					12000	1.4	2	
		100R-12-9T-M	●	9																	2	
	MRX	063R-16-4T-M	●	4	8	63	60	22	18	11	40	21	6.3	10.4	8	+10	-5.5	Yes	13500	0.5	1	RPGT1605... RPMT1605...
		063R-16-5T-M	●	5																	1	
		080R-16-5T-M	●	5		80	70	27	20	13	50	24	7	12.4					11500	1.1	1	
		080R-16-6T-M	●	6																	1	
		100R-16-6T-M	●			100	78	32	46	-		30	8	14.4					10000	1.4	2	
		100R-16-7T-M	●	7																	2	
		125R-16-6T-M	●	6		125	89	40	55		63	33	9	16.4					9000	2.6	2	
		125R-16-8T-M	●	8																	2	
Bore dia. inch spec	MRX	080R-12-6T	●	6	6	80	70	25.4	20	13	50	27	6	9.5	6	+10	-5.5	Yes	13500	1.2	1	RPGT1204... RPMT1204...
		080R-12-8T	●	8																1.1	1	
		100R-12-7T	●	7		100	78	31.75	46	-		34	8	12.7					12000	1.5	2	
		100R-12-9T	●	9																	2	
	MRX	080R-16-5T	●	5	8	80	70	25.4	20	13	50	27	6	9.5	8	+10	-5.5	Yes	11500	1.1	1	RPGT1605... RPMT1605...
		080R-16-6T	●	6																	1	
		100R-16-6T	●			100	78	31.75	46	-		34	8	12.7					10000	1.4	2	
		100R-16-7T	●	7																	2	
		125R-16-6T	●	6		125	89	38.1	55		63	38	10	15.9					9000	2.7	2	
		125R-16-8T	●	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.
Coat anti-seize compound thinly on portion of taper and thread when insert is fixed.

● : Standard item

Spare parts and applicable inserts (MRW face mill)

Description		Spare parts					Applicable inserts
		Clamp screw	Wrench		Anti-seize compound	Mounting bolt	➡ M276
			DTPM 	TTP 			
MRX	040R-10...	SB-3070TRP	DTPM-10 Recommended tightening torque for insert clamp 2.0N•m		P-37	HH8X25	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH * 1
	050R-10...					HH10X30	
	063R-10...						
MRX	040R-12...	SB-4090TRPN	DTPM-15 Recommended tightening torque for insert clamp 3.5N•m		P-37	HH8X25	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH * 2
	050R-12...					HH10X30	
	063R-12...						
	080R-12...					HH12X35	
	100R-12...					-	
MRX	063R-16...	SB-50120TRP	TTP-20 Recommended tightening torque for insert clamp 4.5N•m		P-37	HH10X30	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH * 3
	080R-16...					HH12X35	
	100R-16...					-	
	125R-16...						

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

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

*1··· Not compatible with the conventional RPMT10T3M0.

*2··· Not compatible with the conventional RPMT1204M0 and RPMT1204M0-H.

*3··· Not compatible with the conventional RPMT1606M0-H.

MRX (End mill)

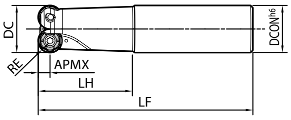


Fig. 1

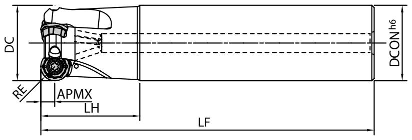


Fig. 2

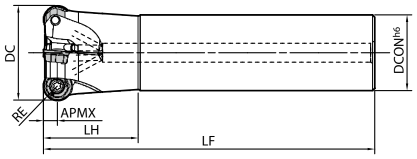


Fig. 3

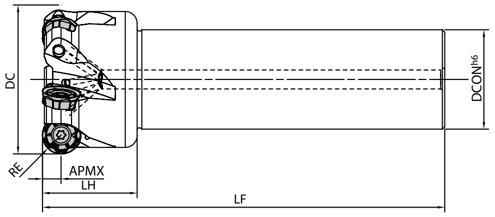


Fig. 4

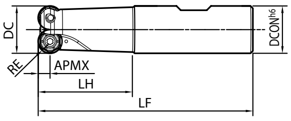


Fig. 5

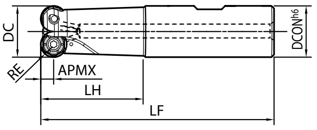


Fig. 6

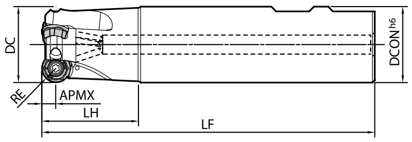


Fig. 7

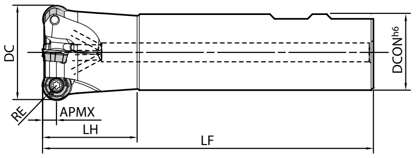


Fig. 8

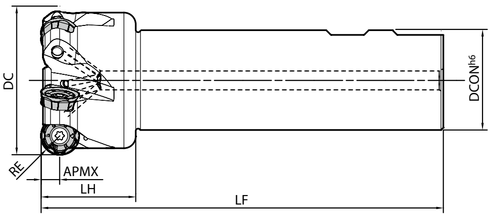


Fig. 9

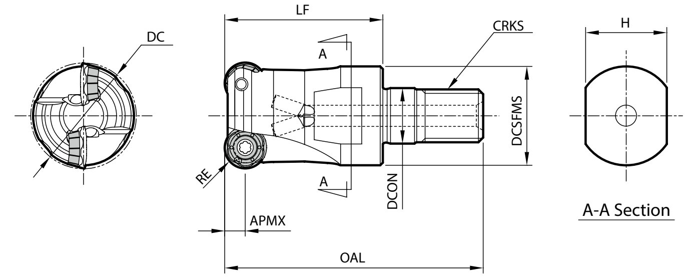
Toolholder dimensions

Description			Availability	Inserts	Dimension (mm)						A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Fig.	Applicable inserts ➡ M276
					RE	DC	DCON	LF	LH	APMX						
Cylindrical	MRX	16-S16-08-2T	●	2	4	16	16	110	40	4	+3	-5.5	No	38000	1	RDGT0803... RDMT0803...
		20-S20-08-2T	●			20	20	120			+10		Yes	32000	2	
		25-S25-08-4T	●	4		25	25							28000	2	
	MRX	20-S20-10-2T	●	2	5	20	20	120	40	5	+5	-8	No	30000	1	RPGT10T3... RPMT10T3...
		25-S25-10-3T	●	3		25	25				+10	-5.5	Yes	28000	2	
		32-S32-10-4T	●	4		32	32	140						22500	2	
	MRX	32-S32-12-3T	●	3	6	32	32	140	40	6	+10	-5.5	Yes	24500	2	RPGT1204... RPMT1204...
		40-S32-12-4T	●	4		40								21000	3	
		50-S42-12-5T	●	5		50	42	170						18000	3	
	MRX	40-S32-16-2T	●	2	8	40	32	140	40	8	+10	-5.5	Yes	18000	3	RPGT1605... RPMT1605...
		50-S42-16-4T	●	4		50	42	170						15500	3	
		63-S42-16-5T	●	5		63								13500	4	
Weldon	MRX	16-W16-08-2T	●	2	4	16	16	89	40	4	+3	-5.5	No	38000	5	RDGT0803... RDMT0803...
		20-W20-08-2T	●			20	20	91			+10		Yes	32000	6	
		25-W25-08-4T	●	4		25	25	97						28000	7	
	MRX	20-W20-10-2T	●	2	5	20	20	91	40	5	+5	-8	No	30000	5	RPGT10T3... RPMT10T3...
		25-W25-10-3T	●	3		25	25	97			+10	-5.5	Yes	28000	7	
		32-W32-10-4T	●	4		32	32	101						22500	7	
	MRX	32-W32-12-3T	●	3	6	32	32	101	40	6	+10	-5.5	Yes	24500	7	RPGT1204... RPMT1204...
		40-W32-12-4T	●	4		40								21000	8	
		50-W40-12-5T	●	5		50	40	111						18000	8	
	MRX	40-W32-16-2T	●	2	8	40	32	101	40	8	+10	-5.5	Yes	18000	8	RPGT1605... RPMT1605...
		50-W40-16-4T	●	4		50	40	111						15500	8	
		63-W40-16-5T	●	5		63		112						13500	9	
Long Shank	MRX	16-S16-08-2T-160	●	2	4	16	16	160	70	4	+3	-5.5	No	38000	1	RDGT0803... RDMT0803...
		20-S20-08-2T-180	●			20	20	180	80		+10		Yes	32000	2	
		25-S25-08-4T-180	●	4		25	25							28000	2	
	MRX	20-S20-10-2T-180	●	2	5	20	20	180	80	5	+5	-8	No	30000	1	RPGT10T3... RPMT10T3...
		25-S25-10-2T-180	●			25	25				+10	-5.5	Yes	28000	2	
		32-S32-10-4T-200	●	4		32	32	200						22500	2	
	MRX	32-S32-12-2T-200	●	2	6	32	32	200	80	6	+10	-5.5	Yes	24500	2	RPGT1204... RPMT1204...
		40-S32-12-4T-200	●	4		40			40					21000	3	
		50-S42-12-4T-300	●			50	42	300						18000	3	
	MRX	40-S32-16-2T-200	●	2	8	40	32	200	40	8	+10	-5.5	Yes	18000	3	RPGT1605... RPMT1605...
		50-S42-16-4T-300	●	4		50	42	300						15500	3	
		63-S42-16-4T-300	●			63								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.

● : Standard item

MRX (Modular type)

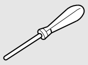
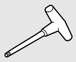
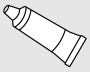


Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)									A.R. max. (°)	R.R. (°)	Coolant hole	Max. revolution (min^{-1})	Applicable inserts ➡ **M276**
			RE	DC	DCON	DCSFMS	OAL	LF	APMX	CRKS	H					
MRX 16-M08-08-2T	●	2	4	16	8.5	14.7	42	25	4	M8x1.25	12	+3	-5.5	No	38000	RDGT0803... RDMT0803...
MRX 20-M10-08-2T	●			20	10.5	18.7	48	30		M10x1.5	15	+10		Yes	32000	
MRX 25-M12-08-4T	●	4		25	12.5	23	56	35		M12x1.75	19				28000	
MRX 20-M10-10-2T	●	2	5	20	10.5	18.7	48	30	5	M10x1.5	15	+5	-8	No	30000	RPGT10T3... RPMT10T3...
MRX 25-M12-10-3T	●	3		25	12.5	23	56	35		M12x1.75	19	+10	-5.5	Yes	28000	
MRX 32-M16-10-4T	●	4		32	17	30	62	40		M16x2.0	24				22500	
MRX 32-M16-12-3T	●	3	6	32	17	30	62	40	6	M16x2.0	24	+10	-5.5	Yes	24500	RPGT1204... RPMT1204...
MRX 40-M16-12-4T	●	4		40											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 **M82** 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 ➡ **M276**
		DTPM 	TTP 		
MRX ...-08...	SB-2555TRP	DTPM-8 Recommended tightening torque for insert clamp 1.2N•m		P-37	RDMT0803M0ER-GM RDGT0803M0ER-GM RDGT0803M0ER-SM RDMT0803M0EN-GH * 1
MRX ...-10...	SB-3070TRP	DTPM-10 Recommended tightening torque for insert clamp 2.0N•m		P-37	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH * 2
MRX ...-12...	SB-4090TRPN	DTPM-15 Recommended tightening torque for insert clamp 3.5N•m		P-37	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH * 3
MRX ...-16...	SB-50120TRP	TTP-20 Recommended tightening torque for insert clamp 4.5N•m		P-37	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH * 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.

- *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.

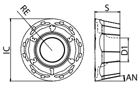
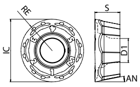
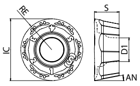
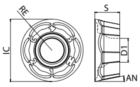
● : Standard item

RDMT/RDGT/RPMT/RPGT

Classification of usage

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

	CA6535	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
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)				Angle (°)	Carbide							Applicable toolholder ➡ M271 M274 M275
		IC	S	D1	RE	AN	CVD	PVD						
							CA6535	PR1510	PR1525	PR1535	PR1810	PR1825	PR1835	
  General purpose	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-..
  General purpose	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-..
  Low cutting force	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-..
  Tough edge	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 ➡ **M277**

● : Standard item ○ : Will be replaced with a new product ☐ : Expected to be discontinued in September 2026

Recommended cutting conditions

Workpiece material	Recommended chipbreaker (fz: mm/t) * RD**08 type: ap=2mm, RP**10 type: ap=2.5mm RP**12 type: ap=3mm, RP**16 type: ap=4mm				Recommended insert grades (Vc: m/min)			
					MEGACOAT NANO EX (MEGACOAT NANO)			CVD Coated carbide
	RDMT-GM RPMT-GM	RDGT-GM RPGT-GM	RDGT-SM RPGT-SM	RDMT-GH RPMT-GH	PR1810 (PR1510)	PR1825 (PR1525)	PR1835 (PR1535)	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	-	☆ 30~**50**~70	-	★ 40~**60**~80	-

★: 1st Recommendation ☆: 2nd Recommendation

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

fz=0.2 mm/t (Reference value for carbon steel and GM chipbreaker)	×	1.5 (Conversion factor for ROMU12 type, ap=1mm)	=	fz=0.3 mm/t (Recommended feed rate)

Recommended cutting conditions for drilling/ramping/helical milling

Tool spec.		Max. ap	Drilling		Ramping (Slant milling)			Helical milling		
Insert	Tool dia.	ap	Max. cutting depth Pd	Min. Cutting length X for flat bottom surface	Max. ramping angle RMPX	tan RMPX	Cutting length L at max. ramping angle	Min. cutting dia. øDh1	Min. cutting dia. for flat bottom facing øDh2	Max. cutting dia. øDh3
RD**08 type	16	4	0.7	9	8°	0.141	28	20	24	30
	20		1.4	13	9°	0.158	25	26	32	38
	25			18	5°	0.087	45	36	42	48
RP**10 type	20	5	0.6	11	5°	0.087	57	26	30	38
	25		1.9	16	10°	0.176	28	33	40	48
	32			23	6°	0.105	47	47	54	62
	40			31	4°	0.070	71	63	70	78
	50			41	3°	0.052	95	83	90	98
	63			54	2°	0.035	143	109	116	124
RP**12 type	32	6	2.4	21	9°	0.158	37	43	52	62
	40			29	5°	0.087	68	59	68	78
	50			39	4°	0.070	85	79	88	98
	63			52	2°	0.035	171	105	114	124
	80			69				139	148	158
	100			89	1°	0.017	343	179	188	198
RP**16 type	40	8	3.4	25	11°	0.194	41	51	64	78
	50			35	7°	0.123	65	71	84	98
	63			48	4°	0.070	114	97	110	124
	80			65	3°	0.052	152	131	144	158
	100			85	2°	0.035	229	171	184	198
	125			110	1°	0.017	458	221	234	248

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

Unit: mm

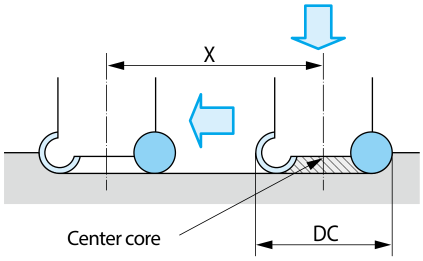
Guide for drilling

Depth of drilling

Refer to max. cutting depth (Pd) shown in the lower table of **M277**.
(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 **M277**.

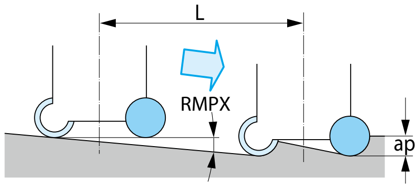


Guide for ramping (Slant milling)

- 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

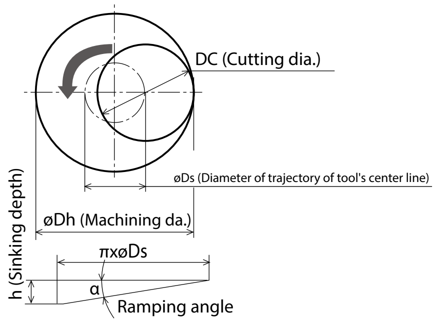
$$L = \frac{ap}{\tan RMPX}$$



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.

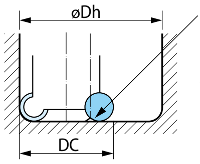
Helical milling factors



øDs **(How to find diameter of trajectory of tool's center line)**
øDs=øDh-DC

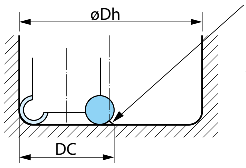
Formula for sinking depth (h)
h=π x øDs x tan α
(h should be ap or under)
(α should be RMPX or under)

[When cutting dia. øDh1≤øDh<øDh2]



Center core part remains after machining. (Not removable with the same cutter)

[When cutting dia. øDh2≤øDh≤øDh3]



Center core part remains after machining. (Removable by traversing with the same cutter)

Please refer to **M277** the list for øDh1 ~ Dh3.

Max. ap and usable edges

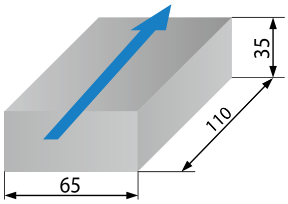
(mm)

Usable edges	Insert corner-R			
	R4	R5	R6	R8
3 edges	ap=2.0~4.0	ap=2.5~5.0	ap=3.0~6.0	ap=4.0~8.0
6 edges	ap=2.0 Less than	ap=2.5 Less than	ap=3.0 Less than	ap=4.0 Less than

Case studies

SUS304

- Nozzle parts
- Vc = 113m/min
- ap x ae = 1.0 x 65mm
- fz = 0.14mm/t
- Dry
- MRX100R-12-9T-M (9 flutes)
- RPGT1204M0ER-SM (PR1535)



4.5 times longer tool life

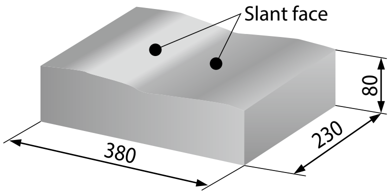
PR1535	**450 pcs/edge**
Conventional	**100 pcs/edge**

- High cost efficiency with 4.5 times longer tool life and 1.5 times more insert edges.
- MRX prevented burr formation and improved surface finish.

(User evaluation)

SKD61 (47~49HRC)

- Mold part
- Vc = 125m/min
- ap x ae = 1.0~ 2.0x 10mm
- fz = 0.25mm/t
- Dry
- MRX20-S20-08-2T (2 flutes)
- RDGT0803M0ER-GM (PR1525)



More than double tool life

PR1525	**2 pcs and more Stable tool life**
Conventional	**1 pc unstable tool life**

- Conventional tool machined only 1 pc of workpiece due to unstable tool life, but MRX doubled the tool life with stable machining.

(User evaluation)

MCSE

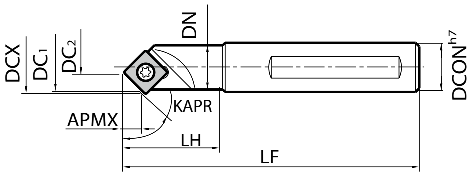


Fig. 1

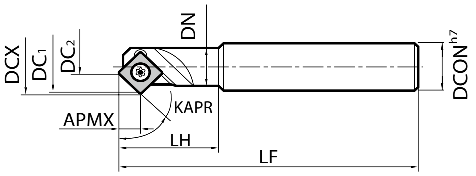


Fig. 2

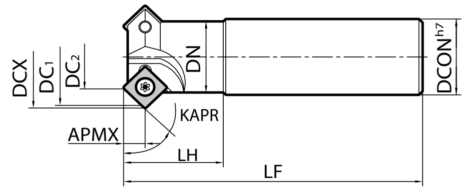


Fig. 3

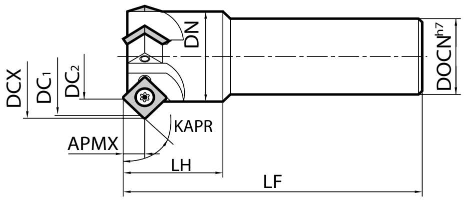


Fig. 4

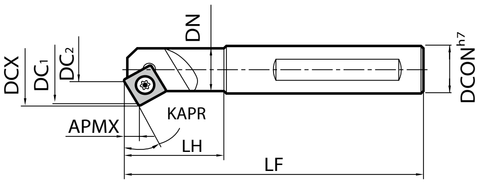


Fig. 5

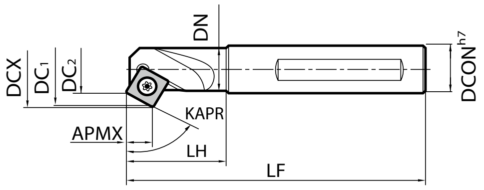
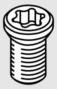
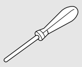
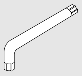


Fig. 6

Toolholder dimensions

Description		Availability	Inserts	Dimension (mm)								Standard corner-R(RE)	KAPR (°)	A.R. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts			Applicable inserts ➡ **M281**
				DCX	DC1	DC2	DCON	LF	LH	APMX	DN							Screw 	Wrench 	Wrench 	
MCSE	104	●	1	16	15	4	16	85	31	6.5	15	0.4	45	0	-4.5	No	1	SB-3060TR	DT-10	-	SDKW09T2... SDMT09T204C
	106	●		22	21	6	20	121	41	8.6	16	0.8			-1		2	SB-5090TR	-	LTW-20	SEKW1203... SEMT120304C
	115	●		31	30	15					18				+5		2				
	227	●	2	43	42	27	32				30				+8		3				
	336	●	3	52	51	36					38				+10		4				
MCSE	104-30D	●	1	19	18	4	16	85	31	4.7	15	0.4	30	0	-4	No	5	SB-3060TR	DT-10	-	SDKW09T2... SDMT09T204C
	108-30D	●		28	27	8	20	110	41	6.3	19	0.8			-2.5		5	SB-5090TR	-	LTW-20	SEKW1203... SEMT120304C
	110-30D	●		30	28	10		120	40		18				0		5				
MCSE	108-60D	●	1	19.5	19	8	20	110	41	10	19	0.8	60	0	-3.5	No	6	SB-5070TR	-	LTW-20	SEKW1203... SEMT120304C
	120-60D	●		31	30	20		120	40		18				0		6	SB-5090TR			

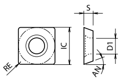
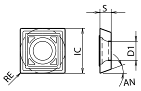
● : Standard item

SDKW/SDMT/SEKW/SEMT

Classification of usage

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

	PR1825	KW10	TN100M	
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)				Angle (°)	Carbide		Cermet	Applicable toolholder ➡ **M280**
									PVD	-	-	
				IC	S	D1	RE	AN	PR1825	KW10	TN100M	
		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	● ●		● ●	
	 Low cutting force	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 ➡ **M282**

● : Standard item

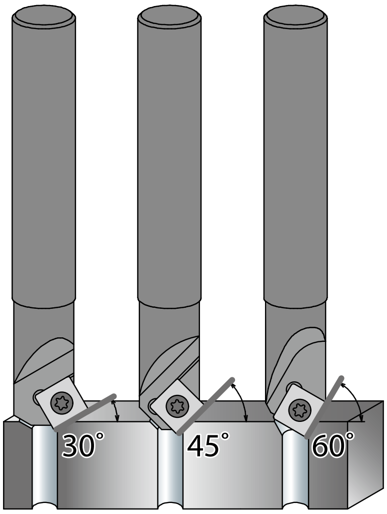
Applicable inserts

Description		Applicable inserts ➡ **M281**		
				
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			

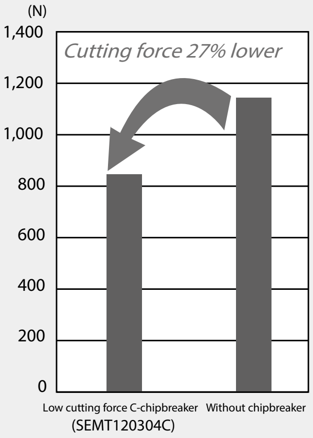
Recommended cutting conditions

Workpiece material	fz (mm/t)		Recommended insert grades (Vc: m/min)		
			MEGACOAT	Carbide	Cermet
	DC_2 (ø4~ø20)	DC_2 (ø27~ø36)	PR1825	KW10	TN100M
Carbon steel	0.05~0.25	0.2~0.4	★ 120~250	-	★ 100~180
Alloy steel	0.05~0.25	0.2~0.4	★ 100~220	-	★ 100~180
Mold steel	0.05~0.25	0.2~0.4	★ 80~180	-	★ 100~150
Stainless steel	0.05~0.2	0.1~0.3	★ 120~220	-	☆ 100~180
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



Cutting performance of low cutting force C-chipbreaker



Cutting conditions
S55C
n=1,900min $^{-1}$
f=0.2mm/rev
(Vf=380mm/min)
C3 chamfering
Dry
MCSE106

Cutting force is reduced by 27% with low cutting force C-chipbreaker

High efficiency bolt countersink end mill

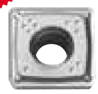
MEF Expanded Offering

For countersinking and boring of bolts with hexagon holes (M6 to M30)
Economical inserts with 4 cutting edges

1 New GM chipbreaker provides high-efficiency and stable machining

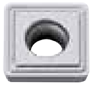
Excellent chip control for a wide range of machining. Provides stable machining with a low cutting force design

NEW



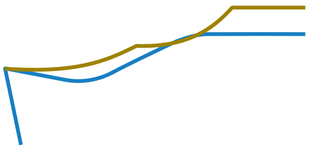
General purpose
1st recommendation

GM Chipbreaker



Tough edge

Z Chipbreaker



GM / Z Chipbreaker
(2mm from the tip of the insert)

Conventional challenges

. Poor chip evacuation can lead to entaglement.
. Feed rate cannot increase due to high cutting force.
. Chatter occurs when deep hole making.

GM Chipbreaker

Variable chipbreaker width considering speed difference of inner and outer periphery
⇒Stable chip control at high D.O.C.

Bump at corners
⇒Stable chip control
at low D.O.C.

Chip samples by GM chipbreaker

10mm

Case1 Vc = 120 m/min fz = 0.10 mm/t ap = 4.5 mm ø26 S45C	Case2 Vc = 80m/min fz = 0.15 mm/t ap = 3.5 mm ø30 S45C
	
Case3 Vc = 120 m/min fz = 0.10 mm/t ap = 1.0 mm ø26 S50C	**Case4** Vc = 120 m/min fz = 0.15 mm/t ap = 1.0 mm ø26 S50C
	

Achieves excellent chip control under various machining conditions

(User/internal evaluation)

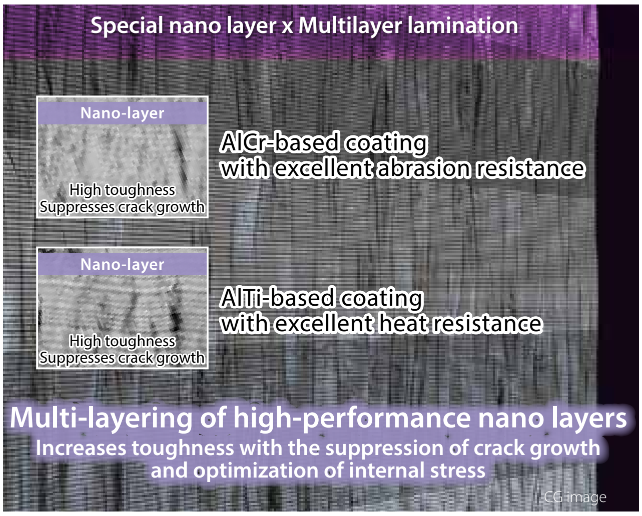
2 New Grade PR18 series Provides extended tool life

NEW

MEGACOAT NANO EX | Milling

Double lamination technology maintains longer tool life

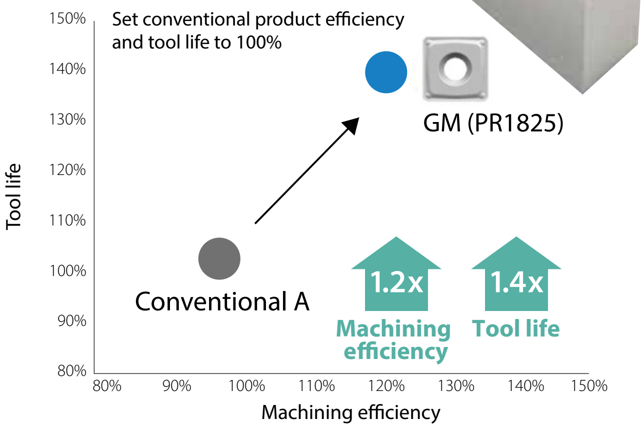
Multi-layer structure with two unique nano layers
Superior abrasion resistance and fracture resistance



Case study

Alloy steel/Copper alloy Block

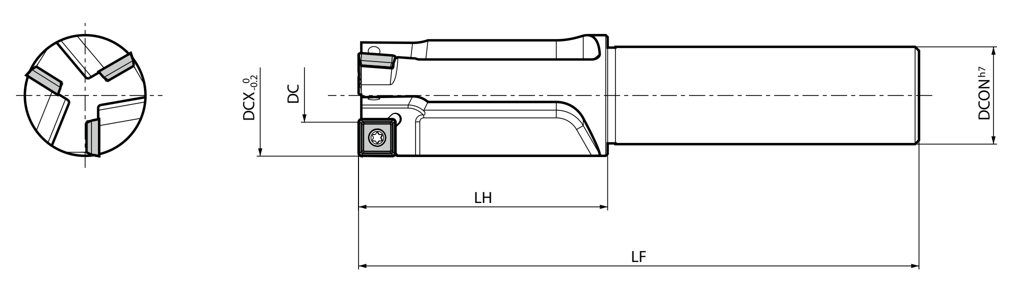
Vc =100m/min
ap × H = 0.8×75mm
Vf = 225mm/min
Wet(Internal and external)
SPMT090308EN-GM PR1825
Custom-made toolholder



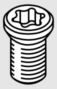
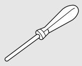
GM chipbreaker (PR1825) provided stable machining with increased cutting speed and feed rate.
Reduced chip clogging and extended tool life.

(User evaluation)

MEF

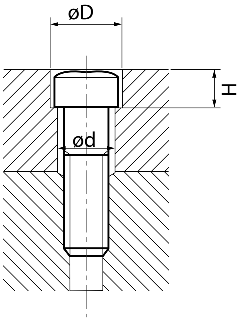


Toolholder dimensions

Description	Availability	Inserts	Dimension (mm)					Standard corner-R(RE)	A.R. (°)	R.R. (°)	Objective bolt size	Coolant hole	Spare parts		Applicable inserts ➡ **M285**
			DC	DCX	DCON	LF	LH						Screw 	Wrench 	
MEF 11-S10	●	1	3	11	10	103	23	0.4	+5	-13	M6	No	SB-2250TR	DT-7	SPMT060204EN-GM SPMT060208EN-GM SPMT060204E-Z SPMT060208E-Z
14-S12	●		4.5	14	12	108	28				M8		SB-2260TR		
17-S16	●	2	7.3	17.5	16	115	35				M10				
18-S16	●		7.7	18		117	38				-				
20-S16	●	3	9.5	20		120	40			-12	M12				
22-S20	●		11.4	22	20	124	44				-				
23-S20	●		12.4	23		126	46				M14				
24-S20	●		13.4	24		128	48				-				
25-S20	●		14.4	25		130	50				-				
MEF 26-S25	●	3	9.8	26	25	132	52	0.8	+5	-13	M16	No	SB-3080TR	DT-10	SPMT090304EN-GM SPMT090308EN-GM SPMT090304E-Z SPMT090308E-Z
27-S25	●		10.6	27		134	54				-				
28-S25	●		11.5	28		136	56				-				
29-S25	●		12.6	29		138	58				M18				
30-S25	●		13.5	30		140	60				-				
32-S25	●		15.5	32		144	64				M20				
35-S32	●		18.4	35	32	150	70				M22				
39-S32	●	4	22.5	39		158	78				M24				
43-S32	●		26.2	43		166	86			-12	M27				
48-S32	●		31.3	48		176	96				M30				

Although Corner-R(RE) pertains to MEF11-S10, DC = 3.0 mm.

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

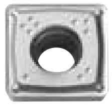
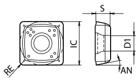
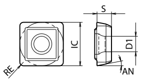
● : Standard item

SPMT

Classification of usage

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

	PR1810	PR1825	PR1835	KW10	
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)				Angle (°)	Carbide				Applicable toolholder ➡ M284
								PVD			-	
			IC	S	D1	RE	AN	PR1810	PR1825	PR1835	KW10	
	 General purpose	SPMT 060204EN-GM 060208EN-GM	6.35	2.38	2.5	0.4 0.8	11	● ●	● ●	● ●		MEF(11~25)-S..
		SPMT 090304EN-GM 090308EN-GM	9.525	3.18	3.4	0.4 0.8	11	● ●	● ●	● ●		MEF(26~48)-S..
	 Tough edge	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 ➡ **M285**

Recommended cutting conditions

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)			
		MEGACOAT NANO EX			Carbide
		PR1810	PR1825	PR1835	KW10
Carbon steel	0.1~**0.12**~0.15	-	★ 120~**180**~220	☆ 120~**180**~220	-
Alloy steel	0.1~**0.12**~0.15	-	★ 120~**180**~220	☆ 120~**180**~220	-
Mold steel	0.05~**0.08**~0.1	-	★ 100~**150**~180	☆ 100~**150**~180	-
Stainless steel	0.05~**0.08**~0.1	-	-	★ 80~**120**~180	-
Cast iron	0.1~**0.15**~0.2	★ 100~**180**~220	-	-	☆ 80~**100**~120
Non-ferrous metals	0.1~**0.15**~0.2	-	-	-	★ 100~**200**~300

★: 1st Recommendation ☆: 2nd Recommendation

● : Standard item

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

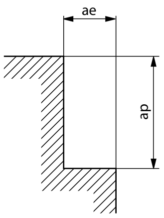
2. Sticky materials
Step feed is recommended for good chip control
Increase the feed rate to **fz=0.1 ~ 0.15 (mm/t)** for preventing long chips at low feed rate **(fz=0.05mm/t)**.
Use cover to prevent accidents or injury by thick chips at higher feed rates.

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)

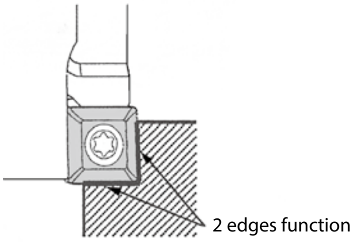


Fig. 1

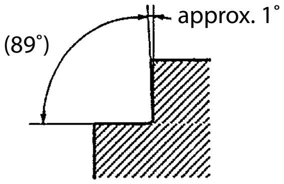
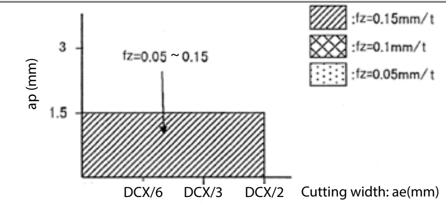
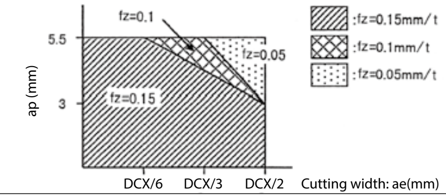
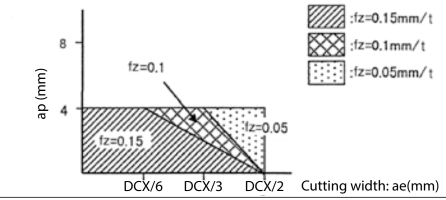
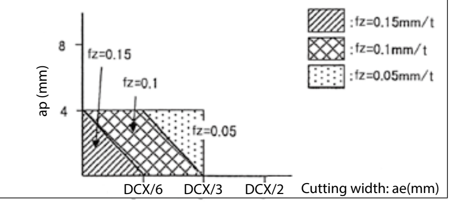


Fig. 2

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	

METS

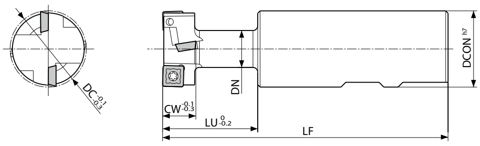


Fig. 1

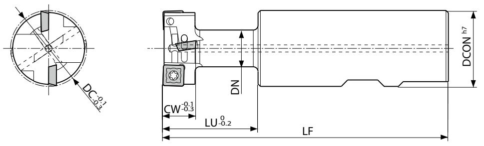
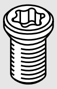
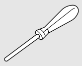


Fig. 2

Toolholder dimensions

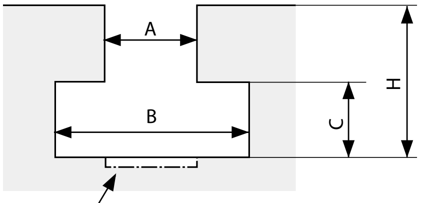
Description	Availability	Inserts	Flutes	Dimension (mm)						A.R. (°)	R.R. (°)	Coolant hole	Fig.	Spare parts		Applicable inserts ➡ M288
				DC	DCON	LF	LU	CW	DN					Screw 	Wrench 	
METS 21-S25	●	2	1	21	25	109	29	9	10.5	+9	-10	No	1	SB-2560TR	DT-8	SDMT060304E-K
25-S25	●	4	2	25		112	32	11	12.5				1			
32-S32	●			32	32	120	38	14	15.5				1	SB-3060TR	DT-10	SDMT080308E-K
40-S32	●			40		130	50	18	20.5		-12		1	SB-4085TR	DT-15	SDMT120408E-K
50-S32	●			50		140	60	22	26.5				1			
METS 21-S25-H	●	2	1	21	25	109	29	9	10.5	+9	-10	Yes	2	SB-2560TR	DT-8	SDMT060304E-K
25-S25-H	●	4	2	25		112	32	11	12.5				2			
32-S32-H	●			32	32	120	38	14	15.5				2	SB-3060TR	DT-10	SDMT080308E-K
40-S32-H	●			40		130	50	18	20.5		-12		2	SB-4085TR	DT-15	SDMT120408E-K
50-S32-H	●			50		140	60	22	26.5				2			

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



Previous milling groove does not affect.

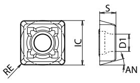
● : Standard item

SDMT

Classification of usage

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

	PR1810	PR1835	KW10	
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)				Angle (°)	Carbide			Applicable toolholder ➡ M287
								PVD		-	
			IC	S	D1	RE	AN	PR1810	PR1835	KW10	
		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)

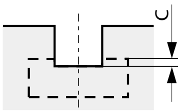
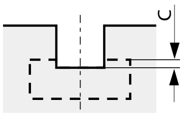
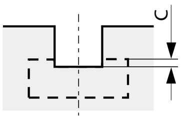
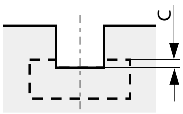
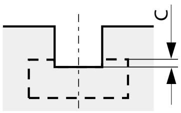
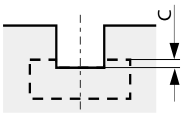
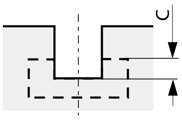
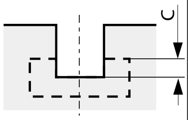
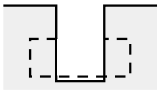
Recommended cutting conditions ➡ **M289**

● : Standard item

Recommended cutting conditions

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)		
		MEGACOAT NANO EX		Carbide
		PR1810	PR1830	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

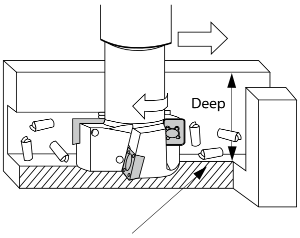
Description (T-Slot nominal size)	Steel			Cast iron		
	Groove shape at pre-process	T-Slotting conditions	Conditions to prevent chattering	Groove shape at pre-process	T-Slotting conditions	Conditions to prevent chattering
METS21-S25(-H) (Nominal size 12)	C=1~3mm 	Vc= 120 fz= 0.1 (n= 1,820) (Vf= 182)	Vc= 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

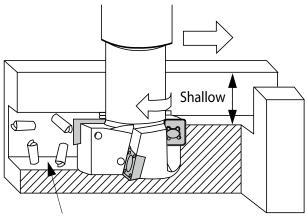
Before Improvement (Deep Groove at Pre-Process)



Chips stay in the pre-process groove.

Improvement of chip biting

After Improvement (Shallow Groove at Pre-Process)



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

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

MGI

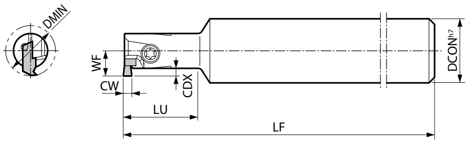


Fig. 1

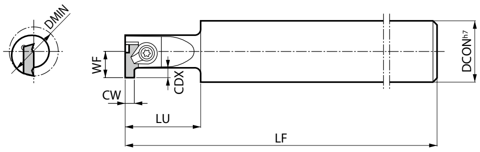
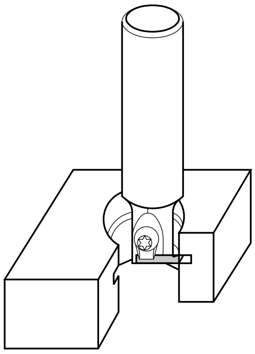
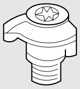
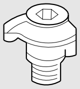
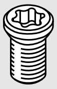
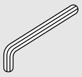
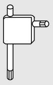


Fig. 2



Toolholder dimensions

Description	Availability	Dimension (mm)								Coolant hole	Fig.	Spare parts					Applicable inserts ➡ M291
												Clamp set	Clamp set	Screw	Wrench	Wrench	
		DMIN	DCON	LF	LU	CDX	WF	CW min.	CW max.								
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.

● : Standard item

GVR

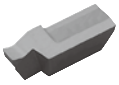
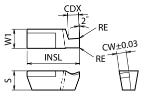
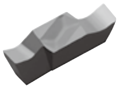
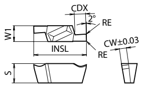
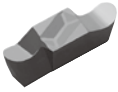
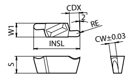
Classification of usage	PR1225	PR930	KW10	TC40N	TC60M	
Carbon steel / Alloy steel	◕	◌				P
Stainless steel	◕	◌				M
Gray cast iron			◕			K
Non-ferrous metals			◕			N
Titanium alloy			◕			S
Hard materials (~ 40HRC)	●	○				H
Hard materials (40HRC ~)						

◕ : Continuous ~Light interruption / 1st Choice

◌ : Continuous ~Light interruption / 2nd Choice

● : Continuous / 1st Choice

○ : Continuous / 2nd Choice

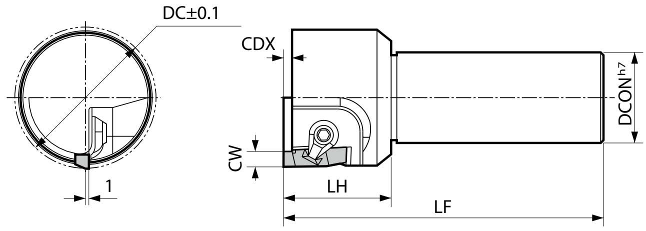
Insert		Description		No. of edges	Dimension (mm)						Tolerance (mm)		Carbide			Cer-met		Applicable toolholder ➡ **M290**
													PVD		-	-		
					CW	CDX	S	RE	INSL	W1	CW min.	CW max.	PR1225	PR930	KW10	TC40N	TC60M	
	 1-edge	GVR	100-020SS	1	1	2.3	3	0.2	9	3.6	- 0.03	+ 0.03	●	●	●		●	MGI1420-1SS
			125-020SS		1.25								●	●	●		●	
			145-020SS		1.45								●	●	●		●	
			200-020SS		2								●	●	●		●	
			250-020SS		2.5								●	●	●		●	
			300-020SS		3								●	●	●		●	
		GVR	100-020S	1	1	2.3	4	0.2	11	4	- 0.03	+ 0.03	●	●	●	●	●	MGI1620-1S
			125-020S		1.25								●	●	●	●	●	
			145-020S		1.45								●	●	●	●	●	
			185-020S		1.85								●	●	●	●	●	
			200-020S		2								●	●	●	●	●	
			250-020S		2.5								●	●	●	●	●	
			340-020S		3.4								●	●	●	●	●	
	 2-edge	GVR	100-020A	2	1	2.3	5	0.2	12	4	- 0.03	+ 0.03	●	●	●	●	●	MGI2020-1A
			125-020A		1.25								●	●	●	●	●	
			145-020A		1.45								●	●	●	●	●	
			185-020A		1.85								●	●	●	●	●	
			200-020A		2								●	●	●	●	●	
			250-020A		2.5								●	●	●	●	●	
			300-020A		3								●	●	●	●	●	
			340-020A		3.4								●	●	●	●	●	
		GVR	145-020B	2	1.45	2.8	5.5	0.2	15	4.5	- 0.03	+ 0.03	●	●	●	●	●	MGI2220-1B
			185-020B		1.85	2.8							●	●	●	●	●	
			200-020B		2	3.2							●	●	●	●	●	
			230-020B		2.3	3.2							●	●	●	●	●	
			250-020B		2.5	3.2							●	●	●	●	●	
			280-020B		2.8	3.2							●	●	●	●	●	
			300-020B		3	4.2							●	●	●	●	●	
			340-020B		3.4	4.2							●	●	●	●	●	
			400-020B		4	4.2							●	●	●	●	●	
		GVR	280-020C	2	2.8	4.5	6.5	0.2	21	5.8	- 0.03	+ 0.03	●	●	●	●	●	MGI3225-1C
			300-020C		3	4.5							●	●	●	●	●	
			340-020C		3.4	5.5							●	●	●	●	●	
			400-020C		4	5.5							●	●	●	●	●	
			(430-020C)		4.3	6.3							●	●	●	●	●	
			(460-020C)		4.6	6.3							●	●	●	●		
			(500-020C)		5	6.3							●	●	●	●	●	
	 2-edge / Full R / Copying	GVR	200-100AR	2	2	2.3	5	1	12	4	- 0.03	+ 0.03	●	●	●		●	MGI2020-1A
			250-125AR		2.5			1.25					●	●	●		●	
			300-150AR		3			1.5					●	●	●		●	
		GVR	200-100BR	2	2	3.2	5.5	1	15	4.5	- 0.03	+ 0.03	●	●	●		●	MGI2220-1B
			300-150BR		3	4.2		1.5					●	●	●		●	

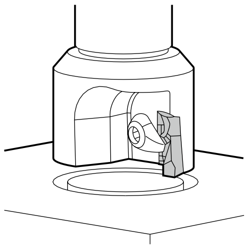
CDX shows available grooving depth.
Right-hand shown

Recommended cutting conditions ➡ **M293**

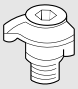
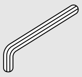
● : Standard item

MVG





Toolholder dimensions

Description		Availability	Dimension (mm)							Coolant hole	Spare parts		Applicable inserts ➡ **M292**
			DC	DCON	LF	LH	CDX	CW min.	CW max.		Clamp set 	Wrench 	
MVG	3032	●	30	32	120	40	5.2	4	4.9	No	CPS-6V	LW-3	GVFR400-020B GVFR430-020B GVFR460-020B GVFR490-020B
	3532	●	35										
	4032	●	40										
	4532	●	45										
	5032	●	50										
	5532	●	55										
	6032	●	60										

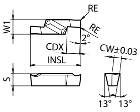
CDX shows available grooving depth.

GVFR

Classification of usage

◐ : Continuous ~Light interruption / 1st Choice
◌ : Continuous ~Light interruption / 2nd Choice
● : Continuous / 1st Choice
○ : Continuous / 2nd Choice

	PR1225	PR930	KW10	TC40N	TC60M	
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 ~)						

Insert		Description		No. of edges	Dimension (mm)						Tolerance (mm)		Carbide			Cer-met		Applicable toolholder ➡ **M292**
													PVD		-	-		
					CW	CDX	S	RE	INSL	W1	CW min.	CW max.	PR1225	PR930	KW10	TC40N	TC60M	
		GVFR	400-020B	2	4	5.3	5	0.2	20	5.8	- 0.03	+ 0.03	●	●	●	●	●	MVG....
			430-020B		4.3								●		●	●	●	
			460-020B		4.6								●		●	●		
			490-020B		4.9								●	●	●	●	●	

CDX shows available grooving depth.
Right-hand shown

Recommended cutting conditions ➡ **M293**

● : Standard item

MGI

Recommended cutting conditions

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)				
		MEGACOAT	PVD Coated carbide	Carbide	Cermet	
		PR1225	PR930	KW10	TC40N	TC60M
Carbon steel	0.05~0.15	★ 80~150	☆ 80~150	-	☆ 120~200	☆ 100~180
Alloy steel	0.05~0.15	★ 80~150	☆ 80~150	-	☆ 120~200	☆ 100~180
Mold steel	0.03~0.12	★ 60~130	☆ 60~130	-	☆ 100~180	☆ 80~150
Stainless steel	0.03~0.12	★ 60~130	☆ 60~130	-	☆ 100~180	★ 80~150
Cast iron	0.05~0.2	-	-	★ 80~150	☆ 100~150	-
Non-ferrous metals	0.05~0.2	-	-	★ 100~300	-	-

Use down-cut machining.

★: 1st Recommendation ☆: 2nd Recommendation

MVG

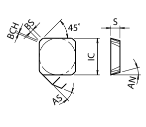
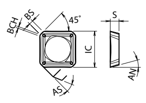
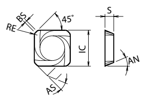
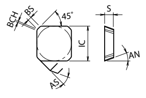
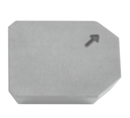
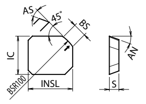
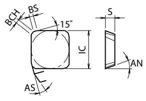
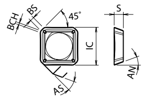
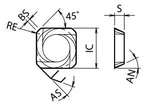
Recommended cutting conditions

Workpiece material	fz (mm/t)	Recommended insert grades (Vc: m/min)				
		MEGACOAT	PVD coated carbide	Carbide	Cermet	
		PR1225	PR930	KW10	TC40N	TC60M
Carbon steel	0.05~0.15	★ 80~170	☆ 80~150	-	★ 120~200	☆ 100~180
Alloy steel	0.05~0.15	★ 80~170	☆ 80~150	-	★ 120~200	☆ 100~180
Mold steel	0.03~0.12	★ 60~150	☆ 60~130	-	★ 100~180	☆ 80~150
Stainless steel	0.03~0.12	★ 60~150	☆ 60~130	-	☆ 100~180	☆ 80~150
Cast iron	0.05~0.2	-	-	★ 80~150	-	-
Non-ferrous metals	0.05~0.2	-	-	★ 100~300	-	-

★: 1st Recommendation ☆: 2nd Recommendation

S-type inserts

Classification of usage ★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice ☐ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	CA420M	PR1210	PR1225	PR1825	KW10	TN100M	
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					Cermet	Applicable toolholder
													CVD	PVD			-	-	
					IC	S	BCH	INSL	RE	BS	AN	AS	CA420M	PR1210	PR1225	PR1825	KW10	TN100M	
		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	1203AUEN-S	4	12.7	3.18	0.5	-	-	1.7	15	23			●			●	-
		SDMR	1203AUER-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			●				
	 1-edge / With wiper edge	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

● : Standard item

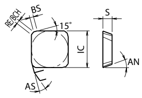
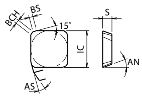
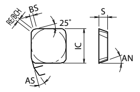
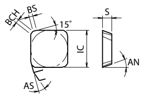
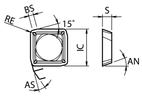
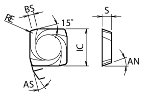
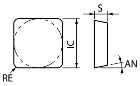
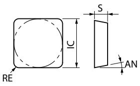
SEEN-W inserts are
sold in 5 piece boxes

S-type inserts

Classification of usage

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

	CA420M	PR1210	PR1225	PR1810	PR1825	KW10	TN100M	TN60	
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)					Angle (°)		Carbide						Cer-met		Applicable toolholder
				IC	S	BCH	RE	BS	AN	AS	CVD	PVD				-	-		
											CA420M	PR1210	PR1225	PR1810	PR1825	KW10	TN100M	TN60	
		SPCN	1203EDTR	12.7	3.18	-	1	2	11	15							●		-
		SPKN	1203EDER	12.7	3.18	1	-	1.6	11	15	●								
		SPKN	1203EDFR	12.7	3.18	1	-	1.6	11	15						●			
		SPKN	1203EDTR	12.7	3.18	-	1	2	11	15			●				●		
						1	-					●							
			1203EDTL			-	1										●		
		SPKN	1504EDFR	15.875	4.76	1	-	2.2	11	15						●			
		SPKN	1504EDTR	15.875	4.76	1	-	2.2	11	15		●	●				●		
		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					●				-
	 Without chipbreaker	SPGN	090304 090308	9.525	3.18	-	0.4 0.8	-	11	-						● ●			-
		SPGN	120304 120308	12.7	3.18	-	0.4 0.8	-	11	-						● ●			
	 Without chipbreaker	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

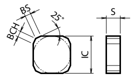
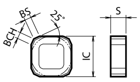
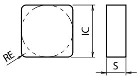
● : Standard item

S-type inserts

Classification of usage

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

	CA420M	TN100M	
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	Cermet	Applicable toolholder
				IC	S	RE	BCH	BS	AN	AS	CVD	-	
											CA420M	TN100M	
		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	-	-		●	-
	 Without chipbreaker	SNMN 120412 SNMN 120424	8	12.7	4.76	1.2 2.4	-	-	-	-	● ●		-

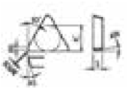
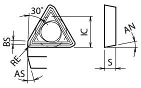
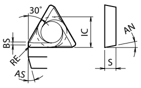
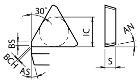
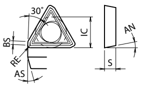
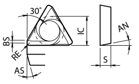
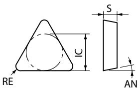
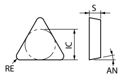
● : Standard item

T type inserts

Classification of usage

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

	PR1210	PR1225	PR1825	KW10	TN100M	TN60	
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				Cer-met		Applicable toolholder
												PVD			-	-		
					IC	S	BCH	RE	BS	AN	AS	PR1210	PR1225	PR1825	KW10	TN100M	TN60	
		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	●						
							-	0.8					●			●		
		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	-	1.4	20	22	●						
							-	1					●			●		
		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			●				
	 Without chipbreaker	TPGN	090202	3	5.56	2.38	-	0.2	-	11	-				●			-
			090204					0.4							●		●	
		TPGN	110302	3	6.35	3.18	-	0.2	-	11	-				●			
			110304					0.4							●		●	
			110308					0.8							●		●	
		TPGN	160304	3	9.525	3.18	-	0.4	-	11	-				●		●	
			160308					0.8							●		●	
	 Without chipbreaker	TPMN	110304	3	6.35	3.18	-	0.4	-	11	-				●			-
			110308					0.8							●			
		TPMN	160304	3	9.525	3.18	-	0.4	-	11	-				●	●		
			160308					0.8							●	●		
			160312					1.2								●		
		TPMN	220408	3	12.7	4.76	-	0.8	-	11	-					●		

Handed insert shows Right-hand

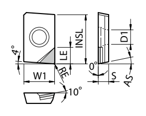
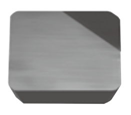
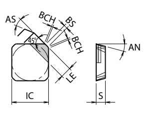
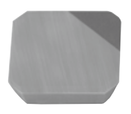
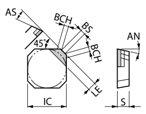
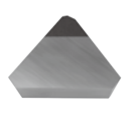
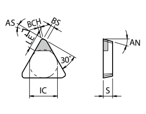
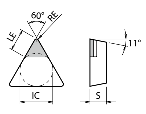
● : Standard item

PCD inserts

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)									Angle (°)		PCD			Applicable toolholder
																-			
					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

● : Standard item

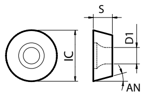
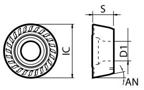
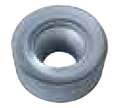
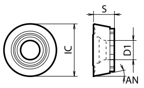
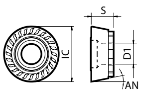
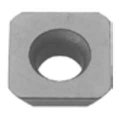
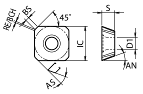
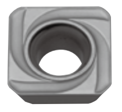
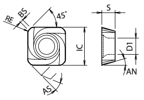
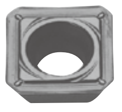
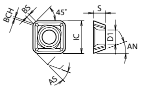
CBN & PCD Inserts are
sold in 1 piece boxes

Available geometries

Classification of usage

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

	PR1210	PR1225	PR1810	PR1825	PR1835	KW10	TN100M	
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)							Angle (°)		Carbide						Cermet	Applicable toolholder
													PVD					-	-	
				IC	S	D1	RE	BCH	BS	L	AN	AS	PR1210	PR1225	PR1810	PR1825	PR1835	KW10	TN100M	
		RDHX	0702M0T	7	2.39	2.8	-	-	-	-	15	-					●			-
		RDHX	1003M0T	10	3.18	3.8	-	-	-	-	15	-					●			
		RDHX	12T3M0T	12	3.97	3.8	-	-	-	-	15	-					●			
	 Tough edge	RDMT	08T2M0-H	8	2.78	3.4	-	-	-	-	15	-			●		●	●		-
	 Low cutting force	RPMT	10T3M0	10	3.97	3.4	-	-	-	-	11	-			●		●	●		-
		RPMT	1204M0	12	4.76	4.4	-	-	-	-	11	-			●		●	●		
	 Tough edge	RPMT	1204M0-H	12	4.76	4.4	-	-	-	-	11	-			●		●	●	●	-
		RPMT	1606M0-H	16	6.35	5.5	-	-	-	-	11	-			●		●	●	●	
		RPMT	2006M0-H	20	6.35	6.5	-	-	-	-	11	-			●		●	●		
		SDKW	1204AESN	12.7	4.76	5.5	1	-	1.5	-	15	20		●						-
		SDKW	1204AETN	12.7	4.76	5.5	1	-	1.5	-	15	20	●							
		SEKW	1204AFTN	12.7	4.76	5.5	-	0.5	1.7	-	20	25	●	●						
		SDMT	1204AESR-H	12.7	4.76	5.5	1	-	0.8	-	15	20				●				-
		SEKT	1204AFEN-S	12.7	4.76	5.5	-	0.5	1.7	-	20	25		●						-

Handed insert shows Right-hand

● : Standard item