THE NEW VALUE FRONTIER

KYOCERA

Milling MRX

MRX

Low-Cutting-Force and High-Efficiency Radius Cutter

- Low Cutting Force due to our helical cutting edge design
- Higher Stability with flat lock structure
- R4, R5, R6 and R8 lineup!

Introducing our new modular type cutter

ADVANCING PRODUCTIVITY

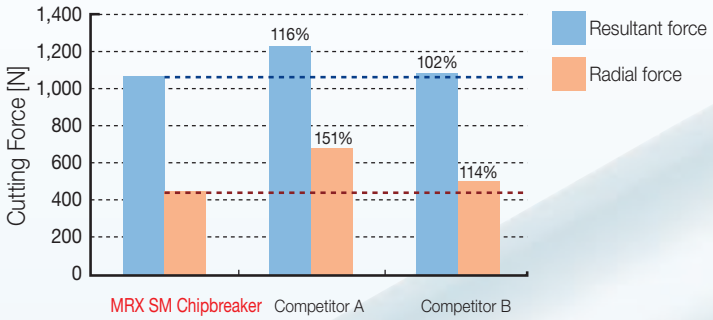
- KYOCERA. Contributing To Advancing Productivity -

MRX

Excellent cutting performance due to low cutting force design High-efficiency radius cutter

POINT 1 Low cutting force with Kyocera's helical cutting edge design

• Cutting force comparison

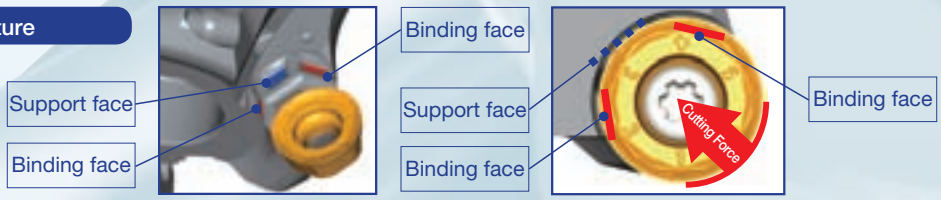


< Cutting Conditions >
Vc=120m/min, ap×ae=2×25mm, fz=0.2mm/t, SUS304, Cutter ϕ 50

POINT 2 Flat Lock Structure holds the insert firmly Prevents insert rotation during machining to provide stable cutting

Flat Lock Structure

2 wide, flat binding faces
•Receives even cutting forces
•Prevents insert rotation



POINT 3 Wide application range

Facing | Slotting | Shouldering | Pocketing | Ramping / Profiling

ONE POINT Cost-effective M-class inserts are available.

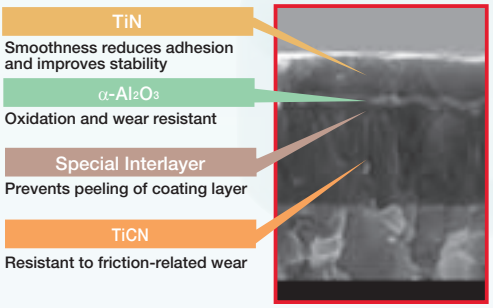
The MRX's wide lineup includes 4 grades and 3 Chipbreakers and extends the life of your cutters! Available for steel, stainless steel, and heat-resistant alloys.

Workpiece		Applicable Insert Grade	Applicable Chipbreaker
P Carbon Steel / Alloy Steel / Die Steel		PR1525	GM/SM/GH Chipbreaker
K Gray Cast Iron / Nodular Cast Iron		PR1510	GH/GM Chipbreaker
S Ni-based Heat-resistant Alloys	M Martensitic Stainless Steel	CA6535	SM/GM Chipbreaker
S Titanium Alloys	M Austenitic Stainless Steel M Precipitation-hardened Stainless Steel	PR1535	SM/GM Chipbreaker

For Chipbreaker Selection and Recommended Cutting Conditions ➡ P8

POINT 4 New grade for difficult-to-cut materials!

Stable cutting prevents insert fracturing
Good for high-efficiency machining



CA6535

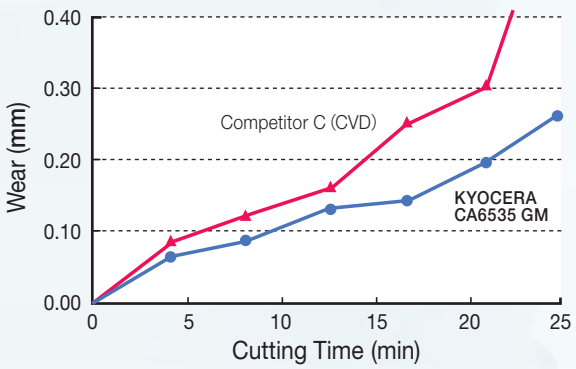
For Ni-based heat-resistant alloys and martensitic stainless steel
High heat resistance and wear resistance with CVD coating
Improved stability due to thin-film coating technology

PR1535

For titanium alloys and precipitation-hardened stainless steel
Kyocera's MEGACOAT NANO coating technology provides stabilized milling and long tool life!

Tool Life Comparison

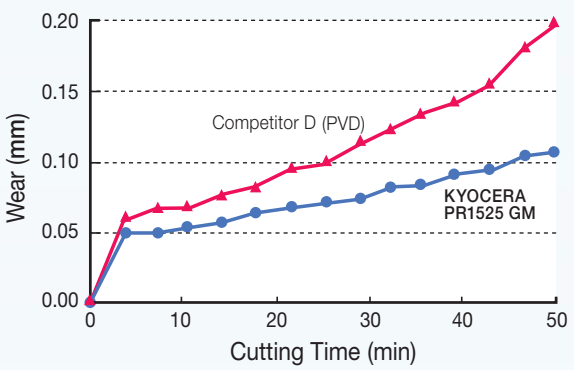
● Ni-based Heat-resistant Alloys



＜Cutting Conditions＞ Vc=50m/min, ap×ae=1×20, fz=0.15mm/t, WET

1st recommendation GM Chipbreaker

● SKD61 (38-42HRC)



＜Cutting Conditions＞ Vc=120m/min, ap×ae=2×25, fz=0.35mm/t, DRY

1st recommendation GM Chipbreaker

MRX Face Mill

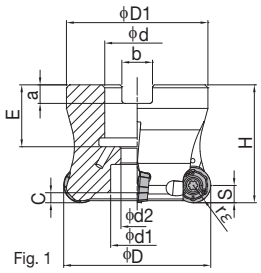


Fig. 1

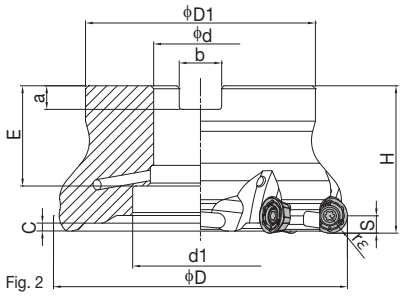


Fig. 2

Toolholder Dimensions

	Description	Stock	No. of inserts	Dimension (mm) r	ϕD	ϕD1	ϕd	ϕd1	ϕd2	H	E	a	b	C	S	Rake Angle (°) A.R.	R.R.	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min⁻¹)
Bore Dia. Inch Specs	MRX 080R-12-6T	●	6	6	80	70	25.4	20	13	50	27	6	9.5	3.4	6	+10°	-5.5°	Yes	Fig. 1	1.2	13,500
	080R-12-8T	●	8																	1.1	13,500
	100R-12-7T	●	7		100	78	31.75	46	-		34	8	12.7						Fig. 2	1.5	12,000
	100R-12-9T	●	9																	1.5	12,000
	MRX 080R-16-5T	●	5	8	80	70	25.4	20	13	50	27	6	9.5	4.4	8	+10°	-5.5°		Fig. 1	1.1	11,500
	080R-16-6T	●	6																	1.1	11,500
	100R-16-6T	●	6		100	78	31.75	46	-		34	8	12.7						Fig. 2	1.4	10,000
	100R-16-7T	●	7																	1.4	10,000
	125R-16-6T	●	6		125	89	38.1	55		63	38	10	15.9							2.7	9,000
	125R-16-8T	●	8																	2.7	9,000
Metric Specs	MRX 040R-10-5T-M	●	5	5	40	38	16	15	9	40	19	5.6	8.4	2.9	5	+10°	-5.5°		Fig. 1	0.2	20,000
	050R-10-6T-M	●	6		50	48	22	18	11		21	6.3	10.4							0.3	17,500
	063R-10-7T-M	●	7		63	60														0.6	15,000
	MRX 040R-12-4T-M	●	4	6	40	38	16	13.5	9	40	19	5.6	8.4	3.4	6	+10°	-5.5°		Fig. 1	0.2	21,000
	050R-12-4T-M	●	4		50	48	22	18	11		21	6.3	10.4							0.3	18,000
	050R-12-5T-M	●	5																	0.3	18,000
	063R-12-5T-M	●	5		63	60														0.6	15,500
	063R-12-6T-M	●	6																	0.6	15,500
	080R-12-6T-M	●	6		80	70	27	20	13	50	24	7	12.4							1.2	13,500
	080R-12-8T-M	●	8																	1.1	13,500
	100R-12-7T-M	●	7		100	78	32	46	-		30	8	14.4						Fig. 2	1.4	12,000
	100R-12-9T-M	●	9																	1.4	12,000
	MRX 063R-16-4T-M	●	4	8	63	60	22	18	11	40	21	6.3	10.4	4.4	8	+10°	-5.5°		Fig. 1	0.5	13,500
	063R-16-5T-M	●	5																	0.5	13,500
	080R-16-5T-M	●	5		80	70	27	20	13	50	24	7	12.4							1.1	11,500
	080R-16-6T-M	●	6																	1.1	11,500
	100R-16-6T-M	●	6		100	78	32	46	-		30	8	14.4						Fig. 2	1.4	10,000
	100R-16-7T-M	●	7																	1.4	10,000
	125R-16-6T-M	●	6		125	89	40	55		63	33	9	16.4							2.6	9,000
	125R-16-8T-M	●	8																	2.6	9,000

● : Std. Item

Spare Parts and Applicable Inserts

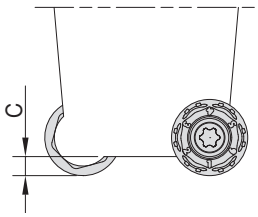
Description	Spare Parts: Clamp Screw	Wrench: DTPM	Wrench: TTP	Anti-seize Compound	Mounting Bolt	Applicable Inserts
MRX 040R-10...	SB-3070TRP	DTPM-10		MP-1	HH8X25	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH ※ 1
050R-10...					HH10X30	
063R-10...	Recommended Torque for Insert Clamp 2.0N·m				HH10X30	
MRX 040R-12...	SB-4090TRPN	DTPM-15		MP-1	HH8X25	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH ※ 2
050R-12...					HH10X30	
063R-12...					HH10X30	
080R-12...	Recommended Torque for Insert Clamp 3.5N·m				HH12X35	
100R-12...					-	
MRX 063R-16...	SB-50120TRP	TTP-20		MP-1	HH10X30	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH ※ 3
080R-16...					HH12X35	
100R-16...					-	
125R-16...	Recommended Torque for Insert Clamp 4.5N·m					

- Caution with Max. Revolution
  When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal
- Apply Anti-seize Compound (MP-1) thinly on the taper and thread portions when insert is attached.

※ 1…Not compatible with the conventional RPMT10T3M0.
※ 2…Not compatible with the conventional RPMT1204M0 and RPMT1204M0-H.
※ 3…Not compatible with the conventional RPMT1606M0-H.

Recommended Cutting Conditions → P8

MRX End Mill



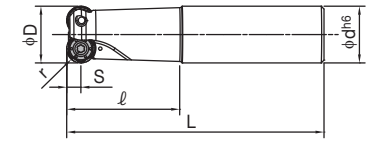


Fig. 1

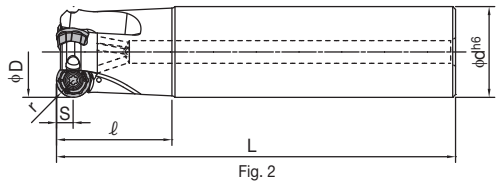


Fig. 2

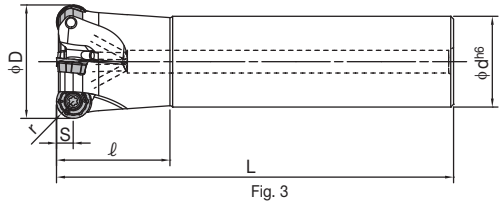


Fig. 3

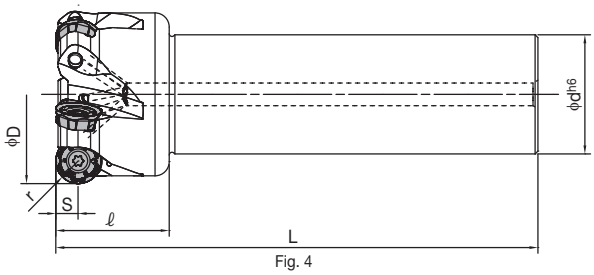


Fig. 4

Fig. 5

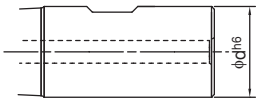


Fig. 6

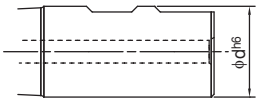


Fig. 7

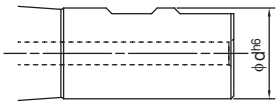


Fig. 8

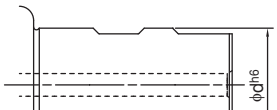


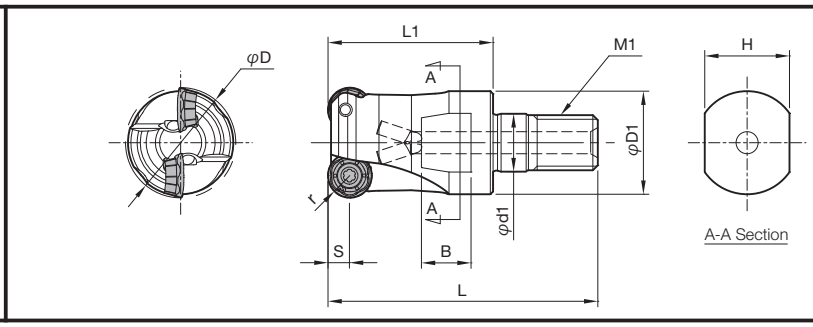
Fig. 9

Toolholder Dimensions

	Description	Stock	No. of inserts	Dimension (mm)							Rake Angle (°)		Coolant Hole	Drawing	Max. Revolution (min⁻¹)
				r	ϕD	ϕd	L	ℓ	C	S	A.R. (MAX)	R.R.			
Standard (Straight)	MRX 16-S16-08-2T	●	2	4	16	16	110	40	2.4	4.0	+3°	-5.5°	No	Fig. 1	38,000
	20-S20-08-2T	●	2		20	20	120				+10°		Yes	Fig. 2	32,000
	25-S25-08-4T	●	4		25	25									28,000
	MRX 20-S20-10-2T	●	2	5	20	20	120	40	2.9	5.0	+5°	-8°	No	Fig. 1	30,000
	25-S25-10-3T	●	3		25	25					+10°	-5.5°	Yes	Fig. 2	28,000
	32-S32-10-4T	●	4		32	32	140								22,500
	MRX 32-S32-12-3T	●	3	6	32	32	140	40	3.4	6.0	+10°	-5.5°	Yes	Fig. 2	24,500
	40-S32-12-4T	●	4		40									Fig. 3	21,000
	50-S42-12-5T	●	5		50	42	170								18,000
	MRX 40-S32-16-2T	●	2	8	40	32	140	40	4.4	8.0	+10°	-5.5°	Yes	Fig. 3	18,000
	50-S42-16-4T	●	4		50	42	170								15,500
	63-S42-16-5T	●	5		63									Fig. 4	13,500
Standard (Weldon)	MRX 16-W16-08-2T	●	2	4	16	16	89	40	2.4	4.0	+3°	-5.5°	No	Fig. 5	38,000
	20-W20-08-2T	●	2		20	20	91				+10°		Yes	Fig. 6	32,000
	25-W25-08-4T	●	4		25	25	97							Fig. 7	28,000
	MRX 20-W20-10-2T	●	2	5	20	20	91	40	2.9	5.0	+5°	-8°	No	Fig. 5	30,000
	25-W25-10-3T	●	3		25	25	97				+10°	-5.5°	Yes	Fig. 7	28,000
	32-W32-10-4T	●	4		32	32	101							Fig. 7	22,500
	MRX 32-W32-12-3T	●	3	6	32	32	101	40	3.4	6.0	+10°	-5.5°	Yes	Fig. 7	24,500
	40-W32-12-4T	●	4		40									Fig. 8	21,000
	50-W40-12-5T	●	5		50	40	111								18,000
	MRX 40-W32-16-2T	●	2	8	40	32	101	40	4.4	8.0	+10°	-5.5°	Yes	Fig. 8	18,000
	50-W40-16-4T	●	4		50	40	111								15,500
	63-W40-16-5T	●	5		63		112							Fig. 9	13,500
Long Shank (Straight)	MRX 16-S16-08-2T-160	●	2	4	16	16	160	70	2.4	4.0	+3°	-5.5°	No	Fig. 1	38,000
	20-S20-08-2T-180	●	2		20	20	180	80			+10°		Yes	Fig. 2	32,000
	25-S25-08-4T-180	●	4		25	25	180								28,000
	MRX 20-S20-10-2T-180	●	2	5	20	20	180	80	2.9	5.0	+5°	-8°	No	Fig. 1	30,000
	25-S25-10-2T-180	●	2		25	25	180				+10°	-5.5°	Yes	Fig. 2	28,000
	32-S32-10-4T-200	●	4		32	32	200								22,500
	MRX 32-S32-12-2T-200	●	2	6	32	32	200	80	3.4	6.0	+10°	-5.5°	Yes	Fig. 2	24,500
	40-S32-12-4T-200	●	4		40		200	40						Fig. 3	21,000
	50-S42-12-4T-300	●	4		50	42	300								18,000
	MRX 40-S32-16-2T-200	●	2	8	40	32	200	40	4.4	8.0	+10°	-5.5°	Yes	Fig. 3	18,000
	50-S42-16-4T-300	●	4		50	42	300								15,500
	63-S42-16-4T-300	●	4		63		300							Fig. 4	13,500

● : Std. Item

MRX Type Head



Dimensions

Description	stock	No. of Inserts	Dimension (mm)										Rake Angle (°)		Coolant Hole	Applicable Inserts	Max. Revolution (min⁻¹)
			r	ϕD	ϕD1	ϕd1	L	L1	M1	H	B	S	A.R. (MAX)	R.R.			
MRX 16-M08-08-2T	●	2	4	16	14.7	8.5	43	25	M8×P1.25	12	8	4	+3°	-5.5°	No	RDMT08 RDGT08	38,000
20-M10-08-2T	●	2		20	18.7	10.5	49	30	M10×P1.5	15	9		+10°		Yes		32,000
25-M12-08-4T	●	4		25	23	12.5	57	35	M12×P1.75	19	10						28,000
MRX 20-M10-10-2T	●	2	5	20	18.7	10.5	49	30	M10×P1.5	15	9	5	+5°	-8°	No	RPMT10 RPGT10	30,000
25-M12-10-3T	●	3		25	23	12.5	57	35	M12×P1.75	19	10		+10°	-5.5°	Yes		28,000
32-M16-10-4T	●	4		32	30	17	63	40	M16×P2	24	12						22,500
MRX 32-M16-12-3T	●	3	6	32	30	17	63	40	M16×P2	24	12	6	+10°	-5.5°	Yes	RPMT12 RPGT12	24,500
40-M16-12-4T	●	4		40	30	17	63	40	M16×P2	24	12						21,000
MRX 40-M16-16-2T	●	2	8	40	30	17	63	40	M16×P2	24	12	8	+10°	-5.5°	Yes	RPMT16 RPGT16	18,000

Caution about the Max. Revolution
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

● : Std. Stock

Modular End Mill Head Identification System

MRX 16 - M08 - 08 - 2T

- MRX — Series
- 16 — Cutting Dia.
- M08 — Thread Size for Clamping
- 08 — Insert Size
- 2T — No. of inserts

Wrenches and clamp screws are "Torx Plus".
1) See Fig. 1 for “Torx Plus” wrench. (Blue grip)
2) See 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 MRX)

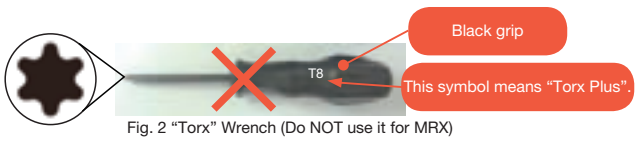
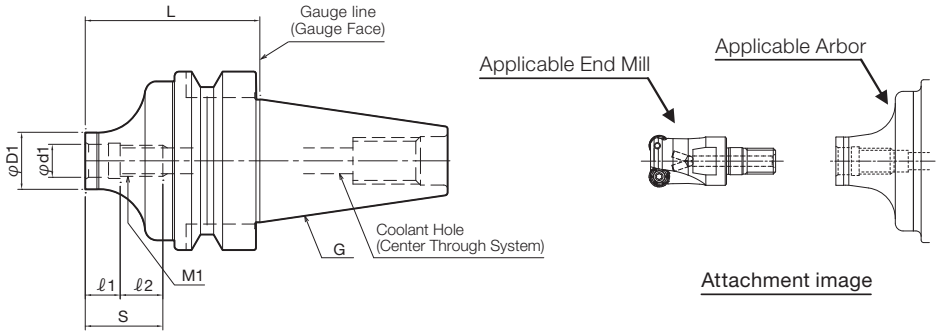


Fig. 2 “Torx” Wrench (Do NOT use it for MRX)

BT Arbor (for exchangeable head / two-face contact)

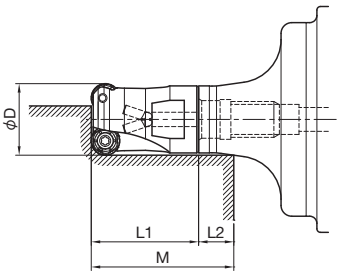


Dimensions

Description		Stock	Dimension (mm)							Coolant Hole	Arbor (two-face clamping)	Applicable End Mill
			L	ϕD1	ϕd1	S	ℓ1	ℓ2	M1		G	
BT30K-	M08-45	●	45	14.7	8.5	20	9	11	M8×P1.25	Yes	BT30	MRX16-M08··
	M10-45	●		18.7	10.5	21		12	M10×P1.5			MRX20-M10··
	M12-45	●		23	12.5	24		15	M12×P1.75			MRX25-M12··
BT40K-	M08-55	●	55	14.7	8.5	20	9	11	M8×P1.25	Yes	BT40	MRX16-M08··
	M10-60	●	60	18.7	10.5	21		12	M10×P1.5			MRX20-M10··
	M12-55	●	55	23	12.5	24		15	M12×P1.75			MRX25-M12··
	M16-65	●	65	30	17	25		16	M16×P2			MRX32-M16·· / MRX40-M16··

● : Std. Stock

Actual End Mill Depth



Arbor Description		Applicable End Mill			Actual End Mill Depth	
		Description	Cutting Dia. ϕD	Dimension L1	M	L2
BT30K-	M08-45	MRX16-M08··	ϕ16	25	31.8	6.8
	M10-45	MRX20-M10··	ϕ20	30	36.8	6.8
	M12-45	MRX25-M12··	ϕ25	35	42.8	7.8
BT40K-	M08-55	MRX16-M08··	ϕ16	25	31.7	6.7
	M10-60	MRX20-M10··	ϕ20	30	38.7	8.7
	M12-55	MRX25-M12··	ϕ25	35	44.6	9.6
	M16-65	MRX32-M16··	ϕ32	40	51.2	11.2
		MRX40-M16··	ϕ40	40	64	24

Arbor Identification System

BT30 K - M08 - 45

- BT30 — Arbor Size
- K — Two-face Clamping Spindle
- M08 — Thread Size for Clamping
- 45 — Length from the Gauge

Spare Parts and Applicable Inserts

Description	Clamp Screw	Wrench		Anti-seize Compound	Applicable Inserts
		DTPM 	TTP 		
MRX ····-08...	SB-2555TRP	DTPM-8		MP-1	RDMT0803M0ER-GM RDGT0803M0ER-GM RDGT0803M0ER-SM RDMT0803M0EN-GH ※1
		Recommended torque for insert clamp 1.2N·m			
MRX ····-10...	SB-3070TRP	DTPM-10		MP-1	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH ※2
		Recommended torque for insert clamp 2.0N·m			
MRX ····-12...	SB-4090TRPN	DTPM-15		MP-1	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH ※3
		Recommended torque for insert clamp 3.5N·m			
MRX ····-16...	SB-50120TRP	TTP-20		MP-1	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH ※4
		Recommended torque for insert clamp 4.5N·m			

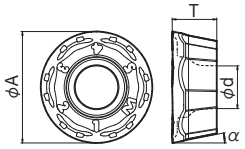
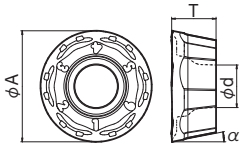
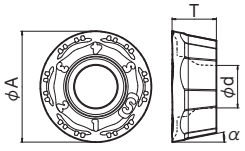
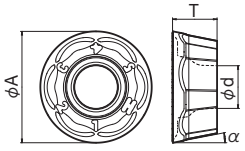
- Caution with Max. Revolution
  When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.
- Apply Anti-seize Compound (MP-1) thinly on taper and thread portions when insert is attached.

※1···Not compatible with the conventional RDMT08T2M0-H.
※2···Not compatible with the conventional RPMT10T3M0.
※3···Not compatible with the conventional RPMT1204M0 and RPMT1204M0-H.
※4···Not compatible with the conventional RPMT1606M0-H.

Recommended Cutting Conditions ➡ P8

Milling Inserts (with hole)

Classification of Usage						
★:Roughing / 1st Choice ☆:Roughing / 2nd Choice ■:Finishing / 1st Choice □:Finishing / 2nd Choice (When hardness is under 45 HRC)	P	Carbon Steel / Alloy Steel		★		
		Die Steel		★		
	M	(SUS304) Austenitic Stainless Steel	★	☆		
		(SUS403) Martensitic Stainless Steel	☆			★
	K	Gray Cast Iron			★	
		Nodular Cast Iron			★	
	S	Heat-resistant Alloys (Ni-based Heat-resistant Alloys)	☆			★
		Titanium Alloys	★		☆	
	H	Hard Materials		□		

Insert		Description	Dimension (mm)				Angle (°)	MEGACOAT NANO			CVD Coated Carbide	Applicable Holder Reference Page
			ϕA	T	ϕd	r	α	PR1535	PR1525	PR1510	CA6535	
 General Purpose (M-class)		RDMT 0803M0ER-GM	8	3.18	3.0	4	15	●	●	●	●	P3 P4 P5
		RPMT 10T3M0ER-GM	10	3.97	3.5	5	11	●	●	●	●	
		1204M0ER-GM	12	4.76	4.6	6		●	●	●	●	
		1605M0ER-GM	16	5.56	5.8	8		●	●	●	●	
 General Purpose (G-class)		RDGT 0803M0ER-GM	8	3.18	3.0	4	15	●	●	●	●	
		RPGT 10T3M0ER-GM	10	3.97	3.5	5	11	●	●	●	●	
		1204M0ER-GM	12	4.76	4.6	6		●	●	●	●	
		1605M0ER-GM	16	5.56	5.8	8		●	●	●	●	
 For stainless steel (Low cutting force)		RDGT 0803M0ER-SM	8	3.18	3.0	4	15	●	●		●	
		RPGT 10T3M0ER-SM	10	3.97	3.5	5	11	●	●		●	
		1204M0ER-SM	12	4.76	4.6	6		●	●		●	
		1605M0ER-SM	16	5.56	5.8	8		●	●		●	
 Tough Edge (Heavy Milling)		RDMT 0803M0EN-GH	8	3.18	3.0	4	15	●	●	●	●	
		RPMT 10T3M0EN-GH	10	3.97	3.5	5	11	●	●	●	●	
		1204M0EN-GH	12	4.76	4.6	6		●	●	●	●	
		1605M0EN-GH	16	5.56	5.8	8		●	●	●	●	

● : Std. Item

Recommended Cutting Conditions

Workpiece Material	Recommended Chipbreaker (fz mm/t) ※RD**08 type: ap=2mm, RP**10 type: ap=2.5mm RP**12 type: ap=3mm, RP**16 type: ap=4mm Recommended feed rate (standard value)				Recommended Insert Grade (m/min)			
					MEGACOAT NANO			CVD Coated Carbide
	RDMT-GM RPMT-GM	RDGT-GM RPGT-GM	RDGT-SM RPGT-SM	RDMT-GH RPMT-GH	PR1535	PR1525	PR1510	CA6535
Carbon Steel (SxxC)	★ 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	–	–
Alloy Steel (SCM)	★ 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	–	–
Die Steel (SKD/NAK)	★ 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	–	–
Austenitic Stainless Steel (SUS304)	☆ 0.1~**0.15**~0.2	☆ 0.1~**0.15**~0.2	★ 0.06~**0.12**~0.2	–	★ 100~**160**~200	☆ 100~**160**~200	–	–
Martensitic Stainless Steel (SUS403)	☆ 0.1~**0.15**~0.2	☆ 0.1~**0.15**~0.2	★ 0.06~**0.12**~0.2	–	☆ 150~**200**~250	–	–	☆ 180~**240**~300
Precipitation hardened Stainless Steel (SUS630)	☆ 0.1~**0.15**~0.2	★ 0.1~**0.15**~0.2	☆ 0.06~**0.12**~0.2	–	★ 90~**120**~150	–	–	–
Gray Cast Iron (FC)	★ 0.1~**0.2**~0.3	☆ 0.1~**0.2**~0.3	–	☆ 0.15~**0.3**~0.35	–	–	★ 120~**180**~250	–
Nodular Cast Iron (FCD)	★ 0.1~**0.15**~0.25	☆ 0.1~**0.15**~0.25	–	☆ 0.15~**0.2**~0.3	–	–	★ 100~**150**~200	–
Ni-based Heat-Resistant Alloys	☆ 0.1~**0.12**~0.15	★ 0.1~**0.12**~0.15	☆ 0.06~**0.1**~0.15	–	☆ 20~**30**~50	–	–	★ 20~**30**~50
Titanium Alloys (Ti-6Al-4V)	☆ 0.1~**0.12**~0.15	☆ 0.1~**0.12**~0.15	★ 0.06~**0.1**~0.15	–	★ 40~**60**~80	–	☆ 30~**50**~70	–

※ Machining with coolant is recommended for Ni-based heat-resistant alloys and titanium alloys.

★:1st recommendation ☆:2nd recommendation

※ RDGT/RPGT are recommended for stainless steel, Ni-based heat-resistant alloys and titanium alloys.

※ The figure in **bold font** is **the median value of the recommended cutting conditions**. Adjust the cutting speed and the feed rate within the above values according to the actual machining conditions.

※ Recommended feed rate in the table is the reference value when ap is r ε /2. (2mm for RD**08 / 2.5mm for RP**10 / 3mm for RP**12 / 4mm for RP**16)
For other ap, calculate the recommended feed rate based on the conversion factor below.

※ MRX16-S16-08-2T (-160), MRX16-W16-08-2T, MRX20-S20-10-2T (-180), MRX20-W20-10-2T
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	ap (max)	Conversion factor for feed per tooth									
		ap=0.5mm	ap=1mm	ap=1.5mm	ap=2mm	ap=2.5mm	ap=3mm	ap=4mm	ap=5mm	ap=6mm	ap=8mm
RD**08 type (GM/SM/GH Chipbreaker)	4mm	1.7	1.3	1.1	1 (Standard)	0.9	0.8	0.8	–	–	–
RP**10 type (GM/SM/GH Chipbreaker)	5mm	1.9	1.4	1.2	1	1 (Standard)	0.9	0.8	0.8	–	–
RP**12 type (GM/SM/GH Chipbreaker)	6mm	2.1	1.5	1.3	1.1	1	1 (Standard)	0.9	0.8	0.8	–
RP**16 type (GM/SM/GH Chipbreaker)	8mm	2.4	1.7	1.4	1.3	1.1	1.1	1 (Standard)	0.9	0.8	0.8

※ Calculation example
(RPMT12 type, Carbon steel, GM Chipbreaker, ap=1mm)
0.2mm/t (Reference value for carbon steel and GM Chipbreaker) x 1.5 (Conversion factor for RP**12 type, ap=1mm)=0.3mm/t (Recommended feed rate)

Drilling / Ramping / Helical Milling

Tool spec.		Max. ap	Drilling		Ramping			Helical milling		
Insert	Tool dia.	ap	Pd Max. Cutting Depth	X Min. Cutting Length for flat bottom face	Maximum ramping angle α_{max} (°)	tan α_{max}	L Max. Cutting Length at Max. Ramping Angle	ϕDh1 Min. Cutting Dia.	ϕDh2 Min. Cutting Dia. for flat bottom facing	ϕDh3 Max. Cutting Dia.
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		0.035		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

※ The above value is based on the clearance of 1mm between the tool body and the workpiece.

Unit : mm

Tips for Drilling

Drilling depth

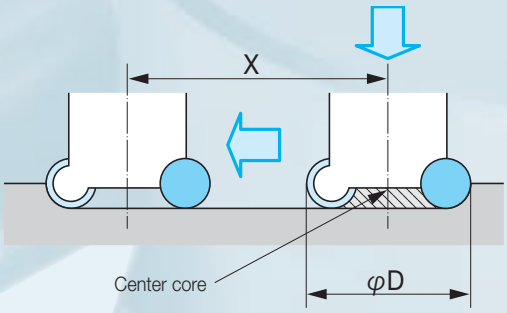
See Max. Cutting Depth (Pd) in the above cutting conditions

Traversing after drilling

Cautions for traversing right after drilling

① Reduce the table feed by 50% of the recommended conditions until the center core part is completely cut off. The internal cutting edge's radial rake angle is large in the negative direction.

② Min. cutting length for flat bottom face is as the list above.

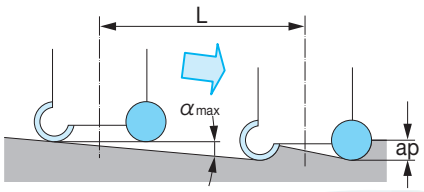


Tips for Ramping

- Ramping angle should be under αmax (Maximum ramping angle), which is listed on page 9.
- Feed rate should be under 70%, as shown in the top table list on page 8.

Formula for Max. cutting length (L) at Max. ramping angle

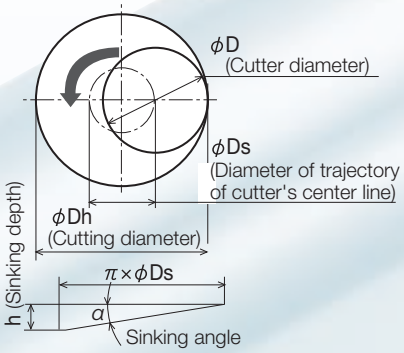
$$L = \frac{ap}{\tan \alpha_{max}}$$



Tips for Helical Milling

- Sinking depth (h) at helical milling should be under Max. ap under the above cutting conditions. Sinking angle α (with trajectory of the center line of the tool) should be under αmax (Maximum ramping angle), which is listed in the table on page 9.
- Feed rate should be under 70%, as shown in the top table list on page 8.
- Down-cut milling is recommended.

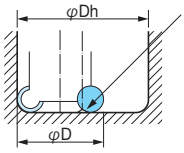
Helical milling factors



ϕDs
(Diameter of trajectory of cutter's center line)
ϕDs=ϕDh-ϕD

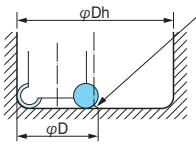
Formula for sinking depth (h)
h=π×ϕDs×tanα
(h should be under ap)
(α should be under αmax)

When cutting dia. ϕDh1≤ϕDh<ϕDh2



Center core part remains after machining.
Cannot be removed with the same cutter.

When cutting dia. ϕDh2≤ϕDh≤ϕDh3

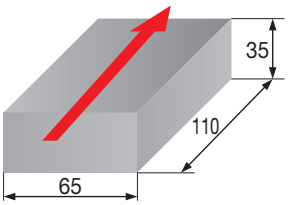


Center core part remains after machining.
Can be removed by traversing with the same cutter.

※Please refer to the list for ϕDh1~Dh3 on P9.

Case studies

SUS304



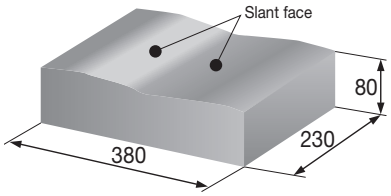
4.5 times longer tool life

- Nozzle parts •Vc = 113m/min •fz = 0.14mm/t
- ap×ae = 1.0×65mm •Dry
- MRX100R-12-9T-M (9 edges) •RPGT1204M0ER-SM (PR1535)

PR1535	450pcs/edge
Conventional E	100pcs/edge

- High cost efficiency due to the 4.5 times longer tool life and 1.5 times more insert edges.
- The MRX prevents burr formation and improves the surface finish.

SKD61 (47-49HRC)



More than double tool life

- Mold parts •Vc = 125m/min •fz = 0.25mm/t
- ap×ae = 1.0~2.0×10mm •Dry
- MRX20-S20-08-2T (2 edges) •RDGT0803M0ER-GM (PR1525)

PR1525	2 pcs and more
Conventional F	1 pc (unstable tool life)

- Conventional tool F machined only 1 workpiece due to its unstable tool life, but the MRX doubled the tool life while maintaining stable machining.

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