



高能率多刃圓刀片銑刀

MRW型

High Efficiency Radius Cutter with Multiple-edge

- **兩面8刀仕様** 經濟型
Economical 8-edge insert
- **螺旋切削刀** 低抵抗
Low cutting force by helical cutting edge design
- 實現穩定加工
平鎖結構穩定加工
Flat lock structure for stable machining



NEW 支援廣泛的難切削材料
Applicable to wide application range from steel
to difficult-to-cut materials

難削材加工用 CA6535 (CVD)
CA6535 for difficult-to-cut materials

不鏽鋼加工用 PR1535 (PVD)
PR1535 for stainless steel

ADVANCING PRODUCTIVITY

生産性向上に貢献する京セラ



MRW型

高能率經濟型 被削材對應範圍大 兩面仕樣負角型刀桿新登場

Economical and high efficiency
New radius cutter with double-face insert for various types of workpieces

POINT.1 兩面8仕樣 經濟型

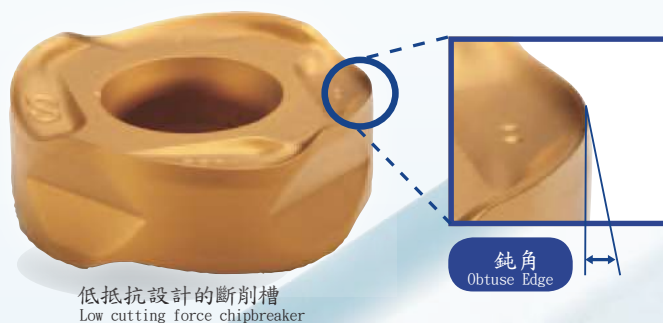
Economical 8-edge insert

POINT.2 結合鋒利切刃與刃口強度

Combine sharpness and cutting edge strength

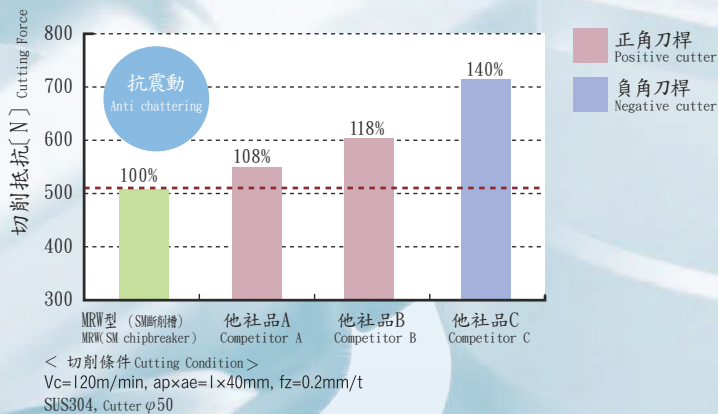
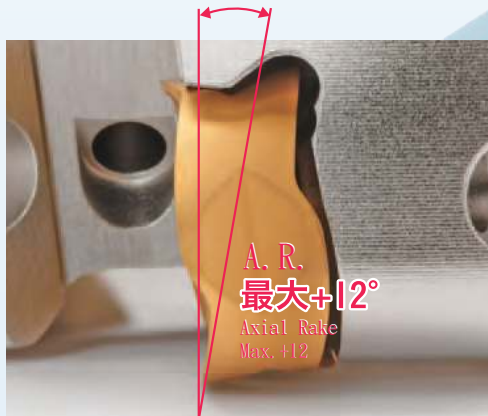
鈍角樣式改善切刃強度

Improved edge strength due to obtuse edge



POINT.3 螺旋切刃 A.R.最大+12° 確保與正角刀片一樣的低抵抗

Helical cutting edge design with maximum axial rake 12° reduced low cutting force equivalent to positive inserts



POINT.4 平鎖結構確保刀片固定 抑制加工時刀片不穩固的狀況 實現安定加工

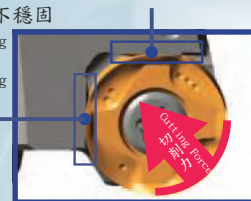
Flat Lock Structure to hold insert firmly
Prevent rotation during machining and realizes stable cutting



平鎖結構 Flat Lock Structure

在2個寬闊平坦的拘束面
•承受同樣切削力
•抑制刀片之不穩固

Wide flat binding face
•receives cutting force evenly
•controls insert rotation



從鋼、不鏽鋼到耐熱合金 利用4材質及3種斷削槽實現長使用壽命加工

Long tool life by wide lineup with 4 grades and 3 chipbreakers, available for steel, stainless steel and heat resistant alloy

切削材質 Workpiece		適用刀片材質 Applicable Insert Grade	適用刀盤 Applicable Chipbreaker
P 碳鋼・合金鋼・模具鋼 Carbon Steel / Alloy Steel / Die Steel		PR1525	GM/SM/GH刀盤 Chipbreaker
K 灰口鑄鐵・球墨鑄鐵 Gray Cast Iron / Nodular Cast Iron		PR1510	GH/GM刀盤 Chipbreaker
S Ni基耐熱合金 Ni-base Heat Resistant Alloy	M 馬氏體型不鏽鋼 Martensitic Stainless Steel	CA6535	SM/GM刀盤 Chipbreaker
S 鈦合金 Titanium Alloy	M 沃斯田鐵型不鏽鋼 Austenitic Stainless Steel M 析出硬化型不鏽鋼 Precipitation Hardened Stainless Steel	PR1535	SM/GM刀盤 Chipbreaker

刀盤用途及推薦切削條件 For Chipbreaker Selection and Recommended Cutting Conditions → P6

POINT.5

難切削材質專用新材質！

New grade for difficult-to-cut material

特別針對突發性損壞
實現高效率安定加工

Stable cutting by preventing sudden insert fracture
Suitable for high efficiency machining



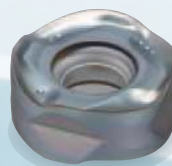
CA6535

Ni基耐熱合金及馬氏體型不鏽鋼專用
CVD具高耐熱性及磨損性
利用塗層硬質合金薄膜可提高穩定性

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



新開發
高韌性基質
New Development
High Toughness Substrate



PR1535

鈦合金、析出硬化型不鏽鋼專用
透過特殊極微塗層硬質合金「MEGACOAT NANO」
實現長壽命及安定銑削加工

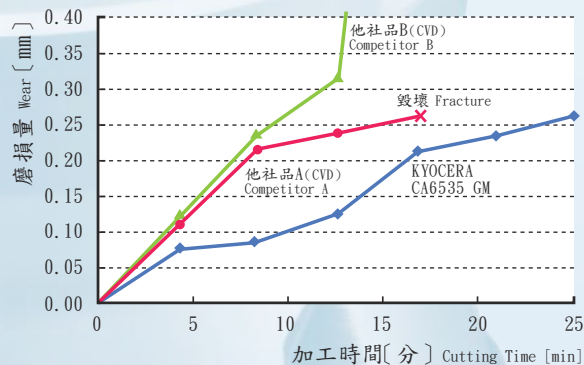
For titanium alloy and precipitation hardened stainless steel
Stabilized milling operation and long tool life by special nano coating layer
MEGACOAT NANO

MEGACOAT
積層構造
Layer structure of MEGACOAT



壽命比較 Tool Life Comparison

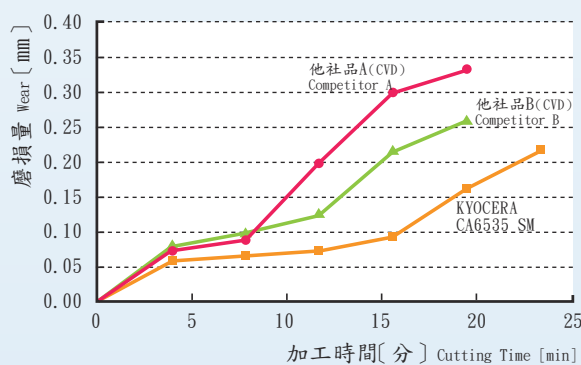
● Ni基耐熱合金 Ni-base Heat Resistant Alloy



< 切削條件 Cutting Condition > Vc=50m/min, ap=1.0mm, fz=0.15mm/t, WET

第一推薦 GM斷削槽
First recommendation GM chipbreaker

● 馬氏體型不鏽鋼 Martensitic Stainless Steel

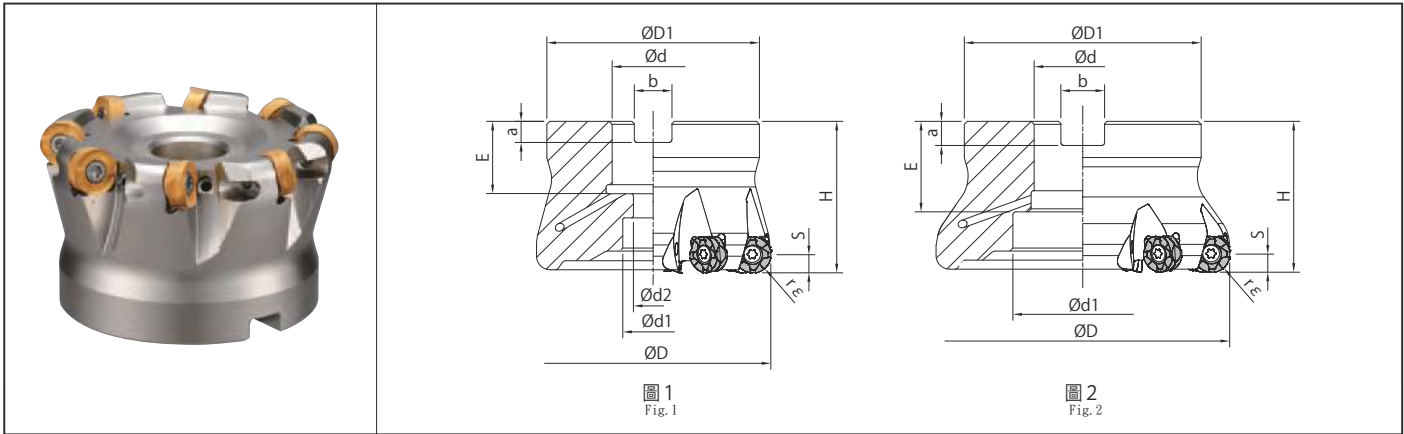


< 切削條件 Cutting Condition > Vc=300m/min, ap=2.0mm, fz=0.2mm/t, WET

第一推薦 SM斷削槽
First recommendation SM chipbreaker

MRW型面銑刀盤 (附出水孔)

MRW Face Mill (with coolant hole)



刀桿尺寸 Toolholder Dimensions

型號 Description	庫存 Stock	刃數 No. of inserts	尺寸 (mm) Dimension											逃角 Rake Angle		出水孔 Coolant Hole	形狀 Drawing	重量 (kg) Weight	最高迴轉數 (min ⁻¹) Max. Revolution										
			r	ε	φ D	φ D1	φ d	φ d1	φ d2	H	E	a	b	S	A. R.					R. R.									
英制規格 Bore Dia. Inch spec	MRW	080R-12-6T	●	6	6	80	70	25.4	20	13	50	27	6	9.5	6.0	+12°	-15.5°	有 Yes	圖1 Fig.1	1.2	12,000								
		080R-12-8T	●	8		100	78	31.75	46	-		34	8	12.7					圖2 Fig.2	1.5									
		100R-12-7T	●	7		8	80	70	25.4	20		13	27	6					9.5	圖1 Fig.1		1.1							
		100R-12-9T	●	9			100	78	31.75	46		-	34	8					12.7	圖2 Fig.2		1.4							
	MRW	080R-16-6T	●	6	8	80	70	25.4	20	13	50	27	6	9.5	8.0	+11°	-16.5°		圖1 Fig.1	1.1	11,000								
		080R-16-7T	●	7		100	78	31.75	46	-		34	8	12.7					圖2 Fig.2	1.4									
		100R-16-6T	●	6		125R-16-8T	125	89	38.1	55		63	38	10					15.9	2.6		2.6	8,560						
		100R-16-8T	●	8			125R-16-10T	●	10																				
公制規格 Metric spec	MRW	050R-12-5T-M	●	5	6	50	48	22	18	11	40	21	6.3	10.4	6.0	+12°	-15.5°	有 Yes	圖1 Fig.1	0.3	16,000								
		050R-12-6T-M	●	6		63	60		19		50	24	7	12.4						0.3									
		063R-12-6T-M	●	6		80	70	27	20	13	50	24	7	12.4						0.6		14,000							
		063R-12-7T-M	●	7			100	78	32	46										-			30	8	14.4	0.6			
		080R-12-6T-M	●	6		8	80	70	27	20	13	50	24	7					12.4	8.0	+11°	-16.5°	圖2 Fig.2	1.1	12,000				
		080R-12-8T-M	●	8			100	78	32	46	-												30	8		14.4	1.1		
		100R-12-7T-M	●	7			125R-16-8T-M	125	89	38.1	55												63	33		9	16.4	1.4	9,600
		100R-12-9T-M	●	9				125R-16-10T-M	●	10																			

● : 標準庫存 Std. Item

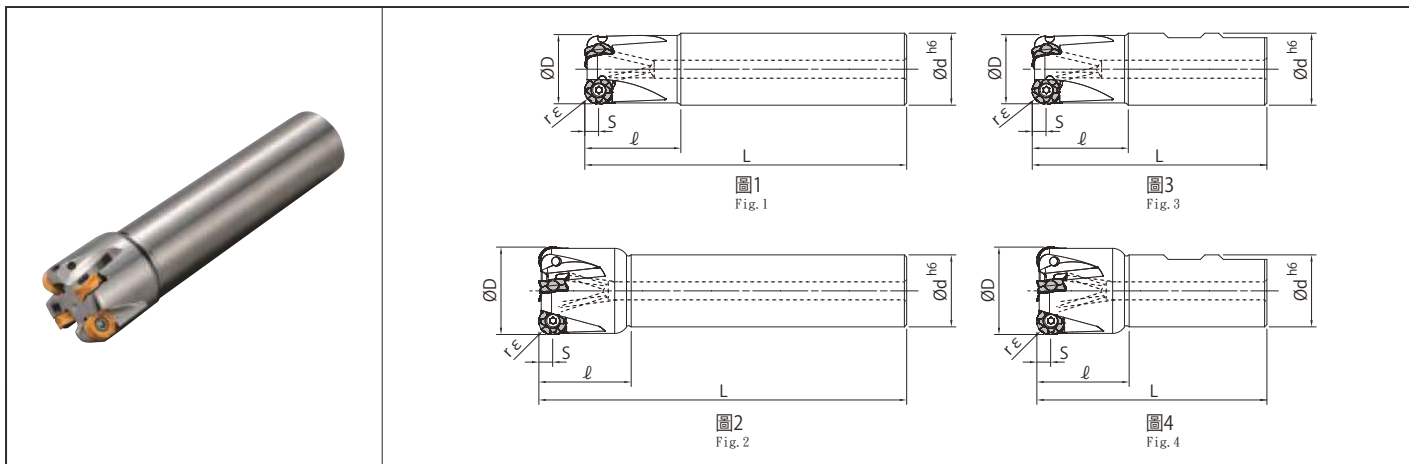
零件及適用刀片 Spare parts and applicable inserts

型號 Description	緊固螺釘 Clamp Screw	扳手 Wrench		防止高溫 燒結劑 Anti-seize Compound	安裝錐柄用螺絲 Mounting bolt	適用刀片 Applicable Inserts
		DTPM-15 	TTP-20 			
MRW 050R-12... 063R-12... 080R-12... 100R-12...	SB-4085TRP	DTPM-15		MP-1	HH10x30	ROMU12...
刀片緊固用緊固扭矩 3.5N·m Recommended torque for insert clamp 3.5N·m					HH12x35	
					-	
MRW 063R-16... 080R-16... 100R-16... 125R-16...	SB-50140TRP	TTP-20		MP-1	HH10x30	ROMU16...
刀片緊固用緊固扭矩 4.5N·m Recommended torque for insert clamp 4.5N·m					HH12x35	
					-	

- 關於最高迴轉數的表示
Caution about the Max. Revolution
如果錯誤的操作銑刀及刀盤超出最大轉速時，刀片、零件等會因離心力而發生飛散等情況。操作時請留意。
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.
- 緊固刀片時，把防止高溫燒結劑薄薄地塗在緊固螺絲的螺紋部和頸部。
Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed.
- S表示最大切深。詳情請參照P6。
S is Maximum ap. For more details, see page 6.

MRW型立銑刀 (附出水孔)

MRW End Mill (with coolant hole)



刀桿尺寸 Toolholder Dimensions

型號 Description	庫存 Stock	刃數 No. of inserts	尺寸 (mm) Dimension						逃角 Rake Angle		出水孔 Coolant Hole	形狀 Drawin	最高迴轉數 (min ⁻¹) Max. Revolution	
			rε	φD	φd	L	ℓ	S	A. R. (MAX)	R. R.				
標準柄 Standard (Straight)	MRW 32-S32-12-3T	●	3	6	32	32	140	40	6.0	+12°	-20°	有 Yes	圖1 Fig. 1	22,000
	40-S32-12-4T	●	4		40		160	40						圖2 Fig. 1
	50-S42-12-5T	●	5		50	42	170	40					16,000	
	MRW 40-S32-16-3T	●	3	8	40	32	160	40	8.0	+11°	-18°	有 Yes	圖2 Fig. 2	17,200
	50-S42-16-4T	●	4		50		42	170						40
	63-S42-16-5T	●	5		63	42	170	50					12,800	
長柄式 Long Shank (Straight)	MRW 32-S32-12-2T-200	●	2	6	32	32	200	40	6.0	+12°	-20°	有 Yes	圖1 Fig. 1	22,000
	40-S32-12-3T-200	●	3		40		200	40						圖2 Fig. 2
	50-S42-12-4T-300	●	4		50	42	300	40					16,000	
	MRW 40-S32-16-2T-200	●	2	8	40	32	200	40	8.0	+11°	-18°	有 Yes	圖2 Fig. 2	17,200
	50-S42-16-3T-300	●	3		50		42	300						40
	63-S42-16-4T-300	●	4		63	42	300	50					12,800	
同柄徑式 Standard (Weldon)	MRW 32-W32-12-3T	●	3	6	32	32	102	40	6.0	+12°	-20°	有 Yes	圖3 Fig. 3	22,000
	40-W32-12-4T	●	4		40		100	40						圖4 Fig. 4
	50-W40-12-5T	●	5		50	40	110	40					16,000	
	MRW 40-W32-16-3T	●	3	8	40	32	100	40	8.0	+11°	-18°	有 Yes	圖4 Fig. 4	17,200
	50-W40-16-4T	●	4		50		40	110						40
	63-W40-16-5T	●	5		63	40	120	50					12,800	

● : 標準庫存 Std. Item




零件及適用刀片 Spare parts and applicable inserts

型號 Description	緊固螺釘 Clamp Screw	扳手 Wrench		防止高溫 燒結劑 Anti-seizCompound	適用刀片 Applicable Inserts
		DTPM-15 	TTP-20 		
MRW ...-12...	SB-4085TRP	DTPM-15		MP-1	ROMU12...
刀片緊固用緊固扭矩 3.5N·m Recommended torque for insert clamp 3.5N·m					
MRW ...-16...	SB-50140TRP	TTP-20		MP-1	ROMU16...
刀片緊固用緊固扭矩 4.5N·m Recommended torque for insert clamp 4.5N·m					

- 關於最高迴轉數的表示
Caution about the Max. Revolution
如果錯誤的操作銑刀及刀盤超出最大轉速時，刀片、零件等會因離心力而發生飛散等情況。操作時請留意。
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.
- 緊固刀片時，把防止高溫燒結劑薄薄地塗在緊固螺絲的螺紋部和頸部。
Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed.
- S表示最大切深。詳情請參照P6。
S is Maximum ap. For more details, see page 6.

推薦切削條件 Recommended Cutting Conditions → P6

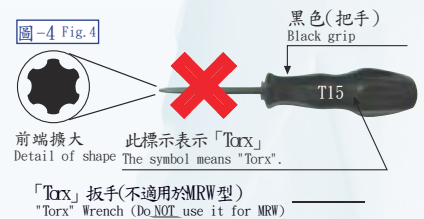
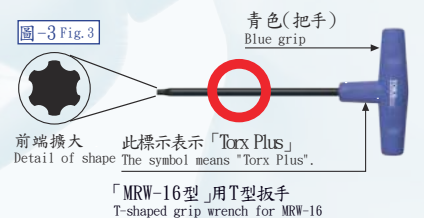
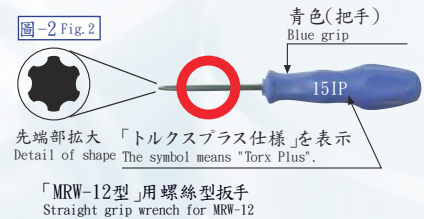
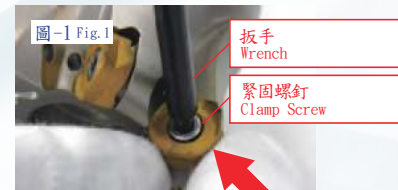
銑削刀片 (有孔) Milling Inserts (with hole)

使用分類的標準 Classification of usage	P	破鋼·合金鋼 Carbon Steel / Alloy Steel	★											適合刀桿參照頁面 Applicable holder reference page	
		模具鋼 Die Steel	★												
★:粗加工/第1推薦 Roughing / 1st Choice ☆:粗加工/第2推薦 Roughing / 2nd Choice ■:精加工/第1推薦 Finishing / 1st Choice □:精加工/第2推薦 Finishing / 2nd Choice (45HRC以下高硬度) In case hardness is under 45 HRC	M	沃斯田鐵不鏽鋼 (SUS304等) Austenitic Stainless Steel	★	☆										P3 P4	
		馬氏體型不鏽鋼 (SUS403等) Martensitic Stainless Steel	☆								★				
		析出硬化型不鏽鋼 Precipitation Hardened Stainless Steel	★												
	K	灰口鑄鐵 Gray Cast Iron									★				
		球墨鑄鐵 Nodular Cast Iron									★				
	S	耐熱合金(Ni基耐熱合金) Heat Resistant Alloy (Ni-base Heat Resistant Alloy)	☆										★		
鈦合金 (Ti-6Al-4V) Titanium Alloy		★								☆					
H	高硬度材質 Hard Materials									☆					
	形狀 Insert	型號 Description	尺寸 (mm) Dimension					MEGACOAT NANO			CVD塗層硬質合金 CVD coating				
φA			T	φd	W	rε	PR1535	PR1525	PR1510	CA6535					
 汎用 General Purpose	ROMU 1204M0ER-GM	12	4.75	4.6	11.8	6	●	●	●	●					
	1605M0ER-GM	16	5.48	6.2	15.8	8	●	●	●	●					
 低阻力型 Low Cutting Force	ROMU 1204M0ER-SM	12	4.75	4.6	11.8	6	●	●	●	●					
	1605M0ER-SM	16	5.48	6.2	15.8	8	●	●	●	●					
 刃先強化型(重切削用) Tough Edge (Heavy Milling)	ROMU 1204M0ER-GH	12	4.75	4.6	11.8	6		●	●						
	1605M0ER-GH	16	5.48	6.2	15.8	8		●	●						

● : 標準庫存 Std. Item

刀片安裝順序 How to mount an insert

- 請清除刀片安裝部位的濁物。
- 緊固螺絲
 - 把防止高溫燒結劑薄薄地塗在緊固螺絲的螺紋部和頸部。
 - 緊固面方向壓緊刀片。(參照圖-1)
- 本產品的緊固螺釘及扳手為
 - 「MRW-12型」(參照圖-2)
 - 「MRW-16型」則為T型扳手(參照圖-3)
 緊固緊固螺絲時，請務必使用附屬的扳手。
 ※錯誤操作「Torx」(參照圖-4)扳手時，可能因螺紋部及扳手前端損壞導致緊固螺絲無法拆卸。
- 請將扳手與緊固螺絲以平行方向緊固。
推薦緊固螺矩...參照P3·P4
- 緊固後，請確認刀片底部和刀柄支撐面及緊固面間無間隙。
若有間隙請再次依安裝順序重新安裝。



- Be sure to remove dust and chips from the insert mounting pocket.
- ①Apply anti-seize compound on portion of taper and thread of clamp screw.
②Attach 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. (See Fig.1)
- Wrenches and clamp screws are "Torx Plus".
①Fig. 2 wrench is for MRW-12. (Straight grip)
②Fig. 3 wrench is for MRW-16. (T-shaped grip)
Please use a "Torx Plus" Wrench for tightening clamp screw.
*If a "Torx" Wrench (Fig. 4) is used to tighten, the screw head might become damaged and then the screw cannot be removed.
- When tightening the screw, make sure that the wrench is parallel to the screw.
For recommended torque, see page 3 and 4.
- After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the holder or between the insert side surfaces and the constraint surface of the holder.
If there is any clearance, remove the insert and mount it again according to the above steps.

推薦切削條件 Recommended Cutting Conditions

被削材 Workpiece Material	推薦斷削槽 (進給fz mm/t) Recommended Chipbreaker ※ROMU12刀片...ap=3mm ROMU16刀片...ap=4mm時推薦進給 (基準值) Recommended feed rate (standard value) for ROMU12 type: ap=3mm, ROMU16 type: ap=4mm			推薦刀片材種(切削速度:m/min) Recommended Insert Grade			
				MEGACOAT NANO			CVD 塗層 CVD coating
	GM	SM	GH	PR1525	PR1510	PR1535	CA6535
炭素鋼 Carbon Steel(SxxC)	★ 0.1~0.2~0.3	☆ 0.06~0.15~0.2	☆ 0.15~0.3~0.35	★ 120~180~250	-	-	-
合金鋼 Alloy Steel(SCM等)	★ 0.1~0.2~0.3	☆ 0.06~0.15~0.2	☆ 0.15~0.3~0.35	★ 100~160~220	-	-	-
金型鋼 Die Steel(SKD/NAK等)	★ 0.1~0.15~0.25	☆ 0.06~0.12~0.2	☆ 0.15~0.2~0.3	★ 80~140~180	-	-	-
沃斯田鐵不鏽鋼 Austenitic Stainless Steel (SUS304等)	☆ 0.1~0.15~0.2	★ 0.06~0.12~0.2	-	☆ 100~160~200	-	★ 100~160~200	-
馬氏體型不鏽鋼 Martensitic Stainless Steel (SUS403等)	☆ 0.1~0.15~0.2	★ 0.06~0.12~0.2	-	-	-	☆ 150~200~250	★ 180~240~300
析出硬化型不鏽鋼 (SUS630等) Precipitation Hardened Stainless Steel	★ 0.1~0.15~0.2	☆ 0.06~0.12~0.2	-	-	-	★ 90~120~150	-
灰口鑄鐵 Gray Cast Iron (FC)	★ 0.1~0.2~0.3	-	☆ 0.15~0.3~0.35	-	★ 120~180~250	-	-
球墨鑄鐵 Nodular Cast Iron (FCD)	★ 0.1~0.15~0.25	-	☆ 0.15~0.2~0.3	-	★ 100~150~200	-	-
Ni基耐熱合金 Ni-base Heat Resistant Alloy	★ 0.1~0.12~0.15	☆ 0.06~0.1~0.15	-	-	-	☆ 20~30~50	★ 20~30~50
鈦合金 Titanium Alloy (Ti-6Al-4V)	☆ 0.1~0.12~0.15	★ 0.06~0.1~0.15	-	-	☆ 30~50~70	★ 40~60~80	-

※ Ni基耐熱合金、鈦合金加工推薦濕式加工。

Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy

★:第一推薦 ☆:第二推薦

★:1st recommendation ☆:2nd recommendation

※ 切削條件的中心值為最推薦條件，但須依實際加工狀況調整切削速度和進給。

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

※ 推薦進給是參照當ap是R角/2 (ROMU12:3mm, ROMU16:4mm)。

若進給低於上述條件，請參考下表的換算係數。

Recommended feed rate is the reference value when ap is re/2 (3mm for ROMU12, 4mm for ROMU16).

For lower feed rate than the above conditions, the conversion factor in the following table is recommended.

每刀進給與切深之換算係數 Conversion factor for feed per tooth by depth of cut (ap)

刀片 Insert	推薦切深 ap (recommended)	最大切深ap ap (max)	每刀進給換算係數 Conversion factor for feed per tooth				
			ap=0.5mm	ap=1mm	ap=2mm	ap=3mm	ap=4mm
ROMU12型 ROMU12 type	3mm以下 3mm or less	6mm	2.1	1.5	1.1	1.0 (基準) Standard	-
ROMU16型 ROMU16 type	4mm以下 4mm or less	8mm	2.4	1.7	1.3	1.1	1.0 (基準) Standard

● 計算例 ROMU12、炭素鋼、GM斷削槽、切深1mmの場合

0.2mm/t(炭素鋼、GM斷削槽進給基準值)x1.5(ROMU12切深1mm的換算係數=0.3mm/t ->推薦值為0.3mm/t)

Example (ROMU12 type, Carbon Steel, GM chipbreaker, ap=1mm)

Recommended feed per tooth: 0.2mm/t (standard value for Carbon Steel / GM chipbreaker) x 1.5 (Conversion factor for ROMU12 / ap=1mm)=0.3mm/t

※ROMU12推薦切深:3mm以下、ROMU推薦切深:4mm以下。

除了暫時超過推薦切深的情況下，建議加工時還是在低於推薦的切深做加工。

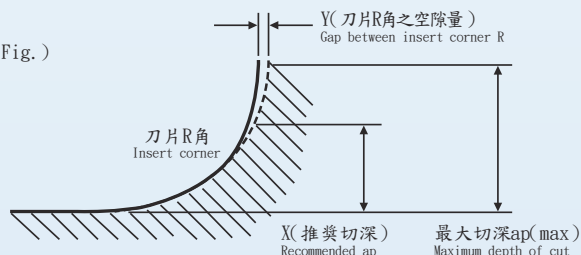
Recommended ap: 3mm or less for ROMU12, 4mm or less for ROMU16

Except the case that ap temporarily surpass the recommended ap, machining under the recommended ap is recommended.

R角的加工形狀 Corner R shape during processing

本產品R角加工形狀 (請參照右圖) Corner R shape during processing with MRW (see Fig.)

刀片 Insert	最大切深 ap (max)	X	Y
ROMU12型 ROMU12 type	6mm	3mm	0.1mm
ROMU16型 ROMU16 type	8mm	4mm	0.1mm



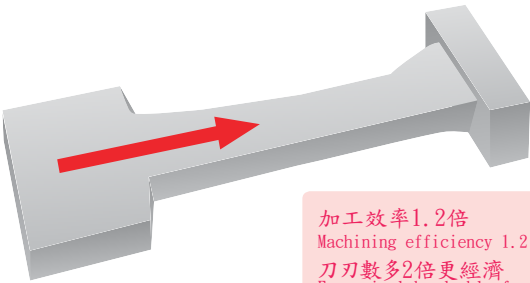
※加工時超過推薦切深(X)、刀片R角與工件會有空隙: Y。

When machining with larger ap than recommended ap (X), there is a gap (Y) between the workpiece corner and insert corner R (re).

※上表為概估值，依條件不同約有±0.2mm公差

The above figure is estimation. There would be ±0.2mm variation depending on the cutting conditions.

12Cr鋼 12Cr Steel



加工効率1.2倍
Machining efficiency 1.2 times
刃数多2倍更經濟
Economical by double face insert

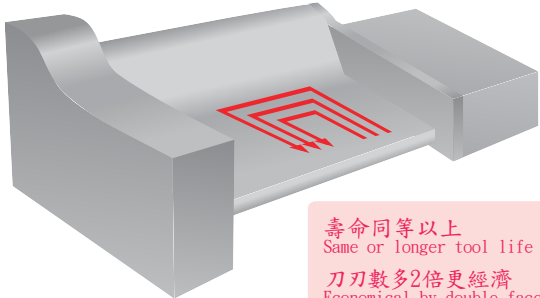
・渦輪葉片 Turbine Blade ・Vc=270m/min ・fz=0.278mm/t
 ・ap=0.5~1.0mm ae=max35mm ・乾式 Dry
 ・MRW050R-12-6T-M(6枚刃) 6 inserts・ROMU1204MOER-SM(CA6535)

CA6535	安定加工 Stable machining
他社品A(正角) Competitor A (Positive)	切削音大, 不安定加工 Unstable machining with large noise

與他社品A相比MRW加工效率多1.2倍, 壽命同等且安定加工。
 MRW型刃数多2倍達到控制成本之效果。
 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.

(依據客戶評價) Evaluation by the user

12Cr鋼 12Cr Steel



壽命同等以上
Same or longer tool life
刃数多2倍更經濟
Economical by double face insert

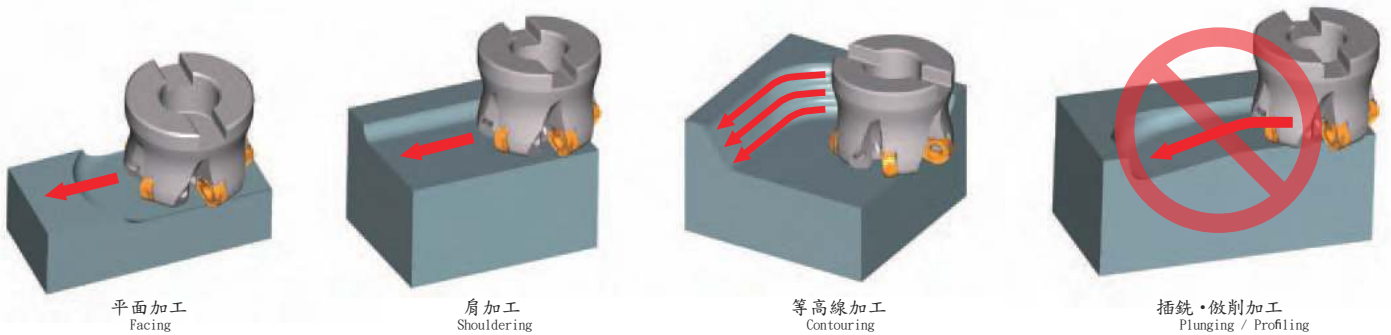
・渦輪葉片 Turbine Blade ・Vc=250m/min ・fz=0.16mm/t
 ・ap=2.0mm ae=5~30mm ・濕式 Wet
 ・MRW050R-12-5T-M(5枚刃) 5 inserts・ROMU1204MOER-SM(CA6535)

CA6535	安定加工・壽命可更長 Stable, available for further machining
他社品B(正角) Competitor B (Positive)	切削音大, 不安定加工 Unstable machining with large noise

與他社品B相比, MRW刀片刃口較少崩壞, 且切削音低。
 MRW的壽命可再延長, 刃数多2倍達到控制成本之效果。
 MRW showed less damage on the cutting edge and reduced cutting noise.
 MRW has equal or longer tool life and cost advantage due to double sides insert.

(依據客戶評價) Evaluation by the user

加工形態 Application



※MRW無法執行插銑、微削等3次元加工。
 MRW type is not available for 3D machining such as Plunging and Profiling.

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銑削、鑽孔、車削相關的計算
迅速計算出加工時間



他社型番對照表
他社材種、斷削槽型番
、與京瓷產品做對照

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0120-39-6369

(携帯・PHSからもご利用できます) FAX:075-602-0335
MAIL: tool.support@kyocera.jp

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