

NEW

新產品


MOLDINO
The Edge To Innovation

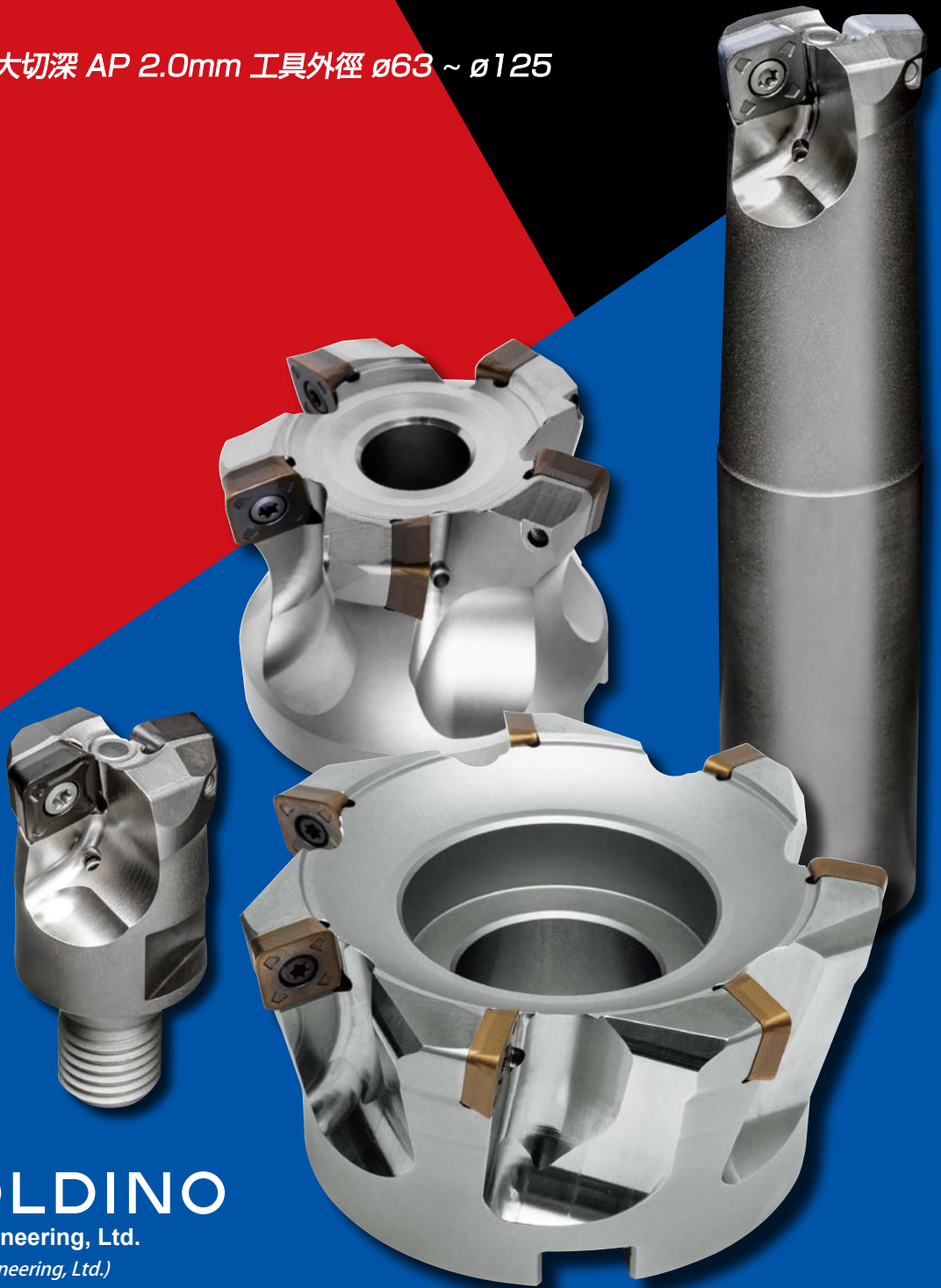
α

超高進給不等分割抗震銑刀 TR4F

Radius Mill TR4F

4000 型 最大切深 AP 1.2mm 工具外徑 $\phi 32 \sim \phi 100$

5000 型 最大切深 AP 2.0mm 工具外徑 $\phi 63 \sim \phi 125$



株式会社 MOLDINO
MOLDINO Tool Engineering, Ltd.
(原: Hitachi Tool Engineering, Ltd.)

TR4F型開創出 2mm切削深度×2mm每刃進給量的領域

The groundbreaking TR4F type, with cutting depth of 2 mm × 2 mm feed rate per tooth

フロンティア

TR4F型的3大特點

我們將克服您在模具加工方面的困難。

Overcomes all major issues encountered in mold machining, thanks to TR4F's three unique features

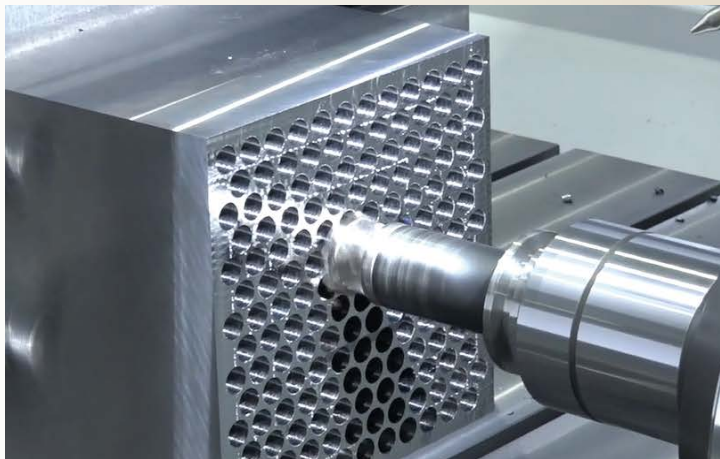
POINT 1

在斷續切削時...

Even with interrupted cutting

高抗崩刃口設計特性！

High chipping resistance



大型模具的超高

選擇密齒類型

Selection of close pitch type

4000

型
Type

The definitive type —even with



1mm × 2mm

切削深度 每刃進給量
Cutting depth Feed per tooth

POINT 3

在切削進行時...

Even in chips

最小化咬

Minimized biting risk

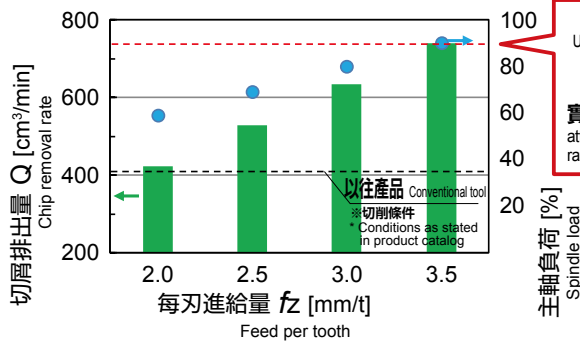


最大限度發揮機器全部功能的工具性能

Tool performance that maximizes the machine's full capabilities

由於獨特的刀片形狀，無論負載如何，都能進行堅固的切削。

Rugged cutting, regardless of load, thanks to the unique insert shape



使用預硬鋼 (30HRC)
Use of pre-hardened steel (30HRC)
740cm³/min
實現驚人的排屑排出量！
attains a remarkable chip removal rate of 740cm³/min!



【切削條件 Cutting conditions】TR4F5000型

工具徑 Tool dia. : φ63、切削速度 Cutting speed : Vc=130m/min

切削深度 Depth of cut : ap×ae=2.0×40mm

被削材 Work material : 預硬鋼(30HRC) Pre-hardened steels 30HRC

使用機械 Machine : 臥式3軸M/C(BT50主軸 37kw) 3-axis MC horizontal type (BT50,37kw)

進給加工實現

for rough machining large molds

選擇深切類型
Deep cutting
5000
型
Type



2mm × 2mm
切削深度 每刃進給量
Cutting depth Feed per tooth

POINT 2

在立面加工時...
Even with wall face processing

防止鐵屑刮擦！ Prevents scraping



傷風險！



鐵屑遠離工件表面的排屑路徑

Chip ejection path away from work surface

防止因斷屑和彎曲而引起的刮削，這在立壁端面加工時無論是向上切割還是向下切割經常發生。

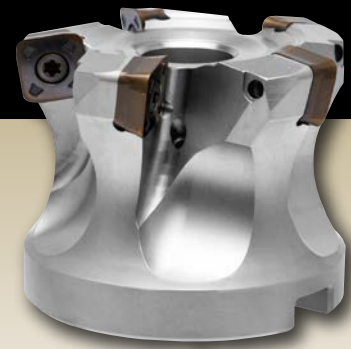
Prevents scraping due to chip breakage and bending, which often occurs during wall face machining, whether cutting up or down.



【切削條件 Cutting conditions】 TR4F5000型
 工具徑 Tool dia. : $\phi 63$ 、切削速度 Cutting speed : $V_c=100\text{m/min}$
 每刃進給量 Feed rate : $f_z=2.0\text{mm/t}$ 、切削深度 Depth of cut : $a_p \times a_e=2.0 \times 37.8\text{mm}$
 被削材 Work material : 預硬鋼 (32HRC) Pre-hardened steels (32HRC)

進入粗加工"超"高進給的世界

Roughing technique achieves "super" high-feed cutting.



獨特的刀片形狀和不等分割的刀體設計，
實現與眾不同的高效率加工。

Exclusive high-efficiency cutting,
resulting from unique insert and body shapes

TR4F型專為解決高效率加工方面的問題。

TR4F type to meet specific challenges posed by high-efficiency cutting

問題
Issue

01

採用高進給加工進行形狀加工，
但切屑堵塞和吞噬現象嚴重，效率無法提高。
Although high-feed cutting is performed for shaping,
resulting severe chip clogging and biting may reduce shaping efficiency.



問題解決的方案!

Proposed solutions

●採用提高排屑性的刀體形狀

在加工突出量較長的形狀部位時，可抑制切屑堵塞、吞噬。

Adopts new body shape to enhance chip removal.
Suppresses chip clogging, even when cutting long overhangs.



Point 1

通過寬闊開放的容屑槽實現優異的排屑性。

Offers excellent chip removal performance thanks to large open pocket.

Point 2

採用獨特的彎曲形狀。
抑制刀具與壁面之間的切屑吞噬。

Adopts unique constricted shape.
Suppresses chip clogging between tools and wall surfaces.

■實現順暢的排屑

Generation of smooth twist-free chips

以往產品
Conventional tool



TR4F型
TR4F type



【切削條件 Cutting conditions】

工具徑 Tool dia. : $\phi 63$

切削速度 Cutting speed : $V_c = 130\text{m/min } 1$

每刃進給量 Feed rate : $f_z = 1.0\text{mm/t}$

切削深度 Depth of cut : $a_p \times a_e = 1.0 \times 38\text{mm}$

被削材 Work material : S50C (220HB)



這裡是重點!

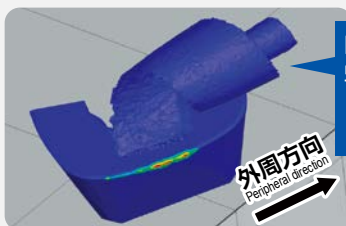
Point

設計用於控制切屑流的切削刃

Cutting edge designed to control chip flow

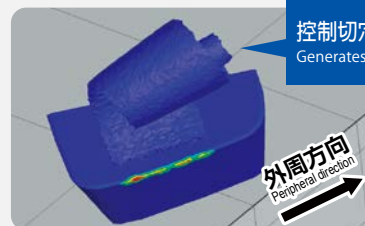
●優化切削刃設計，實現順暢的排屑流程；使切屑遠離牆壁表面。從切屑生成開始就抑制堵塞。

Optimizes cutting edge design to achieve smooth chip removal flow; keeps chips away from wall surfaces.
Suppresses clogging from the time chip generation starts.



以往產品 Conventional tool

向外周方向(壁面側)
螺旋狀伸展的切屑
Helical chips spreading in
peripheral direction
(on wall surface side)



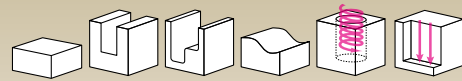
TR4F型 TR4F type

控制切屑排出呈渦旋狀
Generates helical-shaped chips

	JM4160	JP4120	JP4105
	JS4060	JP4120	
	GX2140		
銅	炭素鋼 合金鋼	不銹鋼 工具鋼	預硬鋼 淬火鋼
Copper	Carbon steels Alloy steels	Stainless steels Tool steels	Pre-hardened steels Hardened steels 35~45HRC 45~50HRC
			淬火鋼 50~60HRC
			Hardened steels 50~60HRC

加工用途
Applications

粗加工
Roughing



問題 Issue 02

當為了大幅提高粗加工的效率而引進了新的設備。
想通過高進給加工縮短加工時間，但加快進給速度會導致刀具
壽命縮短，無法發揮新設備的效率。

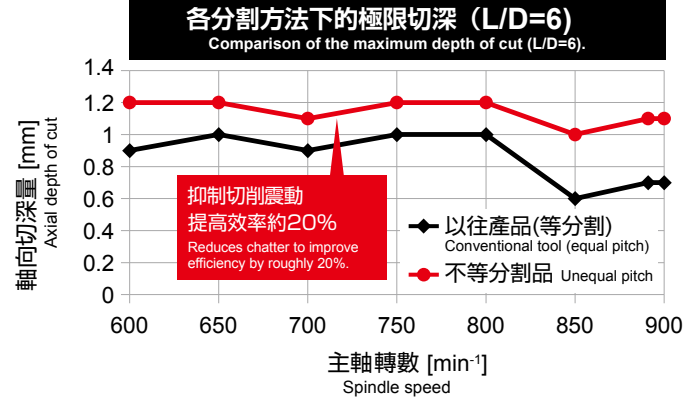
New equipment installed to improve the efficiency of the roughing process.
The goal is to reduce machining times with high-feed cutting. But higher feed rates reduce tool life and keep the machine away from delivering its full potential.



問題解決的方案！ Proposed solutions

- 開發獨特的刀片形狀。通過增大斷面面積與拘束面積，應對高效率加工時的切削負荷。
Developed a unique insert shape. Performs stable machining despite large cutting load generated during high-feed cutting with large cross-sectional and constraint areas.
- 採用獨特的不等分割方式，抑制切削時的震動。
Adopts unique unequal pitch method to reduce chattering during cutting.

	以往產品 Conventional tool	TR4F形 TR4F type
斷面面積 Cross-sectional area	 100%	 110%
拘束面積 Constraint area	 100%	 135%



【切削條件 Cutting conditions】
 工具徑 Tool dia. : $\phi 50$ 、刃數 No. of Flutes : 4 刃 4 Flutes、
 $f_z=1.0\text{mm/t}$ 、 $a_e=35\text{mm}$ 、 $OH=300\text{mm}$
 被削材 Work material : S50C (220HB)

- 通過擴大刀片斷端面面積和拘束面積，在高負荷加工時，也能確保刀片強度與拘束力。
Secures insert strength and constraint force by enlarging cross-sectional and constraint areas even in high-load cutting.

- 採用獨特的不等分割方式，抑制切削時的震動，震動是影響效率的主要因素之一。
Unequal pitch reduces a vibration, a major factor of chattering.

這裡是重點！ Point

對應多用途、多鋼種
Meets the requirements of various applications and steel types.

- 通過獨特的刀片斷面形狀與切刃設計，支持廣泛的加工型態。
The unique cross-sectional shape and cutting edge design of a single insert meets the needs of a wide range of cutting modes.
- 豐富的材質，支持廣泛的被削材。
Diverse lineup of insert grades to meet the demands posed by a wide range of work materials.



產品陣容

Line Up

刀柄型

Shank type

TR4F40 32-





 為數字、 為英文字母。
Numeric figure in a circle  and Alphabetical character comes in a square .



Fig.1 (一般型)
(Standard type)

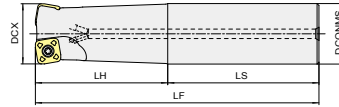
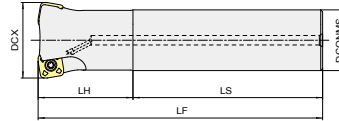


Fig.2 (下切型)
(Undercut type)





有冷卻孔
With air hole

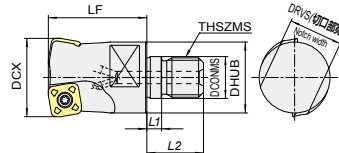
類型 Type	產品代碼 Item code	庫存 Stock	刃數 No. of flutes	尺寸 Size (mm)					形狀 Shape	適用刀片 Recommended insert
				DCX	LF	LH	LS	DCONMS		
Regular 標準	TR4F4032S32-2	●	2	32	150	70	80	32	Fig.1	SDNW120520TR(-P) SDMT120520TR
	TR4F4040S32-3	●	3	40	150	50	100	32	Fig.2	
Long 加長	TR4F4032L32-2	●	2	32	200	120	80	32	Fig.1	
	TR4F4040L32-3	●	3	40	250	50	200	32	Fig.2	

可換式刀頭型

Modular type

TR4F40 M-

 為數字。
Numeric figure comes in a circle .



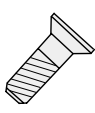


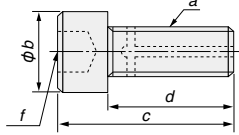
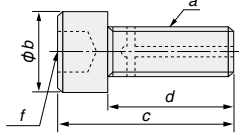
















有冷卻孔
With air hole

產品代碼 Item code	庫存 Stock	刃數 No. of flutes	尺寸 Size (mm)								適用刀片 Recommended Insert
			DCX	LF	L1	L2	DCONMS	DHUB	THSZMS	DRVS	
TR4F4032M-2	●	2	32	40	6	23	17	28.8	M16	22	SDNW120520TR(-P) SDMT120520TR
TR4F4040M-3	●	3	40	40	6	23	17	28.8	M16	22	

【注意】 與硬質合金刀柄成套使用時，不會產生干涉。請勿塗抹潤滑脂等潤滑劑到“組合銼刀”的“接觸面”和“組合螺釘”、“專用刀柄”和“專用心軸”。
【Note】 When \ast and carbide shank are used together as a set, there is no interference. Do not apply lubricants such as grease, etc. to the "contact faces" and "modular screws" of the "modular mill", "dedicated shanks" and "dedicated arbor".

產品編號

Parts

產品名稱 Parts	壓板螺釘 Clamp screw	螺釘扳手 Wrench	螺紋防卡劑 Screw anti-seizure agent	刀柄用螺釘 Arbor screw																																													
形狀 Shape																																																	
適用刀具 Cutter body				 <table border="1"> <thead> <tr> <th>a</th> <th>ϕb</th> <th>c</th> <th>d</th> <th>f</th> </tr> </thead> <tbody> <tr> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>100-178</td> <td>M10×1.5</td> <td>16</td> <td>35</td> <td>8</td> </tr> <tr> <td>100-179</td> <td>M12×1.75</td> <td>18</td> <td>42</td> <td>10</td> </tr> <tr> <td>100-180</td> <td>M16×2.0</td> <td>24</td> <td>51</td> <td>14</td> </tr> <tr> <td>100-178</td> <td>M10×1.5</td> <td>16</td> <td>35</td> <td>8</td> </tr> <tr> <td>100-179</td> <td>M12×1.75</td> <td>18</td> <td>42</td> <td>10</td> </tr> <tr> <td>100-180</td> <td>M16×2.0</td> <td>24</td> <td>51</td> <td>14</td> </tr> <tr> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> </tbody> </table>	a	ϕb	c	d	f	—	—	—	—	—	100-178	M10×1.5	16	35	8	100-179	M12×1.75	18	42	10	100-180	M16×2.0	24	51	14	100-178	M10×1.5	16	35	8	100-179	M12×1.75	18	42	10	100-180	M16×2.0	24	51	14	—	—	—	—	—
a	ϕb	c	d	f																																													
—	—	—	—	—																																													
100-178	M10×1.5	16	35	8																																													
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100-180	M16×2.0	24	51	14																																													
—	—	—	—	—																																													
TR4F40  S/L/M (32) 	262-141	105-T15	P-37	—																																													
TR4F4050 B  				100-178																																													
TR4F4063 B  				100-179																																													
TR4F4080 BM  				100-180																																													
TR4F4080 B  				100-178																																													
TR4F4100 B  				100-179																																													
TR4F5063 B  -4	555-141	105-T20	P-37	100-178																																													
TR4F5080 BM-5				100-179																																													
TR4F5080 B-5				100-180																																													
TR4F5100 B  -6	—	—	—	—																																													
TR4F5125 B  	—	—	—	—																																													

【注意】 夾緊螺釘是消耗品。由於更換壽命取決於使用環境，建議儘早更換。包括一個用於柄型和模塊化的備用夾緊螺釘，兩個用於孔型的備用夾緊螺釘。考慮到減少環境負荷，螺絲刀和螺絲防卡劑現在分開出售，以避免發送不必要的重複工具。我們希望您能理解我們的推理。

【Note】 The clamp screw is a consumable part. Since replacement life depends on the use environment, it is recommended that it be replaced at an early stage. Includes one spare clamp screw for shank type and modular, two spare clamp screws for bore type. In consideration of reducing environmental loads, the screwdriver and screw anti-seizure agent are now sold separately to avoid sending unnecessary duplicate tools. We hope you will understand our reasoning.

●：標準庫存品。●：Stocked items.

刀盤型

Bore type

TR4F○○○○○B□-○

○為數字 □為英文字母

Numeric figure in a circle and Alphabetical character comes in a square □.

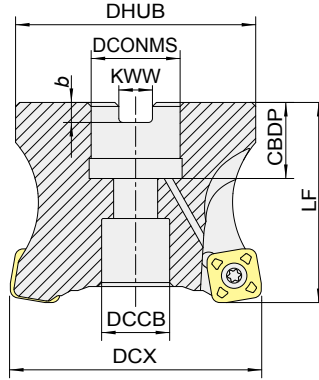


Fig.1 (有冷卻孔)
With air hole

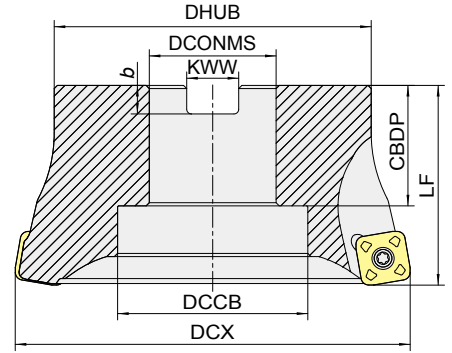


Fig.2 (無冷卻孔)
Without air hole

類型 Type	產品代碼 Item code	庫存 Stock	刃數 No. of flutes	尺寸 Size (mm)							形狀 Shape	適用刀片 Recommended insert											
				DCX	DHUB	LF	CDBP	KWW	b	DCONMS			DCCB										
Bore type 刀盤型	Internal diameter inch size 內徑英制尺寸	TR4F4050B-3	●	3	50	47	50	19	8.4	5	22.225	17	Fig.1	SDNW120520TR(-P) SDMT120520TR									
		TR4F4050B-4	●	4																			
		TR4F4050B-5	●	5																			
		TR4F4063B-4	●	4																			
		TR4F4063B-5	●	5																			
		TR4F4063B-6	●	6																			
		TR4F4080B-5	●	5																			
		TR4F4080B-7	●	7																			
	TR4F4100B-6	●	6	100	96	70	32	12.7	8	31.75	26												
	TR4F4100B-8	●	8																				
	TR4F5063B-4	●	4	63	60	50	19	8.4	5	22.225	17	Fig.2		SDNW150525ZTR SDMT150525ZTR									
	TR4F5080B-5	●	5																				
	TR4F5100B-6	●	6																				
	TR4F5125B-6	●	6	125	100	63	38	15.9	10	38.1	60												
	TR4F5125B-7	●	7																				
	Internal diameter mm size 內徑公制尺寸	TR4F4050BM-3	●	3	50	47	50	20	10.4	6.3	22			17	Fig.1	SDNW120520TR(-P) SDMT120520TR							
TR4F4050BM-4		●	4																				
TR4F4050BM-5		●	5																				
TR4F4063BM-4		●	4																				
TR4F4063BM-5		●	5																				
TR4F4063BM-6		●	6																				
TR4F4080BM-5		●	5	80								76	70				22	12.4	7	27	20		
TR4F4080BM-7		●	7																				
TR4F4100BM-6		●	6	100								96	70				25.5	14.4	8	32	26		
TR4F4100BM-8		●	8																				
TR4F5063BM-4		●	4	63								60	50				20	10.4	6.3	22	17	Fig.2	SDNW150525ZTR SDMT150525ZTR
TR4F5080BM-5		●	5																				
TR4F5100BM-6		●	6																				
TR4F5125BM-6		●	6	125								100	63				38	16.4	9	40	60		
TR4F5125BM-7	●	7																					

【注意】軸螺釘不包括在內。

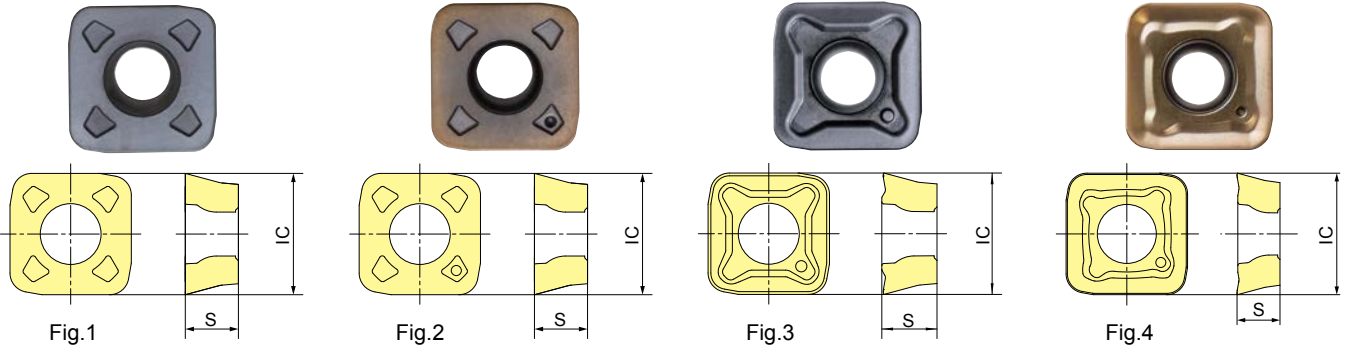
【Note】Arbor screw is not included.

產品陣容

Line Up

刀片

Insert



產品代碼 Item code	精度 Tolerance class	AJ塗層 AJ Coating					尺寸 Size (mm)		形狀 Shape
		JP4105	JP4120	JM4160	JS4060	GX2140	IC	S	
SDNW120520TR	N級 N	●	●	●	●	●	12.7	5.56	Fig.1
SDNW120520TR-P		●*1							Fig.2
SDNW150525ZTR		●	●	●	●	●	15.875		Fig.1
SDMT120520TR	M級 M		●	●	●	●	12.7	5.76	Fig.3
SDMT150525ZTR		★	★	★	★	★			15.875

■ : 一般切削・第一推薦
General cutting, First recommendation
□ : 一般切削・第二推薦
General cutting, Second recommendation

*1: 還可用於析出硬化類不鏽鋼的加工。 *1: Can be used to process the precipitation hardening stainless steel.
【注意】請注意，GX塗層和JS塗層不會引起觸電傳感器的反應。
【Note】Please note that the GX Coating and JS Coating do not cause a reaction in conductive touch sensors.

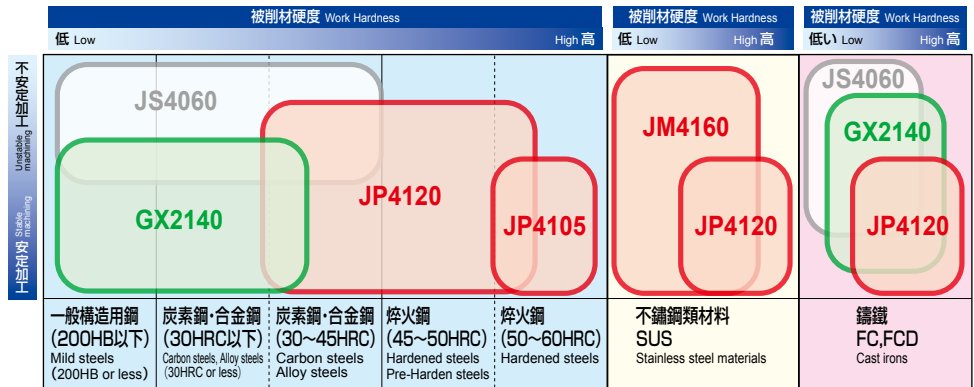
材質圖(35HRC以下的鋼材)

Grade map for less than 35HRC



不同被削材推薦材質圖

Grade map for work materials



刀片的使用區分

Proper use of inserts

SDNW120520TR SDNW150525ZTR	SDNW120520TR-P	SDMT120520TR SDMT150525ZTR
<p>刃尖強度優異的第一推薦刀片 適用於一般高進給加工</p> <p>The recommended default insert offers superior cutting edge strength. Ideal for general high-feed cutting.</p>	<p>突出長度短，斷續切削少的加工推薦使用 特別適合預硬鋼(P20、P21材質)</p> <p>Recommended for relatively continuous (uninterrupted) cutting with short overhangs. Ideal for pre-hardened steels (P20 and P21 materials).</p>	<p>帶斷屑槽刀片 適用於低鋼性工作 and 低馬力 M/C 的粗加工</p> <p>Breaker type insert. Ideal for rough machining with low-rigidity work materials and low-horsepower M/C.</p>

★ : 新商品的標準庫存品。★ : Stocked items of new products. ● : 標準庫存品。● : Stocked items.

標準切削條件表

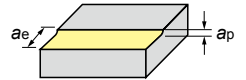
Recommended Cutting Conditions

① 刀柄式・可換式刀頭型

Shank type / Modular type

TR4F4000形(TR4F4000S/M/L(32)-○)

○為數字。Numeric figure in a circle



○ 等高線粗加工標準切削條件 Standard cutting conditions for contour roughing

被削材 Work material	推薦材種 Recommended inserts grade	工具徑 DCX Tool dia.	刀柄型 Shank Type				可換式刀頭型 Modular Type					
			φ32(2刃) (2 Flutes)		φ40(3刃) (3 Flutes)		φ32(2刃) (2 Flutes)			φ40(3刃) (3 Flutes)		
			<3DCX		<3DCX		<3DCX		3DCX-5DCX	<3DCX		3DCX-5DCX
突出量 Overhang		通用 General purpose	高速加工 High-speed Cutting	通用 General purpose	高速加工 High-speed Cutting	通用 General purpose	高速加工 High-speed Cutting	3DCX-5DCX	通用 General purpose	高速加工 High-speed Cutting	3DCX-5DCX	
一般構造用鋼 Mild steels (200HB 以下) (200HB or less)	GX2140 JS4060	n (min-1)	1490	1990	1190	1590	1490	1990	1490	1190	1590	1190
		Vc(m/min)	150	200	150	200	150	200	150	150	200	150
		Vf(mm/min)	5360	7960	6430	9540	5360	7960	5360	6430	9540	6430
		fz(mm/t)	1.8	2.0	1.8	2.0	1.8	2.0	1.8	1.8	2.0	1.8
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	14	14	22	22	14	14	14	22	22	22
		Q(cm³/min)	75	111	141	210	75	111	75	141	210	141
炭素鋼 合金鋼 Carbon steels Alloy steels (35HRC 以下) (35HRC or less)	GX2140 JS4060	n (min-1)	1490	1990	1190	1590	1490	1990	1490	1190	1590	1190
		Vc(m/min)	150	200	150	200	150	200	150	150	200	150
		Vf(mm/min)	5360	7960	6430	9540	5360	7960	5360	6430	9540	6430
		fz(mm/t)	1.8	2.0	1.8	2.0	1.8	2.0	1.8	1.8	2.0	1.8
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	14	14	22	22	14	14	14	22	22	22
		Q(cm³/min)	75	111	141	210	75	111	75	141	210	141
炭素鋼 合金鋼 Carbon steels Alloy steels (35~ 45HRC)	JP4120 JS4060	n (min-1)	1290	1490	1030	1190	1290	1490	1290	1030	1190	1030
		Vc(m/min)	130	150	130	150	130	150	130	130	150	130
		Vf(mm/min)	4640	5960	5560	7140	4640	5960	4640	5560	7140	5560
		fz(mm/t)	1.8	2.0	1.8	2.0	1.8	2.0	1.8	1.8	2.0	1.8
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	14	14	22	22	14	14	14	22	22	22
		Q(cm³/min)	65	83	122	157	65	83	65	122	157	122
不銹鋼 Stainless steels SUS	JM4160	n (min-1)	990	1990	800	1590	990	1990	990	800	1590	800
		Vc(m/min)	100	200	100	200	100	200	100	100	200	100
		Vf(mm/min)	1980	3980	2400	4770	1980	3980	1980	2400	4770	2400
		fz(mm/t)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	14	14	22	22	14	14	14	22	22	22
		Q(cm³/min)	28	56	53	105	28	56	28	53	105	53
鑄鐵 Cast irons FC FCD	JP4120 GX2140	n (min-1)	1490	1990	1190	1590	1490	1990	1490	1190	1590	1190
		Vc(m/min)	150	200	150	200	150	200	150	150	200	150
		Vf(mm/min)	5960	7960	7140	9540	5960	7960	5960	7140	9540	7140
		fz(mm/t)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	14	14	22	22	14	14	14	22	22	22
		Q(cm³/min)	83	111	157	210	83	111	83	157	210	157
淬火鋼 Hardened steels (45~ 50HRC)	JP4120 JP4105	n (min-1)	800	900	640	720	800	900	800	640	720	640
		Vc(m/min)	80	90	80	90	80	90	80	80	90	80
		Vf(mm/min)	800	1440	960	1730	800	1440	800	960	1730	960
		fz(mm/t)	0.5	0.8	0.5	0.8	0.5	0.8	0.5	0.5	0.8	0.5
		ap(mm)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		ae(mm)	14	14	22	22	14	14	14	22	22	22
		Q(cm³/min)	9	16	17	30	9	16	9	17	30	17
淬火鋼 Hardened steels (50~ 60HRC)	JP4105 JP4120	n (min-1)	800	900	640	720	800	900	800	640	720	640
		Vc(m/min)	80	90	80	90	80	90	80	80	90	80
		Vf(mm/min)	640	1080	770	1300	640	1080	640	770	1300	770
		fz(mm/t)	0.4	0.6	0.4	0.6	0.4	0.6	0.4	0.4	0.6	0.4
		ap(mm)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		ae(mm)	14	14	22	22	14	14	14	22	22	22
		Q(cm³/min)	7	12	14	23	7	12	7	14	23	14

○ 插銑粗加工標準切削條件 Standard cutting conditions for vertical roughing

被削材 Work material	推薦材種 Recommended inserts grade	工具徑DCX Tool dia.	φ 32(2刃) (2 Flutes)		φ 40(3刃) (3 Flutes)	
			突出量 Overhang	<3DCX	3DCX-5DCX	<3DCX
鑄鐵 Cast irons FC FCD	JP4120 GX2140	n (min-1)	1990	1990	1990	1590
		Vc(m/min)	200	200	200	200
		Vf(mm/min)	600	600	600	720
		fz(mm/t)	0.15	0.15	0.15	0.15
		pf(mm)	≤ 0.5DCX		≤ 0.5DCX	
		ae(mm)	≤ 9.0		≤ 9.0	

【注意】① 本表所示為切削條件的基準值。請根據機床特性、工具和工件的狀態進行調整。
特別是在有槽切削的加工或切寬與之相近的加工時，可能會發生切屑吞蝕及切削震動，從而導致故障，請參考以下內容進行調整。

- 將轉速、工作進給量降低 50 ~ 70%。
- 將切深 ap 減小 50 ~ 70%。
- 將切寬 ae 減小 50 ~ 70%。

② 通電式觸摸傳感器不會對 GX 塗層、JS 塗層產生反應，請予以注意。

③ 「J P4105」是超硬鋼專用材料，不適用於非熱處理鋼。

④ 強斷續切削，突出量較長和濕式切削推薦採用「J M4160」。

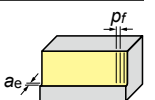
⑤ 為防止切屑吞蝕導致工具損傷，請務必通過吹氣等方法去除切屑。

⑥ 排出的切屑飛散可能會割傷、燙傷作業人員，有可能會濺入眼睛而導致受傷，因此使用刀具時，請在其周圍安裝安全罩，穿戴護目鏡等防護用具，確保在安全的環境下進行作業。

⑦ 請提早更換刀片，防止因過度使用導致破壞。

⑧ 單位時間的切屑排出量 Q 如下所示。

$$Q(\text{cm}^3/\text{min}) = a_p(\text{mm}) \times a_e(\text{mm}) \times V_f(\text{mm}/\text{min}) / 1000$$



標準切削條件表

Recommended Cutting Conditions

② 刀盤型

Bore type **TR4F4000型**(TR4F4050B \square - \circ , TR4F4063B \square - \circ)

\circ 為數字 \square 為英文字母。
Numeric figure in a circle \circ and Alphabetical character comes in a square \square .

○ 等高線荒加工標準切削條件 Standard cutting conditions for contour roughing

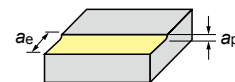
被削材 Work material	推薦 材種 Recommended inserts grade	工具徑 DCX Tool dia.	ϕ 50(3刃) (3 Flutes)			ϕ 50(4刃) (4 Flutes)			ϕ 50(5刃) (5 Flutes)		
			<3DCX		3DCX-5DCX	<3DCX		3DCX-5DCX	<3DCX		3DCX-5DCX
			通用 General purpose	高速加工 High-speed Cutting		通用 General purpose	高速加工 High-speed Cutting		通用 General purpose	高速加工 High-speed Cutting	
一般構造用鋼 Mild steels (200HB 以下) (200HB or less)	GX2140 JS4060	n (min ⁻¹)	950	1270	950	950	1270	950	950	1270	950
		Vc(m/min)	150	200	150	150	200	150	150	200	150
		Vf(mm/min)	5130	7620	5130	6840	10160	6840	8550	12700	8550
		fz(mm/t)	1.8	2.0	1.8	1.8	2.0	1.8	1.8	2.0	1.8
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	30	30	30	30	30	30	30	30	30
		Q(cm ³ /min)	154	229	154	205	305	205	257	381	257
炭素鋼 合金鋼 Carbon steels Alloy steels (35HRC 以下) (35HRC or less)	GX2140 JS4060	n (min ⁻¹)	950	1270	950	950	1270	950	950	1270	950
		Vc(m/min)	150	200	150	150	200	150	150	200	150
		Vf(mm/min)	5130	7620	5130	6840	10160	6840	8550	12700	8550
		fz(mm/t)	1.8	2.0	1.8	1.8	2.0	1.8	1.8	2.0	1.8
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	30	30	30	30	30	30	30	30	30
		Q(cm ³ /min)	154	229	154	205	305	205	257	381	257
炭素鋼 合金鋼 Carbon steels Alloy steels (35~ 45HRC)	JP4120 JS4060	n (min ⁻¹)	830	950	830	830	950	830	830	950	830
		Vc(m/min)	130	150	130	130	150	130	130	150	130
		Vf(mm/min)	4480	5700	4480	5980	7600	5980	7470	9500	7470
		fz(mm/t)	1.8	2.0	1.8	1.8	2.0	1.8	1.8	2.0	1.8
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	30	30	30	30	30	30	30	30	30
		Q(cm ³ /min)	134	171	134	179	228	179	224	285	224
不銹鋼 Stainless steels SUS	JM4160	n (min ⁻¹)	640	1270	640	640	1270	640	640	1270	640
		Vc(m/min)	100	200	100	100	200	100	100	200	100
		Vf(mm/min)	1920	3810	1920	2560	5080	2560	3200	6350	3200
		fz(mm/t)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	30	30	30	30	30	30	30	30	30
		Q(cm ³ /min)	58	114	58	77	152	77	96	191	96
鑄鐵 Cast irons FC FCD	JP4120 GX2140	n (min ⁻¹)	950	1270	950	950	1270	950	950	1270	950
		Vc(m/min)	150	200	150	150	200	150	150	200	150
		Vf(mm/min)	5700	7620	5700	7600	10160	7600	9500	12700	9500
		fz(mm/t)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	30	30	30	30	30	30	30	30	30
		Q(cm ³ /min)	171	229	171	228	305	228	285	381	285
淬火鋼 Hardened steels (45~ 50HRC)	JP4120 JP4105	n (min ⁻¹)	510	570	510	510	570	510	510	570	510
		Vc(m/min)	80	90	80	80	90	80	80	90	80
		Vf(mm/min)	770	1370	770	1020	1820	1020	1280	2280	1280
		fz(mm/t)	0.5	0.8	0.5	0.5	0.8	0.5	0.5	0.8	0.5
		ap(mm)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		ae(mm)	30	30	30	30	30	30	30	30	30
		Q(cm ³ /min)	18	33	18	24	44	24	31	55	31
淬火鋼 Hardened steels (50~ 60HRC)	JP4105 JP4120	n (min ⁻¹)	510	570	510	510	570	510	510	570	510
		Vc(m/min)	80	90	80	80	90	80	80	90	80
		Vf(mm/min)	610	1030	610	820	1370	820	1020	1710	1020
		fz(mm/t)	0.4	0.6	0.4	0.4	0.6	0.4	0.4	0.6	0.4
		ap(mm)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		ae(mm)	30	30	30	30	30	30	30	30	30
		Q(cm ³ /min)	15	25	15	20	33	20	24	41	24

○ 插銑粗加工標準切削條件 Standard cutting conditions for vertical roughing

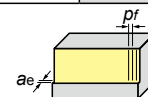
被削材 Work material	推薦 材種 Recommended inserts grade	工具徑 DCX Tool dia.	ϕ 50(3刃) (3 Flutes)		ϕ 50(4刃) (4 Flutes)		ϕ 50(5刃) (5 Flutes)	
			突出量 Overhang		<3DCX		3DCX-5DCX	
			<3DCX	3DCX-5DCX	<3DCX	3DCX-5DCX	<3DCX	3DCX-5DCX
鑄鐵 Cast irons FC FCD	JP4120 GX2140	n (min ⁻¹)	1270	1270	1270	1270	1270	1270
		Vc(m/min)	200	200	200	200	200	200
		Vf(mm/min)	760	760	1020	1020	1270	1270
		fz(mm/t)	0.2	0.2	0.2	0.2	0.2	0.2
		ap(mm)	≤ 0.5DCX		≤ 0.5DCX		≤ 0.5DCX	
ae(mm)	≤ 9.0		≤ 9.0		≤ 9.0			

- [注意]**
- 本表所示為切削條件的基準值。請根據機床特性、工具和工件的狀態進行調整。特別是在有槽切削的加工或切寬與之相近的加工時，可能會發生切屑吞蝕及切削震動，從而導致故障，請參考以下內容進行調整。
 - 將轉速、工作權進給量降低 50 ~ 70%。
 - 將切深 a_p 減小 50 ~ 70%。
 - 將切寬 a_e 減小 50 ~ 70%。
 - 通電式觸摸傳感器不會對 GX 塗層、JS 塗層產生反應，請予以注意。
 - [J P4105] 是高硬度鋼專用材質，不適用於非熱處理鋼。
 - 強斷續切削，突出量較長和濕式切削推薦採用 [J M4160]。
 - 為防止切屑吞蝕導致工具損傷，請務必通過吹氣等方法去除切屑。
 - 排出的切屑飛散可能會割傷、燙傷作業人員，有可能會濺入眼睛而導致受傷，因此使用刀具時，請在其周圍安裝安全罩，穿戴護目鏡等防護用具，確保在安全的環境下進行作業。
 - 請提早更換刀片，防止因過度使用導致破壞。
 - 單位時間的切屑排出量 Q 如下所示。

$$Q(\text{cm}^3/\text{min}) = a_p(\text{mm}) \times a_e(\text{mm}) \times Vf(\text{mm}/\text{min}) / 1000$$



φ 63(4刃) (4 Flutes)			φ 63(5刃) (5 Flutes)			φ 63(6刃) (6 Flutes)			被削材 Work material
<3DCX		3DCX-5DCX	<3DCX		3DCX-5DCX	<3DCX		3DCX-5DCX	
通用 General purpose	高速加工 High-speed Cutting		通用 General purpose	高速加工 High-speed Cutting		通用 General purpose	高速加工 High-speed Cutting		
760	1010	760	760	1010	760	760	1010	760	一般構造用鋼 Mild steels (200HB 以下) (200HB or less)
150	200	150	150	200	150	150	200	150	
5470	8080	5470	6840	10100	6840	8210	12120	8210	
1.8	2.0	1.8	1.8	2.0	1.8	1.8	2.0	1.8	
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
44	44	44	44	44	44	44	44	44	
241	356	241	301	444	301	361	533	361	炭素鋼 合金鋼 Carbon steels Alloy steels (35HRC 以下) (35HRC or less)
760	1010	760	760	1010	760	760	1010	760	
150	200	150	150	200	150	150	200	150	
5470	8080	5470	6840	10100	6840	8210	12120	8210	
1.8	2.0	1.8	1.8	2.0	1.8	1.8	2.0	1.8	
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
44	44	44	44	44	44	44	44	44	
241	356	241	301	444	301	361	533	361	炭素鋼 合金鋼 Carbon steels Alloy steels (35 ~ 45HRC)
660	760	660	660	760	660	660	760	660	
130	150	130	130	150	130	130	150	130	
4750	6080	4750	5940	7600	5940	7130	9120	7130	
1.8	2.0	1.8	1.8	2.0	1.8	1.8	2.0	1.8	
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
44	44	44	44	44	44	44	44	44	
209	268	209	261	334	261	314	401	314	不銹鋼 Stainless steels SUS
510	1010	510	510	1010	510	510	1010	510	
100	200	100	100	200	100	100	200	100	
2040	4040	2040	2550	5050	2550	3060	6060	3060	
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
44	44	44	44	44	44	44	44	44	
90	178	90	112	222	112	135	267	135	鑄鐵 Cast irons FC FCD
760	1010	760	760	1010	760	760	1010	760	
150	200	150	150	200	150	150	200	150	
6080	8080	6080	7600	10100	7600	9120	12120	9120	
2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
44	44	44	44	44	44	44	44	44	
268	356	268	334	444	334	401	533	401	淬火鋼 Hardened steels (45 ~ 50HRC)
400	450	400	400	450	400	400	450	400	
80	90	80	80	90	80	80	90	80	
800	1440	800	1000	1800	1000	1200	2160	1200	
0.5	0.8	0.5	0.5	0.8	0.5	0.5	0.8	0.5	
0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
44	44	44	44	44	44	44	44	44	
28	51	28	35	63	35	42	76	42	淬火鋼 Hardened steels (50 ~ 60HRC)
400	450	400	400	450	400	400	450	400	
80	90	80	80	90	80	80	90	80	
640	1080	640	800	1350	800	960	1620	960	
0.4	0.6	0.4	0.4	0.6	0.4	0.4	0.6	0.4	
0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
44	44	44	44	44	44	44	44	44	
23	38	23	28	48	28	34	57	34	



φ 63(4刃) (4 Flutes)		φ 63(5刃) (5 Flutes)		φ 63(6刃) (6 Flutes)		被削材 Work material
<3DCX	3DCX-5DCX	<3DCX	3DCX-5DCX	<3DCX	3DCX-5DCX	
1010	1010	1010	1010	1010	1010	
200	200	200	200	200	200	
810	810	1010	1010	1210	1210	
0.2	0.2	0.2	0.2	0.2	0.2	
≤ 0.5DCX		≤ 0.5DCX		≤ 0.5DCX		
≤ 9.0		≤ 9.0		≤ 9.0		

- [Note] ① This table provides general guidelines for cutting conditions; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. In particular, when performing shoulder milling in combination with slotting or machining of cutting widths close to slots, etc., chattering vibrations may occur, which can lead to trouble. Therefore, please consider the following when adjusting the conditions;
- Reduce rotation speed and table feed rate by 50 to 70%
 - Reduce cutting depth a_p by 50 to 70%
 - Reduce cutting width a_e by 50 to 70%
- ② Please note that the GX Coating and JS Coating do not cause a reaction in conductive touch sensors.
- ③ JP4105 is for the high-hardness steels. It is not suitable for Non-heat-treated steel material.
- ④ For strongly interrupted cutting, when unsupported length is long, or for wet cutting, JM4160 is recommended.
- ⑤ To prevent tool damage due to chip clogging, always use a chip removal method such as an air blower, etc.
- ⑥ Since there is a danger of the removed chips flying out and causing injury to workers, fire, or damage to eyes, during use be sure to cover the work area with a safety cover and have workers wear protective equipment such as glasses, etc. to make the work area safe.
- ⑦ Perform insert replacement at an early stage to prevent chipping due to excessive use.
- ⑧ Use of the MOLDINO anti-vibration arbor is recommended for overhang of 5DCX or more.
- ⑨ The following equation can be used to determine the metal removal rate per unit time Q ; $Q(\text{cm}^3/\text{min}) = a_p(\text{mm}) \times a_e(\text{mm}) \times V_f(\text{mm}/\text{min}) / 1000$

標準切削條件表

Recommended Cutting Conditions

② 刀盤型

Bore type **TR4F4000型**(TR4F4080B \square - \circ , TR4F4100B \square - \circ) ○為數字、 \square 為英文字母。 Numeric figure in a circle \circ and Alphabetical character comes in a square \square .

○ 等高線粗加工標準切削條件 Standard cutting conditions for contour roughing

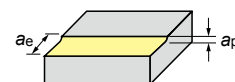
被削材 Work material	推薦 材種 Recommended inserts grade	工具徑 DCX Tool dia.	ϕ 80(5刃) (5 Flutes)			ϕ 80(7刃) (7 Flutes)		
			<3DCX		3DCX-5DCX	<3DCX		3DCX-5DCX
			通用 General purpose	高速加工 High-speed Cutting		通用 General purpose	高速加工 High-speed Cutting	
一般構造用鋼 Mild steels (200HB 以下) (200HB or less)	GX2140 JS4060	n (min ⁻¹)	600	800	600	600	800	600
		Vc(m/min)	150	200	150	150	200	150
		Vf(mm/min)	5400	8000	5400	7560	11200	7560
		fz(mm/t)	1.8	2.0	1.8	1.8	2.0	1.8
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	60	60	60	60	60	60
		Q(cm ³ /min)	324	480	324	454	672	454
炭素鋼 合金鋼 Carbon steels Alloy steels (35HRC 以下) (35HRC or less)	GX2140 JS4060	n (min ⁻¹)	600	800	600	600	800	600
		Vc(m/min)	150	200	150	150	200	150
		Vf(mm/min)	5400	8000	5400	7560	11200	7560
		fz(mm/t)	1.8	2.0	1.8	1.8	2.0	1.8
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	60	60	60	60	60	60
		Q(cm ³ /min)	324	480	324	454	672	454
炭素鋼 合金鋼 Carbon steels Alloy steels (35 ~ 45HRC)	JP4120 JS4060	n (min ⁻¹)	520	600	520	520	600	520
		Vc(m/min)	130	150	130	130	150	130
		Vf(mm/min)	4680	6000	4680	6550	8400	6550
		fz(mm/t)	1.8	2.0	1.8	1.8	2.0	1.8
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	60	60	60	60	60	60
		Q(cm ³ /min)	281	360	281	393	504	393
不銹鋼 Stainless steels SUS	JM4160	n (min ⁻¹)	400	800	400	400	800	400
		Vc(m/min)	100	200	100	100	200	100
		Vf(mm/min)	2000	4000	2000	2800	5600	2800
		fz(mm/t)	1.0	1.0	1.0	1.0	1.0	1.0
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	60	60	60	60	60	60
		Q(cm ³ /min)	120	240	120	168	336	168
鑄鐵 Cast irons FC FCD	JP4120 GX2140	n (min ⁻¹)	600	800	600	600	800	600
		Vc(m/min)	150	200	150	150	200	150
		Vf(mm/min)	6000	8000	6000	8400	11200	8400
		fz(mm/t)	2.0	2.0	2.0	2.0	2.0	2.0
		ap(mm)	1.0	1.0	1.0	1.0	1.0	1.0
		ae(mm)	60	60	60	60	60	60
		Q(cm ³ /min)	360	480	360	504	672	504
淬火鋼 Hardened steels (45 ~ 50HRC)	JP4120 JP4105	n (min ⁻¹)	320	360	320	320	360	320
		Vc(m/min)	80	90	80	80	90	80
		Vf(mm/min)	800	1440	800	1120	2020	1120
		fz(mm/t)	0.5	0.8	0.5	0.5	0.8	0.5
		ap(mm)	0.8	0.8	0.8	0.8	0.8	0.8
		ae(mm)	60	60	60	60	60	60
		Q(cm ³ /min)	38	69	38	54	97	54
淬火鋼 Hardened steels (50 ~ 60HRC)	JP4105 JP4120	n (min ⁻¹)	320	360	320	320	360	320
		Vc(m/min)	80	90	80	80	90	80
		Vf(mm/min)	640	1080	640	900	1510	900
		fz(mm/t)	0.4	0.6	0.4	0.4	0.6	0.4
		ap(mm)	0.8	0.8	0.8	0.8	0.8	0.8
		ae(mm)	60	60	60	60	60	60
		Q(cm ³ /min)	31	52	31	43	72	43

○ 插銑粗加工標準切削條件 Standard cutting conditions for vertical roughing

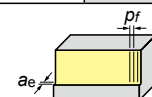
被削材 Work material	推薦 材種 Recommended inserts grade	工具徑 DCX Tool dia.	ϕ 80(5刃) (5 Flutes)		ϕ 80(7刃) (7 Flutes)	
			突出量 Overhang		突出量 Overhang	
			<3DCX	3DCX-5DCX	<3DCX	3DCX-5DCX
鑄鐵 Cast irons FC FCD	JP4120 GX2140	n (min ⁻¹)	800	800	800	800
		Vc(m/min)	200	200	200	200
		Vf(mm/min)	800	800	1120	1120
		fz(mm/t)	0.2	0.2	0.2	0.2
		ap(mm)	$\leq 0.5DCX$		$\leq 0.5DCX$	
		ae(mm)	≤ 9.0		≤ 9.0	

- [注意]**
- 本表所示為切削條件的基準值。請根據機床特性、工具和工件的狀態進行調整。特別是在有槽切削的加工或切寬與之相近的加工時，可能會發生切屑吞蝕及切削震動，從而導致故障，請參考以下內容進行調整。
 - 將轉速、工作進給量降低 50 ~ 70%。
 - 將切深 a_p 減小 50 ~ 70%。
 - 將切寬 a_e 減小 50 ~ 70%。
 - 通電式觸摸傳感器不會對 GX 塗層、JS 塗層產生反應，請予以注意。
 - 「JP4105」是高硬度鋼專用材質，不適用於非熱處理鋼。
 - 強斷續切削，突出量較長和濕式切削推薦採用「JM4160」。
 - 為防止切屑吞蝕導致工具損傷，請務必通過吹氣等方法去除切屑。
 - 排出的切屑飛散可能會割傷、燙傷作業人員，有可能會濺入眼睛而導致受傷，因此使用刀具時，請在其周圍安裝安全罩，穿戴護目鏡等防護用具，確保在安全的環境下進行作業。
 - 請提早更換刀片，防止因過度使用導致破壞。
 - 單位時間的切屑排出量 Q 如下所示。

$$Q(\text{cm}^3/\text{min}) = a_p(\text{mm}) \times a_e(\text{mm}) \times Vf(\text{mm}/\text{min}) / 1000$$



φ 100(6刃) (6 Flutes)			φ 100(8刃) (8 Flutes)			被削材 Work material
<3DCX		3DCX-5DCX	<3DCX		3DCX-5DCX	
通用 General purpose	高速加工 High-speed Cutting		通用 General purpose	高速加工 High-speed Cutting		
480	640	480	480	640	480	一般構造用鋼 Mild steels (200HB 以下) (200HB or less)
150	200	150	150	200	150	
5180	7680	5180	6910	10240	6910	
1.8	2.0	1.8	1.8	2.0	1.8	
1.0	1.0	1.0	1.0	1.0	1.0	
80	80	80	80	80	80	
414	614	414	553	819	553	
480	640	480	480	640	480	
150	200	150	150	200	150	
5180	7680	5180	6910	10240	6910	
1.8	2.0	1.8	1.8	2.0	1.8	
1.0	1.0	1.0	1.0	1.0	1.0	
80	80	80	80	80	80	
414	614	414	553	819	553	
410	480	410	410	480	410	
130	150	130	130	150	130	
4430	5760	4430	5900	7680	5900	
1.8	2.0	1.8	1.8	2.0	1.8	
1.0	1.0	1.0	1.0	1.0	1.0	
80	80	80	80	80	80	
354	461	354	472	614	472	
320	640	320	320	640	320	
100	200	100	100	200	100	
1920	3840	1920	2560	5120	2560	
1.0	1.0	1.0	1.0	1.0	1.0	
1.0	1.0	1.0	1.0	1.0	1.0	
80	80	80	80	80	80	
154	307	154	205	410	205	
480	640	480	480	640	480	
150	200	150	150	200	150	
5760	7680	5760	7680	10240	7680	
2.0	2.0	2.0	2.0	2.0	2.0	
1.0	1.0	1.0	1.0	1.0	1.0	
80	80	80	80	80	80	
461	614	461	614	819	614	
250	290	250	250	290	250	
80	90	80	80	90	80	
750	1390	750	1000	1860	1000	
0.5	0.8	0.5	0.5	0.8	0.5	
0.8	0.8	0.8	0.8	0.8	0.8	
80	80	80	80	80	80	
48	89	48	64	119	64	
250	290	250	250	290	250	
80	90	80	80	90	80	
600	1040	600	800	1390	800	
0.4	0.6	0.4	0.4	0.6	0.4	
0.8	0.8	0.8	0.8	0.8	0.8	
80	80	80	80	80	80	
38	67	38	51	89	51	



φ 100(6刃) (6 Flutes)		φ 100(8刃) (8 Flutes)		被削材 Work material
<3DCX	3DCX-5DCX	<3DCX	3DCX-5DCX	
640	640	640	640	
200	200	200	200	
770	770	1020	1020	
0.2	0.2	0.2	0.2	
≦ 0.5DCX ≦ 9.0		≦ 0.5DCX ≦ 9.0		

- [Note]**
- This table provides general guidelines for cutting conditions; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. In particular, when performing shoulder milling in combination with slotting or machining of cutting widths close to slots, etc., chattering vibrations may occur, which can lead to trouble. Therefore, please consider the following when adjusting the conditions;
 - Reduce rotation speed and table feed rate by 50 to 70%
 - Reduce cutting depth a_p by 50 to 70%
 - Reduce cutting width a_e by 50 to 70%
 - Please note that the GX Coating and JS Coating do not cause a reaction in conductive touch sensors.
 - JP4105 is for the high-hardness steels. It is not suitable for Non-heat-treated steel material.
 - For strongly interrupted cutting, when unsupported length is long, or for wet cutting, JM4160 is recommended.
 - To prevent tool damage due to chip clogging, always use a chip removal method such as an air blower, etc.
 - Since there is a danger of the removed chips flying out and causing injury to workers, fire, or damage to eyes, during use be sure to cover the work area with a safety cover and have workers wear protective equipment such as glasses, etc. to make the work area safe.
 - Perform insert replacement at an early stage to prevent chipping due to excessive use.
 - Use of the MOLDINO anti-vibration arbor is recommended for overhang of 5DCX or more.
 - The following equation can be used to determine the metal removal rate per unit time Q; $Q(\text{cm}^3/\text{min}) = a_p(\text{mm}) \times a_e(\text{mm}) \times V_f(\text{mm}/\text{min}) / 1000$

標準切削條件表

Recommended Cutting Conditions

② 刀盤型

Bore type **TR4F5000型**(TR4F5     **B**          )

 為數字、 為英文字母。
Numeric figure in a circle  and Alphabetical character comes in a square .

◎ 等高線荒加工標準切削條件 Standard cutting conditions for contour roughing

被削材 Work material	推薦 材種 Recommended inserts grade	工具徑 DCX Tool dia.	φ 63(4刃) (4 Flutes)			φ 80(5刃) (5 Flutes)		
			<3DCX		3DCX-5DCX	<3DCX		3DCX-5DCX
			通用 General purpose	高效率 High efficiency		通用 General purpose	高效率 High efficiency	
一般構造用鋼 Mild steels (200HB 以下) (200HB or less)	GX2140 JS4060	<i>n</i> (min ⁻¹)	760	910	760	600	720	600
		<i>Vc</i> (m/min)	150	180	150	150	180	150
		<i>Vf</i> (mm/min)	4560	7280	5470	4500	7200	5400
		<i>fz</i> (mm/t)	1.5	2.0	1.8	1.5	2.0	1.8
		<i>ap</i> (mm)	2.0	2.0	1.0	2.0	2.0	1.0
		<i>ae</i> (mm)	38	38	38	56	56	56
		<i>Q</i> (cm ³ /min)	347	553	208	504	806	302
炭素鋼 合金鋼 Carbon steels Alloy steels (35HRC 以下) (35HRC or less)	GX2140 JS4060	<i>n</i> (min ⁻¹)	760	910	760	600	720	600
		<i>Vc</i> (m/min)	150	180	150	150	180	150
		<i>Vf</i> (mm/min)	4560	7280	5470	4500	7200	5400
		<i>fz</i> (mm/t)	1.5	2.0	1.8	1.5	2.0	1.8
		<i>ap</i> (mm)	2.0	2.0	1.0	2.0	2.0	1.0
		<i>ae</i> (mm)	38	38	38	56	56	56
		<i>Q</i> (cm ³ /min)	347	553	208	504	806	302
炭素鋼 合金鋼 Carbon steels Alloy steels (35 ~ 45HRC)	JP4120 JS4060	<i>n</i> (min ⁻¹)	660	760	660	520	600	520
		<i>Vc</i> (m/min)	130	150	130	130	150	130
		<i>Vf</i> (mm/min)	4750	6080	4750	4680	6000	4680
		<i>fz</i> (mm/t)	1.8	2.0	1.8	1.8	2.0	1.8
		<i>ap</i> (mm)	1.5	1.5	1.0	1.5	1.5	1.0
		<i>ae</i> (mm)	38	38	38	56	56	56
		<i>Q</i> (cm ³ /min)	271	347	181	393	504	262
不銹鋼 Stainless steels SUS	JM4160	<i>n</i> (min ⁻¹)	510	1010	510	400	800	400
		<i>Vc</i> (m/min)	100	200	100	100	200	100
		<i>Vf</i> (mm/min)	2040	4040	2040	2000	4000	2000
		<i>fz</i> (mm/t)	1.0	1.0	1.0	1.0	1.0	1.0
		<i>ap</i> (mm)	1.5	1.5	1.0	1.5	1.5	1.0
		<i>ae</i> (mm)	38	38	38	56	56	56
		<i>Q</i> (cm ³ /min)	116	230	78	168	336	112
鑄鐵 Cast irons FC FCD	JP4120 GX2140	<i>n</i> (min ⁻¹)	760	910	760	600	720	600
		<i>Vc</i> (m/min)	150	180	150	150	180	150
		<i>Vf</i> (mm/min)	6080	8370	6080	6000	8280	6000
		<i>fz</i> (mm/t)	2.0	2.3	2.0	2.0	2.3	2.0
		<i>ap</i> (mm)	2.0	2.0	2.0	2.0	2.0	2.0
		<i>ae</i> (mm)	38	38	38	56	56	56
		<i>Q</i> (cm ³ /min)	462	636	462	672	927	672
淬火鋼 Hardened steels (45 ~ 50HRC)	JP4120 JP4105	<i>n</i> (min ⁻¹)	400	450	400	320	360	320
		<i>Vc</i> (m/min)	80	90	80	80	90	80
		<i>Vf</i> (mm/min)	800	1440	800	800	1440	800
		<i>fz</i> (mm/t)	0.5	0.8	0.5	0.5	0.8	0.5
		<i>ap</i> (mm)	1.0	1.0	1.0	1.0	1.0	1.0
		<i>ae</i> (mm)	38	38	38	56	56	56
		<i>Q</i> (cm ³ /min)	30	55	30	45	81	45
淬火鋼 Hardened steels (50 ~ 60HRC)	JP4105 JP4120	<i>n</i> (min ⁻¹)	400	450	400	320	360	320
		<i>Vc</i> (m/min)	80	90	80	80	90	80
		<i>Vf</i> (mm/min)	640	1080	640	640	1080	640
		<i>fz</i> (mm/t)	0.4	0.6	0.4	0.4	0.6	0.4
		<i>ap</i> (mm)	1.0	1.0	1.0	1.0	1.0	1.0
		<i>ae</i> (mm)	38	38	38	56	56	56
		<i>Q</i> (cm ³ /min)	24	41	24	36	60	36

◎ 插銑粗加工標準切削條件 Standard cutting conditions for vertical roughing

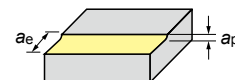
被削材 Work material	推薦 材種 Recommended inserts grade	工具徑 DCX Tool dia.	φ 63(4刃) (4 Flutes)		φ 80(5刃) (5 Flutes)	
			突出量 Overhang		突出量 Overhang	
			<3DCX	3DCX-5DCX	<3DCX	3DCX-5DCX
鑄鐵 Cast irons FC FCD	JP4120 GX2140	<i>n</i> (min ⁻¹)	1010	1010	800	800
		<i>Vc</i> (m/min)	200	200	200	200
		<i>Vf</i> (mm/min)	810	810	800	800
		<i>fz</i> (mm/t)	0.2	0.2	0.2	0.2
		<i>pf</i> (mm)	≤ 0.5DCX		≤ 0.5DCX	
		<i>ae</i> (mm)	≤ 11.0		≤ 11.0	

【注意】

- ① 本表所示為切削條件的基準值。請根據機床特性、工具和工件的狀態進行調整。
特別是在有槽切削的加工或切寬與之相近的加工時，可能會發生切屑吞噬及切削震動，從而導致故障，請參考以下內容進行調整。
 - 將轉速、工作檔進給量降低 50 ~ 70%。
 - 將切深 *ap* 減小 50 ~ 70%。
 - 將切寬 *ae* 減小 50 ~ 70%。
- ② 通電式觸摸傳感器不會對GX塗層、JS塗層產生反應，請予以注意。
- ③ 「J P4105」是超硬度鋼專用材質，不適用於非熱處理鋼。
- ④ 強斷續切削，突出量較長和濕式切削推薦採用「J M4160」。
- ⑤ 為防止切屑吞噬導致工具損傷，請務必通過吹氣等方法去除切屑。
- ⑥ 排出的切屑飛散可能會割傷、燙傷作業人員，有可能會濺入眼睛而導致受傷，因此使用刀具時，請在其周圍安裝安全罩，穿戴護目鏡等防護用具，確保在安全的環境下進行作業。
- ⑦ 請提早更換刀片，防止因過度使用導致破壞。
- ⑧ 單位時間的切屑排出量 *Q* 如下所示。

$$Q(\text{cm}^3/\text{min}) = ap(\text{mm}) \times ae(\text{mm}) \times Vf(\text{mm}/\text{min}) / 1000$$

※為確保高效率條件，我們建議檢查機器的功率/扭矩圖表，並使用能夠保持主軸額定功率的轉速。
 ※To ensure high-efficiency conditions, we recommend checking the machine's power/torque chart and using a rotation speed that can maintain the rated power of the spindle.



φ100(6刃) (6 Flutes)			φ125(6刃) (6 Flutes)			φ125(7刃) (7 Flutes)			被削材 Work material
<3DCX		3DCX-5DCX	<3DCX		3DCX-5DCX	<3DCX		3DCX-5DCX	
通用 General purpose	高效率 High efficiency		通用 General purpose	高效率 High efficiency		通用 General purpose	高效率 High efficiency		
480	570	480	380	460	380	380	460	380	一般構造用鋼 Mild steels (200HB 以下) (200HB or less)
150	180	150	150	180	150	150	180	150	
4320	6840	5180	3420	5520	4100	3990	6440	4790	
1.5	2.0	1.8	1.5	2.0	1.8	1.5	2.0	1.8	
2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	
75	75	75	100	100	100	100	100	100	
648	1026	389	684	1104	410	798	1288	479	
480	570	480	380	460	380	380	460	380	
150	180	150	150	180	150	150	180	150	
4320	6840	5180	3420	5520	4100	3990	6440	4790	
1.5	2.0	1.8	1.5	2.0	1.8	1.5	2.0	1.8	
2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	
75	75	75	100	100	100	100	100	100	
648	1026	389	684	1104	410	798	1288	479	
410	480	410	330	380	330	330	380	330	
130	150	130	130	150	130	130	150	130	
4430	5760	4430	3560	4560	3560	4160	5320	4160	
1.8	2.0	1.8	1.8	2.0	1.8	1.8	2.0	1.8	
1.5	1.5	1.0	1.5	1.5	1.0	1.5	1.5	1.0	
75	75	75	100	100	100	100	100	100	
498	648	332	534	684	356	624	798	416	
320	640	320	250	510	250	250	510	250	
100	200	100	100	200	100	100	200	100	
1920	3840	1920	1500	3060	1500	1750	3570	1750	
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
1.5	1.5	1.0	1.5	1.5	1.0	1.5	1.5	1.0	
75	75	75	100	100	100	100	100	100	
216	432	144	225	459	150	263	536	175	
480	570	480	380	460	380	380	460	380	
150	180	150	150	180	150	150	180	150	
5760	7870	5760	4560	6350	4560	5320	7410	5320	
2.0	2.3	2.0	2.0	2.3	2.0	2.0	2.3	2.0	
2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
75	75	75	100	100	100	100	100	100	
864	1181	864	912	1270	912	1064	1482	1064	
250	290	250	200	230	200	200	230	200	
80	90	80	80	90	80	80	90	80	
750	1390	750	600	1100	600	700	1290	700	
0.5	0.8	0.5	0.5	0.8	0.5	0.5	0.8	0.5	
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
75	75	75	100	100	100	100	100	100	
56	104	56	60	110	60	70	129	70	
250	290	250	200	230	200	200	230	200	
80	90	80	80	90	80	80	90	80	
600	1040	600	480	830	480	560	970	560	
0.4	0.6	0.4	0.4	0.6	0.4	0.4	0.6	0.4	
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
75	75	75	100	100	100	100	100	100	
45	78	45	48	83	48	56	97	56	

φ100(6刃) (6 Flutes)		φ125(6刃) (6 Flutes)		φ125(7刃) (7 Flutes)		被削材 Work material
<3DCX	3DCX-5DCX	<3DCX	3DCX-5DCX	<3DCX	3DCX-5DCX	
640	640	510	510	510	510	
200	200	200	200	200	200	
770	770	610	610	710	710	
0.2	0.2	0.2	0.2	0.2	0.2	
≤ 0.5DCX	≤ 0.5DCX	≤ 0.5DCX	≤ 0.5DCX	≤ 0.5DCX	≤ 0.5DCX	
≤ 11.0	≤ 11.0	≤ 11.0	≤ 11.0	≤ 11.0	≤ 11.0	

- [Note] ① This table provides general guidelines for cutting conditions; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. In particular, when performing shoulder milling in combination with slotting or machining of cutting widths close to slots, etc., chattering vibrations may occur, which can lead to trouble. Therefore, please consider the following when adjusting the conditions;
- Reduce rotation speed and table feed rate by 50 to 70%
 - Reduce cutting depth a_p by 50 to 70%
 - Reduce cutting width a_e by 50 to 70%
- ② If the machine has insufficient power, first try reducing the cutting depth. Next, try reducing the rotation speed and table feed rate.
- ③ Please note that the GX Coating and JS Coating do not cause a reaction in conductive touch sensors.
- ④ JP4105 is for the high-hardness steels. It is not suitable for Non-heat-treated steel material.
- ⑤ For strongly interrupted cutting, when unsupported length is long, or for wet cutting, JM4160 is recommended.
- ⑥ To prevent tool damage due to chip clogging, always use a chip removal method such as an air blower, etc.
- ⑦ Since there is a danger of the removed chips flying out and causing injury to workers, fire, or damage to eyes, during use be sure to cover the work area with a safety cover and have workers wear protective equipment such as glasses, etc. to make the work area safe.
- ⑧ Perform insert replacement at an early stage to prevent chipping due to excessive use.
- ⑨ Use of the MOLDINO anti-vibration arbor is recommended for overhang of 5DCX or more.
- ⑩ The following equation can be used to determine the metal removal rate per unit time Q : $Q(\text{cm}^3/\text{min}) = a_p(\text{mm}) \times a_e(\text{mm}) \times V_f(\text{mm}/\text{min}) \div 1000$

刀具使用注意事項

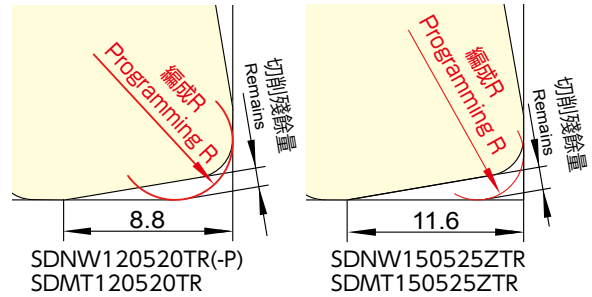
Precautions for use

○ 編程R和最大切深 Programming R and maximum cutting depth

● 參考下表，定義CAM上的刀具形狀。

· Please define the tool shape in the CAM as indicated in the following table:

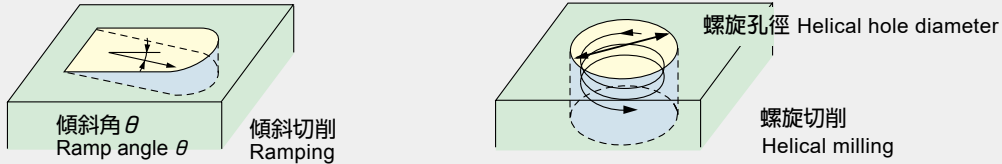
使用刀片 Insert	編成R Programming R	切削殘餘量(mm) Remains	最大切深(mm) Maximum cutting depth
SDNW120520TR(-P) SDMT120520TR	R3.0	1.0	1.2
SDNW150525ZTR SDMT150525ZTR	R3.0	1.47	2.0
	R4.0	1.32	



○ 最大傾斜角和螺旋孔徑 Maximum ramp angle and helical hole diameter

● 由於中心部沒有切刃，因此傾斜角度和孔徑受到限制，但如下圖所示，通過傾斜切削或螺旋切削，即使無導孔也可直接進行刻模加工。

· Since the cutting flute do not extend to the center, there are limitations on the ramp angle and hole diameter, but as shown below, cutting by direct milling without a pilot hole is possible for ramping and helical milling.



● 對於傾斜和螺旋切削，請將“Vf”設置為推薦切削條件的50%左右。

· For ramping and helical cutting, please set the “Vf” to around 50% of recommended cutting condition.

使用刀片 Inserts		刀柄式/可換式刀頭型 Modular/Shank Type		刀盤型 Bore Type							
		SDNW120520TR(-P) SDMT120520TR				SDNW150525ZTR / SDMT150525ZTR					
工具徑 (DCX) Tool dia.(mm)		φ 32	φ 40	φ 50	φ 63	φ 80	φ 100	φ 63	φ 80	φ 100	φ 125
傾斜切削 Ramping	最大傾斜角 (θ) Maximum ramp angle θ	1°	1.4°	2°	2°	1.5°	1°	3°	2°	1.5°	1°
	推薦設定值 Recommendation	1°					2°	1°		0.5°	
螺旋切削 Helical milling	螺旋孔徑 Helical hole diameter	46 ~ 60	62 ~ 76	82 ~ 96	108 ~ 122	142 ~ 156	182 ~ 196	102 ~ 121	136 ~ 155	176 ~ 195	226 ~ 245

【注意】 ① 傾斜角 θ 應設置在上述範圍內。不要超過推薦值。

② 對於超出上述範圍的孔徑，應在銑削前先鑽一個導向孔。

③ 建議在充分去除切屑並確認沒有異常振動的情況下使用該工具。

【Note】 ① The ramp angle θ should be set within the ranges listed above. Do not exceed the recommended value.

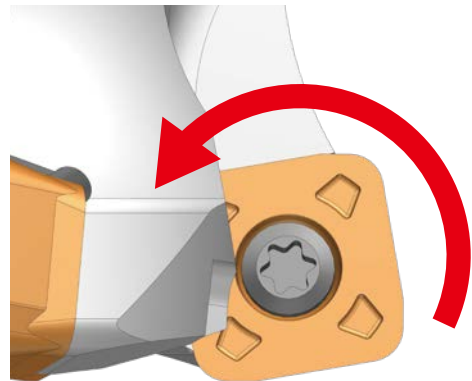
② For hole diameters outside the ranges listed above, a pilot hole should be drilled before milling.

③ It is recommended that the tool be used while performing sufficient chip removal and checking that there are no abnormal vibrations.

○ 刀片換角時的注意事項 Attention for the corner change

● 進行刀片換角時。請將刀片逆時針旋轉。

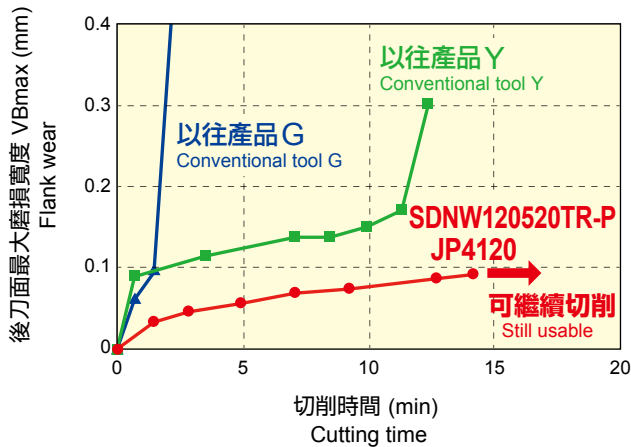
· Turn the insert counterclockwise upon corner change.



切削性能

Cutting performance

加工預硬鋼(40HRC)時的壽命曲線 Tool life curve with pre-hardened steels (40 HRC)

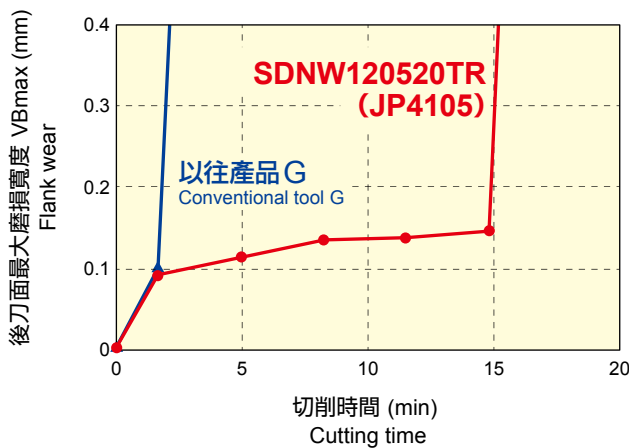


切削條件 Cutting conditions

被削材 Work material	預硬鋼 (40HRC) Pre-hardened steels (40HRC)
工具型號 Tool	TR4F4063BM-5
刀片型號 Insert model	SDNW120520TR-P : JP4120
切削速度 Cutting speed	$V_c = 140\text{m/min}$
每刃進給量 Feed per tooth	$f_z = 2.0\text{mm/t}$
切削深度 Cutting depth	$a_p \times a_e = 1.0 \times 45\text{mm}$
突出量 Overhang	200mm
氣冷、單刃切削 Air-blow Single flute cutting	

在 $f_z = 2.0\text{mm/t}$ 的高進給加工中，實現超越以往產品的長壽命
Surpasses life of conventional tools for high-feed cutting at $f_z=2.0\text{mm/t}$.

加工淬火回火鋼(52HRC)時的壽命曲線 Tool life curve with quench-tempered steels (52 HRC)

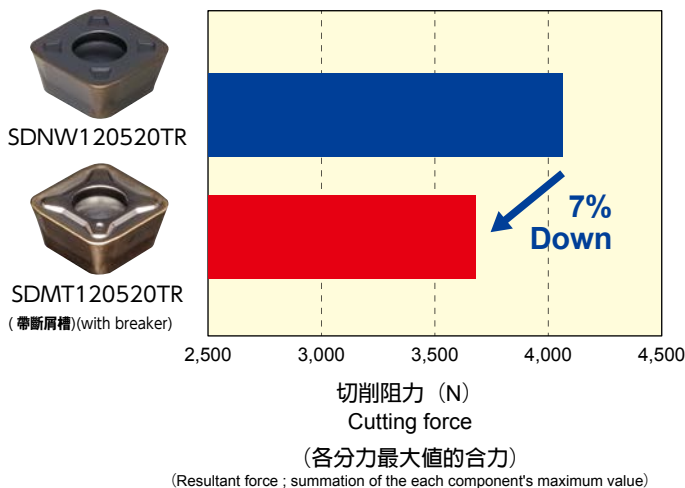


切削條件 Cutting conditions

被削材 Work material	淬火鋼 (52HRC) Quench-tempered steels (52 HRC) ※SUS420J2相当材 *Equivalent to SUS420J2
工具型號 Tool	TR4F4063BM-5
刀片型號 Insert model	SDNW120520TR : JP4105
切削速度 Cutting speed	$V_c = 90\text{m/min}$
每刃進給量 Feed per tooth	$f_z = 1.0\text{mm/t}$
切削深度 Cutting depth	$a_p \times a_e = 1.0 \times 35\text{mm}$
突出量 Overhang	200mm
氣冷、單刃切削 Air-blow Single flute cutting	

在高硬度材料的高效率加工中，實現超越以往產品的刀片長壽命
Surpasses life of conventional tools for more efficient cutting of high-hardness materials

切削阻力比較 Comparison of cutting force



切削條件 Cutting conditions

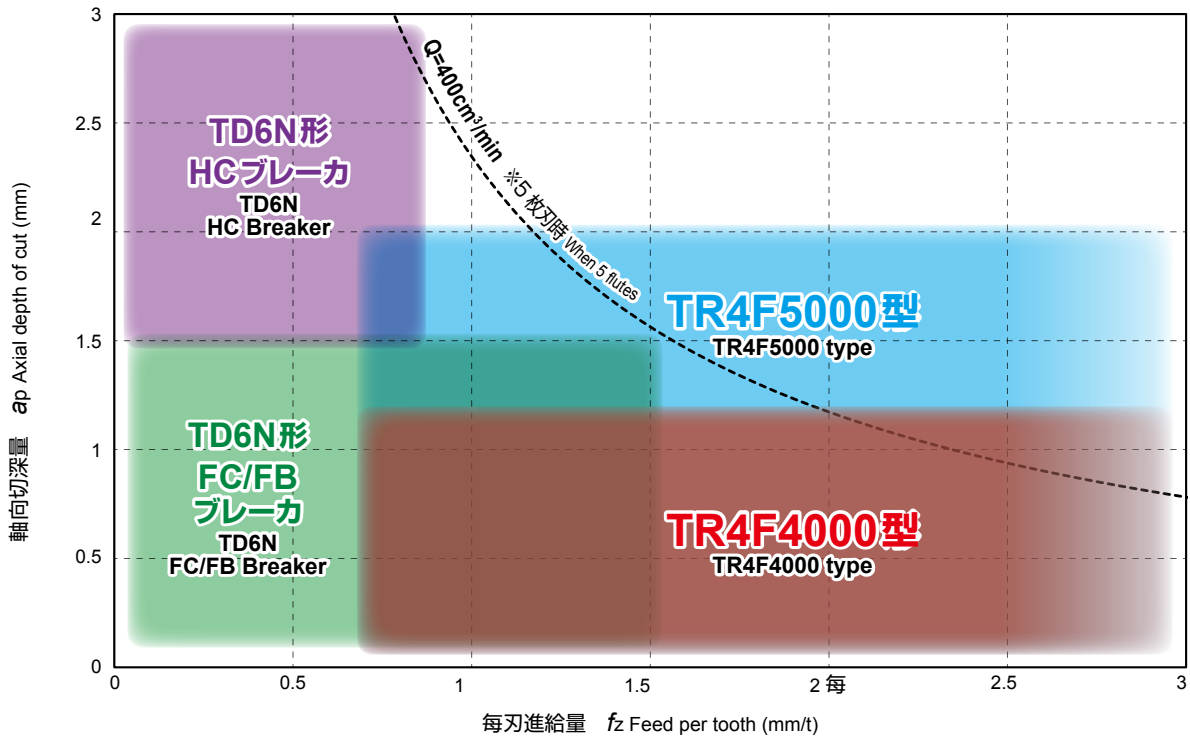
被削材 Work material	預硬鋼 (32HRC) Pre-hardened steels (32HRC)
工具型號 Tool	TR4F4063BM-5
刀片型號 Insert model	SDNW120520TR : JP4120 SDMT120520TR : JP4120
切削速度 Cutting speed	$V_c = 150\text{m/min}$
每刃進給量 Feed per tooth	$f_z = 1.5\text{mm/t}$
切削深度 Cutting depth	$a_p \times a_e = 1.0 \times 42\text{mm}$
突出量 Overhang	200mm
氣冷、單刃切削 Air-blow Single flute cutting	

中大直徑高進給刀具對應圖

Correspondence map for high-feed tools of mid/large diameter

本公司高進給刀具對應圖 (中大徑)

Our high-feed tools correspondence map (mid/large diameter)



※被削材 Work material : S50C(220HB)、使用機械 Machine : 臥式3軸M/C(BT50主軸 22kw) 3-axis MC vertical type(BT50,22kw)、
工具徑 Tool dia. : $\Phi 63$ 、切削速度 Cutting speed : 150m/min、突出量 Overhang : $\leq 3DCX$

TR4F型 TR4F type

外徑 : $\Phi 32 \sim 125$
Tool dia.

刃數 : 2 ~ 8 刃
No. of flutes : 2-8 Flutes



- 4角經濟型的同時，支持 $f_z = 2.0\text{mm/t}$ 以上的高進給加工
- 除了等高線加工，還可以進行插銑加工的多用途型
- Corresponds to high-feed cutting exceeding $f_z = 2.0 \text{ mm/t}$, with economical four-corners insert.
- Multi-purpose type capable of both vertical and contour cutting

TD6N型 TD6N type

外徑 : $\Phi 50 \sim 125$
Tool dia.

刃數 : 3 ~ 8 刃
No. of flutes : 3-8 Flutes



- 備有高進給型(FC/FB)和大切深型(HC)的刀片產品陣容
- 同一刀體2種刀片均可以安裝使用，支持廣泛之加工領域的通用型
- Lineup of high-feed type (FC/FB) and high depth type (HC) for inserts
- General-purpose type allows attachment of two types of inserts to one body to meet a broad range of cutting needs.

本公司高進給刀具的產品陣容

High-feed tools lineup

型號 Type	特點 Feature				刀體 Body	刀片 Insert			編程 R Programming R (mm)	最大 ap Maximum ap (mm)
	經濟性 (刀角數) Economical (No. of corners)	高精度 (切削殘餘量小) high accuracy (Less uncut remnants)	高硬度 對應 Supports for high- hardened steel	效率 (刃數) Efficiency (No. of Flutes)		刀角數 No. of corners	形狀 Shape	內接圓記號 Inscribed circle code		
TD4N 	◎	◎	~62HRC	◎ 高效率多刃 High Efficiency multiflutes	φ16~40	4		06	2.0	1.0
ASR 多刃 Multi-Flutes 		○	~62HRC	◎ 高效率多刃 High Efficiency multiflutes	φ16~66	2		06	2.0	1.5
								12	3.0	2.0
ASRF-mini 	◎		~62HRC	○ 通用 General	φ20~63	4		07	2.0	1.2
ASR 		○	~60HRC	○ 通用 General	φ20~100	2		08~15	3.0	2.0
ASRT 	○	○	~62HRC	○ 通用 General	φ25~100	3		09~14		
ASRF 	◎		~60HRC	○ 通用 General	φ32~100	4		12	4.5	
TD6N 	◎	○	~50HRC	○ 通用 General	φ50~125	6		14	3.0	1.5
										14
TR4F 	◎		~60HRC	○ 通用 General	φ32~125	4		12	3.0	1.2
								15		2.0

※除上述以外，還有許多其他粗加工刀具產品陣容。

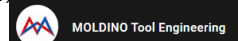
※關於刀具規格的詳情，請通過綜合產品目錄或網站主頁(<http://www.jumbopower.com.tw>)進行確認。

Various other tools for roughing are also available.

For more information on tool specifications, please refer to our general catalog or visit our website. (<http://www.jumbopower.com.tw>)

相關製品影片

Related product videos



https://youtu.be/TjvWuJy_lbE



<https://youtu.be/R9maN-NHWNE>





圖表等數據為測試結果示例，並非保證值。

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The diagrams and table data are examples of test results, and are not guaranteed values.

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安全注意事項

Attentions on Safety

1. 處理注意事項

- (1) 從外殼（包裝）中取出工具時，請注意不要將其掉到腳上或掉到裸露的指尖上。
- (2) 實際安裝刀片時，請注意不要直接用手接觸切削刀。

2. 安裝注意事項

- (1) 準備使用時，請確保嵌件牢固地安裝到位，並牢固地安裝在心軸等上。
- (2) 使用過程中如出現異常顫振，應立即停機，排除引起顫振的原因。

3. 使用注意事項

- (1) 使用前，確認刀具和銑削工件材料的尺寸和旋轉方向。
- (2) 開始新工作時，應以標準切削條件表中的數值作為標準。當切削深度較大，所用機床剛性較低時，或根據被加工材料的條件，應適當調整切削條件。
- (3) 刀片由硬質材料製成。在使用過程中，它們可能會破裂並飛走。此外，切削屑也可能飛散。由於此類飛物可能會導致工人受傷、火災或眼睛受傷，因此應安裝安全罩並佩戴安全眼鏡等安全設備，以營造安全的工作環境。
 - 請勿在有火災或爆炸危險的地方使用。
 - 請勿使用非水溶性切削油。此類油可能會導致火災。
- (4) 請勿將工具用於其預期用途以外的任何目的，也不要對其進行修改。

1. Attentions regarding handling

- (1) When removing the tool from the case (package), be careful not to drop it on your foot or drop it onto the tips of your bare fingers.
- (2) When actually setting the inserts, be careful not to touch the cutting flute directly with your bare hands.

2. Attentions regarding mounting

- (1) When preparing for use, be sure that the inserts are firmly mounted in place and that they are firmly mounted on the arbor, etc.
- (2) If abnormal chattering occurs during use, stop the machine immediately and remove the cause of the chattering.

3. Attentions during use

- (1) Before use, confirm the dimensions and direction of rotation of the tool and milling work material.
- (2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.
- (3) The inserts are made of a hard material. During use, they may break and fly off. In addition, cutting chips may also fly off. Since there is a danger of injury to workers, fire, or eye damage from such flying pieces, a safety cover should be installed and safety equipment such as safety glasses should be worn to create a safe environment for work.
 - Do not use where there is a risk of fire or explosion.
 - Do not use non-water-soluble cutting oils. Such oils may result in fire.
- (4) Do not use the tool for any purpose other than that for which it is intended, and do not modify it.

