



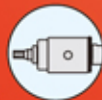
# ADONAI<sup>®</sup>

PRAISE PRECISION  
IND.CO.,LTD.

滾花刀系列(車花、壓花)  
KNURLING TOOLS



迴轉沖削刀具系列  
ROTARY BROACHING TOOLS



專利  
PATENT



專利  
PATENT



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PATENT



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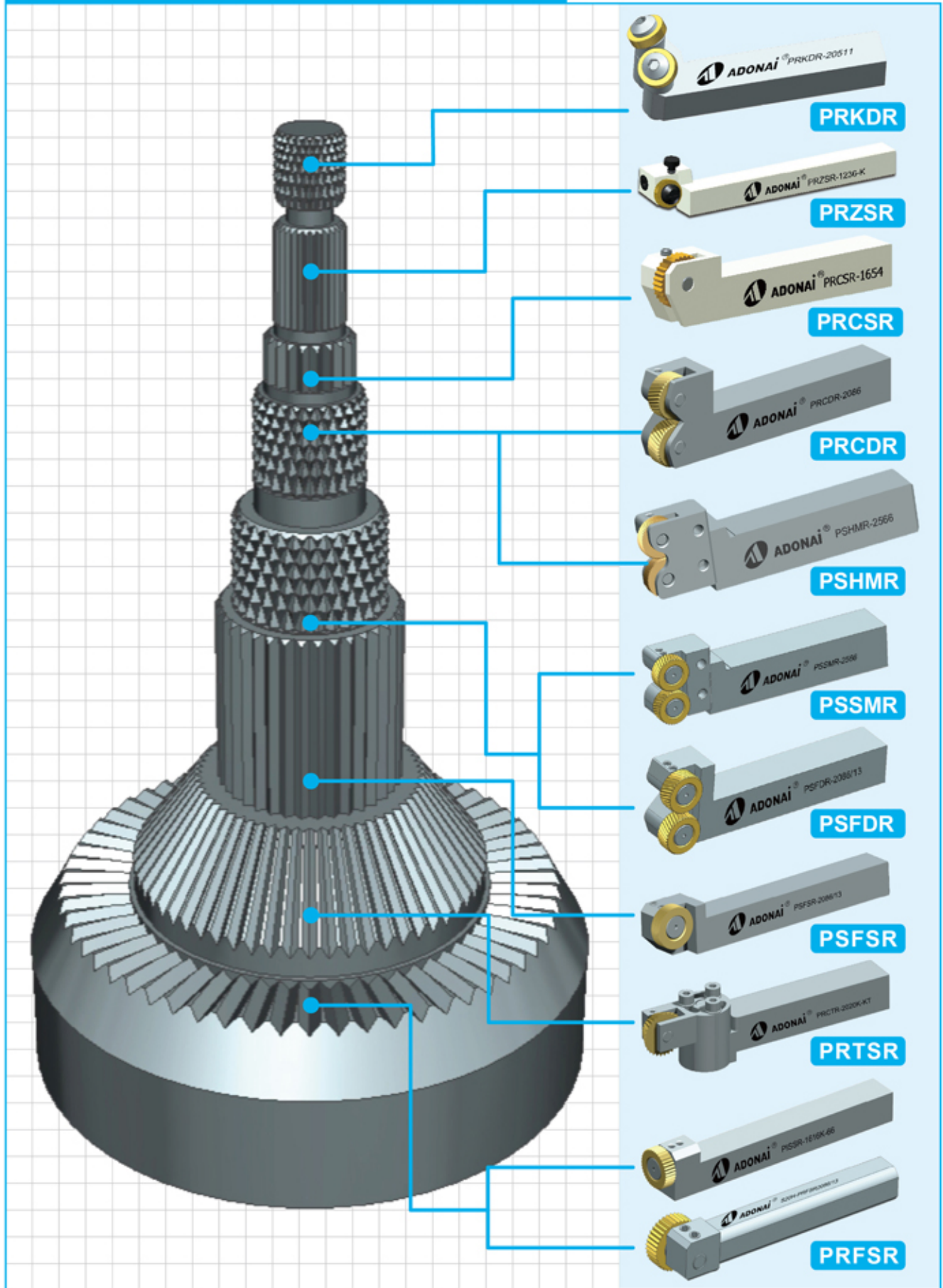
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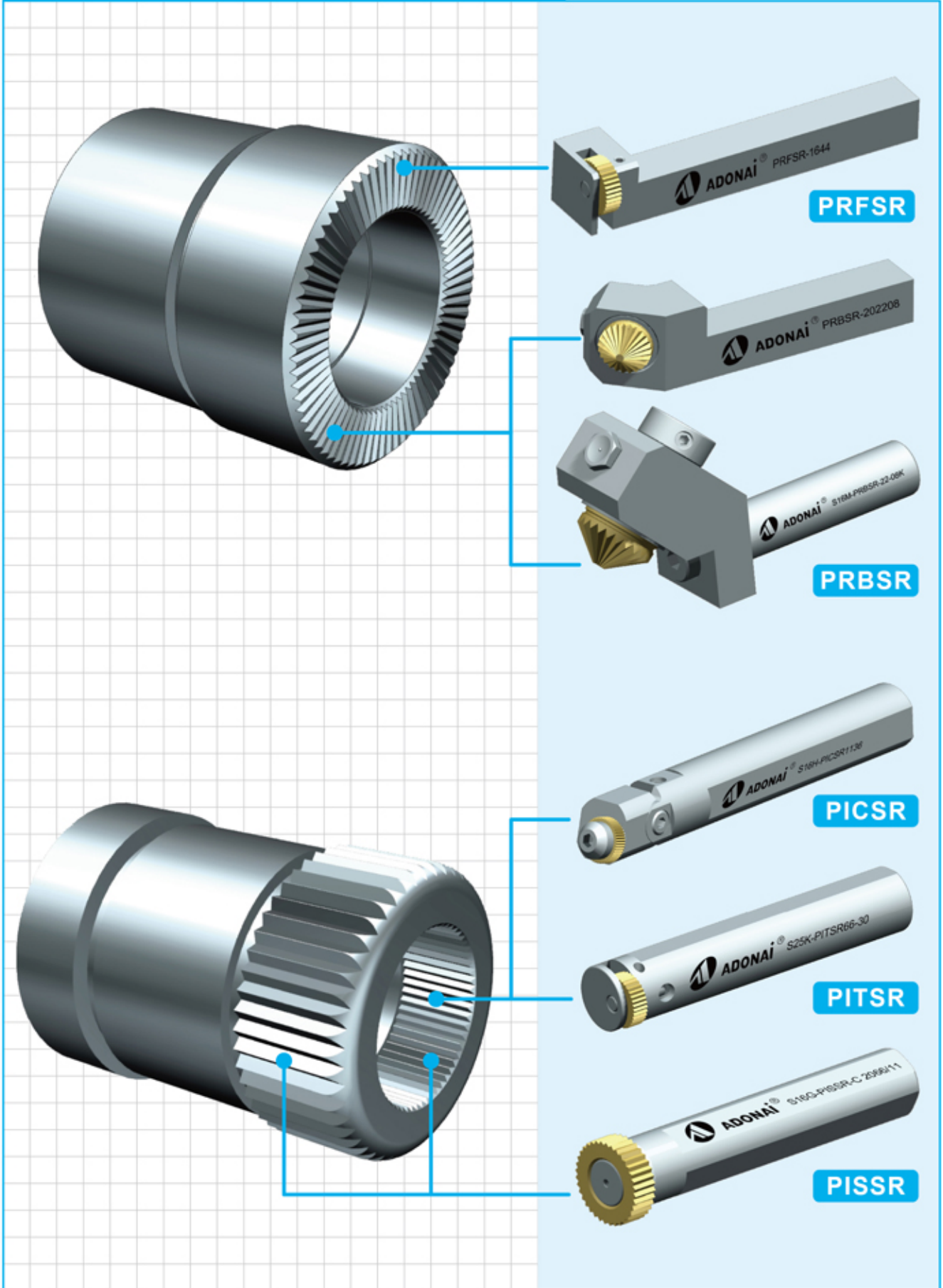
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車、壓花刀架應用實例 Application Example



- ADONAI**<sup>®</sup> PRKDR-20511 **PRKDR**
- ADONAI**<sup>®</sup> PRZSR-123G-K **PRZSR**
- ADONAI**<sup>®</sup> PRCSR-1654 **PRCSR**
- ADONAI**<sup>®</sup> PRCDR-2066 **PRCDR**
- ADONAI**<sup>®</sup> PSHMR-2556 **PSHMR**
- ADONAI**<sup>®</sup> PSSMR-2596 **PSSMR**
- ADONAI**<sup>®</sup> PSFDR-2086/13 **PSFDR**
- ADONAI**<sup>®</sup> PSFSR-2086/13 **PSFSR**
- ADONAI**<sup>®</sup> PRTSR-2020K-KT **PRTSR**
- ADONAI**<sup>®</sup> PCSR-1E16K-66
- ADONAI**<sup>®</sup> 2020-1110-PRKDR-13 **PRFSR**

車、壓花刀架應用實例 Application Example



## 滾花輪識別系統 Knurling Wheels Identification System








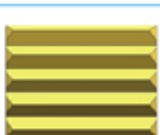
**R D A A** — **2 0 0 8 0 6** — **0 0 1 0** — **H S S** — **T**

**1**   **2**   **3**   **4**   **5**   **6**   **7**   **8**   **9**

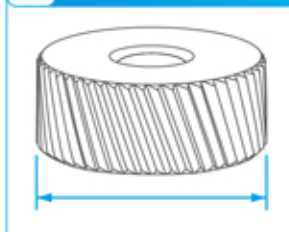
### 1 滾花輪形狀 Knurling Wheels Shape

<b>MR</b>	Convex type
<b>RB</b>	Round shank type
<b>RD</b>	Deformation type
<b>RF</b>	Cutting type
<b>RT</b>	Conical type

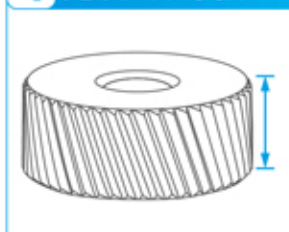
### 2 滾花輪樣式 Knurling Wheels Type

<b>AA</b>		<b>GV</b>	
<b>BR</b>		<b>LV</b>	
<b>BL</b>		<b>RV</b>	
<b>GE</b>		<b>SV</b>	

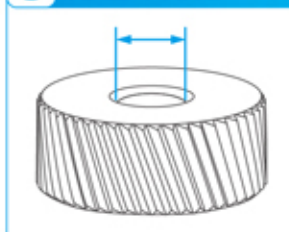
### 3 直徑 Diameter



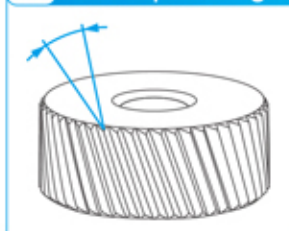
### 4 寬度 Width



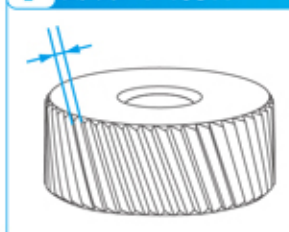
### 5 孔徑 Hole



### 6 旋角 Spiral Angle



### 7 節距 Pitch



### 8 材質 Materials

<b>ES</b>
<b>HSS</b>
<b>HP</b>

### 9 塗層 Coating

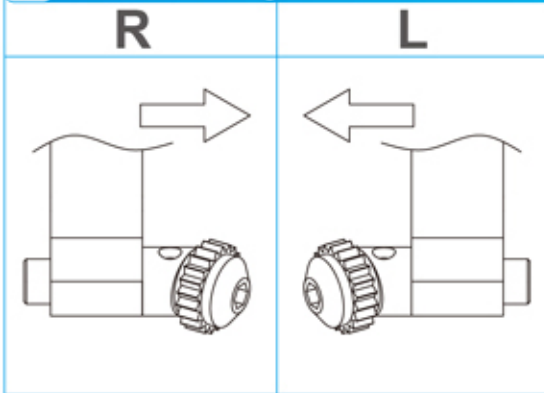
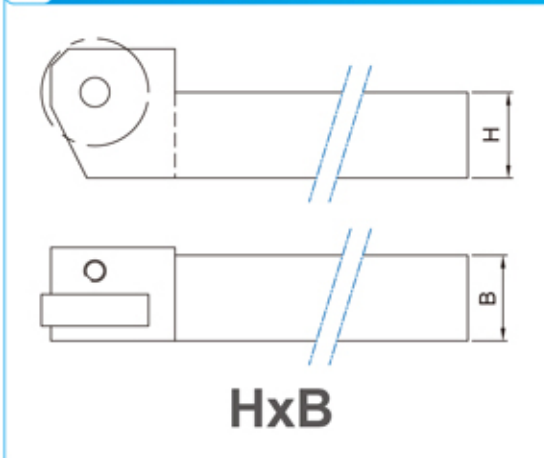
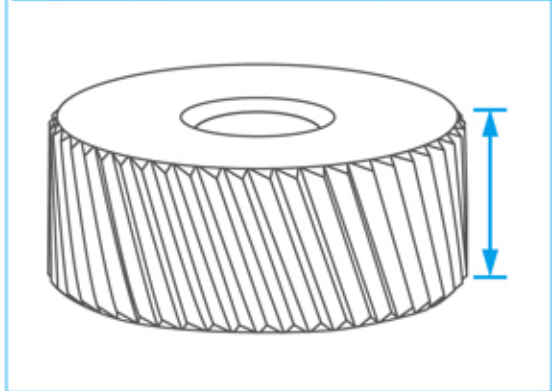
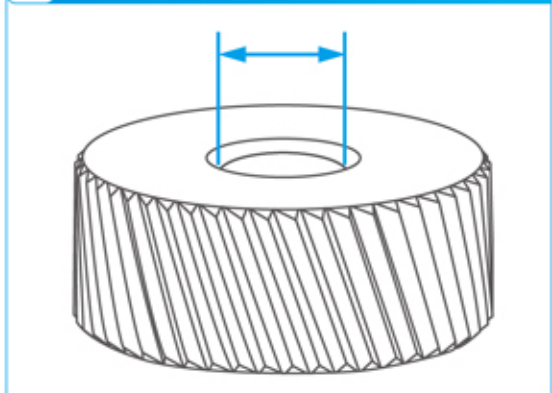
<b>T</b>
<b>TAN</b>
<b>TACN</b>
<b>TCN</b>

**刀架識別系統 Knurling Tools Identification System**

<b>P</b>	<b>R</b>	<b>K</b>	<b>D</b>	<b>R</b>	—	<b>1</b>	<b>2</b>	<b>3</b>	<b>6</b>	—	<b>K</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>					

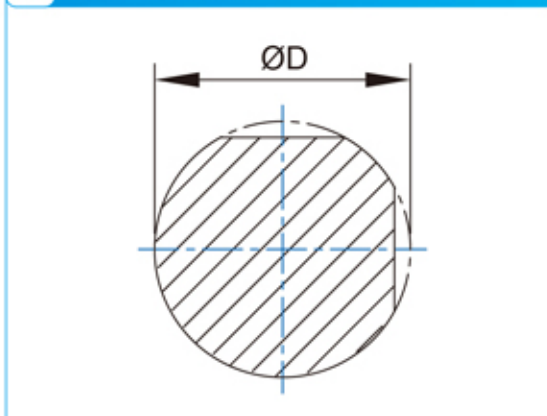
**1** 代號 Code

**2** 加工型式 Working Type

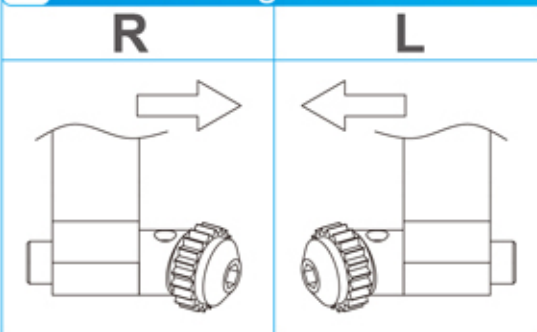
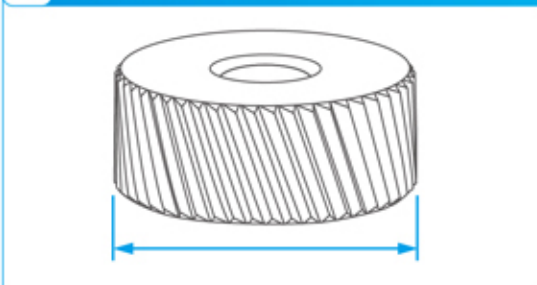
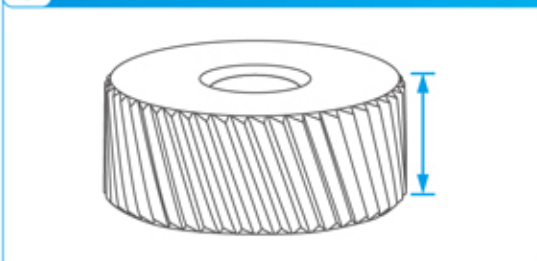
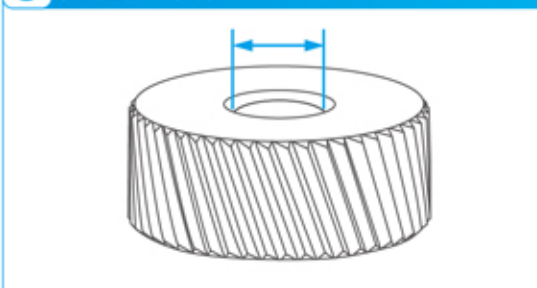
**3** 進刀方向 Right/Left Hand

**4** 柄徑 Thickness Of Shank

**5** 寬度 Width

**6** 孔徑 Hole

**7** 後縮型 Offset Type


**刀架識別系統 Knurling Toolholder Identification System**

**S 2 0 M** — **P I C S R** — **1 5 4 4**  
**1 2 3**      **4 5 6**      **7 8 9**

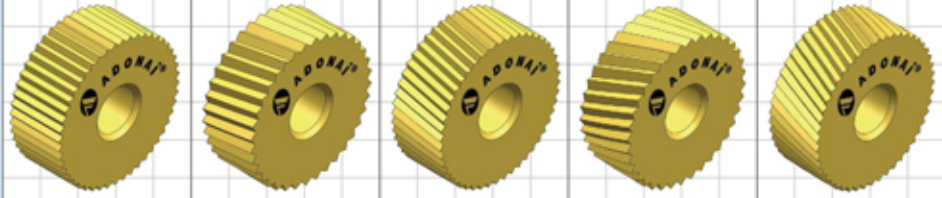
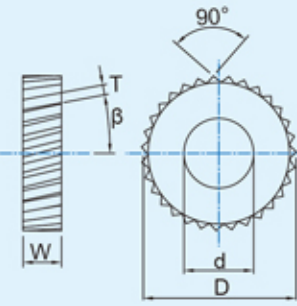
**1 材質 Materials**
**2 柄徑 Shank**

**3 柄長 Shank Length**

<b>G</b>	<b>90</b>
<b>H</b>	<b>100</b>
<b>J</b>	<b>110</b>
<b>K</b>	<b>125</b>
<b>M</b>	<b>150</b>

**4 代號 Code**
**5 加工型式 Working Type**
**6 進刀方向 Right/Left Hand**

**7 直徑 Diameter**

**8 寬度 Width**

**9 孔徑 Hole**




## 車花輪 Cut Knurling Wheels

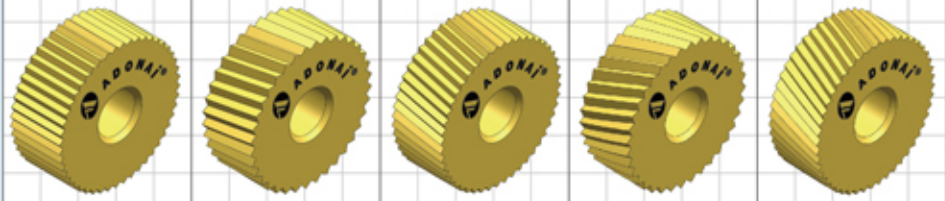
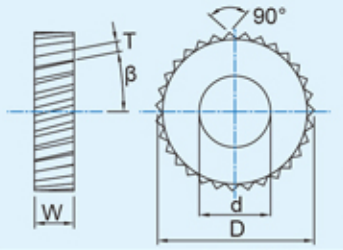


D x W x d	齒距 Metric Pitch	AA	BL15°	BR15°	BL30°	BR30°
11 x 3 x 6	0.3	●	●	●	-	-
	0.4	●	●	●	-	-
	0.5	●	●	●	-	-
	0.6	●	●	●	-	-
	0.7	○	○	○	-	-
	0.8	●	●	●	-	-
	1.0	●	●	●	-	-
	1.2	●	●	●	-	-
	1.5	●	●	●	-	-
20 x 5 x 11	0.5	●	●	●	-	-
	0.6	●	●	●	-	-
	0.8	●	●	●	-	-
	1.0	●	●	●	-	-
	1.2	●	●	●	-	-
	1.5	●	●	●	-	-
	1.75	○	○	○	-	-
	2.0	●	●	●	-	-
25 x 5 x 11	0.5	●	●	●	-	-
	0.6	●	●	●	-	-
	0.8	●	●	●	-	-
	1.0	●	●	●	-	-
	1.2	●	●	●	-	-
	1.5	●	●	●	-	-
	1.75	○	○	○	-	-
	2.0	●	●	●	-	-

● Standard Stock

○ Standard(Please Check Delivery)

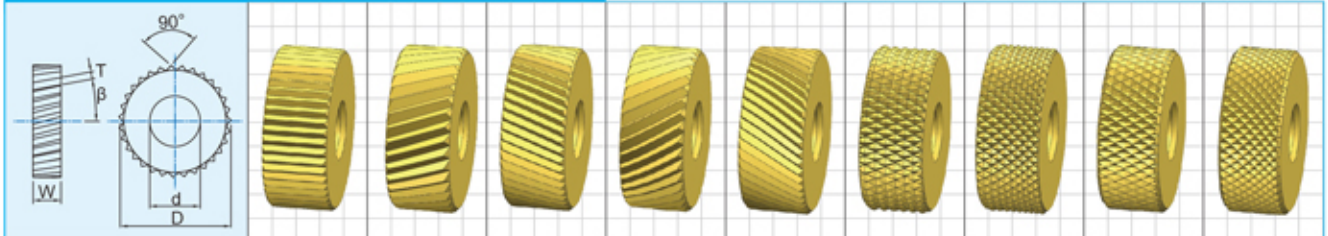
## 車花輪 Cut Knurling Wheels



D x W x d	齒距 Metric Pitch	AA	BL15°	BR15°	BL30°	BR30°
8.9 x 2.5 x 4	0.3	●	●	●	●	●
	0.4	●	●	●	●	●
	0.5	●	●	●	●	●
	0.6	●	●	●	●	●
	0.7	○	○	○	○	○
	0.8	●	●	●	●	●
	0.9	●	●	●	●	●
	1.0	●	●	●	●	●
	1.2	●	●	●	●	●
14.5 x 3 x 5	0.4	●	●	●	●	●
	0.5	●	●	●	●	●
	0.6	●	●	●	●	●
	0.7	○	—	—	○	○
	0.8	●	●	●	●	●
	0.9	●	—	—	—	—
	1.0	●	●	●	●	●
	1.2	●	●	●	●	●
15 x 4 x 8	0.4	●	—	—	●	●
	0.5	●	●	●	●	●
	0.6	●	—	—	●	●
	0.7	○	○	○	○	○
	0.8	●	—	—	●	●
	1.0	●	●	●	●	●
	1.2	●	●	●	●	●
	1.5	●	●	●	●	●
	1.6	●	—	—	—	—
	1.8	●	●	●	—	—
2.0	●	—	—	—	—	
21.5 x 5 x 8	0.3	●	●	●	●	●
	0.4	●	●	●	●	●
	0.5	●	●	●	●	●
	0.6	●	●	●	●	●
	0.7	○	○	○	○	○
	0.8	●	●	●	●	●
	1.0	●	●	●	●	●
	1.2	●	●	●	●	●
	1.5	●	●	●	●	●
	1.6	●	—	—	●	●
	2.0	●	●	●	●	●
	3.0	●	●	●	—	—

● Standard Stock    ○ Standard(Please Check Delivery)

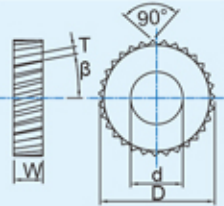
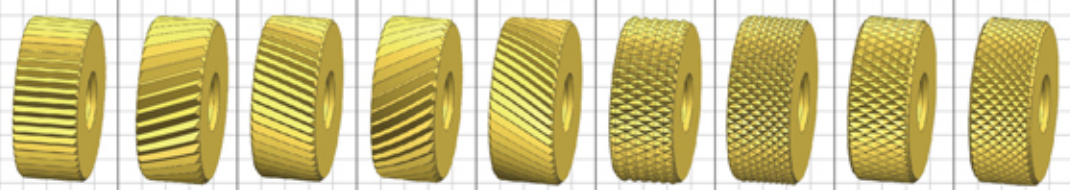
## 壓花輪 Form Knurling Wheels



D x W x d	齒距 Metric Pitch	AA	BL30°	BR30°	BL45°	BR45°	GE30°	GE45°	GV30°	GV45°
10 x 4 x 4	0.2	●	—	—	—	—	—	—	—	—
	0.3	●	●	●	●	●	—	●	●	●
	0.4	●	●	●	●	●	—	●	●	●
	0.5	●	●	●	●	●	—	●	●	●
	0.6	●	●	●	●	●	●	●	●	●
	0.7	○	○	○	○	○	○	○	○	○
	0.8	●	●	●	●	●	●	●	●	●
	0.9	●	●	●	●	●	●	●	●	●
	1.0	●	●	●	●	●	●	●	●	●
	1.2	●	●	●	●	●	●	●	●	●
	1.5	●	●	●	●	●	●	●	●	●
15 x 4 x 4	0.3	●	●	●	●	●	—	—	—	●
	0.4	●	●	●	●	●	—	—	—	●
	0.5	●	●	●	●	●	—	—	—	●
	0.6	●	●	●	●	●	—	—	—	●
	0.7	○	○	○	○	○	—	—	—	○
	0.8	●	●	●	●	●	—	—	—	●
	0.9	●	●	●	●	●	—	—	—	●
	1.0	●	●	●	●	●	—	—	—	●
	1.2	●	●	●	●	●	—	—	—	●
1.5	●	●	●	●	●	—	—	—	●	
15 x 6 x 4	0.3	●	●	●	●	●	●	●	●	●
	0.4	●	●	●	●	●	●	●	●	●
	0.5	●	●	●	●	●	●	●	●	●
	0.6	●	●	●	●	●	●	●	●	●
	0.7	●	●	●	●	●	●	●	●	●
	0.8	●	●	●	●	●	●	●	●	●
	0.9	●	●	●	●	●	●	●	●	●
	1.0	●	●	●	●	●	●	●	●	●
	1.2	●	●	●	●	●	●	●	●	●
	1.5	●	●	●	●	●	●	●	●	●
2.0	●	●	●	●	●	●	—	—	—	
15 x 6 x 6	0.3	●	●	●	●	●	●	●	●	●
	0.4	●	●	●	●	●	●	●	●	●
	0.5	●	●	●	●	●	●	●	●	●
	0.6	●	●	●	●	●	●	●	●	●
	0.7	●	●	●	●	●	●	●	●	●
	0.8	●	●	●	●	●	●	●	●	●
	0.9	●	●	●	●	●	●	●	●	●
	1.0	●	●	●	●	●	●	●	●	●
	1.2	●	●	●	●	●	●	●	●	●
	1.5	●	●	●	●	●	●	●	●	●
	2.0	●	●	●	●	●	●	—	—	—

● Standard Stock  
○ Standard(Please Check Delivery)

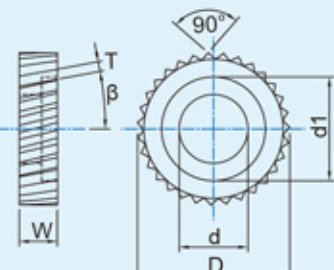
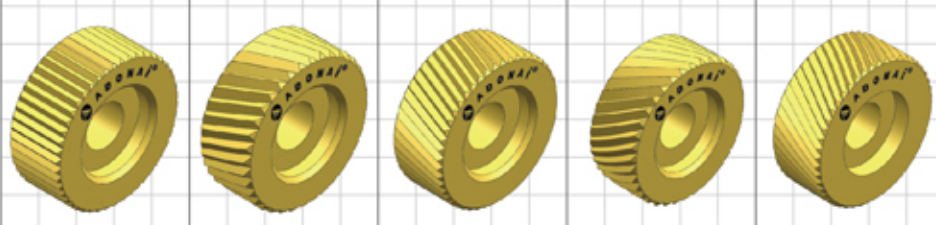
## 壓花輪 Form Knurling Wheels

D x W x d	齒距 Metric Pitch	AA	BL30°	BR30°	BL45°	BR45°	GE30°	GE45°	GV30°	GV45°
20 x 6 x 6	0.3	●	●	●	●	●	●	●	●	●
	0.4	●	●	●	●	●	●	●	●	●
	0.5	●	●	●	●	●	●	●	●	●
	0.6	●	●	●	●	●	●	●	●	●
	0.7	○	○	○	○	○	○	○	○	○
	0.8	●	●	●	●	●	●	●	●	●
	0.9	●	○	○	○	○	○	○	○	○
	1.0	●	●	●	●	●	●	●	●	●
	1.2	●	●	●	●	●	●	●	●	●
	1.3	●	—	—	—	—	—	—	—	—
	1.4	●	—	—	—	—	—	—	—	—
	1.5	●	●	●	●	●	●	●	●	●
1.6	●	—	—	—	—	—	—	—	—	
2.0	●	●	●	●	●	●	●	●	●	
20 x 8 x 6	0.3	●	●	●	●	●	●	●	●	—
	0.4	●	●	●	●	●	●	●	●	—
	0.5	●	●	●	●	●	●	●	●	●
	0.6	●	●	●	●	●	●	●	●	●
	0.7	○	○	○	○	○	○	○	○	○
	0.8	●	●	●	●	●	●	●	●	●
	0.9	○	○	○	○	○	○	○	○	○
	1.0	●	●	●	●	●	●	●	●	●
	1.2	●	●	●	●	●	●	●	●	●
	1.5	●	●	●	●	●	●	●	●	●
	1.6	●	—	—	—	—	—	—	—	—
	2.0	●	●	●	●	●	●	●	●	●
2.5	●	●	●	●	●	—	—	—	—	
3.0	●	●	●	●	●	—	—	—	—	
20 x 10 x 6	0.3	●	●	●	●	●	●	●	●	●
	0.4	●	●	●	●	●	●	●	●	●
	0.5	●	●	●	●	●	●	●	●	●
	0.6	●	●	●	●	●	●	●	●	●
	0.7	○	○	○	○	○	○	○	○	○
	0.8	●	●	●	●	●	●	●	●	●
	0.9	●	●	●	●	●	●	●	●	●
	1.0	●	●	●	●	●	●	●	●	●
	1.2	●	●	●	●	●	●	●	●	●
	1.5	●	●	●	●	●	●	●	●	●
	2.0	●	●	●	●	●	●	●	●	●
	2.0	●	●	●	●	●	●	●	●	●
25 x 8 x 6	0.4	●	●	●	—	—	—	—	—	—
	0.5	●	●	●	●	●	—	—	●	●
	0.6	●	●	●	●	●	—	—	●	●
	0.7	—	—	—	—	—	—	—	○	○
	0.8	●	●	●	●	●	●	—	●	●
	0.9	—	—	—	—	—	—	—	●	●
	1.0	●	●	●	—	—	●	—	●	●
	1.2	●	●	●	●	●	●	—	●	●
	1.5	●	●	●	●	●	●	—	●	●
	1.6	●	●	●	—	—	—	—	—	—
2.0	●	—	—	●	●	●	—	●	●	

● Standard Stock    ○ Standard(Please Check Delivery)

## 肩部壓花輪 Shoulder Form Knurling Wheels

D x W x d/d1	齒距 Metric Pitch	AA	BL30°	BR30°	BL45°	BR45°
15x6x6/11	0.3	●	●	●	●	●
	0.4	●	●	●	●	●
	0.5	●	●	●	●	●
	0.6	●	●	●	●	●
	0.7	●	●	●	●	●
	0.8	●	●	●	●	●
	0.9	●	●	●	●	●
	1.0	●	●	●	●	●
	1.2	●	●	●	●	●
	1.5	●	●	●	●	●
	1.6	●	●	●	●	●
20x6x6/11	0.3	●	●	●	●	●
	0.4	●	●	●	●	●
	0.5	●	●	●	●	●
	0.6	●	●	●	●	●
	0.7	○	○	○	○	○
	0.8	●	●	●	●	●
	1.0	●	●	●	●	●
	1.2	●	●	●	●	●
	1.5	●	●	●	●	●
	1.6	●	○	○	○	○
	2.0	●	●	●	—	—
20x8x6/13	0.3	—	—	—	—	—
	0.4	●	●	●	●	●
	0.5	●	●	●	●	●
	0.6	●	●	●	●	●
	0.7	○	○	○	—	—
	0.8	●	●	●	●	●
	1.0	●	●	●	●	●
	1.2	●	●	●	●	●
	1.5	●	●	●	●	●
	1.6	●	—	—	—	—
	2.0	●	●	●	●	●
	2.5	●	●	●	●	●
	3.0	●	●	●	●	●
20x8x10/12	0.3	○	—	—	—	—
	0.4	○	○	○	—	—
	0.5	○	○	○	—	—
	0.6	○	○	○	—	—
	0.8	○	○	○	—	—
	1.0	○	○	○	—	—
	1.2	○	○	○	—	—
	1.6	○	○	○	—	—
2.0	○	○	○	—	—	

● Standard Stock    ○ Standard(Please Check Delivery)

## 凸面壓花輪(適軸向進給) Convex Axial Feed Knurling Wheels

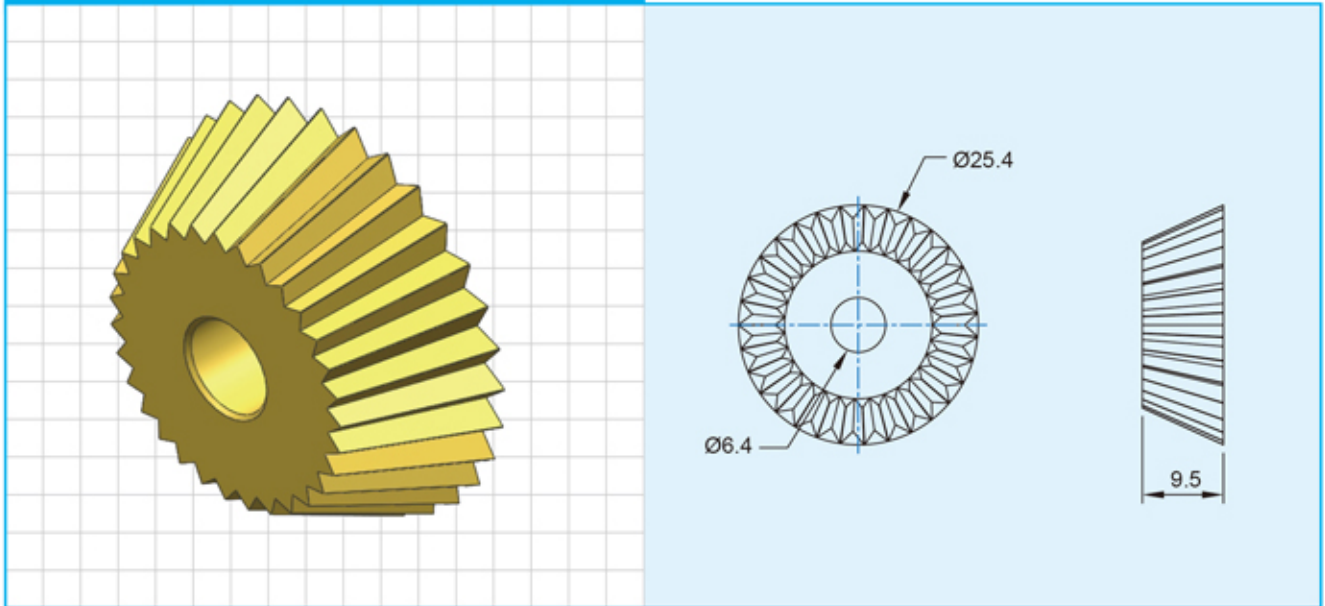



D x W x d	齒距 Metric Pitch	MRSV	MRLV30°	MRRV30°	MRLV45°	MRRV45°
20 x 6 x 6	0.3	—	—	—	—	—
	0.4	●	●	●	●	●
	0.5	●	●	●	●	●
	0.6	●	●	●	●	●
	0.7	○	○	○	○	○
	0.8	●	●	●	●	●
	1.0	●	●	●	●	●
	1.2	●	●	●	●	●
	1.5	●	●	●	●	●
	1.6	●	●	●	●	●
	1.8	—	—	—	—	—
	2.0	●	●	●	●	●

● Standard Stock

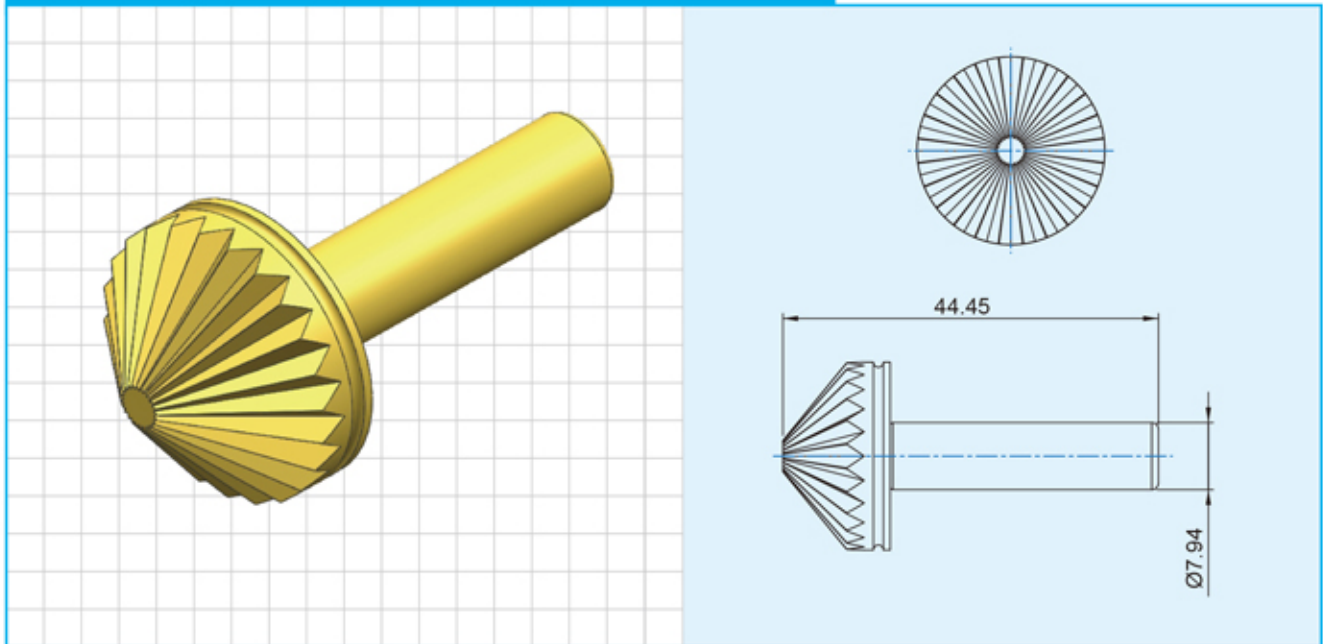
○ Standard(Please Check Delivery)

## 錐形壓花輪 Conical Knurling Wheels



產品規格 Model No.	齒數 Teeth	齒距 Pitch		錐度 Conical Angle	直徑 Diameter	
		SMALL END	LARGE END	ROOT	SMALL END	LARGE END
RTAA-251006-15031	31	2.0	2.57	15°	19.7	25.4
RTAA-251006-15078	78	0.81	1.02	15°	20.1	25.4
RTAA-251006-15125	125	0.51	0.64	15°	20.2	25.4
RTAA-251006-22031	31	1.7	2.57	22°	16.9	25.4
RTAA-251006-22050	50	1.08	1.6	22°	17.2	25.4
RTAA-251006-22064	64	0.85	1.25	22°	17.3	25.4
RTAA-251006-22078	78	0.7	1.02	22°	17.4	25.4
RTAA-251006-22089	89	0.61	0.88	22°	17.4	25.4
RTAA-251006-22100	100	0.55	0.8	22°	17.5	25.4
RTAA-251006-22125	125	0.44	0.64	22°	17.5	25.4
RTAA-251006-30031	31	1.34	2.57	30°	13.2	25.4
RTAA-251006-30078	78	0.56	1.02	30°	14	25.4
RTAA-251006-30125	125	0.36	0.64	30°	14.1	25.4

## 傘形壓花輪 Conical Knurling Wheels With Shank



產品規格 Model No.	齒數 Teeth	備註 Remark
RBAA-220846-0024	24	COARSE
RBAA-220846-0036	36	MED-COARSE
RBAA-220846-0048	48	MEDIUM
RBAA-220846-0060	60	MED-FINE
RBAA-220846-0072	72	FINE

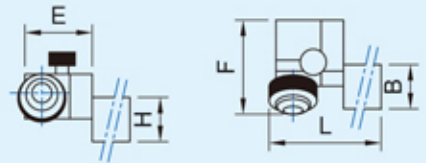
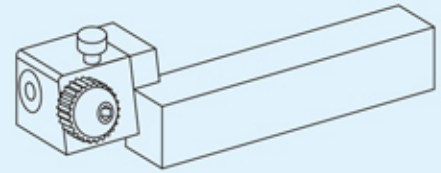


**專利  
PATENT**

**車花刀架 Cut Knurling Tools**



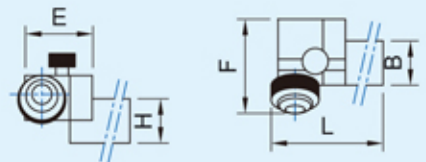
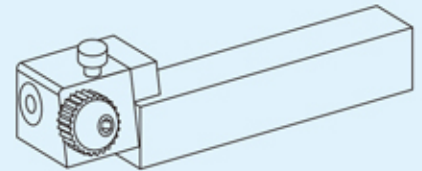
**PRZSR-K 後縮型**  
PRZSR-K Offset Type



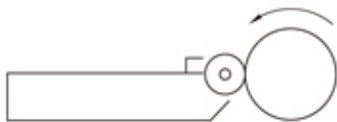
**PRZSR-K 右手系**  
PRZSR-K Right-hand series



**PRZSR 標準型**  
PRZSR Standard Type



**PRZSR 右手系**  
PRZSR Right-hand series

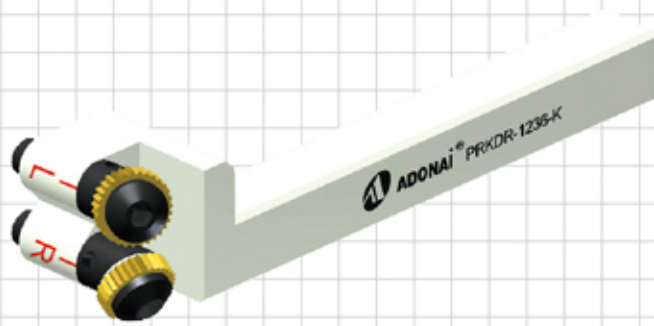


直花  
採用 RFBR-15°  
Straight knurl  
Use RFBR-15°

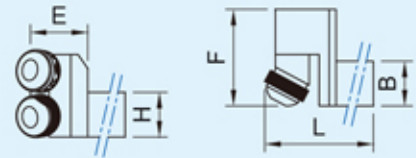
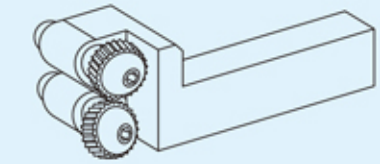
產品規格 Model No.	尺寸 Dimensions				加工範圍 Range of processing	車花輪 Wheels D x W x d
	HXB	L	F	E		
PRZSR-1236-K	12X12	110	24	19	3-40	11 x 3 x 6
PRZSR-1636-K	16X16	110	24	19	3-40	
PRZSR-20511	20X20	130	36	30	6-100	20 x 5 x 11
PRZSR-25511	25X25	150	41	35	6-250	25 x 5 x 11

**專利**  
**PATENT**

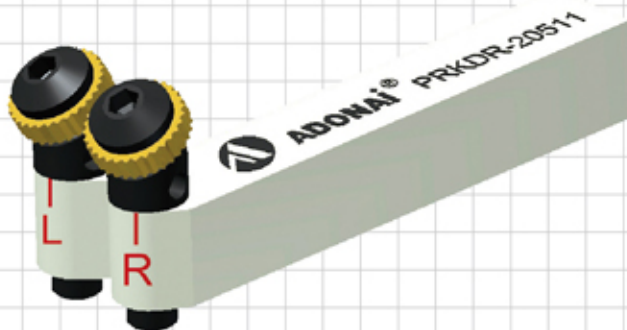
**車花刀架** Cut Knurling Tools



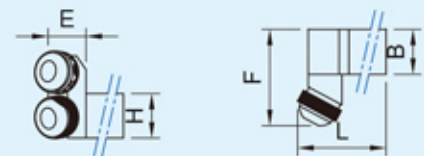
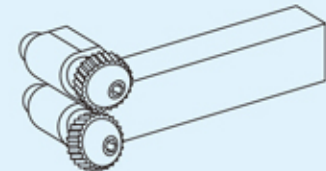
**PRKDR-K 後縮型**  
PRKDR-K Offset Type



**PRKDR-K 右手系**  
PRKDR-K Right-hand series



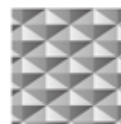
**PRKDR 標準型**  
PRKDR Standard Type



**PRKDR 右手系**  
PRKDR Right-hand series



**交叉花45°**  
採用 RFBR-15° RFBL-15°各1個  
Cross45° knurl  
Use RFBR-15° RFBL-15° 1each

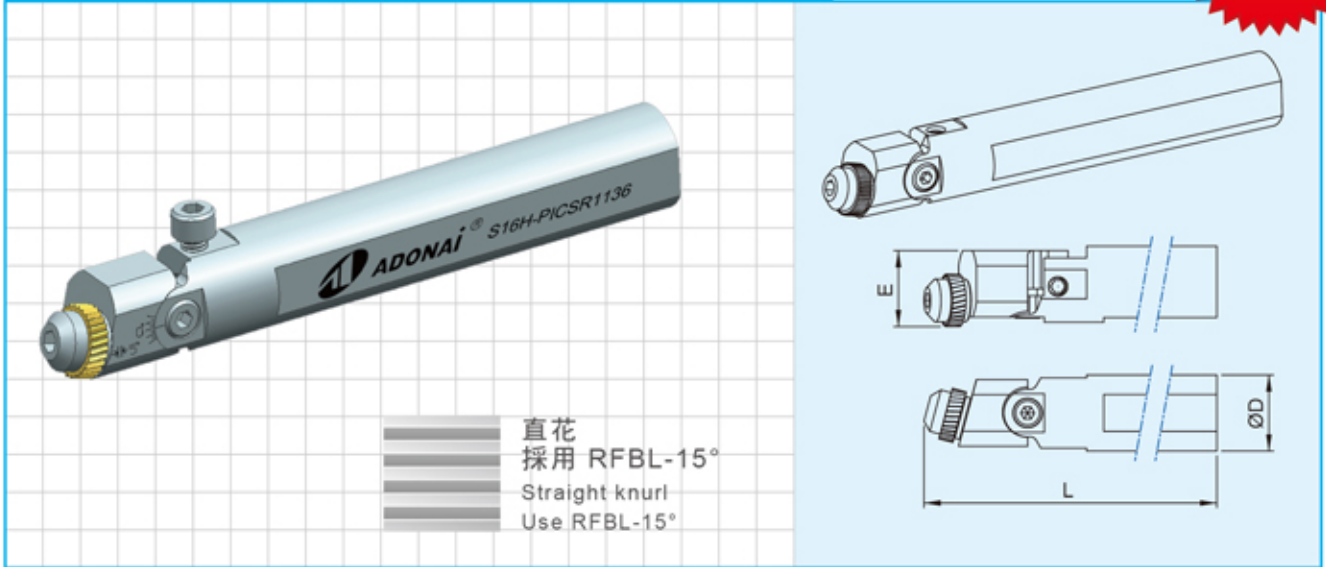


**鑽石花30°**  
採用 RFAA-00° 2個  
Cross30° knurl  
Use RFAA-00° 2pcs

產品規格 Model No.	尺寸 Dimensions				加工範圍 Range of processing	車花輪 Wheels D x W x d
	HXB	L	F	E		
PRKDR-1236-K	12X12	110	24	20	3-40	11 x 3 x 6
PRKDR-1636-K	16X16	110	24	20	3-40	
PRKDR-20511	20X20	130	49	23	6-100	20 x 5 x 11
PRKDR-25511	25X25	150	62	35	6-250	25 x 5 x 11



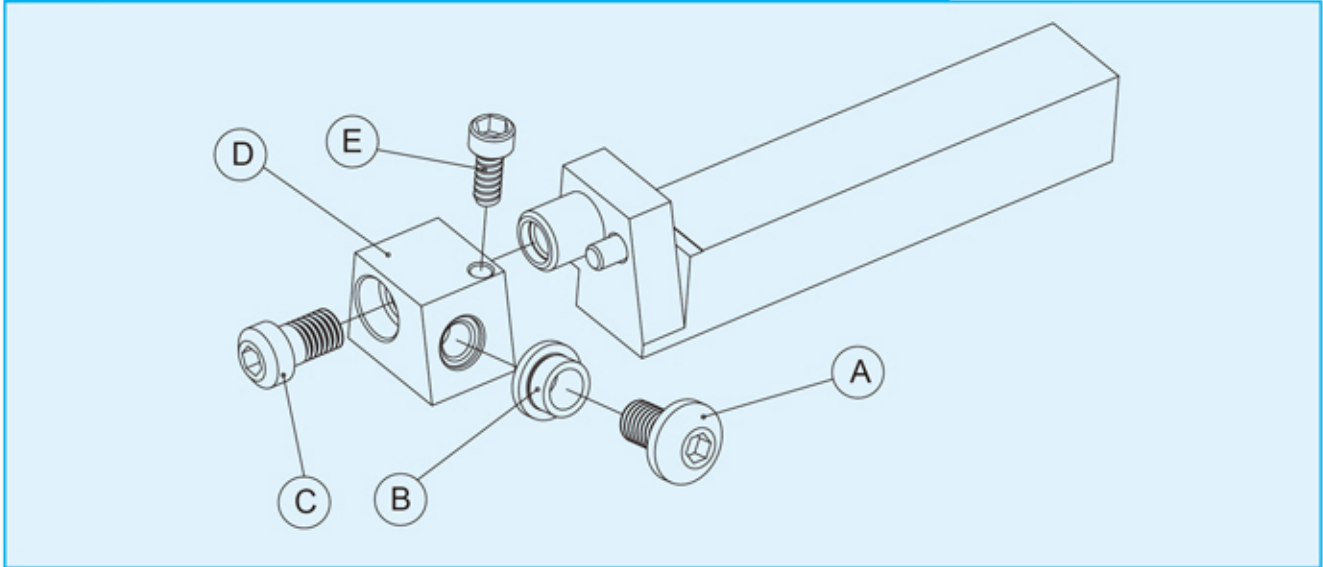
微調式內孔車花刀架 Micro Internal Cut Knurling Tools



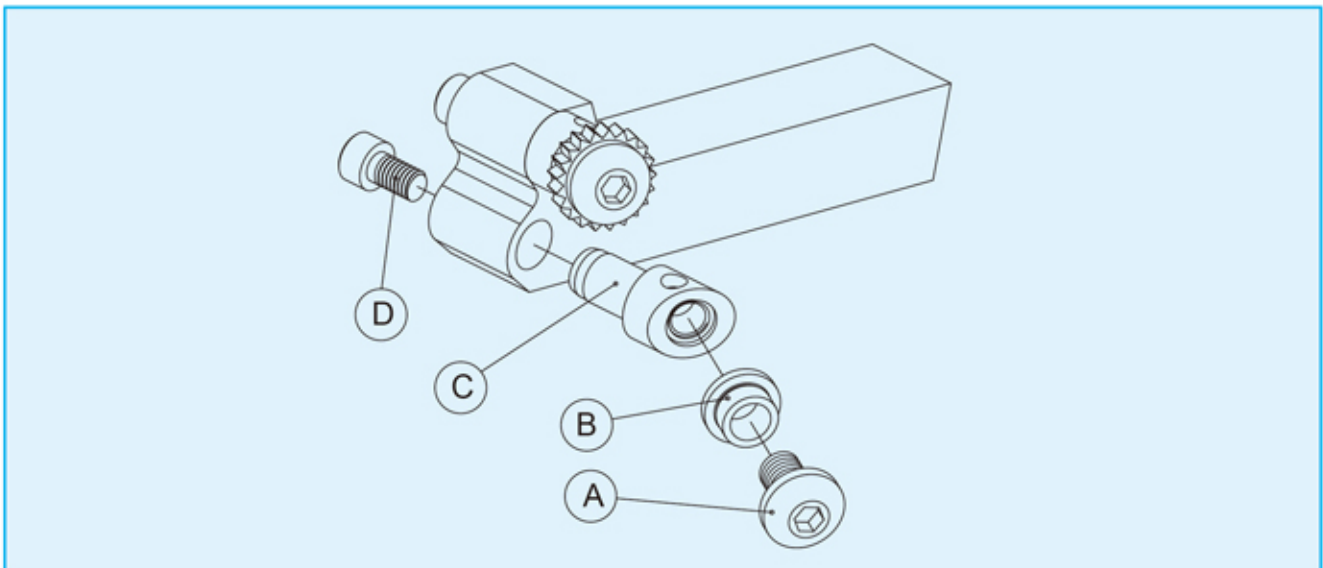
PICSR 右手系  
PICSR Right-hand series

產品規格 Model No.	尺寸 Dimensions			最小加工徑 min ØB	車花輪 Wheels
	ØD	E	L		D x W x d
S16M-PICSR1136	16	17	150	18	11 x 3 x 6

## 備用零件 Spare Parts



產品規格 Model No.	備用零件 Spare Parts				
	A	B	C	D	E
PRZSR-1236-K	PRKDR-123605	PRKDR-123604	PRZSR-123603	PRZSR-123602	PRZSR-123608
PRZSR-1636-K	PRKDR-123605	PRKDR-123604	PRZSR-123603	PRZSR-123602	PRZSR-123608
PRZSR-20511	PRKDR-2051105	PRKDR-2051104	PRZSR-2051103	PRZSR-2051102	PRZSR-2051108
PRZSR-25511	PRKDR-2551105	PRKDR-2551104	PRZSR-2551103	PRZSR-2551102	PRZSR-2551108

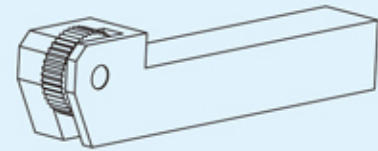


產品規格 Model No.	備用零件 Spare Parts			
	A	B	C	D
PRKDR-1236-K	PRKDR-123605	PRKDR-123604	PRKDR-123602	PRKDR-123603
PRKDR-1636-K	PRKDR-123605	PRKDR-123604	PRKDR-123602	PRKDR-123603
PRKDR-20511	PRKDR-2051105	PRKDR-2051104	PRKDR-2051102	PRKDR-2051103
PRKDR-25511	PRKDR-2551105	PRKDR-2551104	PRKDR-2551102	PRKDR-2551103

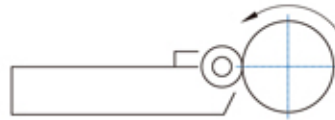
## 壓花刀架 Form Knurling Tools



樣式：PRCSR  
 採用RDAA、RDGV、RDBR、RDBL、RDGE 壓花輪  
 Type: PRCSR  
 Use RDAA、RDGV、RDBR、RDBL、RDGE Knurling Wheels

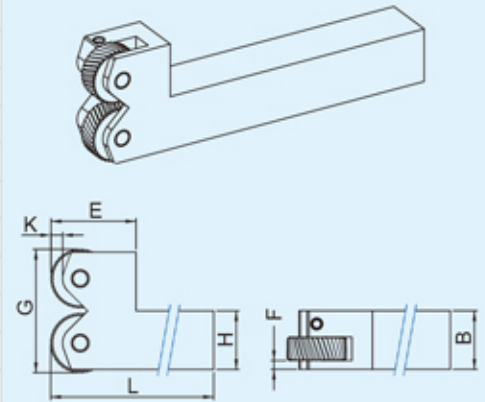
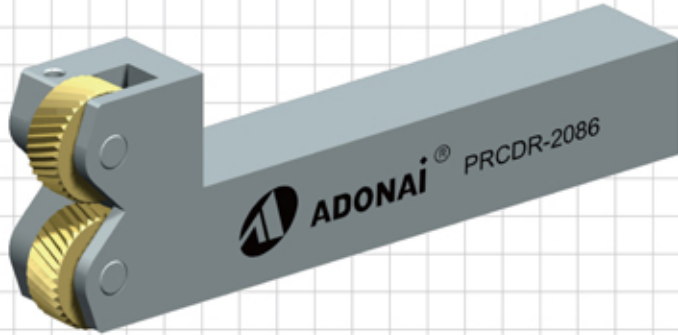


PRCSR 右手系  
 PRCSR Right-hand series

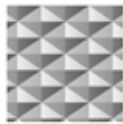


產品規格 Model No.	尺寸 Dimensions						壓花輪 Wheels
	HXB	L	C	E	G	K	D x W x d
PRCSR-1044	10X10	125	12	15	2	3.5	15 x 4 x 4
PRCSR-1244	12X12	125	12	15	2	3.5	
PRCSR-1644	16X16	125	16	15	2	3.5	
PRCSR-1264	12x12	125	14	15	2	3.5	15 x 6 x 4
PRCSR-1664	16X16	125	16	15	2	3.5	
PRCSR-1666	16x16	125	16	15	2	2.5	15 x 6 x 6
PRCSR-1666	16X16	125	16	15	2	5	20 x 6 x 6
PRCSR-2066	20X20	130	20	22	3	5	
PRCSR-2566	25X25	130	25	25	3	5	
PRCSR-2086	20X20	130	20	20	2	5	20 x 8 x 6
PRCSR-2586	25X25	130	25	23	2	5	
PRCSR-20106	20X20	130	20	20	2	5	20 x 10 x 6

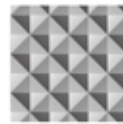
## 壓花刀架 Form Knurling Tools



PRCDR 右手系  
PRCDR Right-hand series



可做成鑽石花30°  
採用RDBR-30° RDBL-30° 各一個  
Cross30° knurl  
Use RDBR-30° RDBL-30° 1 each

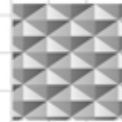
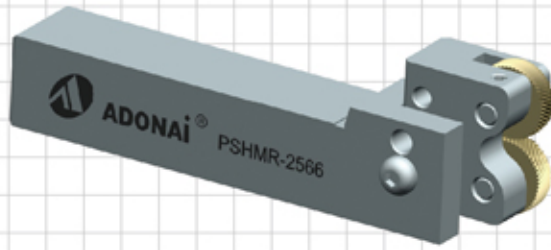


可做成交叉花45°  
採用RDBR-45° RDBL-45° 各一個  
Cross45° knurl  
Use RDBR-45° RDBL-45° 1 each

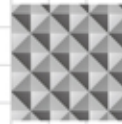
產品規格 Model No.	尺寸 Dimensions						壓花輪 Wheels D x W x d
	HXB	E	F	G	L	K	
PRCDR-1244	12X12	23	2	31	125	3.5	15 x 4 x 4
PRCDR-1644	16X16	23	2	31	125	3.5	
PRCDR-1664	16x16	23	2	31	125	3.5	15 x 6 x 4
PRCDR-1666	16x16	23	2	31	125	3.5	15 x 6 x 6
PRCDR-2066	20X20	25	3	42	130	5	20 x 6 x 6
PRCDR-2566	25X25	25	3	42	130	5	
PRCDR-2086	20X20	25	3	42	130	5	20 x 8 x 6
PRCDR-2586	25X25	25	3	42	130	5	

## 可調式壓花刀架 Adjustable Form Knurling Tools

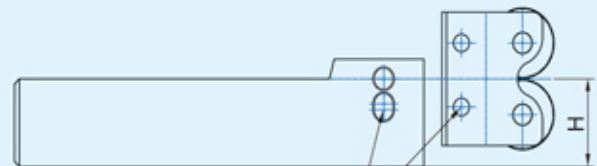
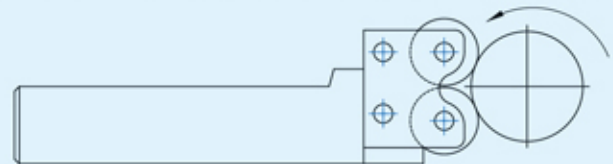
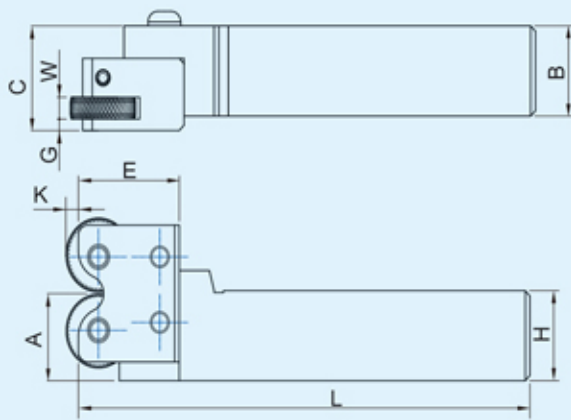
### ■雙輪壓花組合形式 Two Knurling Wheels Set Up Shown



可做成鑽石花30°  
採用MRRV-30° MRLV-30°各1個  
Cross30° knurl  
Use MRRV-30° MRLV-30° 1each

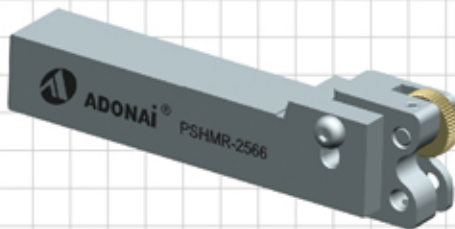


可做成交叉花45°  
採用MRRV-45° MRLV-45° 各一個  
Cross45° knurl  
Use MRRV-45° MRLV-45° 1 each

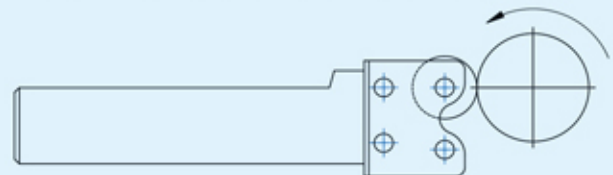
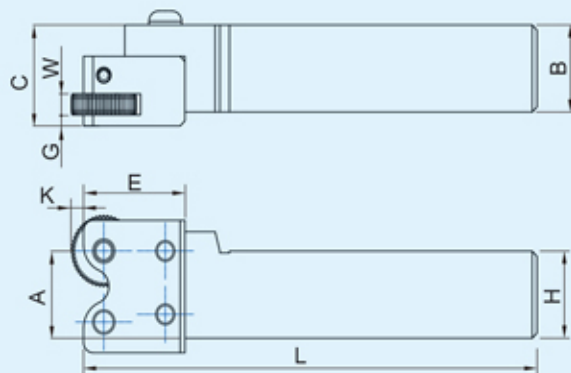


使用雙輪刀片螺絲鎖緊的位置  
Locking Screw Position For Two Knurling Wheels

### ■單輪壓花組合形式 Single Knurling Wheel Set Up Shown



可做成直花00°  
採用 MRSV-00° 1個  
Straight Knurl (00°)  
Use MRSV-00° 1pc

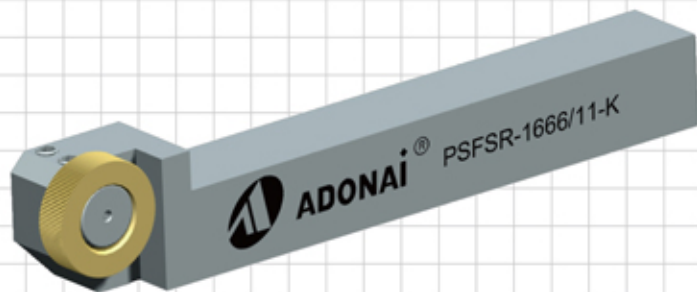


使用單輪刀片螺絲鎖緊的位置  
Locking Screw Position For Single Knurling Wheel

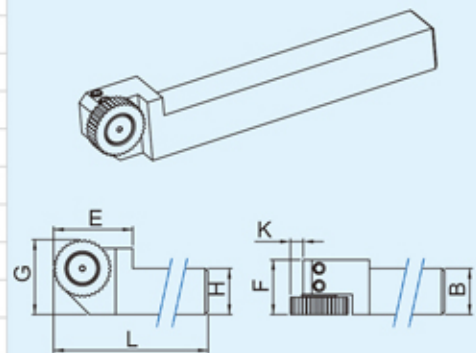
右手系 Right-hand shown

產品規格 Model No.	尺寸 Dimensions						壓花輪 Wheels
	HXB	G	C	L	E	K	D x W x d
PSHMR-2066	20X20	3.3	29	125	32	3.5	20 x 6 x 6
PSHMR-2566	25X25	3.3	32	140	32	3.5	

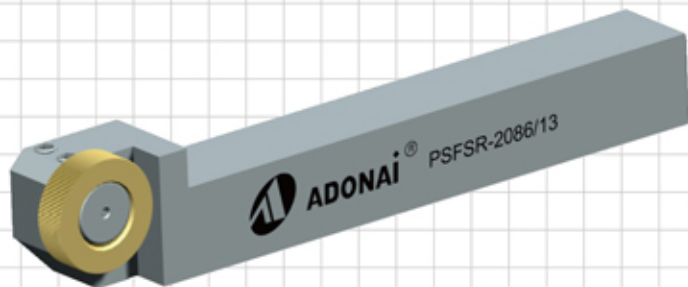
## 肩部壓花刀架 Shoulder Form Knurling Tools



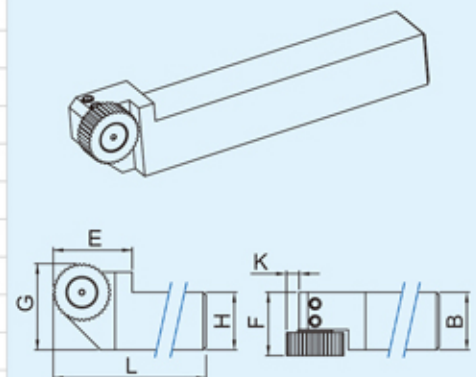
PSFSR-K 後縮型  
PSFSR-K Offset Type



PSFSR-K 右手系  
PSFSR-K Right-hand series



PSFSR 標準型  
PSFSR Standard Type

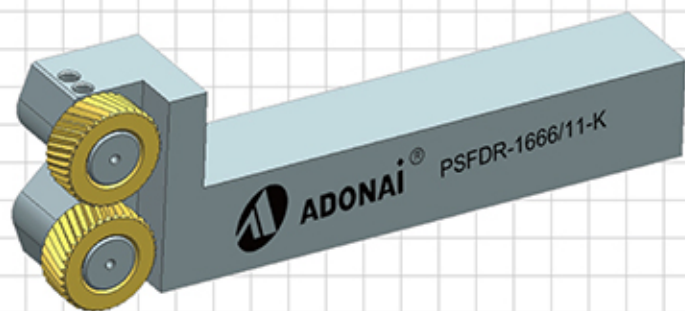


PSFSR 右手系  
PSFSR Right-hand series

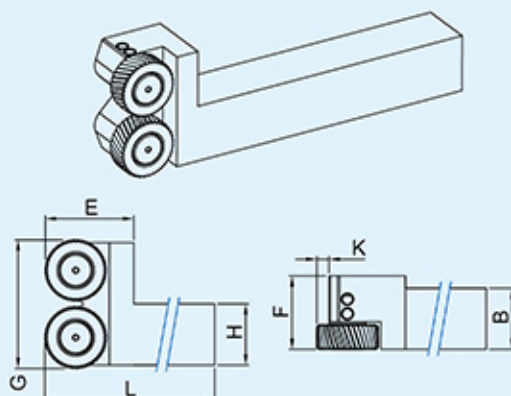
產品規格 Model No.	尺寸 Dimensions						壓花輪 Wheels D x W x d/d1
	HXB	E	F	G	L	K	
PSFSR-1066/11-K	10X10	23	19	16	125	1.5	15 x 6 x 6/11
PSFSR-1266/11-K	12X12	23	19	18	125	1.5	
PSFSR-1666/11-K	16X16	23	19	20	125	1.5	
PSFSR-1066/11-K	10X10	27	19	20	125	3.0	20 x 6 x 6/11
PSFSR-1266/11-K	12X12	27	19	22	125	3.0	
PSFSR-1666/11-K	16X16	27	19	26	125	3.0	
PSFSR-2066/11	20X20	27	21	24	130	3.0	20 x 6 x 6/11
PSFSR-1286/13-k	12X12	27	19	22	125	3.0	20 x 8 x 6/13
PSFSR-1686/13-k	16X16	27	19	26	125	3.0	
PSFSR-2086/13	20X20	27	23	30	130	3.0	
PSFSR-2586/13	25X25	27	28	35	130	3.0	



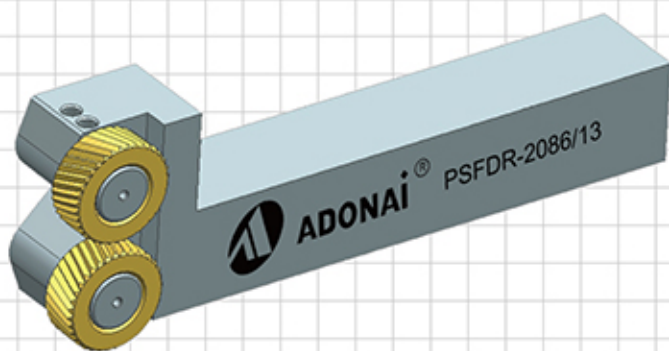
## 肩部壓花刀架 Shoulder Form Knurling Tools



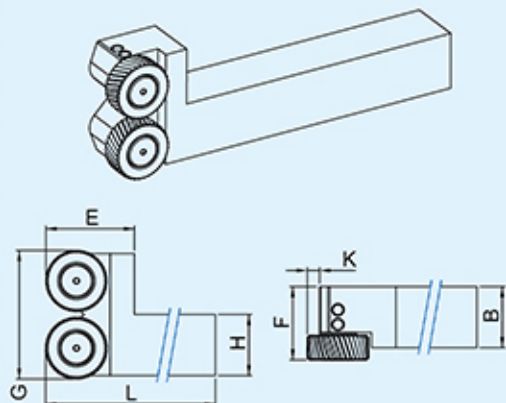
PSFDR-K 後縮型  
PSFDR-K Offset Type



PSFDR-K 右手系  
PSFDR-K Right-hand series



PSFDR 標準型  
PSFDR Standard Type

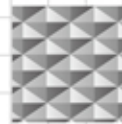
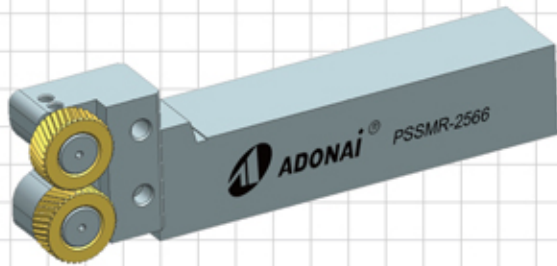


PSFDR 右手系  
PSFDR Right-hand series

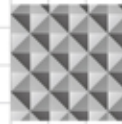
產品規格 Model No.	尺寸 Dimensions						壓花輪 Wheels
	HXB	E	F	G	L	K	D x W x d/d1
PSFDR-1266/11-K	12X12	23	19	31	125	1.5	15 x 6 x 6/11
PSFDR-1666/11-K	16X16	23	19	31	125	1.5	
PSFDR-2066/11	20X20	27	22	42	130	3.0	20 x 6 x 6/11
PSFDR-2566/11	25X25	27	27	42	130	3.0	
PSFDR-2086/13	20X20	27	24	42	130	3.0	20 x 8 x 6/13
PSFDR-2586/13	25X25	27	29	42	130	3.0	

## 可調式肩部壓花刀架 Adjustable Shoulder Form Knurling Tools

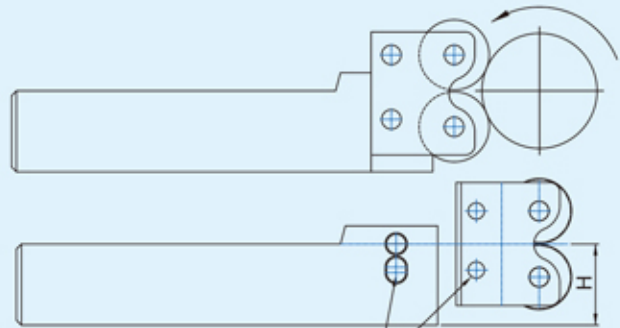
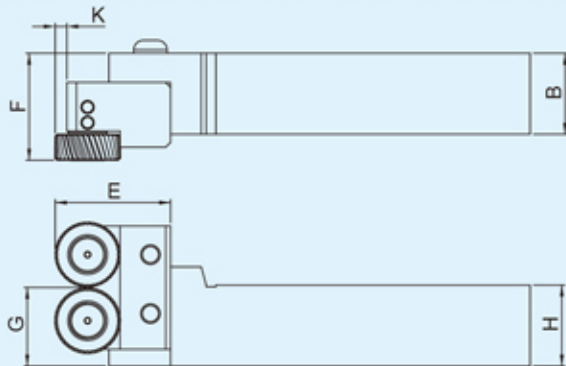
### ■雙輪壓花組合形式 Two Knurling Wheels Set Up Shown



可做成鑽石花30°  
採用MRRV-30° MRLV-30°各1個  
Cross30° knurl  
Use MRRV-30° MRLV-30° 1each

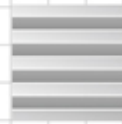
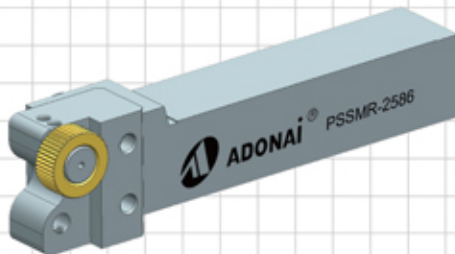


可成交叉花45°  
採用MRRV-45° MRLV-45° 各一個  
Cross45° knurl  
Use MRRV-45° MRLV-45° 1 each

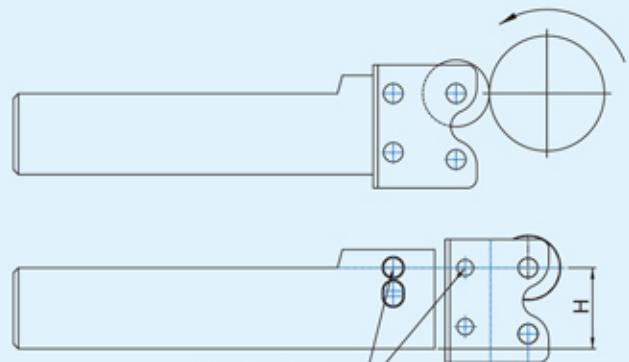
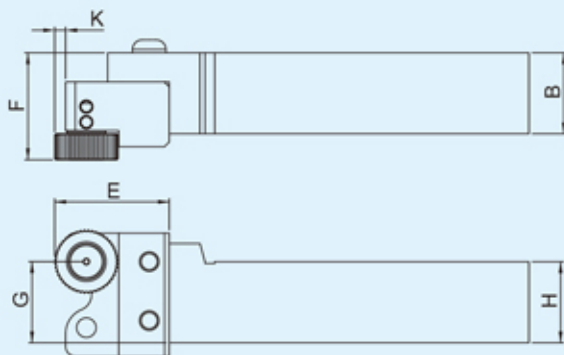


使用雙輪刀片螺絲鎖緊的位置  
Locking Screw Position For Two Knurling Wheels

### ■單輪壓花組合形式 Single Knurling Wheel Set Up Shown



可做成直花00°  
採用 MRSV-00° 1個  
Straight Knurl (00°)  
Use MRSV-00° 1pc

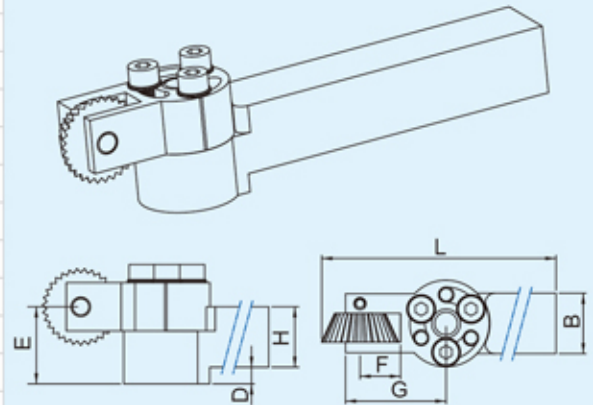
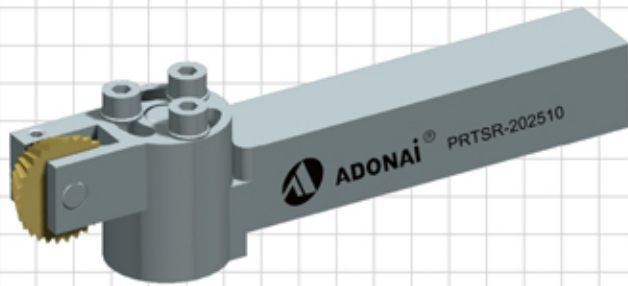


使用單輪刀片螺絲鎖緊的位置  
Locking Screw Position For Single Knurling Wheel

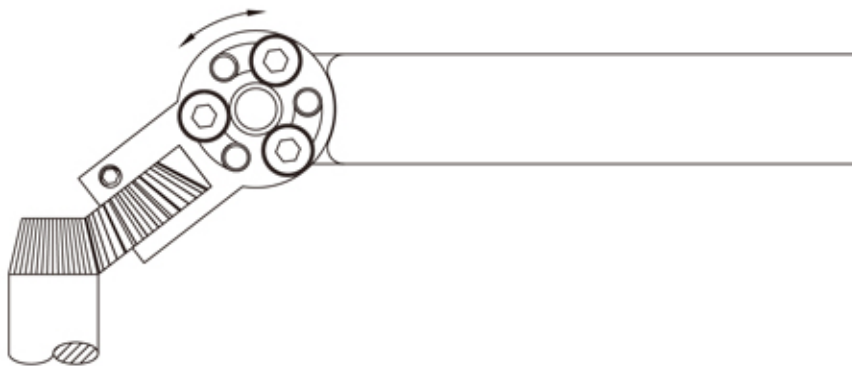
產品規格 Model No.	尺寸 Dimensions						壓花輪 Wheels
	HXB	E	F	G	L	K	D x W x d / d1
PSSMR-2066	20X20	35.6	31	20	130	3.5	20 x 6 x 6 / 11
PSSMR-2566	25X25	35.6	31	25	130	3.5	
PSSMR-2086	20X20	35.6	33	20	130	3.0	20 x 8 x 6 / 13
PSSMR-2586	25X25	35.6	33	25	130	3.0	

## 調整式錐度壓花刀架 Adjustable Taper Form Knurling Tools

■ Holders Are Adjustable To Accommodate  $0^{\circ} \sim 60^{\circ}$



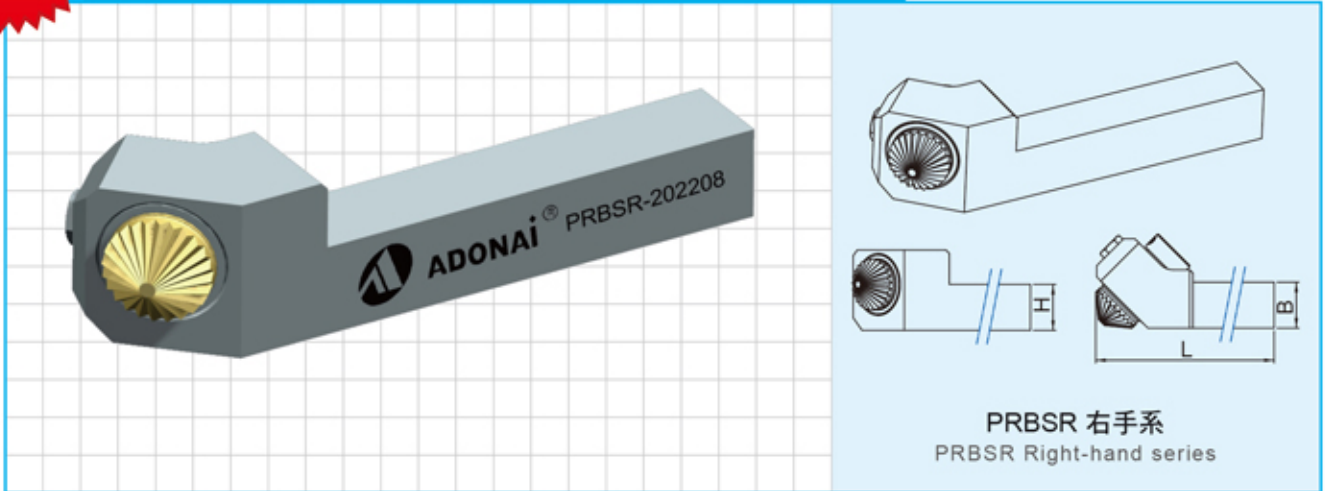
PRTSR 右手系  
PRTSR Right-hand series



產品規格 Model No.	尺寸 Dimensions						壓花輪 Wheels
	HXB	D	E	F	G	L	
PRTSR-202510	20X20	5	25	13.5	33.3	130	RTAA-251006
PRTSR-252510	25X25	5	25	13.5	33.3	130	



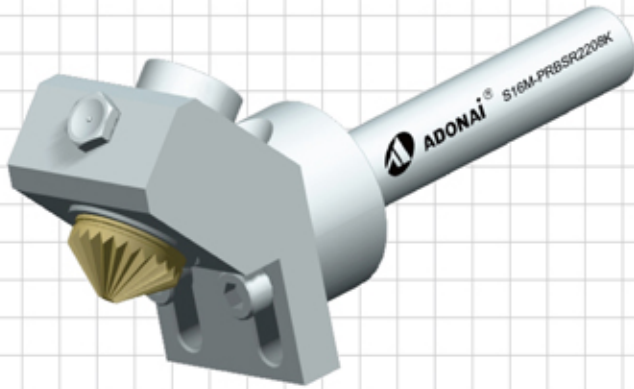
**端面壓花刀架** Face Form Knurling Tools



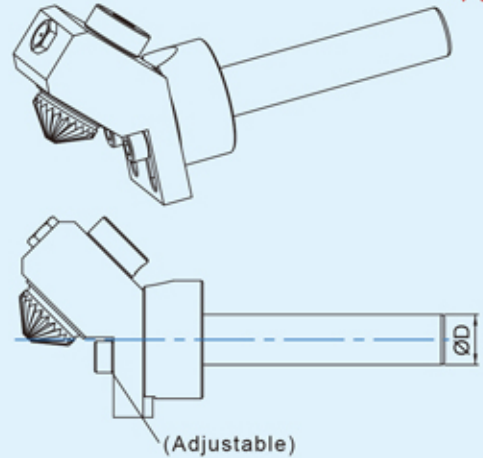
產品規格 Model No.	尺寸 Dimensions			壓花輪 Wheels
	H	B	L	
PRBSR-162208	16	16	130	RBAA-220846
PRBSR-202208	20	20	130	
PRBSR-252208	25	25	130	

**專利 PATENT**

**可調式端面壓花刀架(圓柄型) Adjustable Face Form Knurling Of Round Shank**

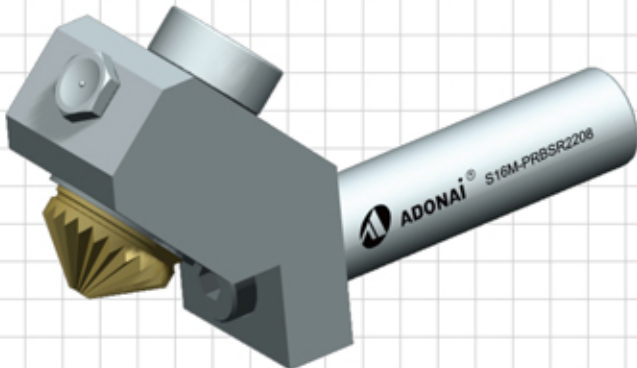


可加工範圍:  $\varnothing 2.0\text{mm} \sim \varnothing 46\text{mm}$   
 PRBSR-K 後縮型  
 PRBSR-K Offset Type

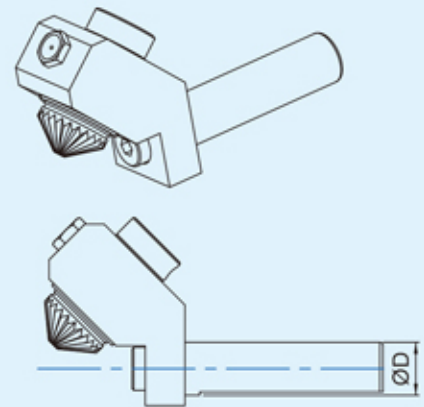


PRBSR-K 右手系(可調整式刀架)  
 PRBSR-K Right-hand series(Adjustable)

**固定式端面壓花刀架(圓柄型) / Fixed Face Form Knurling Of Round Shank**



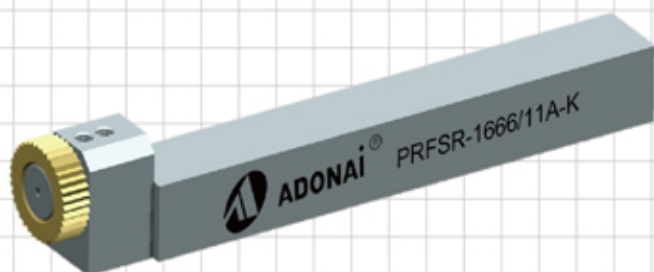
可加工範圍:  $\varnothing 20\text{mm} \sim \varnothing 36\text{mm}$   
 PRBSR 標準型  
 PRBSR Standard Type



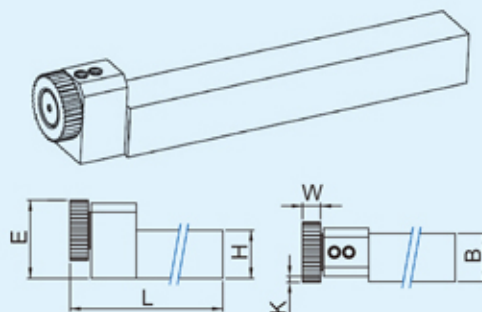
PRBSR 右手系  
 PRBSR Right-hand series

產品規格 Model No.	尺寸 Dimensions		壓花輪 Wheels
	ØD	L	
S16M-PRBSR2208K	16	130	RBAA-220846
S20M-PRBSR2208K	20	130	
S25M-PRBSR2208K	25	130	
S16M-PRBSR2208	16	130	RBAA-220846
S20M-PRBSR2208	20	130	
S25M-PRBSR2208	25	130	

## 端面壓花刀架 Face Form Knurling Tools

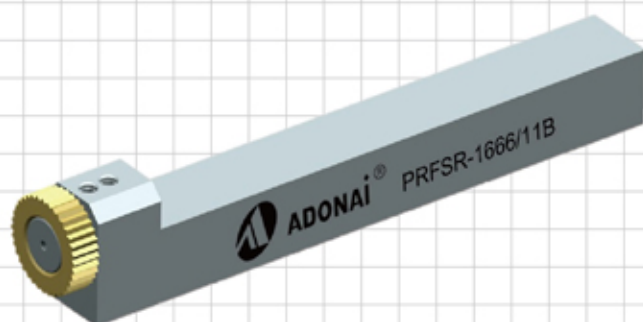


PRFSR-K 後縮型  
PRFSR-K Offset Type

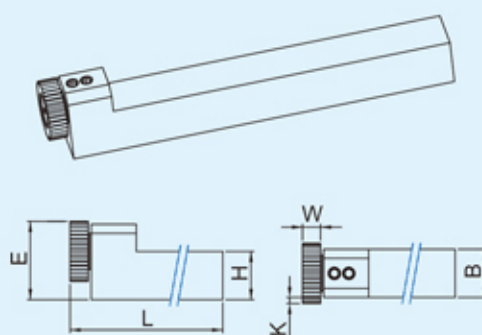


PRFSR-K 右手系  
PRFSR-K Right-hand series

產品規格 Model No.	尺寸 Dimensions					壓花輪 Wheels
	HXB	E	K	W	L	D x W x d/d1
PRFSR-1066/11A-K	10X10	17.5	2	6	125	15 x 6 x 6 / 11
PRFSR-1266/11A-K	12X12	19.5	2	6	125	
PRFSR-1666/11A-K	16X16	23.5	2	6	125	
PRFSR-1666/11B-K	16X16	26	2	8	125	20 x 6 x 6 / 11



PRFSR 標準型  
PRFSR Standard Type



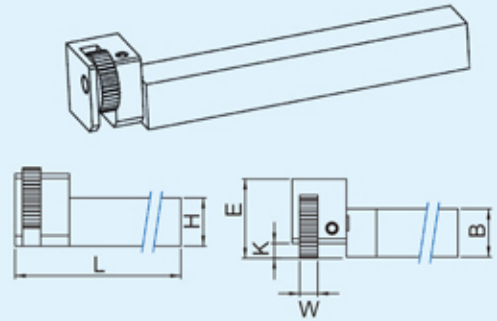
PRFSR 右手系  
PRFSR Right-hand series

產品規格 Model No.	尺寸 Dimensions					壓花輪 Wheels
	HXB	E	K	W	L	D x W x d/d1
PRFSR-1266/11A	12X12	17.5	1.5	6	125	15 x 6 x 6 / 11
PRFSR-1266/11B	12X12	22	4	6	125	20 x 6 x 6 / 11
PRFSR-1666/11B	16X16	26	2	6	125	
PRFSR-2066/11B	20X20	28	0	6	125	
PRFSR-1286/13B	12X12	22	4	8	125	20 x 8 x 6 / 13
PRFSR-1686/13B	16X16	26	2	8	125	
PRFSR-2086/13B	20X20	28	0	8	125	

## 端面壓花刀架 Face Form Knurling Tools

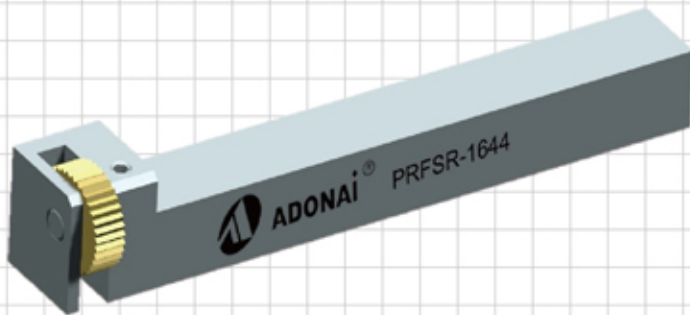


PRFSR-K 後縮型  
PRFSR-K Offset Type

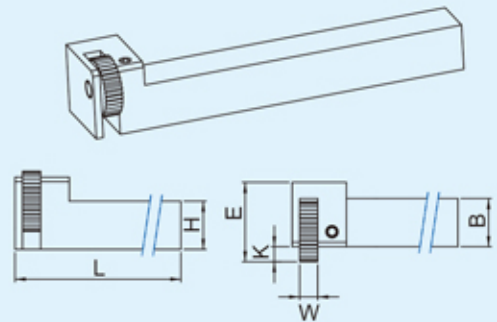


PRFSR-K 右手系  
PRFSR-K Right-hand series

產品規格 Model No.	尺寸 Dimensions					壓花輪 Wheels
	HXB	E	K	W	L	D x W x d
PRFSR-1044-K	10X10	20	2	4	125	15 x 4 x 4
PRFSR-1244-K	12X12	20	2	4	125	
PRFSR-1644-K	16X16	20	2	4	125	



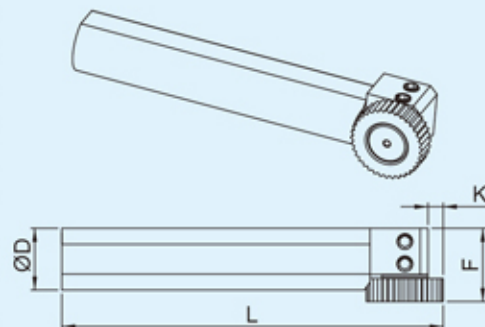
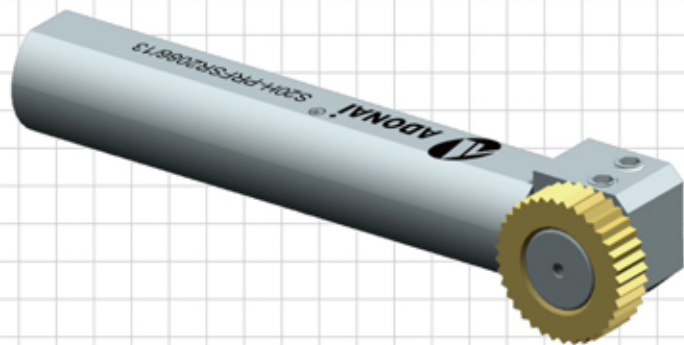
PRFSR 標準型  
PRFSR Standard Type



PRFSR 右手系  
PRFSR Right-hand series

產品規格 Model No.	尺寸 Dimensions					壓花輪 Wheels
	HXB	E	K	W	L	D x W x d
PRFSR-1666	16X16	25	5	6	125	20 x 6 x 6
PRFSR-2066	20X20	25	5	6	125	
PRFSR-2566	25X25	30	5	6	125	
PRFSR-1686	16X16	25	5	8	125	20 x 8 x 6
PRFSR-2086	20X20	25	5	8	125	
PRFSR-2586	25X25	30	5	8	125	

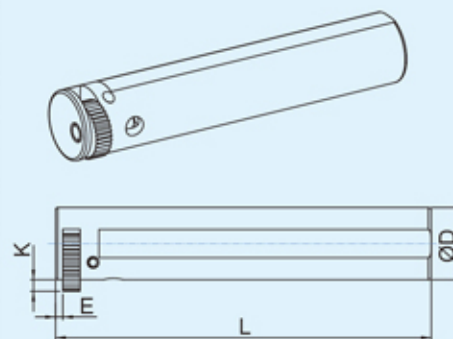
## 端面壓花刀架 Face Form Knurling Of Round Shank



PRFSR 右手系  
PRFSR Right-hand series

產品規格 Model No.	尺寸 Dimensions				壓花輪 Wheels
	ØD	K	F	L	D x W x d/d1
S16H-PRFSR1566/11	16	1.5	19	100	15 x 6 x 6 / 11
S16H-PRFSR2066/11	16	4	19	100	20 x 6 x 6 / 11
S20H-PRFSR2066/11	20	4	21	100	
S16H-PRFSR2086/13	16	4	21	100	20 x 8 x 6 / 13
S20H-PRFSR2086/13	20	4	23	100	

## 內孔壓花刀架 True Internal Form Knurling Tools

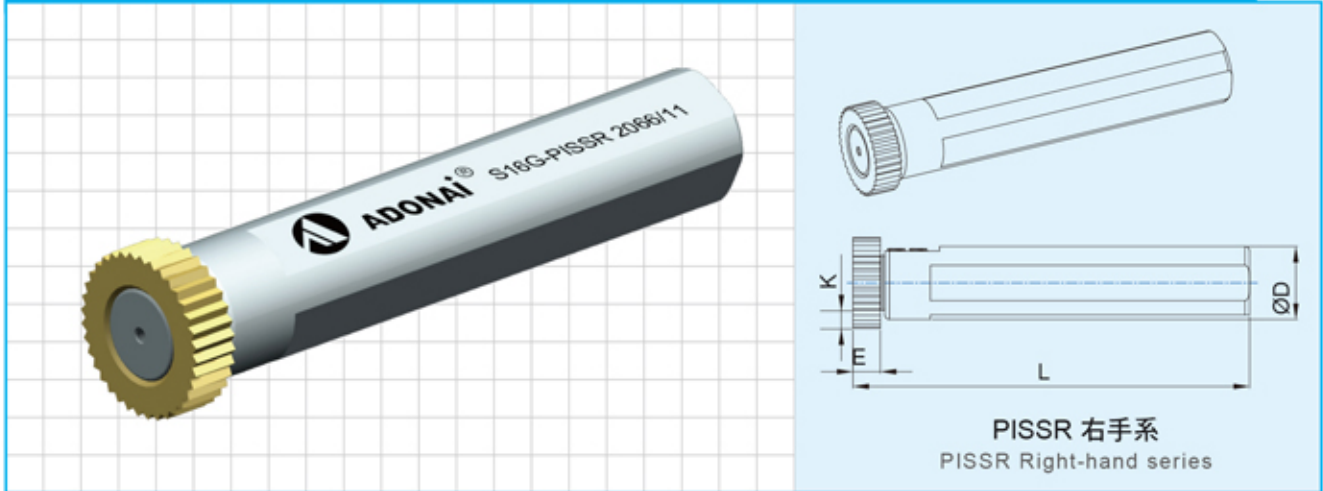


PITSR 右手系  
PITSR Right-hand series

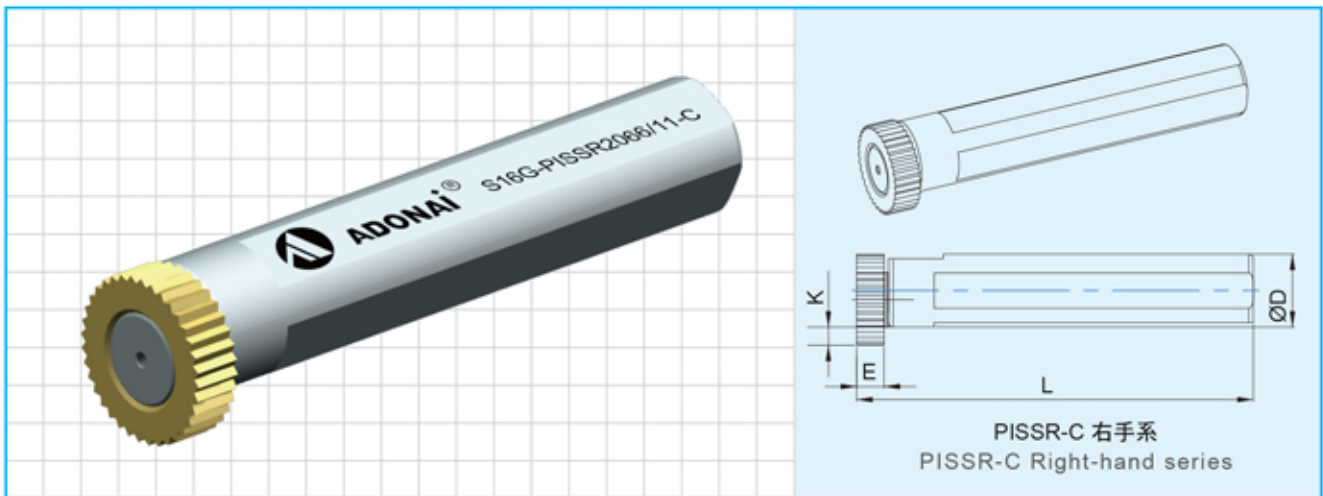
產品規格 Model No.	尺寸 Dimensions					壓花輪 Wheels
	ØD	E	K	L	min ØB	D x W x d
S20M-PITSR1544-23	20	1.5	3	150	23	15 x 4 x 4
S25M-PITSR2066-30	25	2.5	4	150	30	20 x 6 x 6
S25M-PITSR2086-30	25	2.5	4	150	30	20 x 8 x 6



## 內孔壓花刀架 Shoulder Internal Form Knurling Tools

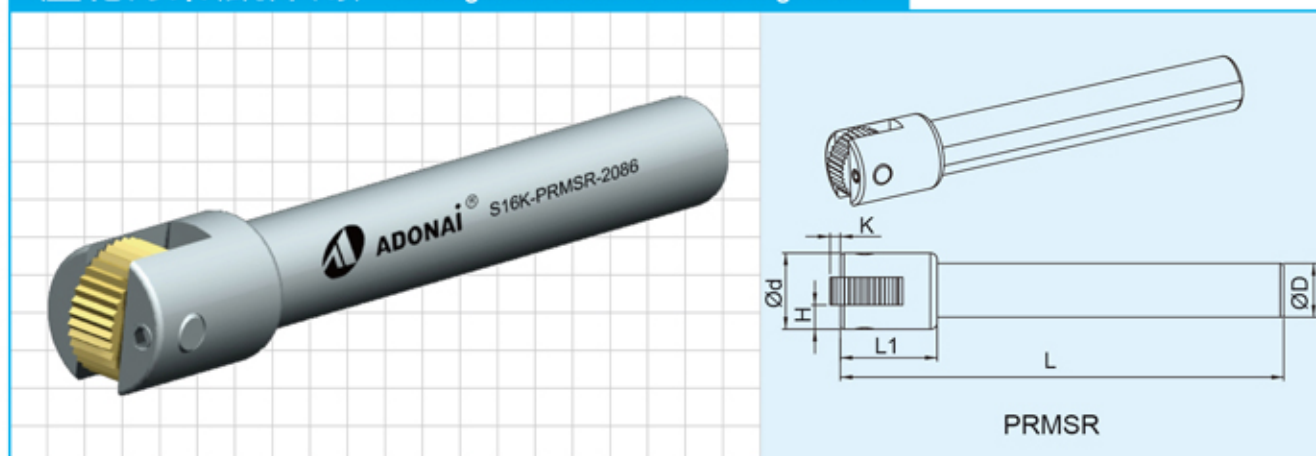


產品規格 Model No.	尺寸 Dimensions				壓花輪 Wheels
	ØD	E	L	min ØB	D x W x d/d1
S12K-PISSR1566/11	12	6	125	17	15 x 6 x 6 / 11
S16K-PISSR2066/11	16	6	125	22	20 x 6 x 6 / 11
S16K-PISSR2086/13	16	8	125	22	20 x 8 x 6 / 13



產品規格 Model No.	尺寸 Dimensions					壓花輪 Wheels
	ØD	E	K	L	min ØB	D x W x d/d1
S12K-PISSR1566/11-C	12	6	2	125	16	15 x 6 x 6 / 11
S16K-PISSR1566/11-C	16	6	2	125	20	
S16K-PISSR2066/11-C	16	6	2.5	125	21	20 x 6 x 6 / 11
S20M-PISSR2066/11-C	20	6	2.5	150	25	
S16K-PISSR2086/13-C	16	8	2.5	125	21	20 x 8 x 6 / 13
S20M-PISSR2086/13-C	20	8	2.5	150	25	

## 壓花刀架(銑床用) Milling Machine Form Knurling Tools

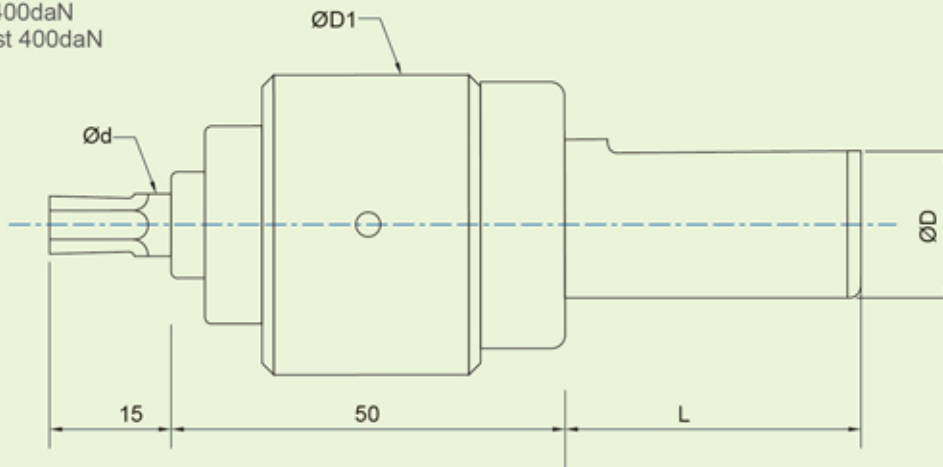


產品規格 Model No.	尺寸 Dimensions						壓花輪 Wheels
	ØD	Ød	H	K	L1	L	D x W x d
S10K-PRMSR-1544	10	16	6	1.5	23	125	15 x 4 x 4
S12K-PRMSR-1544	12	16	6	1.5	23	125	
S16K-PRMSR-1544	16	16	6	1.5	-	125	
S16K-PRMSR-2066	16	22	8	3	28	125	20 x 6 x 6
S16K-PRMSR-2086	16	22	7	3	28	125	20 x 8 x 6
S20K-PRMSR-2086	20	22	7	3	28	130	

## 迴轉沖削刀座 Rotary Broaching Tool Holders

### ■ TYPE:BCM21

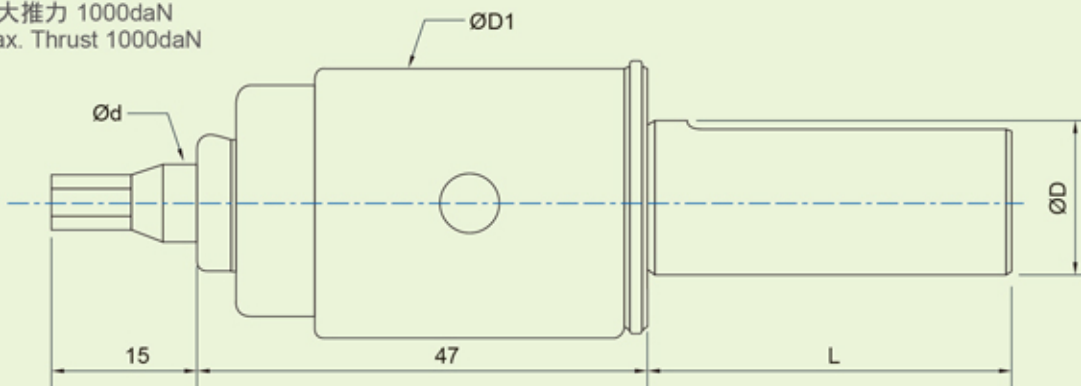
最大推力 400daN  
Max. Thrust 400daN



產品規格 Model No.	尺寸 Dimensions				沖刀 Insert	應用範圍 Scope of application
	D	D1	d	L		
BCM21-ST16	16	38	8	38	BCM32-***	六角形 (Hexagonal) 星形 (Torx) 正方形 (Square) 溝槽 (Grooves) 特殊外形 (Special Profiles)
BCM21-ST20	20					

### ■ TYPE:BCM22

最大推力 1000daN  
Max. Thrust 1000daN

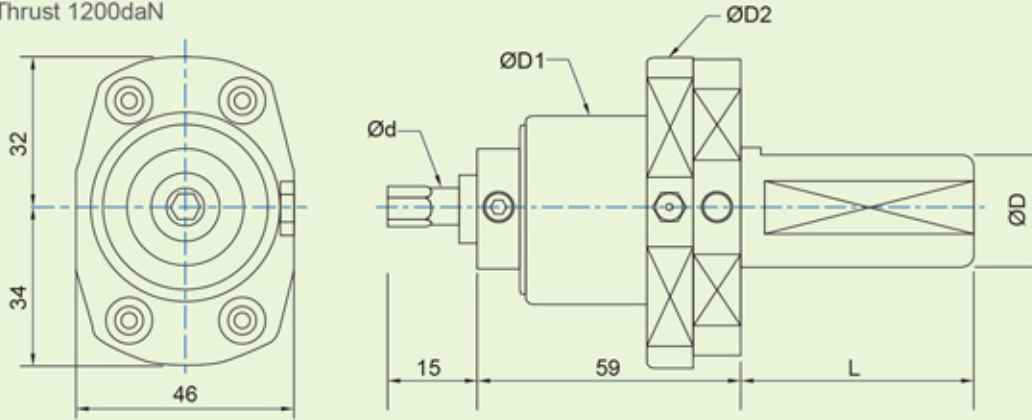


產品規格 Model No.	尺寸 Dimensions				沖刀 Insert	應用範圍 Scope of application
	D	D1	d	L		
BCM22-ST10	10	28	8	38	BCM32-***	六角形 (Hexagonal) 星形 (Torx) 正方形 (Square) 溝槽 (Grooves) 特殊外形 (Special Profiles)
BCM22-ST16	16			38		
BCM22-ST19-100	19.05			100		
BCM22-ST19-150	19.05			150		
BCM22-ST20	20			38		
BCM22-ST20-60	20			60		
BCM22-ST22	22			38		
BCM22-ST25	25			60		

## 迴轉沖削刀座(中心可調式) Adjustable Center Rotary Broaching Tool Holders

### ■ TYPE:BCM26

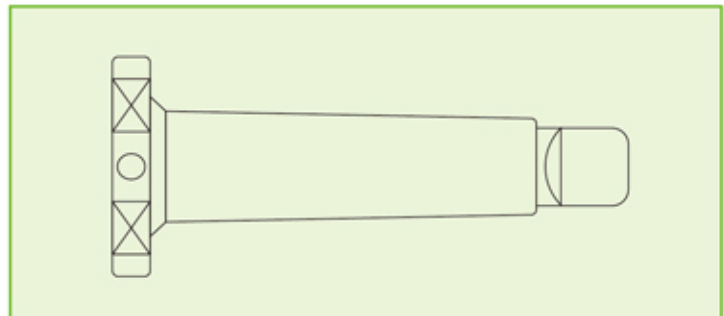
最大推力 1200daN  
Max. Thrust 1200daN



產品規格 Model No.	尺寸 Dimensions					沖刀 Insert	應用範圍 Scope of application
	D	D1	D2	d	L		
BCM26-ST16	16	40	66	8	50	BCM32-***	六角形 (Hexagonal) 星形 (Torx) 正方形 (Square) 溝槽 (Grooves) 特殊外形 (Special Profiles)
BCM26-ST20	20						
BCM26-ST25	25						
BCM26-ST30	30						
BCM26-ST32	32						

\*沖削刀座特殊刀柄:SPECIAL SHANK (Morse Taper)

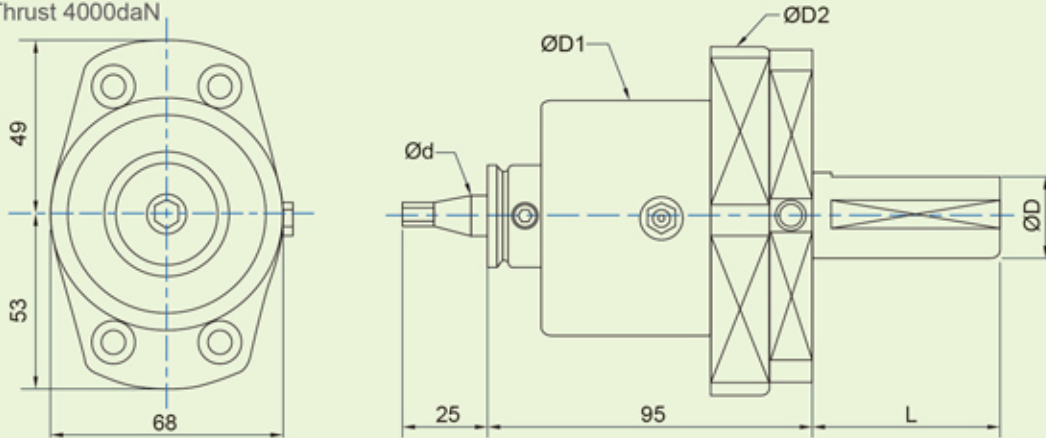
產品規格 Model No.	刀柄 Shank
BCM26-MT4	MT4



## 迴轉沖削刀座(中心可調式) Adjustable Center Rotary Broaching Tool Holders

### ■ TYPE:BCM27

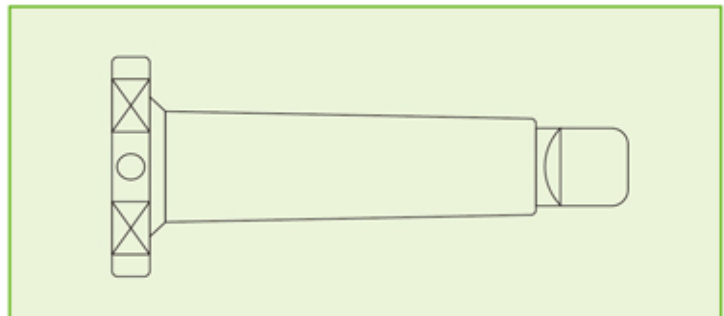
最大推力 4000daN  
Max. Thrust 4000daN



產品規格 Model No.	尺寸 Dimensions					沖刀 Insert	應用範圍 Scope of application
	D	D1	D2	d	L		
BCM27-ST25	25	68	98	12	55	BCM37-****	六角形 (Hexagonal) 星形 (Torx) 正方形 (Square) 溝槽 (Grooves) 特殊外形 (Special Profiles)
BCM27-ST32	32						

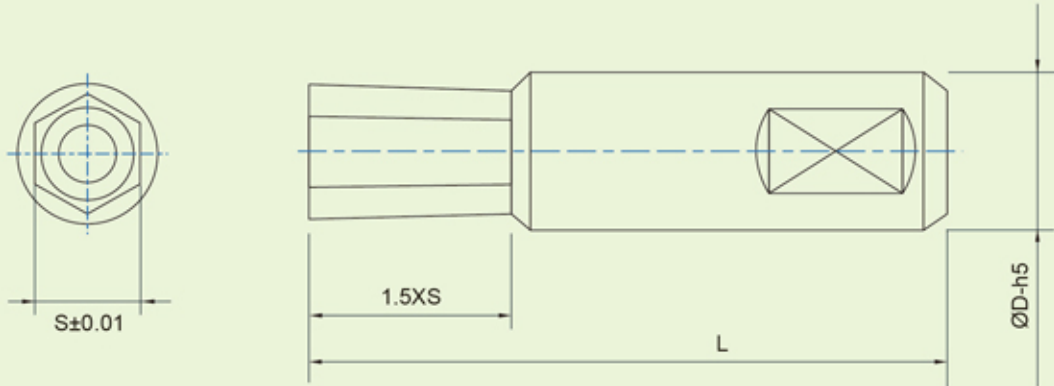
\*沖削刀座特殊刀柄:SPECIAL SHANK (Morse Taper)

產品規格 Model No.	刀柄 Shank
BCM27-MT4	MT4



## 六角沖刀 Hexagon Broachs

### ■ BCM32



產品規格 Model No.	尺寸 Dimensions(mm)			材質 Grade	
	S	D	L	HSS	Carbide
BCM32-H015	1.55	8	$28 \begin{smallmatrix} +0.3 \\ -0 \end{smallmatrix}$	●	○
BCM32-H02	2.05			●	○
BCM32-H025	2.55			●	○
BCM32-H03	3.05			●	○
BCM32-H035	3.55			●	○
BCM32-H04	4.06			●	○
BCM32-H05	5.06			●	○
BCM32-H06	6.06			●	○
BCM32-H07	7.06			●	○
BCM32-H08	8.08			●	○
BCM32-H09	9.08			●	○
BCM32-H10	10.08			●	○
BCM32-H12	12.10			●	○

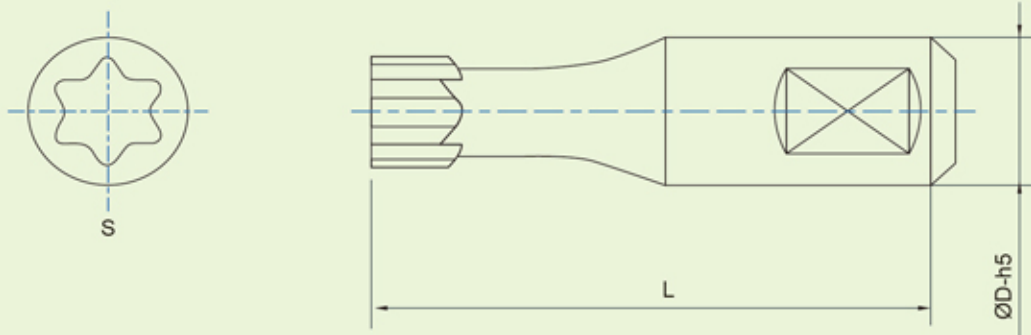
● Standard Stock

○ Standard(Please Check Delivery)

※規格外尺寸，歡迎訂製！(Custom specifications are available upon request.)

## 星形沖刀 Torx Broachs

### ■ BCM32



產品規格 Model No.	尺寸 Dimensions(mm)			材質 Grade	
	S	D	L	HSS	Carbide
BCM32-T6	T6	8	$28^{+0.3}_{-0}$	○	○
BCM32-T8	T8			●	○
BCM32-T10	T10			●	○
BCM32-T15	T15			●	○
BCM32-T20	T20			●	○
BCM32-T25	T25			●	○
BCM32-T30	T30			●	○
BCM32-T40	T40			●	○
BCM32-T45	T45			○	○
BCM32-T50	T50			●	○
BCM32-T55	T55			○	○

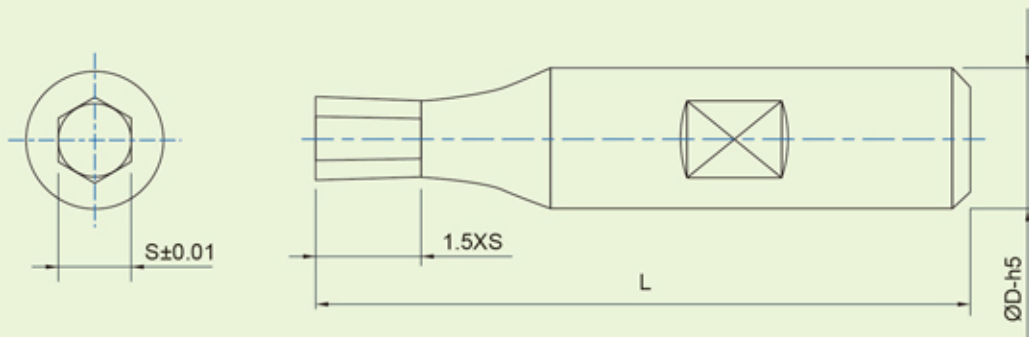
● Standard Stock

○ Standard(Please Check Delivery)

※規格外尺寸，歡迎訂製！(Custom specifications are available upon request.)

## 六角沖刀 Hexagon Broachs

### ■ BCM37



產品規格 Model No.	尺寸 Dimensions(mm)			材質 Grade	
	S	D	L	HSS	Carbide
BCM37-H03	3	12	$55 \begin{smallmatrix} +0.3 \\ -0 \end{smallmatrix}$	○	○
BCM37-H04	4			●	○
BCM37-H05	5			●	○
BCM37-H06	6			●	○
BCM37-H07	7			○	○
BCM37-H08	8			●	○
BCM37-H09	9			○	○
BCM37-H10	10			●	○
BCM37-H11	11			○	○
BCM37-H12	12			●	○
BCM37-H13	13			●	○
BCM37-H14	14			●	○
BCM37-H15	15			●	○
BCM37-H16	16			●	○
BCM37-H17	17			●	○
BCM37-H18	18			●	○

● Standard Stock

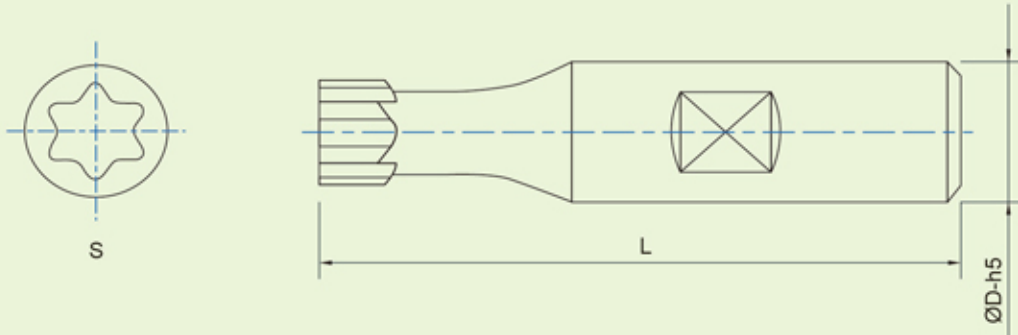
○ Standard(Please Check Delivery)

※規格外尺寸，歡迎訂製！(Custom specifications are available upon request.)



## 星形沖刀 Torx Broachs

### ■ BCM37



產品規格 Model No.	尺寸 Dimensions(mm)			材質 Grade	
	S	D	L	HSS	Carbide
BCM37-T20	T20	12	55 <sup>+0.3</sup> <sub>-0</sub>	○	○
BCM37-T25	T25			○	○
BCM37-T30	T30			○	○
BCM37-T40	T40			○	○
BCM37-T45	T45			○	○
BCM37-T50	T50			○	○
BCM37-T55	T55			○	○

● Standard Stock

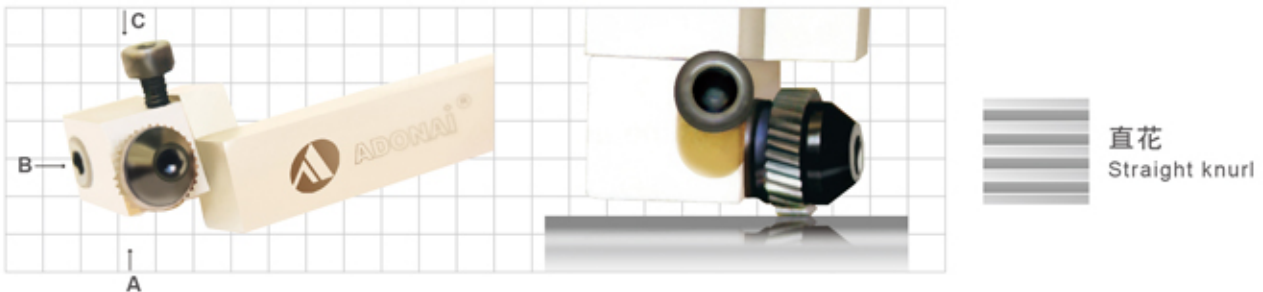
○ Standard(Please Check Delivery)

※規格外尺寸，歡迎訂製！(Custom specifications are available upon request.)

## PRZSR 單花輪安裝方法 Assembly Of Wheel

- 1.將螺絲A鬆開。
- 2.將車花輪（BR-15°）放入，將螺絲A旋緊，旋緊後確認車花輪還可以自由轉動。
- 3.當花紋車削後若有傾斜，鬆開B螺絲，調整旋轉C螺絲可調整車花輪中心的花紋平行。
- 4.再將螺絲B旋緊，即完成安裝。

- 1.Loose screw A.
- 2.Put on wheel(BR15°) and tighten screw A. ensure the wheel is revolution-free after screw is tightened.
- 3.If knurling pattern is inclined please loosen screw B and adjust screw C to make the center of wheel parallel to pattern.
- 4.After adjustment,re-tighten screw B.



## PRKDR 雙花輪安裝方法 Assembly Of wheels

- 1.將螺絲A、B鬆開。
- 2.將車花輪（BL）放入B位置，將B旋緊，旋緊後確認車花輪還可以自由轉動。
- 3.將車花輪（BR）放入A位置，將A旋緊，旋緊後確認車花輪還可以自由轉動。
- 4.鬆開E、F螺絲，將C、D旋至兩花輪貼合（圖2），再平均往兩側旋開(可參考第13頁車花刀架刻度調整參考表)，使花輪外徑平面與工件外徑貼合（圖3）再將E、F旋緊。
- 5.使用RFBL-15°+RFBR-15°各一個可做成交叉花（夾角90°）。使用RFAA-0° 兩個可做成鑽石花（夾角60°）。

- 1.Loose screw A and B.
- 2.Put on wheel(BL) in B position, then tighten screw B ; make sure the wheel is revolution-free.
- 3.Put on wheel(BR) in A position, then tighten screw A ; make sure the wheel is revolution-free.
- 4.Loosen screws E,F, adjust 2 wheels C, D to fit each other as shown in Fig.2,then turn 2 wheels outside evenly to make sure the surface of wheel outside diameter is fit to outside diameter of workpiece Fig.3, then tighten screws E,F.(Adjustment of Knurling Toolholder Graduation,see page 13)
- 5.To make cross knurl(90°) with one wheel each RFBL-15°and RFBR-15°and cross knurl(60°) with 2 wheels RFAA-0°



## PRKDR 車花刀架使用方法 Application and Trouble-Shooting

- 1.將刀柄置入刀座，設定刀具中心高在工件中心位置。
- 2.將花輪靠近工件外徑，調整兩個花輪全寬軸線完全同時貼住工件。
- 3.開始車花時，以快速進入1/2的牙距深度，寬度約輪寬的1/3。
- 4.當花目成型完成，才開始Z軸向進給。
- 5.如果牙型有錯誤，可以修正，而藉由調整刀座軸向。
- 6.使用切削水或潤滑油，排去鐵屑。
- 7.切削資料另參考。
- 8.適用PRZSR/L，PRKDR/L。

- 1.Clamp the wheel holder in the tool post and set its center to center of the workpiece.
- 2.Approacht the 2 knurling wheels close to workpiece, adjust the center of 2 wheels entirely touch the workpiece.
- 3.Start knurling operation firmly with rapid infeed to half pitch with knurling wheel engaged to 1/3 of width.
- 4.When the initial pattern is cut, start Z-axis feed.
- 5.Errors in knurling pattern can be corrected by resetting the adjustable wheel holder head.
- 6.Flush away the chips with cutting oil or lubricant.
- 7.Cutting data refer to reference information.
- 8.Applicable to PRZSR/L,PRKDR/L.



## PRKDR 車花刀架刻度調整參考表 Adjustment of Knurling Toolholder Graduation

(此參考數據為近似值)

(Reference figures in table is an approximate value)

產品規格 Model No.	PRKDR-1236-K	PRKDR-1636-K	PRKDR-20511	PRKDR-25511
(最小刻度)單位:→     ← (Min.Graduation)Unit:	→     ← 0.1	→     ← 0.1	→     ← 0.2	→     ← 0.2
工件直徑 Dia. of Workpiece(mm)	參考刻度 Reference Graduation			
3	0.4			
4	0.5	0.5		
6	0.6	0.6	0.4	1.4
10	0.8	0.8	0.6	1.8
20	1	1	0.8	2.6
30	1.1	1.1	1	2.8
40	1.2	1.2	1	3
50		1.2	1	3.2
60		1.3	1.2	3.4
70			1.2	3.6
80			1.2	3.6
90			1.2	3.6
100			1.2	3.8
120~140				3.8
160~220				4
240~250				4.2

## 車花轉速與進給率 Speed And Feed Charts For Cut Knurling

工件材質 Material of Workpiece	花輪直徑 ∅ of knurling wheels	工件直徑 ∅2-12 ∅of workpiece		工件直徑 ∅12-40 ∅of workpiece		工件直徑 ∅40-250 ∅of workpiece		工件直徑 ∅250+ ∅of workpiece	
		V	F	V	F	V	F	V	F
易削鋼 Steel up to 600 N/mm	8.9 -11	30	0.05-0.08	30	0.05-0.08				
	14.5 -15	40	0.07-0.09	40	0.07-0.09				
	20 -21.5	60	0.07-0.14	60	0.07-0.15	55	0.07-0.15		
	25	100	0.01-0.20	100	0.10-0.20	100	0.10-0.20	50	0.10-0.20
中碳鋼 Steel up to 900 N/mm	8.9 -11	25	0.04-0.07	25	0.04-0.07				
	14.5 -15	35	0.06-0.08	30	0.06-0.08				
	20 -21.5	45	0.07-0.14	45	0.06-0.12	40	0.06-0.12		
	25	60	0.08-0.16	60	0.08-0.16	55	0.08-0.16	50	0.08-0.16
不鏽鋼 Stainless steel	8.9 -11	20	0.04-0.06	20	0.04-0.06				
	14.5 -15	30	0.06-0.08	28	0.06-0.08				
	20 -21.5	40	0.06-0.12	35	0.06-0.12	32	0.06-0.12		
	25	45	0.08-0.17	45	0.08-0.17	42	0.08-0.17	40	0.08-0.17
鑄鐵 Grey cast iron	8.9 -11	22	0.04-0.06	22	0.04-0.06				
	14.5 -15	30	0.06-0.08	28	0.06-0.08				
	20 -21.5	40	0.06-0.12	35	0.06-0.12	32	0.06-0.12		
	25	45	0.08-0.17	45	0.08-0.17	42	0.08-0.17	40	0.08-0.17
鑄鋼 Cast steel	8.9 -11	25	0.04-0.07	25	0.04-0.07				
	14.5 -15	35	0.05-0.08	30	0.05-0.08				
	20 -21.5	45	0.06-0.12	45	0.06-0.12	40	0.06-0.12		
	25	90	0.08-0.15	90	0.08-0.15	65	0.08-0.15	60	0.08-0.15
銅 MS58 Brass 58	8.9 -11	60	0.06-0.10	60	0.06-0.10				
	14.5 -15	70	0.08-0.12	60	0.08-0.12				
	20 -21.5	100	0.08-0.20	100	0.08-0.20	90	0.08-0.20		
	25	140	0.10-0.20	140	0.10-0.20	130	0.10-0.20	115	0.10-0.20
銅 MS60 Brass 60	8.9 -11	50	0.05-0.08	50	0.05-0.08				
	14.5 -15	60	0.08-0.10	60	0.06-0.10				
	20 -21.5	90	0.07-0.15	90	0.07-0.15	80	0.07-0.15		
	25	125	0.08-0.20	125	0.08-0.20	120	0.08-0.20	105	0.08-0.20
鋁 Copper Aluminium	8.9 -11	70	0.06-0.13	70	0.06-0.13				
	14.5 -15	80	0.08-0.18	70	0.08-0.18				
	20 -21.5	120	0.10-0.25	110	0.10-0.25	100	0.10-0.25		
	25	150	0.10-0.35	150	0.10-0.35	135	0.10-0.35	125	0.10-0.35
鋅 Bronze	8.9 -11	35	0.05-0.08	35	0.05-0.08				
	14.5 -15	45	0.07-0.09	40	0.07-0.09				
	20 -21.5	60	0.07-0.14	60	0.07-0.14	56	0.07-0.14		
	25	80	0.10-0.18	80	0.10-0.18	86	0.10-0.18	80	0.10-0.18

切削工件轉速:  $N=(1000 \times V) / (\pi \times D)$

Turning speed of workpiece:  $N=(1000 \times V) / (\pi \times D)$

此圖表數據為參考值，依實際加工時適當調整

These values are intended as a guide, and better results may be obtained by tests carried out on machines

## 壓花轉速與進給率 Speed And Feed Charts For Form Knurling

工件材質 Material of Workpiece	工件直徑 ∅ of workpiece	花輪直徑 ∅ of knurling wheels	轉速 Vc (m/min)	進給量 f (mm/rev)				
				徑向 radial	軸向齒距 axial pitch			
					0.3-0.6	0.6-1.2	1.2-1.6	1.6-2.0
易削鋼 Steel up to 600 N/mm	<10	10	25-55	0.04-0.08	0.2	0.12	0.08	0.06
	10-50	15			0.26	0.16	0.12	0.08
	50-100	20	30-60		0.3	0.18	0.15	0.1
	100-250				0.4	0.26	0.16	0.12
	>250	25						
中碳鋼 Steel up to 900 N/mm	<10	10	20-50	0.04-0.08	0.18	0.1	0.06	0.04
	10-50	15			0.24	0.14	0.1	0.06
	50-100	20	20-55		0.28	0.16	0.12	0.08
	100-250				0.36	0.24	0.14	0.1
	>250	25						
不鏽鋼 Stainless steel	<10	10	20-40	0.04-0.08	0.14	0.08	0.06	0.04
	10-50	15			0.2	0.12	0.1	0.06
	50-100	20	20-45		0.25	0.15	0.12	0.08
	100-250				0.3	0.2	0.14	0.1
	>250	25						
鑄鐵 Grey cast iron	<10	10	20-40	0.04-0.08	0.14	0.08	0.06	0.04
	10-50	15			0.2	0.12	0.1	0.06
	50-100	20	20-45		0.25	0.15	0.12	0.08
	100-250				0.3	0.2	0.14	0.1
	>250	25						
鋁 Copper Aluminium	<10	10	35-75	0.04-0.08	0.25	0.15	0.1	0.08
	10-50	15			0.3	0.2	0.15	0.1
	50-100	20	45-90		0.4	0.25	0.2	0.15
	100-250				0.5	0.3		
	>250	25						
銅 Brass	<10	10	35-75	0.04-0.08	0.25	0.15	0.1	0.08
	10-50	15			0.3	0.2	0.15	0.1
	50-100	20	45-90		0.4	0.25	0.2	0.15
	100-250				0.5	0.3		
	>250	25						
鋅 Bronze	<10	10	25-55	0.04-0.08	0.2	0.12	0.08	0.06
	10-50	15			0.26	0.16	0.12	0.08
	50-100	20	30-60		0.3	0.18	0.15	0.1
	100-250				0.4	0.26	0.16	0.12
	>250	25						

切削工件轉速:  $N=(1000 \times V) / (\pi \times D)$

Turning speed of workpiece:  $N=(1000 \times V) / (\pi \times D)$

此圖表數據為參考值，依實際加工時適當調整

These values are intended as a guide, and better results may be obtained by tests carried out on machines

## 壓花外徑膨脹值 Material Displacement Through Form Knurling

< 工件：直紋      Workpiece : RAA  
 壓花輪：AA      Knurling wheels : AA



UNIT:m/m

齒距 Pitch		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.5	1.6	1.8	2.0
工件材料 Material of workpiece	工件直徑-ømm Workpiece	工件外徑膨脹值 Increases in workpiece diameter												
易削鋼 Steel	5	0.08	0.14	0.18	0.22	0.27	0.29	0.33	0.35	0.50	-	-	-	-
	15	0.08	0.14	0.18	0.23	0.30	0.40	0.41	0.44	0.50	0.60	0.65	0.67	0.70
	25	0.08	0.15	0.23	0.24	0.28	0.35	0.38	0.44	0.53	0.62	0.70	0.70	0.98
不銹鋼 Stainless steel	5	0.10	0.15	0.20	0.25	0.28	0.30	0.35	0.42	0.41	-	-	-	-
	15	0.10	0.15	0.19	0.25	0.30	0.34	0.40	0.45	0.51	0.60	-	-	-
	25	0.10	0.14	0.20	0.26	0.31	0.33	0.38	0.43	0.50	0.62	-	-	-
銅 Brass	5	0.08	0.12	0.18	0.20	0.21	0.22	0.23	0.25	0.28	-	-	-	-
	15	0.10	0.14	0.20	0.26	0.28	0.29	0.31	0.35	0.41	0.44	0.48	0.50	0.55
	25	0.10	0.15	0.20	0.25	0.28	0.30	0.32	0.36	0.43	0.46	0.50	0.53	0.53
鋁 Copper aluminium	5	0.09	0.15	0.19	0.23	0.28	0.30	0.34	0.41	0.40	-	-	-	-
	15	0.10	0.15	0.19	0.26	0.29	0.33	0.39	0.45	0.51	0.57	0.65	-	-
	25	0.09	0.15	0.19	0.26	0.29	0.32	0.37	0.45	0.52	0.59	0.65	0.78	0.75

< 工件：30° 左右斜紋      Workpiece : RBL30° / RBR30°  
 壓花輪：BL30° / BR30°      Knurling wheels : BL30° / BR30°



齒距 Pitch		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.5	1.6	1.8	2.0
工件材料 Material of workpiece	工件直徑-ømm Workpiece	工件外徑膨脹值 Increases in workpiece diameter												
易削鋼 Steel	5	0.11	0.15	0.20	0.24	0.28	0.34	0.38	0.45	0.55	-	-	-	-
	15	0.11	0.15	0.22	0.26	0.30	0.35	0.42	0.45	0.52	0.67	0.73	0.75	0.85
	25	0.11	0.14	0.23	0.25	0.28	0.36	0.42	0.45	0.56	0.70	0.72	0.78	0.90
不銹鋼 Stainless steel	5	0.09	0.14	0.19	0.25	0.31	0.34	0.39	0.45	0.52	-	-	-	-
	15	0.12	0.20	0.23	0.31	0.35	0.40	0.45	0.51	0.62	0.66	0.73	0.85	0.97
	25	0.12	0.18	0.24	0.27	0.37	0.39	0.43	0.49	0.59	0.80	0.84	0.93	0.96
銅 Brass	5	0.10	0.14	0.20	0.23	0.24	0.28	0.30	0.33	0.37	-	-	-	-
	15	0.10	0.15	0.21	0.23	0.24	0.31	0.36	0.41	0.47	0.53	0.55	0.64	0.63
	25	0.11	0.15	0.22	0.22	0.25	0.30	0.35	0.40	0.45	0.55	0.61	0.62	0.68
鋁 Copper aluminium	5	0.12	0.14	0.21	0.24	0.29	0.34	0.39	0.41	0.51	-	-	-	-
	15	0.12	0.18	0.23	0.26	0.36	0.40	0.43	0.50	0.56	0.56	0.61	0.74	0.75
	25	0.12	0.16	0.25	0.28	0.37	0.39	0.46	0.50	0.58	0.77	0.82	0.84	0.96

< 工件：30° 網紋      Workpiece : RGE30°  
 壓花輪：BL30° + BR30°      Knurling wheels = BL30° + BR30°

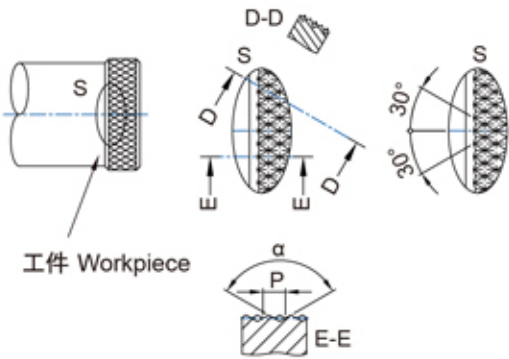
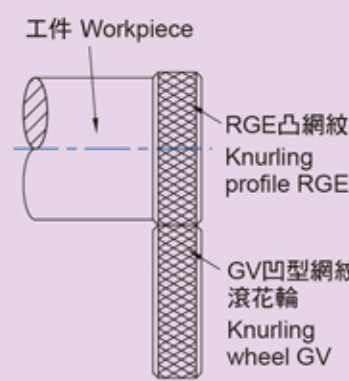
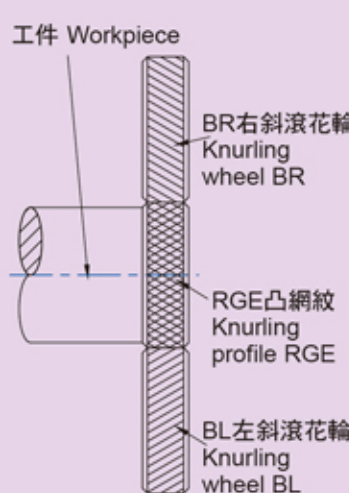

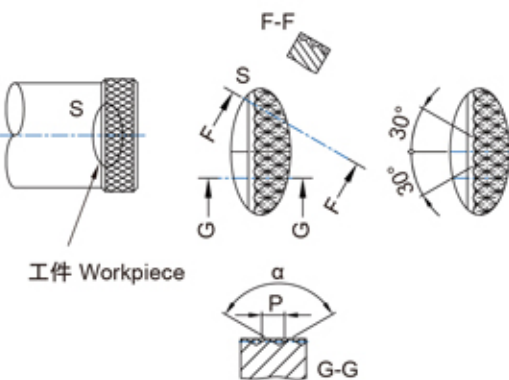
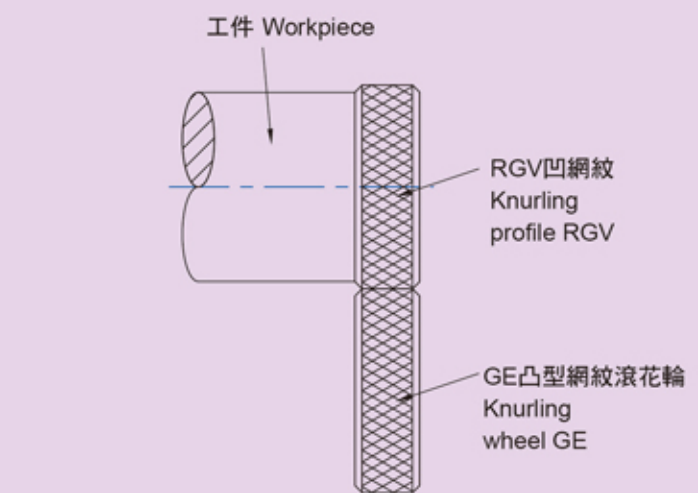


齒距 Pitch		0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.5	1.6	1.8	2.0
工件材料 Material of workpiece	工件直徑-ømm Workpiece	工件外徑膨脹值 Increases in workpiece diameter												
易削鋼 Steel	5	0.12	0.16	0.20	0.25	0.33	0.41	0.45	0.55	0.65	-	-	-	-
	15	0.13	0.22	0.30	0.32	0.35	0.41	0.43	0.52	0.62	0.67	0.81	0.86	0.95
	25	0.12	0.18	0.28	0.32	0.35	0.38	0.43	0.55	0.67	0.77	0.87	0.98	0.98
不銹鋼 Stainless steel	5	0.11	0.20	0.25	0.30	0.36	0.39	0.41	0.55	0.55	-	-	-	-
	15	0.10	0.14	0.21	0.24	0.29	0.34	0.40	0.43	0.53	0.66	0.72	0.70	0.88
	25	0.11	0.13	0.20	0.25	0.28	0.32	0.41	0.44	0.52	0.67	0.70	0.71	0.83
銅 Brass	5	0.12	0.13	0.16	0.20	0.24	0.28	0.30	0.32	0.38	-	-	-	-
	15	0.12	0.16	0.18	0.24	0.28	0.30	0.37	0.39	0.40	0.48	0.52	0.55	0.63
	25	0.12	0.17	0.22	0.23	0.27	0.30	0.34	0.38	0.41	0.48	0.50	0.63	0.63
鋁 Copper aluminium	5	0.10	0.15	0.21	0.25	0.33	0.36	0.41	0.50	0.57	-	-	-	-
	15	0.11	0.14	0.20	0.25	0.28	0.33	0.39	0.43	0.54	0.67	0.71	0.76	0.89
	25	0.11	0.15	0.22	0.25	0.29	0.34	0.40	0.44	0.53	0.68	0.69	0.71	0.88

## 滾花刀具的選擇 Knurling Tools Choice

工件上的滾花表面花型 (DIN 82) Knurling Profile (DIN 82)	加工方式 Knurling Technique	
	滾壓滾花 Form Knurling	切削滾花 Cut Knurling
<p>RAA直紋花型 RAA-Knurl with straight pattern</p> <p>工件 Workpiece</p>	<p>工件 Workpiece</p> <p>RAA 直紋花型 Knurling profile RAA</p> <p>AA 直紋滾花輪 Knurling wheel AA</p>	<p>工件 Workpiece</p> <p>RAA 直紋花型 Knurling profile RAA</p> <p>左斜15° 滾花輪 Knurling wheel BL swivelled 15°</p> <p>右斜15° 滾花輪 Knurling wheel BR swivelled 15°</p>
<p>RBL左斜花型 RBL-Knurl, left-hand spiral</p> <p>工件 Workpiece</p>	<p>工件 Workpiece</p> <p>RBL左斜滾花型 Knurling profile RBL</p> <p>BR右斜滾花輪 Knurling wheel BR</p>	
<p>RBR右斜花型 RBR-Knurl, right-hand spiral</p> <p>工件 Workpiece</p>	<p>工件 Workpiece</p> <p>RBR右斜滾花型 Knurling profile RBR</p> <p>BL左斜滾花輪 Knurling wheel BL</p>	

## 滾花刀具的選擇 Knurling Tools Choice

工件上的滾花表面花型 (DIN 82) Knurling Profile (DIN 82)	加工方式 Knurling Technique	
	滾壓滾花 Form Knurling	切削滾花 Cut Knurling
<p><b>RGE凸網紋花型</b> RGE-Diamond knurl, left-right-hand knurl, points raised (male)</p>  <p>工件 Workpiece</p>	<p>工件 Workpiece</p>  <p>RGE凸網紋 Knurling profile RGE</p> <p>GV凹型網紋 滾花輪 Knurling wheel GV</p> <p>工件 Workpiece</p>  <p>BR右斜滾花輪 Knurling wheel BR</p> <p>RGE凸網紋 Knurling profile RGE</p> <p>BL左斜滾花輪 Knurling wheel BL</p>	<p>工件 Workpiece</p>  <p>AA直紋滾花輪 Knurling wheel AA swivelled 30°</p> <p>RGE30°凸網紋 Knurling profile RGE</p> <p>AA直紋滾花輪 Knurling wheel AA swivelled 30°</p>
<p><b>RGV凹網紋花型</b> RGV-Diamond knurl, left-right-hand knurl, points indented (female)</p>  <p>工件 Workpiece</p>	<p>工件 Workpiece</p>  <p>RGV凹網紋 Knurling profile RGV</p> <p>GE凸型網紋滾花輪 Knurling wheel GE</p>	



## 滾花刀具的選擇 Knurling Tools Choice

工件上的滾花表面花型 (DIN 82) Knurling Profile (DIN 82)	加工方式 Knurling Technique
<p>RKE凸方紋花型 RKE-Cross-knurl , points raised (male)</p> <p>工件 Workpiece</p>	<p>滾壓滾花 Form Knurling</p> <p>工件 Workpiece</p> <p>RKE凸方紋 Knurling profile RKE</p> <p>KV凹方紋滾花輪 Knurling wheel KV</p>
<p>RKV凹方花型 RKE-Cross-knurl , points indented (female)</p> <p>工件 Workpiece</p>	<p>工件 Workpiece</p> <p>RKV凹方紋 Knurling profile RKV</p> <p>KE凸方紋滾花輪 Knurling wheel KE</p>

## 迴轉沖削孔加工使用說明

**ADONAI** 沖削刀具是一個操作簡單的轉削孔刀具，可在盲孔或通孔上，銳邊或倒角邊製作有規則或不規則的多邊形，除了標準的六角形與正方形孔，也可製作溝槽，星形或其他特殊外形。



**ADONAI** 沖削刀具適用於一般車床、CNC自動車床、綜合加工機、鑽床以及特殊功能機器。也適用各種標準或特殊內外孔沖孔。

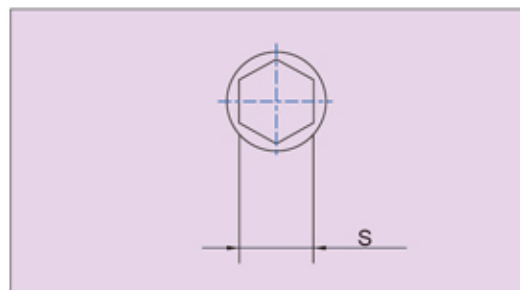
在正確的配合下，這個特殊角度 $\theta$ 的結構可以節省80%的機械推力(如圖一)。這個重要的加工力量縮減是依賴特殊角度 $\theta$ 的傾斜使機械推力集中於外形區域的一小部份去沖孔。外形的每一部份被沖刀的先端在同步迴轉中連續加工。輪廓精密度取決於沖刀的精密度，但也與正確的中心調整有關，如此也可增進刀刀的壽命。

在大部份轉塔車床的案例，夾頭本體是靜止的而組合在一起的沖刀卻可正、逆旋轉。在一些多軸或專用機械，情況剛好相反，夾頭本體在旋轉而沖刀在工件擋住而靜止。當輪廓必須被定位到工件的形狀，此時需要一個在主軸鼻端的連接器將沖刀靜止在正確的角度位置上。

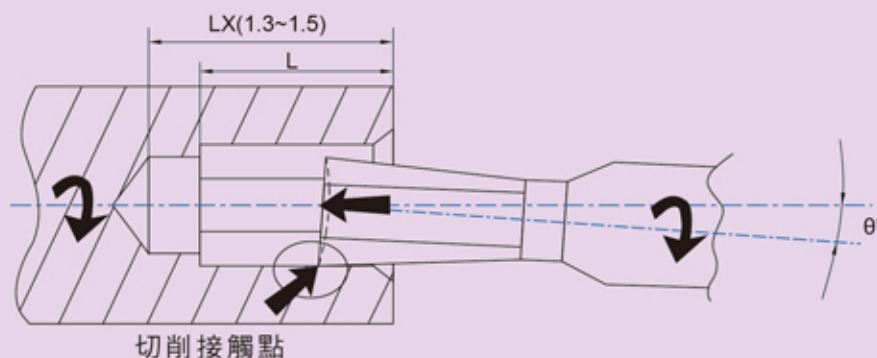
### 一、沖削孔加工之前的鑽孔與搪孔

例如沖六角孔其正常的鑽孔必須稍大於被沖孔兩相對平面的有效尺寸。在中碳鋼(60-80dN/mm)我們建議以下的容許公差值：

六邊形對邊尺寸S	鑽孔的容許公差值
1.5~3mm	$S + 0.03 \sim + 0.06$
3~6mm	$S + 0.04 \sim + 0.08$
6~10mm	$S + 0.06 \sim + 0.12$
10~16mm	$S + 0.10 \sim + 0.20$
> 16mm	$S + 0.15 \sim + 0.30$



(圖1) 工件



### 二、鑽孔的深度

通常我們建議鑽孔的深度是沖孔深度的1.3至1.5倍，(如圖一)碎片必須被沖刀充分的推擠而清除。如果工件必須熱處理，在這個狀況可能需要利用小於當初鑽孔0.1~0.2mm的鑽頭去鑽掉碎片。鑽孔的偏心最大不可超過沖孔尺寸的0.02~0.04mm。

### 三、沖削孔前注意事項

1、一個60度或90度倒角，倒角稍大於沖刀兩對角尺寸，這是一般沖孔的原則。如果在高迴轉速度下加工，則可能需要在沖孔後再修補倒角。

2、當需要高同心度時，預鑽一個0.5mm深的孔，直徑相同或稍小於沖刀兩對角尺寸，可提供解決的方案，這個預留的孔當開始沖孔時能撐住沖刀防止偏擺。加工完成後可將這個預留孔切削掉或倒角。

### 四、沖孔加工的迴轉速度

迴轉沖刀的原理允許應用於高轉速，從1000到3000轉/分鐘，因為迴轉速度不影響切削速度。然而，在非常高速下，當開始加工時沖刀會與工件摩擦，直到速度同步為止。這樣在時常使用小沖刀時非常容易提早磨損沖刀，為了避免這種現象，剛開始時用較慢的轉速或甚至不旋轉，當沖刀進入工作狀態再增加迴轉速度。

### 五、進給率

1、進刀量的選擇是根據材料的特性，在中碳鋼，如果機械有足夠的推力，我們建議每一迴轉進給率0.03~0.06mm。在銅、鋁材料能夠用到兩倍甚至三倍的進刀量。在大的輪軸尺寸和難切削材料加工，必須減少進給率0.01mm。

2、退刀時退刀量我們建議每一迴轉進給率0.08-0.10mm。

### 六、切削液

使用一般冷卻液或切削油。

## ROTARY BROACHING TOOLS OPERATING MANUAL

The **ADONAI** broaching tools is a simple, easy to operate attachment, which produces regular or irregular polygons in blind or through holes having sharp or chamfered edges. The attachment operates with a hunting rotary motion which, in addition to the standard hexagonal and square holes, can also produce grooves, Torx and other special profiles.

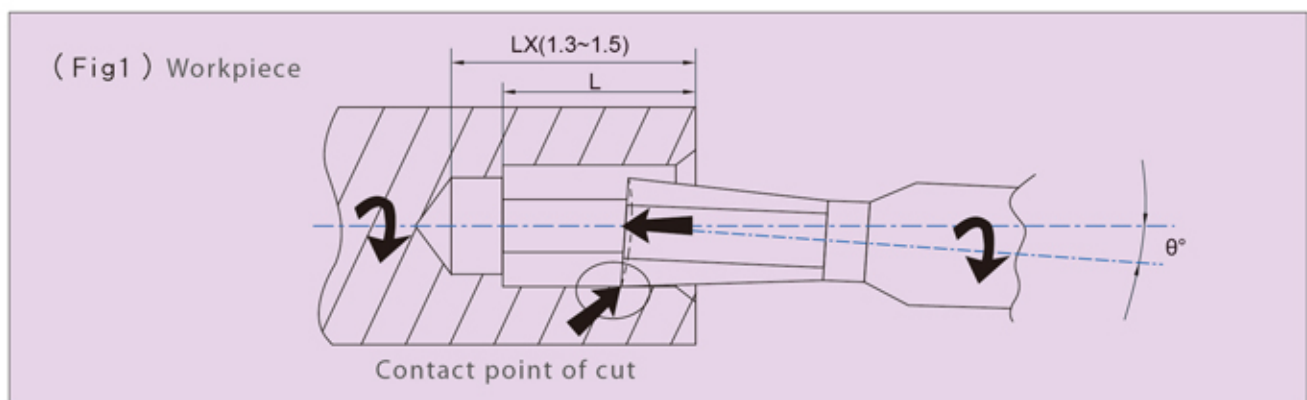
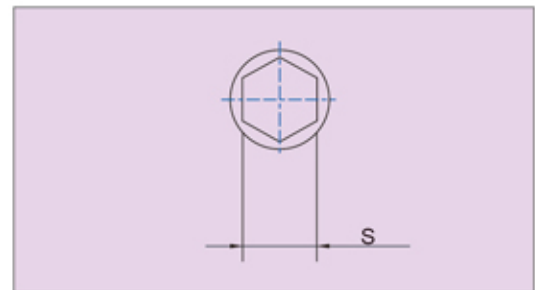


The **ADONAI** broaching tools can also be used on lathes, CNC automatic lathes, machining centers, drilling machines and special purpose machines for a wide variety of standard or special internal and external forms.

### 1.

**Drilling The Hole** - For internal broaching, the hole should be drilled approximately 1% bigger than the diameter across the flats of a hex shape. This percentage can be reduced in free cutting material and increased as machinability decreases, In mild steel we recommend the following tolerances:

Hex. Size S	Drill Hole Tolerance
1.5~3 mm	$S + 0.03 \sim + 0.06$
3~6 mm	$S + 0.04 \sim + 0.08$
6~10 mm	$S + 0.06 \sim + 0.12$
10~16 mm	$S + 0.10 \sim + 0.20$
> 16 mm	$S + 0.15 \sim + 0.30$



### 2.

Drill the hole as deep as possible to leave room for chip accumulation. A depth of 1.3 to 1.5 times the length of the profile is recommended. (Fig.1) If the chips need to be removed, re-drill the hole with a slightly smaller drill size.

3.

Preparing To Broach A Hole - The hole should first be prepared with a 60°-90° chamfer slightly bigger than the largest dimension of the broach tool. This ensures easy starting of the broach by guiding the tool in.

4.

Recommended Speed - The basic principle of the  $\theta^\circ$  offset allows high speed application from 1000 up to 3000 rpm. Surface footage has very little effect on cutting action or the tool life. The cutting edges of the broach tend to dig in to the face of the part as the tool comes in to contact with the rotating material. At higher speeds this dig mark will become more pronounced and tool life will suffer. For best results start the broach operation at a slow rotation and then increase the speed when it is in full contact. Reversing the spindle rotation half way into the part can reduce spiraling.

5.

Feed Rate - The feed choice mainly depends on the material characteristics. In a mild-steel, we recommend. 0.03~0.06mm per revolution. If the machine thrust force is sufficient, the feed can be doubled even.

6.

Coolant - Water soluble coolant or cutting oil are both sufficient for Rotary Broaching.

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