

MURATA TOOL, LTD.

# MURATA TURRET PUNCH PRESS TOOLING GUIDEBOOK

MURATEC WIEDEMANN TOOLING

VERSION 2.05

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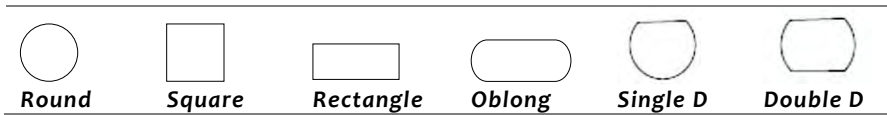
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# I BASIC INFORMATION

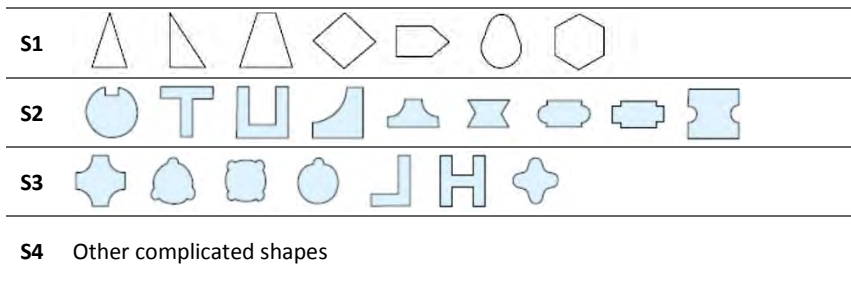
## Materials and coatings

TYPES	ITEM	STAINLESS	MILD STEEL	ALUMINUM	FEATURES
<b>SKD</b>	Punch/Die	-	-	-	Harder, tougher, better abrasion-resistant than SKD11.
<b>SKH</b>	Punch	-	-	-	Tensile strength is better than SHK51
<b>UHP</b>	Punch	✓	✓✓	✓✓	Better machinability than SHK51.
<b>UGP</b>	Punch	✓✓	✓✓✓	✓✓	Tougher surface than UHP - longer life, preventing build-up edge (SKH Punches only)
<b>TIN COATING</b>	Punch	✓✓	-	✓✓	Finalized in gold. Titanium nitride coating reduces sliding resistance.
<b>TICN COATING</b>	Punch	✓✓✓	✓✓✓	✓✓✓	Finalized in gray. Coated with titanium carbide and titanium nitride - tougher and better abrasion resistance than TIN.

## Standard shapes



## Special shapes



## Die clearance – Servo models

CLEARANCE	MILD STEEL	STAINLESS	ALUMINUM
<b>0.2</b>	~ 0.6	~ 0.5	~ 0.8
<b>0.2</b>	0.8	0.6	1
<b>0.2</b>	1	0.8	1.2
<b>0.25</b>	1.2	1 ~ 1.2	1.5
<b>0.35</b>	1.6	1.5	2
<b>0.5</b>	2.3	2	3
<b>0.7</b>	3.2	3	4
<b>0.9</b>	4.5	4	5
<b>1.2</b>	6	-	6
<b>TO THICKNESS</b>	<b>20~25%</b>	<b>25~30%</b>	<b>20~25%</b>

(mm)

- Minimum clearance varies among models.
- The listed clearance assume the fastest punching speed.
- For a slow mode, clearance should be larger by 2-5% than the listed.


## Die clearance – Mechanical models

CLEARANCE	MILD STEEL	STAINLESS	ALUMINUM
<b>0.2</b>	~ 0.8	~ 0.6	~ 0.8
<b>0.2</b>	1	0.8	1
<b>0.2</b>	1.2	0.8	1.2
<b>0.25</b>	1.6	1.2	1.5
<b>0.35</b>	2.3	1.5	2
<b>0.4</b>	-	2	-
<b>0.5</b>	3.2	3	3
<b>0.6</b>	-	-	4
<b>0.75</b>	4.5	4	5
<b>1.0</b>	6	-	-
<b>TO THICKNESS</b>	<b>15~20%</b>	<b>20~25%</b>	<b>15~20%</b>

(mm)

# I BASIC INFORMATION

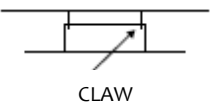
## Standard shear angles

Station	Cutting shapes and sizes	Shear angle
X, A, B, C, VARITOOL	ROUND $\phi 38$ mm or smaller Standard shapes	No shear
D, E, F, G, H, J	Standard shape in X, A, B or VARI size	Roof top
	Standard shape in D, E, F, G, H, J	Concave
	<div style="display: flex; align-items: center;">  </div>	

A punch provided with shear is basically 2.4mm longer than those without shear. Shear height varies among the cutting shape and size.

## Slug Wiper die (SW) – optional

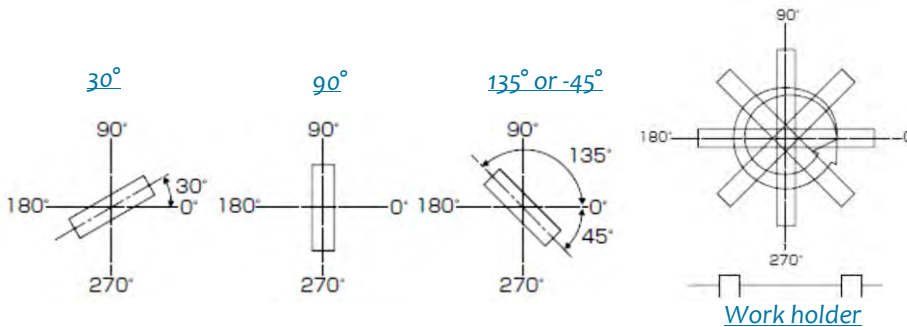
**SLUG WIPER (SW)**



A special claw is provided to remove the slug off the drawing punch.

## Angles

- The below defines the angles of the shape when the processed work is seen from the top.
- A rectangle at 0 degree refers to the one laying horizontally.
- For additional angle(s), visual information is preferred to prevent from being occurred mutual misunderstanding.



## Angles available with MURATA items

	0°	45°	90°	135°	180°	225°	270°	315°
114 PUNCH HOLDER	✓							
VULCAN PUNCH HOLDER	✓							
114 DIE HOLDER B~D	✓		✓		✓		✓	
114 DIE HOLDER E~	✓	✓	✓					
SLIDE IN DIE HOLDER B~D	✓		✓	✓	✓	✓	✓	
SLIDE IN DIE HOLDER E~	✓	✓	✓		✓		✓	✓
114 PUNCH B~C	✓		✓		✓		✓	
114 PUNCH D~	✓		✓					
VULCAN PUNCH	✓							
114 DIE	✓							
VARITOOL PUNCH & DIE	✓							
VULCAN STRIPPER B~F	✓	✓	✓	✓	✓	✓	✓	✓
VULCAN STRIPPER GHJ	✓		✓		✓		✓	

# I BASIC INFORMATION

## Station compatibility

		X	A, IA	B	INDEX FB	C	INDEX FC	D	INDEX D	E	F	INDEX F	G	H	J
<b>114</b>	Punch holder	-	-	-	-	-	-	-	-	✓	✓	-	✓	✓	-
	Punch	✓		✓		✓		✓		✓			✓		
	Urethane stripper	-	-	✓		✓		✓		-	✓		-	-	-
<b>VULCAN</b>	Punch holder	-	✓		-	-	-	-	-	✓		-	✓		
	Punch	-	✓			✓		✓		✓			✓		
	Metal stripper	-	✓			✓		✓		-	-	-	-	-	-
<b>114</b>	Die	✓				✓		✓		-	✓		-	-	-

Contact us for further information.

## VULCANTOOL Guideline

### GUIDED METAL STRIPPER

Guide-type of metal stripper is provided to 6.0mm wide or narrower standard shapes. Special shapes (see page 3) are exceptional.

### GREASE APPLIED TO METAL STRIPPER

If your turret punch press is a grease model, metal strippers shall be covered with a grease.

### VULCAN SIZE LIMIT BY SHEET THICKNESS

Cutting size with VULCANTOOL is limited by sheet material and thickness. For some metal sheets, tool shall be larger than the pre-determined.

(mm)

Mild steel	Stainless		X	AB	C	D	EF	GHJ
~ 2.3	~ 1.0	Diameter	<b>12.7</b>	<b>25.0</b>	<b>38.0</b>	<b>50.0</b>	<b>75.0</b>	<b>120.0</b>
		Perimeter	<b>39.9</b>	<b>78.5</b>	<b>119.0</b>	<b>157.0</b>	<b>235.5</b>	<b>376.8</b>
~ 3.2	~ 1.5	Diameter	<b>12.7</b>	<b>20.4</b>	<b>38.0</b>	<b>50.0</b>	<b>70.0</b>	<b>111.0</b>
		Perimeter	<b>39.9</b>	<b>64.0</b>	<b>119.0</b>	<b>157.0</b>	<b>219.8</b>	<b>348.5</b>
~ 4.5	~ 2.0	Diameter	<b>9.5</b>	<b>16.1</b>	<b>31.0</b>	<b>44.0</b>	<b>55.0</b>	<b>86.0</b>
		Perimeter	<b>29.8</b>	<b>50.5</b>	<b>97.0</b>	<b>138.0</b>	<b>172.7</b>	<b>270.0</b>
~ 6.0	~ 3.0	Diameter	<b>6.5</b>	<b>12.7</b>	<b>25.0</b>	<b>35.0</b>	<b>44.0</b>	<b>70.0</b>
		Perimeter	<b>20.0</b>	<b>39.9</b>	<b>78.5</b>	<b>110.0</b>	<b>138.0</b>	<b>219.8</b>

The values above is based on an unused punch and die with a recommended clearance. Except mentioned above, contact us for further information.

# I BASIC INFORMATION

## Punching tonnage

Tonnage of punching is determined by the perimeter of the shape to cut, as well as the thickness and the shearing resistance of the object to be processed. Shear angles (see page 4) help tonnage reduces.

### WITHOUT SHEAR ON PUNCH

$$\text{Tonnage (kN)} = \frac{\text{Perimeter (mm)} \times \text{Thickness (mm)} \times \text{Shearing Resistance } \left(\frac{\text{N}}{\text{mm}^2}\right)}{1000}$$

### WITH SHEAR ON PUNCH

$$\text{Tonnage (kN)} = \frac{\text{Perimeter (mm)} \times \text{Thickness (mm)} \times \text{Shearing Resistance } \left(\frac{\text{N}}{\text{mm}^2}\right) \times \text{Shear coefficient}}{1000}$$

## Shearing resistance

Mild Steel (SPCC)	260 N/mm <sup>2</sup> as minimum ( 350 Nmm <sup>2</sup> )
Stainless steel	520~560 N/mm <sup>2</sup>
Aluminum (anti-corrosive)	150~220 N/mm <sup>2</sup>
Brass	220~400 N/mm <sup>2</sup>
Silicon steel	450~560 N/mm <sup>2</sup>
Hard Steel (SS4400)	420 N/mm <sup>2</sup>

## Shear coefficient

MURATA cutting shears are applied to D and larger punches. Shear height is 2.4mm unless otherwise required. Shearing coefficient is determined by its depth as well as worksheet thickness. The coefficient below is based on a shear of 2.4mm.

THICKNESS (MM)	<b>1.2</b>	<b>1.6</b>	<b>2.0</b>	<b>2.3</b>	<b>3.0</b>	<b>3.2</b>	<b>1.0</b>	<b>4.5</b>	<b>6.3</b>	<b>9.5</b>
COEFFICIENT	<b>0.50</b>	<b>0.50</b>	<b>0.50</b>	<b>0.50</b>	<b>0.61</b>	<b>0.63</b>	<b>0.71</b>	<b>0.75</b>	<b>0.83</b>	<b>0.90</b>

### Example)

What is the punching tonnage for Φ50 with a 2.4mm shear punch to process SPCC t3.2?

The shearing resistance is 350 N/mm and the coefficient is 0.63.


$$\text{Punching Tonnage} = (50 \times \pi \times 3.2 \times 350 \times 0.63) / 1000 = 110 \text{ (kN)}$$

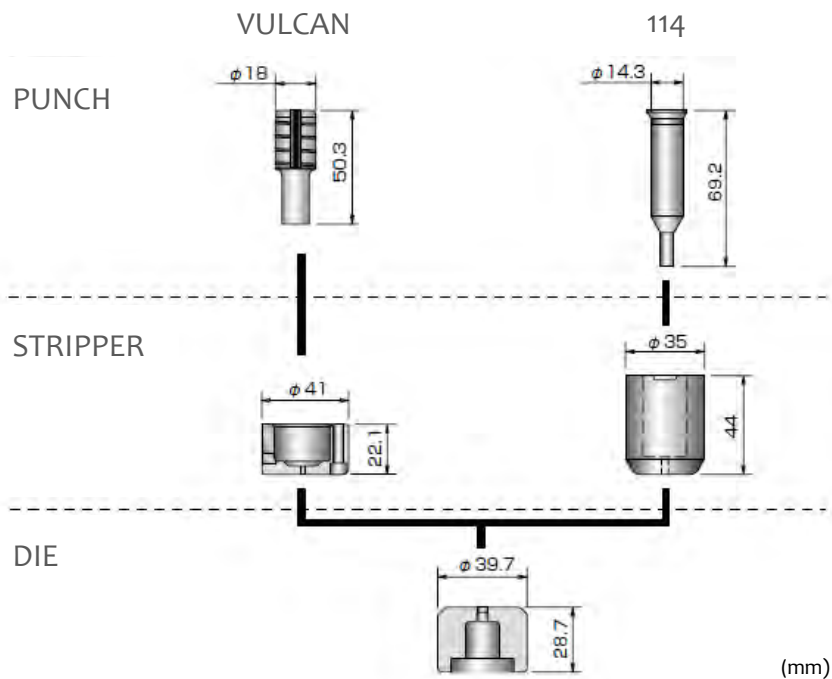
# II PUNCH, DIE & STRIPPER

STATION

**X**

NARROW

			
<b>ROUND</b> ~ 3.2 mm	<b>SQUARE</b>	<b>RECTANGLE</b>	<b>OBLONG</b>



Round only

		Basic	Option	Coating (See page 3)
VULCAN	PUNCH	SKH	-	UHP, UGP, TIN, TICN
	STRIPPER	METAL	-	-
114	PUNCH	SKD	SKH	UHP, UGP, TIN, TICN
	STRIPPER	URATHANE 4XXA	-	-
114	DIE		SW, SA	-

SKH = High speed steel

SKD = Die steel

SA = Slug away


SW = Slug wiper (See page 4.)

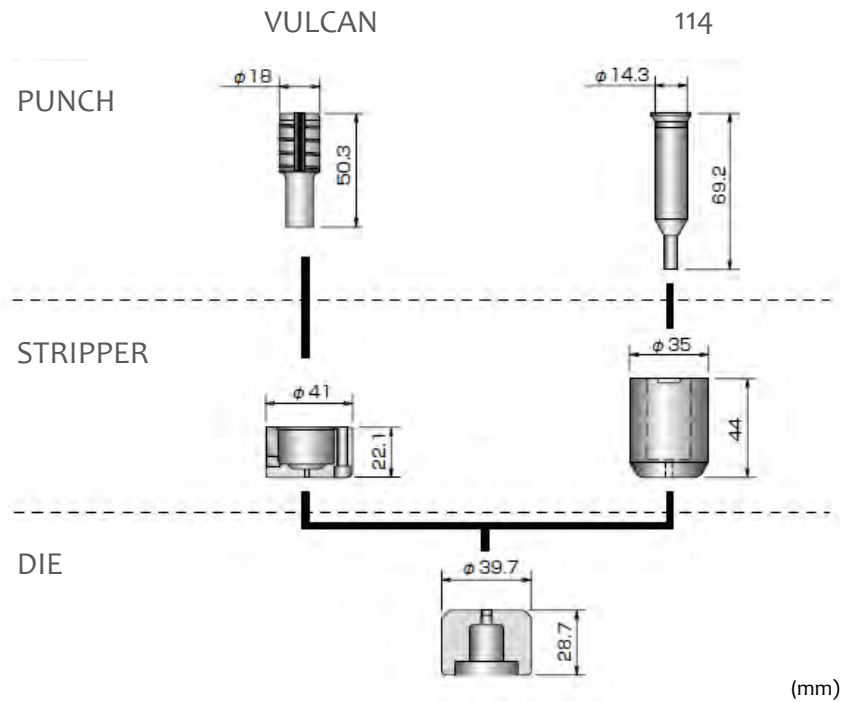


# II PUNCH, DIE & STRIPPER

STATION

# X

			
<b>ROUND</b> 3.2 ~ 12.7 mm	<b>SQUARE</b>	<b>RECTANGLE</b>	<b>OBLONG</b>



Round only

		Basic	Option	Coating (See page 3)
VULCAN	PUNCH	SKH	-	UHP, UGP, TIN, TICN
	STRIPPER	METAL	-	-
114	PUNCH	SKD	SKH	UHP, UGP, TIN, TICN
	STRIPPER	URATHANE 4XXA	-	-
114	DIE		SW, SA	-


SKH = High speed steel  
 SKD = Die steel  
 SA = Slug away  
 SW = Slug wiper (See page 4)

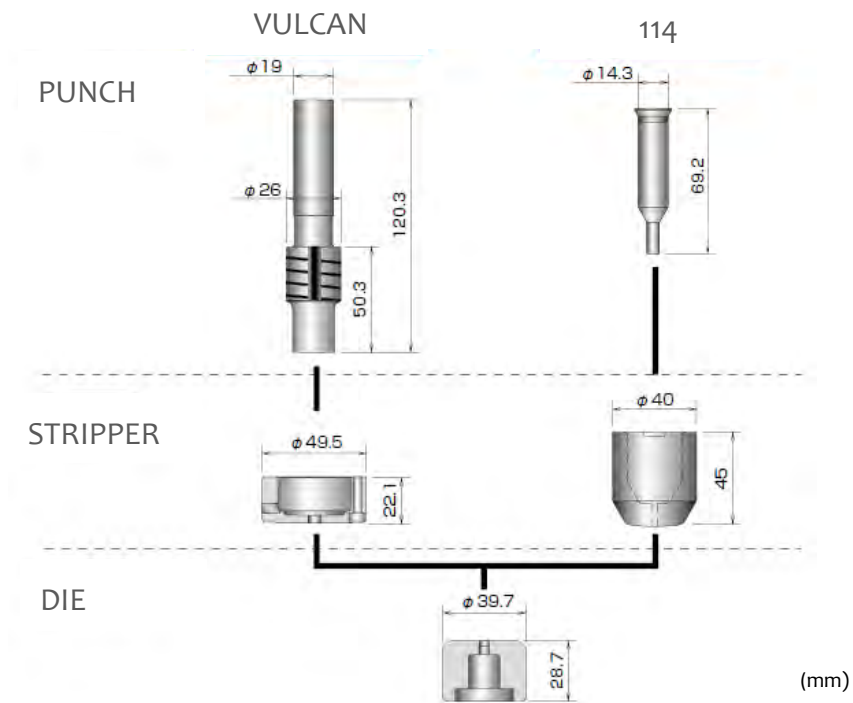
# II PUNCH, DIE & STRIPPER

STATION

# A

NARROW

			
<b>ROUND</b> ~ 3.2 mm	<b>SQUARE</b>	<b>RECTANGLE</b>	<b>OBLONG</b>



Round only

		Basic	Option	Coating (See page 3)
VULCAN	PUNCH	SKH	-	UHP, UGP, TIN, TICN
	STRIPPER	METAL	-	-
114	PUNCH	SKD	SKH	UHP, UGP, TIN, TICN
	STRIPPER	URATHANE 4A	-	-
114	DIE		SW, SA	-

SKH = High speed steel

SKD = Die steel


SA = Slug away

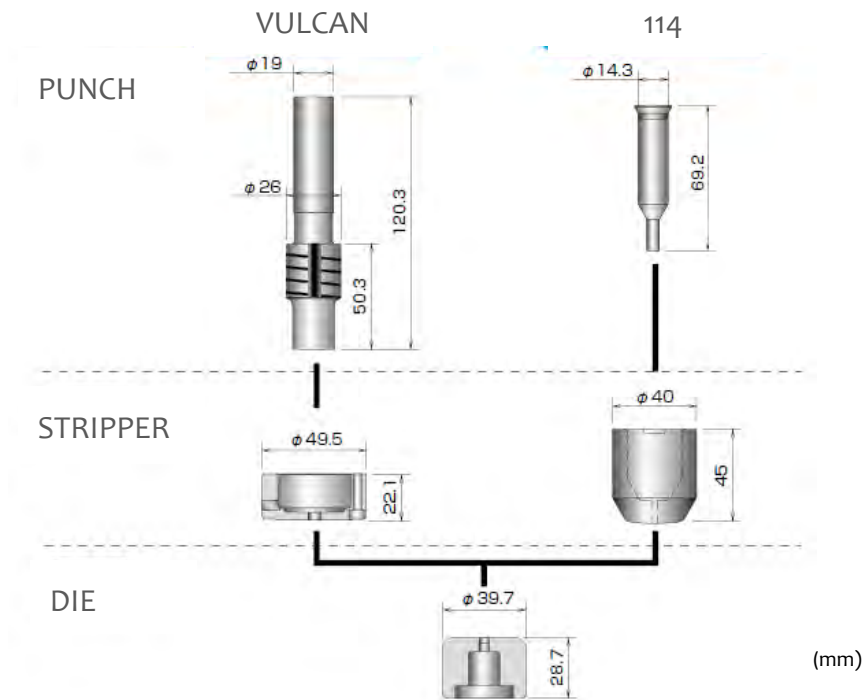
SW = Slug wiper (See page 4)

# II PUNCH, DIE & STRIPPER

## STATION

# A

			
<b>ROUND</b>	<b>SQUARE</b>	<b>RECTANGLE</b>	<b>OBLONG</b>
3.2 ~ 12.7 mm			



Round only



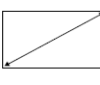

		Basic	Option	Coating (See page 3)
VULCAN	PUNCH	SKH	-	UHP, UGP, TIN, TICN
	STRIPPER	METAL	-	-
114	PUNCH	SKD	SKH	UHP, UGP, TIN, TICN
	STRIPPER	URATHANE 4A	-	-
114	DIE		SW, SA	-

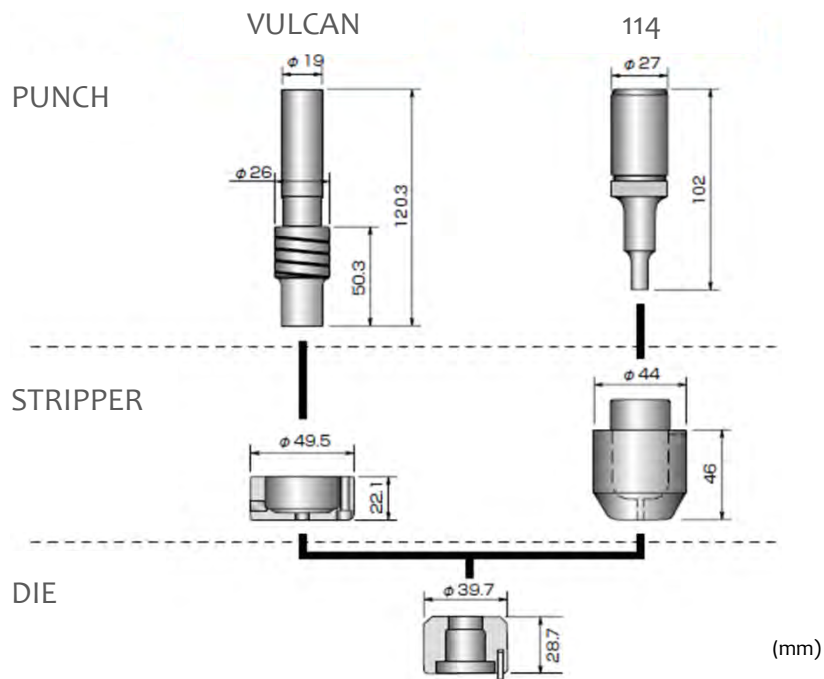
SKH = High speed steel  
 SKD = Die steel  
 SA = Slug away  
 SW = Slug wiper (See page 4)

# II PUNCH, DIE & STRIPPER

## STATION

# B

			
<b>ROUND</b> ~ 25 mm	<b>SQUARE</b> ~ 16 mm	<b>RECTANGLE</b> ~ 22 mm	<b>OBLONG</b> ~ 25mm





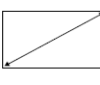

		Basic	Option	Coating (See page 3)	0°	90°	45°
VULCAN	PUNCH	SKH	-	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	METAL	-	-	✓	✓	✓
114	PUNCH	SKD	SKH	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	URATHANE 4B	-	-	✓	✓	
114	DIE		SW, SA	-	✓	✓	

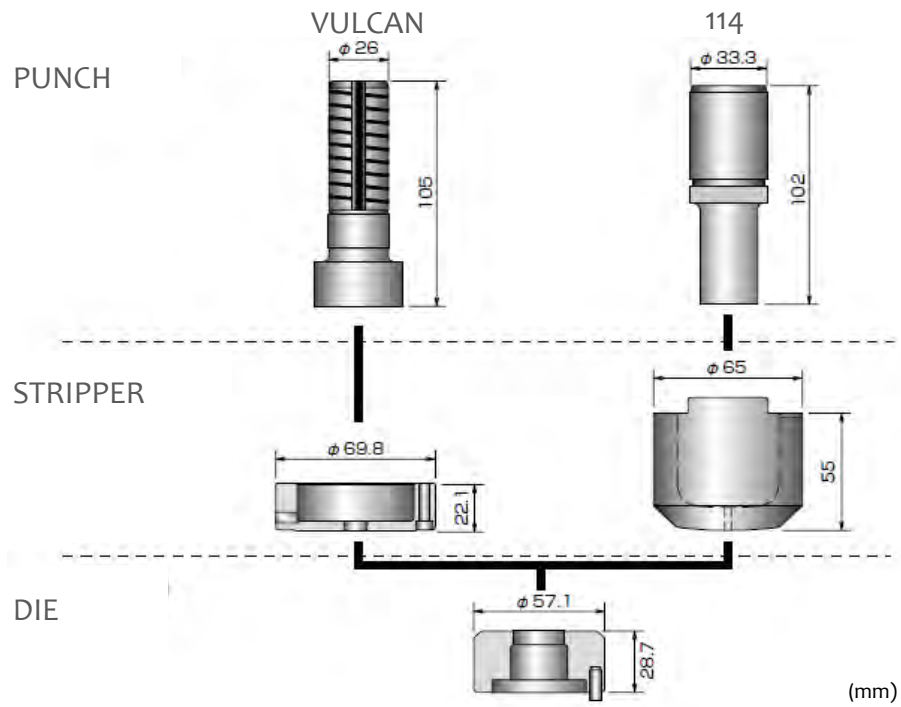
SKH = High speed steel  
 SKD = Die steel  
 SA = Slug away  
 SW = Slug wiper (See page 4)  
 Rounded corners are possible.

# II PUNCH, DIE & STRIPPER

## STATION

# C

			
<b>ROUND</b>	<b>SQUARE</b>	<b>RECTANGLE</b>	<b>OBLONG</b>
~ 38 mm	~ 22 mm	~ 32 mm	~ 38 mm





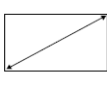
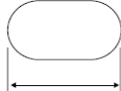
		Basic	Option	Coating (See page 3)	0°	90°	45°
VULCAN	PUNCH	SKH	-	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	METAL	-	-	✓	✓	✓
114	PUNCH	SKD	SKH	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	URATHANE 4C	-	-	✓	✓	
114	DIE		SW, SA	-	✓	✓	

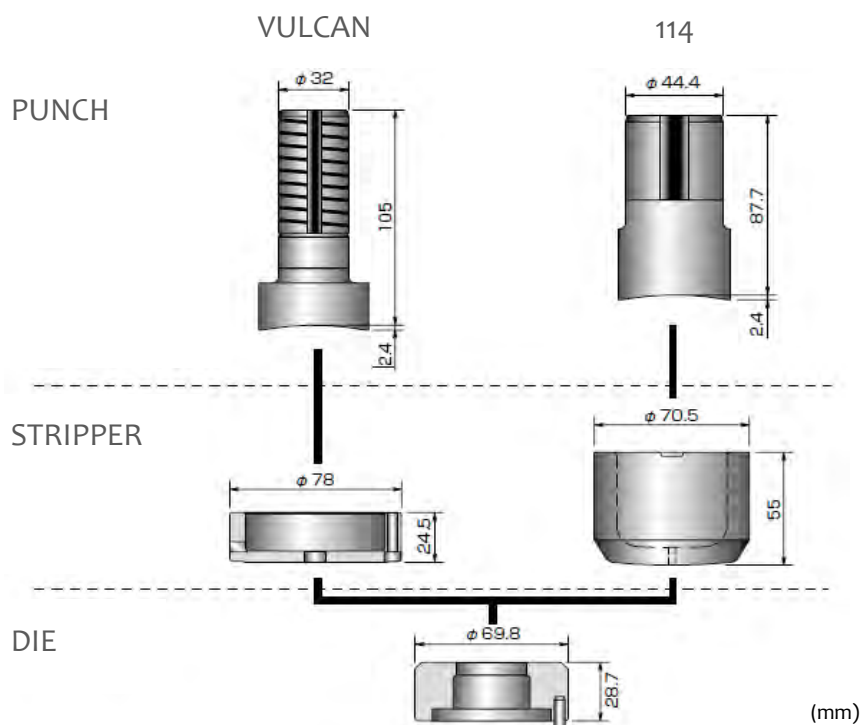
SKH = High speed steel  
 SKD = Die steel  
 SA = Slug away  
 SW = Slug wiper (See page 4)  
 Rounded corners are possible.

# II PUNCH, DIE & STRIPPER

STATION

## D, INDEX D

			
<b>ROUND</b> ~ 50 mm	<b>SQUARE</b> ~ 32 mm	<b>RECTANGLE</b> ~ 44 mm	<b>OBLONG</b> ~ 50 mm



		Basic	Option	Coating (See page 3)	0°	90°	45°
VULCAN	PUNCH	SKH	-	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	METAL	-	-	✓	✓	✓
114	PUNCH	SKD	SKH	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	URATHANE 4D, 4DR*	-	-	✓	✓	
114	DIE		SW, SA	-	✓	✓	

SKH = High speed steel

SKD = Die steel

SA = Slug away

SW = Slug wiper (See page 4)



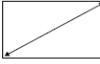

Rounded corners are possible.

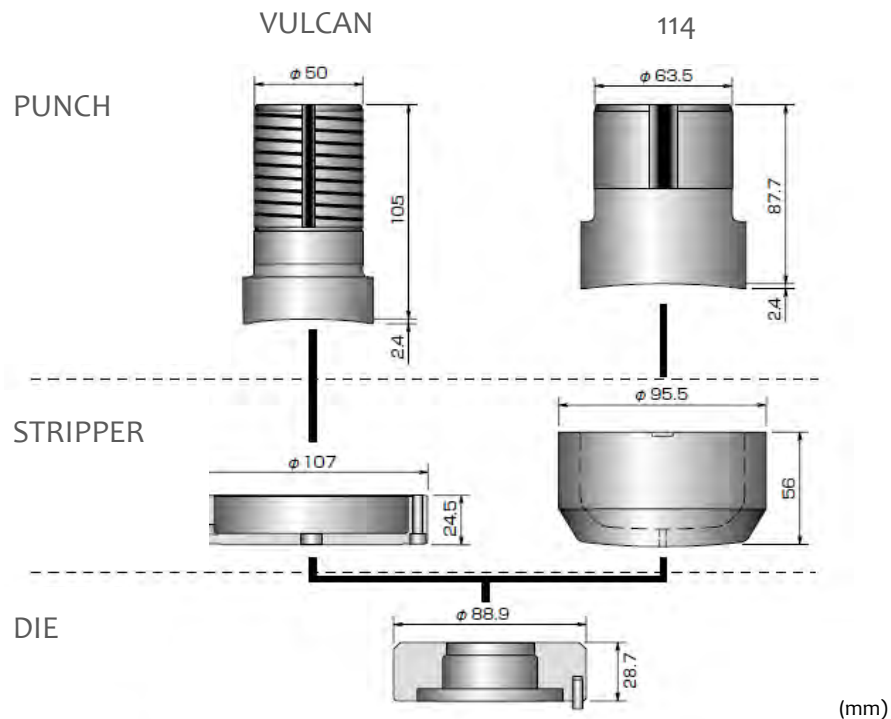
\*Ribbed stripper is for 16mm or narrower shapes only

# II PUNCH, DIE & STRIPPER

## STATION

# E

			
<b>ROUND</b> ~ 64 mm	<b>SQUARE</b> ~ 41 mm	<b>RECTANGLE</b> ~ 57 mm	<b>OBLONG</b> ~ 64 mm



		Basic	Option	Coating (See page 3)	0°	90°	45°
VULCAN	PUNCH	SKH	-	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	METAL	-	-	✓	✓	✓
114	PUNCH	SKD	SKH	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	URATHANE 4E, 4ER*	-	-	✓	✓	
114	DIE		SW, SA	-	✓	✓	

SKH = High speed steel

SKD = Die steel

SA = Slug away

SW = Slug wiper (See page 4)



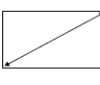

Rounded corners are possible.

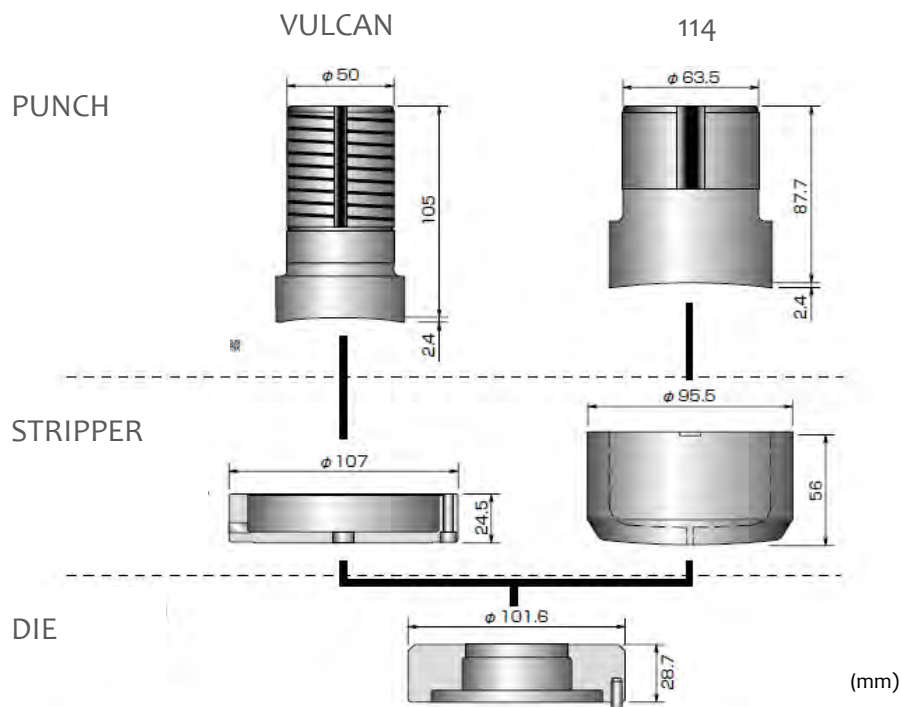
\*Ribbed stripper is for 16mm or narrower shapes only

# II PUNCH, DIE & STRIPPER

## STATION

# F

			
<b>ROUND</b>	<b>SQUARE</b>	<b>RECTANGLE</b>	<b>OBLONG</b>
~ 75 mm	~ 48 mm	~ 67 mm	~ 75 mm



		Basic	Option	Coating (See page 3)	0°	90°	45°
VULCAN	PUNCH	SKH	-	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	METAL	-	-	✓	✓	✓
114	PUNCH	SKD	SKH	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	URATHANE 4F, 4FR*	-	-	✓	✓	
114	DIE		SW, SA	-	✓	✓	

SKH = High speed steel  
 SKD = Die steel  
 SA = Slug away  
 SW = Slug wiper (See page 4)

Rounded corners are possible.



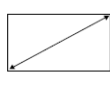
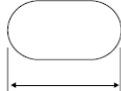
\*Ribbed stripper is for 16mm or narrower shapes only

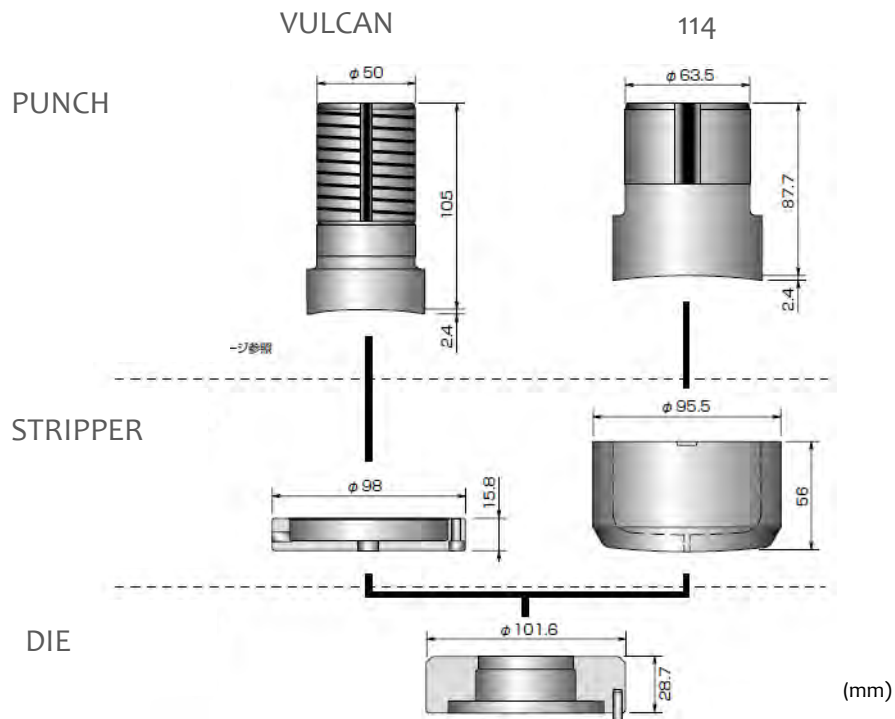


# II PUNCH, DIE & STRIPPER

STATION

## INDEX F

			
<b>ROUND</b> ~ 75 mm	<b>SQUARE</b> ~ 48 mm	<b>RECTANGLE</b> ~ 67 mm	<b>OBLONG</b> ~ 75 mm



		Basic	Option	Coating (See page 3)	0°	90°	45°
VULCAN	PUNCH	SKH	-	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	METAL	-	-	✓	✓	✓
114	PUNCH	SKD	SKH	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	URATHANE 4F, 4FR*	-	-	✓	✓	
114	DIE		SW, SA	-	✓	✓	

SKH = High speed steel  
 SKD = Die steel  
 SA = Slug away  
 SW = Slug wiper (See page 4)



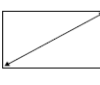

Rounded corners are possible.

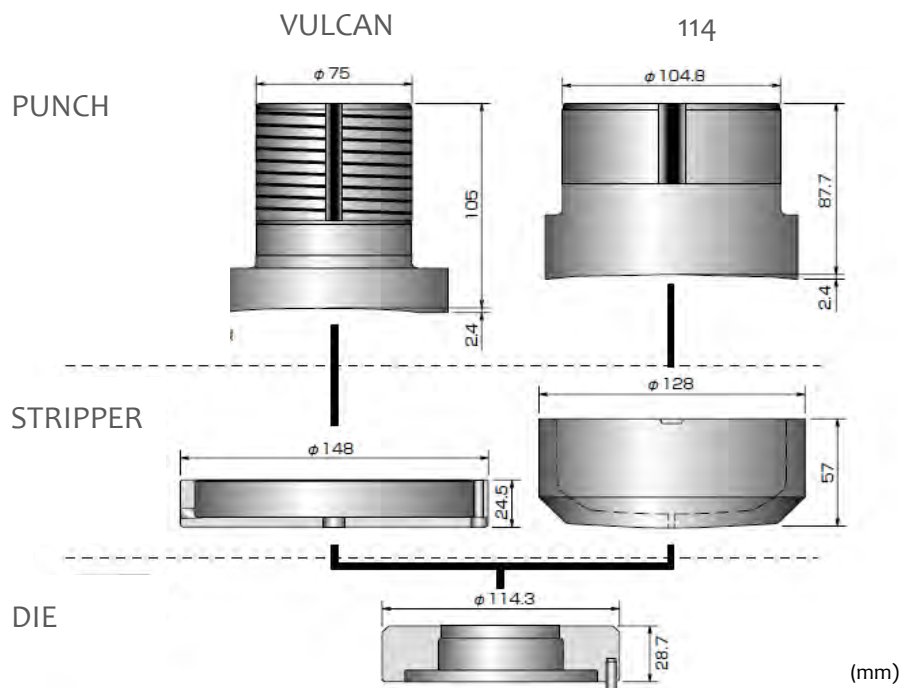
\*Ribbed stripper is for 16mm or narrower shapes only.

# II PUNCH, DIE & STRIPPER

## STATION

# G

			
<b>ROUND</b> ~ 89 mm	<b>SQUARE</b> ~ 57 mm	<b>RECTANGLE</b> ~ 79 mm	<b>OBLONG</b> ~ 89 mm



		Basic	Option	Coating (See page 3)	0°	90°	45°
VULCAN	PUNCH	SKH	-	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	METAL	-	-	✓	✓	✓
114	PUNCH	SKD	SKH	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	URATHANE 4G, 4GR*, 4G5	-	-	✓	✓	
114	DIE		SW, SA	-	✓	✓	

SKH = High speed steel  
 SKD = Die steel  
 SA = Slug away  
 SW = Slug wiper (See page 4)



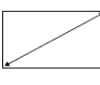

Rounded corners are possible.

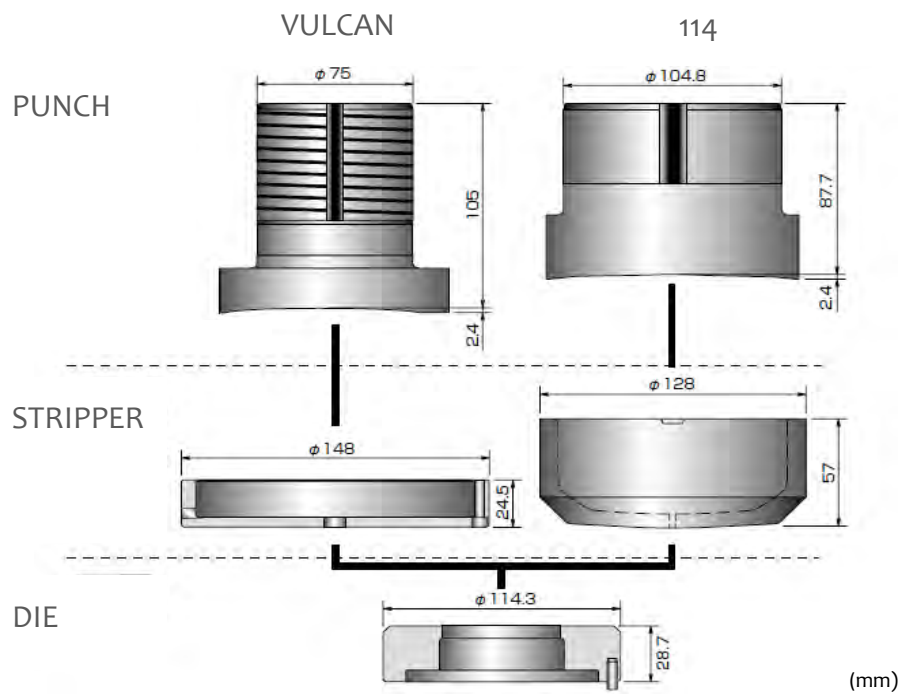
\*Ribbed stripper is for 16mm or narrower shapes only.

# II PUNCH, DIE & STRIPPER

## STATION

# H

			
<b>ROUND</b>	<b>SQUARE</b>	<b>RECTANGLE</b>	<b>OBLONG</b>
~ 105 mm	~ 70 mm	~ 98 mm	~ 105 mm



		Basic	Option	Coating (See page 3)	0°	90°	45°
VULCAN	PUNCH	SKH	-	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	METAL	-	-	✓	✓	✓
114	PUNCH	SKD	SKH	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	URATHANE 4H, 4HR*	-	-	✓	✓	
114	DIE		SW, SA	-	✓	✓	

SKH = High speed steel  
 SKD = Die steel  
 SA = Slug away  
 SW = Slug wiper (See page 4)



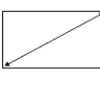

Rounded corners are possible.

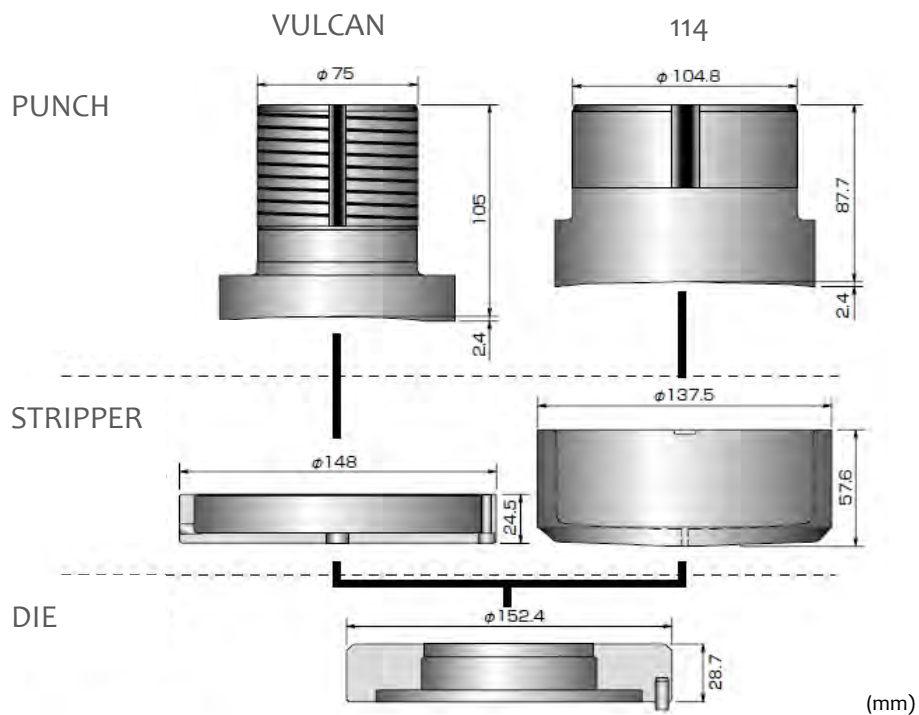
\*Ribbed stripper is for 16mm or narrower shapes only.

# II PUNCH, DIE & STRIPPER

## STATION

# J

			
<b>ROUND</b>	<b>SQUARE</b>	<b>RECTANGLE</b>	<b>OBLONG</b>
~ 120 mm	~ 79 mm	~ 113 mm	~ 120 mm



		Basic	Option	Coating (See page 3)	0°	90°	45°
VULCAN	PUNCH	SKH	-	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	METAL	-	-	✓	✓	✓
114	PUNCH	SKD	SKH	UHP, UGP, TIN, TICN	✓	✓	
	STRIPPER	URATHANE 4J, 4JR*	-	-	✓	✓	
114	DIE		SW, SA	-	✓	✓	

SKH = High speed steel  
 SKD = Die steel  
 SA = Slug away  
 SW = Slug wiper (See page 4)

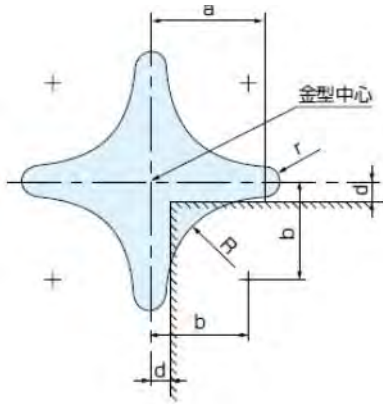
Rounded corners are possible.

\*Ribbed stripper is for 16mm or narrower shapes only.

# II PUNCH, DIE & STRIPPER

## OTHER SHAPES

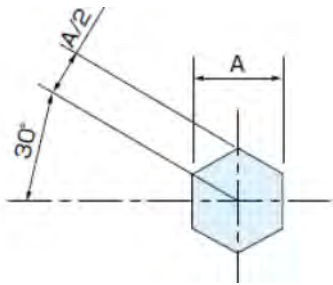
### 1. 4 WAY



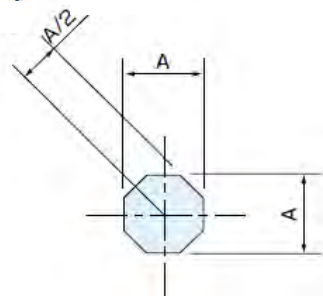
	R	a	b	r	d
B	2	6	4	1.59	2
	3	7	5	1.58	2
	4	8	6	1.56	2
	5	9	7.5	2.13	2.5
	6	10	8	1.53	2
C	8	12	10	1.5	2
	10	14.5	12.5	1.96	2.5
	13	17	15	1.43	2

(mm)

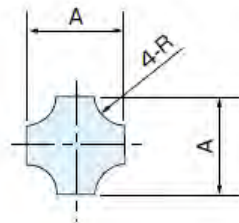
### 2. HEXAGON



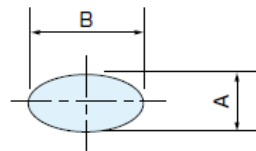
### 3. OCTAGON



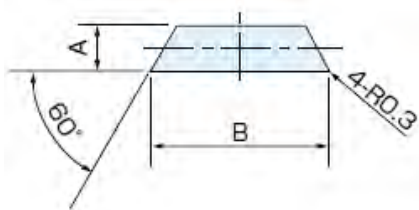
### 4. CORNER RADIUS



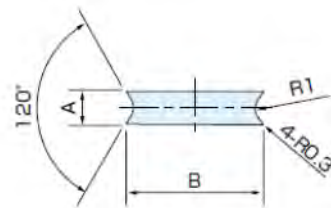
### 5. ELLIPSE



### 6. TRAPEZOID

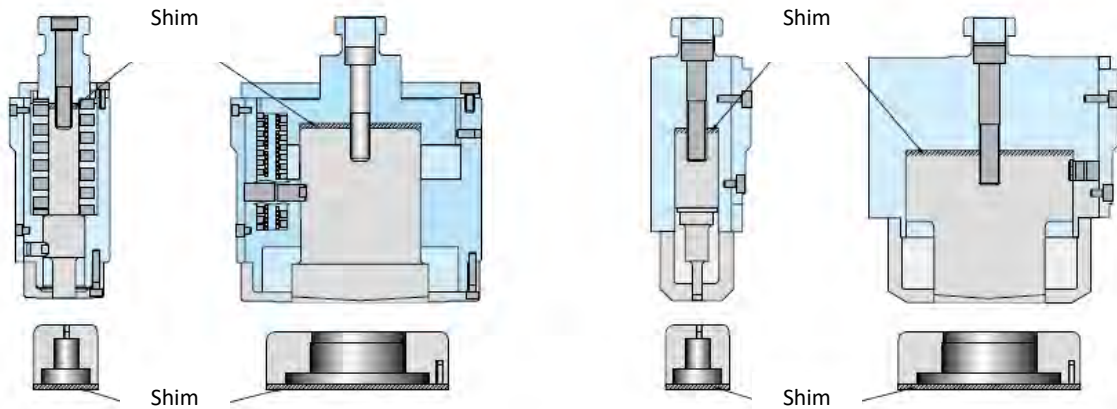


### 7. DIAMOND JOINT



# II PUNCH, DIE & STRIPPER

## SHIMS



VULCAN PUNCH		
X	t0.3	P52YA26360A
	t0.5	P52YA26360B
	t1.0	P52YA26360C
	t1.5	P52YA26360D
AB	t0.3	P52YA26460A
	t0.5	P52YA26460B
	t1.0	P52YA26460C
	t1.5	P52YA26460D
C	t0.3	P52YA26560A
	t0.5	P52YA26560B
	t1.0	P52YA26560C
	t1.5	P52YA26560D
D	t0.3	P52YA26660A
	t0.5	P52YA26660B
	t1.0	P52YA26660C
	t1.5	P52YA26660D
EF	t0.3	P52YA26760A
	t0.5	P52YA26760B
	t1.0	P52YA26760C
	t1.5	P52YA26760D
GHJ	t0.3	P52YA26860A
	t0.5	P52YA26860B
	t1.0	P52YA26860C
	t1.5	P52YA26860D

114 PUNCH		
XA	t0.3	P52YA07360A
	t0.5	P52YA07360B
	t1.0	P52YA07360C
	t1.5	P52YA07360D
B	t0.3	P52YA07460A
	t0.5	P52YA07460B
	t1.0	P52YA07460C
	t1.5	P52YA07460D
C	t0.3	P52YA07560A
	t0.5	P52YA07560B
	t1.0	P52YA07560C
	t1.5	P52YA07560D
D	t0.3	P52YA07660A
	t0.5	P52YA07660B
	t1.0	P52YA07660C
	t1.5	P52YA07660D
EF	t0.3	P52YA07760A
	t0.5	P52YA07760B
	t1.0	P52YA07760C
	t1.5	P52YA07760D
GHJ	t0.3	P52YA07860A
	t0.5	P52YA07860B
	t1.0	P52YA07860C
	t1.5	P52YA07860D

114 DIE		
X,A,B	t0.3	P52YA07960A
	t0.5	P52YA07960B
	t1.0	P52YA07960C
C	t0.3	P52YA08060A
	t0.5	P52YA08060B
	t1.0	P52YA08060C
D	t0.3	P52YA08160A
	t0.5	P52YA08160B
	t1.0	P52YA08160C
E	t0.3	P52YA08260A
	t0.5	P52YA08260B
	t1.0	P52YA08260C
F	t0.3	P52YA08360A
	t0.5	P52YA08360B
	t1.0	P52YA08360C
G	t0.3	P52YA08460A
	t0.5	P52YA08460B
	t1.0	P52YA08460C
H	t0.3	P52YA08560A
	t0.5	P52YA08560B
	t1.0	P52YA08560C
J	t0.3	P52YA08660A
	t0.5	P52YA08660B
	t1.0	P52YA08660C

(mm)

# III HOLDERS

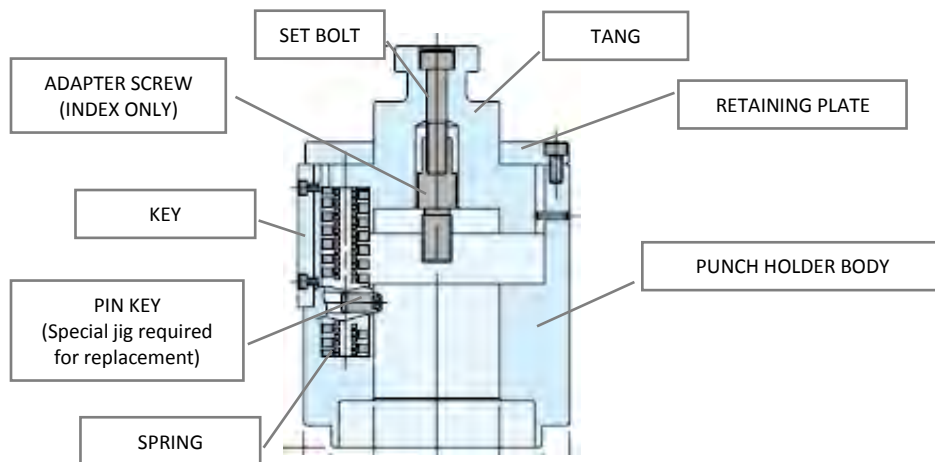
## MACHINE AND HOLDERS

M/C		PUNCH HOLDER			DIE HOLDER	
		VULCAN PH	114 PH	114 PH INDEX	114	
C2000		C2	C2	C2	C2	6
C2500		C2	C2	C2	C2	6
C3000	40ST Single	C3	C3	P36	C3S - C3V3	7
	54ST Double	C3	C3	P36	C3W	10
C3500	40ST Single	C3	C3	P36	C3S - C3V3	7
	54ST Double	C3	C3	P36	C3W	10
FL1544		C3	C3	C3	C2	6
M1250		C3	C3	C3	C2	6
M2033	ETP BUSH D=19	C3	C3	C3	SLIDE IN 2 M2	3
	ETP BUSH D=15	C3	C3	C3	SLIDE IN 1 M2	5
M2034	ETP BUSH D=19	C3	C3	C3	SLIDE IN 2 M2	3
	ETP BUSH D=15	C3	C3	C3	SLIDE IN 1 M2	5
M2044		C3	C3	C3	SLIDE IN 2 M2	3
M2044EZ		C3	C3	C3	C2	6
M2044TC		C3	C3	C3	C2	6
M2044TS		C3	C3	C3	SLIDE IN 2 W	2
M2044UT		C3	C3	C3	SLIDE IN 2 W	2
M2048		C3	C3	C3	SLIDE IN 2 M2	3
M2048HL		C3	C3	C3	SLIDE IN 2 S	1
M2048HYB		C3	C3	C3	SLIDE IN 2 S	1
M2048LT		C3	C3	C3	SLIDE IN 2 W	2
	56ST	C3	C3	C3	SLIDE IN 2 M2	2
M2048ST		C3	C3	C3	C3S M2TE	8
M2048TE		C3	C3	C3	C3S M2TE	8
M2048TS		C3	C3	C3	SLIDE IN 2 W	2
M2048UT		C3	C3	C3	SLIDE IN 2 W	2
M2125		C3	C3	P36	C3S - M2125	9
M2125HYB		C3	C3	P36	C3S - M2125	9
M2544		C3	C3	C3	SLIDE IN 2 W	2
M2544TS		C3	C3	C3	SLIDE IN 2 W	2
M2548		C3	C3	C3	SLIDE IN 2 W	2
M2548TS		C3	C3	C3	SLIDE IN 2 W	2
M2558		C3	C3	C3	SLIDE IN 2 W	2
M2558HL		C3	C3	C3	SLIDE IN 2 W	2
M2558HYB		C3	C3	C3	SLIDE IN 2 W	2
M2558TS		C3	C3	C3	SLIDE IN 2 W	2
M3048TG		C3	C3	C3	SLIDE IN 2 W	2
M3058TG		C3	C3	C3	SLIDE IN 2 W	2
M5000		C3	C3	P36	C3W	10
M5000HYB		C3	C3	P36	C3W	10
V3000	40ST Single	C3	C3	P36	C3S - C3V3	7
	54ST Double	C3	C3	P36	C3W	10
V3000α	ETP BUSH D=19	C3	C3	C3	SLIDE IN 2 W	2
	ETP BUSH D=15	C3	C3	C3	SLIDE IN 1 V3α	4
V3046α	ETP BUSH D=19	C3	C3	C3	SLIDE IN 2 W	2
	ETP BUSH D=15	C3	C3	C3	SLIDE IN 1 V3α	4
V3046β		C3	C3	C3	SLIDE IN 2 W	2
V3056α		C3	C3	C3	SLIDE IN 2 W	2
V5000		C3	C3	P36	C3W	10
V5058		C3	C3	P36	C3W	10
W4560	40ST Single	C3	C3	P36	Contact us.	
	54ST Double	C3	C3	P36		

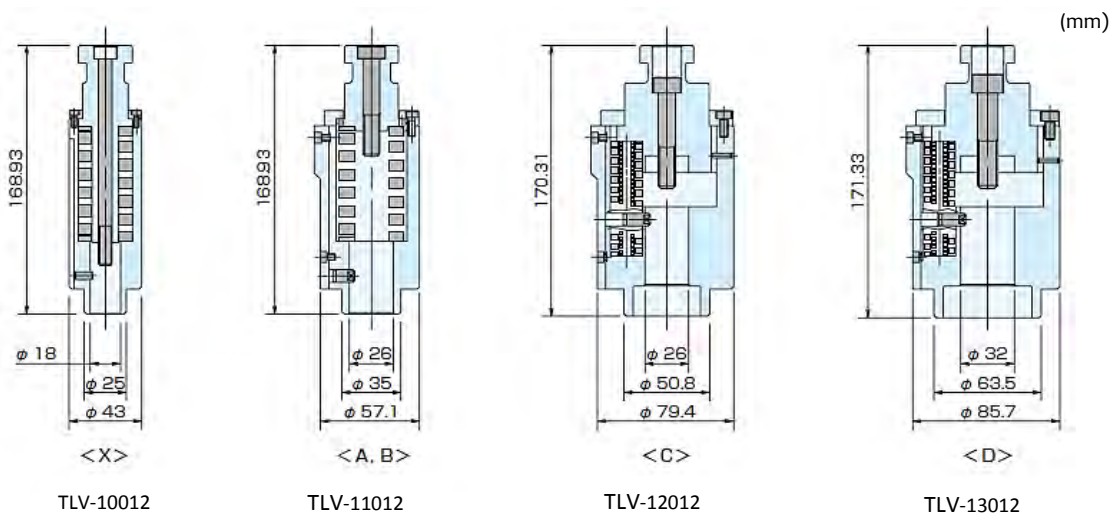
# III HOLDERS

## VULCANTOOL PUNCH HOLDER C<sub>3</sub> Series

C3000, C3500, FL1544, M1250, M2033, M2034, M2044, M2044EZ, M2044TC, M2044TS, M2044UT, M2048, M2048HL, M2048HYB, M2048LT, M2048ST, M2048TE, M2048TS, M2048UT, M2125, M2125HYB, M2544, M2544TS, M2548, M2548TS, M2558, M2558HL, M2558HYB, M2558TS, M3048TG, M3058TG, M5000, M5000HYB, V3000, V3000 $\alpha$ , V3046 $\alpha$ , V3046 $\beta$ , V3056 $\alpha$ , V5000, V5058, W4560



### C<sub>3</sub> SERIES: X ~ D

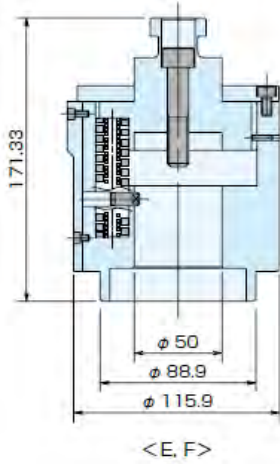




# III HOLDERS

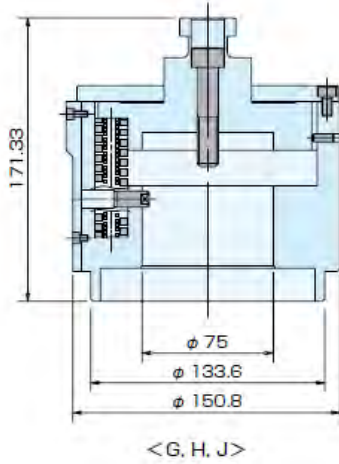
## C3 SERIES: EF ~ INDEX

(mm)



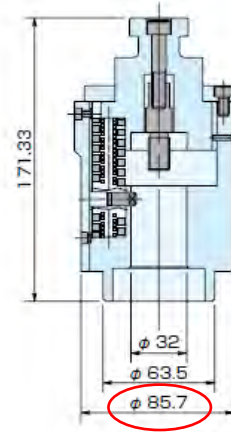
<E, F>

TLV-14012



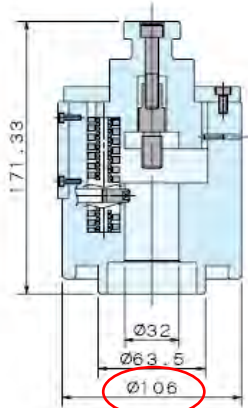
<G, H, J>

TLV-15012



<INDEX D>

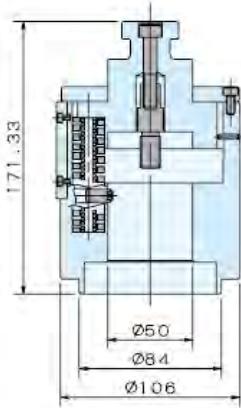
NON-VARI COMATIBLE  
TLV-17012 (54ST)  
TLV-17600 (40ST)



<INDEX D>

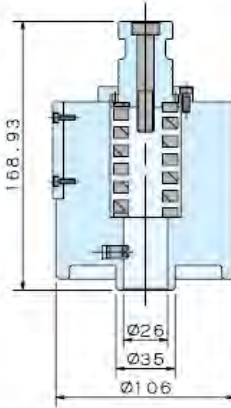
VARI COMPATIBLE

TLV-17412



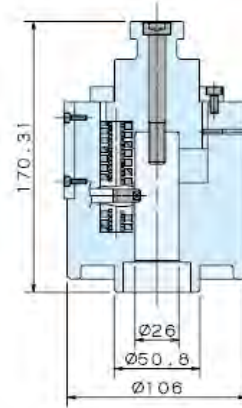
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TLV-18012



<INDEX FB>

TLV-17212



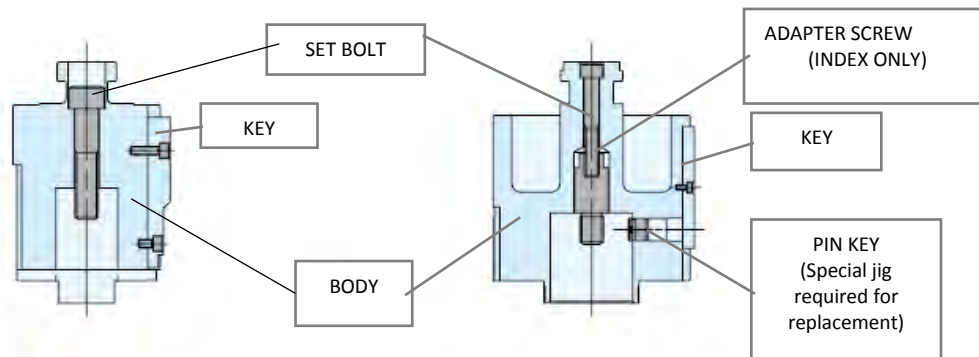
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TLV-17312

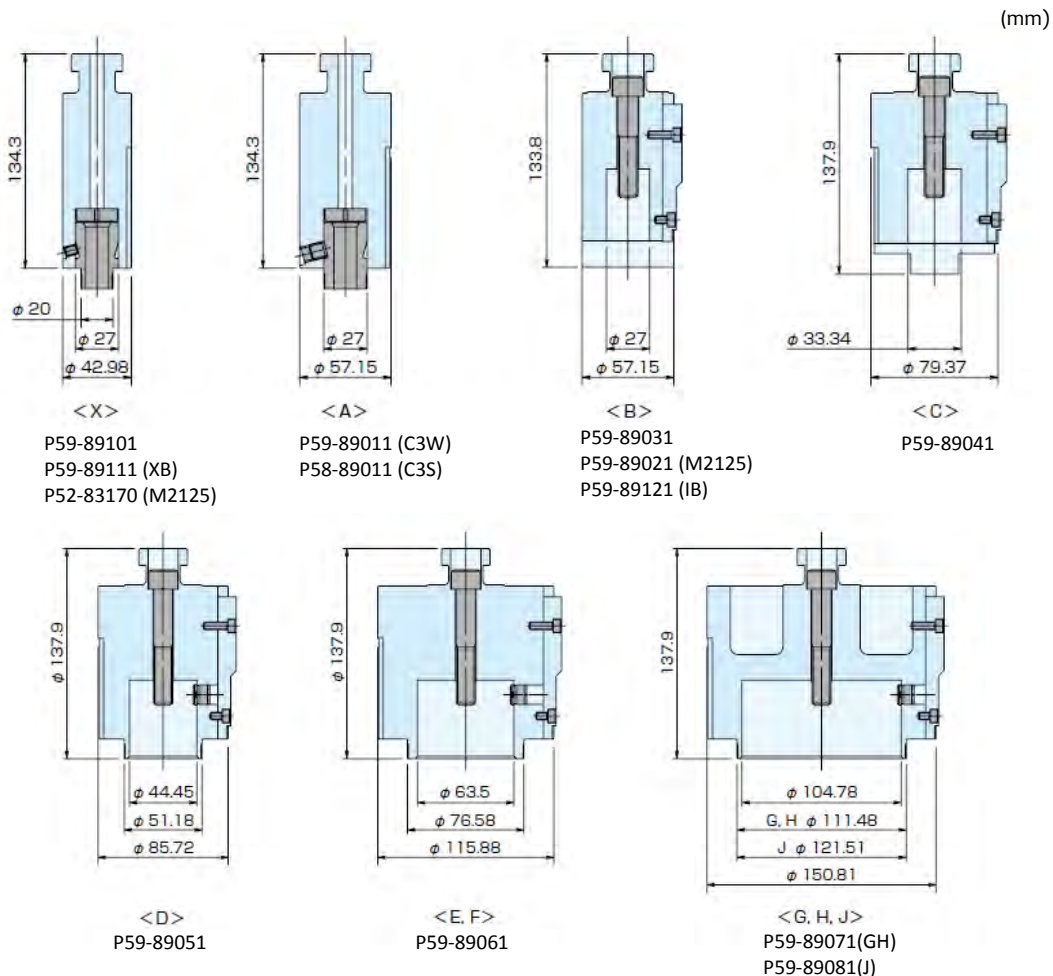
# III HOLDERS

## STYLE 114 PUNCH HOLDER C<sub>3</sub> Series

C3000, C3500, FL1544, M1250, M2033, M2034, M2044, M2044EZ, M2044TC, M2044TS, M2044UT, M2048, M2048HL, M2048HYB, M2048LT, M2048ST, M2048TE, M2048TS, M2048UT, M2125, M2125HYB, M2544, M2544TS, M2548, M2548TS, M2558, M2558HL, M2558HYB, M2558TS, M3048TG, M3058TG, M5000, M5000HYB, V3000, V3000α, V3046α, V3046β, V3056α, V5000, V5058, W4560



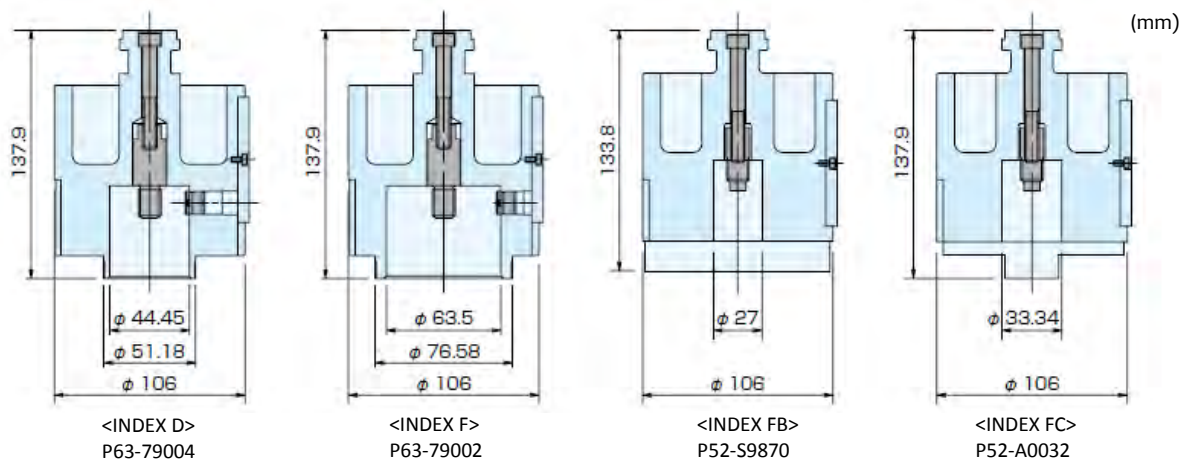
### C<sub>3</sub> SERIES X ~ GHJ



# III HOLDERS

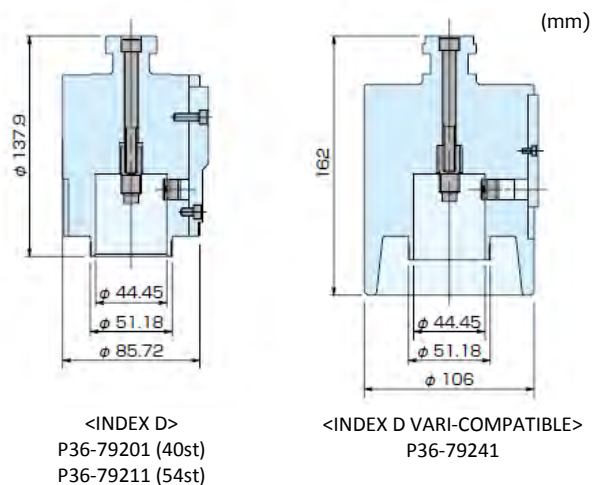
## STYLE 114 INDEX PUNCH HOLDER C<sub>3</sub> Series

FL1544, M2044TC, M2048LT, M2125HYB, M2558HL, V3046 $\alpha$ , M1250, M2044TS, M2048ST, M2544, M2558HYB, V3046 $\beta$ , M2033, M2044UT, M2048TE, M2544TS, M2558TS, M2034, M2048, M2048TS, M2548, M3048TG, M2044, M2048HL, M2048UT, M2548TS, M3058TG, M2044EZ, M2048HYB, M2125, M2558, V3000 $\alpha$



## STYLE 114 INDEX PUNCH HOLDER P<sub>36</sub> Series

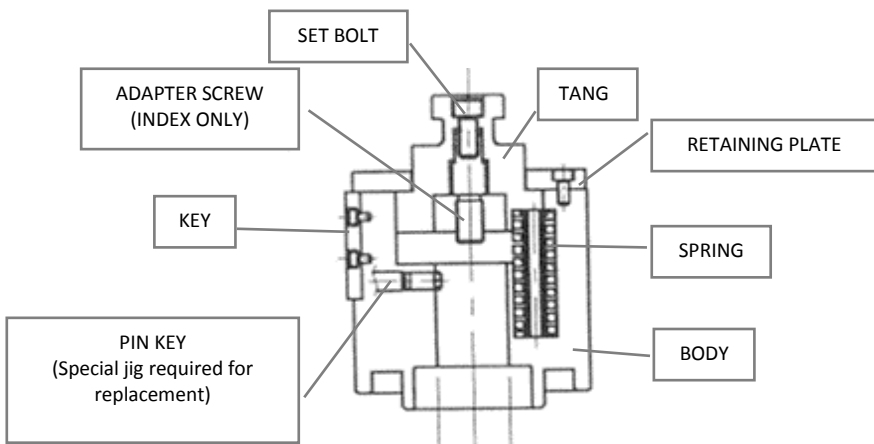
C3000, C3500, M2125, M2125HYB, M5000HYB, M5000, V3000, V5000, V5000 $\alpha$ , V5058, W4560



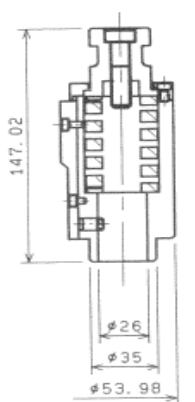
# III HOLDERS

## VULCANTOOL PUNCH HOLDER C2 Series

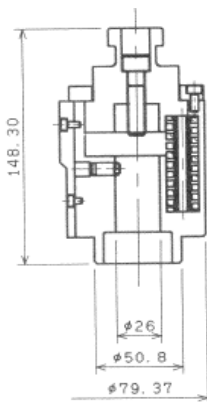
C2000, C2500



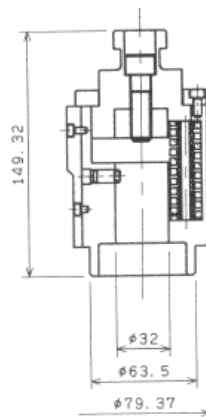
(mm)



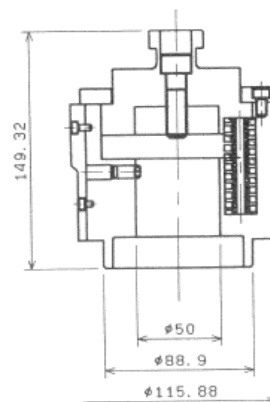
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TLV-21012



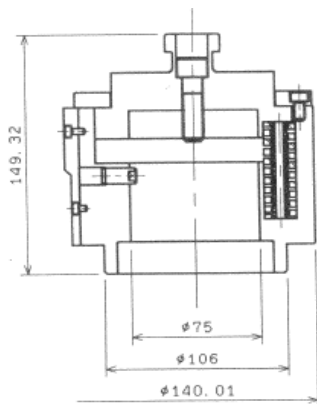
<C>  
TLV-22012



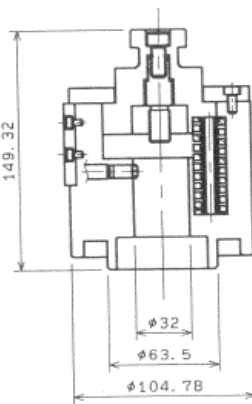
<D>  
TLV-23012



<EF>  
TLV-24012



<G>  
TLV-25012

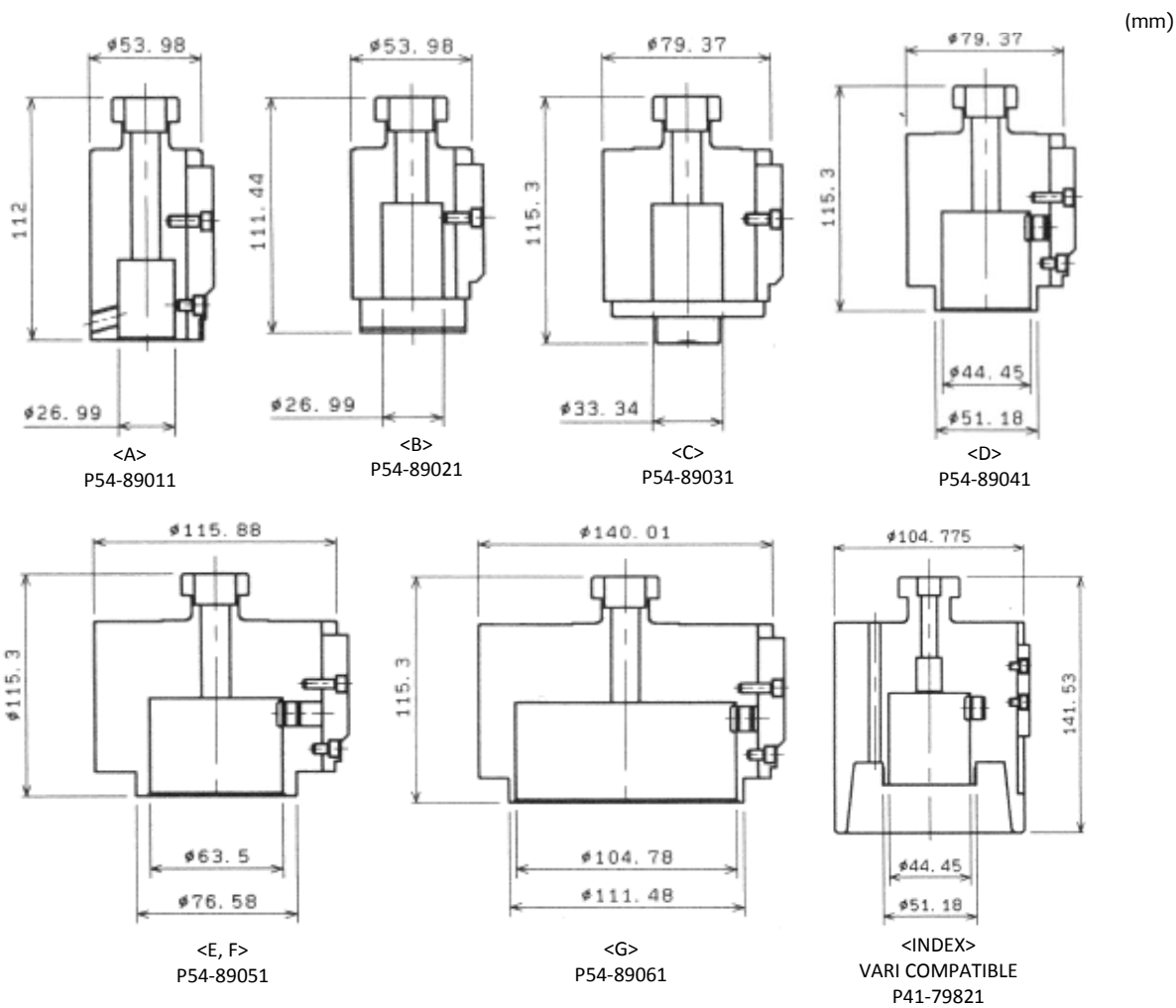
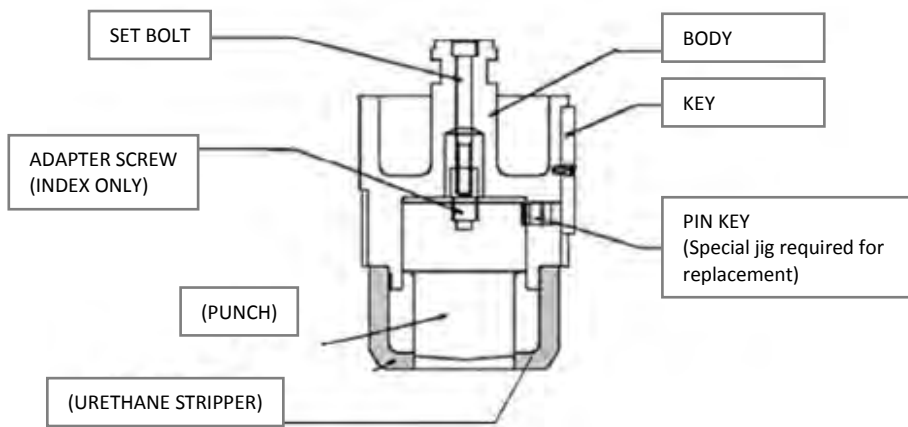


<INDEX D>  
VARI COMPATIBLE  
TLV-27412

# III HOLDERS

## STYLE 114 PUNCH HOLDER C2 Series

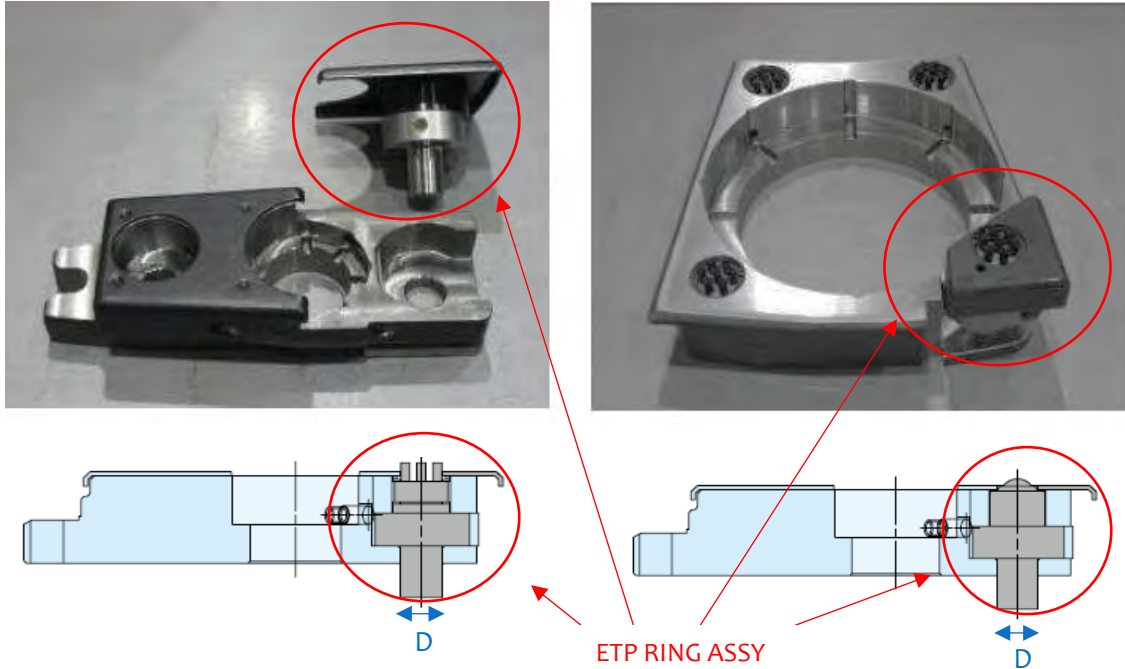
C2000, C2500



# III HOLDERS

## SLIDE IN DIE HOLDER (STYLE 114)

BRUSH / STEEL BALL / URETHANE BALL



### SELECTION

Complete assembly:

	1	2	3	4	5
	SLIDE IN 2 S	SLIDE IN 2 W	SLIDE IN 2 M2	SLIDE IN 1 V3α D=15.0 mm	SLIDE IN 1 M2 D=15.0 mm
B	<b>P52-86310</b>	<b>P52-86010</b>	<b>P52-86011</b>	<b>P52-85010</b>	<b>P52-86011</b>
C	<b>P52-86320</b>	<b>P52-86020</b>	<b>P52-86090</b>	<b>P52-85020</b>	<b>P52-85090</b>
D	<b>P52-86330</b>	<b>P52-86030</b>	<b>P52-86100</b>	<b>P52-85030</b>	<b>P52-85100</b>
E		<b>P52-86040</b>	<b>P52-86130</b>	<b>P52-85040</b>	
F		<b>P52-86050</b>	<b>P52-86140</b>	<b>P52-85050</b>	
G		<b>P52-86060</b>	<b>P52-86120</b>	<b>P52-85060</b>	<b>P52-85110</b>
GE			<b>P52-86130</b>		
GF			<b>P52-86140</b>		
H		<b>P52-86070</b>		<b>P52-85070</b>	
J		<b>P52-86080</b>		<b>P52-85080</b>	
Note	<b>BRUSH ONLY</b>				
	M2048HL, M2048HYB	M2044TS, 2044UT, M2048LT, M2048TS, M2048UT, M2544, M2544TS, M2548, M2548TS, M2558, M2558HL, M2558HYB, M2558TS, M3048TG, M3058TG, V3000α, V3046α, V3048α	M2033, M2034, M2044	V3000α, V3046α, V3048α	M2033, M2034,

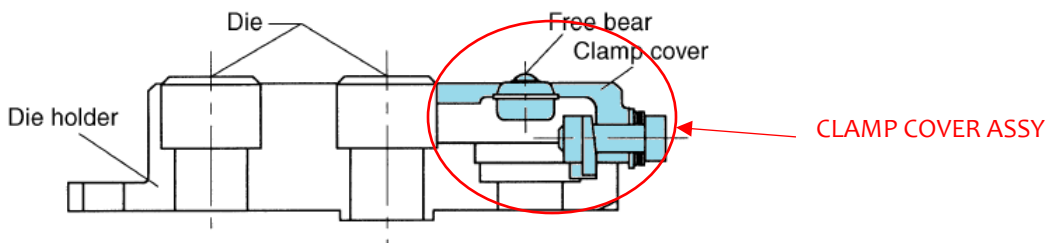
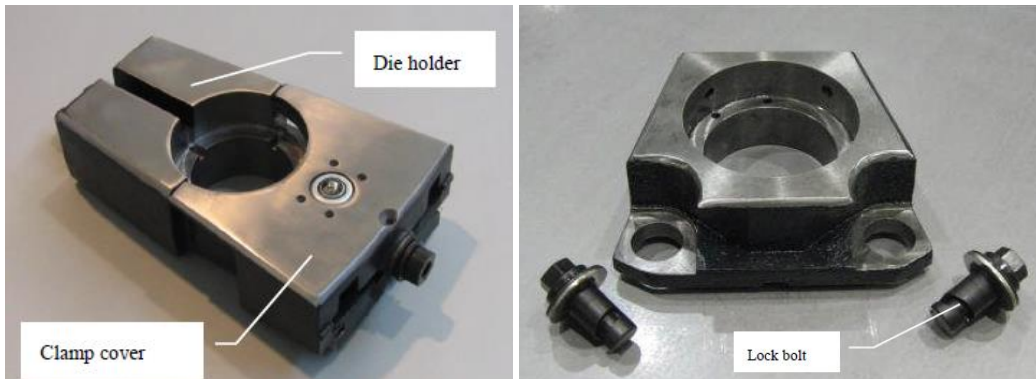
For 56ST turret table, the above is not applicable – contact us.



# III HOLDERS

## DIE HOLDER (STYLE 114)

STEEL BALL / URETHANE BALL



### SELECTION

Complete assembly:

	6	7	8	9	10
	C2	C3S – C3V3S	C3S – M2TE	C3S – M2125	C3W
AB	<b>P54-83020</b>	<b>P52-83010</b>	<b>P52-83011</b>	<b>P52-83190</b>	<b>P59-85011</b>
C	<b>P54-83030</b>	<b>P52-83020</b>	<b>P52-83021</b>	<b>P52-83150</b>	<b>P59-85031</b>
D	<b>P54-83040</b>	<b>P52-83030</b>	<b>P52-83031</b>	<b>P52-83160</b>	<b>P59-85051</b>
E	<b>P54-83050</b>	<b>P52-83040</b>	<b>P52-83040</b>	<b>P52-83040</b>	<b>P59-85061</b>
F	<b>P54-83060</b>	<b>P52-83050</b>	<b>P52-83050</b>	<b>P52-83050</b>	<b>P59-85071</b>
G	<b>P54-83140</b>	<b>P52-83060</b>	<b>P52-83060</b>		<b>P59-85081</b>
H		<b>P52-83070</b>	<b>P52-83070</b>		<b>P59-85091</b>
J		<b>P52-83080</b>	<b>P52-83080</b>		<b>P59-85101</b>
Note					
	C2000, C2500, M2044EZ, M2044TC	C3000S, C3500S, V3000S	M2048ST, M2048UT	M2125, M2125HYB	C3000W, C3500W, M5000, M5000HYB, V5000, V5058

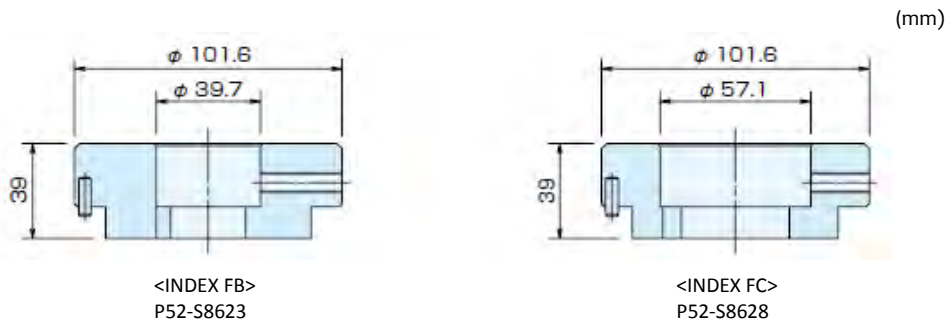
# III HOLDERS

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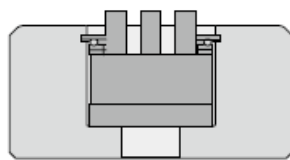
## STYLE 114 INDEX DIE HOLDER

Inform us of your machine's KX number, or your machine's name and how many stations the table has.

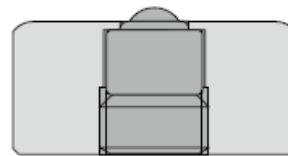
## STYLE 114 DIE ADAPTER



## DIE HOLDER ACCESSARIES



Brush Die



STEEL BALL/ URETHANE BALL



# III HOLDERS

## VARITOOL 12Z / VARITOOL 12S



VARITOOL 12Z

- PUNCH HOLDER
- DIE HOLDER
- PUNCH
- DIE
- STRIPPER



VARITOOL 12S

- PUNCH HOLDER
- STEM ASSY
- DIE HOLDER
- PUNCH
- DIE
- STRIPPER

PUNCH		DIE
VARITOOL 12Z	VARITOOL 12S	

VARITOOL 12z/12s PUNCH is made of SKH.

(mm)

<b>ROUND</b> ~ 12.7 mm	<b>SQUARE</b> ~ 7.7 mm	<b>RECTANGLE</b> ~ 11.0 mm	<b>OBLONG</b> ~ 12.7 mm

TONNAGE: ~ 4.5 TONS  
MILD STEEL: ~3.2mm  
STAINLESS STEEL: ~2.0mm

# III HOLDERS

## MARKING TOOL



### SELECTION

	Letter size	Sheet (t)	Note
20 LETTERS	L5.0xW3.2	0.8 ~6.3	For some thickness, shims are required.
40 LETTERS	L3.2xW2.1	0.8 ~6.3	For some thickness, shims are required.

(mm)

### STANDARD LETTERS TO CHOOSE:

**ABCDEFGHIJKLMNOPQRSTUVWXYZ**

**0123456789**

**+ - / ,**

Other characters are selectable.

### FOR INTRODUCTION

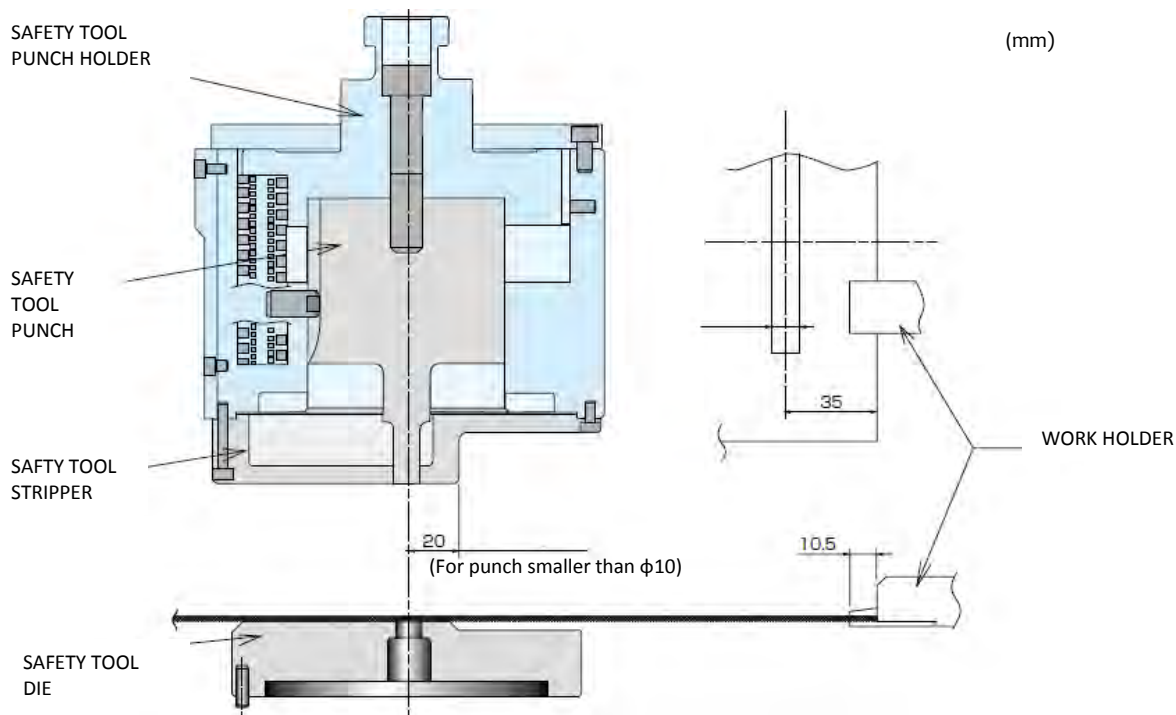
Contact Murata Machinery first for machine settings.

### NOTE

MARKING TOOL is usable in MOTORUM and VECTRUM series. CENTRUM with VARI compatible also accept the option. C2000 and C2500 could take 40 letters only.

# III HOLDERS

## WORK HOLDER SAFETY TOOL (VULCANTOOL only)



### NOTE

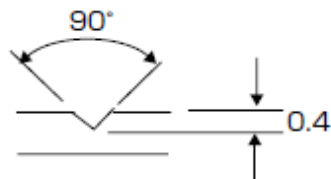
Program settings are necessary.

### SELECTION

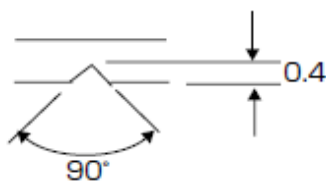
Model	Station	Unit	Code	Other
SAFETY TOOL (VULCAN)	D	Whole set (see above) or part to be replaced	<b>N.P.N</b>	Your machine name or KX number. Punch size, die size and clearance.
	E			
	F			
	G			
	H			
	J			
	INDEX D			
INDEX F				

# IV FORMING TOOL

## CENTER PUNCH



TOP MARKING



BOTTOM MARKING

(mm)

- Both direction OK
- Punch holder is included.

### MODEL SELECTION

#### 1. STANDARD

MTL's basic center point tool. There are two options in the height of the lower part for bottom marking.

	Lower	Sheet	Unit	114 X	114 AB C2	114 AB C3S	114 AB C3W	114 AB L10
TOP Marking	Flat	t1.0~t6.3	Set	<b>P52-HX014</b>	<b>P54-HA055</b>	<b>P52-HA145</b>	<b>P58-HA148</b>	-
BTM Marking	Normal	t1.0~t3.2	Set	<b>P52-HX015</b>	<b>P54-HA143</b>	<b>P52-HA147</b>	<b>P58-HA151</b>	<b>L10-HA130</b>
		t2.4~t6.3	Set	<b>P52-HX051</b>	-	<b>P52-HA562</b>	<b>P52-HA528</b>	-
	Short	t1.0~t2.3	Set	<b>P52-HX026</b>	<b>P54-HA461</b>	<b>P52-HA463</b>	<b>P52-HA464</b>	<b>L10-HA466</b>

(mm)

#### 2. ADJUSTABLE

The level of pin is changeable as long as 1.5mm in projection. Short-type lower part only:

	Lower	Sheet	Unit	114 X	114 AB C2	114 AB C3S	114 AB C3W	114 AB L10
TOP Marking	Flat	t1.0~t6.3	Set	<b>P5Y-HX007</b>	-	-	<b>P5Y-HA036</b>	-
BTM Marking	Short	t1.0~t2.3	Set	<b>P5Y-HX006</b>	-	-	<b>P5Y-HA034</b>	-

(mm)

#### 3. CROSS POINTER

A cross is marked. There are two options in the height of the lower part for bottom marking.

	Lower	Sheet	Unit	114 X	114 AB C2	114 AB C3S	114 AB C3W	114 AB L10
TOP Marking	Flat	t1.0~t6.3	Set	-	<b>P54-HB075</b>	<b>P52-HB076</b>	<b>P58-HB077</b>	-
BTM Marking	Short	t1.0~t2.3	Set	-	<b>P54-HB460</b>	<b>P52-HB462</b>	<b>P58-HB463</b>	-
	Normal	t1.0~t3.2	Set	-	<b>P54-HB072</b>	<b>P58-HB074</b>	<b>P58-HB073</b>	-

(mm)

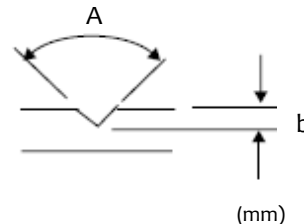
# IV FORMING TOOL

## CENTER PUNCH - CONTINUED

### FOR FURTHER REQUIREMENT(S)

Let us know the following:

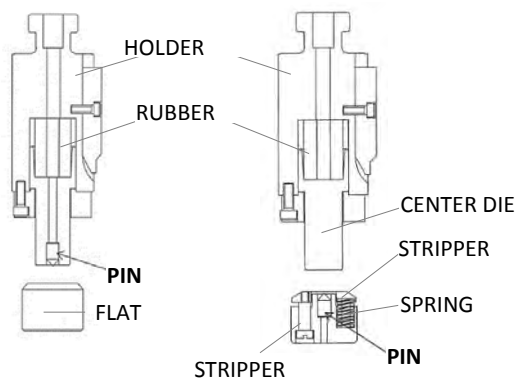
- ✓ Point dimensions
- ✓ Process direction; i.e. top marking or bottom marking
- ✓ Sheet material and thickness to be processed
- ✓ Machine's KX number
- ✓ Other requests: i.e. lower height, etc.



### FOR REPLACEMENT

Let us know the following:

- ✓ Part name (see the right)
- ✓ Assembly code (engraved on the surface)

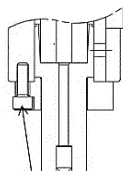
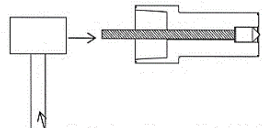
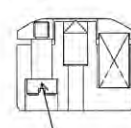
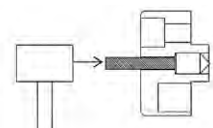


TOP MARKING

BOTTOM MARKING

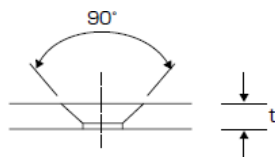
### TIPS

The pin is replaceable.

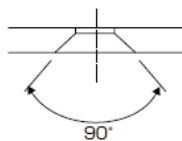
TOP MARKING	BOTTOM MARKING
 <p>Loosen the fixtures.</p>  <p>Hammer with a brass smaller than <math>\phi 4.5</math>.</p>	 <p>Loosen the fixtures.</p>  <p>Hammer with a brass smaller than <math>\phi 4.5</math>.</p>

# IV FORMING TOOL

## COINED COUNTERSINK



TOP PUNCHING



BOTTOM PUNCHING

(mm)

- Both direction OK
- No punch holder is included.
- Pilot hole is needed.

## SELECTION

### TOP PUNCHING

D	BOLT	PILOT	SHEET	114X	114A	114B	VUL X	VUL B
5	M2.5	4.7	t 1.2	P52-ZX062	P52-ZA776	P52-ZBE64	P52-ZX017	P52-ZB243
		4.5	t 1.6	P52-ZX063	P52-ZA780	P52-ZBE66	P52-ZX020	P52-ZB245
		4.2	t 2.0	P52-ZX064	P52-ZA784	P52-ZBE68	P52-ZX022	P52-ZB247
		4	t 2.3	P52-ZX065	P52-ZA788	P52-ZBE70	P52-ZX024	P52-ZB249
6	M3	5.7	t 1.2	P52-ZX067	P52-ZA792	P52-ZBE72	P52-ZX026	P52-ZB251
		5.3	t 1.6	P52-ZX068	P52-ZA794	P52-ZBE74	P52-ZX029	P52-ZB253
		5	t 2.0	P52-ZX069	P52-ZA693	P52-ZBE76	P52-ZX031	P52-ZB255
		4.7	t 2.3	P52-ZX070	P52-ZA798	P52-ZBE78	P52-ZX033	P52-ZB257
8	M4	7.7	t 1.2	P52-ZX072	P52-ZA802	P52-ZBE80	P52-ZX035	P52-ZB259
		7.3	t 1.6	P52-ZX073	P52-ZA716	P52-ZBE82	P52-ZX038	P52-ZB261
		6.8	t 2.0	P52-ZX074	P52-ZA808	P52-ZBE84	P52-ZX040	P52-ZB263
		6.5	t 2.3	P52-ZX075	P52-ZA812	P52-ZBE86	P52-ZX042	P52-ZB265
10	M5	9.6	t 1.2	P52-ZX077	P52-ZA816	P52-ZBE88	P52-ZX044	P52-ZB267
		9.2	t 1.6	P52-ZX078	P52-ZA713	P52-ZBE90	P52-ZX047	P52-ZB269
		8.7	t 2.0	P52-ZX079	P52-ZA822	P52-ZBE92	P52-ZX049	P52-ZB271
		8.4	t 2.3	P52-ZX080	P52-ZA826	P52-ZBE94	P52-ZX051	P52-ZB273
12	M6	11.5	t 1.2	P52-ZX082	P52-ZA953	P52-ZBE96	P52-ZX053	P52-ZB275
		11.1	t 1.6	P52-ZX083	P52-ZA955	P52-ZBE98	P52-ZX056	P52-ZB277
		10.6	t 2.0	P52-ZX084	P52-ZA957	P52-ZBF01	P52-ZX058	P52-ZB279
		10.3	t 2.3	P52-ZX085	P52-ZA959	P52-ZBF03	P52-ZX060	P52-ZB281

(mm)

### BOTTOM PUNCHING

Inform us of the following:

- ✓ Bolt size or size D
- ✓ Sheet material and thickness to be processed
- ✓ Machine's KX number



(mm)

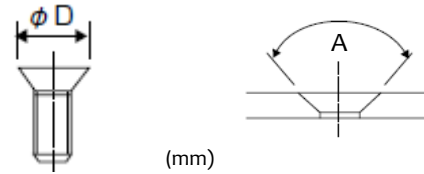
# IV FORMING TOOL

## COINED COUNTERSINK – CONTINUED

### FOR FURTHER REQUIREMENT

Inform us of the following:

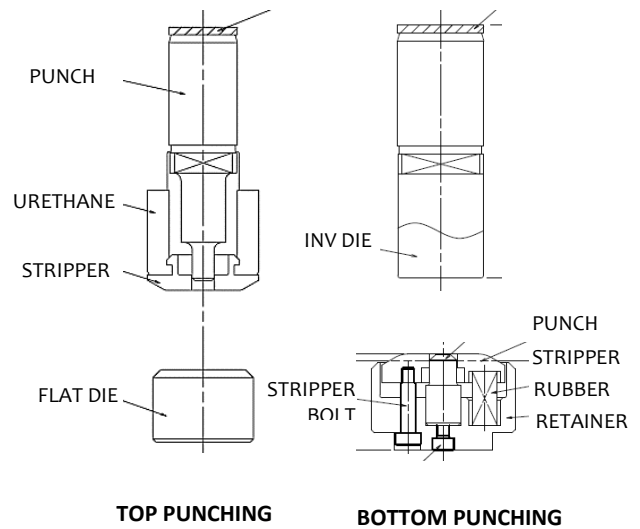
- ✓ Bolt size or size D
- ✓ Open angle A
- ✓ Side
- ✓ Sheet material and thickness to be processed
- ✓ Machine's KX number
- ✓ Other requests



### FOR REPLACEMENT

Inform us of the following:

- ✓ Part name (see the previous page)
- ✓ Assembly code (engraved on the surface)



### TIPS

A pilot hole and a result



Pilot hole is OK.



Pilot hole is too large.



Pilot hole is too small.

# IV FORMING TOOL

## BURRING / EXTRUDED HOLE



- Both side is OK.
- No punch holder is included.
- Pilot hole is needed.

## SELECTION

### UPWARD PROCESS

	SHEET	Tap to cut			Tap to form	
		114B	114C	114D	114C	114D
M3	t0.6 - t1.0	<b>P52-FB277</b>	<b>P52-FC095</b>	<b>P52-FD819</b>	<b>P52-FC205</b>	<b>P52-FD602</b>
	t1.2 - t1.6	<b>P52-FB278</b>	<b>P52-FC096</b>	<b>P52-FD417</b>	<b>P52-FC870</b>	<b>P52-FD732</b>
M4	t0.8 - t1.0	<b>P52-FB279</b>	<b>P52-FC097</b>	<b>P52-FD418</b>	<b>P52-FC206</b>	<b>P52-FD603</b>
	t1.2 - t1.6	<b>P52-FB280</b>	<b>P52-FC098</b>	<b>P52-FD419</b>	<b>P52-FC869</b>	<b>P52-FD733</b>
	t2.0 - t2.3		<b>P52-FC099</b>	<b>P52-FD420</b>	<b>P52-FC592</b>	<b>P52-FD735</b>
M5	(t0.8) t1.0		<b>P52-FC100</b>	<b>P52-FD421</b>	<b>P52-FC207</b>	<b>P52-FD604</b>
	t1.2 - t1.6		<b>P52-FC101</b>	<b>P52-FD422</b>	<b>P52-FC208</b>	<b>P52-FD605</b>
	t2.0 - t2.3		<b>P52-FC102</b>	<b>P52-FD423</b>	<b>P52-FC595</b>	<b>P52-FD736</b>
M6	t1.0		<b>P52-FC103</b>	<b>P52-FD424</b>	<b>P52-FC209</b>	<b>P52-FD606</b>
	t1.2 - t1.6		<b>P52-FC104</b>	<b>P52-FD436</b>	<b>P52-FC210</b>	<b>P52-FD607</b>
	t2.0 - t2.3		<b>P52-FC105</b>	<b>P52-FD437</b>	<b>P52-FC630</b>	<b>P52-FD737</b>
M8	t1.6			<b>P52-FD439</b>		
	t2.0 - t2.3			<b>P52-FD440</b>		
	t3.2			<b>P52-FD441</b>		

(mm)

For mild steels, 114C is recommended: For stainless steels, 114 D is recommended.



# IV FORMING TOOL

BURRING - CONTINUED

## DOWNWARD PROCESS

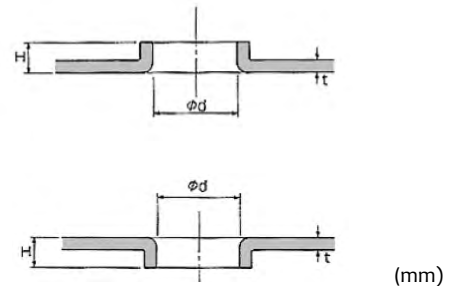
	SHEET	Tap to cut				Tap to form			
		114X	114A	114B	VUL AB	114X	114A	114B	VUL AB
M3	0.6-1.0	P52-FX007	P52-FA581	P52-FB608	P52-FB049	P52-FX019	P52-FA313	P52-FB628	P52-FB120
	1.2-1.6	P52-FX008	P52-FA189	P52-FB609	P52-FB117	P52-FX020	P52-FA582	P52-FB629	P52-FB121
M4	0.8-1.0	P52-FX009	P52-FA190	P52-FB610	P52-FB066	P52-FX021	P52-FA314	P52-FB630	P52-FB122
	1.2-1.6	P52-FX010	P52-FA191	P52-FB611	P52-FB058	P52-FX022	P52-FA315	P52-FB631	P52-FB123
	2.0-2.3	P52-FX011	P52-FA192	P52-FB612	P52-FB118	P52-FX023	P52-FA316	P52-FB632	P52-FB124
M5	(0.8) 1.0	P52-FX012	P52-FA193	P52-FB613	P52-FB067	P52-FX024	P52-FA317	P52-FB633	P52-FB125
	1.2-1.6	P52-FX013	P52-FA194	P52-FB614	P52-FB062	P52-FX025	P52-FA318	P52-FB634	P52-FB126
	2.0-2.3	P52-FX014	P52-FA195	P52-FB615	P52-FB068	P52-FX026	P52-FA583	P52-FB635	P52-FB127
M6	1.0	P52-FX015	P52-FA196	P52-FB616	P52-FB119	P52-FX027	P52-FA584	P52-FB636	P52-FB128
	1.2-1.6	P52-FX016	P52-FA197	P52-FB617	P52-FB069	P52-FX028	P52-FA319	P52-FB637	P52-FB129
	2.0-2.3	P52-FX017	P52-FA198	P52-FB618	P52-FB070	P52-FX029	P52-FA320	P52-FB638	P52-FB130

(mm)

## FOR FURTHER REQUIREMENT

Inform us of the following:

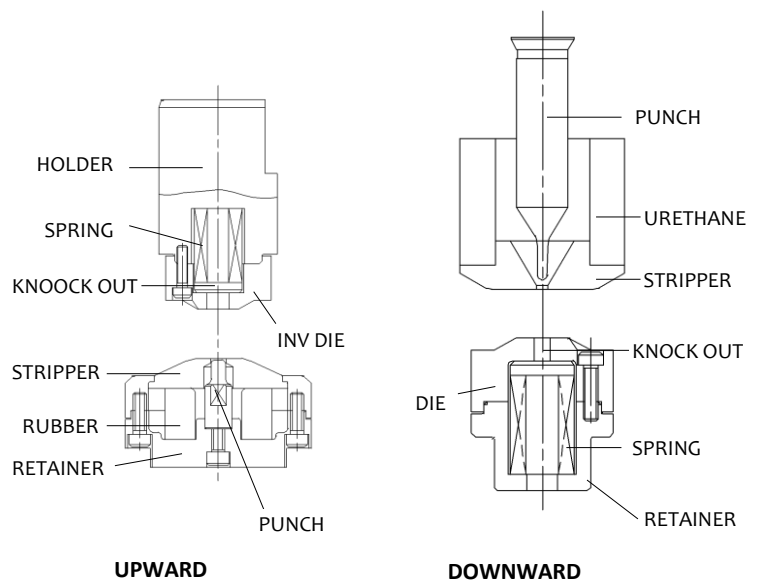
- ✓ Hole dimensions
- ✓ Side
- ✓ Sheet material and thickness to be processed
- ✓ Machine's KX number
- ✓ Other requests; i.e. up/down (upward only), etc.



## FOR REPLACEMENT

Inform us of the following:

- ✓ Part name (see the previous page)
- ✓ Assembly code (engraved on the surface)



# IV FORMING TOOL

BURRING - CONTINUED

## BURRING AND PILOT HOLE

### TAP TO CUT

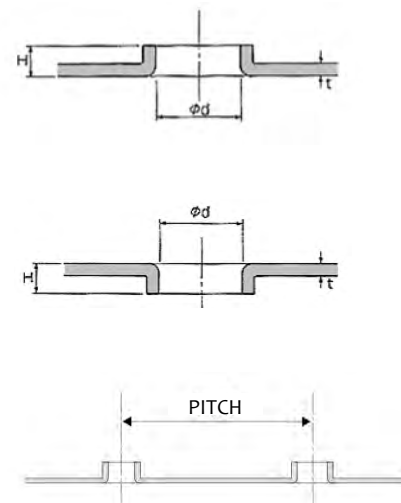
	t	PILOT	d	PITCH
M3	0.5-0.6	<b>1.0</b>	2.44	12
	0.8-1.0	<b>1.2</b>		
	1.2-1.6	<b>1.4</b>		
M4	0.5~0.6	<b>1.0</b>	3.33	14
	0.8	<b>1.2</b>		
	1.0	<b>1.4</b>		
	1.2	<b>1.7</b>		
	1.5-1.6	<b>1.9</b>		
	2.0-2.3	<b>2.2</b>		
M5	(0.8)	<b>1.4</b>	4.17	14
	1.0	<b>1.6</b>		
	1.2-1.4	<b>2.0</b>		
	1.5-1.6	<b>2.2</b>		
	2.0	<b>2.6</b>		
	2.3	<b>3</b>		
M6	(1.0) SUS 1.0	<b>1.8</b>	5.08	15
	1.2-1.4	<b>2.0</b>		
	1.5	<b>2.4</b>		
	1.6	<b>2.6</b>		
	2	<b>3</b>		
	2.3	<b>3.6</b>		

(mm)

### TAP TO FORM

	t	PILOT	d	PITCH
M3	0.5-0.8	<b>1.2</b>	2.81	13
	1.0-1.6	<b>1.4</b>		
M4	0.5-1.0	<b>1.4</b>	3.7	15
	SUS 1.0	<b>1.9</b>		
	1.2-1.4	<b>1.9</b>		
	1.5-1.6	<b>1.9</b>		
	SUS 1.5	<b>1.9</b>		
	2.0-2.3	<b>2.2</b>		
	SUS 2.0	<b>2.2</b>		
M5	(0.8)-1.2	<b>2.1</b>	4.66	15
	SUS 1.0	<b>2.3</b>		
	1.4-1.6	<b>2.5</b>		
	SUS 1.5	<b>2.6</b>		
	2.0	<b>2.8</b>		
	2.3	<b>3.3</b>		
M6	(1.0)-1.4	<b>2.4</b>	5.57	16
	1.5-1.6	<b>2.6</b>		
	2.0	<b>3.3</b>		
	2.3	<b>3.8</b>		

(mm)

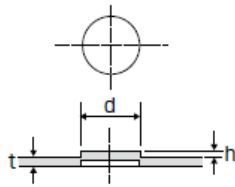


### NOTE

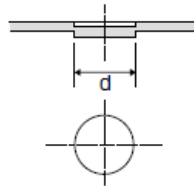
- A 0.1-0.2 difference in pilot hole size does not affect the height of an extrusion.
- More attention shall be paid to downward setting.
- Pitch is limited by sheet thickness and  $\phi d$ .
- Too large pilot hole for stainless steel may cause stripping failure.

# IV FORMING TOOL

## LOCATER POINT



UPWARD



DOWNWARD

(mm)

- Both direction OK
- No punch holder is included.

## MTL STOCK

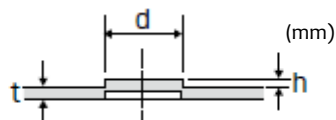
		Unit	3.0	4.0	5.0	NOTE
UPWARD	114 B	Set	<b>P52-JBN30</b>	<b>P52-JBN31</b>	<b>P52-JBN32</b>	Mild steel ~t2.3; Stainless ~t2.0
DOWNWARD	114 A	Set	<b>P52-JA474</b>	<b>P52-JA475</b>	<b>P52-JA476</b>	Mild steel ~t2.3; Stainless ~t2.0
DOWNWARD	114 B	Set	<b>P52-JBP17</b>	<b>P52-JBP18</b>	<b>P52-JBP19</b>	Mild steel ~t3.2; Stainless ~t2.0

(mm)

## FOR CUSTOMIZATION

Inform us of the following:

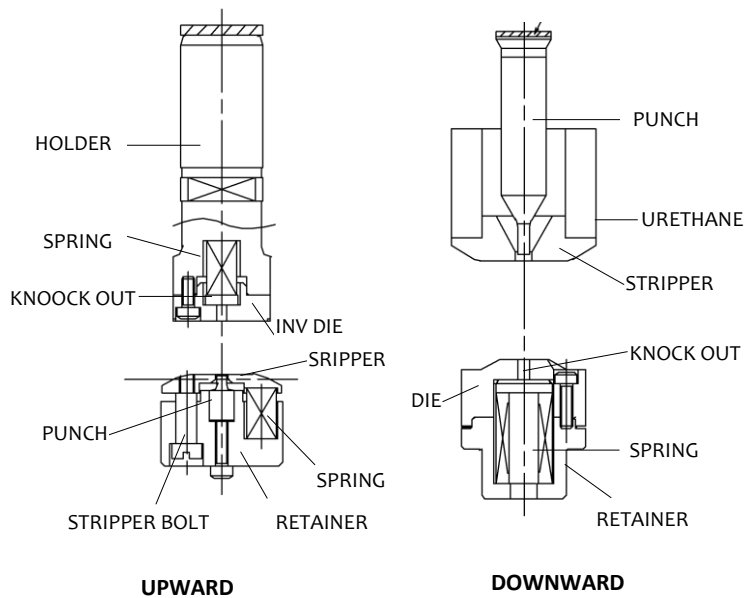
- ✓ Required dimensions ( $h$  shall be half of  $t$ : see above)
- ✓ Side
- ✓ Sheet material and thickness to be processed
- ✓ Machine's KX number
- ✓ Other requests; i.e. up/down, station, etc.
  - $h$  shall be half of  $t$  or shorter.



## FOR REPLACEMENT

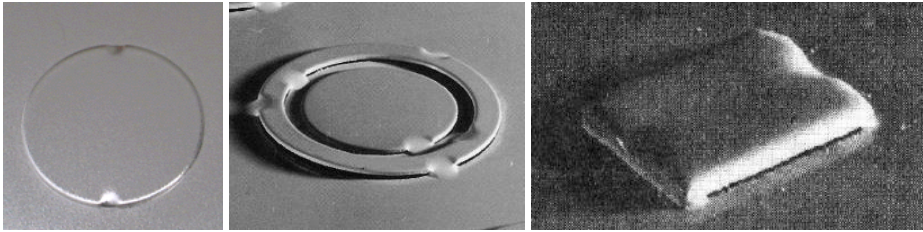
Inform us of the following:

- ✓ Part name (see the previous page)
- ✓ Assembly code (engraved on the surface)



# IV FORMING TOOL

## KNOCK OUT



- Make to order
- Upward only, Style 114 only
- No punch holder included.

### SIZE LIMIT

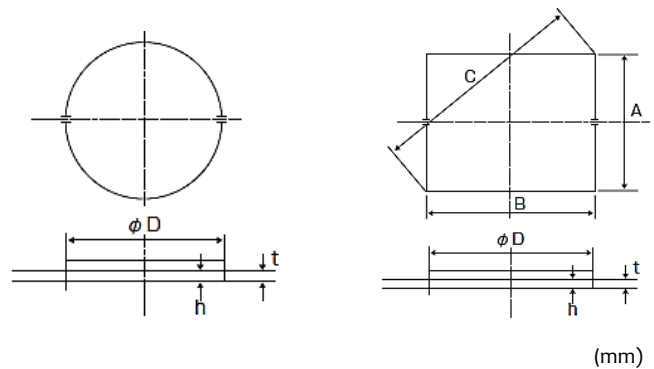
STATION	ROUND $\Phi$	SQUARE	RECTANGULAR
B	8		
C	14	13X13	5X18
D	23	17X17	10X20
E	29	20X20	15X44
F	33	23X23	17X55
G	55	38X38	17X64
H	64	45X45	22X77
J	74	52X52	24X92

(mm)

### FOR CUSTEMIZATION

Inform us of the following:

- ✓ Dimensions (see right)
- ✓ Sheet material and thickness
- ✓ Machine's KX number
- ✓ Number of connections
- ✓ Other preferences; i.e. Station, up/down, etc.

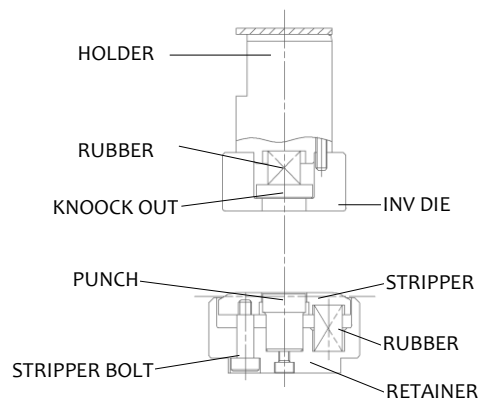


(mm)

### FOR REPLACEMENT

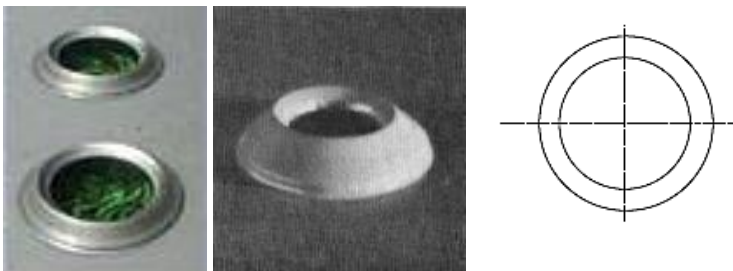
Inform us of the following:

- ✓ Part name (see the previous page)
- ✓ Assembly code (engraved on the surface)



# IV FORMING TOOL

## COUNTERSINK (EMBOSS TYPE)

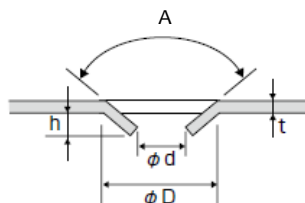
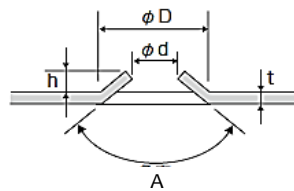


- Make to order
- Both direction OK
- A pilot hole is needed.
- No punch holder is not included.

### SIZE LIMIT

STATION	UPWARD $\Phi D$	DOWNWARD $\Phi D$
X		8
A		8
B		8
C	14	
D	23	
E	29	
F	33	
G	55	
H	64	
J	74	

(mm)



### FOR CUSTOMIZATION

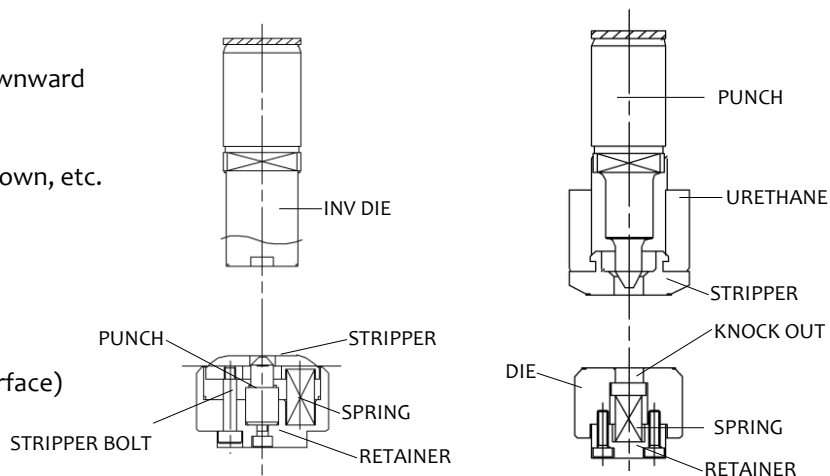
Inform us of the following:

- ✓ Dimensions (see above)
- ✓ Process direction; i.e. upward or downward
- ✓ Sheet material and thickness
- ✓ Machine's KX number
- ✓ Other preferences; i.e. Station, up/down, etc.

### FOR REPLACEMENT

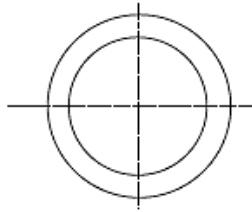
Inform us of the following:

- ✓ Part name (see right)
- ✓ Assembly code (engraved on the surface)



# IV FORMING TOOL

## EMBOSS ROUND

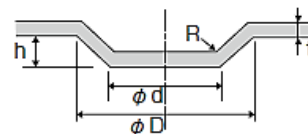
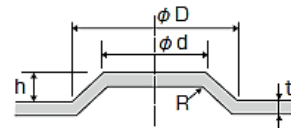


- Make to order
- Both direction OK
- No punch holder is included.

### SIZE LIMIT

STATION	UPWARD $\Phi D$	DOWNWARD $\Phi D$
X		8
A		8
B		8
C	14	
D	23	
E	29	
F	33	
G	55	
H	64	
J	74	

(mm)



### FOR CUSTEMIZATION

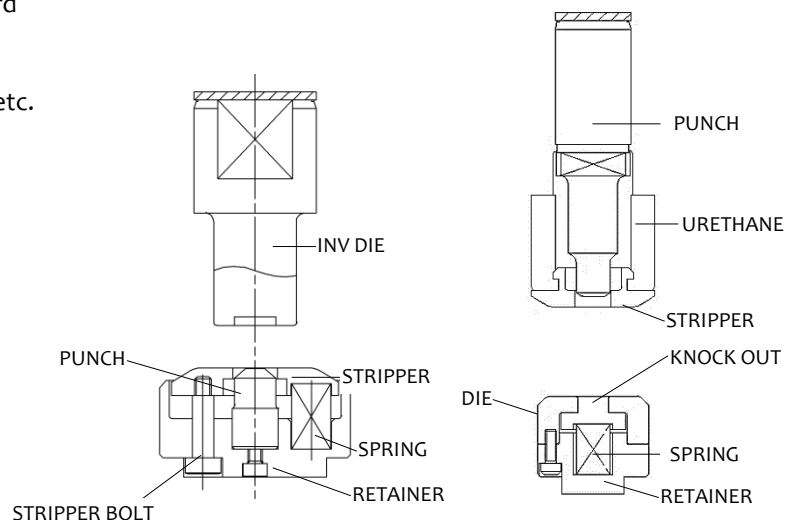
Inform us of the following:

- ✓ Dimensions (see above)
- ✓ Process direction; i.e. upward or downward
- ✓ Sheet material and thickness
- ✓ Machine's KX number
- ✓ Other preferences; i.e. Station, up/down, etc.

### FOR REPLACEMENT

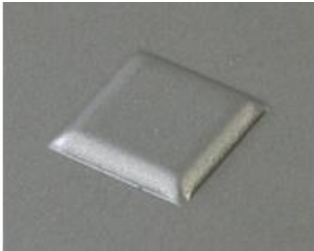
Inform us of the following:

- ✓ Part name (see the right)
- ✓ Assembly code (engraved on the surface)



# IV FORMING TOOL

## EMBOSS SQUARE



- Make to order
- Upward / Style 114 only
- No punch holder is included.

### SIZE LIMIT

STATION	C	RECTANGLE
C	13	5X18
D	17	10X20
E	20	15X44
F	23	17X55
G	38	17X64
H	45	22X77
J	52	24X92

(mm)

### FOR CUSTOMIZATION

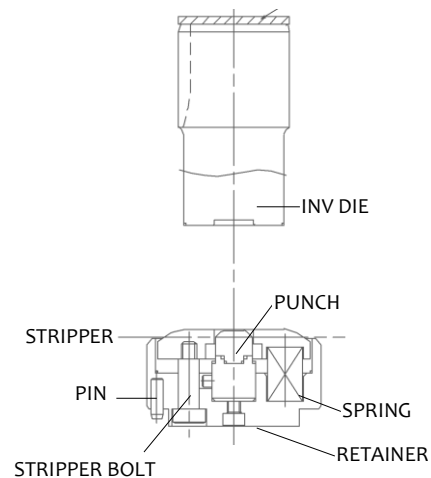
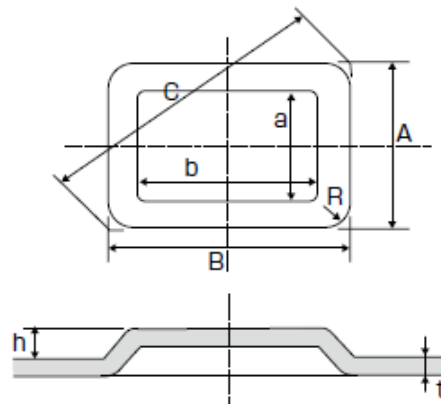
Inform us of the following:

- ✓ Dimensions (see above)
- ✓ Process direction; i.e. upward or downward
- ✓ Sheet material and thickness
- ✓ Machine's KX number
- ✓ Other preferences; i.e. Station, up/down, etc.

### FOR REPLACEMENT

Inform us of the following:

- ✓ Part name (see right)
- ✓ Assembly code (engraved on the surface)



# IV FORMING TOOL

## BRIDGE

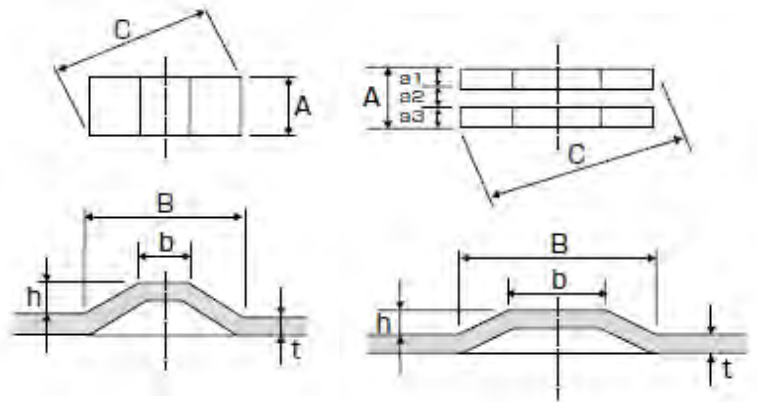


- Make to order
- Upward / Style 114 only
- No punch holder is included.

### SIZE LIMIT

STATION	SINGLE C	DOUBLE C
C	5X12	5X12
D	7X23	7X23

(mm)



### FOR CUSTOMIZATION

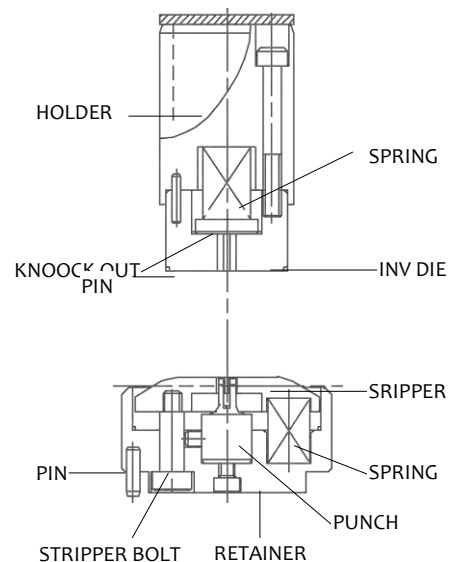
Inform us of the following:

- ✓ Dimensions (see above)
- ✓ Sheet material and thickness
- ✓ Machine's KX number
- ✓ Other preferences; i.e. Station, up/down, etc.

### FOR REPLACEMENT

Inform us of the following:

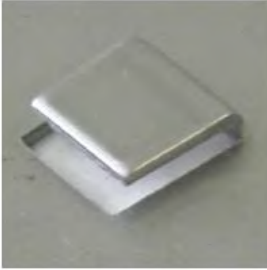
- ✓ Part name (see the right)
- ✓ Assembly code (engraved on the surface)





# IV FORMING TOOL

## LANCE

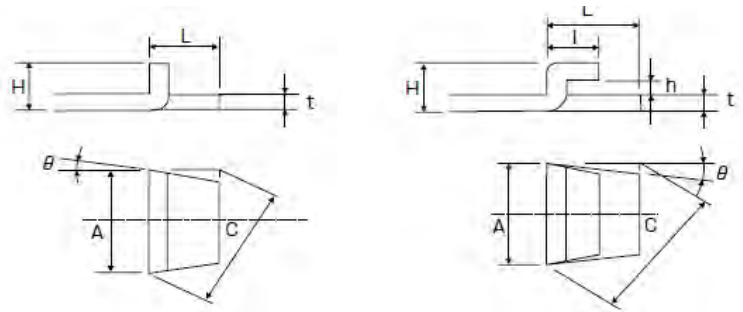


- Make to order
- Upward / Style 114 only
- No punch holder is included.

### SIZE LIMIT

STATION	SINGLE C
D	10X22
E	15X44
F	17X55
G	17X64
H	20X77
J	20X100

(mm)



### FOR CUSTOMIZATION

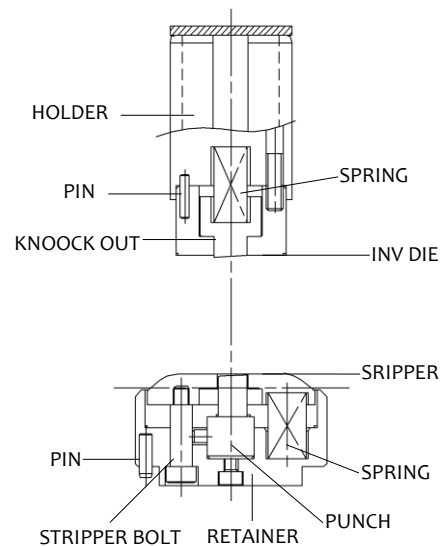
Inform us of the following:

- ✓ Dimensions (see above)
- ✓ Sheet material and thickness
- ✓ Machine's KX number
- ✓ Other preferences; i.e. Station, up/down, etc.

### FOR REPLACEMENT

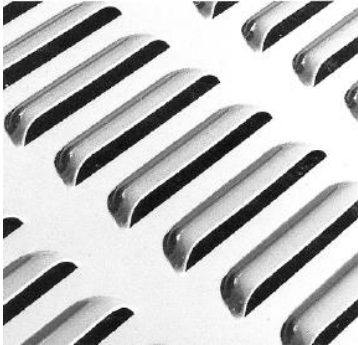
Inform us of the following:

- ✓ Part name (see the right)
- ✓ Assembly code (engraved on the surface)



# IV FORMING TOOL

## LOUVER



- Make to order
- Upward / Style 114 only
- No punch holder is included.

### SIZE LIMIT

STATION	SINGLE C
D	10X22
E	15X44
F	17X55
G	17X64
H	20X77
J	20X100

(mm)

### FOR CUSTOMIZATION

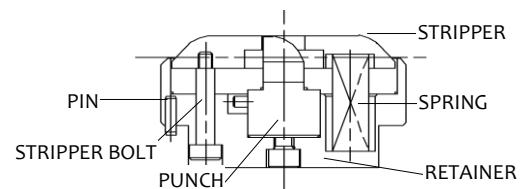
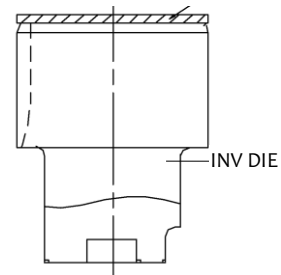
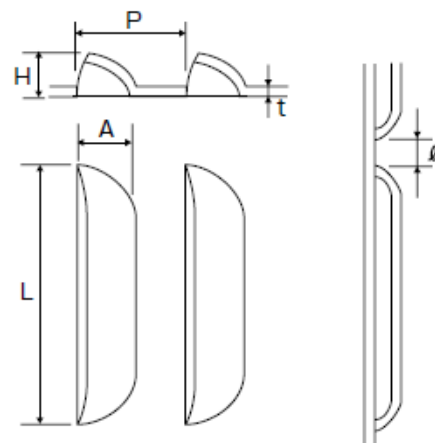
Inform us of the following:

- ✓ Dimensions (see above)
- ✓ Sheet material and thickness
- ✓ Machine's KX number
- ✓ Other preferences; i.e. Station, up/down, etc.

### FOR REPLACEMENT

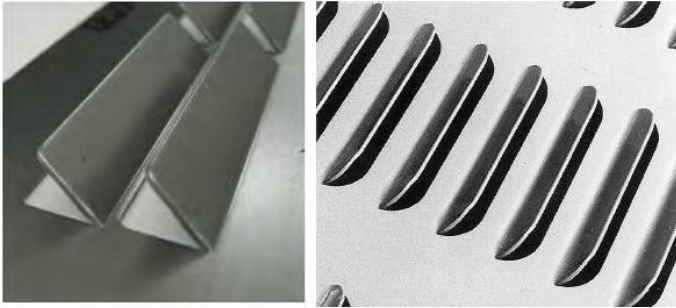
Inform us of the following:

- ✓ Part name (see the right)
- ✓ Assembly code (engraved on the surface)



# IV FORMING TOOL

## HOOP



- Make to order
- Upward / Style 114 only
- No punch holder is included.

### SIZE LIMIT

STATION	SINGLE C
D	10X22
E	15X44
F	17X55
G	17X64
H	20X77
J	20X100

(mm)

### FOR CUSTOMIZATION

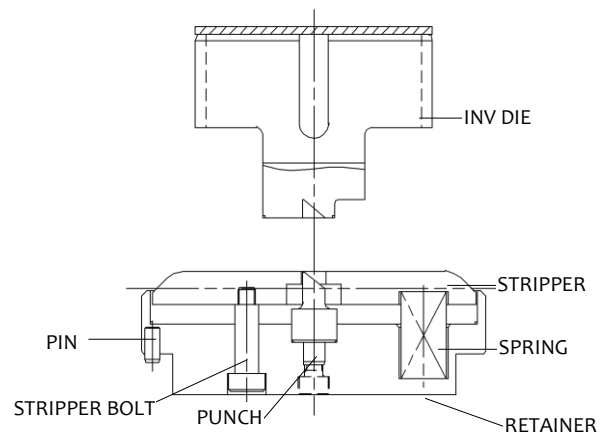
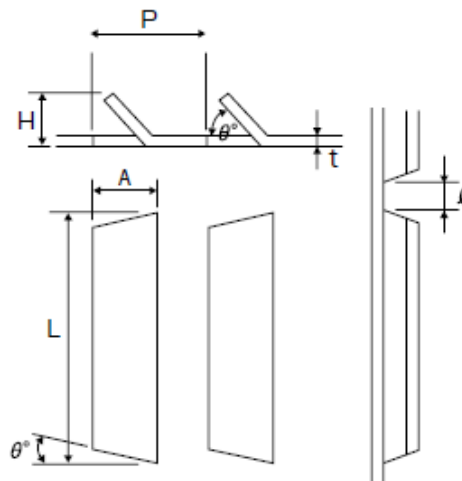
Inform us of the following:

- ✓ Dimensions (see above)
- ✓ Sheet material and thickness
- ✓ Machine's KX number
- ✓ Other preferences; i.e. Station, up/down, etc.

### FOR REPLACEMENT

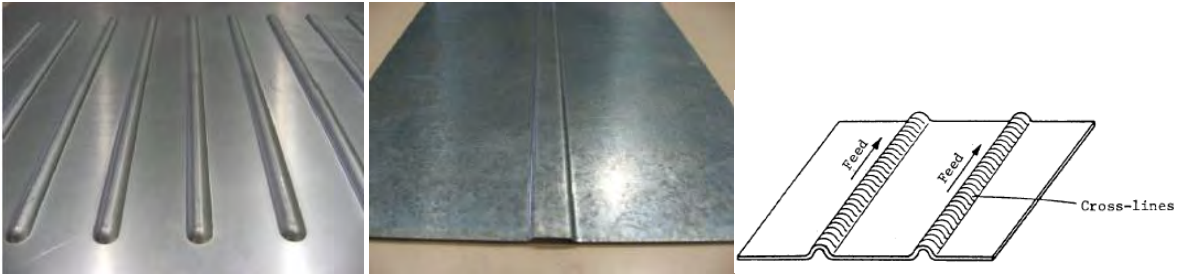
Inform us of the following:

- ✓ Part name (see the right)
- ✓ Assembly code (engraved on the surface)



# IV FORMING TOOL

## BEAD

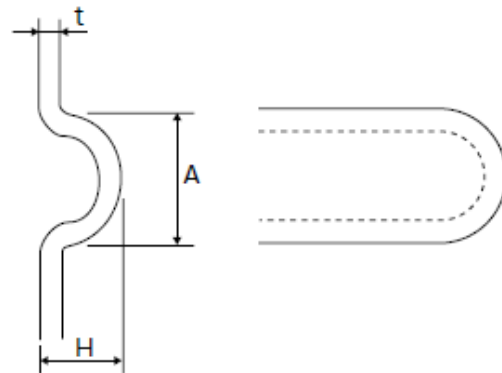


- Make to order
- Upward / Style 114 only
- No punch holder is included.

### SIZE LIMIT

STATION	A	H
C	6	A/5
D	10	
E	16	
F	20	
G	26	
H	32	
J	40	

(mm)



### FOR CUSTOMIZATION

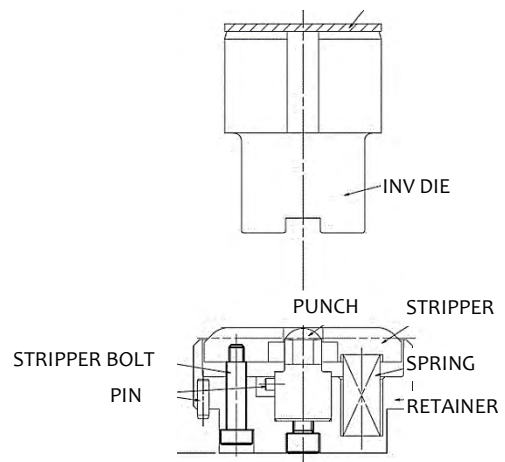
Inform us of the following:

- ✓ Dimensions (see above)
- ✓ Sheet material and thickness
- ✓ Machine's KX number
- ✓ Other preferences; i.e. Station, up/down, etc.

For replacement

Inform us of the following:

- ✓ Part name (see the right)
- ✓ Assembly code (engraved on the surface)



# IV FORMING TOOL

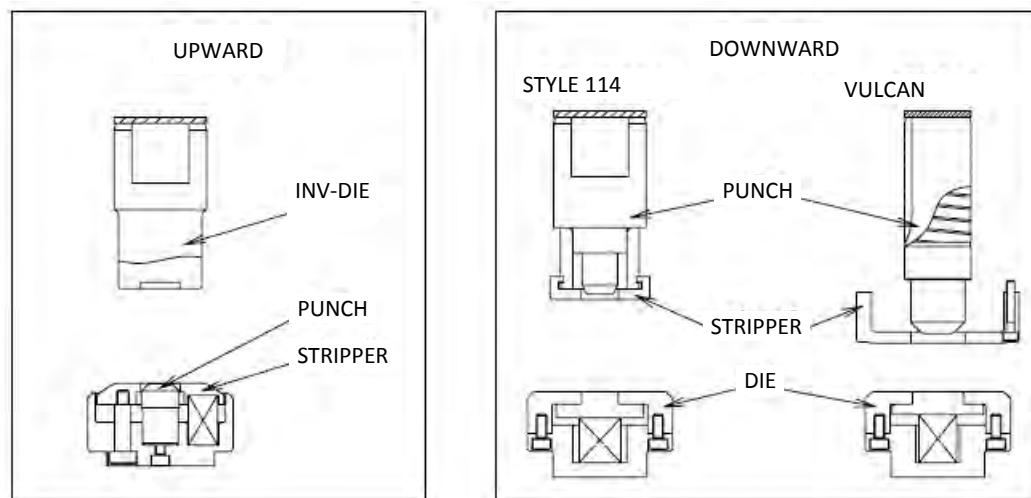
## FORMING TOOL BASIC CONSTRUCTION

### UPWARD

- Forming upper part fits in 114 PUNCH HOLDER.
- Most of non-UP/DOWN forming lower part fit in 114 DIE HOLDER except some special cases.
- Forming punch (pin) in the lower part is replaceable. The part can be sharpened.
- Non-UP/DOWN lower part is higher than the remaining surface.

### DOWNWARD

- Forming upper part is selectable from VULCANTOOL or STYLE 114.
- Non-UP/DOWN lower part fits in 114 DIE HOLDER except some special cases.
- Lower part pushes up the sheet when the punch withdraws.
- Lower tool is as high as the surrounding surface, unlike upward tool, except some special cases.



# IV FORMING TOOL

## UP/DOWN (RETRACTABLE) MODEL – Optional

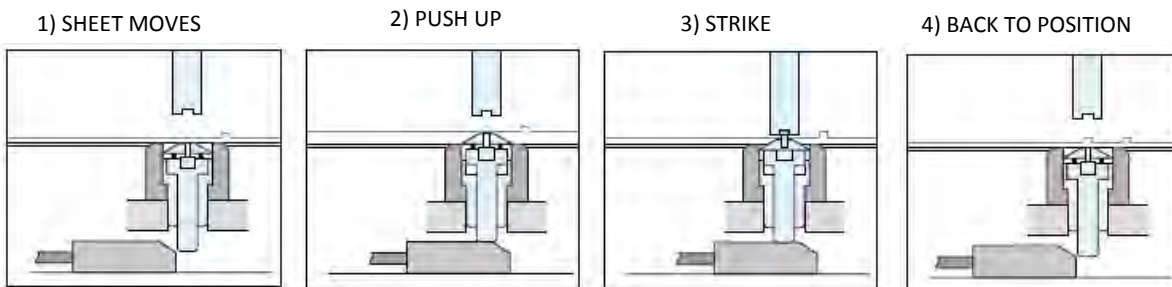
UP/DOWN FORMING TOOL is designed to be retractable when necessary. While a work is traversing, the lower part stays flush with the surrounding surface and pops up only when the punch strikes. There is less friction between the work and the part, and thus, less scratches are found on the backside of the sheet.

NOTE: Your machine must be ready for this option. Contact Murata Machinery for confirmation.

### GOOD

- ✓ Fewer scratches on a metal sheet
- ✓ A metal sheet does not bend when punching takes place near the forming area.
- ✓ No limitation in table speed
- ✓ No interference with the work holder

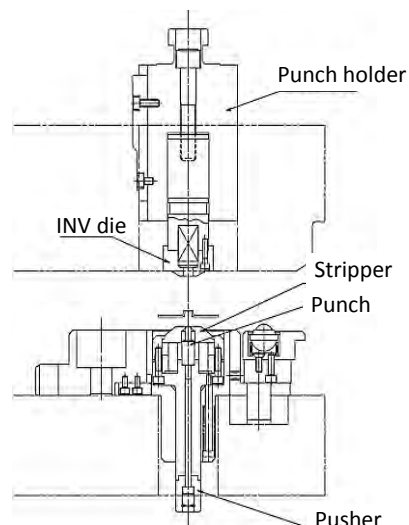
### MECHANIZM



1. The sheet comes to position.
2. The machine's cylinder pushes the cam and the cam raises the lower part at the bottom.
3. Forming takes place.
4. The tools return to their position.

### NOTE

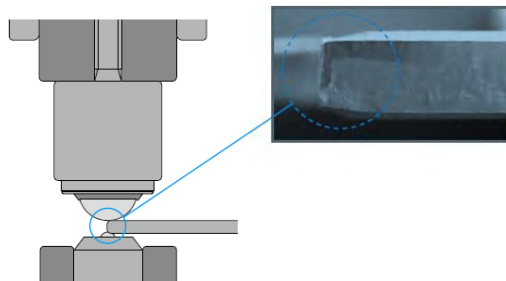
- The first setting of NC parameters shall be done by MURATA engineer.
- Die holder is special to UP/DOWN.
- UP/DOWN operation must be done in outer-track only.
- Put the lower part through the upper turret for mounting.
- Keep a sufficient distance between two UP/DOWN operations.
- Do not use two UP/DOWN tool next to each other.
- The length of the lower part varies among machines. For sharing a tool among several machines, the pusher may be changed. Contact us for further information.



# V MTL RECOMMENDABLE

## BALL TOOL BT-III (114 A)

BALL TOOL BT-III is MTL's original deburring tool. By rolling over the jagged surface, the balls constricts the slits on the both side and makes the cut surface milder and smoother. BT-III is an improved tool, more reachable even where the precedent model of 1-INCH BALL TOOL could not.



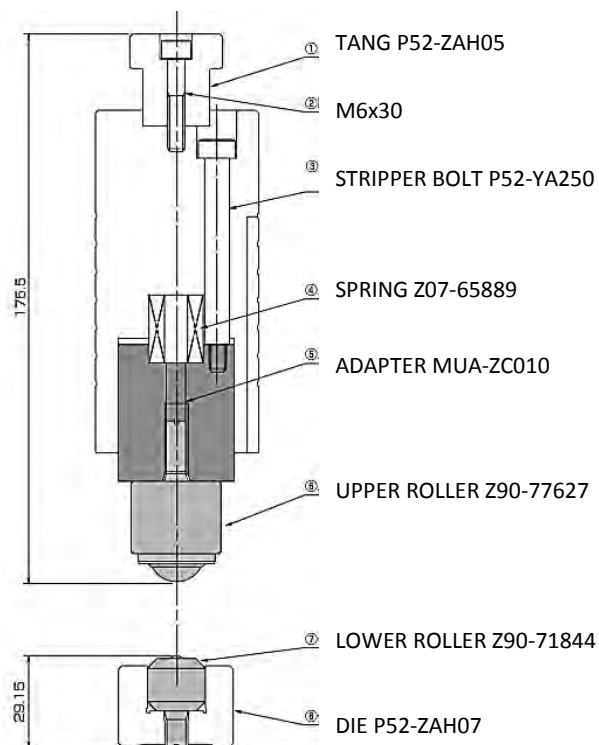
Sheet	Thick t
Mild steel	0.8 ~ 4.5
Stainless steel	0.8 ~ 3.0
Aluminum	0.8 ~ 3.0

(mm)

### FOR INTRODUCTION

Contact Murata Machinery first for software preparation.

Model	Station	Unit	Code
BT-III	114 A	Whole set (see right)	<b>P52-ZAL29</b>

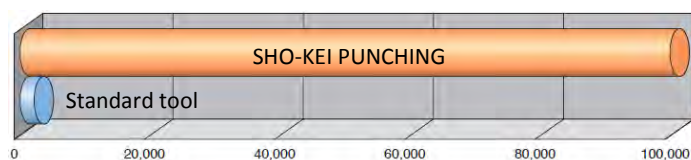


# V MTL RECOMMENDABLE

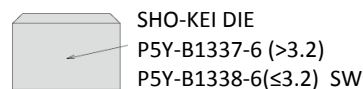
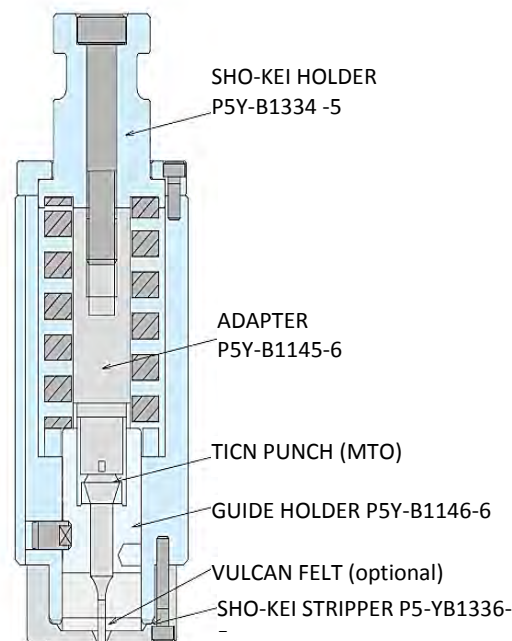
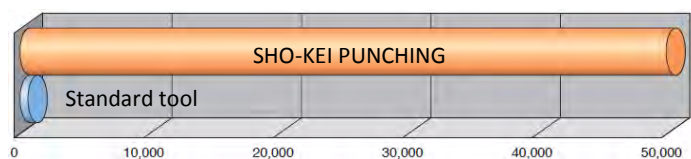
## SHO-KEI PUNCHING SET (VULCANTOOL B)

The tool is good at piercing an extremely small hole or a too-small-against-the-thickness hole, which so often breaks your punches. The SHO-KEI punch is made of stronger HSS steel and every other part is specially designed to help the fine cutting head penetrate a metal sheet safely.

Pierce  $\phi 3.6$  on SPHC  $t 6.0$  with CL1.2 – over 100,000 hit successful!



Pierce  $\phi 3.3$  on SUS304  $t 3.0$  with CL0.7 – over 50,000 hit successful!



### NOTE

- Do not use for nibbling.
- TICN PUNCH cannot be sharpened.
- VULCAN FELT and FELT OIL recommendable.

Sheet	Thick $t$	Hole size	Punch range	CL minimum	CL recommended
Mild steel	$\sim 6.0$	$t \times 0.6 \sim$	$\Phi 1.6 \sim 6.0$	0.5	$t \times 0.2 \sim 0.25$
stainless steel	$\sim 6.0$	$t \times 1.1 \sim$	$\Phi 2.2 \sim 6.0$	0.5	$t \times 0.25 \sim 0.3$
aluminum	$\sim 6.0$	$t \times 0.6 \sim$	$\Phi 1.6 \sim 6.0$	0.5	$t \times 0.2 \sim 0.25$

(mm)

Model	Station	Unit	Code	Other
SHO-KEI PUNCHING	VULCAN AB	Whole set (see above)	<b>P5Y-B1335</b>	Punch and die size, clearance



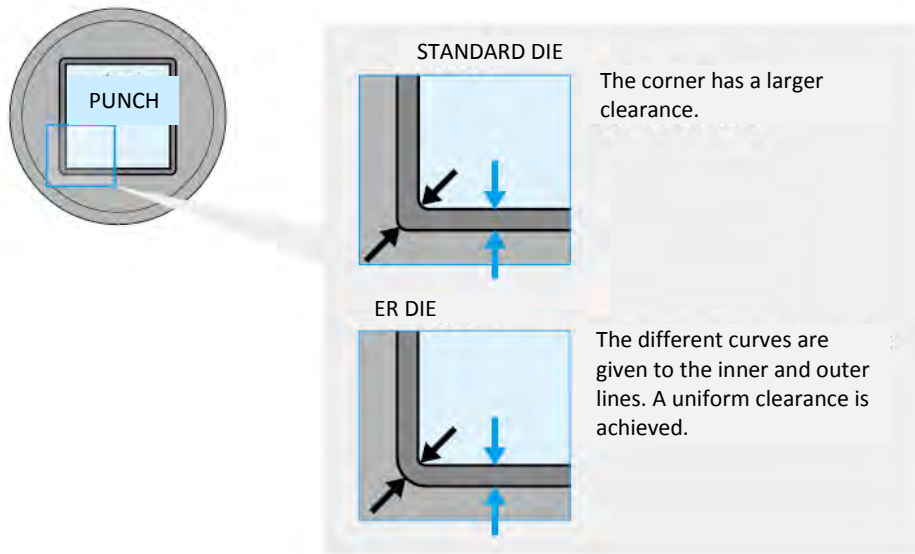
# V MTL RECOMMENDABLE

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## ER DIE

ER DIE has specially designed corners, in a way which a punch is surrounded by a perfectly even clearance. Even clearance reduces unwanted material effects during nibbling like burrs or projections on the backside of a sheet.

- Effective in nibbling operation
- To be used with MTL standard punches
- No additional cost



## FOR ORDERING

Just add *ER* to your die requirement.

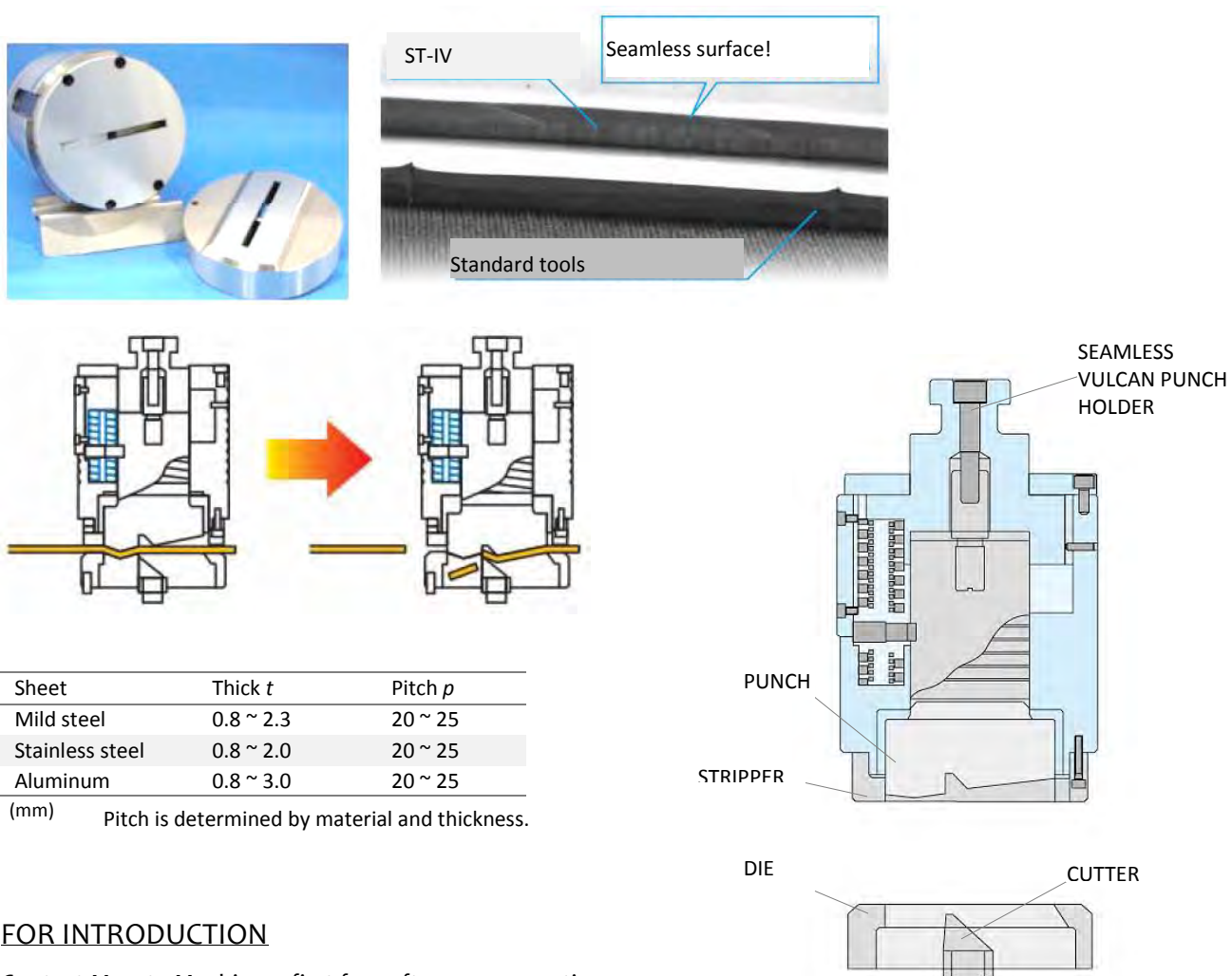
Example: 114 B DIE 5x5 RECT +CLo.25 **ER**

# V MTL RECOMMENDABLE

## SEAMLESS TOOL ST-IV (VULCANTOOL F or INDEX F)

ST-IV is good for a smooth, seamless cutting surface in nibbling operation. For the first installation, contact your MURATA sales person for software preparation.

Machine operational: M2048TS, M2548TS, M2558TS, M3048TG, M3058TS, M2048HL, M2558HL



Sheet	Thick $t$	Pitch $p$
Mild steel	0.8 ~ 2.3	20 ~ 25
Stainless steel	0.8 ~ 2.0	20 ~ 25
Aluminum	0.8 ~ 3.0	20 ~ 25

(mm) Pitch is determined by material and thickness.

### FOR INTRODUCTION

Contact Murata Machinery first for software preparation.

Model	Station	Punch*	Unit	Code	Other
SEAMLESS TOOL ST-IV	VULCAN F, INDEX F	5x70 10x70	Whole set (see above)	<b>N.P.N</b>	Sheet material and thickness (to determine clearance and pitch)

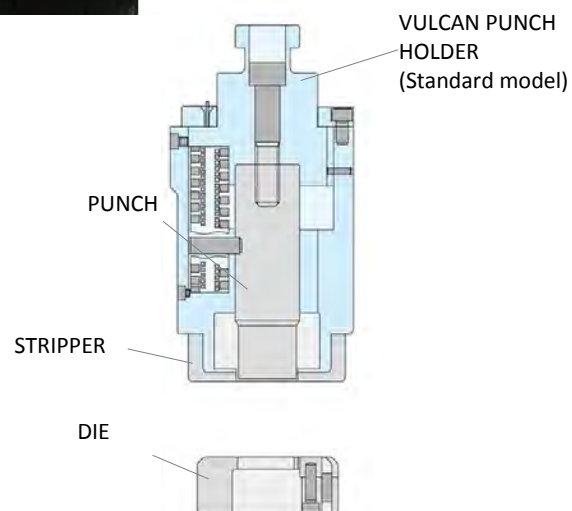
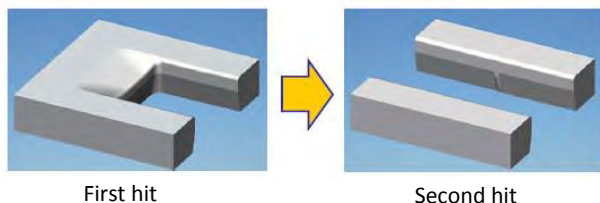
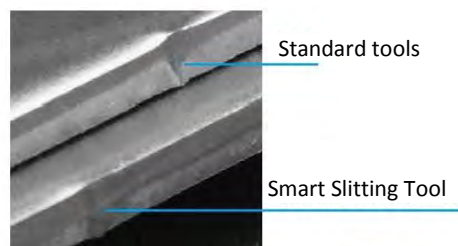
(mm)

\* For other sizes, contact us.

# V MTL RECOMMENDABLE

## SMART SLITTING TOOL (VULCANTOOL D or larger)

SMART SLITTING TOOL is another solution for a smoother cut line after nibbling operation. This model is usable in standard holders and in all MURATA machines. Stations are selectable (see below).



Sheet	Thick $t$	CL to $t$	D	E	F, INDEX F	G	H	J
Mild steel	0.8 ~ 2.3	15% ~ 20%						
Stainless steel	0.8 ~ 2.0	20% ~ 25%	6X30	6X40	6X60	6X70	6X80	6X90
Aluminum	0.8 ~ 3.0	15% ~ 20%						

(mm)

Sheet	Thick $t$	CL	D	E	F, INDEX F	G	H	J
Mild steel	0.8 ~ 6.0	15% ~ 20%						
Stainless steel	0.8 ~ 4.0	20% ~ 25%	10X30	10X40	10X60	10X70	10X80	10X90
Aluminum	0.8 ~ 6.0	15% ~ 20%						

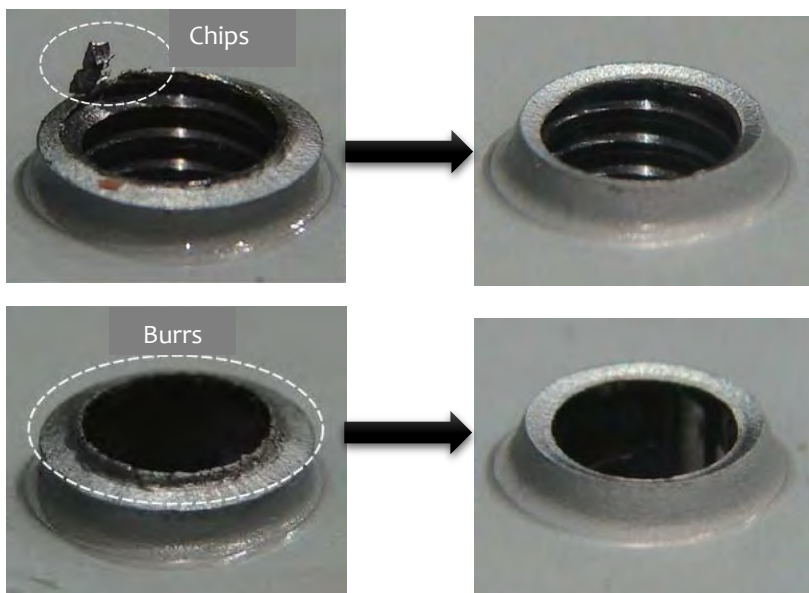
(mm)

Model	Unit	Station	Size
SMART SLITTING TOOL	VULCAN Punch	See above	Pick up a size from the above and determine a die clearance.
	VULCAN Stripper		
	Style 114 Die		

# V MTL RECOMMENDABLE

## HQ BARRING (EXTRUDED HOLE)

HQ BARRING is a higher quality of burring tool, which is designed to solve unfavorable byproducts after tapping – like chips and burrs. The surface of the tapped end is beautifully smooth.



- Make to order
- No punch holder is included.
- Pilot hole is needed.

## SELECTION

### MILD STEEL UPWARD

Mild steel: 0.8~2.3; Aluminum: 0.8~2.0

	Sheet t	Tap to cut		Tap to form		Unit
		114C	114D	114C	114D	
M3	0.8 - 1.0	<b>P5Y-FC014</b>	<b>P5Y-FD003</b>	<b>P5Y-FC022</b>	<b>P5Y-FD016</b>	
	1.2 - 1.6	<b>P5Y-FC015</b>	<b>P5Y-FD004</b>	<b>P5Y-FC023</b>	<b>P5Y-FD017</b>	
M4	0.8 - 1.0	<b>P5Y-FC016</b>	<b>P5Y-FD005</b>	<b>P5Y-FC024</b>	<b>P5Y-FD018</b>	
	1.2 - 1.6	<b>P5Y-FC017</b>	<b>P5Y-FD006</b>	<b>P5Y-FC025</b>	<b>P5Y-FD019</b>	
	2.0-2.3		<b>P5Y-FD007</b>		<b>P5Y-FD020</b>	
M5	0.8 - 1.0	<b>P5Y-FC018</b>	<b>P5Y-FD008</b>	<b>P5Y-FC026</b>	<b>P5Y-FD021</b>	
	1.2 - 1.6	<b>P5Y-FC019</b>	<b>P5Y-FD009</b>	<b>P5Y-FC027</b>	<b>P5Y-FD022</b>	
	2.0-2.3		<b>P5Y-FD010</b>		<b>P5Y-FD023</b>	
M6	0.8 - 1.0	<b>P5Y-FC020</b>	<b>P5Y-FD011</b>	<b>P5Y-FC028</b>	<b>P5Y-FD024</b>	
	1.2 - 1.6	<b>P5Y-FC021</b>	<b>P5Y-FD012</b>	<b>P5Y-FC029</b>	<b>P5Y-FD025</b>	
	2.0-2.3		<b>P5Y-FD013</b>		<b>P5Y-FD026</b>	

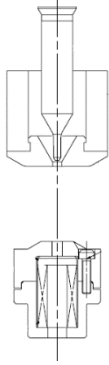
(mm)

# V MTL RECOMMENDABLE

HQ BURRING - CONTINUED

## MILD STEEL DOWNWARD

Mild steel: 0.8~2.3; Aluminum: 0.8~2.0

	Sheet (t)	Tap to cut		Tap to form		Unit
		114 A	VULCAN AB	114 A	VULCAN AB	
M3	0.8 - 1.0	<b>P5Y-FA003</b>	<b>P5Y-FB005</b>	<b>P5Y-FA014</b>	<b>P5Y-FB016</b>	
	1.2 - 1.6	<b>P5Y-FA004</b>	<b>P5Y-FB006</b>	<b>P5Y-FA015</b>	<b>P5Y-FB017</b>	
M4	0.8 - 1.0	<b>P5Y-FA005</b>	<b>P5Y-FB007</b>	<b>P5Y-FA016</b>	<b>P5Y-FB018</b>	
	1.2 - 1.6	<b>P5Y-FA006</b>	<b>P5Y-FB008</b>	<b>P5Y-FA017</b>	<b>P5Y-FB019</b>	
	2.0-2.3	<b>P5Y-FA007</b>	<b>P5Y-FB009</b>	<b>P5Y-FA018</b>	<b>P5Y-FB020</b>	
M5	0.8 - 1.0	<b>P5Y-FA008</b>	<b>P5Y-FB010</b>	<b>P5Y-FA019</b>	<b>P5Y-FB021</b>	
	1.2 - 1.6	<b>P5Y-FA009</b>	<b>P5Y-FB011</b>	<b>P5Y-FA020</b>	<b>P5Y-FB022</b>	
	2.0-2.3	<b>P5Y-FA010</b>	<b>P5Y-FB012</b>	<b>P5Y-FA021</b>	<b>P5Y-FB023</b>	
M6	0.8 - 1.0	<b>P5Y-FA011</b>	<b>P5Y-FB013</b>	<b>P5Y-FA022</b>	<b>P5Y-FB024</b>	
	1.2 - 1.6	<b>P5Y-FA012</b>	<b>P5Y-FB014</b>	<b>P5Y-FA023</b>	<b>P5Y-FB025</b>	
	2.0-2.3	<b>P5Y-FA013</b>	<b>P5Y-FB015</b>	<b>P5Y-FA024</b>	<b>P5Y-FB026</b>	

(mm)

## FOR STAINLESS STEEL

Contact us.

## TOOLING SPECIFICATION

### MILD STEEL, ALUMINIUM

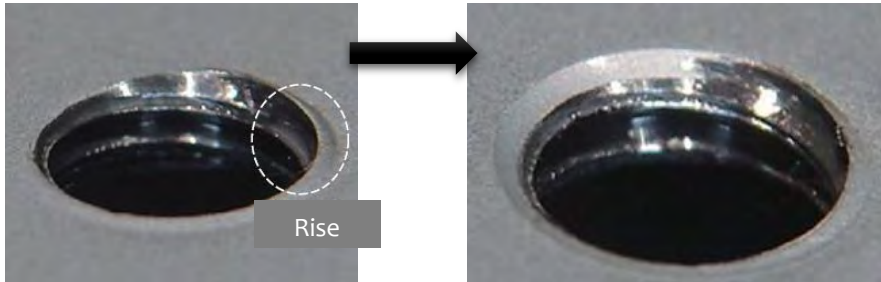
	Sheet (t)	Tap to cut				Tap to steel			
		Pilot	Punch	Die	Pitch	Pilot	Punch	Die	Pitch
M3	0.8 - 1.0	1.6	2.44	3.9	12~	1.9	2.81	4.1	13~
	1.2 - 1.6	1.9	2.44	4.3	12~	2.2	2.81	4.9	13~
M4	0.8 - 1.0	1.9	3.33	4.7	14~	2.4	3.7	4.7	15~
	1.2 - 1.6	2.4	3.33	5.1	14~	2.8	3.7	5.3	15~
	2.0-2.3	2.7	3.33	5.7	14~	2.8	3.7	6.1	15~
M5	0.8 - 1.0	2.2	4.17	5.5	14~	2.8	4.66	5.9	15~
	1.2 - 1.6	2.7	4.17	5.9	14~	2.9	4.66	6.5	15~
	2.0-2.3	3.2	4.17	6.7	14~	3.3	4.66	7.3	15~
M6	0.8 - 1.0	2.4	5.08	6.5	15~	3.0	5.57	7.1	16~
	1.2	2.7	5.08	6.9	6.9~	3.6	5.57	7.3	16~
	1.6	3.2	5.08	6.9	6.9~	3.6	5.57	7.3	16~
	2.0	3.4	5.08	7.9	7.9~	4.0	5.57	8.3	16~
	2.3	3.6	5.08	7.9	7.9~	4.0	5.57	8.3	16~

(mm)

# V MTL RECOMMENDABLE

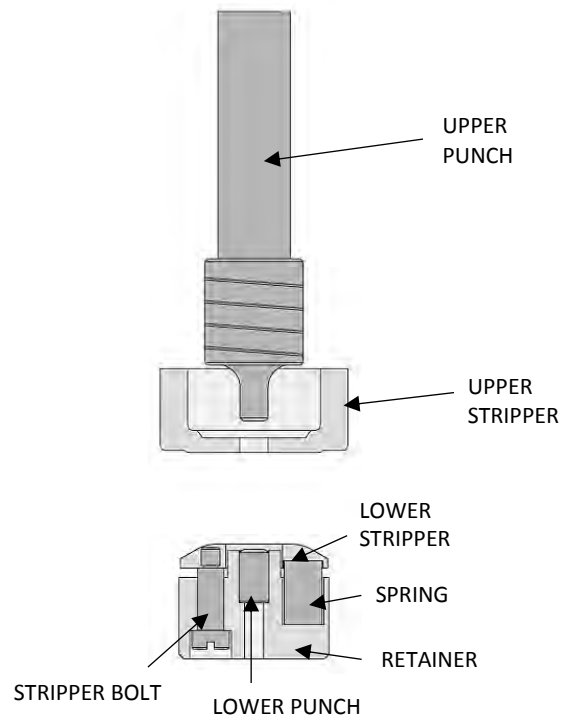
## CHAMFER TOOL

CHAMFER TOOL prevents the rise of the material when a thread being formed. This is effective for a non-extruded tapping.



Sheet	Thick t
Mild steel	0.8 ~ 3.2
Stainless steel	0.8 ~ 2.0
Aluminum	0.8 ~ 3.0

(mm)



## SELECTION

	VULCAN X	VULCAN AB	Unit	Hole
CHAMFER TOOL M3	<b>P5Y-ZX003</b>	<b>P5Y-ZB025</b>	Set (see above)	φ2.81
CHAMFER TOOL M4	<b>P5Y-ZX004</b>	<b>P5Y-ZB026</b>	Set (see above)	φ3.7
CHAMFER TOOL M5	<b>P5Y-ZX005</b>	<b>P5Y-ZB027</b>	Set (see above)	φ4.66
CHAMFER TOOL M6	<b>P5Y-ZX006</b>	<b>P5Y-ZB028</b>	Set (see above)	φ5.57

(mm)

# V MTL RECOMMENDABLE

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## MR STICKER (VULCANTOOL)

Have you troubled with punching traces? MR STICKER helps you.



### NOTE

For Aluminum, a special care shall be necessary to keep the surface clean. Even a tiny amount of waste may affect.

### SELECTION

Station	Code	MOQ pcs.
X	<b>P52-YX001-60X</b>	10
AB	<b>P52-YB010-60B</b>	10
C	<b>P52-YC017-60C</b>	5
D	<b>P52-YD063-60D</b>	3
E	<b>P52-YE012-60E</b>	3
F	<b>P52-YF045-60F</b>	3
G	<b>P52-YG018-60G</b>	3
H	<b>P52-YH011-60H</b>	2
J	<b>P52-YJ045-60J</b>	2

# V MTL RECOMMENDABLE

## VULCAN FELT (VULCANTOOL)

VULCAN FELT is one of the solutions for a longer tooling life. The felt serves as a protective cushion as well as a lubricant between VULCAN PUNCH and STRIPPER.



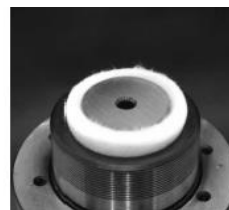
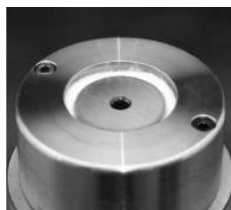
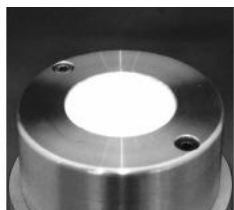
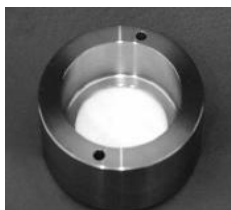
VULCAN FELT



VULCAN FELT STRIPPER





VULCAN FELT OIL



### EXPECTED RESULT

- ✓ Longer punch life
- ✓ Fewer stripping failure
- ✓ Less contamination of a sheet metal with the grease
- ✓ More cut size accuracy
- ✓ Fewer intrusion s of foreign objects inside the stripper

### SELECTION

	VULCAN FELT CODE	VULCAN FELT MOQ pcs.	VULCAN FELT STRIPPER CODE	 mm	 mm
X	P52-YX002-60X	10	P52-WA177-60	~12.7	-
B	P52-YB011-60B	10	P5Y-B0207-60	~20	~20
C	P52-YC018-60C	10	P52-WA038-60	~32	~30
D	P52-YD064-60D	10	P52-WA039-60	~45	~40
EF	P52-YF046-60F	10	P52-WA039-60	~70	~65
INDEX F			P52-WA042-60		
GHJ	P52-YJ046-60J	5	P52-WA053-60	~115	~110

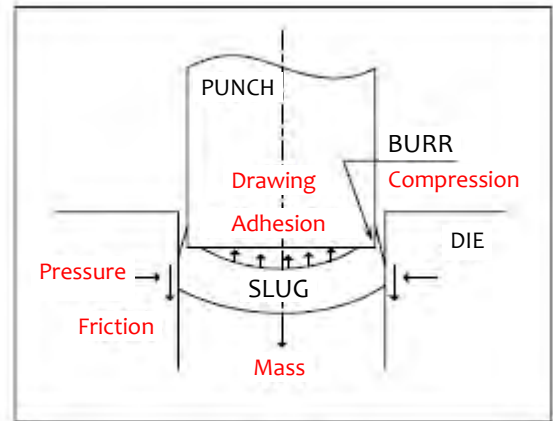


# VI TROUBLES

## SLUG TROUBLE

### WHAT CAUSES SLUG TROUBLE?

1. The slug has burrs.
  - a. The cutting head is not sharp enough.
  - b. The clearance is too large.
  - c. The punching speed is not fast enough.
2. The punch fails to insert the die sufficiently.
3. The punch is magnetized.
  - a. Degaussing is skipped or not completed after the punch sharpened.
4. The physical force which incurs when the punch is drawing takes the slug.
5. Oil-related attaching
6. Improper positioning of replacements
  - a. Individual part has an allowed tolerance. Unfortunate combination of these deviation would result in reducing the necessary abrasion between the die and the slug, or in creating the burrs on the slug.



### HOW TO SHOP SLUG TROUBLE?

1. Punch
  - a. Add SLUG EJECTER  
MTL standard punches larger than 6.0mm are provided with small urethane piece(s) which is called SLUG EJECTER on the top, which pushes away the processed object. Larger square or rectangle over 25mm are given four ejectors. The number is determined by size based on MURATA standard, but could be increased if desired.
  - b. Special Shearing  
If the punch is smaller than 6.0mm, try a top-roof cutting shear. The curve deforms the slug when striking. The slug spring backs and take off the punch. However, this solution may create a dull edge around a hole, particularly with aluminum sheet. If appearance is important, this may not be a good choice.
2. Die
  - a. Try SLUG WIPER  
SLUG WIPER die has a slightly tapered hole inside for constriction with a special claw attached to the land. The claw stops and takes the slug away from the punch. This solution works very well with 2.3mm or thinner sheet, but is not very effective in nibbling operation.
  - b. Try SHO-KEI SLUG WIDER DIE  
The claw given to SHO-KEI DIE is specially designed to be suitable for every thickness of the sheet. This solution is effective with 3.2mm or thicker sheet in particular, with punching sizes of  $\phi 4.5\sim 9.0$ .
  - c. Review the die clearance

# VI TROUBLES

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3. Tool Maintenance
  - a. Sharpen a punch and a die constantly. Tool condition is important to prevent slug burrs.
  - b. Remember to degauss after every sharpening.
  - c. Complement the lost height after sharpened with shims. Make sure that the cutting head achieves an adequate insertion into the die.
4. Punching speed
  - a. The faster the punch moves, the less burr on the slug is generated.

## SCRATCHES

1. What causes scratches over the sheet surface?
  - a. The die holder's urethane ball has been damaged, or been covered with waste.
  - b. The die holder's brush has been worn or damaged.
  - c. The forming tool's lower part is higher than the surrounding surface.
2. How to reduce scratches?
  - a. Replace the defective free-bearing part (urethane ball or brush).
  - b. Apply TIC coating to the lower surface of the forming tool.
  - c. Choose a *Short* model of forming lower tool if available.
  - d. Choose a retractable model (UP/DOWN) if available.

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