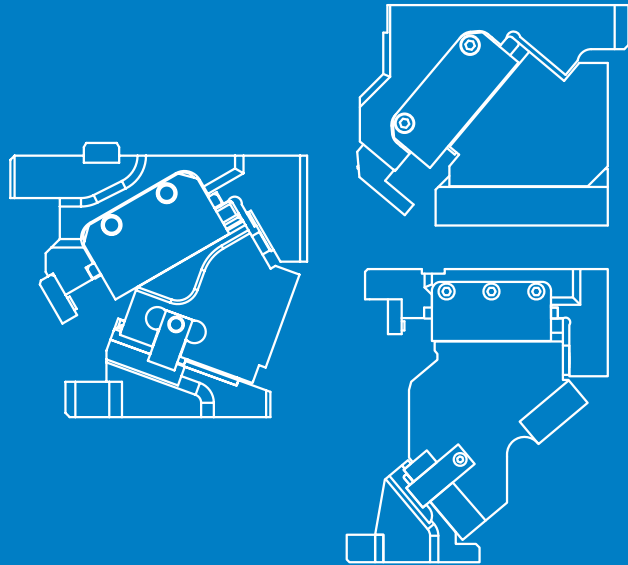


CAM UNITS



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Cam Units [Overview]

Information

Aerial Cam Unit

VALCAM™

- Mount face widths of 46, 58, 72, 100, 140, 200, 300, and 400 mm are available.
- Four interchangeable grades are available with the same installation configuration irrespective either high or low working force.

Whereas, the compact model WHITE is not interchangeable.

Weight reductions and enhancement of rigidity are achieved by the design decreasing stress concentrations based on CAE and durability test by our servo press machine. Consequently, rapid stamping can be expected.

- V-shaped guide structure.
- Mount face widths 46, 58, and 72 mm are available with both short and long travel.
- Coil (ISO: default, ISOL: Long life type) or Gas Spring can be selected for pressure source. YELLOW, PINK and BLACK can be used for trimming and flanging operations.



P.385

VALCAM is a registered trademark or unregistered trademark of Sankyo Oilless Industry, INC.

* CENTER LOAD working forces

Grade	Mount Face Width mm	Working Force [kN (tonf)]	
		Allowable 1,000,000 strokes	Allowable 300,000 strokes
White	46	22.1 (2.2)	29.4 (3.0)
	58	27.9 (2.8)	37.2 (3.8)
Sky	46	22.1 (2.2)	29.4 (3.0)
	58	27.9 (2.8)	37.2 (3.8)
	72	36.8 (3.7)	49.0 (5.0)
Yellow	46	30.9 (3.1)	41.2 (4.2)
	58	42.6 (4.3)	56.8 (5.8)
	72	60.3 (6.1)	80.4 (8.2)
	100	86.7 (8.8)	103.9 (10.6)
	140	112.8 (11.5)	135.3 (13.8)
	200	141.1 (14.4)	164.6 (16.8)
	300	225.4 (23.0)	254.8 (26.0)
	400	269.5 (27.5)	294.0 (30.0)
Pink	46	42.1 (4.3)	56.4 (5.8)
	58	58.8 (6.0)	78.9 (8.0)
	72	77.4 (7.9)	103.7 (10.6)
	100	116.1 (11.8)	139.2 (14.2)
	140	159.3 (16.3)	191.1 (19.5)
	200	197.6 (20.1)	230.5 (23.5)
	300	315.6 (30.2)	356.7 (36.4)
	400	377.3 (38.5)	411.6 (42.0)
Black	46	56.4 (5.8)	59.0 (6.0)
	58	78.9 (8.0)	98.0 (10.0)
	72	103.7 (10.6)	127.4 (13.0)
	100	170.0 (17.3)	200.0 (20.4)
	140	235.0 (24.0)	270.0 (27.6)

Aerial Cam Unit

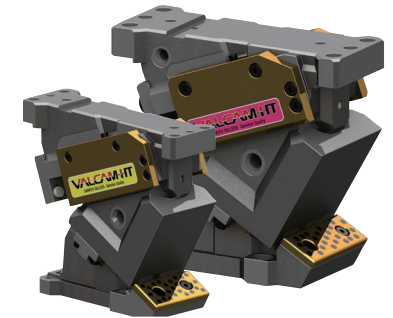
Burr Reduction Cam Unit

VALCAM-HT™

- Mount face widths 100 and 140 mm.
- Working angles from 0° to 70° in 10° increments.
- Coil or Gas Spring can be selected for pressure source.
- Space saving.

* CENTER LOAD working forces

Grade	Mount Face Width mm	Working Force [kN (tonf)]	
		Allowable 1,000,000 strokes	Allowable 300,000 strokes
Yellow	100	86.7 (8.8)	103.9 (10.9)
	140	112.8 (11.5)	135.3 (13.8)
Pink	100	116.1 (11.8)	139.2 (14.2)
	140	159.3 (16.3)	191.1 (19.5)



P.485

VALCAM-HT is a registered trademark or unregistered trademark of Sankyo Oilless Industry, INC

Aerial Cam Unit

VALCAM VA™

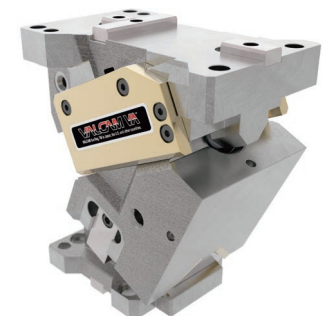
- Mount face widths 65, 85, 110, 165, 200, 260, 330, and 400 mm.
- Working angles from 0° to 75° in 5° increments.
- Sliding elements: bronze with solid lubricants - hardened slide surfaces.
- Gas spring type acc. to VDI 3003.

Mount Face Width mm	Working Force kN (tonf) 1,000,000 strokes
65	117
85	162
110	206
165	323
200	515
260	603
330	735
400	882



P.499

VALCAM VA is a registered trademark or unregistered trademark of Sankyo Oilless Industry, INC.



Cam Units [Overview]

Information

Special Cam Units Panel Avoidance Cam

LONG LEG CAM TSHC

For Pierce

- Mount face width 50 mm.
- Working angles from 10° to 30° in 5° increments.
- V-shaped guide structure.

Working Force
kN (tonf)
1,000,000 strokes

14.7 (1.5)



P.551



Special Cam Units Panel Avoidance Cam

LONG NOSE CAM SULNC · SULNG

For Pierce

- Mount face width 65 mm.
- Working angles from 0° to 25° in 5° increments.
- SULNC: Cast iron and solid lubricant sliding Coil Spring type.
- SULNG: Bronze and solid lubricant sliding Gas Spring type. For high speed production.
- SULNC and SULNG are interchangeable.

Working Force
kN (tonf)
300,000 strokes

14.7 (1.5)



P.571



Special Cam Units Panel Avoidance Cam

LONG LEG CAM SACTFR

For Pierce

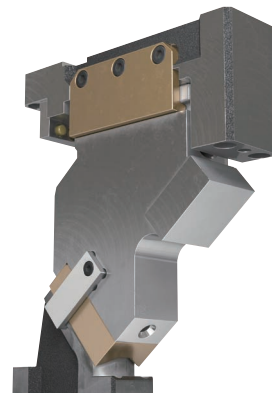
- Mount face width 65 mm.
- Working angles from 35° to 80° in 5° increments.
- Coil or Gas Spring can be selected for pressure source.
- Option SH, which is to change shut height.

Working Force
kN (tonf)
1,000,000 strokes

28.4 (2.9)



P.557



Special Cam Units Panel Avoidance Cam

LONG BODY CAM SACLB · SACMB

For Pierce

- Mount face width 80 mm.
- Working angles from 50° to 80° in 5° increments.
- Selectable Cam Slider length
- Coil or Gas Spring can be selected for pressure source.
- Minimal rear space removal and ease of cam slider disassembly.

Working Force
kN (tonf)
1,000,000 strokes

58.8 (6.0)



P.587



Cam Units [Overview]

Information

Special Cam Units

Panel Avoidance Cam

PULL CAM SAPLC · SAPLS · SAPLU

For Pierce

- Mount face width 80 mm.
- Working angles from 50° to 80° in 5° increments.
- Added size variations that allow to choose the cam length and driver height.
- Minimal rear space removal and ease of cam slider disassembly.
- Compact design for back angle piercing.
- Coil or Gas Spring can be selected for pressure source.



Working Force kN (tonf)
1,000,000 strokes
39.2 (4.0)

Special Cam Units

Die Mounted Cam Unit

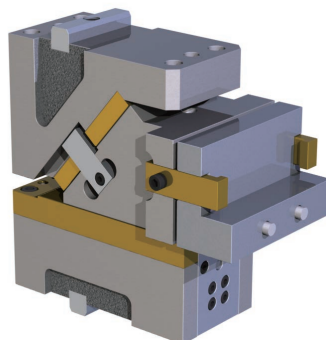
SDCHL

For Pierce

For Trim

For Flange

- Mount face width 170 mm.
- Ease of assembly with exposed cam slider.
- Developed for High Tensile Material Applications.
- High rigidity by new structure.
- Gas spring.



Working Force kN (tonf)
1,000,000 strokes
98.0 (10.0)

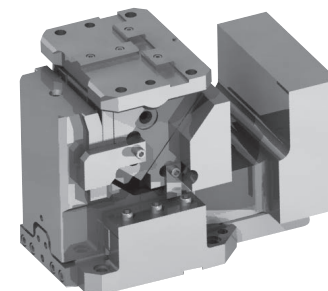
P.601

Special Cam Units

Double Cam Unit

WCMSH/WCMS

- Mount face width 250 mm.
- Working angles from 0.0° to 10.0° in 0.5° increments.
- Working angles from 1.6° to 3.9° in 0.1° increments.
- WCMSH: With Cam Holder A.
- WCMS: Without Cam Holder A.
- Coil or Gas Spring can be selected for pressure source.



Working Force kN (tonf)
98.0 (10.0)

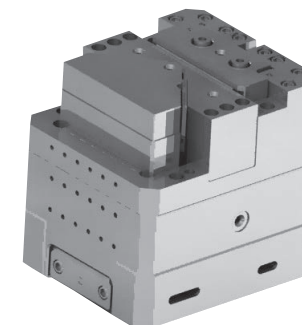
P.607

Special Cam Units

Counter Cam Unit

CTCS · CTCH/CTVS · CTVH

- Mount face widths 120, 145, 245, and 320 mm.
- High rigidity structure.
- V-shaped guide structure.
- Built-in abnormal ascent stop mechanism.
- Built-in urethane for shock absorption in cam driver stopper.



Catalog No.	Mount Face Width mm	Working Force kN (tonf)
CTCS	120	29.4 (3.0)
	145	73.5 (7.5)
CTVS	245	117.6 (12.0)
	320	156.8 (16.0)

P.629

Cam Units [Overview]

Information

Special Cam Units

Counter Cam Unit Compact Type

CTCC

- Mount face width 120 mm.
- Space saving.
- High rigidity by new structure
- Easy maintenance.

Mount Face Width mm	Working Force kN (tonf)
120	9.8 (1.0)



P.649



Aerial Cam Unit

Compact Type

SACE

- Mount face width 52 mm.
- Working angles from 0° to 60° in 5° increments.
- V-shaped guide structure.
- Optimum for high tensile strength steel sheets and thick plate piercing.
- A spring force just under 10% of the working force is attained.

Working Force [kN (tonf)]	
Standard Working Force 1,000,000 strokes	Allowable Working Force 300,000 strokes
29.4 (3.0)	58.8 (6.0)



P.657



For Pierce

Aerial Cam Unit

NAAMS Type

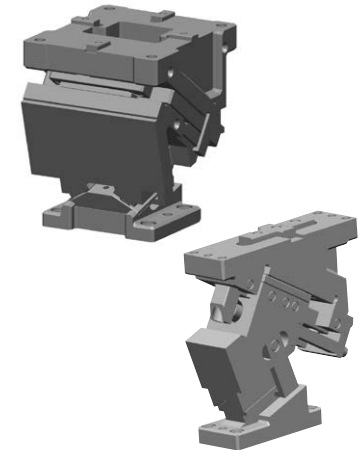
UCMSNR

- Mount face widths 70, 80, 165, 200, 300, and 400 mm.
- Working angles from 0° to 60° in 5° increments.
- Coil or Gas Spring can be selected for pressure source.
- Gas Spring is removable from the rear without disassembling.
- High rigidity structure.

Mount Face Width mm	Working Force kN (tonf)
70	98.1 (10.0)
80	166.7 (17.0)
165	294.2 (30.0)
200	353.0 (36.0)
300·400	451.1 (46.0)



P.687



Aerial Cam Unit

Large Type

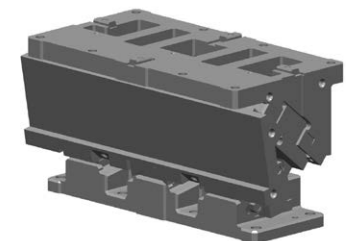
UCMSL

- Mount face widths from 500 to 1000 mm in 100 mm increments.
- Working angles from 0° to 60° in 5° increments.
- Gas Spring is removable from the rear without disassembling.

Mount Face Width mm	Working Force kN (tonf)
500·600	137.3 (14.0)
700·800	470.4 (48.0)
900·1000	627.2 (64.0)



P.839



For Pierce

For Trim

For Flange

Cam Units [Overview]

Information

Die Mounted Cam Unit

CMSD · CMSDG

- Mount face widths 52 and 90 mm.
- Working angles from 0° to 20° in 5° increments for 52mm.
- Working angles from 0° to 15° in 5° increments for 90mm.
- CMSD: Cast iron and solid lubricant sliding, Coil Spring.
- CMSDG: Bronze and solid lubricant sliding, Gas Spring, Higher Working Force.
- Interchangeable between CMSD and CMSDG.

Catalog No.	Mount Face Width mm	Working Force [kN (tonf)]	
		Standard 1,000,000 strokes	Allowable 300,000 strokes
CMSD	52	19.6 (2.0)	39.2 (4.0)
	90	38.2 (3.9)	76.4 (7.8)
CMSDG	52	39.2 (4.0)	58.8 (6.0)
	90	58.8 (6.0)	88.2 (9.0)

P.927

Die Mounted Cam Unit

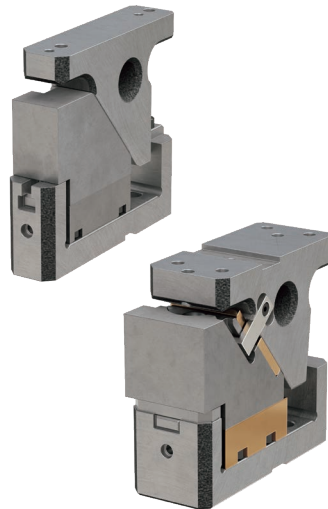
SKCA

- Mount face widths 52, 65, 100, 150, 200, 250, and 300 mm.
- Working angles from 0° to 20° in 5° increments for 65, 100, and 150mm.
- Mount face widths of 52, 200, 250, and 300 mm are available with an angle of 0°.
- Gas Spring is available in 65, 100, 150, and 200mm width and 0°.
- The Box-type holder provides high rigidity.

Mount Face Width mm	Working Angle	Working Force [kN (tonf)]	
		Standard 1,000,000 strokes	Allowable 300,000 strokes
52	00	14.7 (1.5)	29.4 (3.0)
65	00~20	19.6 (2.0)	39.2 (4.0)
100	00	29.4 (3.0)	58.8 (6.0)
	05~20	39.2 (4.0)	78.4 (8.0)
150	00	58.8 (6.0)	88.2 (9.0)
	05~20	64.7 (6.6)	98.0 (10.0)
200	00	78.4 (8.0)	117.6 (12.0)
250	00	98.0 (10.0)	147.0 (15.0)
300	00	117.6 (12.0)	176.4 (18.0)

P.953

For Pierce



Die Mounted Cam Unit

Large Type

KCMSL

- Mount face widths from 500 to 1000 mm in 100 mm increments.
- Working angles from 0° to 20° in 5° increments.
- Gas Spring is removable from the rear without disassembling.

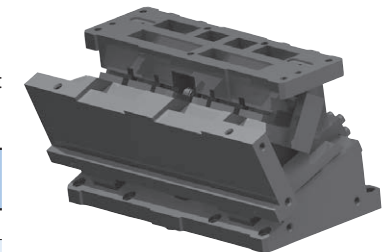
Mount Face Width mm	Working Force kN (tonf)
500~600	313.6 (32.0)
700~800	470.4 (48.0)
900~1000	627.2 (64.0)

P.1053

For Pierce

For Trim

For Flange



Roller Cam Unit

Die Mounted Cam Unit

PSCXG

- Mount face widths 55, 80, 100, and 120 mm.
- Working angles from -20° to 50° in 5° increments.
- Gas spring type acc. to VDI 3003.
- Low maintenance by minimizing the number of parts.
- Suitable drivers available.
- Optional positive return follower.

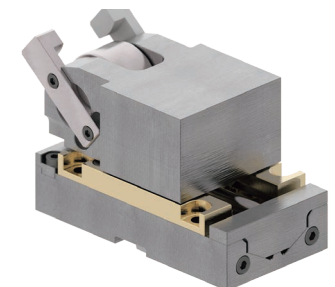
Mount Face Width mm	Working Force [kN] 1,000,000 strokes
55	32.0
80	65.0
100	85.0
120	140.0

P.1095

For Pierce

For Trim

For Flange



Cam Units [Overview]

Additional Machining

Information

■ Tapped Hole and Dowel Hole (Prepared Hole, Finish) Machining for Retainer Mounting

Instruction method for machining

Indicate the tapped hole diameter and the dowel hole (or prepared hole) diameter with the XY coordinates.

To indicate the coordinates

- The origin is positioned at the upper left corner of the mount face. (However, machining uses our machining datum as the reference.)

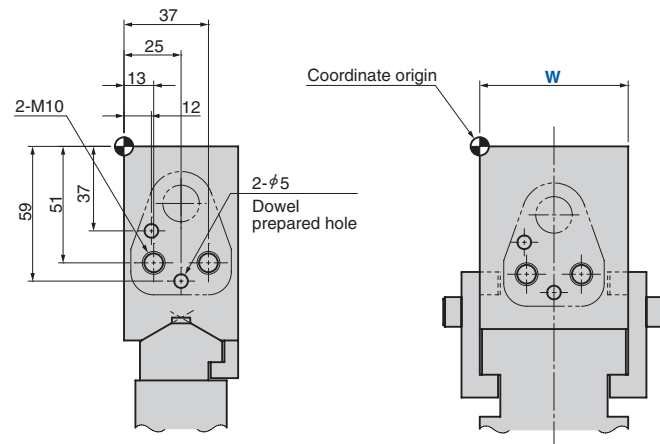
- Indication symbol

—M...Tapped hole, —N...Dowel prepared hole, —K...Dowel finish hole

Machining standard

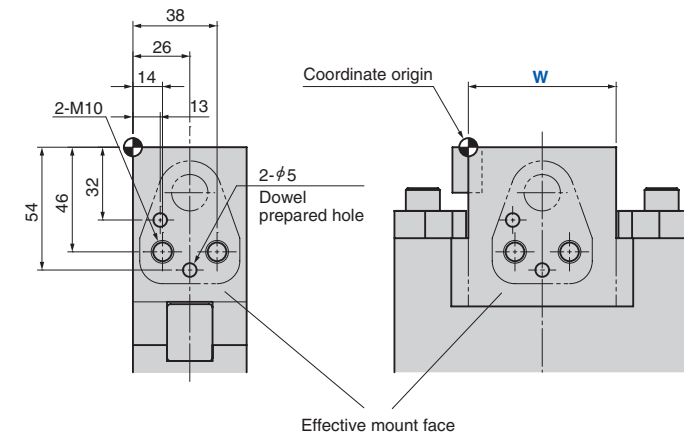
- Tapped holes and dowel prepared holes are machined to general tolerances.
- The hole depth is 2.5 times the diameter for both tapped holes and dowel holes. The dowel pilot hole is processed for 2 times the diameter.
- The dowel hole spacing is machined to the tolerance of ± 0.02 . The hole tolerance is H7.

〈Example of Aerial Cam Unit〉



Order	Catalog No.	W	θ	Additional Machining
	SACE	52	00	— M10 — X (13.0) — Y (−51.0) — M10 — X (37.0) — Y (−51.0) — K5.0 — X (12.0) — Y (−37.0) — K5.0 — X (25.0) — Y (−59.0)

〈Example of Die Mounted Cam Unit〉



Catalog No.	W	θ	S	Additional Machining
CMSD	52	00	55	— M10 — X (14.0) — Y (−46.0) — M10 — X (38.0) — Y (−46.0) — K5.0 — X (13.0) — Y (−32.0) — K5.0 — X (26.0) — Y (−54.0)

■ Other machining

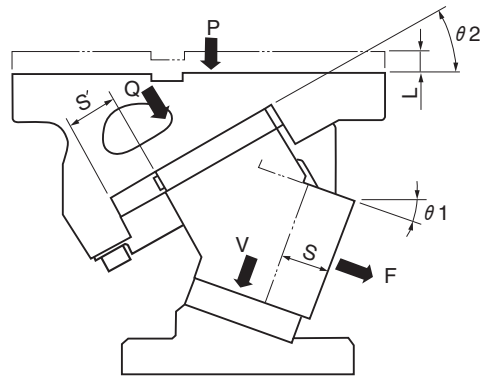
Please give instructions on a separate drawing for drilling or cutting other than tapped holes and dowel holes.

Cam Units [Overview]

Aerial Cam Unit

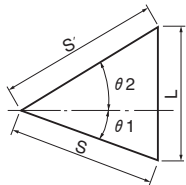
Information

■ Calculation Formula of Force Applied to Aerial Cam Unit



θ_1 : Working angle
 θ_2 : Cam Angle
 F : Force Required for Working
 (Working Force + Spring Return Force + Pad Force)
 P : Press force
 V : Load Applied to Cam Driver Surface
 Q : Load Applied to Cam Slider Surface
 S : Travel
 S' : Spring Travel
 L : Press Travel

● Cam diagram



Press Force

$$P = F \cdot \frac{\cos \theta_2}{\sin (\theta_1 + \theta_2)}$$

Load Applied to Cam Slider Surface

$$Q = F \cdot \frac{1}{\sin (\theta_1 + \theta_2)}$$

Load Applied to Cam Driver Surface

$$V = F \cdot \frac{1}{\tan (\theta_1 + \theta_2)}$$

Press Travel

$$L = S \cdot \frac{\sin (\theta_1 + \theta_2)}{\cos \theta_2}$$

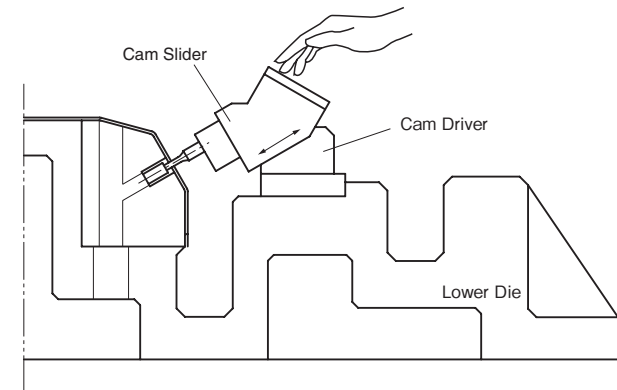
Spring Travel

$$S' = S \cdot \frac{\cos \theta_1}{\cos \theta_2}$$

■ Locating and Installation Procedure of Pierce Punch (retainer) in Aerial Cam Unit

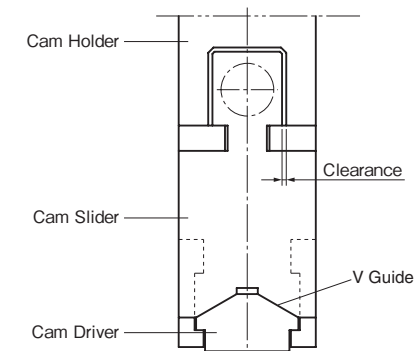
- ① Drill the mounting holes and dowel pin holes (finish) on the die for the Cam Holder and the Driver.
- ② Fix the Cam Holder and the Driver on the die with bolts and dowels.
- ③ Set the Cam Slider removed from the Cam Holder on the fixed driver and locate the pierce punch (retainer).
- ④ Fix the pierce punch (retainer) on the Cam Slider.
- ⑤ Mount the Cam Slider on the Cam Holder fixed on the die.

Locating and installation are now completed.



■ Panel Machining Position Reproducibility for V Guide (Bottom Guide) Type

The clearance between the Cam Holder and the Cam Slider absorbs the error in the Cam Holder and Cam Driver installation machining. The Cam Slider main unit operates with its position secured by the Driver and Cam Slider V guide structure. Therefore, the Piercing punch (Retainer) position can always be replicated.

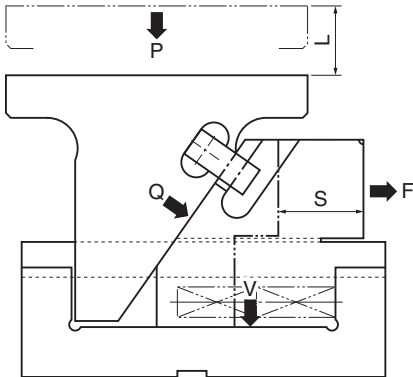


Cam Units [Overview]

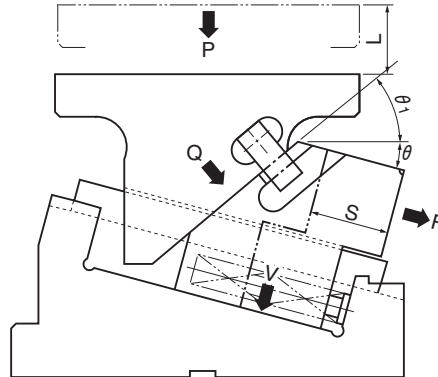
Die Mounted Cam Unit

Information

■ Calculation Formula of Force Applied to Die Mounted Cam Unit



θ : Working Angle
 θ_1 : Driver Inclination Angle
 F : Force Required for Working
 (Working force + Spring Return Force + Pad Force)
 P : Press Force

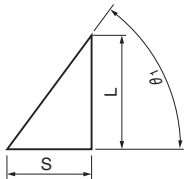


V : Load Applied to Cam Holder Surface
 Q : Load applied to Cam Slider Surface
 S : Working Travel
 L : Press Travel

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● Cam Diagram

No Inclination of Working Angle (0°)



Press Force

$$P = F \cdot \frac{1}{\tan \theta_1}$$

Load Applied to Cam Slider Surface

$$Q = F \cdot \frac{1}{\sin \theta_1}$$

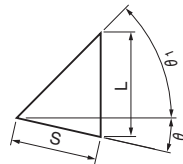
Load Applied to Cam Holder Surface

$$V = F \cdot \frac{1}{\tan \theta_1}$$

Press Travel

$$L = S \cdot \tan \theta_1$$

Inclination of Working Angle



Press Force

$$P = F \cdot \frac{\cos \theta_1}{\sin (\theta_1 + \theta)}$$

Load Applied to Cam Slider Surface

$$Q = F \cdot \frac{1}{\sin (\theta_1 + \theta)}$$

Load Applied to Cam Holder Surface

$$V = F \cdot \frac{1}{\tan (\theta_1 + \theta)}$$

Press Travel

$$L = S \cdot \frac{\sin (\theta_1 + \theta)}{\cos \theta_1}$$