General Description of Cam Unit

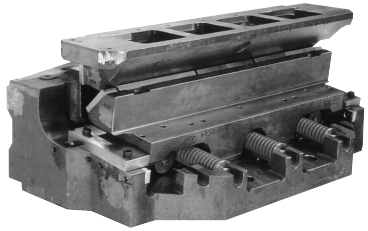
OVERVIEW

Large or dedicated cams can be engineered and manufactured to customer's specifications.

In addition to standard cam units, customized cam units may be manufactured.
The reduction of lead time, cost, etc. is a benefit to the die builder and their customer.

■Large Cam

Conventionally, some dies are designed with multiple smaller cam units that are side by side. Each cam performing a small part of the total operation. Engineered large cam can eliminate the need for multiple small cams and perform the total operation with one larger cam. This will simplify the die design resulting in a reduction in time needed for die design as well as manufacturing time.

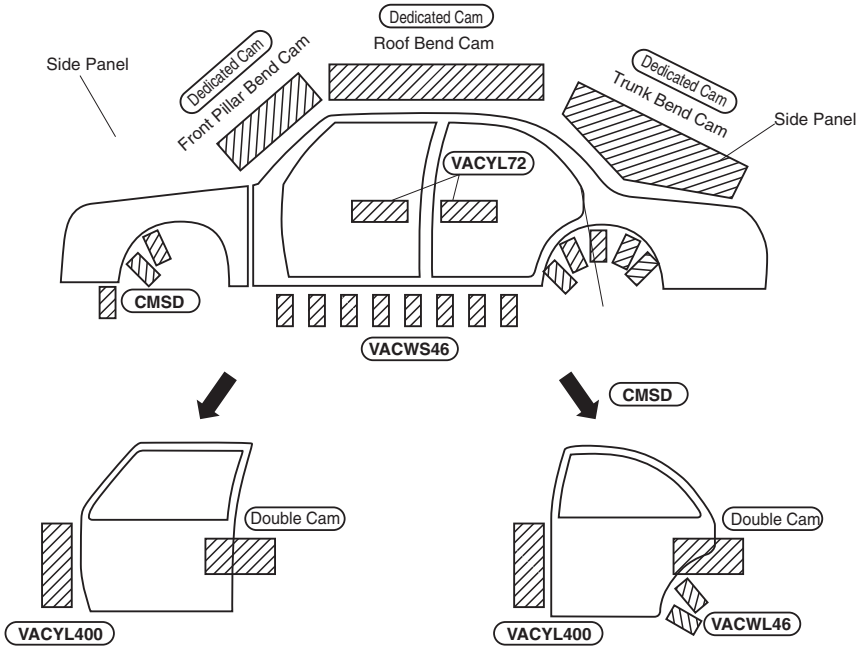


■Dedicated Cam

Applications that demand operations that exceed the capability of a standard cam unit require an engineered cam unit specific to the customer requirements. Heavy loads and special shapes are good examples of a dedicated cam.
If the quantity of the dedicated cam is high or quick delivery is required, the option to keep the dedicated cams in stock may be taken.

＊For more technical information or inquiries, please contact your local sales representative.

＊To proceed with an order, drawing becoming the base of the cam is required. If you do not have one yet, we can help the design along.



■Table of Cam Unit Options

Cat.No. \ code		SC	WC	K	N	N12	N20	S
VACWS/L	46	●	–	–	–	–	–	–
VACWS/L	58	●	●	–	–	–	–	–
VACSS/L VACYS/L VACPS/L	46	●	–	●	–	–	–	–
	58	●	●	●	–	–	–	–
	72	●	●	●	–	–	–	–
VACBS/L	46・58・72	–	–	●	–	–	–	–
VACYL VACPL	100・140	–	–	●	–	–	–	–
VACYL VACPL	200～140	–	–	●	–	–	–	–
VACYHT VACPHT	100・140	–	–	●	–	–	–	–
		–	–	●	–	–	–	–
SACLB	80	–	–	●	–	–	–	–
SACE	52	●	●	–	–	●	–	–
SULNC	65	●	–	–	–	●	–	–
UCNBK		–	–	●	–	–	–	–
UCMSL		–	–	–	–	–	–	–
UCMSNR	70・80	–	–	–	–	–	–	–
	165・200	–	–	–	●	–	–	–
	300・400	–	–	–	●	–	●	–
CMSD	52	●	●	●	–	–	–	–
	90	–	●	●	–	●	–	–
SKCA	52・65	–	–	–	–	–	–	–
	100	–	–	–	–	●	–	–
	150～300	–	–	–	–	–	–	–
	400～600	–	–	●	–	–	–	–
KCMSL		–	–	–	–	–	–	–
CTCS/CTCH	120	–	–	–	–	●	–	●
CTVS/CTVH	145	–	–	–	–	–	–	●
	245	–	–	–	–	–	–	●
	320	–	–	–	–	–	–	●
CTCC	120	–	–	–	–	●	–	●

◆Option code details

SC : The length of mounting surface is extended.
WC : The width of mounting surface is extended.
K : Key is attached.
N : ϕ16mm dowel hole is provided in holder.
N12 : Dowel pin hole diameter is changed to ϕ12mm.
N20 : Dowel pin hole diameter is changed to ϕ20mm.
S : Slide lock plate is attached.

General Description of Cam Unit Option

AERIAL CAM UNIT OPTION

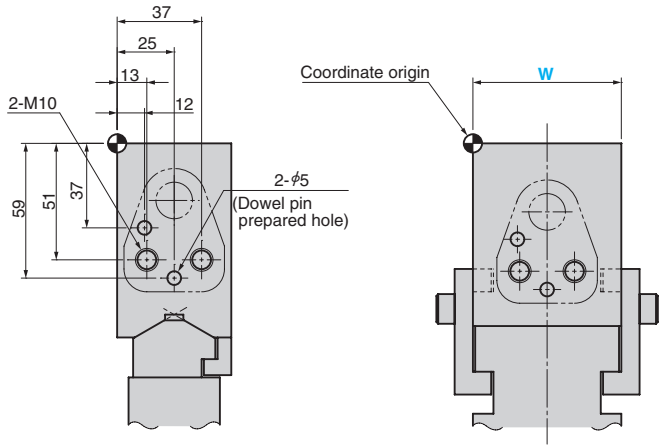
■Tapped Hole and Dowel Pin Hole (Prepared Hole, Finish) Machining for Retainer Mounting

- Instruction method for machining

  Indicate the tapped hole diameter and the dowel pin 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 surface. (However, machining uses our machining datum as the reference.)
  - Indication symbol
    M…Tapped hole,K…Dowel pin prepared hole,N…Dowel pin finish hole
- Machining standard
  - Tapped holes and dowel pin 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 pin hole spacing is machined to the tolerance of ±0.02.The hole tolerance is H7.

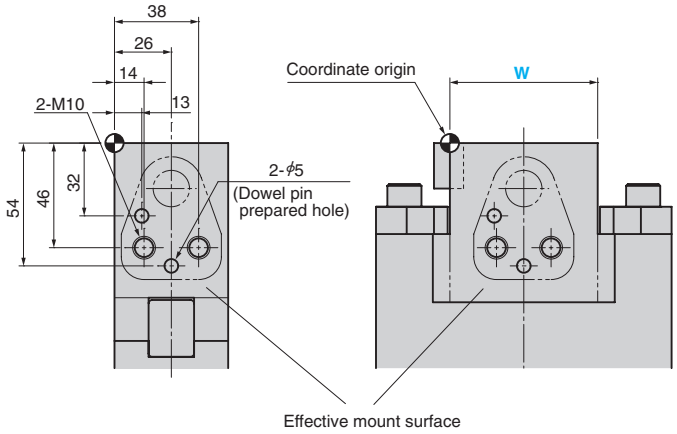
(Example of aerial cam)



Order

Catalog No.	(W)	—	(θ)	—	Option
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)



Order

Catalog No.	(W)	—	(θ)	—	S	— Option
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)

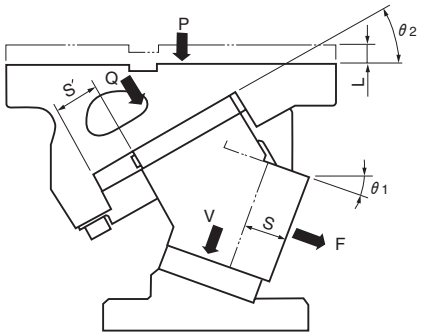
■Other machining

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

General Description of Cam Unit

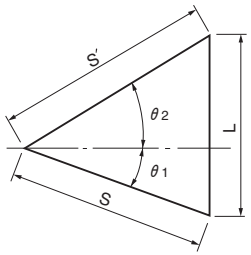
OUTLINE OF OILLESS CAM UNIT

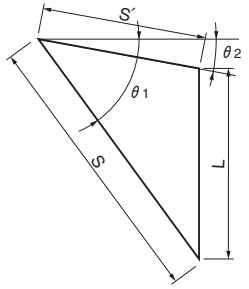
■Calculation Formula of Force Applied to Aerial Cam Unit



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 Driver Surface

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

•Load Applied to Cam Slider Surface

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

•Press Travel

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

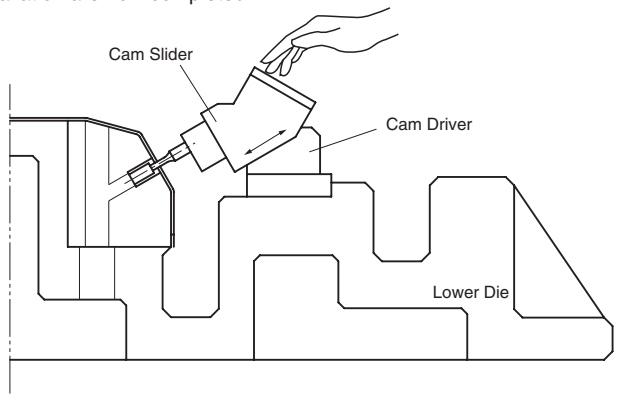
•Spring Travel

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

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

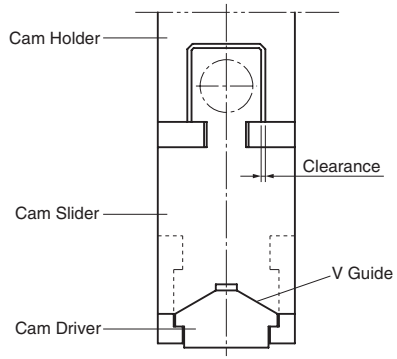
① Drill the mounting holes and dowel pin holes (finish) on the die for the cam holder and the driver.
② Fix the cam holder and the driver on the die with bolts and dowel pins.
③ Set the cam slider removed from the cam holder on the fixed driver and locate the pierce punch (retainer).
④ Fix the pierce 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.

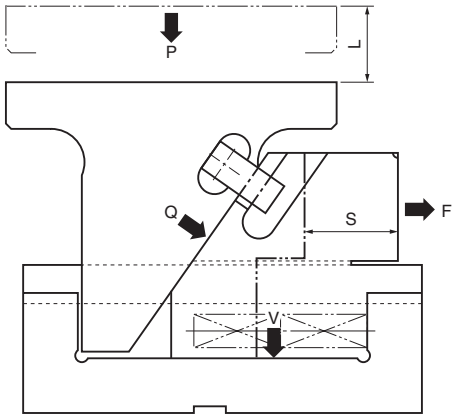


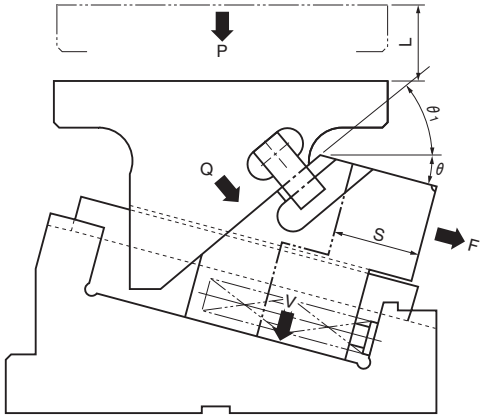
■Panel Machining Position Reproducibility for V Guide (Bottom Guide) Type

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.



■Calculation Formula of Force Applied to Die Mounted Cam Unit

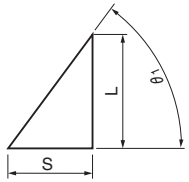




θ : Working Angle
θ_1 : Driver Inclination Angle
F : Force Required for Working
(Working force + Spring Return Forc
+ Pad Force)
P : Press Force
V : Load Applied to Cam Driver Surface
Q : Load applied to Cam Slider Ssurface
S : Working Travel
L : Press Travel

Cam Diagram

●No Inclination of Working Angle (0˚)



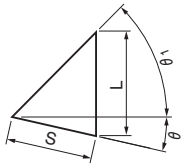
$$P = F \cdot \frac{1}{\tan\theta_1}$$

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

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

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

●Inclination of Working Angle



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

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

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

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

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