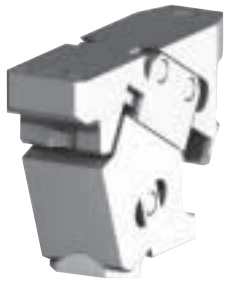
General Description of Cam Unit

OVER VIEW

■Types and Features of Aerial Cam Unit

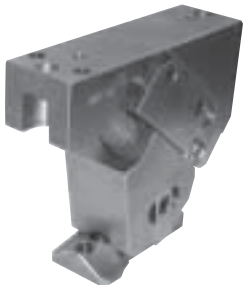
SUCD Compact Type For Pierce P.579～614



- Compact design with the mounting width of 52 mm and the shut height of 125 mm.
- Automatic alignment mechanism of the V-shaped guide.
- Available angle is 0°to 80° at increments of 5°.

Working Force kN(tonf)	
Standard Working Force (one million strokes)	Allowable Working Force (300,000 strokes)
14.7 (1.5)	29.4 (3.0)

SLSD Long Travel Type For Pierce P.615～638



- The travel is about 1.5 times as long as the same model's (SUCD) travel.
- Compact design with the mounting width of 52 mm and the shut height of 135 mm.
- Automatic alignment mechanism of the V-shaped guide.
- Available angle is 0°to 50° at increments of 5°.
- ISO springs are used.

Working Force kN(tonf)	
Standard Working Force (one million strokes)	Allowable Working Force (300,000 strokes)
14.7 (1.5)	29.4 (3.0)

SACD Compact Type For Pierce Working Force 3tonf P.639～666

- Mount width is 52mm.
- The spring force is about 3.0 times as long as the same model's travel.
  A little less than 10% of the piercing force is achieved. It is most suitable for piercing of high strength steel and thick steel.
  Automatic alignment mechanism of the V-shaped guide.
- Available angle is 0°to 60° at increments of 5°.

Working Force kN(tonf)	
Standard Working Force (one million strokes)	Allowable Working Force (300,000 strokes)
29.4 (3.0)	58.8 (6.0)

SULNC Long Nose Type For Pierce P.667～682

- Mount width is 65 mm.
- In addition to a long nose (protrusion by 70 mm longer for the standard type than normal product), further protrusion of 150 mm (SC option) is available.
- Automatic alignment mechanism of the V-shaped guide.
- Available angle is 0°to 25° at increments of 5°.

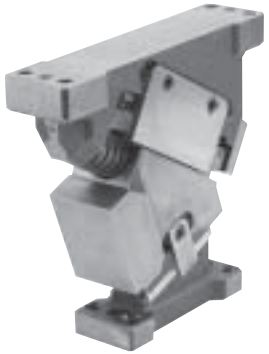
Working Force kN(tonf)	
Standard Working Force (one million strokes)	Allowable Working Force (300,000 strokes)
14.7 (1.5)	29.4 (3.0)

General Description of Cam Unit

OVER VIEW

HUCTF For thick metal pierce reinforced return force type

P.683～716



- Strong type with spring force of about 6000 N-600 kgf.
  It is most suitable for piercing of high strength steel and thick steel.
- Automatic alignment mechanism of the V-shaped guide.
- Available angle is 0° to 75° at increments of 5°.
- ISO springs are used.

Working Force kN(tonf)	
Standard Working Force (one million strokes)	Allowable Working Force(300,000 strokes)
68.7 (7.0)	137.3 (14.0)

UCMSC50・65 Standard Type for Pierce

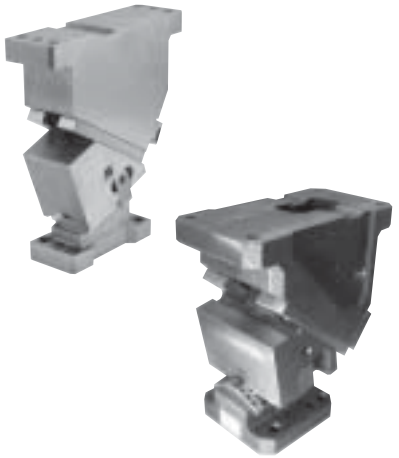
P.717～786

- Standard type with the mount width which is equal to the cam width.
  Space saving design with reduced weight.
- Automatic alignment mechanism of the V-shaped guide.
- Cam Slider is removable from the back side.
- Available angle is 0°to 70° at increments of 5°.

Working Force kN(tonf)	
Standard Working Force (one million strokes)	Allowable Working Force (300,000 strokes)
19.6 (2.0)	39.2 (4.0)

UCMSC80・150 Standard Type for Pierce

P.787～850



- Standard type with the mount width which is equal to the cam width.
- Automatic alignment mechanism of the V-shaped guide.
- Cam Slider is removable from the back side.
- Available angle is 0° to 70° at increments of 5°.

Mount width	Working Force kN(tonf)	
	Standard Working Force (one million strokes)	Allowable Working Force (300,000 strokes)
80	39.2 (4.0)	78.4 (8.0)
150	88.2 (9.0)	132.3 (13.5)

UCMSF80・150 Reinforced Working Force Type for Pierce

P.787～850

- Standard type with the mount width which is equal to the cam width.
- Reinforced working force type of UCMSC (about 1.4 times)
- 2-stage spring type is used.
  The spring force is about twice that of UCMSC.
- Automatic alignment mechanism of the V-shaped guide.
- Cam Slider is removable from the back side.
- Available angle is 0° to 70° at increments of 5°.

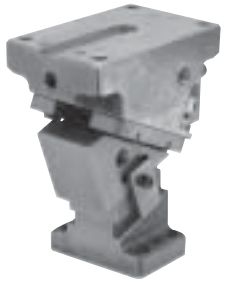
Mount width	Working Force kN(tonf)	
	Standard Working Force (one million strokes)	Allowable Working Force (300,000 strokes)
80	54.9 (5.6)	109.8 (11.2)
150	123.5 (12.6)	185.2 (18.9)

General Description of Cam Unit

OVER VIEW

SOUK Standard Type for Pierce and Flange

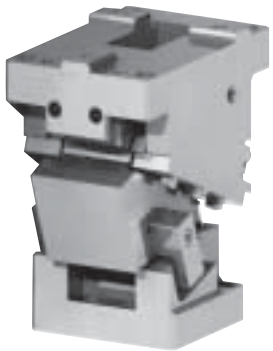
P.851～944



- Highly rigid sliding structure of cam slider.
- Cam Slider is removable from the back side.
- Available angle is 0° to 70° at increments of 5°.
- 65,100 and 200 are available for the mount width.

UCNBK V-Shaped Guide for Pierce and Flange

P.945～1006



- Highly rigid sliding structure of cam slider.
- Automatic alignment mechanism of the V-shaped guide.
- Cam Slider is removable from the back side.
- Available angle is 0° to 70° at increments of 5°.
- 65,100 and 200 are available for the mount width.

＊Although intermediate angle（5°type）product with the mount width of 100 and 200 is not shown, it can be manufactured.

SUWB Wide Type For Pierce and Flange

P.1007～1098

- 200, 300, 400, 500 and 600 are available for the mount width.
- Automatic alignment mechanism of the V-shaped guide.
- Cam Slider is removable from the back side.
- Available angle is 0° to 60° at increments of 10°.
  (Angle up to 20°is increments of 5°.)

Mount Width	Working Force kN(tonf)	
	Standard Working Force (one million strokes)	Allowable Working Force (300,000 strokes)
200	117.6(12.0)	235.2(24.0)
300	196.0(20.0)	392.0(40.0)
400	245.0(25.0)	490.0(50.0)
500	313.6(32.0)	627.2(64.0)
600	392.0(40.0)	784.0(80.0)

UCMSG Long Life Type for Pierce and Flange

P.1099～1266

- Highly rigid structure with the overseas automotive approved.
- 50,65,80,150,200 and 300 are available for the mount width
- Cam Slider is removable from the back side（except width of 50 and 80）.
- Available angle is 0° to 65° at increments of 5°.
- ISO springs are used.

Mount Width	Working Force kN(tonf)	
	Standard Working Force (one million strokes)	Allowable Working Force (300,000 strokes)
50	29.4(3.0)	58.8(6.0)
65		
80	49.0(5.0)	98.0(10.0)
150	147.0(15.0)	294.0(30.0)
200		
300	294.0(30.0)	588.0(60.0)

General Description of Cam Unit

OVER VIEW

UCMSL Large and Long Life Type For Pierce and Flange

P.1267～1352

- 500 to 1000 at the increments of 100 mm are available for the mount width.
- Available angle is 0° to 60° at increments of 10°.

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

UCMSNR NAAMS standards for pierce and flange

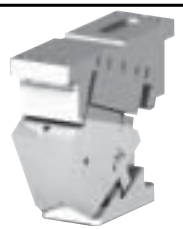
P.1353～1486

- Product conforming to NAAMS standard.
- 70,80,165,200,300,400 are available for the mount width.
- Available angle is 0° to 60° at increments of 5°.
- Highly rigid structure with double wear plates and S45C material.

Mount Width	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)

UCMSV VDI standard for pierce and flange

P.1487～1554



- 60, 85, 110, 165, 200, 250, 300 and 400 available for the mount width.
- Available angle is 0° to 75° at increments of 5°.
- Cam Slider(Spring) is removable from rear of cam.
- Product comforms to VDI standard.

■Types and Features of Die Mounted Cam Unit

CMSD Compact Type For Pierce

P.1555～1574

- 52 and 90 are available for the mount width.
- Easy to remove the cam slider.
- Available angle is 0° to 20° at increments of 5°. (Up to 15°for CMSD90)

Mount Width	Working Force kN(tonf)	
	Standard Working Force (one million strokes)	Allowable Working Force (300,000 strokes)
52	19.6 (2.0)	39.2 (4.0)
90	38.2 (3.9)	76.4 (7.8)

SKC/SKCA Standard Type for Pierce and Flange

P.1575～1664

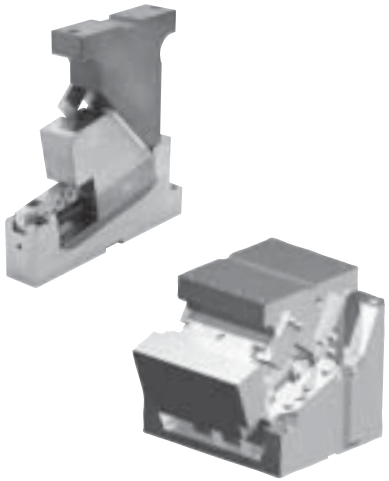
- 52, 65, 100, 150, 200, 250, 300, to 600(at increments of 100 mm) are available for the mount width.
- Sliding type with highly rigid box guide.
- When the mount width is 65 to 150, the angle is 0°to 20°with increments of 5°. (0°only for the mount width of 52 and 200 or more.)

General Description of Cam Unit

OVER VIEW

KGSP Long Life Type For Pierce and Flange

P.1665～1738

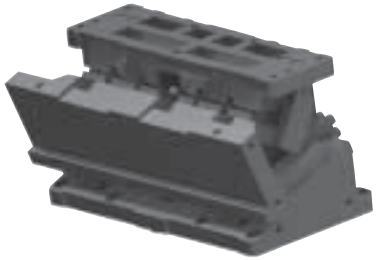


- Highly rigid structure with the overseas automobile manufacturer specification.
- 52,80,150,200 and 300 are available for the mount width.
- Available angle is 0°to 30° at increments of 5°.
- ISO springs are used.

Mount Width	Working Force kN(tonf)
50	14.7(1.5)
80	35.3(3.6)
150	117.6(12.0)
200	147.0(15.0)
300	294.0(30.0)

KCMSL Large and Long Life Type For Pierce and Flange

P.1739～1722



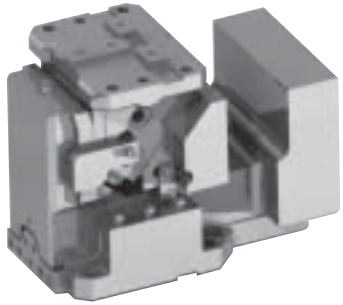
- Highly rigid structure with the overseas automotive approved.
- Mount width of available standard parts is 500 to 1000 at increments of 100mm.
- Available angle is 0°to 20° at increments of 5°.

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

■Special Die Mounted Cam Unit

WCMSH/WCMS Double Cam Unit Series

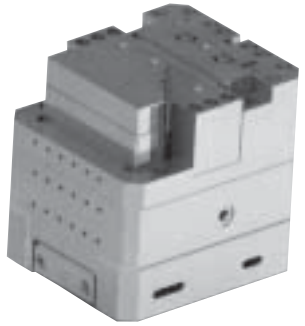
P.1773～1788



- Since the cam is an aerial type, the overall design is made compact.
- Available angle is 0.0° to 10.0° at increments of 0.5°.
  (The angle can be specified at increments of 0.1°from 1.6°to 3.9°.)
- If the working angle is changed, the cam shut height is constant.
- Two types with/without the guide cam holder are available.

CTCS/CTCH・CTVS/CTVH Thrust Cam Unit Series

P.1789～1798



- Use of integrated rigid casting design
- The cam slider backup surface is reinforced for the highly rigid type.
- V guide design which does not apply reaction force to the cam slider surface
- Urethane is installed on the cam driver stopper for impact absorption.
- Mechanism to prevent unusual elevation of the cam slider is built in.

General Description of Cam Unit

OVER VIEW

Available for large cam or dedicated cam to customer's specification.

In addition to standard cam units, customized cam units may be manufactured.
Large cams or dedicated cams are products that can satisfy requirements of customers for module units on dies. Reduction of lead time, indirect costs, etc. contributes to die manufacturing of customers.

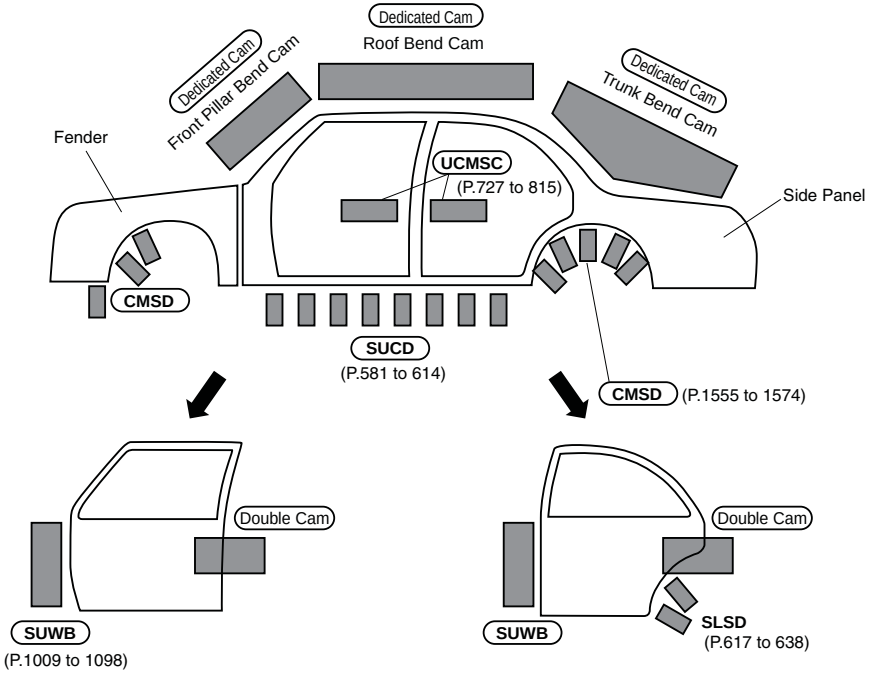
■Large Cam

Cams which have conventionally been manufactured together with dies are separated into units. Dies are simplified and cam units are customized to order. Time for design and manufacturing can be reduced.

■Dedicated Cam

The most appropriate cam in a large and heavy load operation or special shape area where a standard cam cannot be used is manufactured to customer's specification.
If the similar types of cams are continuously used, actions to manufacture products quickly or to keep stocks may be taken.

＊Please ask sales representative for information or queries. Your requirements are satisfied by professional engineers.



■List of cam unit option

Cat.No \ Code		SC	WC	K	TK	FK	N	N12	N13	N16	S	KA
SUCD	52	●	–	–	–	–	–	–	–	–	–	–
SLSD	52	●	●	–	–	–	–	–	–	–	–	–
SULNC	65	●	–	–	–	–	–	●	–	–	–	–
SACD	52	●	●	–	–	–	–	●	–	–	–	–
HUCTF	65	–	–	–	–	–	–	–	–	–	–	–
UCMSC	50	●	●	●	–	–	–	–	–	–	–	–
	65	●	–	●	–	–	–	–	–	–	–	–
	80	●	●	●	–	–	–	–	–	●	–	–
	150	–	–	●	●	–	●	–	–	●	●	–
UCMSF	80	●	●	●	–	–	–	–	–	●	–	–
	150	–	–	●	●	–	●	–	–	●	●	–
SOUK		–	–	●	–	–	–	–	–	–	–	–
UCNBK		–	–	●	–	–	–	–	–	–	–	●
SUWB		–	–	●	–	●	●	–	–	–	–	–
UCMSG	50	–	–	●	–	–	–	–	●	–	–	●
	65	–	–	●	–	–	–	–	–	–	–	–
	80	–	–	●	–	–	–	●	–	–	–	●
	150～	–	–	–	–	–	–	–	●	–	–	●
UCMSL		–	–	–	–	–	●	–	–	–	–	–
UCMSNR	70・80	–	–	–	–	–	–	–	–	–	–	–
	165～	–	–	–	–	–	●	–	–	–	–	–
CMSD	52	●	●	●	–	–	–	–	–	–	–	–
	90	–	●	●	–	–	–	–	–	–	–	–
SKCA100		–	–	–	–	–	–	●	–	–	–	–
KGSP	50	–	–	–	–	–	–	–	–	–	–	●
	80	–	–	–	–	–	–	–	●	–	–	●
	150～	–	–	–	–	–	●	–	–	–	–	●
KCMSL		–	–	–	–	–	–	–	–	–	–	–

◆Option code details

SC : Mount surface protrusion length is changed.
WC : Mount width is changed.
K : It is changed to a key type. (Key is accompanied.)
TK : It is changed to a T-shaped key type.
FK : Key position is changed.
N : Dowel pin hole is drilled.
N12 : It is changed to ϕ12 dowel pin hole.
N13 : It is changed to ϕ13 dowel pin hole.
N16 : It is changed to ϕ16 dowel pin hole.
S : Bottom dead center lock type
KA : It is changed to metric key with the width of 25.

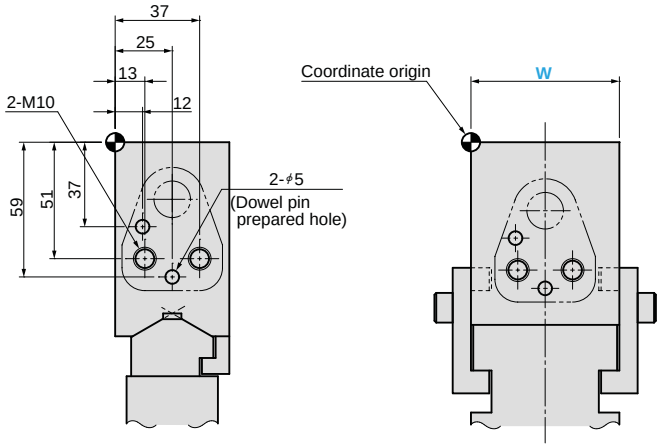
General Description of Cam Unit Option

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.
  - 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.
  - Depth of both tapped holes and dowel pin holes (or prepared holes) is machined to the dimension 2.5 times the diameter.
  - The dowel pin hole spacing is machined to the tolerance of ±0.02.The hole tolerance is H7.

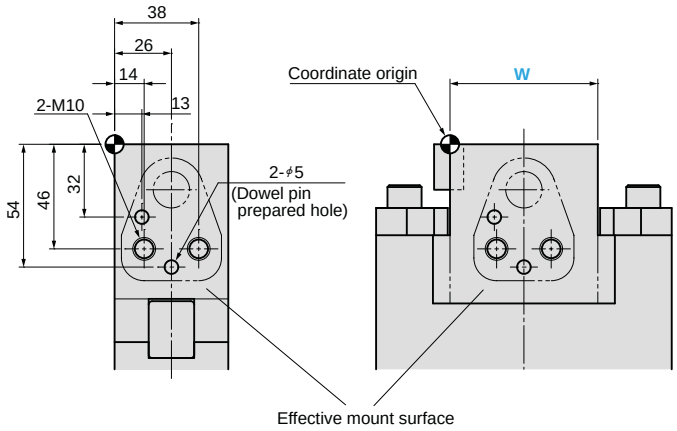
(Example of aerial cam)



Order

Catalog No.	(W)	—	(θ)	—	Option
UCMSC	50	—	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)

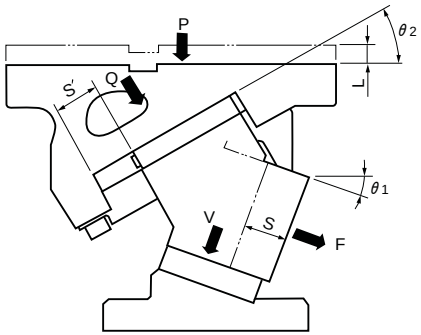
■Other machining

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

General Description of Cam Unit

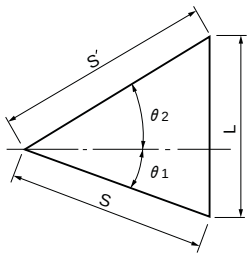
OVER VIEW

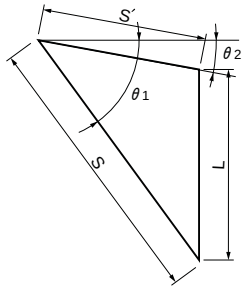
■Calculation Formula of Force Applied to Aerial Cam Unit



θ1 : Working angle
θ2 : 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

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

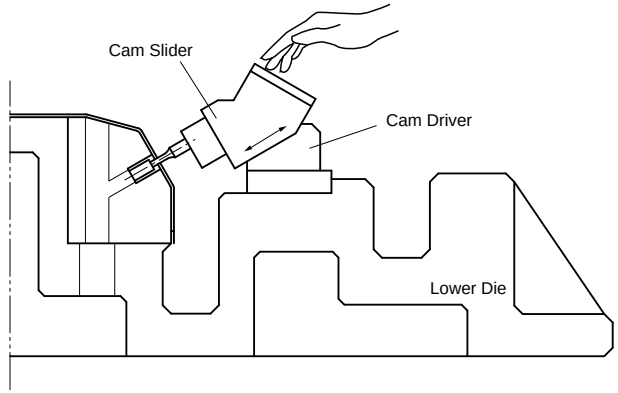
•Spring Travel

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

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

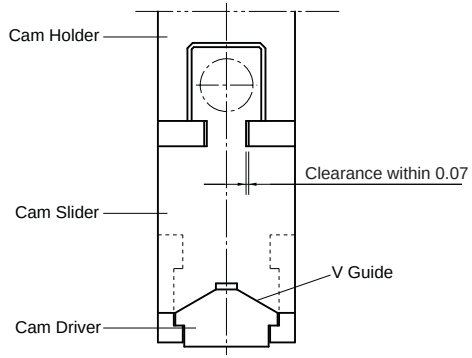
① Drill the mounting holes and dowel pin holes (finish) on the die for the cam holder and the driver.
② Fix the cam holder and the driver on the die with bolts and dowel pins.
③ Set the cam slider removed from the cam holder on the fixed driver and locate the pierce punch (retainer).
④ Fix the pierce punch (retainer) on the cam holder.
⑤ Mount the cam slider on the cam holder fixed on the die.

Locating and installation are now completed.



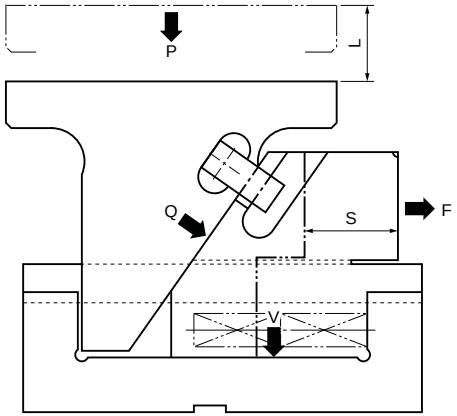
■Automatic Alignment Reproducibility of V Guide (Bottom Guide) Type

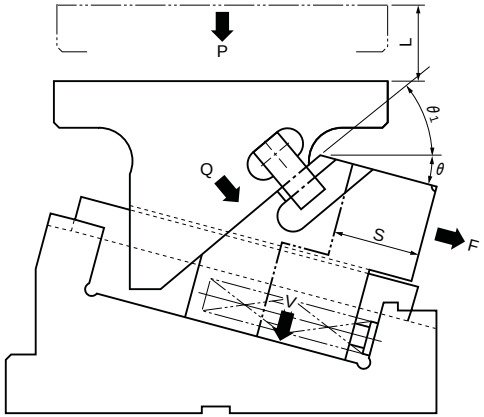
Automatic alignment means that clearance between the cam holder and the cam slider absorbs machining error for installation of the cam holder and the cam driver. The cam slider body is correctly located with the V guide structure of the driver and the cam slider. Therefore, the position of the pierce punch (retainer) is always reproduced.



General Description of Cam Unit

■Calculation Formula of Force Applied to Die Mounted Cam Unit

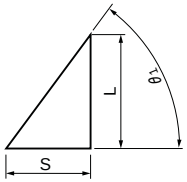




θ : Working Angle
θ_1 : Driver Inclination Angle
F : Force Required for Working
(Working force + Spring Return Force
+ Pad Force)
P : Press Force
V : Load Applied to Cam Driver Surface
Q : Load applied to Cam Slider Ssurface
S : Working Travel
L : Press Travel

Cam Diagram

●No Inclination of Working Angle (0°)



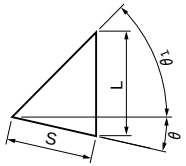
$$P = F \cdot \frac{1}{\tan\theta_1}$$

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

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

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

●Inclination of Working Angle

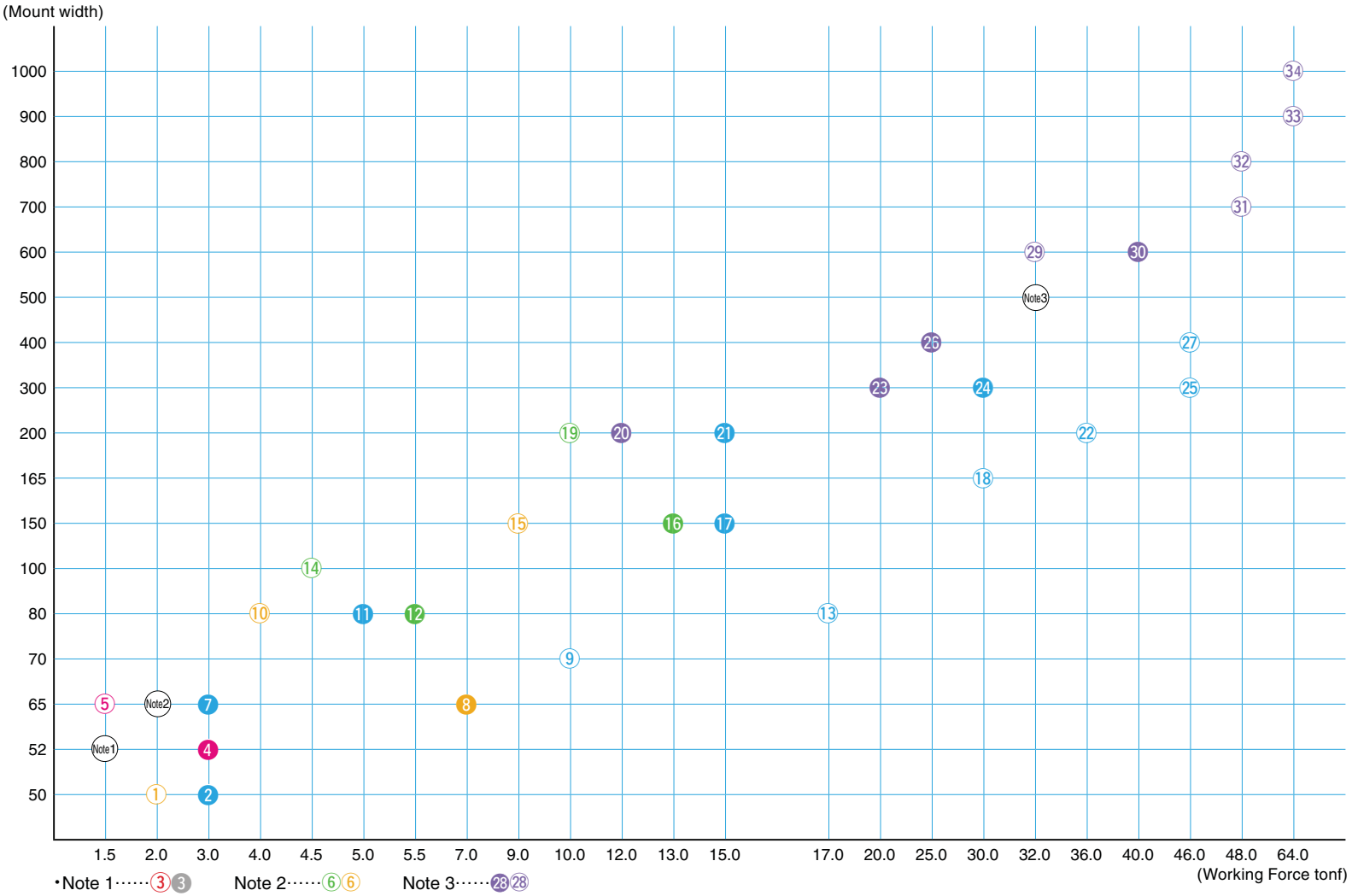


$$P = F \cdot \frac{\cos\theta_1}{\sin(\theta_1+\theta)}$$

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

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

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



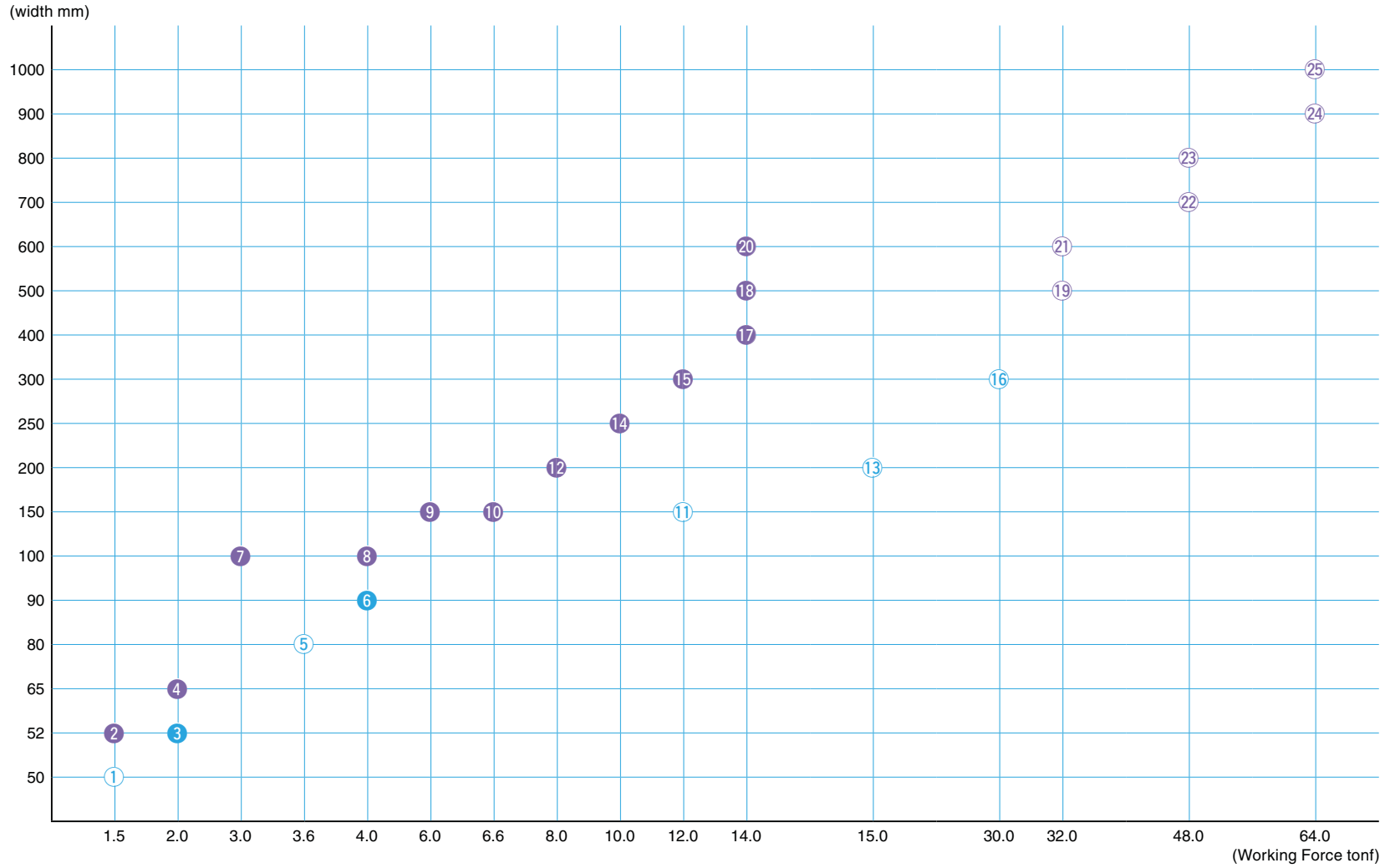
• Note 1 ····· ③ ③ Note 2 ····· ⑥ ⑥ Note 3 ····· ㉘ ㉘

① UCMSC50 ····· P.727
② UCMSG50 ····· P.1105
③ SUCD52 ····· P.581
③ SLSD ····· P.617
④ SACD52 ····· P.641
⑤ SULNC65 ····· P.671
⑥ UCMSC65 ····· P.757
⑥ SOUK65 ····· P.855
UCNBK65 ····· P.945
⑦ UCMSG65 ····· P.1137
⑧ HUCTF65 ····· P.685
⑨ UCMSNR70 ····· P.1357
⑩ UCMSC80 ····· P.787
⑪ UCMSG80 ····· P.1155
⑫ UCMSF80 ····· P.787
⑬ UCMSNR80 ····· P.1383
⑭ SOUK100 ····· P.885
UCNBK100 ····· P.975
⑮ UCMSC150 ····· P.817
⑯ UCMSF150 ····· P.817
⑰ UCMSG150 ····· P.1183
⑱ UCMSNR165 ····· P.1409
⑲ SOUK200 ····· P.915
UCNBK200 ····· P.991
⑳ SUWB200 ····· P.1009
㉑ UCMSG200 ····· P.1211
㉒ UCMSNR200 ····· P.1435
㉓ SUWB300 ····· P.1027
㉔ UCMSG300 ····· P.1239
㉕ UCMSNR300 ····· P.1461
㉖ SUWB400 ····· P.1045
㉗ UCMSNR400 ····· P.1461
㉘ SUWB500 ····· P.1063
㉘ UCMSL500 ····· P.1269
㉙ UCMSL600 ····· P.1269
㉚ SUWB600 ····· P.1081
㉛ UCMSL700 ····· P.1297
㉜ UCMSL800 ····· P.1297
㉝ UCMSL900 ····· P.1325
㉞ UCMSL1000 ····· P.1325

General Description of Cam Unit

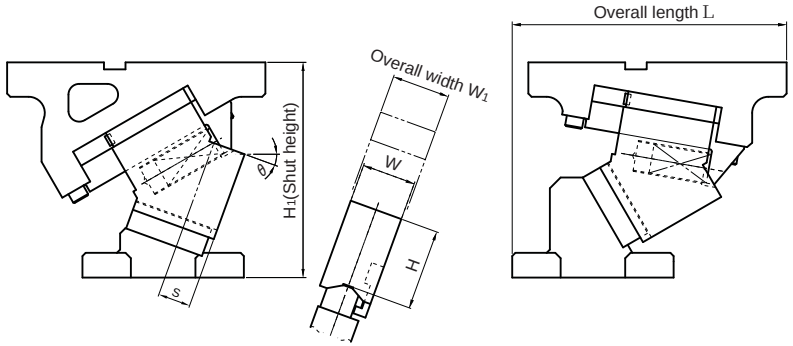
Guide Line for Selection (Die Mounted Cam)

OVER VIEW



General Description of Cam Unit

AERIAL CAM UNIT SELECTION TABLE

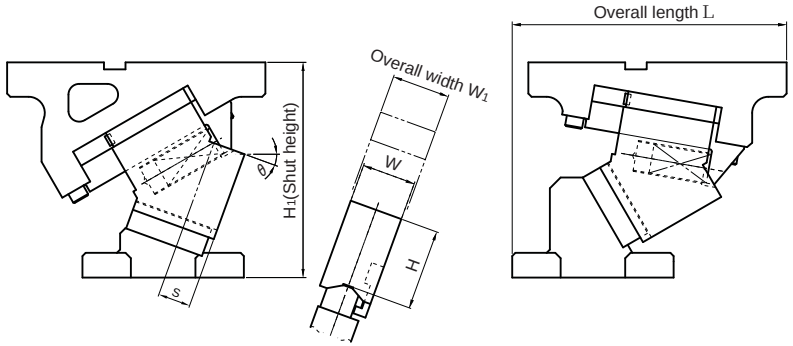


Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf) Standard Working Force (one million strokes)	Working Force kN(tonf) Allowable Working Force (300,000 strokes)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
			00	19.3						
			05	21.3						
			10	23.3						
			15	25.4						
			20	27.6					175	
			25	30.0						
			30	32.6						980.0(100.0)
For Pierce SUCD (P.579～)			35	35.4				125		
	52	60	40	38.6	14.7(1.5)	29.4(3.0)	52			
			45	42.3					179	
			50	46.7					184	
			55	52.3					185	
			60	60.0					184	
			65	47.3					220	981.0(99.9)
			70	58.5					215	
			75	46.3				150	205	981.2(100.1)
			80	57.5						
			00	30.2						
			05	31.9						
			10	35.0						
			15	38.2						
Long Travel Type For Pierce SLSD (P.615～)			20	41.5					185	
	52	60	25	45.0	14.7(1.5)	29.4(3.0)	52	135		901.6(91.9)
			30	48.8						
			35	53.1						
			40	57.9						
			45	54.9						
			50	60.7					192	

Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf) Standard Working Force (one million strokes)	Working Force kN(tonf) Allowable Working Force (300,000 strokes)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
			00	30.2					196.9	
			05	33.4					200.8	
			10	36.6					207.7	
			15	39.9					211.6	
			20	43.3					213.1	
			25	47.0					214.5	
3 ton Type For Pierce SACD (P.639～)	52	75	30	51.0	29.4(3.0)	58.8(6.0)	52	160	216.0	3110.8(317.2)
			35	55.4					216.5	
			40	60.4					212.6	
			45	66.2					213.7	
			50	73.1					205.0	
			55	64.5					215.0	
			60	54.0					200.0	
			00	30.2					335.00	
			05	31.9					338.62	
Long Nose Type For Pierce SULNC (P.667～)	65	80	10	35.0	14.7(1.5)	29.4(3.0)	65	240	341.65	2115.0(215.7)
			15	31.4					339.01	
			20	32.3					335.66	
			25	35.0					331.55	
			00	22.5						
			05	22.6						
			10	27.2					275	
			15	27.8						
			20	32.3						
			25	33.4						
			30	38.0						5988.5(610.7)
For Thick Metal Pierce HUCTF (P.683～)	65	90	35	40.2	68.7(7.0)	137.3(14.0)	65	230		
			40	45.0					290	
			45	48.7						
			50	54.5						
			55	61.0						
			60	70.0					300	
			65	68.5						5936.3(605.3)
			70	67.2					335	5862.7(597.8)
			75	69.5						5257.8(536.1)
			00	30.2					257	
			05	30.5					250	
For Pierce UCMSC (P.717～)	50	75	10	30.3	19.6(2.0)	39.2(4.0)	50	200		980.0(100.0)
			15	30.5					240	
			20	30.4						

General Description of Cam Unit

AERIAL CAM UNIT SELECTION TABLE



Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf) Standard Working Force (one million strokes)	Working Force kN(tonf) Allowable Working Force (300,000 strokes)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
			25	30.0						
			30	32.6						
		75	35	35.4						
			40	38.6					240	
			45	42.3						
	50		50	46.7	19.6(2.0)	39.2(4.0)	50	200		982.8(100.1)
		65	55	52.1						
			60	59.1					255	
		75	65	58.3					272	
			70	57.6					278	
			00	15.0					190	1187.2(121.0)
			05	15.1					185	
			10	15.2						
			15	15.5					180	
			20	16.5					176.5	
			25	17.1				180	172.9	
			30	18.5					177.8	
	65	65	35	19.6	19.6(2.0)	39.2(4.0)	65		173.3	
			40	21.5					170.8	1221.1(124.4)
			45	23.3					170	
			50	26.5				190	175	
			55	29.7					180	
			60	35.0					190	
			65	41.4				210	195	
			70	51.1					202	

For Pierce UCMSC (P.717～)

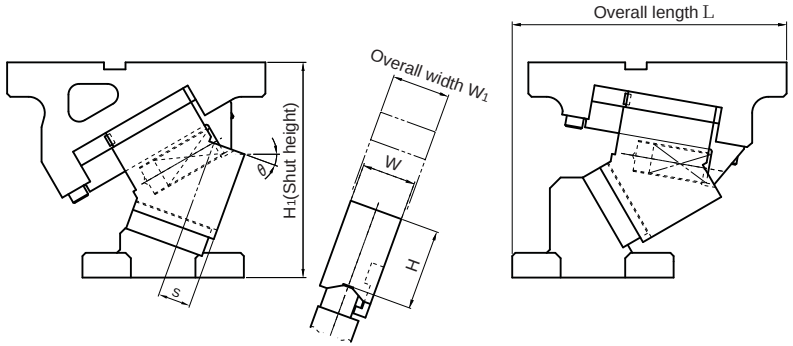
Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf) Standard Working Force (one million strokes)	Working Force kN(tonf) Allowable Working Force (300,000 strokes)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
			00	32.1					270	
			05	38.4					272.9	
			10	38.9					279.9	
			15	39.7					285.9	
			20	46.1						
			25	47.8					289.8	
			30	54.3					282.6	1626.0(165.6)
	80	86	35	57.4	39.2(4.0)	78.4(8.0)	80	270	284.3	
			40	64.3					274.8	
			45	69.6					274.2	
			50	77.8						
			55	87.2					270	
			60	98.5						
			65	81.6					275	1462.5(149.0)
			70	86.4					280	1624.0(165.6)
			00	32.1					280	
			05	32.3					288.3	
			10	38.9					285.5	
			15	39.7					291.8	
			20	46.1					287	
			25	47.8					291	
			30	54.3					283.9	
	150	85	35	57.4	88.2(9.0)	132.3(13.5)	150	270	285.7	4605.2(469.8)
			40	64.3						
			45	69.6						
			50	77.8					280	
			55	87.2						
			60	98.5						
			65	93.2						
			70	86.4					285	
			00	32.1					270	
			05	38.4					272.9	
			10	38.9					279.9	
			15	39.7					285.9	
			20	46.1						
	80	86	25	47.8	59.4(5.6)	109.8(11.2)	80	270	289.8	3250.0(331.4)
			30	54.3					282.6	
			35	57.4					284.3	
			40	64.3					274.8	
			45	69.6					274.2	
			50	77.8					270	

For Pierce UCMSC (P.717～)

Reinforced Working Force Type For Pierce UCMSF (P.717～)

General Description of Cam Unit

AERIAL CAM UNIT SELECTION TABLE

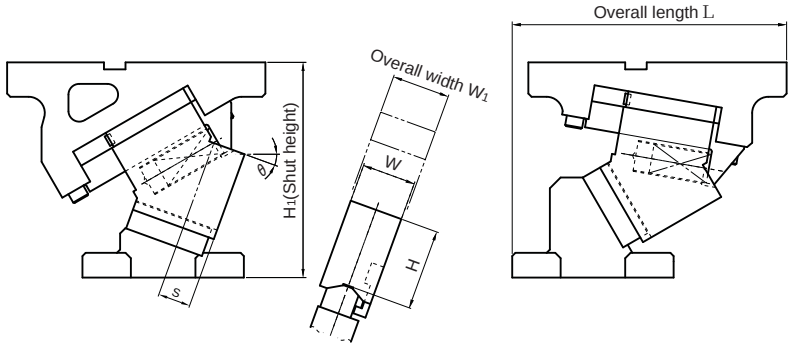


Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf) Standard Working Force (one million strokes)	Working Force kN(tonf) Allowable Working Force (300,000 strokes)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
	80	86	55	87.2	59.4(5.6)	109.8(11.2)	80	270	270	3250.0(331.4)
			60	98.5						
			65	81.6					275	
			70	86.4					280	
Reinforced Working Force Type For Pierce UCMSF (P.717～)	150	85	00	32.1	123.5(12.6)	185.2(18.9)	150	270	280	9569.4(975.8)
			05	32.3					288.3	
			10	38.9					285.5	
			15	39.7					291.8	
			20	46.1					287	
			25	47.8					291	
			30	54.3					283.9	
			35	57.4					285.7	
			40	64.3					280	
			45	69.6						
			50	77.8						
			55	87.2						
			60	98.5						
			65	93.2						
			70	86.4					285	
For Pierce and Flange SOUK (P.851～) V-Shaped Guide Type UCNBK (P.945～)	65	80	00	26.9	19.6(2.0)	39.2(4.0)	115	210	209.9	1066.5(108.9)
		90	05	27.0					217.0	1137.6(116.2)
		80	10	31.6					220.8	
		90	15	32.2					227.8	
		80	20	33.8					222.1	
		90	25	35.0					228.8	
		80	30	33.5	23.5(2.4)	47.0(4.8)			217.6	
		90	35	35.4					223.8	

Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf) Standard Working Force (one million strokes)	Working Force kN(tonf) Allowable Working Force (300,000 strokes)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
	65	80	40	42.9	23.5(2.4)	47.0(4.8)	115	210	212.7	
		90	45	46.5					218.1	1137.6(116.2)
			50	54.5	29.4(3.0)	58.8(6.0)			214	
		100	55	43.6						1039.5(106.1)
			60	50.0						
		110	65	47.3						891.0(90.9)
			70	58.5						
For Pierce and Flange SOUK (P.851～) V-Shaped Guide Type UCNBK (P.945～)	100*	100	00	28.3	44.1(4.5)	88.2(9.0)	160	280		2817.0(287.1)
		140	05	28.4					273	
		100	10	33.3						3074.4(313.3)
		140	15	33.9					287.4	
		100	20	30.9					274	
		140	25	32.0					287.3	2978.4(304.0)
		120	30	33.5					273	
		140	35	35.4					285.3	
		120	40	39.0					273	
		140	45	42.3					280.4	2803.2(286.1)
			50	46.7	49.0(5.0)	98.0(10.0)				
			55	52.3						
			60	60.0					272	
			65	47.3						2740.0(279.5)
			70	58.5						
*Although intermediate angle (increments of 5°) product with the mount width of 100 and 200 for UCNBK is not shown, it can be manufactured.	200*	100	00	28.3	98.1(10.0)	196.2(20.0)	260	280		5634.0(574.2)
		130	05	28.4					273	
		100	10	33.3						6148.8(626.6)
		130	15	33.9					287.4	
		100	20	30.9					274	5956.8(607.9)
		130	25	32.0					287.3	
		120	30	33.5					273	
		140	35	35.4					285.3	
		120	40	39.0					273	
		140	45	42.3					280.4	5606.4(572.2)
			50	46.7	117.7(12.0)	235.4(24.0)				
			55	52.3						
			60	60.0					272	
			65	47.3						5480.0(559.0)
			70	58.5						

General Description of Cam Unit

AERIAL CAM UNIT SELECTION TABLE

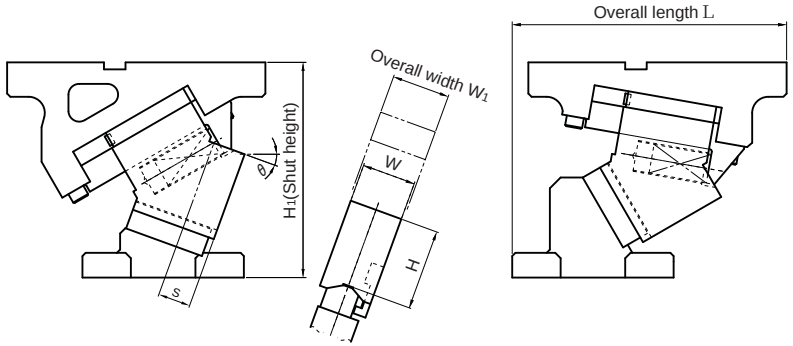


Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf) Standard Working Force (one million strokes)	Working Force kN(tonf) Allowable Working Force (300,000 strokes)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
Wide Type For Pierce and Flange SUWB (P.1007～)	200	180	00	38.6	117.6(12.0)	235.2(24.0)	200	350	340	4903.2(499.7)
			05	42.6						
			10	46.7						
			15	50.9						
			20	55.3					340.8	
			30	65.1					347.8	
			40	77.1					351.2	
			50	93.3					354.8	
			60	120.0					385	
	300	180	00	38.6	196.0(20.0)	392.0(40.0)	300	350	340	9806.4(999.4)
			05	42.6						
			10	46.7						
			15	50.9						
			20	55.3					340.8	
			30	65.1					347.8	
			40	77.1					351.2	
			50	93.3					354.8	
			60	120.0					385	
	400	180	00	38.6	245.0(25.0)	490.0(50.0)	400	350	340	9806.4(999.4)
			05	42.6						
			10	46.7						
			15	50.9						
			20	55.3					340.8	
			30	65.1					347.8	
			40	77.1					351.2	
			50	93.3					354.8	
			60	120.0					385	

Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf) Standard Working Force (one million strokes)	Working Force kN(tonf) Allowable Working Force (300,000 strokes)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
Wide Type For Pierce and Flange SUWB (P.1007～)	500	180	00	38.6	313.6(32.0)	627.2(64.0)	500	350	340	14709.6(1499.0)
			05	42.6						
			10	46.7						
			15	50.9						
			20	55.3					340.8	
			30	65.1					347.8	
			40	77.1					351.2	
			50	93.3					354.8	
			60	120.0					385	
	600	180	00	38.6	392.0(40.0)	784.0(79.9)	600	350	340	19612.8(1998.7)
			05	42.6						
			10	46.7						
			15	50.9						
			20	55.3					340.8	
			30	65.1					347.8	
			40	77.1					351.2	
			50	93.3					354.8	
			60	120.0					385	
Long Life Type For Pierce and Flange UCMSG (P.1099～)	50	65	00	15.0	29.4(3.0)	58.8(6.0)	50	180	225	1097.6(111.7)
			05	15.6					220	
			10							
			15	17.0						1167.4(118.8)
			20	18.4						
			25	18.0						
			30	17.4					210	
			35	18.9						
		55	40	20.6						
			45	22.5						1104.6(112.6)
			50	23.3						
			55	26.1					225	
			60	31.5					235	
			65	36.6					245	
	65	56	00	15.0	29.4(3.0)	58.8(6.0)	65	175	190	834.9(85.1)
			05	15.6					185	
			10						182.5	
			15	17.0					175	828.8(84.3)
			20	18.4					172.4	
			30	19.5					171.8	
			40	23.1					170	809.6(82.6)
			50	24.9						
			60	32.0					185	

General Description of Cam Unit

AERIAL CAM UNIT SELECTION TABLE



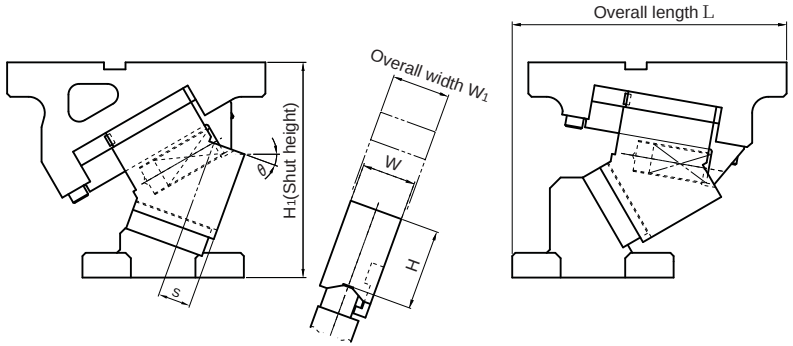
Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf) Standard Working Force (one million strokes)	Working Force kN(tonf) Allowable Working Force (300,000 strokes)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
Long Life Type For Pierce and Flange UCMSG (P.1099～)	80	90	00	30.2	49.0(5.0)	98.0(10.0)	80	270	305	1842.4(187.6)
			05	30.5					295	1872.0(190.8)
			10	31.1					280	
			15	33.9					277.6	
			20	32.3					273.3	1914.0(194.9)
			25	35.0					270	
			30	34.7						
			35	37.7						
			40	39.9						
			45	43.7						
			50	46.7						
			55	53.8						
			60	61.1					290	
			65	70.9					300	
	150	120	00	28.6	147.0(15.0)	294.0(30.0)	240	355	325	7022.4(715.9)
			05	32.2						
			10	35.9						
			15	39.6						
			20	43.5					326.3	
			25	47.7					329	
			30	52.3					326	
			35	57.3					340	
			40	63.0					360	
			45	69.6					375	
			50	77.4					395	
			55	87.1					415	
			60	99.6					430	
			65	116.5					445	

Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf) Standard Working Force (one million strokes)	Working Force kN(tonf) Allowable Working Force (300,000 strokes)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
Long Life Type For Pierce and Flange UCMSG (P.1099～)	200	120	00	28.6	147.0(15.0)	294.0(30.0)	270	365	325	7022.4(715.9)
			05	32.2						
			10	35.9						
			15	39.6						
			20	43.5					326.3	
			25	47.7					329	
			30	52.3					326	
			35	57.3					340	
			40	63.0					360	
			45	69.6					375	
			50	77.4					395	
			55	87.1					415	
			60	99.6					430	
			65	116.5					445	
	300	160	00	28.6	294.0(30.0)	588.0(60.0)	340	355	325	14044.8(1431.8)
			05	32.2						
			10	35.9						
			15	39.6						
			20	43.5					340	
			25	47.7					346	
			30	52.3					346	
			35	57.3					345	
			40	63.0					373	
			45	69.6					384.7	
			50	77.4					395	
			55	87.1					415	
			60	99.6					430	
			65	116.5					445	

Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
Large Type For Pierce and Flange UCMSL (P.1267～)	500	180	00	38.6	313.6(32.0)	500	385	370	19600.0(1998.6)
			10	46.7					
			20	55.3					
			30	65.1					
			40	77.1				400	
			50	93.3				430	
			60	120.0				438.8	

General Description of Cam Unit

AERIAL CAM UNIT SELECTION TABLE

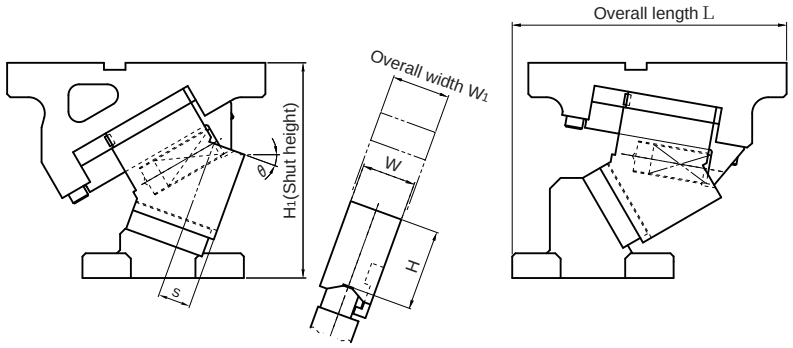


Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
Large Type For Pierce and Flange UCMSL (P.1267～)	600	180	00	38.6	313.6(32.0)	600	385	370	19600.0(1998.6)
			10	46.7					
			20	55.3					
			30	65.1					
			40	77.1				400	
			50	93.3				430	
			60	120.0				438.8	
	700	180	00	38.6	470.4(48.0)	700	385	370	29400.0(2998.0)
			10	46.7					
			20	55.3					
			30	65.1					
			40	77.1				400	
			50	93.3				430	
			60	120.0				438.8	
	800	180	00	38.6	470.4(48.0)	800	385	370	29400.0(2998.0)
			10	46.7					
			20	55.3					
			30	65.1					
			40	77.1				400	
			50	93.3				430	
			60	120.0				438.8	
	900	180	00	38.6	627.2(64.0)	900	385	370	39200.0(3997.3)
			10	46.7					
			20	55.3					
			30	65.1					
			40	77.1				400	
			50	93.3				430	
			60	120.0				438.8	

Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
Large Type For Pierce and Flange UCMSL (P.1267～)	1000	180	00	38.6	627.2(64.0)	1000	385	370	39200.0(3997.3)
			10	46.7					
			20	55.3					
			30	65.1					
			40	77.1				400	
			50	93.3				430	
			60	120.0				438.8	
NAAMS Type For Pierce and Flange UCMSNR (P.1353～)	70	75	00	19.3	98.1(10.0)	70	225	252	–
			05	21.3				242	
			10	23.3					
			15	25.4					
			20	27.6					
			25	30.0				240	
			30	32.6					
			35	35.4					
			40	38.6					
			45	42.3				242	
			50	46.7				261	
			55	43.5				263	
			60	50.0				275	
	80	75	00	32.1	166.7(17.0)	80	275	305	–
			05	35.5				295	
			10	38.9				280	
			15	42.4				280.5	
			20	46.1				276.2	
			25	50.0				271.5	
			30	54.3					
			35	59.0					
			40	64.3					
			45	70.4				270	
			50	77.8					
			55	78.4					
			60	80.0					
	165	120	00	32.1	294.2(30.0)	165	300	340	–
			05	35.5					
			10	38.9					
			15	42.4					
			20	46.1					
			25	50.0					
			30	54.3					
			35	59.0					

General Description of Cam Unit

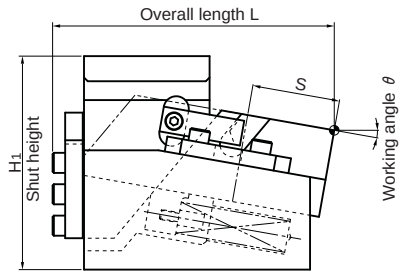
AERIAL CAM UNIT SELECTION TABLE

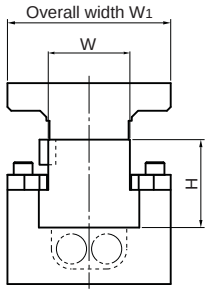


Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
NAAMS Type For Pierce and Flange UCMSNR (P.1353～)	165	120	40	64.3	294.2(30.0)	165	300	350	—
			45	70.4				365	
			50	77.8				355	
		125	55	87.2				372	
			60	100.0				385	
	200	120	00	32.1	353.0(36.0)	200	300	340	—
			05	35.5					
			10	38.9					
			15	42.4					
			20	46.1					
			25	50.0					
			30	54.3					
			35	59.0					
			40	64.3				350	
			45	70.4				365	
			50	77.8				355	
			55	87.2				372	
			60	100.0				385	
	300 400	160	00	38.6	451.1(46.0)	300 400	375	328	—
			05	42.6				320	
			10	46.7				324.1	
			15	50.9				325.8	
			20	55.3				327.1	
			25	60.0				334.7	
			30	65.1				327.8	
			35	70.8				334.5	
			40	77.1				330.5	
			45	84.5				347.8	
			50	79.3				355	
			55	88.9				405	
			60	102.0					

General Description of Cam Unit

DIE MOUNTED CAM UNIT SELECTION TABLE





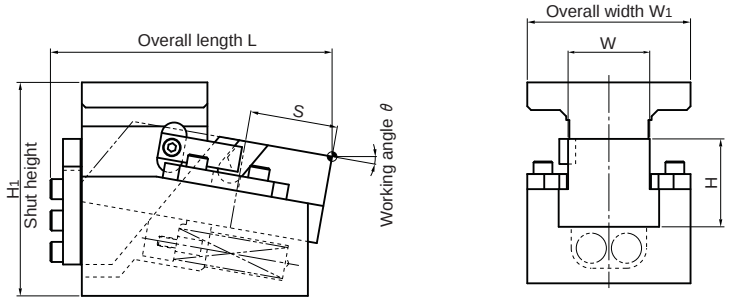
Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf) Standard Working Force (one million strokes)	Working Force kN(tonf) Allowable Working Force (300,000 strokes)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
For Pierce CMSD (P.1555～)	52	75	00	55	19.6(2.0)	39.2(4.0)	52	215	235	608.0(62.1)
			05					255	310	
			10							
			15							
			20							
	90	82	00	55	38.2(3.9)	76.4(7.8)	90	220	236	1217.3(124.1)
			05						251.4	
			10						261.7	
			15						260.8	
	52	65	00	25	14.7(1.5)	29.4(3.0)	98	140	140	594.0(60.7)
				40					155	604.8(61.4)
				60					200	613.2(62.8)
For Pierce and Flange SKC SKCA (P.1575～)	65	70	00	40	19.6(2.0)	39.2(4.0)	130	160	167	748.8(76.8)
				60					212	759.2(77.4)
			05	45					175.6	743.4(75.5)
				70				170	220.4	974.4(99.2)
			10	45				160	180	743.4(75.5)
				70					224.3	974.4(99.2)
			15	45					183.2	743.4(75.5)
				70				170	226.6	974.4(99.2)
*SKC Dowel pin prepared hole			20	45					185.2	743.4(75.5)
				70					227.5	974.4(99.2)
*SKCA Dowel pin hole finish	100	100	00	40	29.4(3.0)	58.8(6.0)	175	200	218	1132.8(115.2)
				60					238	1138.8(116.8)
				80					277	1306.4(132.5)
		90	05	45	39.2(4.0)	78.4(8.0)			199.2	1109.2(113.3)
				70					234.1	1149.2(116.6)

Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf) Standard Working Force (one million strokes)	Working Force kN(tonf) Allowable Working Force (300,000 strokes)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
For Pierce and Flange SKC SKCA (P.1575～)	100	90	10	45	39.2(4.0)	78.4(8.0)	175	200	205.1	1109.2(113.3)
				70					239.6	1149.2(116.6)
			15	45					209.7	1109.2(113.3)
				70					243.5	1149.2(116.6)
			20	45					212.8	1109.2(113.3)
				70					245.7	1149.2(116.6)
	150	100	00	40	58.8(6.0)	88.2(9.0)	260	220	225	1843.2(188.2)
				60					245	1854.2(189.8)
			05	45	64.7(6.6)	98.0(10.0)			229	1805.4(184.1)
				70					253.9	1848.0(188.2)
			10	45					235.6	1805.4(184.1)
				70					260.2	1848.0(188.2)
			15	45					240.6	1805.4(184.1)
				70				230	264.7	1848.0(188.2)
			20	45				220	244	1805.4(184.1)
				70				230	267.5	1848.0(188.2)
	200	110	00	40	78.4(8.0)	117.6(12.0)	310	240	236	2764.8(282.2)
				60					256	2781.3(284.7)
*SKC Dowel pin prepared hole	250	130	00	40	98.0(10.0)	147.0(15.0)	360	270	246	3614.4(368.6)
				60					266	3657.3(372.3)
	300		00	40	117.6(12.0)	176.4(18.0)	410		246	3614.4(368.6)
				60					266	3657.3(372.3)
*SKCA Dowel pin hole finish	400	150	00	60	137.2(14.0)	205.8(21.0)	525	250	356	9349.6(952.3)
	500		00				625		361	
	600		00				725			

Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
Long Life Type For Pierce and Flange KGSP (P.1665～)	50	68	00	60	14.7(1.5)	50	240	255	591.5(60.2)
			05					290	
			10					290	
			15					298	
			20					308.3	
			25					308.1	
			30					312.3	

General Description of Cam Unit

DIE MOUNTED CAM UNIT SELECTION TABLE



Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
Long Life Type For Pierce and Flange KGSP (P.1665～)	80	88	00	60	35.3(3.6)	80	265	310	1339.6(136.0)
			05					312.6	
			10					321.5	
			15					329.8	
			20					332.3	
			25					365	
			30				300	378.5	
	150	120	00	60	117.6(12.0)	290	310	385	3746.8(381.5)
			05					394.5	
			10				335	397	
			15				345	397.2	
			20				360	400.4	
			25				300	365	
			30					378.5	
	200	120	00	60	147.0(15.0)	320	310	385	3746.8(381.5)
			05					394.5	
			10				335	397	
			15				345	397.2	
			20				360	400.3	
			25				335	420	
			30					431.8	
	300	120	00	60	294.0(30.0)	410	355	442.6	7493.6(763.0)
			05					449.6	
			10				375	454.2	
			15				385	461.1	
			20				405	465.5	
			25						
			30						

Catalog No.	Mount Surface W	Mount Surface H	Working Angle θ	Travel S	Working Force kN(tonf)	Unit Size W1	Unit Size H1	Unit Size L	Spring Force N(kgf)
Large Type For Pierce and Flange KCMSL (P.1739～)	500	180	00	60	313.6(32.0)	500	385	350	19600.0(1998.6)
			05					368.2	
			10					384.9	
			15					400.2	
			20					413.9	
	600	180	00	60	313.6(32.0)	600	385	350	19600.0(1998.6)
			05					368.2	
			10					384.9	
			15					400.2	
			20					413.9	
	700	180	00	60	470.4(48.0)	700	385	350	19600.0(1998.6)
			05					368.2	
			10					384.9	
			15					400.2	
			20					413.9	
	800	180	00	60	470.4(48.0)	800	385	350	19600.0(1998.6)
			05					368.2	
			10					384.9	
			15					400.2	
			20					413.9	
	900	180	00	60	627.2(64.0)	900	385	350	39200.0(3997.3)
			05					368.2	
			10					384.9	
			15					400.2	
			20					413.9	
	1000	180	00	60	627.2(64.0)	1000	385	350	39200.0(3997.3)
			05					368.2	
			10					384.9	
			15					400.2	
			20					413.9	