

# Pascal Link Clamp

*Highly flexible mounting design*

## One piece body design for higher rigidity and position tolerance

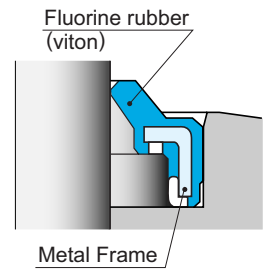
Link pin support is forged and integrated with the cylinder body for durability with high power.



Solid body ( Carbon steel )

## Heavy-duty scraper

Protects the cylinder from high pressure coolant and machining chips.



Metal Frame

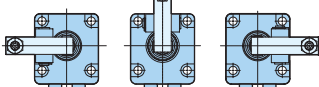
## Corrosion resistant body

Cylinder body and piston rod are ion-nitrided to enhance the durability against friction and rust.

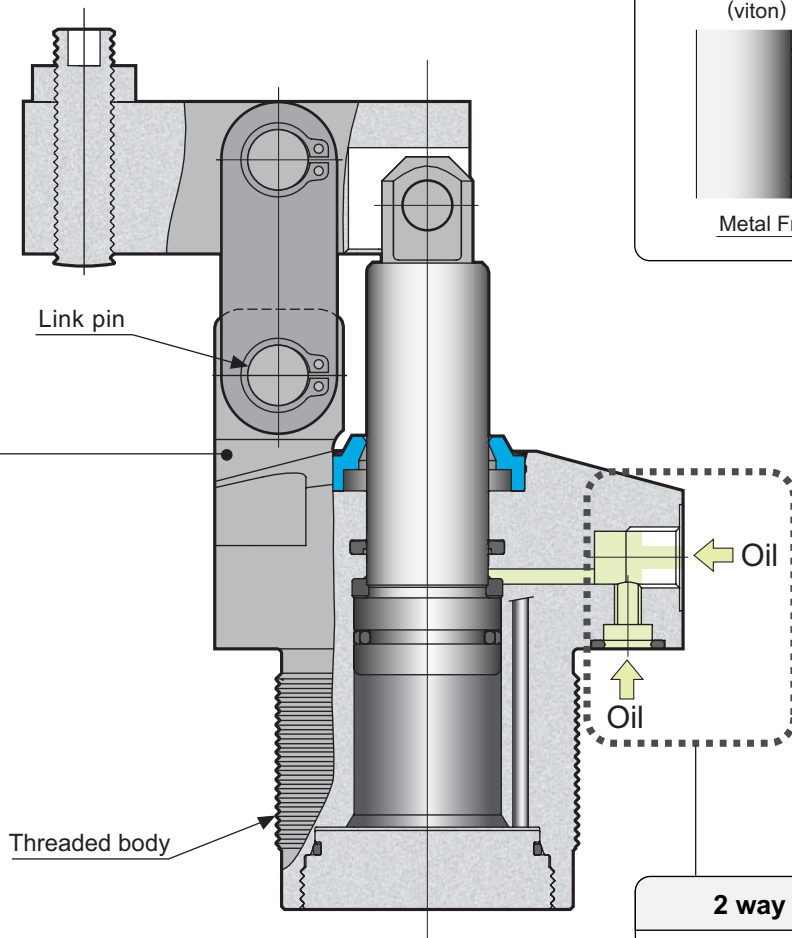
## Choice of forward, left and right clamp arm position

Three styles available with clamp arm direction according to the layout of workpieces or piping for the fixture.

Left Forward Right



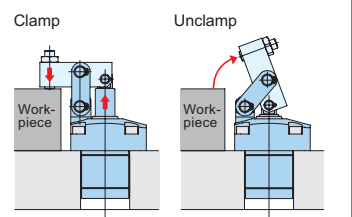
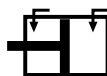
A variety of workpieces can be clamped by replacing the clamp arm. Standard and extended length arms are available as options.



## 2 way oil supply

Cylinder body designed with BSPP threaded ports and manifold mount oil feed holes. Removable plugs allow for easy changeover.

Double acting model **CLW**



Model		CLW06	CLW10	CLW16	CLW25
Cylinder force at 5000 psi		1970 lbs	2940 lbs	4770 lbs	7880 lbs
Clamping force ※1	at 5000 psi	1280 lbs	2020 lbs	3350 lbs	5320 lbs
	at 3500 psi	900 lbs	1420 lbs	2350 lbs	3730 lbs
	at 2000 psi	510 lbs	810 lbs	1340 lbs	2130 lbs
Standard clamp arm length (LH)		1.97 in	2.22 in	2.74 in	3.44 in
Cylinder inner diameter		0.71 in	0.87 in	1.10 in	1.42 in
Rod diameter		0.55 in	0.71 in	0.88 in	1.10 in
Cylinder effective area (A)		0.39 in <sup>2</sup>	0.59 in <sup>2</sup>	0.95 in <sup>2</sup>	1.58 in <sup>2</sup>
Full stroke		1.02 in	1.16 in	1.42 in	1.77 in
Piston rod stroke		0.91 in	1.04 in	1.30 in	1.65 in
Safety stroke		0.12 in	0.12 in	0.12 in	0.12 in
Maximum oil flow rate		42 in <sup>3</sup> / min	72 in <sup>3</sup> / min	146 in <sup>3</sup> / min	310 in <sup>3</sup> / min
Cylinder oil capacity	Clamping side	0.40 in <sup>3</sup>	0.68 in <sup>3</sup>	1.35 in <sup>3</sup>	2.79 in <sup>3</sup>
	Unclamping side	0.16 in <sup>3</sup>	0.23 in <sup>3</sup>	0.49 in <sup>3</sup>	1.10 in <sup>3</sup>
Weight		3.7 lbs	5.1 lbs	9.7 lbs	16.3 lbs

Working pressure range 150 ~ 5000 psi, Ambient temperature 32 ~ 158 °F

※1 : With standard length clamp arm (G1 series, See page 9 ) equipped

※ : Fluorine rubber (Viton) is adopted at the sealing portions for protection against chlorine coolant. (This is not a heat proof specification)

## Model ordering (Example : CLW16-F)

① Size (Refer to specification table.)

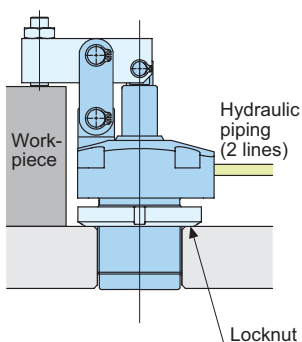
② Clamp arm mounting direction (Refer to below diagram.)

<b>CLW</b>	06	—	L : Left F : Forward R : Right
	10		
	16		
	25		

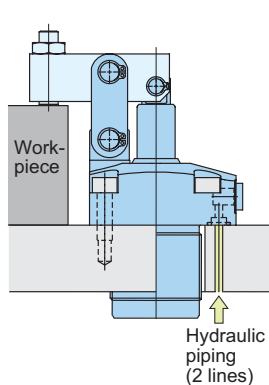
## Mounting example

## Clamp arm mounting direction

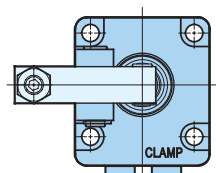
Threaded body mount with piping connection



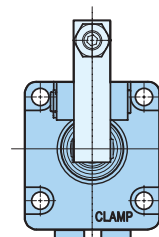
Manifold mount using upper flange



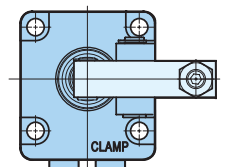
CLW ① -L  
Left



CLW ① -F  
Forward



CLW ① -R  
Right



# Clamp arm length (LH) and clamping force (Performance table and diagram)

The clamping force varies according to the clamp arm length and hydraulic force.

Select the most suitable model considering clamp arm length, working pressure applicable and mounting dimension, etc. with the following tables or diagrams according to the convenience.

Note :

The shorter the length of the clamp arm, the larger the forces are at the link structure.

Do not use in the nonusable area to avoid overloading the link structure.

### <EXAMPLE : 1>

When clamp arm length (LH) 2.50 inches and clamping force 880 lbs are required, the applicable hydraulic pressures are as follows.

CLW06 - 5000 psi

CLW10 - 3000 psi

CLW16 - 1500 psi

CLW25 - 500 psi

### <EXAMPLE : 2>

When using model CLW10 with hydraulic pressure 3500 psi, clamping forces against the clamp arm are as follows.

LH= 6.00 in - 360 lbs

LH= 3.00 in - 880 lbs

LH= 2.00 in - 1730 lbs

LH= 1.50 in - Nonusable

CLW 06										indicates nonusable range.
Hydraulic pressure (psi)	Cylinder force (lbs)	Clamping force (lbs)								Minimum clamp arm length (in)
		Clamp arm length LH (in)								
		1.30	1.50	1.97	2.50	3.00	4.00	5.00		
5000	1970			1280	880	680	460	350	1.93	
4500	1770			1160	790	610	420	320	1.69	
4000	1580			1030	700	540	370	280	1.51	
3500	1380		1530	900	610	470	320	250	1.36	
3000	1180	1860	1310	770	530	410	280	210	1.30	
2500	990	1550	1090	640	440	340	230	180	↑	
2000	790	1240	870	510	350	270	180	140	↑	
1500	590	930	650	390	260	200	140	110	↑	
1000	390	620	440	260	180	140	90	70	↑	
500	200	310	220	130	90	70	50	40	↑	
150	60	90	70	40	30	20	10	10	1.30	
Maximum working pressure (psi)		3250	3970	5000	5000	5000	5000	5000		

CLW 10											indicates nonusable range.
Hydraulic pressure (psi)	Cylinder force (lbs)	Clamping force (lbs)									Minimum clamp arm length (in)
		Clamp arm length LH (in)									
		1.50	2.00	2.22	2.50	3.00	3.50	4.00	5.00	6.00	
5000	2940			2020	1670	1260	1010	840	630	510	2.18
4500	2650		2220	1830	1500	1130	910	760	570	460	1.92
4000	2360		1980	1620	1330	1010	810	670	510	410	1.72
3500	2060		1730	1420	1170	880	710	590	440	360	1.56
3000	1770	2870	1480	1220	1000	750	610	510	380	300	1.50
2500	1470	2390	1230	1020	830	630	500	420	320	250	↑
2000	1180	1910	990	810	670	500	400	340	250	200	↑
1500	880	1430	740	610	500	380	300	250	190	150	↑
1000	590	960	490	410	330	250	200	170	130	100	↑
500	290	480	250	200	170	130	100	80	60	50	↑
150	90	140	70	60	50	40	30	30	20	20	1.50
Maximum working pressure (psi)		3270	4660	5000	5000	5000	5000	5000	5000	5000	

CLW 16											indicates nonusable range.
Hydraulic pressure (psi)	Cylinder force (lbs)	Clamping force (lbs)									Minimum clamp arm length (in)
		Clamp arm length LH (in)									
		2.00	2.50	2.74	3.00	3.50	4.00	5.00	6.00	7.00	
5000	4770			3350	2870	2240	1840	1360	1070	890	2.68
4500	4290		3570	3020	2580	2020	1660	1220	970	800	2.37
4000	3820		3180	2690	2290	1790	1470	1090	860	710	2.13
3500	3340	4520	2780	2350	2010	1570	1290	950	750	620	2.00
3000	2860	3870	2380	2020	1720	1350	1110	810	640	530	↑
2500	2390	3230	1980	1680	1430	1120	920	680	540	440	↑
2000	1910	2580	1590	1340	1150	900	740	540	430	360	↑
1500	1430	1940	1190	1010	860	670	550	410	320	270	↑
1000	950	1290	790	670	570	450	370	270	210	180	↑
500	480	650	400	340	290	220	180	140	110	90	↑
150	140	190	120	100	90	70	60	40	30	30	2.00
Maximum working pressure (psi)		3670	4710	5000	5000	5000	5000	5000	5000	5000	

CLW 25											indicates nonusable range.
Hydraulic pressure (psi)	Cylinder force (lbs)	Clamping force (lbs)									Minimum clamp arm length (in)
		Clamp arm length LH (in)									
		2.50	3.00	3.44	4.00	4.50	5.00	6.00	7.00	8.00	
5000	7880			5320	4150	3470	2970	2320	1900	1610	3.37
4500	7100		6190	4790	3740	3120	2680	2090	1710	1450	2.97
4000	6310		5500	4260	3320	2770	2380	1850	1520	1290	2.66
3500	5520	7170	4820	3730	2910	2430	2080	1620	1330	1120	2.50
3000	4730	6140	4130	3190	2490	2080	1780	1390	1140	960	↑
2500	3940	5120	3440	2660	2080	1730	1490	1160	950	800	↑
2000	3160	4100	2750	2130	1660	1390	1190	930	760	640	↑
1500	2370	3070	2060	1600	1250	1040	890	700	570	480	↑
1000	1580	2050	1380	1060	830	690	590	460	380	320	↑
500	790	1020	690	530	420	350	300	230	190	160	↑
150	240	310	210	160	120	100	90	70	60	50	2.50
Maximum working pressure (psi)		3700	4540	5000	5000	5000	5000	5000	5000	5000	

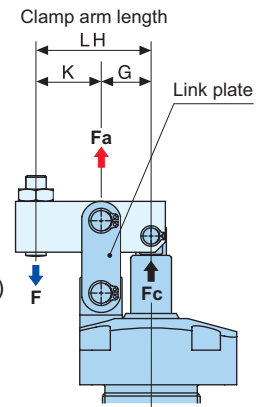
1.The clamping force varies according to the clamp arm length. The clamping force **F** can be calculated using the following formula.

Clamping force calculation formula 
$$F = F_c \times \frac{G}{K} \times \eta$$

2.When using a clamp arm length that is less than the **K** value specified from the chart, the maximum allowable hydraulic pressure will need to be calculated using the formula shown. If the operating pressure is not adjusted for the short clamp arm, the force at link structure may exceed the **Fa** value in the chart. If this force is exceeded, the linkage may be damaged.

Hydraulic pressure calculation formula 
$$P_a \leq \frac{F_a \times K}{A(G \times \eta + K)}$$

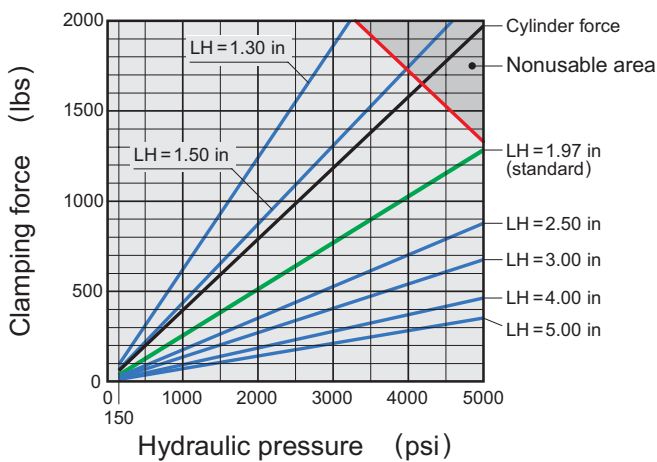
- F** : Clamping force (lbs)
- F<sub>c</sub>** : Cylinder force (lbs) (refer to Performance diagram)
- G, K** : Clamp arm length (in) (see figure on the right)
- η** : Output efficiency (0.9)
- P<sub>a</sub>** : Max. allowable hydraulic pressure (psi)
- F<sub>a</sub>** : Max. allowable force at link structure (lbs) (refer to the table below)
- A** : Cylinder area (in<sup>2</sup>) (refer to specification table)



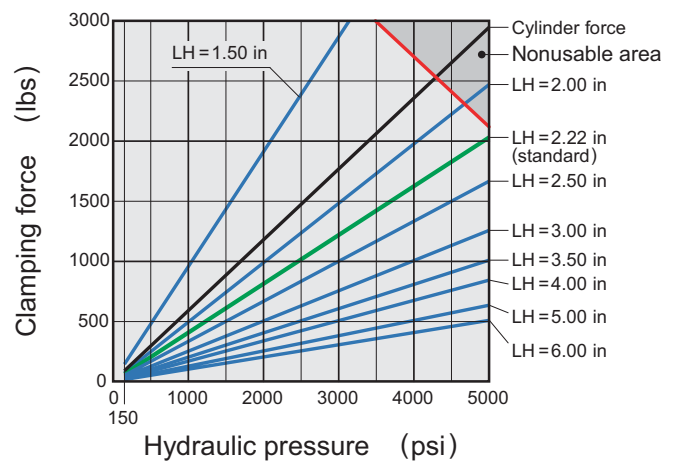
Model	CLW06	CLW10	CLW16	CLW25
G (in)	0.83	0.96	1.20	1.48
K※(in)	1.14	1.26	1.54	1.97
F <sub>a</sub> (lbs)	3300	5050	8250	13400

※ Standard clamp arm length

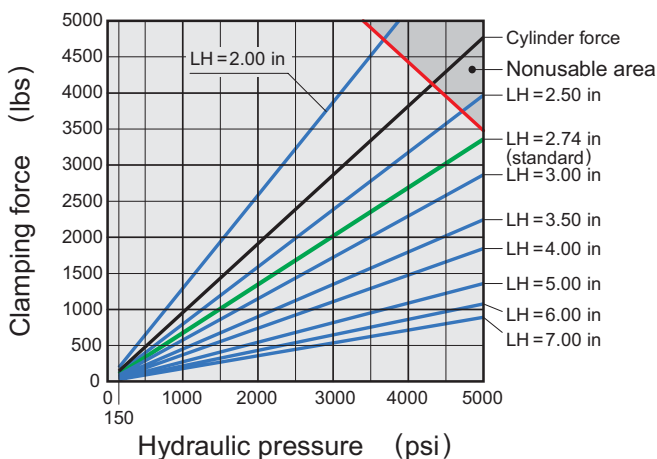
### CLW 06



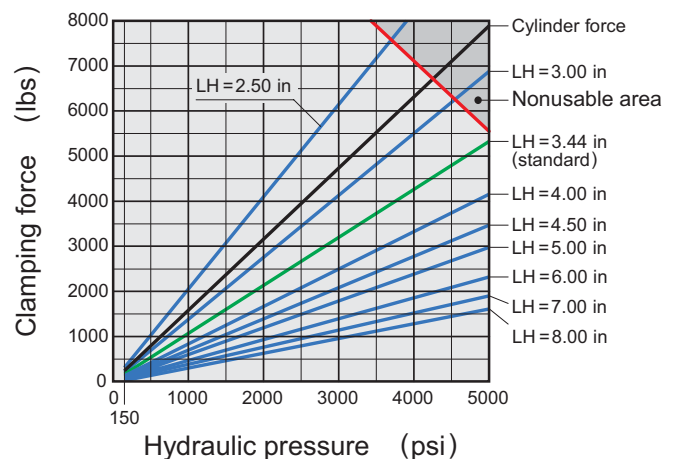
### CLW 10



### CLW 16



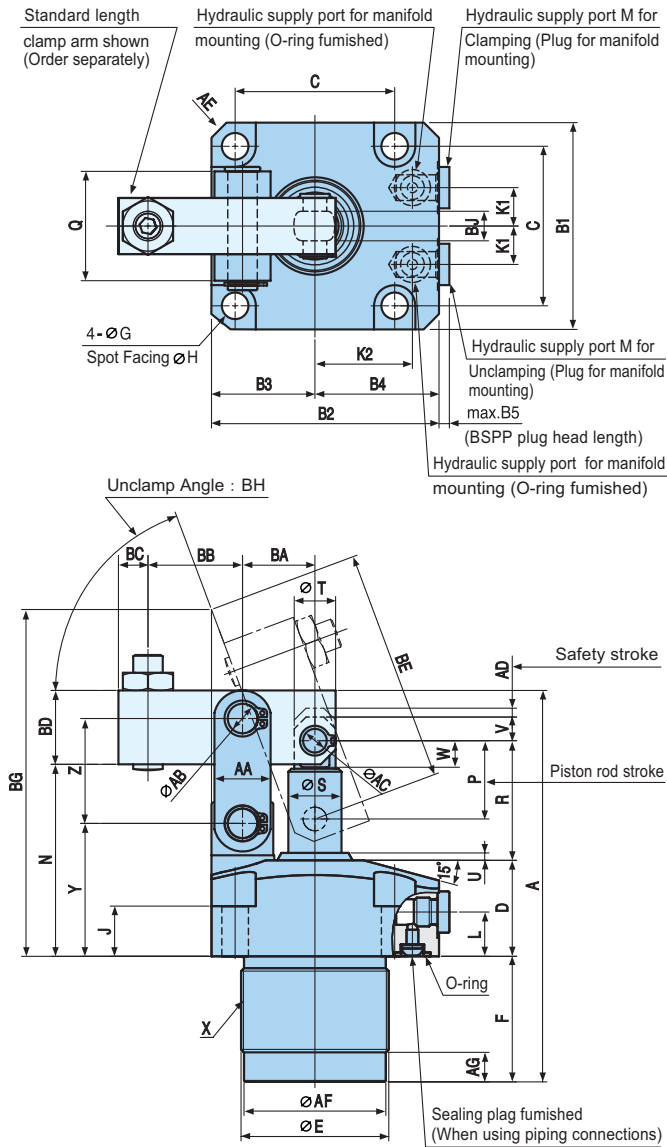
### CLW 25



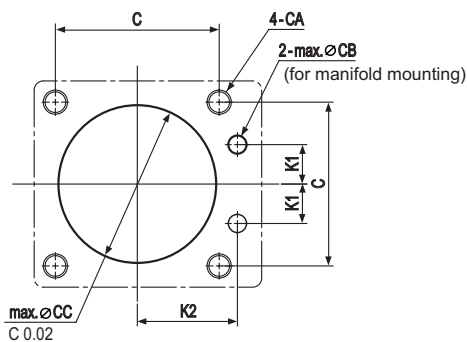
Outline drawing for 2D/3D CAD can be downloaded from our URL: <http://www.pascaleng.co.jp/>

( inch-accept where noted )

## CLW ① -F (shown)

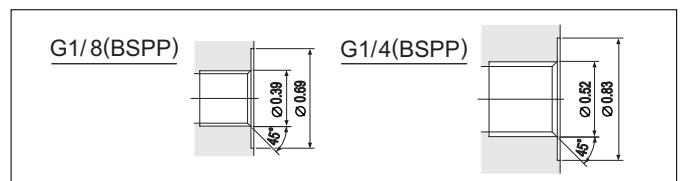


### Mounting details



1. For manifold mounting, the o-ring sealing area should have a minimum surface finish of 63 MU in.
2. Mounting bolts and Locknut are not furnished.

model	CLW06	CLW10	CLW16	CLW25
A	4.80	5.22	6.38	7.76
B1	2.36	2.76	3.39	4.25
B2	2.72	3.03	3.78	4.33
B3	1.18	1.38	1.69	2.13
B4	1.54	1.65	2.09	2.20
B5	0.15	0.15	0.19	0.19
C	1.85	2.13	2.56	3.35
D	1.22	1.28	1.57	1.85
E	1.764-1.772	1.961-1.969	2.354-2.362	2.748-2.756
F	1.67	1.67	2.01	2.48
G	0.27	0.35	0.43	0.55
H	0.43	0.55	0.69	0.79
J	0.67	0.67	0.79	0.83
K1	0.45	0.51	0.59	0.79
K2	1.18	1.30	1.57	1.69
L	0.59	0.59	0.67	0.67
M ※1	G1/8	G1/8	G1/4	G1/4
N	2.34	2.56	3.15	3.78
P	0.91	1.04	1.30	1.65
Q	1.10	1.46	1.81	2.20
R	1.36	1.59	1.93	2.42
S	0.55	0.71	0.88	1.10
T	0.47	0.59	0.79	1.02
U	0.08	0.10	0.10	0.10
V	0.24	0.31	0.43	0.51
W	0.28	0.35	0.43	0.57
X	M45 × 1.5	M50 × 1.5	M60 × 2	M70 × 2
Y	1.630-1.638	1.768-1.776	2.142-2.150	2.555-2.563
Z	1.18	1.40	1.73	2.09
O-ring ※2	P9	P9	P9	P9
AA	0.59	0.75	0.98	1.26
AB	0.315-0.316	0.394-0.395	0.551-0.552	0.630-0.631
AC	0.236-0.237	0.315-0.316	0.472-0.473	0.551-0.552
AD	0.12	0.12	0.12	0.12
AE	C0.10	C0.12	C0.14	C0.22
AF	1.69	1.89	2.26	2.66
AG	0.39	0.39	0.47	0.47
BA ※3	0.83	0.96	1.20	1.48
BB	1.14	1.26	1.54	1.97
BC	0.31	0.39	0.43	0.59
BD	0.79	0.98	1.22	1.50
BE	2.82	3.10	3.87	5.26
BG	4.25	4.62	5.70	7.45
BH	Approx.70°	Approx.70°	Approx.69°	Approx.72°
BJ	0.315-0.319	0.394-0.398	0.433-0.437	0.630-0.634
CA	1/4-20 M6	5/16-18 M8	3/8-16 M10	1/2-13 M12
CB	0.28	0.28	0.28	0.28
CC	1.85	2.05	2.44	2.83

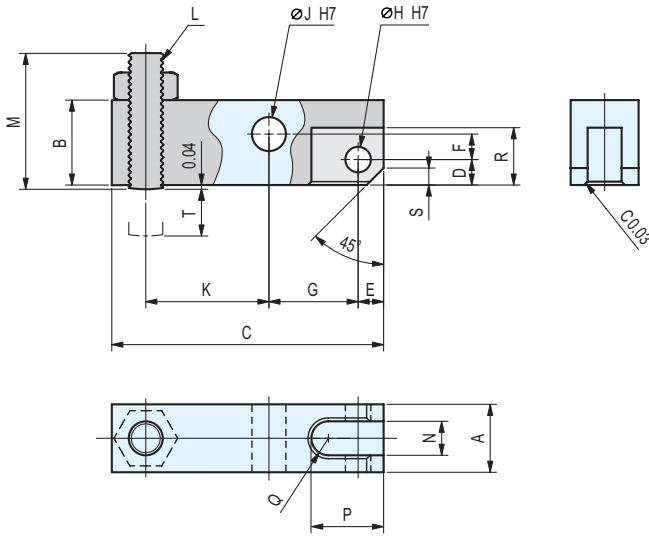


- ※1 : BSP tube fittings are available from Pascal. Please refer to separate listing for model number.
- ※2 : O-ring material is fluorine rubber (hardness Hs90).
- ※3 : Dimension BA does not change on L or R model number. The clamp arm is positioned clockwise or counter-clockwise 90 degrees based on the top view.

# Clamp arms — standard and extended length type

( inch-accept where noted )

## Standard length type model CLH ① -G1

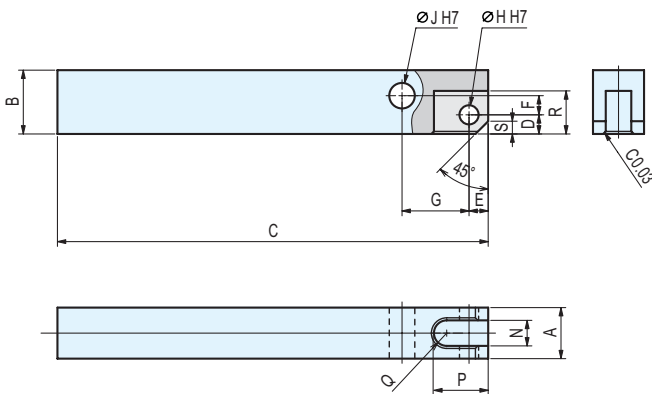


Material : Carbon steel Hardness : HRC13.8~27.6

Clamp arm model	CLH06-G1	CLH10-G1	CLH16-G1	CLH25-G1
A	0.626-0.630	0.744-0.748	0.862-0.866	1.256-1.260
B	0.79	0.98	1.22	1.50
C	2.52	2.89	3.56	4.55
D	0.24	0.31	0.35	0.49
E	0.24	0.28	0.39	0.51
F	0.24	0.30	0.37	0.37
G	0.83	0.96	1.20	1.48
H	0.236-0.237	0.315-0.316	0.472-0.473	0.551-0.552
J	0.315-0.316	0.394-0.395	0.551-0.552	0.630-0.631
K	1.14	1.26	1.54	1.97
L	M8	M10	M12	M16
M	1.26	1.54	1.89	2.28
N	0.315-0.319	0.394-0.398	0.433-0.437	0.630-0.634
P	0.67	0.79	1.04	1.42
Q	R0.16	R0.20	R0.22	R0.32
R	0.53	0.69	0.87	1.10
S	0.16	0.20	0.28	0.31
T (Adjustment length)	0.43	0.51	0.63	0.75
Clamp arm weight	0.3 lbs	0.5 lbs	0.9 lbs	2.2 lbs
Clamp model applied	<b>CLW06</b> <b>CLV06</b>	<b>CLW10</b> <b>CLV10</b>	<b>CLW16</b> <b>CLV16</b>	<b>CLW25</b> <b>CLV25</b>

( inch-accept where noted )

## Extended length type model CLH ① -GL

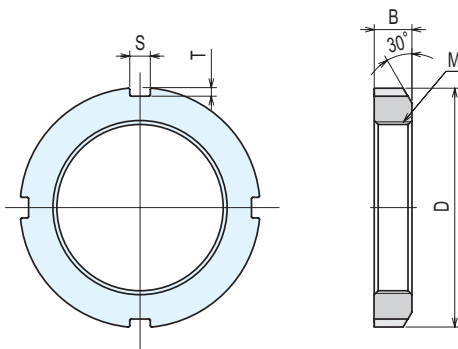


Material : Carbon steel Hardness : HRC13.8~27.6

Clamp arm model	CLH06-GL	CLH10-GL	CLH16-GL	CLH25-GL
A	0.626-0.630	0.744-0.748	0.862-0.866	1.256-1.260
B	0.79	0.98	1.22	1.50
C	5.31	7.09	7.87	9.06
D	0.24	0.31	0.35	0.49
E	0.24	0.28	0.39	0.51
F	0.24	0.30	0.37	0.37
G	0.83	0.96	1.20	1.48
H	0.236-0.237	0.315-0.316	0.472-0.473	0.551-0.552
J	0.315-0.316	0.394-0.395	0.551-0.552	0.630-0.631
N	0.315-0.319	0.394-0.398	0.433-0.437	0.630-0.634
P	0.67	0.79	1.04	1.42
Q	R0.16	R0.20	R0.22	R0.32
R	0.53	0.69	0.87	1.10
S	0.16	0.20	0.28	0.31
Clamp arm weight	0.7 lbs	1.4 lbs	2.1 lbs	4.3 lbs
Clamp model applied	<b>CLW06</b> <b>CLV06</b>	<b>CLW10</b> <b>CLV10</b>	<b>CLW16</b> <b>CLV16</b>	<b>CLW25</b> <b>CLV25</b>

( inch-accept where noted )

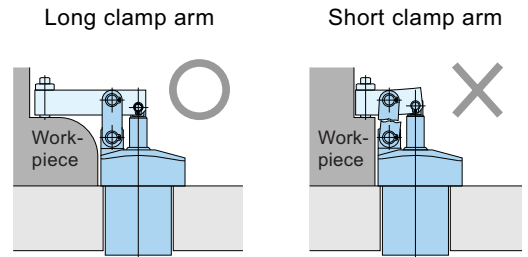
## Locknut model CLH ① -VN



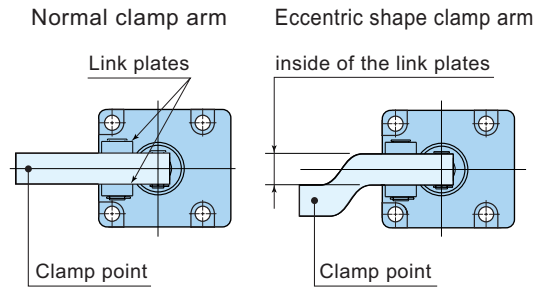
Locknut model	CLH06-VN	CLH10-VN	CLH16-VN	CLH25-VN
M	M45 × 1.5	M50 × 1.5	M60 × 2	M70 × 2
D	2.56	2.76	3.15	3.62
B	0.39	0.43	0.43	0.47
S	0.24	0.24	0.28	0.31
T	0.10	0.10	0.12	0.14
Clamp model applied	<b>CLW06</b> <b>CLV06</b>	<b>CLW10</b> <b>CLV10</b>	<b>CLW16</b> <b>CLV16</b>	<b>CLW25</b> <b>CLV25</b>

## ⚠ Caution in use

1. The shorter the length of the clamp arm, the larger the forces are at the link structure. If the clamping force exceeds the maximum allowable force at the link structure, damage may occur. Depending on the clamp arm length, the operating pressure to the cylinder may need to be reduced. Refer to the performance diagrams on page 4 and 10 to properly match the clamping force (hydraulic pressure) with the clamp arm length you plan to use.



2. If the workpiece contact point is not inside of the link plates, an eccentric shape clamp arm can be used (shown right). Please contact Pascal for pamphlet PA-169A showing the allowable offset lengths versus operating pressure. Exceeding the allowable offset can cause damage to the link structure and piston rod due to the heavy side loading.



3. Maximum clamping efficiency is achieved when the clamp arm's bottom surface is parallel to the cylinder mounting surface when the workpiece is clamped. The clamp arm should be no more than 3 degrees above or below parallel. The clamp arm's angle can be adjusted by using the adjustment bolt supplied with the standard clamp arm.

