Sensing Link clamp

Double acting 25 MPa

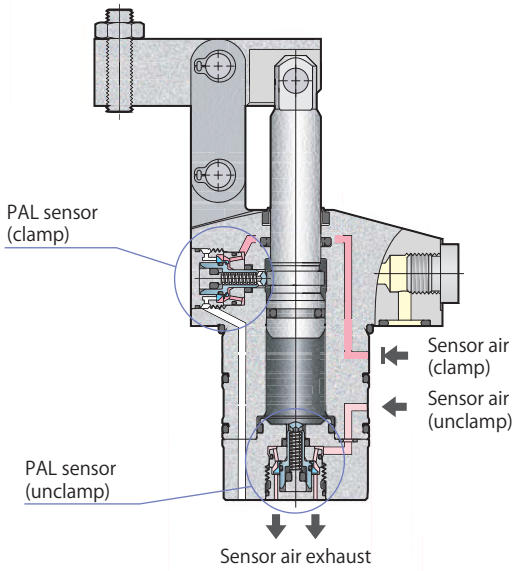
model CLW

3 point sensor model
model CLW04-FT

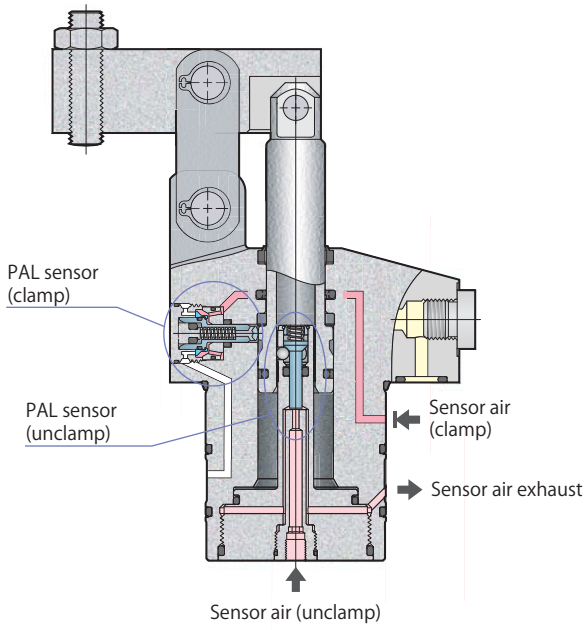
3 point sensor model T

Clamp, Unclamp, Over clamp stroke (Incomplete clamp) detection

model CLW04-□T PAT.

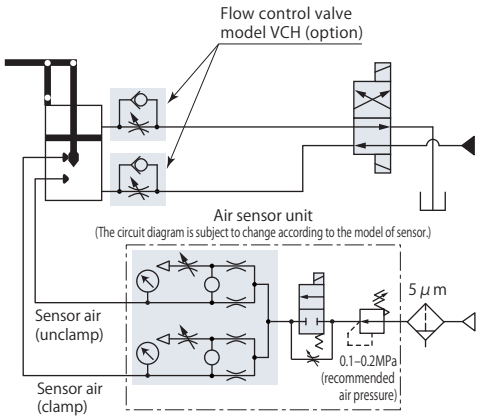


model CLW06/10/16/25-□T PAT.



Hydraulic and pneumatic circuit diagram

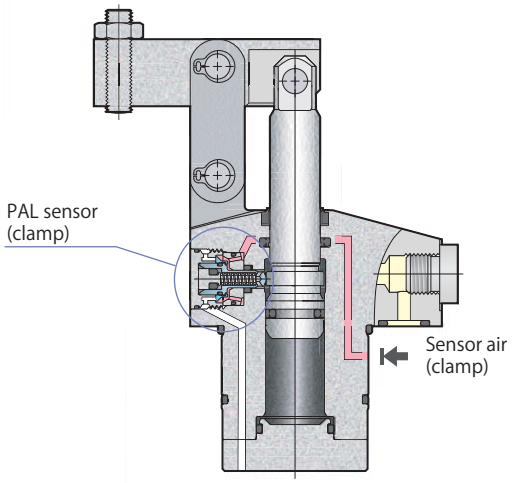
model CLW□-□T



Clamp sensor model C

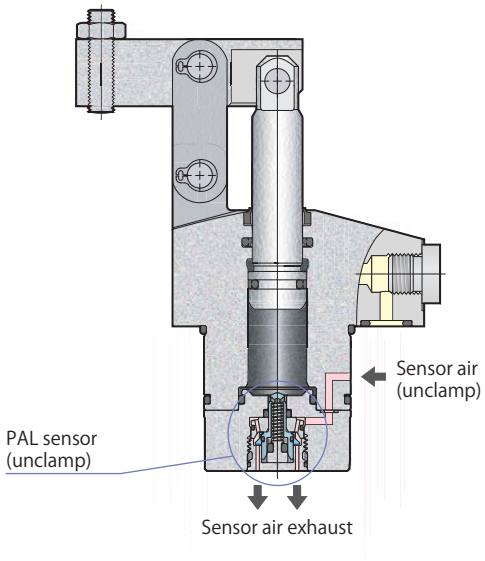
Clamp, Over clamp stroke (Incomplete clamp) detection

model **CLW04-□C** PAT.

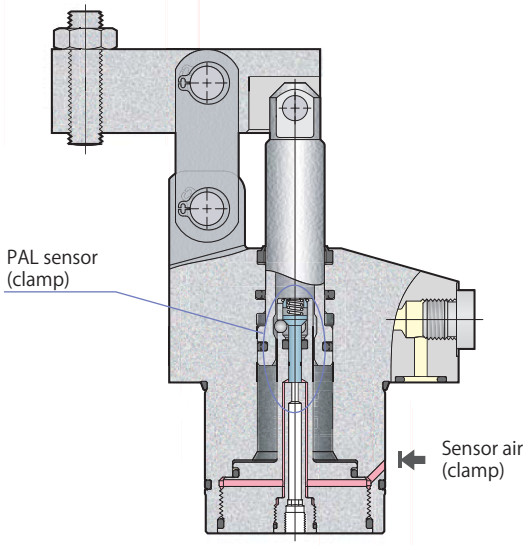


Unclamp sensor model B

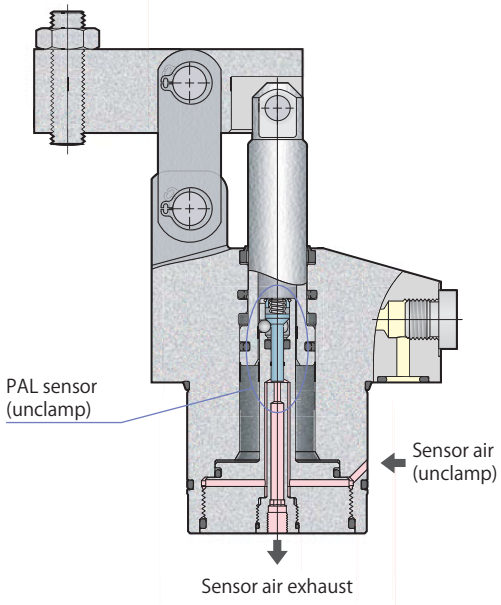
model **CLW04-□B** PAT.



model **CLW06/10/16/25-□C** PAT.

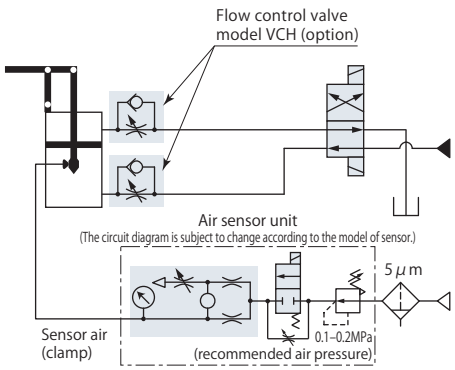


model **CLW06/10/16/25-□B** PAT.

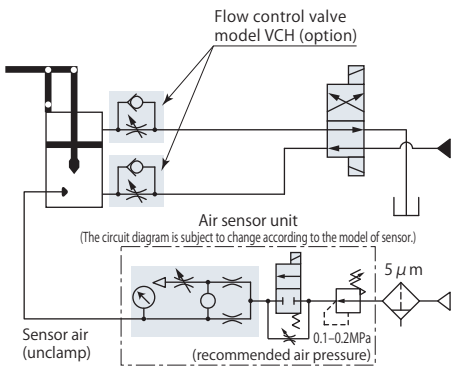


Hydraulic and pneumatic circuit diagram

model **CLW□-□C**



model **CLW□-□B**



Specifications

Size / Clamp arm mounting direction

CLW — 04 / 06 / 10 / 16 / 25

- **L** : Left side
- **F** : Front side
- **R** : Right side

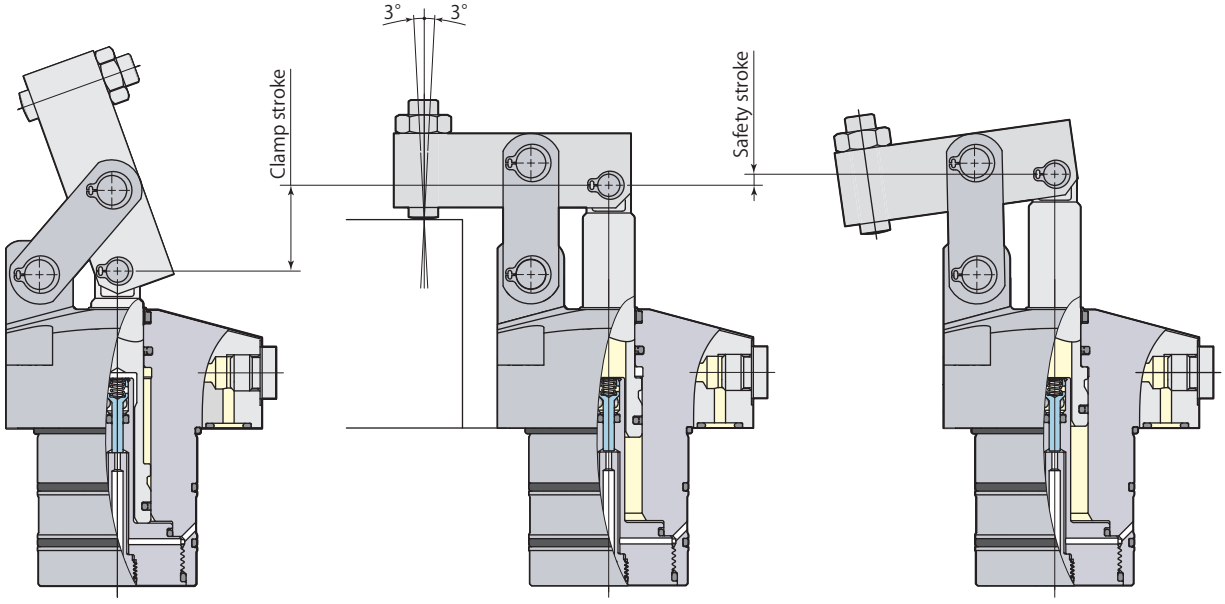
- **T** : 3 point sensor model — Clamp, Unclamp, Over clamp stroke (Incomplete clamp) detection
- **C** : Clamp sensor model — Clamp, Over clamp stroke (Incomplete clamp) detection
- **B** : Unclamp sensor model

Model			CLW04	CLW06	CLW10	CLW16	CLW25
Cylinder force	Hydraulic pressure 35MPa	kN	—	8.9	13.3	21.6	35.6
	Hydraulic pressure 25MPa	kN	3.8	6.4	9.5	15.4	25.4
Cylinder inner diameter		mm	14	18	22	28	36
Rod diameter		mm	12	14	18	22.4	28
Effective area (clamp)		cm^2	1.5	2.5	3.8	6.2	10.2
Full stroke		mm	23.5	26	29.5	36	45
Clamp stroke*1		mm	20.5	23	26.5	33	42
Safety stroke		mm	3	3	3	3	3
Max. oil flow rate		L/min	0.38	0.69	1.18	2.39	5.08
Cylinder capacity	Clamp	cm^3	3.6	6.6	11.2	22.2	45.8
	Unclamp	cm^3	1.0	2.6	3.7	8.0	18.1
Mass	CLW□-T	kg	0.9	1.4	2.0	3.6	5.9
	CLW□-C/B	kg	0.9	1.3	1.9	3.5	5.7
Recommended tightening torque of mounting screws*2		N·m	7	12	29	57	100

- Pressure range：6–25 MPa (model CLW-T, CLW04-C/B), 5–35MPa (model CLW06-C/B, CLW10-C/B, CLW16-C/B, CLW25-C/B)
- Proof pressure：37.5 MPa (model CLW-T, CLW04-C/B), 52.5MPa (model CLW06-C/B, CLW10-C/B, CLW16-C/B, CLW25-C/B)
- Operating temperature：0–70 ℃
- Fluid used：General mineral based hydraulic oil (ISO-VG32 equivalent)
- Seals are resistant to chlorine-based cutting fluid. (not thermal resistant specification)

*1：Indicates a distance from unclamping position to clamping point. *2：ISO R898 class 12.9

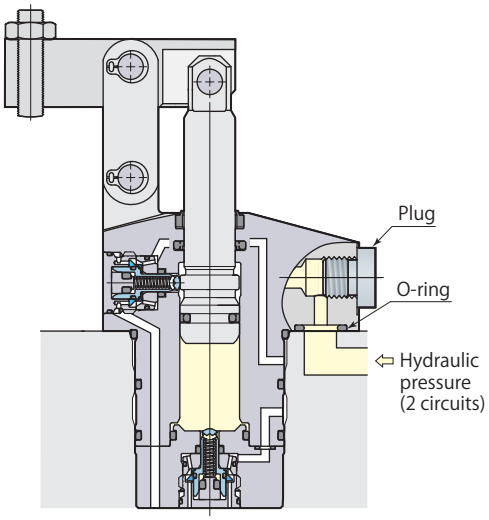
When clamping the workpiece, the clamp arm should be situated like the sketch as shown below. (Clamping point)
Please avoid any non-axial force such as the bending moment toward the piston rod. (Allowable angle ±3°)



Manifold piping and G port piping are available.

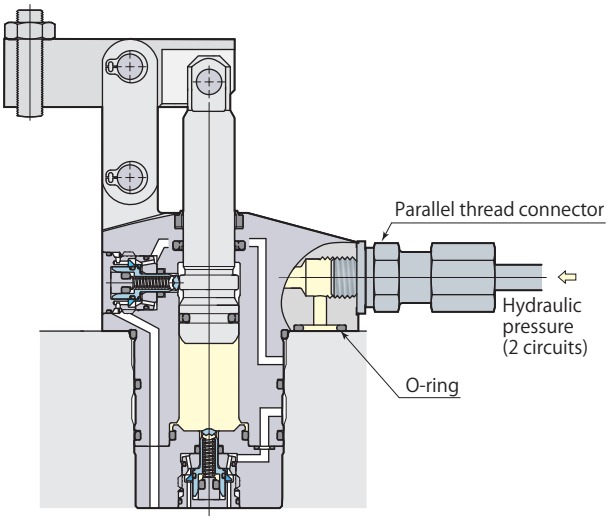
Manifold piping

When choosing manifold piping, a flow control valve (model VCH) and an air bleeding valve (model VCE) are mountable on the G ports of the clamp.



G port piping

Remove plugs when choosing G port piping. (O-ring must be used.) The flow control valve and the air bleeding valve should be installed in the middle of oil path.



Flow control valve model VCH

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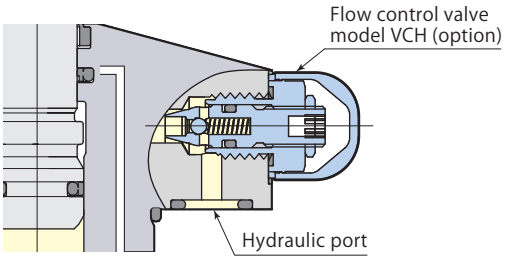

Air bleeding valve model VCE

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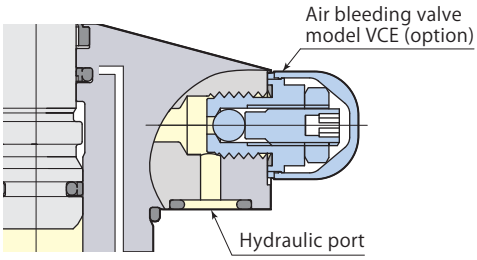
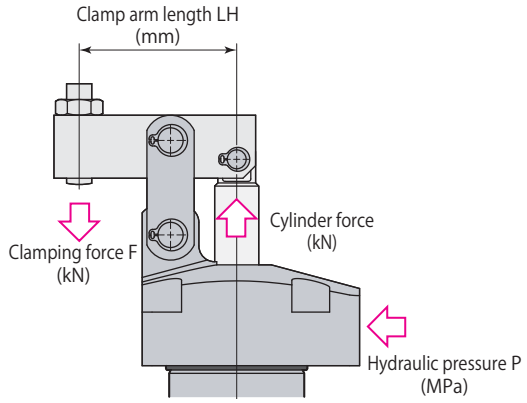


● In case of mounting flow control valve model VCH on the G port of the clamp, air bleeding valve should be installed in the piping to the clamp. (VCE Mounting details. Refer to **page →78**)

Performance diagram



Clamping force varies depending on the clamp arm length (LH) and hydraulic pressure (P).

Clamping force calculation formula

F = Coefficient 1 × P/(LH - Coefficient 2)

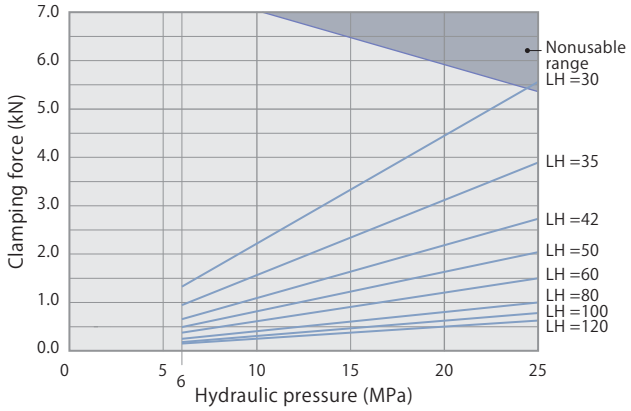
F : Clamping force P : Hydraulic pressure LH : Clamp arm length

CLW10 with clamp arm length (LH) = 50 mm at hydraulic pressure of 25 MPa, Clamping force F is calculated by

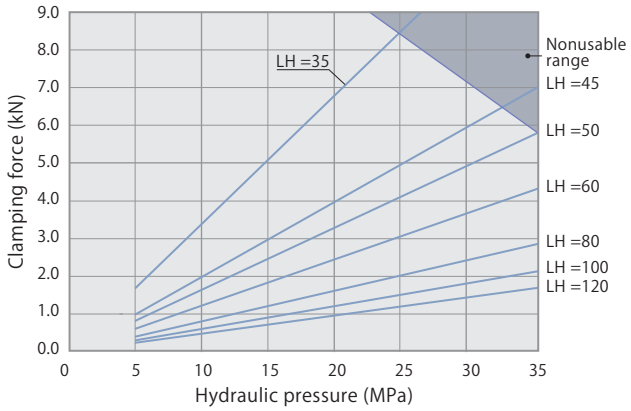
8.38×25/(50-24.5)=8.2 kN

Do not use the clamp in the nonusable range. It may cause damage of link mechanism.

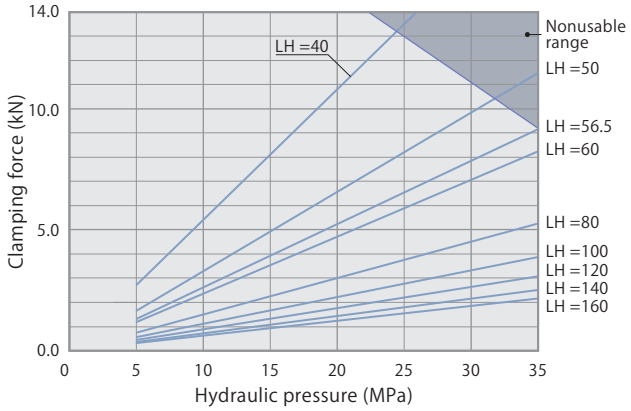
model CLW04



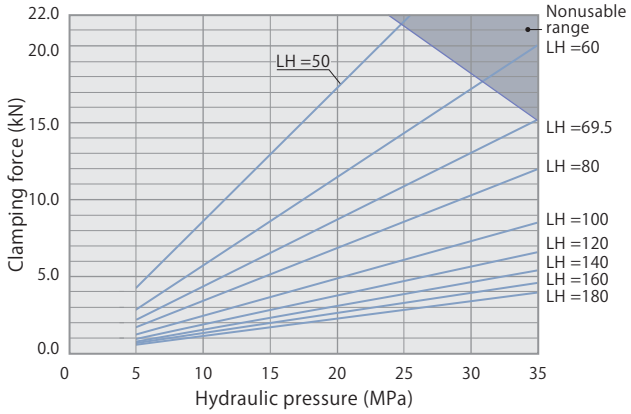
model CLW06



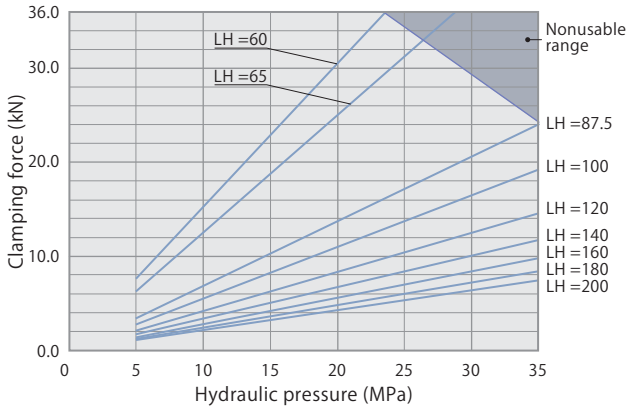
model CLW10



model CLW16



model CLW25



Performance table

model CLW04 Clamping force F=2.56×P/(LH-18.5)

Hydraulic pressure MPa	Cylinder force kN	Clamping force kN — Clamp arm length LH mm								Min. arm length Min. LH mm
		30	35	42	50	60	80	100	120	
25	3.8		3.9	2.7	2.0	1.5	1.0	0.8	0.6	30.5
20	3.1	4.5	3.1	2.2	1.6	1.2	0.8	0.6	0.5	30
15	2.3	3.3	2.3	1.6	1.2	0.9	0.6	0.5	0.4	↑
10	1.5	2.2	1.6	1.1	0.8	0.6	0.4	0.3	0.3	↑
6	0.9	1.3	0.9	0.7	0.5	0.4	0.2	0.2	0.2	30
Max. pressure MPa		24.4	25	25	25	25	25	25	25	

indicates nonusable range

model CLW06 Clamping force F=4.81×P/(LH-21.0)

Hydraulic pressure MPa	Cylinder force kN	Clamping force kN — Clamp arm length LH mm							Min. arm length Min. LH mm
		35	45	50	60	80	100	120	
35	8.9			5.8	4.3	2.9	2.1	1.7	50
30	7.6		6.0	5.0	3.7	2.4	1.8	1.5	41.5
25	6.4		5.0	4.1	3.1	2.0	1.5	1.2	35.5
20	5.1	6.9	4.0	3.3	2.5	1.6	1.2	1.0	35
15	3.8	5.2	3.0	2.5	1.9	1.2	0.9	0.7	↑
10	2.5	3.4	2.0	1.7	1.2	0.8	0.6	0.5	↑
5	1.3	1.7	1.0	0.8	0.6	0.4	0.3	0.2	35
Max. pressure MPa		24.6	32.3	35	35	35	35	35	

indicates nonusable range

model CLW10 Clamping force F=8.38×P/(LH-24.5)

Hydraulic pressure MPa	Cylinder force kN	Clamping force kN — Clamp arm length LH mm									Min. arm length Min. LH mm
		40	50	56.5	60	80	100	120	140	160	
35	13.3			9.2	8.3	5.3	3.9	3.1	2.5	2.2	56.5
30	11.4		9.9	7.9	7.1	4.5	3.3	2.6	2.2	1.9	47
25	9.5		8.2	6.5	5.9	3.8	2.8	2.2	1.8	1.5	40.5
20	7.6	10.8	6.6	5.2	4.7	3.0	2.2	1.8	1.5	1.2	40
15	5.7	8.1	4.9	3.9	3.5	2.3	1.7	1.3	1.1	0.9	↑
10	3.8	5.4	3.3	2.6	2.4	1.5	1.1	0.9	0.7	0.6	↑
5	1.9	2.7	1.6	1.3	1.2	0.8	0.6	0.4	0.4	0.3	40
Max. pressure MPa		24.4	31.7	35	35	35	35	35	35	35	

indicates nonusable range

model CLW16 Clamping force F=16.90×P/(LH-30.5)

Hydraulic pressure MPa	Cylinder force kN	Clamping force kN — Clamp arm length LH mm									Min. arm length Min. LH mm
		50	60	69.5	80	100	120	140	160	180	
35	21.6			15.2	11.9	8.5	6.6	5.4	4.6	4.0	69.5
30	18.5		17.2	13.0	10.2	7.3	5.7	4.6	3.9	3.4	58.5
25	15.4		14.3	10.8	8.5	6.1	4.7	3.9	3.3	2.8	50.5
20	12.3	17.3	11.5	8.7	6.8	4.9	3.8	3.1	2.6	2.3	50
15	9.2	13.0	8.6	6.5	5.1	3.6	2.8	2.3	2.0	1.7	↑
10	6.2	8.7	5.7	4.3	3.4	2.4	1.9	1.5	1.3	1.1	↑
5	3.1	4.3	2.9	2.2	1.7	1.2	0.9	0.8	0.7	0.6	50
Max. pressure MPa		24.8	30.9	35	35	35	35	35	35	35	

indicates nonusable range

model CLW25 Clamping force F=34.35×P/(LH-37.5)

Hydraulic pressure MPa	Cylinder force kN	Clamping force kN — Clamp arm length LH mm									Min. arm length Min. LH mm
		60	65	87.5	100	120	140	160	180	200	
35	35.6			24.0	19.2	14.6	11.7	9.8	8.4	7.4	87.5
30	30.5			20.6	16.5	12.5	10.1	8.4	7.2	6.3	73
25	25.4		31.2	17.2	13.7	10.4	8.4	7.0	6.0	5.3	62.5
20	20.4	30.5	25.0	13.7	11.0	8.3	6.7	5.6	4.8	4.2	60
15	15.3	22.9	18.7	10.3	8.2	6.2	5.0	4.2	3.6	3.2	↑
10	10.2	15.3	12.5	6.9	5.5	4.2	3.4	2.8	2.4	2.1	↑
5	5.1	7.6	6.2	3.4	2.7	2.1	1.7	1.4	1.2	1.1	60
Max. pressure MPa		23.5	26.3	35	35	35	35	35	35	35	

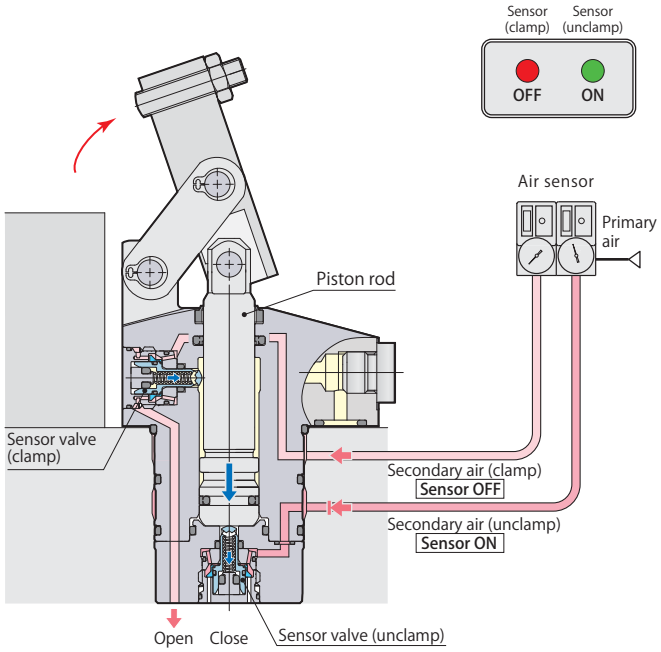
indicates nonusable range

- Applicable hydraulic pressure range:
  6 to 25MPa for model CLW-T, CLW04-C/B
  5 to 35MPa for model CLW06-C/B, CLW10-C/B, CLW16-C/B and CLW25-C/B

Clamp, Unclamp, Over clamp stroke detection signal

CLW04-□T

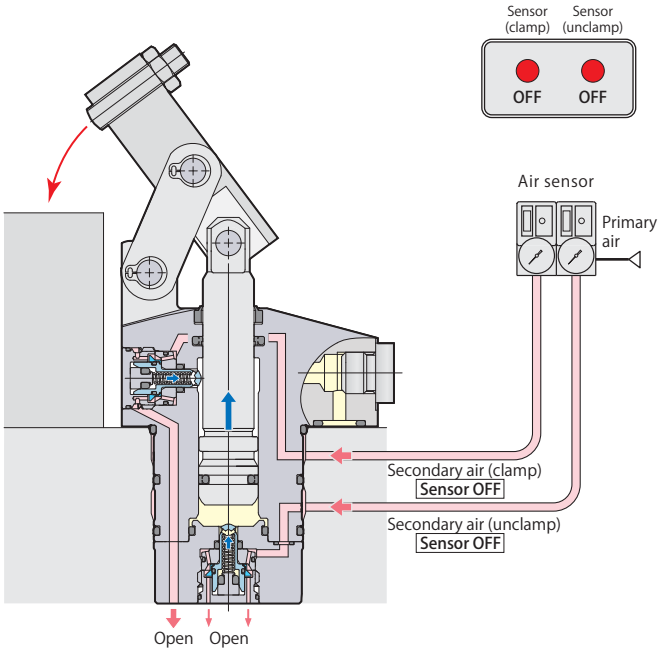
Unclamp detection



The sensor may not work correctly when the cylinder is not pressurized by hydraulic force because the piston of the clamp moves under such environment. Keep supplying hydraulic force the cylinder all the times.

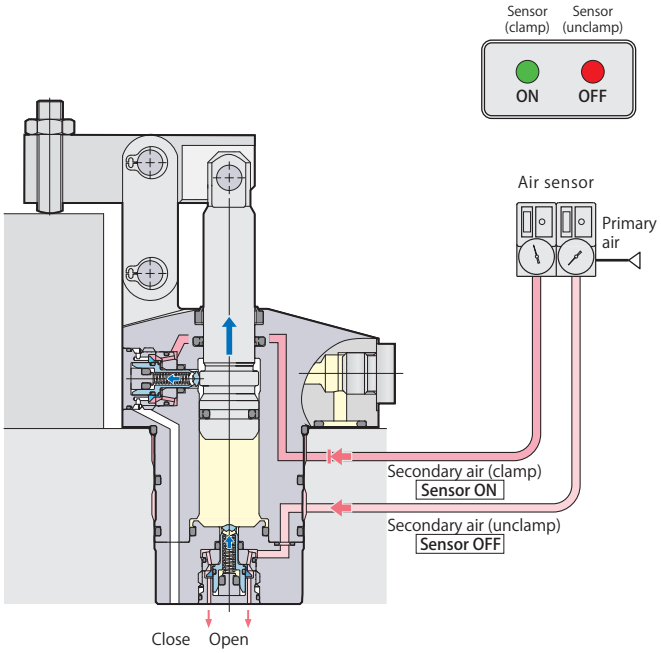
Sensor signal (clamp)	OFF	Unclamp
Sensor signal (unclamp)	ON	

In the middle of clamp stroke



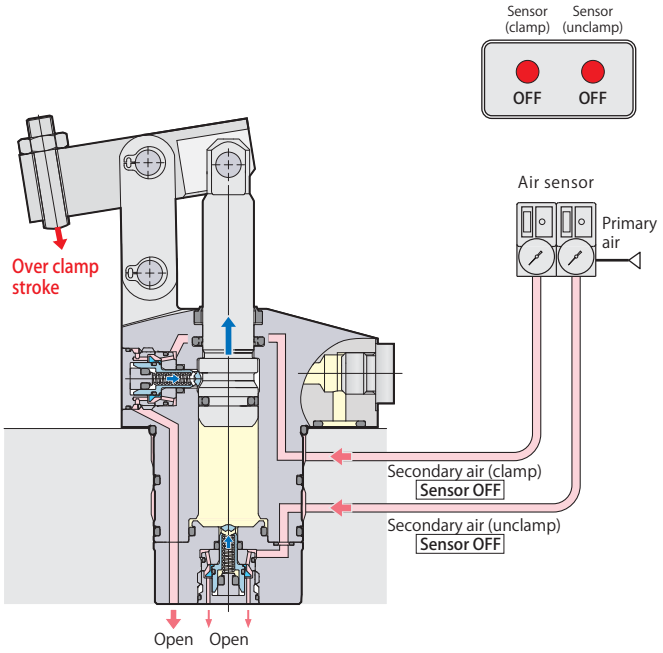
Sensor signal (clamp)	OFF	In the middle of clamp stroke
Sensor signal (unclamp)	OFF	

Clamp detection



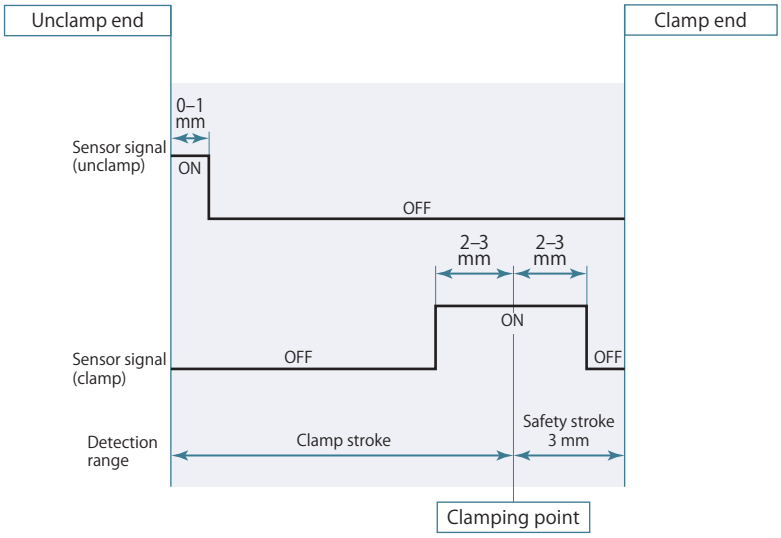
Sensor signal (clamp)	ON	Clamp
Sensor signal (unclamp)	OFF	

Over clamp stroke (Incomplete clamp) detection



Sensor signal (clamp)	OFF	Over clamp stroke (Incomplete clamp)
Sensor signal (unclamp)	OFF	

Air sensor triggering point



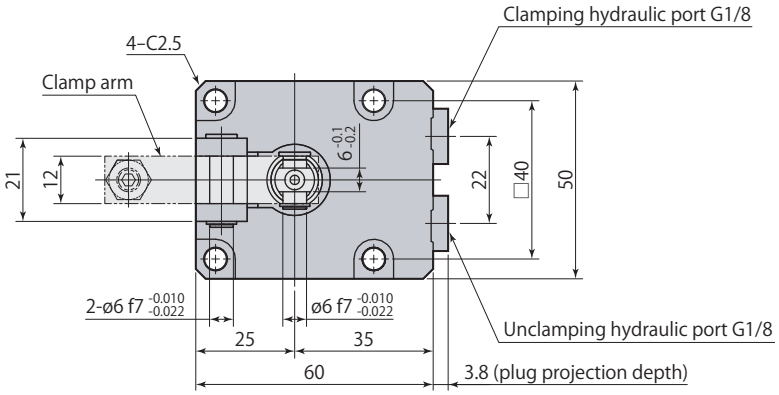
- Refer to the sensor supplier's instruction manual for the details of setting.
- Sensing performance such as detectable time and pressure differs depending on the supplier and model number of the sensor. Select the right model referring to sensor's application and characteristics.

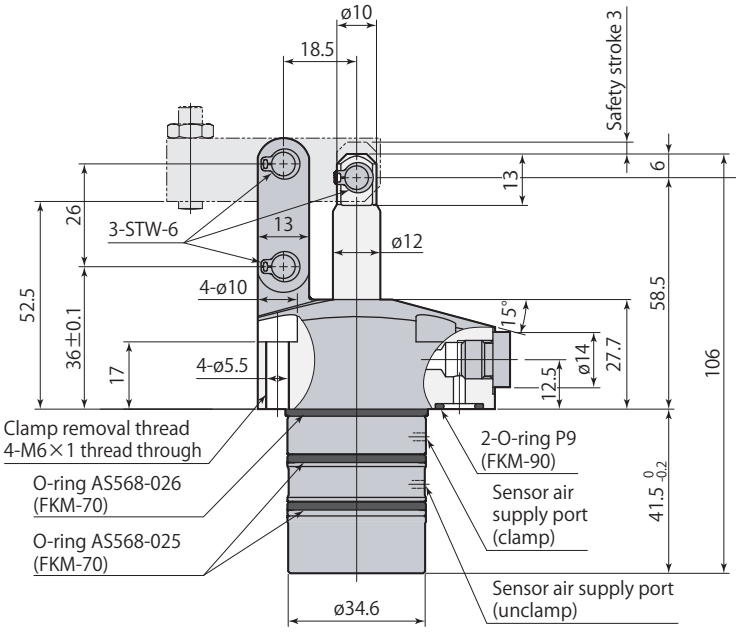
Air sensor unit recommended condition of use

Supplier and model	ISA3-F/G series manufactured by SMC
	GPS2-05, GPS3-E series manufactured by CKD
Air supply pressure	0.1–0.2 MPa
Inner diameter of piping	ø4 mm (ISA3-F：ø2.5 mm)
Overall piping length	5 m or less

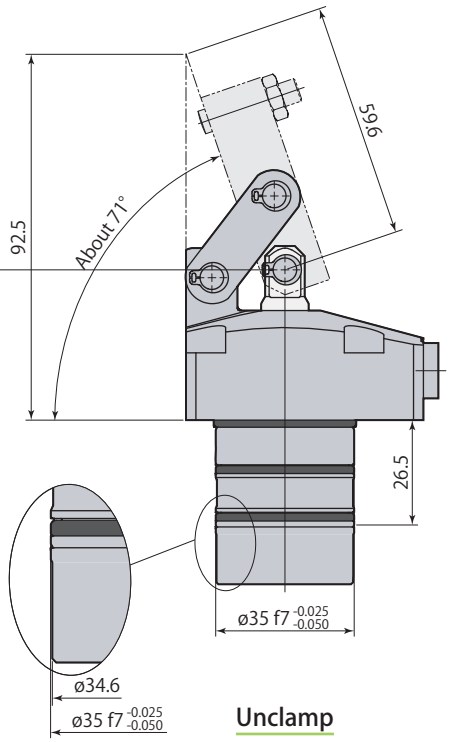
- Supply the dry and filtered air. Particulate size 5 μm or less is recommended.
- Use a solenoid valve with needle for air sensor unit and control it supplying air all the time in order to eliminate intrusion of chips or coolant.
- There is a case that air sensing cannot be successfully made as designed when it is used out of the above usage. Contact Technical service center for more details.

Dimensions

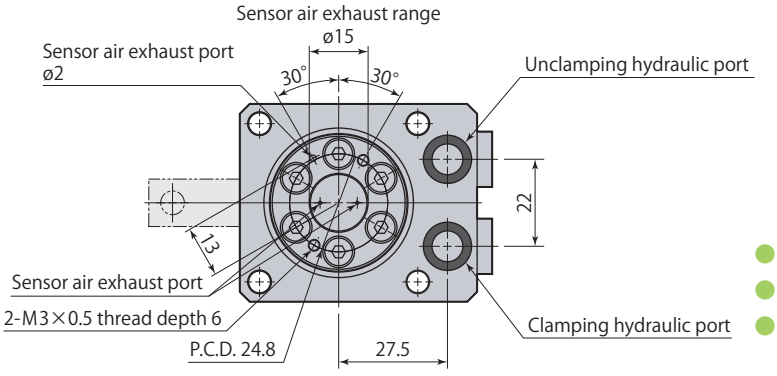




Clamp

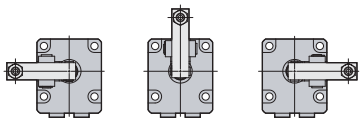


Unclamp



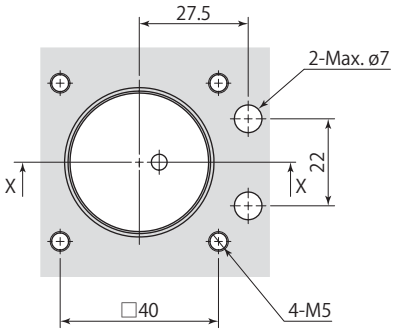
- This diagram represents external contour of CLW04-FT. CLW04-LT and CLW04-RT differ only in terms of mounting direction of clamp arm and otherwise all dimensions are identical to those of CLW04-FT.

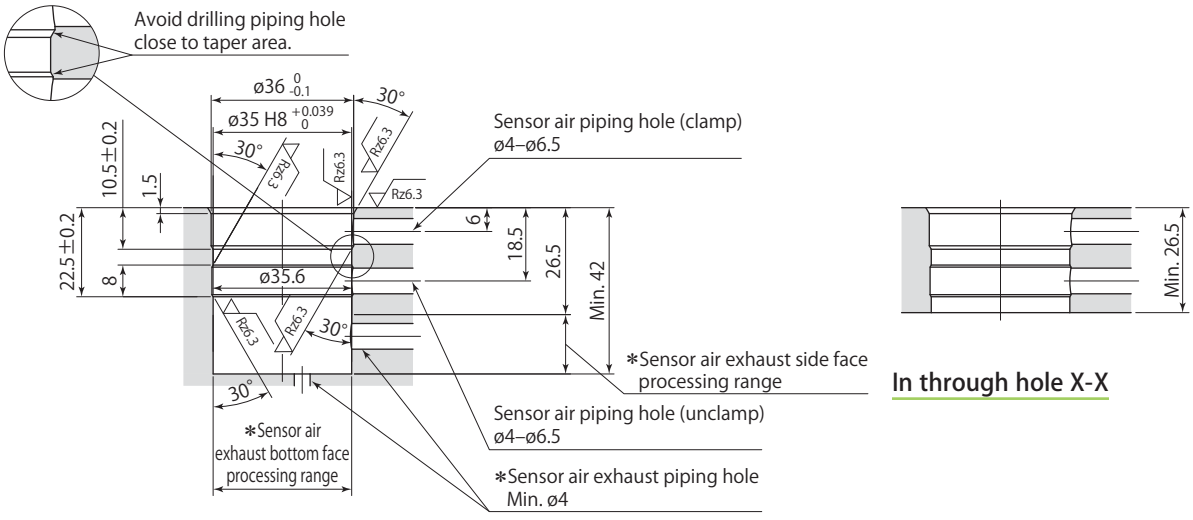
L:Left side F:Front side R:Right side



- Clamp arm and mounting screws are not included.
- Snap ring is made by Ochiai Corporation.
- Use a snap ring (STW-6) and a pin (ø6) when installing a clamp arm.
- When choosing manifold piping, a meter-in type flow control valve (model VCH01) and an air bleeding valve (model VCE01) are mountable on the G ports of the clamp.

Mounting details





In blind hole X-X

In through hole X-X

Rz: ISO4287(1997)

*: Sensor air exhaust piping hole must be made on either side or bottom face.

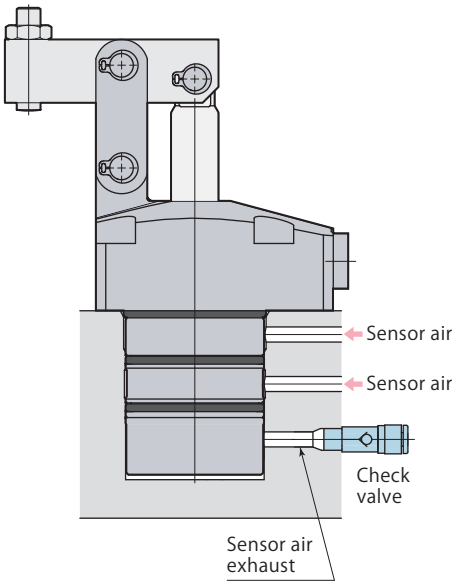
- Apply an appropriate amount of grease to the chamfer and the bore when mounting.
  Excessive grease may be a blockage in the air passage, causing malfunction of the sensor.

- The 30° taper machining must be provided to avoid the damage of the O-ring.
  Ensure that there are no interference on taper area when drilling the hole for sensor air.

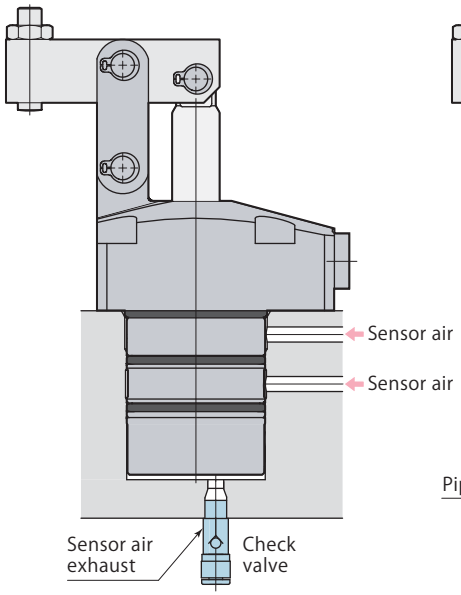
Caution for piping

Refer to the diagram shown below for the sensor air exhaust port.

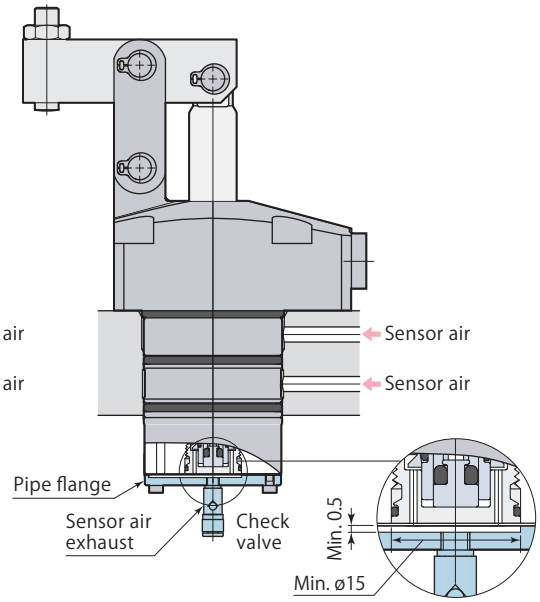
Mounting in blind hole
(Sensor air exhaust：side face)



Mounting in blind hole
(Sensor air exhaust：bottom face)



Mounting in through hole

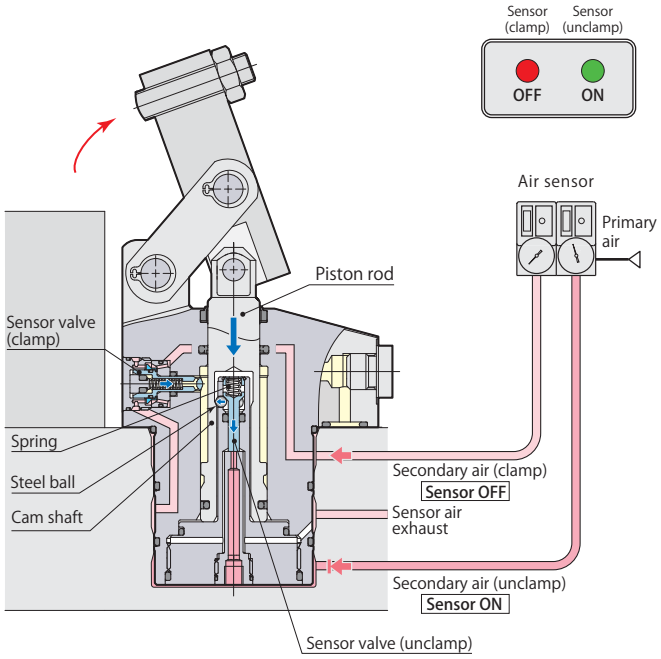


- Use a check valve with cracking pressure of 0.005 MPa or less if there is a risk of metal chips or coolant intrusion. Recommended check valve : AKH or AKB series manufactured by SMC.
- Furnish the piping by means of the pipe flange when mounting in a through hole. The flange is mountable with M3 threads at the bottom of the clamp. Be sure to provide an opening not to cover the exhaust port. See the sketch shown above.

Clamp, Unclamp, Over clamp stroke detection signal

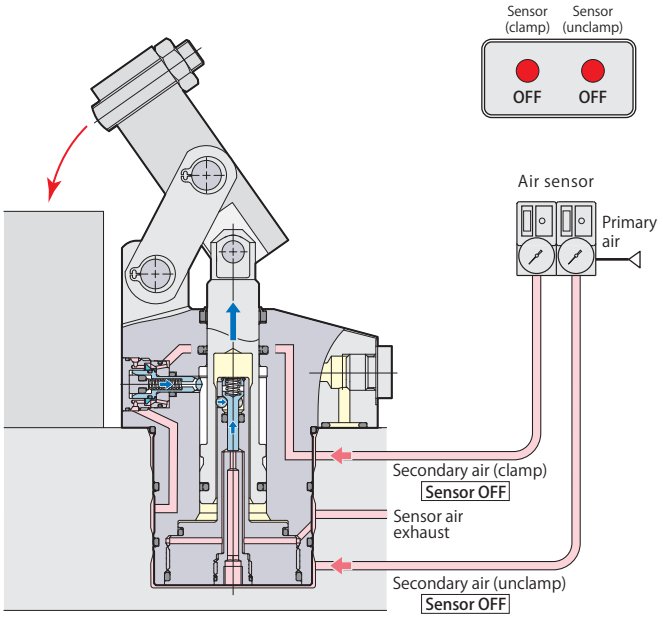
CLW06/10/16/25-□T

Unclamp detection



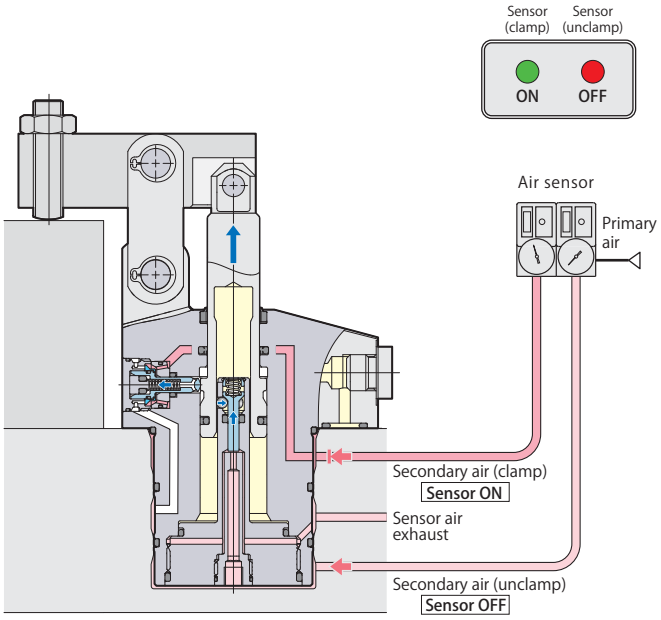
Sensor signal (clamp)	OFF	Unclamp
Sensor signal (unclamp)	ON	

In the middle of clamp stroke



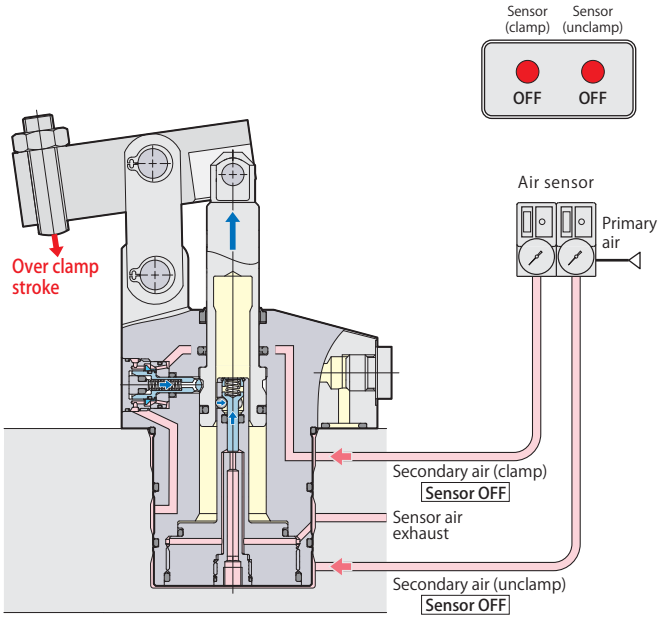
Sensor signal (clamp)	OFF	In the middle of clamp stroke
Sensor signal (unclamp)	OFF	

Clamp detection



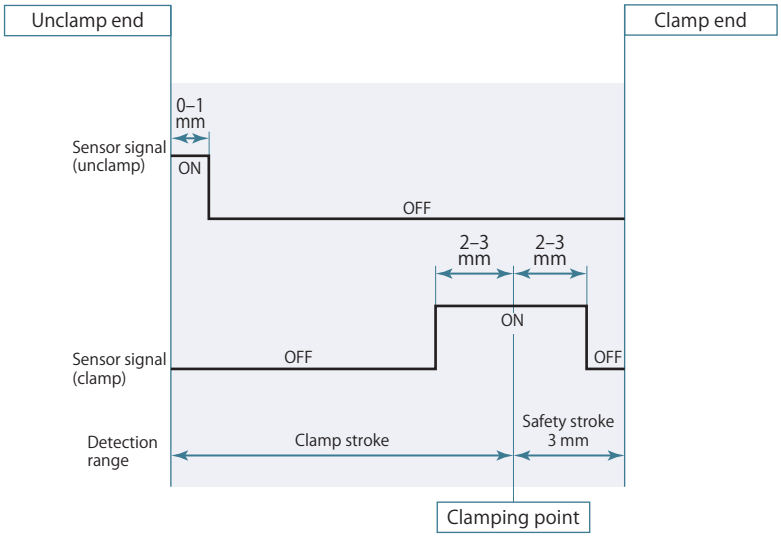
Sensor signal (clamp)	ON	Clamp
Sensor signal (unclamp)	OFF	

Over clamp stroke (Incomplete clamp) detection



Sensor signal (clamp)	OFF	Over clamp stroke (Incomplete clamp)
Sensor signal (unclamp)	OFF	

Air sensor triggering point



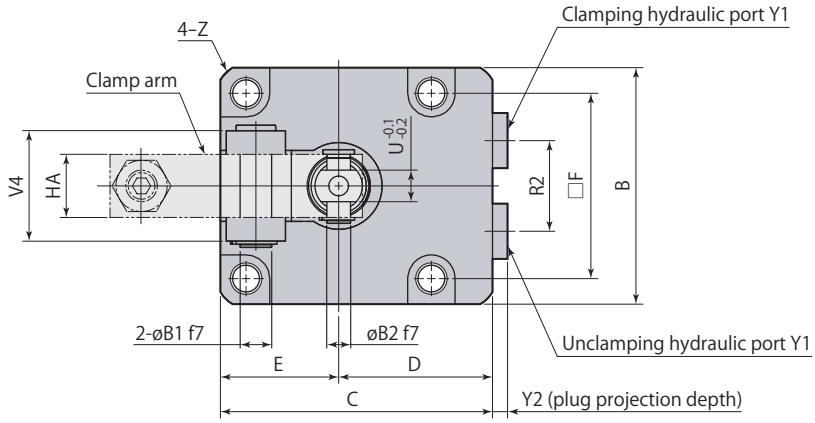
- Refer to the sensor supplier's instruction manual for the details of setting.
- Sensing performance such as detectable time and pressure differs depending on the supplier and model number of the sensor. Select the right model referring to sensor's application and characteristics.

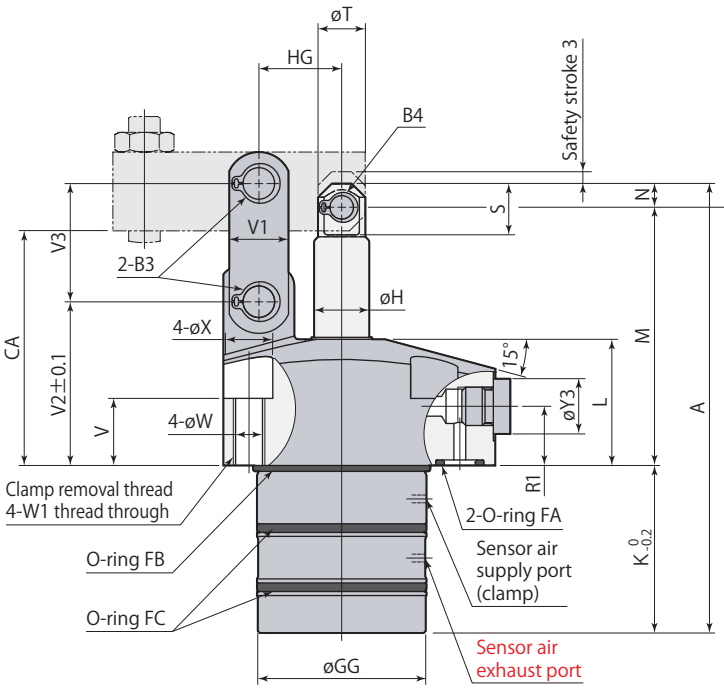
Air sensor unit recommended condition of use

Supplier and model	ISA3-F/G series manufactured by SMC
	GPS2-05, GPS3-E series manufactured by CKD
Air supply pressure	0.1–0.2 MPa
Inner diameter of piping	ø4 mm (ISA3-F：ø2.5 mm)
Overall piping length	5 m or less

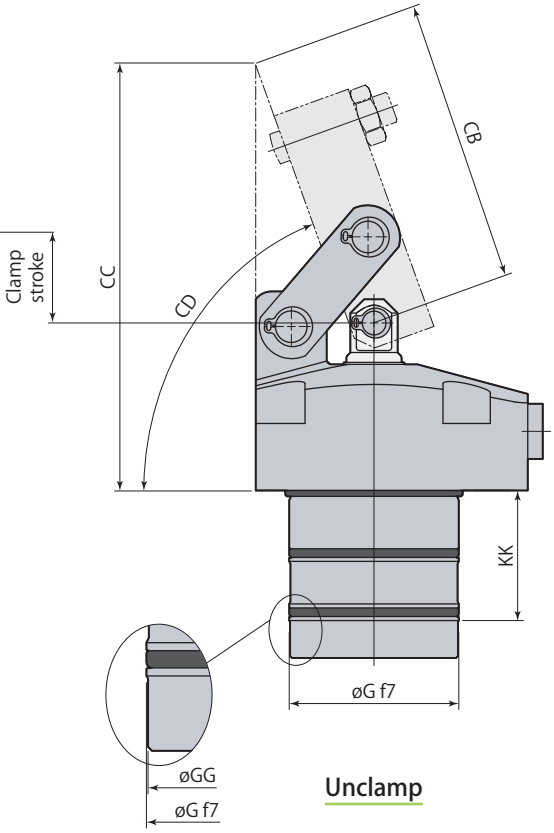
- Supply the dry and filtered air. Particulate size 5 μm or less is recommended.
- Use a solenoid valve with needle for air sensor unit and control it supplying air all the time in order to eliminate intrusion of chips or coolant.
- There is a case that air sensing cannot be successfully made as designed when it is used out of the above usage. Contact Technical service center for more details.

Dimensions

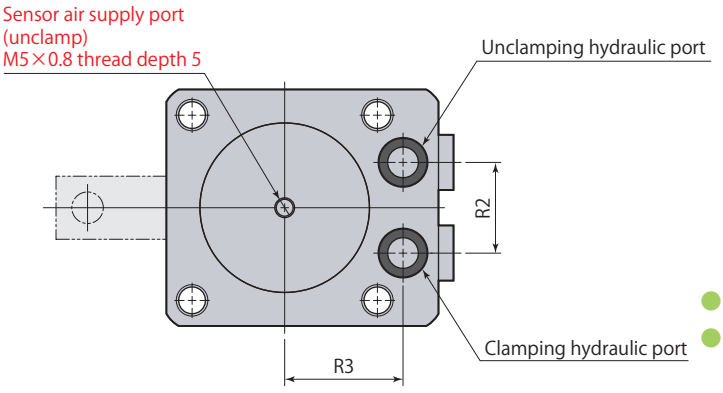




Clamp

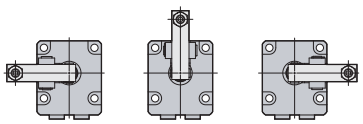


Unclamp



- This diagram represents external contour of CLW□-FT. CLW□-LT and CLW□-RT differ only in terms of mounting direction of clamp arm and otherwise all dimensions are identical to those of CLW□-FT.

L:Left side F:Front side R:Right side



- Clamp arm and mounting screws are not included.
- Use a snap ring (B4) and a pin (øB2) when installing a clamp arm.

mm

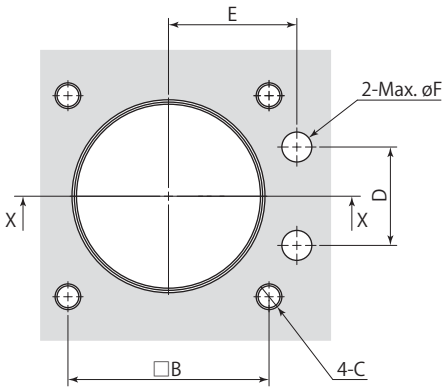
Model	CLW06-□T	CLW10-□T	CLW16-□T	CLW25-□T
A	114	127	155	182.5
B	60	70	86	108
C	69	77	96	110
D	39	42	53	56
E	30	35	43	54
F	47	54	65	85
øG	43 $^{-0.025}_{-0.050}$	48 $^{-0.025}_{-0.050}$	58 $^{-0.030}_{-0.060}$	66 $^{-0.030}_{-0.060}$
øGG	42.6	47.6	57.6	65.6
øH	14	18	22.4	28
K	42.5	46	55	61
KK	33	36.5	41.5	47.5
L	32	33.5	41	47
M	65.5	73	89	108.5
N	6	8	11	13
R1	15	15	17	21
R2	23	26	30	40
R3	30	33	40	43
S	13	17	21.8	27.5
øT	12	15	20	26
U (width across flats)	8	10	11	16
V	17	17	20	21
V1	15	19	25	32
V2	41.5	45	54.5	65
V3	30	35.5	44	53
V4	28	37	46	56
øW	6.8	9	11	14
W1	M8×1.25	M10×1.5	M12×1.75	M16×2
øX	12	15	18.5	20.5
Y1	G1/8	G1/8	G1/4	G1/4
Y2	3.8	3.8	4.8	4.8
øY3	14	14	19	19
Z	C2.5	C3	C3.5	C5.5
øB1	8 $^{-0.013}_{-0.028}$	10 $^{-0.013}_{-0.028}$	14 $^{-0.016}_{-0.034}$	16 $^{-0.016}_{-0.034}$
øB2	6 $^{-0.010}_{-0.022}$	8 $^{-0.013}_{-0.028}$	12 $^{-0.016}_{-0.034}$	14 $^{-0.016}_{-0.034}$
B3 (snap ring)*1	STW-8	STW-10	STW-14	STW-16
B4 (snap ring)*1	STW-6	STW-8	STW-12	STW-14
CA	59.5	65	80	96
CB	71.7	78.7	98.2	133.5
CC	107.9	117.4	144.7	189.2
CD	About 70°	About 70°	About 69°	About 72°
HA	16	19	22	32
HG	21	24.5	30.5	37.5
O-ring FA (FKM-90)	P9	P9	P9	P9
O-ring FB (FKM-70)	AS568-030	AS568-031	AS568-035	AS568-037
O-ring FC (FKM-70)	AS568-029	AS568-031	AS568-034	AS568-036
Flow control valve (meter-in)*2	VCH01	VCH01	VCH02	VCH02
Air bleeding valve*2	VCE01	VCE01	VCE02	VCE02

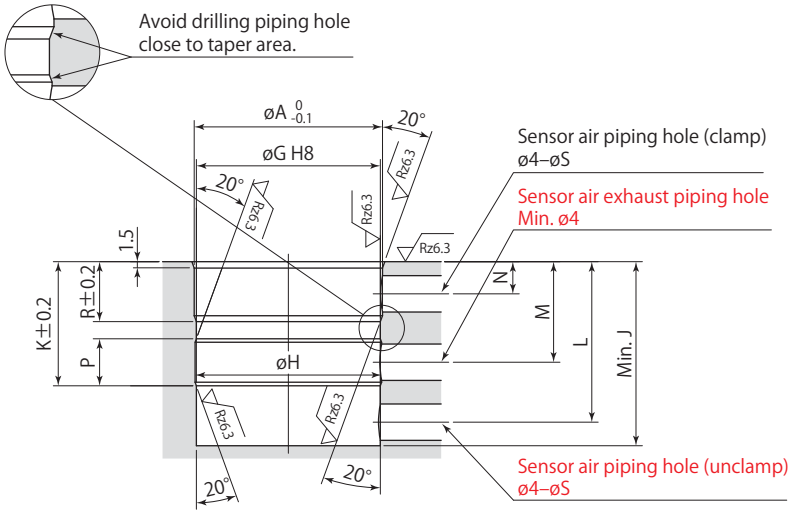
∗1：Snap ring is made by Ochiai Corporation.

∗2：Select the right model of VCH and VCE according to the size of the clamp.

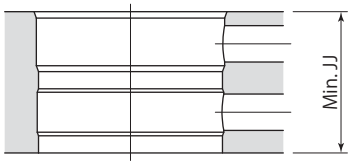
Refer to each page for the details of options. ● Flow control valve **page →76** ● Air bleeding valve **page →78**

Mounting details





In blind hole X-X



In through hole X-X

Rz: ISO4287(1997)

- The position of sensor air port and taper angle are differernt from that of model CLW04-□T.
- Apply an appropriate amount of grease to the chamfer and the bore when mounting.
  Excessive grease may be a blockage in the air passage, causing malfunction of the sensor.
- The 20° taper machining must be provided to avoid the damage of the O-ring.
  Ensure that there are no interference on taper area when drilling the hole for sensor air.

Mounting details

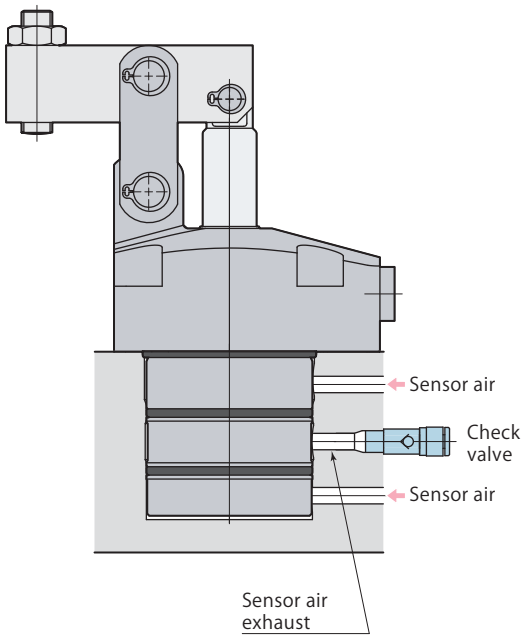
mm

Model	CLW06-□T	CLW10-□T	CLW16-□T	CLW25-□T
øA	44	49	59	67
B	47	54	65	85
C	M6	M8	M10	M12
D	23	26	30	40
E	30	33	40	43
øF	7	7	7	7
øG	$43^{+0.039}_{0}$	$48^{+0.039}_{0}$	$58^{+0.046}_{0}$	$66^{+0.046}_{0}$
H	43.6	48.6	58.6	66.6
J	43	46.5	55.5	61.5
JJ	33	36.5	41.5	47.5
K	29	32.5	37.5	43.5
L	37.5	41	48	54
M	23.5	26	30	34.5
N	7.5	8.5	10	11.5
P	11	13	15	18
R	14	15.5	18.5	21.5
øS	8.5	8.5	12.5	12.5

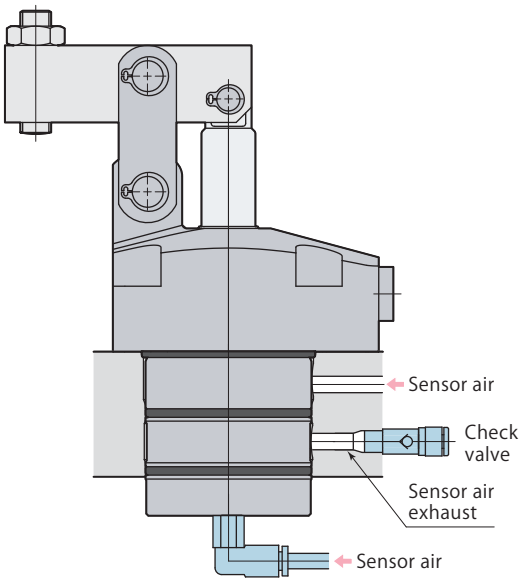
Caution for piping

Refer to the diagram shown below for the sensor air exhaust port.

Mounting in blind hole



Mounting in through hole

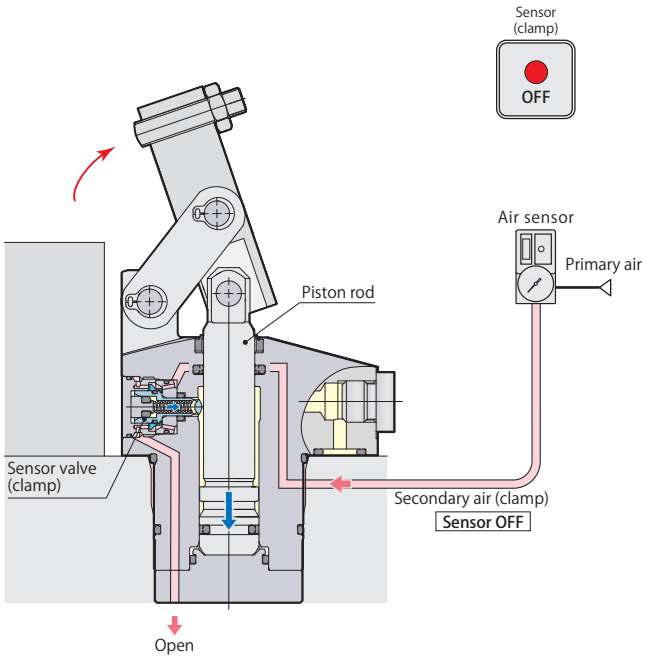


- Use a check valve with cracking pressure of 0.005 MPa or less if there is a risk of metal chips or coolant intrusion. Recommended check valve : AKH or AKB series manufactured by SMC.

Clamp, Over clamp stroke detection signal

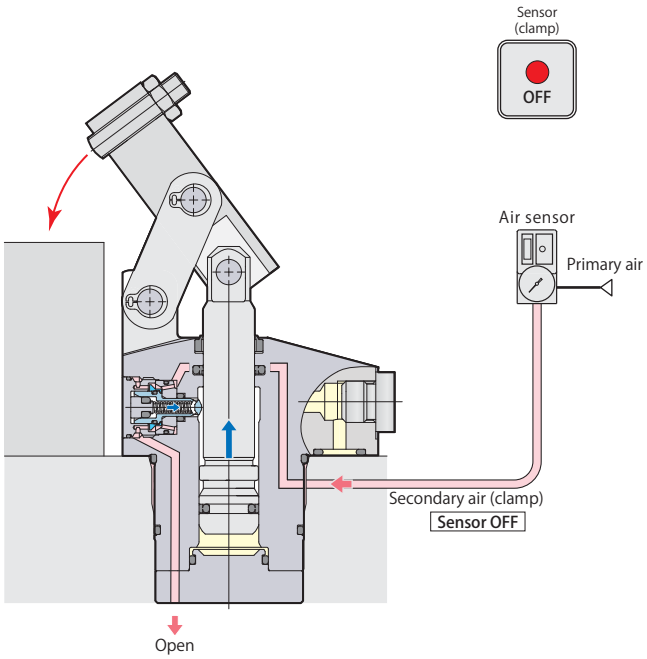
CLW04-□C

Unclamp



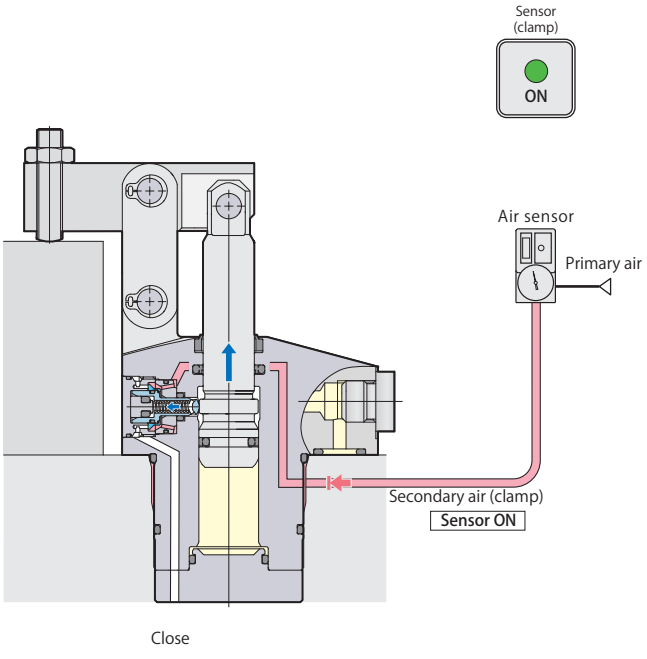
Sensor signal (clamp)	OFF	Unclamp

In the middle of clamp stroke



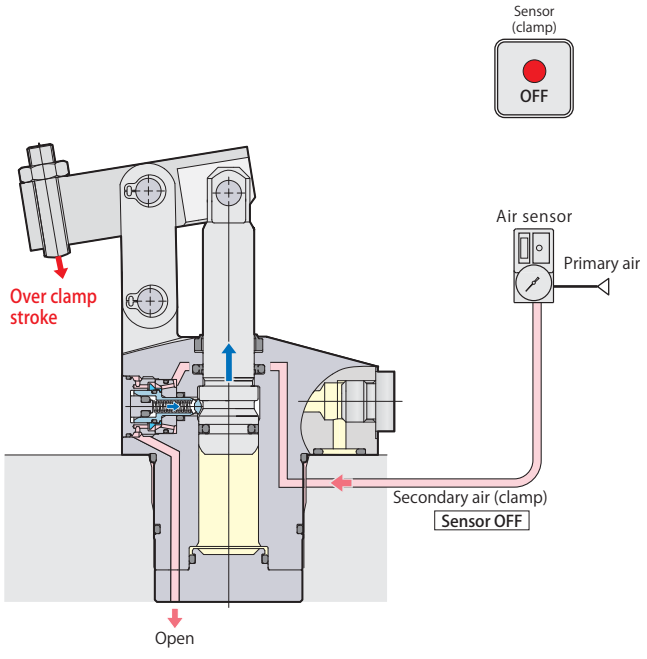
Sensor signal (clamp)	OFF	In the middle of clamp stroke

Clamp detection



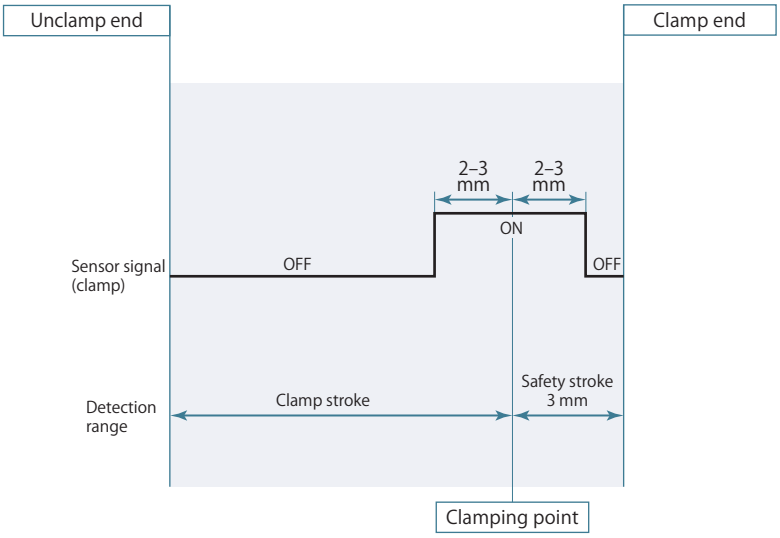
Sensor signal (clamp)	ON	Clamp

Over clamp stroke (Incomplete clamp) detection



Sensor signal (clamp)	OFF	Over clamp stroke (Incomplete clamp)

Air sensor triggering point



- Refer to the sensor supplier's instruction manual for the details of setting.
- Sensing performance such as detectable time and pressure differs depending on the supplier and model number of the sensor. Select the right model referring to sensor's application and characteristics.

Air sensor unit recommended condition of use

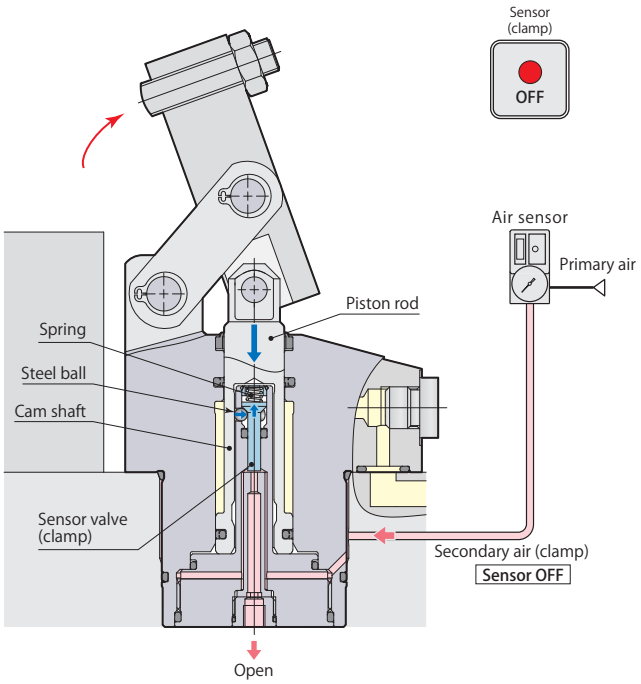
Supplier and model	ISA3-F/G series manufactured by SMC
	GPS2-05, GPS3-E series manufactured by CKD
Air supply pressure	0.1–0.2 MPa
Inner diameter of piping	ø4 mm (ISA3-F：ø2.5 mm)
Overall piping length	5 m or less

- Supply the dry and filtered air. Particulate size 5 μm or less is recommended.
- Use a solenoid valve with needle for air sensor unit and control it supplying air all the time in order to eliminate intrusion of chips or coolant.
- There is a case that air sensing cannot be successfully made as designed when it is used out of the above usage. Contact Technical service center for more details.

Clamp, Over clamp stroke detection signal

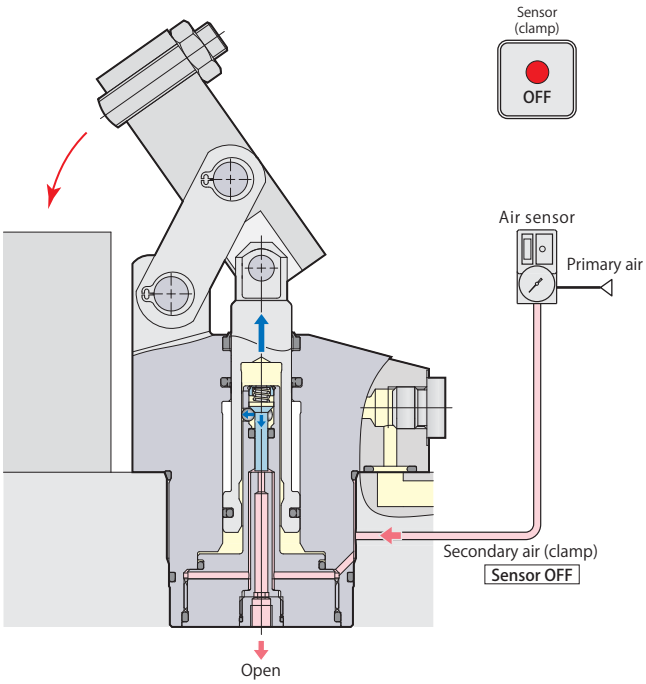
CLW06/10/16/25-□C

Unclamp



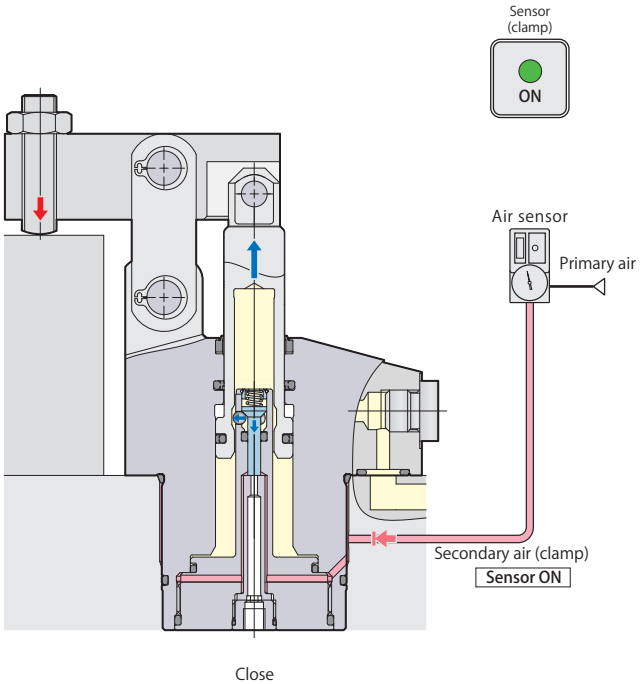
Sensor signal (clamp)	OFF	Unclamp

In the middle of clamp stroke



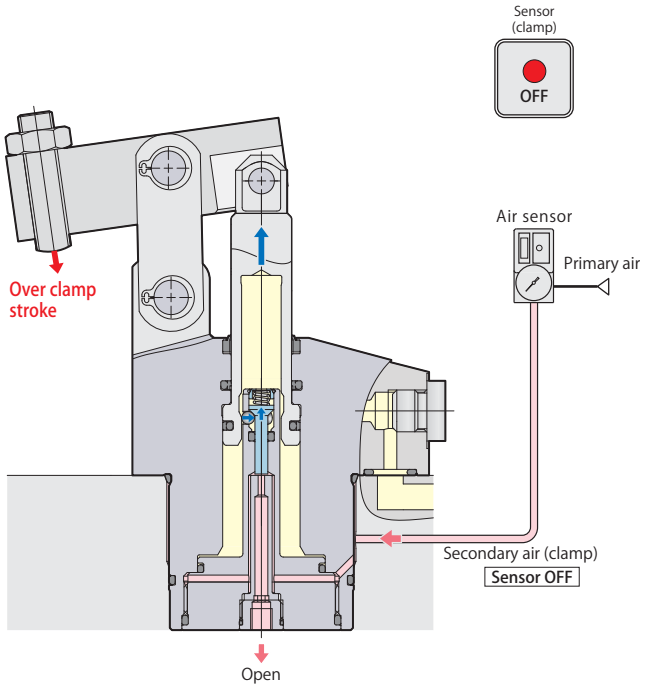
Sensor signal (clamp)	OFF	In the middle of clamp stroke

Clamp detection



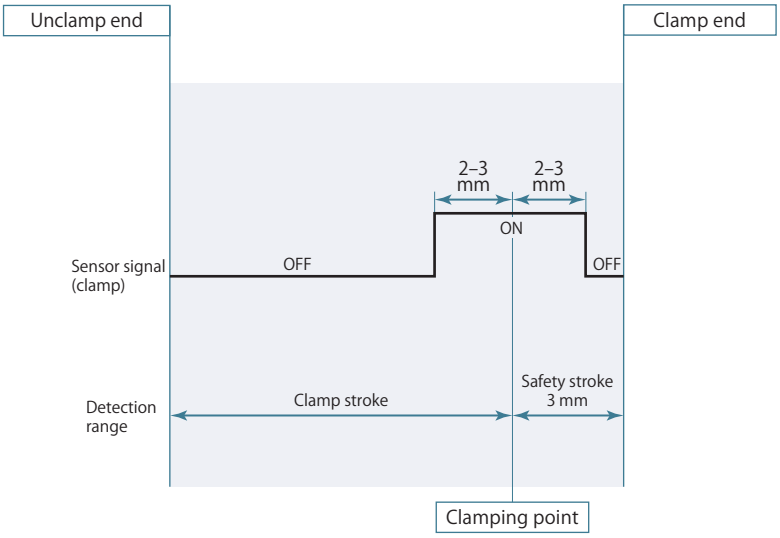
Sensor signal (clamp)	ON	Clamp

Over clamp stroke (Incomplete clamp) detection



Sensor signal (clamp)	OFF	Over clamp stroke (Incomplete clamp)

Air sensor triggering point



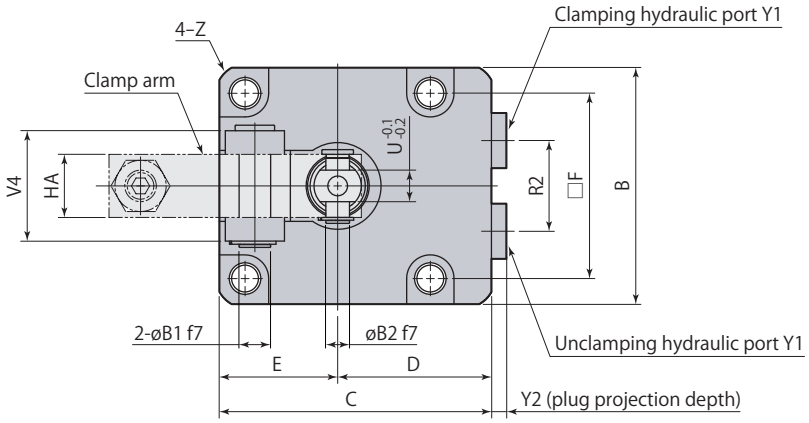
- Refer to the sensor supplier's instruction manual for the details of setting.
- Sensing performance such as detectable time and pressure differs depending on the supplier and model number of the sensor. Select the right model referring to sensor's application and characteristics.

Air sensor unit recommended condition of use

Supplier and model	ISA3-F/G series manufactured by SMC
	GPS2-05, GPS3-E series manufactured by CKD
Air supply pressure	0.1–0.2 MPa
Inner diameter of piping	ø4 mm (ISA3-F：ø2.5 mm)
Overall piping length	5 m or less

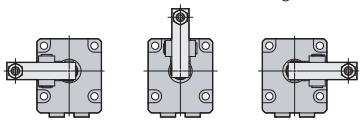
- Supply the dry and filtered air. Particulate size 5 μm or less is recommended.
- Use a solenoid valve with needle for air sensor unit and control it supplying air all the time in order to eliminate intrusion of chips or coolant.
- There is a case that air sensing cannot be successfully made as designed when it is used out of the above usage. Contact Technical service center for more details.

Dimensions

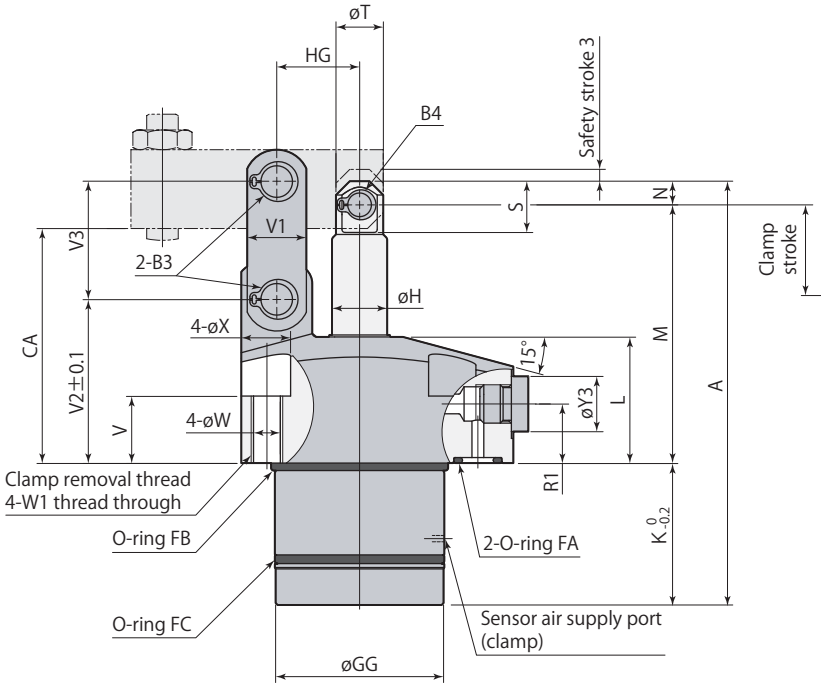


- This diagram represents external contour of CLW□-FC. CLW□-LC and CLW□-RC differ only in terms of mounting direction of clamp arm and otherwise all dimensions are identical to those of CLW□-FC.

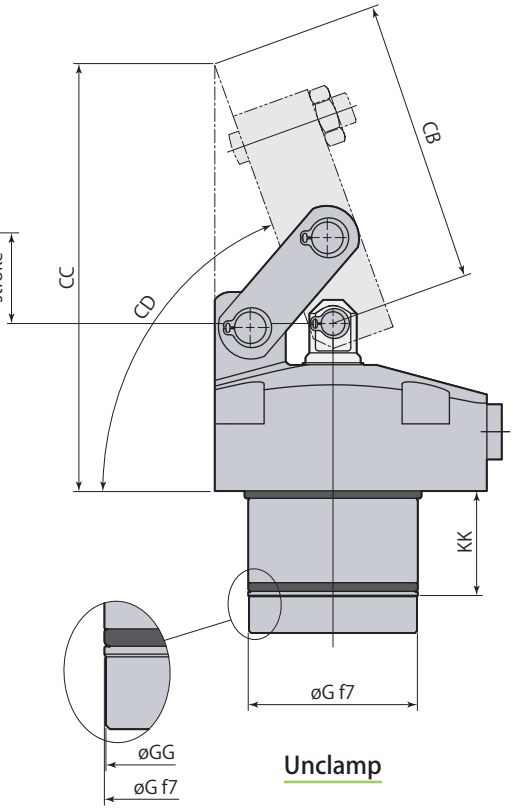
L:Left side F:Front side R:Right side



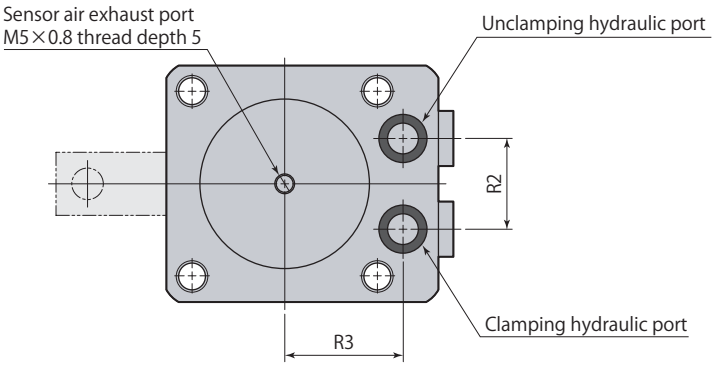
- Clamp arm and mounting screws are not included.
- Use a snap ring (B4) and a pin (øB2) when installing a clamp arm.



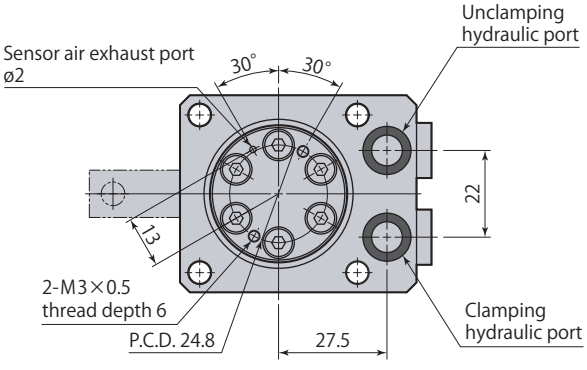
Clamp



Unclamp



CLW06/10/16/25-□C



CLW04-□C

mm

Model	CLW04-□C	CLW06-□C	CLW10-□C	CLW16-□C	CLW25-□C
A	99	107.5	120.5	148.5	176.5
B	50	60	70	86	108
C	60	69	77	96	110
D	35	39	42	53	56
E	25	30	35	43	54
F	40	47	54	65	85
øG	$35^{-0.025}_{-0.050}$	$43^{-0.025}_{-0.050}$	$48^{-0.025}_{-0.050}$	$58^{-0.030}_{-0.060}$	$66^{-0.030}_{-0.060}$
øGG	34.6	42.6	47.6	57.6	65.6
øH	12	14	18	22.4	28
K	34.5	36	39.5	48.5	55
KK	19.5	26.5	30	35	41.5
L	27.7	32	33.5	41	47
M	58.5	65.5	73	89	108.5
N	6	6	8	11	13
R1	12.5	15	15	17	21
R2	22	23	26	30	40
R3	27.5	30	33	40	43
S	13	13	17	21.8	27.5
øT	10	12	15	20	26
U (width across flats)	6	8	10	11	16
V	17	17	17	20	21
V1	13	15	19	25	32
V2	36	41.5	45	54.5	65
V3	26	30	35.5	44	53
V4	21	28	37	46	56
øW	5.5	6.8	9	11	14
W1	M6x1	M8×1.25	M10×1.5	M12×1.75	M16×2
øX	10	12	15	18.5	20.5
Y1	G1/8	G1/8	G1/8	G1/4	G1/4
Y2	3.8	3.8	3.8	4.8	4.8
øY3	14	14	14	19	19
Z	C2.5	C2.5	C3	C3.5	C5.5
øB1	$6^{-0.010}_{-0.022}$	$8^{-0.013}_{-0.028}$	$10^{-0.013}_{-0.028}$	$14^{-0.016}_{-0.034}$	$16^{-0.016}_{-0.034}$
øB2	$6^{-0.010}_{-0.022}$	$6^{-0.010}_{-0.022}$	$8^{-0.013}_{-0.028}$	$12^{-0.016}_{-0.034}$	$14^{-0.016}_{-0.034}$
B3 (snap ring)*1	STW-6	STW-8	STW-10	STW-14	STW-16
B4 (snap ring)*1	STW-6	STW-6	STW-8	STW-12	STW-14
CA	52.5	59.5	65	80	96
CB	59.6	71.7	78.7	98.2	133.5
CC	92.5	107.9	117.4	144.7	189.2
CD	About 71°	About 70°	About 70°	About 69°	About 72°
HA	12	16	19	22	32
HG	18.5	21	24.5	30.5	37.5
O-ring FA (FKM-90)	P9	P9	P9	P9	P9
O-ring FB (FKM-70)	AS568-026	AS568-030	AS568-031	AS568-035	AS568-037
O-ring FC (FKM-70)	AS568-025	AS568-029	AS568-031	AS568-034	AS568-036
Flow control valve (meter-in)*2	VCH01	VCH01	VCH01	VCH02	VCH02
Air bleeding valve*2	VCE01	VCE01	VCE01	VCE02	VCE02

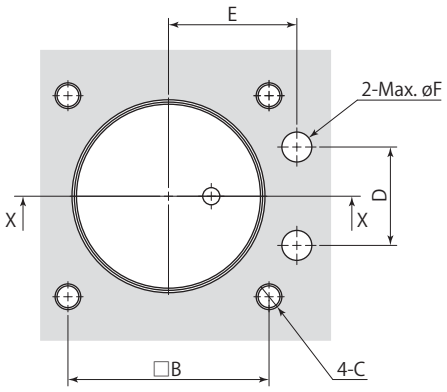
∗1：Snap ring is made by Ochiai Corporation.

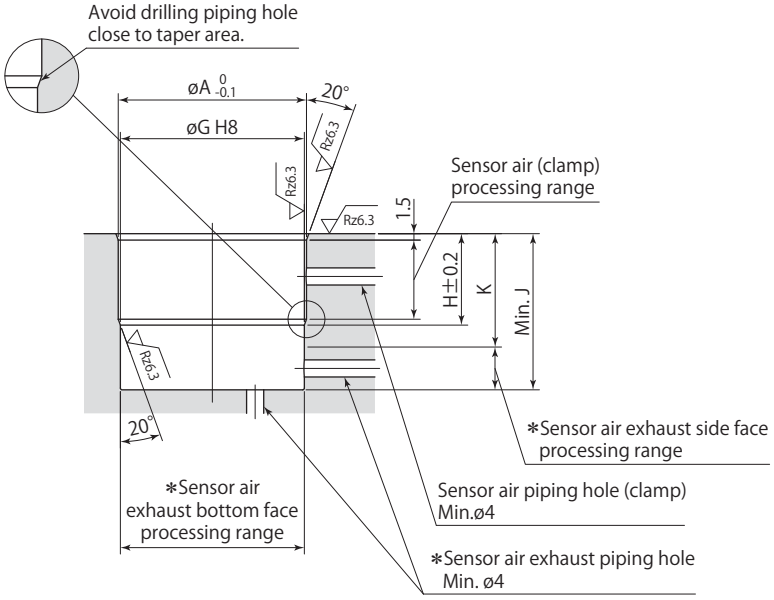
∗2：Select the right model of VCH and VCE according to the size of the clamp.

Refer to each page for the details of options. ● Flow control valve **page →76** ● Air bleeding valve **page →78**

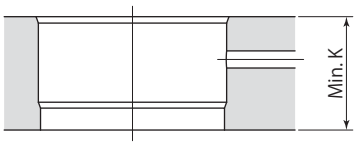
● The outer shape is identical with CLW□-□B (Unclamp sensor model).

Mounting details





In blind hole X-X



In through hole X-X

*: Sensor air exhaust piping hole must be made on either side or bottom face.

Rz: ISO4287(1997)

- Apply an appropriate amount of grease to the chamfer and the bore when mounting.
  Excessive grease may be a blockage in the air passage, causing malfunction of the sensor.
- The 20° taper machining must be provided to avoid the damage of the O-ring.
  Ensure that there are no interference on taper area when drilling the hole for sensor air.
- The outer shape is identical with CLW□-□B (Unclamp sensor model).

Mounting details

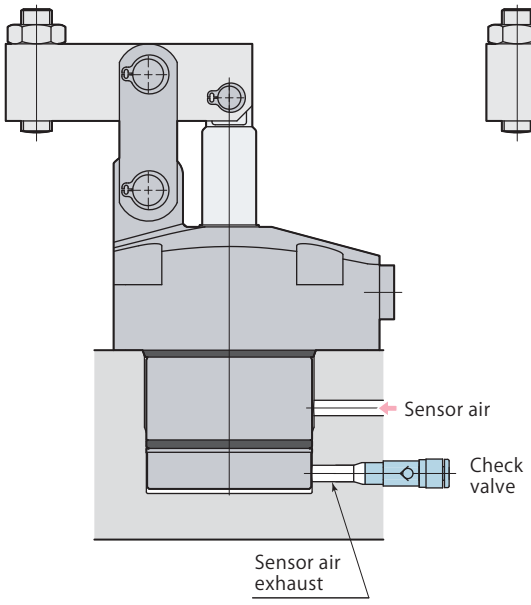
mm

Model	CLW04-□C	CLW06-□C	CLW10-□C	CLW16-□C	CLW25-□C
øA	36	44	49	59	67
B	40	47	54	65	85
C	M5	M6	M8	M10	M12
D	22	23	26	30	40
E	27.5	30	33	40	43
øF	7	7	7	7	7
øG	$35^{+0.039}_{0}$	$43^{+0.039}_{0}$	$48^{+0.039}_{0}$	$58^{+0.046}_{0}$	$66^{+0.046}_{0}$
H	15.5	21	24	29	36
J	35	36.5	40	49	55.5
K	19.5	26.5	30	35	41.5

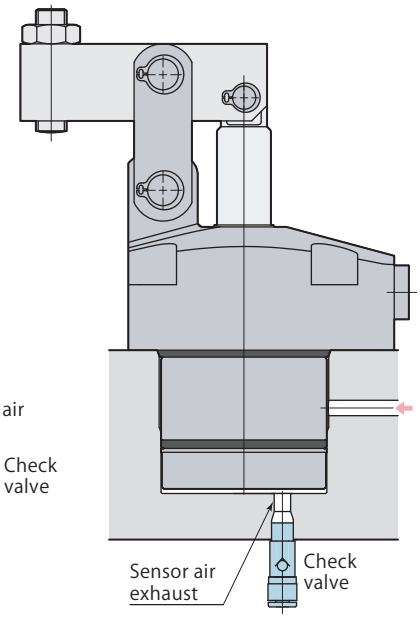
Caution for piping

Refer to the diagram shown below for the sensor air exhaust port.

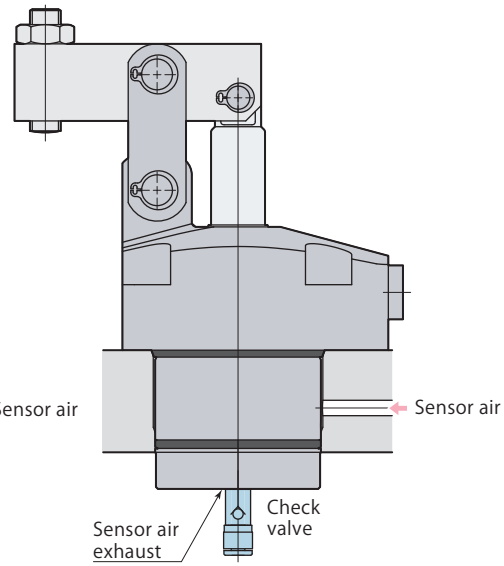
Mounting in blind hole
(Sensor air exhaust : side face)



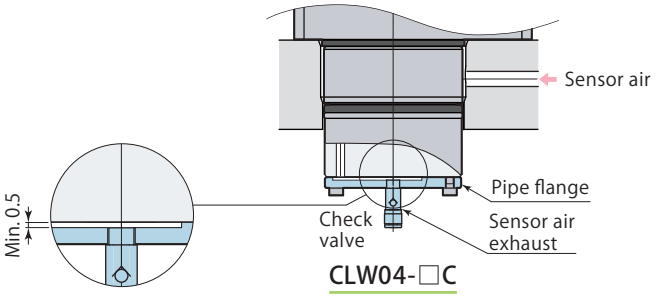
Mounting in blind hole
(Sensor air exhaust : bottom face)



Mounting in through hole



CLW06/10/16/25-□C



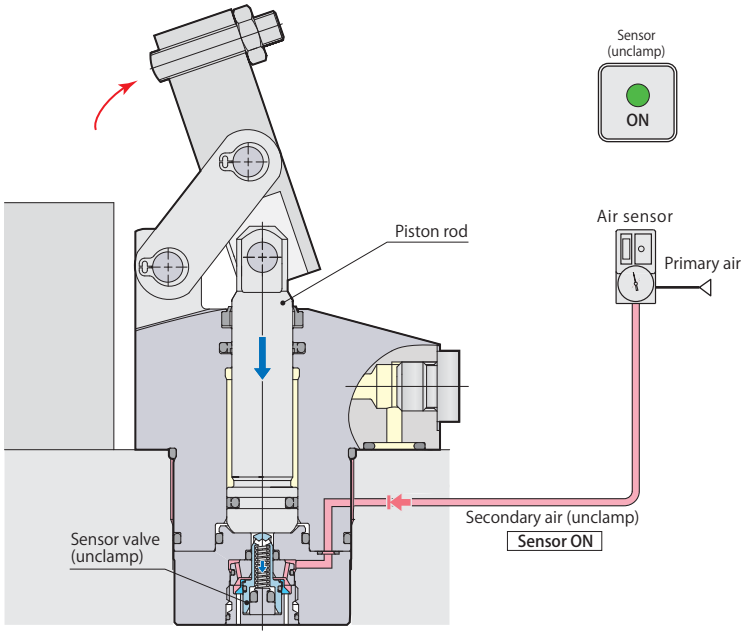
CLW04-□C

- Use a check valve with cracking pressure of 0.005 MPa or less if there is a risk of metal chips or coolant intrusion. Recommended check valve : AKH or AKB series manufactured by SMC.
- Furnish the piping by means of the pipe flange when mounting in a through hole. The flange is mountable with M3 threads at the bottom of the clamp. Be sure to provide an opening not to cover the exhaust port. See the sketch shown above. (For model CLW04-□C)

Unclamp detection signal

CLW04-□B

Unclamp detection

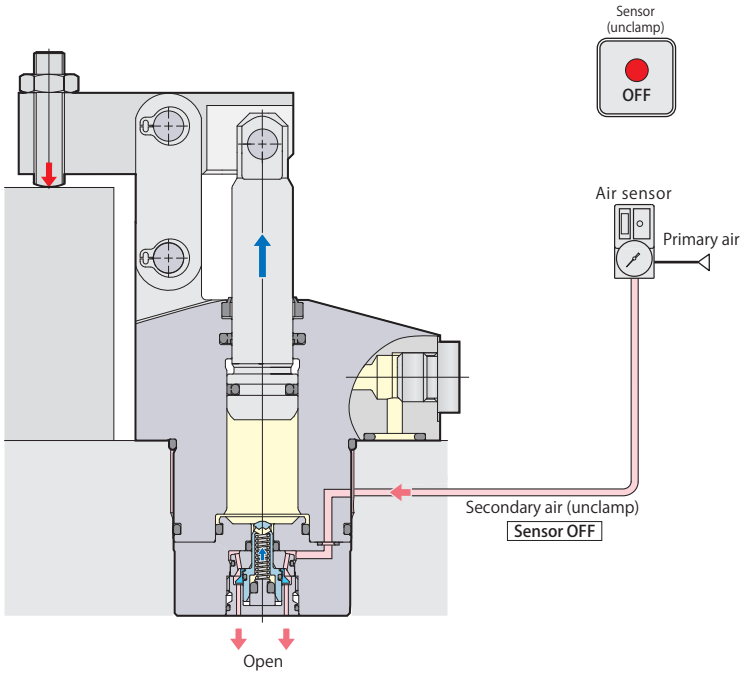


Close

The sensor may not work correctly when the cylinder is not pressurized by hydraulic force because the piston of the clamp moves under such environment. Keep supplying hydraulic force the cylinder all the times.

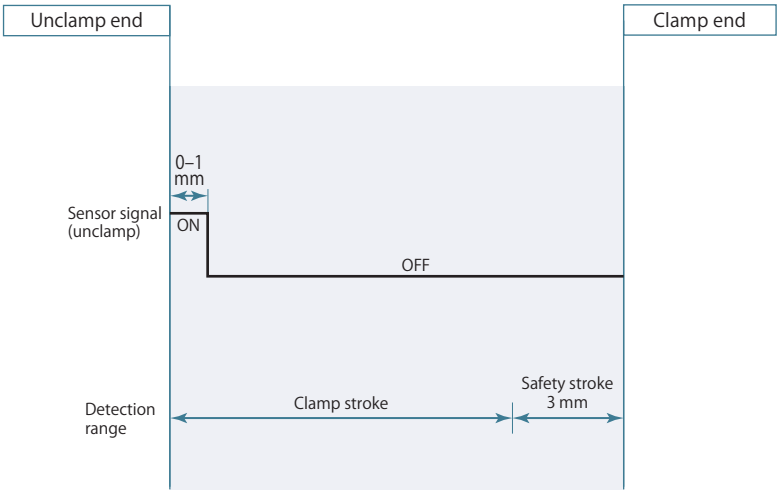
Sensor signal (unclamp)	ON	Unclamp

In the middle of clamp stroke



Sensor signal (unclamp)	OFF	Clamp, in the middle of clamp stroke

Air sensor triggering point



- Refer to the sensor supplier's instruction manual for the details of setting.
- Sensing performance such as detectable time and pressure differs depending on the supplier and model number of the sensor. Select the right model referring to sensor's application and characteristics.

Air sensor unit recommended condition of use

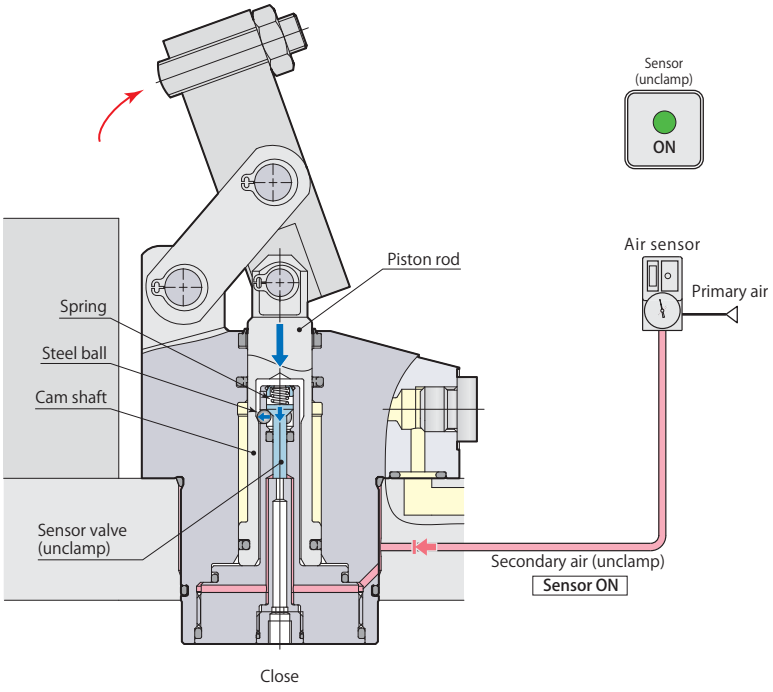
Supplier and model	ISA3-F/G series manufactured by SMC
	GPS2-05, GPS3-E series manufactured by CKD
Air supply pressure	0.1–0.2 MPa
Inner diameter of piping	ø4 mm (ISA3-F：ø2.5 mm)
Overall piping length	5 m or less

- Supply the dry and filtered air. Particulate size 5 μm or less is recommended.
- Use a solenoid valve with needle for air sensor unit and control it supplying air all the time in order to eliminate intrusion of chips or coolant.
- There is a case that air sensing cannot be successfully made as designed when it is used out of the above usage. Contact Technical service center for more details.

Unclamp detection signal

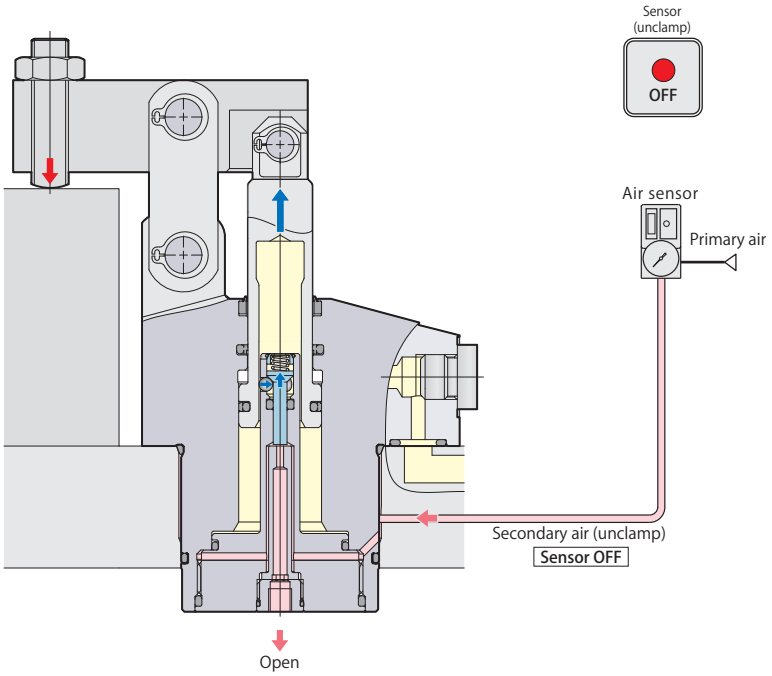
CLW06/10/16/25-□B

Unclamp detection



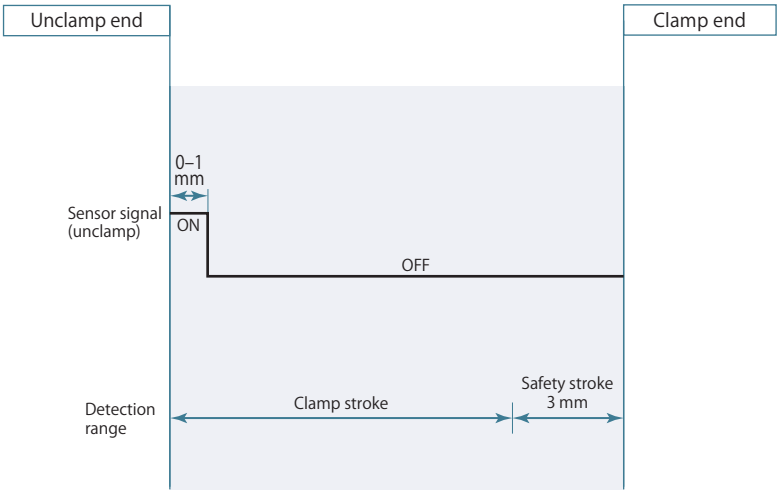
Sensor signal (unclamp)	ON	Unclamp

In the middle of clamp stroke



Sensor signal (unclamp)	OFF	Clamp, in the middle of clamp stroke

Air sensor triggering point



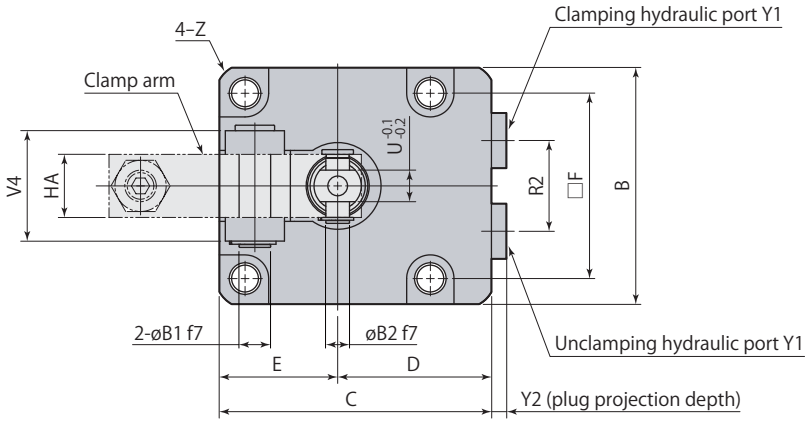
- Refer to the sensor supplier's instruction manual for the details of setting.
- Sensing performance such as detectable time and pressure differs depending on the supplier and model number of the sensor. Select the right model referring to sensor's application and characteristics.

Air sensor unit recommended condition of use

Supplier and model	ISA3-F/G series manufactured by SMC
	GPS2-05, GPS3-E series manufactured by CKD
Air supply pressure	0.1–0.2 MPa
Inner diameter of piping	ø4 mm (ISA3-F：ø2.5 mm)
Overall piping length	5 m or less

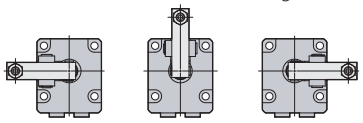
- Supply the dry and filtered air. Particulate size 5 μm or less is recommended.
- Use a solenoid valve with needle for air sensor unit and control it supplying air all the time in order to eliminate intrusion of chips or coolant.
- There is a case that air sensing cannot be successfully made as designed when it is used out of the above usage. Contact Technical service center for more details.

Dimensions

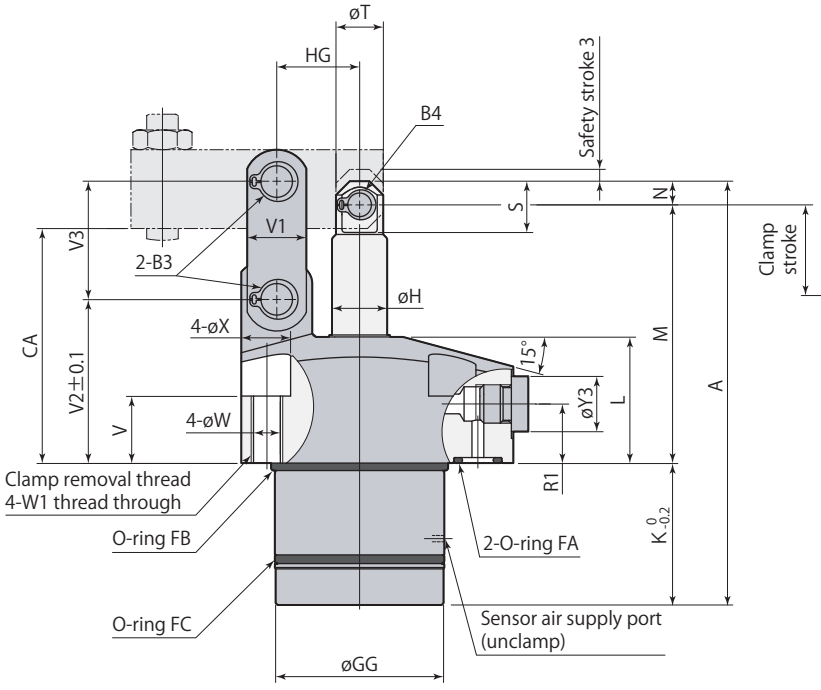


- This diagram represents external contour of CLW□-FB. CLW□-LB and CLW□-RB differ only in terms of mounting direction of clamp arm and otherwise all dimensions are identical to those of CLW□-FB.

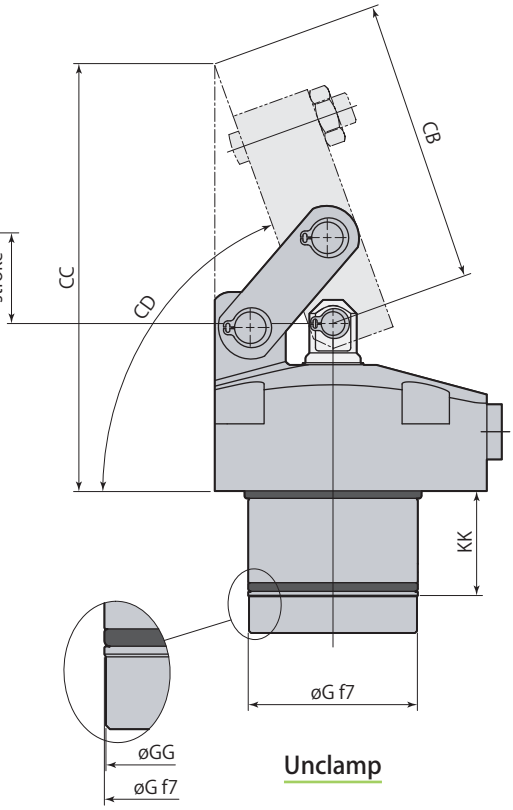
L:Left side F:Front side R:Right side



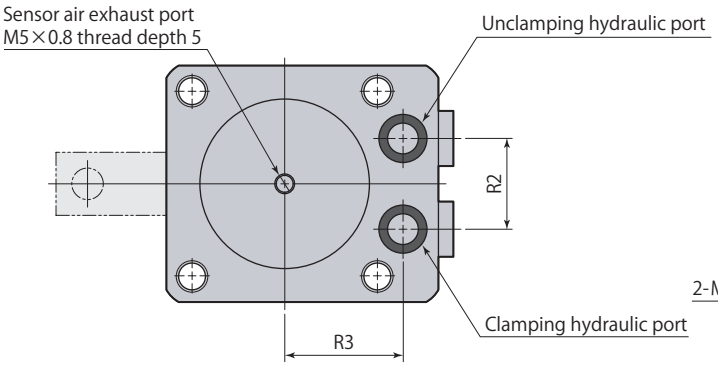
- Clamp arm and mounting screws are not included.
- Use a snap ring (B4) and a pin (øB2) when installing a clamp arm.



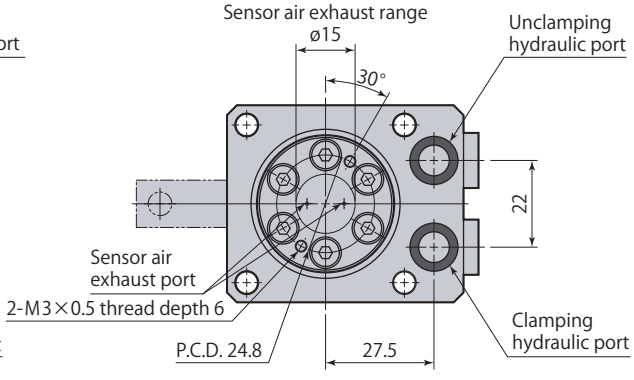
Clamp



Unclamp



CLW06/10/16/25-□B



CLW04-□B

CLW□-□B	Link clamp　Unclamp sensor model	25MPa	Double acting

mm

Model	CLW04-□B	CLW06-□B	CLW10-□B	CLW16-□B	CLW25-□B
A	99	107.5	120.5	148.5	176.5
B	50	60	70	86	108
C	60	69	77	96	110
D	35	39	42	53	56
E	25	30	35	43	54
F	40	47	54	65	85
øG	$35^{-0.025}_{-0.050}$	$43^{-0.025}_{-0.050}$	$48^{-0.025}_{-0.050}$	$58^{-0.030}_{-0.060}$	$66^{-0.030}_{-0.060}$
øGG	34.6	42.6	47.6	57.6	65.6
øH	12	14	18	22.4	28
K	34.5	36	39.5	48.5	55
KK	19.5	26.5	30	35	41.5
L	27.7	32	33.5	41	47
M	58.5	65.5	73	89	108.5
N	6	6	8	11	13
R1	12.5	15	15	17	21
R2	22	23	26	30	40
R3	27.5	30	33	40	43
S	13	13	17	21.8	27.5
øT	10	12	15	20	26
U (width across flats)	6	8	10	11	16
V	17	17	17	20	21
V1	13	15	19	25	32
V2	36	41.5	45	54.5	65
V3	26	30	35.5	44	53
V4	21	28	37	46	56
øW	5.5	6.8	9	11	14
W1	M6x1	M8×1.25	M10×1.5	M12×1.75	M16×2
øX	10	12	15	18.5	20.5
Y1	G1/8	G1/8	G1/8	G1/4	G1/4
Y2	3.8	3.8	3.8	4.8	4.8
øY3	14	14	14	19	19
Z	C2.5	C2.5	C3	C3.5	C5.5
øB1	$6^{-0.010}_{-0.022}$	$8^{-0.013}_{-0.028}$	$10^{-0.013}_{-0.028}$	$14^{-0.016}_{-0.034}$	$16^{-0.016}_{-0.034}$
øB2	$6^{-0.010}_{-0.022}$	$6^{-0.010}_{-0.022}$	$8^{-0.013}_{-0.028}$	$12^{-0.016}_{-0.034}$	$14^{-0.016}_{-0.034}$
B3 (snap ring)*1	STW-6	STW-8	STW-10	STW-14	STW-16
B4 (snap ring)*1	STW-6	STW-6	STW-8	STW-12	STW-14
CA	52.5	59.5	65	80	96
CB	59.6	71.7	78.7	98.2	133.5
CC	92.5	107.9	117.4	144.7	189.2
CD	About 71°	About 70°	About 70°	About 69°	About 72°
HA	12	16	19	22	32
HG	18.5	21	24.5	30.5	37.5
O-ring FA (FKM-90)	P9	P9	P9	P9	P9
O-ring FB (FKM-70)	AS568-026	AS568-030	AS568-031	AS568-035	AS568-037
O-ring FC (FKM-70)	AS568-025	AS568-029	AS568-031	AS568-034	AS568-036
Flow control valve (meter-in)*2	VCH01	VCH01	VCH01	VCH02	VCH02
Air bleeding valve*2	VCE01	VCE01	VCE01	VCE02	VCE02

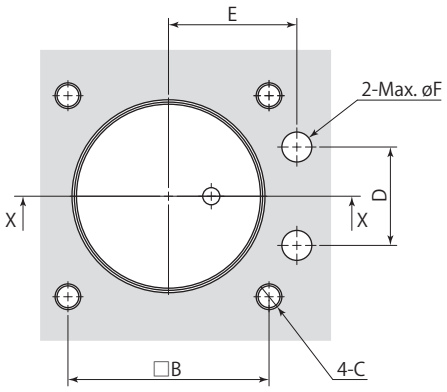
∗1：Snap ring is made by Ochiai Corporation.

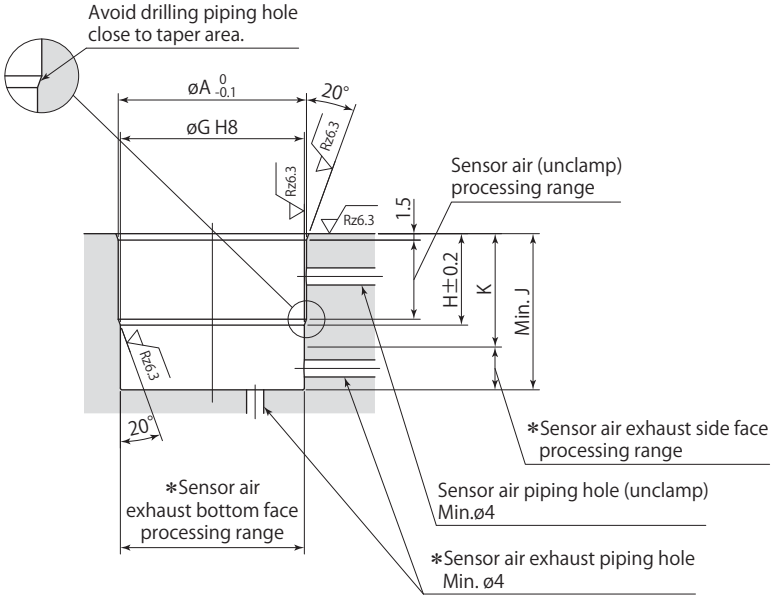
∗2：Select the right model of VCH and VCE according to the size of the clamp.

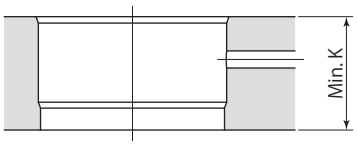
Refer to each page for the details of options.　● Flow control valve **page →76**　● Air bleeding valve **page →78**

● The outer shape is identical with CLW□-□C (Clamp sensor model).

Mounting details







In through hole X-X

In blind hole X-X

Rz: ISO4287(1997)

*: Sensor air exhaust piping hole must be made on either side or bottom face.

- Apply an appropriate amount of grease to the chamfer and the bore when mounting.
  Excessive grease may be a blockage in the air passage, causing malfunction of the sensor.
- The 20° taper machining must be provided to avoid the damage of the O-ring.
  Ensure that there are no interference on taper area when drilling the hole for sensor air.
- The outer shape is identical with CLW□-□C (Clamp sensor model).

Mounting details

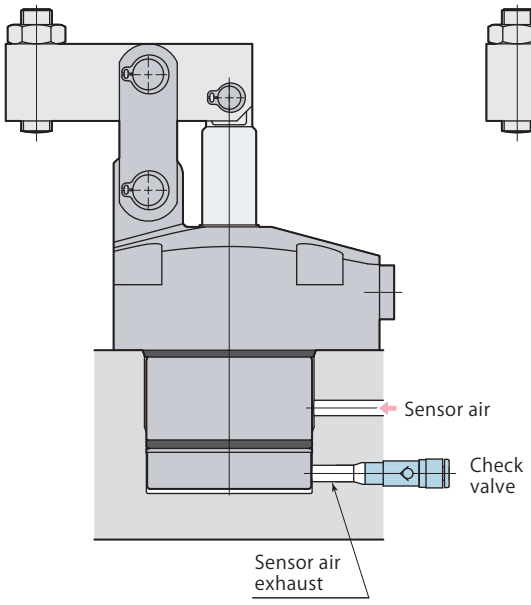
mm

Model	CLW04-□B	CLW06-□B	CLW10-□B	CLW16-□B	CLW25-□B
øA	36	44	49	59	67
B	40	47	54	65	85
C	M5	M6	M8	M10	M12
D	22	23	26	30	40
E	27.5	30	33	40	43
øF	7	7	7	7	7
øG	$35^{+0.039}_{0}$	$43^{+0.039}_{0}$	$48^{+0.039}_{0}$	$58^{+0.046}_{0}$	$66^{+0.046}_{0}$
H	15.5	21	24	29	36
J	35	36.5	40	49	55.5
K	19.5	26.5	30	35	41.5

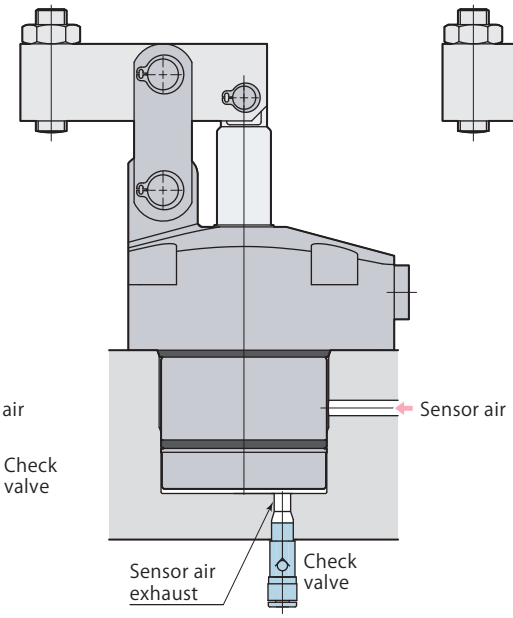
Caution for piping

Refer to the diagram shown below for the sensor air exhaust port.

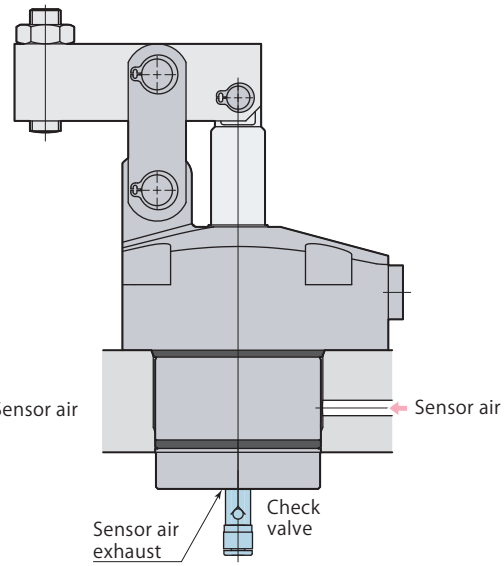
Mounting in blind hole
(Sensor air exhaust：side face)



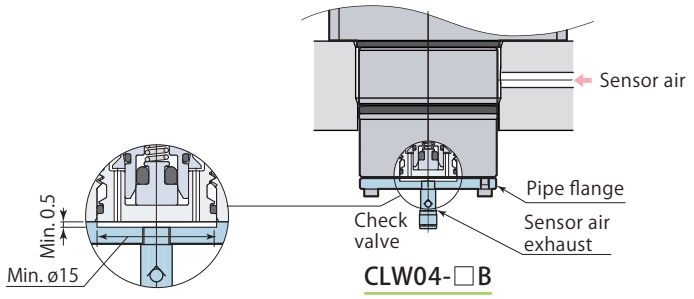
Mounting in blind hole
(Sensor air exhaust：bottom face)



Mounting in through hole



CLW06/10/16/25-□B

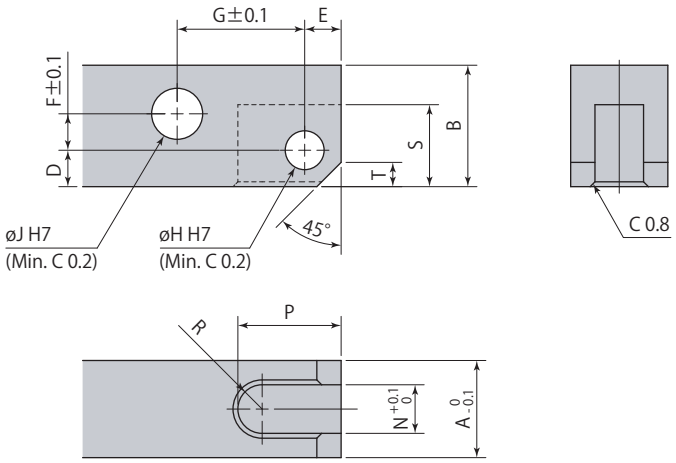


CLW04-□B

- Use a check valve with cracking pressure of 0.005 MPa or less if there is a risk of metal chips or coolant intrusion. Recommended check valve : AKH or AKB series manufactured by SMC.
- Furnish the piping by means of the pipe flange when mounting in a through hole. The flange is mountable with M3 threads at the bottom of the clamp. Be sure to provide an opening not to cover the exhaust port. See the sketch shown above. (For model CLW04-□B)

Clamp arm mounting details

Clamp arm is not included. Manufacture a clamp arm with the dimensions shown in the table below.



Recommended material：S45C (HB167–229)

mm

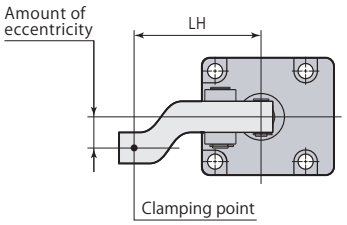
Link clamp	CLW04	CLW06	CLW10	CLW16	CLW25
A	12	16	19	22	32
B	16	20	25	31	38
D	6	6	8	9	12.5
E	6	6	7	10	13
F	3.5	6	7.5	9.5	9.5
G	18.5	21	24.5	30.5	37.5
øH	$6^{+0.012}_{0}$	$6^{+0.012}_{0}$	$8^{+0.015}_{0}$	$12^{+0.018}_{0}$	$14^{+0.018}_{0}$
øJ	$6^{+0.012}_{0}$	$8^{+0.015}_{0}$	$10^{+0.015}_{0}$	$14^{+0.018}_{0}$	$16^{+0.018}_{0}$
N	6	8	10	11	16
P	17	17	20	26.5	36
R	R3	R4	R5	R5.5	R8
S	13.5	13.5	17.5	22	28
T	4	4	5	7	8

● When mounting the clamp arm, use included pins and snap rings.

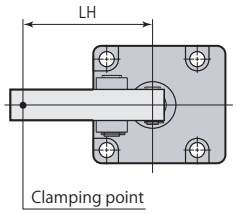
Clamp arm allowable eccentricity

An eccentric shape clamp arm, as shown in diagram on right can be used with link clamp model CLW, if it is not possible to set clamping point at tip section of clamp arm in alignment with center line of piston rod and clamp arm.
Amount of eccentricity, however, must be within allowable eccentricity shown below.
Using a clamp arm that exceeds allowable eccentricity results in significant eccentric load on link mechanism and piston rod, leading to malfunction.

Eccentric shape clamp arm



Ordinary clamp arm



model CLW04 — indicates nonusable range

Hydraulic pressure MPa	Allowable eccentricity mm / Clamp arm length LH mm								
	30	35	42	50	60	70	80	100	120
25			6	18	27	36	45	60	60
20		6	18	27	39	52	60	↑	↑
15	8	17	29	42	59	60	↑	↑	↑
10	19	32	51	60	60	↑	↑	↑	↑
6	41	60	60	60	60	60	60	60	60

model CLW06 — indicates nonusable range

Hydraulic pressure MPa	Allowable eccentricity mm / Clamp arm length LH mm								
	35	45	50	60	70	80	90	100	120
35			8	8	8	8	8	8	8
30		8	8	8	8	8	8	8	8
25		8	8	8	8	8	8	8	8
20	10	20	23	28	33	38	44	49	60
15	19	43	50	65	80	80	80	80	80
10	37	74	80	80	↑	↑	↑	↑	↑
5	80	80	80	80	80	80	80	80	80

model CLW10 — indicates nonusable range

Hydraulic pressure MPa	Allowable eccentricity mm / Clamp arm length LH mm								
	40	50	56.5	60	80	100	120	140	160
35			9	9	9	9	9	9	9
30		9	11	11	12	13	14	15	16
25		16	25	30	42	54	66	78	90
20	9	27	38	45	80	95	95	95	95
15	19	44	60	69	95	↑	↑	↑	↑
10	40	79	95	95	↑	↑	↑	↑	↑
5	95	95	95	95	95	95	95	95	95

model CLW16 — indicates nonusable range

Hydraulic pressure MPa	Allowable eccentricity mm / Clamp arm length LH mm								
	50	60	69.5	80	100	120	140	160	180
35			11	11	13	24	34	45	56
30		11	11	16	32	48	65	81	96
25		12	23	35	59	83	107	110	110
20	11	29	46	64	99	110	110	↑	↑
15	30	57	83	110	110	↑	↑	↑	↑
10	67	110	110	↑	↑	↑	↑	↑	↑
5	110	110	110	110	110	110	110	110	110

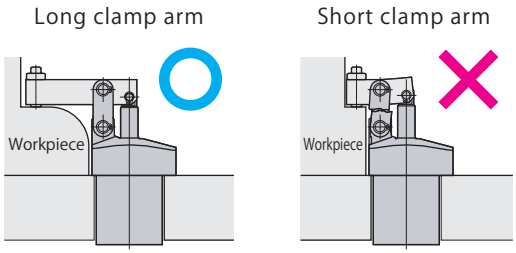
model CLW25 — indicates nonusable range

Hydraulic pressure MPa	Allowable eccentricity mm / Clamp arm length LH mm								
	60	65	87.5	100	120	140	160	180	200
35			21	27	30	34	37	41	44
30			31	46	70	83	97	110	123
25		16	46	65	95	125	154	160	160
20	16	25	68	92	131	160	160	↑	↑
15	32	45	105	139	160	↑	↑	↑	↑
10	65	86	160	160	↑	↑	↑	↑	↑
5	160	160	160	160	160	160	160	160	160

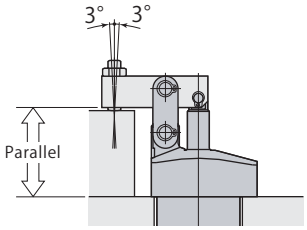
- Applicable hydraulic pressure range:
  6 to 25MPa for model CLW-T, CLW04-C/B
  5 to 35MPa for model CLW06-C/B, CLW10-C/B, CLW16-C/B and CLW25-C/B

Caution in use

- With link clamps, force acting on link mechanism becomes larger as clamp arm becomes shorter. Exceeding maximum allowable load for link mechanism will lead to malfunction. Depending on clamp arm length, it would be necessary to lower clamping force (hydraulic pressure). Use a clamp at appropriate clamping force that is suitable for clamp arm length, referring to performance diagram and table.



- Determine height and mount clamp, ensuring that clamp arm becomes parallel to clamping surface and mounting surface when workpiece is clamped (allowable angle ±3°).



- Using a method such as that shown in the diagram on the right will apply a transverse force on the piston rod and cause the piston rod to break. Please avoid the usage that may apply a non-axial force to the piston rod.