

7MPa Work clamping system

- CTU CTT CTJ
- CLU CLT
- CNA CMC CMD
- CSU CST CSN CSY CSK
- CEK CEA CVH
- VCB VCP VHD VRG VEF WPB WPC
- HCD HCS HCT X63 WRA WRB

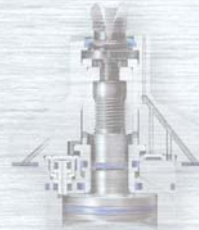
Refer to separate catalog for details.



Expansion clamp

- CGC
- CGT
- CGU
- CGE
- CGY

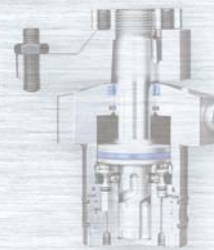
Refer to separate catalog for details.



7MPa Sensing clamp

- CTM
- CTN
- CLM
- CLN
- CNB

Refer to separate catalog for details.



Pal system

- CPC
- CPH
- CPY
- CPK
- WVP

Refer to separate catalog for details.



air Work clamping system

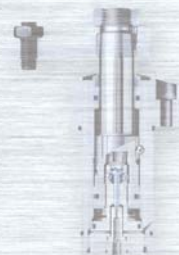
- CTX
- CTY
- CLX
- CLZ CLY
- CSS
- CSX



35MPa Work clamping system

- CTK CTW CTV
- CLW CLV
- CSW CSV
- WVP
- VCB VCP VHD VRG VEF WPC
- HCD HCS HCT X63

Refer to separate catalog for details.



Air
swing
clamp

Product lineup

Page → 3



Sensing
Air swing clamp
CTX-T
3 point sensor model

air
Double acting
Page → 7



Air swing clamp
CTX

air
Double acting
Page → 27



Air swing clamp
CTY
Dual cylinder model

air
Double acting
Page → 42



Speed controller
VCL

Option
Page → 56

Air
link
clamp

Product lineup

Page → 59



Sensing
Air link clamp
CLX-T
3 point sensor model

air
Double acting
Page → 63



Air link clamp
CLX

air
Double acting
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Air link clamp
CLZ
Dual cylinder model

air
Double acting
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Air link clamp
CLY
boost model

air
Double acting
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Speed controller
VCL

Option
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Air
work
support

Product lineup

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Air work support
CSS
Air lift

air
Page → 124



Air work support
CSX
Spring lift

air
Page → 125










<p style="text-align: center;">air Swing clamp</p>		<p>model CTX-T Page →4</p> 	<p>model CTX Page →24</p> 	<p>model CTY Page →40</p> 
		air Double acting	air Double acting	air Double acting
Specifications		air Double acting	air Double acting	air Double acting
Features		Built-in sensor model	Standard model	Dual cylinder model
Variations	3 point sensor model	 CTX-T Page →16	—	—
	Standard (without sensor)	 —	CTX Page →32	CTY Page →48
	Long stroke	 —	—	CTY-S Page →50
	Dual rod	 —	CTX-E Page →35	—
Option	Taper sleeve	 CTH-XS Pages →22, 38, 54		
	Speed controller	 VCL Page →58		

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Sensing **air** Swing clamp

Double acting 1 MPa

model **CTX-T**



3 point sensor model
model CTX50-LT

Sensing air Swing clamp model CTX-T

The extremely small sensing clamp can detect the loading miss and setting miss of a workpiece firmly.

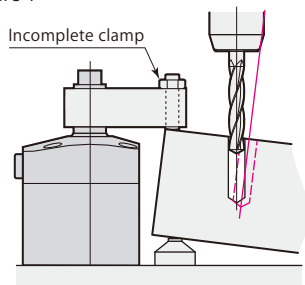
3 point sensor model



Cylinder force is increased 1.1 to 1.3 times of the force of CTX standard model

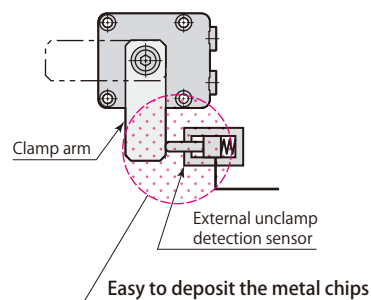
- Sensor model can prevent tool breakage and defective machining due to incomplete clamp. (Figure 1)
- Unclamp PAL sensor moves along with the piston rod and can positively detect unclamping point, thereby enabling a high-speed production line by fully synchronizing operation with workpiece lifters.
- Built-in sensors enable a compact and simple jig.
- Unclamp detection failure due to the metal chips deposit on an independent external detector can be reduced. (Figure 2)

Figure 1



Machining failure due to incomplete clamp

Figure 2



3 point sensor model T

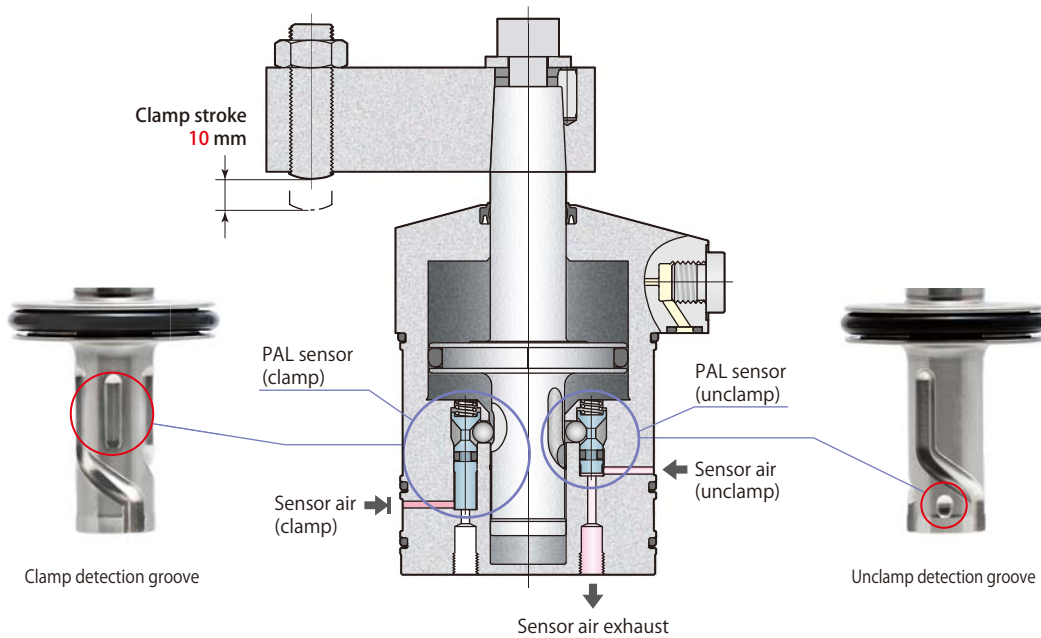
Clamp, Unclamp, Over clamp stroke (Incomplete clamp) detection

model **CTX□-□T** PAT.

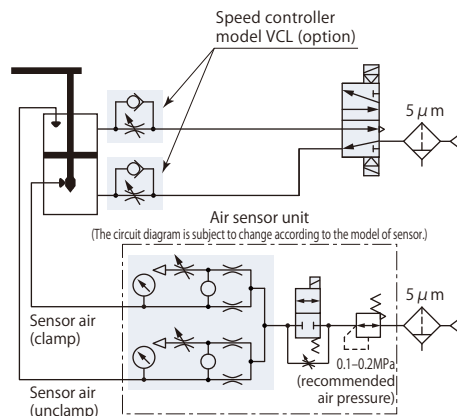


The 3 point sensor model can detect the status of clamp, unclamp and over clamp stroke with just 2 circuits of air.

Refer to **pages →12-15** for the details.



Pneumatic circuit diagram



Specifications

Size: 32, 40, 50, 63

Swing direction (when clamping): L: Counter-clockwise, R: Clockwise

T: 3 point sensor model (Clamp, Unclamp, Over clamp stroke (Incomplete clamp) detection)

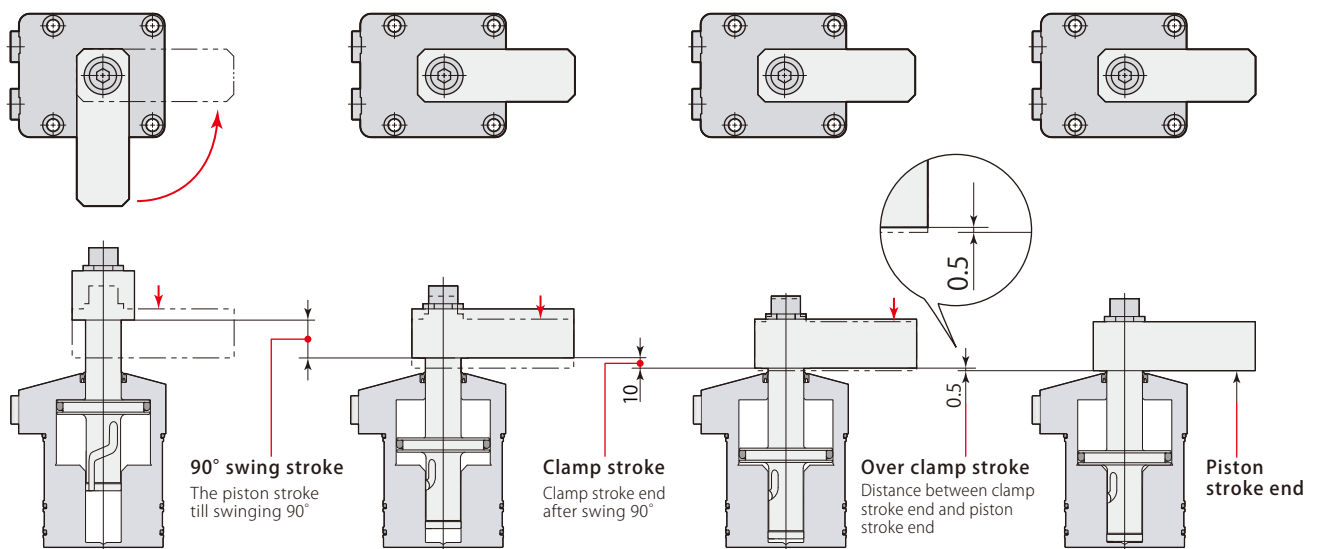
Model		CTX32-□T	CTX40-□T	CTX50-□T	CTX63-□T
Cylinder force (air pressure 0.5MPa)	N	400	590	900	1410
Cylinder inner diameter	mm	35	42	52	65
Rod diameter	mm	14	16	20	25
Effective area	mm ²	808	1184	1810	2827
Swing angle		90° ± 3°			
Positioning pin groove position accuracy		± 1°			
Repeated clamp positioning accuracy		± 0.5°			
Full stroke	mm	21	22.5	25.5	29
90° swing stroke	mm	10.5	12	15	18.5
Clamp stroke	mm	10	10	10	10
Over clamp stroke	mm	0.5	0.5	0.5	0.5
Cylinder capacity	Clamp	17.0	26.6	46.1	82.0
	Unclamp	20.2	31.2	54.2	96.2
Mass	kg	0.45	0.62	1.05	1.72
Recommended tightening torque of mounting screws*1	N·m	4.0	4.0	5.9	5.9
Recommended tightening torque of cap screw*2	N·m	25	25	50	53

- Pressure range: 0.2–1 MPa
- Proof pressure: 1.5 MPa
- Operating temperature: 0–70 °C
- Fluid used: Air*3
- Oil supply: Not required
- Seals are resistant to chlorine-based cutting fluid. (not thermal resistant specification)

*1: ISO R898 class 12.9 *2: Arm mounting screw

*3: Supply the dry and filtered air. Particulate size 5 μm or less is recommended.

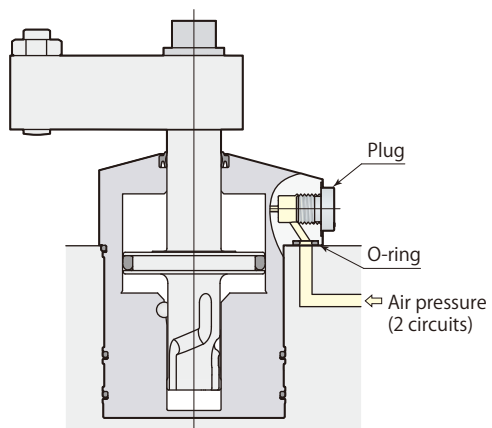
Clamping must be done within the range of clamp stroke.



Manifold piping and G port piping are available.

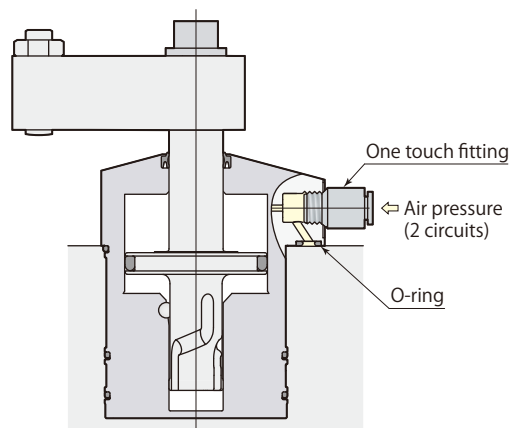
Manifold piping

When choosing manifold piping, a speed controller model VCL is mountable on the G ports of the clamp.



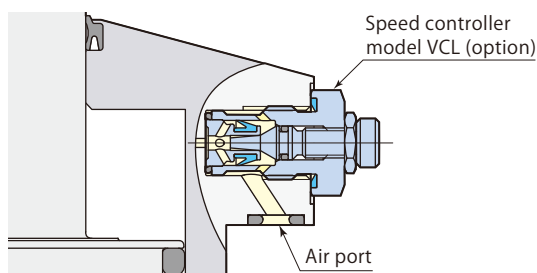
G port piping

When choosing G port piping, remove plugs. (O-ring must be used.) The one touch fitting or the speed controller with one touch fitting should be mounted when choosing G port piping.

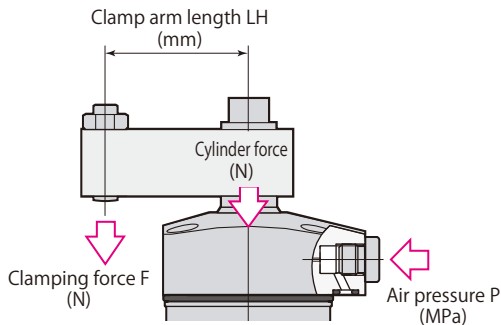


Speed controller model VCL

Page →58



Performance table



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

Clamping force calculation formula

$$F = P \times 1000 / (\text{Coefficient 1} + \text{Coefficient 2} \times LH)$$

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

CTX50-T with clamp arm length (LH) 60 mm at air pressure of 1.0 MPa, Clamping force F is calculated by $1.0 \times 1000 / (0.553 + 0.00152 \times 60) = 1550 \text{ N}$

Do not use the clamp in the nonusable range. It may cause damage to the cylinder and rod.

model CTX32-□T Clamping force $F = P \times 1000 / (1.24 + 0.00424 \times LH)$

Air pressure MPa	Cylinder force N	Clamping force N						Max. arm length Max. LH mm
		Clamp arm length LH mm						
		35	50	70	90	100	120	
1.0	810	720	690	650	Nonusable range		77	
0.9	730	650	620	590	Nonusable range		88	
0.8	650	580	550	520	490	480	104	
0.7	560	500	480	460	430	420	125	
0.6	480	430	410	390	370	360	159	
0.5	400	360	340	330	310	300	190	
0.4	320	290	280	260	250	240	↑	
0.3	240	220	210	200	190	180	↑	
0.2	160	140	140	130	120	120	190	

model CTX40-□T Clamping force $F = P \times 1000 / (0.844 + 0.00275 \times LH)$

Air pressure MPa	Cylinder force N	Clamping force N						Max. arm length Max. LH mm
		Clamp arm length LH mm						
		50	70	90	110	130	150	
1.0	1180	1020	960	Nonusable range			80	
0.9	1070	920	870	820	Nonusable range		92	
0.8	950	820	770	730	Nonusable range		108	
0.7	830	710	680	640	610	580	130	
0.6	710	610	580	550	520	500	164	
0.5	590	510	480	460	440	420	196	
0.4	470	410	390	370	350	330	↑	
0.3	360	310	290	270	260	240	↑	
0.2	240	200	190	180	170	160	196	

model CTX50-□T Clamping force $F = P \times 1000 / (0.553 + 0.00152 \times LH)$

Air pressure MPa	Cylinder force N	Clamping force N						Max. arm length Max. LH mm
		Clamp arm length LH mm						
		60	80	100	120	140	160	
1.0	1810	1550	1480	1420	Nonusable range		104	
0.9	1630	1400	1330	1280	1220	Nonusable range	120	
0.8	1450	1240	1190	1130	1090	1040	142	
0.7	1270	1090	1040	990	950	910	172	
0.6	1080	930	890	850	820	780	219	
0.5	900	780	740	710	680	650	260	
0.4	720	620	590	570	540	520	↑	
0.3	540	470	440	430	410	390	↑	
0.2	360	310	300	280	270	260	260	

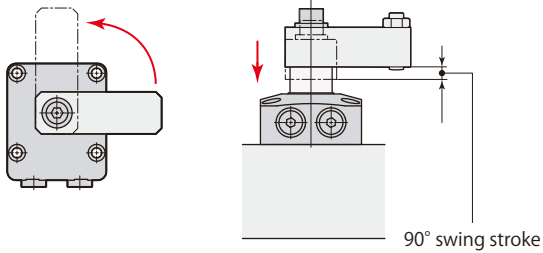
model CTX63-□T Clamping force $F = P \times 1000 / (0.354 + 0.000835 \times LH)$

Air pressure MPa	Cylinder force N	Clamping force N						Max. arm length Max. LH mm
		Clamp arm length LH mm						
		75	90	110	130	150	170	
1.0	2820	2400	2330	2240	2160	Nonusable range	134	
0.9	2540	2160	2100	2020	1950	1880	155	
0.8	2260	1920	1860	1790	1730	1670	184	
0.7	1980	1680	1630	1570	1510	1460	225	
0.6	1690	1440	1400	1350	1300	1250	290	
0.5	1410	1200	1170	1120	1080	1040	330	
0.4	1130	960	930	900	860	830	↑	
0.3	850	720	700	670	650	630	↑	
0.2	560	480	470	450	430	420	330	

Swing speed adjustment

Swing time is restricted by the mass and length of the clamp arm (moment of inertia) since the 90° swing action impacts the cam shaft.

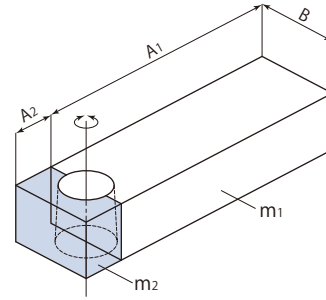
1. Calculate the moment of inertia according to the arm length and mass.
 2. Adjust swing speed with speed controller to ensure that 90° swing time of the clamp arm is greater than the shortest swing time in the graph shown below.
- The cam groove may be damaged in case the swing speed is set at the nonusable range in the graph.



Example of calculation for moment of inertia

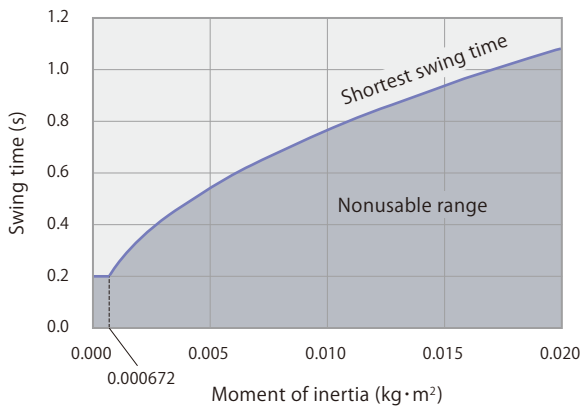
$$I = \frac{1}{12} m_1(4A_1^2 + B^2) + \frac{1}{12} m_2(4A_2^2 + B^2)$$

I : Moment of inertia (kg·m²)
m : Mass (kg)



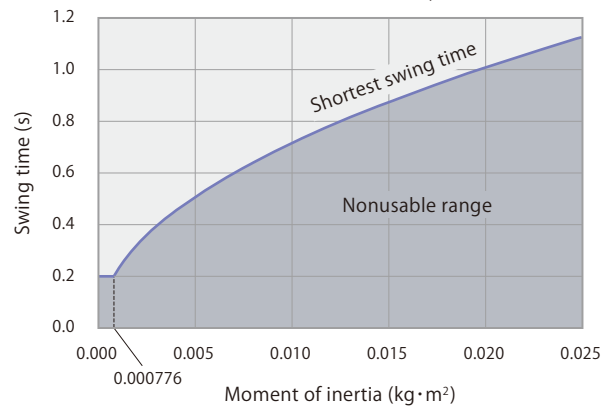
model CTX32-□T

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0168}}$



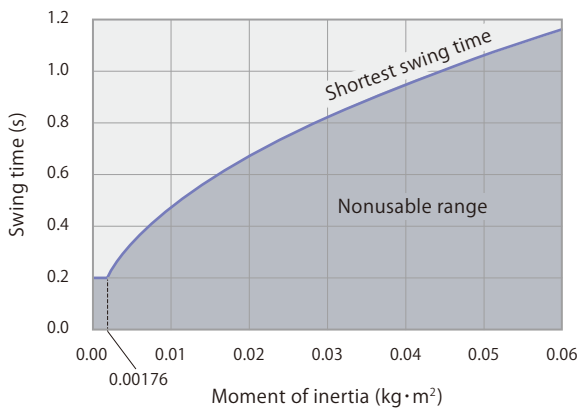
model CTX40-□T

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0194}}$



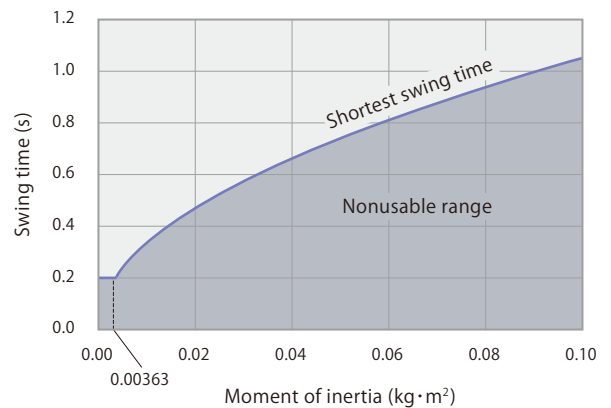
model CTX50-□T

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0440}}$



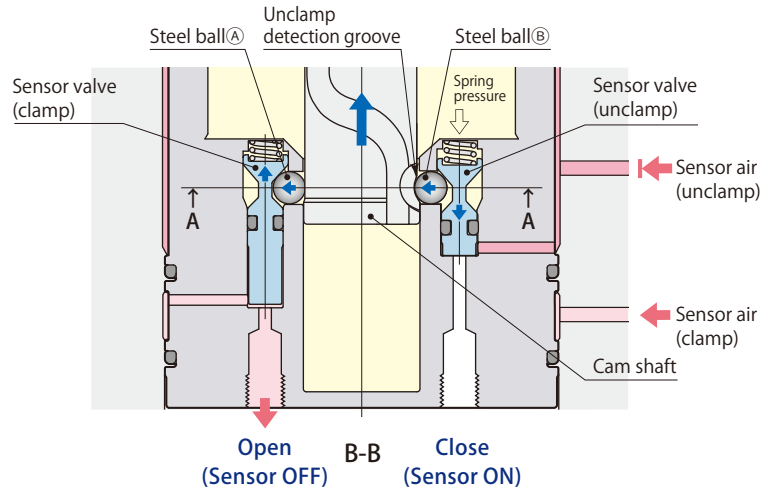
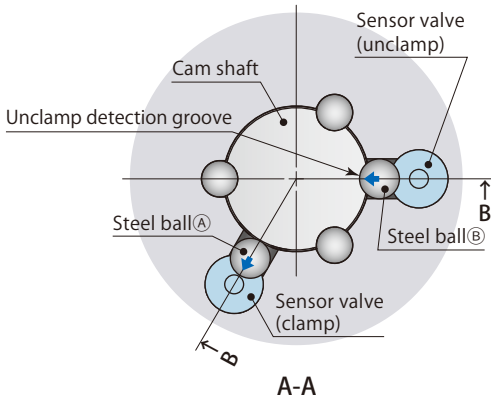
model CTX63-□T

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0908}}$



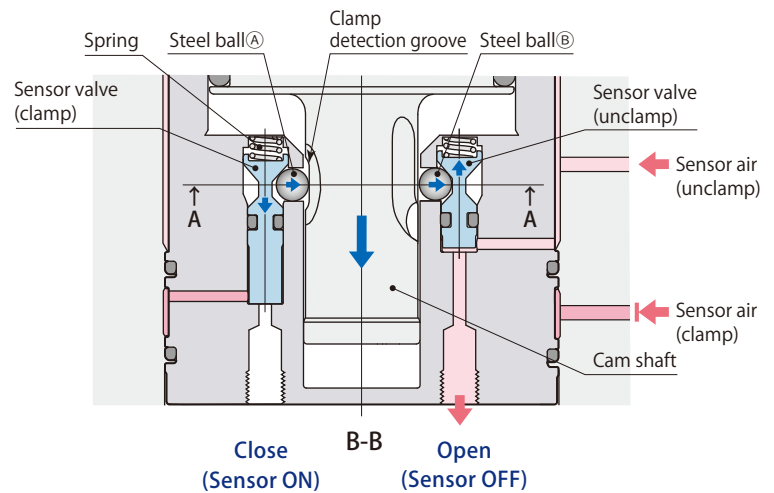
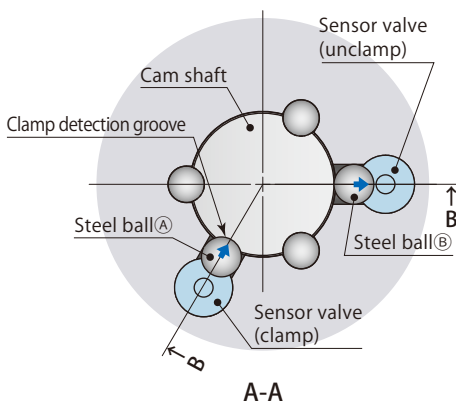
PAL sensor function and structure

Unclamp detection



- The steel ball (B) seats in the unclamp detection groove when the cam shaft reaches unclamp end, and a sensor valve (unclamp) is pushed down to shut off the sensor air by spring pressure. The sensor valve (clamp) is pushed up by the steel ball (A) to open for air exhaust and detects the unclamped condition.

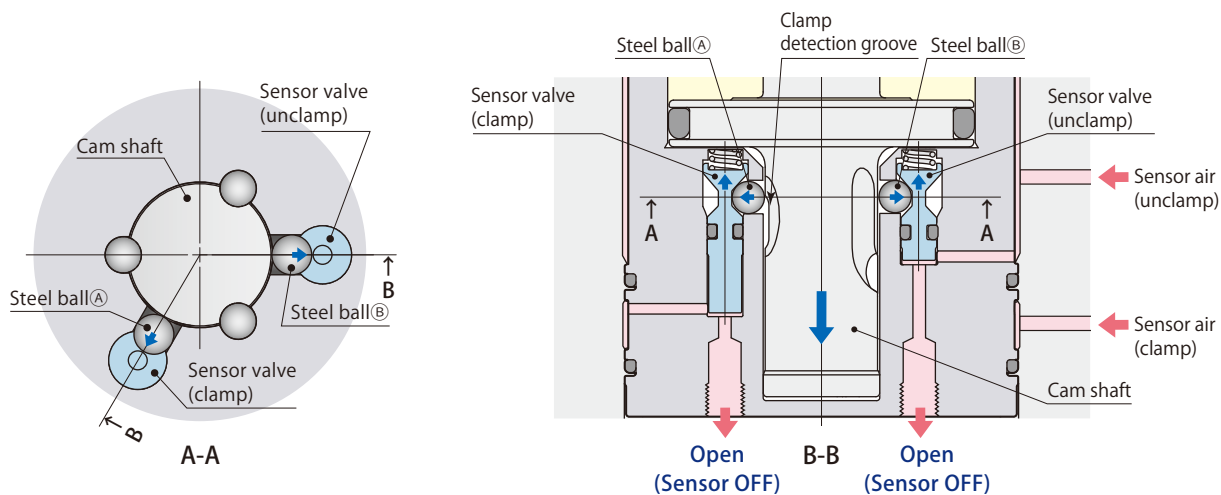
Clamp detection



- The steel ball (A) seats in the clamp detection groove when the cam shaft reaches clamping point, and a sensor valve (clamp) is pushed down to shut of the sensor air by a spring. The sensor valve (unclamp) is pushed up by the steel ball (B) to open for air exhaust and detects the clamped condition.

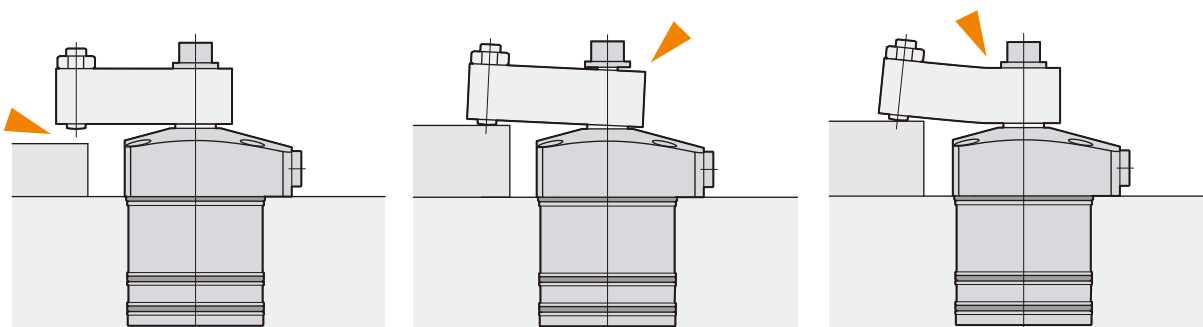
PAL sensor function and structure

Over clamp stroke (Incomplete clamp) detection



- When the cam shaft passes the clamping point, the sensor valve (clamp) is pushed up by the steel ball (A) to open for air exhaust. The sensor valve (unclamp) is pushed up by the steel ball (B) to open for air exhaust and detects the over clamp stroked (incomplete clamp) condition.

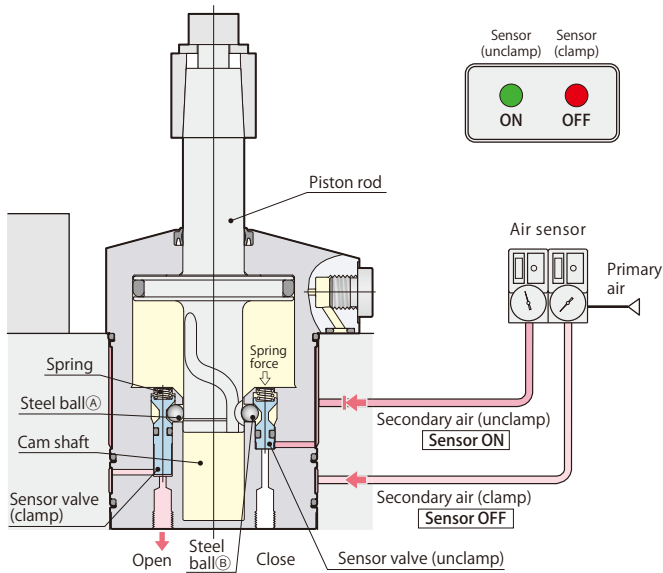
Over clamp stroke (Incomplete clamp) detection example



- Clamp disabled due to mis-setting workpiece.
- Clamp disabled due to the damage of piston rod or loose clamp arm.
- Clamp disabled due to the deflection of clamp arm.
- Clamp disabled due to the abrasion on the tip of clamp arm during prolonged use.

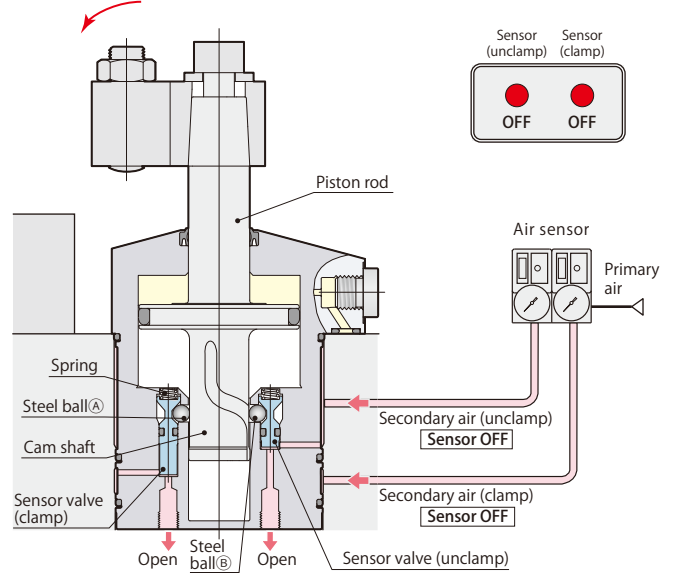
Clamp, Unclamp, Over clamp stroke detection signal

Unclamp detection



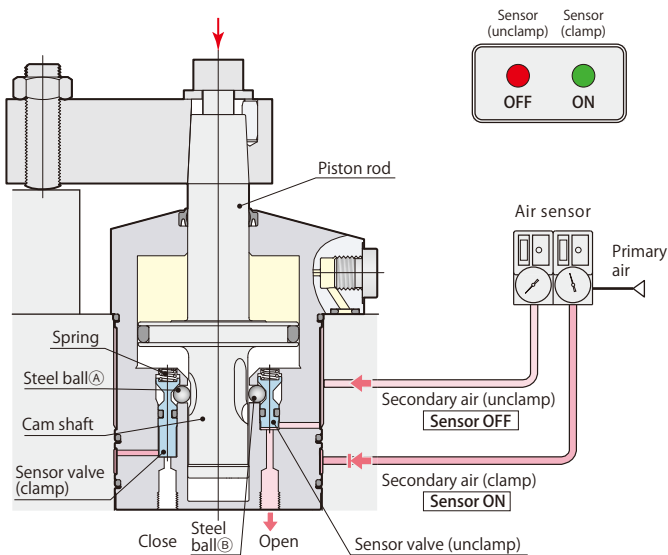
Sensor signal (unclamp)	ON	Unclamp
Sensor signal (clamp)	OFF	

In the middle of swing stroke



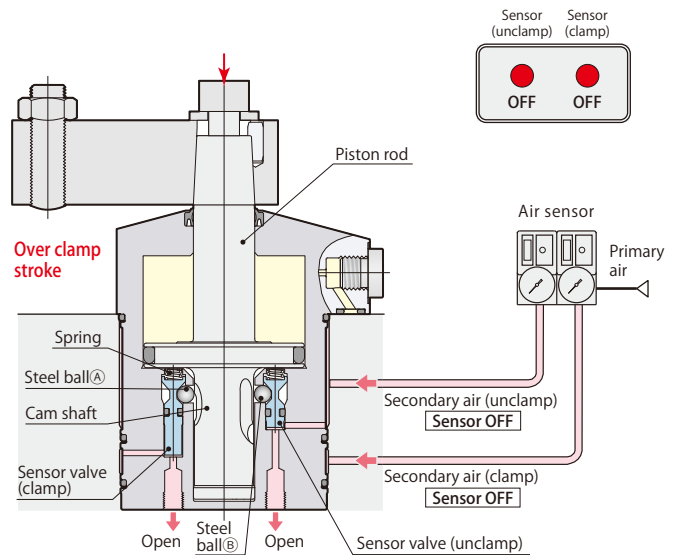
Sensor signal (unclamp)	OFF	In the middle of swing stroke
Sensor signal (clamp)	OFF	

Clamp detection



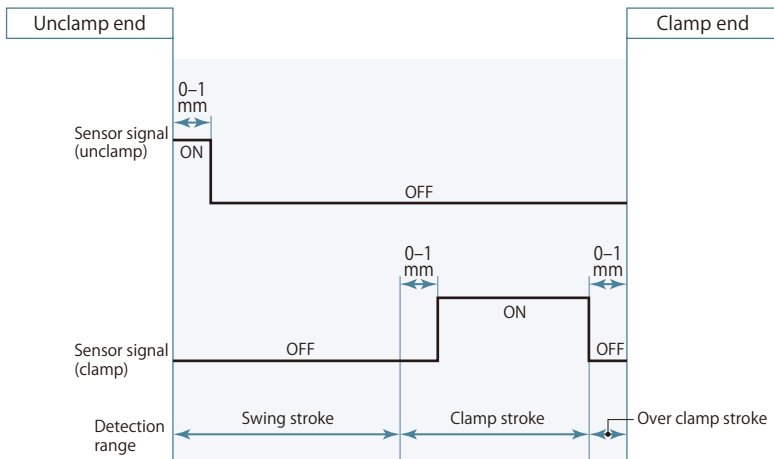
Sensor signal (unclamp)	OFF	Clamp
Sensor signal (clamp)	ON	

Over clamp stroke (Incomplete clamp) detection



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

Air sensor triggering point



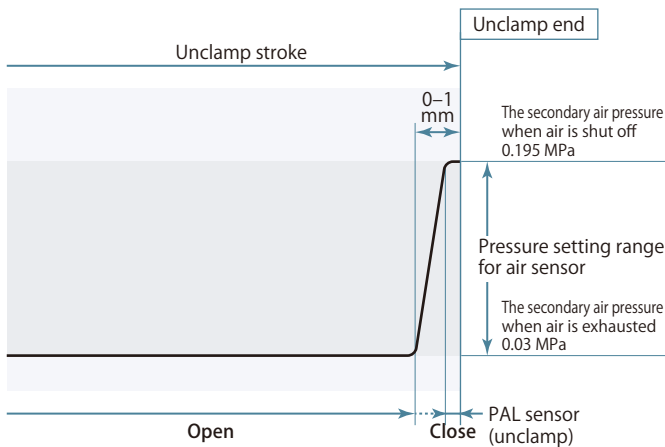
- Refer to the sensor supplier's instruction manual for the details of setting.
- Sensing performance such as detectable time and pressure differs depending on the supplier and model number of the sensor. Select the right model referring to sensor's application and characteristics.

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.

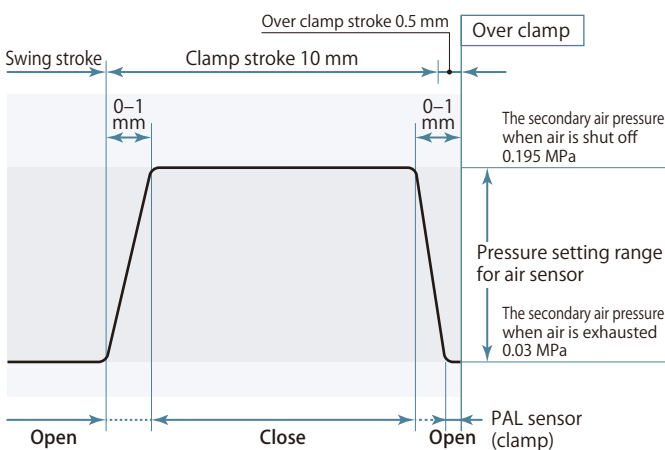
Relation between sensor air pressure, PAL sensor and piston stroke



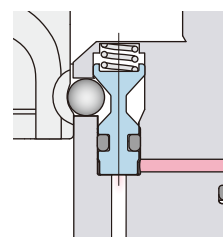
The diagram shown on the left indicates the relation between the PAL sensor, piston stroke, and secondary air pressure. (The pressure shown in the diagram is a reference based on the 0.2 MPa of primary air pressure for one piece of clamp.)

Since the new PAL sensor works with less air-leakage compared to previous sensor valve,

- Enhances the pressure setting range of the sensor which enables the sensor to set easily. (Ex. Pressure setting range 0.03–0.195 MPa in the diagram)
- Allows the use for a number of clamps by one air sensor because of better pressure holding when air is shut off. (Maximum number of clamps to be detected by one sensor is 10.)
- Allows to choose less air-consumed, i.e. small orifice diameter type, air sensor.
- Can create large differential-pressure when opening and closing the PAL sensor so that sensor primary pressure can be set as low as possible and reduce the consumption of air.

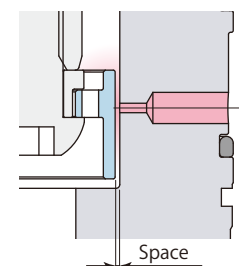


New PAL sensor



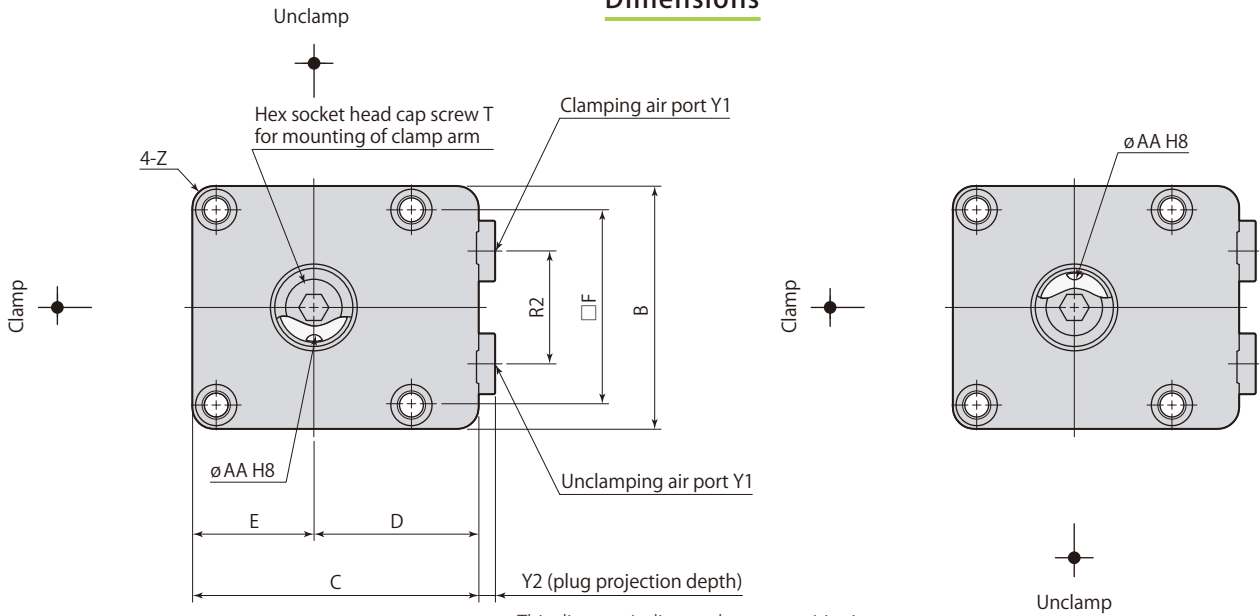
Poppet structure ensures superior sealing performance and can create large differential-pressure when the valve is opening and closing, and air leakage can be minimized.

Previous sensor valve



Air leaks easily due to a large space.

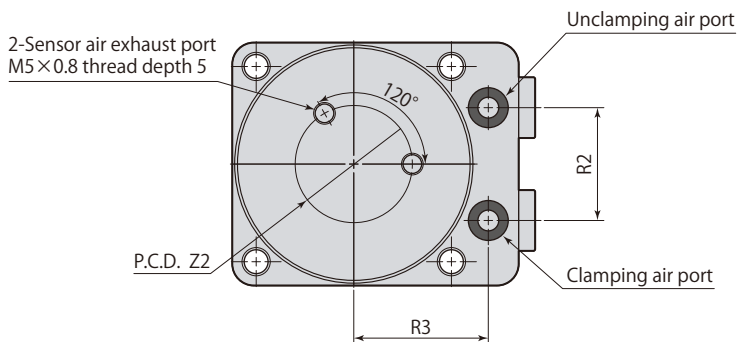
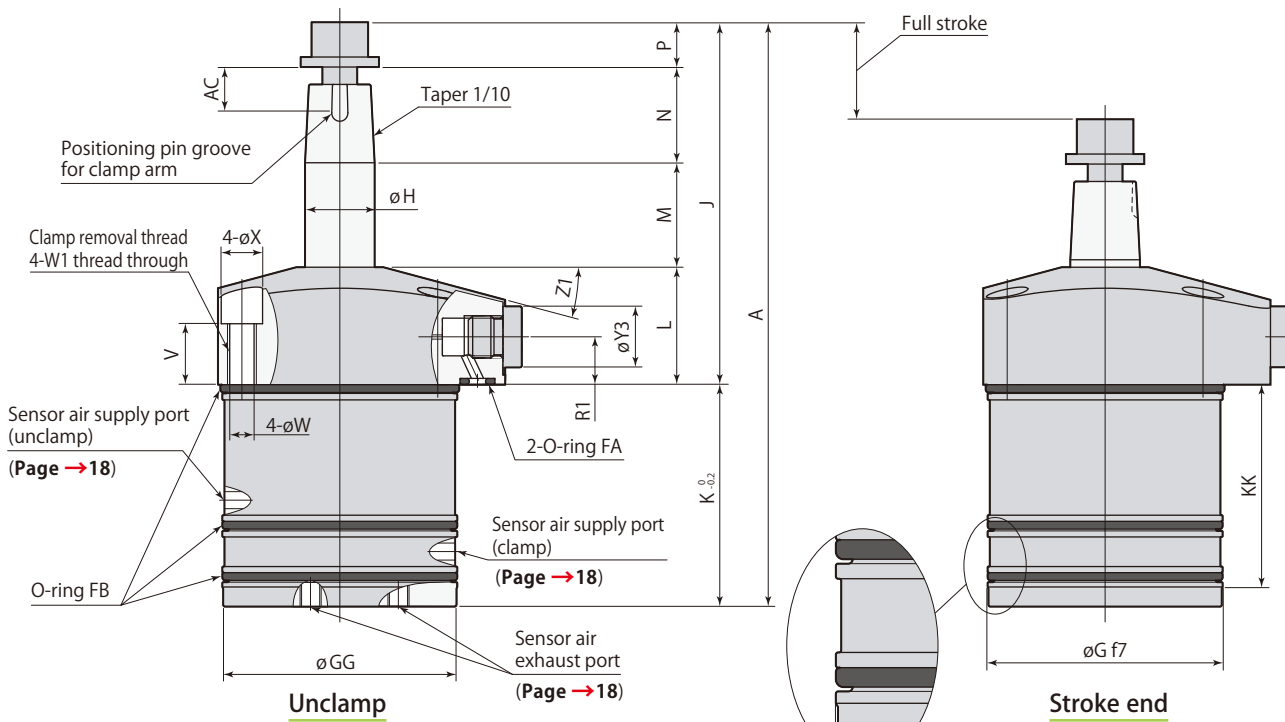
Dimensions



This diagram indicates the arm positioning pin groove at unclamped condition.

Swing direction L (counter-clockwise)

Swing direction R (clockwise)



CTX32-□T only

● Clamp arm, positioning pin and mounting screws are not included.

CTX□-□T	Air swing clamp 3 point sensor model	air	Double acting
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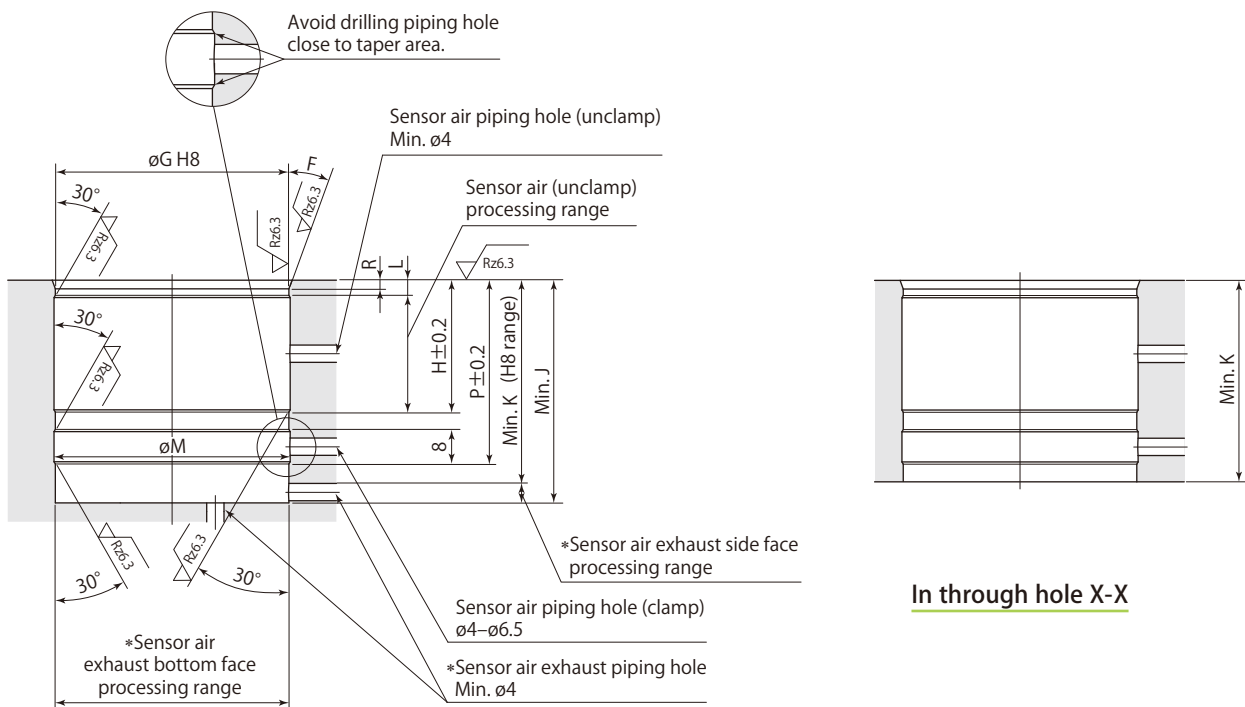
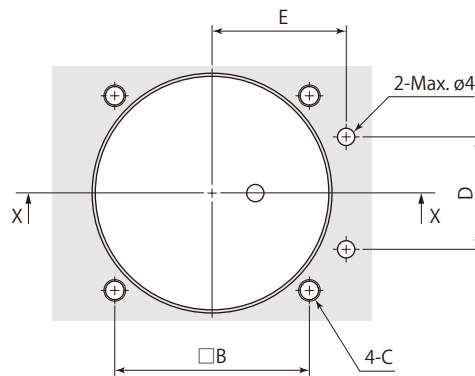
Model	CTX32-□T	CTX40-□T	CTX50-□T	CTX63-□T
A	127.3	134.3	159.2	181.7
B	50	56	66	78
C	60	66	80	91
D	35	38	47	52
E	25	28	33	39
F	39	45	53	65
øG	46 ^{-0.025} _{-0.050}	54 ^{-0.030} _{-0.060}	64 ^{-0.030} _{-0.060}	77 ^{-0.030} _{-0.060}
øGG	45.6	53.6	63.6	76.6
øH	14	16	20	25
J	78.8	83.3	100.2	110.7
K	48.5	51	59	71
KK	44.5	46.5	49.5	57.5
L	27	27	32	32
M	22.5	24	28	31.5
N (arm thickness)	19	22	27	32
P	10.3	10.3	13.2	15.2
R1	11	11	12.5	12.5
R2	20	26	30	40
R3	28	31	36	41
T	M8×1.25 length 16	M8×1.25 length 16	M10×1.5 length 20	M12×1.75 length 25
V	14	14	17	16
øW	5.5	5.5	6.8	6.8
W1	M6×1	M6×1	M8×1.25	M8×1.25
øX	9.5	9.5	11	11
Y1	G1/8	G1/8	G1/4	G1/4
Y2	3.8	3.8	4.8	4.8
øY3	14	14	19	19
Z	R5	R5	R6	R6
Z1	15°	15°	14°	13°
Z2	20	27	34	42
øAA (pin groove diameter)	4 ^{+0.018} ₀	4 ^{+0.018} ₀	5 ^{+0.018} ₀	5 ^{+0.018} ₀
AC	10.5	10.5	12.5	12.5
Positioning pin (dowel pin)	ø4(h8)×10	ø4(h8)×10	ø5(h8)×12	ø5(h8)×12
O-ring FA (FKM-90)	P6	P6	P6	P6
O-ring FB (FKM-70)	AS568-030	AS568-033	AS568-036	AS568-040
Taper sleeve	CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
Speed controller*	Meter-in	VCL01-I	VCL01-I	VCL02-I
	Meter-out	VCL01-O	VCL01-O	VCL02-O

*: Select the right model of VCL according to the size of the clamp.

Refer to each page for the details of options.

● Taper sleeve **page →22** ● Speed controller **page →58**

Mounting details



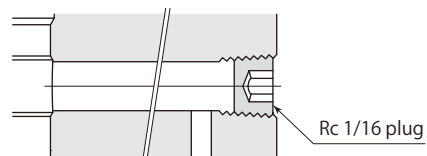
In blind hole X-X

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 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.

- No sensor air piping hole (unclamp) is needed unless unclamp sensor is used. Contact Pascal for the details.
- The sensor air piping hole can be used for a pilot hole of Rc 1/16 plug.



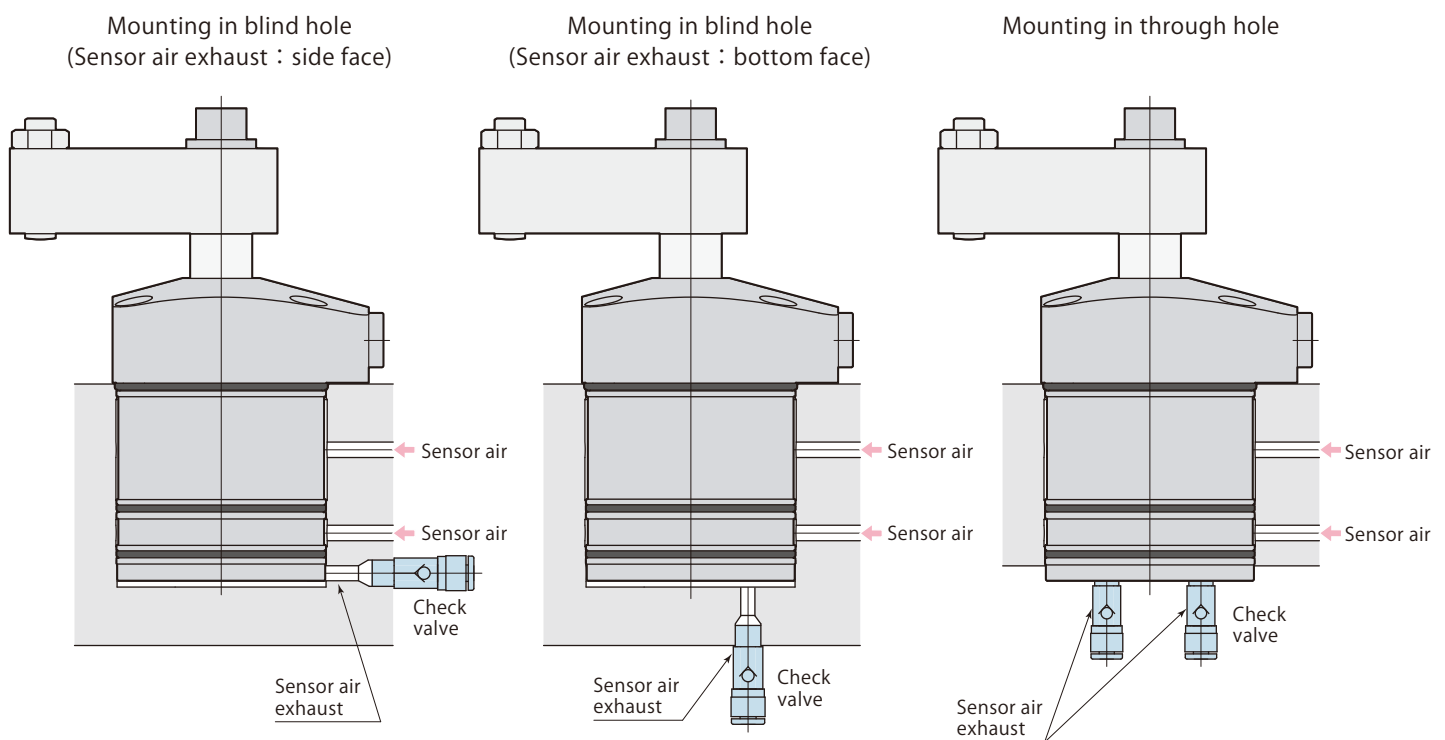
Mounting details

Model	CTX32-□T	CTX40-□T	CTX50-□T	CTX63-□T
B	39	45	53	65
C	M5	M5	M6	M6
D	20	26	30	40
E	28	31	36	41
F	20°	20°	20°	30°
øG	46 ^{+0.039} ₀	54 ^{+0.046} ₀	64 ^{+0.046} ₀	77 ^{+0.046} ₀
H	28.5	30.5	33.5	41.5
J	52.5	51.5	59.5	71.5
K	44.5	46.5	49.5	57.5
L	3.5	3.5	3.5	8±0.2
øM	46.6	54.6	64.6	77.6
P	40.5	42.5	45.5	53.5
R	2	2	2	1

mm

Caution for piping

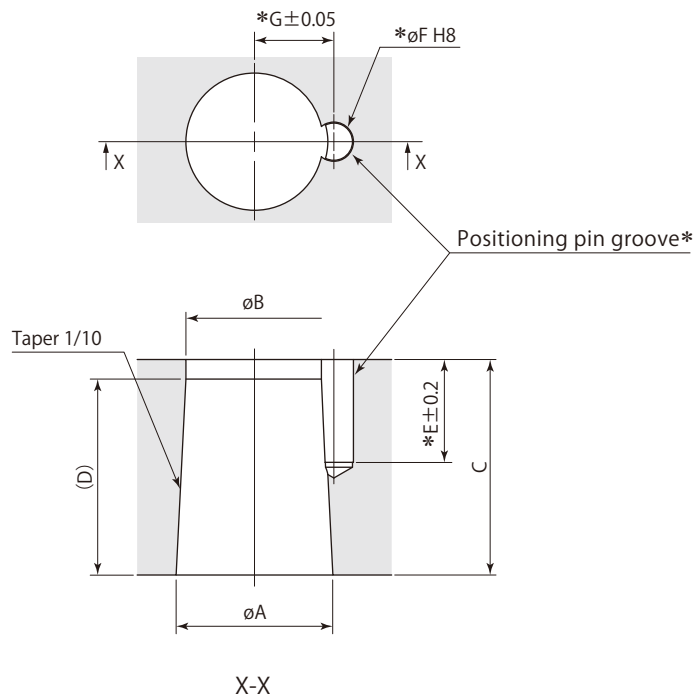
Refer to the diagram shown below for the sensor air exhaust port.



- 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 arm mounting details

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



* :No need to machine the pin groove (E, ϕF , G) unless positioning pin is used for the arm.
The positioning pin enables a clamp arm to locate on the clamp firmly and easily.

Swing clamp	CTX32-□T	CTX40-□T	CTX50-□T	CTX63-□T
ϕA	14 ^{-0.016} _{-0.034}	16 ^{-0.016} _{-0.034}	20 ^{-0.020} _{-0.041}	25 ^{-0.020} _{-0.041}
ϕB	12.6	14	17.8	22.4
C	19	22	27	32
D	14	20	22	26
E	10.5	10.5	12.5	12.5
ϕF (pin groove diameter)	4 ^{+0.018} ₀	4 ^{+0.018} ₀	5 ^{+0.018} ₀	5 ^{+0.018} ₀
G	7.1	8.1	10.1	12.6

mm

Taper sleeve

Size

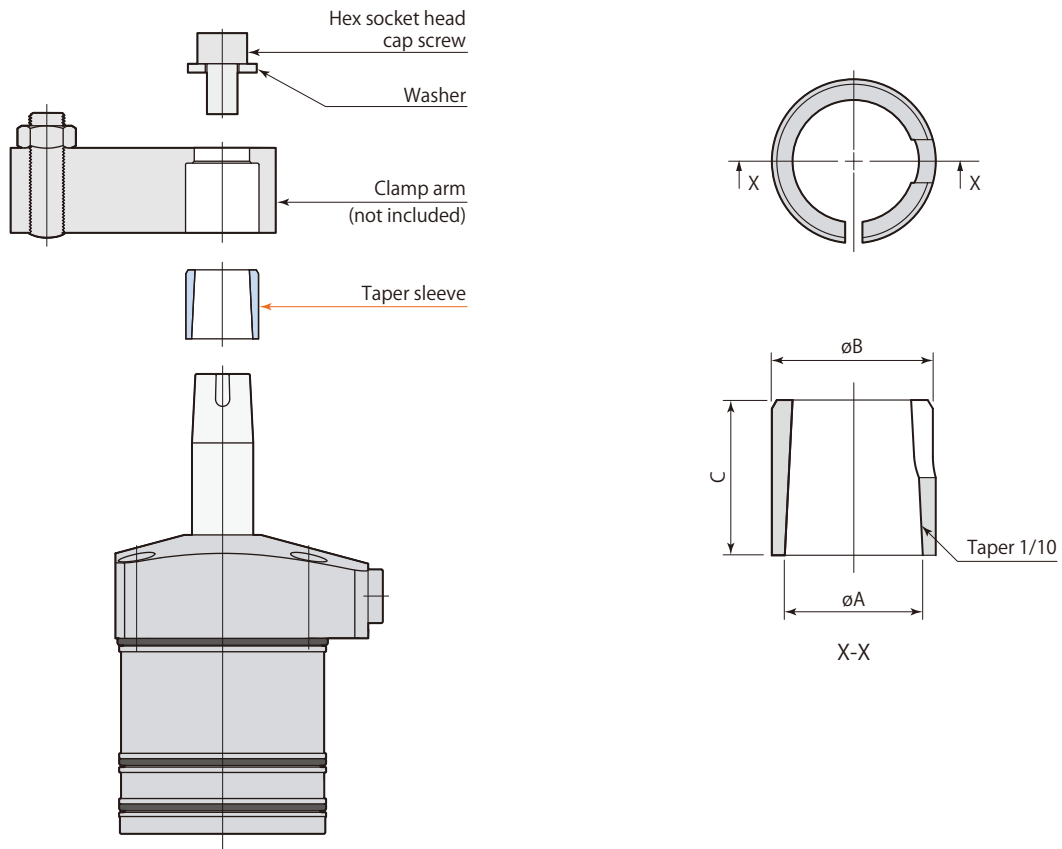
32

40

50

63

CTH — XS : Taper sleeve



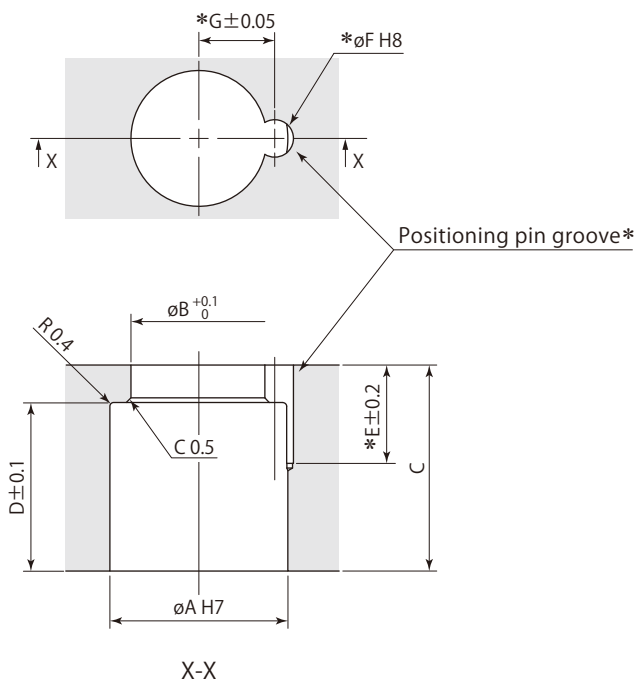
mm

Taper sleeve	CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
Applicable swing clamp	CTX32-□T	CTX40-□T	CTX50-□T	CTX63-□T
ϕA	14	16	20	25
ϕB	17	19	24	29
C	14	18	22	26

Clamp arm mounting details

(Using taper sleeve)

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



* :No need to machine the pin groove (E, øF, G) unless positioning pin is used for the arm.
The positioning pin enables a clamp arm to locate on the clamp firmly and easily.

Taper sleeve	CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
Applicable swing clamp	CTX32-□T	CTX40-□T	CTX50-□T	CTX63-□T
øA	17 ^{+0.018} ₀	19 ^{+0.021} ₀	24 ^{+0.021} ₀	29 ^{+0.021} ₀
øB	13	14.5	18.5	23
C	19	22	27	32
D	14	18	22	26
E	10.5	10.5	12.5	12.5
øF (pin groove diameter)	4 ^{+0.018} ₀	4 ^{+0.018} ₀	5 ^{+0.018} ₀	5 ^{+0.018} ₀
G	7.1	8.1	10.1	12.6

mm

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Option	
Taper sleeve CTH-XS	38
Mounting & dismounting of clamp arm	56
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air Swing clamp

Double acting 1 MPa

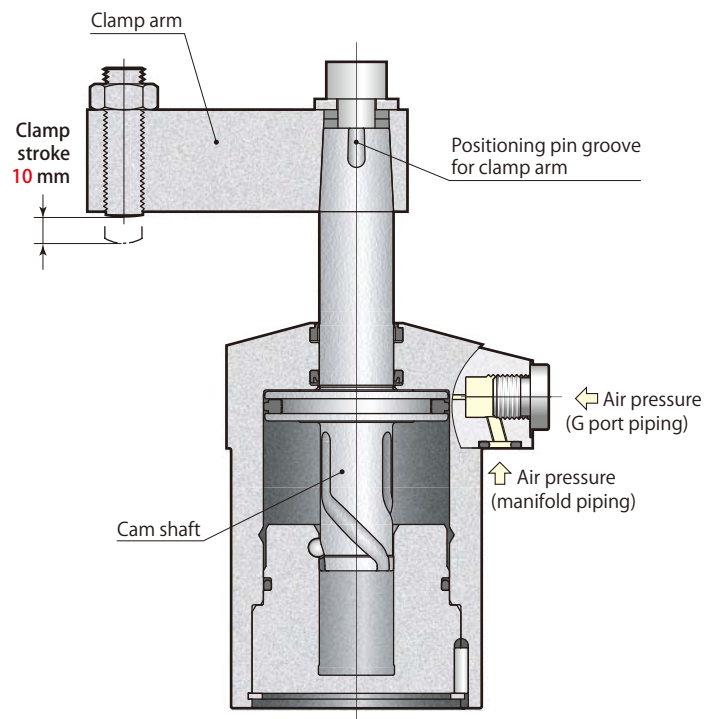
model **CTX**



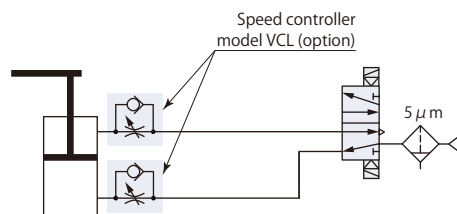
Standard model
model CTX40-L

Standard model

model CTX□-□



Pneumatic circuit diagram



Specifications

Size

32
40
50
63

CTX

Swing direction (when clamping)

L : Counter-clockwise

R : Clockwise

(Nil) : Standard

E : Dual rod

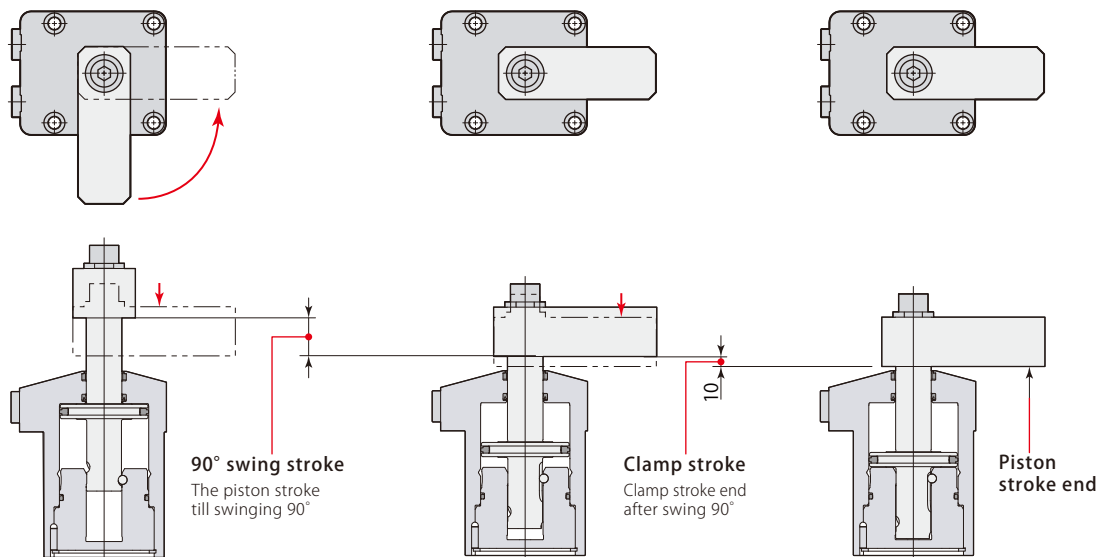
Model			CTX32	CTX40	CTX50	CTX63
Cylinder force (air pressure 0.5MPa)	N		330	530	820	1310
Cylinder inner diameter	mm		32	40	50	63
Rod diameter	mm		14	16	20	25
Effective area (clamp)	mm ²		650	1056	1649	2626
Swing angle			90° ± 3°			
Positioning pin groove position accuracy			± 1°			
Repeated clamp positioning accuracy			± 0.5°			
Full stroke	mm		20.5	22	25	28.5
90° swing stroke	mm		10.5	12	15	18.5
Clamp stroke	mm		10	10	10	10
Max. swing torque*1	N-m		0.10	0.20	0.40	0.75
Cylinder capacity	Clamp	cm ³	13.3	23.2	41.2	74.9
	Unclamp	cm ³	16.5	27.6	49.1	88.8
Mass	kg		0.45	0.62	1.02	1.68
Recommended tightening torque of mounting screws*2	N-m		4.0	4.0	5.9	5.9
Recommended tightening torque of cap screw*3	N-m		25	25	50	53

- Pressure range: 0.1–1 MPa
- Proof pressure: 1.5 MPa
- Operating temperature: 0–70 °C
- Fluid used: Air*4
- Oil supply: Not required
- Seals are resistant to chlorine-based cutting fluid (not thermal resistant specification).

*1: This is the limit value for lifting arm at 0.1 MPa when mounted vertically. *2: ISO R898 class 12.9

*3: Arm mounting screw *4: Supply the dry and filtered air. Particulate size 5 μm or less is recommended.

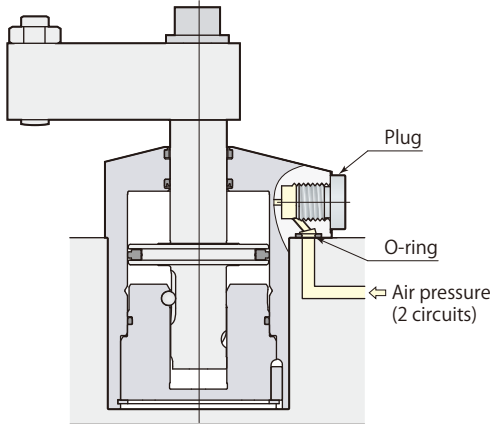
Clamping must be done within the range of clamp stroke.



Manifold piping and G port piping are available.

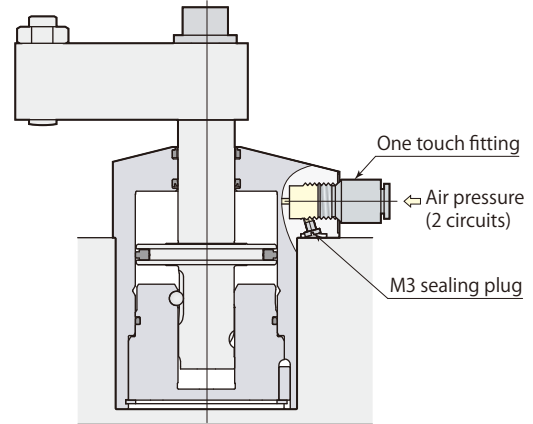
Manifold piping

When choosing manifold piping, a speed controller model VCL is mountable on the G ports of the clamp.



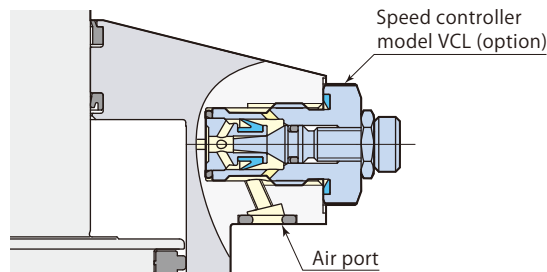
G port piping

When choosing G port piping, remove plugs and mount M3 sealing plugs that are included. (M3 sealing plugs are not mounted at the time of factory shipment.) The one touch fitting or the speed controller with one touch fitting should be mounted when choosing G port piping.

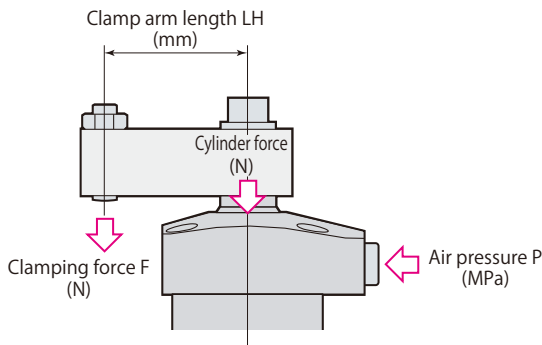


Speed controller model VCL

Page →58



Performance table



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

Clamping force calculation formula

$$F = P \times 1000 / (\text{Coefficient 1} + \text{Coefficient 2} \times LH)$$

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

CTX50 with clamp arm length (LH) 60 mm at air pressure of 1.0 MPa, Clamping force F is calculated by $1.0 \times 1000 / (0.606 + 0.00169 \times 60) = 1410 \text{ N}$

Do not use the clamp in the nonusable range. It may cause damage to the cylinder and rod.

model CTX32		Clamping force $F = P \times 1000 / (1.53 + 0.00527 \times LH)$						
Air pressure MPa	Cylinder force N	Clamping force N						Max. arm length Max. LH mm
		Clamp arm length LH mm						
		35	50	70	90	100	120	
1.0	650	580	560	530	Nonusable range		89	
0.9	590	520	500	470	450	440	103	
0.8	520	470	450	420	400	390	370	122
0.7	460	410	390	370	350	340	320	148
0.6	390	350	330	320	300	290	280	190
0.5	330	290	280	260	250	240	230	↑
0.4	260	230	220	210	200	190	180	↑
0.3	200	170	170	160	150	150	140	↑
0.2	130	120	110	110	100	100	90	↑
0.1	70	60	60	50	50	50	50	190

model CTX40		Clamping force $F = P \times 1000 / (0.947 + 0.00302 \times LH)$						
Air pressure MPa	Cylinder force N	Clamping force N						Max. arm length Max. LH mm
		Clamp arm length LH mm						
		50	70	90	110	130	150	
1.0	1060	910	860	820	Nonusable range		92	
0.9	950	820	780	740	Nonusable range		107	
0.8	840	730	690	660	630		126	
0.7	740	640	600	570	550	520	500	153
0.6	630	550	520	490	470	450	430	196
0.5	530	460	430	410	390	370	360	↑
0.4	420	360	350	330	310	300	290	↑
0.3	320	270	260	250	230	220	210	↑
0.2	210	180	170	160	160	150	140	↑
0.1	110	90	90	80	80	70	70	196

model CTX50		Clamping force $F = P \times 1000 / (0.606 + 0.00169 \times LH)$						
Air pressure MPa	Cylinder force N	Clamping force N						Max. arm length Max. LH mm
		Clamp arm length LH mm						
		60	80	100	120	140	160	
1.0	1650	1410	1350	1290	Nonusable range		119	
0.9	1480	1270	1210	1160	1110		138	
0.8	1320	1130	1080	1030	990	950	910	163
0.7	1150	990	940	900	870	830	800	201
0.6	990	850	810	770	740	710	680	260
0.5	820	710	670	650	620	590	570	↑
0.4	660	570	540	520	490	470	460	↑
0.3	490	420	400	390	370	360	340	↑
0.2	330	280	270	260	250	240	230	↑
0.1	160	140	130	130	120	120	110	260

model CTX63		Clamping force $F = P \times 1000 / (0.381 + 0.00090 \times LH)$						
Air pressure MPa	Cylinder force N	Clamping force N						Max. arm length Max. LH mm
		Clamp arm length LH mm						
		75	90	110	130	150	170	
1.0	2630	2230	2160	2080	2010	Nonusable range		148
0.9	2360	2010	1950	1880	1810	1740	1690	172
0.8	2100	1780	1730	1670	1610	1550	1500	205
0.7	1840	1560	1520	1460	1410	1360	1310	253
0.6	1580	1340	1300	1250	1200	1160	1120	330
0.5	1310	1110	1080	1040	1000	970	940	↑
0.4	1050	890	870	830	800	780	750	↑
0.3	790	670	650	630	600	580	560	↑
0.2	530	450	430	420	400	390	370	↑
0.1	260	220	220	210	200	190	190	330

Swing speed adjustment

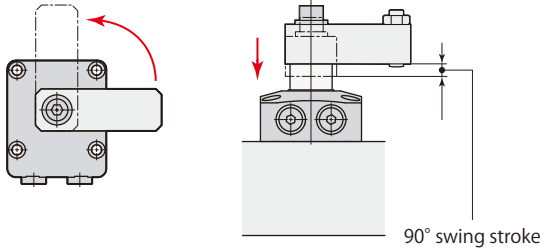
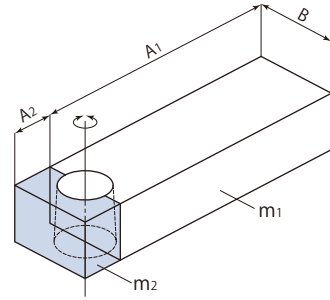
Swing time is restricted by the mass and length of the clamp arm (moment of inertia) since the 90° swing action impacts the cam shaft.

1. Calculate the moment of inertia according to the arm length and mass.
 2. Adjust swing speed with speed controller to ensure that 90° swing time of the clamp arm is greater than the shortest swing time in the graph shown below.
- The cam groove may be damaged in case the swing speed is set at the nonusable range in the graph.

Example of calculation for moment of inertia

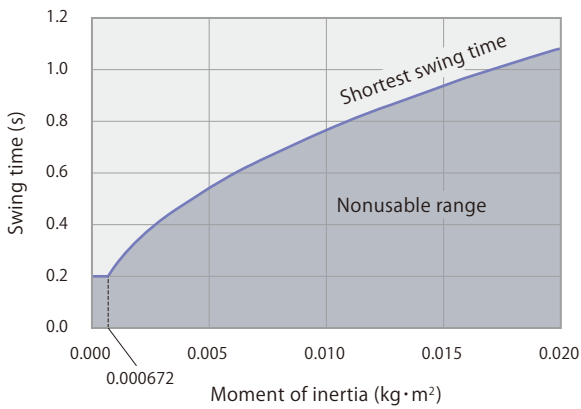
$$I = \frac{1}{12} m_1(4A_1^2 + B^2) + \frac{1}{12} m_2(4A_2^2 + B^2)$$

I : Moment of inertia (kg·m²)
m : Mass (kg)



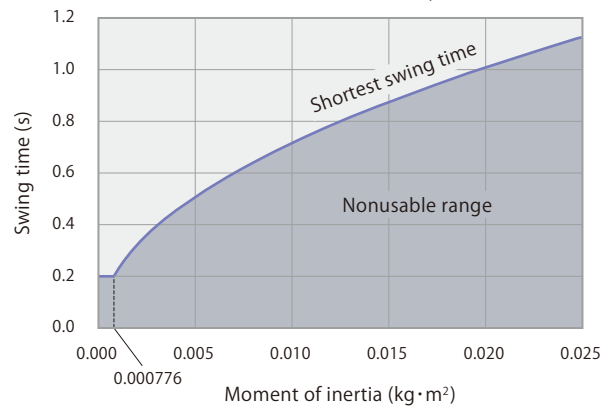
model CTX32

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0168}}$



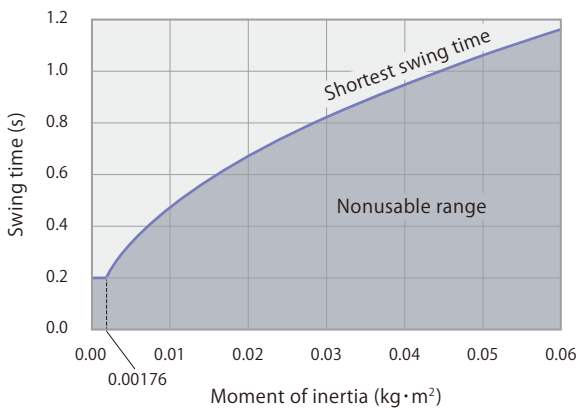
model CTX40

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0194}}$



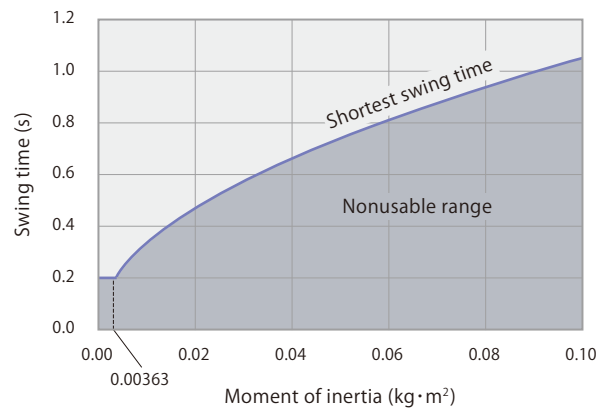
model CTX50

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0440}}$

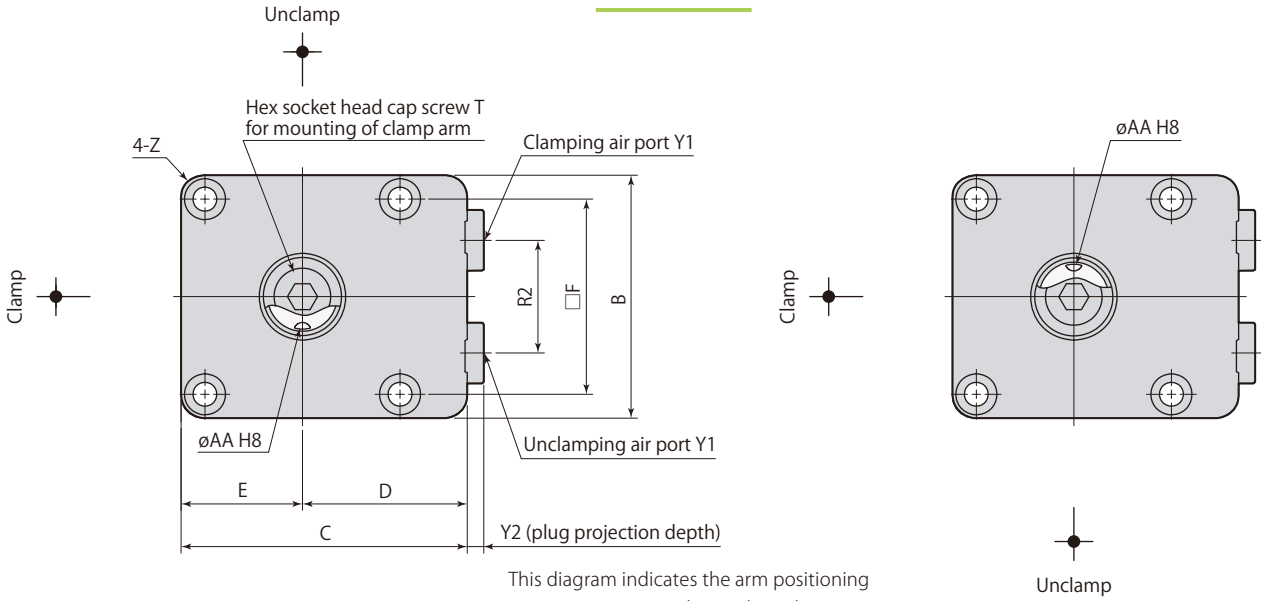


model CTX63

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0908}}$

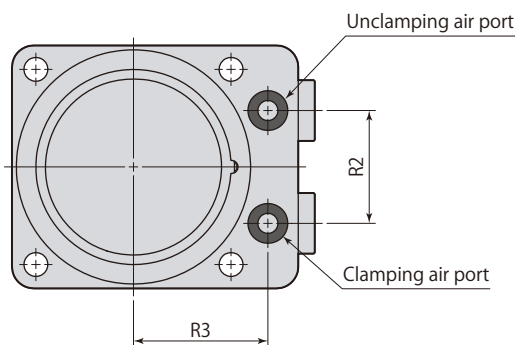
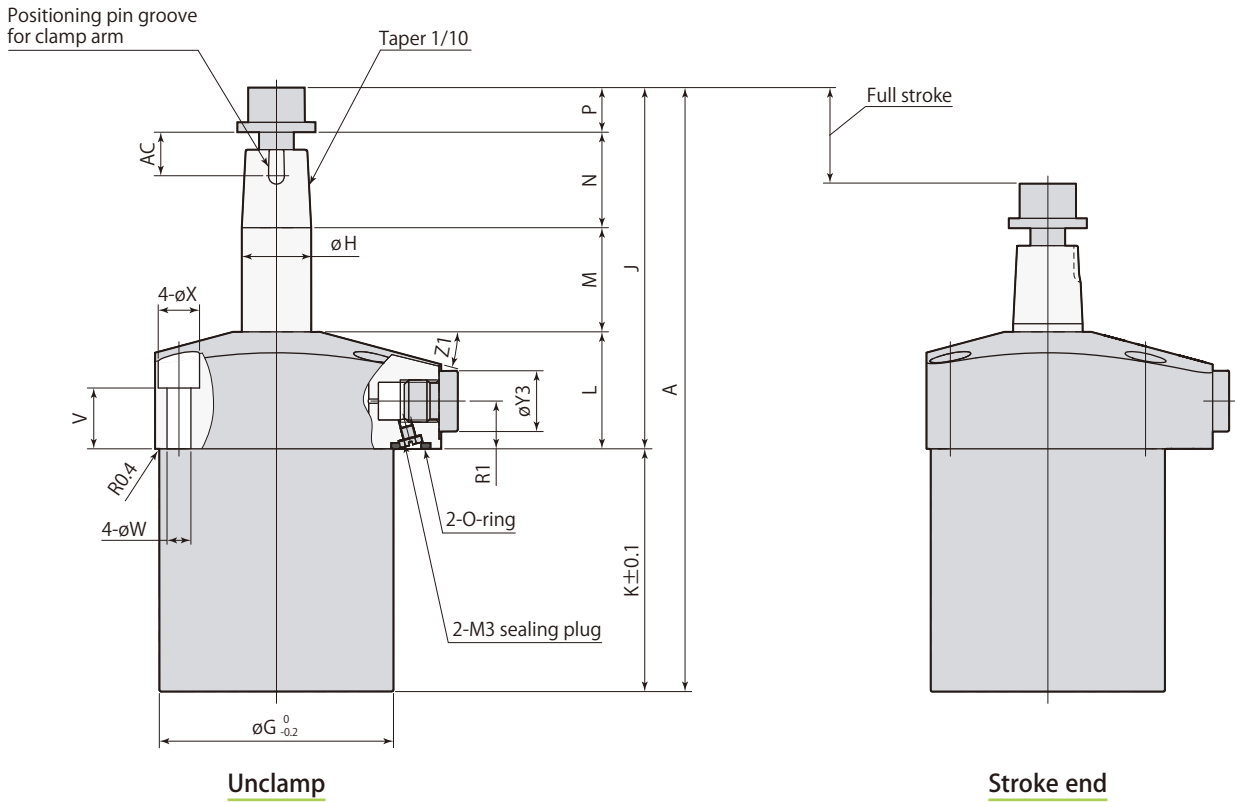


Dimensions



Swing direction L (counter-clockwise)

Swing direction R (clockwise)



- Clamp arm, positioning pin and mounting screws are not included.
- Install M3 sealing plug when choosing G port piping. The M3 sealing plug is packed with a swing clamp.

CTX □-□	Air swing clamp Standard	air	Double acting
----------------	---------------------------------	------------	----------------------

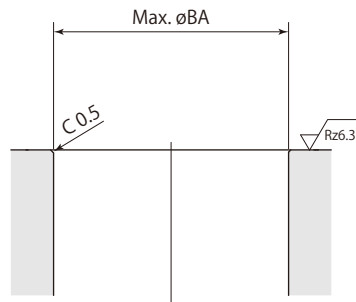
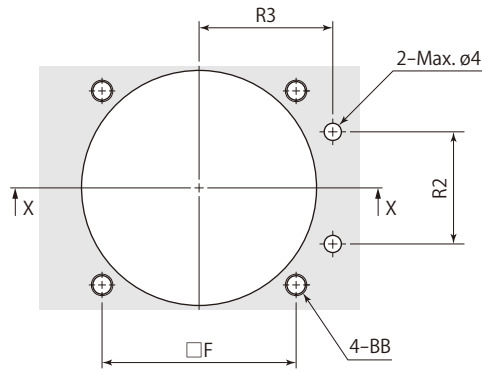
Model	CTX32-□	CTX40-□	CTX50-□	CTX63-□
A	129.8	139.3	160.7	187.2
B	50	56	66	78
C	60	66	80	91
D	35	38	47	52
E	25	28	33	39
F	39	45	53	65
øG	46	54	64	77
øH	14	16	20	25
J	78.8	83.3	100.2	110.7
K	51	56	60.5	76.5
L	27	27	32	32
M	22.5	24	28	31.5
N (arm thickness)	19	22	27	32
P	10.3	10.3	13.2	15.2
R1	11	11	12.5	12.5
R2	20	26	30	40
R3	28	31	36	41
T	M8×1.25 length 16	M8×1.25 length 16	M10×1.5 length 20	M12×1.75 length 25
V	14	14	17	16
øW	5.5	5.5	6.8	6.8
øX	9.5	9.5	11	11
Y1	G1/8	G1/8	G1/4	G1/4
Y2	3.8	3.8	4.8	4.8
øY3	14	14	19	19
Z	R5	R5	R6	R6
Z1	15°	15°	14°	13°
øAA (pin groove diameter)	4 ^{+0.018} ₀	4 ^{+0.018} ₀	5 ^{+0.018} ₀	5 ^{+0.018} ₀
AC	10.5	10.5	12.5	12.5
Positioning pin (dowel pin)	ø4(h8)×10	ø4(h8)×10	ø5(h8)×12	ø5(h8)×12
O-ring (FKM-90)	P6	P6	P6	P6
Taper sleeve	CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
Speed controller*	Meter-in	VCL01-I	VCL01-I	VCL02-I
	Meter-out	VCL01-O	VCL01-O	VCL02-O

* : Select the right model of VCL according to the size of the clamp.

Refer to each page for the details of options.

● Taper sleeve **page →38** ● Speed controller **page →58**

Mounting details



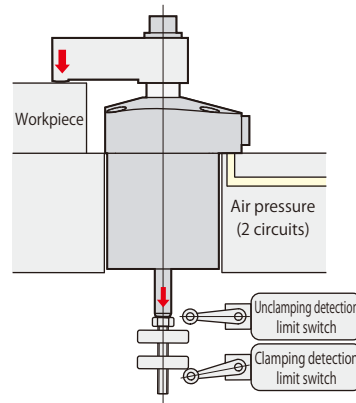
X-X

Rz: ISO4287(1997)

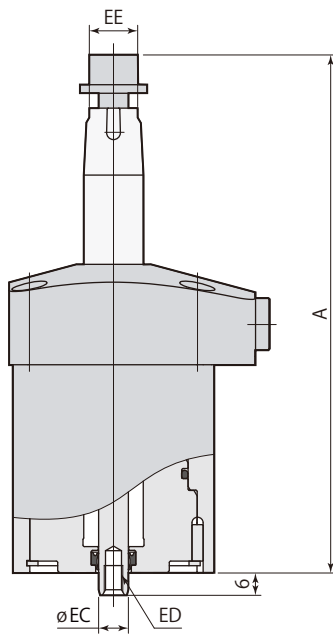
Model	CTX32-□	CTX40-□	CTX50-□	CTX63-□
F	39	45	53	65
R2	20	26	30	40
R3	28	31	36	41
øBA	46.5	54.5	64.5	77.5
BB	M5	M5	M6	M6

mm

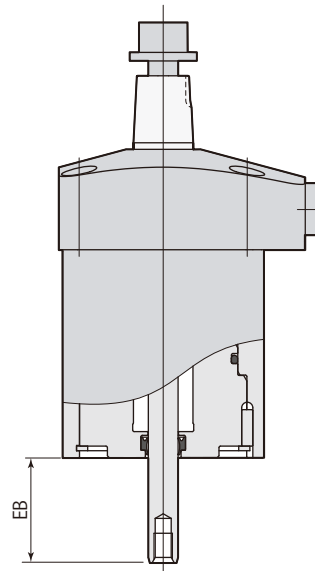
Usage example



Dimensions



Unclamp



Stroke end

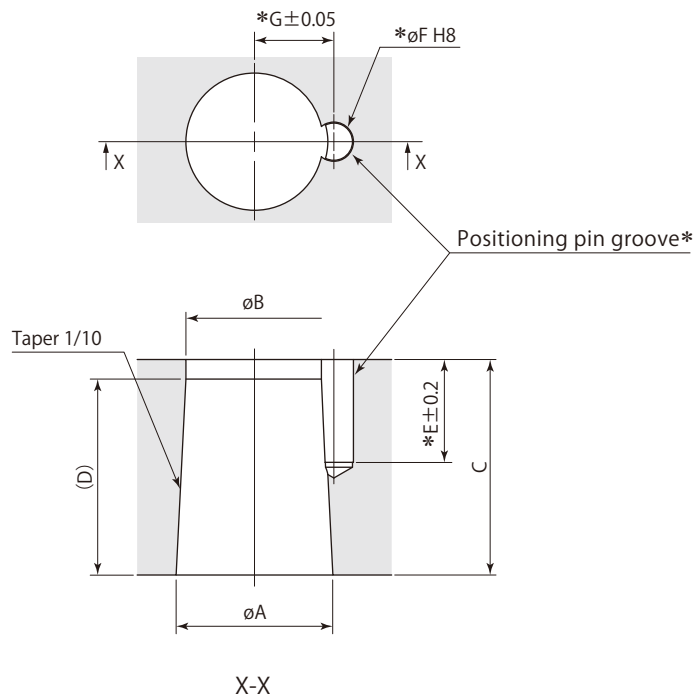
mm

Model	CTX32-□E	CTX40-□E	CTX50-□E	CTX63-□E
Cylinder capacity (unclamp)	15.5 cm ³	26.5 cm ³	47.1 cm ³	86.6 cm ³
A	129.8	139.3	160.7	187.2
EB	26.5	28	31	34.5
øEC	8	8	10	10
ED	M5×0.8 depth 8	M5×0.8 depth 8	M6×1 depth 11	M6×1 depth 11
EE (width across flats)	11 _{-0.2} ⁰	13 _{-0.2} ⁰	14 _{-0.2} ⁰	19 _{-0.2} ⁰
Mass	0.47 kg	0.63 kg	1.04 kg	1.70 kg

- This diagram indicates a swing direction L (L stands for counter-clockwise).
- Refer to specifications (**page →28**), dimensions (**page →32**) for specifications and dimensions that are not shown in the diagram.

Clamp arm mounting details

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



* :No need to machine the pin groove (E, øF, G) unless positioning pin is used for the arm.
The positioning pin enables a clamp arm to locate on the clamp firmly and easily.

Swing clamp	CTX32	CTX40	CTX50	CTX63
øA	14 ^{-0.016} _{-0.034}	16 ^{-0.016} _{-0.034}	20 ^{-0.020} _{-0.041}	25 ^{-0.020} _{-0.041}
øB	12.6	14	17.8	22.4
C	19	22	27	32
D	14	20	22	26
E	10.5	10.5	12.5	12.5
øF (pin groove diameter)	4 ^{+0.018} ₀	4 ^{+0.018} ₀	5 ^{+0.018} ₀	5 ^{+0.018} ₀
G	7.1	8.1	10.1	12.6

mm

Taper sleeve

Size

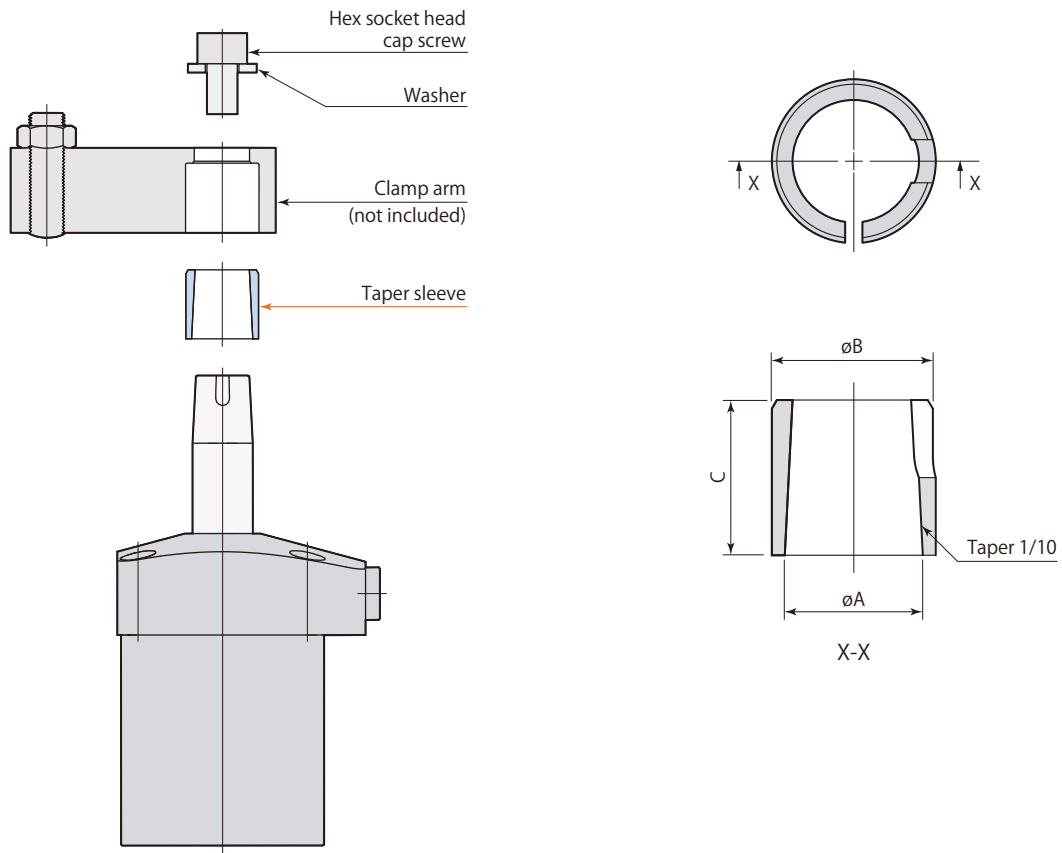
32

40

50

63

CTH — XS : Taper sleeve



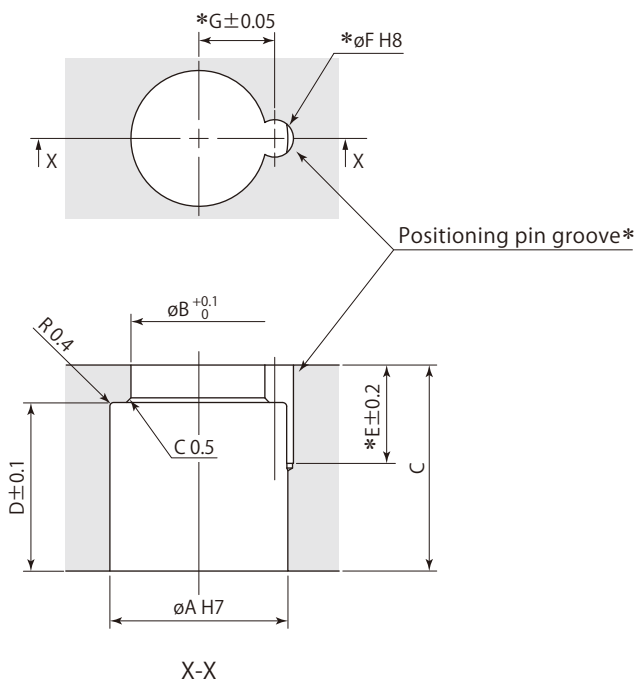
Taper sleeve	CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
Applicable swing clamp	CTX32	CTX40	CTX50	CTX63
ϕA	14	16	20	25
ϕB	17	19	24	29
C	14	18	22	26

mm

Clamp arm mounting details

(Using taper sleeve)

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



*: No need to machine the pin groove (E, ϕF , G) unless positioning pin is used for the arm. The positioning pin enables a clamp arm to locate on the clamp firmly and easily.

Taper sleeve	CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
Applicable swing clamp	CTX32	CTX40	CTX50	CTX63
ϕA	17 ^{+0.018} ₀	19 ^{+0.021} ₀	24 ^{+0.021} ₀	29 ^{+0.021} ₀
ϕB	13	14.5	18.5	23
C	19	22	27	32
D	14	18	22	26
E	10.5	10.5	12.5	12.5
ϕF (pin groove diameter)	4 ^{+0.018} ₀	4 ^{+0.018} ₀	5 ^{+0.018} ₀	5 ^{+0.018} ₀
G	7.1	8.1	10.1	12.6

mm

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Standard CTY	48
Long stroke CTY-S	50
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Clamp arm mounting details	53
Option	
Taper sleeve CTH-XS	54
Mounting & dismounting of clamp arm	56
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air Swing clamp

Dual cylinder model Double acting 0.5 MPa

model **CTY**

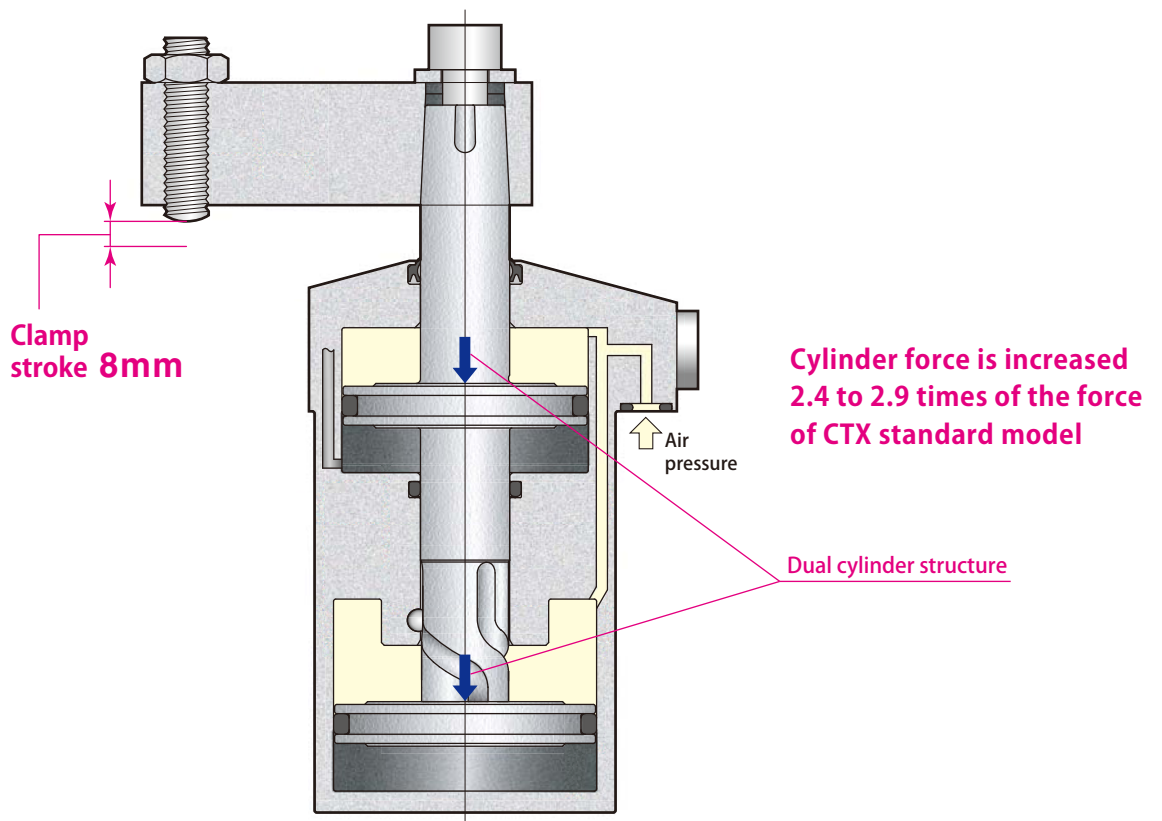


Dual cylinder model
model CTY40-L

Dual cylinder model

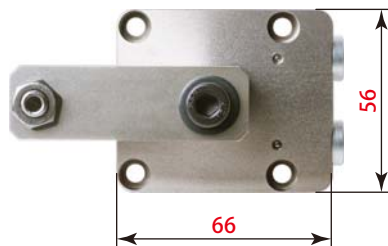
model CTY□-□ JP PAT.

Dual cylinder structure enables cylinder force 2.4 to 2.9 times than that of single cylinder's.



Comparison with the current model**Air swing clamp
Dual cylinder model****CTY40**

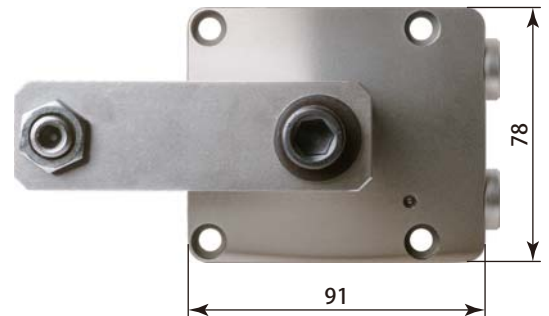
Clamp stroke : **8mm**
 Cylinder force : **1430N**
 (Air pressure 0.5MPa)



**Clamp stroke
 Cylinder force
 Equality**

**Air swing clamp
Standard model****CTX63**

Clamp stroke : **10mm**
 Cylinder force : **1310N**
 (Air pressure 0.5MPa)



Flange area
 approx. **52%**

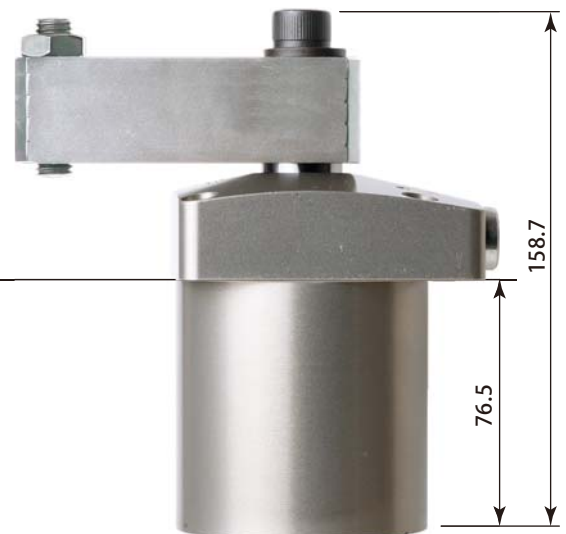
2 size
 smaller

Less space



Height
 approx. **82%**

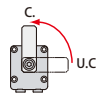
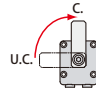
Size
 smaller



Stroke end

Stroke end

Specifications

Size	Swing direction (when clamping)
25	L : Counter-clockwise 
32	
40	R : Clockwise 
50	
63	

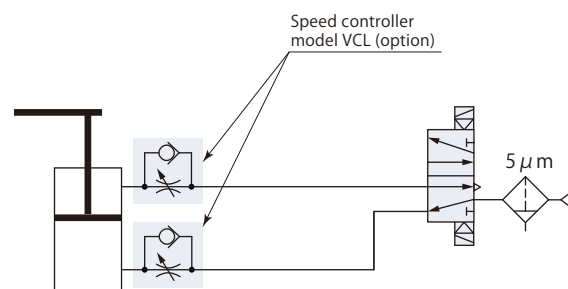
Model		CTY25	CTY32	CTY40	CTY50	CTY63	
Cylinder force (air pressure 0.5MPa)	N	650	950	1430	2110	3090	
Rod diameter	mm	12	14	16	20	25	
Effective area (clamp)	mm ²	1290	1905	2853	4214	6179	
Swing angle		90° ± 3°					
Positioning pin groove position accuracy		± 1°					
Repeated clamp positioning accuracy		± 0.5°					
Full stroke	mm	16	17	18	21	24.5	
90° swing stroke	mm	8	9	10	13	16.5	
Clamp stroke	mm	8	8	8	8	8	
Cylinder capacity	Clamp	cm ³	20.6	32.4	51.4	88.5	151.4
	Unclamp	cm ³	22.4	35.0	55.0	95.1	163.4
Mass	kg	0.4	0.49	0.67	1.10	1.70	
Recommended tightening torque of mounting screws*1	N·m	4.0	4.0	4.0	5.9	5.9	
Recommended tightening torque of cap screw*2	N·m	11	25	25	50	53	

- Pressure range: 0.1–0.5 MPa ● Proof pressure: 0.75 MPa ● Operating temperature: 0–70 °C ● Fluid used: Air*3
- Oil supply: Not required ● Seals are resistant to chlorine-based cutting fluid. (not thermal resistant specification)

*1: ISO R898 class 12.9

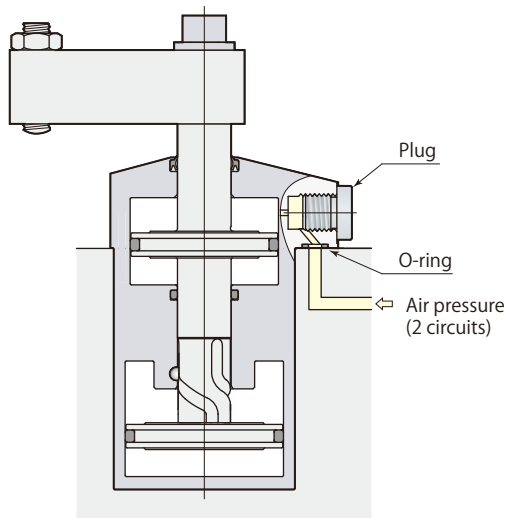
*2: Arm mounting screw

*3: Supply the dry and filtered air. Particulate size 5 μm or less is recommended.

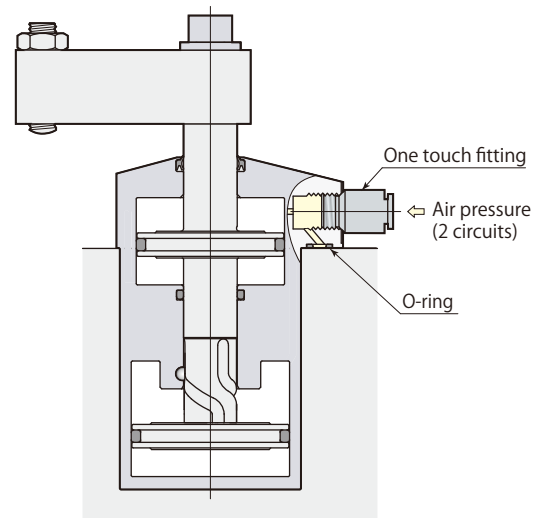
Pneumatic circuit diagram

Manifold piping and G port piping are available.Manifold piping

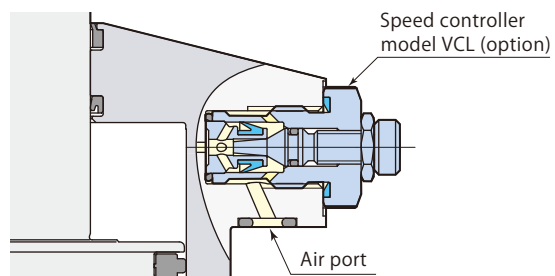
When choosing manifold piping, a speed controller model VCL is mountable on the G ports of the clamp.

G port piping

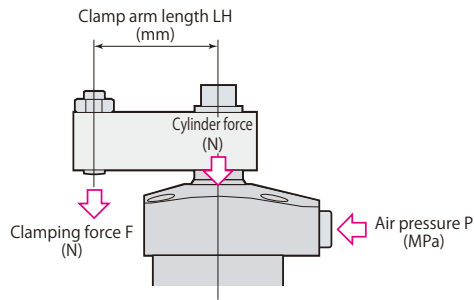
When choosing G port piping, remove plugs. (O-ring must be used.) The one touch fitting or the speed controller with one touch fitting should be mounted when choosing G port piping.

Speed controller model VCL

Page →58



Performance table



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

Clamping force calculation formula

$$F = P \times 1000 / (\text{Coefficient 1} + \text{Coefficient 2} \times LH)$$

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

CTY50 with clamp arm length (LH) 60 mm at air pressure of 0.5 MPa, Clamping force F is calculated by $0.5 \times 1000 / (0.237 + 0.00105 \times 60) = 1670 \text{ N}$

Do not use the clamp in the nonusable range. It may cause damage to the cylinder and rod.

model CTY25 Clamping force $F = P \times 1000 / (0.775 + 0.00432 \times LH)$

Air pressure MPa	Cylinder force N	Clamping force N						Max. arm length Max. LH mm
		Clamp arm length LH mm						
		30	40	50	65	80	100	
0.5	650	550	530	500	470	Nonusable range		70
0.4	520	440	420	400	380	360		98
0.3	390	330	320	300	280	270	250	163
0.2	260	220	210	200	190	180	170	↑
0.1	130	110	110	100	90	90	80	163

model CTY32 Clamping force $F = P \times 1000 / (0.525 + 0.00283 \times LH)$

Air pressure MPa	Cylinder force N	Clamping force N						Max. arm length Max. LH mm
		Clamp arm length LH mm						
		35	50	70	90	100	120	
0.5	950	800	750	690	Nonusable range			77
0.4	760	640	600	550	510	500		109
0.3	570	480	450	410	380	370	350	182
0.2	380	320	300	280	260	250	230	190
0.1	190	160	150	140	130	120	120	190

model CTY40 Clamping force $F = P \times 1000 / (0.350 + 0.00180 \times LH)$

Air pressure MPa	Cylinder force N	Clamping force N						Max. arm length Max. LH mm
		Clamp arm length LH mm						
		50	70	90	110	130	150	
0.5	1430	1140	1050	Nonusable range			75	
0.4	1140	910	840	780				105
0.3	860	680	630	590	550	510	480	174
0.2	570	450	420	390	360	340	320	196
0.1	290	230	210	200	180	170	160	196

model CTY50 Clamping force $F = P \times 1000 / (0.237 + 0.00105 \times LH)$

Air pressure MPa	Cylinder force N	Clamping force N						Max. arm length Max. LH mm
		Clamp arm length LH mm						
		60	80	100	120	140	160	
0.5	2110	1670	1560	1460	Nonusable range			105
0.4	1690	1330	1250	1170	1100	1040		151
0.3	1270	1000	930	880	830	780	740	260
0.2	840	670	620	580	550	520	490	↑
0.1	420	330	310	290	280	260	250	260

model CTY63 Clamping force $F = P \times 1000 / (0.162 + 0.00062 \times LH)$

Air pressure MPa	Cylinder force N	Clamping force N						Max. arm length Max. LH mm
		Clamp arm length LH mm						
		75	90	110	130	150	170	
0.5	3090	2400	2300	2170	2060	1960	Nonusable range	
0.4	2470	1920	1840	1740	1650	1570	1500	224
0.3	1850	1440	1380	1300	1240	1180	1120	330
0.2	1230	960	920	870	820	780	750	↑
0.1	620	480	460	430	410	390	370	330

Swing speed adjustment

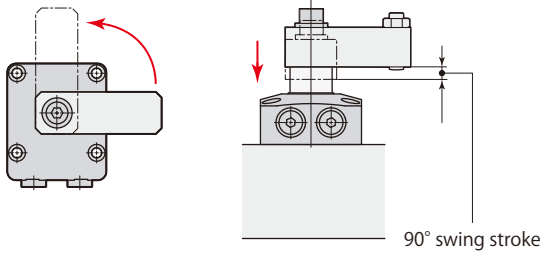
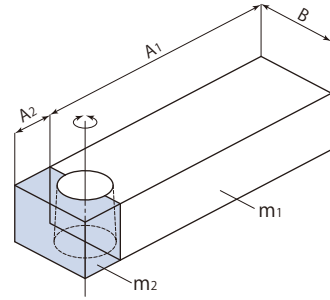
Swing time is restricted by the mass and length of the clamp arm (moment of inertia) since the 90° swing action impacts the cam shaft.

1. Calculate the moment of inertia according to the arm length and mass.
 2. Adjust swing speed with speed controller to ensure that 90° swing time of the clamp arm is greater than the shortest swing time in the graph shown below.
- The cam groove may be damaged in case the swing speed is set at the nonusable range in the graph.

Example of calculation for moment of inertia

$$I = \frac{1}{12} m_1(4A_1^2 + B^2) + \frac{1}{12} m_2(4A_2^2 + B^2)$$

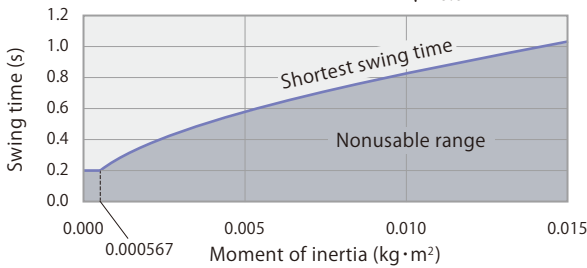
I : Moment of inertia (kg·m²)
m : Mass (kg)



model CTY25

Shortest swing time calculation formula

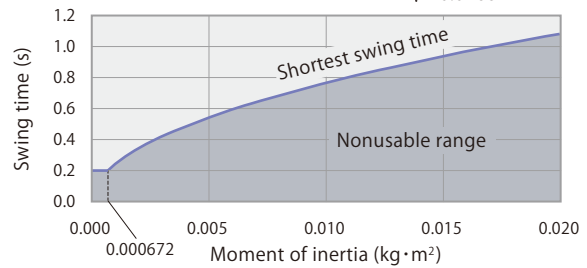
$$t = \sqrt{\frac{I}{0.0142}}$$



model CTY32

Shortest swing time calculation formula

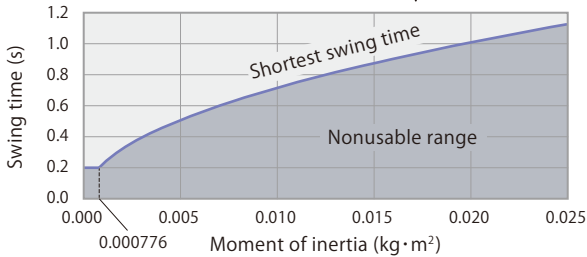
$$t = \sqrt{\frac{I}{0.0168}}$$



model CTY40

Shortest swing time calculation formula

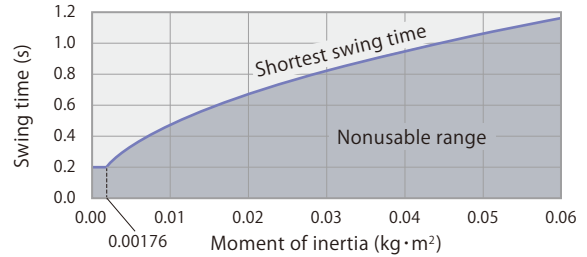
$$t = \sqrt{\frac{I}{0.0194}}$$



model CTY50

Shortest swing time calculation formula

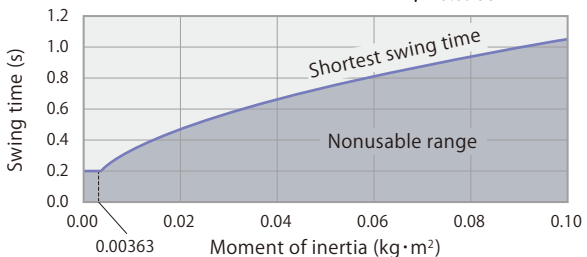
$$t = \sqrt{\frac{I}{0.0440}}$$



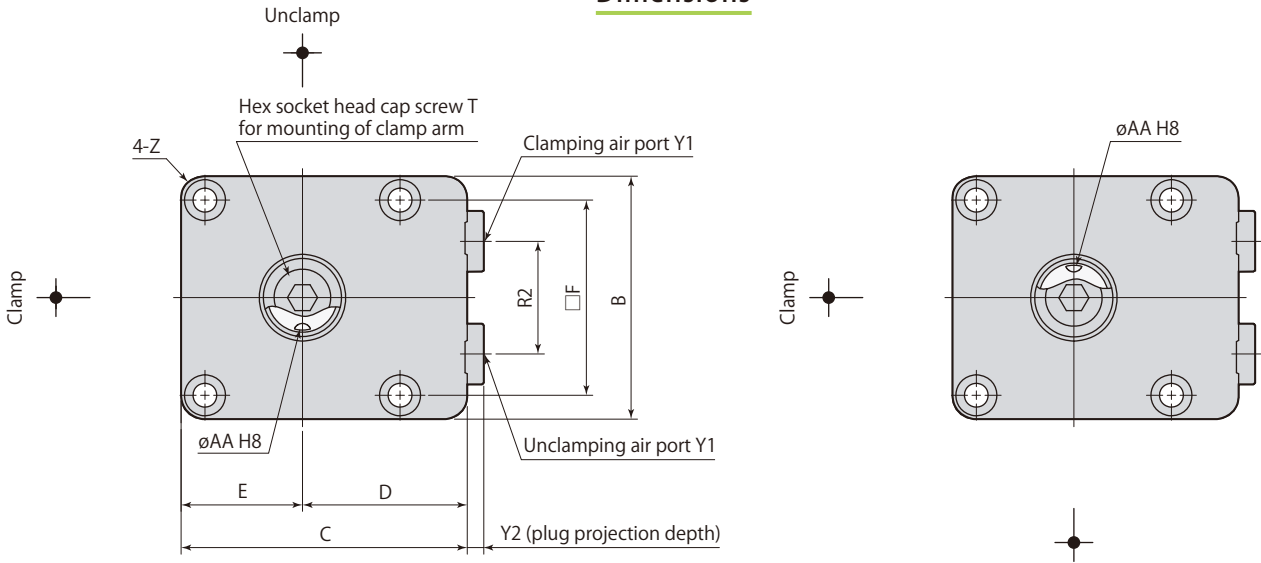
model CTY63

Shortest swing time calculation formula

$$t = \sqrt{\frac{I}{0.0908}}$$



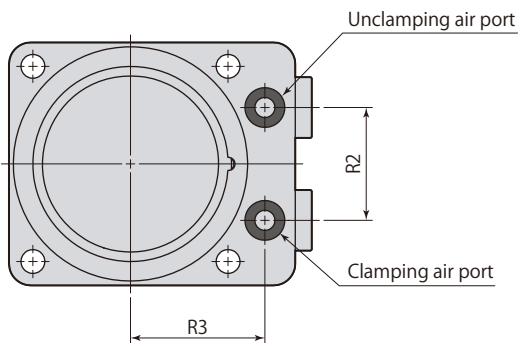
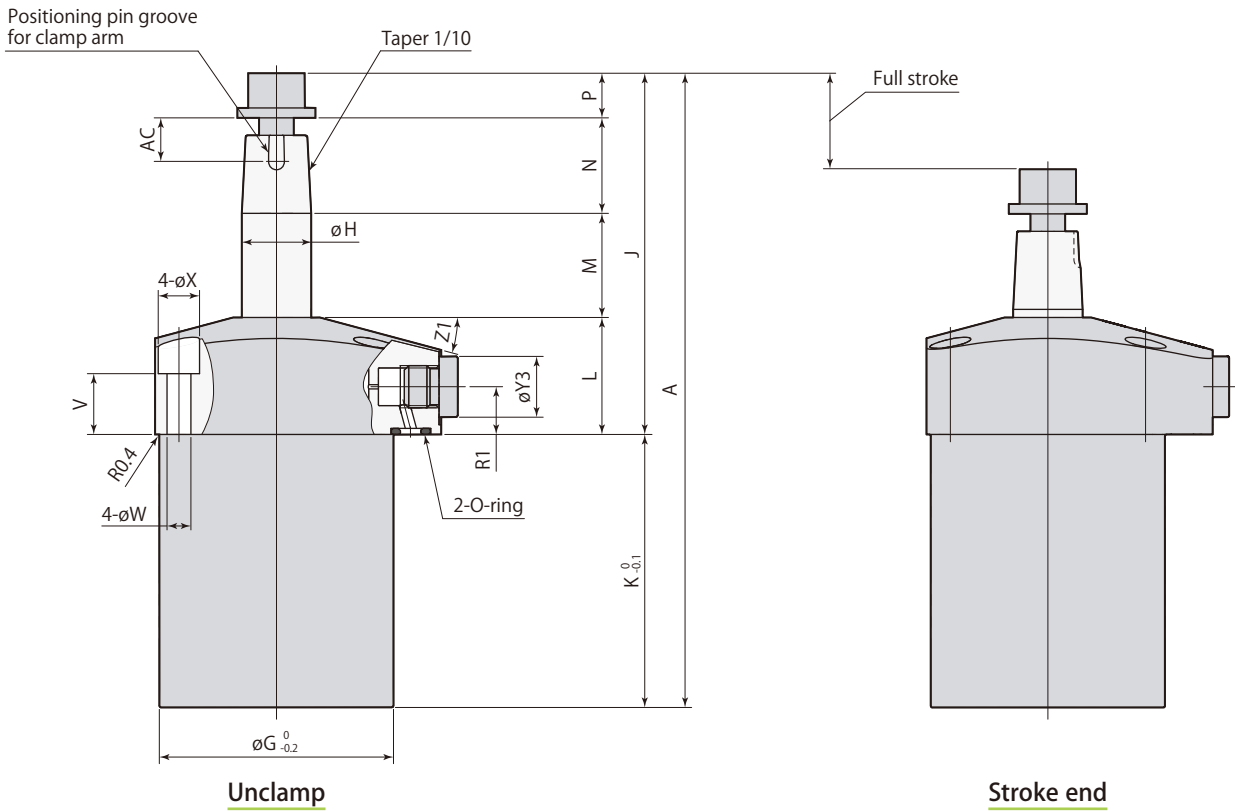
Dimensions



This diagram indicates the arm positioning pin groove at unclamped condition.

Swing direction L (counter-clockwise)

Swing direction R (clockwise)



● Clamp arm, positioning pin and mounting screws are not included.

CTY□-□		Air swing clamp Dual cylinder model			air	Double acting
Model		CTY25-□	CTY32-□	CTY40-□	CTY50-□	CTY63-□
		mm				
A		131.8	141.3	148.3	171.7	195.7
B		45	50	56	66	78
C		54	60	66	80	91
D		31.5	35	38	47	52
E		22.5	25	28	33	39
F		34	39	45	53	65
øG		39	46	54	64	77
øH		12	14	16	20	25
J		69.3	75.3	79.3	95.2	105.7
K		62.5	66	69	76.5	90
L		27	27	27	32	32
M		18	19	20	23	26.5
N (arm thickness)		16	19	22	27	32
P		8.3	10.3	10.3	13.2	15.2
R1		11	11	11	12.5	12.5
R2		18	20	26	30	40
R3		26	28	31	36	41
T		M6×1 length 20	M8×1.25 length 16	M8×1.25 length 16	M10×1.5 length 20	M12×1.75 length 25
V		14	14	14	17	16
øW		5.5	5.5	5.5	6.8	6.8
øX		9.5	9.5	9.5	11	11
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		R5	R5	R5	R6	R6
Z1		15°	15°	15°	14°	13°
øAA (pin groove diameter)		3 ^{+0.014} ₀	4 ^{+0.018} ₀	4 ^{+0.018} ₀	5 ^{+0.018} ₀	5 ^{+0.018} ₀
AC		10.5	10.5	10.5	12.5	12.5
Positioning pin (dowel pin)		ø3(h8)×10	ø4(h8)×10	ø4(h8)×10	ø5(h8)×12	ø5(h8)×12
O-ring (FKM-90)		P6	P6	P6	P6	P6
Taper sleeve		CTH25-XS	CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
Speed controller*	Meter-in	VCL01-I	VCL01-I	VCL01-I	VCL02-I	VCL02-I
	Meter-out	VCL01-O	VCL01-O	VCL01-O	VCL02-O	VCL02-O

*: Select the right model of VCL according to the size of the clamp.

Refer to each page for the details of options.

● Taper sleeve **page →54** ● Speed controller **page →58**

Specifications

Size: **25**, **32**, **40**, **50**, **63**

Swing direction (when clamping): **L** : Counter-clockwise, **R** : Clockwise

Clamp stroke: **S16** : 16mm

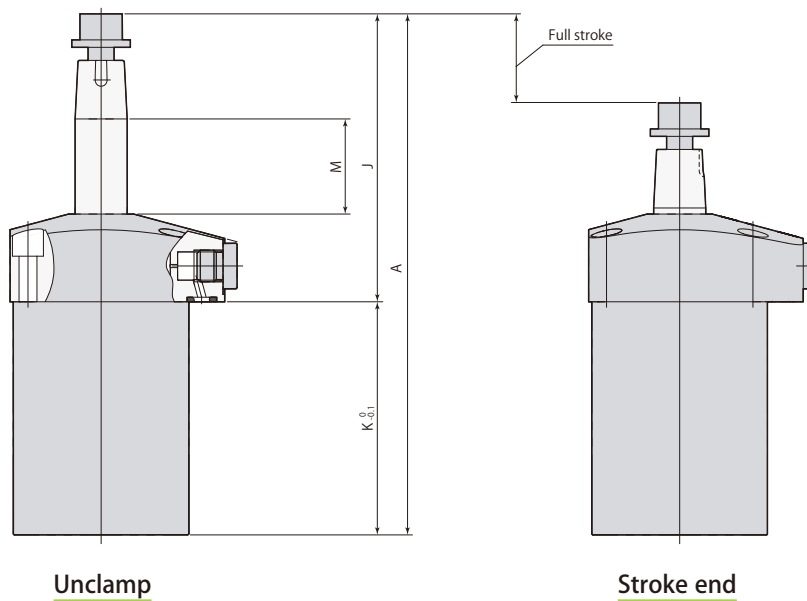
CTY —

■ indicates made to order.

Model		CTY25-□S16	CTY32-□S16	CTY40-□S16	CTY50-□S16	CTY63-□S16	
Full stroke	mm	24	25	26	29	32.5	
Clamp stroke	mm	16	16	16	16	16	
Cylinder capacity	Clamp	cm ³	31.0	47.6	74.2	122.2	200.8
	Unclamp	cm ³	33.7	51.5	79.4	131.3	214.2
Mass	kg	0.42	0.57	0.80	1.3	2.5	

● Refer to **page →44** for the specifications of products that are not listed on this page.

Dimensions

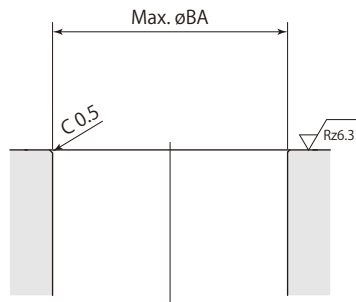
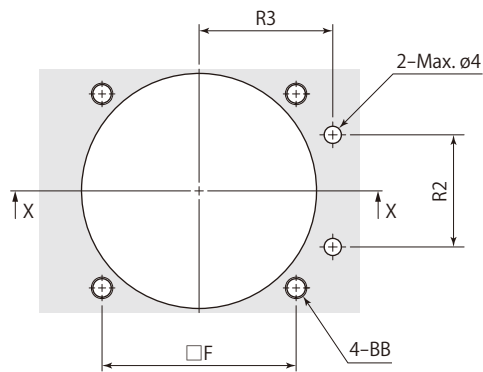


Model	CTY25-□S16	CTY32-□S16	CTY40-□S16	CTY50-□S16	CTY63-□S16
A	163.8	173.3	180.3	203.7	227.7
J	77.3	83.3	87.3	103.2	113.7
K	86.5	90	93	100.5	114
M	26	27	28	31	34.5

mm

● Refer to **pages →48-49** for the dimensions of products that are not listed on this page.

Refer to each page for the details of options. ● Taper sleeve **page →54** ● Speed controller **page →58**

Mounting details

X-X

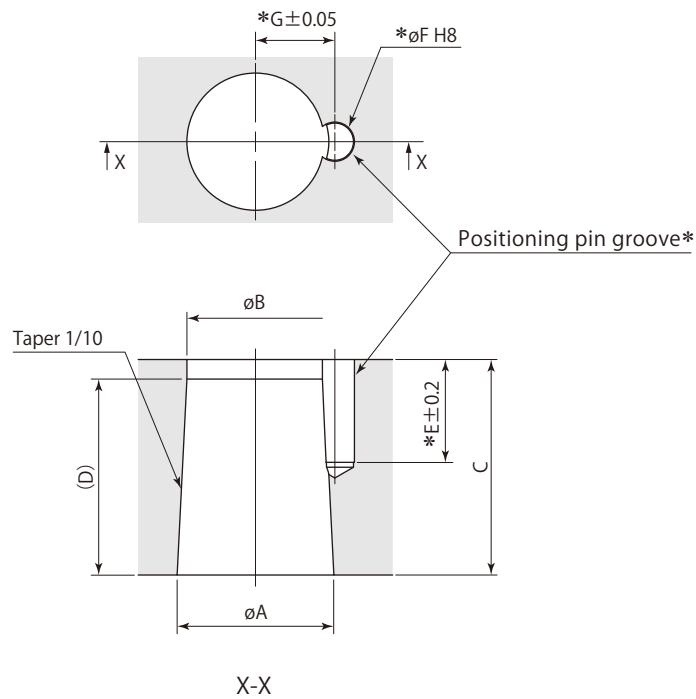
Rz: ISO4287(1997)

Model	CTY25-□	CTY32-□	CTY40-□	CTY50-□	CTY63-□
F	34	39	45	53	65
R2	18	20	26	30	40
R3	26	28	31	36	41
øBA	39.5	46.5	54.5	64.5	77.5
BB	M5	M5	M5	M6	M6

mm

Clamp arm mounting details

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



*:No need to machine the pin groove (E, ϕF , G) unless positioning pin is used for the arm.
The positioning pin enables a clamp arm to locate on the clamp firmly and easily.

Swing clamp	CTY25-□	CTY32-□	CTY40-□	CTY50-□	CTY63-□
ϕA	12 ^{-0.016} _{-0.034}	14 ^{-0.016} _{-0.034}	16 ^{-0.016} _{-0.034}	20 ^{-0.020} _{-0.041}	25 ^{-0.020} _{-0.041}
ϕB	10.5	12.6	14	17.8	22.4
C	16	19	22	27	32
D	15	14	20	22	26
E	10.5	10.5	10.5	12.5	12.5
ϕF (pin groove diameter)	3 ^{+0.014} ₀	4 ^{+0.018} ₀	4 ^{+0.018} ₀	5 ^{+0.018} ₀	5 ^{+0.018} ₀
G	6.1	7.1	8.1	10.1	12.6

Taper sleeve

Size

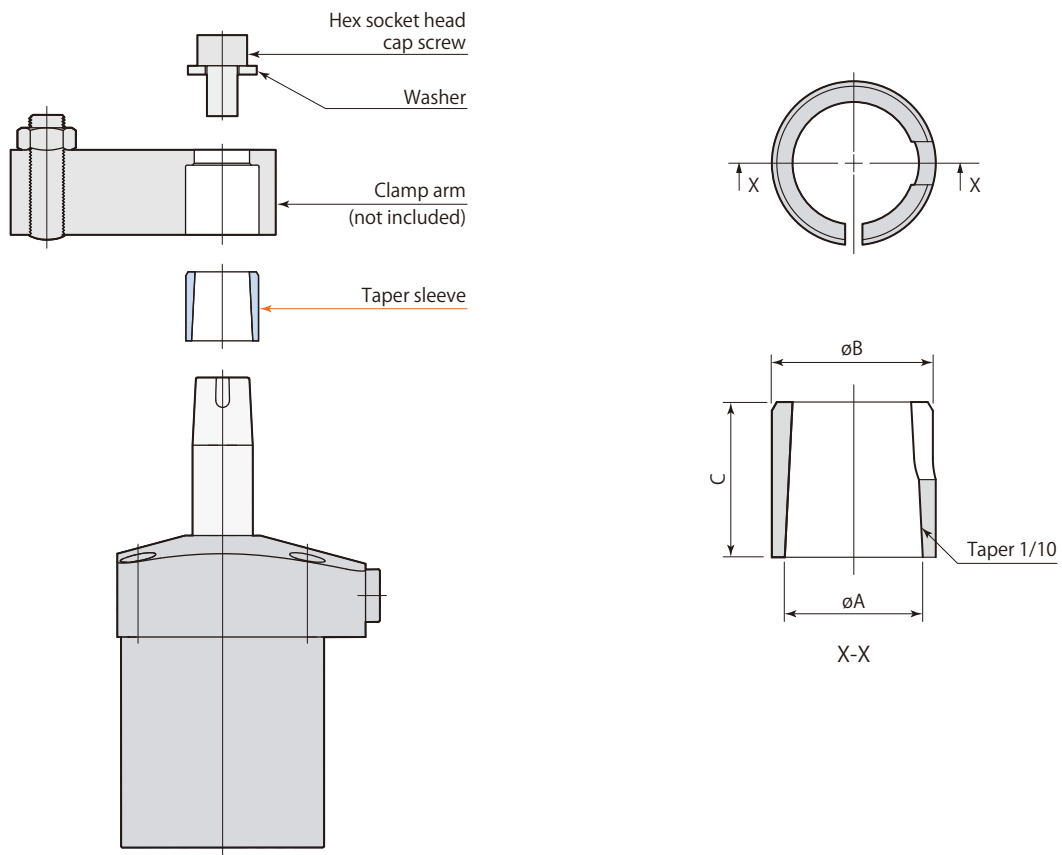
25

32

CTH 40 — XS : Taper sleeve

50

63



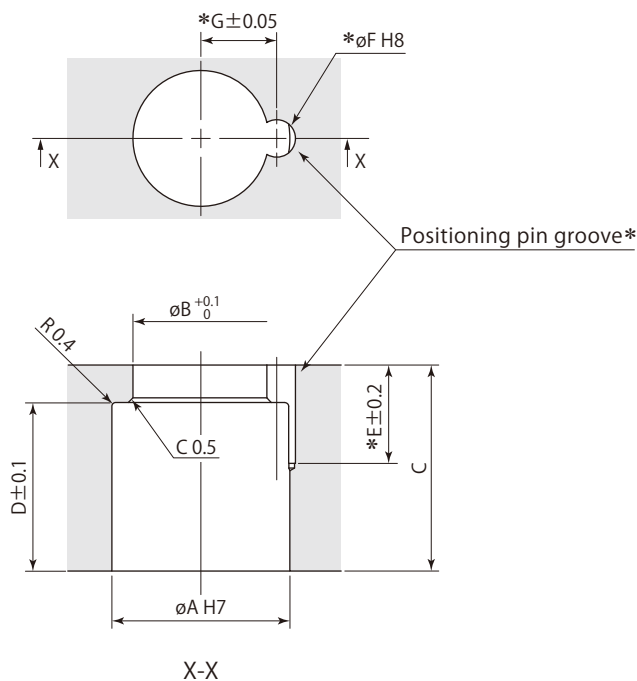
mm

Taper sleeve	CTH25-XS	CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
Applicable swing clamp	CTY25-□	CTY32-□	CTY40-□	CTY50-□	CTY63-□
ϕA	12	14	16	20	25
ϕB	14.5	17	19	24	29
C	10	14	18	22	26

Clamp arm mounting details

(Using taper sleeve)

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



* :No need to machine the pin groove (E, ϕF , G) unless positioning pin is used for the arm.
The positioning pin enables a clamp arm to locate on the clamp firmly and easily.

Taper sleeve	CTH25-XS	CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
Applicable swing clamp	CTY25-□	CTY32-□	CTY40-□	CTY50-□	CTY63-□
ϕA	14.5 ^{+0.018} ₀	17 ^{+0.018} ₀	19 ^{+0.021} ₀	24 ^{+0.021} ₀	29 ^{+0.021} ₀
ϕB	10.5	13	14.5	18.5	23
C	16	19	22	27	32
D	10	14	18	22	26
E	10.5	10.5	10.5	12.5	12.5
ϕF (pin groove diameter)	3 ^{+0.014} ₀	4 ^{+0.018} ₀	4 ^{+0.018} ₀	5 ^{+0.018} ₀	5 ^{+0.018} ₀
G	6.1	7.1	8.1	10.1	12.6

mm

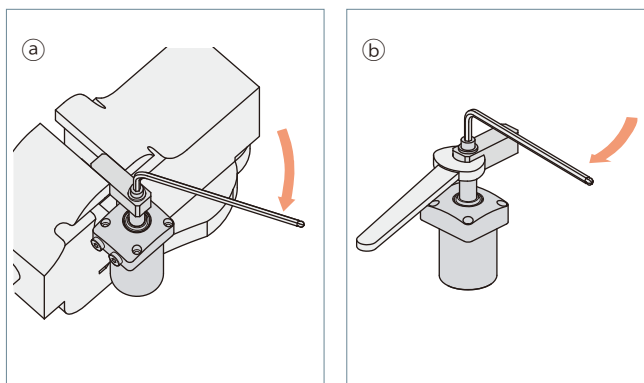
Mounting & dismounting of clamp arm

- Swing clamp may be damaged if excessive torque is applied, since structure is intended for swinging using cam mechanism with lead grooves. Follow instructions shown below to prevent excessive torque from being applied on piston rod when mounting or dismounting clamp arm.
- Be sure to tighten the hex socket head cap screw with recommended tightening torque. If the tightening torque is insufficient, clamp arm may slip during operation.

Model		CTY25	CTX32 CTY32	CTX40 CTY40	CTX50 CTY50	CTX63 CTY63
Recommended tightening torque of cap screw	N·m	11	25	25	50	53

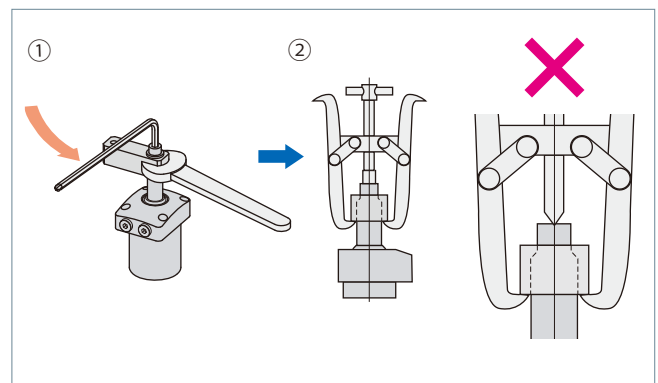
Mounting of clamp arm

- Fix the clamp arm in a vise, then set the clamp body and clamp arm at the desired orientation, and tighten the hex socket head cap screw with a hex wrench.
- For clamps that are mounted on jig, set clamp arm at desired orientation, and hold it with a wrench not to rotate piston rod, and then tighten screw on the piston rod with a hex wrench.



Dismounting of clamp arm

- Hold the clamp arm with a wrench not to rotate piston rod, and then loosen screw on the piston rod with a hex wrench.
- After dismounting hex socket head cap screw, pull out clamp arm using gear puller. A flat saddle type of gear puller should be used when removing an arm not to enlarge the hole on the tip of the piston rod. In addition, be careful not to rotate the rod when removing the arm.



Specifications

I : Meter-in

O : Meter-out

G port size

Control method



Locknut color : Silver

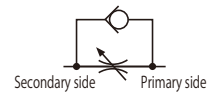
Locknut color : Black

VCL

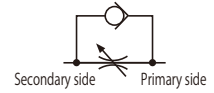
01 : G1/8

02 : G1/4

I : Meter-in



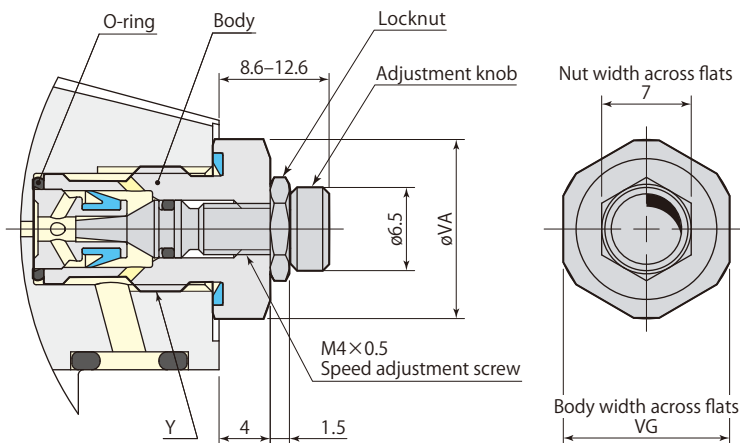
O : Meter-out



Model	VCL01-I	VCL01-O	VCL02-I	VCL02-O
G port size	G1/8		G1/4	
Orifice area	mm ²	2.8	6.2	
Recommended tightening torque	N·m	7	15	
Mass	kg	0.01	0.02	

- Pressure range: 0.1–1.0 MPa
- Proof pressure: 1.5 MPa
- Operating temperature: 0–70 °C
- Fluid used: Air*

*: Supply the dry and filtered air. Particulate size 5 μm or less is recommended.



Model	VCL01	VCL02
Y	G1/8	G1/4
øVA	14	19
VG	13	17
Adjustment screw number of turns	8 rotations	
O-ring*1	6.0×1.0*2	8.0×1.0*2

*1: FKM-90

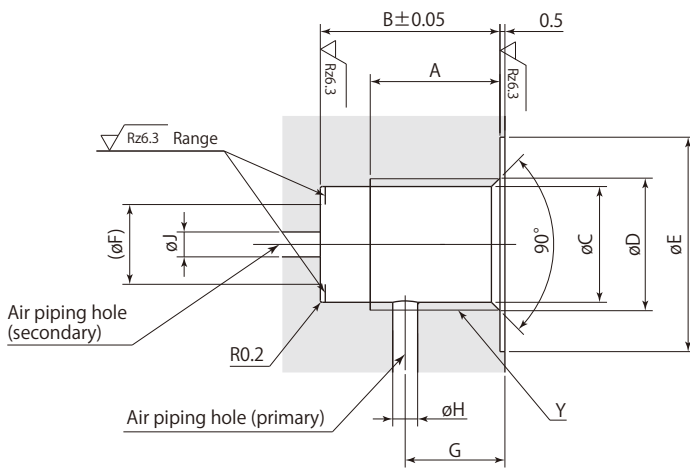
*2: Inner diameter × Thickness

- Use a closed wrench or socket wrench for mounting and dismounting.
- Speed controller can be mounted on air port (G port) when using manifold piping.
- This diagram depicts mounted condition for meter-out (VCL□-O).
- VCL is shipped with the valve fully open. Adjust the flow rate by loosening the screw after it is tightened up to close the valve. Tighten the locknut after adjustment is completed.

Applicable clamp

Model	VCL01	VCL02
Air swing clamp	CTX32, CTX40 CTY25, CTY32, CTY40	CTX50, CTX63 CTY50, CTY63
Air link clamp	CLX32, CLX40 CLY32, CLY40* CLZ25	CLX50, CLX63 CLY50, CLY63*

*: Air link clamp boost model CLY are meter-out only.

Mounting details

Rz: ISO4287(1997)

Model	mm	
	VCL01	VCL02
A	9	13
B	14	18
ϕC	$8.7^{+0.1}_0$	$11.6^{+0.1}_0$
ϕD	9.9	13.3
ϕE	17.5	21.5
ϕF	6	8
G	8-11	9-12.5
ϕH	2	3
ϕJ	2	3
Y	G1/8	G1/4

Mounting & dismounting of speed controller

- When mounting or dismounting a speed controller, be sure to set pressure within air circuit to 0 MPa before starting.
- When mounting a speed controller, be sure to tighten it with the recommended tightening torque.



<p style="text-align: center;">air Link clamp</p>		<p>model CLX-T Page →62</p> 	<p>model CLX Page →80</p> 	<p>model CLZ Page →94</p> 	<p>model CLY Page →104</p> 
		air Double acting	air Double acting	air Double acting	air Double acting
Specifications		air Double acting	air Double acting	air Double acting	air Double acting
Features		Built-in sensor model	Standard model	Dual cylinder model	Boost model
Variations	3 point sensor model	 <p>CLX-T Page →74</p>	—	—	—
	Standard (without sensor)	 <p>—</p>	CLX Page →88	CLZ Page →102	CLY Page →112
	Dual rod	 <p>—</p>	CLX-E Page →91	—	—
Option	Speed controller		VCL Page →118		

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Clamp arm mounting details	78
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Sensing **air** Link clamp

Double acting 1 MPa

model **CLX-T**



3 point sensor model
model CLX50-FT

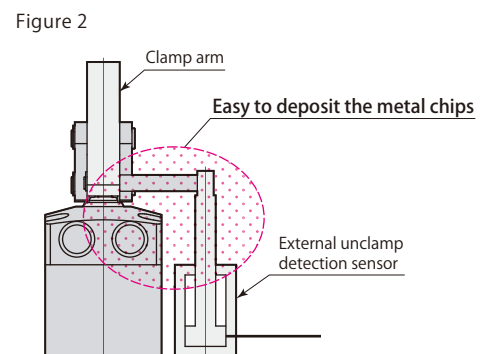
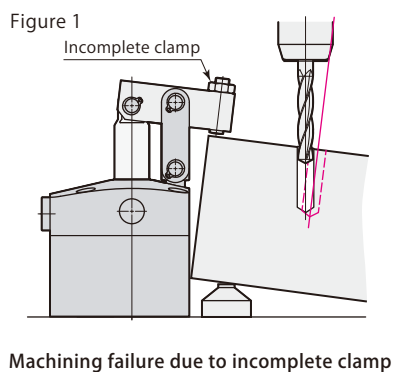
Sensing **air Link clamp** model **CLX-T**

The extremely small sensing clamp can detect the loading miss and setting miss of a workpiece firmly.

3 point sensor model



- Sensor model can prevent tool breakage and defective machining due to incomplete clamp. (Figure 1)
- Unclamp PAL sensor moves along with the piston rod and can positively detect unclamping point, thereby enabling a high-speed production line by fully synchronizing operation with workpiece lifters.
- Built-in sensors enable a compact and simple jig.
- Unclamp detection failure due to the metal chips deposit on an independent external detector can be reduced. (Figure 2)



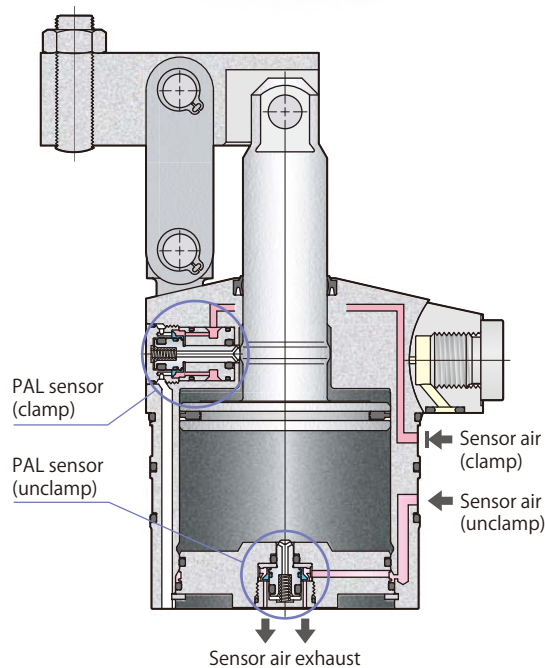
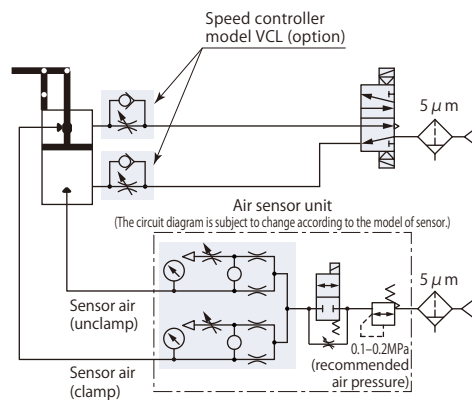
3 point sensor model T

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

model **CLX□-□T** PAT.

The 3 point sensor model can detect the status of clamp, unclamp and over clamp stroke with just 2 circuits of air.

Refer to **pages →70-73** for the details.

**Pneumatic circuit diagram**

Specifications

Size

CLX —

- 32
- 40
- 50
- 63

Clamp arm mounting direction

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

T : 3 point sensor model
Clamp, Unclamp, Over clamp stroke (Incomplete clamp) detection

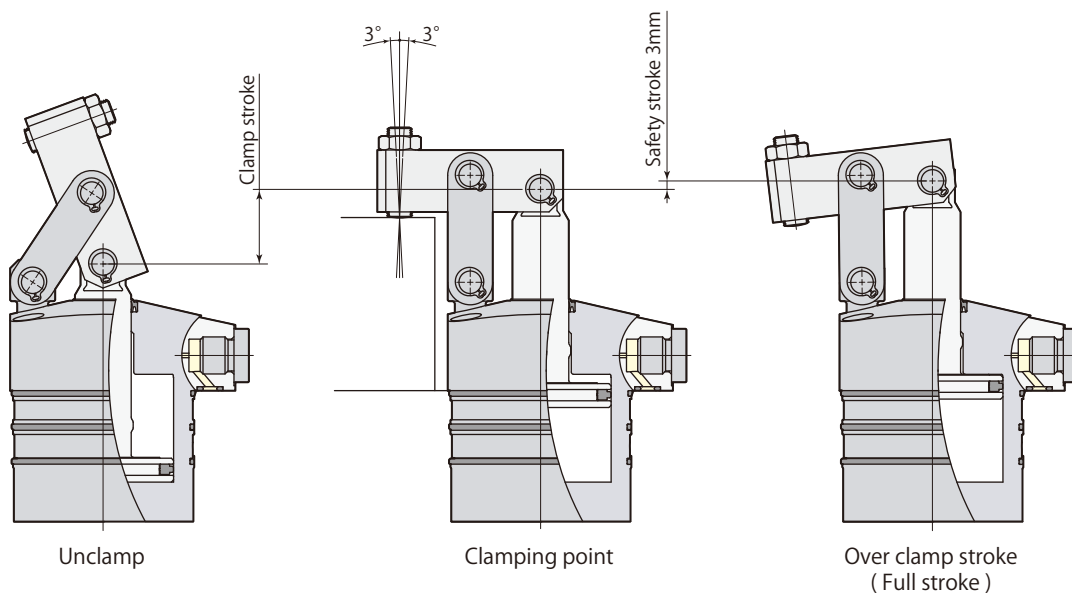
Model		CLX32-□T	CLX40-□T	CLX50-□T	CLX63-□T	
Cylinder force (air pressure 0.5MPa)	N	400	630	980	1560	
Cylinder inner diameter	mm	32	40	50	63	
Rod diameter	mm	14	16	20	25	
Effective area (clamp)	mm ²	804	1257	1963	3117	
Full stroke	mm	24	26	29.5	34.5	
Clamp stroke*1	mm	21	23	26.5	31.5	
Safety stroke	mm	3	3	3	3	
Cylinder capacity	Clamp	cm ³	19.3	32.7	57.9	107.5
	Unclamp	cm ³	15.6	27.4	48.7	90.6
Mass	kg	0.44	0.59	0.99	1.54	
Recommended tightening torque of mounting screws*2	N·m	4.0	4.0	5.9	5.9	

- Pressure range: 0.1–1 MPa
- Proof pressure: 1.5 MPa
- Operating temperature: 0–70 °C
- Fluid used: Air*3
- Oil supply: Not required
- 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 *3: Supply the dry and filtered air. Particulate size 5 μm or less is recommended.

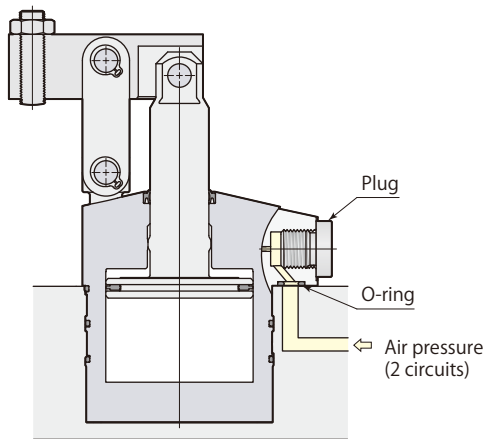
When clamping the workpiece, the clamp arm should be situated like the sketch as shown below. (Clamping point)
Please avoid any non-axial force such as the bending moment toward the piston rod. (Allowable angle ±3°)



Manifold piping and G port piping are available.

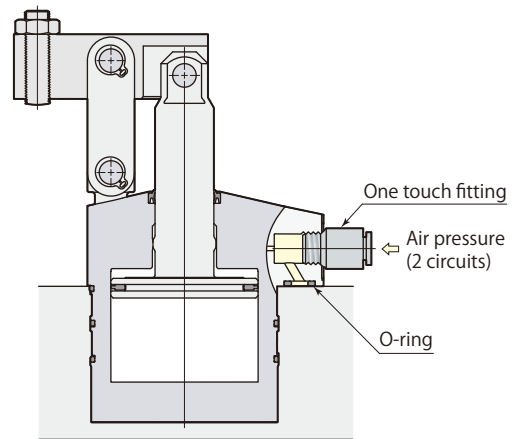
Manifold piping

When choosing manifold piping, a speed controller model VCL is mountable on the G ports of the clamp.



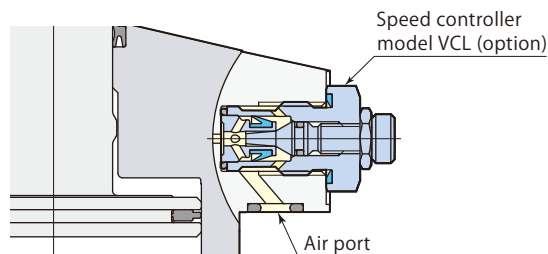
G port piping

When choosing G port piping, remove plugs. (O-ring must be used.) The one touch fitting or the speed controller with one touch fitting should be mounted when choosing G port piping.

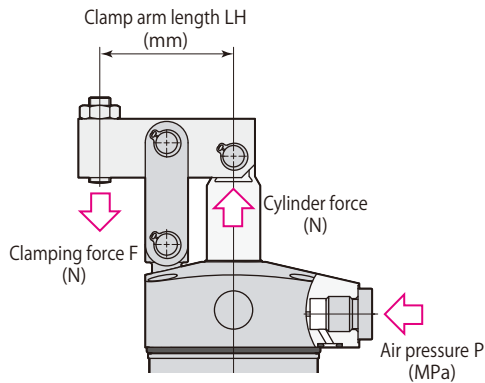


Speed controller model VCL

Page →118



Performance diagram



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

Clamping force calculation formula

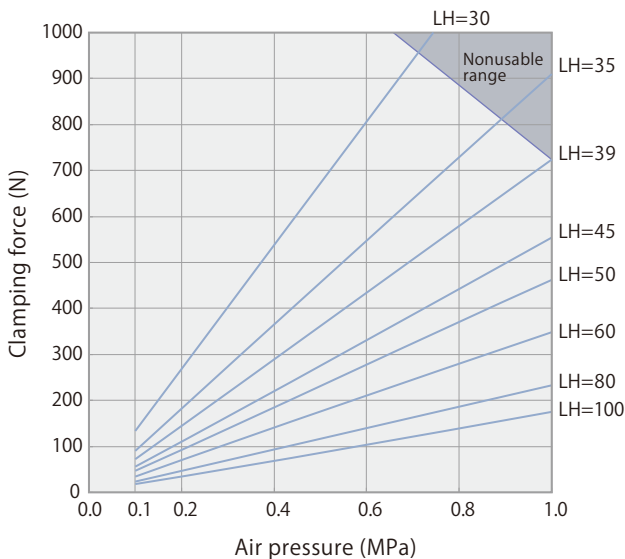
$$F = \text{Coefficient 1} \times P \times 1000 / (\text{LH} - \text{Coefficient 2})$$

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

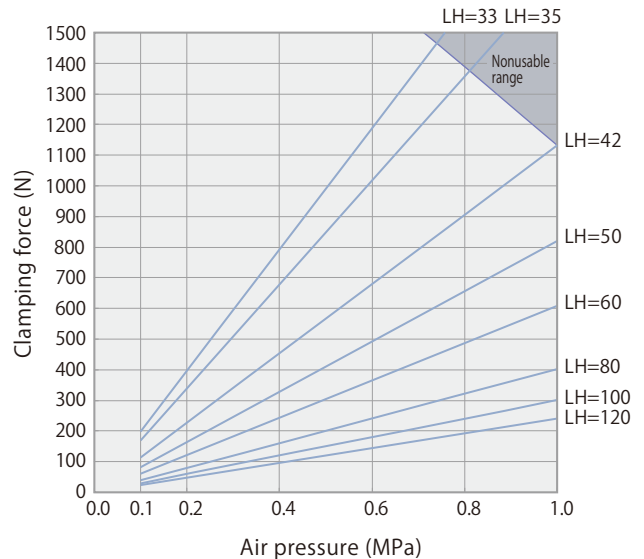
CLX50-T with clamp arm length (LH) 50 mm at air pressure of 0.5 MPa, Clamping force F is calculated by $44.18 \times 0.5 \times 1000 / (50 - 25.0) = 880 \text{ N}$

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

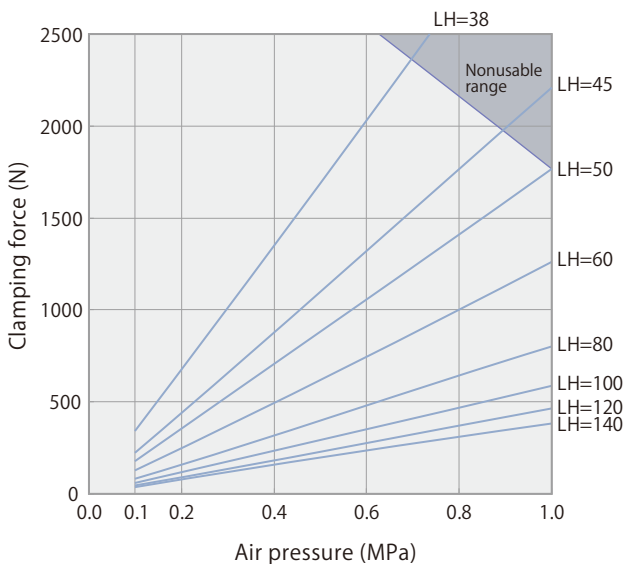
model CLX32-□T



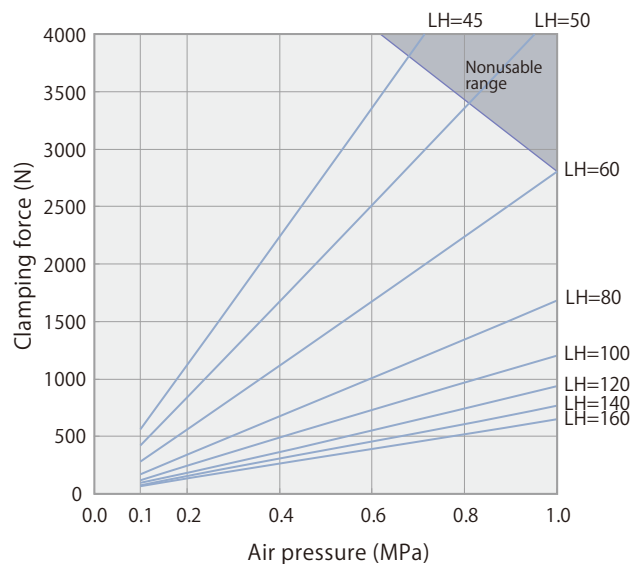
model CLX40-□T



model CLX50-□T



model CLX63-□T



Performance table

model CLX32-□T Clamping force $F=14.11 \times P \times 1000 / (LH-19.5)$

Air pressure MPa	Cylinder force N	Clamping force N								Min. arm length Min. LH mm
		Clamp arm length LH mm								
		30	35	39	45	50	60	80	100	
1.0	800			720	550	460	350	230	180	39
0.9	720			650	500	420	310	210	160	36
0.8	640		730	580	440	370	280	190	140	33
0.7	560	940	640	510	390	320	240	160	120	30
0.6	480	810	550	430	330	280	210	140	110	28
0.5	400	670	460	360	280	230	170	120	90	26
0.4	320	540	360	290	220	190	140	90	70	↑
0.3	240	400	270	220	170	140	100	70	50	↑
0.2	160	270	180	140	110	90	70	50	40	↑
0.1	80	130	90	70	60	50	30	20	20	26

■ indicates nonusable range

model CLX40-□T Clamping force $F=23.75 \times P \times 1000 / (LH-21.0)$

Air pressure MPa	Cylinder force N	Clamping force N								Min. arm length Min. LH mm
		Clamp arm length LH mm								
		33	35	42	50	60	80	100	120	
1.0	1260			1130	820	610	400	300	240	42
0.9	1130			1020	740	550	360	270	220	38
0.8	1010		1360	900	660	490	320	240	190	35
0.7	880	1390	1190	790	570	430	280	210	170	32
0.6	750	1190	1020	680	490	370	240	180	140	30
0.5	630	990	850	570	410	300	200	150	120	29
0.4	500	790	680	450	330	240	160	120	100	↑
0.3	380	590	510	340	250	180	120	90	70	↑
0.2	250	400	340	230	160	120	80	60	50	↑
0.1	130	200	170	110	80	60	40	30	20	29

■ indicates nonusable range

model CLX50-□T Clamping force $F=44.18 \times P \times 1000 / (LH-25.0)$

Air pressure MPa	Cylinder force N	Clamping force N								Min. arm length Min. LH mm
		Clamp arm length LH mm								
		38	45	50	60	80	100	120	140	
1.0	1960			1770	1260	800	590	470	380	50
0.9	1770			1590	1140	720	530	420	350	46
0.8	1570		1770	1410	1010	640	470	370	310	42
0.7	1370		1550	1240	880	560	410	330	270	39
0.6	1180	2040	1330	1060	760	480	350	280	230	36
0.5	980	1700	1100	880	630	400	290	230	190	34
0.4	790	1360	880	710	500	320	240	190	150	↑
0.3	590	1020	660	530	380	240	180	140	120	↑
0.2	390	680	440	350	250	160	120	90	80	↑
0.1	200	340	220	180	130	80	60	50	40	34

■ indicates nonusable range

model CLX63-□T Clamping force $F=84.16 \times P \times 1000 / (LH-30.0)$

Air pressure MPa	Cylinder force N	Clamping force N								Min. arm length Min. LH mm
		Clamp arm length LH mm								
		45	50	60	80	100	120	140	160	
1.0	3120			2810	1680	1200	940	770	650	60
0.9	2810			2520	1510	1080	840	690	580	55
0.8	2490		3370	2240	1350	960	750	610	520	50
0.7	2180		2950	1960	1180	840	650	540	450	46
0.6	1870	3370	2520	1680	1010	720	560	460	390	43
0.5	1560	2810	2100	1400	840	600	470	380	320	40
0.4	1250	2240	1680	1120	670	480	370	310	260	↑
0.3	940	1680	1260	840	500	360	280	230	190	↑
0.2	620	1120	840	560	340	240	190	150	130	↑
0.1	310	560	420	280	170	120	90	80	60	40

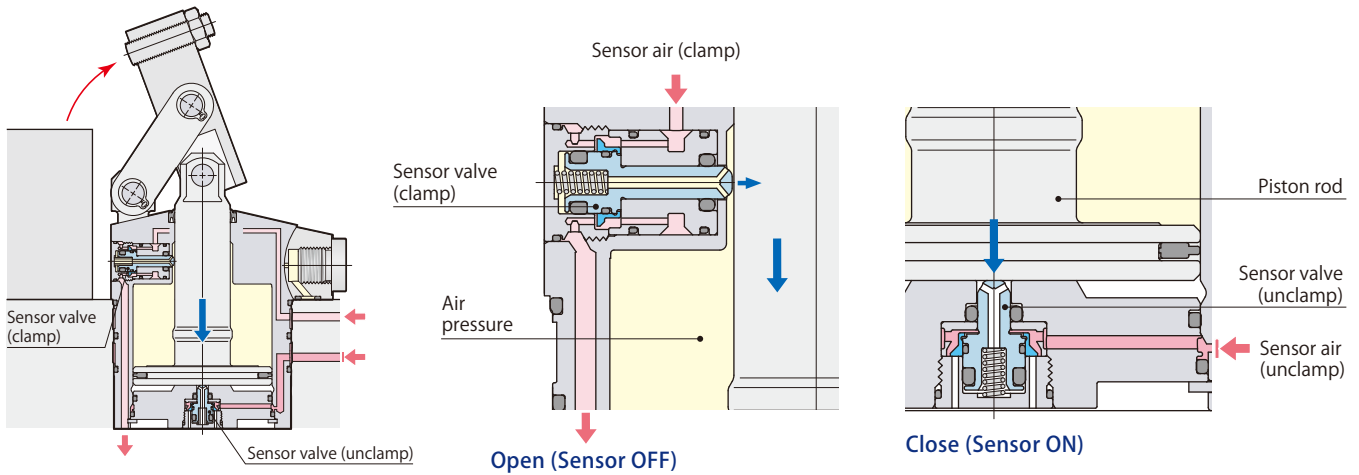
■ indicates nonusable range

Sensing Air link clamp CLX-T 3 point sensor model

PAL sensor function and structure

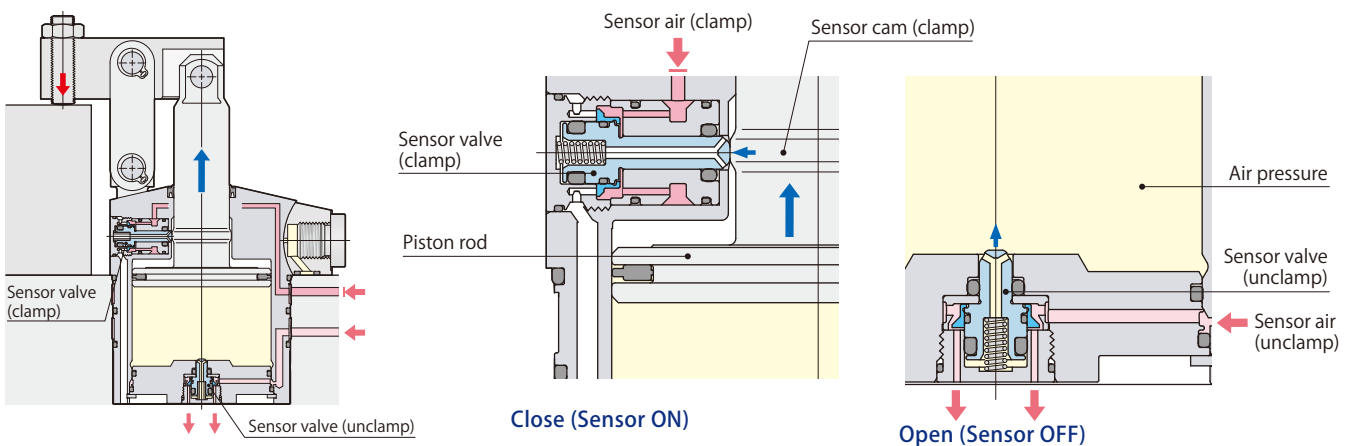
Sensing Air link clamp
CLX-T
3 point sensor model

Unclamp detection



- The sensor valve (unclamp) is pushed down by the piston rod and shuts off the sensor air flow when the piston rod reaches the unclamp end. The sensor valve (clamp) is pushed up by the air pressure to open for air exhaust and detects the unclamped condition.

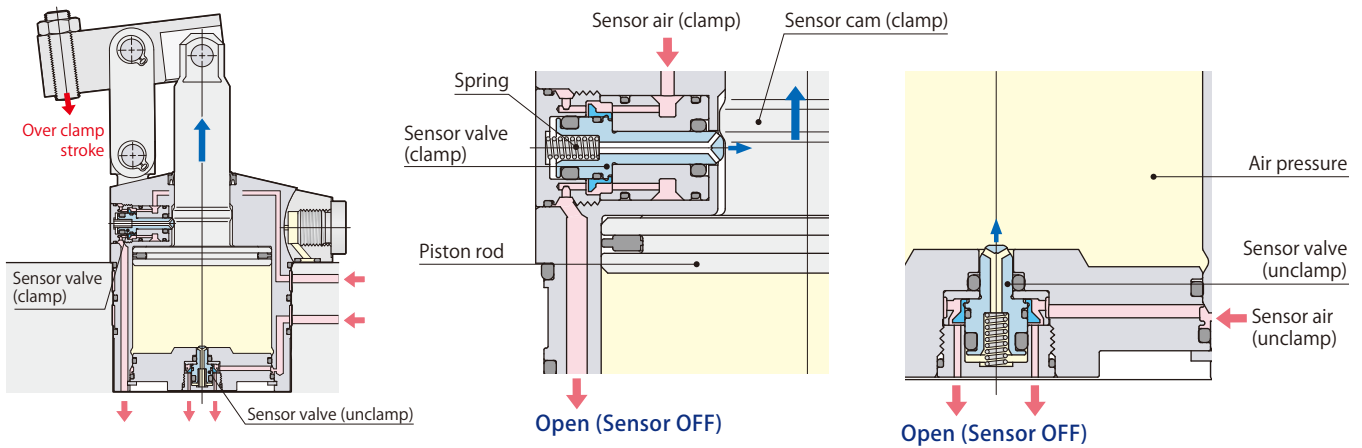
Clamp detection



- The sensor valve (clamp) is pushed down by the sensor cam (clamp) and shuts off the sensor air flow when the piston rod reaches the clamping point. The sensor valve (unclamp) is pushed up by the air pressure to open for air exhaust and detects the clamped condition.

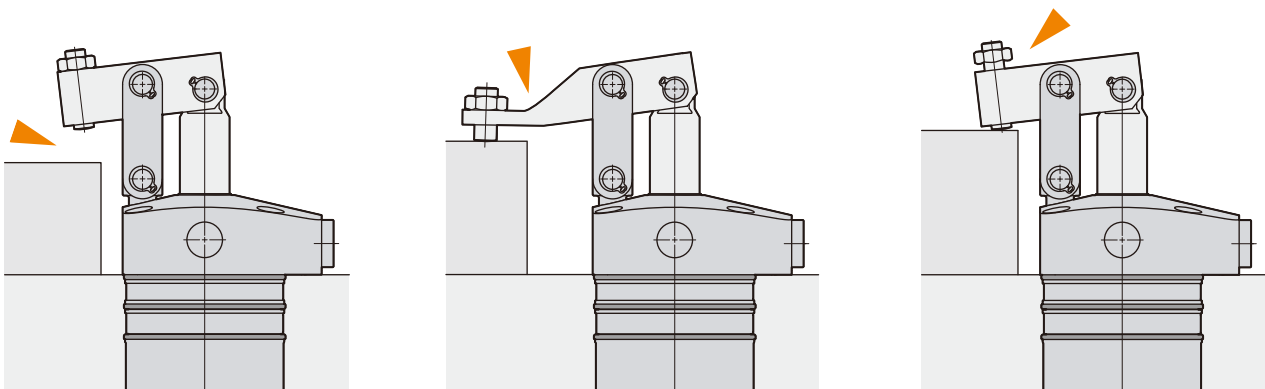
PAL sensor function and structure

Over clamp stroke (Incomplete clamp) detection



- The sensor cam passes the clamping point, the sensor valve (clamp) is pushed up by the spring and exhausts the sensor air. Also the sensor valve (unclamp) exhausts the air and detects the over clamp stroked (incomplete clamp) condition.

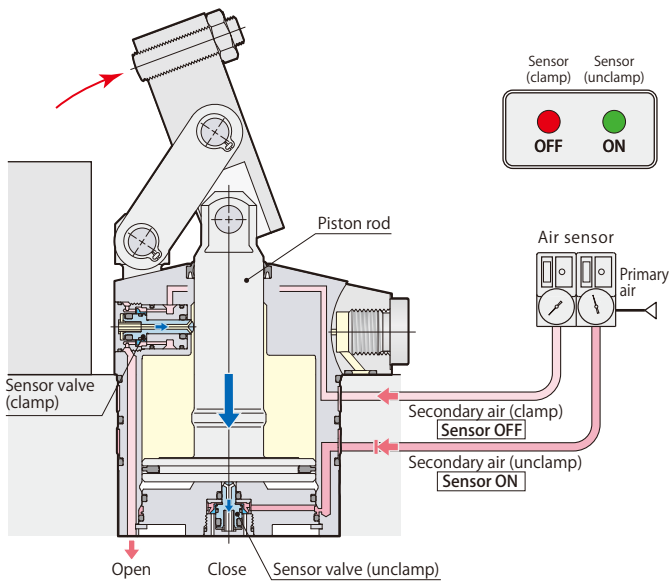
Over clamp stroke (Incomplete clamp) detection example



- Clamp disabled due to missetting workpiece.
- Clamp disabled due to the deflection of clamp arm.
- Clamp disabled due to the damage of piston rod or loose adjustment bolt.
- Clamp disabled due to the abrasion on the tip of clamp arm during prolonged use.

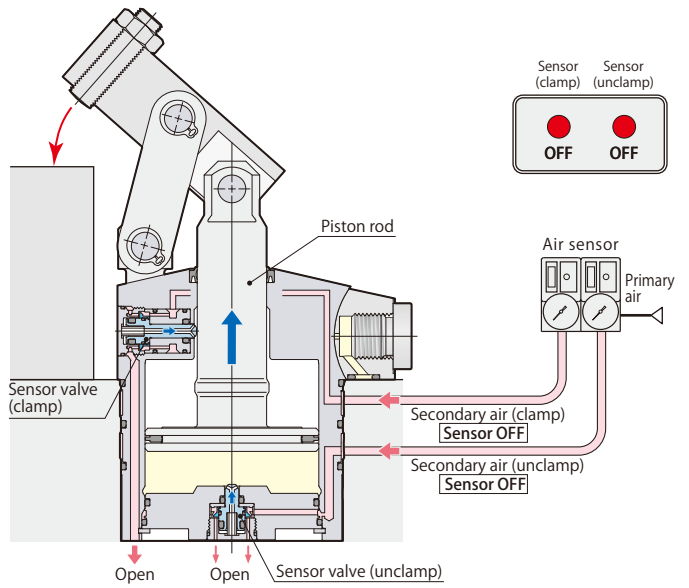
Clamp, Unclamp, Over clamp stroke detection signal

Unclamp detection



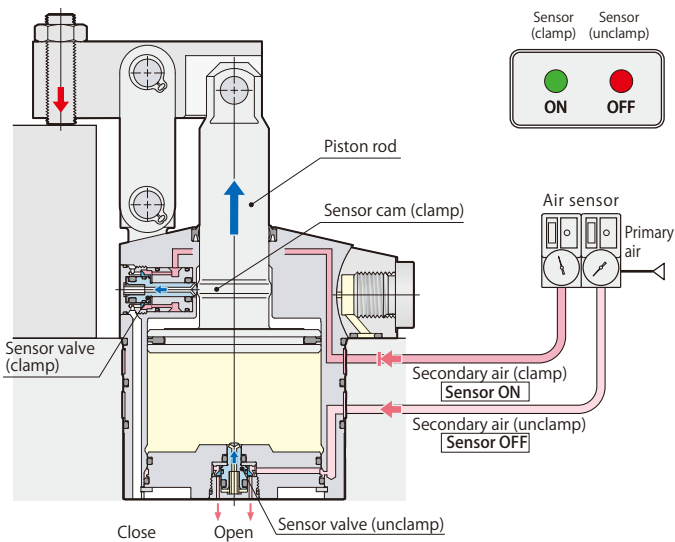
Sensor signal (clamp)	OFF	Unclamp
Sensor signal (unclamp)	ON	

In the middle of clamp stroke



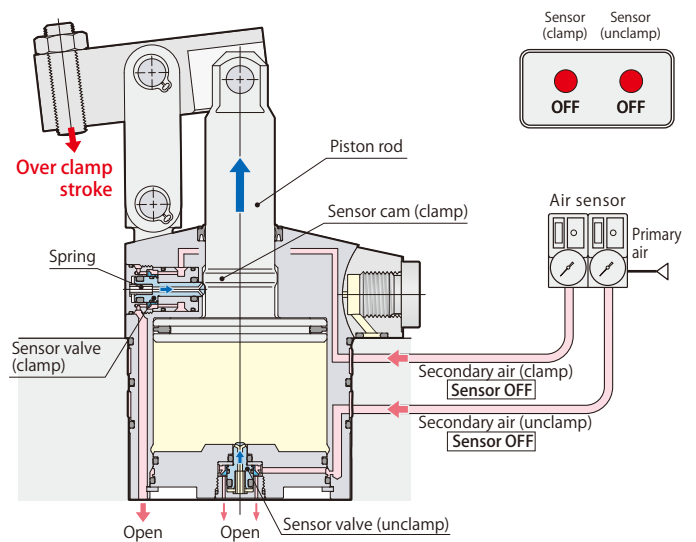
Sensor signal (clamp)	OFF	In the middle of clamp stroke
Sensor signal (unclamp)	OFF	

Clamp detection



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

Over clamp stroke (Incomplete clamp) detection

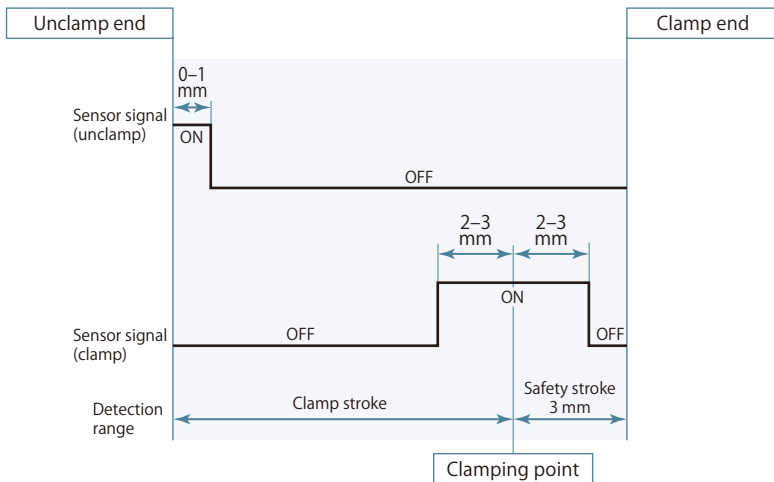


Sensor signal (clamp)	OFF	Over clamp stroke (Incomplete clamp)
Sensor signal (unclamp)	OFF	

Sensing Air link clamp

CLX-T 3 point sensor model

Air sensor triggering point



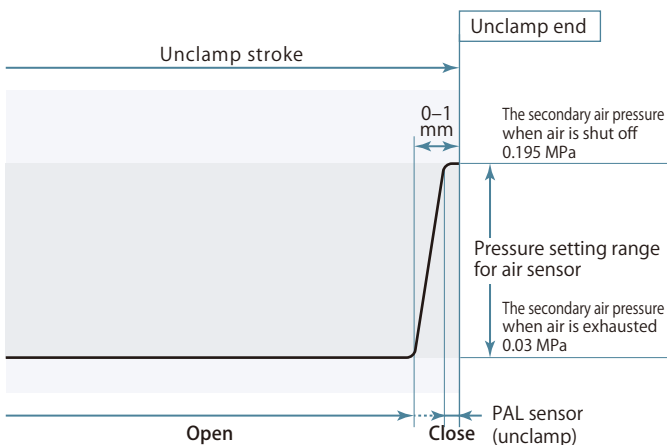
- Refer to the sensor supplier's instruction manual for the details of setting.
- Sensing performance such as detectable time and pressure differs depending on the supplier and model number of the sensor. Select the right model referring to sensor's application and characteristics.

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.

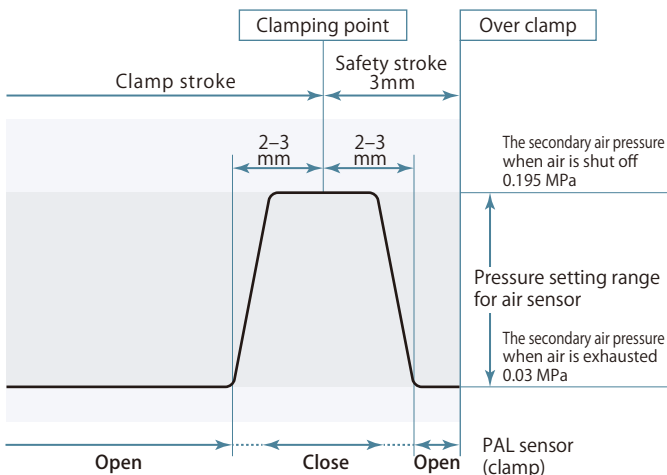
Relation between sensor air pressure, PAL sensor and piston stroke



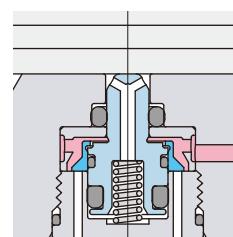
The diagram shown on the left indicates the relation between the PAL sensor, piston stroke, and secondary air pressure. (The pressure shown in the diagram is a reference based on the 0.2 MPa of primary air pressure for one piece of clamp.)

Since the new PAL sensor works with less air-leakage compared to previous sensor valve,

- Enhances the pressure setting range of the sensor which enables the sensor to set easily. (Ex. Pressure setting range 0.03–0.195 MPa in the diagram)
- Allows the use for a number of clamps by one air sensor because of better pressure holding when air is shut off. (Maximum number of clamps to be detected by one sensor is 10.)
- Allows to choose less air-consumed, i.e. small orifice diameter type, air sensor.
- Can create large differential-pressure when opening and closing the PAL sensor so that sensor primary pressure can be set as low as possible and reduce the consumption of air.

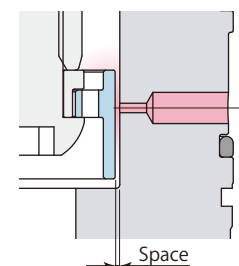


New PAL sensor



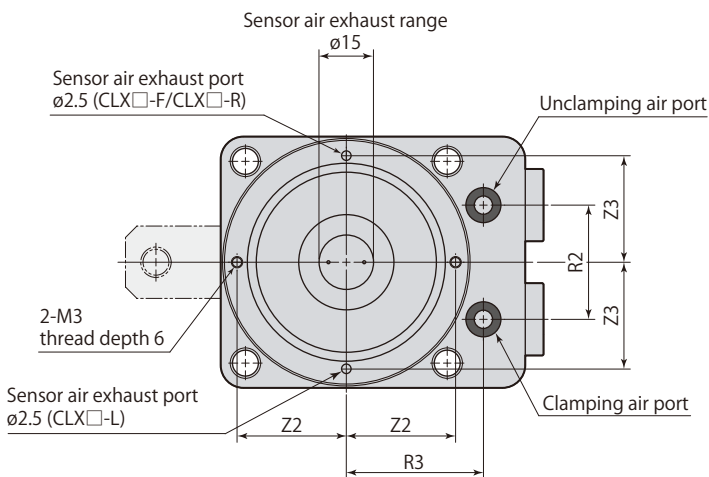
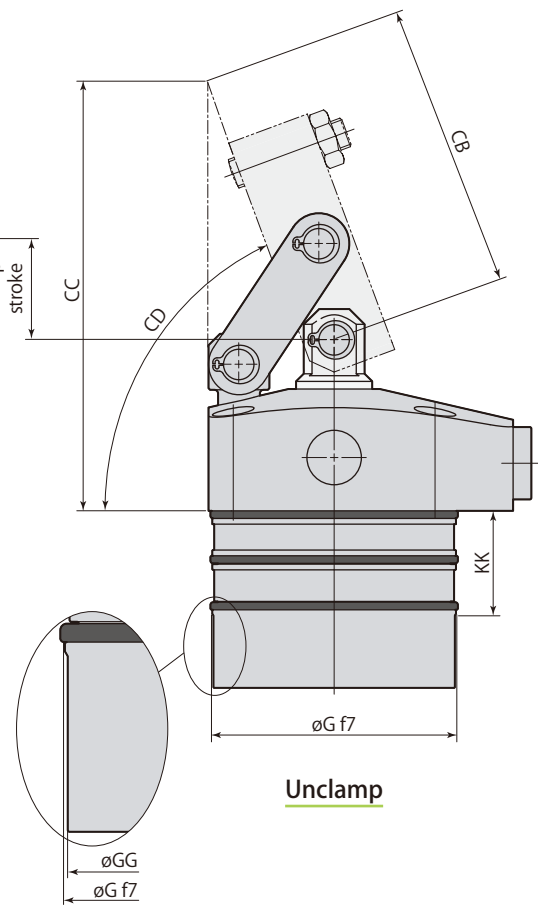
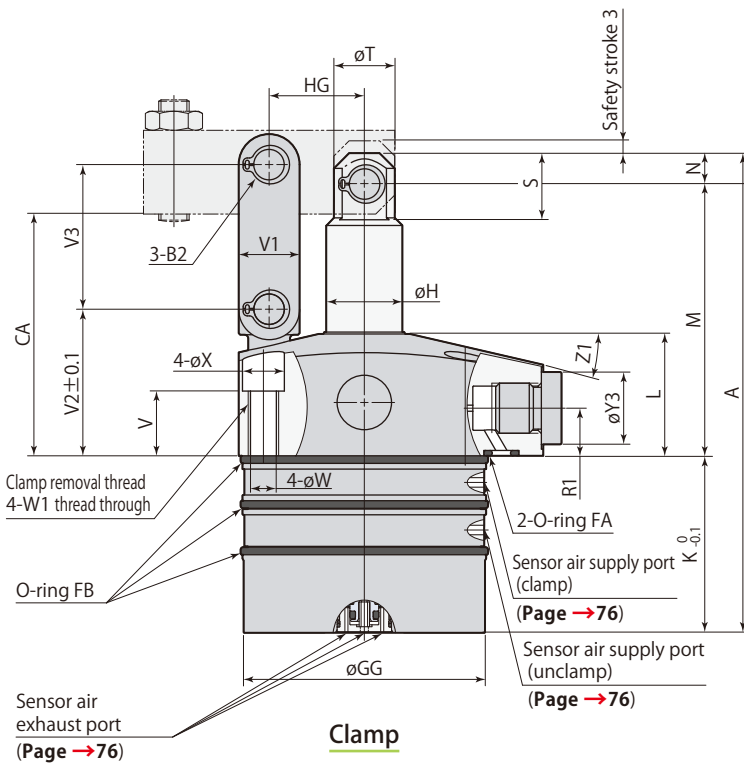
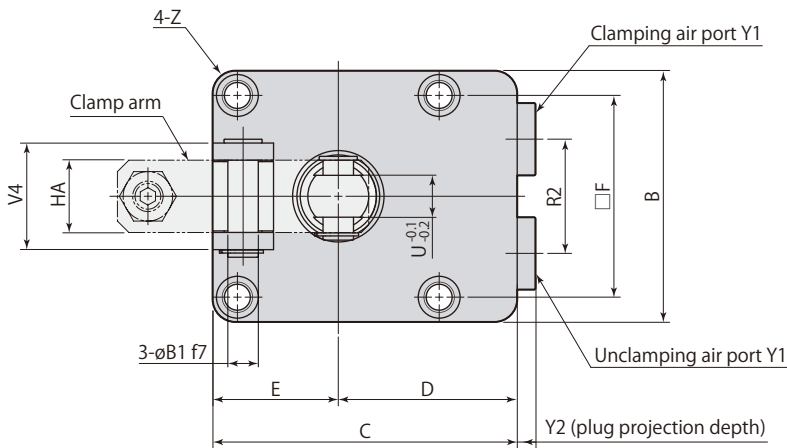
Poppet structure ensures superior sealing performance and can create large differential-pressure when the valve is opening and closing, and air leakage can be minimized.

Previous sensor valve



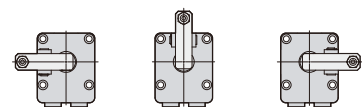
Air leaks easily due to a large space.

Dimensions



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

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



- Clamp arm and mounting screws are not included.
- Use a snap ring (B2) and a pin (øB1) when installing a clamp arm.

CLX□-□T	Air link clamp 3 point sensor model	air	Double acting
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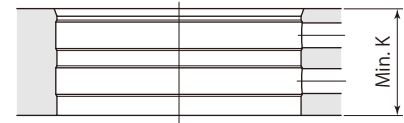
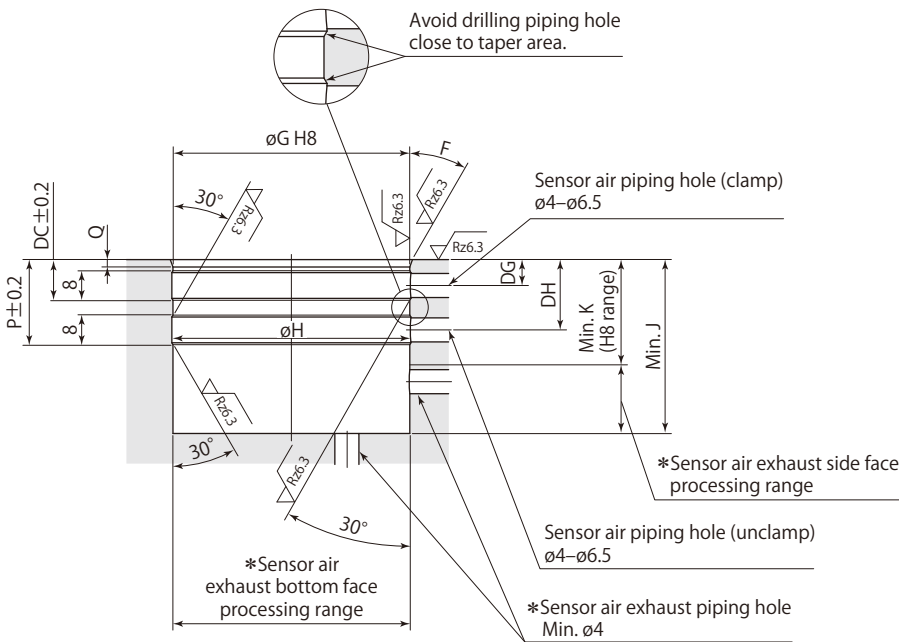
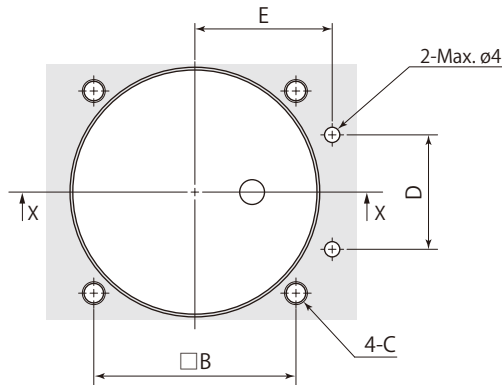
mm				
Model	CLX32-□T	CLX40-□T	CLX50-□T	CLX63-□T
A	101.5	110	126	144.5
B	50	56	66	78
C	60	66	80	91
D	35	38	47	52
E	25	28	33	39
F	39	45	53	65
øG	46 ^{-0.025 -0.050}	54 ^{-0.030 -0.060}	64 ^{-0.030 -0.060}	77 ^{-0.030 -0.060}
øGG	45.4	53.4	63.4	76.4
øH	14	16	20	25
K	39.5	43	46.5	56
KK	27	27	27	29
L	27	27	32	32
M	57	61	71.5	78.5
N	5	6	8	10
R1	11	11	12.5	12.5
R2	20	26	30	40
R3	28	31	36	41
S	11.5	14	17.5	21.5
øT	11	12	16	21
U (width across flats)	7	8	11	13
V	14	14	17	17
V1	10	12	16	18
V2	31.5	33	38.5	39.5
V3	28.5	32	38	44
V4	20	25	28	34
øW	5.5	5.5	6.8	6.8
W1	M6	M6	M8	M8
øX	9.5	9.5	11	11
Y1	G1/8	G1/8	G1/4	G1/4
Y2	3.8	3.8	4.8	4.8
øY3	14	14	19	19
Z	R5	R5	R6	R6
Z1	15°	15°	13°	13°
Z2	19.5	23.5	28.7	35.3
Z3	19.2	23.2	28	34.7
øB1	5 ^{-0.010 -0.022}	6 ^{-0.010 -0.022}	8 ^{-0.013 -0.028}	10 ^{-0.013 -0.028}
B2 (snap ring)*1	STW-5	STW-6	STW-8	STW-10
CA	52	55	63.5	69.5
CB	59.1	72.5	73.3	82.4
CC	89.7	105.2	110.9	120.2
CD	About 70°	About 72°	About 70°	About 68°
HA	14	16	19	22
HG	19.5	21	25	30
O-ring FA (FKM-90)	P6	P6	P6	P6
O-ring FB (FKM-70)	AS568-030	AS568-033	AS568-036	AS568-040
Speed controller*2	Meter-in	VCL01-I	VCL02-I	VCL02-I
	Meter-out	VCL01-O	VCL01-O	VCL02-O

*1: Snap ring is made by Ochiai Corporation.

*2: Select the right model of VCL according to the size of the clamp.

● Refer to **page →118** for the details of speed controller.

Mounting details



In through hole X-X

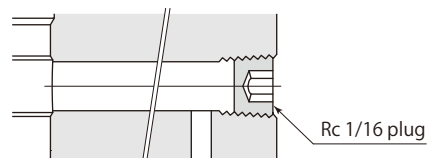
In blind hole X-X

*: 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 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.

- No sensor air piping hole (unclamp) is needed unless unclamp sensor is used. Contact Pascal for the details.
- The sensor air piping hole can be used for a pilot hole of Rc 1/16 plug.



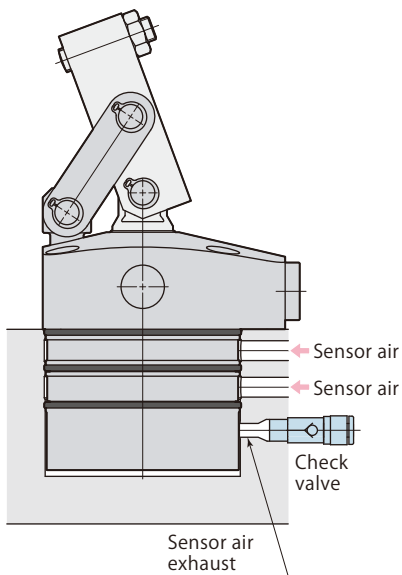
Mounting details

Model	mm			
	CLX32-□T	CLX40-□T	CLX50-□T	CLX63-□T
B	39	45	53	65
C	M5	M5	M6	M6
D	20	26	30	40
E	28	31	36	41
F	20°	20°	20°	30°
øG	46 ^{+0.039} ₀	54 ^{+0.046} ₀	64 ^{+0.046} ₀	77 ^{+0.046} ₀
øH	46.6	54.6	64.6	77.6
J	40	43.5	47	56.5
K	28	28	28	30
P	23	23	23	25
Q	2	2	2	1
DC	11	11	11	13
DG	7	7	7	9
DH	19	19	19	21

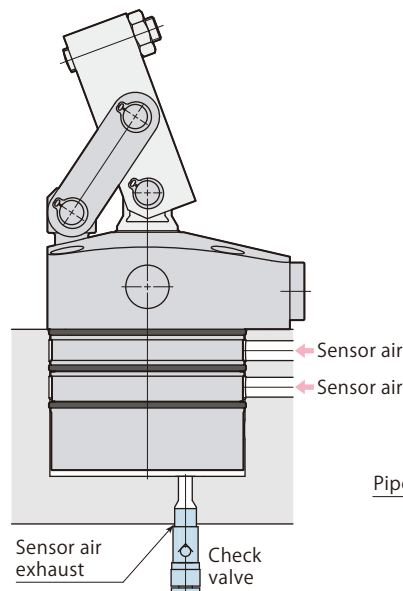
Caution for piping

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

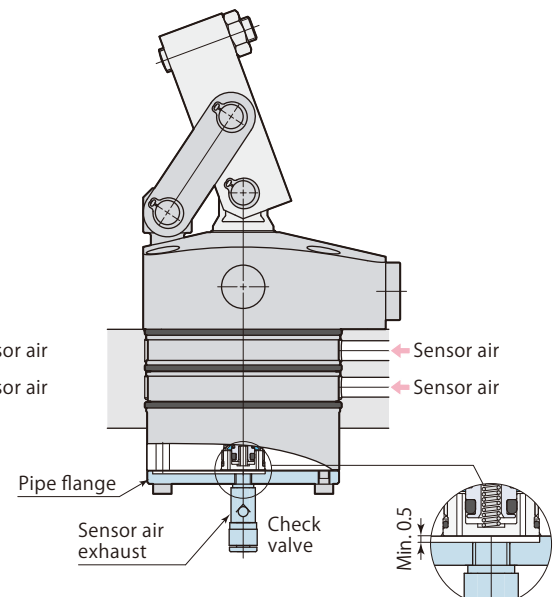
Mounting in blind hole
(Sensor air exhaust : side face)



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



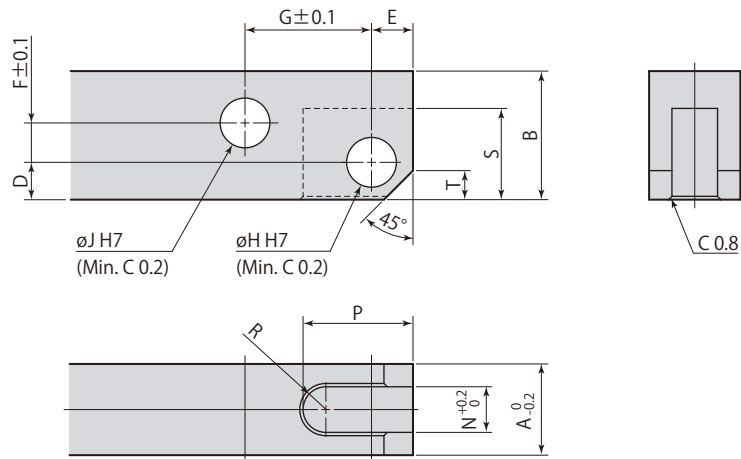
Mounting in through hole



- 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 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)

Link clamp	mm			
	CLX32-□T	CLX40-□T	CLX50-□T	CLX63-□T
A	14	16	19	22
B	16	19	22	25
D	5	6	8	9
E	5	6	8	10
F	3	4	5	5
G	19.5	21	25	30
$\varnothing H$	$5^{+0.012}_0$	$6^{+0.012}_0$	$8^{+0.015}_0$	$10^{+0.015}_0$
$\varnothing J$	$5^{+0.012}_0$	$6^{+0.012}_0$	$8^{+0.015}_0$	$10^{+0.015}_0$
N	7	8	11	13
P	16	20	22	27
R	R3.5	R4	R5.5	R6.5
S	12	15	18	22
T	3	4	5	6

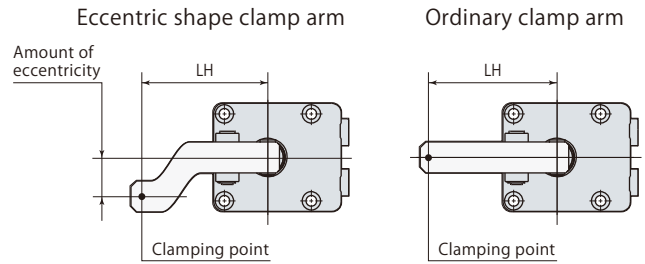
● When mounting the clamp arm, use included pins and snap rings.

Clamp arm allowable eccentricity

An eccentric shape clamp arm, as shown in diagram on right can be used with link clamp model CLX-T, 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.



model CLX32-□T		■ indicates nonusable range							
Air pressure MPa	Allowable eccentricity mm								
	Clamp arm length LH mm								
	30	35	39	45	50	60	80	100	
1.0	■	■	■	■	7	12	24	35	
0.9	■	■	■	8	11	18	32	47	
0.8	■	■	7	12	17	26	44	60	
0.7	■	7	12	18	24	35	58	↑	
0.6	5	12	18	26	34	48	60	↑	
0.5	9	19	26	38	47	60	↑	↑	
0.4	16	29	39	54	60	↑	↑	↑	
0.3	28	46	60	60	↑	↑	↑	↑	
0.2	51	60	↑	↑	↑	↑	↑	↑	
0.1	60	60	60	60	60	60	60	60	

model CLX40-□T		■ indicates nonusable range							
Air pressure MPa	Allowable eccentricity mm								
	Clamp arm length LH mm								
	33	35	42	50	60	80	100	120	
1.0	■	■	■	6	13	26	39	53	
0.9	■	■	5	11	20	36	53	70	
0.8	■	■	9	17	28	49	70	80	
0.7	3	6	15	25	39	65	80	↑	
0.6	7	11	23	36	53	80	↑	↑	
0.5	14	18	33	51	73	↑	↑	↑	
0.4	23	29	50	73	80	↑	↑	↑	
0.3	38	47	77	80	↑	↑	↑	↑	
0.2	67	80	80	↑	↑	↑	↑	↑	
0.1	80	80	80	80	80	80	80	80	

model CLX50-□T		■ indicates nonusable range							
Air pressure MPa	Allowable eccentricity mm								
	Clamp arm length LH mm								
	38	45	50	60	80	100	120	140	
1.0	■	■	■	10	24	37	51	65	
0.9	■	■	7	16	33	50	67	85	
0.8	■	7	12	23	44	66	87	100	
0.7	■	12	19	33	59	86	100	↑	
0.6	8	20	28	45	79	100	↑	↑	
0.5	14	30	41	63	100	↑	↑	↑	
0.4	24	45	60	90	↑	↑	↑	↑	
0.3	41	70	92	100	↑	↑	↑	↑	
0.2	74	100	100	↑	↑	↑	↑	↑	
0.1	100	100	100	100	100	100	100	100	

model CLX63-□T		■ indicates nonusable range							
Air pressure MPa	Allowable eccentricity mm								
	Clamp arm length LH mm								
	45	50	60	80	100	120	140	160	
1.0	■	■	4	19	33	48	62	76	
0.9	■	■	9	27	45	63	81	99	
0.8	■	5	16	38	60	83	105	120	
0.7	■	10	24	52	80	108	120	↑	
0.6	9	18	35	71	106	120	↑	↑	
0.5	17	28	51	97	120	↑	↑	↑	
0.4	29	44	75	120	↑	↑	↑	↑	
0.3	48	70	114	↑	↑	↑	↑	↑	
0.2	87	120	120	↑	↑	↑	↑	↑	
0.1	120	120	120	120	120	120	120	120	

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air Link clamp

Double acting 1 MPa

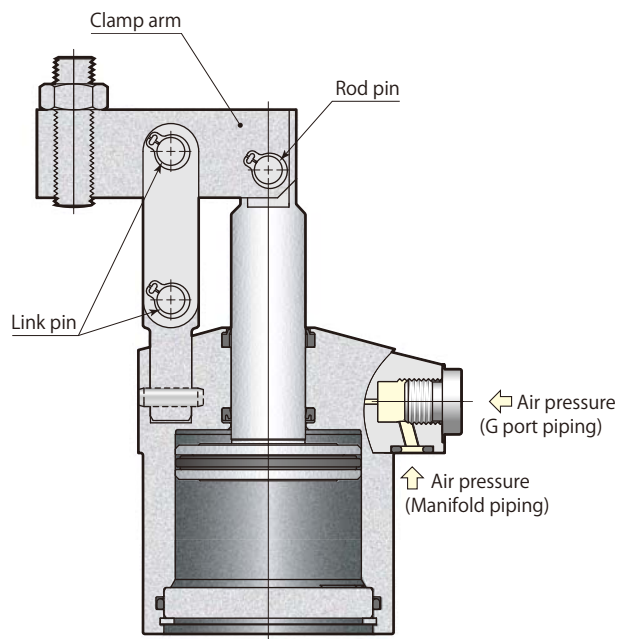
model **CLX**



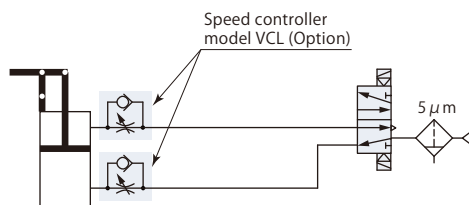
Standard model
model CLX40-F

Standard model

model CLX□-□



Pneumatic circuit diagram



Specifications

Size Clamp arm mounting direction

CLX

- 32 L : Left side
- 40 F : Front side
- 50 R : Right side
- 63

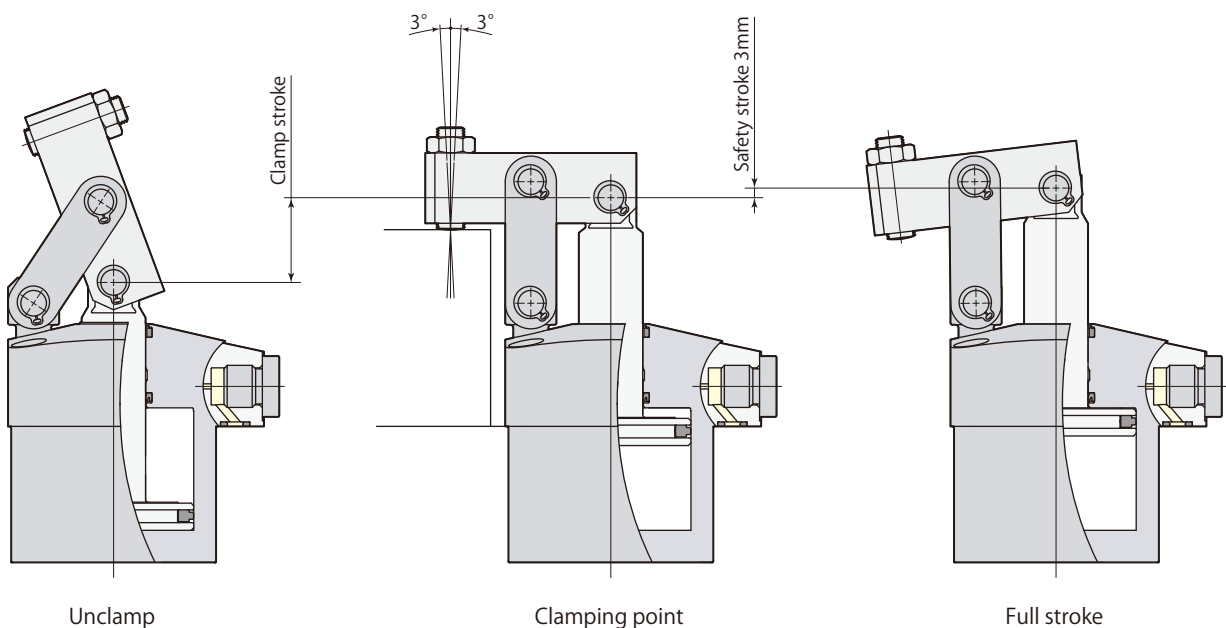
(Nil) : Standard

E : Dual rod

Model		CLX32	CLX40	CLX50	CLX63	
Cylinder force (air pressure 0.5MPa)	N	400	630	980	1560	
Cylinder inner diameter	mm	32	40	50	63	
Rod diameter	mm	14	16	20	25	
Effective area (clamp)	mm ²	804	1257	1963	3117	
Full stroke	mm	24	26	29.5	34.5	
Clamp stroke	mm	21	23	26.5	31.5	
Safety stroke	mm	3	3	3	3	
Cylinder capacity	Clamp	cm ³	19.3	32.7	57.9	107.5
	Unclamp	cm ³	15.6	27.4	48.7	90.6
Mass	kg	0.39	0.54	0.92	1.44	
Recommended tightening torque of mounting screws*1 N·m		4.0	4.0	5.9	5.9	

- Pressure range: 0.1–1 MPa
 - Proof pressure: 1.5 MPa
 - Operating temperature: 0–70 °C
 - Fluid used: Air*2
 - Oil supply: Not required
 - Seals are resistant to chlorine-based cutting fluid. (not thermal resistant specification)
- *1: ISO R898 class 12.9 *2: Supply the dry and filtered air. Particulate size 5 μm or less is recommended.

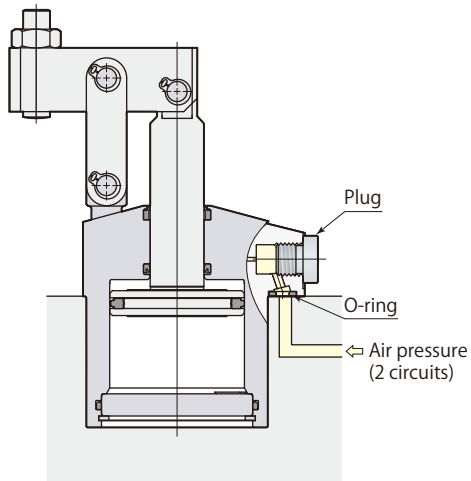
When clamping the workpiece, the clamp arm should be situated like the sketch as shown below. (Clamping point)
Please avoid any non-axial force such as the bending moment toward the piston rod. (Allowable angle ±3°)



Manifold piping and G port piping are available.

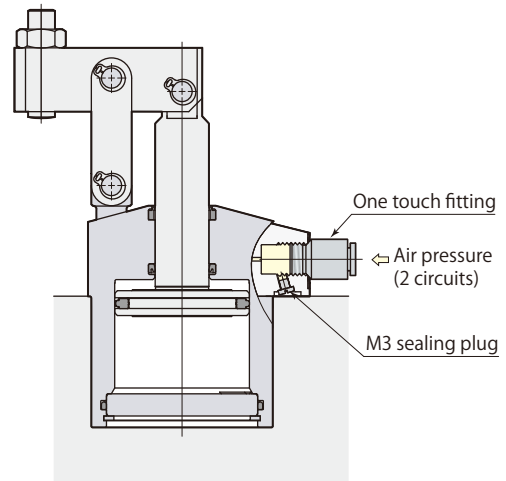
Manifold piping

When choosing manifold piping, a speed controller model VCL is mountable on the G ports of the clamp.



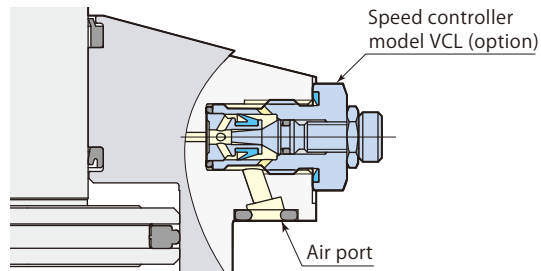
G port piping

When choosing G port piping, remove plugs and mount M3 sealing plugs that are included. (M3 sealing plugs are not mounted at the time of factory shipment.) The one touch fitting or the speed controller with one touch fitting should be mounted when choosing G port piping.

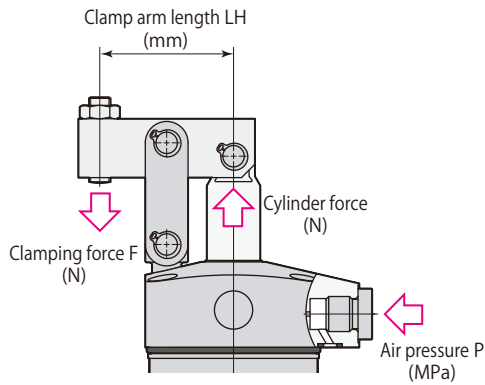


Speed controller model VCL

Page →118



Performance diagram



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

Clamping force calculation formula

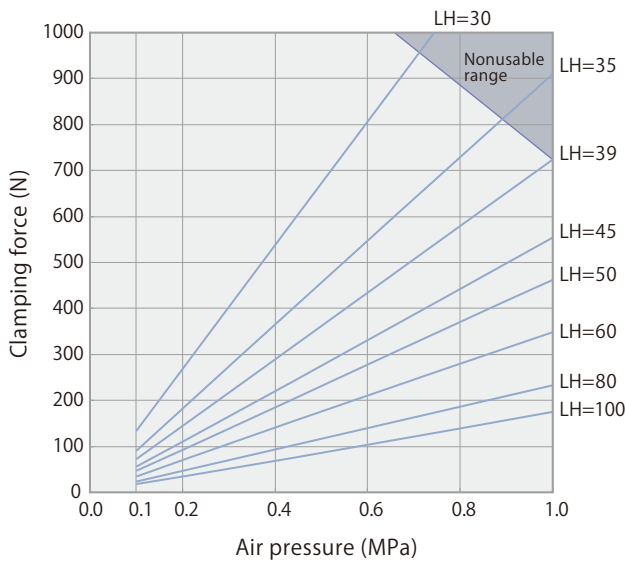
$$F = \text{Coefficient 1} \times P \times 1000 / (\text{LH} - \text{Coefficient 2})$$

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

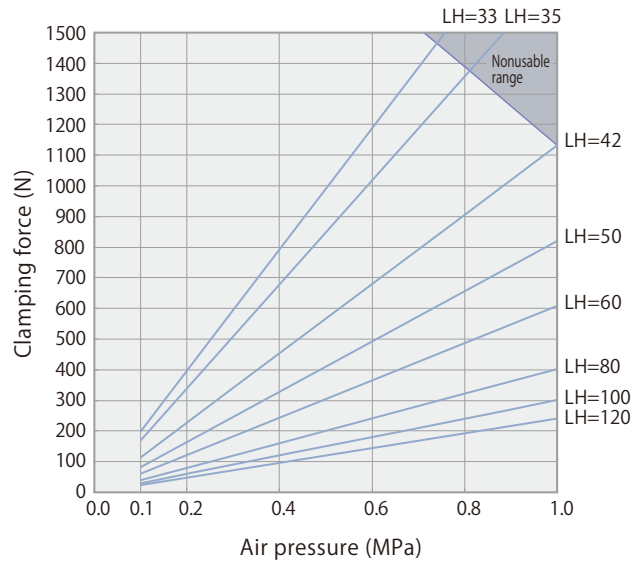
CLX50 with clamp arm length (LH) 50 mm at air pressure of 0.5 MPa, Clamping force F is calculated by $44.18 \times 0.5 \times 1000 / (50 - 25.0) = 880 \text{ N}$

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

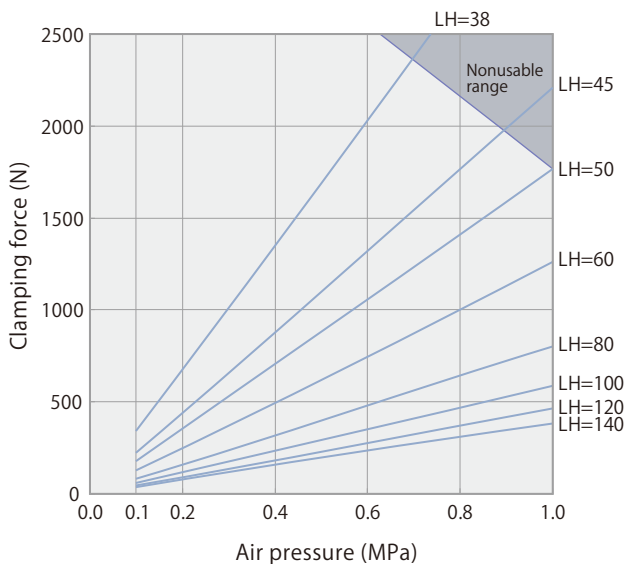
model CLX32



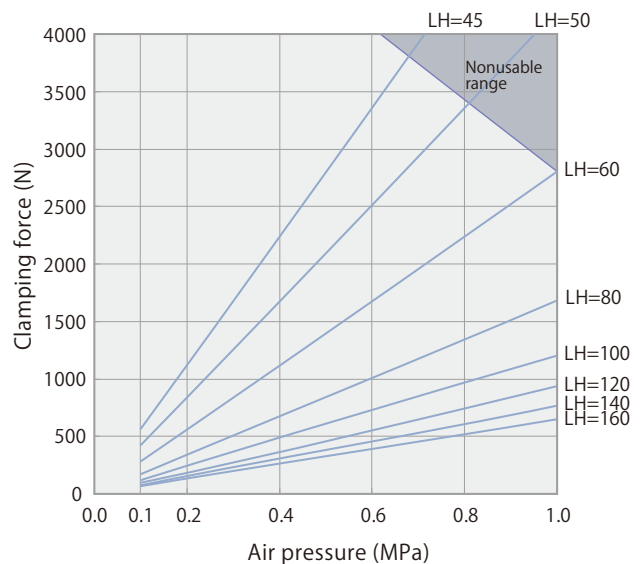
model CLX40



model CLX50



model CLX63



Air link clamp

CLX

Performance table

model CLX32 Clamping force $F=14.11 \times P \times 1000 / (LH-19.5)$

Air pressure MPa	Cylinder force N	Clamping force N								Min. arm length Min. LH mm
		Clamp arm length LH mm								
		30	35	39	45	50	60	80	100	
1.0	800			720	550	460	350	230	180	39
0.9	720			650	500	420	310	210	160	36
0.8	640		730	580	440	370	280	190	140	33
0.7	560	940	640	510	390	320	240	160	120	30
0.6	480	810	550	430	330	280	210	140	110	28
0.5	400	670	460	360	280	230	170	120	90	26
0.4	320	540	360	290	220	190	140	90	70	↑
0.3	240	400	270	220	170	140	100	70	50	↑
0.2	160	270	180	140	110	90	70	50	40	↑
0.1	80	130	90	70	60	50	30	20	20	26

■ indicates nonusable range

model CLX40 Clamping force $F=23.75 \times P \times 1000 / (LH-21.0)$

Air pressure MPa	Cylinder force N	Clamping force N								Min. arm length Min. LH mm
		Clamp arm length LH mm								
		33	35	42	50	60	80	100	120	
1.0	1260			1130	820	610	400	300	240	42
0.9	1130			1020	740	550	360	270	220	38
0.8	1010		1360	900	660	490	320	240	190	35
0.7	880	1390	1190	790	570	430	280	210	170	32
0.6	750	1190	1020	680	490	370	240	180	140	30
0.5	630	990	850	570	410	300	200	150	120	29
0.4	500	790	680	450	330	240	160	120	100	↑
0.3	380	590	510	340	250	180	120	90	70	↑
0.2	250	400	340	230	160	120	80	60	50	↑
0.1	130	200	170	110	80	60	40	30	20	29

■ indicates nonusable range

model CLX50 Clamping force $F=44.18 \times P \times 1000 / (LH-25.0)$

Air pressure MPa	Cylinder force N	Clamping force N								Min. arm length Min. LH mm
		Clamp arm length LH mm								
		38	45	50	60	80	100	120	140	
1.0	1960			1770	1260	800	590	470	380	50
0.9	1770			1590	1140	720	530	420	350	46
0.8	1570		1770	1410	1010	640	470	370	310	42
0.7	1370		1550	1240	880	560	410	330	270	39
0.6	1180	2040	1330	1060	760	480	350	280	230	36
0.5	980	1700	1100	880	630	400	290	230	190	34
0.4	790	1360	880	710	500	320	240	190	150	↑
0.3	590	1020	660	530	380	240	180	140	120	↑
0.2	390	680	440	350	250	160	120	90	80	↑
0.1	200	340	220	180	130	80	60	50	40	34

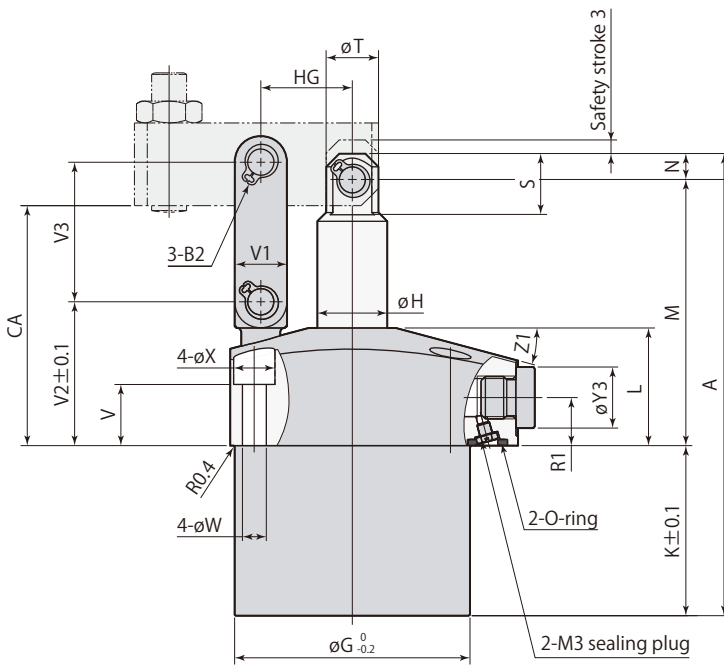
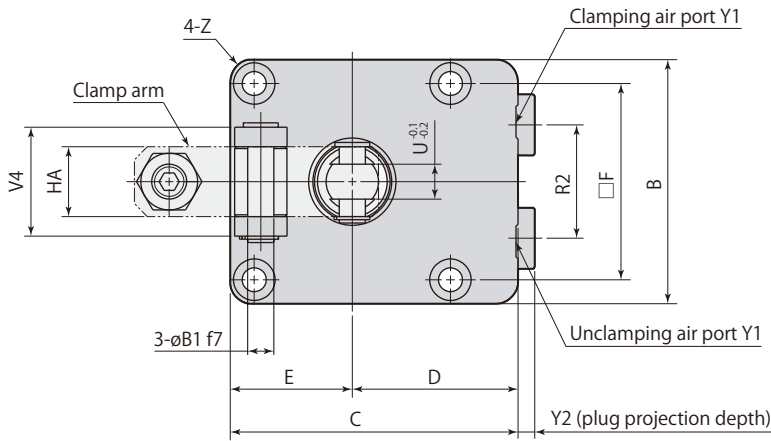
■ indicates nonusable range

model CLX63 Clamping force $F=84.16 \times P \times 1000 / (LH-30.0)$

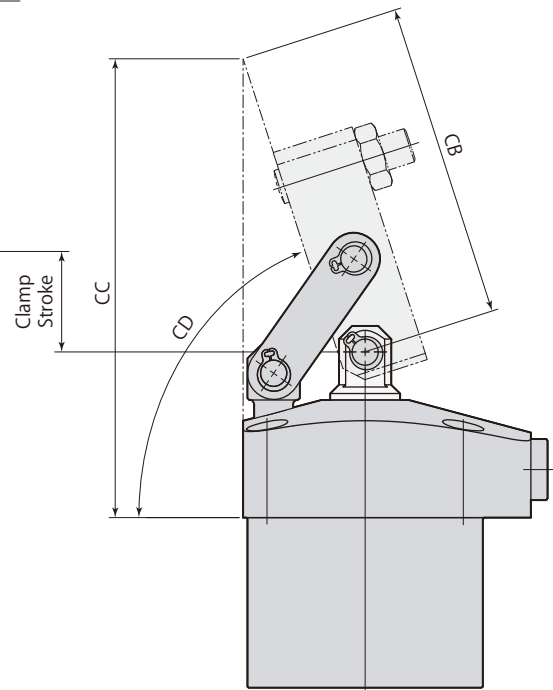
Air pressure MPa	Cylinder force N	Clamping force N								Min. arm length Min. LH mm
		Clamp arm length LH mm								
		45	50	60	80	100	120	140	160	
1.0	3120			2810	1680	1200	940	770	650	60
0.9	2810			2520	1510	1080	840	690	580	55
0.8	2490		3370	2240	1350	960	750	610	520	50
0.7	2180		2950	1960	1180	840	650	540	450	46
0.6	1870	3370	2520	1680	1010	720	560	460	390	43
0.5	1560	2810	2100	1400	840	600	470	380	320	40
0.4	1250	2240	1680	1120	670	480	370	310	260	↑
0.3	940	1680	1260	840	500	360	280	230	190	↑
0.2	620	1120	840	560	340	240	190	150	130	↑
0.1	310	560	420	280	170	120	90	80	60	40

■ indicates nonusable range

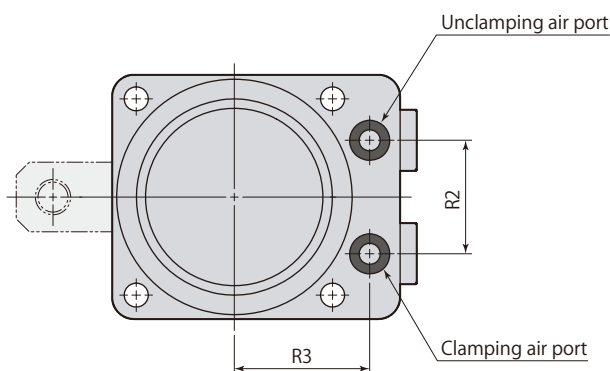
Dimensions



Clamp

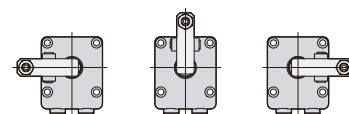


Unclamp



● This diagram represents external contour of CLX □-F, CLX□-L and CLX□-R differ only in terms of mounting direction of clamp arm and otherwise all dimensions are identical to those of CLX□-F.

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



- Clamp arm and mounting screws are not included.
- Install M3 sealing plug when choosing G port piping. The M3 sealing plug is packed with a link clamp.
- Use a snap ring (B2) and a pin (øB1) when installing a clamp arm.

CLX □-□	Air link clamp Standard			air	Double acting
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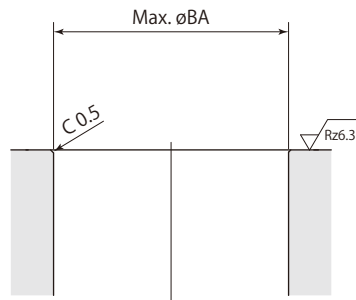
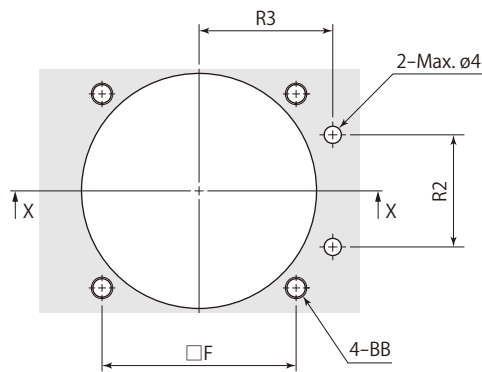
Model	CLX32-□	CLX40-□	CLX50-□	CLX63-□
A	97	106	122	141.5
B	50	56	66	78
C	60	66	80	91
D	35	38	47	52
E	25	28	33	39
F	39	45	53	65
øG	46	54	64	77
øH	14	16	20	25
K	35	39	42.5	53
L	27	27	32	32
M	57	61	71.5	78.5
N	5	6	8	10
R1	11	11	12.5	12.5
R2	20	26	30	40
R3	28	31	36	41
S	11.5	14	17.5	21.5
øT	11	12	16	21
U (width across flats)	7	8	11	13
V	14	14	17	17
V1	10	12	16	18
V2	31.5	33	38.5	39.5
V3	28.5	32	38	44
V4	20	25	28	34
øW	5.5	5.5	6.8	6.8
øX	9.5	9.5	11	11
Y1	G1/8	G1/8	G1/4	G1/4
Y2	3.8	3.8	4.8	4.8
øY3	14	14	19	19
Z	R5	R5	R6	R6
Z1	15°	15°	13°	13°
B1	5 ^{-0.010} _{-0.022}	6 ^{-0.010} _{-0.022}	8 ^{-0.013} _{-0.028}	10 ^{-0.013} _{-0.028}
B2 (snap ring)*1	STW-5	STW-6	STW-8	STW-10
CA	52	55	63.5	69.5
CB	59	72.5	73.3	82.4
CC	89.7	105.2	110.9	120.2
CD	About 70°	About 72°	About 70°	About 68°
HA	14	16	19	22
HG	19.5	21	25	30
O-ring (FKM-90)	P6	P6	P6	P6
Speed controller*2	Meter-in	VCL01-I	VCL01-I	VCL02-I
	Meter-out	VCL01-O	VCL01-O	VCL02-O

*1: Snap ring is made by Ochiai Corporation.

*2: Select the right model of VCL according to the size of the clamp.

● Refer to **page →118** for the details of speed controller.

Mounting details



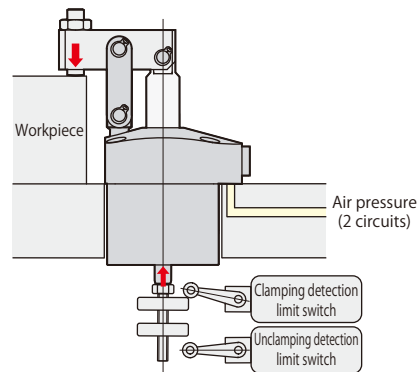
X-X

Rz: ISO4287(1997)

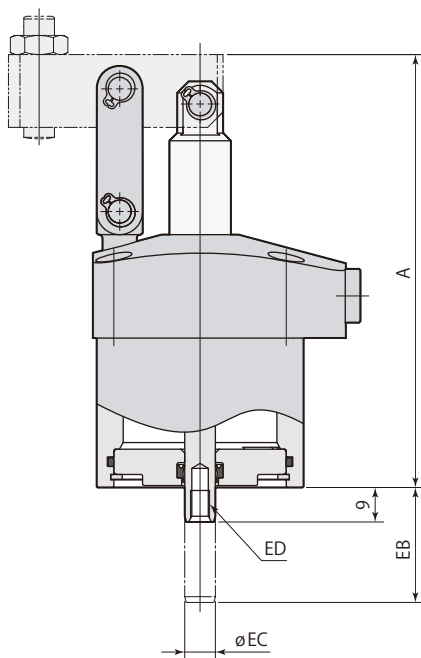
mm

Model	CLX32-□	CLX40-□	CLX50-□	CLX63-□
F	39	45	53	65
R2	20	26	30	40
R3	28	31	36	41
øBA	46.5	54.5	64.5	77.5
BB	M5	M5	M6	M6

Usage example



Dimensions



	mm			
Model	CLX32-□E	CLX40-□E	CLX50-□E	CLX63-□E
Effective area (clamp)	754 mm ²	1206 mm ²	1885 mm ²	3039 mm ²
Cylinder capacity (clamp)	18.1 cm ³	31.4 cm ³	55.6 cm ³	104.8 cm ³
A	103	113	128	147.5
EB	30	32	35.5	40.5
øEC	8	8	10	10
ED	M5×0.8 depth 8	M5×0.8 depth 8	M6×1 depth 11	M6×1 depth 11
Mass	0.41 kg	0.56 kg	0.95 kg	1.47 kg

● Refer to specifications (page →84), dimensions (page →88) for specifications and dimensions of products that are not listed on this page.

Clamping performance

Dual rod models have smaller effective area on clamping side, which slightly reduces clamping force.

Obtain clamping force by multiplying standard clamping force obtained from performance diagram (page →86) or performance table (page →87) by coefficient shown in table below.

Calculation example

For models CLX50-FE, with air pressure of 0.5 MPa and clamp arm length of 60 mm :

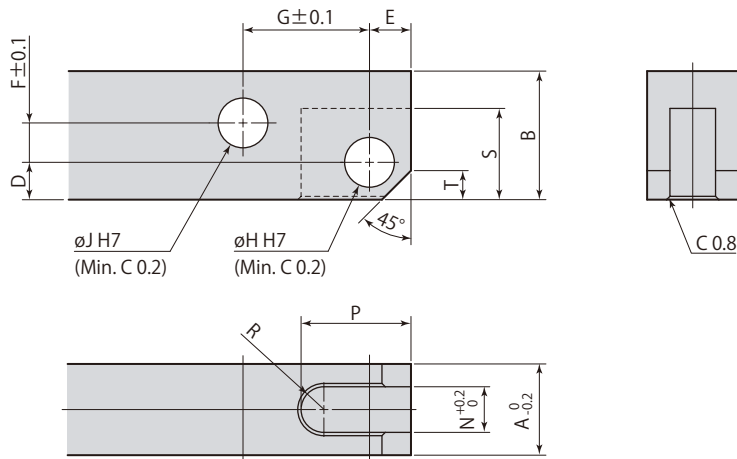
Clamping force of standard specification CLX50-F : 630 N

Clamping force of CLX50-FE : $630 \times 0.96 = 604.8$ N

Model	CLX32-□E	CLX40-□E	CLX50-□E	CLX63-□E
Clamping performance coefficient	0.94	0.96	0.96	0.97

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)

Link clamp	CLX32	CLX40	CLX50	CLX63
A	14	16	19	22
B	16	19	22	25
D	5	6	8	9
E	5	6	8	10
F	3	4	5	5
G	19.5	21	25	30
$\varnothing H$	5 ^{+0.012} ₀	6 ^{+0.012} ₀	8 ^{+0.015} ₀	10 ^{+0.015} ₀
$\varnothing J$	5 ^{+0.012} ₀	6 ^{+0.012} ₀	8 ^{+0.015} ₀	10 ^{+0.015} ₀
N	7	8	11	13
P	16	20	22	27
R	R3.5	R4	R5.5	R6.5
S	12	15	18	22
T	3	4	5	6

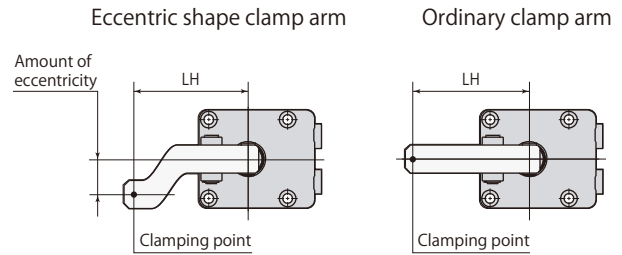
● When mounting the clamp arm, use included pins and snap rings.

Clamp arm allowable eccentricity

An eccentric shape clamp arm, as shown in diagram on right can be used with link clamp model CLX, 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.



model CLX32		■ indicates nonusable range							
Air pressure MPa	Allowable eccentricity mm								
	Clamp arm length LH mm								
	30	35	39	45	50	60	80	100	
1.0	■	■	■	■	7	12	24	35	
0.9	■	■	■	8	11	18	32	47	
0.8	■	■	7	12	17	26	44	60	
0.7	■	7	12	18	24	35	58	↑	
0.6	5	12	18	26	34	48	60	↑	
0.5	9	19	26	38	47	60	↑	↑	
0.4	16	29	39	54	60	↑	↑	↑	
0.3	28	46	60	60	↑	↑	↑	↑	
0.2	51	60	↑	↑	↑	↑	↑	↑	
0.1	60	60	60	60	60	60	60	60	

model CLX40		■ indicates nonusable range							
Air pressure MPa	Allowable eccentricity mm								
	Clamp arm length LH mm								
	33	35	42	50	60	80	100	120	
1.0	■	■	■	6	13	26	39	53	
0.9	■	■	5	11	20	36	53	70	
0.8	■	■	9	17	28	49	70	80	
0.7	3	6	15	25	39	65	80	↑	
0.6	7	11	23	36	53	80	↑	↑	
0.5	14	18	33	51	73	↑	↑	↑	
0.4	23	29	50	73	80	↑	↑	↑	
0.3	38	47	77	80	↑	↑	↑	↑	
0.2	67	80	80	↑	↑	↑	↑	↑	
0.1	80	80	80	80	80	80	80	80	

model CLX50		■ indicates nonusable range							
Air pressure MPa	Allowable eccentricity mm								
	Clamp arm length LH mm								
	38	45	50	60	80	100	120	140	
1.0	■	■	■	10	24	37	51	65	
0.9	■	■	7	16	33	50	67	85	
0.8	■	7	12	23	44	66	87	100	
0.7	■	12	19	33	59	86	100	↑	
0.6	8	20	28	45	79	100	↑	↑	
0.5	14	30	41	63	100	↑	↑	↑	
0.4	24	45	60	90	↑	↑	↑	↑	
0.3	41	70	92	100	↑	↑	↑	↑	
0.2	74	100	100	↑	↑	↑	↑	↑	
0.1	100	100	100	100	100	100	100	100	

model CLX63		■ indicates nonusable range							
Air pressure MPa	Allowable eccentricity mm								
	Clamp arm length LH mm								
	45	50	60	80	100	120	140	160	
1.0	■	■	4	19	33	48	62	76	
0.9	■	■	9	27	45	63	81	99	
0.8	■	5	16	38	60	83	105	120	
0.7	■	10	24	52	80	108	120	↑	
0.6	9	18	35	71	106	120	↑	↑	
0.5	17	28	51	97	120	↑	↑	↑	
0.4	29	44	75	120	↑	↑	↑	↑	
0.3	48	70	114	↑	↑	↑	↑	↑	
0.2	87	120	120	↑	↑	↑	↑	↑	
0.1	120	120	120	120	120	120	120	120	

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air Link clamp

Dual cylinder model Double acting 0.5 MPa

model **CLZ**



Dual cylinder model
model CLZ25-F

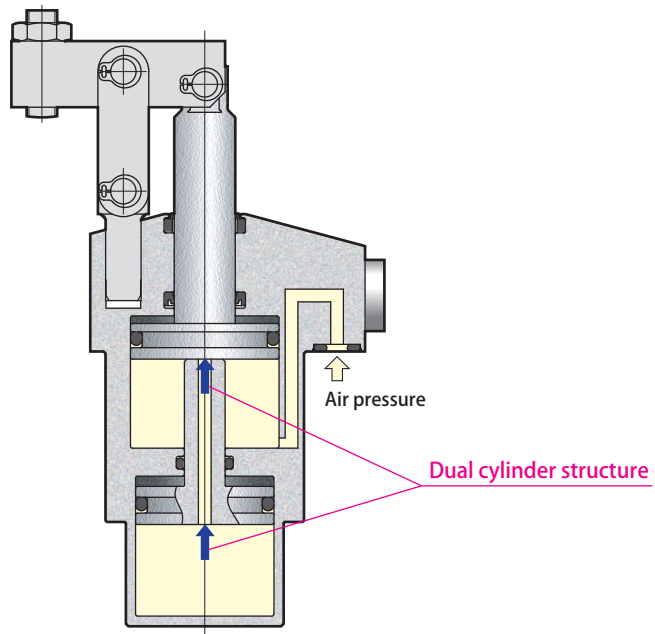
Dual cylinder model

model CLZ□-□ JP PAT.

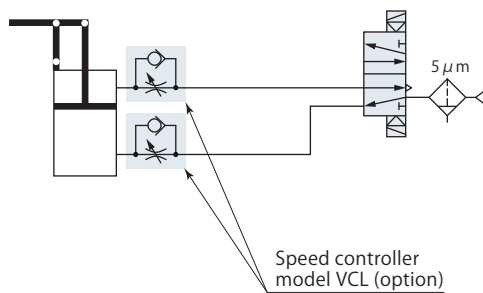
Dual cylinder structure enables cylinder force upper than that of single cylinder's.

Air link clamp

CLZ
Dual cylinder model



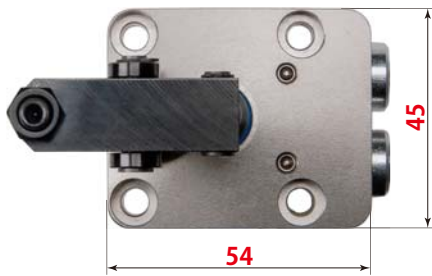
Pneumatic circuit diagram



Comparison with the current model

Air link clamp
Dual cylinder model
CLZ25

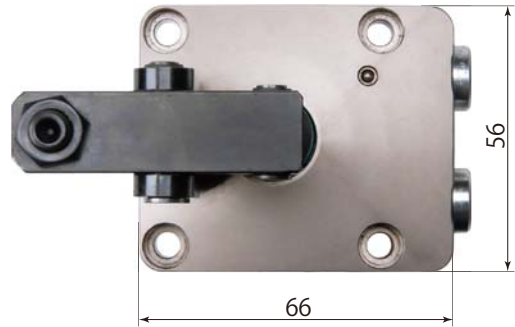
Cylinder force : 590 N
(Air pressure 0.5MPa)



Cylinder force Equality

Air link clamp
Standard model
CLX40

Cylinder force : 630 N
(Air pressure 0.5MPa)



Flange area approx. 66%



Less space

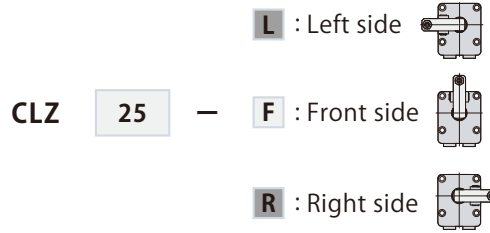


Height from mounting surface approx. 82%



Specifications

Size Clamp arm mounting direction



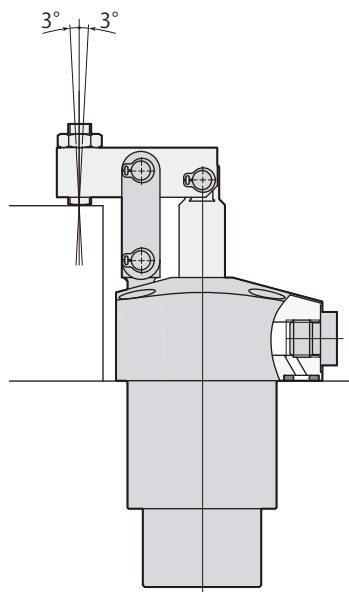
 indicates made to order.

Model		CLZ25	
Cylinder force (Air pressure 0.5 MPa)	N	590	
Rod diameter	mm	12	
Effective area (clamp)	mm ²	1183	
Full stroke	mm	19	
Clamp stroke	mm	17.5	
Stroke margin	mm	1.5	
Cylinder capacity	Clamp	cm ³	22.5
	Unclamp	cm ³	20.3
Mass	kg	0.34	
Recommended tightening torque of mounting screws*1		N·m	4.0

- Air pressure range:0.1–0.5 MPa ● Proof pressure:0.75 MPa ● Operating temperature:0–70 °C
- Fluid used: Air*2 ● Oil supply: Not required
- Seals are resistant to chlorine-based cutting fluid.

*1: ISO R898 class 12.9

*2: Supply the dry and filtered air. Particulate size 5 μm or less is recommended.



Clamping point

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°)

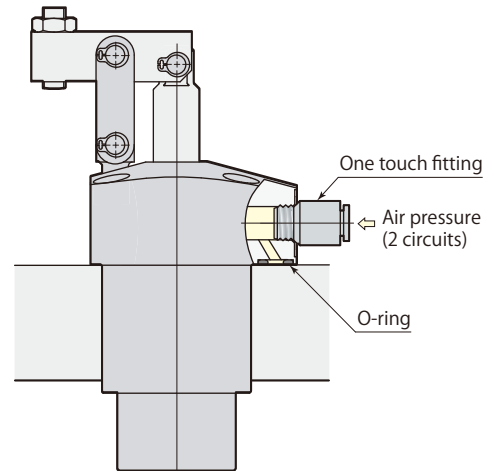
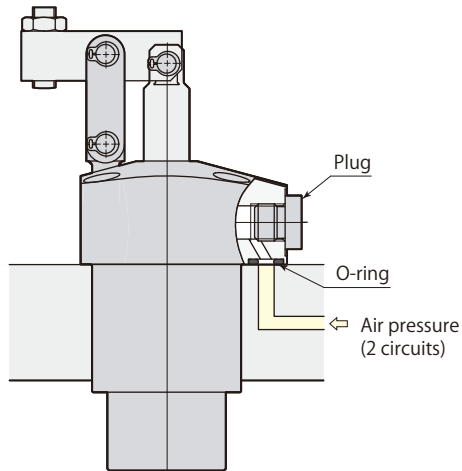
Manifold piping and G port piping are available.

Manifold piping

When choosing manifold piping, a speed controller model VCL is mountable on the G ports of the clamp.

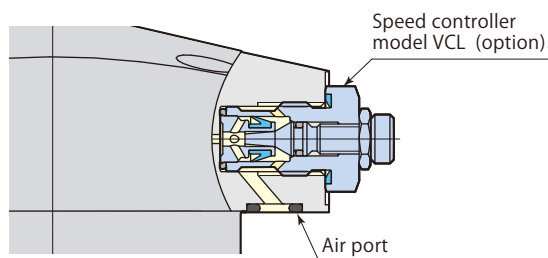
G port piping

Dismount plugs when choosing G port piping. (O-ring must be used.) The one touch fitting or the speed controller with one touch fitting should be mounted when choosing G port piping.



Speed controller model VCL

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Performance diagram and Performance table

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

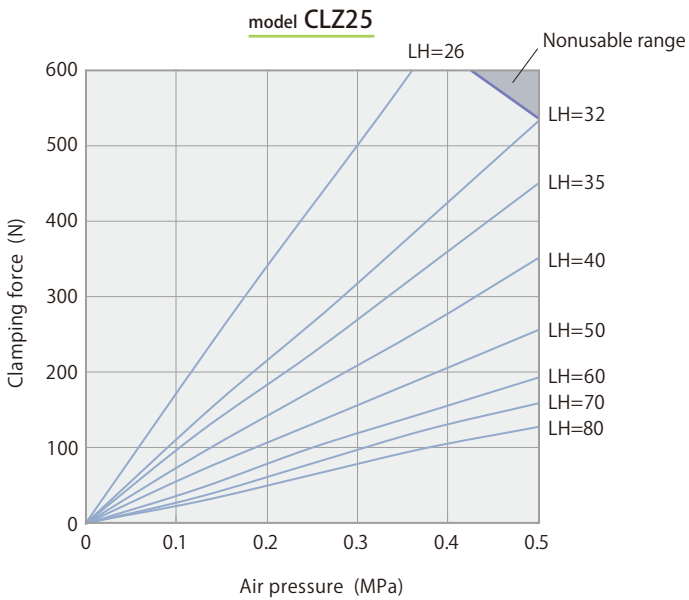
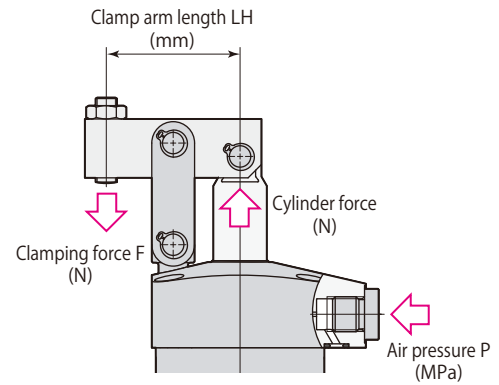
Clamping force calculation formula

$$F = \text{Coefficient 1} \times P \times 1000 / (\text{LH} - \text{Coefficient 2})$$

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

Clamp arm length (LH) 50 mm, at air pressure 0.5 MPa,
Clamping force $F = 17.03 \times 0.5 \times 1000 / (50 - 16) = 250.44 \text{ N}$

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



model CLZ25 Clamping force $F = 17.03 \times P \times 1000 / (\text{LH} - 16)$

Air pressure MPa	Cylinder force N	Clamping force N								Min. arm length Min. LH mm
		Clamp arm length LH mm								
		26	32	35	40	50	60	70	80	
0.5	590	500	530	450	350	250	190	160	130	32
0.4	470	420	420	360	280	200	150	130	110	27
0.3	350	320	320	270	210	150	110	90	80	24
0.2	240	220	220	180	140	100	80	60	50	24
0.1	120	110	110	90	70	50	40	30	30	24

■ indicates nonusable range

Air link clamp

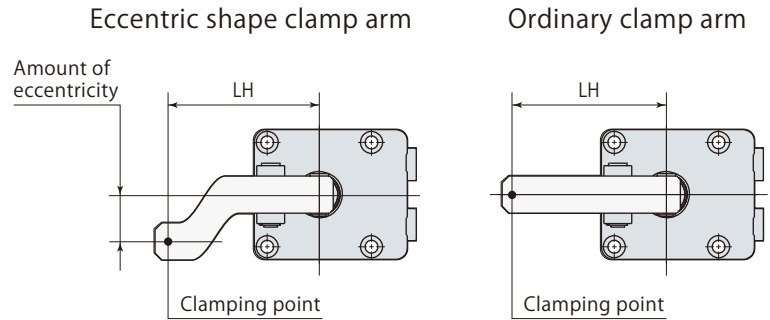
CLZ Dual cylinder model

Clamp arm allowable eccentricity

An eccentric shape clamp arm, as shown in diagram on right can be used with link clamp model CLZ, 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.



model CLZ25 □ indicates nonusable range								
Air pressure MPa	Allowable eccentricity mm							
	Clamp arm length LH mm							
	26	32	35	40	50	60	70	80
0.5	□	□	□	2	6	10	13	18
0.4	□	2	3	6	12	18	22	28
0.3	1	6	9	13	22	32	41	47
0.2	6	15	19	27	41	53	60	60
0.1	24	32	35	40	50	60	60	60

Air link clamp
CLZ
Dual cylinder model

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air Link clamp

Boost model Double acting 0.5 MPa

model **CLY**



Air link clamp **boost model**
model CLY40-F

Boost model

model **CLY**□-□ PAT.

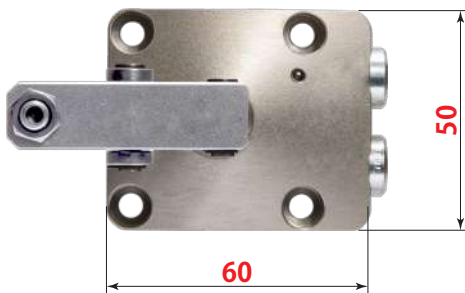


New boosting mechanism makes cylinder force 2.5 times larger.

Air link clamp boost model

CLY32

Cylinder force : 1070 N
(Air pressure 0.5MPa)



Less space

Flange area approx. 57%

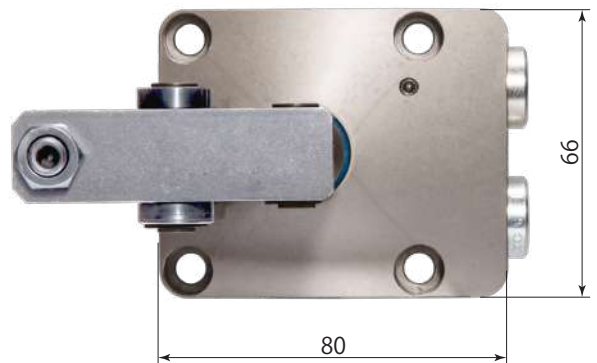


2 size smaller

Air link clamp

CLX50

Cylinder force : 982 N
(Air pressure 0.5MPa)



Height from mounting surface approx. 80%



2 size smaller



Clamp

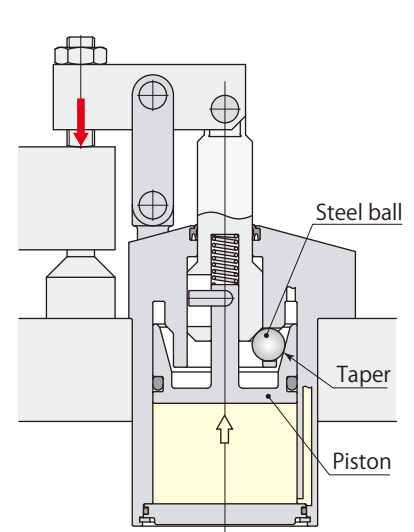
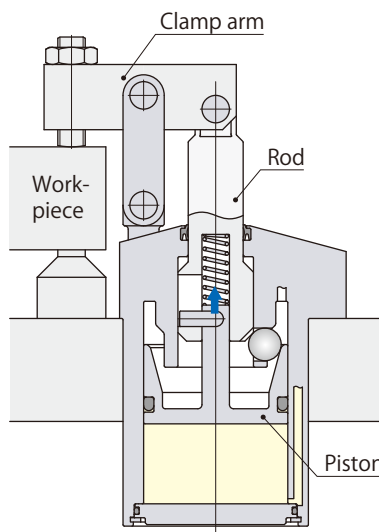
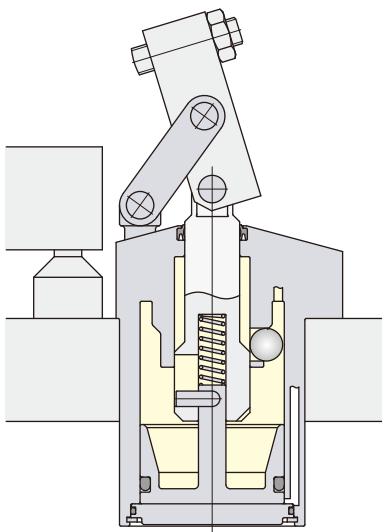
① Unclamp



② Clamping position



③ Clamping force boosted



- The rod and piston go up at the same time until a clamp arm contacts to workpiece. Designing the circuit to generate the back pressure on unclamp chamber of the cylinder ensures smoother operation.

- Only a piston goes up, the clamping force is boosted up by the taper and steel balls.

Unclamp

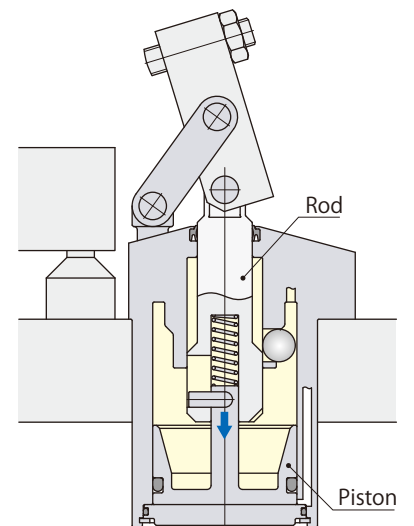
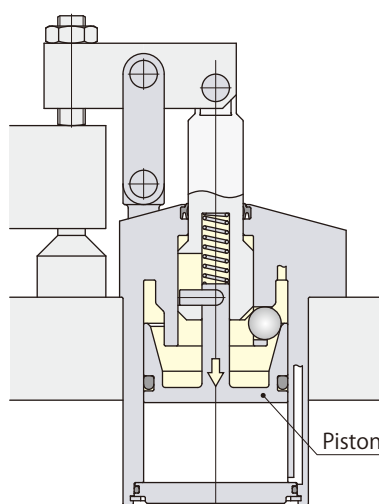
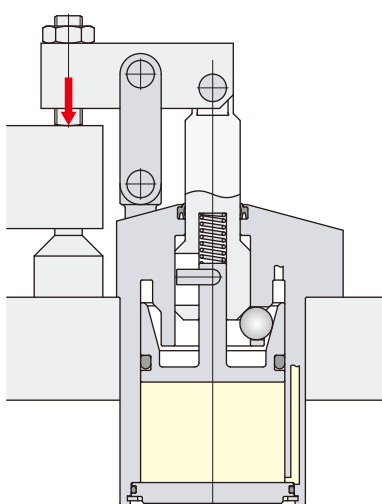
① Clamping force boosted



② Taper-lock released






③ Unclamp



- Only a piston goes down, Taper-lock is released firmly.

- The rod and piston go down at the same time. The rod may go down too far if no air pressure remains in the unclamping side. Keep supplying air as much as possible when the clamp is in unclamped condition.

Specifications

Size	Clamp arm mounting direction
32	L : Left side 
40	F : Front side 
50	R : Right side 

CLY

 indicates made to order.

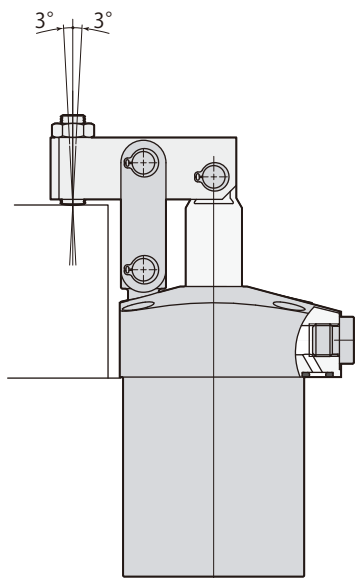
Model		CLY32	CLY40	CLY50	CLY63	
Cylinder force (air pressure 0.5MPa)	N	1070	1600	2400	3590	
Boost range angle*1		±3.5°				
Cylinder inner diameter	mm	36	44	54	66	
Rod diameter	mm	14	16	20	25	
Effective area (clamp)	cm ²	10.2	15.2	22.9	34.2	
Rod clamp stroke*2	mm	21.0	23.0	26.5	31.5	
Safety stroke	mm	1.5	1.6	1.9	2.3	
Cylinder capacity	Clamp	cm ³	32.6	53.5	93.9	165.2
	Unclamp	cm ³	29.1	48.6	84.9	148.6
Mass	kg	0.53	0.75	1.28	2.12	
Recommended tightening torque of mounting screws*3 N·m		4.0	4.0	5.9	5.9	

- Pressure range:0.1–0.5 MPa ● Proof pressure:0.75 MPa ● Operating temperature:0–70 °C
- Fluid used:Air*4 ● Oil supply:Not required
- Seals are resistant to chlorine-based cutting fluid. (not thermal resistant specification)

*1:Cylinder cannot exert the rated value in case the angle is out of range.

*2:Indicates a distance from unclamping position to clamping point. *3:ISO R898 class 12.9

*4:Supply the dry and filtered air. Particulate size 5 μm or less is recommended.



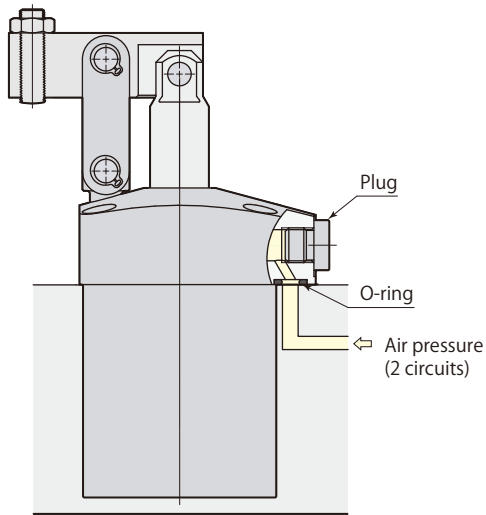
Clamping point

When clamping the workpiece, the clamp arm should be situated like the sketch as shown left. (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.

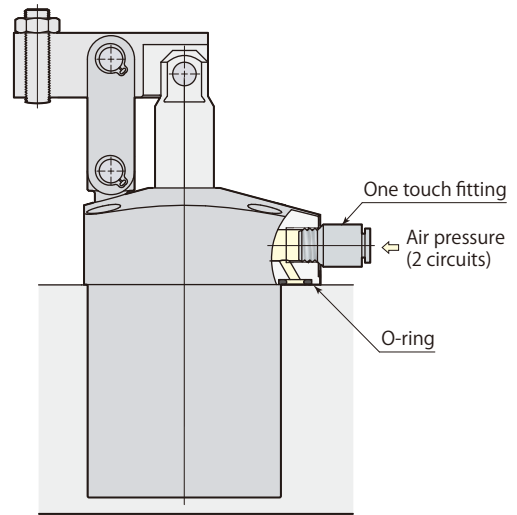
Manifold piping

When choosing manifold piping, a speed controller model VCL is mountable on the G ports of the clamp.



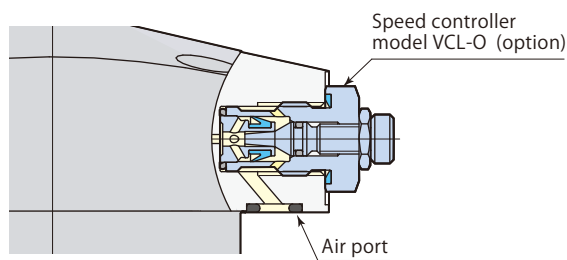
G port piping

When choosing G port piping, remove plugs. (O-ring must be used.) The one touch fitting or the speed controller with one touch fitting should be mounted when choosing G port piping.

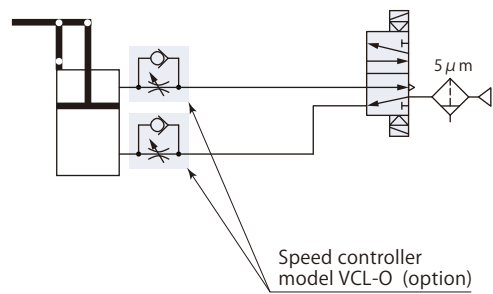


Speed controller model VCL-O

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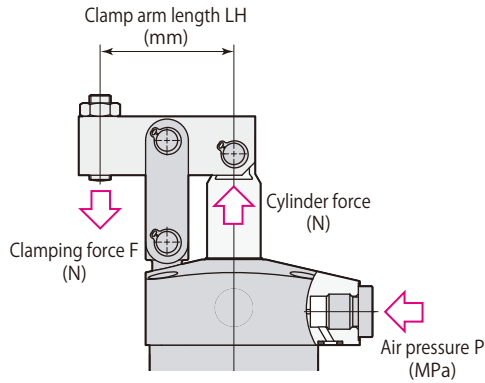
Pneumatic circuit diagram



The meter-out control is recommended for speed controller.



Performance diagram



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

Clamping force calculation formula

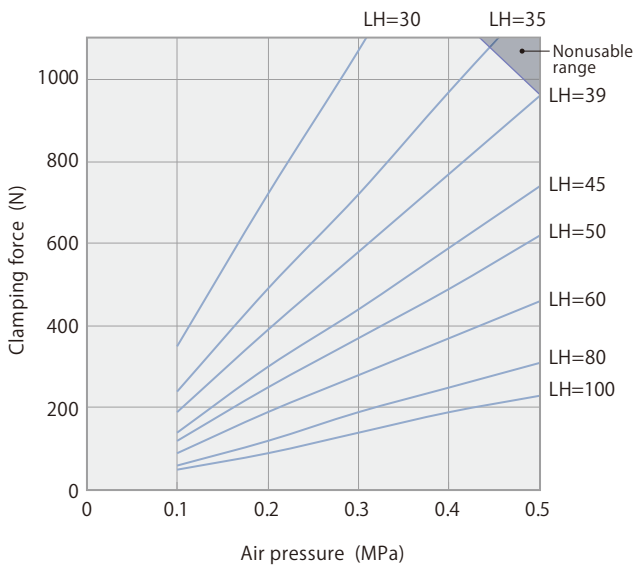
$$F = \text{Coefficient 1} \times P \times 1000 / (\text{LH} - \text{Coefficient 2})$$

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

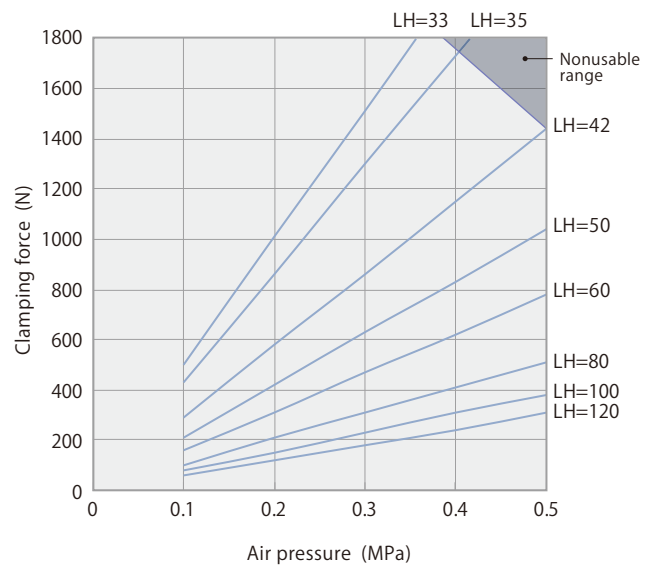
CLY50 with clamp arm length (LH) 50 mm at air pressure of 0.5 MPa, Clamping force F is calculated by $108.23 \times 0.5 \times 1000 / (50 - 25.0) = 2160 \text{ N}$

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

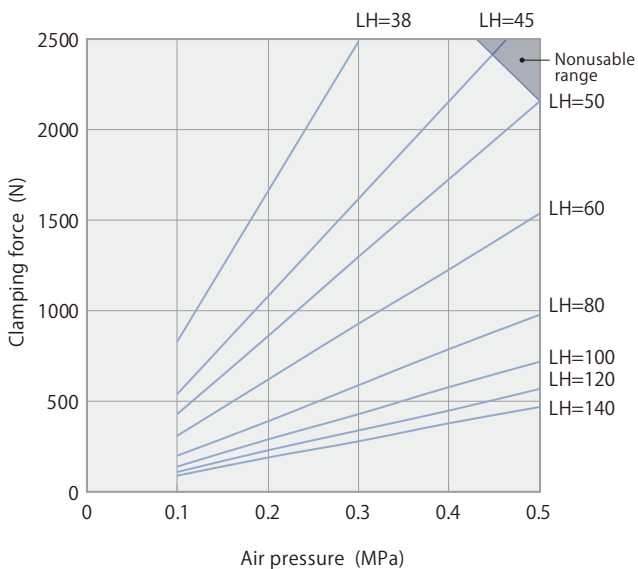
model CLY32



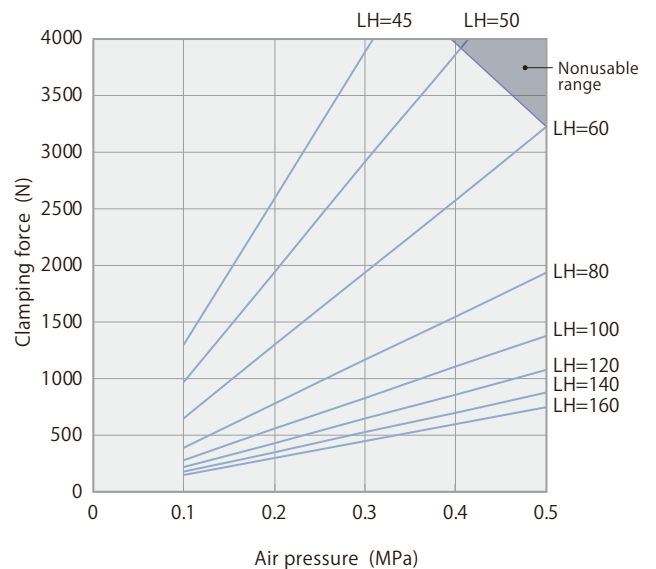
model CLY40



model CLY50



model CLY63



Performance table

model CLY32 Clamping force $F=37.52 \times P \times 1000 / (LH-19.5)$

Air pressure MPa	Cylinder force N	Clamping force N								Min. arm length Min. LH mm
		Clamp arm length LH mm								
		30	35	39	45	50	60	80	100	
0.5	1070			960	740	620	460	310	230	39
0.4	860		970	770	590	490	370	250	190	33
0.3	640	1070	720	580	440	370	280	190	140	28
0.2	430	720	490	390	300	250	190	120	90	26
0.1	210	350	240	190	140	120	90	60	50	26

■ indicates nonusable range

model CLY40 Clamping force $F=60.36 \times P \times 1000 / (LH-21.0)$

Air pressure MPa	Cylinder force N	Clamping force N								Min. arm length Min. LH mm
		Clamp arm length LH mm								
		33	35	42	50	60	80	100	120	
0.5	1600			1440	1040	780	510	380	310	42
0.4	1280		1730	1150	830	620	410	310	240	35
0.3	960	1510	1300	860	630	470	310	230	180	30
0.2	640	1010	860	580	420	310	210	150	120	29
0.1	320	500	430	290	210	160	100	80	60	29

■ indicates nonusable range

model CLY50 Clamping force $F=108.23 \times P \times 1000 / (LH-25.0)$

Air pressure MPa	Cylinder force N	Clamping force N								Min. arm length Min. LH mm
		Clamp arm length LH mm								
		38	45	50	60	80	100	120	140	
0.5	2400			2160	1540	980	720	570	470	50
0.4	1920		2160	1730	1230	790	580	450	380	42
0.3	1440	2490	1620	1300	930	590	430	340	280	36
0.2	960	1660	1080	860	620	390	290	230	190	34
0.1	480	830	540	430	310	200	140	110	90	34

■ indicates nonusable range

model CLY63 Clamping force $F=193.97 \times P \times 1000 / (LH-30.0)$

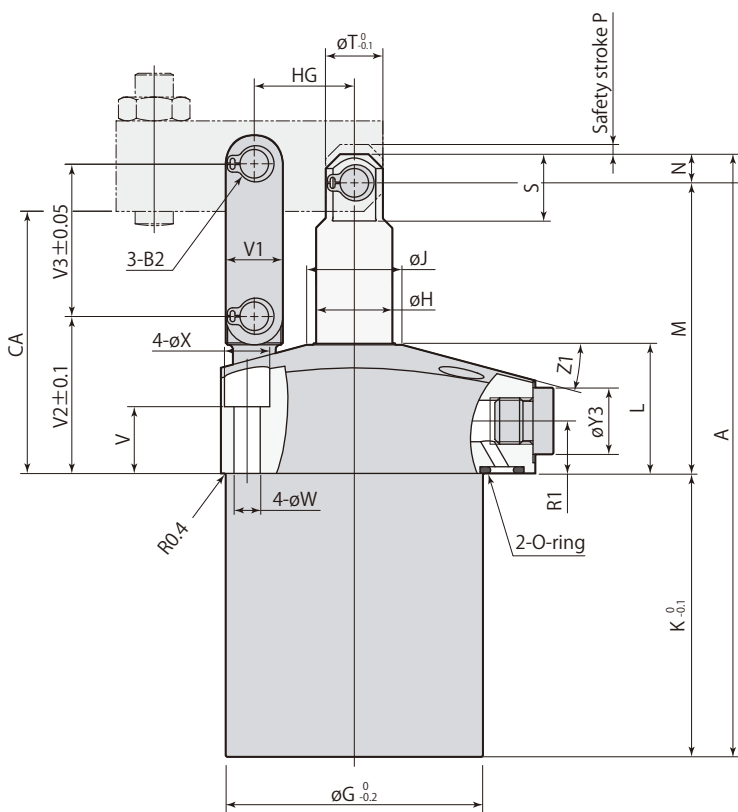
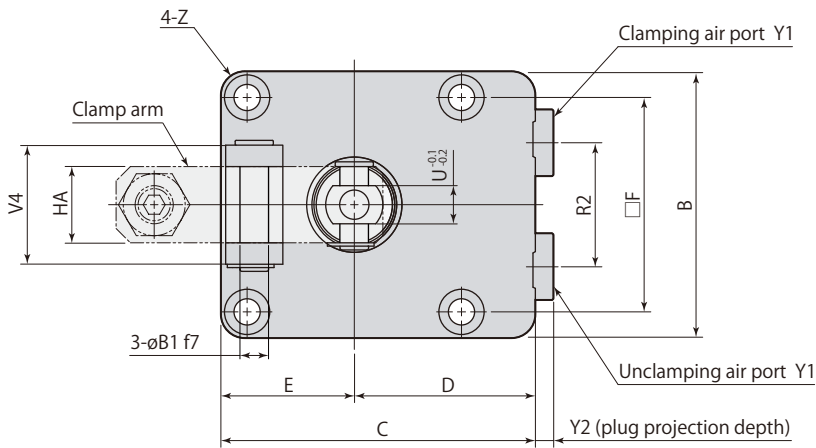
Air pressure MPa	Cylinder force N	Clamping force N								Min. arm length Min. LH mm
		Clamp arm length LH mm								
		45	50	60	80	100	120	140	160	
0.5	3590			3230	1940	1380	1080	880	750	60
0.4	2870		3870	2580	1550	1110	860	700	600	50
0.3	2160	3890	2920	1940	1170	830	650	530	450	43
0.2	1440	2590	1940	1300	780	560	430	350	300	40
0.1	720	1300	970	650	390	280	220	180	150	40

■ indicates nonusable range

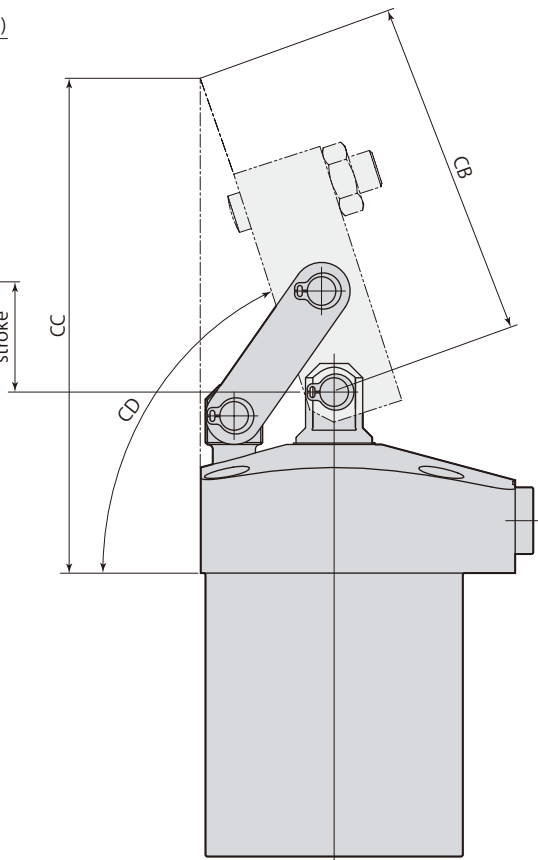
Air link clamp

CLY Boost model

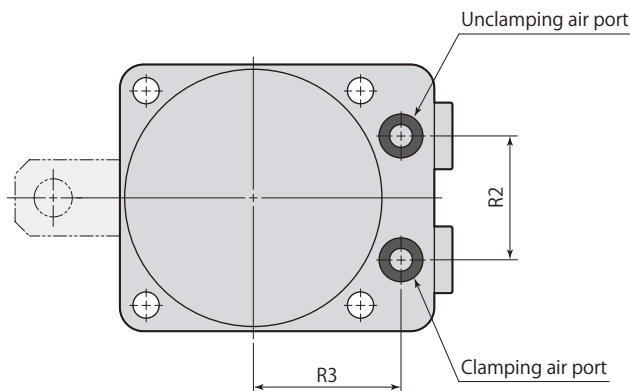
Dimensions



Clamp

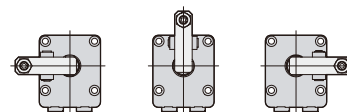


Unclamp



● This diagram represents external contour of CLY □-F, CLY□-L and CLY□-R differ only in terms of mounting direction of clamp arm and otherwise all dimensions are identical to those of CLY□-F.

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



● Clamp arm and mounting screws are not included.

CLY □-□	Air link clamp Boost model	air	Double acting
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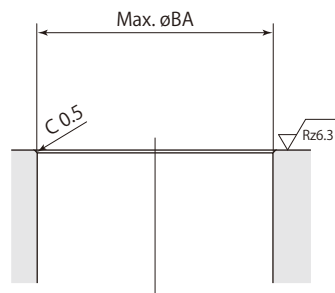
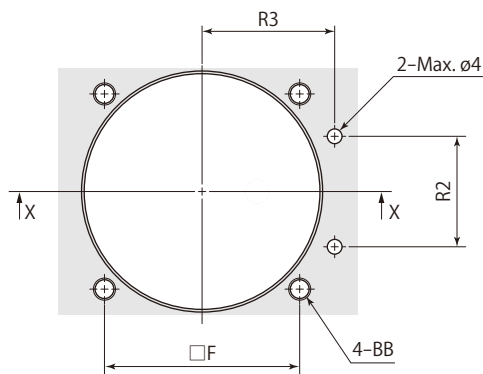
Model	CLY32-□	CLY40-□	CLY50-□	CLY63-□
A	115	126.5	146.5	173
B	50	56	66	78
C	60	66	80	91
D	35	38	47	52
E	25	28	33	39
F	39	45	53	65
øG	46	54	64	77
øH	14	16	20	25
øJ	18	20	24	30
K	53	59.5	67	84.5
L	27	27	32	32
M	57	61	71.5	78.5
N	5	6	8	10
P	1.5	1.6	1.9	2.3
R1	11	11	12.5	12.5
R2	20	26	30	40
R3	28	31	36	41
S	11.5	14	17.5	21.5
øT	11	12	16	21
U (width across flats)	7	8	11	13
V	14	14	17	17
V1	10	12	16	18
V2	31.5	33	38.5	39.5
V3	28.5	32	38	44
V4	20	25	28	34
øW	5.5	5.5	6.8	6.8
øX	9.5	9.5	11	11
Y1	G1/8	G1/8	G1/4	G1/4
Y2	3.8	3.8	4.8	4.8
øY3	14	14	19	19
Z	R5	R5	R6	R6
Z1	15°	15°	13°	13°
øB1	5 ^{-0.010 -0.022}	6 ^{-0.010 -0.022}	8 ^{-0.013 -0.028}	10 ^{-0.013 -0.028}
B2 (snap ring)*1	STW-5	STW-6	STW-8	STW-10
CA	52	55	63.5	69.5
CB	59.1	72.5	73.3	82.4
CC	89.7	105.2	110.9	120.2
CD	About 70°	About 72°	About 70°	About 68°
HA	14	16	19	22
HG	19.5	21	25	30
O-ring (FKM-90)	P6	P6	P6	P6
Speed controller (Meter-out)*2	VCL01-O	VCL01-O	VCL02-O	VCL02-O

*1: Snap ring is made by Ochiai Corporation.

*2: Select the right model of VCL according to the size of the clamp.

● Refer to **page →118** for the details of speed controller.

Mounting details



X-X

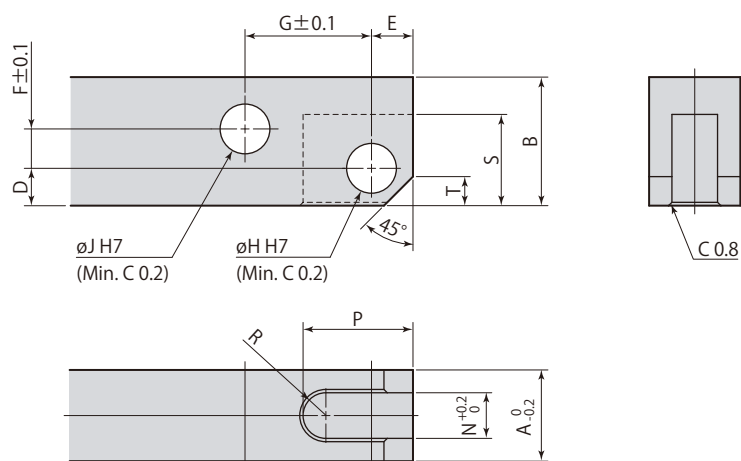
Rz: ISO4287(1997)

Model	CLY32-□	CLY40-□	CLY50-□	CLY63-□
F	39	45	53	65
R2	20	26	30	40
R3	28	31	36	41
øBA	46.5	54.5	64.5	77.5
BB	M5	M5	M6	M6

mm

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)

Link clamp	CLY32-□	CLY40-□	CLY50-□	CLY63-□
A	14	16	19	22
B	16	19	22	25
D	5	6	8	9
E	5	6	8	10
F	3	4	5	5
G	19.5	21	25	30
$\varnothing H$	$5^{+0.012}_0$	$6^{+0.012}_0$	$8^{+0.015}_0$	$10^{+0.015}_0$
$\varnothing J$	$5^{+0.012}_0$	$6^{+0.012}_0$	$8^{+0.015}_0$	$10^{+0.015}_0$
N	7	8	11	13
P	16	20	22	27
R	R3.5	R4	R5.5	R6.5
S	12	15	18	22
T	3	4	5	6

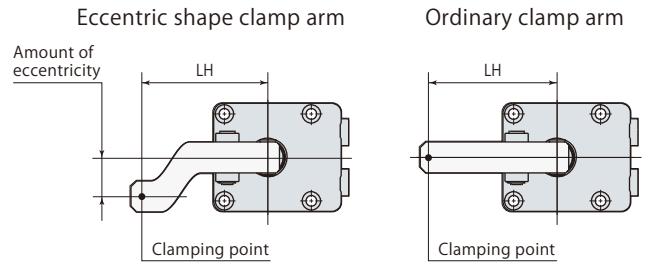
● When mounting the clamp arm, use included pins and snap rings.

Clamp arm allowable eccentricity

An eccentric shape clamp arm, as shown in diagram on right can be used with link clamp model CLY, 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.



Air link clamp

CLY Boost model

model CLY32 indicates nonusable range

Air pressure MPa	Allowable eccentricity mm							
	Clamp arm length LH mm							
	30	35	39	45	50	60	80	100
0.5					3	7	15	24
0.4			1	4	7	13	24	36
0.3		2	6	11	15	23	40	56
0.2	3	10	15	23	30	43	60	60
0.1	19	33	39	45	50	60	60	60

model CLY40 indicates nonusable range

Air pressure MPa	Allowable eccentricity mm							
	Clamp arm length LH mm							
	33	35	42	50	60	80	100	120
0.5					3	11	19	27
0.4				3	8	19	30	41
0.3			3	10	17	33	49	64
0.2	2	5	13	23	36	61	80	80
0.1	19	24	42	50	60	80	80	80

model CLY50 indicates nonusable range

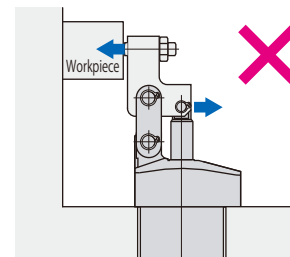
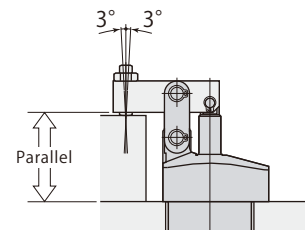
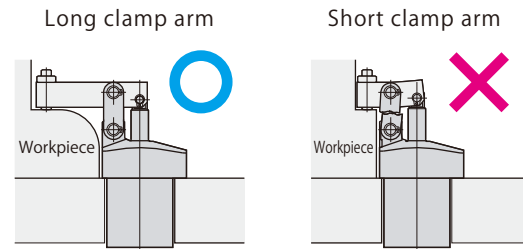
Air pressure MPa	Allowable eccentricity mm							
	Clamp arm length LH mm							
	38	45	50	60	80	100	120	140
0.5				6	18	29	41	53
0.4		1	5	13	28	44	59	75
0.3		8	13	24	46	68	90	100
0.2	8	20	29	47	80	100	100	↑
0.1	33	45	50	60	80	100	100	100

model CLY63 indicates nonusable range

Air pressure MPa	Allowable eccentricity mm							
	Clamp arm length LH mm							
	45	50	60	80	100	120	140	160
0.5				12	24	36	48	60
0.4			6	22	38	54	70	86
0.3		5	16	39	61	84	106	120
0.2	9	18	36	71	100	120	120	↑
0.1	39	50	60	80	100	120	120	120

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 (air 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 $\pm 3^\circ$).
- 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.



Specifications

I : Meter-in

O : Meter-out

G port size

Control method



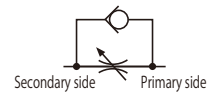
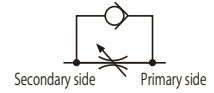
Locknut color : Silver

Locknut color : Black

VCL

01 : G1/8

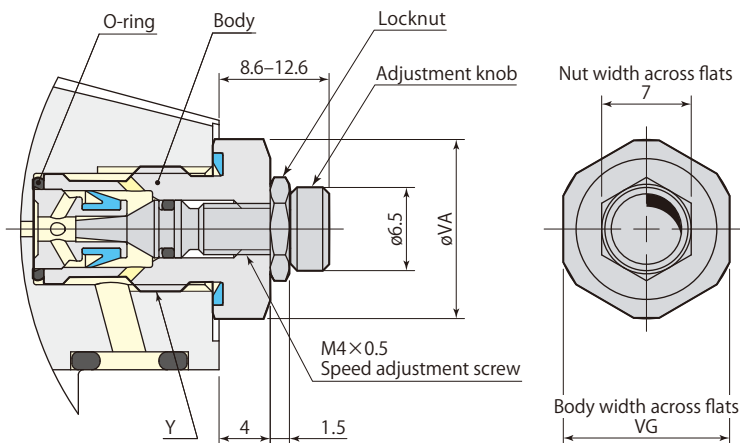
02 : G1/4

I : Meter-in

O : Meter-out


Model	VCL01-I	VCL01-O	VCL02-I	VCL02-O
G port size	G1/8		G1/4	
Orifice area	mm ²	2.8	6.2	
Recommended tightening torque	N·m	7	15	
Mass	kg	0.01	0.02	

● Pressure range: 0.1–1.0 MPa ● Proof pressure: 1.5 MPa ● Operating temperature: 0–70 °C ● Fluid used: Air*

*: Supply the dry and filtered air. Particulate size 5 μm or less is recommended.



Model	VCL01	VCL02
Y	G1/8	G1/4
øVA	14	19
VG	13	17
Adjustment screw number of turns	8 rotations	
O-ring*1	6.0×1.0*2	8.0×1.0*2

*1: FKM-90

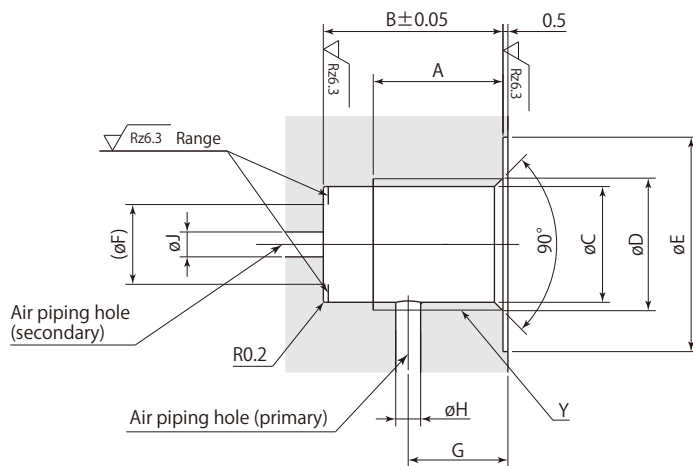
*2: Inner diameter × Thickness

- Use a closed wrench or socket wrench for mounting and dismounting.
- Speed controller can be mounted on air port (G port) when using manifold piping.
- This diagram depicts mounted condition for meter-out (VCL□-O).
- VCL is shipped with the valve fully open. Adjust the flow rate by loosening the screw after it is tightened up to close the valve. Tighten the locknut after adjustment is completed.

Applicable clamp

Model	VCL01	VCL02
Air swing clamp	CTX32, CTX40 CTY25, CTY32, CTY40	CTX50, CTX63 CTY50, CTY63
Air link clamp	CLX32, CLX40 CLY32, CLY40* CLZ25	CLX50, CLX63 CLY50, CLY63*

*: Air link clamp boost model CLY are meter-out only.

Mounting details

Rz: ISO4287(1997)

Model	mm	
	VCL01	VCL02
A	9	13
B	14	18
øC	8.7 ^{+0.1} ₀	11.6 ^{+0.1} ₀
øD	9.9	13.3
øE	17.5	21.5
øF	6	8
G	8-11	9-12.5
øH	2	3
øJ	2	3
Y	G1/8	G1/4

Mounting & dismounting of speed controller

- When mounting or dismounting a speed controller, be sure to set pressure within air circuit to 0 MPa before starting.
- When mounting a speed controller, be sure to tighten it with the recommended tightening torque.



<p style="text-align: center;">air Work support</p>		<p style="text-align: center;">model CSS Page →122</p> 	<p style="text-align: center;">model CSX Page →122</p> 
		<p style="text-align: center;">air Air lift</p>	<p style="text-align: center;">air Spring lift</p>
Specifications		<p style="text-align: center;">Threaded body Standard model</p>	<p style="text-align: center;">Threaded body Standard model</p>
Features			
Option	Piping cap		<p style="text-align: right;">CSP-C Page →138</p>
	Flange		<p style="text-align: right;">CSP-F Page →139</p>
	Piping block		<p style="text-align: right;">CSP-P Page →140</p>

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Mounting details	136
Caution in use	137
Option	
Piping cap CSP-C	138
Flange CSP-F	139
Piping block CSP-P	140

air Work support

1 MPa



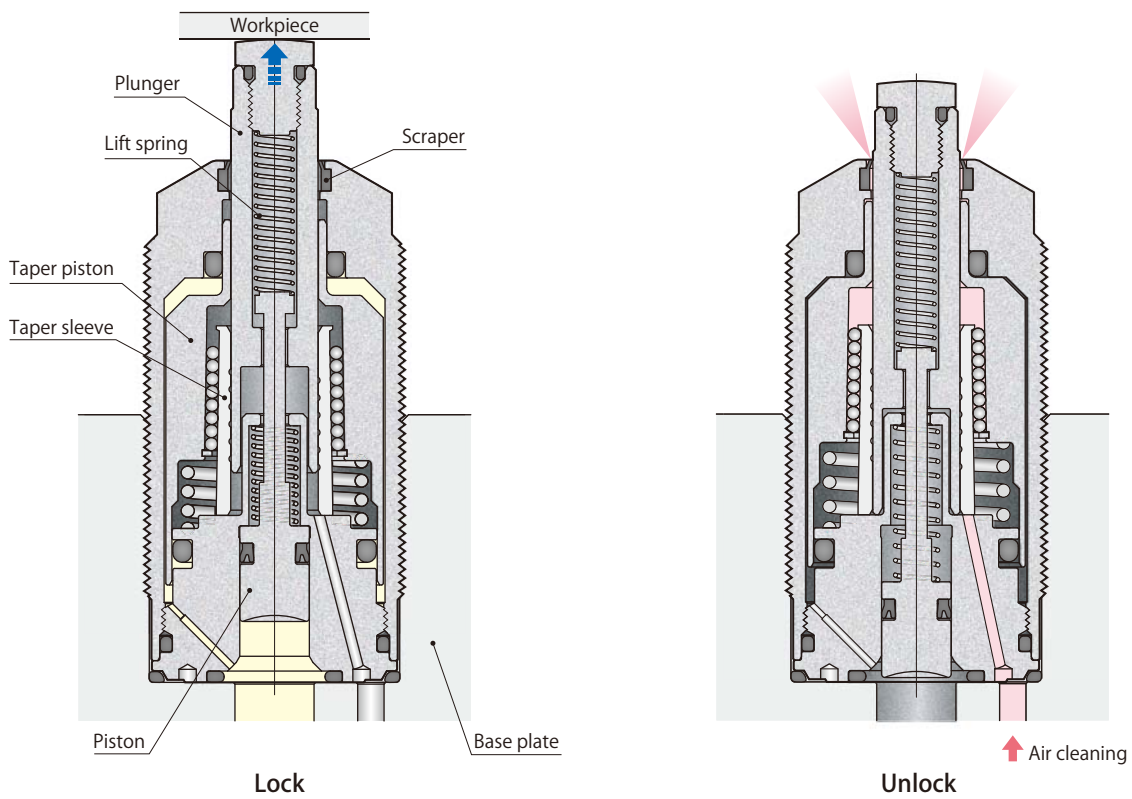
Air lift
model CSS04-L



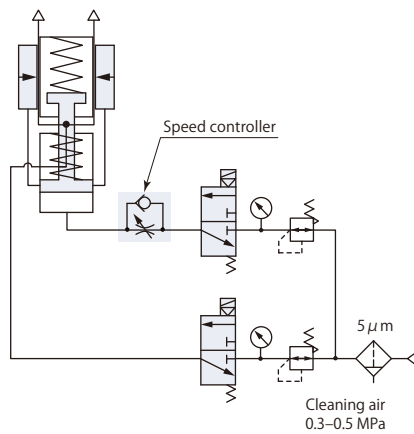
Spring lift
model CSX04-L

Air lift

model CSS □-□

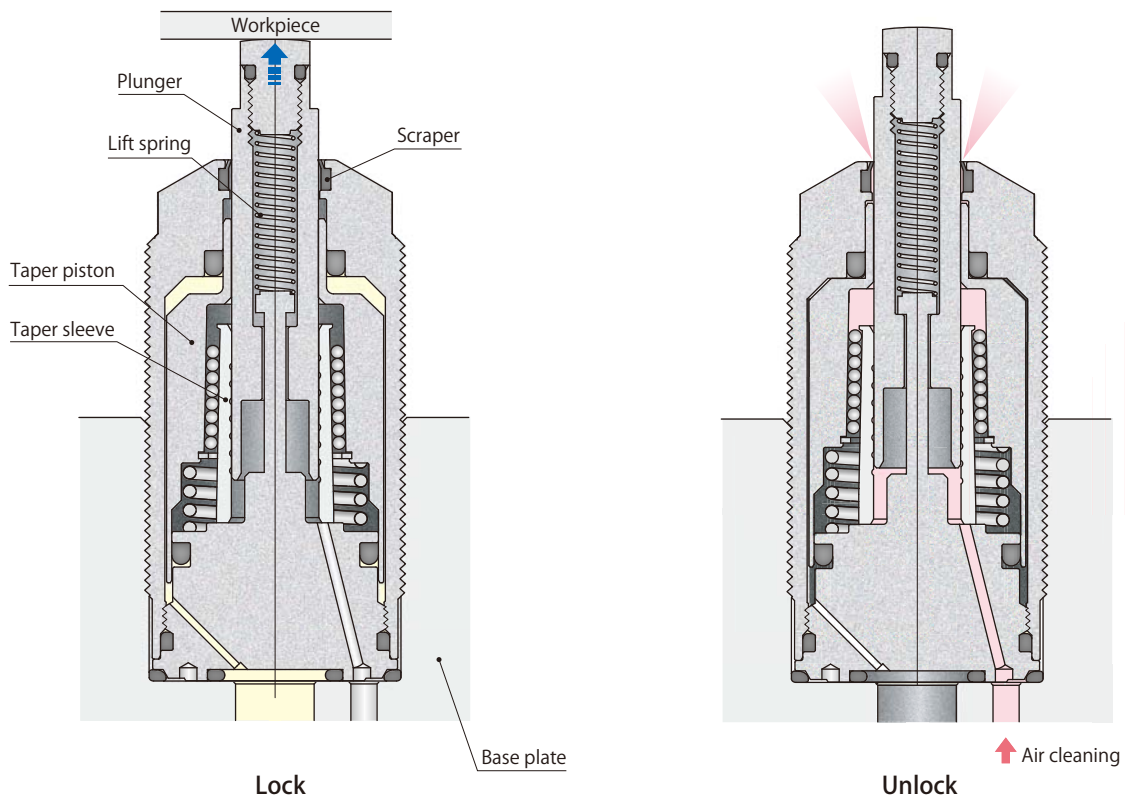


Pneumatic circuit diagram

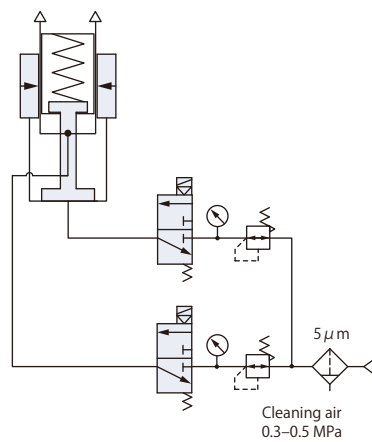


Spring lift

model CSX□-□

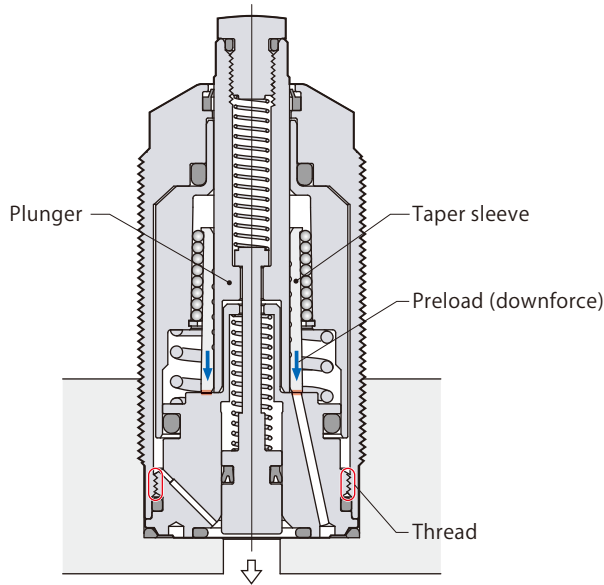


Pneumatic circuit diagram

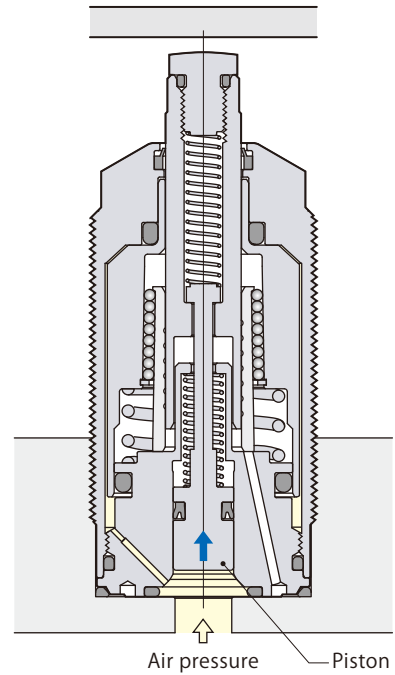


Air lift (model CSS)

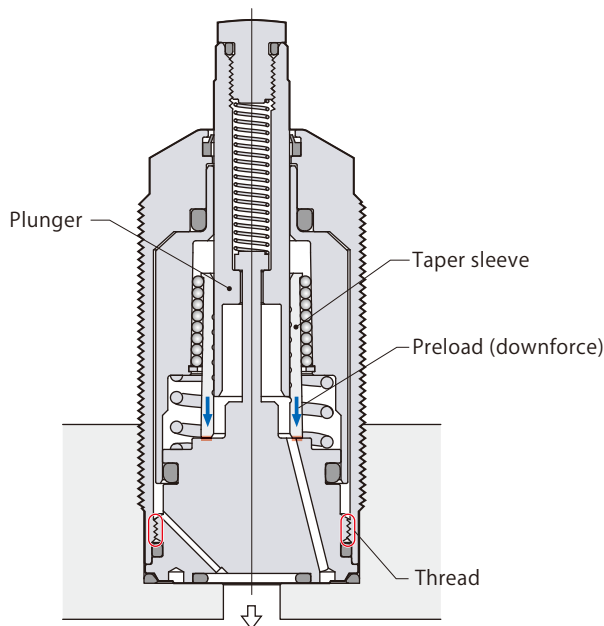
Plunger is locked after it stroked by the structure containing sequential movement, which enables a workpiece to hold securely.



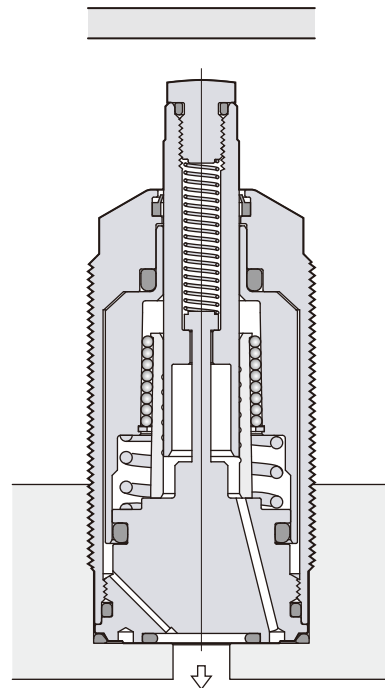
- The taper sleeve is preloaded by the thread and is kept the position lower.

① The piston moves upward

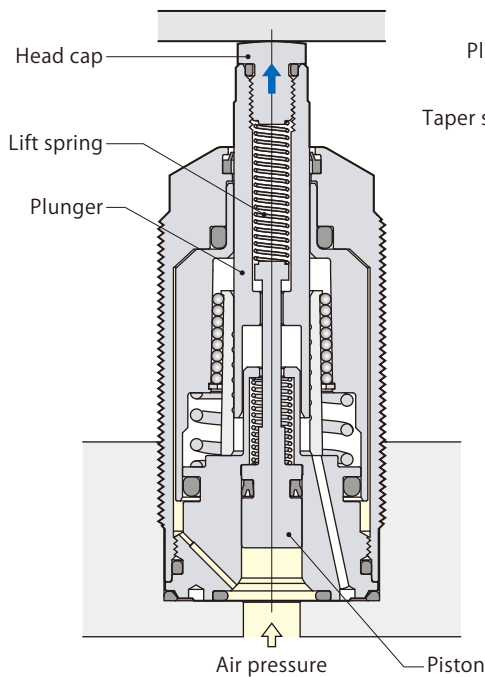
- Piston moves upward by the air force.

Spring lift (model CSX)

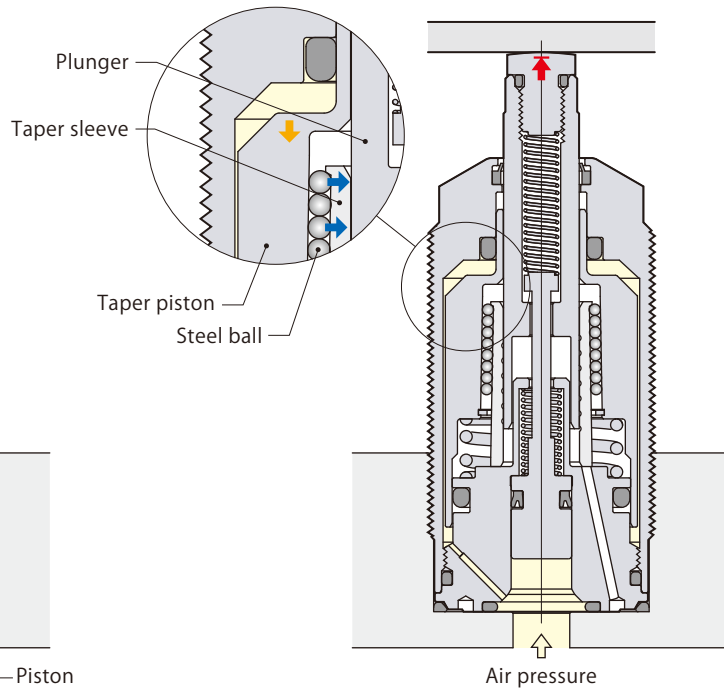
- The taper sleeve is preloaded by the thread and is kept the position lower.

① Before the workpiece approaches

② Contact with the workpiece



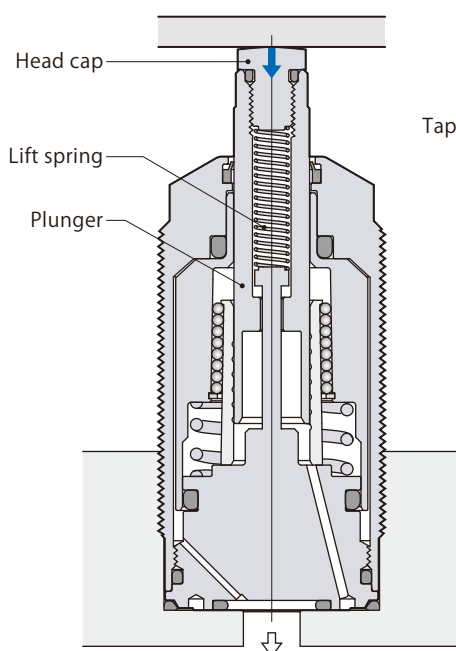
③ Supporting the workpiece



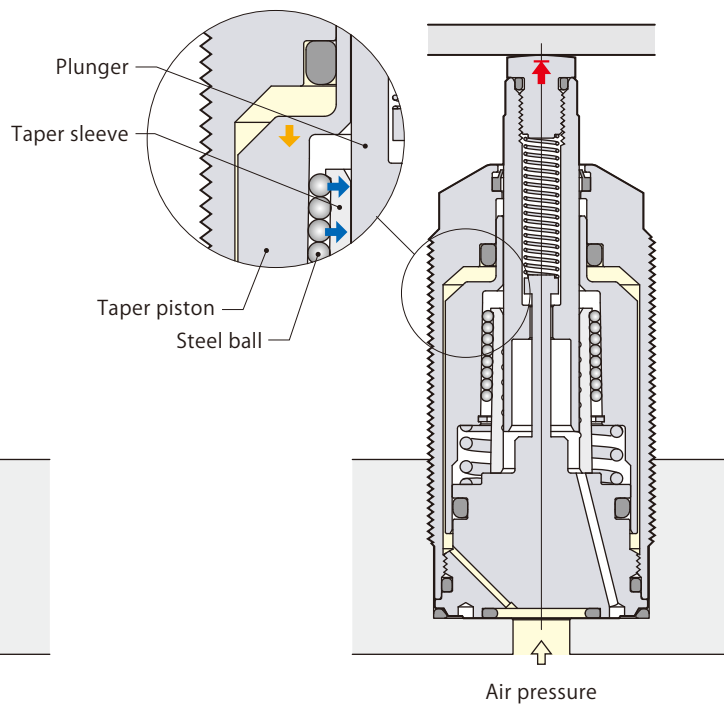
- The plunger with a head cap strokes upward by the lift spring to contact the workpiece. The plunger puts a load on the workpiece since the piston continues to move upward to the end of its stroke.

- After piston stroking, the taper piston moves down by the air force to depress the taper sleeve by means of the steel balls. Then the taper sleeve locks the plunger firmly.

② Contact with the workpiece



③ Supporting the workpiece



- The workpiece touches head cap then depresses the plunger until it reaches to the seating surface. The lift spring puts a load onto the workpiece.

- The taper piston is pushed down by the air force to depress the taper sleeve by means of the steel balls. Then the taper sleeve locks the plunger firmly.

Specifications

	Size	Lift spring force
CSS : Air lift CSX : Spring lift	005	L : Standard
	00	
	01	
	02	H : Strong
	04	
05		

Model			CSS005	CSS00	CSS01	CSS02	CSS04	CSS05
			CSX005	CSX00	CSX01	CSX02	CSX04	CSX05
Support force*1	Air pressure 1MPa	kN	0.5	0.8	1.3	1.9	3.5	5.0
	Air pressure 0.5MPa	kN	0.19	0.3	0.5	0.7	1.3	1.9
Cylinder capacity	CSS	cm ³	0.7	1.1	1.7	2.6	4.2	6.2
	CSX	cm ³	0.5	0.8	1.3	2.2	3.6	4.6
Lift spring force*2	L:Standard	N	1-2	1-2	1-2	1-2	2-4	4-7
	H:Strong	N	2-3	2-3	2-3	2-3	3-6	6-11
Plunger stroke		mm	6.5	6.5	6.5	8	8	8
Max. allowable mass of head cap		kg	0.05					
Mass		kg	0.1	0.2	0.3	0.4	0.8	1.1
Recommended tightening torque of body		N·m	20-25	35-45	40-50	45-55	55-65	80-90

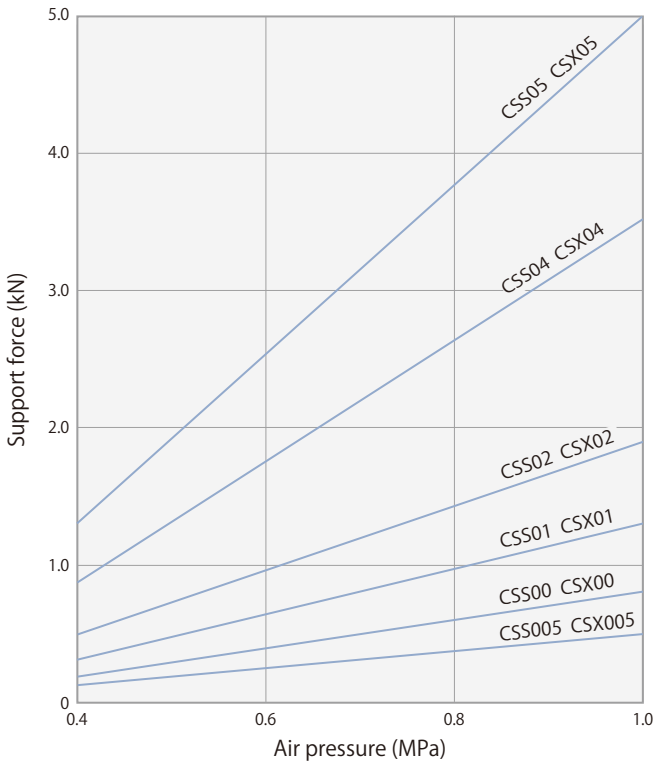
- Air pressure range:0.4-1 MPa
- Proof pressure:1.5 MPa
- Operating temperature:0-70 °C
- Fluid used:Air*3
- Oil supply:Not required
- Seals are resistant to chlorine-based cutting fluid. (not thermal resistant specification)
- Air sensor operation is unavailable.

*1:When work support and clamp are used facing each other, work support and clamp must be selected in such a way that the support force is 1.5 times the applied load (clamping force + machining force).

*2:Figures are for "upper end to lower end" of plunger action.

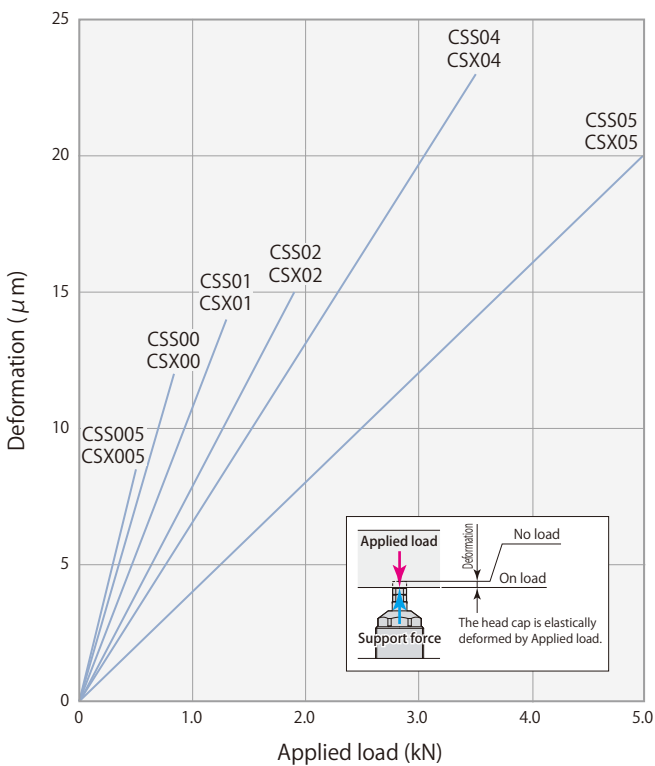
*3:Supply the dry and filtered air. Particulate size 5 μm or less is recommended.

Air pressure & support force



Air pressure MPa	Support force kN					
	CSS005 CSX005	CSS00 CSX00	CSS01 CSX01	CSS02 CSX02	CSS04 CSX04	CSS05 CSX05
0.4	0.13	0.2	0.3	0.5	0.9	1.3
0.5	0.19	0.3	0.5	0.7	1.3	1.9
0.6	0.25	0.4	0.7	1.0	1.7	2.5
0.7	0.31	0.5	0.8	1.2	2.2	3.1
0.8	0.38	0.6	1.0	1.4	2.6	3.8
0.9	0.44	0.7	1.1	1.7	3.1	4.4
1.0	0.5	0.8	1.3	1.9	3.5	5.0

Applied load & deformation



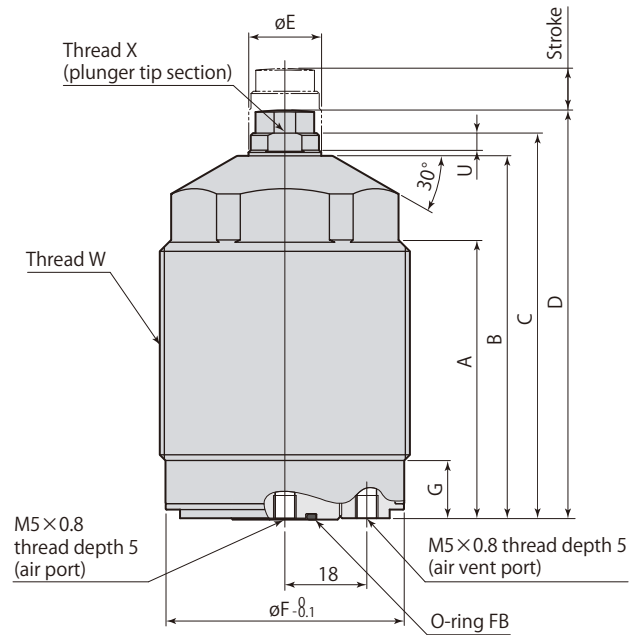
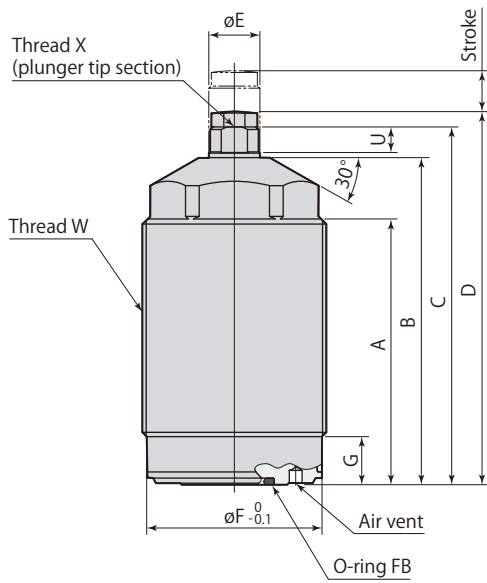
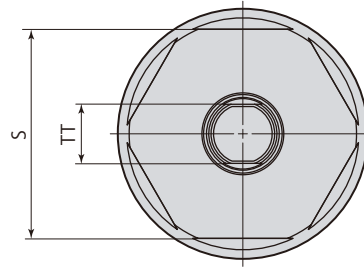
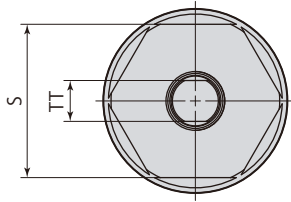
Applied load kN	Deformation μm					
	CSS005 CSX005	CSS00 CSX00	CSS01 CSX01	CSS02 CSX02	CSS04 CSX04	CSS05 CSX05
0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	8.5	7.5	5.4	3.9	3.3	2.0
1.0			10.8	7.9	6.6	4.0
1.5				11.8	9.9	6.0
2.0					13.1	8.0
2.5					16.4	10.0
3.0					19.7	12.0
3.5	Nonusable range				23.0	14.0
4.0						16.0
4.5						18.0
5.0						20.0

Held with air pressure of 1 MPa.

Dimensions

CSS005, CSS00, CSS01, CSS02, CSS04

CSS05

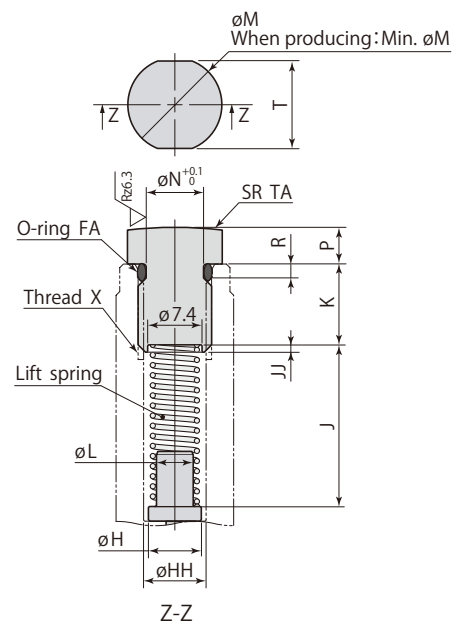
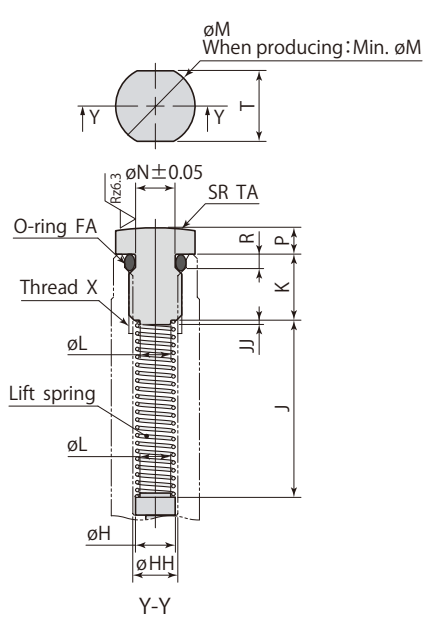


Head cap details

Hardness: HRC52

CSS005, CSS00, CSS01, CSS02, CSS04

CSS05



Rz: ISO4287(1997)

Air work support
CSS
Air lift

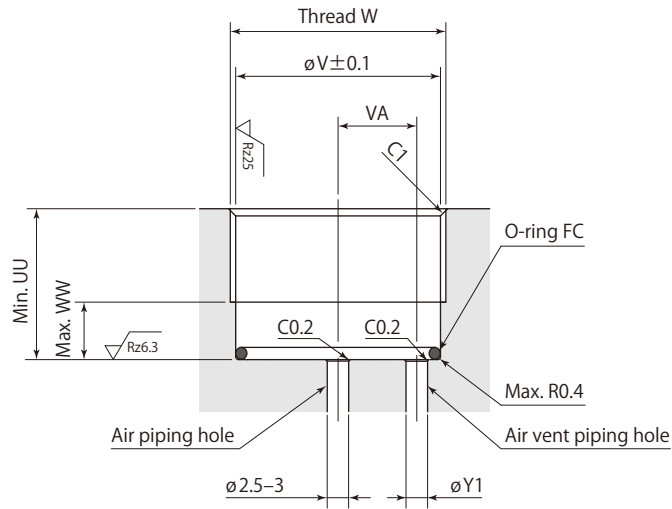
Model	CSS005-□	CSS00-□	CSS01-□	CSS02-□	CSS04-□	CSS05-□
A	39	44	51	52	61	61
B	47	53	60	64	76	80
C	51.5	59	66	70	83	85
D	54	62	69	73	87	90
øE	8	10	10	10	12	16
øF	20.3	24.3	28.3	34.3	43.3	52.5
G	8.4	9.4	9.4	9.4	9.4	13
øH	3.8	4.5	4.5	4.5	5.5	7.2
øHH	4.3	5.1	5.1	5.1	6.8	8.5
J	15.5	20.5	20.5	20	20.1	22
JJ	0.5	0.5	0.5	0.5	1	1
K	7	7.5	7.5	7.5	9	11
øL	2.8	3.5	3.5	3.5	4.3	5
øM	8	9	9	9	11.5	12.9
Min. øM	7.5	8.5	8.5	8.5	10	12.5
øN	4	4.5	4.5	4.5	6	7.8
P	2.5	3	3	3	4	5
R	1.0	1.5	1.5	1.5	1.9	1.9
S (hex width across flats)	19	22	24	30	36	46
T (width across flats)	7	8	8	8	10	12
TA	30	30	30	30	50	55
TT (plunger width across flats)	7	8	8	8	10	13
U	3.5	5	5	5	6	4
W	M22×1.5	M26×1.5	M30×1.5	M36×1.5	M45×1.5	M55×2
X (recommended tightening torque)	M5×0.8 depth 8 (6 N·m)	M6×1 depth 9 (10 N·m)	M6×1 depth 9 (10 N·m)	M6×1 depth 9 (10 N·m)	M8×1.25 depth 12 (20 N·m)	M10×1.5 depth 13 (30 N·m)
O-ring FA (FKM-70)	SS4.5 (4.0×1.0)*	S5	S5	S5	S6	S8
O-ring FB (FKM-90)	AS568-011	AS568-013	AS568-014	AS568-014	AS568-015	AS568-013

* : Inner diameter × Thickness

- When fixing the hexagon part of body with a vise, etc., make sure the tightening force is 2.5 kN or less.
- Always attach head cap (lift spring cannot be retained). When fabricating head cap, ensure that O-ring slot, spring spot facing and guide are made by referring to head cap details. Be sure to always use O-ring.
- When fabricating a lift spring, determine dimensions by referring to head cap details. Furthermore, rustproofing must be implemented (however, there is no guarantee for operation).
- A pipe fitting (M5) is mountable at the bottom of the body. (CSS05 only) Refer to the diagram shown in **page →130** for details.
- This diagram indicates a situation where head cap has been fitted into plunger with no pressure applied.

CSS
Air lift
Air work support

Mounting details



Rz: ISO4287(1997)

mm

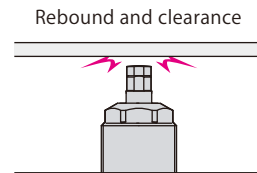
Model	CSS005-□	CSS00-□	CSS01-□	CSS02-□	CSS04-□	CSS05-□
UU	19	20	20	20	20	27
ϕV	20.5	24.5	28.5	34.5	43.5	53
VA	7	9	11	13	15	21
W	M22×1.5	M26×1.5	M30×1.5	M36×1.5	M45×1.5	M55×2
WW	8	9	9	9	9	12
$\phi Y1$	2	2.5-3	2.5-3	2.5-3	2.5-3	2.5-3
O-ring FC (FKM-90)	AS568-017	AS568-020	AS568-022	AS568-026	AS568-030	AS568-134

● Install O-ring FC at the bottom of the hole. The O-ring FC is packed with a work support.

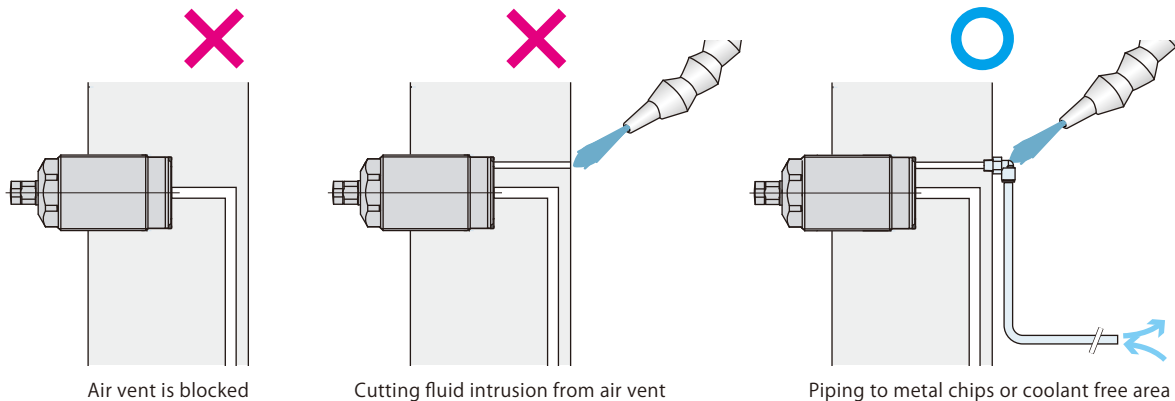
Caution in use

- The lift spring in the plunger may push the workpiece upward if it is light weight and seating detection cannot be complete. Review the weight of workpiece or lift spring force and make it appropriate to seat the workpiece perfectly and acutate the work support.
- Set the plunger lifting time to 0.5 seconds or longer by adjusting the speed controller (meter-in). Reasonable plunger ascending speed can prevent the parts from breakage also curbs plunger contact false.

If the plunger ascends to reach a workpiece too fast, it rebounds after hitting the workpice and will create a small clearance between the two. The clearance may cause a supporting fault of the workpiece.



- Avoid following usages. These may cause sleeve deformation that could lead to malfunction of plunger or decreased support force.
 - ✗ Applying eccentric load on plunger.
 - ✗ Applying load that exceeds rated support force.
 - ✗ Rotating plunger when locked.
- Air vent must be opened to atmosphere. Any blockage on the vent results in malfunction. Provide the piping if there is a risk of coolant or metal chips intrusion. Allowing intrusion of cutting fluid may cause rusting and other problems.

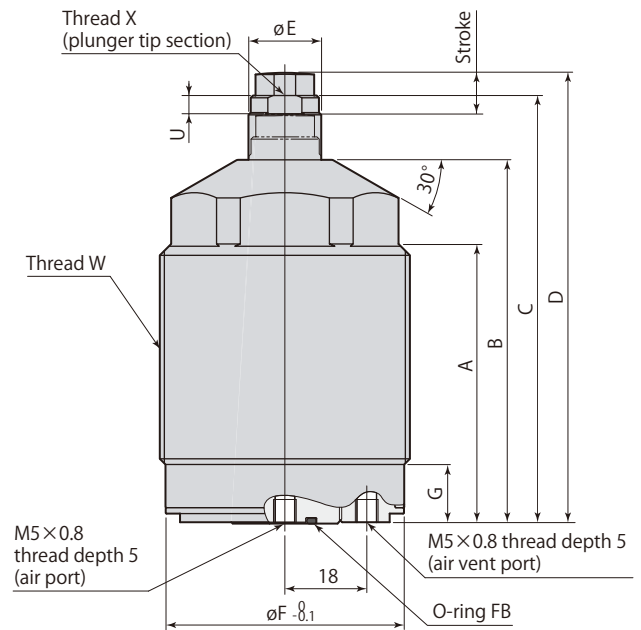
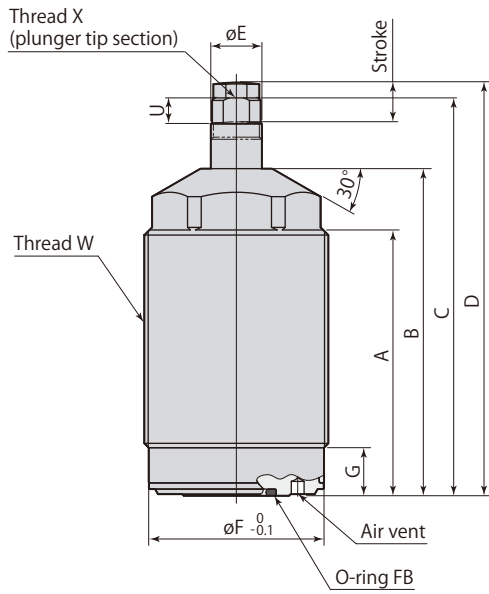
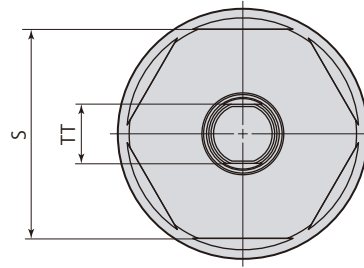
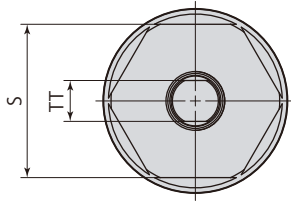


- Air (oil free) must be fed through a $5\ \mu\text{m}$ filter that is connected to an air vent port for air cleaning. Perform air cleaning only when replacing workpiece. Plunger will rise during air cleaning.

Dimensions

CSX005, CSX00, CSX01, CSX02, CSX04

CSX05

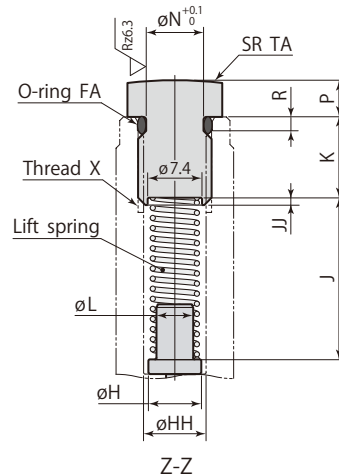
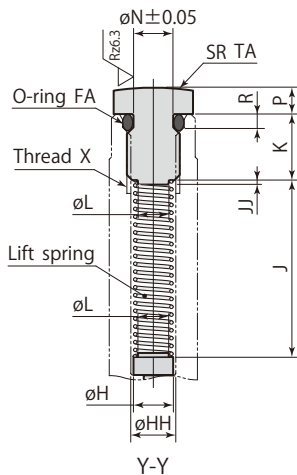
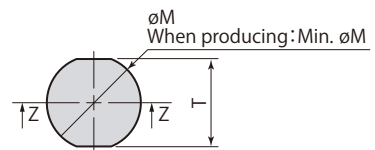
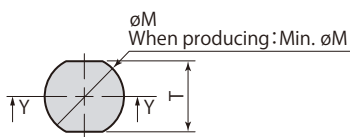


Head cap details

Hardness: HRC52

CSX005, CSX00, CSX01, CSX02, CSX04

CSX05



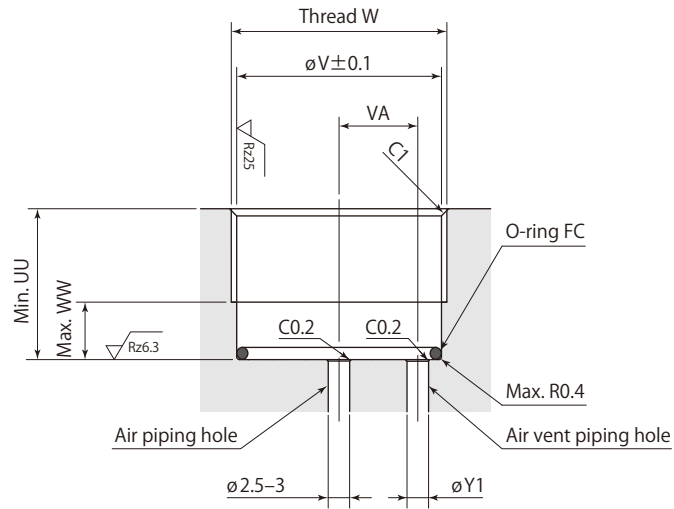
Rz: ISO4287(1997)

Air work support
CSX
Spring lift

Model	CSX005-□	CSX00-□	CSX01-□	CSX02-□	CSX04-□	CSX05-□
A	39	44	51	52	61	61
B	47	53	60	64	76	80
C	58	65.5	72.5	78	91	93
D	60.5	68.5	75.5	81	95	98
øE	8	10	10	10	12	16
øF	20.3	24.3	28.3	34.3	43.3	52.5
G	8.4	9.4	9.4	9.4	9.4	13
øH	3.8	4.5	4.5	4.5	5.5	7.2
øHH	4.3	5.1	5.1	5.1	6.8	8.5
J	15.5	20.5	20.5	20	20.1	22
JJ	0.5	0.5	0.5	0.5	1	1
K	7	7.5	7.5	7.5	9	11
øL	2.8	3.5	3.5	3.5	4.3	5
øM	8	9	9	9	11.5	12.9
Min. øM	7.5	8.5	8.5	8.5	10	12.5
øN	4	4.5	4.5	4.5	6	7.8
P	2.5	3	3	3	4	5
R	1.0	1.5	1.5	1.5	1.9	1.9
S (hex width across flats)	19	22	24	30	36	46
T (width across flats)	7	8	8	8	10	12
TA	30	30	30	30	50	55
TT (plunger width across flats)	7	8	8	8	10	13
U	3.5	5	5	5	6	4
W	M22×1.5	M26×1.5	M30×1.5	M36×1.5	M45×1.5	M55×2
X (recommended tightening torque)	M5×0.8 depth 8 (6 N·m)	M6×1 depth 9 (10 N·m)	M6×1 depth 9 (10 N·m)	M6×1 depth 9 (10 N·m)	M8×1.25 depth 12 (20 N·m)	M10×1.5 depth 13 (30 N·m)
O-ring FA (FKM-70)	SS4.5 (4.0×1.0)*	S5	S5	S5	S6	S8
O-ring FB (FKM-90)	AS568-011	AS568-013	AS568-014	AS568-014	AS568-015	AS568-013

* : Inner diameter × Thickness

- When fixing the hexagon part of body with a vise, etc., make sure the tightening force is 2.5 kN or less.
- Always attach head cap (lift spring cannot be retained). When fabricating head cap, ensure that O-ring slot, spring spot facing and guide are made by referring to head cap details. Be sure to always use O-ring.
- When fabricating a lift spring, determine dimensions by referring to head cap details. Furthermore, rustproofing must be implemented (however, there is no guarantee for operation).
- A pipe fitting (M5) is mountable at the bottom of the body. (CSX05 only) Refer to the diagram shown in **page →134** for details.
- This diagram indicates a situation where head cap has been fitted into plunger with no pressure applied.

Mounting details

Rz: ISO4287(1997)

mm

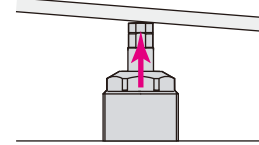
Model	CSX005-□	CSX00-□	CSX01-□	CSX02-□	CSX04-□	CSX05-□
UU	19	20	20	20	20	27
ϕV	20.5	24.5	28.5	34.5	43.5	53
VA	7	9	11	13	15	21
W	M22×1.5	M26×1.5	M30×1.5	M36×1.5	M45×1.5	M55×2
WW	8	9	9	9	9	12
$\phi Y1$	2	2.5-3	2.5-3	2.5-3	2.5-3	2.5-3
O-ring FC (FKM-90)	AS568-017	AS568-020	AS568-022	AS568-026	AS568-030	AS568-134

● Install O-ring FC at the bottom of the hole. The O-ring FC is packed with a work support.

Caution in use

- If the workpiece is light weight, the plunger cannot be pressed down by the weight of workpiece and seating detection cannot be complete. Review the weight of workpiece or lift spring force to make the workpiece seat perfectly, and lock the work support.

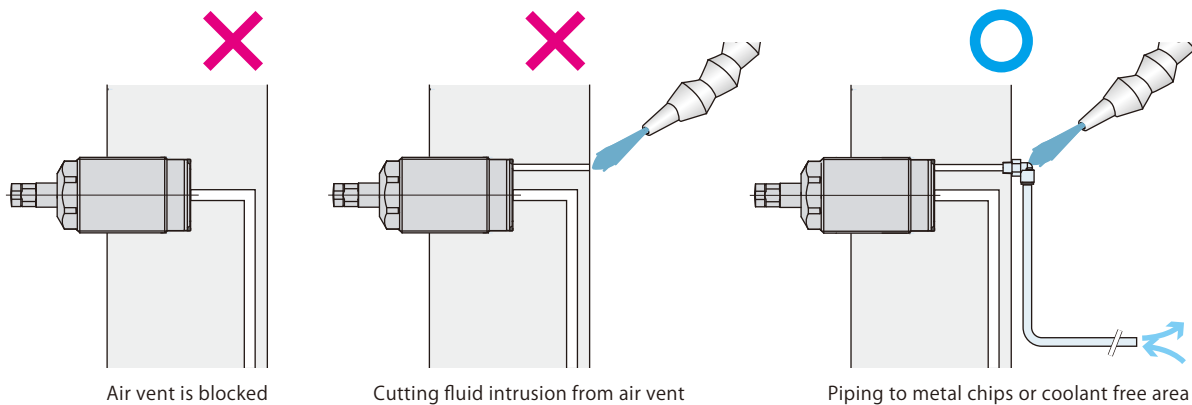
Spring pushes the workpiece



- Avoid following usages. These may cause sleeve deformation that could lead to malfunction of plunger or decreased support force.

- ✗ Applying eccentric load on plunger.
- ✗ Applying load that exceeds rated support force.
- ✗ Rotating plunger when locked.

- Air vent must be opened to atmosphere. Any blockage on the vent results in malfunction. Provide the piping if there is a risk of coolant or metal chips intrusion. Allowing intrusion of cutting fluid may cause rusting and other problems.



- Air (oil free) must be fed through a $5\ \mu\text{m}$ filter that is connected to an air vent port for air cleaning. Perform air cleaning only when replacing workpiece.

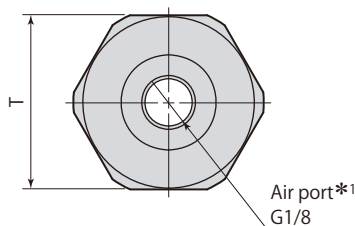
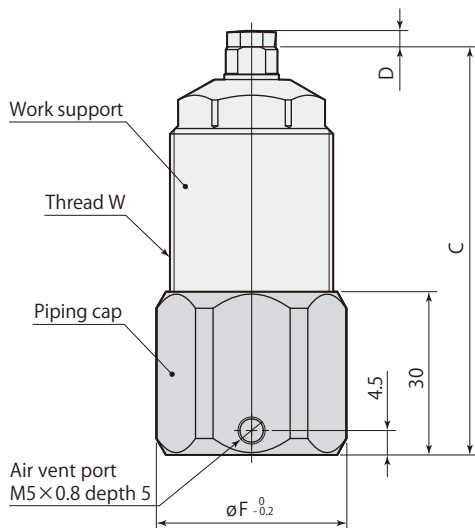
Piping cap

Size

005 : CSS005, CSX005**00** : CSS00, CSX00**CSP** (Nil) : CSS01, CSX01 — **C** : Piping cap**02** : CSS02, CSX02**06** : CSS04, CSX04

Work support	CSS005 CSX005	CSS00 CSX00	CSS01 CSX01	CSS02 CSX02	CSS04 CSX04	CSS05 CSX05
Piping cap	CSP005-C	CSP00-C	CSP-C	CSP02-C	CSP06-C	(*)

*: Connect model CSS05 and model CSX05 directly as a port is available on body. (For details about thread size and connecting position, please refer to **page →130** for model CSS, **page →134** for model CSX.)



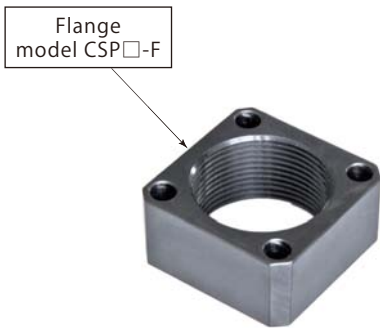
Install O-ring in the same way even when a piping cap is used for mounting.

The O-ring is included in the package of the work support.

Model	CSP005-C	CSP00-C	CSP-C	CSP02-C	CSP06-C
C* ²	61.5	68	75	79	92
D	2.5	3	3	3	4
øF	32	32	35	45	54
T (width across flats)	29	29	32	41	50
W	M22×1.5	M26×1.5	M30×1.5	M36×1.5	M45×1.5

*1: Use one-touch fittings manufactured by SMC for G port piping. (See SMC catalog for the details of the fitting.)

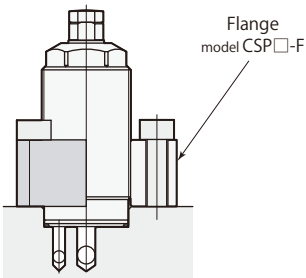
*2: Stroke length to be added on C dimension when mounting on model CSX.



Use a mounting flange when installing with screws.



Work support model CSS, CSX mounting

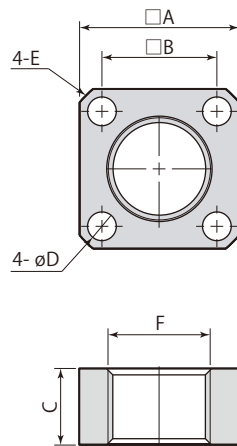


Flange

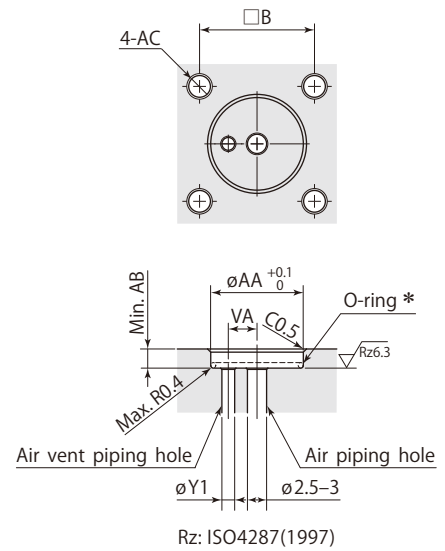
Size	
022	: CSS005, CSX005
026	: CSS00, CSX00
030	: CSS01, CSX01
036	: CSS02, CSX02
045	: CSS04, CSX04
055	: CSS05, CSX05

CSP — **F** : Flange

Dimensions



Mounting details

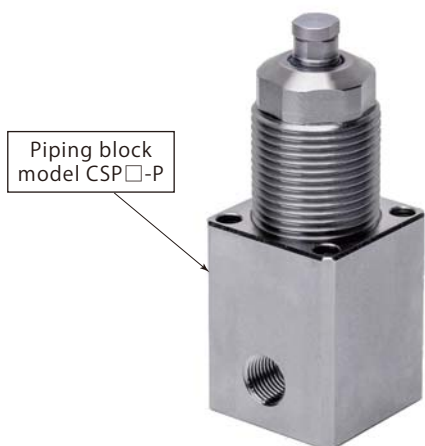


- *: Install O-ring in the same way even when a flange is used for mounting. The O-ring is included in the package of the work support.
- Mounting screws are not included.
- Refer to **pages → 130** for model CSS, **134** for model CSX for the dimensions of products that are not listed on this page.

- ① Mount a flange with screws.
- ② Screw the work support in the flange.

Model	CSP022-F	CSP026-F	CSP030-F	CSP036-F	CSP045-F	CSP055-F
A	30	35	40	50	55	70
B	23	26	31	40	42	54
C	12	17	16	16	18	24
øD	4.5	5.5	5.5	6.8	9	11
E	C2	C3	C3	C3	C4	C5
F	M22×1.5	M26×1.5	M30×1.5	M36×1.5	M45×1.5	M55×2.0
øY1	2	2.5-3	2.5-3	2.5-3	2.5-3	2.5-3
øAA	20.5	24.5	28.5	34.5	43.5	53
AB	3	3	3	3	3	3
AC	M4	M5	M5	M6	M8	M10
VA	7	9	11	13	15	21
Mass	0.05 kg	0.09 kg	0.11 kg	0.18 kg	0.18 kg	0.43 kg

Piping block

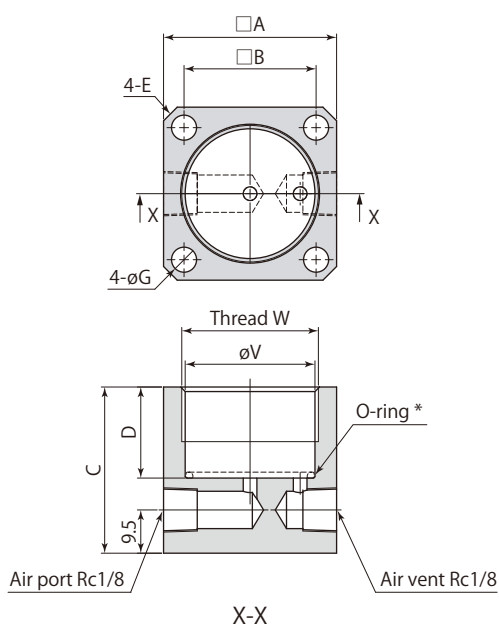


Size	
022	: CSS005, CSX005
026	: CSS00, CSX00
030	: CSS01, CSX01
036	: CSS02, CSX02
045	: CSS04, CSX04
055	: CSS05, CSX05

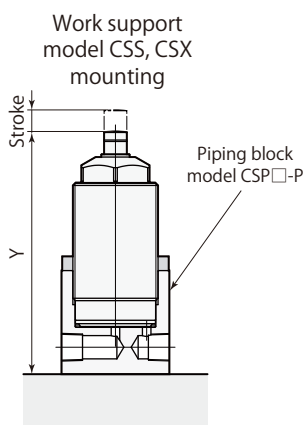
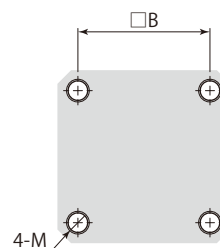
CSP

— **P** : Piping block

Dimensions



Mounting details



* : Install O-ring in the same way even when a piping block is used for mounting. The O-ring is included in the package of the work support.

- Mounting screws are not included.
- Provide the piping if there is a risk of coolant or metal chips intrusion from air vent.
- Refer to **pages →130** for model CSS, **134** for model CSX for the dimensions of products that are not listed on this page.

Model	CSP022-P	CSP026-P	CSP030-P	CSP036-P	CSP045-P	CSP055-P
A	28	35	38	45	55	70
B	21	26	29	35	42	54
C	35.5	36.5	36.5	36.5	36.5	43.5
D	19	20	20	20	20	27
E	C2	C3	C3	C3	C4	C5
ØG	4.5	5.5	5.5	6.8	9	11
M	M4	M5	M5	M6	M8	M10
ØV	20.5	24.5	28.5	34.5	43.5	53
W	M22×1.5	M26×1.5	M30×1.5	M36×1.5	M45×1.5	M55×2
Y*	70.5	78.5	85.5	89.5	103.5	106.5
Stroke	6.5	6.5	6.5	8	8	8
Mass	0.14 kg	0.23 kg	0.27 kg	0.37 kg	0.53 kg	1.03 kg

* : Stroke length to be added on Y dimension when mounting on model CSX.