

air Swing clamp

Dual cylinder model Double acting 0.5 MPa

model **CTY**

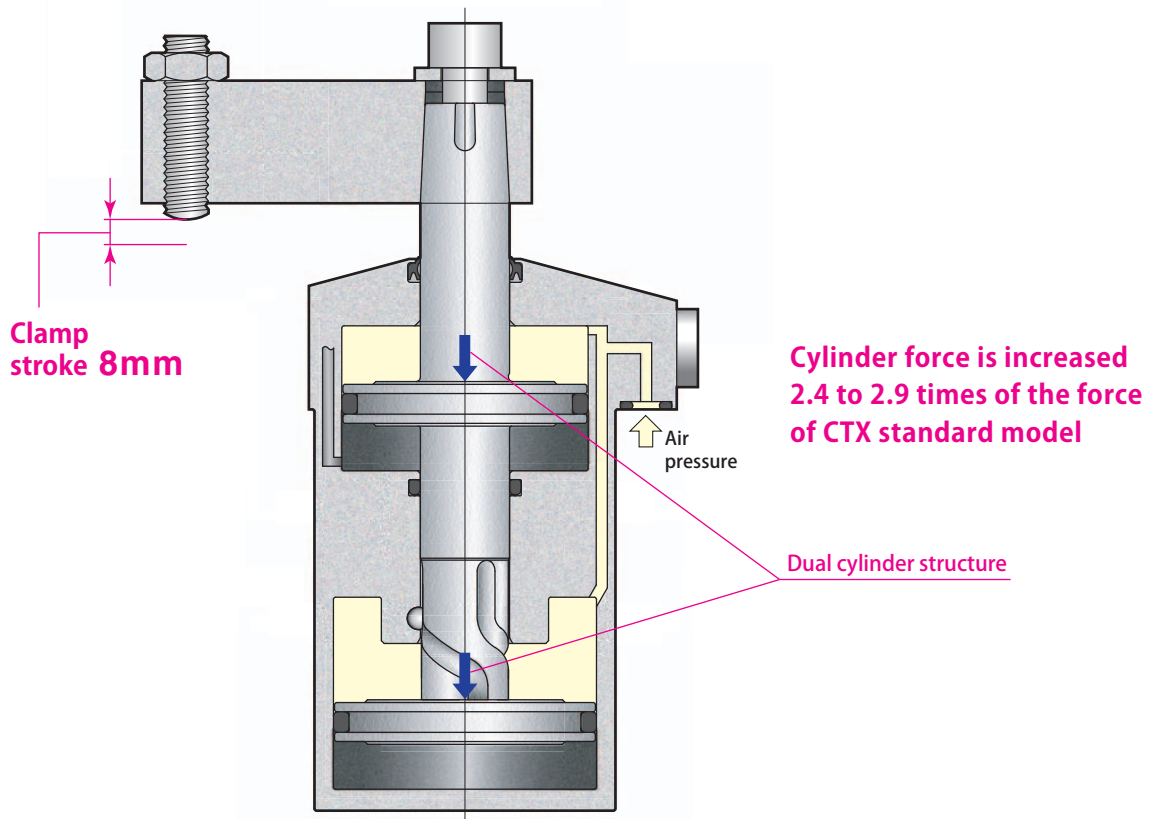


Dual cylinder model
model CTY40-L

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.

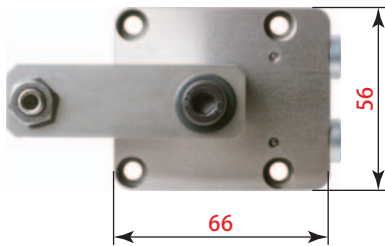


Comparison with the current model

**Air swing clamp
Dual cylinder model**

CTY40

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

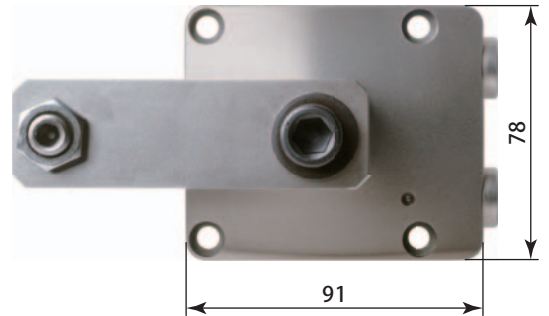


**Clamp stroke
Cylinder force
Equality**

**Air swing clamp
Standard model**

CTX63

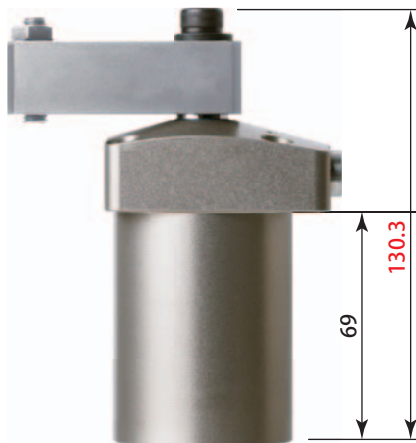
Clamp stroke : 10mm
Cylinder force : 1310N
(Air pressure 0.5MPa)



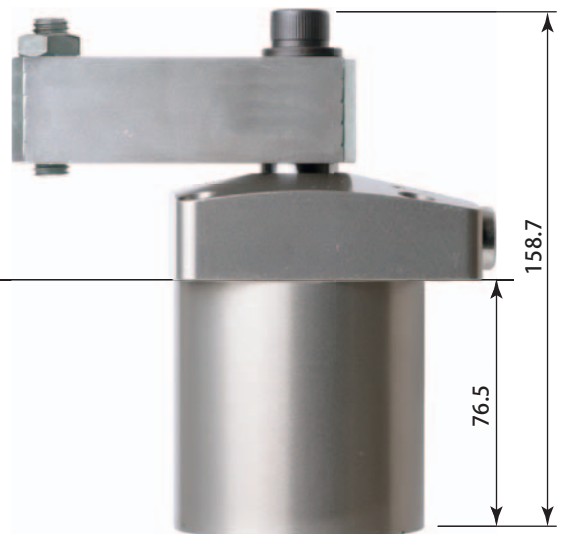
Flange area
approx. **52%**



Less space



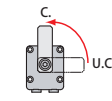
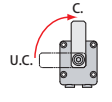
Height
approx. **82%**



Stroke end

Stroke end

Specifications

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

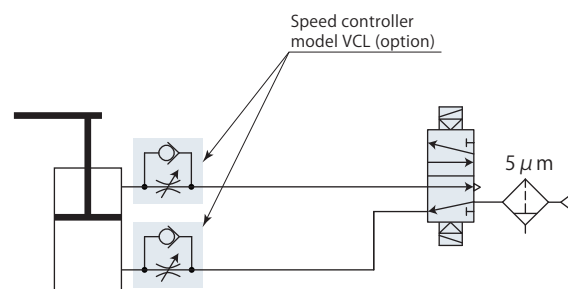
Model		CTY25	CTY32	CTY40	CTY50	CTY63	
Cylinder force (air pressure 0.5MPa)	N	650	950	1430	2110	3090	
Rod diameter	mm	12	14	16	20	25	
Effective area (clamp)	mm ²	1290	1905	2853	4214	6179	
Swing angle		90° ± 3°					
Positioning pin groove position accuracy		± 1°					
Repeated clamp positioning accuracy		± 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

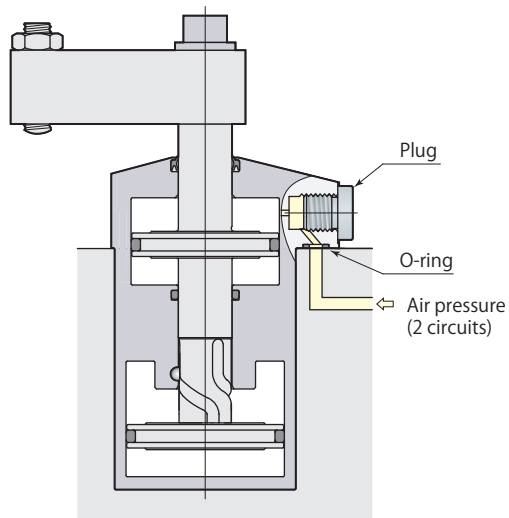
*2: Arm mounting screw

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

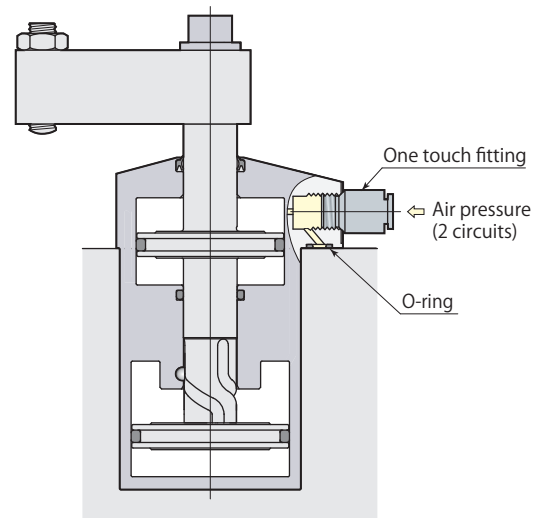
Pneumatic circuit diagram

Manifold piping and G port piping are available.Manifold piping

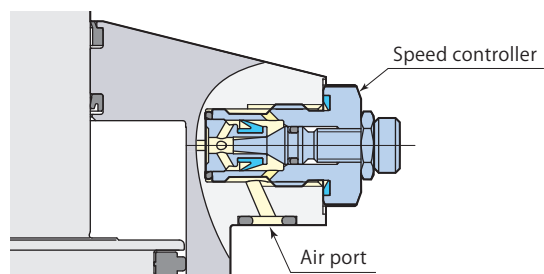
When choosing manifold piping, a speed controller model VCL is mountable on the G ports of the clamp.

G port piping

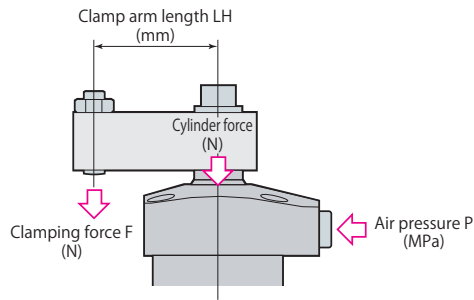
When choosing G port piping, remove plugs. (O-ring must be used.) The one touch fitting or the speed controller with one touch fitting should be mounted when choosing G port piping.

Speed controller model VCL

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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

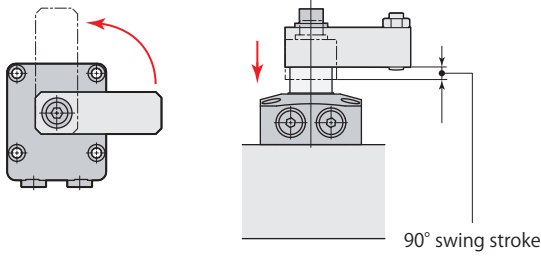
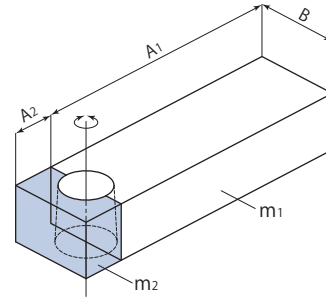
Swing time is restricted by the mass and length of the clamp arm (moment of inertia) since the 90° swing action impacts the cam shaft.

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

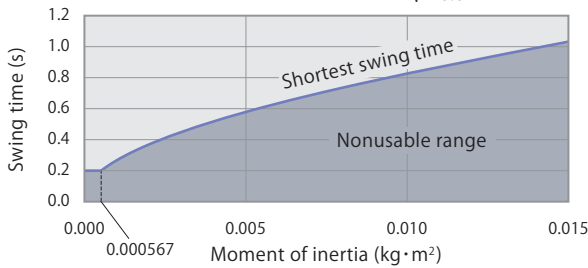
$$I = \frac{1}{12} m_1(4A_1^2 + B^2) + \frac{1}{12} m_2(4A_2^2 + B^2)$$

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



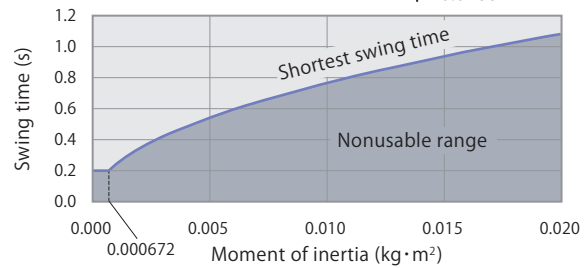
model CTY25

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0142}}$



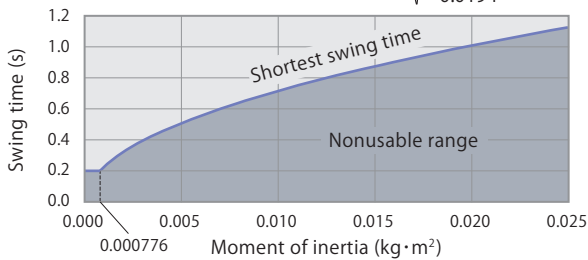
model CTY32

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



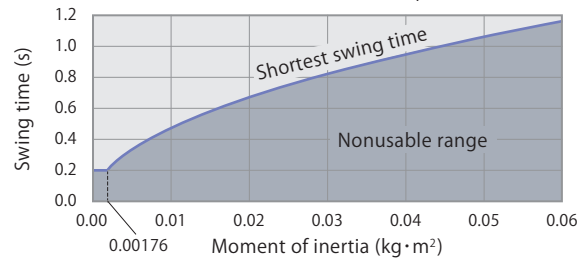
model CTY40

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



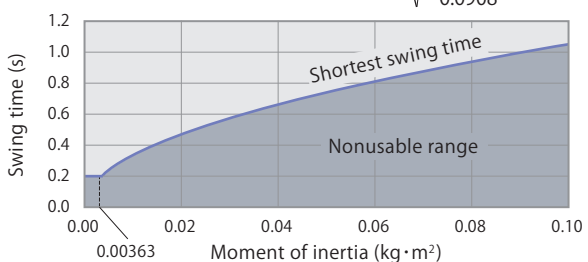
model CTY50

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

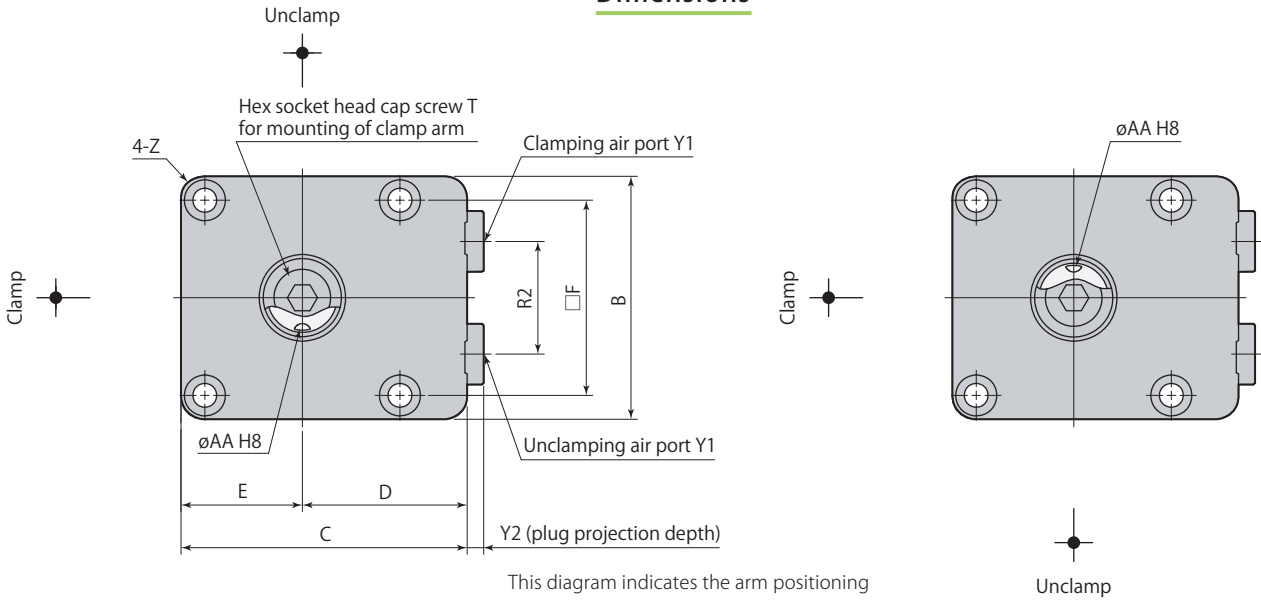


model CTY63

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

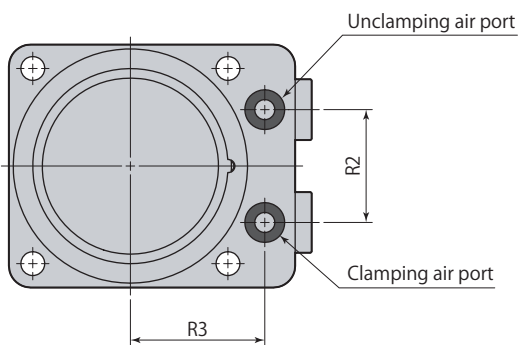
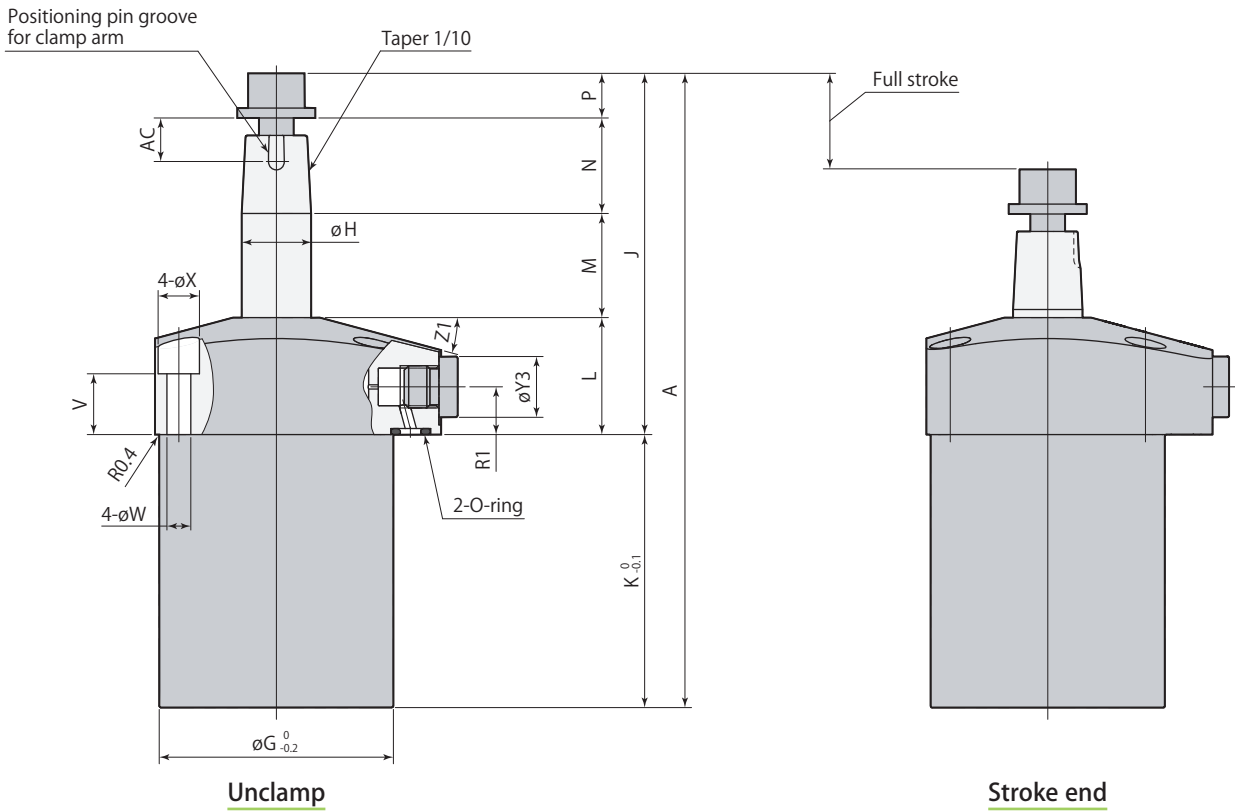


Dimensions



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
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Model	CTY25-□	CTY32-□	CTY40-□	CTY50-□	CTY63-□	
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 (fluorocarbon hardness Hs90)	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.

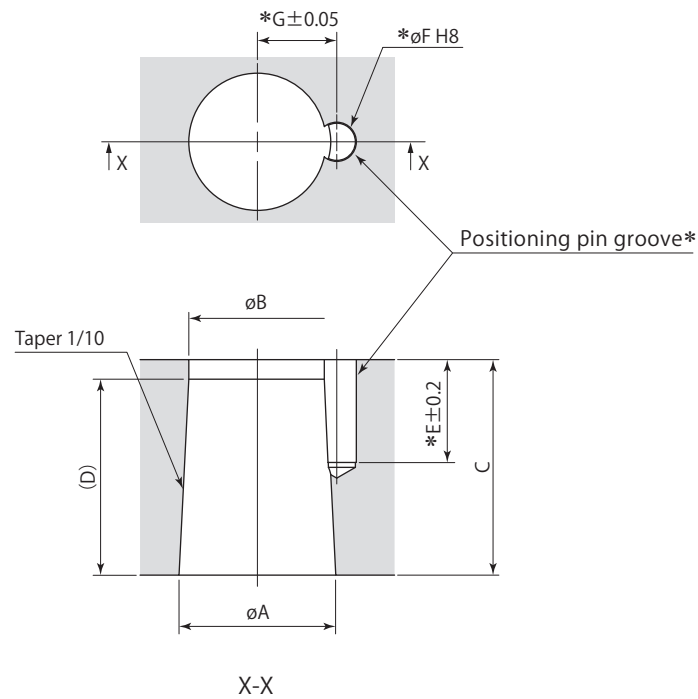
Refer to each page for the details of options.

● Taper sleeve **page →52** ● Speed controller **page →56**

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

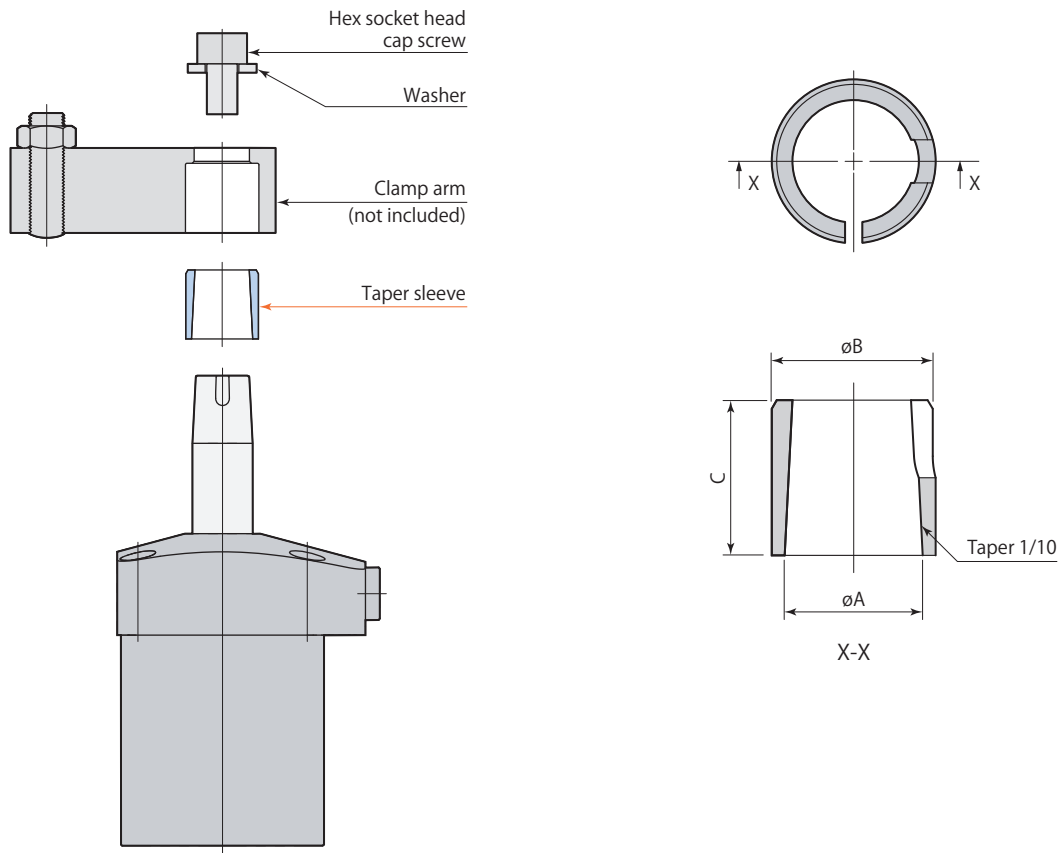
25

32

CTH 40 — XS : Taper sleeve

50

63



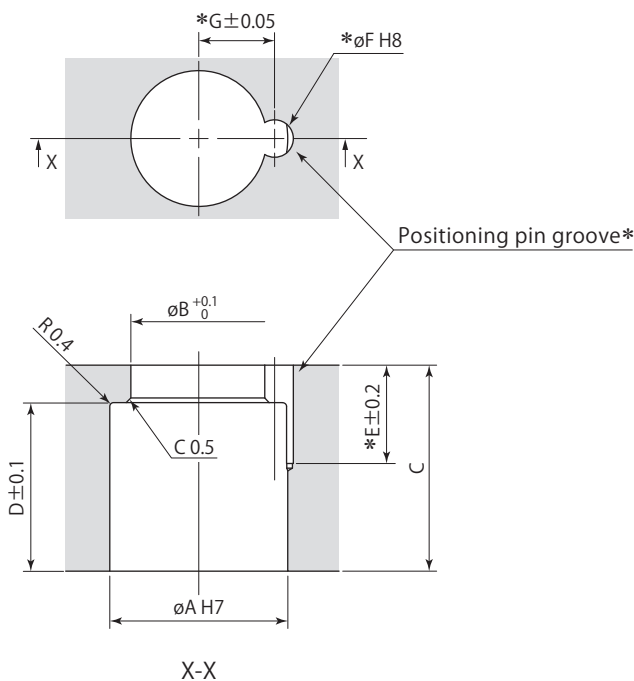
mm

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