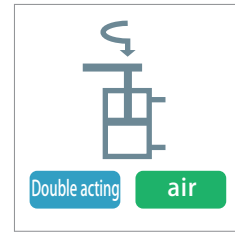


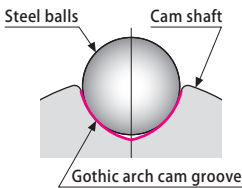
air
Swing clamp
model
CTX



Dramatic improvement in durability and acceleration of clamping speed

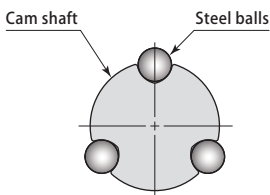
Gothic arch cam groove

Superior durability, high frequency, and high-speed swinging operation is achieved thanks to lowered and controlled seating surface pressure. This is made possible by adopting gothic arch cam grooves that use steel balls with larger surface area.



3-point ball support

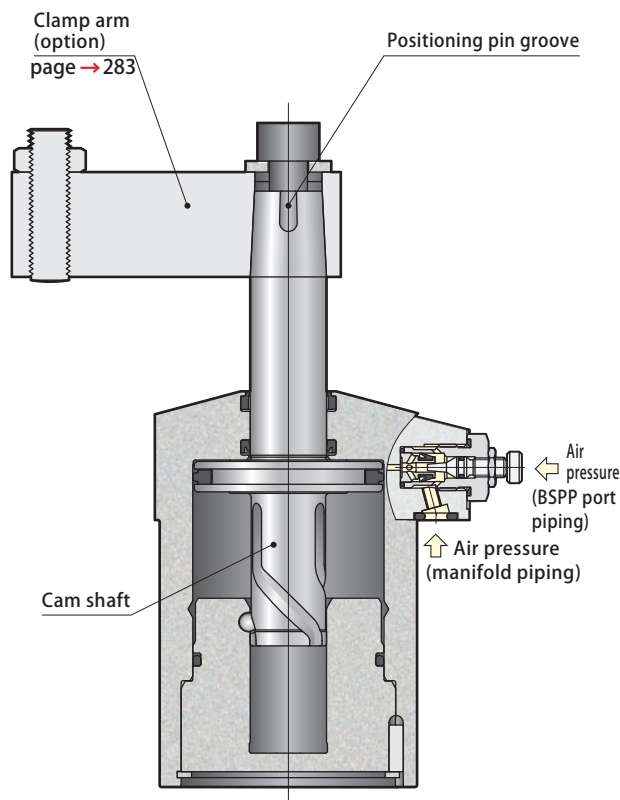
Smooth, stable and high-speed swinging operation has been achieved by 3-point ball support mechanism.



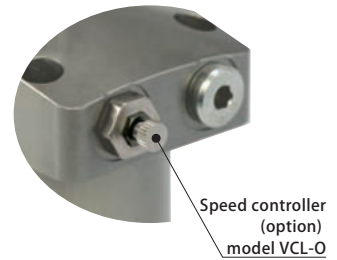
Large diameter cam shaft and wide distance between the cam grooves offers higher rigidity. A overload protection mechanism is not needed due to improvement of durability and impact resistance, providing stable and secure high-speed swing operation.



Cam groove view



Speed controller



For manifold piping, operating speeds can be adjusted individually by mounting a speed controller (option), making sequential operation on same circuit or control of synchronization operation easier. [page -> 297](#)

2-way air piping

BSPP specification piping connection port and manifold piping connection port are available. Piping method can be selected simply by mounting an included plug.

Specifications

Model		CTX32	CTX40	CTX50	CTX63	
Cylinder force (air pressure 0.5 MPa)	(N)	325	528	825	1313	
Cylinder inner diameter	(mm)	32	40	50	63	
Rod diameter	(mm)	14	16	20	25	
Effective area (clamp)	(mm ²)	650	1056	1649	2626	
Full stroke	(mm)	20.5	22	25	28.5	
Swing stroke (90°)	(mm)	10.5	12	15	18.5	
Clamp stroke	(mm)	10	10	10	10	
Swing angle		90° ± 3°				
Positioning pin groove position accuracy		± 1°				
Repeated clamp positioning accuracy		± 0.5°				
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	

Working air pressure range: 0.1 ~ 1 MPa Proof pressure: 1.5 MPa Operating temperature: 0 ~ 70° C Oil supply: Not required
 Fluid used: Air

*1: This is the limit value for lifting arm at 0.1 MPa when mounted horizontally.

Fluorocarbon has been adopted for seal sections where cutting fluid is applied, as a measure for the use of chlorine-based cutting fluid (this is not thermal resistant specification.)

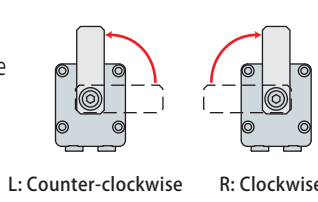
Model designation

CTX ①-②③ (Example : CTX40-RE)

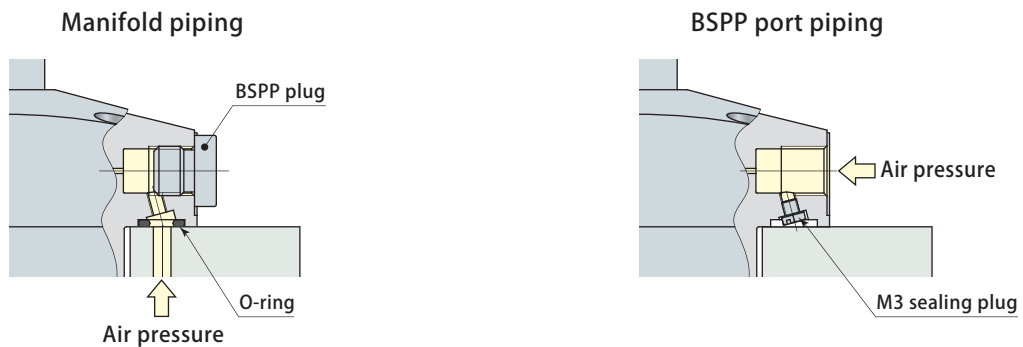
① Size (refer to specification table)

② Swing direction (when clamping)

③ Variation code

CTX	32	-	L : Counter-clockwise R : Clockwise		(Nil): Standard E : Dual rod page → 282
	40				
	50				
	63				

Piping method



Two piping methods are available for model CTX, manifold piping and BSPP port piping.

For BSPP port piping, dismount BSPP plug and O-ring and mount M3 sealing plug that is included. (M3 sealing plug is not mounted with shipment.)
 If it is difficult to obtain a BSPP fitting, use of Uni one-touch fitting made by SMC is recommended. (Refer to catalog issued by manufacturer for details.)

Performance table

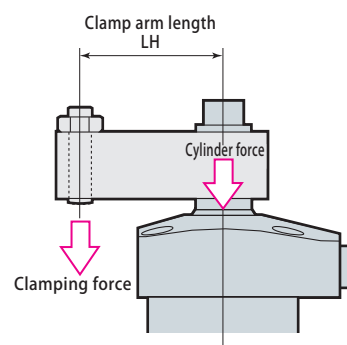
Clamping force varies depending on clamp arm (LH) length and air pressure.

Select an appropriate clamp model based on considerations for clamp arm length, working air pressure and mounting dimensions.

Note : With swing clamps, force acting on cam mechanism becomes larger as arm becomes longer. Do not use arm lengths that exceed maximum arm length (Max. LH).

- For clamp arm length (LH) of 80 mm and where clamping force of 500 N or more is necessary, the working air pressure for each model is:

- 1 MPa for CTX32
- 0.6 MPa for CTX40
- 0.4 MPa for CTX50
- 0.3 MPa for CTX63



F: Clamping force (N) P: Working air pressure (MPa) LH: Clamp arm length (mm)

CTX32 $F = \frac{1000 \times P}{1.53 + 0.00527 \times LH}$ indicates nonusable range

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	520			89	
0.9	590	520	500	470	450	440	103	
0.8	520	460	440	420	400	390	122	
0.7	460	410	390	370	350	340	148	
0.6	390	350	330	310	300	290	190	
0.5	330	290	280	260	250	240	↑	
0.4	260	230	220	210	200	190	↑	
0.3	200	170	170	160	150	150	↑	
0.2	130	120	110	100	100	100	↑	
0.1	70	60	60	50	50	50	190	

CTX40 $F = \frac{1000 \times P}{0.947 + 0.00302 \times LH}$ indicates nonusable range

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			92	
0.9	950	820	780	740			107	
0.8	840	730	690	660	630		126	
0.7	740	640	600	570	550	520	153	
0.6	630	550	520	490	470	450	196	
0.5	530	460	430	410	390	370	↑	
0.4	420	360	350	330	310	300	↑	
0.3	320	270	260	250	230	220	↑	
0.2	210	180	170	160	160	150	↑	
0.1	110	90	90	80	80	70	196	

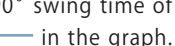
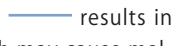
CTX50 $F = \frac{1000 \times P}{0.606 + 0.00169 \times LH}$ indicates nonusable range

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			119	
0.9	1480	1270	1210	1160	1110		138	
0.8	1320	1130	1080	1030	990	950	163	
0.7	1150	990	940	900	860	830	201	
0.6	990	850	810	770	740	710	260	
0.5	820	710	670	640	620	590	↑	
0.4	660	570	540	520	490	470	↑	
0.3	490	420	400	390	370	360	↑	
0.2	330	280	270	260	250	240	↑	
0.1	160	140	130	130	120	120	260	

CTX63 $F = \frac{1000 \times P}{0.381 + 0.00090 \times LH}$ indicates nonusable range

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	2170	2080	2010	1940	1870	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	1210	1160	1120	330
0.5	1310	1120	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

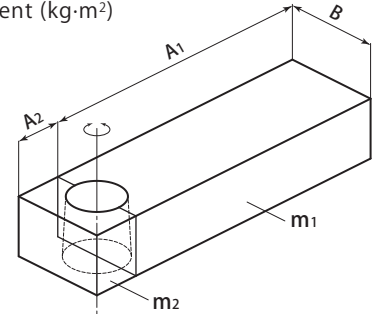
Swing speed adjustment

1. Adjust swing speed with speed controller to ensure that the relationship between inertial moment and 90° swing time of clamp arm remains lower than the line  in the graph. Clamp stroke (perpendicular operation) time is not included in 90° swing time.
2. Use with 90° swing time shorter than line  results in excessive loads on cylinder and piston, which may cause malfunction.

Example of calculation for inertial moment

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

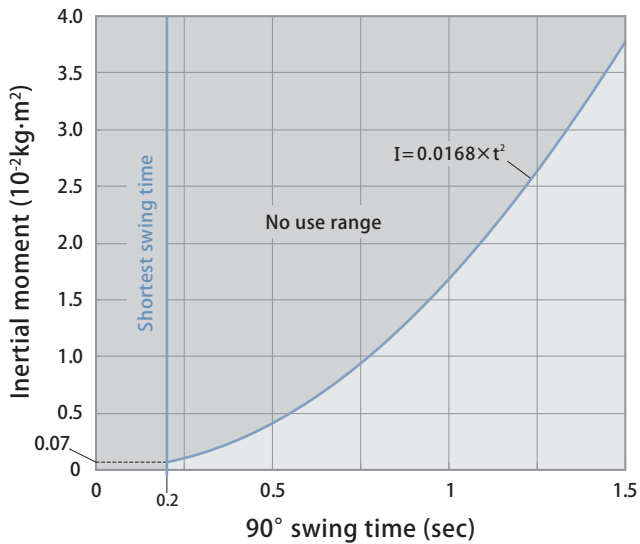
I : Inertial moment (kg·m²)
m : Mass (kg)



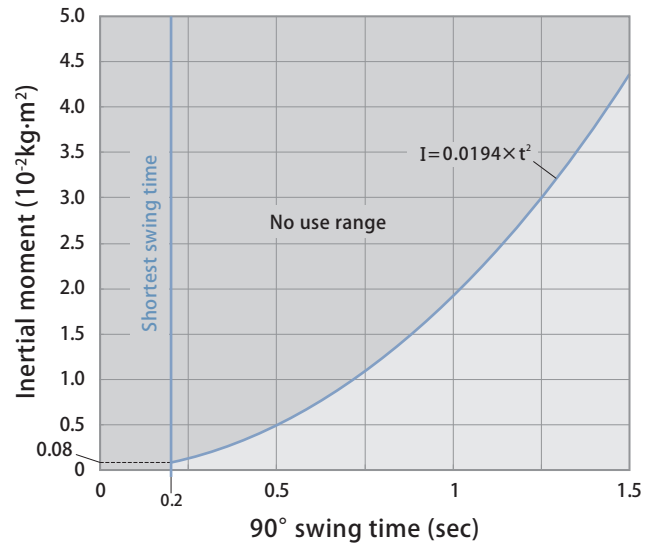
Inertial moment for standard clamp arm (reference) (kg·m²)

Model	Inertial moment	Model	Inertial moment
CTH32-L1	7.7×10^{-5}	CTH32-L2	5.2×10^{-5}
CTH40-L1	2.8×10^{-4}	CTH40-L2	2.0×10^{-4}
CTH50-L1	6.6×10^{-4}	CTH50-L2	5.2×10^{-4}
CTH63-L1	2.0×10^{-3}	CTH63-L2	1.4×10^{-3}

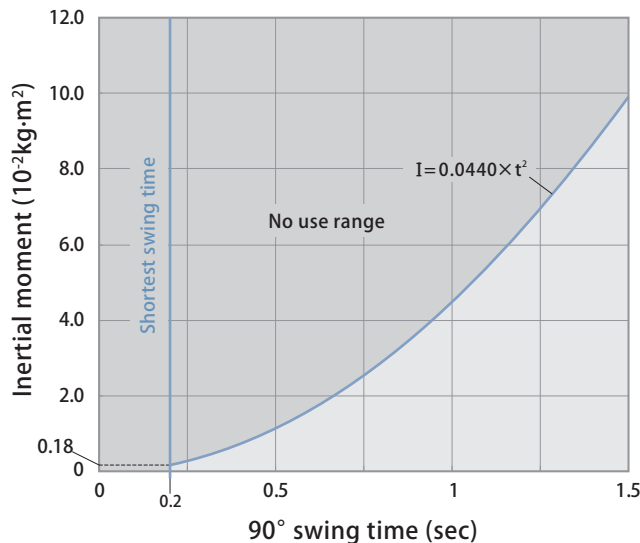
CTX32



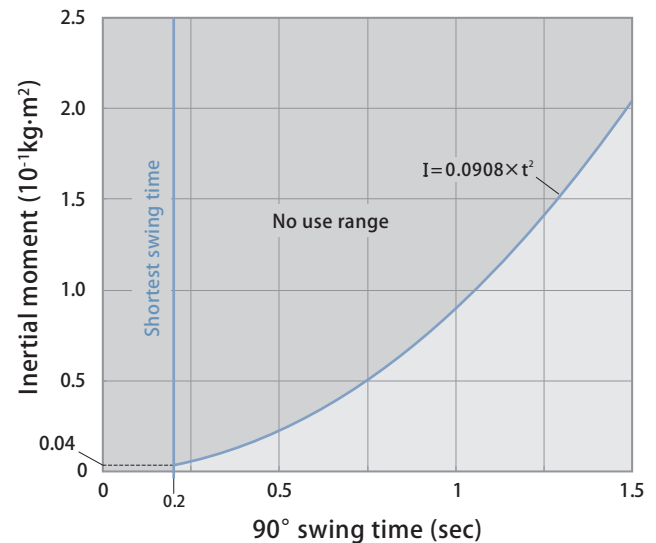
CTX40



CTX50

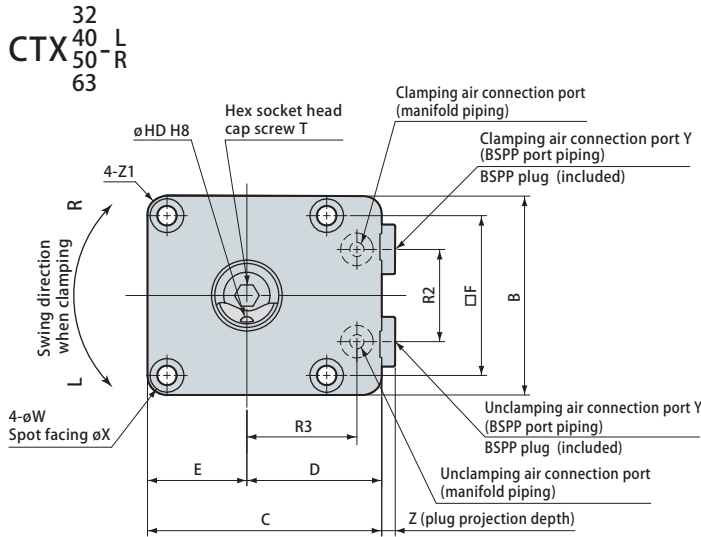


CTX63



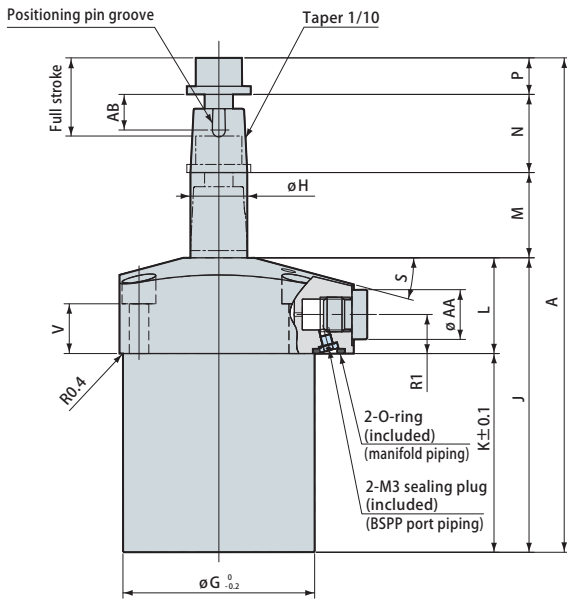
I : Inertial moment (kg·m²) t : 90° swing time (sec)

Dimensions

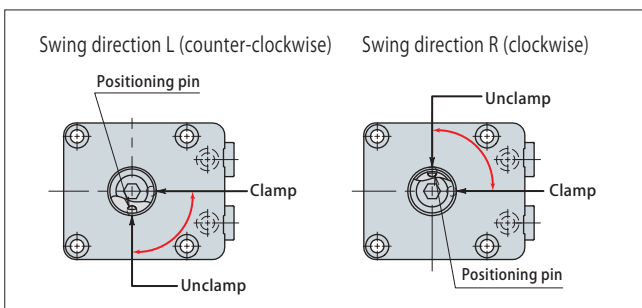
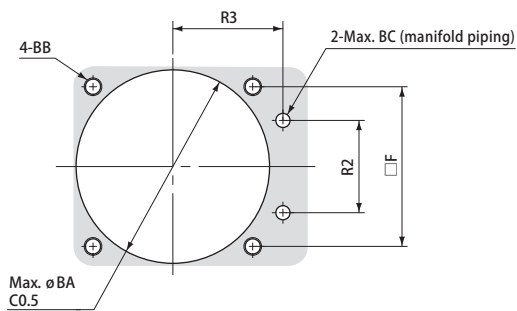


(mm)

Model	CTX32- ^L / _R	CTX40- ^L / _R	CTX50- ^L / _R	CTX63- ^L / _R
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
G	46	54	64	77
H	14	16	20	25
J	78	83	92.5	108.5
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
S	15°	15°	14°	13°
T thread × pitch Screw length (Recommended tightening torque)	M8×1.25 length 16 (20 N·m)	M8×1.25 length 16 (20 N·m)	M10×1.5 length 20 (35 N·m)	M12×1.75 length 25 (40 N·m)
V	14	14	17	16
W	5.5	5.5	6.8	6.8
X	9.5	9.5	11	11
Y	G1/8	G1/8	G1/4	G1/4
Z	3.8	3.8	4.8	4.8
Z1	R5	R5	R6	R6
O-ring *1	P6	P6	P6	P6
AA	14	14	19	19
AB	10.5	10.5	12.5	12.5
BA	46.5	54.5	64.5	77.5
BB	M5	M5	M6	M6
BC	4	4	4	4
HD	4	4	5	5
Positioning pin	ø4(h8) × 10	ø4(h8) × 10	ø5(h8) × 12	ø5(h8) × 12



Mounting details



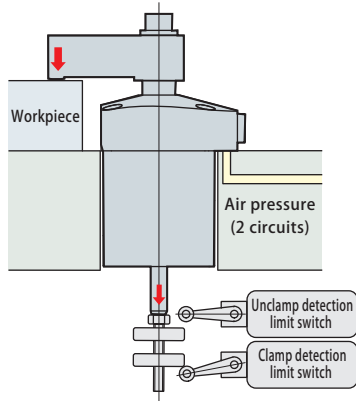
*1 : Material used for O-ring is fluorocarbon (with hardness Hs90).

Note 1. Diagram above on left side indicates unclamped condition of swing direction L (counter-clockwise). Direction of positioning pin groove will be air connection port side at the time of clamping. Refer to diagram below on left for relationship between swing direction and positioning pin groove.

2. The mounting surface finish must be no rougher than Rz6.3 (ISO4287:1997) for manifold piping.

3. Positioning pins and mounting screws are not included.

Usage example



Specifications

Model	CTX32- ^L _R E	CTX40- ^L _R E	CTX50- ^L _R E	CTX63- ^L _R E
Cylinder capacity (unclamp)	15.5 cm ³	26.5 cm ³	47.1 cm ³	86.6 cm ³
Mass	0.47 kg	0.63 kg	1.04 kg	1.70 kg

Refer to section on Standard models (page → 278) for details on specifications other than those above.

Model designation

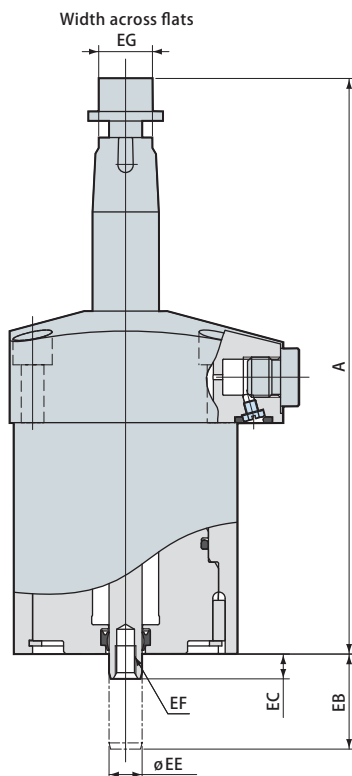
CTX ①-②E

① Size (refer to specification table)

② Swing direction (when clamping)

CTX	32	L : Counter-clockwise R : Clockwise		E : Dual rod
	40			
	50			
	63			

Dimensions



(mm)				
Model	CTX32- ^L _R E	CTX40- ^L _R E	CTX50- ^L _R E	CTX63- ^L _R E
A	129.8	139.3	160.7	187.2
EB	26.5	28	31	34.5
EC	6	6	6	6
EE	8	8	10	10
EF	M5×0.8 depth 8	M5×0.8 depth 8	M6×1 depth 11	M6×1 depth 11
EG	11 ⁰ _{-0.2}	13 ⁰ _{-0.2}	14 ⁰ _{-0.2}	19 ⁰ _{-0.2}

Note 1. Diagram on left side indicates unclamped condition of swing direction L (counter-clockwise).

Direction of positioning pin groove will be air connection port side at the time of clamping. Refer to page → 281 for relationship between swing direction and positioning pin groove.

2. The mounting surface finish must be no rougher than Rz6.3 (ISO4287:1997) for manifold piping.

3. Positioning pins and mounting screws are not included.

4. Refer to section on Standard models (page → 281) for details on dimensions other than those above.

Model designation

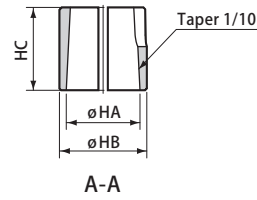
CTH ①-② (Example : CTH32-XS)

CTH	① Size	② Option code
	32	XS : Taper sleeve
	40	L1 : L1 type clamp arm
	50	L2 : L2 type clamp arm
63		

There is no positioning pin processing for L1 and L2 type clamp arms.

Taper sleeve

CTH³²₄₀⁵⁰₆₃-XS



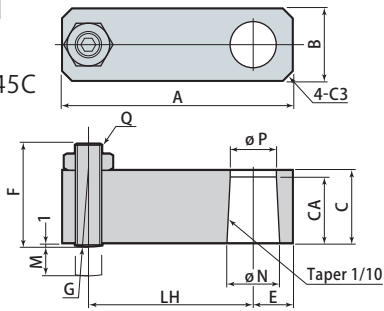
(mm)

Model	CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
HA	14	16	20	25
HB	17	19	24	29
HC	14	18	22	26

L1 type clamp arm

CTH³²₄₀⁵⁰₆₃-L1

Material: S45C



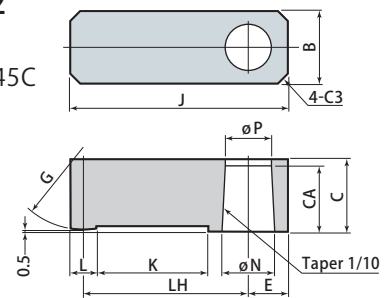
(mm)

Model	CTH32-L1	CTH40-L1	CTH50-L1	CTH63-L1
A	52	70	82	104
B	19	22	27	32
C	19	22	27	32
CA	14	20	22	26
E	10	12	14	17
F	26	32	38	48
G	R20	R25	R30	R40
J	48	66	79	98
K	22	34	41	52
L	6	8	10	12
LH	35	50	60	75
M (adjustment amount)	6	9	10	12
N	14	16	20	25
P	12.6	14	17.8	22.4
Q	M6	M8	M8	M12
Mass	L1 arm	0.13 kg	0.24 kg	0.42 kg
	L2 arm	0.11 kg	0.21 kg	0.38 kg

L2 type clamp arm

CTH³²₄₀⁵⁰₆₃-L2

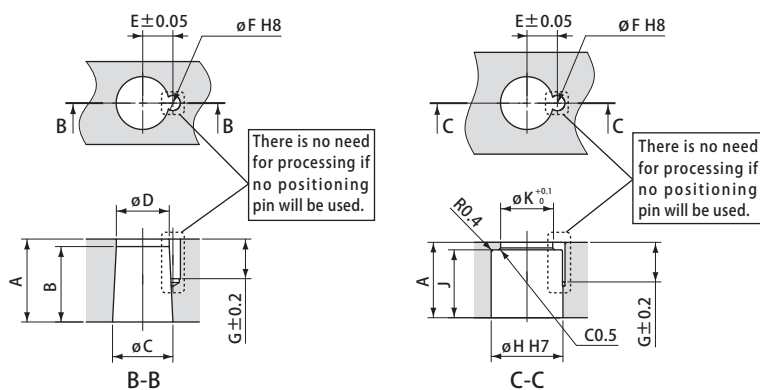
Material: S45C



Clamp arm processing diagram

Not using taper sleeve

Using taper sleeve



(mm)

Model	CTX32-LR	CTX40-LR	CTX50-LR	CTX63-LR
A	19	22	27	32
B	14	20	22	26
C	14	16	20	25
D	12.6	14	17.8	22.4
E	7.1	8.1	10.1	12.6
F	4 ^{+0.018} ₀	4 ^{+0.018} ₀	5 ^{+0.018} ₀	5 ^{+0.018} ₀
G	10.5	10.5	12.5	12.5
H	17 ^{+0.018} ₀	19 ^{+0.021} ₀	24 ^{+0.021} ₀	29 ^{+0.021} ₀
J	14	18	22	26
K	13	14.5	18.5	23

Mounting & dismounting of clamp arm

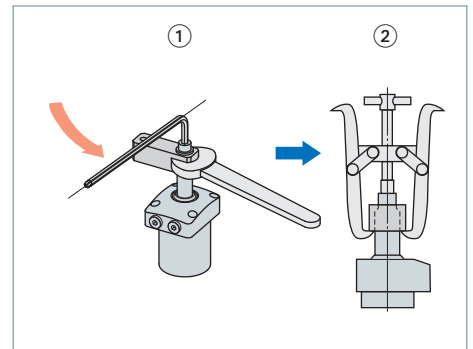
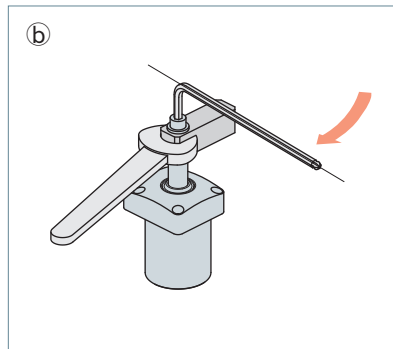
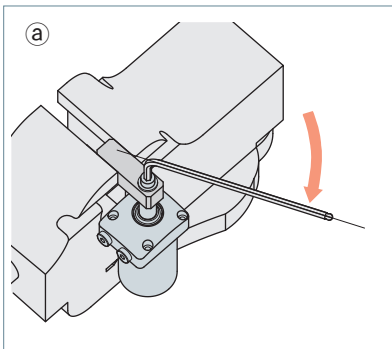
1. Swing clamp may be damaged if excessive torque is applied, since structure is intended for swinging using cam mechanism with lead grooves. Follow instructions shown below to prevent excessive torque from being applied on piston rod when mounting or dismounting clamp arm.
2. Be sure to tighten the hex socket head cap screw with specified tightening torque (refer to recommended tightening torque on [page → 281](#)). If the tightening torque is insufficient, clamp arm may slip during operation.

Mounting of clamp arm

- a) 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.
- b) For clamps that are mounted on fixture, set clamp arm at desired orientation, and hold it with a wrench not to rotate piston rod, and then tighten screw at piston rod with a hex wrench.

Dismounting of clamp arm

- ① Grab onto clamp arm with a wrench to prevent piston rod from moving and loosen hex socket head cap screw on tip section of piston rod.
- ② After dismounting hex socket head cap screw, pull out clamp arm using gear puller.



Mounting of clamp

Use screws with strength class of 12.9 for mounting clamps and be sure to apply specified torque for tightening, by referring to recommended tightening torque of mounting screws indicated below.

Recommended tightening torque of mounting screws (strength class 12.9)

Model	Mounting screw size	Tightening torque
CTX32	M5×0.8	4.2 N·m
CTX40	M5×0.8	4.2 N·m
CTX50	M6×1	7.0 N·m
CTX63	M6×1	7.0 N·m

Air circuit diagram (reference)

