air Swing clamp

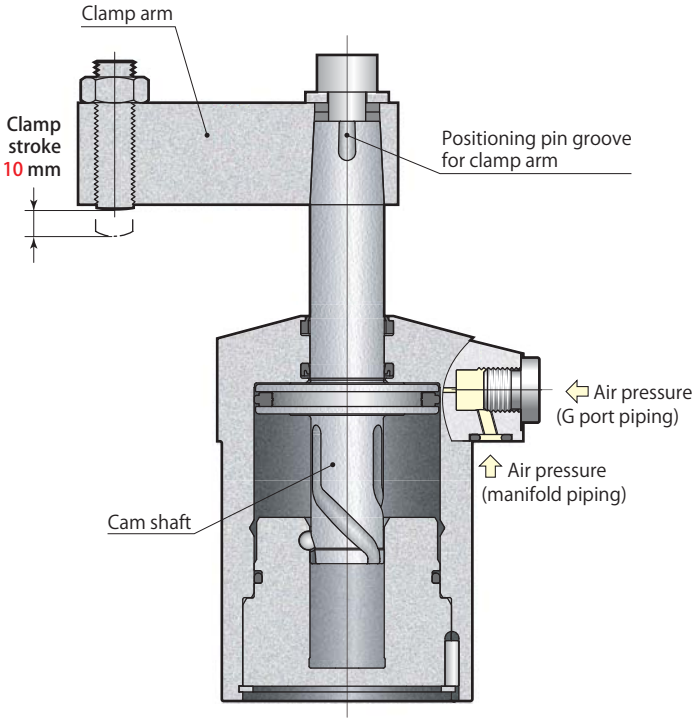
Double acting 1 MPa

model CTX

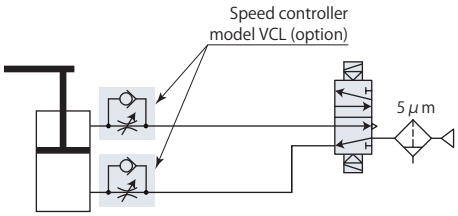
Standard model
model CTX40-L

Standard model

model **CTX□-□**



Pneumatic circuit diagram

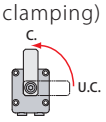


Specifications

CTX — Size: 32 / 40 / 50 / 63 —

Swing direction (when clamping)

- L : Counter-clockwise



- R : Clockwise

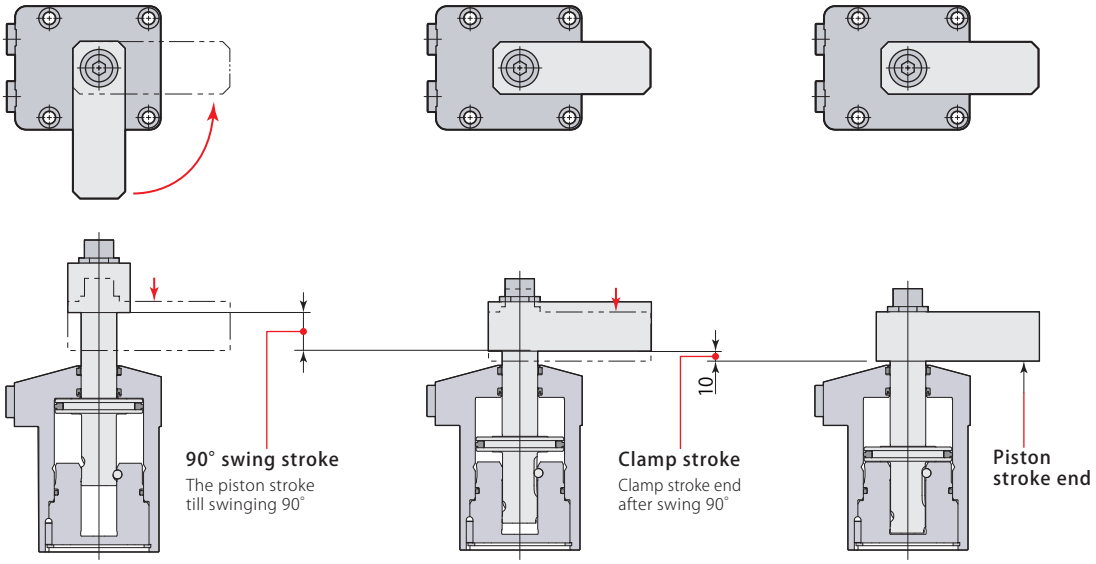
- (Nil) : Standard
- E : Dual rod

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)	mm²	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 cm³	13.3	23.2	41.2	74.9
	Unclamp cm³	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 ℃
- 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.

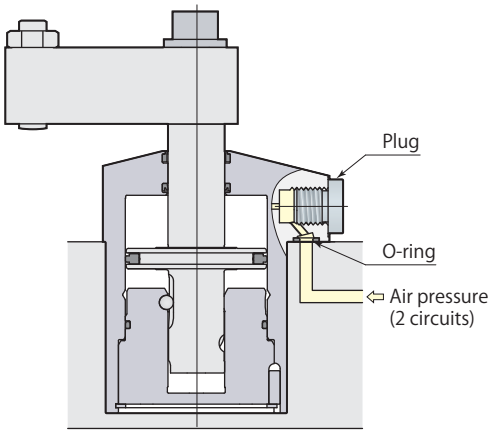
Clamping must be done within the range of clamp stroke.



Manifold piping and G port piping are available.

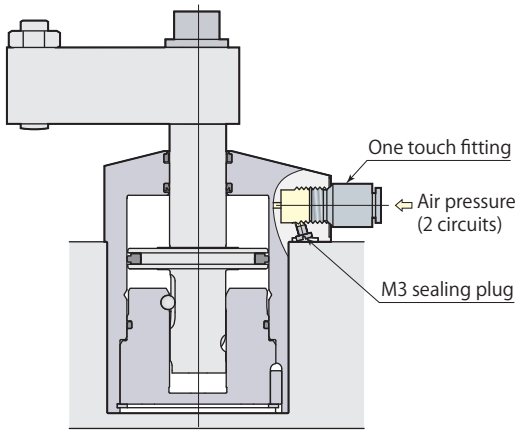
Manifold piping

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



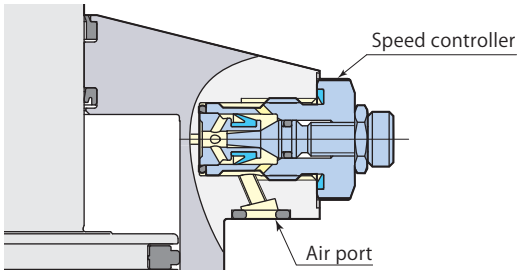
G port piping

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.

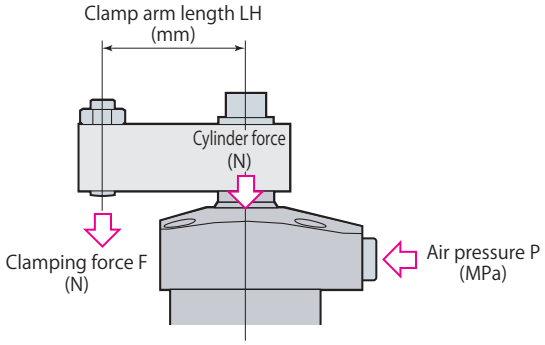


Speed controller model VCL

Page →56



Performance table



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

Clamping force calculation formula

F = P × 1000/(Coefficient 1 + Coefficient 2 × 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

1.0×1000/(0.606+0.00169×60)=1410 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×1000/(1.53+0.00527×LH)

Air pressure MPa	Cylinder force N	Clamping force N / Clamp arm length LH mm						Max. arm length Max. 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×1000/(0.947+0.00302×LH)

Air pressure MPa	Cylinder force N	Clamping force N / Clamp arm length LH mm						Max. arm length Max. LH mm
		50	70	90	110	130	150	
1.0	1060	910	860	820				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×1000/(0.606+0.00169×LH)

Air pressure MPa	Cylinder force N	Clamping force N / Clamp arm length LH mm						Max. arm length Max. 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×1000/(0.381+0.00090×LH)

Air pressure MPa	Cylinder force N	Clamping force N / Clamp arm length LH mm						Max. arm length Max. 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

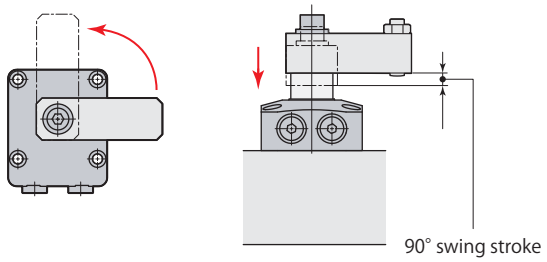
Swing speed adjustment

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.

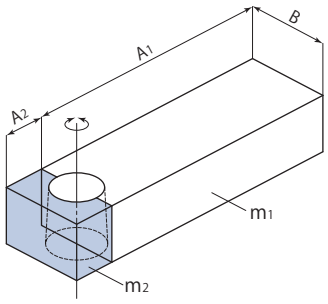


Example of calculation for moment of inertia

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

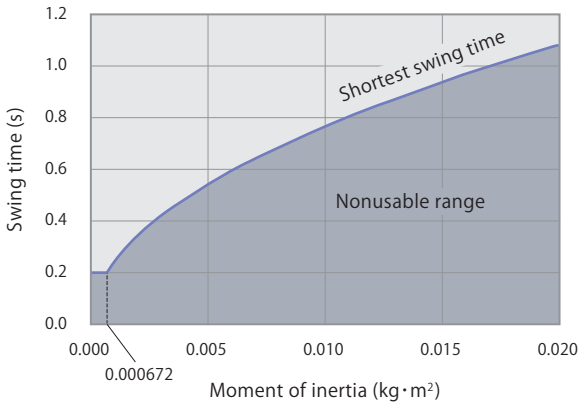
I : Moment of inertia (kg·m²)

m: Mass (kg)



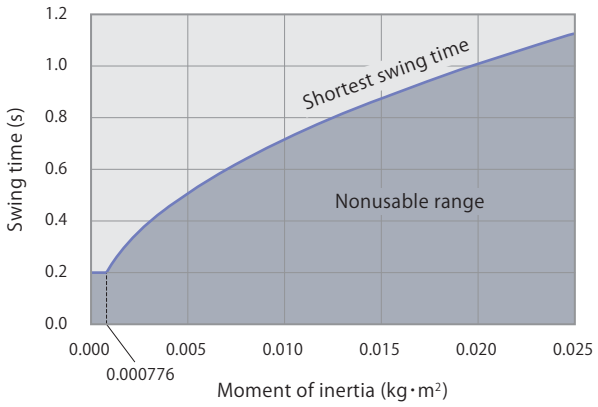
model CTX32

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



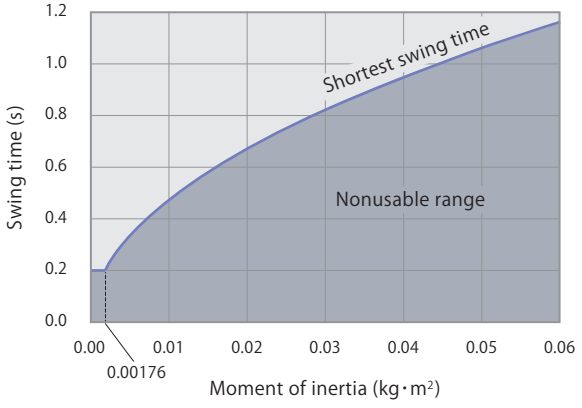
model CTX40

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



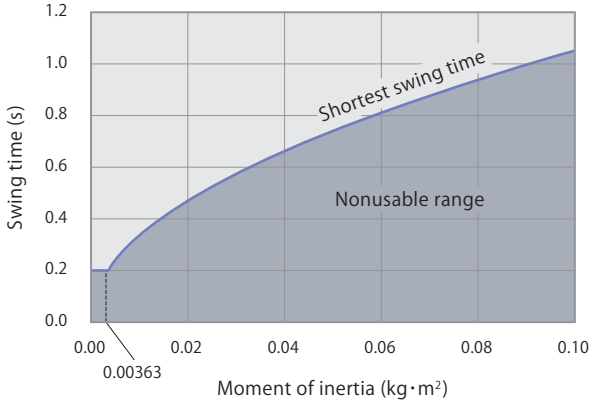
model CTX50

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

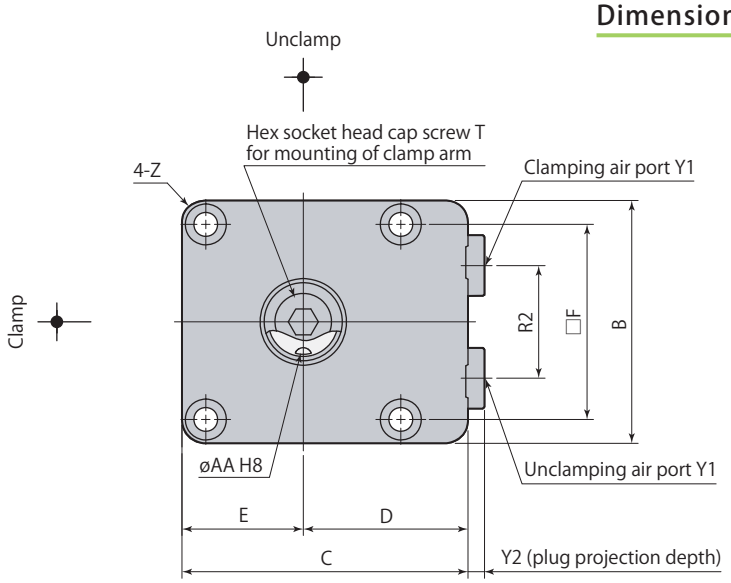


model CTX63

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

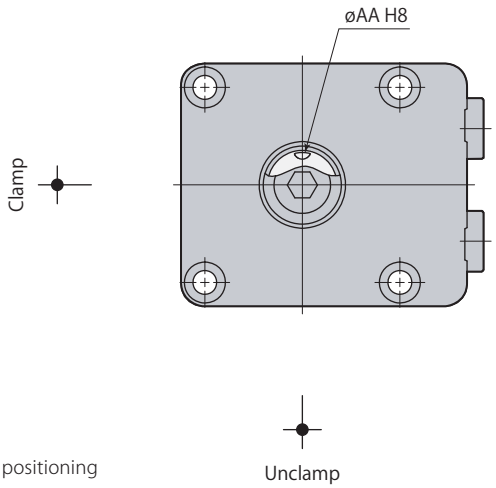


Dimensions

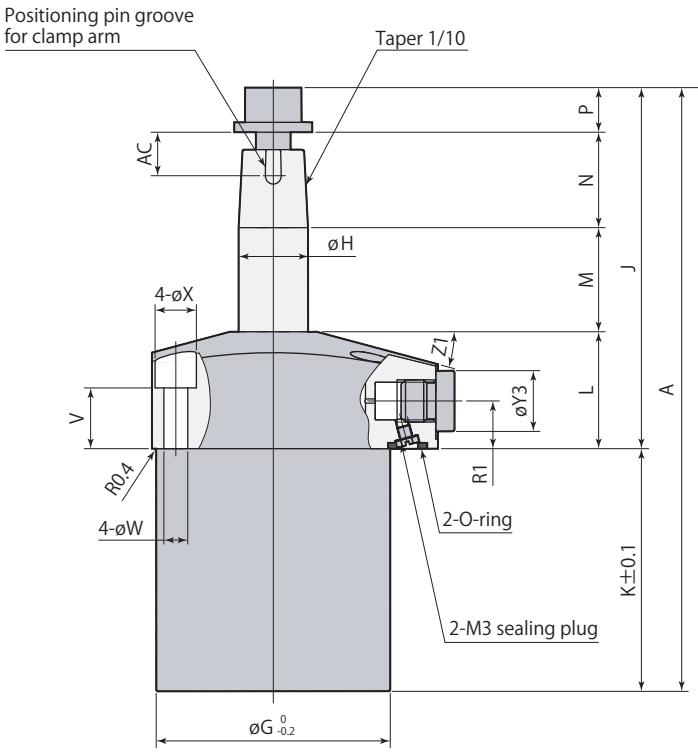


This diagram indicates the arm positioning pin groove at unclamped condition.

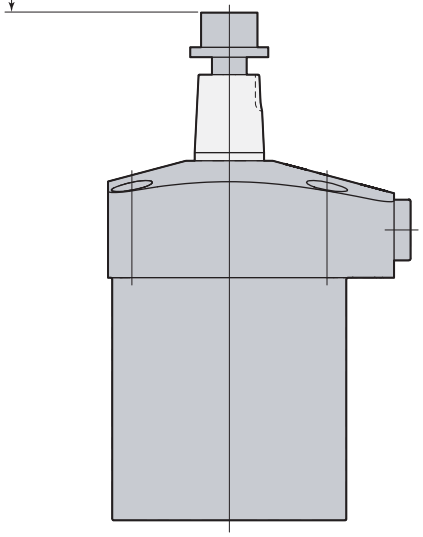
Swing direction L (counter-clockwise)



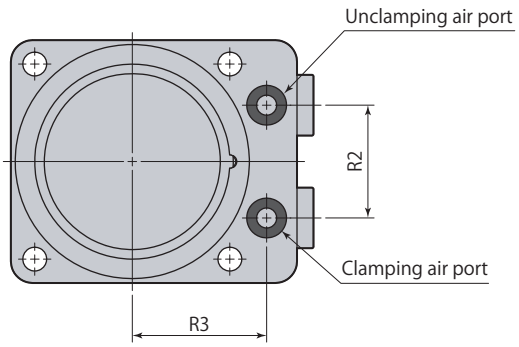
Swing direction R (clockwise)



Unclamp



Stroke end



- 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.

mm

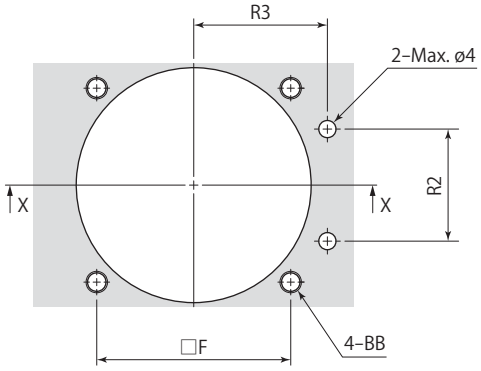
Model		CTX32-□	CTX40-□	CTX50-□	CTX63-□
A		129.8	139.3	160.7	187.2
B		50	56	66	78
C		60	66	80	91
D		35	38	47	52
E		25	28	33	39
F		39	45	53	65
øG		46	54	64	77
øH		14	16	20	25
J		78.8	83.3	100.2	110.7
K		51	56	60.5	76.5
L		27	27	32	32
M		22.5	24	28	31.5
N (arm thickness)		19	22	27	32
P		10.3	10.3	13.2	15.2
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 (fluorocarbon hardness Hs90)		P6	P6	P6	P6
Taper sleeve		CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
Speed controller*	Meter-in	VCL01-I	VCL01-I	VCL02-I	VCL02-I
	Meter-out	VCL01-O	VCL01-O	VCL02-O	VCL02-O

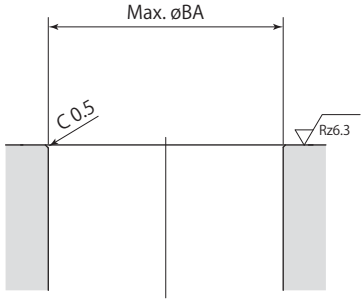
∗: Select the right model of VCL according to the size of the clamp.

Refer to each page for the details of options.

● Taper sleeve **page →38** ● Speed controller **page →56**

Mounting details





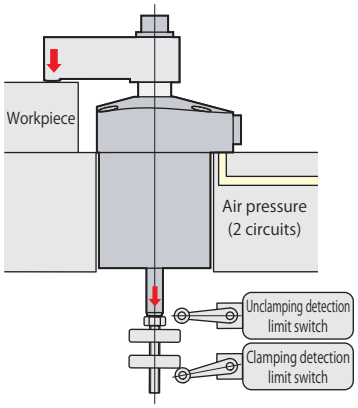
X-X

Rz: ISO4287(1997)

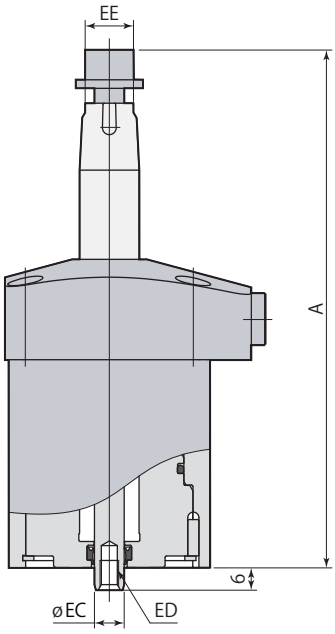
mm

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

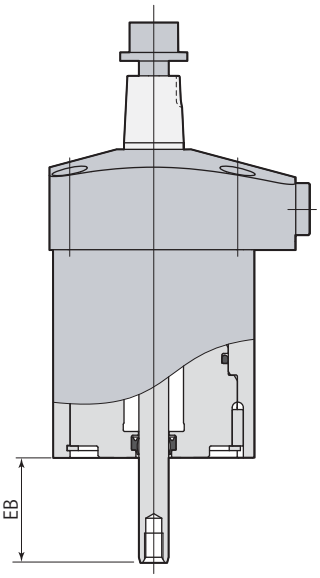
Usage example



Dimensions



Unclamp



Stroke end

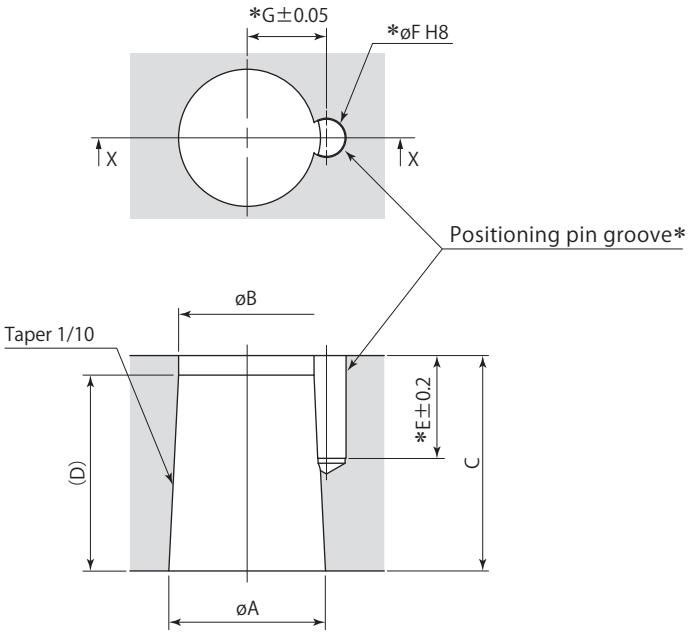
mm

Model	CTX32-□E	CTX40-□E	CTX50-□E	CTX63-□E
Cylinder capacity (unclamp)	15.5 cm³	26.5 cm³	47.1 cm³	86.6 cm³
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 $^{0}_{-0.2}$	13 $^{0}_{-0.2}$	14 $^{0}_{-0.2}$	19 $^{0}_{-0.2}$
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.



X-X

*: 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.

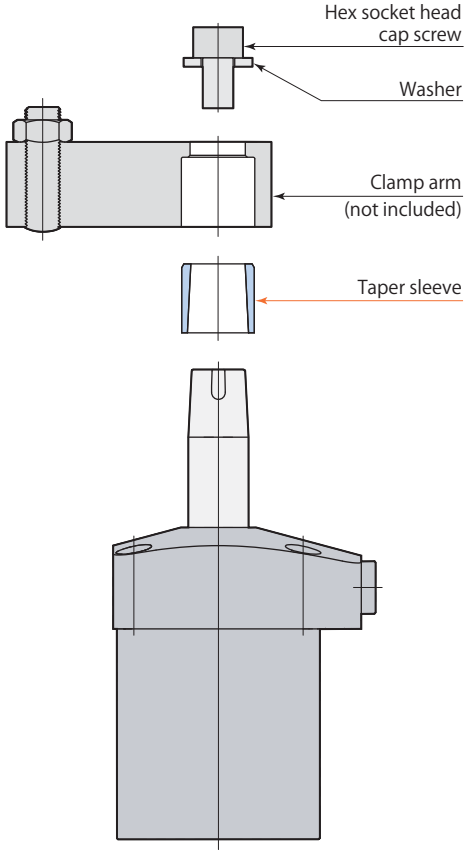
mm

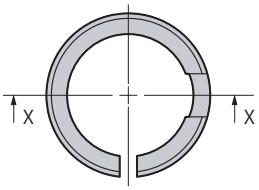
Swing clamp	CTX32	CTX40	CTX50	CTX63
øA	$14^{-0.016}_{-0.034}$	$16^{-0.016}_{-0.034}$	$20^{-0.020}_{-0.041}$	$25^{-0.020}_{-0.041}$
øB	12.6	14	17.8	22.4
C	19	22	27	32
D	14	20	22	26
E	10.5	10.5	12.5	12.5
øF (pin groove diameter)	$4^{+0.018}_{0}$	$4^{+0.018}_{0}$	$5^{+0.018}_{0}$	$5^{+0.018}_{0}$
G	7.1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

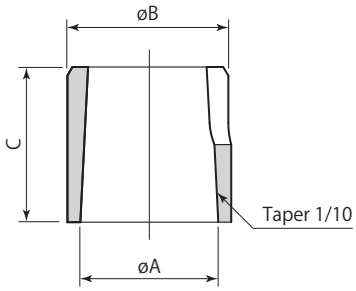
Taper sleeve

Size

CTH **32** / **40** / **50** / **63** — **XS** : Taper sleeve







X-X

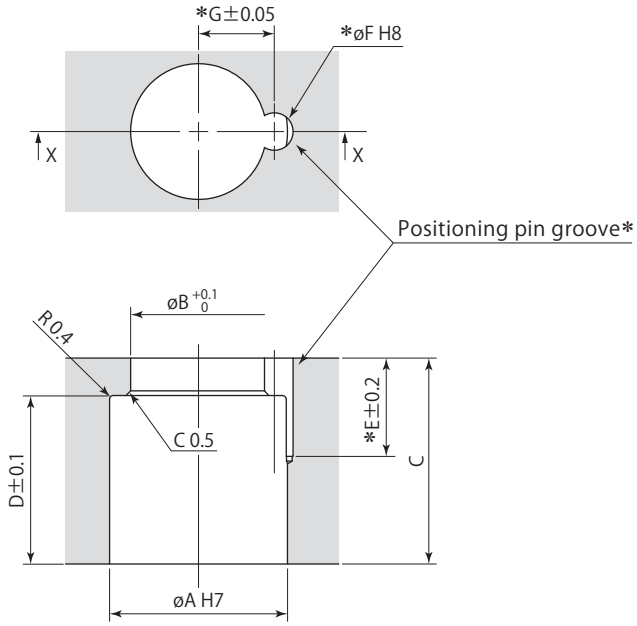
mm

Taper sleeve	CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
Applicable swing clamp	CTX32	CTX40	CTX50	CTX63
øA	14	16	20	25
øB	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.



X-X

∗: 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.

mm

Taper sleeve	CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
Applicable swing clamp	CTX32	CTX40	CTX50	CTX63
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