

air Swing clamp

Block model

model **BTX**
Double acting air

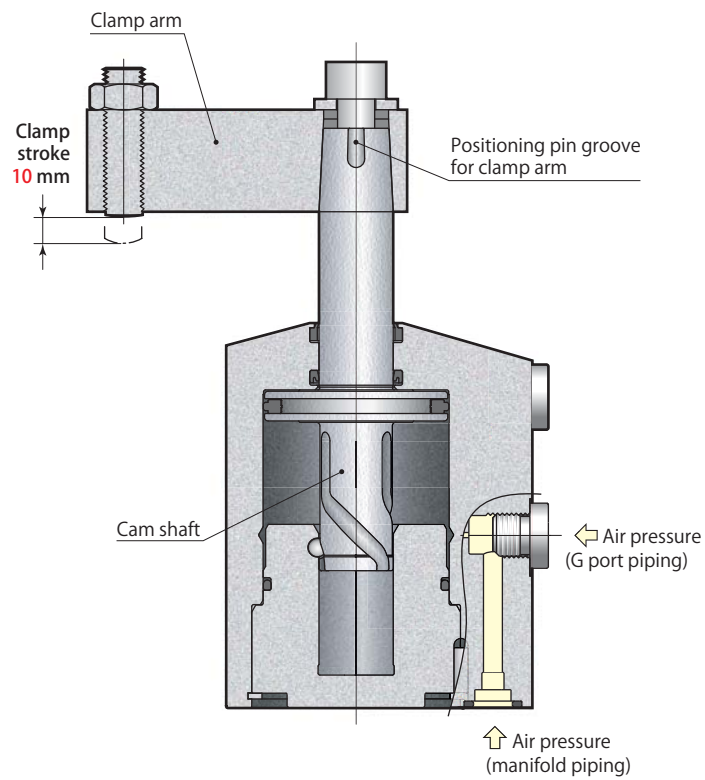


model BTX32-L

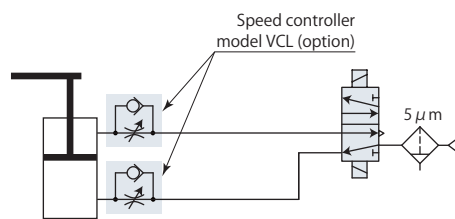
Pascal
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Block model

model BTX□-□

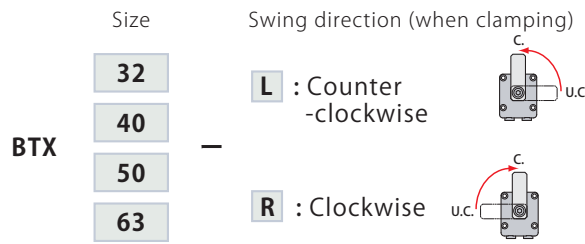


Air circuit diagram



Specifications page → 2
Piping page → 2
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Specifications



Model			BTX32	BTX40	BTX50	BTX63
Cylinder force (air pressure 0.5 MPa)	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		0.64	0.84	1.38	2.20
Recommended tightening torque of mounting screws*2	N-m		4.0	4.0	5.9	5.9
Recommended tightening torque of cap screw	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*3
- 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: Supply the dry and filtered air. Particulate size 5 μm or less is recommended.

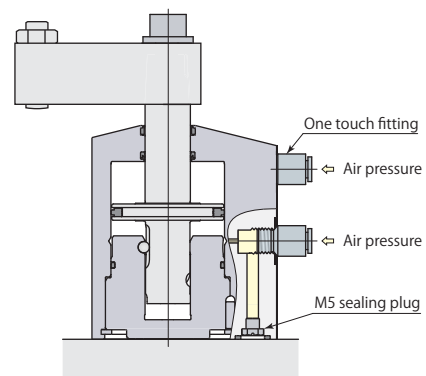
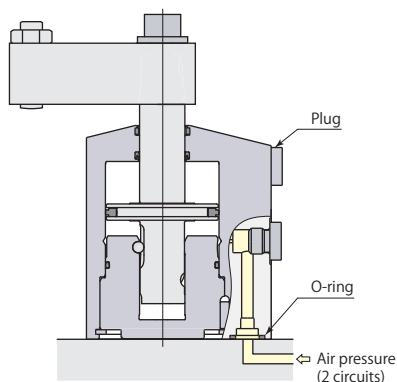
Manifold piping and G port piping are available.

Manifold piping

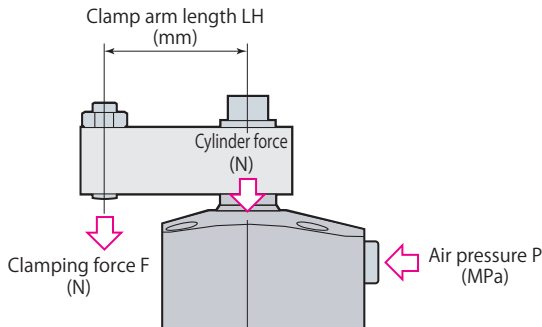
When choosing manifold piping a speed controller model VCL is mountable on the G ports of the clamp.

G port piping

When choosing G port piping, dismount plug and mount M5 sealing plug that is included. (M5 sealing plug is not mounted at the time of factory shipment.) Use an one touch fitting or a speed controller with one touch fitting for G port piping.



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

BTX50 with clamp arm length (LH) 60 mm at air pressure of 1.0 MPa,

Clamping force F is calculated by

$$F = 1.0 \times 1000 / (0.606 + 0.00169 \times 60) = 1410 \text{ N}$$

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

model BTX32		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 BTX40		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	Nonusable range		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 BTX50		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	Nonusable range		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 BTX63		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.

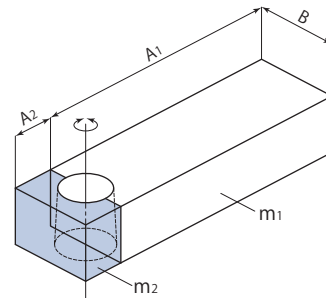
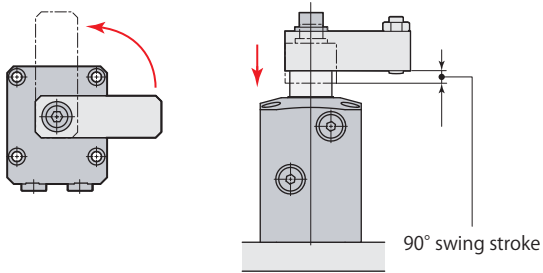
● The cam groove may be damaged in case the swing speed is set at the nonusable range in the graph.

Example of calculation for moment of inertia

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

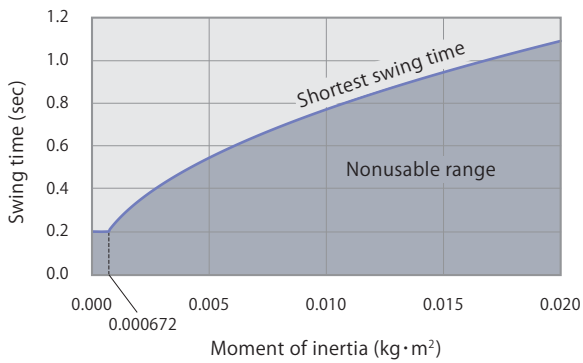
I : Moment of inertia (kg·m²)

m: Mass (kg)



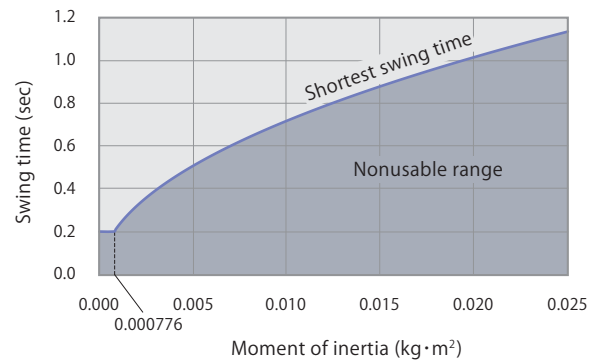
model BTX32

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



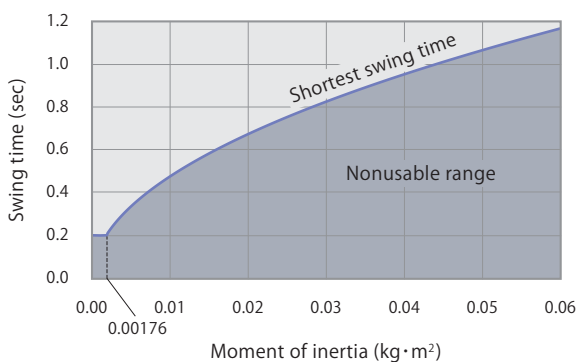
model BTX40

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



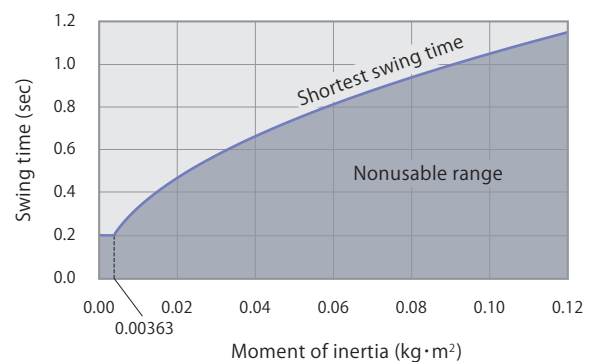
model BTX50

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

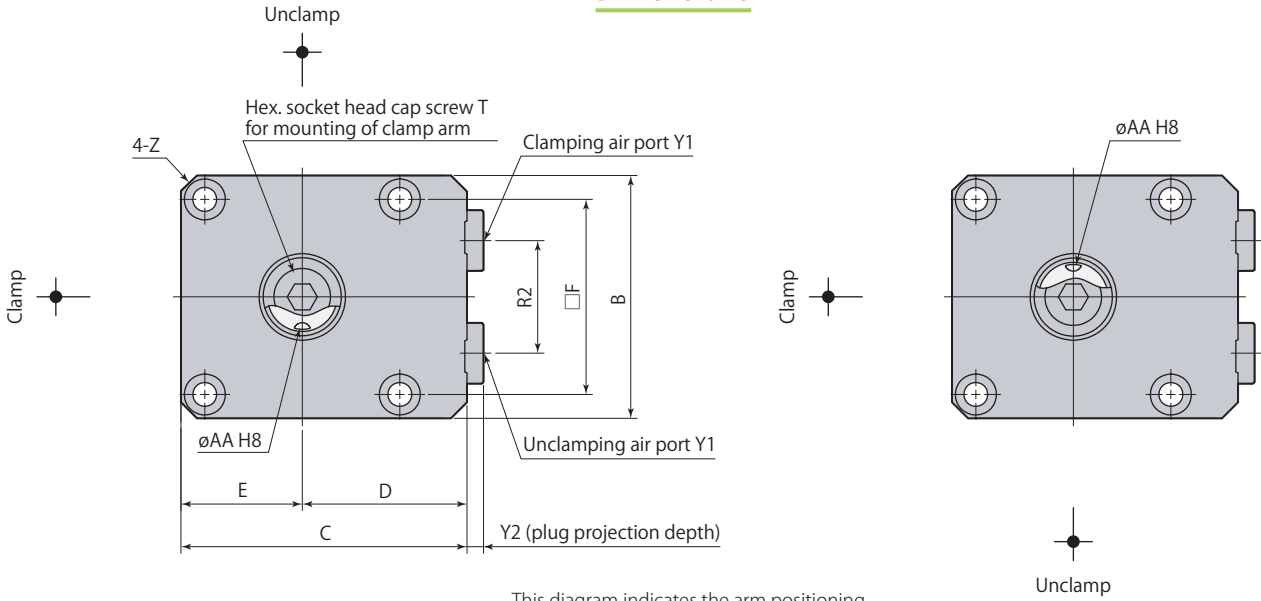


model BTX63

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



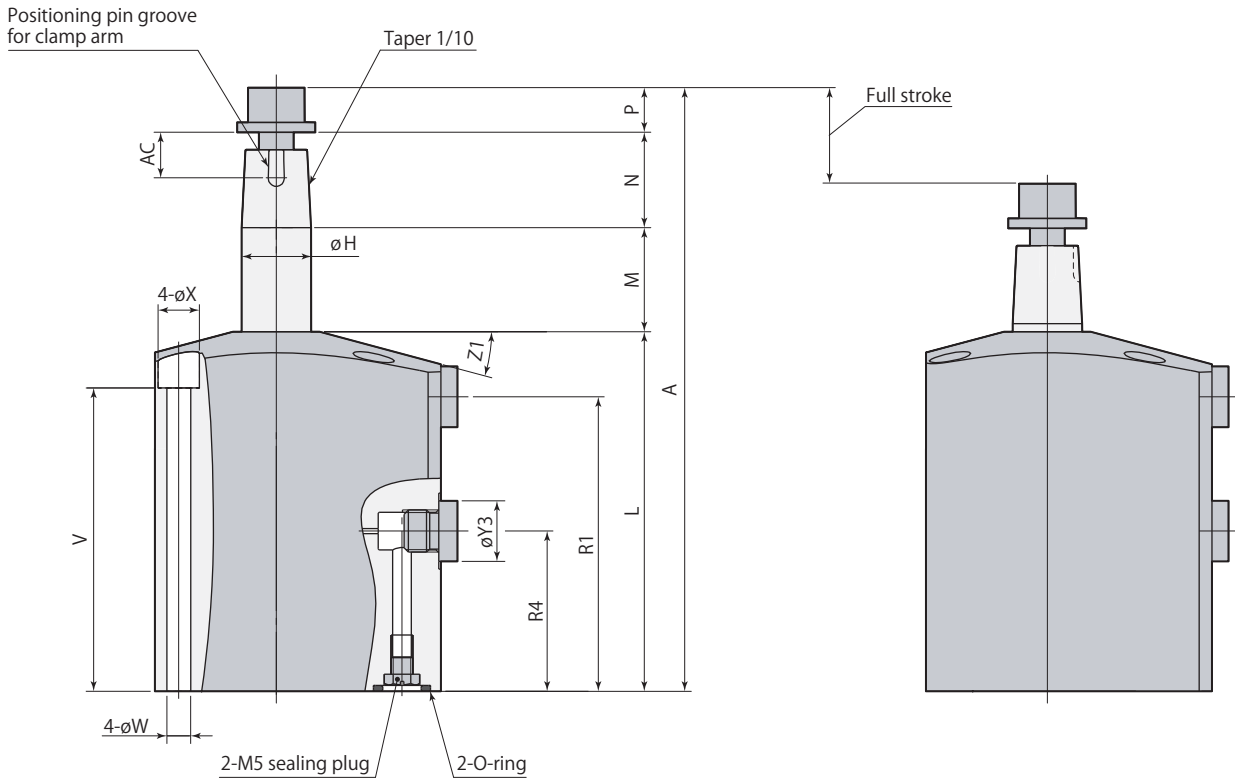
Dimensions



Swing direction L (counter-clockwise)

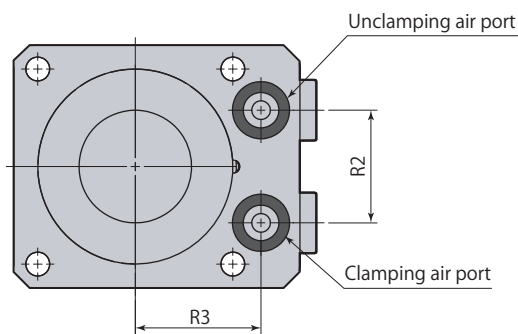
This diagram indicates the arm positioning pin groove at unclamped condition.

Swing direction R (clockwise)



Unclamp

Stroke end



- Clamp arm, positioning pin and mounting screws are not included.
- Install M5 sealing plug when choosing G port piping. The M5 sealing plug is packed with a swing clamp.

BTX □-□	Air swing clamp Block model	air	Double acting
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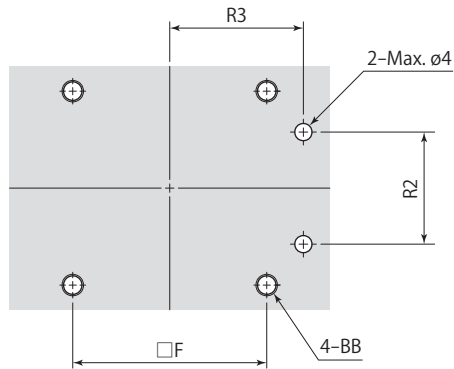
Model		BTX32-□	BTX40-□	BTX50-□	BTX63-□
A		129.8	139.3	160.7	187.2
B		50	56	66	78
C		60	66	80	91
D		35	38	47	52
E		25	28	33	39
F		39	45	53	65
øH		14	16	20	25
L		78	83	92.5	108.5
M		22.5	24	28	31.5
N (arm thickness)		19	22	27	32
P		10.3	10.3	13.2	15.2
RA		35	37	41.5	47.5
RB		63	68	73.5	86.5
R2		20	26	30	40
R3		26	29	35	40
T		M8×1.25 length 16	M8×1.25 length 16	M10×1.5 length 20	M12×1.75 length 25
V		65	70	77.5	92.5
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		C3	C3	C4	C4
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		ø4(h8)×10	ø4(h8)×10	ø5(h8)×12	ø5(h8)×12
O-ring (FKM-90)		P10	P10	P10	P10
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 →9** ● Speed controller **page →11**

Mounting details

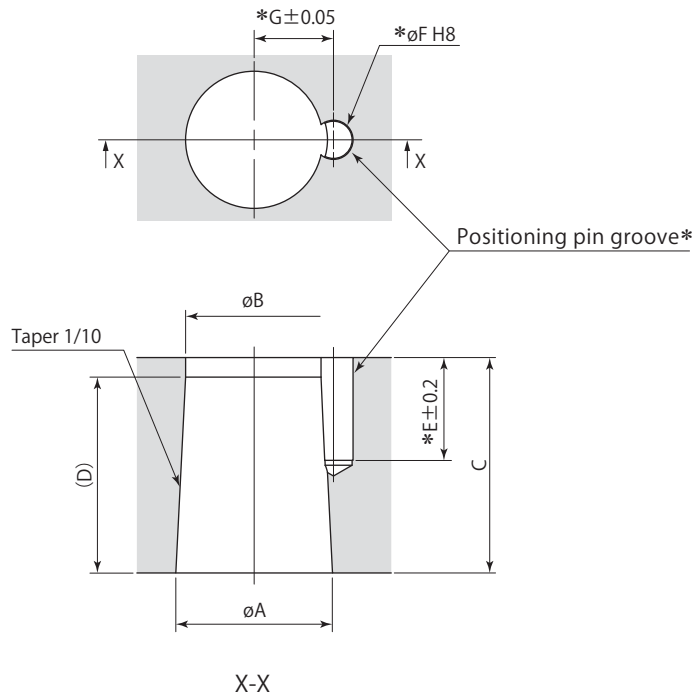


Model	BTX32-□	BTX40-□	BTX50-□	BTX63-□
F	39	45	53	65
R2	20	26	30	40
R3	26	29	35	40
BB	M5	M5	M6	M6

mm

Clamp arm mounting details

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



* :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.

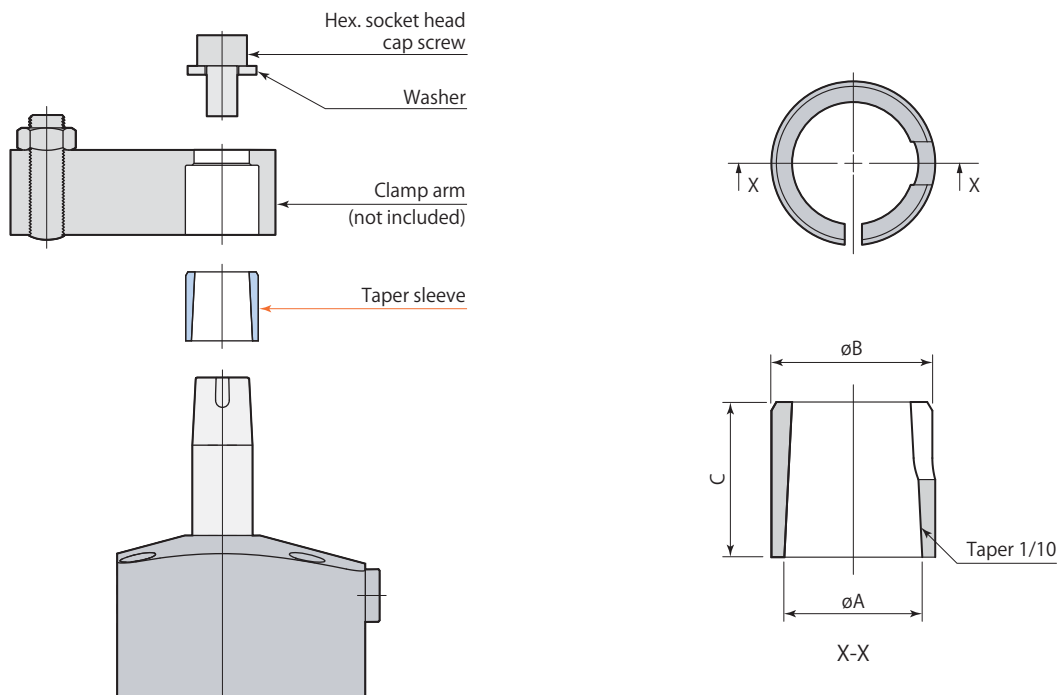
Swing clamp	BTX32	BTX40	BTX50	BTX63
ϕA	14 ^{-0.016} _{-0.034}	16 ^{-0.016} _{-0.034}	20 ^{-0.020} _{-0.041}	25 ^{-0.020} _{-0.041}
ϕB	12.6	14	17.8	22.4
C	19	22	27	32
D	14	20	22	26
E	10.5	10.5	12.5	12.5
ϕF (pin groove diameter)	4 ^{+0.018} ₀	4 ^{+0.018} ₀	5 ^{+0.018} ₀	5 ^{+0.018} ₀
G	7.1	8.1	10.1	12.6

mm

Taper sleeve

Size
32
40
50
63

CTH — **XS** : Taper sleeve



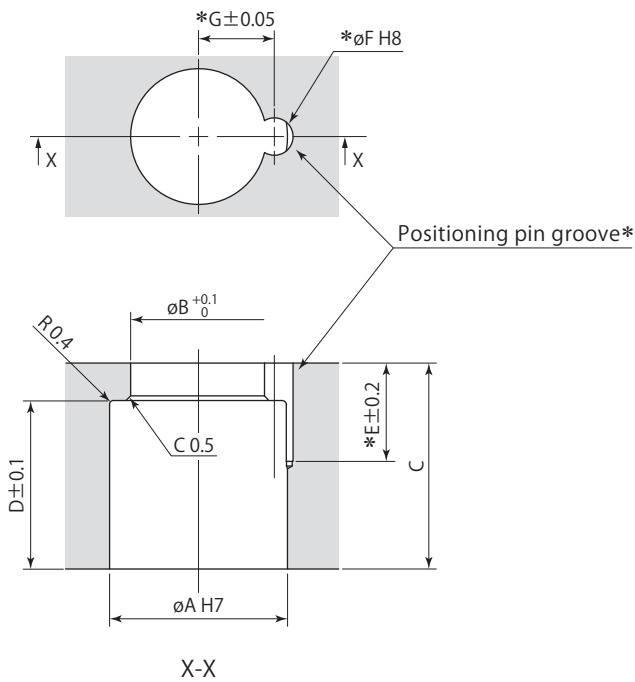
Taper sleeve	CTH32-XS	CTH40-XS	CTH50-XS	CTH63-XS
Applicable swing clamp	BTX32	BTX40	BTX50	BTX63
ϕA	14	16	20	25
ϕB	17	19	24	29
C	14	18	22	26

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	BTX32	BTX40	BTX50	BTX63
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

Specifications

I : Meter-in

O : Meter-out

G port size

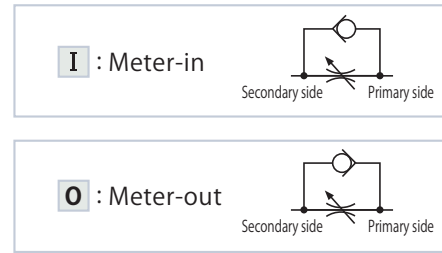
Control method



Locknut color : Silver

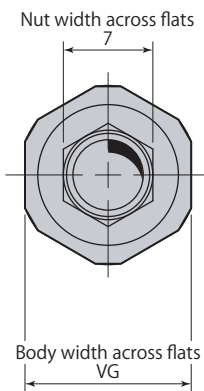
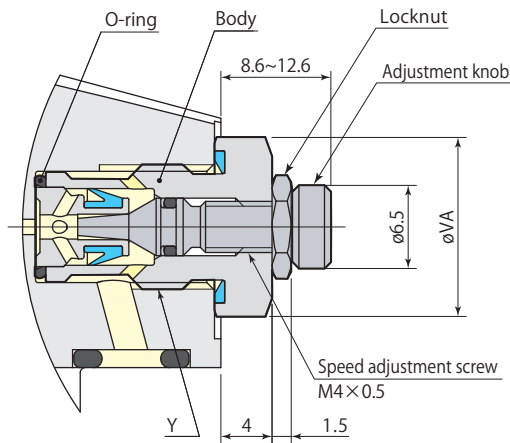
Locknut color : Black

VCL
01 : G1/8
02 : G1/4



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

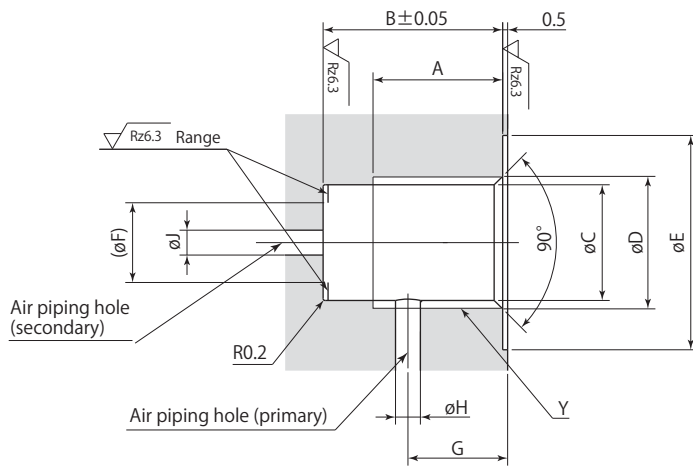
- *1: Fluorocarbon hardness Hs90
- *2: Inner diameter × Thickness

- 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 models

Model	VCL01	VCL02
Air swing clamp	CTX32, CTX40, BTX32, BTX40 CTY32, CTY40	CTX50, CTX63, BTX50, BTX63 CTY50, CTY63
Air link clamp	CLX32, CLX40 CLY32, CLY40*	CLX50, CLX63 CLY50, CLY63*

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

Mounting details

Rz: ISO4287(1997)

Model	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.



Pascal

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