Swing clamp

Flat mount model Double acting 7MPa

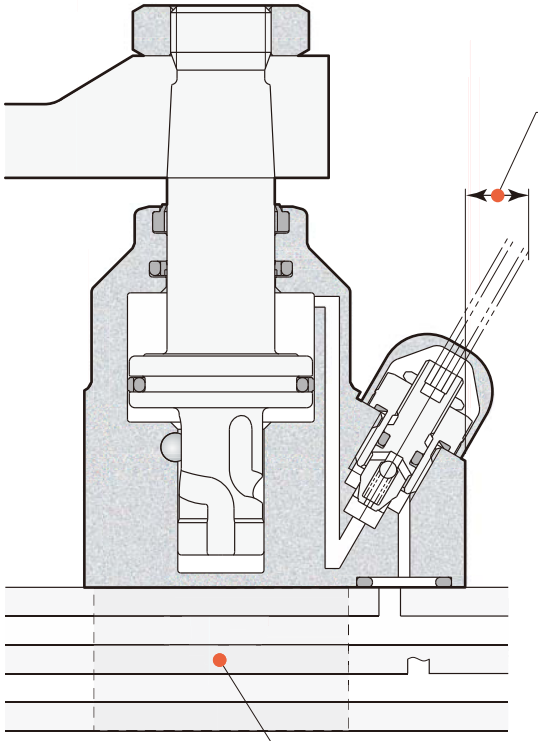
model CTJ

Flat mount model
model CTJ03-L

CTJ□-□	Swing clamp Flat mount model	7MPa Double acting

Swing clamp
Flat mount model

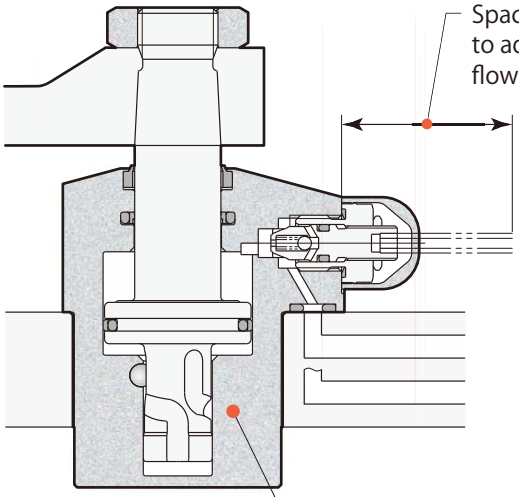
model **CTJ** PAT. P.



Since the embedded hole is not machined, the piping design under the clamp is easy and the jig plate can be made thin.

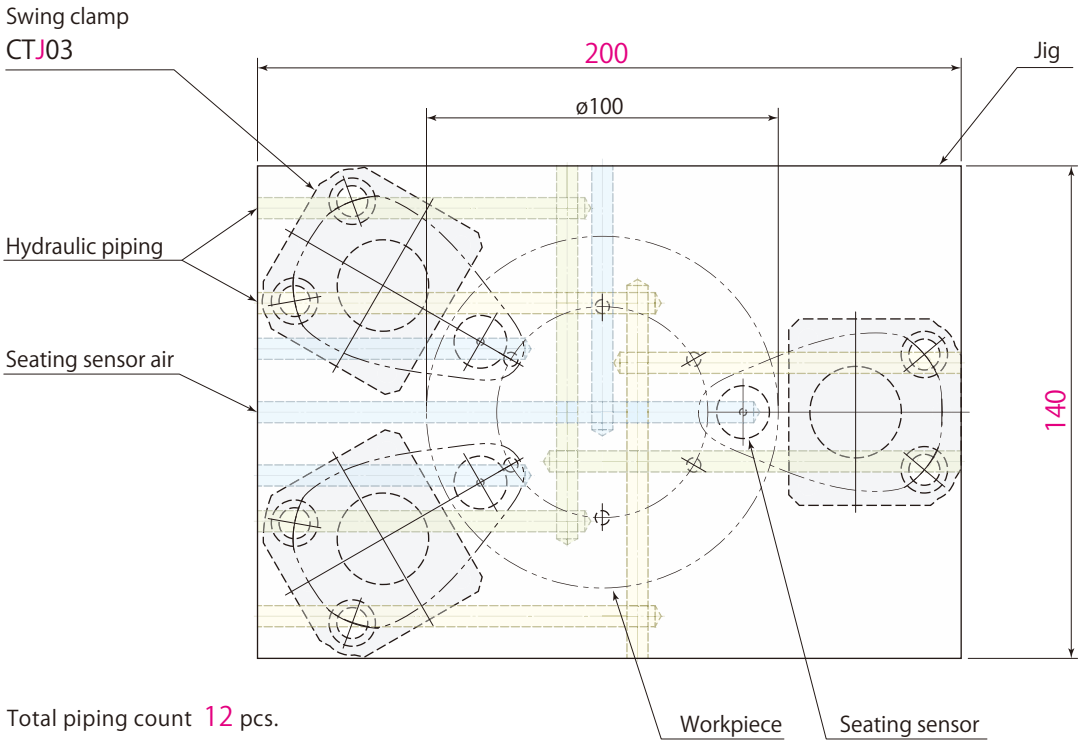
Swing clamp
Compact model

model **CTM**



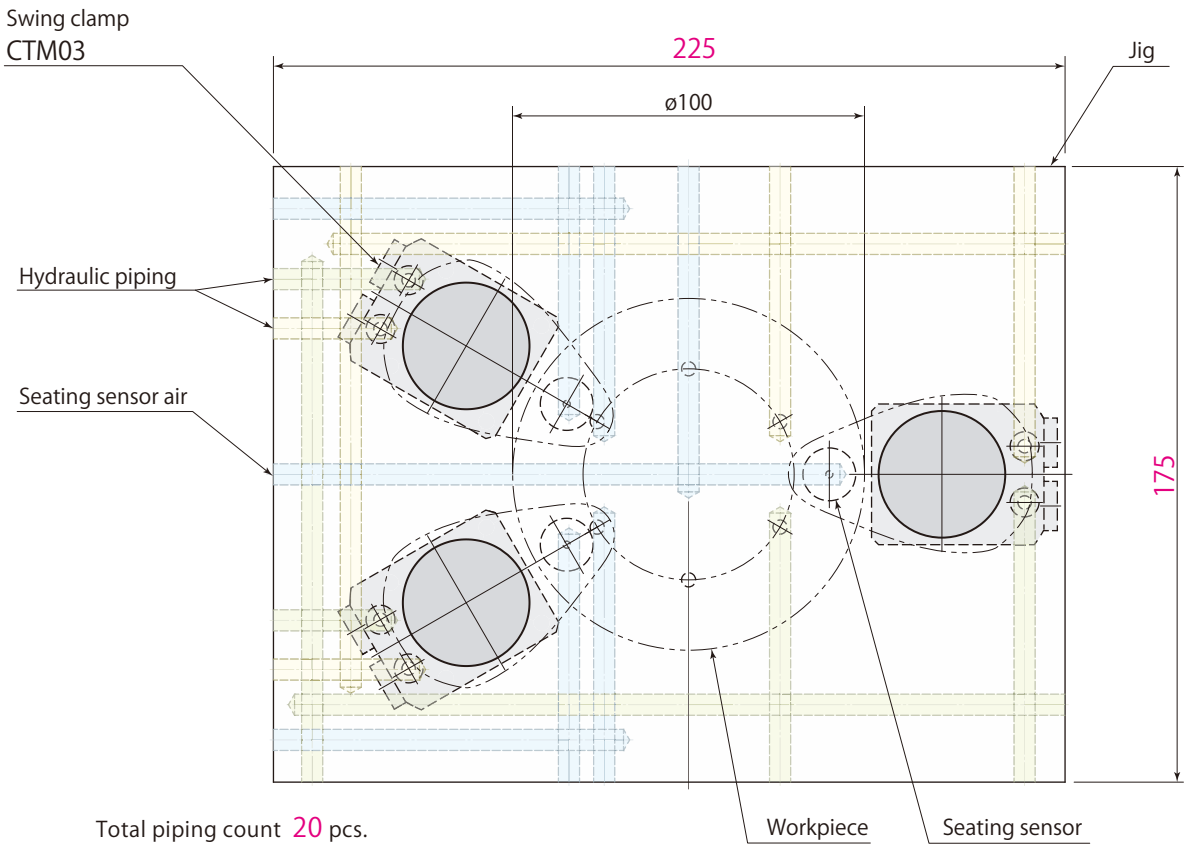
Embedded holes need to be machined, complicating piping. Therefore, the jig plate becomes thicker.

Jig area **29** % down Total piping distance **38** % down



Total piping count 12 pcs.

Size Down



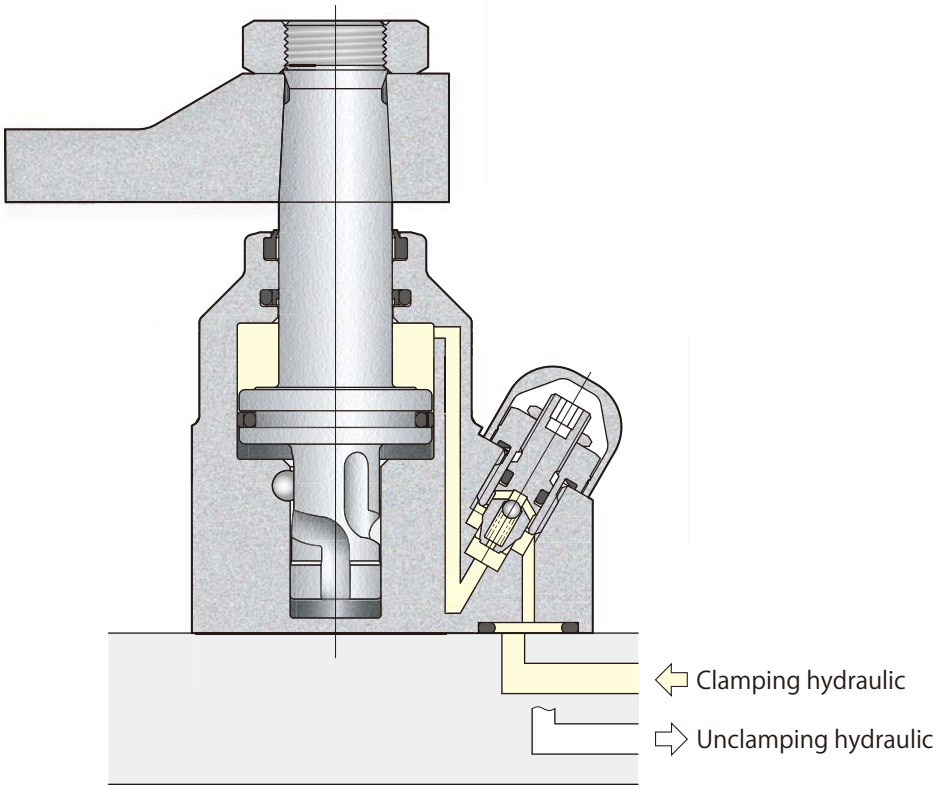
Total piping count 20 pcs.

Flat mount model

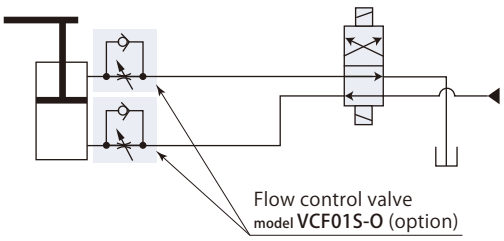
model **CTJ□-□** PAT. P.

Eliminating the embedding of the main body

makes it easier to process the jig plate.



Hydraulic circuit diagram



Specifications

Size / Swing direction (when clamping)

CTJ 02 / 03 / 05 –

L : Counter-clockwise

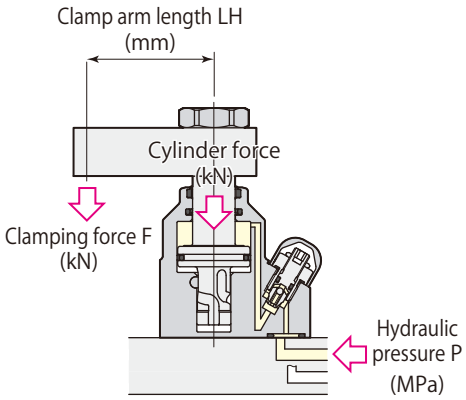
R : Clockwise

Model			CTJ02	CTJ03	CTJ05
Cylinder force (Hydraulic pressure 7MPa)		kN	1.41	2.48	4.87
Cylinder inner diameter		mm	20	26	37
Rod diameter		mm	12	15	22
Effective area (Clamp)		cm^2	2.0	3.5	7.0
Swing angle			90°±3°		
Positioning pin groove position accuracy			±1°		
Repeated clamp positioning accuracy			±0.5°		
Full stroke		mm	9.5	10.5	12.5
90° swing stroke		mm	4.5	5.5	7.5
Clamp stroke		mm	5	5	5
Cylinder capacity	Clamp	cm^3	1.9	3.7	8.7
	Unclamp	cm^3	3.0	5.6	13.4
Mass		kg	0.46	0.62	1.13
Recommended tightening torque of mounting screws*		N·m	7	7	12
Recommended tightening torque of nut		N·m	7	22	60

- Pressure range : 1.5–7 MPa
- Proof pressure : 10.5 MPa
- Operating temperature : 0–70 ℃
- Fluid used : General mineral based hydraulic oil (ISO-VG32 equivalent)
- Seals are resistant to chlorine-based cutting fluid.

*: ISO R898 class 12.9

Performance table



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

Clamping force calculation formula
F＝P/(Coefficient 1+Coefficient 2×LH)
F：Clamping force　P：Hydraulic pressure　LH：Clamp arm length

CTJ03 with clamp arm length(LH)50 mm at hydraulic pressure of 7 MPa, Clamping force F is calculated by
＝7/(2.82+0.0165×50)＝1.92 kN

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

model CTJ02　Clamping force　F=P/(4.97+0.0323×LH)

Hydraulic pressure MPa	Cylinder force kN	Clamping force kN Clamp arm length LH mm								Max. arm length Max. LH mm
		25	30	40	50	60	70	80	100	
7	1.41	1.21	1.18	1.12	1.06	1.01		Nonusable range		67
6.5	1.31	1.12	1.09	1.04	0.99	0.94	0.90			74
6	1.21	1.04	1.01	0.96	0.91	0.87	0.83	0.79		84
5.5	1.11	0.95	0.93	0.88	0.84	0.80	0.76	0.73		97
5	1.01	0.87	0.84	0.80	0.76	0.72	0.69	0.66	0.61	115
4.5	0.90	0.78	0.76	0.72	0.68	0.65	0.62	0.60	0.55	140
4	0.80	0.69	0.67	0.64	0.61	0.58	0.55	0.53	0.49	↑
3.5	0.70	0.61	0.59	0.56	0.53	0.51	0.48	0.46	0.43	↑
3	0.60	0.52	0.50	0.48	0.46	0.43	0.41	0.40	0.37	↑
2.5	0.50	0.43	0.42	0.40	0.38	0.36	0.35	0.33	0.30	↑
2	0.40	0.35	0.34	0.32	0.30	0.29	0.28	0.26	0.24	↑
1.5	0.30	0.26	0.25	0.24	0.23	0.22	0.21	0.20	0.18	140

model CTJ03　Clamping force　F=P/(2.82+0.0165×LH)

Hydraulic pressure MPa	Cylinder force kN	Clamping force kN Clamp arm length LH mm								Max. arm length Max. LH mm
		30	40	50	60	70	80	100	120	
7	2.48	2.11	2.01	1.92	1.84	1.76				73
6.5	2.30	1.96	1.87	1.78	1.70	1.63	1.57	Nonusable range		82
6	2.13	1.81	1.72	1.64	1.57	1.51	1.45			93
5.5	1.95	1.66	1.58	1.51	1.44	1.38	1.33	1.23		107
5	1.77	1.51	1.44	1.37	1.31	1.26	1.21	1.12	1.04	127
4.5	1.59	1.36	1.29	1.23	1.18	1.13	1.09	1.01	0.94	155
4	1.42	1.21	1.15	1.10	1.05	1.01	0.96	0.89	0.83	↑
3.5	1.24	1.05	1.00	0.96	0.92	0.88	0.84	0.78	0.73	↑
3	1.06	0.90	0.86	0.82	0.79	0.75	0.72	0.67	0.62	↑
2.5	0.89	0.75	0.72	0.69	0.66	0.63	0.60	0.56	0.52	↑
2	0.71	0.60	0.57	0.55	0.52	0.50	0.48	0.45	0.42	↑
1.5	0.53	0.45	0.43	0.41	0.39	0.38	0.36	0.34	0.31	155

model CTJ05　Clamping force　F=P/(1.44+0.00711×LH)

Hydraulic pressure MPa	Cylinder force kN	Clamping force kN Clamp arm length LH mm								Max. arm length Max. LH mm
		50	60	80	100	120	140	160	180	
7	4.87	3.90	3.75	3.49						80
6.5	4.52	3.62	3.48	3.24						89
6	4.17	3.34	3.22	2.99	2.79	Nonusable range				100
5.5	3.82	3.07	2.95	2.74	2.56					114
5	3.48	2.79	2.68	2.49	2.33	2.18				133
4.5	3.13	2.51	2.41	2.24	2.09	1.96	1.85			159
4	2.78	2.23	2.14	1.99	1.86	1.75	1.64	1.55	1.47	199
3.5	2.43	1.95	1.88	1.74	1.63	1.53	1.44	1.36	1.29	↑
3	2.09	1.67	1.61	1.49	1.40	1.31	1.23	1.16	1.10	↑
2.5	1.74	1.39	1.34	1.25	1.16	1.09	1.03	0.97	0.92	↑
2	1.39	1.11	1.07	1.00	0.93	0.87	0.82	0.78	0.74	↑
1.5	1.04	0.84	0.80	0.75	0.70	0.65	0.62	0.58	0.55	199

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 flow control valve to ensure that 90° swing time of the clamp arm is greater than the shortest swing time in the graph shown below.

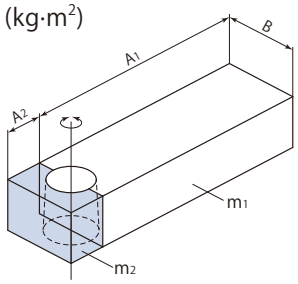
● The cam groove may be damaged in case the swing speed is set at the nonusable range in the graph.

Example of calculation for moment of inertia

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

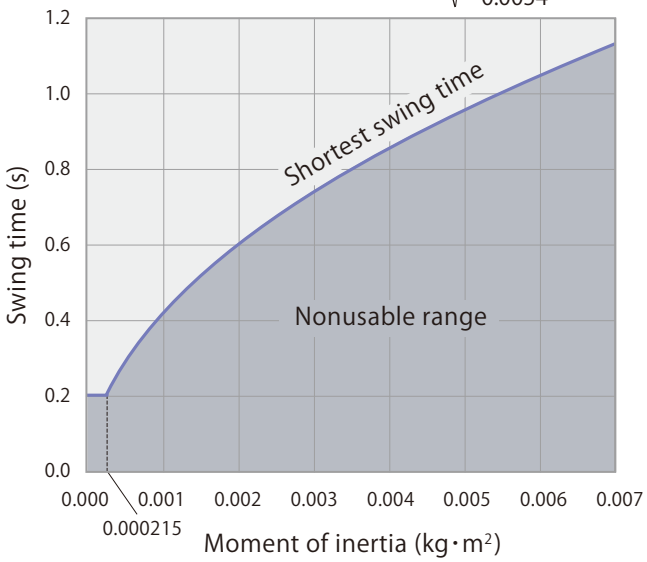
I : Moment of inertia (kg·m²)

m: Mass (kg)



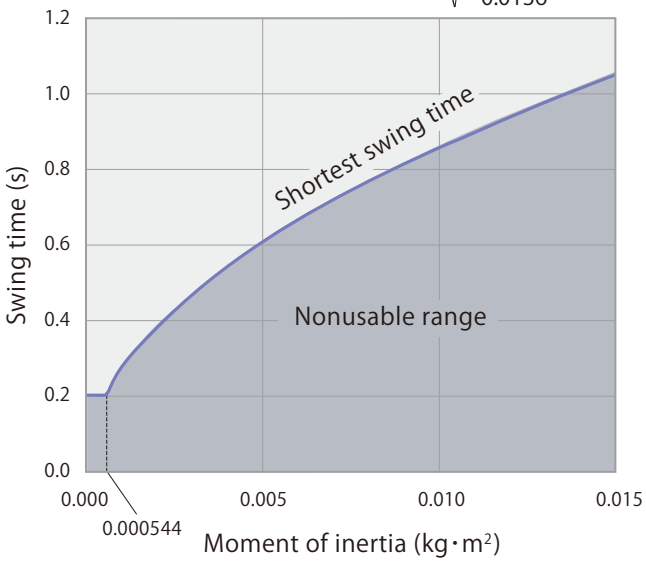
model CTJ02

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0054}}$



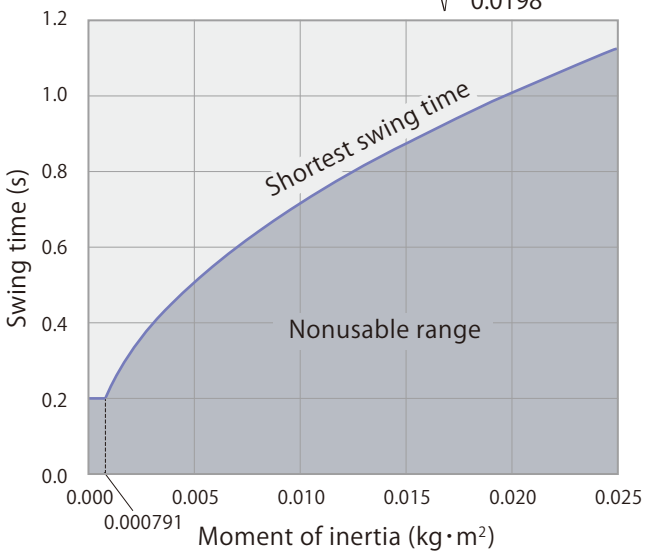
model CTJ03

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0136}}$

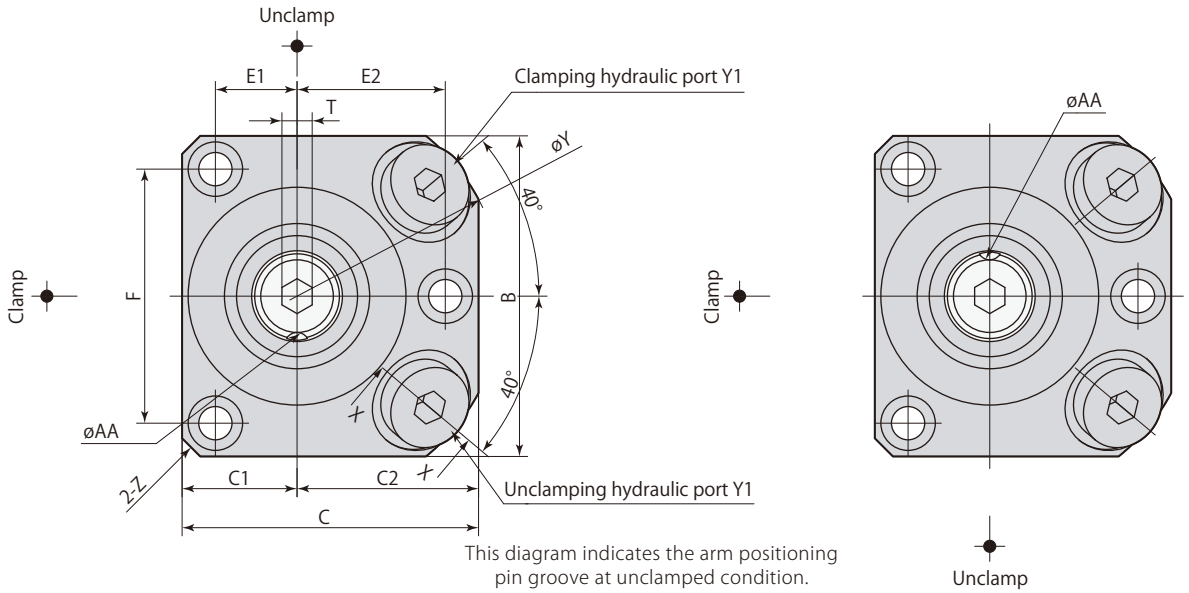


model CTJ05

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0198}}$

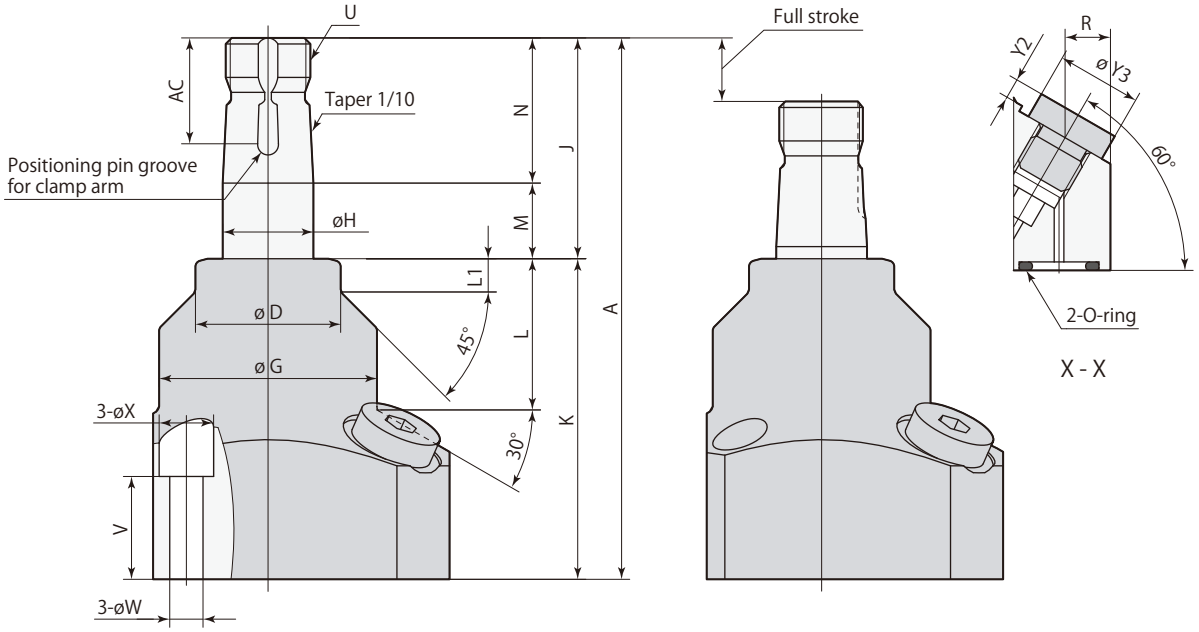


Dimensions



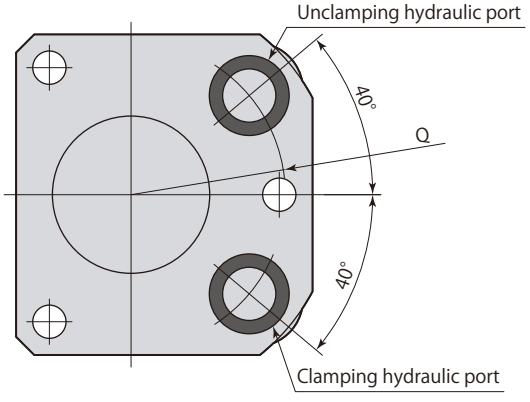
Swing direction L (counter-clockwise)

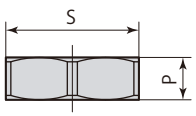
Swing direction R (clockwise)



Unclamp

Stroke end





Hex nut for arm mount

- Hex nut for arm mount is included.
- Clamp arm, positioning pin and mounting screws are not included.

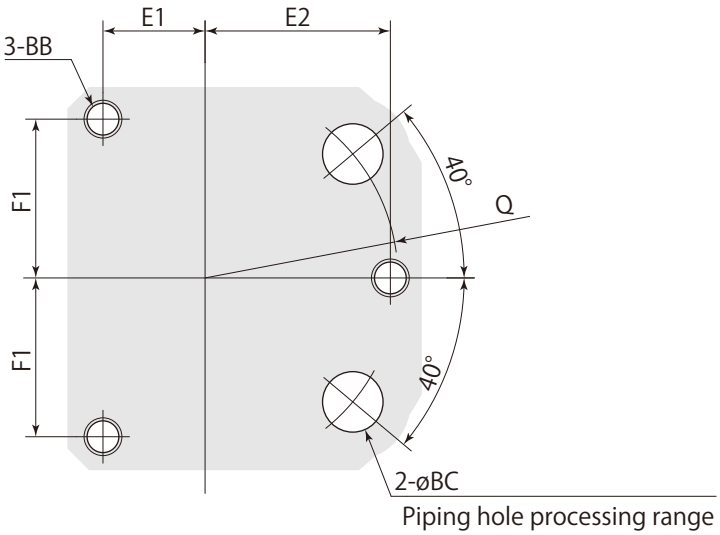
mm

Model		CTJ02	CTJ03	CTJ05
A		78	89.5	106.5
B		48	53	60
C		43	49	61
C1		16	19	25
C2		27	30	36
øD		21	24	36
E1		10.5	13.5	19
E2		21.5	24.5	30
F		37	42	48
øG		30	36	48
øH		12	15	22
J		29.5	36.5	46.5
K		48.5	53	60
L		20.5	25	31.5
L1		4.5	5.5	5.5
M		11.5	12.5	14.5
N		18	24	32
P		5	7	9
Q		R22.5	R25.5	R31.5
R		7.5	7.5	7.5
S (nut width across flats)		17	22	30
T (hex socket)		4	5	8
U		M10×1	M14×1.5	M20×1.5
V		16	16	15.5
øW		5.5	5.5	6.5
øX		9	9	10.5
øY		62	68	80
Y1		G1/8	G1/8	G1/8
Y2		3.3	3.3	3.3
øY3		14	14	14
Z		C3	C3	C3
øAA (pin groove diameter)		3	4	5
AC		13.5	17.5	21.5
Positioning pin (dowel pin)		ø3(h8)×8	ø4(h8)×10	ø5(h8)×12
O-ring (FKM-90)		P10	P10	P10
Taper sleeve		CTH02-MS	CTH03-MS	CTH05-MS
Flow control valve	Meter-in	VCF01S	VCF01S	VCF01S
	Meter-out	VCF01S-O	VCF01S-O	VCF01S-O
Air bleeding valve		VCE01	VCE01	VCE01

Refer to each page for the details of options.

● Taper sleeve **page →15** ● Flow control valve **page →65** ● Air bleeding valve **page →67**

Mounting details



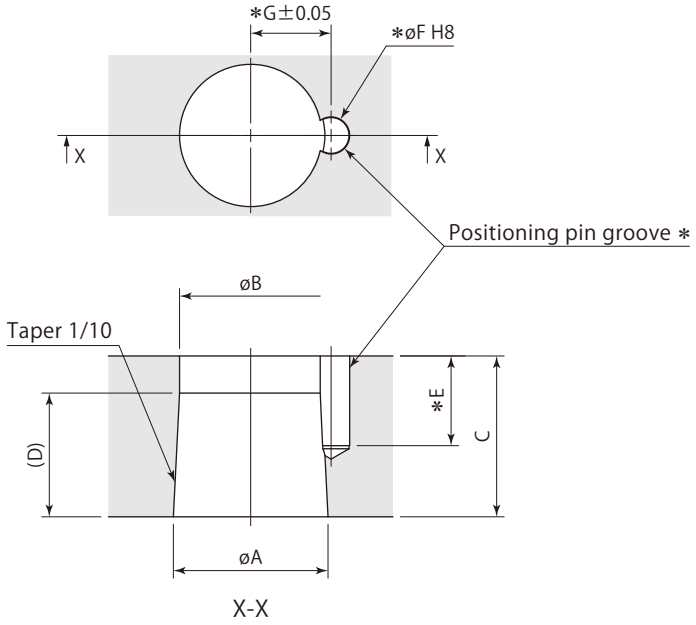
● The mounting surface finish must be no rougher than Rz6.3 (ISO4287:1997).

mm

Model	CTJ02	CTJ03	CTJ05
BB	M5	M5	M6
øBC	8	8	8
E1	10.5	13.5	19
E2	21.5	24.5	30
F1	18.5	21	24
Q	R22.5	R25.5	R31.5

Clamp arm mounting details

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



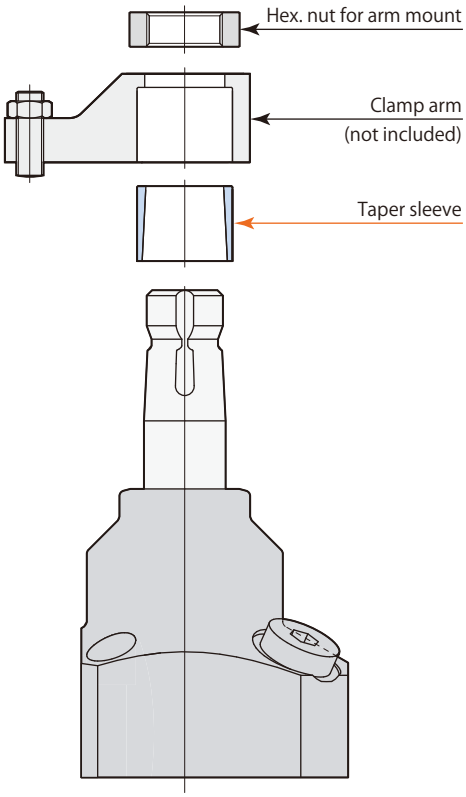
∗:No need to machine the pin groove (E, øF, G) unless positioning pin is used for the arm.
The positioning pin enables a clamp arm to locate on the clamp firmly and easily.

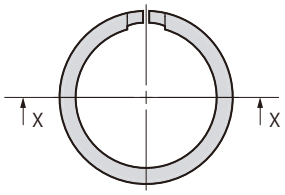
mm

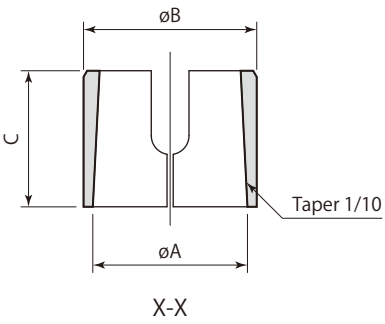
Model	CTJ02	CTJ03	CTJ05
øA	$12^{-0.016}_{-0.034}$	$15^{-0.016}_{-0.034}$	$22^{-0.020}_{-0.041}$
øB	11	14.1	20.5
C	13	17	23
D	10	9	15
E	8.5	10.5	12.5
øF (pin groove diameter)	$3^{+0.014}_{0}$	$4^{+0.018}_{0}$	$5^{+0.018}_{0}$
G	6.5	8	11.5

Taper sleeve

Size
02
CTH 03 — MS : Taper sleeve
05







X-X

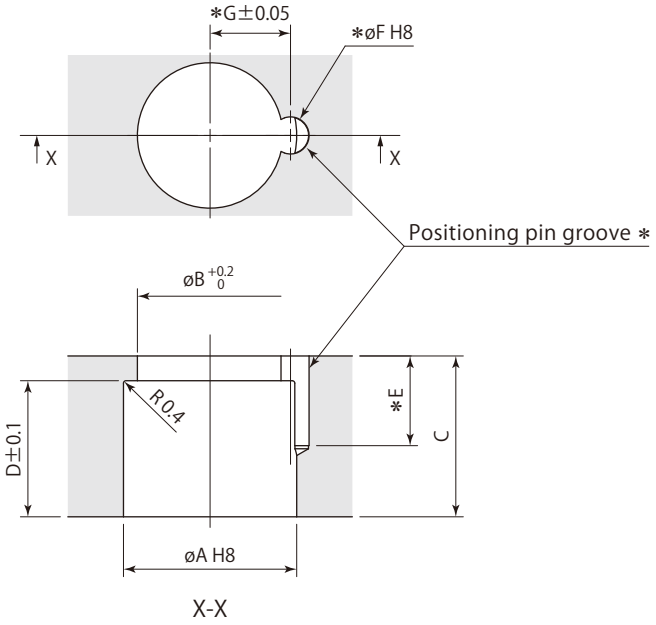
mm

Taper sleeve	CTH02-MS	CTH03-MS	CTH05-MS
Applicable swing clamp	CTJ02	CTJ03	CTJ05
øA	12	15	22
øB	14	17	25
C	10	14	19

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.

mm

Taper sleeve	CTH02-MS	CTH03-MS	CTH05-MS
Applicable swing clamp	CTJ02	CTJ03	CTJ05
øA	14 +0.027 0	17 +0.027 0	25 +0.032 0
øB	11.5	15	21
C	13	17	23
D	10	14	19
E	8.5	10.5	12.5
øF (pin groove diameter)	3 +0.014 0	4 +0.018 0	5 +0.018 0
G	6.5	8	11.5