

# Swing clamp

Flat mount model Double acting 7MPa

model **CTJ**

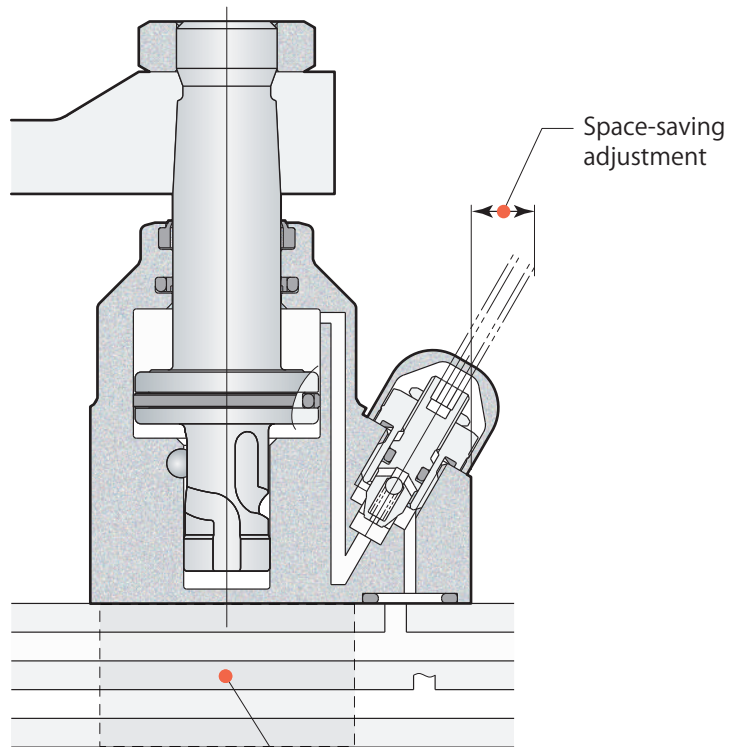


Flat mount model  
model CTJ03-L



Swing clamp  
Flat mount model

model **CTJ** JP PAT.

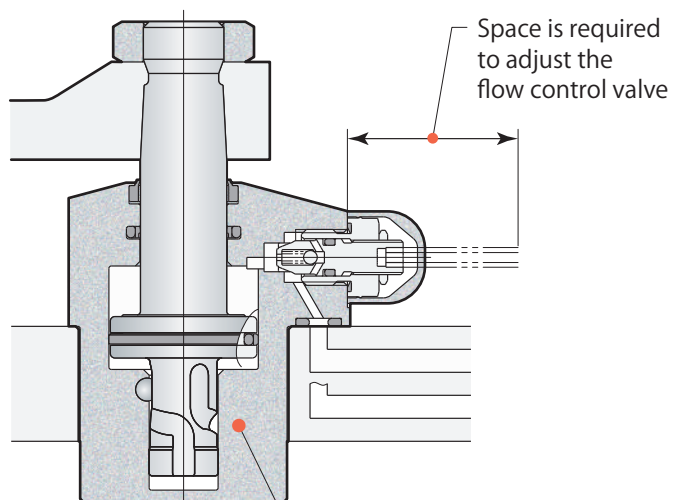


Since the embedded hole is not machined, the piping design under the clamp is easy and the jig plate can be made thin.



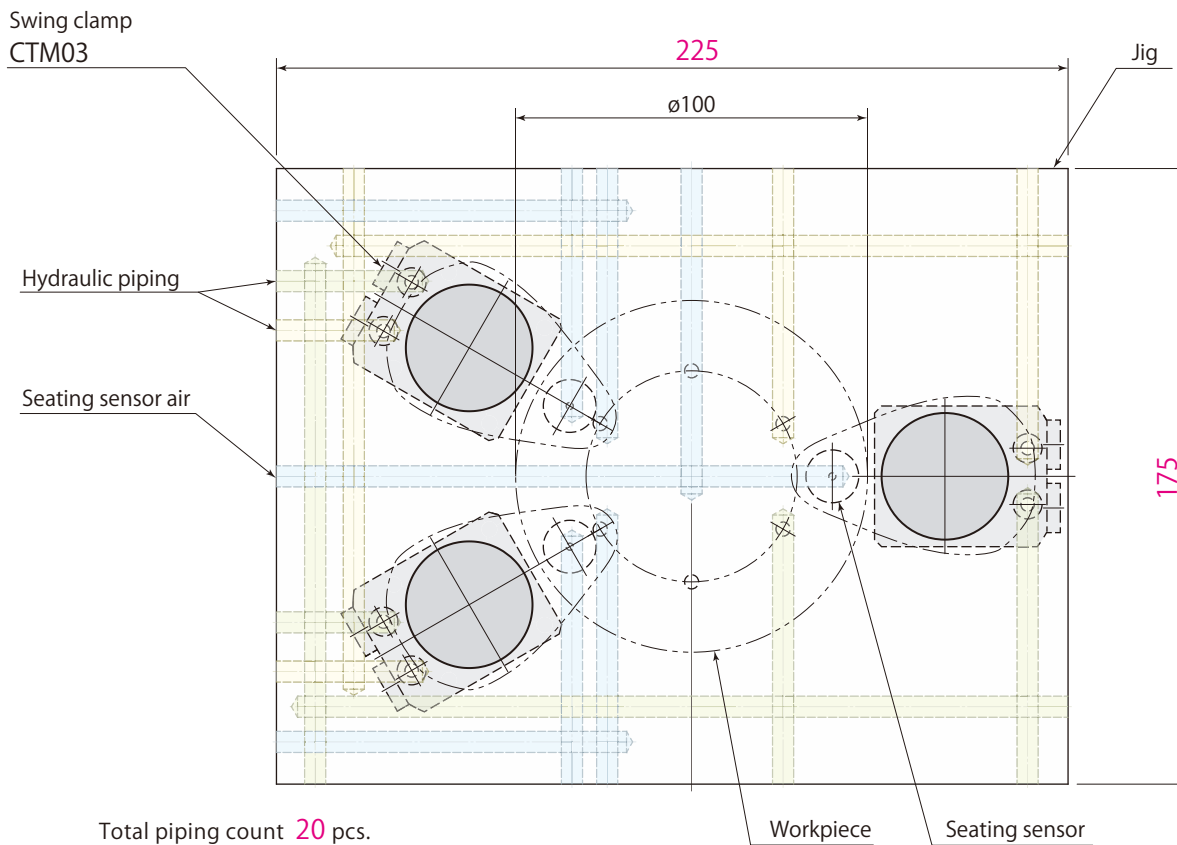
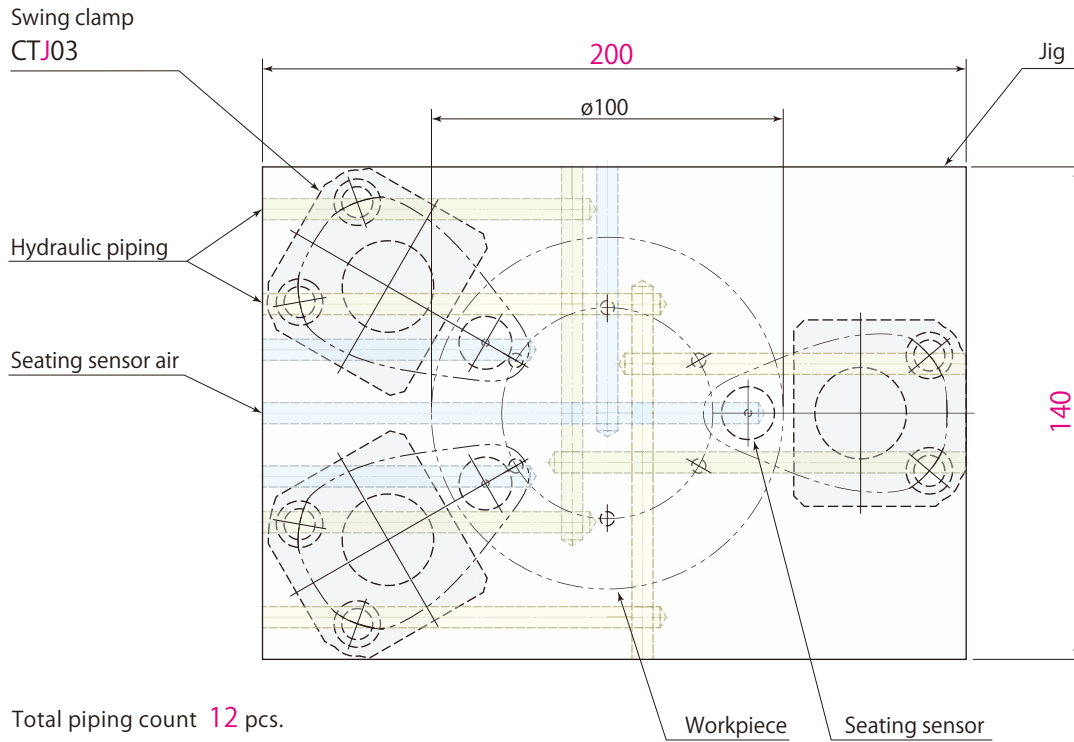
Swing clamp  
Compact model

model **CTM**



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

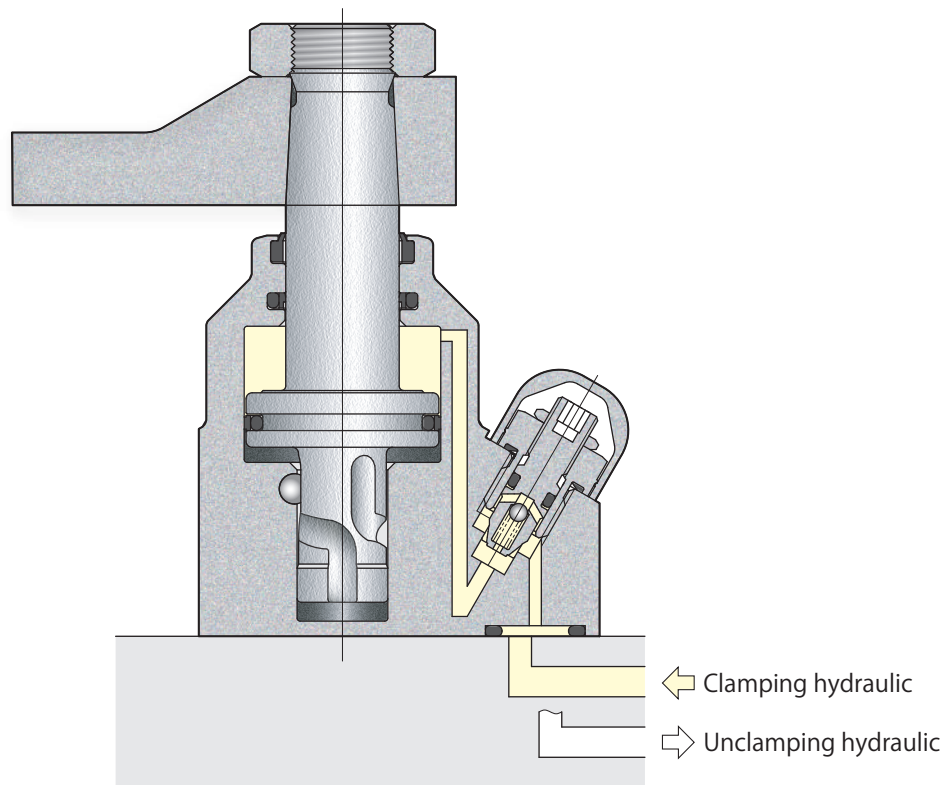
Jig area **29 % down** Total piping distance **38 % down**



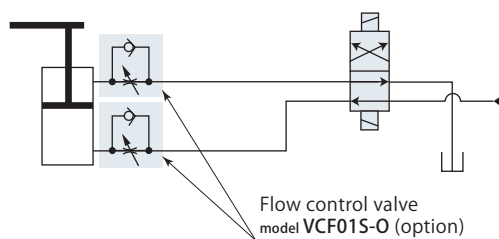
Flat mount model

model CTJ□-□ JP PAT.



Eliminating the embedding of the main body makes it easier to process the jig plate.



Hydraulic circuit diagram



## Specifications

	Size	Swing direction (when clamping)	
<b>CTJ</b>	<b>02</b>	—	<b>L</b> : Counter-clockwise <div style="display: inline-block; vertical-align: middle; margin-left: 10px;">  </div>
	<b>03</b>		<b>R</b> : Clockwise <div style="display: inline-block; vertical-align: middle; margin-left: 10px;">  </div>
	<b>05</b>		

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 <sup>2</sup>	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 <sup>3</sup>	1.9	3.7	8.7
	Unclamp	cm <sup>3</sup>	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	

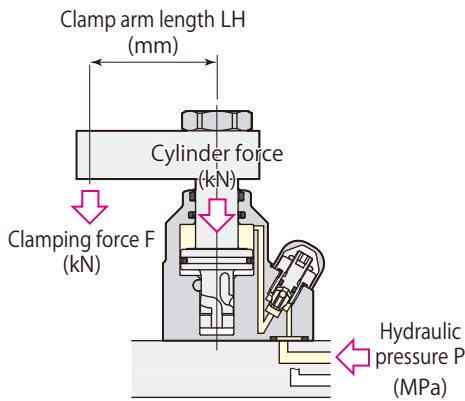
● Pressure range: 1.5–7 MPa    ● Proof pressure: 10.5 MPa    ● Operating temperature: 0–70 °C

● 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

$$F = P / (\text{Coefficient 1} + \text{Coefficient 2} \times LH)$$

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  
 $= 7 / (2.82 + 0.0165 \times 50) = 1.92 \text{ kN}$

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

model CTJ02		Clamping force $F = P / (4.97 + 0.0323 \times LH)$									
Hydraulic pressure MPa	Cylinder force kN	Clamping force kN									Max. arm length Max. LH mm
		Clamp arm length LH mm									
		25	30	40	50	60	70	80	100		
7	1.41	1.21	1.18	1.12	1.06	1.01					67
6.5	1.31	1.12	1.09	1.04	0.99	0.94	0.90	Nonusable range			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 $F = P / (2.82 + 0.0165 \times LH)$									
Hydraulic pressure MPa	Cylinder force kN	Clamping force kN									Max. arm length Max. LH mm
		Clamp arm length 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 $F = P / (1.44 + 0.00711 \times LH)$								
Hydraulic pressure MPa	Cylinder force kN	Clamping force kN								Max. arm length Max. LH mm
		Clamp arm length 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.

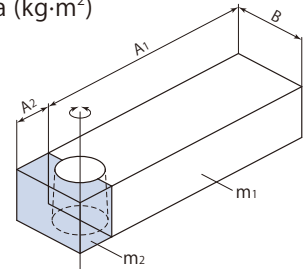
● The cam groove may be damaged in case the swing speed is set at the nonusable range in the graph.

### 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·m<sup>2</sup>)

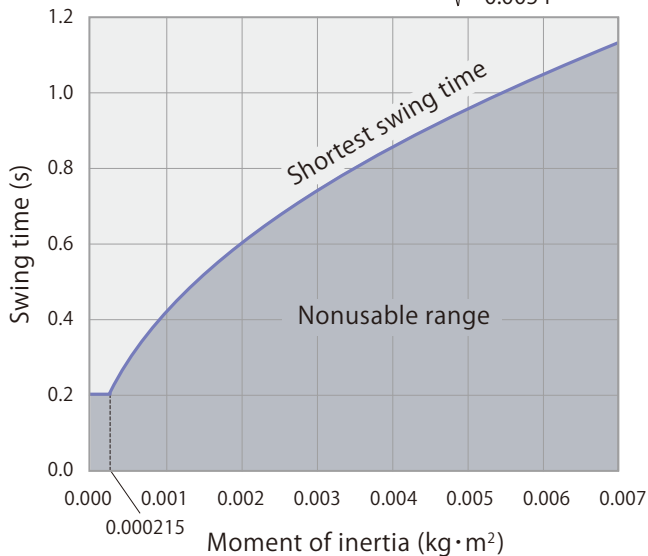
m : Mass (kg)



model CTJ02

Shortest swing time calculation formula

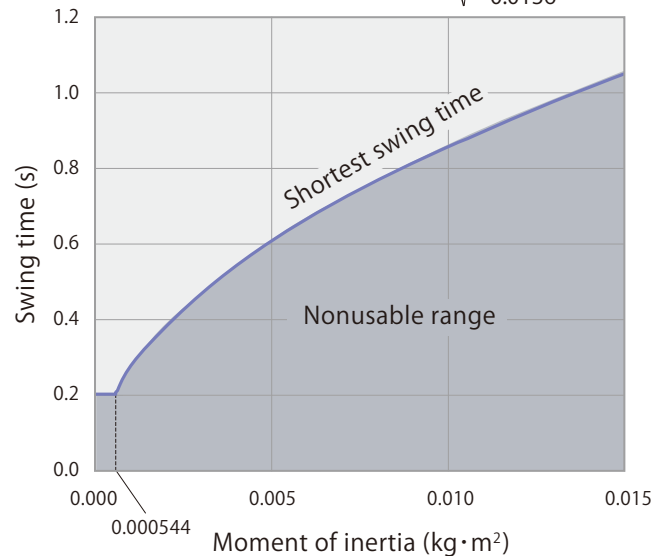
$$t = \sqrt{\frac{I}{0.0054}}$$



model CTJ03

Shortest swing time calculation formula

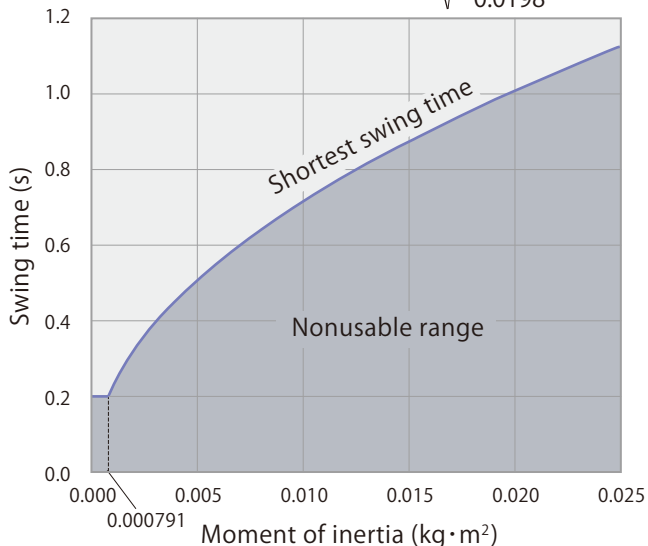
$$t = \sqrt{\frac{I}{0.0136}}$$



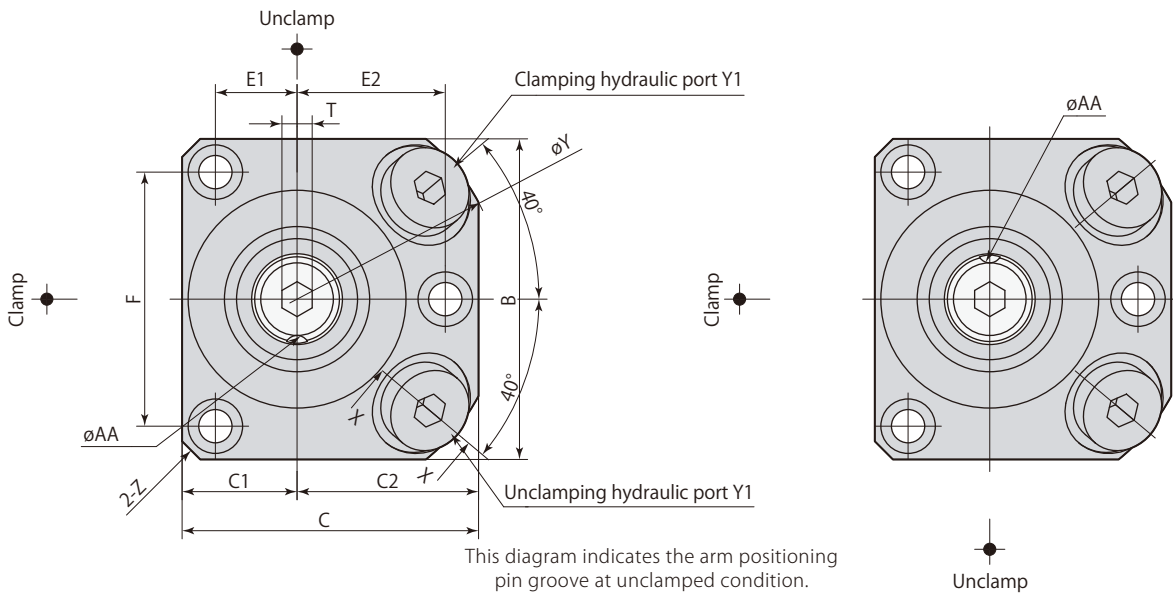
model CTJ05

Shortest swing time calculation formula

$$t = \sqrt{\frac{I}{0.0198}}$$

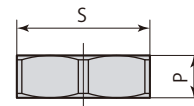
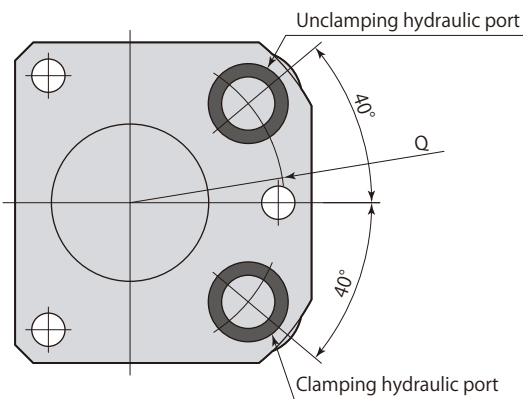
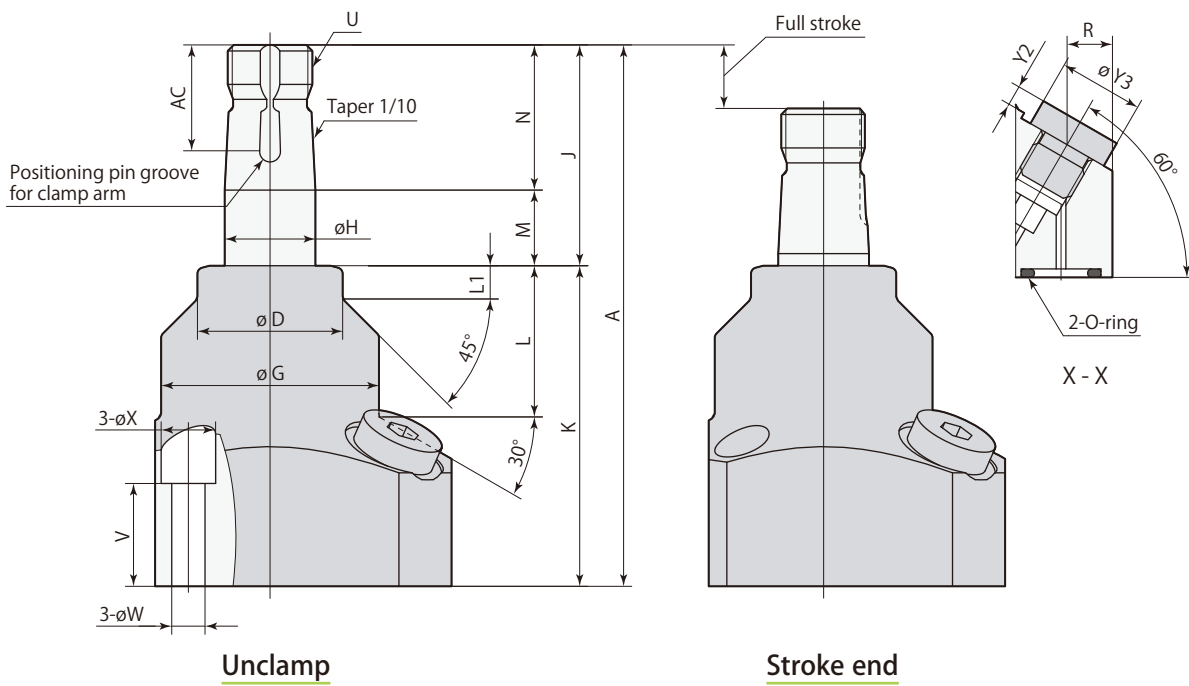


Dimensions



Swing direction L (counter-clockwise)

Swing direction R (clockwise)



Hex nut for arm mount

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



mm

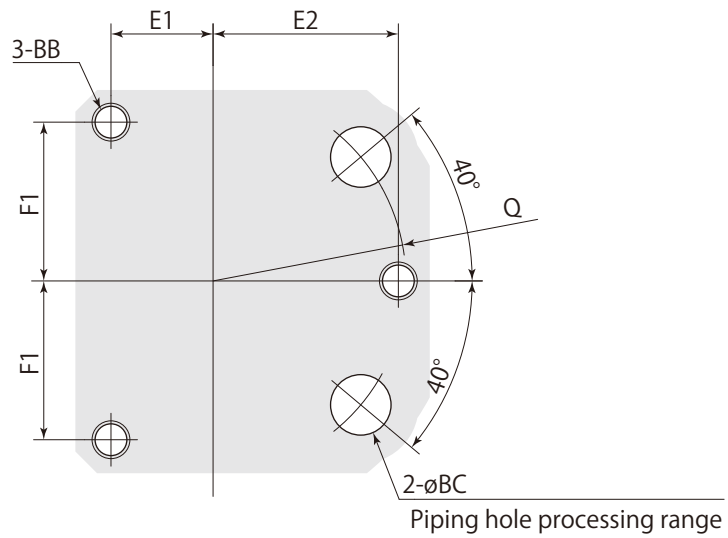
Model	CTJ02	CTJ03	CTJ05
A	78	89.5	106.5
B	48	53	60
C	43	49	61
C1	16	19	25
C2	27	30	36
øD	21	24	36
E1	10.5	13.5	19
E2	21.5	24.5	30
F	37	42	48
øG	30	36	48
øH	12	15	22
J	29.5	36.5	46.5
K	48.5	53	60
L	20.5	25	31.5
L1	4.5	5.5	5.5
M	11.5	12.5	14.5
N	18	24	32
P	5	7	9
Q	R22.5	R25.5	R31.5
R	7.5	7.5	7.5
S (nut 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
	Meter-out	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

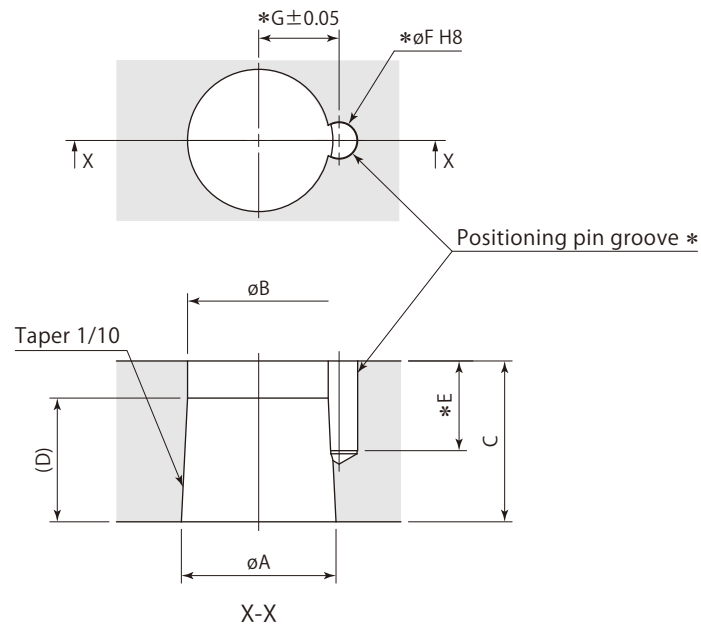
- The mounting surface finish must be no rougher than Rz6.3 (ISO4287:1997).

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

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,  $\phi F$ , G) unless positioning pin is used for the arm.  
The positioning pin enables a clamp arm to locate on the clamp firmly and easily.

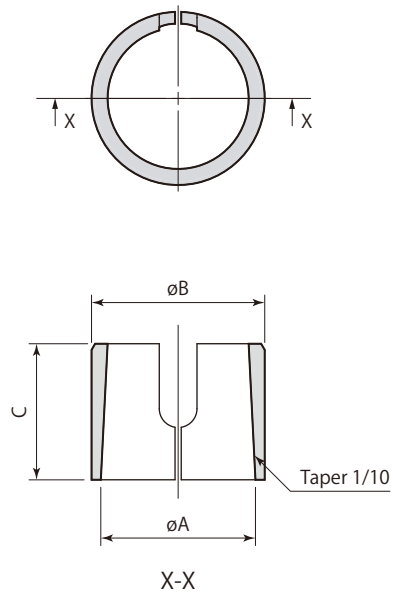
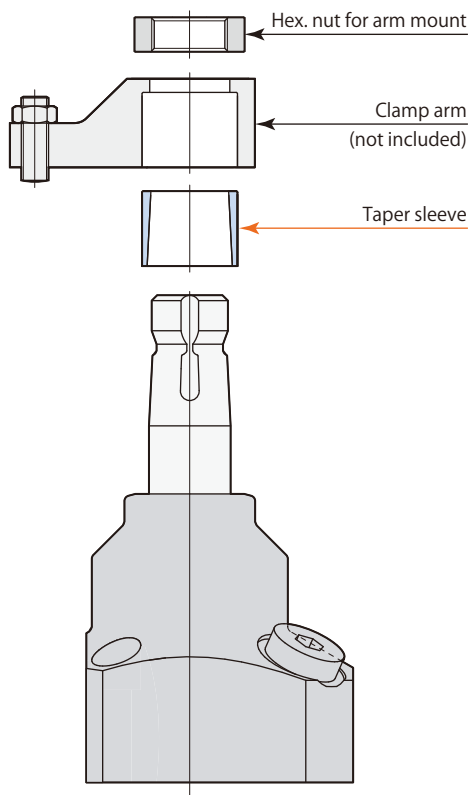
Model	CTJ02	CTJ03	CTJ05
$\phi A$	12 <sub>-0.034</sub> <sup>-0.016</sup>	15 <sub>-0.034</sub> <sup>-0.016</sup>	22 <sub>-0.041</sub> <sup>-0.020</sup>
$\phi B$	11	14.1	20.5
C	13	17	23
D	10	9	15
E	8.5	10.5	12.5
$\phi F$ (pin groove diameter)	3 <sub>0</sub> <sup>+0.014</sup>	4 <sub>0</sub> <sup>+0.018</sup>	5 <sub>0</sub> <sup>+0.018</sup>
G	6.5	8	11.5

mm

Taper sleeve



Size  
**02**  
**03** — **MS** : Taper sleeve  
**05**



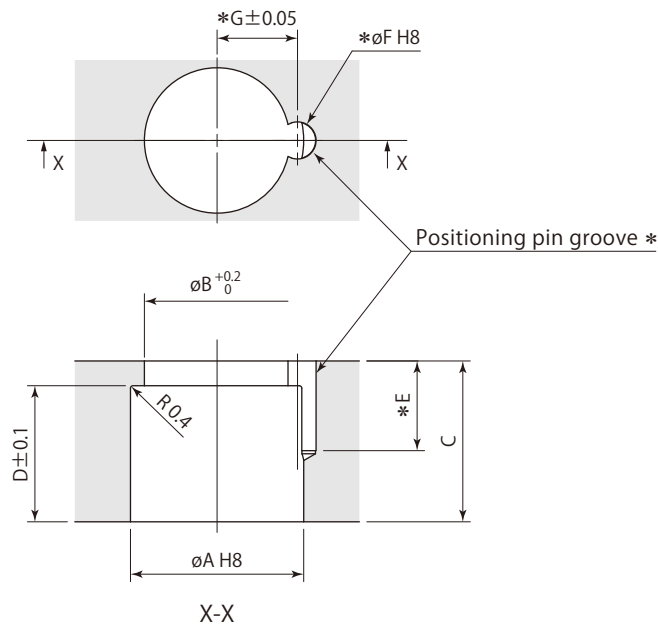
Taper sleeve	CTH02-MS	CTH03-MS	CTH05-MS
Applicable swing clamp	CTJ02	CTJ03	CTJ05
$\phi A$	12	15	22
$\phi B$	14	17	25
C	10	14	19

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,  $\phi F$ , 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	CTH02-MS	CTH03-MS	CTH05-MS
Applicable swing clamp	CTJ02	CTJ03	CTJ05
$\phi A$	14 <sup>+0.027/0</sup>	17 <sup>+0.027/0</sup>	25 <sup>+0.032/0</sup>
$\phi B$	11.5	15	21
C	13	17	23
D	10	14	19
E	8.5	10.5	12.5
$\phi F$ (pin groove diameter)	3 <sup>+0.014/0</sup>	4 <sup>+0.018/0</sup>	5 <sup>+0.018/0</sup>
G	6.5	8	11.5

mm