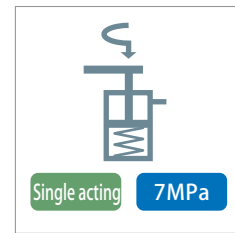


Swing clamp

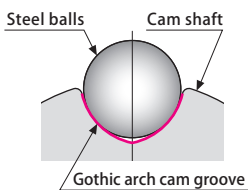
model
CTT



Dramatic improvement in durability and acceleration of clamping speed

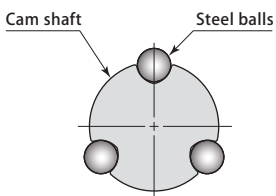
Gothic arch cam groove

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.

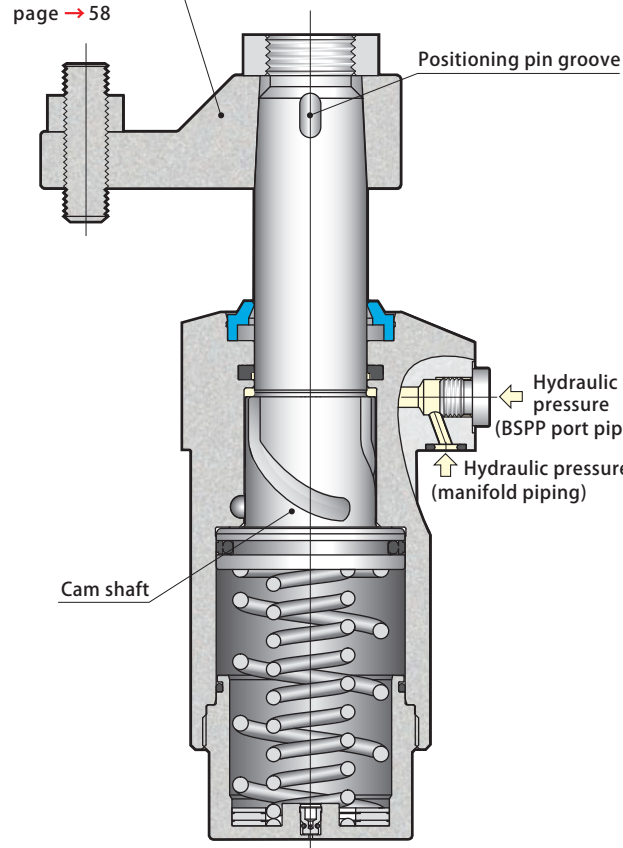


Large diameter cam shaft and wide distance between the cam grooves offers higher rigidity. An overload protection mechanism is not needed due to improvement of durability and impact resistance, providing stable and secure high-speed swing operation.



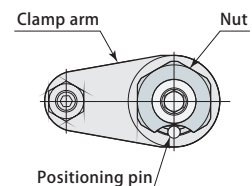
Cam groove view

Clamp arm (option)
page → 58



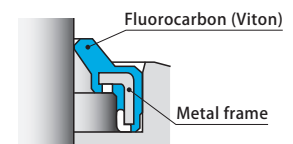
Clamp arm positioning & replacement

Positioning pin groove adopted with all models. Positioning (angle) of clamp arm can be performed easily.



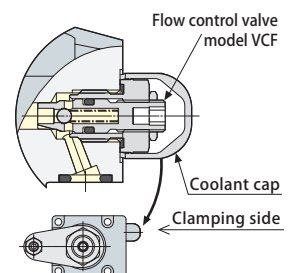
High pressure coolant & metal chip countermeasure

Special scraper prevents intrusion of high pressure coolant and metal chips into cylinder.



Flow control valve Patented

For manifold piping, operating speeds can be adjusted individually by mounting a flow control valve (option), making sequential operation on same circuit or control of synchronization operation easier. page → 145



Specifications

Model		CTT01	CTT02	CTT04	CTT06	CTT10	CTT16	CTT25
Cylinder force (hydraulic pressure 7 MPa) *4 (kN)		2.0	2.4	3.4	5.1	8.1	13.3	20.5
Clamping force *1 *4	Hydraulic pressure 7 MPa (kN)	1.7	2.0	2.9	4.3	6.3	11.0	16.8
	Clamp arm length (LH) (mm)	30	35	40	50	60	70	90
Cylinder inner diameter (mm)		25	29	36	42	52	65	82
Rod diameter (mm)		14	18	22.4	25	30	35.5	45
Effective area (clamp) (cm ²)		3.4	4.1	6.2	8.9	14.2	23.3	36.9
Swing angle		90° ± 3°						
Positioning pin groove position accuracy		± 1°						
Repeated clamp positioning accuracy		± 0.5°						
Full stroke (mm)		16	18	20.5	23.5	26.5	28.5	36
Swing stroke (mm)		8	10	12.5	13.5	16.5	18.5	23
Clamp stroke (mm)		8	8	8	10	10	10	13
Max. swing torque *2 (N·m)		0.15	0.2	0.6	1.0	1.8	3.6	5.4
Cylinder capacity (clamp) (cm ³)		5.4	7.3	12.8	21.0	37.5	66.4	132.9
Return spring force	Unclamp (kN)	0.23	0.29	0.50	0.74	1.13	1.79	2.92
	Clamp stroke central position (kN)	0.37	0.47	0.94	1.12	1.79	2.99	5.32
	Clamp end (kN)	0.42	0.52	1.05	1.22	1.94	3.25	5.85
Recommended piping inner diameter *3 (mm)		ø6	ø6	ø6	ø6	ø8	ø8	ø10
Mass (kg)		0.37 *5	1.0	1.5	2.0	3.3	5.5	10.4

Working pressure range: 2.5 ~ 7 MPa Proof pressure: 10.5 MPa Operating temperature: 0 ~ 70°C

Fluid used: General mineral based hydraulic oil (ISO-VG32 equivalent)

*1 : Clamping force varies depending on clamp arm length. Refer to performance table (page → 47) for details.

*2 : This is the limit value for lifting arm with spring force (unclamp) when mounted horizontally.

*3 : Care must be taken when numerous clamps are used or when hydraulic piping is long.

*4 : This is value for central position of clamp stroke.

*5 : Body material is aluminum only for model CTT01, to reduce weight.

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

CTT ①-②③ (Example : CTT06-RP)

① Size (refer to specification table)

② Swing direction (when clamping)

③ Variation code*1

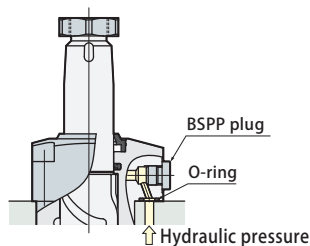
CTT	01 02 04 06 10 16 25	- -	L : Counter-clockwise  R : Clockwise 	(Nil) : Standard P : Top pin page → 50 □ : Swing angle 30°, 45°, 60° pages → 51 and 52
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*1 : All varieties are not available for all sizes. Refer to each relevant page for details.

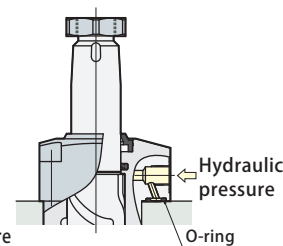
Request for separate document regarding variation codes (models) that are not described in the catalog.

Piping method

Manifold piping



BSPP port piping

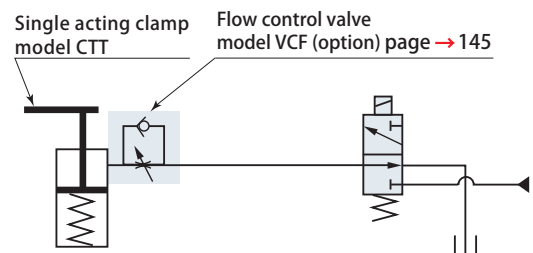


Two piping methods are available for model CTT, manifold piping and BSPP port piping.

Dismount BSPP plug when using BSPP port piping (do not dismount O-ring).

Refer to page → 149 for details on BSPP port piping flareless fitting.

Hydraulic circuit diagram (reference)

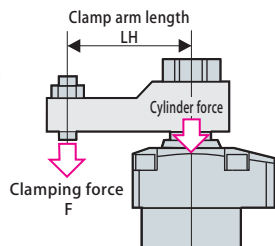


Use flow control valve for meter-in control.

Performance table

Clamping force varies depending on clamp arm length (LH) and hydraulic pressure. Select an appropriate clamp model based on considerations for clamp arm length (LH), working hydraulic pressure and mounting dimensions.

- For clamp arm length (LH) of 60 mm and where clamping force of 1.5 kN or more is necessary, the working hydraulic pressure for each model is:
 6 MPa for CTT02
 4.5 MPa for CTT04
 3.5 MPa for CTT06
 2.5 MPa for CTT10



F: Clamping force (kN) P: Working hydraulic pressure (MPa)
 LH: Clamp arm length (mm)

CTT 01 $F=(P-1.10)/(2.97+0.0153 \times LH)$ indicates nonusable range

Hydraulic pressure (MPa)	Cylinder force (kN)	Clamping force (kN)								Max. arm length (mm)
		Clamp arm length LH (mm)								
		30	35	40	50	60	80	100	120	
7	2.0	1.7	1.7	1.6						49
6.5	1.8	1.6	1.5	1.5	1.4					55
6	1.6	1.4	1.4	1.4	1.3	1.3				62
5.5	1.5	1.3	1.3	1.2	1.2	1.1				73
5	1.3	1.1	1.1	1.1	1.0	1.0	0.9			87
4.5	1.1	1.0	1.0	0.9	0.9	0.9	0.8	0.8		107
4	1.0	0.8	0.8	0.8	0.8	0.7	0.7	0.6	0.6	139
3.5	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.5	0.5	↑
3	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	↑
2.5	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	139

CTT 04 $F=(P-1.51)/(1.60+0.00664 \times LH)$ indicates nonusable range

Hydraulic pressure (MPa)	Cylinder force (kN)	Clamping force (kN)								Max. arm length (mm)
		Clamp arm length LH (mm)								
		40	50	60	80	100	120	140	160	
7	3.4	2.9	2.8	2.7	2.6	2.4				116
6.5	3.1	2.7	2.6	2.5	2.3	2.2	2.1			135
6	2.8	2.4	2.3	2.2	2.1	2.0	1.9	1.8	1.7	161
5.5	2.5	2.1	2.1	2.0	1.9	1.8	1.7	1.6	1.5	199
5	2.2	1.9	1.8	1.7	1.6	1.5	1.5	1.4	1.3	↑
4.5	1.9	1.6	1.5	1.5	1.4	1.3	1.2	1.2	1.1	↑
4	1.6	1.3	1.3	1.2	1.2	1.1	1.0	1.0	0.9	↑
3.5	1.2	1.1	1.0	1.0	0.9	0.9	0.8	0.8	0.7	↑
3	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6	↑
2.5	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	199

CTT 02 $F=(P-1.16)/(2.46+0.0116 \times LH)$ indicates nonusable range

Hydraulic pressure (MPa)	Cylinder force (kN)	Clamping force (kN)								Max. arm length (mm)
		Clamp arm length LH (mm)								
		35	40	50	60	80	100	120	140	
7	2.4	2.0	2.0	1.9	1.8					78
6.5	2.2	1.9	1.8	1.8	1.7	1.6				89
6	2.0	1.7	1.7	1.6	1.5	1.4	1.3			104
5.5	1.8	1.5	1.5	1.4	1.4	1.3	1.2	1.1		123
5	1.6	1.3	1.3	1.3	1.2	1.1	1.1	1.0	0.9	152
4.5	1.4	1.2	1.1	1.1	1.1	1.0	0.9	0.9	0.8	↑
4	1.2	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.7	↑
3.5	1.0	0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.6	↑
3	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	↑
2.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	152

CTT 10 $F=(P-1.26)/(0.706+0.00228 \times LH)$ indicates nonusable range

Hydraulic pressure (MPa)	Cylinder force (kN)	Clamping force (kN)								Max. arm length (mm)
		Clamp arm length LH (mm)								
		60	80	100	120	140	160	180	200	
7	8.1	6.8	6.5	6.1	5.9					135
6.5	7.4	6.2	5.9	5.6	5.3	5.1				155
6	6.7	5.6	5.3	5.1	4.8	4.6	4.4	4.2		182
5.5	6.0	5.0	4.8	4.5	4.3	4.1	4.0	3.8	3.6	221
5	5.3	4.4	4.2	4.0	3.8	3.6	3.5	3.3	3.2	↑
4.5	4.6	3.8	3.6	3.5	3.3	3.2	3.0	2.9	2.8	↑
4	3.9	3.2	3.1	2.9	2.8	2.7	2.6	2.5	2.4	↑
3.5	3.2	2.7	2.5	2.4	2.3	2.2	2.1	2.0	1.9	↑
3	2.5	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.5	↑
2.5	1.8	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.1	221

CTT 06 $F=(P-1.25)/(1.12+0.00422 \times LH)$ indicates nonusable range

Hydraulic pressure (MPa)	Cylinder force (kN)	Clamping force (kN)								Max. arm length (mm)
		Clamp arm length LH (mm)								
		50	60	80	100	120	140	160	180	
7	5.1	4.3	4.2	4.0	3.7					111
6.5	4.7	4.0	3.8	3.6	3.4	3.2				127
6	4.2	3.6	3.5	3.3	3.1	2.9	2.8			149
5.5	3.8	3.2	3.1	2.9	2.8	2.6	2.5	2.4		180
5	3.4	2.8	2.7	2.6	2.4	2.3	2.2	2.1	2.0	226
4.5	2.9	2.4	2.4	2.2	2.1	2.0	1.9	1.8	1.7	↑
4	2.5	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.5	↑
3.5	2.0	1.7	1.6	1.5	1.5	1.4	1.3	1.3	1.2	↑
3	1.6	1.3	1.3	1.2	1.1	1.1	1.0	1.0	0.9	↑
2.5	1.1	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.7	226

CTT 25 $F=(P-1.44)/(0.271+0.000658 \times LH)$ indicates nonusable range



Hydraulic pressure (MPa)	Cylinder force (kN)	Clamping force (kN)								Max. arm length (mm)
		Clamp arm length LH (mm)								
		90	100	120	140	160	180	200	240	
7	20.5	16.8	16.5	15.9	15.3	14.8	14.3			180
6.5	18.7	15.3	15.0	14.5	13.9	13.4	13.0	12.6		208
6	16.8	13.8	13.5	13.0	12.6	12.1	11.7	11.3	10.6	246
5.5	15.0	12.3	12.1	11.6	11.2	10.8	10.4	10.1	9.5	300
5	13.1	10.8	10.6	10.2	9.8	9.5	9.1	8.8	8.3	↑
4.5	11.3	9.3	9.1	8.7	8.4	8.1	7.9	7.6	7.1	↑
4	9.4	7.8	7.6	7.3	7.0	6.8	6.6	6.4	6.0	↑
3.5	7.6	6.2	6.1	5.9	5.7	5.5	5.3	5.1	4.8	↑
3	5.8	4.7	4.6	4.5	4.3	4.1	4.0	3.9	3.6	↑
2.5	3.9	3.2	3.1	3.0	2.9	2.8	2.7	2.6	2.5	300

CTT 16 $F=(P-1.28)/(0.429+0.00128 \times LH)$ indicates nonusable range

Hydraulic pressure (MPa)	Cylinder force (kN)	Clamping force (kN)								Max. arm length (mm)
		Clamp arm length LH (mm)								
		70	80	100	120	140	160	180	200	
7	13.3	11.0	10.7	10.3	9.8					132
6.5	12.1	10.0	9.8	9.4	8.9	8.6				151
6	11.0	9.1	8.9	8.5	8.1	7.7	7.4			176
5.5	9.8	8.1	7.9	7.6	7.2	6.9	6.6	6.4	6.2	212
5	8.6	7.2	7.0	6.7	6.4	6.1	5.9	5.6	5.4	264
4.5	7.5	6.2	6.0	5.8	5.5	5.3	5.1	4.9	4.7	↑
4	6.3	5.2	5.1	4.9	4.7	4.5	4.3	4.1	4.0	↑
3.5	5.2	4.3	4.2	4.0	3.8	3.6	3.5	3.4	3.2	↑
3	4.0	3.3	3.2	3.1	2.9	2.8	2.7	2.6	2.5	↑
2.5	2.8	2.3	2.3	2.2	2.1	2.0	1.9	1.8	1.8	264

Note 1. Do not use arm lengths that exceed maximum arm length (Max. LH).

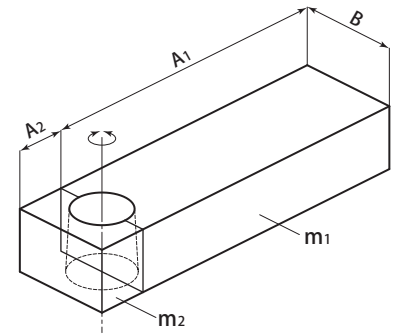
Swing speed adjustment

1. Adjust swing speed with flow control valve 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.

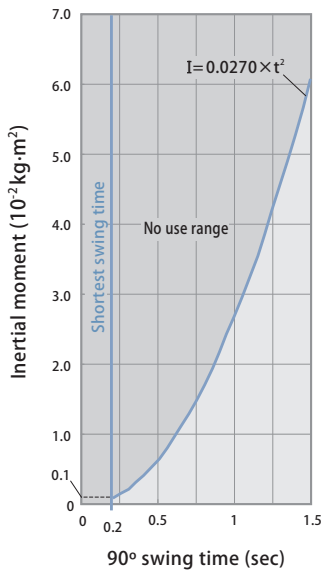
Example of calculation for inertial moment

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

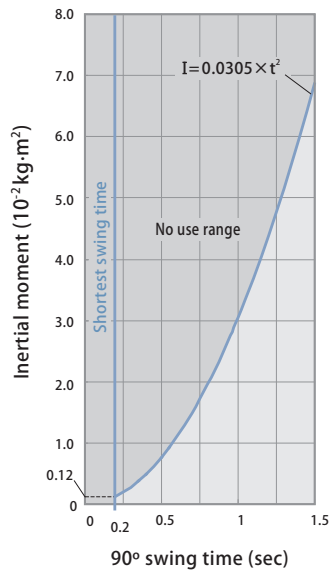
I : Inertial moment (kg·m²)
m : Mass (kg)



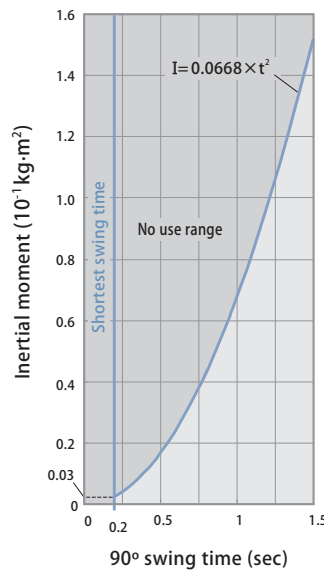
CTT 01



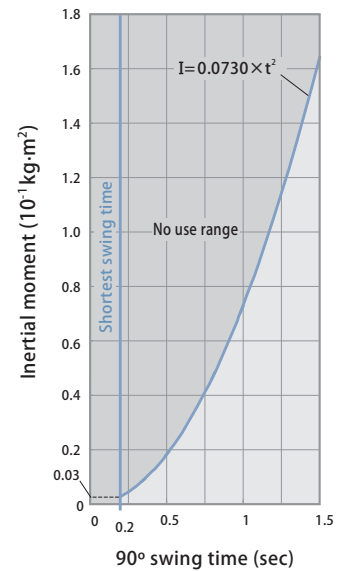
CTT 02



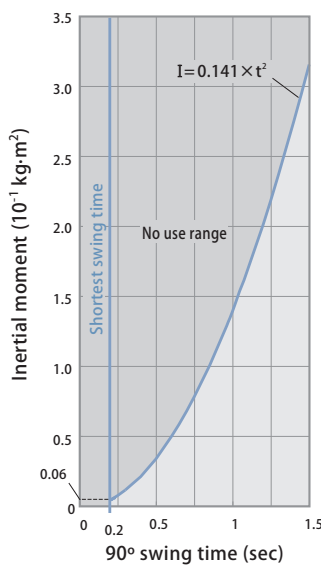
CTT 04



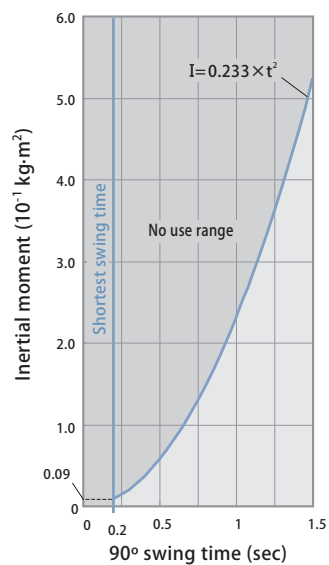
CTT 06



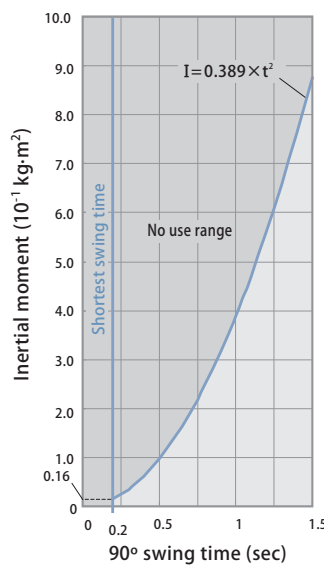
CTT 10



CTT 16

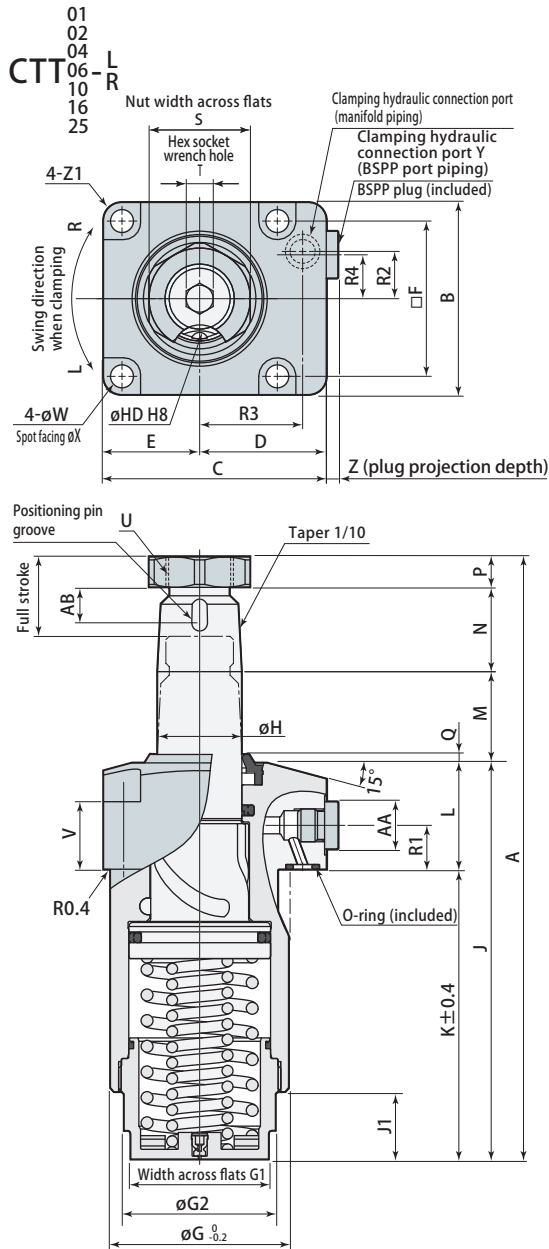


CTT 25

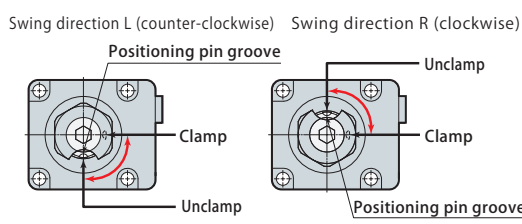
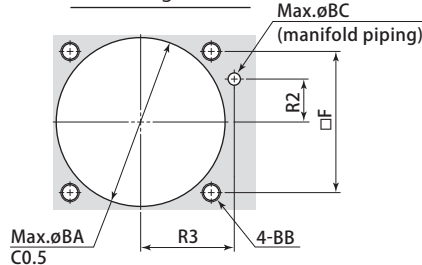


I: Inertial moment (kg·m²)
t: 90° swing time (sec)

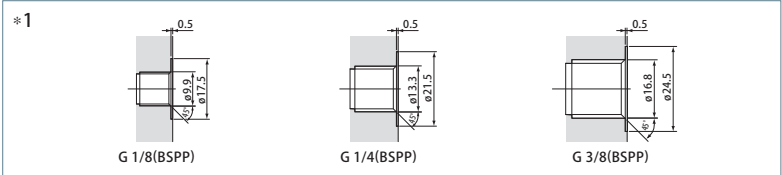
Dimensions



Mounting details

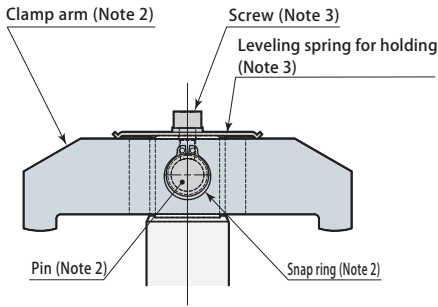


Model	CTT01- $\frac{1}{8}$ " _R	CTT02- $\frac{1}{4}$ " _R	CTT04- $\frac{1}{2}$ " _R	CTT06- $\frac{3}{4}$ " _R	CTT10-1" _R	CTT16-1 $\frac{1}{2}$ " _R	CTT25-2" _R
A	129	136	161.5	178.5	203.5	231.5	284
B	38	45	50	57	70	86	108
C	48	55	60	66	82	96	120
D	29	32.5	35	37.5	47	53	66
E	19	22.5	25	28.5	35	43	54
F	30.5	35	40	46	56	68	88
G	35	39	47	53	63	78	100
G1	24	30	36	41	50	60	75
G2	26	33	40	45	55	66	85
H	14	18	22.4	25	30	35.5	45
J	87.5	86.5	103.5	117.5	136.5	153	187
J1	12	5	13	20	25	30	40
K	60.5	59	74	86	102	114	137
L	27	27.5	29.5	31.5	34.5	39	50
M	19	21.5	24	27	30	31.5	39
N (arm thickness)	16	20	25	25	27	35	45
P (nut thickness)	6.5	8	9	9	10	12	13
Q	2	2.5	2.5	2.5	2.5	2	2
R1	12.5	12.5	12.5	12.5	14	14	21
R2	9	11	12	14	18	22.5	25
R3	22.5	25	28	30.5	36	42	57
R4	8.1	10	11	13	15	19	25
S (nut width across flats)	19	22	27	30	36	46	55
T (hex socket wrench hole)	5	6	6	8	8	10	14
U (recommended tightening torque)	M12×1.5 (12 N·m)	M14×1.5 (26 N·m)	M18×1.5 (51 N·m)	M20×1.5 (60 N·m)	M24×1.5 (86 N·m)	M30×1.5 (120 N·m)	M39×1.5 (180 N·m)
V	20	19.5	20	20	19.5	20	26
W	4.3	5.5	5.5	6.8	9	11	14
X	8	9.5	9.5	11	14	17.5	20
Y *1	G1/8	G1/8	G1/8	G1/8	G1/4	G1/4	G3/8
Z	3.8	3.8	3.8	3.8	4.8	4.8	4.8
Z1	R3	R3	R3	R5	R6	R7	R10
O-ring *2	P7	P7	P7	P7	P8	P8	P10
AA	14	14	14	14	19	19	22
AB	9	10.5	10.5	10.5	12.5	12.5	14.5
BA	36	40	48	54	64	79	101
BB	M4	M5	M5	M6	M8	M10	M12
BC	4	4	4	4	6	6	8
HD	3 ^{+0.014} ₀	4 ^{+0.018} ₀	4 ^{+0.018} ₀	5 ^{+0.014} ₀	6 ^{+0.014} ₀	6 ^{+0.014} ₀	6 ^{+0.014} ₀
Positioning pin	ø3(h8)×8	ø4(h8)×10	ø4(h8)×10	ø5(h8)×10	ø6(h8)×12	ø6(h8)×12	ø6(h8)×14



*1: Material used for O-ring is fluorocarbon (with hardness Hs90).
 Note 1. This diagram indicates unclamped condition of swing direction L (counter-clockwise). Direction of positioning pin groove will be hydraulic connection port side at the time of clamping. Refer to diagram 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).
 3. Positioning pins and mounting screws are not included.
 4. Refer to page → 57 for details on taper sleeve.
 5. Refer to page → 150 for caution in use.

Usage example

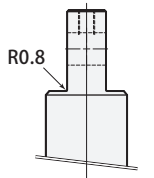
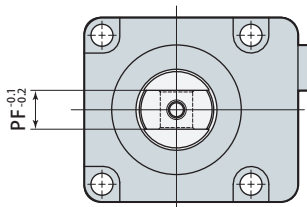


Model designation

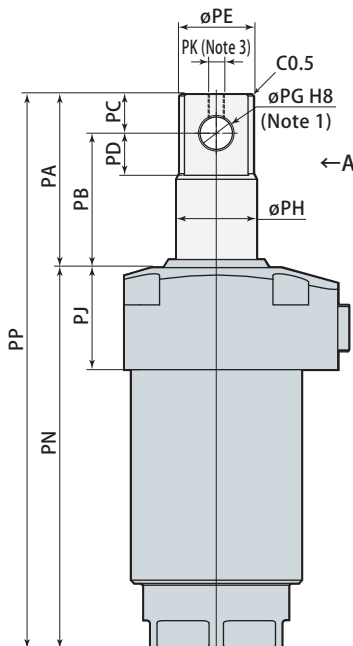
CTT ①-②P (Example : CTT06-RP)

CTT	① Size (refer to specification table)	-	② Swing direction (when clamping)
	01 02 04 06 10 16 25		L : Counter-clockwise R : Clockwise

Dimensions

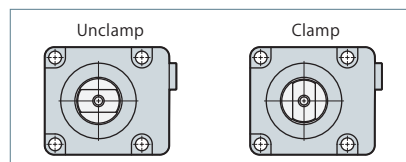


Arrow A view



Model	(mm)						
	CTT01-L _R P	CTT02-L _R P	CTT04-L _R P	CTT06-L _R P	CTT10-L _R P	CTT16-L _R P	CTT25-L _R P
PA	37.5	40	46.5	53.5	60.5	72	89.5
PB	29.5	32	36.5	41.5	46.5	53	65.5
PC	8	8	10	12	14	19	24
PD	9	9	11	13	15	20	25
PE	12	16	20.4	23	28	33.5	43
PF	8	8	10	12	16	18	22
PG	6 ^{+0.018} ₀	6 ^{+0.018} ₀	8 ^{+0.022} ₀	10 ^{+0.022} ₀	12 ^{+0.027} ₀	16 ^{+0.027} ₀	20 ^{+0.033} ₀
PH	14	18	22.4	25	30	35.5	45
PJ	27	27.5	29.5	31.5	34.5	39	50
PK	M3×0.5	M3×0.5	M4×0.7	M5×0.8	M6×1	M6×1	M8×1.25
PN	87.5	86.5	103.5	117.5	136.5	153	187
PP	125	126.5	150	171	197	225	276.5
Mass	0.35 kg	0.8 kg	1.3 kg	1.8 kg	3.0 kg	4.9 kg	9.5 kg

Note 1. This diagram indicates unclamped condition. Direction of pin hole will be hydraulic connection port side at the time of clamping.



- Clamp arm, pin and snap ring are not included. Customers must arrange for them.
- Thread at top portion of the rod is for attaching a leveling spring. Screw and leveling spring are not included.
- Refer to specifications (page → 46), dimensions (page → 49) for specifications and dimensions of products that are not listed on this page.

Model designation

CTT ①-②③ (Example : CTT06-RN45)

① Size (refer to specification table)

② Swing direction (when clamping)

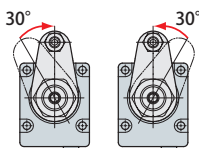
③ Swing angle (refer to diagram below)

CTT	01 02 04 06 10 16 25	-	L : Counter-clockwise R : Clockwise	N30 : Swing angle 30° N45 : Swing angle 45° N60 : Swing angle 60°
------------	--	---	--	---

Swing angle (when clamping)

CTT①- $\frac{L}{R}$ N30

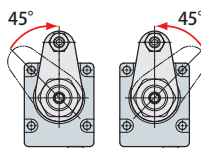
Swing angle 30°



R: Clockwise L: Counter-clockwise

CTT①- $\frac{L}{R}$ N45

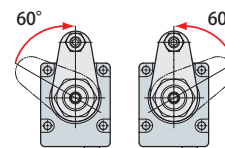
Swing angle 45°



R: Clockwise L: Counter-clockwise

CTT①- $\frac{L}{R}$ N60

Swing angle 60°



R: Clockwise L: Counter-clockwise

Specifications

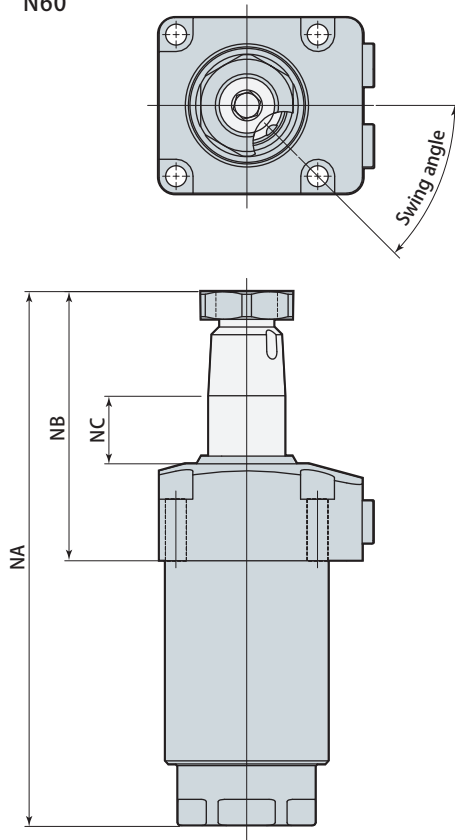
Model	CTT01- $\frac{L}{R}$ N30 N45 N60			CTT02- $\frac{L}{R}$ N30 N45 N60			CTT04- $\frac{L}{R}$ N30 N45 N60			CTT06- $\frac{L}{R}$ N30 N45 N60		
	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°
Swing angle												
Full stroke (mm)	11.8	12.7	13.7	13.0	14.3	15.5	14.3	15.8	17.4	16.8	18.4	20.1
Swing stroke (mm)	3.8	4.7	5.7	5.0	6.3	7.5	6.3	7.8	9.4	6.8	8.4	10.1
Clamp stroke (mm)	8			8			8			10		
Cylinder capacity (clamp) (cm ³)	4.0	4.3	4.6	5.3	5.8	6.3	8.9	9.9	10.8	15.0	16.5	18.0
Return spring force (unclamp) (kN)	0.28	0.27	0.26	0.36	0.34	0.32	0.66	0.62	0.58	0.88	0.85	0.81

Model	CTT10- $\frac{L}{R}$ N30 N45 N60			CCT16- $\frac{L}{R}$ N30 N45 N60			CTT25- $\frac{L}{R}$ N30 N45 N60		
	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°
Swing angle									
Full stroke (mm)	18.3	20.3	22.4	19.3	21.6	23.9	24.5	27.4	30.3
Swing stroke (mm)	8.3	10.3	12.4	9.3	11.6	13.9	11.5	14.4	17.3
Clamp stroke (mm)	10			10			13		
Cylinder capacity (clamp) (cm ³)	25.9	28.8	31.7	44.8	50.2	55.6	90.4	101.0	111.6
Return spring force (unclamp) (kN)	1.38	1.32	1.25	2.26	2.15	2.03	3.86	3.62	3.39

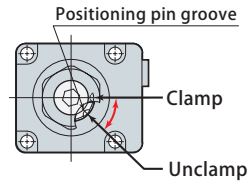
Note 1. Refer to specifications page → 46 for specifications of products that are not listed on this page.

Dimensions

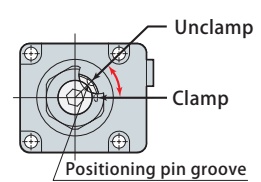
CTT 01
02
04 - L N30
06 - R N45
10 N60
16
25



Swing direction L (counter-clockwise)



Swing direction R (clockwise)



Note 1. This diagram indicates unclamped condition of swing direction L (counter-clockwise). Direction of positioning pin groove will be hydraulic connection port side at the time of clamping. Refer to diagram above for positioning pin groove position for unclamping.

2. Refer to page → 49 for dimensions of products that are not listed on this page.

(mm)

Model	CTT01-L N30 R N45 N60			CTT02-L N30 R N45 N60			CTT04-L N30 R N45 N60			CTT06-L N30 R N45 N60		
	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°
Swing angle	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°
NA	124.8	125.7	126.7	131.0	132.3	133.5	155.3	156.8	158.4	171.8	173.4	175.1
NB	64.3	65.2	66.2	72.0	73.3	74.5	81.3	82.8	84.4	85.8	87.4	89.1
NC	14.8	15.7	16.7	16.5	17.8	19.0	17.8	19.3	20.9	20.3	21.9	23.6

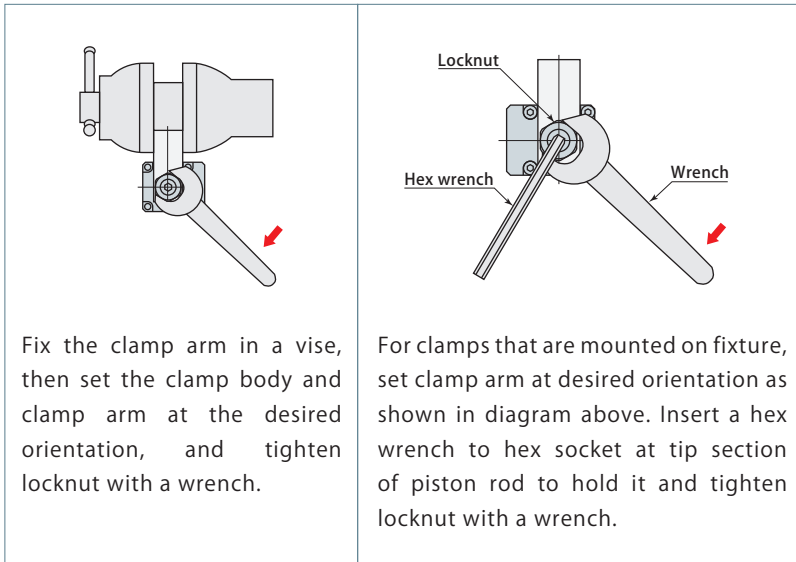
(mm)

Model	CTT10-L N30 R N45 N60			CTT16-L N30 R N45 N60			CTT25-L N30 R N45 N60		
	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°
Swing angle	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°
NA	195.3	197.3	199.4	222.3	224.6	226.9	272.5	275.4	278.3
NB	93.3	95.3	97.4	108.3	110.6	112.9	135.5	138.4	141.3
NC	21.8	23.8	25.9	22.3	24.6	26.9	27.5	30.4	33.3

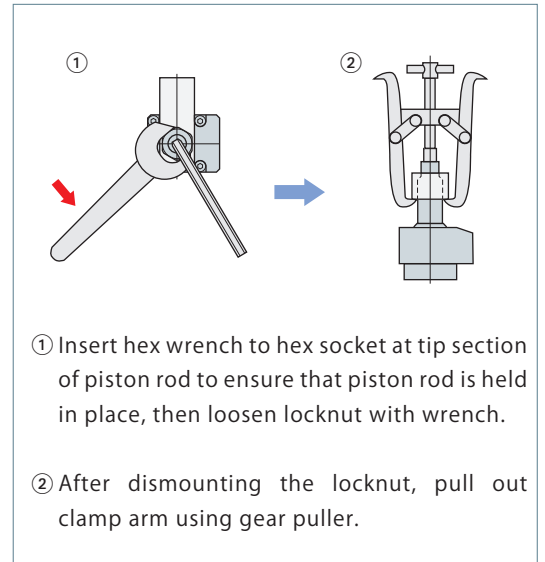
Mounting & dismounting of clamp arm

- Swing clamp may be damaged if excessive torque is applied to piston rod, 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.
- Be sure to tighten locknut with specified tightening torque (refer to pages → 35, 49 and 55 for recommended tightening torque). If the tightening torque is insufficient, clamp arm may slip during operation.

Mounting of clamp arm



Dismounting of clamp arm



Model designation

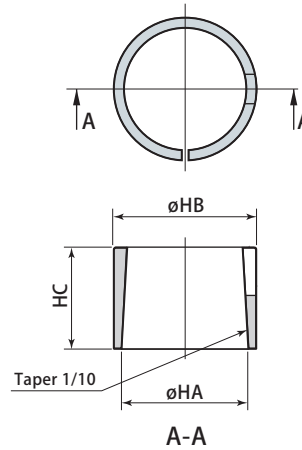
Taper sleeve

CTH①-TS

(Example : CTH06-TS)

① Size
(refer to specification table)

CTH	01	- TS : Taper sleeve
	02	
	04	
	06	
	10	
	16	
	25	

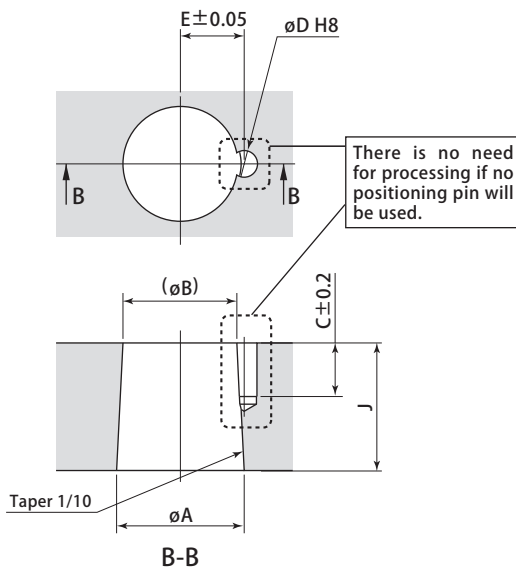


(mm)

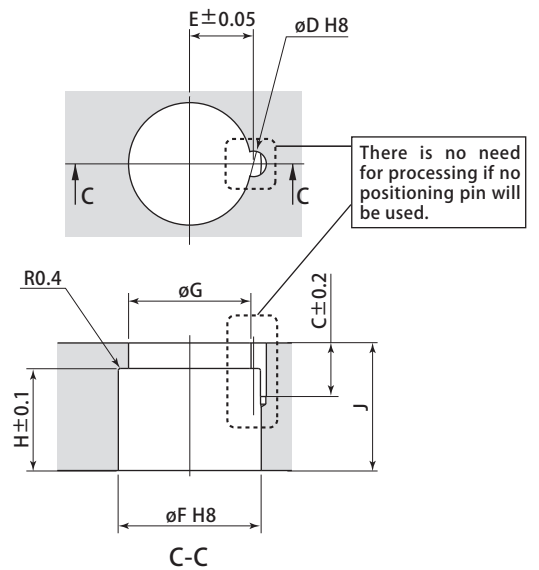
Model	CTH01-TS	CTH02-TS	CTH04-TS	CTH06-TS	CTH10-TS	CTH16-TS	CTH25-TS
HA	14	18	22.4	25	30	35.5	45
HB	16	20	25	28	34	40	49
HC	13	16	21	20	22	29	38

Clamp arm processing diagram

Not using taper sleeve



Using taper sleeve



(mm)

Clamp models	CTU01 CTT01	CTU02 CTT02 BTU02	CTU04 CTT04 BTU04	CTU06 CTT06 BTU06	CTU10 CTT10 BTU10	CTU16 CTT16 BTU16	CTU25 CTT25 BTU25
A	14 ^{-0.016} / _{-0.034}	18 ^{-0.016} / _{-0.034}	22.4 ^{-0.020} / _{-0.041}	25 ^{-0.020} / _{-0.041}	30 ^{-0.020} / _{-0.041}	35.5 ^{-0.025} / _{-0.050}	45 ^{-0.025} / _{-0.050}
B	12.4	16	19.9	22.5	27.3	32	40.5
C	9	10.5	10.5	10.5	12.5	12.5	14.5
D	3 ^{+0.014} / ₀	4 ^{+0.018} / ₀	4 ^{+0.018} / ₀	5 ^{+0.018} / ₀	6 ^{+0.018} / ₀	6 ^{+0.018} / ₀	6 ^{+0.018} / ₀
E	7.55	9.1	11.1	12.6	15.1	18.1	22.6
F	16 ^{+0.027} / ₀	20 ^{+0.033} / ₀	25 ^{+0.033} / ₀	28 ^{+0.033} / ₀	34 ^{+0.039} / ₀	40 ^{+0.039} / ₀	49 ^{+0.039} / ₀
G	13	17	21	24	28.5	34	42
H	13	16	21	20	22	29	38
J	16	20	25	25	27	35	45
Positioning pin	$\phi 3(h8) \times 8$	$\phi 4(h8) \times 10$	$\phi 4(h8) \times 10$	$\phi 5(h8) \times 10$	$\phi 6(h8) \times 12$	$\phi 6(h8) \times 12$	$\phi 6(h8) \times 14$
Taper sleeve models	CTH01-TS	CTH02-TS	CTH04-TS	CTH06-TS	CTH10-TS	CTH16-TS	CTH25-TS

Model designation

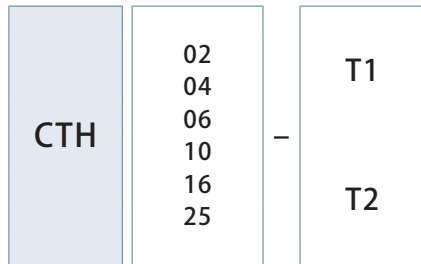
T1 type clamp arm

T2 type clamp arm

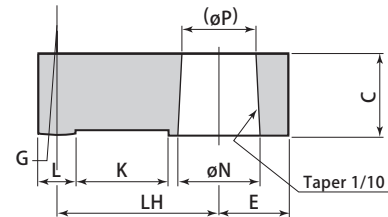
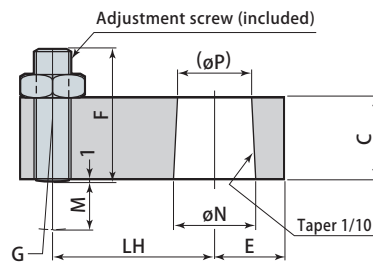
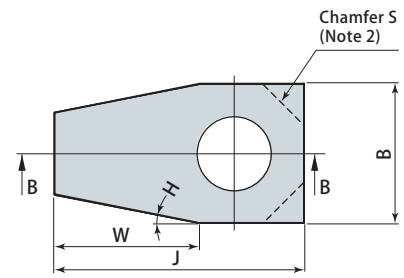
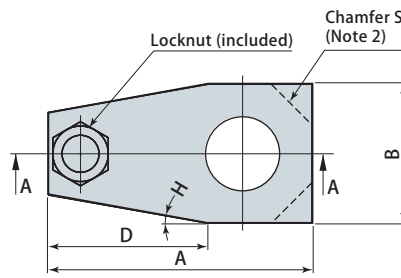
CTH①-② (Example : CTH06-T2)

① Size
(refer to speci-
fication table)

② Models



Material: S45C (Refining HB201 to 269)



A-A

B-B

(mm)

Clamp arm models	CTH02-T ₁ T ₂	CTH04-T ₁ T ₂	CTH06-T ₁ T ₂	CTH10-T ₁ T ₂	CTH16-T ₁ T ₂	CTH25-T ₁ T ₂	
A	55	65	80	96	114	153	
B	28	34	40	52	60	80	
C	20	25	25	27	35	45	
D	34	43	50	60	69	80	
E	14	17	20	25	30	45	
F	33	38	38	48	57	77	
G	R20	R30	R30	R40	R50	R75	
H	10°	10°	10°	10°	10°	20°	
J	52	61	75	91	108	145	
K	20	20	25	30	40	45	
L	6	8	10	12	16	20	
LH	35	40	50	60	70	90	
M (adjustment amount)	12	12	12	20	21	31	
N	18 ^{-0.016 -0.034}	22.4 ^{-0.020 -0.041}	25 ^{-0.020 -0.041}	30 ^{-0.020 -0.041}	35.5 ^{-0.025 -0.050}	45 ^{-0.025 -0.050}	
P	16	19.9	22.5	27.3	32	40.5	
Q	M6×1	M8×1.25	M10×1.5	M12×1.75	M16×2	M20×2.5	
S (chamfer)	-	-	-	-	16	25	
W	31	39	45	55	63	72	
Mass	T1 type	0.2 kg	0.3 kg	0.5 kg	0.8 kg	1.4 kg	2.9 kg
	T2 type	0.2 kg	0.3 kg	0.4 kg	0.7 kg	1.2 kg	2.7 kg
Inertial moment	T1 type	9.1 × 10 ⁻⁵ kg·m ²	2.2 × 10 ⁻⁴ kg·m ²	5.2 × 10 ⁻⁴ kg·m ²	1.3 × 10 ⁻³ kg·m ²	3.0 × 10 ⁻³ kg·m ²	9.6 × 10 ⁻³ kg·m ²
	T2 type	6.9 × 10 ⁻⁵ kg·m ²	1.6 × 10 ⁻⁴ kg·m ²	4.0 × 10 ⁻⁴ kg·m ²	9.6 × 10 ⁻⁴ kg·m ²	2.3 × 10 ⁻³ kg·m ²	6.5 × 10 ⁻³ kg·m ²
Clamp models	CTU02	CTU04	CTU06	CTU10	CTU16	CTU25	
	CTT02	CTT04	CTT06	CTT10	CTT16	CTT25	
	BTU02	BTU04	BTU06	BTU10	BTU16	BTU25	

Note 1. Consider strength of clamp arm when fabricating clamp arm.

(Having same cross-sectional dimensions as T1 and T2 types may result in insufficient strength depending on clamp arm length and working pressure.)

2. Only CTH16-T₁T₂ and CTH25-T₁T₂ have chamfer.

3. Positioning pin hole is not provided.

Mounting of clamp and work support

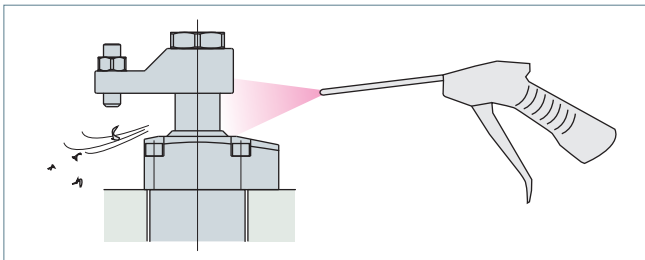
Use screws with strength class of 12.9 for mounting clamp and work support and be sure to apply specified torque for tightening, by referring to recommended tightening torque of mounting screws indicated below.

Recommended tightening torque of mounting screws (strength class 12.9)

Mounting screws size	Tightening torque
M4 ×0.7	2.8 N·m
M5 ×0.8	7 N·m
M6 ×1	11 N·m
M8 ×1.25	25 N·m
M10×1.5	49 N·m
M12×1.75	60 N·m

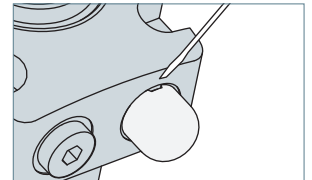
Caution in use of equipment

1. Clamp and work supports have been developed for the purpose of clamping workpiece for machine tools. Do not use them for other purposes.
2. Always protect them with a cover to ensure sliding surfaces are not exposed to weld slags when using them as fixture for welding.
3. Clean sliding surfaces and top part of clamp body with air blowing periodically to ensure smooth operations.



Mounting & dismantling of optional parts

1. When mounting or dismantling a flow control valve or air bleeding valve, be sure to set pressure within hydraulic circuit to 0 MPa before starting.
2. When mounting a flow control valve or air bleeding valve, be sure to tighten it with the specified tightening torque (refer to pages → 145 and 146 for recommended tightening torque).
3. When mounting a coolant cap (resin : POM), firmly press the body of cover. If it is not mounting properly, use a plastic mallet to tap it into place.
4. When dismantling a coolant cap, use a sharp-pointed tool such as a precision screw driver by hooking the notched portion.



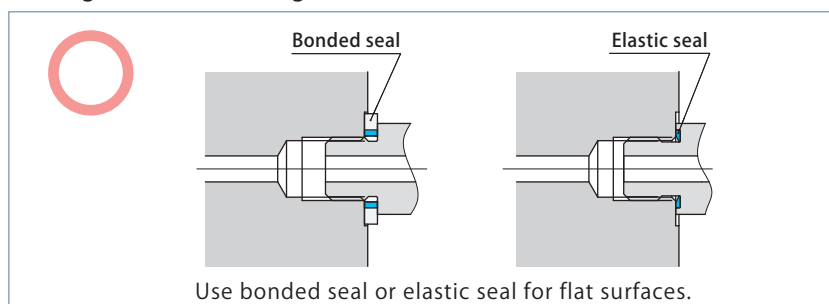
Caution for hydraulic piping

1. Most problems that occur with hydraulic equipment are caused by foreign substances such as metal chips and dust that enter into hydraulic circuits. Refer to "Piping Hydraulic & Pneumatic Equipment-Practical Notes" provided with the product for mounting and hydraulic piping of the product.
2. After performing hydraulic piping, always be sure to bleed out air in the hydraulic circuit. Insufficient bleeding can lead to malfunction.
3. When using multiple clamps, operating speeds and timings vary due to variance in pipe resistance and internal resistance of clamps. Adjust operating speeds and timings using flow control valve.
4. The special scraper has superior scraping capability to remove oil film on the surface of the rod, there are cases where grease and working fluid (oil films) inside the clamp are scraped and expelled to the outside. This may result in accumulation of oil in the external perimeters of piston rod on the upper part of the scraper, but this does not indicate an oil leak.

BSPB port sealing method

1. "Sealing method for flange surfaces" has been adopted as standard means for this product. Use fittings and connectors of bonded seal or elastic body seal. Do not use fittings of "Sealing method for tapered surfaces" (O-ring seal method).
2. Seal tapes and liquid packing are not necessary. Seal fittings with included with packing.
3. When mounting, clean metal chips and dust off surfaces that will come into contact with packing.

Sealing method for flange surfaces



Sealing method for tapered surfaces

