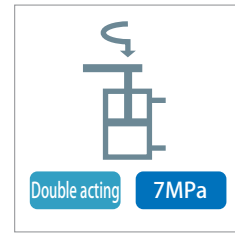


Swing clamp

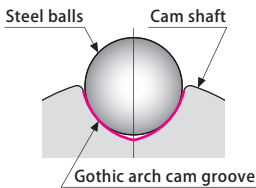
model
CTU



Dramatic improvement in durability and acceleration of clamping speed

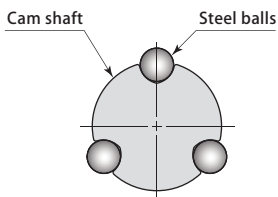
Gothic arch cam groove

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.

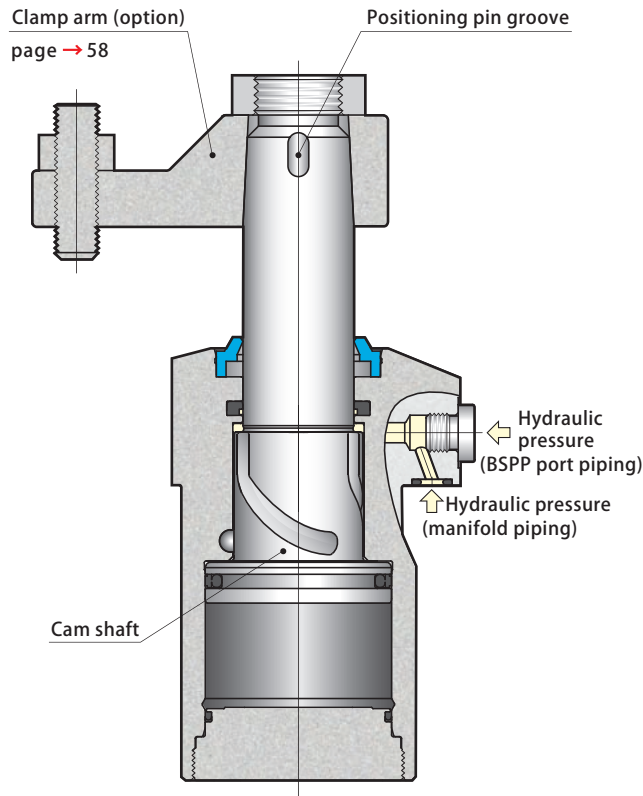


3-point ball support

Smooth, stable and high-speed swinging operation has been achieved by 3-point ball support mechanism.

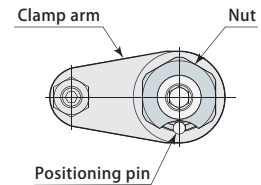


Large diameter cam shaft and wide distance between the cam grooves offers higher rigidity. An overload protection mechanism is not needed due to improvement of durability and impact resistance, providing stable and secure high-speed swing operation.



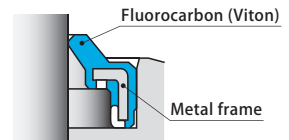
Clamp arm positioning & replacement

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



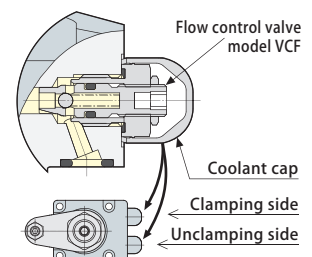
High pressure coolant & metal chip countermeasure

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		CTU01	CTU02	CTU04	CTU06	CTU10	CTU16	CTU25	
Cylinder force (hydraulic pressure 7 MPa)		(kN)	2.4	2.8	4.4	6.3	9.9	16.3	25.8
Clamping force *1	Hydraulic pressure 7 MPa	(kN)	2.0	2.4	3.7	5.3	8.3	13.5	21.2
	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)	0.6	0.7	1.6	1.8	3.4	5.6	9.3
Cylinder capacity	Clamp	(cm ³)	5.4	7.3	12.8	21.0	37.5	66.4	132.9
	Unclamp	(cm ³)	7.9	11.9	20.9	32.6	56.3	94.6	190.1
Mass		(kg)	0.31*3	0.9	1.3	1.7	2.8	4.7	9.9

Working pressure range: 1 ~ 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 → 33) for details.

*2: This is the limit value for lifting arm at 1 MPa when mounted horizontally.

*3: Body material is aluminum only for model CTU01, 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

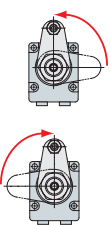
CTU ①-②③

(Example : CTU06-RA)

① Size (refer to specification table)

② Swing direction (when clamping)

③ Variation code*1

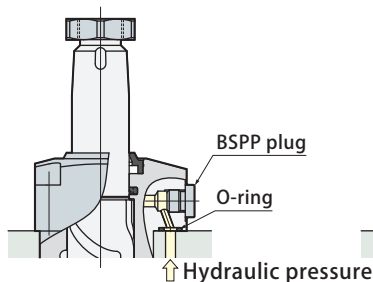
CTU	01	-	L : Counter-clockwise R : Clockwise		(Nil) : Standard E : Dual rod page → 36 P : Top pin page → 37 A : Air sensor pages → 38 and 39 N□ : swing angle 30°, 45°, 60° pages → 41 and 42 S□ : Long stroke pages → 43 and 44
	02				
	04				
	06				
	10				
	16				
	25				

*1 : All varieties are not available for all sizes. Refer to each relevant page for details.

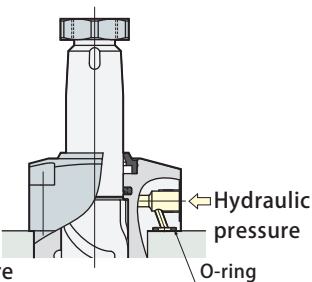
Request for separate document regarding variation codes (models) that are not described in the catalog.

Piping method

Manifold piping

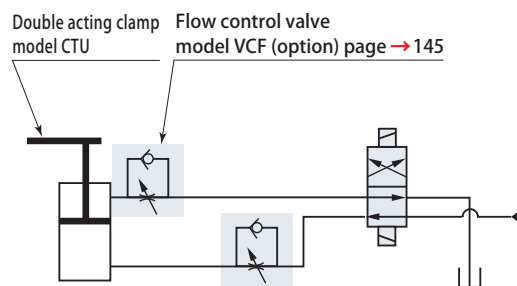


BSPP port piping



Two piping methods are available for model CTU, 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)

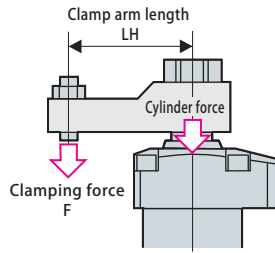


Use flow control valve for meter-in control. Using it in meter-out control results in abnormally high pressure due to back pressure on clamping side during unclamping, leading to malfunction.

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 2 kN or more is necessary, the working hydraulic pressure for each model is:
 6.5 MPa for CTU02
 4 MPa for CTU04
 3 MPa for CTU06
 2 MPa for CTU10



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

CTU 02		$F=P/(2.46+0.0116 \times LH)$								indicates nonusable range	
Hydraulic pressure (MPa)	Cylinder force (kN)	Clamping force (kN)								Max. arm length Max.LH (mm)	
		Clamp arm length LH (mm)									
		35	40	50	60	80	100	120	140		
7	2.8	2.4	2.4	2.3	2.2	2.1				80	
6.5	2.6	2.3	2.2	2.1	2.1	1.9				89	
6	2.4	2.1	2.0	2.0	1.9	1.8	1.7			101	
5.5	2.2	1.9	1.9	1.8	1.7	1.6	1.5			115	
5	2.0	1.7	1.7	1.6	1.6	1.5	1.4	1.3		135	
4.5	1.8	1.6	1.5	1.5	1.4	1.3	1.2	1.2	1.1	162	
4	1.6	1.4	1.4	1.3	1.3	1.2	1.1	1.0	1.0	202	
3.5	1.4	1.2	1.2	1.2	1.1	1.0	1.0	0.9	0.9	↑	
3	1.2	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	↑	
2.5	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	↑	
2	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.5	0.5	↑	
1.5	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	↑	
1	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	202	

CTU 01		$F=P/(2.97+0.0153 \times LH)$								indicates nonusable range	
Hydraulic pressure (MPa)	Cylinder force (kN)	Clamping force (kN)								Max. arm length Max.LH (mm)	
		Clamp arm length LH (mm)									
		30	35	40	50	60	80	100	120		
7	2.4	2.0	2.0							39	
6.5	2.2	1.9	1.9	1.8						43	
6	2.0	1.8	1.7	1.7						48	
5.5	1.9	1.6	1.6	1.5	1.5					53	
5	1.7	1.5	1.4	1.4	1.3	1.3				61	
4.5	1.5	1.3	1.3	1.3	1.2	1.2				70	
4	1.3	1.2	1.1	1.1	1.1	1.0	1.0			83	
3.5	1.2	1.0	1.0	1.0	0.9	0.9	0.8	0.8		102	
3	1.0	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.6	131	
2.5	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.5	↑	
2	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	↑	
1.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	↑	
1	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	131	

CTU 04		$F=P/(1.60+0.00664 \times LH)$								indicates nonusable range	
Hydraulic pressure (MPa)	Cylinder force (kN)	Clamping force (kN)								Max. arm length Max.LH (mm)	
		Clamp arm length LH (mm)									
		40	50	60	80	100	120	140	160		
7	4.4	3.7	3.6	3.5	3.3	3.1				105	
6.5	4.1	3.5	3.4	3.2	3.0	2.9				117	
6	3.7	3.2	3.1	3.0	2.8	2.6	2.5			133	
5.5	3.4	2.9	2.8	2.7	2.6	2.4	2.3	2.2		153	
5	3.1	2.7	2.6	2.5	2.3	2.2	2.1	2.0	1.9	181	
4.5	2.8	2.4	2.3	2.2	2.1	2.0	1.9	1.8	1.7	220	
4	2.5	2.1	2.1	2.0	1.9	1.8	1.7	1.6	1.5	↑	
3.5	2.2	1.9	1.8	1.7	1.6	1.5	1.5	1.4	1.3	↑	
3	1.9	1.6	1.6	1.5	1.4	1.3	1.2	1.2	1.1	↑	
2.5	1.6	1.3	1.3	1.2	1.2	1.1	1.0	1.0	0.9	↑	
2	1.2	1.1	1.0	1.0	0.9	0.9	0.8	0.8	0.8	↑	
1.5	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6	↑	
1	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	220	

CTU 06		$F=P/(1.12+0.00422 \times LH)$								indicates nonusable range	
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	6.3	5.3	5.1	4.8						96	
6.5	5.8	4.9	4.7	4.5	4.2					107	
6	5.4	4.5	4.4	4.1	3.9					120	
5.5	4.9	4.1	4.0	3.8	3.6	3.4				137	
5	4.5	3.8	3.6	3.4	3.2	3.1	2.9	2.8		160	
4.5	4.0	3.4	3.3	3.1	2.9	2.8	2.6	2.5	2.4	191	
4	3.6	3.0	2.9	2.7	2.6	2.5	2.3	2.2	2.1	238	
3.5	3.1	2.6	2.6	2.4	2.3	2.2	2.0	2.0	1.9	↑	
3	2.7	2.3	2.2	2.1	1.9	1.8	1.8	1.7	1.6	↑	
2.5	2.2	1.9	1.8	1.7	1.6	1.5	1.5	1.4	1.3	↑	
2	1.8	1.5	1.5	1.4	1.3	1.2	1.2	1.1	1.1	↑	
1.5	1.3	1.1	1.1	1.0	1.0	0.9	0.9	0.8	0.8	↑	
1	0.9	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.5	238	



CTU 10		$F=P/(0.706+0.00228 \times LH)$								indicates nonusable range	
Hydraulic pressure (MPa)	Cylinder force (kN)	Clamping force (kN)								Max. arm length Max.LH (mm)	
		Clamp arm length LH (mm)									
		60	80	100	120	140	160	180	200		
7	9.9	8.3	7.9	7.5						102	
6.5	9.2	7.7	7.3	7.0						113	
6	8.5	7.1	6.8	6.4	6.1					127	
5.5	7.8	6.5	6.2	5.9	5.6	5.4				144	
5	7.1	5.9	5.6	5.4	5.1	4.9	4.7			167	
4.5	6.4	5.3	5.1	4.8	4.6	4.4	4.2	4.0		199	
4	5.7	4.7	4.5	4.3	4.1	3.9	3.7	3.6	3.4	245	
3.5	5.0	4.2	3.9	3.7	3.6	3.4	3.3	3.1	3.0	↑	
3	4.3	3.6	3.4	3.2	3.1	2.9	2.8	2.7	2.6	↑	
2.5	3.5	3.0	2.8	2.7	2.6	2.4	2.3	2.2	2.2	↑	
2	2.8	2.4	2.3	2.1	2.0	2.0	1.9	1.8	1.7	↑	
1.5	2.1	1.8	1.7	1.6	1.5	1.5	1.4	1.3	1.3	↑	
1	1.4	1.2	1.1	1.1	1.0	1.0	0.9	0.9	0.9	245	

CTU 16		$F=P/(0.429+0.00128 \times LH)$								indicates nonusable range	
Hydraulic pressure (MPa)	Cylinder force (kN)	Clamping force (kN)								Max. arm length Max.LH (mm)	
		Clamp arm length LH (mm)									
		70	80	100	120	140	160	180	200		
7	16.3	13.5	13.2							99	
6.5	15.1	12.5	12.2	11.7						110	
6	14.0	11.6	11.3	10.8	10.3					123	
5.5	12.8	10.6	10.3	9.9	9.4					139	
5	11.6	9.6	9.4	9.0	8.6	8.2	7.9			161	
4.5	10.5	8.7	8.5	8.1	7.7	7.4	7.1	6.8		190	
4	9.3	7.7	7.5	7.2	6.9	6.6	6.3	6.1	5.8	231	
3.5	8.1	6.7	6.6	6.3	6.0	5.8	5.5	5.3	5.1	↑	
3	7.0	5.8	5.6	5.4	5.1	4.9	4.7	4.5	4.4	↑	
2.5	5.8	4.8	4.7	4.5	4.3	4.1	3.9	3.8	3.6	↑	
2	4.7	3.9	3.8	3.6	3.4	3.3	3.2	3.0	2.9	↑	
1.5	3.5	2.9	2.8	2.7	2.6	2.5	2.4	2.3	2.2	↑	
1	2.3	1.9	1.9	1.8	1.7	1.6	1.6	1.5	1.5	231	

CTU 25		$F=P/(0.271+0.000658 \times LH)$								indicates nonusable range	
Hydraulic pressure (MPa)	Cylinder force (kN)	Clamping force (kN)								Max. arm length Max.LH (mm)	
		Clamp arm length LH (mm)									
		90	100	120	140	160	180	200	240		
7	25.8	21.2	20.8	20.0						129	
6.5	24.0	19.7	19.3	18.6	17.9					143	
6	22.1	18.2	17.8	17.1	16.5	16.0				161	
5.5	20.3	16.7	16.3	15.7	15.2	14.6	14.1			183	
5	18.5	15.1	14.8	14.3	13.8	13.3	12.8	12.4		212	
4.5	16.6	13.6	13.4	12.9	12.4	12.0	11.6	11.2	10.5	251	
4	14.8	12.1	11.9	11.4	11.0	10.6	10.3	9.9	9.3	308	
3.5	12.9	10.6	10.4	10.0	9.6	9.3	9.0	8.7	8.2	↑	
3	11.1	9.1	8.9	8.6	8.3	8.0	7.7	7.5	7.0	↑	
2.5	9.2	7.6	7.4	7.1	6.9	6.6	6.4	6.2	5.8	↑	
2	7.4	6.1	5.9	5.7	5.5	5.3	5.1	5.0	4.7	↑	
1.5	5.5	4.5	4.5	4.3	4.1	4.0	3.9	3.7	3.5	↑	
1	3.7	3.0	3.0	2.9	2.8	2.7	2.6	2.5	2.3	308	

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

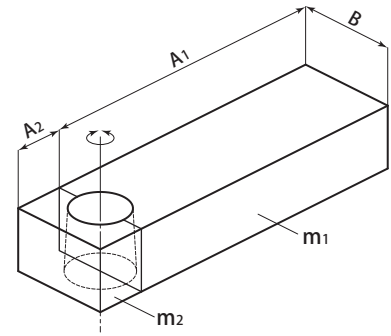
Swing speed adjustment

- 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.
- Use with 90° swing time shorter than line  results in excessive loads on the cylinder and piston, which may cause malfunction.

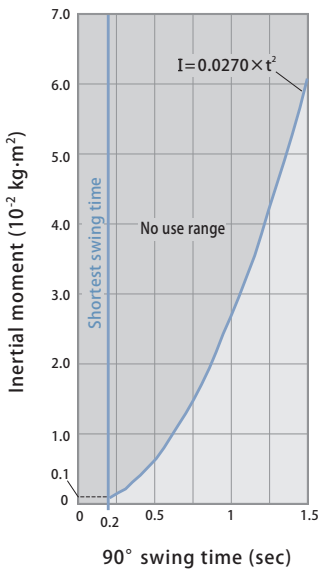
Example of calculation for inertial moment

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

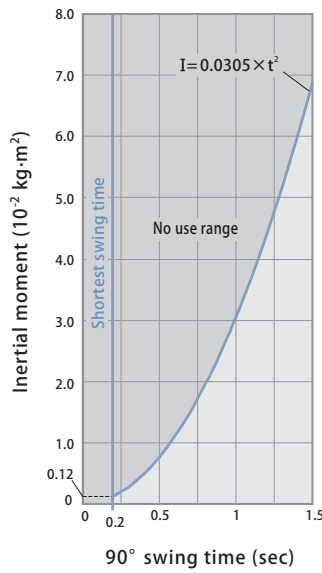
I : Inertial moment (kg·m²)
m : Mass (kg)



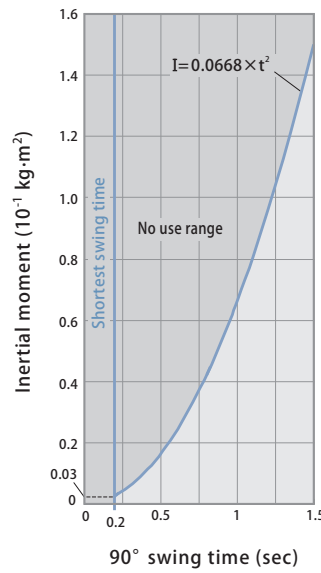
CTU 01



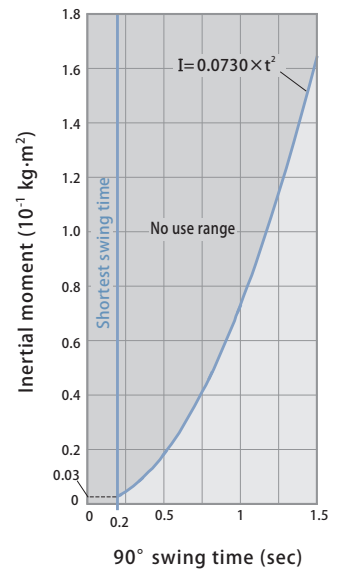
CTU 02



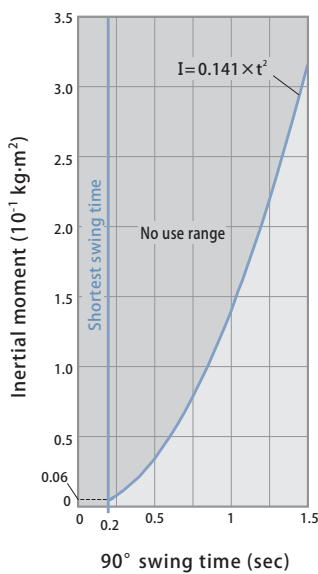
CTU 04



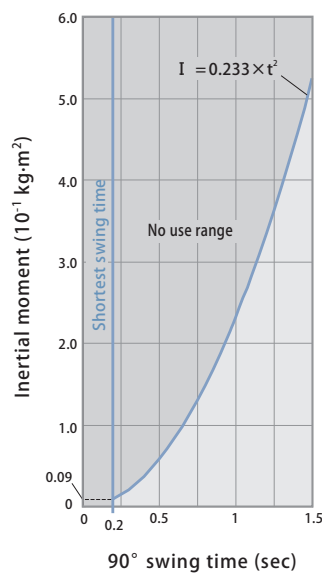
CTU 06



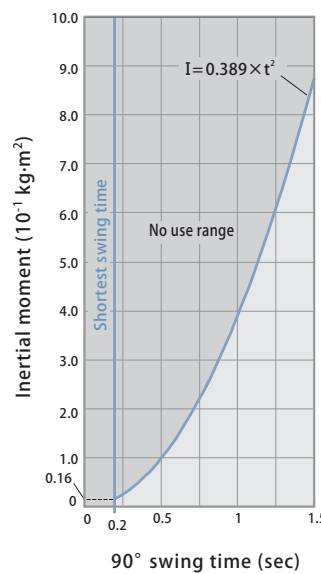
CTU 10



CTU 16

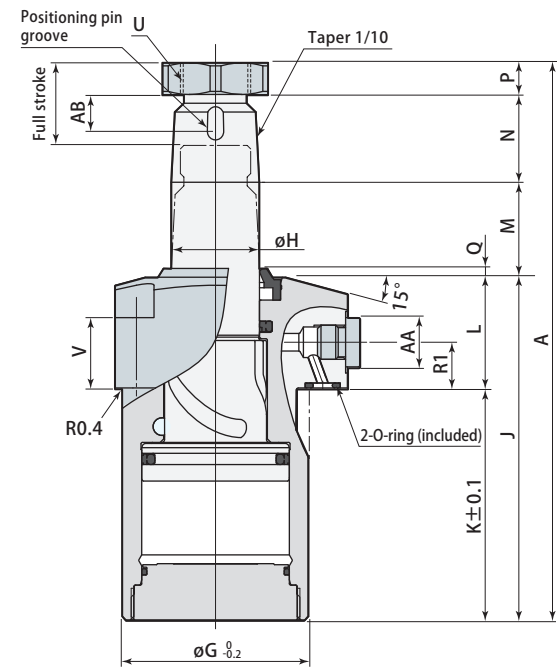
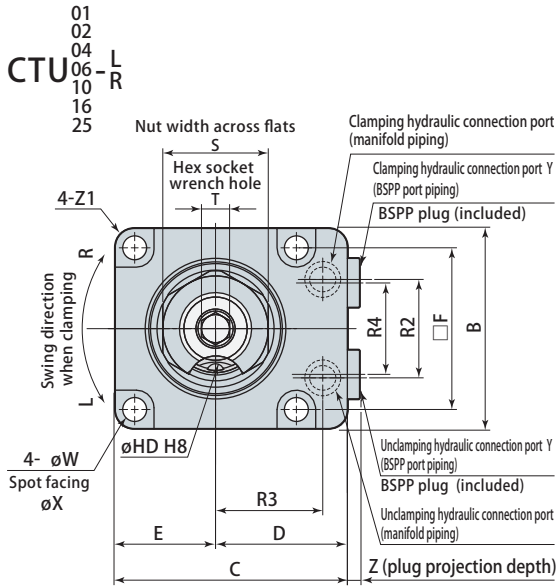


CTU 25

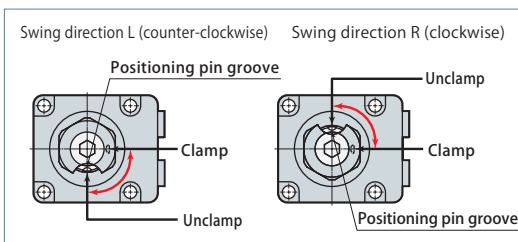
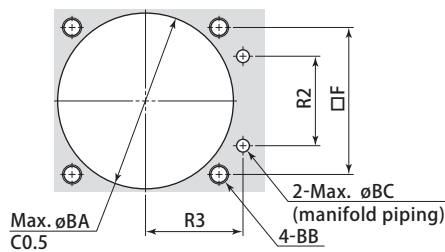


I : Inertial moment (kg·m²)
t : 90° swing time (sec)

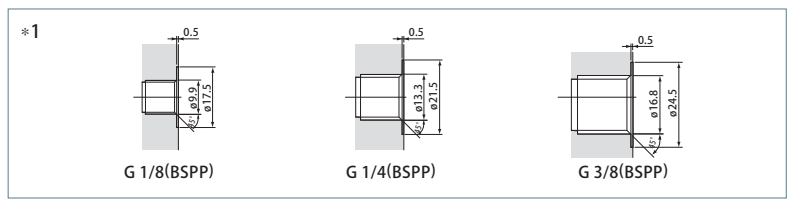
Dimensions



Mounting details

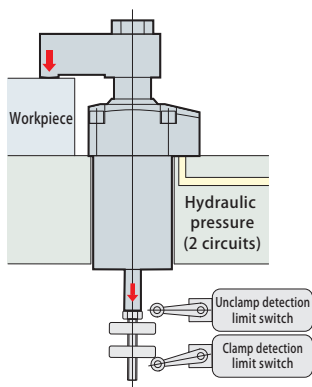


Model	CTU01-L _R	CTU02-L _R	CTU04-L _R	CTU06-L _R	CTU10-L _R	CTU16-L _R	CTU25-L _R
A	117	131	148.5	158.5	178.5	201.5	244
B	38	45	50	57	70	86	108
C	48	55	60	66	82	96	120
D	29	32.5	35	37.5	47	53	66
E	19	22.5	25	28.5	35	43	54
F	30.5	35	40	46	56	68	88
G	35	39	47	53	63	78	100
H	14	18	22.4	25	30	35.5	45
J	75.5	81.5	90.5	97.5	111.5	123	147
K	48.5	54	61	66	77	84	97
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	18	22	24	28	36	45	50
R3	22.5	25	28	30.5	36	42	57
R4	16.2	20	22	26	30	38	50
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 ^{+0.018} ₀	6 ^{+0.018} ₀	6 ^{+0.018} ₀	6 ^{+0.018} 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 pages → 57 and 58 for details on taper sleeve and clamp arm.
 5. Refer to page → 150 for caution in use.

Usage example



Model designation

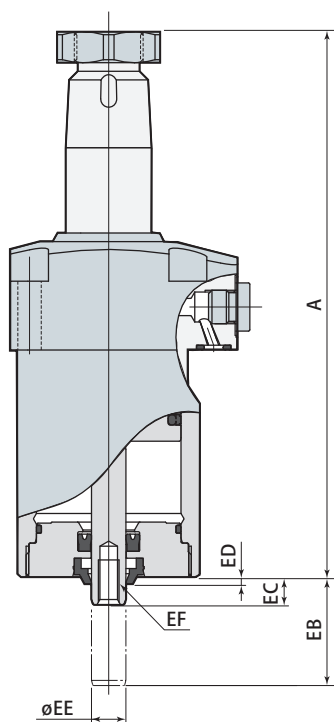
CTU ①-②E (Example : CTU06-RE)

① Size (refer to specification table)

② Swing direction (when clamping)

CTU	01	L : Counter-clockwise R : Clockwise	E : Dual rod
	02		
	04		
	06		
	10		
	16 25		

Dimensions

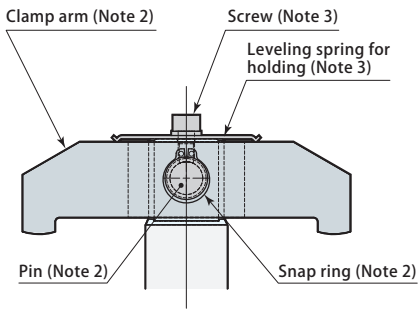


Model	CTU01- ^L _R E	CTU02- ^L _R E	CTU04- ^L _R E	CTU06- ^L _R E	CTU10- ^L _R E	CTU16- ^L _R E	CTU25- ^L _R E
Cylinder capacity (unclamp)	7.0 cm ³	11.0 cm ³	19.3 cm ³	30.7 cm ³	53.3 cm ³	91.3 cm ³	182.9 cm ³
A	117	131	148.5	158.5	178.5	201.5	244
EB	24	26	28.5	31.5	34.5	36.5	44
EC	8	8	8	8	8	8	8
ED	2	2	2	2	2	2	2
EE	8	8	10	10	12	12	16
EF	M5×0.8 depth 8	M5×0.8 depth 8	M6×1 depth 11	M6×1 depth 11	M8×1.25 depth 15	M8×1.25 depth 15	M10×1.5 depth 18
Mass	0.35 kg	0.9 kg	1.3 kg	1.7 kg	2.8 kg	4.7 kg	9.9 kg

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.

2. Refer to specifications (page → 32), dimensions (page → 35) for specifications and dimensions of products that are not listed on this page.

Usage example



Model designation

CTU ①-②P (Example : CTU06-RP)

① Size (refer to specification table)

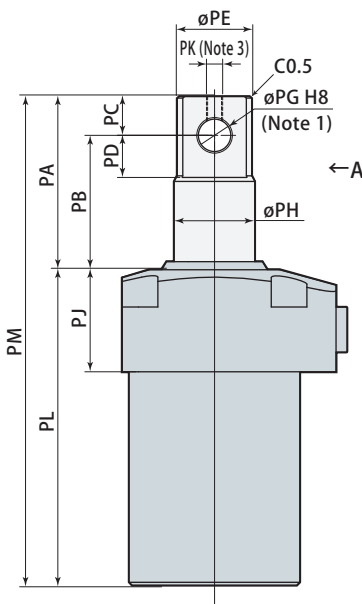
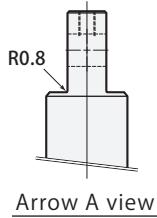
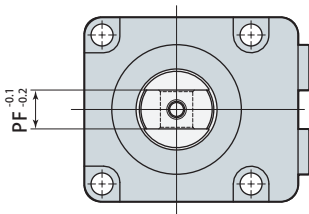
② Swing direction (when clamping)

CTU	01	L : Counter-clockwise R : Clockwise	P : Top pin
	02		
	04		
	06		
	10		
	16		
	25		

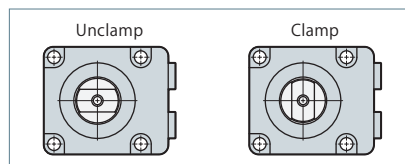
Dimensions

(mm)

Model	CTU01- $\frac{L}{R}$ P	CTU02- $\frac{L}{R}$ P	CTU04- $\frac{L}{R}$ P	CTU06- $\frac{L}{R}$ P	CTU10- $\frac{L}{R}$ P	CTU16- $\frac{L}{R}$ P	CTU25- $\frac{L}{R}$ 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
PL	75.5	81.5	90.5	97.5	111.5	123	147
PM	113	121.5	137	151	172	195	236.5
Mass	0.30 kg	0.9 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 → 32), dimensions (page → 35) for specifications and dimensions of products that are not listed on this page.

7MPa clamp & work support

Swing clamp

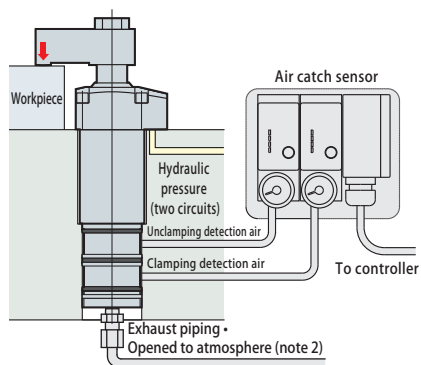
Link clamp

Clamp cylinder

Work support

Option

Usage example

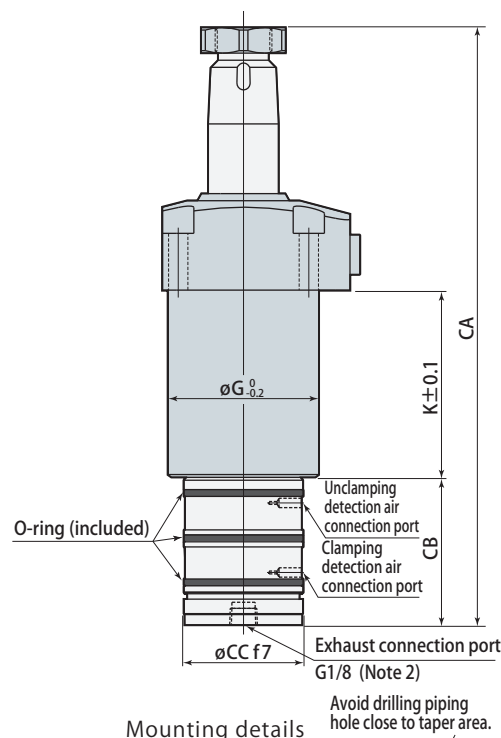


Model designation

CTU ①-②A (Example : CTU06-RA)

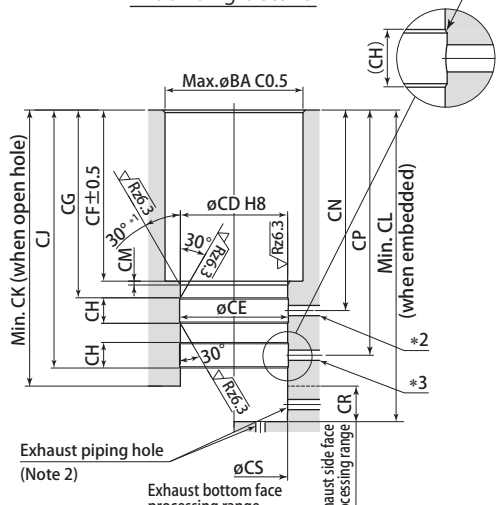
CTU	① Size (refer to specification table)	-	② Swing direction (when clamping)	A : Air sensor
	01		L : Counter-clockwise	
	02			
	04			
	06			
	10		R : Clockwise	
	16			
25				

Dimensions



Mounting details

Avoid drilling piping hole close to taper area.



- *1 : 15° only for CTU01-^L/_RA, CTU02-^L/_RA.
- *2 : Air piping hole (unclamping detection) ø4 to ø3. ø4 to ø5 only for CTU01-^L/_RA.
- *3 : Air piping hole (clamping detection) ø4 to ø6. ø4 to ø5 only for CTU01-^L/_RA.

Model	CTU01- ^L / _R A	CTU02- ^L / _R A	CTU04- ^L / _R A	CTU06- ^L / _R A	CTU10- ^L / _R A	CTU16- ^L / _R A	CTU25- ^L / _R A
Cylinder capacity (unclamp)	7.0 cm ³	11.0 cm ³	19.3 cm ³	30.7 cm ³	53.3 cm ³	91.3 cm ³	182.9 cm ³
CA	159	175	197.5	210.5	233.5	258.5	311.5
CB	42	44	49	52	55	57	67.5
CC	33 ^{-0.025} _{-0.050}	38 ^{-0.025} _{-0.050}	42 ^{-0.025} _{-0.050}	42 ^{-0.025} _{-0.050}	45 ^{-0.025} _{-0.050}	45 ^{-0.025} _{-0.050}	52 ^{-0.030} _{-0.060}
CD	33 ^{+0.039} ₀	38 ^{+0.039} ₀	42 ^{+0.039} ₀	42 ^{+0.039} ₀	45 ^{+0.039} ₀	45 ^{+0.039} ₀	52 ^{+0.046} ₀
CE	33.6	38.6	42.6	42.6	45.6	45.6	52.6
CF	49.5	55	62	67	78	85	98
CG	56 ^{+0.5} ₀	61.5 ^{+0.5} ₀	68.5 ⁺¹ ₀	73.5 ⁺¹ ₀	84.5 ⁺¹ ₀	91.5 ⁺¹ ₀	104.5 ⁺¹ ₀
CH	8	8.5	10	10	10	10	10
CJ	77 ^{-0.5} ₀	84.5 ^{-0.5} ₀	95.5 ⁻⁰ ₀	101 ⁻⁰ ₀	116.5 ⁻⁰ ₀	123.5 ⁻⁰ ₀	144.5 ⁻⁰ ₀
CK	84	91.5	101.5	106.5	123.5	130.5	156
CL	94.5	102	114	122	136	145	168.5
CM	1	1	1.5	1.5	1.5	1.5	1.5
CN	60	66	73.5	78.5	89.5	96.5	109.5
CP	73	80	90.5	96	111.5	118.5	139.5
CR	10.5	10.5	12.5	15.5	12.5	14.5	12.5
CS	33	38	42	42	45	45	52
G	35	39	47	53	63	78	100
BA	36	40	48	54	64	79	101
K	48.5	54	61	66	77	84	97
O-ring	AS568-025	AS568-028	AS568-029	AS568-029	AS568-030	AS568-030	AS568-032
Mass	0.40 kg	1.0 kg	1.6 kg	2.0 kg	3.2 kg	5.2 kg	10.1 kg

- 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.
2. Exhaust connection port must be opened to atmosphere. If sensor is embedded, prepare an exhaust piping hole. Furthermore, provide the piping if there is a risk of coolant or metal chips intrusion. If it is difficult to obtain a BSPP fitting, use of KQ2 series Uni one-touch fitting made by SMC is recommended. (Refer to catalog issued by manufacturer for details.)
3. Refer to specifications (page → 32), dimensions (page → 35) for specifications and dimensions of products that are not listed on this page.

Air catch sensor

Air catch sensor is required to perform operating detection of clamp.

- Recommended sensor: ISA series manufactured by SMC or GPS2 series manufactured by CKD (refer to instruction manuals of manufacturers for details.)
- Recommended air pressure: 0.2 MPa
Supply dry air that is passed through a 5 μm filter.

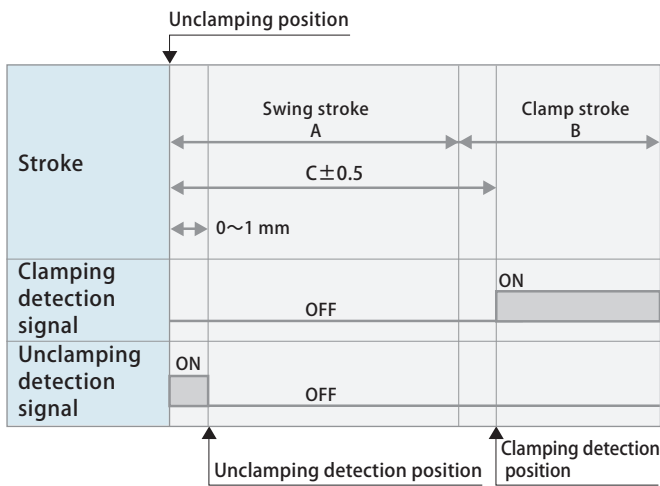
● Air piping

Air piping from sensor to clamp must have inner diameter of ø 4 mm or more and length must be as short as possible.

Number of clamps that can be detected by a single sensor is shown in table below.

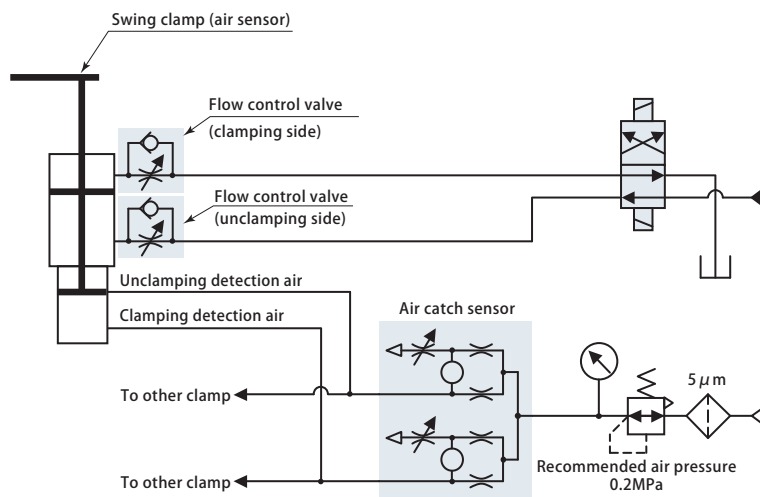
Supplied air pressure	Number of clamps	Air piping
0.2 MPa	Maximum 6	Parallel piping, inner diameter ø 4 mm Total piping length 5 m or shorter
0.1 MPa	Maximum 3	

Time chart



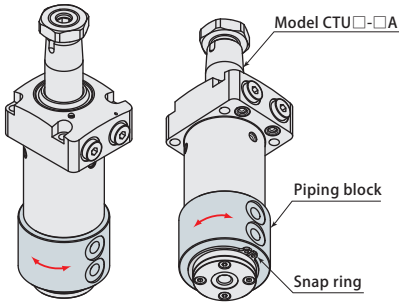
Model	Swing stroke A (mm)	Clamp stroke B (mm)	Clamp detection position C (mm)
CTU01- ^L / _R A	8	8	9
CTU02- ^L / _R A	10	8	11
CTU04- ^L / _R A	12.5	8	13.5
CTU06- ^L / _R A	13.5	10	14.5
CTU10- ^L / _R A	16.5	10	17.5
CTU16- ^L / _R A	18.5	10	19.5
CTU25- ^L / _R A	23	13	24

Hydraulic and air circuit diagram (reference)



Air sensor piping type

Model CTU□-□A can also be used as piping type by mounting a piping block.

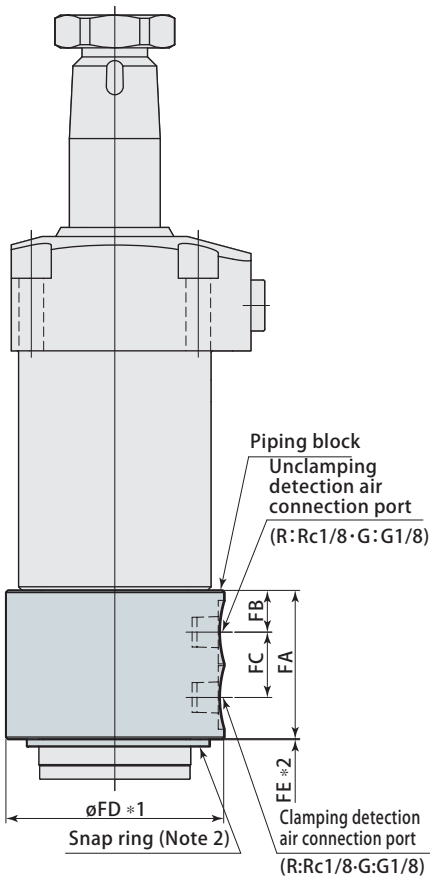


Model designation

CTH ①-U② (Example : CTH06-UR)

CTH	① Size (refer to specification table)	- U : Piping block	② Air connection port thread section
	01 02 04 06 10 16 25		R : Rc1/8 G : G1/8

Piping block



(mm)

Model	CTH01-UR CTH01-UG	CTH02-UR CTH02-UG	CTH04-UR CTH04-UG	CTH06-UR CTH06-UG	CTH10-UR CTH10-UG	CTH16-UR CTH16-UG	CTH25-UR CTH25-UG
FA	35.7	37.8	40.8	40.8	46.8	46.8	59.3
FB	10.6	11.4	11.4	11.4	13.4	13.4	13.4
FC	14.5	15	18	18	20	20	32.5
FD(R) *1	51	56	60	60	63	63	70
FD(G) *1	54	59	63	63	66	66	73
FE *2	0.45	0.35	0.35	0.35	0.35	0.35	0.4
Snap ring	STW32	STW38	STW42	STW42	STW45	STW45	STW52
Clamp models	CTU01-L-RA	CTU02-L-RA	CTU04-L-RA	CTU06-L-RA	CTU10-L-RA	CTU16-L-RA	CTU25-L-RA

* 1 : FD (R) dimensions show R type and FD (G) dimensions show G type dimensions.

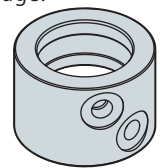
* 2 : FE dimensions show space between piping block and snap ring.

1. Refer to specifications (page → 32), dimensions (pages → 35 and 38) for specifications and dimensions of products that are not listed on this page.

2. Snap ring for securing piping block is included.

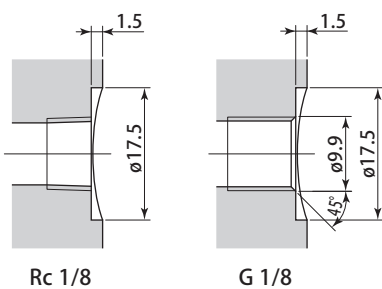
3. For CTH01-U, CTH02-U, phase of clamping detection air connection port and unclamping detection air connection port vary by 30° (refer to diagram to right).

4. This product is made to order.



CTH^{01-U} to CTH^{02-U} G
Piping block (Note 3)

Air connection port thread section



Model designation

CTU ①-②③

(Example : CTU06-RN45)

① Size (refer to specification table)

② Swing direction (when clamping)

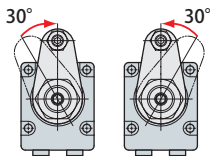
③ Swing angle (refer to diagram below)

CTU	01 02 04 06 10 16 25	-	L : Counter-clockwise R : Clockwise	N30 : Swing angle 30° N45 : Swing angle 45° N60 : Swing angle 60°
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Swing angle (when clamping)

CTU ①- $\frac{L}{R}$ N30

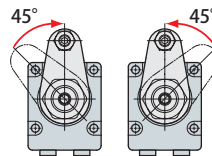
Swing angle 30°



R: Clockwise L: Counter-clockwise

CTU ①- $\frac{L}{R}$ N45

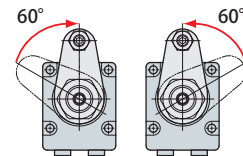
Swing angle 45°



R: Clockwise L: Counter-clockwise

CTU ①- $\frac{L}{R}$ N60

Swing angle 60°



R: Clockwise L: Counter-clockwise

Specifications

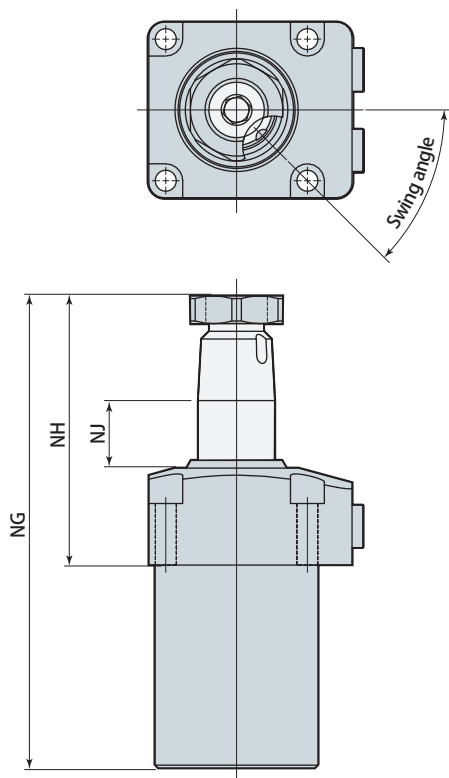
Model		CTU01- $\frac{L}{R}$ N30 N45 N60			CTU02- $\frac{L}{R}$ N30 N45 N60			CTU04- $\frac{L}{R}$ N30 N45 N60			CTU06- $\frac{L}{R}$ N30 N45 N60		
Swing angle		30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°
Full stroke (mm)		11.8	12.7	13.7	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
	Unclamp (cm ³)	5.8	6.2	6.7	8.6	9.4	10.2	14.5	16.1	17.7	23.3	25.5	27.9

Model		CTU10- $\frac{L}{R}$ N30 N45 N60			CTU16- $\frac{L}{R}$ N30 N45 N60			CTU25- $\frac{L}{R}$ N30 N45 N60		
Swing angle		30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°
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
	Unclamp (cm ³)	38.8	43.1	47.5	63.9	71.5	79.2	129.4	144.6	159.8

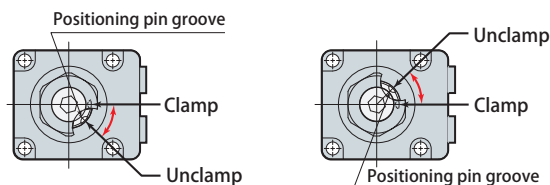
Note 1. Refer to specifications refer to page → 32 for specifications of products that are not listed on this page.

Dimensions

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



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 → 35 for dimensions of products that are not listed on this page.

Model	CTU01- ^{N30} _L ^{N45} _R ^{N60}			CTU02- ^{N30} _L ^{N45} _R ^{N60}			CTU04- ^{N30} _L ^{N45} _R ^{N60}			CTU06- ^{N30} _L ^{N45} _R ^{N60}		
	Swing angle	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°
NG	112.8	113.7	114.7	126.0	127.3	128.5	142.3	143.8	145.4	151.8	153.4	155.1
NH	64.3	65.2	66.2	72.0	73.3	74.5	81.3	82.8	84.4	85.8	87.4	89.1
NJ	14.8	15.7	16.7	16.5	17.8	19.0	17.8	19.3	20.9	20.3	21.9	23.6

Model	CTU10- ^{N30} _L ^{N45} _R ^{N60}			CTU16- ^{N30} _L ^{N45} _R ^{N60}			CTU25- ^{N30} _L ^{N45} _R ^{N60}		
	Swing angle	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°	60° ± 3°	30° ± 3°	45° ± 3°
NG	170.3	172.3	174.4	192.3	194.6	196.9	232.5	235.4	238.3
NH	93.3	95.3	97.4	108.3	110.6	112.9	135.5	138.4	141.3
NJ	21.8	23.8	25.9	22.3	24.6	26.9	27.5	30.4	33.3

Model designation

CTU ①-②③ (Example : CTU06-RS20)

① Size (refer to specification table)

② Swing direction (when clamping)

③ Clamp stroke

CTU	01	-	L : Counter-clockwise R : Clockwise	(S16) : Clamp stroke 16 mm
	02			(S20) : Clamp stroke 20 mm
	04			(S30) : Clamp stroke 30 mm
	06			
	10			
	16			
	25			

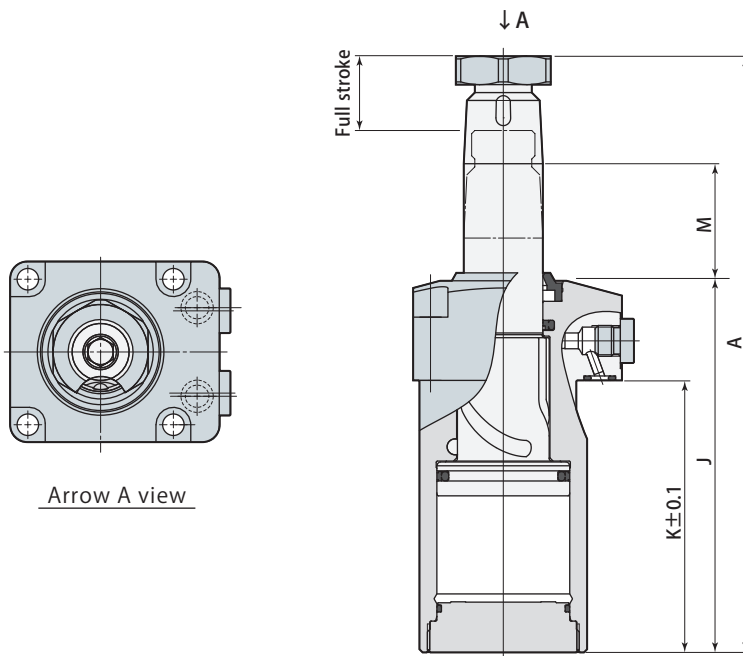
Those in brackets () are made to order.

Specifications

Model		CTU01- $\frac{L}{R}$ S16	CTU02- $\frac{L}{R}$ S16	CTU04- $\frac{L}{R}$ S16	CTU06- $\frac{L}{R}$ S20	CTU10- $\frac{L}{R}$ S20	CTU16- $\frac{L}{R}$ S20	CTU25- $\frac{L}{R}$ S30
Full stroke	(mm)	24	26	28.5	33.5	36.5	38.5	53
Clamp stroke	(mm)	16	16	16	20	20	20	30
Cylinder capacity	Clamp (cm ³)	8.1	10.6	17.8	30.0	51.7	89.6	195.6
	Unclamp (cm ³)	11.8	17.2	29.0	46.4	77.5	127.8	279.9
Mass	(kg)	0.35	1.1	1.6	2.1	3.4	5.5	11.7

Note 1. Refer to specifications (page → 32) for specifications of products that are not listed on this page.

Dimensions



Note 1. Flange size is same as standard model. Refer to section for standard model (page → 35) for dimensions of products that are not listed on this page.

(mm)

Model	CTU01- $\frac{L}{R}$ S16	CTU02- $\frac{L}{R}$ S16	CTU04- $\frac{L}{R}$ S16	CTU06- $\frac{L}{R}$ S20	CTU10- $\frac{L}{R}$ S20	CTU16- $\frac{L}{R}$ S20	CTU25- $\frac{L}{R}$ S30
A	141	155	172.5	188.5	208.5	231.5	295
J	91.5	97.5	106.5	117.5	131.5	143	181
K	64.5	70	77	86	97	104	131
M	27	29.5	32	37	40	41.5	56

Model designation

CTU ①-②③ (Example : CTU06-RS30)

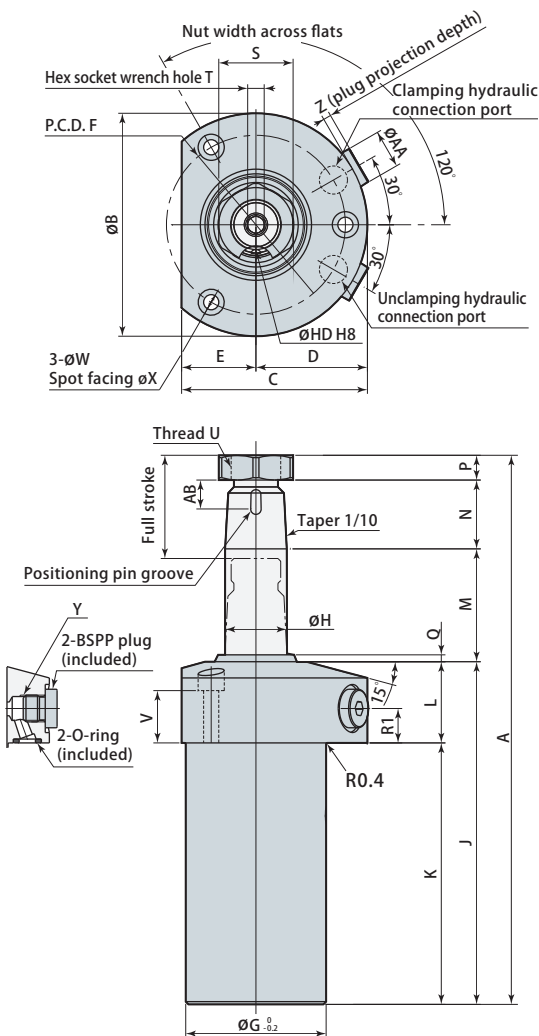
① Size (refer to specification table)

② Swing direction (when clamping)

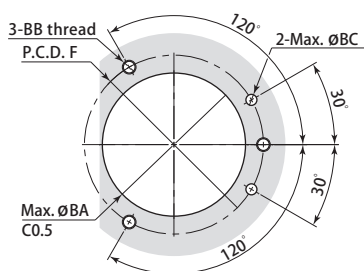
③ Clamp stroke

CTU	04	-	L : Counter-clockwise R : Clockwise	S25 : Clamp stroke 25 mm
	06			S30 : Clamp stroke 30 mm
	10			S30 : Clamp stroke 30 mm S50 : Clamp stroke 50 mm
	16			S30 : Clamp stroke 30 mm S50 : Clamp stroke 50 mm

Dimensions



Mounting details



Model	CTU04- $\frac{1}{8}$ S25	CTU06- $\frac{1}{8}$ S30	CTU10- $\frac{1}{8}$ S30	CTU10- $\frac{1}{8}$ S50	CTU16- $\frac{1}{8}$ S30	CTU16- $\frac{1}{8}$ S50
Full stroke	37.5	43.5	46.5	66.5	48.5	68.5
Clamp stroke	25	30	30	50	30	50
Cylinder capacity *1	23.4 cm ³	38.9 cm ³	65.9 cm ³	94.2 cm ³	112.9 cm ³	159.5 cm ³
Cylinder capacity *2	38.2 cm ³	60.3 cm ³	98.8 cm ³	141.2 cm ³	160.9 cm ³	227.3 cm ³
Mass	2.3 kg	3.1 kg	5.0 kg	6.0 kg	7.5 kg	8.7 kg
A	199.5	218.5	238.5	298.5	261.5	321.5
B	81	89	112	112	125	125
C	67.5	75	92.5	92.5	105.5	105.5
D	40.5	44.5	56	56	62.5	62.5
E	27	30.5	36.5	36.5	43	43
F	65	73	88	88	101	101
G	51	58	70	70	83	83
H	22.4	25	30	30	35.5	35.5
J	124.5	137.5	151.5	191.5	163	203
K	95	106	117	157	124	164
L	29.5	31.5	34.5	34.5	39	39
M	41	47	50	70	51.5	71.5
N (arm thickness)	25	25	27	27	35	35
P (nut thickness)	9	9	10	10	12	12
Q	2.5	2.5	2.5	2.5	2	2
R1	12.5	12.5	14	14	14	14
S (nut width across flats)	27	30	36	36	46	46
T (hex socket wrench hole)	6	8	8	8	10	10
U (recommended tightening torque)	M18×1.5 (51 N·m)	M20×1.5 (60 N·m)	M24×1.5 (86 N·m)	M24×1.5 (86 N·m)	M30×1.5 (120 N·m)	M30×1.5 (120 N·m)
V	19	19.5	19	19	20	20
W	5.5	6.8	9	9	11	11
X	9.5	11	14	14	17.5	17.5
Y	G1/8	G1/8	G1/4	G1/4	G1/4	G1/4
Z	2.8	2.8	3.8	3.8	3.8	3.8
O-ring	P7	P7	P8	P8	P8	P8
AA	14	14	19	19	19	19
AB	10.5	10.5	12.5	12.5	12.5	12.5
BA	52	59	71	71	84	84
BB	M5	M6	M8	M8	M10	M10
BC	4	4	6	6	6	6
HD	4 ^{+0.018} ₀	5 ^{+0.018} ₀	6 ^{+0.018} ₀	6 ^{+0.018} ₀	6 ^{+0.018} ₀	6 ^{+0.018} ₀
Positioning pin	Ø4(h8)×10	Ø5(h8)×10	Ø6(h8)×12	Ø6(h8)×12	Ø6(h8)×12	Ø6(h8)×12

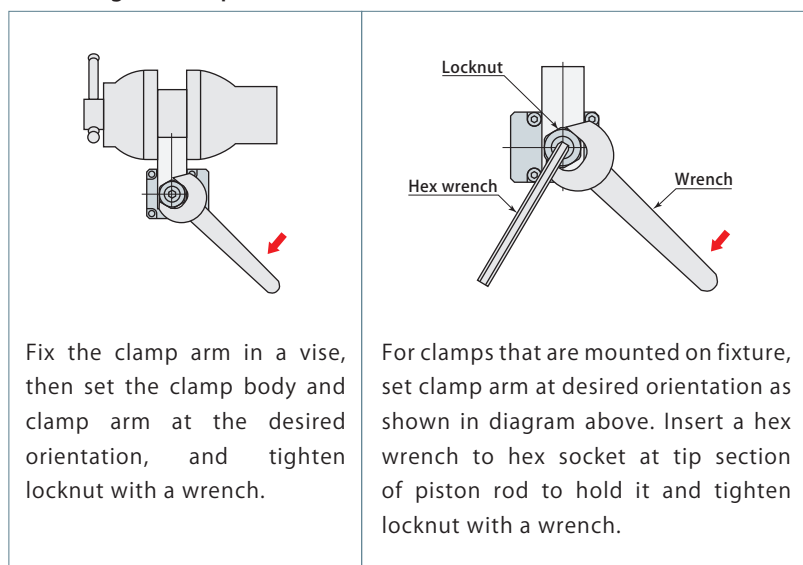
*1 : Clamp *2 : Unclamp

Note 1. Refer to specifications (page → 32) for specifications of products that are not listed on this page.

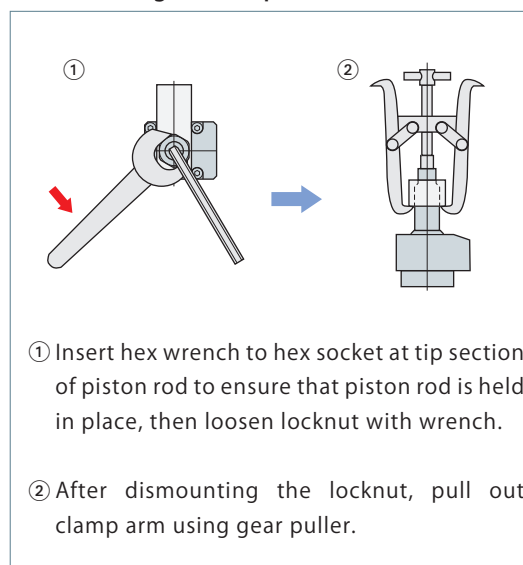
Mounting & dismounting of clamp arm

- 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

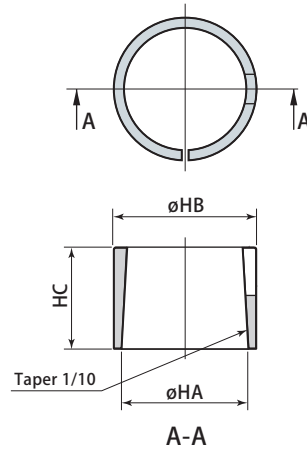
Taper sleeve

CTH^①-TS

(Example : CTH06-TS)

① Size
(refer to specification table)

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

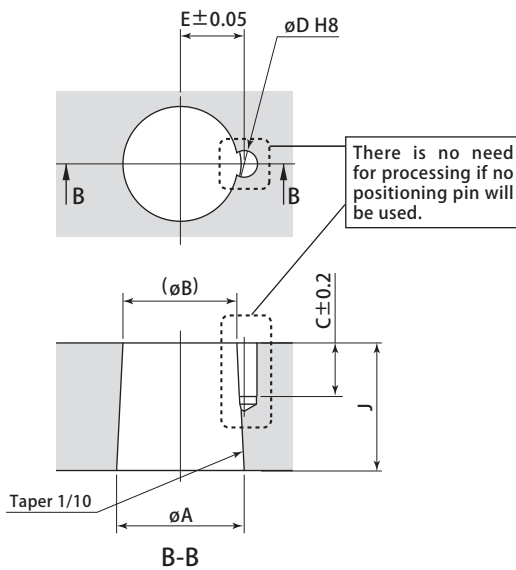


(mm)

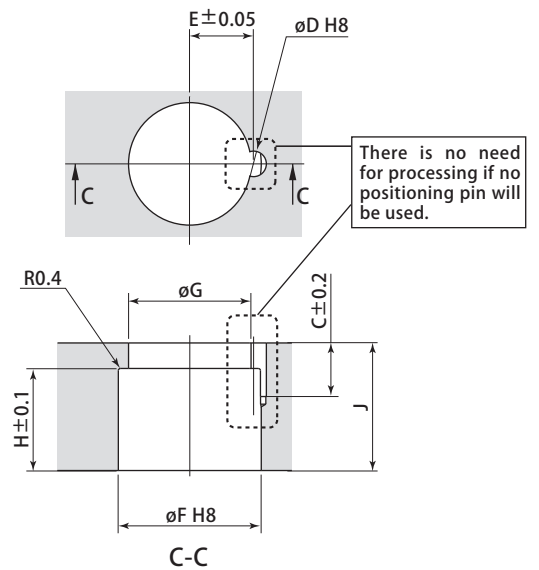
Model	CTH01-TS	CTH02-TS	CTH04-TS	CTH06-TS	CTH10-TS	CTH16-TS	CTH25-TS
HA	14	18	22.4	25	30	35.5	45
HB	16	20	25	28	34	40	49
HC	13	16	21	20	22	29	38

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

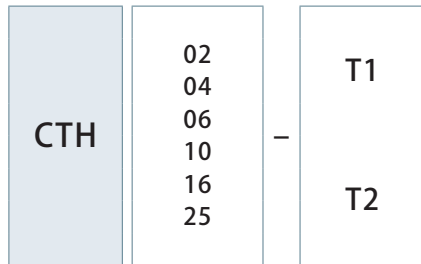
T1 type clamp arm

T2 type clamp arm

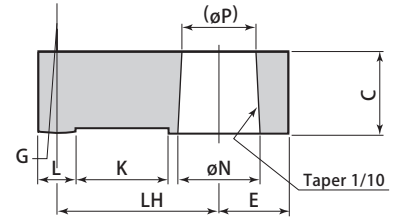
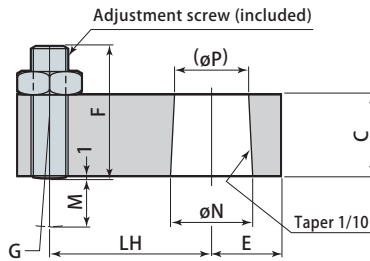
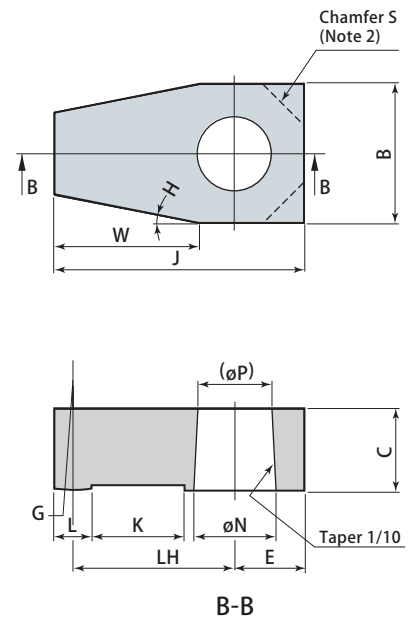
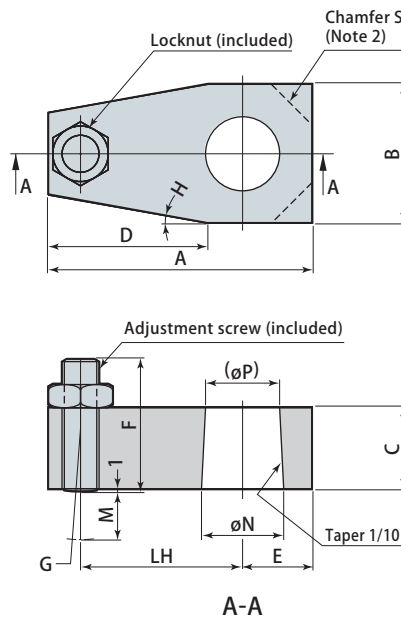
CTH①-② (Example : CTH06-T2)

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 ^{T2}	CTH04-T ₁ ^{T2}	CTH06-T ₁ ^{T2}	CTH10-T ₁ ^{T2}	CTH16-T ₁ ^{T2}	CTH25-T ₁ ^{T2}	
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-T₁^{T2} and CTH25-T₁^{T2} have chamfer.

3. Positioning pin hole is not provided.

Mounting of clamp and work support

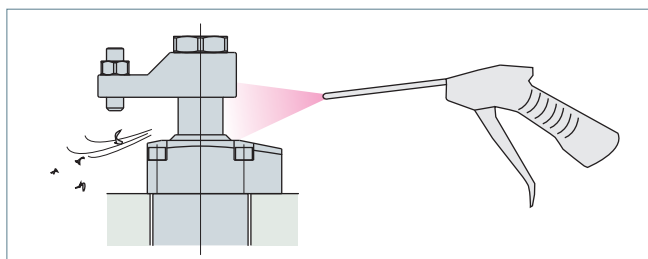
Use screws with strength class of 12.9 for mounting clamp and work support and be sure to apply specified torque for tightening, by referring to recommended tightening torque of mounting screws indicated below.

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

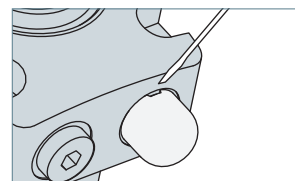
Caution in use of equipment

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.



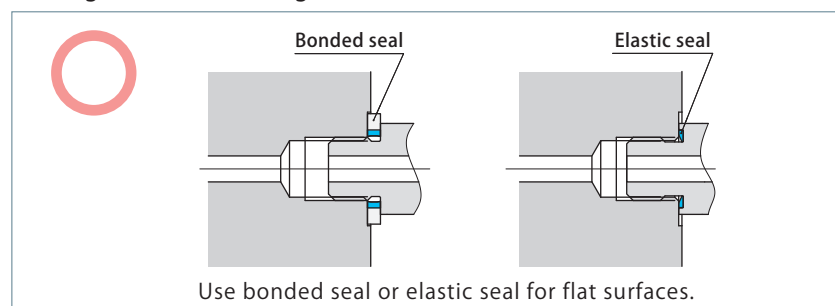
Caution for hydraulic piping

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

