

Swing clamp

Double acting 7 MPa

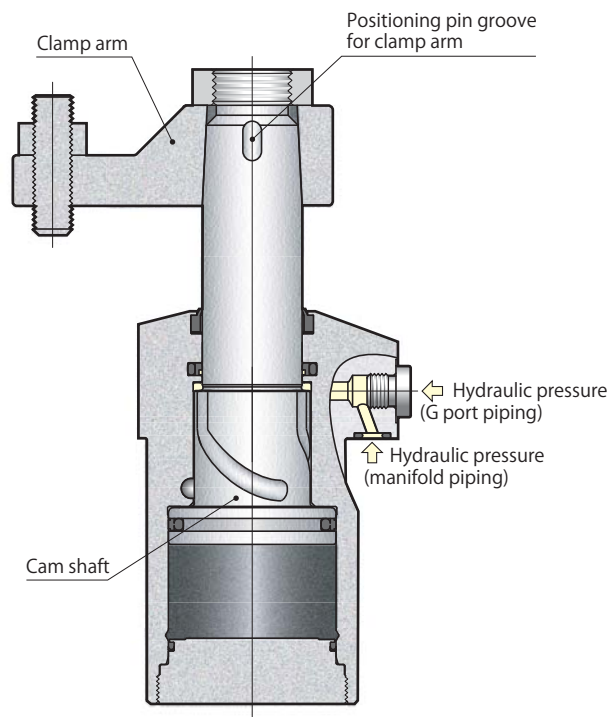
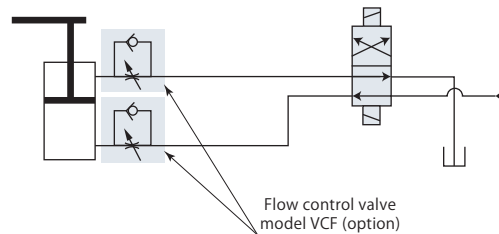
model **CTU**



Standard model
model CTU06-L

Standard model

model CTU□-□

Hydraulic circuit diagram

For flow control valve, we recommend the meter-in control. If meter-out control is used, due to the area difference, it will cause back pressure and become high pressure. This can lead to malfunction of the system. Please be aware when designing the circuit.

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Dual rod	page → 14
Pin rod	page → 15
Air sensor	page → 16
Swing angle 30°, 45°, 60°	page → 20
Long stroke	page → 22

Specifications

CTU	Size	Swing direction (when clamping)	Variation code*1
	01	L : Counter-clockwise	(Nil) : Standard
	02		E : Dual rod
	04		P : Pin rod
	06	R : Clockwise	A : Air sensor
	10		N □ : Swing angle 30°, 45°, 60°
	16		S □ : Long stroke
25*2	■ indicates made to order.		

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

Contact Pascal for the details of variation codes (models) that are not described in the catalog.

*2: CTU25-□E, CTU25-□P and CTU25-□S30 are made to order.

Model		CTU01	CTU02	CTU04	CTU06	CTU10	CTU16	CTU25	
Cylinder force (hydraulic pressure 7MPa)	kN	2.4	2.8	4.4	6.3	9.9	16.3	25.8	
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	
90° 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*1	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	0.7	0.9	1.3	1.7	2.8	4.7	9.9	
Recommended tightening torque of mounting screws*2	N·m	3.5	7	7	12	29	57	77	
Recommended tightening torque of nut	N·m	12	26	51	60	86	120	180	

● 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)

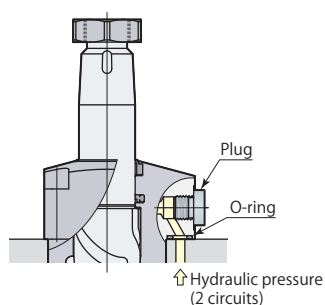
● Seals are resistant to chlorine-based cutting fluid. (not thermal resistant specification)

*1: This is the limit value for lifting arm at 1 MPa when mounted vertically. *2: ISO R898 class 12.9

Manifold piping and G port piping are available.

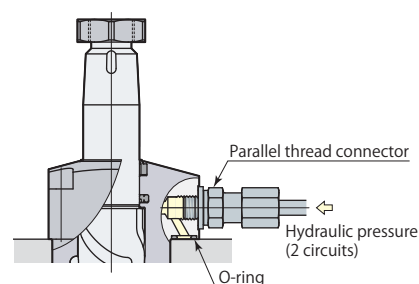
Manifold piping

When choosing manifold piping, a flow control valve (model VCF) and an air bleeding valve (model VCE) are mountable on the G ports of the clamp.



G port piping

Remove plugs when choosing G port piping. (O-ring must be used.) Refer to **page → 174** for details on G port piping flareless fitting. The flow control valve and the air bleeding valve should be installed in the middle of oil path.



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

CTU06 with clamp arm length (LH) = 60 mm

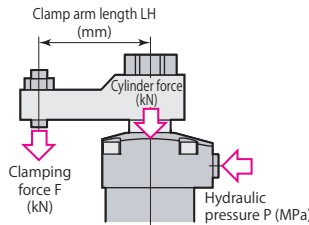
at hydraulic pressure of 7 MPa,

Clamping force F is calculated by

$$7 / (1.12 + 0.00422 \times 60) = 5.1 \text{ kN}$$

Do not use the clamp in the nonusable range.

It may cause damage to the cylinder and rod.



model CTU02		Clamping force $F = P / (2.46 + 0.0116 \times LH)$									
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	2.1	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	1.0	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	

model CTU06		Clamping force $F = P / (1.12 + 0.00422 \times LH)$									
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	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	3.7				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	2.5	2.4	2.3	2.2	2.0	1.9	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	

model CTU16		Clamping force $F = P / (0.429 + 0.00128 \times LH)$									
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	15.2	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	10.4	9.9	9.4					139	
5	11.7	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	8.2	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	

model CTU01		Clamping force $F = P / (2.97 + 0.0153 \times LH)$									
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	1.7	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	

model CTU04		Clamping force $F = P / (1.60 + 0.00664 \times LH)$									
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	3.8	3.6	3.5	3.3	3.1				105	
6.5	4.1	3.5	3.4	3.3	3.0	2.9				117	
6	3.8	3.2	3.1	3.0	2.8	2.7	2.5			133	
5.5	3.4	2.9	2.8	2.8	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	2.3	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	1.8	1.6	1.5	1.5	1.4	1.3	↑	
3	1.9	1.6	1.6	1.5	1.4	1.3	1.3	1.2	1.1	↑	
2.5	1.6	1.3	1.3	1.3	1.2	1.1	1.0	1.0	0.9	↑	
2	1.3	1.1	1.0	1.0	0.9	0.9	0.8	0.8	0.8	↑	
1.5	0.9	0.8	0.8	0.8	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	

model CTU10		Clamping force $F = P / (0.706 + 0.00228 \times LH)$									
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	4.2	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	

model CTU25		Clamping force $F = P / (0.271 + 0.000658 \times LH)$									
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	15.9				161	
5.5	20.3	16.7	16.3	15.7	15.1	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	

● See the formula shown on page →15 for clamping force calculation when pin rod type (CTU□-□P) is selected.

Swing speed adjustment

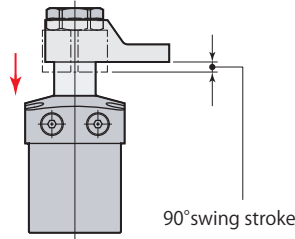
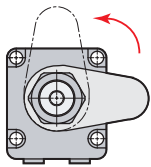
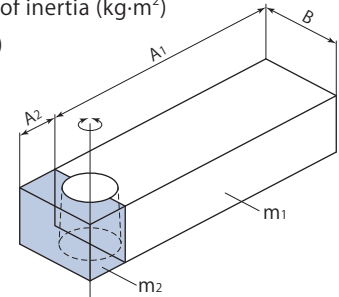
Swing time is restricted by the mass and length of the clamp arm (moment of inertia) since the 90° swing action impacts the cam shaft.

1. Calculate the moment of inertia according to the arm length and mass.
 2. Adjust swing speed with flow control valve to ensure that 90° swing time of the clamp arm is greater than the shortest swing time in the graph shown below.
- The cam groove may be damaged in case the swing speed is set at the nonusable range in the graph.

Example of calculation for moment of inertia

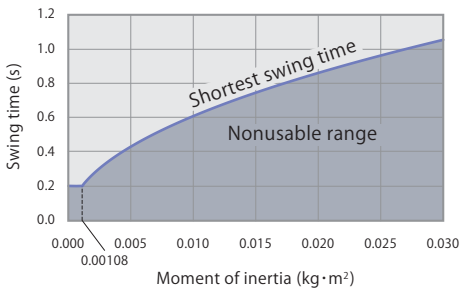
$$I = \frac{1}{12} m_1(4A_1^2 + B^2) + \frac{1}{12} m_2(4A_2^2 + B^2)$$

I : Moment of inertia (kg·m²)
m : Mass (kg)



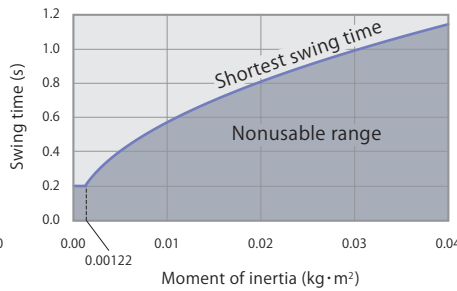
model **CTU01**

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0270}}$



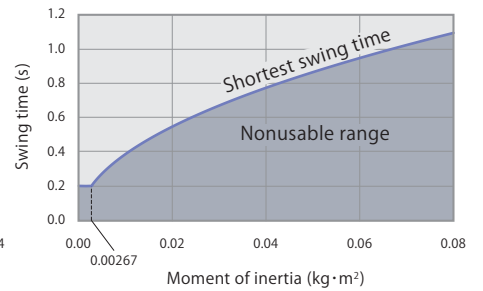
model **CTU02**

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0305}}$



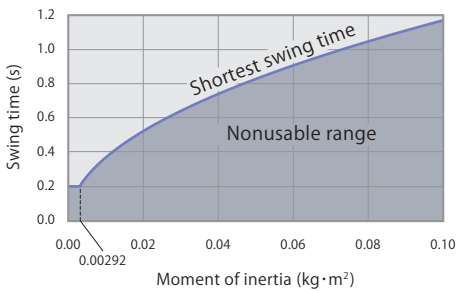
model **CTU04**

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0668}}$



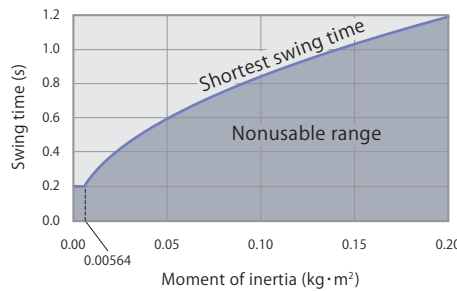
model **CTU06**

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.0730}}$



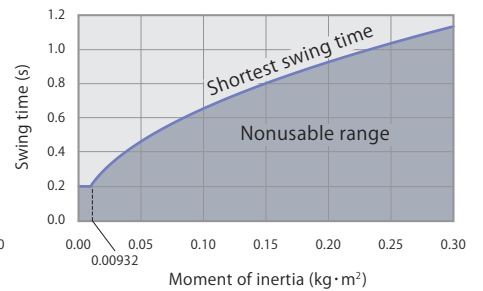
model **CTU10**

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.141}}$



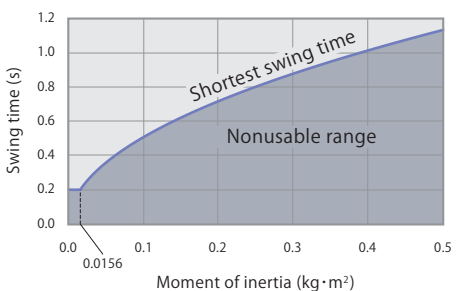
model **CTU16**

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.233}}$

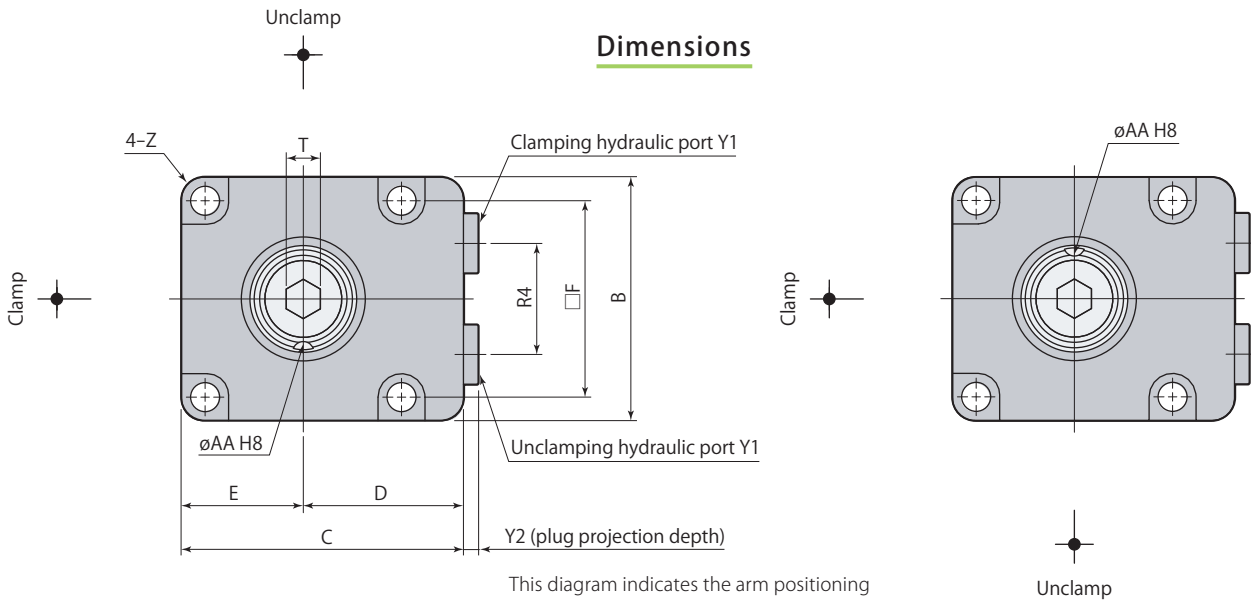


model **CTU25**

Shortest swing time calculation formula $t = \sqrt{\frac{I}{0.389}}$



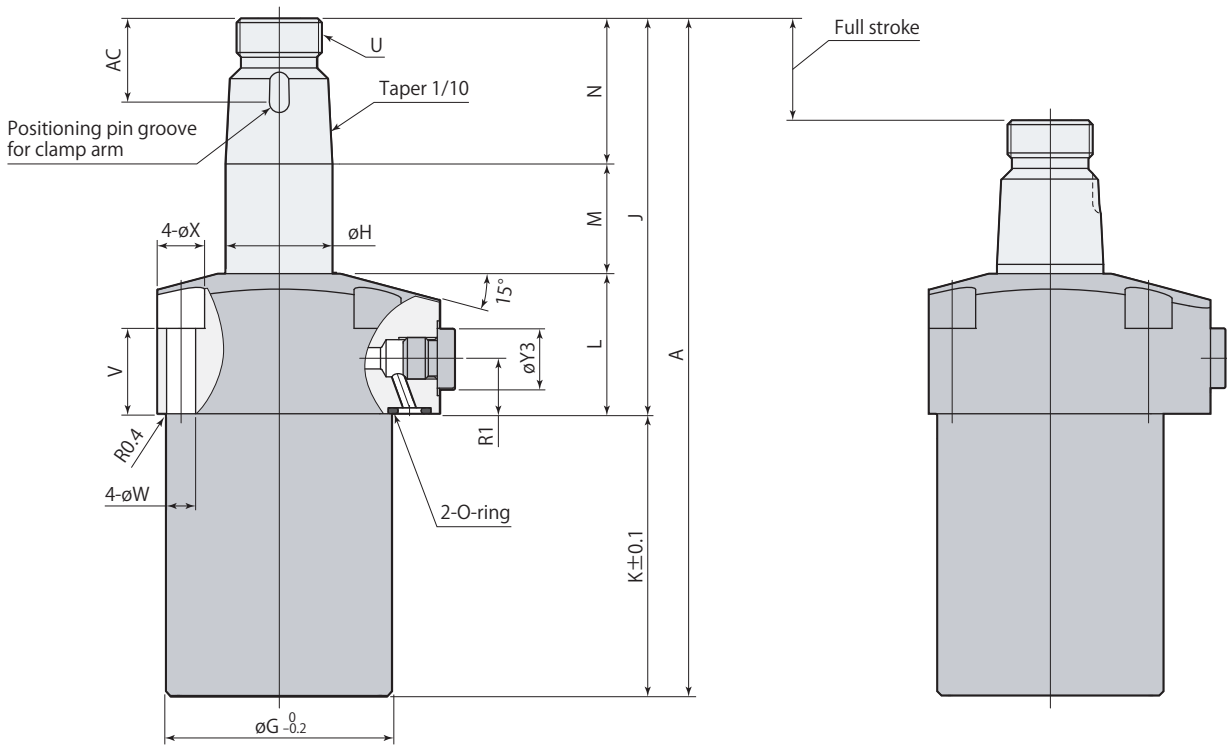
Dimensions



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

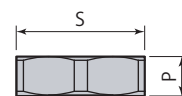
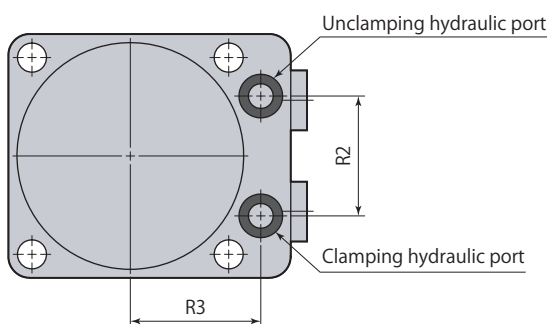
Swing direction L (counter-clockwise)

Swing direction R (clockwise)



Unclamp

Stroke end



Hex nut for arm mount

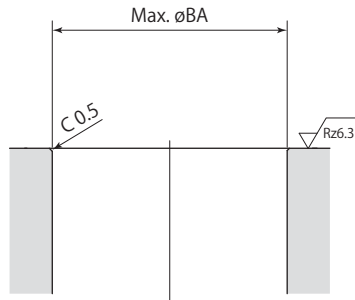
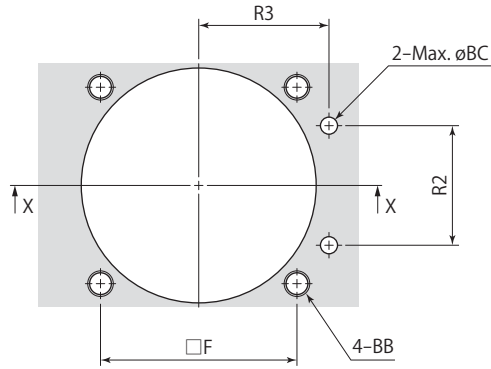
- Hex nut for arm mount is included.
- Refer to **page →41** for the details of perfect nut.
- Clamp arm, positioning pin and mounting screws are not included.

Model		CTU01-□	CTU02-□	CTU04-□	CTU06-□	CTU10-□	CTU16-□	CTU25-□
		mm						
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
øG		35	39	47	53	63	78	100
øH		14	18	22.4	25	30	35.5	45
J		68.5	77	87.5	92.5	101.5	117.5	147
K		48.5	54	61	66	77	84	97
L		28.5	29	31	33	36	40.5	51.5
M		17.5	20	22.5	25.5	28.5	30	37.5
N		22.5	28	34	34	37	47	58
P		6.5	8	9	9	10	12	13
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)		5	6	6	8	8	10	14
U		M12×1.5	M14×1.5	M18×1.5	M20×1.5	M24×1.5	M30×1.5	M39×1.5
V		20	19.5	20	20	19.5	20	26
øW		4.3	5.5	5.5	6.8	9	11	14
øX		8	9.5	9.5	11	14	17.5	20
Y1		G1/8	G1/8	G1/8	G1/8	G1/4	G1/4	G3/8
Y2		3.8	3.8	3.8	3.8	4.8	4.8	4.8
øY3		14	14	14	14	19	19	22
Z		R3	R3	R3	R5	R6	R7	R10
øAA (pin groove diameter)		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
AC		15.5	18.5	19.5	19.5	22.5	24.5	27.5
Positioning pin (dowel pin)		ø3(h8)×8	ø4(h8)×10	ø4(h8)×10	ø5(h8)×10	ø6(h8)×12	ø6(h8)×12	ø6(h8)×14
O-ring (fluorocarbon hardness Hs90)		P7	P7	P7	P7	P8	P8	P10
Taper sleeve		CTH01-TS	CTH02-TS	CTH04-TS	CTH06-TS	CTH10-TS	CTH16-TS	CTH25-TS
Flow control valve*	Meter-in	VCF01	VCF01	VCF01	VCF01	VCF02	VCF02	VCF03
	Meter-out	VCF01-O	VCF01-O	VCF01-O	VCF01-O	VCF02-O	VCF02-O	VCF03-O
Air bleeding valve*		VCE01	VCE01	VCE01	VCE01	VCE02	VCE02	VCE03

*: Select the right model of VCF and VCE according to the size of the clamp.

Refer to each page for the details of options.

● Taper sleeve **page →25** ● Flow control valve **page →52** ● Air bleeding valve **page →54**

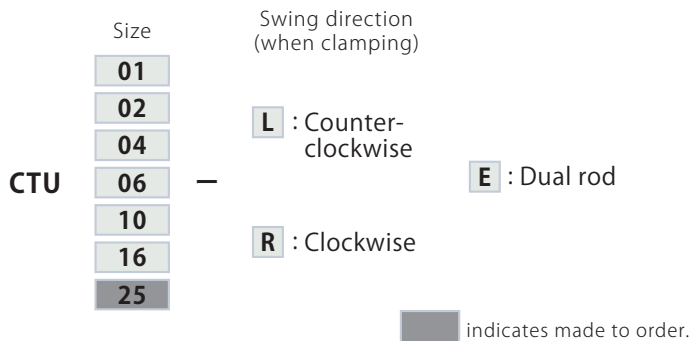
Mounting details

X-X

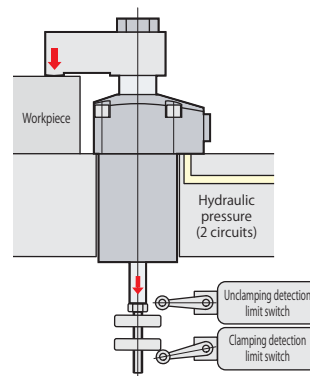
Rz: ISO4287(1997)

Model	CTU01-□	CTU02-□	CTU04-□	CTU06-□	CTU10-□	CTU16-□	CTU25-□
F	30.5	35	40	46	56	68	88
R2	18	22	24	28	36	45	50
R3	22.5	25	28	30.5	36	42	57
øBA	36	40	48	54	64	79	101
BB	M4	M5	M5	M6	M8	M10	M12
øBC	4	4	4	4	6	6	8

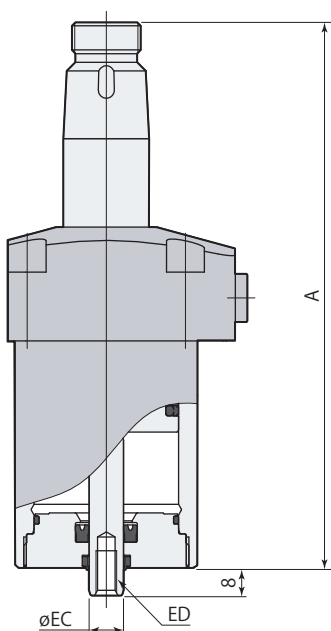
mm



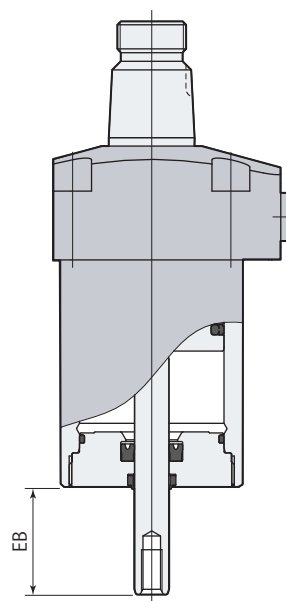
Usage example



Dimensions



Unclamp



Stroke end

- This diagram indicates a swing direction L (L stands for counter-clockwise).
- Refer to specifications (page →7), dimensions (page →10) for other specifications and dimensions that are not shown in the diagram.

Model	CTU01-□E	CTU02-□E	CTU04-□E	CTU06-□E	CTU10-□E	CTU16-□E	CTU25-□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
øEC	8	8	10	10	12	12	16
ED	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	0.7 kg	0.9 kg	1.3 kg	1.7 kg	2.8 kg	4.7 kg	9.9 kg

mm

Size

01
02
04
06
10
16
25

CTU

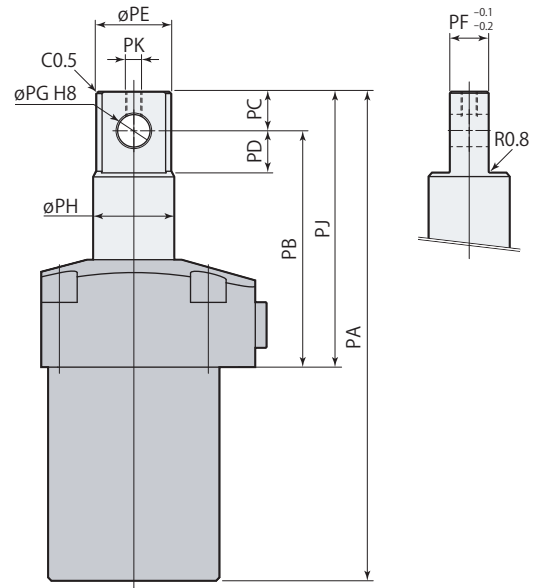
Swing direction (when clamping)

L : Counter-clockwise
R : Clockwise

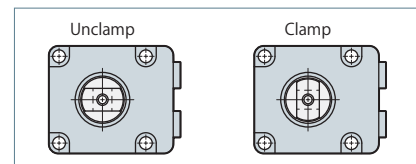
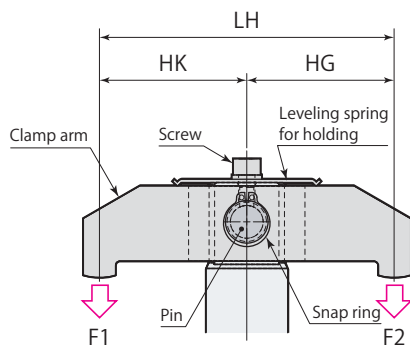
P : Pin rod

■ indicates made to order.

Dimensions



Usage example



Clamping performance

Clamping force calculation formula

$$F1 = \frac{HG}{LH} \times n \times P$$

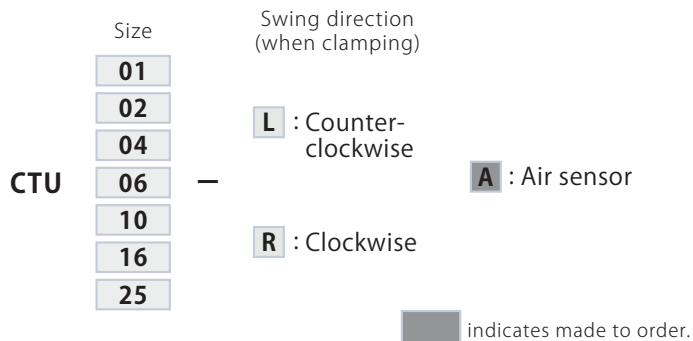
$$F2 = \frac{HK}{LH} \times n \times P$$

F1, F2=Clamping force (kN),
n=Coefficient (refer to right table),
P=Hydraulic pressure (MPa),
HG, HK=Distance from center of piston to clamping point (mm), LH=(mm)

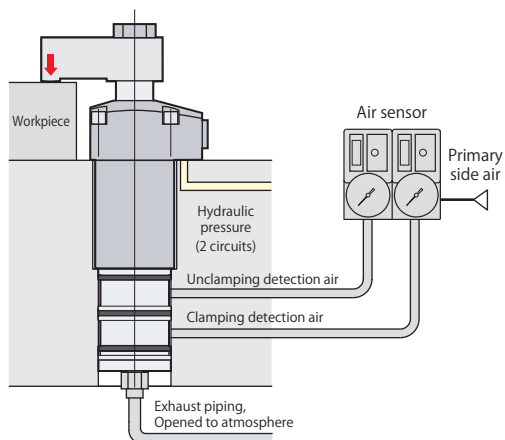
Model	Coefficient n
CTU01-□P	0.336
CTU02-□P	0.406
CTU04-□P	0.624
CTU06-□P	0.895
CTU10-□P	1.42
CTU16-□P	2.33
CTU25-□P	3.69

- This diagram indicates unclamped condition. Direction of pin hole will be hydraulic 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 →7), dimensions (page →10) for other specifications and dimensions that are not shown in the diagram.

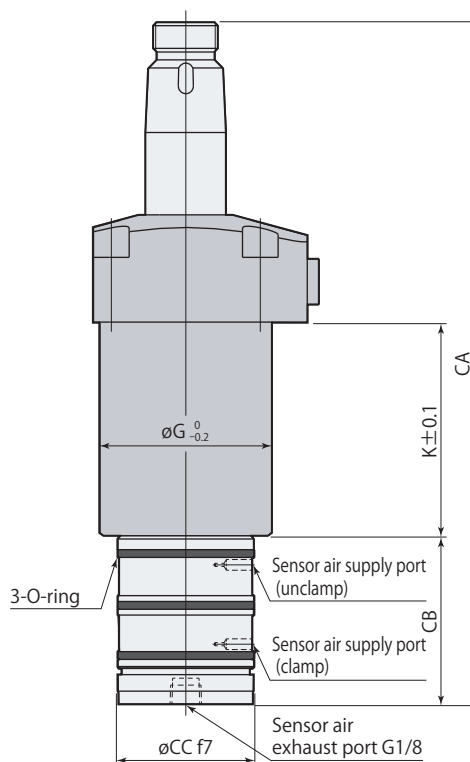
Model	CTU01-□P	CTU02-□P	CTU04-□P	CTU06-□P	CTU10-□P	CTU16-□P	CTU25-□P
PA	113	121.5	137	151	172	195	236.5
PB	56.5	59.5	66	73	81	92	115.5
PC	8	8	10	12	14	19	24
PD	9	9	11	13	15	20	25
øPE	12	16	20.4	23	28	33.5	43
PF	8	8	10	12	16	18	22
øPG	6 ^{+0.018} ₀	6 ^{+0.018} ₀	8 ^{+0.022} ₀	10 ^{+0.022} ₀	12 ^{+0.027} ₀	16 ^{+0.027} ₀	20 ^{+0.033} ₀
øPH	14	18	22.4	25	30	35.5	45
PJ	64.5	67.5	76	85	95	111	139.5
PK	M3×0.5	M3×0.5	M4×0.7	M5×0.8	M6×1	M6×1	M8×1.25
Mass	0.6 kg	0.9 kg	1.3 kg	1.8 kg	3.0 kg	4.9 kg	9.5 kg



Usage example



Dimensions

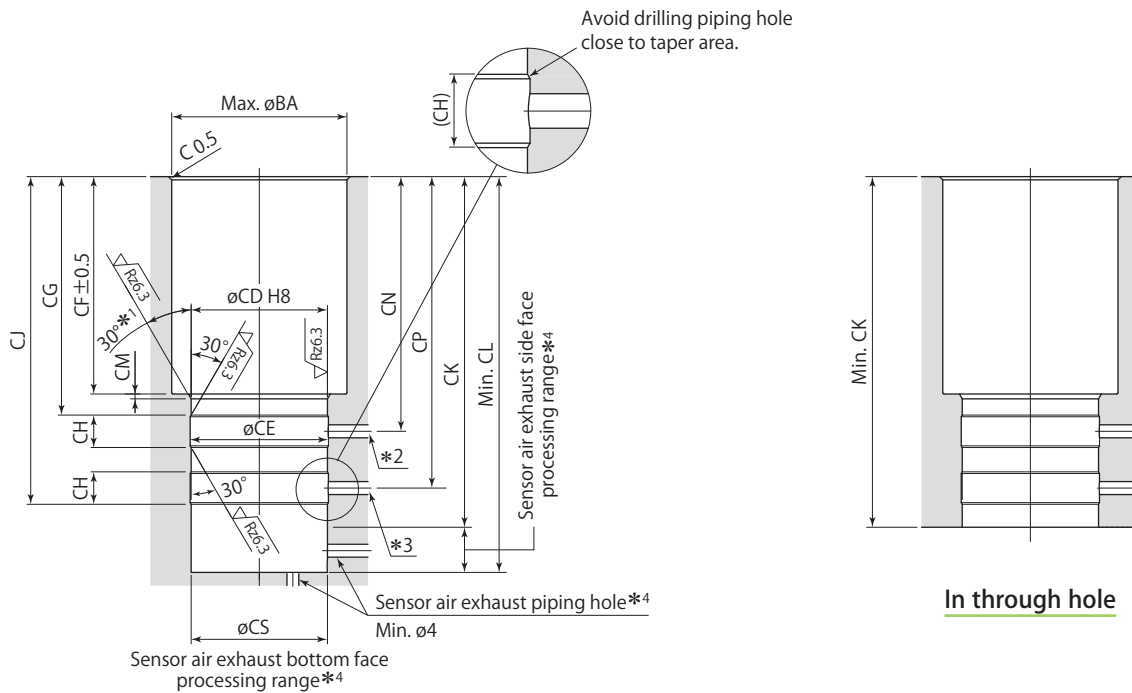


- This diagram indicates unclamped condition of swing direction L (L stands for counter-clockwise). Direction of positioning pin groove will be hydraulic port side at the time of clamping.
- Exhaust port must be opened to atmosphere.
If sensor is embedded, prepare an exhaust piping hole.
Furthermore, provide the piping if there is a risk of coolant or metal chips intrusion.
Use one-touch fittings manufactured by SMC for G port piping. (See SMC catalog for the details of the fitting.)
- Refer to specifications (**page →7**), dimensions (**page →10**) for other specifications and dimensions that are not shown in the diagram.

mm

Model	CTU01-□A	CTU02-□A	CTU04-□A	CTU06-□A	CTU10-□A	CTU16-□A	CTU25-□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
øCC	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}
øG	35	39	47	53	63	78	100
K	48.5	54	61	66	77	84	97
O-ring (fluorocarbon hardness Hs70)	AS568-025	AS568-028	AS568-029	AS568-029	AS568-030	AS568-030	AS568-032
Mass	0.8 kg	1.0 kg	1.6 kg	2.0 kg	3.2 kg	5.2 kg	10.1 kg

Mounting details



In blind hole

Rz: ISO4287(1997)

- *1: 15° only for CTU01-□A , CTU02-□A
- *2: Sensor air piping hole (unclamp) ø4 to ø6. ø4 to ø5 only for CTU01-□A.
- *3: Sensor air piping hole (clamp) ø4 to ø6. ø4 to ø5 only for CTU01-□A.
- *4: Sensor air exhaust piping hole must be made on either side or bottom face.

- Apply an appropriate amount of grease to the chamfer and the bore when mounting. Excessive grease may be a blockage in the air passage, causing malfunction of the sensor.
- The 30° taper machining must be provided to avoid the damage of the O-ring. Ensure that there are no interference on taper area when drilling the hole for sensor air.

mm

Model	CTU01-□A	CTU02-□A	CTU04-□A	CTU06-□A	CTU10-□A	CTU16-□A	CTU25-□A
øCD	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
øCE	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 ₋₁ ⁰	101 ₋₁ ⁰	116.5 ₋₁ ⁰	123.5 ₋₁ ⁰	144.5 ₋₁ 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
øCS	33	38	42	42	45	45	52
øBA	36	40	48	54	64	79	101

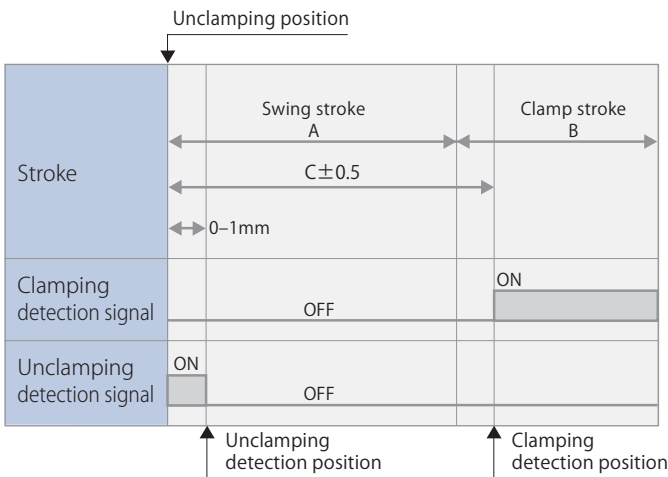
Air sensor unit

Supplier and model	ISA3-G series manufactured by SMC
	GPS2-05 series manufactured by CKD
Air supply pressure	0.2 MPa
Inner diameter of piping	ø4 mm
Overall piping length	5 m or less

- Supply the dry and filtered air. Particulate size 5 μm or less is recommended.
- Use a solenoid valve with needle for air sensor unit and control it supplying air all the time in order to eliminate intrusion of chips or coolant.

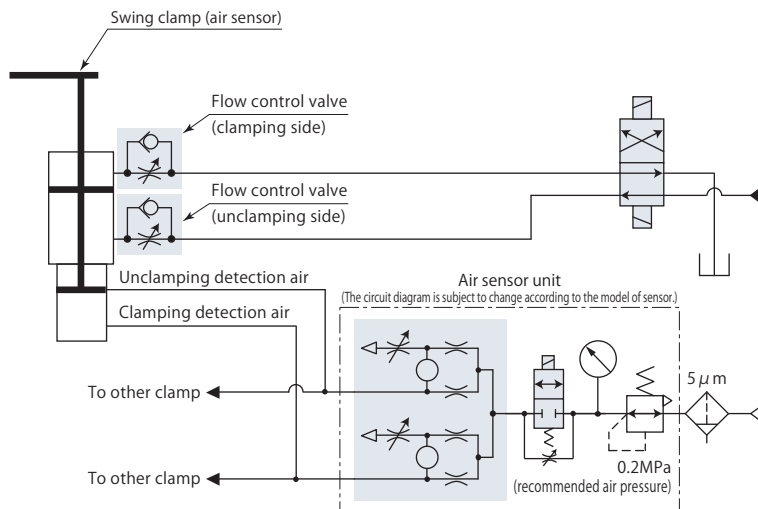
- There is a case that air sensing cannot be successfully made as designed when it is used out of the usage shown on the left. Contact Technical service center for more details.
- Refer to the sensor supplier's instruction manual for the details of setting.
- Sensing performance such as detectable time and pressure differs depending on the supplier and model number of the sensor. Select the right model referring to sensor's application and characteristics.
- Maximum 6 pieces of clamp can be detected at 0.2MPa air pressure by means of 1 piece of sensor. In case of 0.1MPa air pressure, maximum 3 pieces of clamp are detectable.

Air sensor triggering point



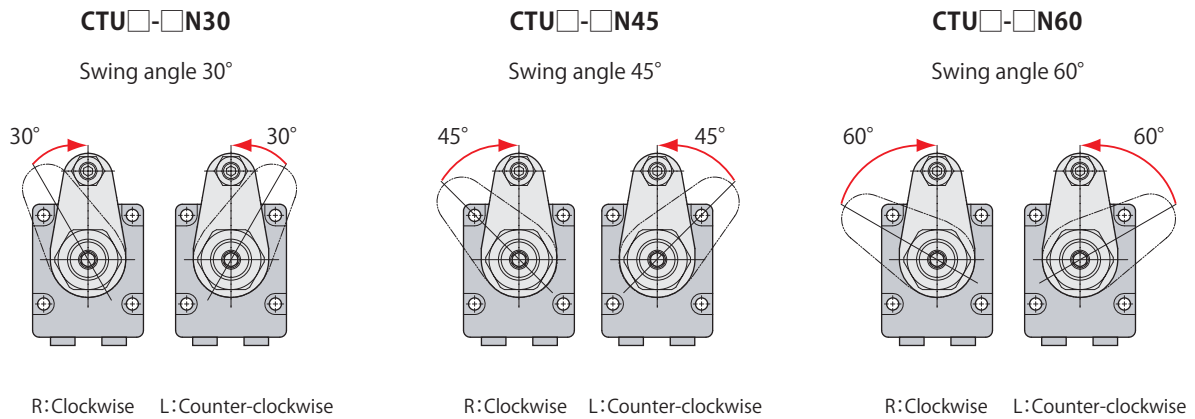
Model	Swing stroke A	Clamp stroke B	Clamping detection position C
CTU01-□A	8	8	9
CTU02-□A	10	8	11
CTU04-□A	12.5	8	13.5
CTU06-□A	13.5	10	14.5
CTU10-□A	16.5	10	17.5
CTU16-□A	18.5	10	19.5
CTU25-□A	23	13	24

Hydraulic and pneumatic circuit diagram



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

Swing angle



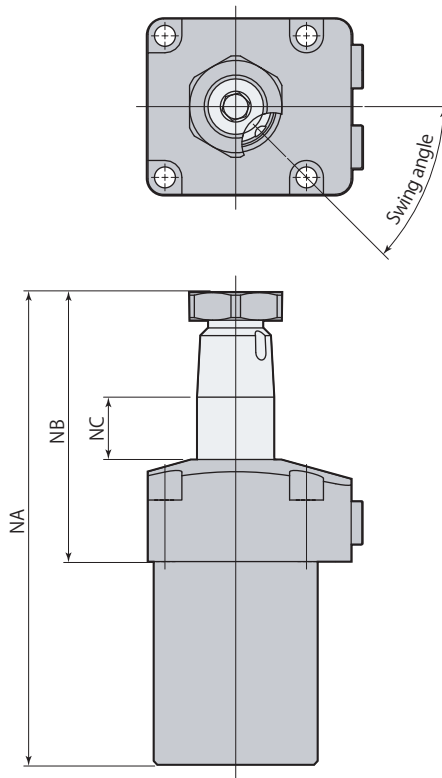
Specifications

Model		CTU01-□N□			CTU02-□N□			CTU04-□N□			CTU06-□N□			
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

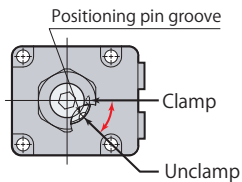
Model		CTU10-□N□			CTU16-□N□			CTU25-□N□			
Swing angle		30°±3°	45°±3°	60°±3°	30°±3°	45°±3°	60°±3°	30°±3°	45°±3°	60°±3°	
Full stroke	mm	18.3	20.3	22.4	19.3	21.6	23.9	24.5	27.4	30.3	
Swing stroke	mm	8.3	10.3	12.4	9.3	11.6	13.9	11.5	14.4	17.3	
Clamp stroke	mm	10			10			13			
Cylinder capacity	Clamp	cm 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

● Refer to **page →7** for the specifications of products that are not listed on this page.

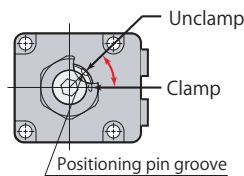
Dimensions



Swing direction L (counter-clockwise)



Swing direction R (clockwise)



● This diagram indicates unclamped condition of swing direction L (L stands for counter-clockwise).

Direction of positioning pin groove will be hydraulic port side at the time of clamping.

● Refer to **page →10** for the dimensions of products that are not listed on this page.

Model	CTU01-□N□			CTU02-□N□			CTU04-□N□			CTU06-□N□		
	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	112.8	113.7	114.7	126.0	127.3	128.5	142.3	143.8	145.4	151.8	153.4	155.1
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	13.3	14.2	15.2	15.0	16.3	17.5	16.3	17.8	19.4	18.8	20.4	22.1

Model	CTU10-□N□			CTU16-□N□			CTU25-□N□		
	30°±3°	45°±3°	60°±3°	30°±3°	45°±3°	60°±3°	30°±3°	45°±3°	60°±3°
NA	170.3	172.3	174.4	192.3	194.6	196.9	232.5	235.4	238.3
NB	93.3	95.3	97.4	108.3	110.6	112.9	135.5	138.4	141.3
NC	20.3	22.3	24.4	20.8	23.1	25.4	26.0	28.9	31.8

Size	Swing direction (when clamping)	Clamp stroke
01	L : Counter-clockwise	S16 : 16mm
02		S20 : 20mm
04	R : Clockwise	S25 : 25mm
06		S30 : 30mm
10		S50 : 50mm
16		
25		

■ indicates made to order.

Size, stroke and shape of flange

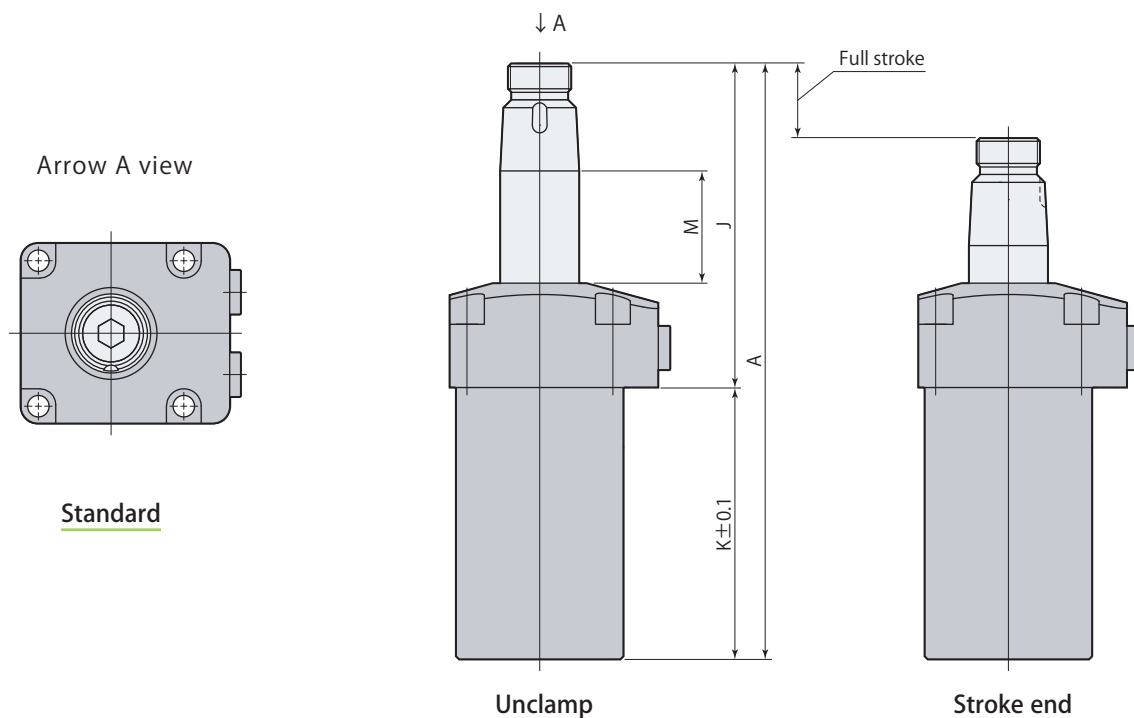
CTU size	01	02	04	06	10	16	25	Shape of flange
Clamp stroke mm	16		20		30			Standard page →22
	-	25	30	30	50	-		Round page →23

Specifications

Model		CTU01-□S16	CTU02-□S16	CTU04-□S16	CTU06-□S20	CTU10-□S20	CTU16-□S20	CTU25-□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
	Unclamp	cm ³	11.8	17.2	29.0	46.4	77.5	127.8
Mass	kg	0.8	1.1	1.6	2.1	3.4	5.5	11.7

● Refer to standard (page →7) for the specifications of products that are not listed on this page.

Dimensions



● Flange size is same as standard stroke model.

Refer to section for standard stroke model (page →10) for the dimensions of products that are not listed on this page.

Model	CTU01-□S16	CTU02-□S16	CTU04-□S16	CTU06-□S20	CTU10-□S20	CTU16-□S20	CTU25-□S30
A	141	155	172.5	188.5	208.5	231.5	295
J	76.5	85	95.5	102.5	111.5	127.5	164
K	64.5	70	77	86	97	104	131
M	25.5	28	30.5	35.5	38.5	40	54.5

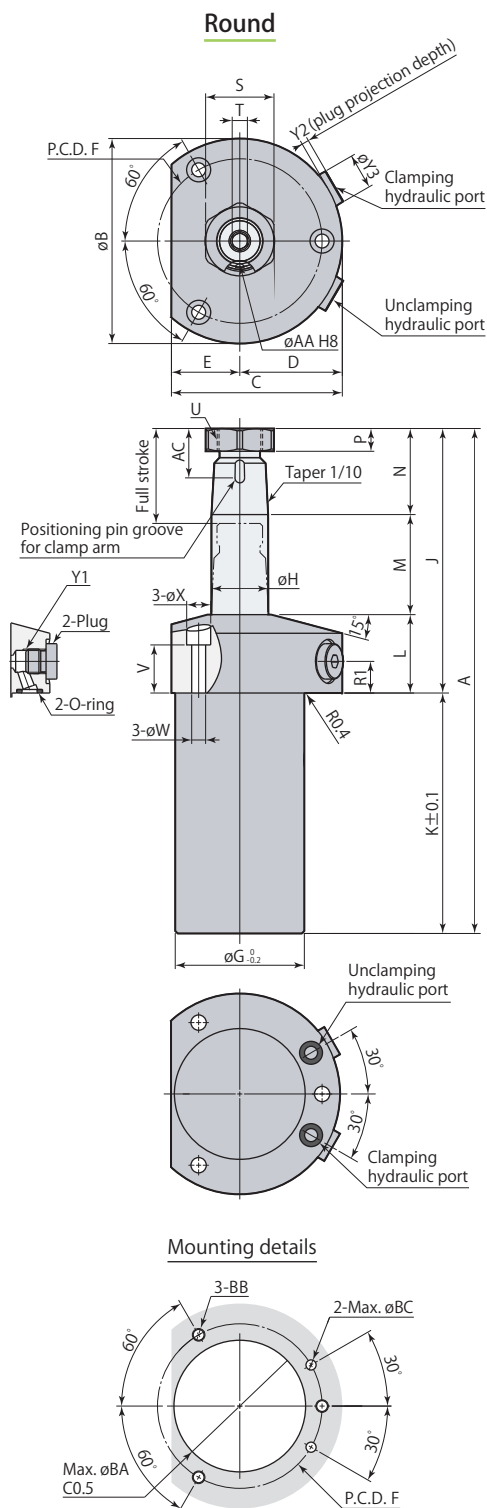
mm

Specifications

Model		CTU04-□S25	CTU06-□S30	CTU10-□S30	CTU10-□S50	CTU16-□S30	CTU16-□S50
Full stroke	mm	37.5	43.5	46.5	66.5	48.5	68.5
Clamp stroke	mm	25	30	30	50	30	50
Cylinder capacity	Clamp	cm ³	23.4	38.9	65.9	94.2	112.9
	Unclamp	cm ³	38.2	60.3	98.8	141.2	160.9
Mass	kg	2.3	3.1	5.0	6.0	7.5	8.7

● Refer to standard (page →7) for the specifications of products that are not listed on this page.

Dimensions

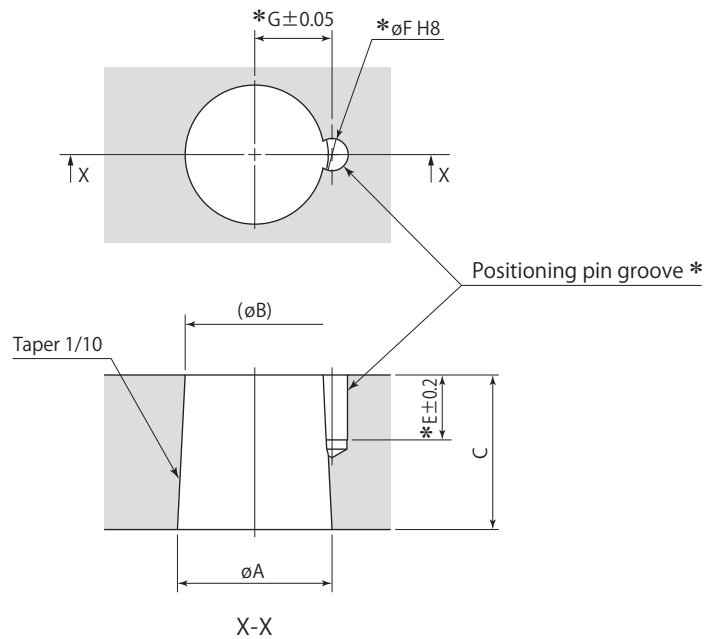


Model	CTU04-□S25	CTU06-□S30	CTU10-□S30	CTU10-□S50	CTU16-□S30	CTU16-□S50
A	199.5	218.5	238.5	298.5	261.5	321.5
øB	81	89	112	112	125	125
C	67.5	75	92.5	92.5	105.5	105.5
D	40.5	44.5	56	56	62.5	62.5
E	27	30.5	36.5	36.5	43	43
F	65	73	88	88	101	101
øG	51	58	70	70	83	83
øH	22.4	25	30	30	35.5	35.5
J	104.5	112.5	121.5	141.5	137.5	157.5
K	95	106	117	157	124	164
L	31	33	36	36	40.5	40.5
M	39.5	45.5	48.5	68.5	50	70
N	34	34	37	37	47	47
P (nut thickness)	9	9	10	10	12	12
R1	12.5	12.5	14	14	14	14
S (nut width across flats)	27	30	36	36	46	46
T (hex socket)	6	8	8	8	10	10
U	M18×1.5	M20×1.5	M24×1.5	M24×1.5	M30×1.5	M30×1.5
V	19	19.5	19	19	20	20
øW	5.5	6.8	9	9	11	11
øX	9.5	11	14	14	17.5	17.5
Y1	G1/8	G1/8	G1/4	G1/4	G1/4	G1/4
Y2	2.8	2.8	3.8	3.8	3.8	3.8
øY3	14	14	19	19	19	19
O-ring*	P7	P7	P8	P8	P8	P8
øAA (pin groove diameter)	4 ^{+0.018} ₀	5 ^{+0.018} ₀	6 ^{+0.018} ₀	6 ^{+0.018} ₀	6 ^{+0.018} ₀	6 ^{+0.018} ₀
AC	19.5	19.5	22.5	22.5	24.5	24.5
øBA	52	59	71	71	84	84
BB	M5	M6	M8	M8	M10	M10
øBC	4	4	6	6	6	6
Positioning pin (dowel pin)	ø4(h8)×10	ø5(h8)×10	ø6(h8)×12	ø6(h8)×12	ø6(h8)×12	ø6(h8)×12

*: Fluorocarbon hardness Hs90 ● This diagram indicates unclamped condition of swing direction L (L stands for counter-clockwise).

Clamp arm mounting details

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



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

Swing clamp	CTU01	CTU02	CTU04	CTU06	CTU10	CTU16	CTU25
ϕA	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}
ϕB	12.4	16	19.9	22.5	27.3	32	40.5
C	16	20	25	25	27	35	45
E	9	10.5	10.5	10.5	12.5	12.5	14.5
ϕF (pin groove diameter)	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
G	7.55	9.1	11.1	12.6	15.1	18.1	22.6

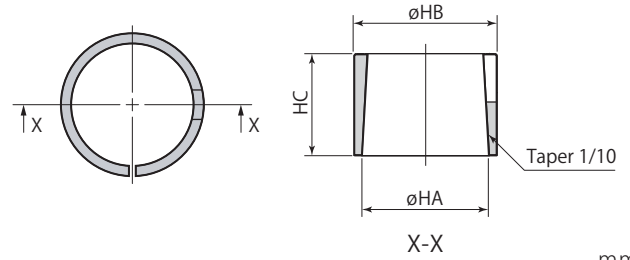
mm

Taper sleeve

Size

01
02
04
06
10
16
25

CTH — **TS** : Taper sleeve

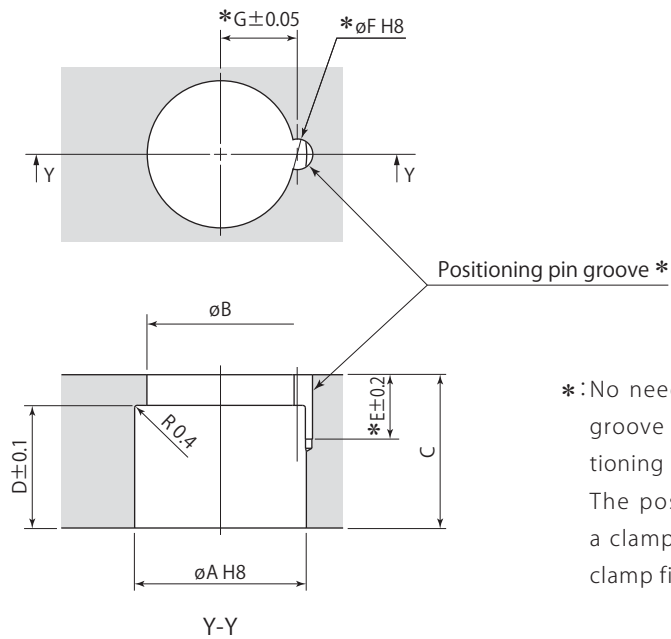


Taper sleeve	CTH01-TS	CTH02-TS	CTH04-TS	CTH06-TS	CTH10-TS	CTH16-TS	CTH25-TS
Applicable swing clamp	CTU01	CTU02	CTU04	CTU06	CTU10	CTU16	CTU25
ϕHA	14	18	22.4	25	30	35.5	45
ϕHB	16	20	25	28	34	40	49
HC	13	16	21	20	22	29	38

Clamp arm mounting details

(Using taper sleeve)

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



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

Taper sleeve	CTH01-TS	CTH02-TS	CTH04-TS	CTH06-TS	CTH10-TS	CTH16-TS	CTH25-TS
Applicable swing clamp	CTU01	CTU02	CTU04	CTU06	CTU10	CTU16	CTU25
ϕA	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
ϕB	13	17	21	24	28.5	34	42
C	16	20	25	25	27	35	45
D	13	16	21	20	22	29	38
E	9	10.5	10.5	10.5	12.5	12.5	14.5
ϕF (pin groove diameter)	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
G	7.55	9.1	11.1	12.6	15.1	18.1	22.6