

## Swing clamp

Double acting 15 MPa

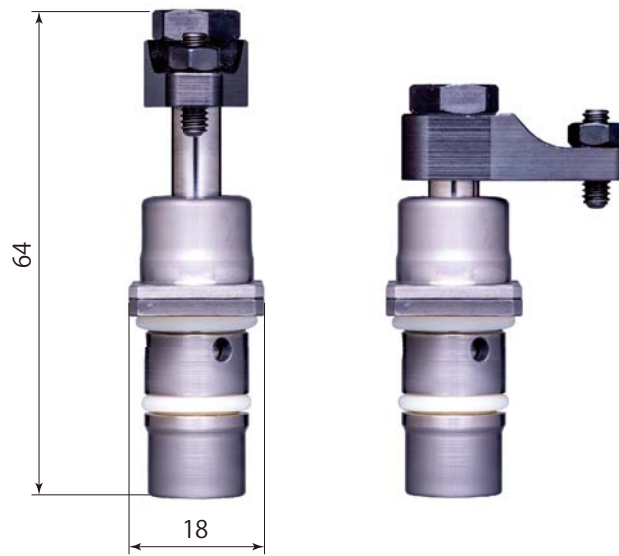
Cartridge model



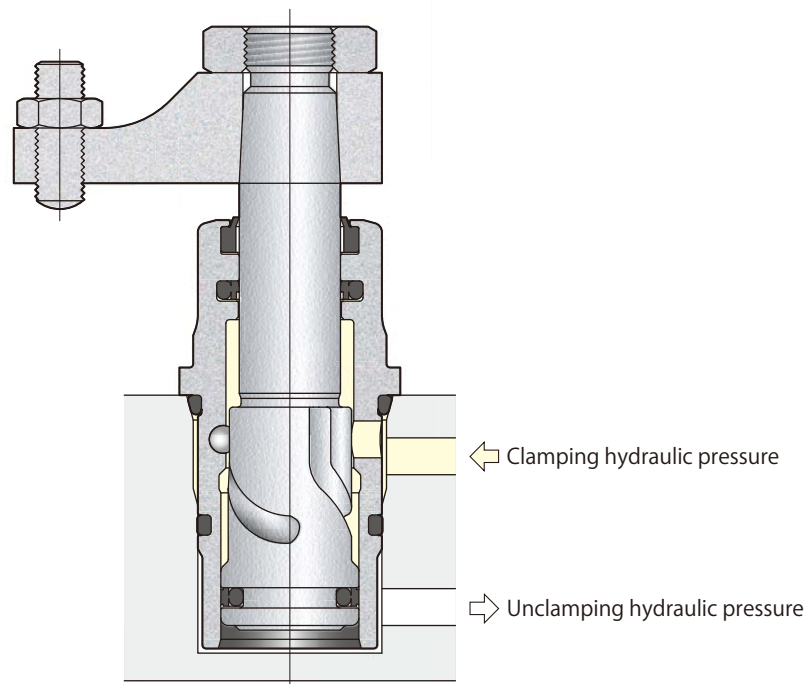
Cartridge model  
model CUC12-L

**Cartridge model**

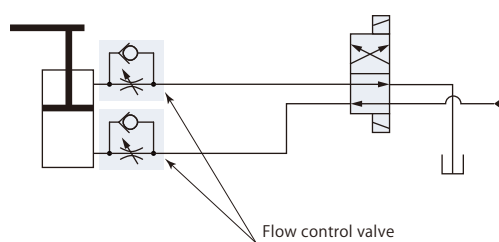
model **CUC**□-□



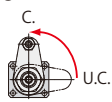
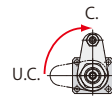
CUC04-L (Scale 1:1)



Hydraulic circuit diagram



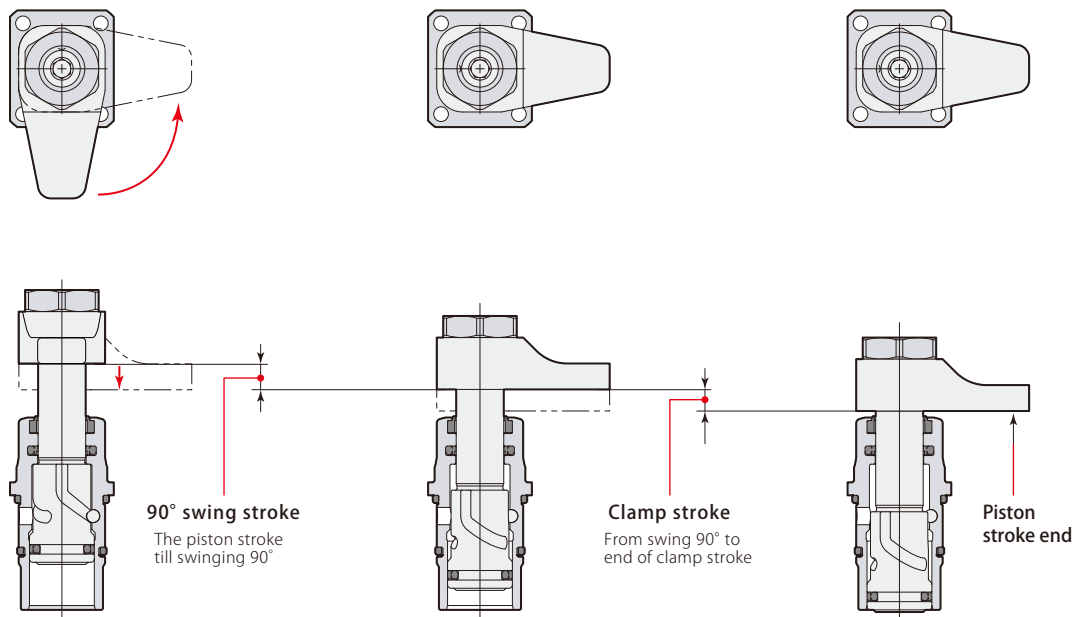
### Specifications

	Size		Swing direction (when clamping)
<b>CUC</b>	04	-	<b>L</b> : Counter-clockwise 
	07		
	12		<b>R</b> : Clockwise 
	24		

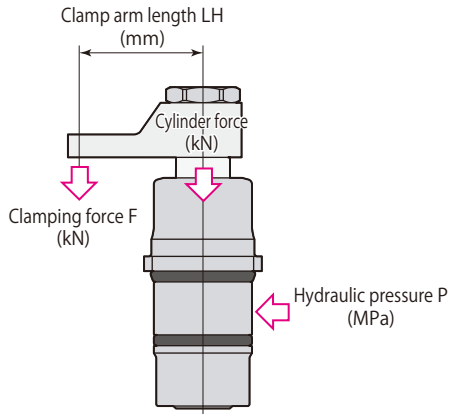
Model		CUC04	CUC07	CUC12	CUC24	
Cylinder force (hydraulic pressure 15MPa)	N	380	740	1230	2400	
Cylinder inner diameter	mm	9	12	15	20	
Rod diameter	mm	7	9	11	14	
Effective area(Clamp)	cm <sup>2</sup>	0.25	0.49	0.82	1.60	
Swing angle		90° ± 3°				
Positioning pin groove position accuracy		± 2°		± 1.5°	± 1°	
Repeated clamp positioning accuracy		± 1°		± 0.5°		
Full stroke	mm	11	11	11	11.5	
90° swing stroke	mm	6	6	6	6.5	
Clamp stroke	mm	5	5	5	5	
Cylinder capacity	Clamp	cm <sup>3</sup>	0.28	0.54	0.90	1.84
	Unclamp	cm <sup>3</sup>	0.70	1.24	1.94	3.61
Mass	g	50	80	120	210	
Recommended tightening torque of mounting screws*	N·m	0.8	0.8	1.4	3.5	
Recommended tightening torque of nut	N·m	3	7	12	20	

- Pressure range: 5-15 MPa   ● Proof pressure: 22.5 MPa   ● Operating temperature: 0-70 °C
- Fluid used: General mineral based hydraulic oil (ISO-VG32 equivalent)
- Seals are resistant to chlorine-based cutting fluid.   \* : ISO R898 class 12.9

Clamping must be done within the range of clamp stroke.



Performance table



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

Clamping force calculation formula

$$F = P / (\text{Coefficient 1} + \text{Coefficient 2} \times LH) \times 1000$$

F: Clamping force P: Hydraulic pressure LH: Clamp arm length

CUC04 with (LH) 40mm clamp arm at hydraulic pressure of 7 MPa, Clamping force F is calculated by  
 $= 7 / (45.73 + 0.3286 \times 40) \times 1000 = 119 \text{ N}$

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

model CUC04		Clamping force $F = P / (45.73 + 0.3286 \times LH) \times 1000$								
Hydraulic pressure MPa	Cylinder force N	Clamping force N								Max. arm length Max. LH mm
		Clamp arm length LH mm								
		15	20	25	30	35	40	45	50	
15	377	296	287							21
14	352	276	268							23
13	327	257	249	241						25
12	302	237	229	222						28
11	276	217	210	204	198					31
10	251	197	191	185	180	175				35
9	226	178	172	167	162	157	153			40
8	201	158	153	148	144	140	136	132		47
7	176	138	134	130	126	122	119	116	113	57
6	151	118	115	111	108	105	102	99	97	↑
5	126	99	96	93	90	87	85	83	80	57

model CUC07		Clamping force $F = P / (22.21 + 0.1538 \times LH) \times 1000$								
Hydraulic pressure MPa	Cylinder force N	Clamping force N								Max. arm length Max. LH mm
		Clamp arm length LH mm								
		15	20	25	30	40	50	60	70	
15	742	612	593							24
14	693	571	554	537						26
13	643	530	514	499						29
12	594	489	475	461	447					32
11	544	449	435	422	410					36
10	495	408	395	384	373	353				40
9	445	367	356	345	336	317				47
8	396	326	316	307	298	282	268			55
7	346	286	277	269	261	247	234	223	212	70
6	297	245	237	230	224	212	201	191	182	↑
5	247	204	198	192	186	176	167	159	152	70

model CUC12		Clamping force $F = P / (12.89 + 0.0869 \times LH) \times 1000$								
Hydraulic pressure MPa	Cylinder force N	Clamping force N								Max. arm length Max. LH mm
		Clamp arm length LH mm								
		20	25	30	35	40	50	60	80	
15	1225	1026	996							28
14	1144	957	930	904						31
13	1062	889	863	839						34
12	980	821	797	775	753					38
11	898	752	730	710	691	672				42
10	817	684	664	645	628	611				48
9	735	615	598	581	565	550	522			56
8	653	547	531	516	502	489	464	442		66
7	572	479	465	452	439	428	406	387	353	82
6	490	410	398	387	377	367	348	331	302	↑
5	408	342	332	323	314	306	290	276	252	82

model CUC24		Clamping force $F = P / (6.30 + 0.0387 \times LH) \times 1000$								
Hydraulic pressure MPa	Cylinder force N	Clamping force N								Max. arm length Max. LH mm
		Clamp arm length LH mm								
		25	30	35	40	50	60	70	85	
15	2403	2063	2009							30
14	2243	1925	1875							33
13	2083	1788	1741	1697						37
12	1923	1650	1607	1567	1528					41
11	1762	1513	1473	1436	1401					46
10	1602	1375	1340	1306	1274	1214				52
9	1442	1238	1206	1175	1146	1092	1043			61
8	1282	1100	1072	1045	1019	971	927	888		72
7	1122	963	938	914	891	850	811	777	730	89
6	961	825	804	783	764	728	696	666	625	↑
5	801	688	670	653	637	607	580	555	521	89

### 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.

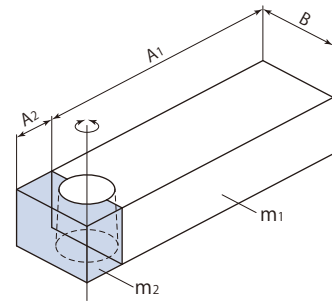
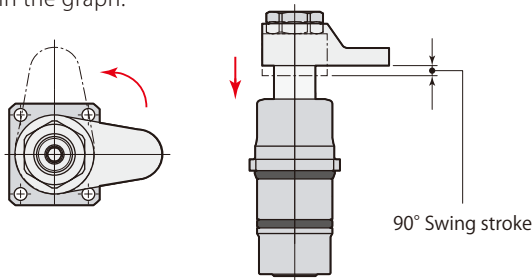
1. Calculate the moment of inertia according to the arm length and mass.
  2. Adjust the flow rate with a flow control valve so that the 90° swing time is equal to or longer than the minimum swing time shown in the graph below.
- The cam groove may be damaged in case the swing speed is set at the nonusable range in the graph.

#### Example of calculation for moment of inertia

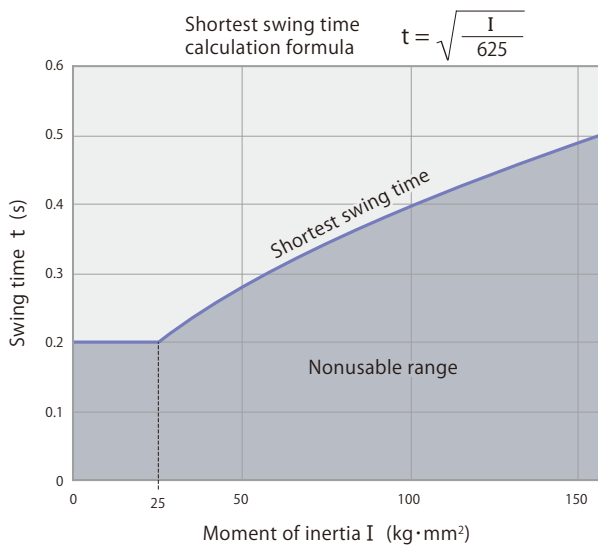
$$I = \frac{1}{12} m_1(4A_1^2 + B^2) + \frac{1}{12} m_2(4A_2^2 + B^2)$$

I : Moment of inertia (kg·mm<sup>2</sup>)

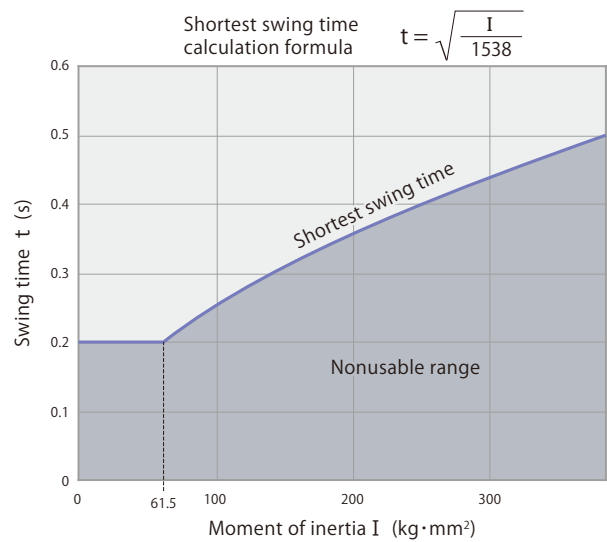
m: Mass (kg)



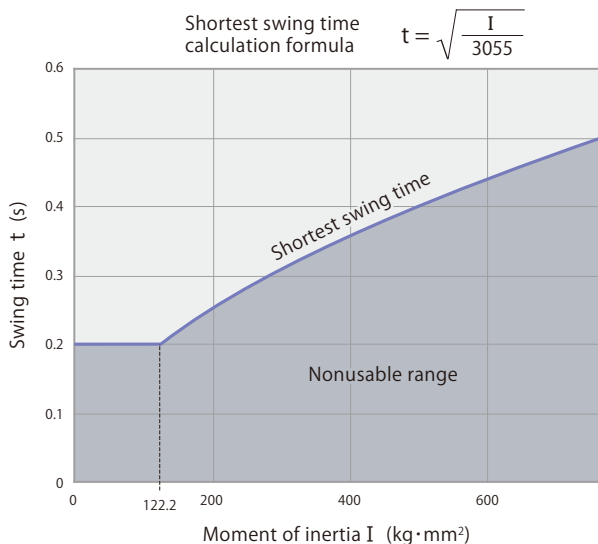
model CUC04



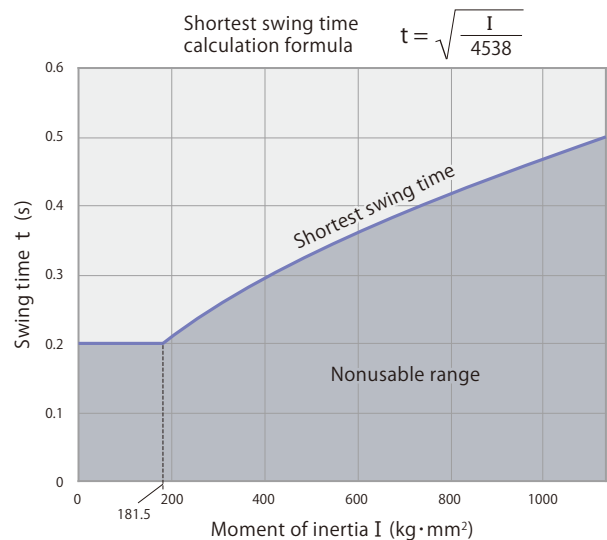
model CUC07



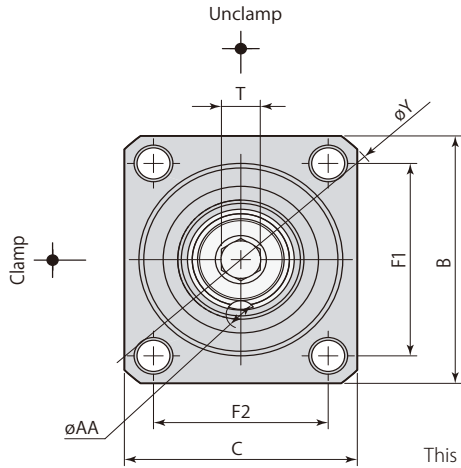
model CUC12



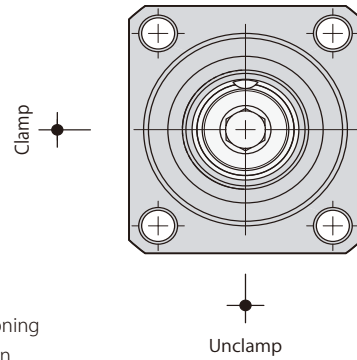
model CUC24



Dimensions

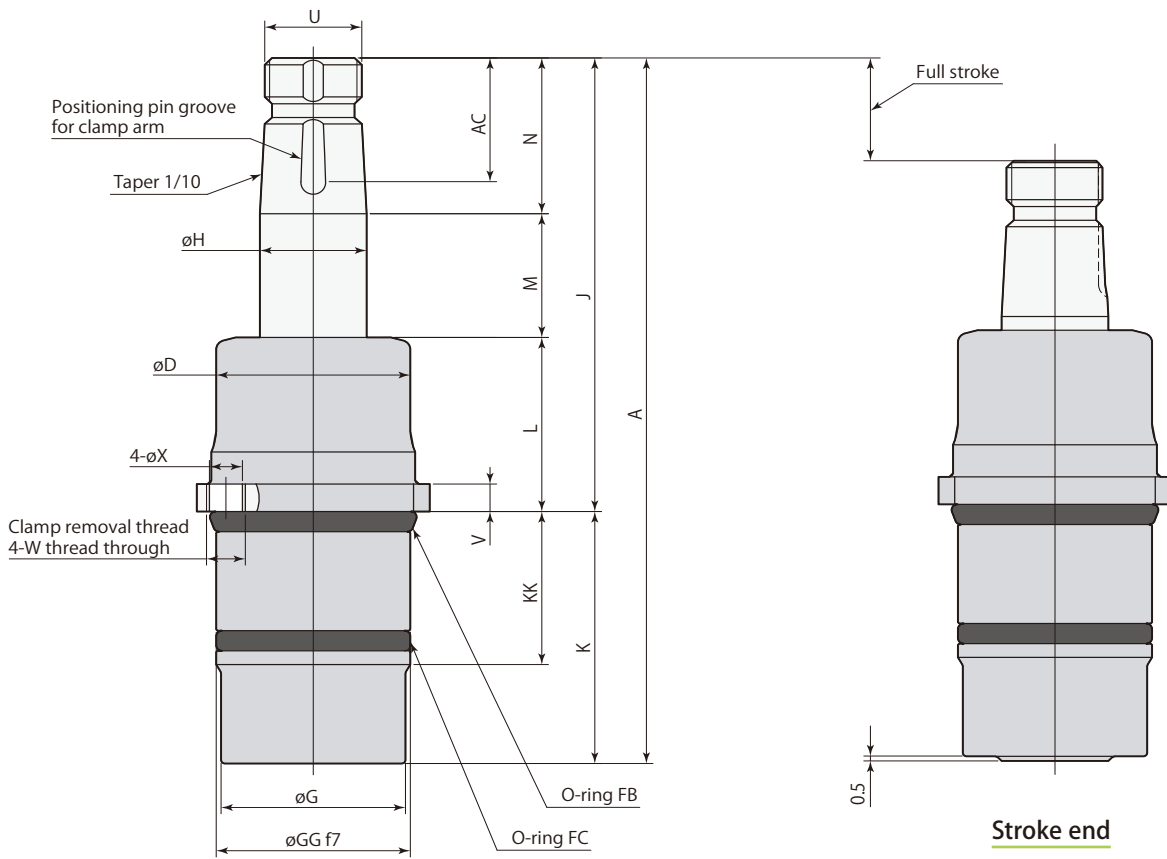


This diagram indicates the arm positioning pin groove at unclamped condition.



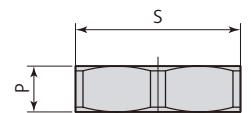
Swing direction L (counter-clockwise)

Swing direction R (clockwise)



Unclamp

Stroke end



Hex nut for arm mount

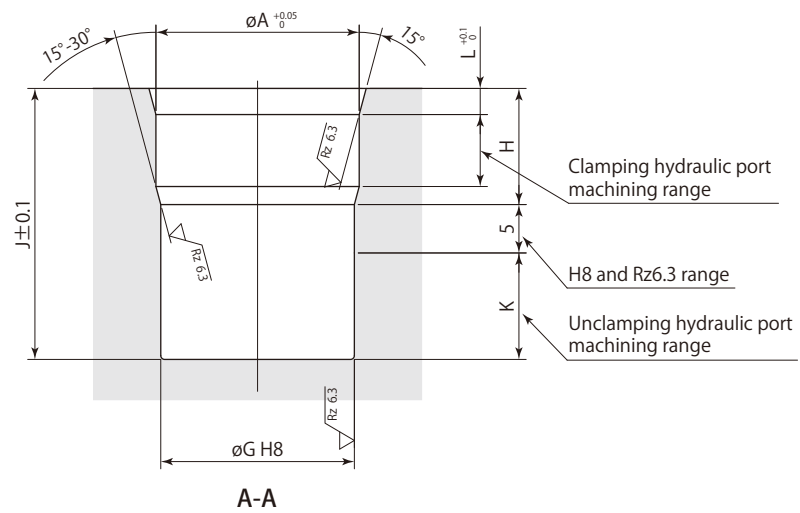
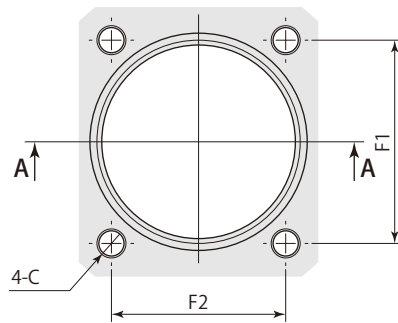
- Hex nut for arm mount is included.
- Clamp arm, positioning pin and mounting screws are not included.

<b>CUC</b>	<b>Swing clamp Cartridge model</b>	<b>15 MPa</b>	<b>Double acting</b>
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Model	CUC04	CUC07	CUC12	CUC24
A	64	68.5	74	84.5
B	21.5	23	27	33.5
C	18	21	24	29
øD	15	17.5	20	23
F1	16.5	18	21	26
F2	13	16	18	21.5
øG	13	16	19	24
øGG	14 <sup>-0.016</sup> <sub>-0.034</sub>	17 <sup>-0.016</sup> <sub>-0.034</sub>	20 <sup>-0.020</sup> <sub>-0.041</sub>	25 <sup>-0.020</sup> <sub>-0.041</sub>
øH	7	9	11	14
J	38.5	43	47.5	55.5
K	25.5	25.5	26.5	29
KK	15	15	15.5	18
L	14.5	16	18	20
M	12.5	12.5	12.5	13
N	11.5	14.5	17	22.5
P	3.5	4.5	5	6.5
S (nut width across flats)	11	14	17	19
T (hex socket)	2.5	3	4	5
U	M6×0.75	M8×0.75	M10×1	M12×1.5
V	3.5	4	3	3.5
W	M3×0.5	M3×0.5	M4×0.7	M5×0.8
øX	2.7	2.7	3.4	4.5
øY	26.5	29	34	41.5
øAA (pin groove diameter)	2	2.5	3	3
AC	9.8	11	13.5	15.5
Positioning pin (dowel pin)	ø2(h8)×6	ø2.5(h8)×6	ø3(h8)×8	ø3(h8)×8
O-ring FB (AU-90)	AS568-014	AS568-016	AS568-018	AS568-021
O-ring FC (AU-90)	AS568-013	AS568-015	AS568-017	AS568-020
Taper sleeve	CTH04-UTS	CTH07-UTS	CTH00-TS	CTH01-TS

● Refer to Taper sleeve (**Page →9**).

Mounting details



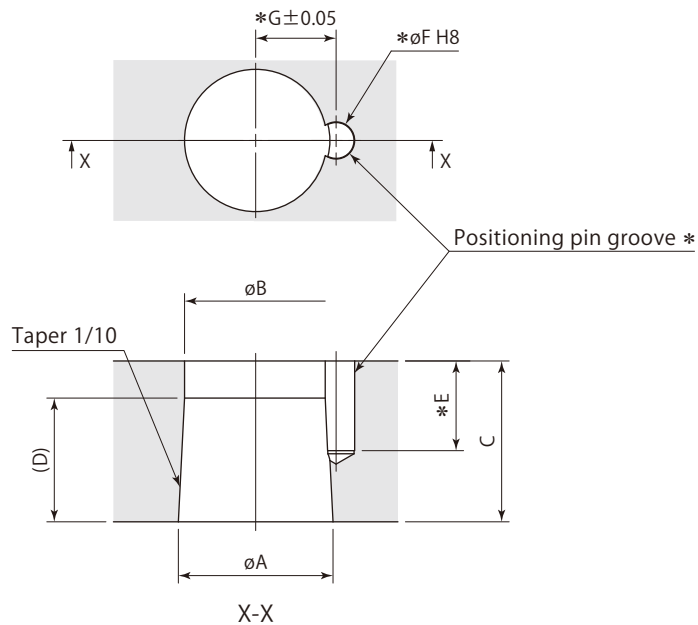
Model	CUC04	CUC07	CUC12	CUC24
$\varnothing A$	15	18	21	26
C	M2.5	M2.5	M3	M4
F1	16.5	18	21	26
F2	13	16	18	21.5
$\varnothing G$	$14^{+0.027}_0$	$17^{+0.027}_0$	$20^{+0.033}_0$	$25^{+0.033}_0$
H	10.5	10.5	11	13.5
J	26	26	27	29.5
K	10.5	10.5	11	11
L	2.7	2.7	2.7	2.7

mm



**Clamp arm mounting details**

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



\* :When the positioning pin is not used, the machining of the positioning pin groove (E,  $\phi$ F, G) is not required.  
 (The positioning pin allows for secure and easy positioning of the clamp arm in the mounting direction.)

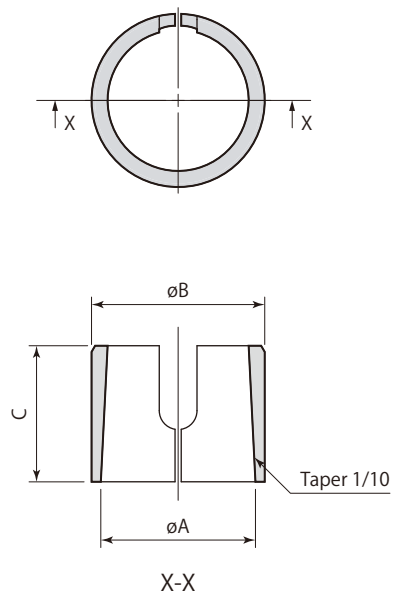
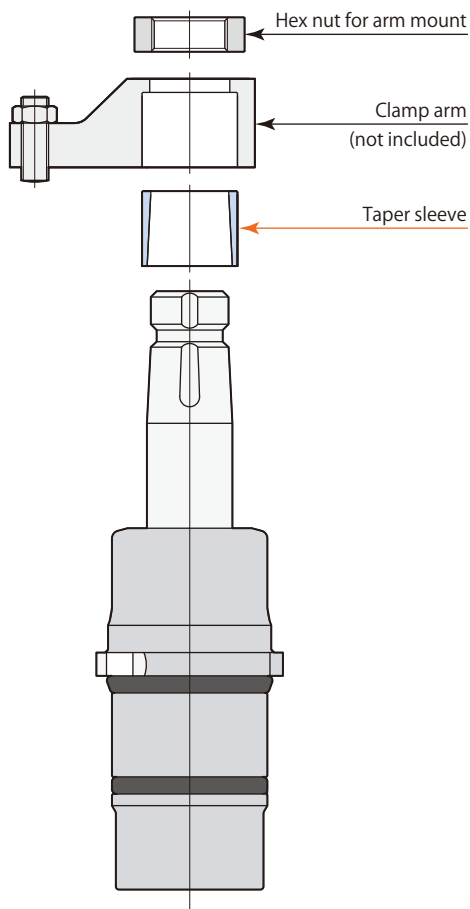
Applicable swing clamp	CUC04	CUC07	CUC12	CUC24
$\phi$ A	7 <sup>-0.013</sup> <sub>-0.028</sub>	9 <sup>-0.013</sup> <sub>-0.028</sub>	11 <sup>-0.016</sup> <sub>-0.034</sub>	14 <sup>-0.016</sup> <sub>-0.034</sub>
$\phi$ B	6.2	8.2	10.2	12.4
C	8	10	12	16
D	8	8	8	16
E	6.5	6.5	8.5	9
$\phi$ F (pin groove diameter)	2 <sup>+0.014</sup> <sub>0</sub>	2.5 <sup>+0.014</sup> <sub>0</sub>	3 <sup>+0.014</sup> <sub>0</sub>	3 <sup>+0.014</sup> <sub>0</sub>
G	3.65	5.05	6.05	7.55

mm

Taper sleeve



<b>CTH</b>	04	-	<b>UTS</b>	: Taper sleeve for CUC04
	07			: Taper sleeve for CUC07
	00		<b>TS</b>	: Taper sleeve for CUC12
	01			: Taper sleeve for CUC24



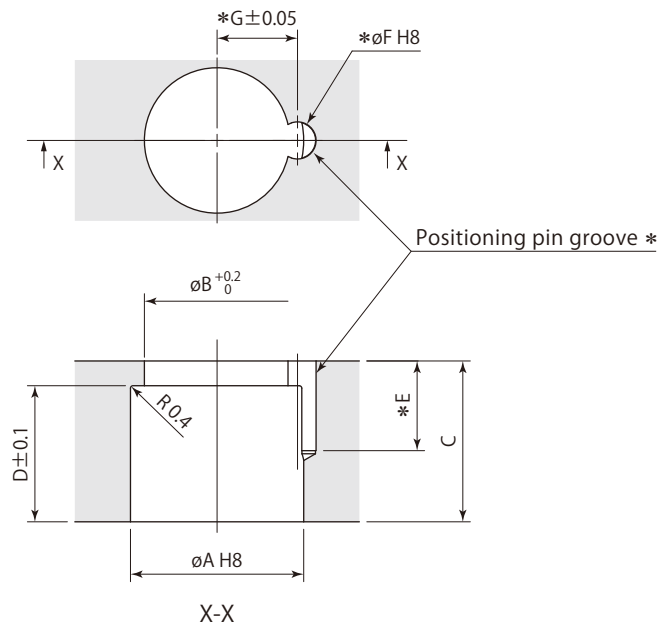
Taper sleeve	CTH04-UTS	CTH07-UTS	CTH00-TS	CTH01-TS
Applicable swing clamp	CUC04	CUC07	CUC12	CUC24
$\phi A$	7	9	11	14
$\phi B$	8.2	10.5	13	16
C	6	8	9	13

mm

### Clamp arm mounting details

#### Using taper sleeve

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



\* :When the positioning pin is not used, the machining of the positioning pin groove (E, øF, G) is not required.  
(The positioning pin allows for secure and easy positioning of the clamp arm in the mounting direction.)

Taper sleeve	CTH04-UTS	CTH07-UTS	CTH00-TS	CTH01-TS
Applicable swing clamp	CUC04	CUC07	CUC12	CUC24
øA	8.2 <sup>+0.022</sup> <sub>0</sub>	10.5 <sup>+0.027</sup> <sub>0</sub>	13 <sup>+0.027</sup> <sub>0</sub>	16 <sup>+0.027</sup> <sub>0</sub>
øB	6.2	8.2	10.5	13
C	8	10	12	16
D	6	8	9	13
E	6.5	6.5	8.5	9
øF (pin groove diameter)	2 <sup>+0.014</sup> <sub>0</sub>	2.5 <sup>+0.014</sup> <sub>0</sub>	3 <sup>+0.014</sup> <sub>0</sub>	3 <sup>+0.014</sup> <sub>0</sub>
G	3.65	5.05	6.05	7.55

mm

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