Free Mount Cylinder

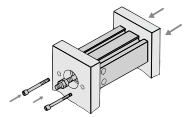
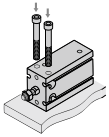
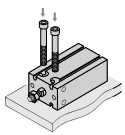
Series CU

A space-saving air cylinder with multiple surfaces capable of mounting directly. Offered in rich variations.

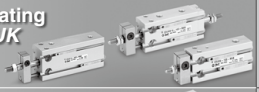
Space-saving

The multiple surface direct mounting with a square body and no brackets allows the freedom of the mounting surface.
This enables space-saving designs for equipment.

Mounting

Axial mounting (Body tapped)	Vertical mounting (Body through-holes)	Lateral mounting (Body through-holes)
		

Series Variations

Series	Action	Rod	Bore size (mm)	Page
Standard *Series* ***CU*** 	Double acting	Single rod	6, 10, 16, 20, 25, 32	657
		Double rod		664
	Single acting	Single rod (Spring return/Extend)		669
Non-rotating *Series* ***CUK*** 	Double acting	Single rod		676
		Double rod		680
	Single acting	Single rod (Spring return/Extend)		684
Long stroke *Series* ***CU*** 	Double acting	Single rod		690
Long stroke, Non-rotating rod *Series* ***CUK*** 	Double acting	Single rod		694
With air cushion *Series* ***CU-A*** 	Double acting	Single rod	20, 25, 32	698
For vacuum *Series* ***ZCUK*** 	Double acting	Single rod	10, 16, 20, 25, 32	707

Combinations of Standard Products and Made

Series CU

●: Standard
◎: Made to Order specifications
○: Special product (Contact SMC for details.)
—: Not available

Symbol	Specification	Applicable bore size	CU (Standard) Double acting Single rod	CU (Standard) Double acting Double rod	CU (Standard) Single acting Single rod	CUK (Non-rotating) Double acting Single rod	CUK (Non-rotating) Double acting Double rod	CUK (Non-rotating) Single acting Single rod
			ø6 to ø32					
Standard	Standard	ø6 to ø32	●	●	●	●	●	●
D	Built-in magnet		●	●	●	●	●	●
10-, 11-, 21-, 22-	Clean series	ø6 to ø25	●	—	—	—	—	—
25-	Copper (Cu)-free Note 3)	ø10 to ø32	●	○	○	●	○	○
25A-	Copper (Cu) and zinc (Zn)-free Note 3)		●	○	○	●	○	○
20-	Copper Note 2) and Fluorine-free	ø6 to ø32	●	○	○	●	○	○
XB6	Heat-resistant cylinder (–10 to 150 °C)	ø6 to ø32	◎	○	—	◎	○	—
XB7	Cold-resistant cylinder (–40 to 70 °C)		◎	○	—	◎	○	—
XB9	Low-speed cylinder (10 to 50 mm/s) Note 1)		◎	○	—	◎	○	—
XB13	Low-speed cylinder (5 to 50 mm/s) Note 1)		◎	○	—	◎	○	—
XC19	Intermediate stroke (5 mm spacer)		◎	○	—	◎	○	—
XC22	Fluororubber seals		◎	○	◎	◎	○	◎
XC34	Rod not extending beyond non-rotating plate		—	—	—	◎	○	◎

Note 1) Refer to Best Pneumatics No. 3 for low-speed cylinders.
Note 2) Copper-free for the externally exposed part.
Note 3) For details, refer to the SMC website.

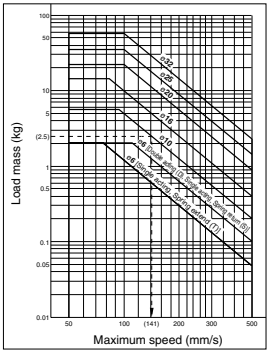
	CU (Long stroke)		CUK (Long stroke, Non-rotating)		CU-A (Air cushion)	ZCUK (For vacuum)	CUX (Low-speed cylinder) Note)
	Double acting		Double acting		Double acting	Double acting	Double acting
	Single rod	Double rod	Single rod	Double rod	Single rod	Single rod	Single rod
	ø6 to ø32				ø20 to ø32	ø10 to ø32	
	●	●	●	●	●	●	●
	●	●	●	●	●	●	●
	—	—	—	—	—	—	○ (ø16 or more)
	○	○	○	○	○	○	—
	○	○	○	○	○	○	—
	●	○	○	●	○	○	—
	◎	○	◎	○	—	○	—
	◎	○	◎	○	—	○	—
	◎	○	◎	○	—	○	—
	◎	○	◎	○	—	○	—
	◎	○	◎	○	—	○	○
	◎	○	◎	○	—	○	—
	—	—	◎	○	—	○	—

Precautions on Free Mount

1. Operating speed

Make sure to connect a speed controller to the cylinder and adjust its speed to 500 mm/s or less.
If a load is to be attached to the end of the rod, adjust the speed to the maximum speed shown in Graph (1) or less, in accordance with the added mass.

Graph (1) Load Mass and Maximum Speed



How to read the graph
- Using the CU10 to drive a load weighing 2.5 kg: From the vertical axis in the graph on the left, extend the horizontally from 2.5 kg., and drop down from the point at which it intersects with the tube bore ø10. The maximum speed will be 141 mm/s.

2. Rod end allowable lateral load

Make sure that the lateral load that is applied to the rod end will be no more than the values shown in the tables.
The tables show the value for a single rod. For double rods, please contact SMC.

Standard Double Acting, Single Rod

Without auto switch: CU□-□D (N)

Model	Stroke (mm)												
	5	10	15	20	25	30	40	50	60	70	80	90	100
CU6	0.085	0.075	0.068	0.061	0.056	0.052	0.045	0.039	0.035	—	—	—	—
CU10	0.34	0.30	0.27	0.25	0.23	0.21	0.18	0.16	0.15	—	—	—	—
CU16	0.69	0.61	0.55	0.50	0.46	0.43	0.37	0.33	0.29	—	—	—	—
CU20	2.2	2.0	1.8	1.6	1.5	1.4	1.2	1.1	1.0	0.92	0.85	0.78	0.73
CU25	3.5	3.2	3.0	2.7	2.6	2.4	2.1	1.9	1.7	1.6	1.4	1.3	1.2
CU32	5.4	4.9	4.6	4.3	4.0	3.8	3.3	3.0	2.8	2.5	2.3	2.2	2.0

With auto switch: CDU□-□D (N)

Model	Stroke (mm)												
	5	10	15	20	25	30	40	50	60	70	80	90	100
CDU6	0.085	0.075	0.068	0.061	0.056	0.052	0.045	0.039	0.035	—	—	—	—
CDU10	0.34	0.30	0.27	0.25	0.23	0.21	0.18	0.16	0.15	—	—	—	—
CDU16	0.99	0.89	0.81	0.74	0.69	0.64	0.56	0.50	0.45	—	—	—	—
CDU20	3.0	2.7	2.5	2.3	2.1	2.0	1.8	1.6	1.4	1.3	1.2	1.1	1.0
CDU25	4.7	4.3	4.0	3.7	3.5	3.2	2.9	2.6	2.4	2.2	2.0	1.9	1.7
CDU32	7.1	6.6	6.1	5.7	5.4	5.1	4.6	4.1	3.8	3.5	3.2	3.0	2.8

Single Acting, Spring Return (S)

Without auto switch: CU□-□S (N)

Model	Stroke (mm)		
	5	10	15
CU6	0.19	0.17	0.15
CU10	0.66	0.59	0.60
CU16	1.4	1.3	1.3
CU20	4.7	4.2	4.4
CU25	6.8	6.2	6.5
CU32	10	9.8	10

With auto switch: CDU□-□S (N)

Model	Stroke (mm)		
	5	10	15
CDU6	0.17	0.15	0.13
CDU10	0.66	0.59	0.60
CDU16	1.6	1.5	1.5
CDU20	5.3	4.8	4.9
CDU25	7.6	7.0	7.2
CDU32	12	11	11

Single Acting, Spring Extend (T)

Without auto switch: CU□-□T (N)

Model	Stroke (mm)		
	5	10	15
CU6	0.067	0.059	0.052
CU10	0.29	0.26	0.24
CU16	0.99	0.89	0.81
CU20	2.2	2.0	1.8
CU25	3.5	3.2	3.0
CU32	5.4	4.9	4.6

With auto switch: CDU□-□T (N)

Model	Stroke (mm)		
	5	10	15
CDU6	0.062	0.055	0.049
CDU10	0.29	0.26	0.24
CDU16	0.99	0.89	0.81
CDU20	3.0	2.7	2.5
CDU25	4.7	4.3	4.0
CDU32	7.1	6.6	6.1

Non-rotating Rod Type

Without auto switch: CUK□-□D (N)

Model	Stroke (mm)												
	5	10	15	20	25	30	40	50	60	70	80	90	100
CUK6	0.075	0.068	0.061	0.056	0.052	0.048	0.042	0.037	0.033	—	—	—	—
CUK10	0.30	0.27	0.25	0.23	0.21	0.20	0.17	0.15	0.14	—	—	—	—
CUK16	0.55	0.50	0.46	0.43	0.40	0.37	0.33	0.29	0.26	—	—	—	—
CUK20	1.8	1.6	1.5	1.4	1.3	1.2	1.1	1.0	0.92	0.85	0.78	0.73	0.68
CUK25	3.0	2.7	2.6	2.4	2.2	2.1	1.9	1.7	1.6	1.4	1.3	1.2	1.2
CUK32	4.3	4.0	3.8	3.5	3.3	3.2	2.9	2.6	2.4	2.2	2.1	2.0	1.8

With auto switch: CDUK□-□D (N)

Model	Stroke (mm)												
	5	10	15	20	25	30	40	50	60	70	80	90	100
CDUK6	0.075	0.068	0.061	0.056	0.052	0.048	0.042	0.037	0.033	—	—	—	—
CDUK10	0.30	0.27	0.25	0.23	0.21	0.20	0.17	0.15	0.14	—	—	—	—
CDUK16	0.81	0.74	0.69	0.64	0.60	0.56	0.50	0.45	0.41	—	—	—	—
CDUK20	2.5	2.3	2.1	2.0	1.9	1.8	1.6	1.4	1.3	1.2	1.1	1.0	1.0
CDUK25	4.0	3.7	3.5	3.2	3.1	2.9	2.6	2.4	2.2	2.0	1.9	1.7	1.6
CDUK32	5.7	5.4	5.1	4.8	4.6	4.4	4.0	3.6	3.4	3.1	2.9	2.7	2.6

Non-rotating Rod Type

Single Acting, Spring Return (S)

Without auto switch: CUK□-□S (N)

Model	Stroke (mm)		
	5	10	15
CUK6	0.17	0.15	0.14
CUK10	0.59	0.54	0.56
CUK16	1.1	1.0	1.1
CUK20	3.9	3.6	3.8
CUK25	5.7	5.3	5.7
CUK32	8.5	7.9	8.6

With auto switch: CDUK□-□S (N)

Model	Stroke (mm)		
	5	10	15
CDUK6	0.15	0.13	0.12
CDUK10	0.59	0.54	0.56
CDUK16	1.3	1.2	1.3
CDUK20	4.4	4.1	4.3
CDUK25	6.5	6.1	6.4
CDUK32	9.7	9.1	9.6

Non-rotating Rod Type

Single Acting, Spring Extend (T)

Without auto switch: CUK□-□T (N)

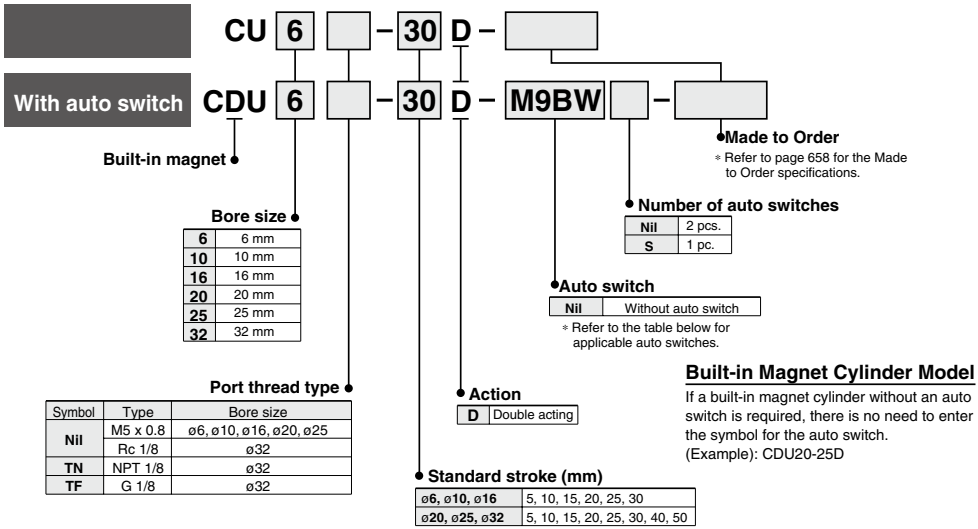
Model	Stroke (mm)		
	5	10	15
CUK6	0.059	0.052	0.047
CUK10	0.26	0.24	0.22
CUK16	0.81	0.74	0.69
CUK20	1.8	1.6	1.5
CUK25	3.0	2.7	2.6
CUK32	4.3	4.0	3.8

With auto switch: CDUK□-□T (N)

Model	Stroke (mm)		
	5	10	15
CDUK6	0.055	0.049	0.044
CDUK10	0.26	0.24	0.22
CDUK16	0.81	0.74	0.69
CDUK20	2.5	2.3	2.1
CDUK25	4.0	3.7	3.5
CDUK32	5.7	5.4	5.1

Free Mount Cylinder
Double Acting, Single Rod
Series CU
ø6, ø10, ø16, ø20, ø25, ø32

How to Order



Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example): CDU20-25D

Applicable Auto Switches/Refer to pages 1559 to 1673 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	●	●	○	○		
				2-wire		12 V		M9BV	M9B	●	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)		5 V, 12 V		M9NWV	M9NW	●	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PWV	M9PW	●	●	●	○	○		
				2-wire		12 V		M9BWV	M9BW	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V		M9NAV∗1	M9NA∗1	○	○	●	○	○	IC circuit	
				3-wire (PNP)				M9PAV∗1	M9PA∗1	○	○	●	○	○		
				2-wire		12 V		M9BAV∗1	M9BA∗1	○	○	●	○	○	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	A93V∗2	A93	●	●	●	●	—	—	Relay, PLC
							100 V or less	A90V	A90	●	—	●	—	—	IC circuit	

∗1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.
∗2 1 m type lead wire is only applicable to D-A93.

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

∗ Solid state auto switches marked with "○" are produced upon receipt of order.

∗ Since there are applicable auto switches other than the above, refer to page 712 for details.
∗ For detail about auto switches with pre-wired connector, refer to pages 1626 and 1627.
∗ Auto switches are shipped together but not assembled.

Specifications

Bore size (mm)	6	10	16	20	25	32
Fluid	Air					
Proof pressure	1.05 MPa					
Maximum operating pressure	0.7 MPa					
Minimum operating pressure	0.12 MPa	0.06 MPa		0.05 MPa		
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)					
Lubrication	Non-lube					
Piston speed	50 to 500 mm/s					
Cushion	Rubber bumper					
Rod end thread	Male thread					
Stroke length tolerance	$^{+1.0}_{0}$ mm					

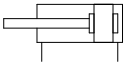
Standard Stroke

Bore size (mm)	Standard stroke (mm)
6, **10**, **16**	5, 10, 15, 20, 25, 30
20, **25**, **32**	5, 10, 15, 20, 25, 30, 40, 50

For "Long Stroke", refer to page 690.

Symbol

Double acting, Single rod, Rubber bumper



Theoretical Output

(N)

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)		
				0.3	0.5	0.7
6	**3**	OUT	28.3	8.49	14.2	19.8
		IN	21.2	6.36	10.6	14.8
10	**4**	OUT	78.5	23.6	39.3	55.0
		IN	66.0	19.8	33.0	46.2
16	**6**	OUT	201	60.3	101	141
		IN	172	51.6	86.0	121
20	**8**	OUT	314	94.2	157	220
		IN	264	79.2	132	185
25	**10**	OUT	491	147	246	344
		IN	412	124	206	288
32	**12**	OUT	804	241	402	563
		IN	691	207	346	454

Made to Order Specifications

(For details, refer to pages 1699 to 1818.)

Symbol	Specifications
-XB6	Heat resistant (–10 to 150°C)
-XB7	Cold resistant (–40 to 70°C)
-XB9	Low speed (10 to 50 mm/s)
-XB13	Low speed (5 to 50 mm/s)
-XC19	Intermediate stroke (5 mm spacer)
-XC22	Fluororubber seals

Tightening Torque/

When mounting Series CU, refer to the below table.

Bore size (mm)	Hexagon socket head cap screw dia.	Proper tightening torque (N·m)
6, 10	M3	1.08 ±10%
16	M4	2.45 ±10%
20, 25	M5	5.10 ±10%
32	M6	8.04 ±10%

Weight

/( ): Denotes the values with D-A93.

(g)

Model	Cylinder stroke (mm)							
	5	10	15	20	25	30	40	50
C(D)U6-□D	22 (27)	25 (35)	28 (38)	31 (41)	34 (44)	37 (47)	—	—
C(D)U10-□D	36 (41)	40 (50)	44 (54)	48 (58)	52 (62)	56 (66)	—	—
C(D)U16-□D	50 (75)	56 (86)	62 (92)	68 (98)	74 (104)	80 (110)	—	—
C(D)U20-□D	95 (128)	106 (143)	117 (154)	128 (165)	139 (176)	150 (187)	172 (209)	194 (231)
C(D)U25-□D	176 (230)	193 (252)	210 (269)	227 (286)	244 (303)	261 (320)	295 (354)	329 (388)
C(D)U32-□D	262 (335)	286 (364)	310 (388)	334 (412)	358 (436)	382 (460)	430 (508)	478 (556)

∗ For the auto switch weight, refer to page 1559.

Moisture Control Tube Series IDK

When operating an actuator with a small diameter and a short stroke at a high frequency, the dew condensation (water droplet) may occur inside the piping depending on the conditions.

Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to **Series IDK in the WEB catalog**.

Low-speed Cylinder

CU X | **Mounting bracket** | **Bore size** | **–** | **Stroke**

● **Low-speed Cylinder**

Smooth operation with a little sticking and slipping at low speed.
Can start smoothly with a little ejection even after being rendered for hours.

Specifications

Bore size (mm)	10	16	20	25	32
Fluid	Air				
Proof pressure	1.05 MPa				
Max. operating pressure	0.7 MPa				
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)				
Lubricant	Not applicable (Non-lube)				
Piston speed	ø10, ø16: 1 to 300 mm/s ø20 to ø32: 0.5 to 300 mm/s				
Cushion	Rubber bumper on both ends				
Rod end thread	Male thread				
Stroke length tolerance	$^{+1.0}_{0}$				

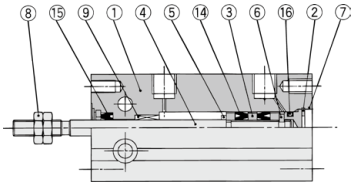
Minimum Operating Pressure

Bore size (mm)	10	16	20	25	32
Minimum Operating Pressure (MPa)	0.06	0.06	0.05	0.05	0.05

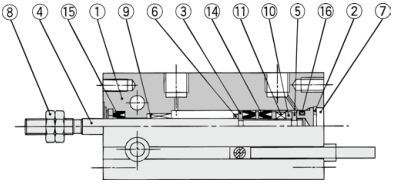
The dimensions are the same as the double acting, single rod type.
Refer to Best Pneumatics No. 3 for details.

Construction

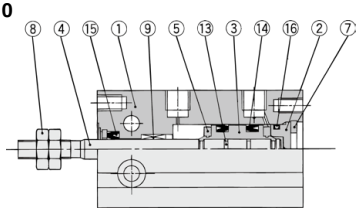
ø6

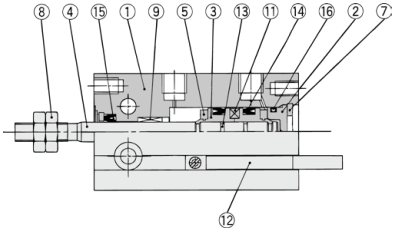


With auto switch

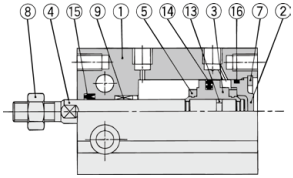


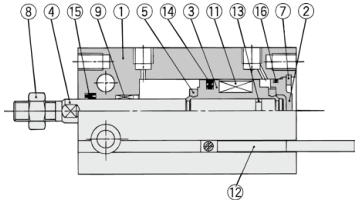
ø10





ø16 to ø32





Component Parts

No.	Description	Material	Note
1	**Cylinder tube**	Aluminum alloy	Hard anodized
2	**Head cover**	Brass	ø6 to ø10, Electroless nickel plated
		Aluminum alloy	ø16 to ø32, Chromated
3	**Piston**	Brass	ø6
		Aluminum alloy	ø10 to ø32, Chromated
4	**Piston rod**	Stainless steel	
5	**Bumper A**	Urethane	
6	**Bumper B**	Urethane	
7	**Retaining ring**	Carbon tool steel	Phosphate coated

Component Parts

No.	Description	Material	Note
8	**Rod end nut**	Carbon steel	Chromated
9	**Bushing**	Bearing alloy	
10	**Magnet holder**	Brass	ø6
11	**Magnet**	—	
12	**Auto switch**	—	
13	**Piston gasket**	NBR	
14*	**Piston seal**		
15*	**Rod seal**		
16*	**Gasket**		

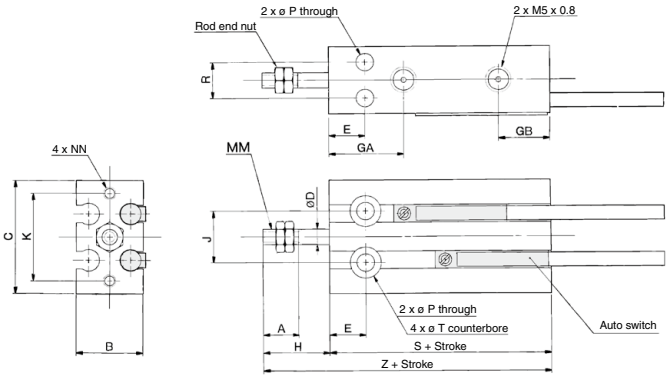
Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
10	CU10D-PS	Set of nos. above ⑭, ⑮, ⑯
16	CU16D-PS	
20	CU20D-PS	
25	CU25D-PS	
32	CU32D-PS	

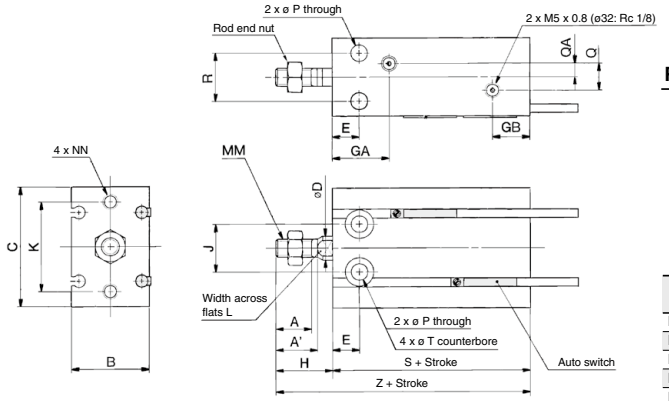
∗ Seal kit includes ⑭, ⑮, ⑯. Order the seal kit, based on each bore size.
∗ Seal kit includes a grease pack (10 g).
Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g)

Dimensions: Double Acting, Single Rod

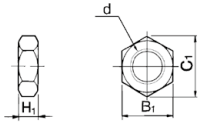
ø6, ø10



ø16 to ø32



Rod End Nut/Accessory



Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H_1	B_1	C_1
NTP-006	**6**	M3 x 0.5	1.8	5.5	6.4
NTP-010	**10**	M4 x 0.7	2.4	7	8.1
NTJ-015A	**16**	M5 x 0.8	4	8	9.2
NT-015A	**20**	M6 x 1.0	5	10	11.5
NT-02	**25**	M8 x 1.25	5	13	15.0
NT-03	**32**	M10 x 1.25	6	17	19.6

(mm)

Bore size (mm)	A	A'	B	C	D	E	GA	GB	H	J	K	L	MM	NN	P	Q	QA
6	7	—	13	22	3	7	15	10	13	10	17	—	M3 x 0.5	M3 x 0.5 depth 5	3.2	—	—
10	10	—	15	24	4	7	16.5	10	16	11	18	—	M4 x 0.7	M3 x 0.5 depth 5	3.2	—	—
16	11	12.5	20	32	6	7	16.5[Note]	11.5	16	14	25	5	M5 x 0.8	M4 x 0.7 depth 6	4.5	4	2
20	12	14	26	40	8	9	19	12.5	19	16	30	6	M6 x 1.0	M5 x 0.8 depth 8	5.5	9	4.5
25	15.5	18	32	50	10	10	21.5	13	23	20	38	8	M8 x 1.25	M5 x 0.8 depth 8	5.5	9	4.5
32	19.5	22	40	62	12	11	23	12.5	27	24	48	10	M10 x 1.25	M6 x 1.0 depth 9	6.6	13.5	4.5

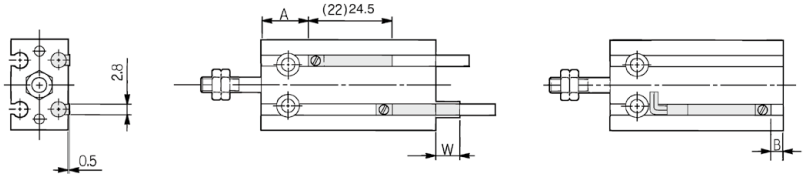
Note) 5 stroke (CU16-5D): 14.5 mm

Bore size (mm)	R	T	Without auto switch		With auto switch	
			S	Z	S	Z
6	7	6 depth 4.8	33	46	33	46
10	9	6 depth 5	36	52	36	52
16	12	7.6 depth 6.5	30	46	40	56
20	16	9.3 depth 8	36	55	46	65
25	20	9.3 depth 9	40	63	50	73
32	24	11 depth 11.5	42	69	52	79

Auto Switch Mounting

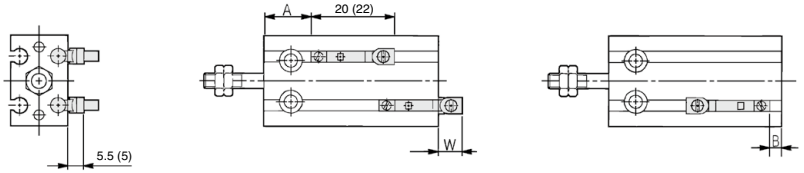
Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

D-A9□
D-M9□
D-M9□W
D-M9□A



( ): Denotes the values of D-A96.

D-A9□V
D-M9□V
D-M9□WV
D-M9□AV



( ): Denotes the values of D-A9□V.

(mm)

Bore size (mm)	D-A9□, D-A9□V			D-M9□, D-M9□W			D-M9□V, D-M9□WV			D-M9□A			D-M9□AV		
	A	B	W	A	B	W	A	B	W	A	B	W	A	B	W
6	13.5	–0.5	2.5 (5)	17.5	3.5	6.5	17.5	3.5	4.5	17.5	3.5	8.5	17.5	3.5	6.5
10	12.5	3.5	–1.5 (1)	16.5	7.5	2.5	16.5	7.5	0.5	16.5	7.5	4.5	16.5	7.5	2.5
16	16	4	–2 (0.5)	20	8	1.5	20	8	–0.5	20	8	3.5	20	8	1.5
20	20	6	–4 (–1.5)	24	10	0	24	10	–2	24	10	2	24	10	0
25	22.5	7	–5.5 (–3)	26.5	11	–1.5	26.5	11	–3.5	26.5	11	0.5	26.5	11	–1.5
32	23.5	8.5	–6.5 (–4)	27.5	12.5	–2.5	27.5	12.5	–4.5	27.5	12.5	–0.5	27.5	12.5	–2.5

Note 1) Figures in the table above are used as a reference when mounting the auto switches for stroke end detection. In the case of actually setting the auto switches, adjust them after confirming their operation.
Note 2) Negative figures in the table W indicate an auto switch is mounted inward from the edge of the cylinder body.
Note 3) In the case of the 5 stroke or the 10 stroke, there are times in which the auto switch will not turn OFF or 2 auto switches will turn ON simultaneously due to their movement range. Therefore, set the position approximately 1 to 4 mm outward from the values given in the table above. Then, perform an operation inspection to make sure that the auto switches operate normally (if 1 switch is used, make sure that it turns ON and OFF properly; if 2 auto switches are used, make sure that both auto switches turn ON).
Note 4) ( ) in column W is the dimensions of D-A90 and A93.

Operating Range

(mm)

Auto switch model	Bore size					
	6	**10**	**16**	**20**	**25**	**32**
D-A9□, A9□V	5	6	9	11	12.5	14
D-M9□, M9□V **D-M9□W, M9□WV** **D-M9□A, M9□AV**	3	4	5.5	7	7	7.5

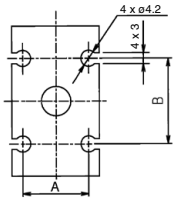
∗ Since the operating range is provided as a guideline including hysteresis, it cannot be guaranteed (assuming approximately ±30% dispersion).
It may vary substantially depending on an ambient environment.

Minimum Stroke for Auto Switch Mounting

(mm)

No. of auto switches mounted	Applicable auto switch		
	D-A9□, D-A9□V	**D-M9□, D-M9□V**	**D-M9□W, D-M9□WV D-M9□A, D-M9□AV**
1 pc.	5	5	5
2 pcs.	10	5	10

Auto Switch Groove Position

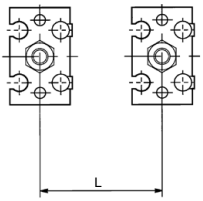


(mm)

Bore size (mm)	**A**	**B**
6	8.2	9
10	10.3	13
16	15	18
20	21	23
25	27	25
32	35	27

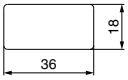
Caution on Proximity Installation

When free mounting cylinders equipped with auto switches are used, the auto switches could activate unintentionally if the installed distance is less than the dimensions shown in the table. Therefore, make sure to provide a greater clearance. Due to unavoidable circumstances, if they must be used with less distance than the dimensions given in the table, the cylinders must be shielded. Therefore, affix a steel plate or a magnetic shield plate (MU-S025) to the area on the cylinder that corresponds to the adjacent auto switch. (Please contact SMC for details.) Auto switches may malfunction if a shield plate is not used.



Bore size (mm)	Mounting pitch L (mm)
6	18
10	20
16	33
20	40
25	46
32	56

Dimensions of shield plate (MU-S025) that is sold separately are indicated as reference.



Material: Ferrite stainless steel, Thickness: 0.3 mm
The product can be attached to the cylinder since the bottom side is a seal type.

Free Mount Cylinder
Double Acting, Double Rod
Series CUW
ø6, ø10, ø16, ø20, ø25, ø32

How to Order

CUW 6 □ – 30 D

With auto switch **CDUW 6 □ – 30 D – M9BW □**

Built-in magnet

Double rod

Bore size

6	6 mm
10	10 mm
16	16 mm
20	20 mm
25	25 mm
32	32 mm

Port thread type

Symbol	Type	Bore size
Nil	M5 x 0.8	ø6, ø10, ø16, ø20, ø25
	Rc 1/8	ø32
TN	NPT 1/8	ø32
TF	G 1/8	ø32

Standard stroke (mm)

ø6, ø10, ø16	5, 10, 15, 20, 25, 30, 40, 50, 60
ø20, ø25, ø32	5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100

Action

D	Double acting

Auto switch

Nil	Without auto switch

∗ Refer to the table below for applicable auto switches.

Number of auto switches

Nil	2 pcs.
S	1 pc.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example): CDUW20-30D

Applicable Auto Switches/Refer to pages 1559 to 1673 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model Perpendicular	Auto switch model In-line	Lead wire length (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	——	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9NV**	**M9N**	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)			**M9PV**	**M9P**	●	●	●	○	○		
				2-wire	12 V		**M9BV**	**M9B**	●	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)	5 V, 12 V		**M9NWV**	**M9NW**	●	●	●	○	○	IC circuit	
				3-wire (PNP)			**M9PWV**	**M9PW**	●	●	●	○	○		
				2-wire	12 V		**M9BWV**	**M9BW**	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)	5 V, 12 V		**M9NAV**∗1	**M9NA**∗1	○	○	●	○	○	IC circuit	
				3-wire (PNP)			**M9PAV**∗1	**M9PA**∗1	○	○	●	○	○		
				2-wire	12 V		**M9BAV**∗1	**M9BA**∗1	○	○	●	○	○	—	
Reed auto switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96V**	**A96**	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	**A93V**∗2	**A93**	●	●	●	●	—	—	Relay, PLC
							100 V or less	**A90V**	**A90**	●	—	●	—	—	IC circuit	

∗1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.
∗2 1 m type lead wire is only applicable to D-A93.

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

∗ Solid state auto switches marked with "○" are produced upon receipt of order.

∗ Since there are applicable auto switches other than the above, refer to page 712 for details.
∗ For detail about auto switches with pre-wired connector, refer to pages 1626 and 1627.
∗ Auto switches are shipped together but not assembled.

Specifications

Bore size (mm)	6	10	16	20	25	32
Fluid	Air					
Proof pressure	1.05 MPa					
Maximum operating pressure	0.7 MPa					
Minimum operating pressure	0.15 MPa	0.10 MPa		0.08 MPa		
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)					
Lubrication	Non-lube					
Piston speed	50 to 500 mm/s					
Cushion	Rubber bumper					
Rod end thread	Male thread					
Stroke length tolerance	$^{+1.0}_{0}$ mm					

Standard Stroke

Bore size (mm)	Standard stroke (mm)
6, **10**, **16**	5, 10, 15, 20, 25, 30, 40, 50, 60
20, **25**, **32**	5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100

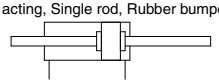
Theoretical Output

(N)

Bore size (mm)	Rod size (mm)	Piston area (mm^2)	Operating pressure (MPa)		
			0.3	0.5	0.7
6	3	21.2	6.36	10.6	14.8
10	4	66.0	19.8	33.0	46.2
16	6	172	51.6	86.0	121
20	8	264	79.2	132	185
25	10	412	124	206	288
32	12	691	207	346	484

Symbol

Double acting, Single rod, Rubber bumper



Weight

/( ): Denotes the values with D-A93.

(g)

Model	Stroke (mm)												
	5	10	15	20	25	30	40	50	60	70	80	90	100
C(D)UW6-□D	27 (32)	30 (40)	34 (44)	37 (47)	40 (50)	44 (54)	51 (61)	58 (68)	65 (75)	—	—	—	—
C(D)UW10-□D	44 (49)	49 (59)	53 (63)	58 (68)	62 (72)	67 (77)	76 (86)	85 (95)	94 (104)	—	—	—	—
C(D)UW16-□D	74 (99)	81 (111)	88 (118)	95 (125)	102 (132)	109 (139)	123 (153)	137 (167)	151 (181)	—	—	—	—
C(D)UW20-□D	132 (165)	145 (182)	158 (195)	171 (208)	184 (221)	197 (234)	223 (260)	250 (287)	275 (312)	301 (338)	327 (364)	353 (390)	379 (416)
C(D)UW25-□D	240 (294)	260 (319)	280 (339)	300 (359)	321 (380)	341 (400)	381 (440)	421 (480)	461 (520)	501 (560)	541 (600)	581 (640)	621 (680)
C(D)UW32-□D	365 (438)	394 (472)	422 (500)	451 (529)	479 (557)	508 (586)	586 (664)	622 (700)	679 (757)	736 (814)	793 (871)	850 (928)	907 (985)

∗ For the auto switch weight, refer to page 1559.

Tightening Torque

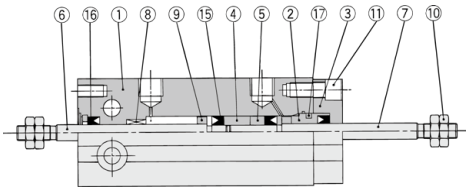
When mounting Series CUW, refer to page 658.

Moisture Control Tube Series IDK

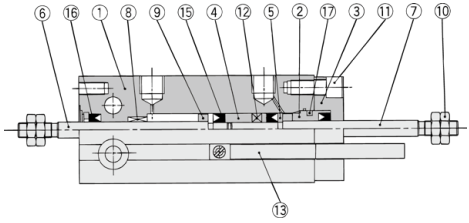
When operating an actuator with a small diameter and a short stroke at a high frequency, the dew condensation (water droplet) may occur inside the piping depending on the conditions.
Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to **Series IDK in the WEB catalog**.

Construction

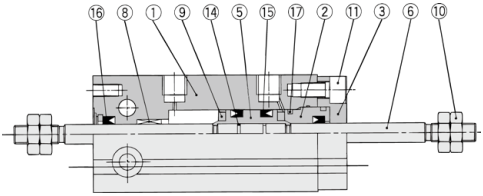
ø6

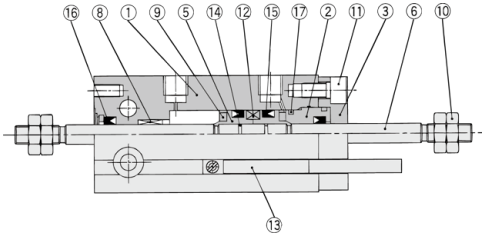


With auto switch

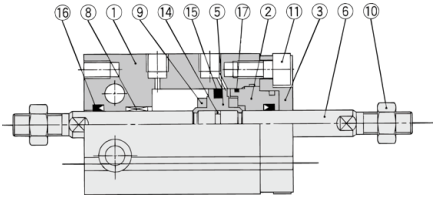


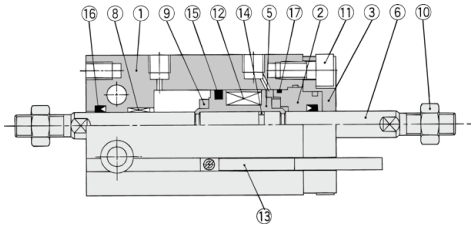
ø10





ø16 to ø32





Component Parts

No.	Description	Material	Note
1	**Cylinder tube**	Aluminum alloy	Hard anodized
2	**Rod cover**	Aluminum alloy	Chromated
3	**Rod cover retainer**	Aluminum alloy	Hard anodized
4	**Piston**	Brass	ø6
5	**Piston**	Brass	ø6
		Aluminum alloy	ø10 to ø32, Chromated
6	**Piston rod**	Stainless steel	
7	**Piston rod**	Stainless steel	ø6
8	**Bushing**	Bearing alloy	

Component Parts

No.	Description	Material	Note
9	**Bumper**	Urethane	
10	**Rod end nut**	Carbon steel	Chromated
11	**Hexagon socket head cap screw**	Carbon steel	Chromated
12	**Magnet**	—	
13	**Auto switch**	—	
14	**Piston gasket**	NBR	
15*	**Piston seal**		
16*	**Rod seal**		
17*	**Gasket**		

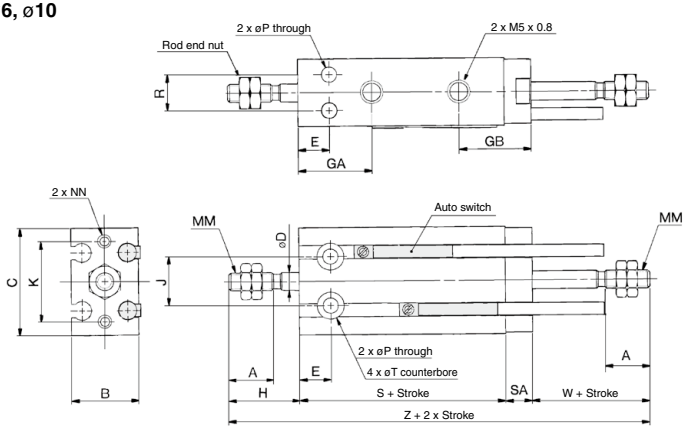
Replacement Parts: Seal Kit

	Bore size (mm) / Part no.				
	10	**16**	**20**	**25**	**32**
Kit no.	CUW10D-PS	CUW16D-PS	CUW20D-PS	CUW25D-PS	CUW32D-PS

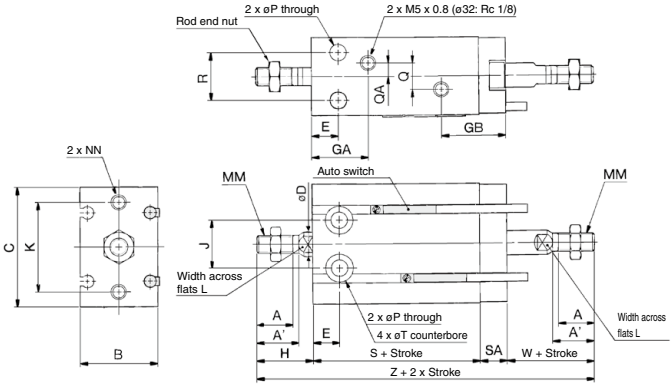
* Seal kit includes ⑮, ⑯, ⑰. Order the seal kit, based on each bore size.
* Seal kit includes a grease pack (10 g).
  Order with the following part number when only the grease pack is needed.
  Grease pack part number: GR-S-010 (10 g)

Dimensions: Double Acting, Double Rod

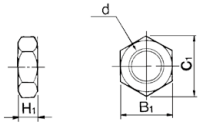
ø6, ø10



ø16 to ø32



Rod End Nut/Accessory



Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H_1	B_1	C_1
NTP-006	**6**	M3 x 0.5	1.8	5.5	6.4
NTP-010	**10**	M4 x 0.7	2.4	7	8.1
NTJ-015A	**16**	M5 x 0.8	4	8	9.2
NT-015A	**20**	M6 x 1.0	5	10	11.5
NT-02	**25**	M8 x 1.25	5	13	15.0
NT-03	**32**	M10 x 1.25	6	17	19.6

Bore size (mm)	A	A'	B	C	D	E	GA	GB	H	J	K	L	MM	NN	P	Q	QA
6	7	—	13	22	3	7	15	16	13	10	17	—	M3 x 0.5	M3 x 0.5 depth 5	3.2	—	—
10	10	—	15	24	4	7	16.5	16	16	11	18	—	M4 x 0.7	M3 x 0.5 depth 5	3.2	—	—
16	11	12.5	20	32	6	7	16.5 Note	19	16	14	25	5	M5 x 0.8	M4 x 0.7 depth 6	4.5	4	2
20	12	14	26	40	8	9	19	21.5	19	16	30	6	M6 x 1.0	M5 x 0.8 depth 8	5.5	9	4.5
25	15.5	18	32	50	10	10	21.5	22	23	20	38	8	M8 x 1.25	M5 x 0.8 depth 8	5.5	9	4.5
32	19.5	22	40	62	12	11	23	22.5	27	24	48	10	M10 x 1.25	M6 x 1.0 depth 9	6.6	13.5	4.5

Bore size (mm)	R	SA	T	W	Without auto switch		With auto switch	
					S	Z	S	Z
6	7	6	6 depth 4.8	13	38	70	38	70
10	9	6	6 depth 5	16	36	74	36	74
16	12	7.5	7.6 depth 6.5	16	30	69.5	40	79.5
20	16	9	9.3 depth 8	19	36	83	46	93
25	20	9	9.3 depth 9	23	40	95	50	105
32	24	10	11 depth 11.5	27	42	106	52	116

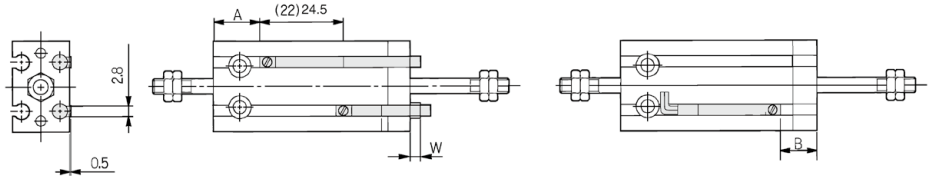
Note 1) 5 stroke (CUW16-5D): GA = 14.5

Note 2) The two chamfered positions for the double rod type are not identical.

Auto Switch Mounting

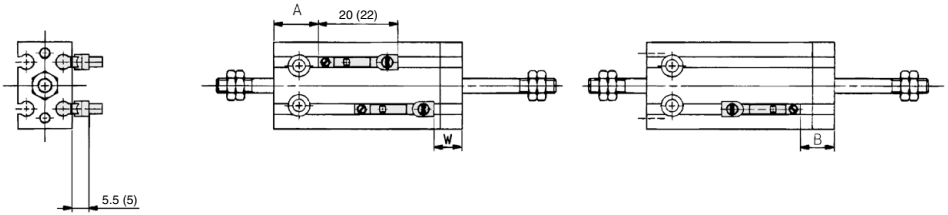
Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

D-A9□
D-M9□
D-M9□W
D-M9□A



( ): Denotes the values of D-A96.

D-A9□V
D-M9□V
D-M9□WV
D-M9□AV



( ): Denotes the values of D-A9□V.

(mm)

Bore size (mm)	D-A9□, D-A9□V			D-M9□, D-M9□W			D-M9□V, D-M9□WV			D-M9□A			D-M9□AV		
	A	B	W	A	B	W	A	B	W	A	B	W	A	B	W
6	13.5	5.5	–3.5 (–1)	17.5	9.5	0.5	17.5	9.5	–1.5	17.5	9.5	2.5	17.5	9.5	0.5
10	12.5	9.5	–7.5 (–5)	16.5	13.5	–3.5	16.5	13.5	–5.5	16.5	13.5	–1.5	16.5	13.5	–3.5
16	16	11.5	–9.5 (–7)	20	15.5	–5.5	20	15.5	–7.5	20	15.5	–3.5	20	15.5	–5.5
20	20	15	–13 (–10.5)	24	19	–9	24	19	–11	24	19	–7	24	19	–9
25	22.5	16	–14.5 (–12)	26.5	20	–10.5	26.5	20	–12.5	26.5	20	–8.5	26.5	20	–10.5
32	23.5	18.5	–16.5 (–14)	27.5	22.5	–12.5	27.5	22.5	–14.5	27.5	22.5	–10.5	27.5	22.5	–12.5

Note 1) Figures in the table above are used as a reference when mounting the auto switches for stroke end detection. In the case of actually setting the auto switches, adjust them after confirming their operation.
Note 2) Negative figures in the table W indicate an auto switch is mounted inward from the edge of the cylinder body.
Note 3) In the case of the 5 stroke or the 10 stroke, there are times in which the auto switch will not turn OFF or 2 auto switches will turn ON simultaneously due to their movement range. Therefore, set the position approximately 1 to 4 mm outward from the values given in the table above. Then, perform an operation inspection to make sure that the auto switches operate normally (if 1 switch is used, make sure that it turns ON and OFF properly; if 2 auto switches are used, make sure that both auto switches turn ON).
Note 4) ( ) in column W is the dimensions of D-A90 and A93.

Operating Range

(mm)

Auto switch model	Bore size (mm)					
	6	10	16	20	25	32
D-A9□, A9□V	5	6	9	11	12.5	14
D-M9□, M9□V **D-M9□W, M9□WV** **D-M9□A, M9□AV**	3	4	5.5	7	7	7.5

∗ Since the operating range is provided as a guideline including hysteresis, it cannot be guaranteed (assuming approximately ±30% dispersion). It may vary substantially depending on an ambient environment.

Minimum Stroke for Auto Switch Mounting

(mm)

No. of auto switches mounted	Applicable auto switch		
	D-A9□, D-A9□V	D-M9□, D-M9□V	D-M9□W, D-M9□WV D-M9□A, D-M9□AV
1 pc.	5	5	5
2 pcs.	10	5	10

Free Mount Cylinder
Single Acting, Single Rod, Spring Return/Extend
Series CU
ø6, ø10, ø16, ø20, ø25, ø32

How to Order

	CU	10		–	15	S	–				
With auto switch	CDU	10		–	15	S	–	M9BW		–	

Built-in magnet

Bore size

6	6 mm
10	10 mm
16	16 mm
20	20 mm
25	25 mm
32	32 mm

Port thread type

Symbol	Type	Bore size
Nil	M5 x 0.8	ø6, ø10, ø16, ø20, ø25
	Rc 1/8	ø32
TN	NPT 1/8	ø32
TF	G 1/8	ø32

Standard stroke (mm)

ø6, ø10, ø16 ø20, ø25, ø32	5, 10, 15

Action

S	Single acting, Spring return
T	Single acting, Spring extend

Auto switch

Nil	Without auto switch

∗ Refer to the table below for applicable auto switches.

Number of auto switches

Nil	2 pcs.
S	1 pc.

Made to Order

∗ Refer to page 670 for the Made to Order specifications.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example): CDU20-10S

Applicable Auto Switches/Refer to pages 1559 to 1673 for further information on auto switches.

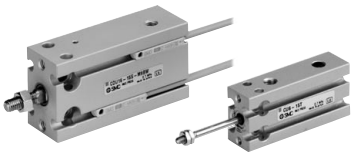
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load:	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9NV**	**M9N**	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)			**M9PV**	**M9P**	●	●	●	○	○		
				2-wire	12 V		**M9BV**	**M9B**	●	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)	5 V, 12 V		**M9NWV**	**M9NW**	●	●	●	○	○	IC circuit	
				3-wire (PNP)			**M9PWV**	**M9PW**	●	●	●	○	○		
				2-wire	12 V		**M9BWV**	**M9BW**	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)	5 V, 12 V		**M9NAV**∗1	**M9NA**∗1	○	○	●	○	○	IC circuit	
				3-wire (PNP)			**M9PAV**∗1	**M9PA**∗1	○	○	●	○	○		
				2-wire	12 V		**M9BAV**∗1	**M9BA**∗1	○	○	●	○	○	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96V**	**A96**	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	**A93V**∗2	**A93**	●	●	●	●	—	—	Relay, PLC
							100 V or less	**A90V**	**A90**	●	—	●	—	—	IC circuit	

∗1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.
∗2 1 m type lead wire is only applicable to D-A93.

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

∗ Solid state auto switches marked with "○" are produced upon receipt of order.

∗ Since there are applicable auto switches other than the above, refer to page 712 for details.
∗ For detail about auto switches with pre-wired connector, refer to pages 1626 and 1627.
∗ Auto switches are shipped together but not assembled.



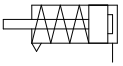
Specifications

Bore size (mm)	6	10	16	20	25	32
Fluid	Air					
Proof pressure	1.05 MPa					
Maximum operating pressure	0.7 MPa					
Minimum operating pressure	0.2 MPa	0.15 MPa		0.13 MPa		
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)					
Lubrication	Non-lube					
Piston speed	50 to 500 mm/s					
Cushion	Rubber bumper					
Rod end thread	Male thread					
Stroke length tolerance	$^{+1.0}_{0}$ mm					

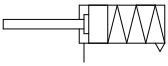
Note) ø6 with auto switch type: One side rubber bumper

Symbol

Single acting, Spring return



Single acting, Spring extend



Rubber bumper

Standard Stroke

Bore size (mm)	Standard stroke (mm)
6, **10**, **16**, **20**, **25**, **32**	5, 10, 15

Theoretical Output

(N)

Action	Bore size (mm)	Operating pressure (MPa)		
		0.3	0.5	0.7
Spring return (S)	**ø6**	4.99	10.7	16.3
	ø10	16.7	32.4	48.1
	ø16	45.6	86.3	126
	ø20	73	136	199
	ø25	119	218	316
	ø32	207	368	529
Spring extend (T)	**ø6**	2.86	7.10	11.3
	ø10	12.9	26.1	39.3
	ø16	37.2	71.8	106
	ø20	58	111	164
	ø25	95	178	260
	ø32	173	312	450

For the reactive force of spring return, refer to page 1821.

Made to Order Specifications

(For details, refer to pages 1699 to 1818.)

Symbol	Specifications
-XC22	Fluororubber seals

Weight

/( ): Denotes the values with D-A93.

(g)

Model	Stroke (mm)		
	5	10	15
C(D)U6-□S,T	22 (27)	25 (35)	28 (38)
C(D)U10-□S,T	36 (41)	40 (50)	48 (58)
C(D)U16-□S,T	50 (75)	56 (86)	71 (101)
C(D)U20-□S,T	95 (128)	106 (143)	133 (170)
C(D)U25-□S,T	176 (230)	193 (252)	235 (294)
C(D)U32-□S,T	262 (335)	286 (364)	347 (425)

∗ For the weight of auto switch, refer to page 1559.

Moisture Control Tube Series IDK

When operating an actuator with a small diameter and a short stroke at a high frequency, the dew condensation (water droplet) may occur inside the piping depending on the conditions.
Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to **Series IDK in the WEB catalog**.

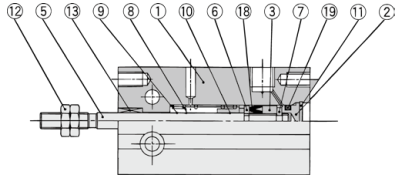
Tightening Torque

When mounting a CU single acting series, refer to page 658.

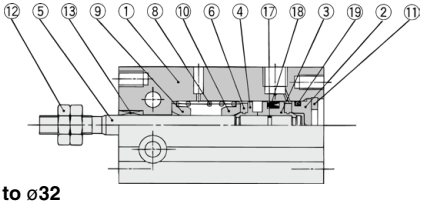
Construction

Single acting, Spring return

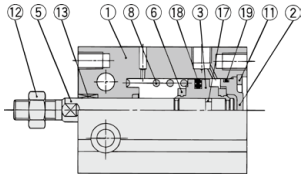
ø6



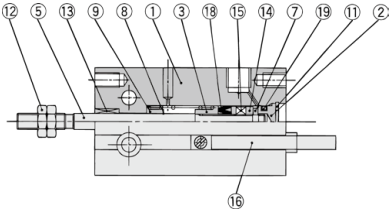
ø10

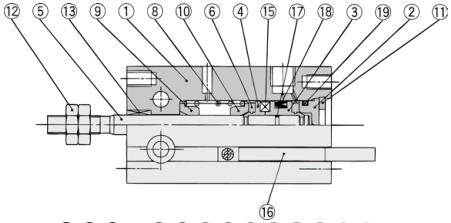


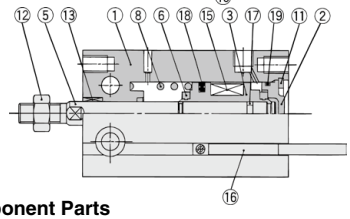
ø16 to ø32



With auto switch







Component Parts

No.	Description	Material	Note
1	**Cylinder tube**	Aluminum alloy	Hard anodized
2	**Head cover**	Brass	ø6 to ø10, Electroless nickel plated
		Aluminum alloy	ø16 to ø32, Chromated
3	**Piston**	Brass	ø6
		Aluminum alloy	ø10 to ø32, Chromated
4	**Piston**	Aluminum alloy	ø10
5	**Piston rod**	Stainless steel	
6	**Bumper A**	Urethane	
7	**Bumper B**	Urethane	
8	**Return spring**	Piano wire	Zinc chromated

Component Parts

No.	Description	Material	Note
9	**Spring seat**	Brass	
10	**Spring seat**	Brass	
11	**Retaining ring**	Carbon tool steel	Phosphate coated
12	**Rod end nut**	Carbon steel	Chromated
13	**Bushing**	Bearing alloy	
14	**Magnet holder**	Brass	ø6
15	**Magnet**	—	
16	**Auto switch**	—	
17	**Piston gasket**	NBR	
18*	**Piston seal**		
19*	**Gasket**		

Replacement Parts: Seal Kit

	Bore size (mm) / Part no.				
	10	**16**	**20**	**25**	**32**
Kit no.	CU10S-PS	CU16S-PS	CU20S-PS	CU25S-PS	CU32S-PS

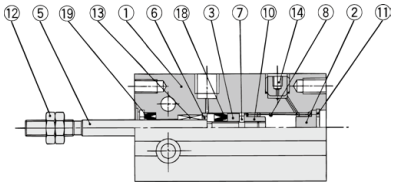
* Seal kit includes ⑱, ⑲. Order the seal kit, based on each bore size.
* Seal kit includes a grease pack (10 g).
Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g)

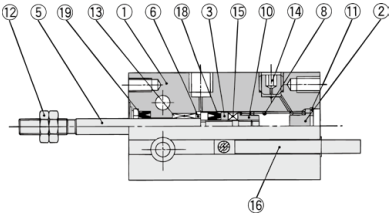
Construction

Single acting, Spring extend

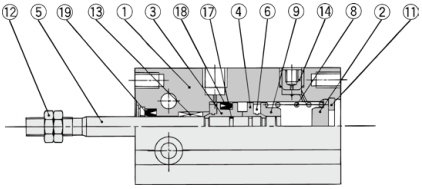
With auto switch

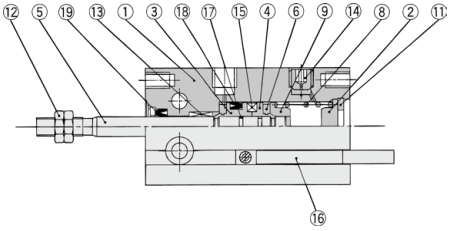
ø6



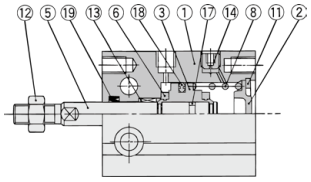


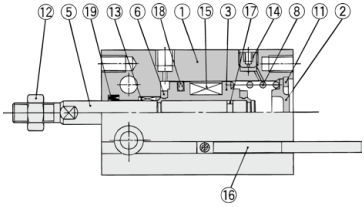
ø10





ø16 to ø32





Component Parts

No.	Description	Material	Note
1	**Cylinder tube**	Aluminum alloy	Hard anodized
2	**Head cover**	Brass	ø6 to ø10, Electroless nickel plated
		Aluminum alloy	ø16 to ø32, Chromated
3	**Piston**	Brass	ø6
		Aluminum alloy	ø10 to ø32, Chromated
4	**Piston**	Aluminum alloy	ø10, Chromated
5	**Piston rod**	Stainless steel	
6	**Bumper A**	Urethane	
7	**Bumper B**	Urethane	
8	**Return spring**	Piano wire	Zinc chromated

Component Parts

No.	Description	Material	Note
9	**Spring seat**	Brass	
10	**Stopper**	Brass	ø6
11	**Retaining ring**	Carbon tool steel	Phosphate coated
12	**Rod end nut**	Carbon steel	Chromated
13	**Bushing**	Bearing alloy	
14	**Plug with fixed orifice**	Alloy steel	Black dyed
15	**Magnet**	—	
16	**Auto switch**	—	
17	**Piston gasket**	NBR	
18*	**Piston seal**		
19*	**Rod seal**		

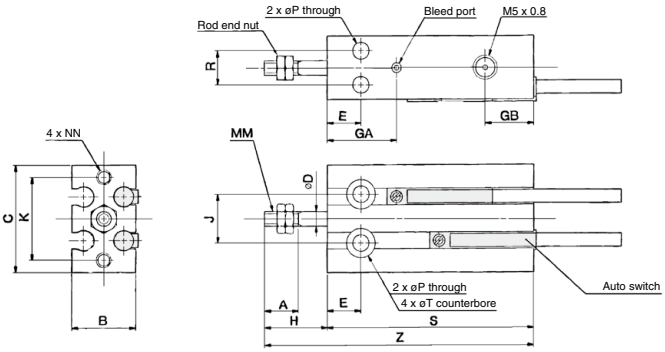
Replacement Parts: Seal Kit

	Bore size (mm) / Part no.				
	10	**16**	**20**	**25**	**32**
Kit no.	CU10T-PS	CU16T-PS	CU20T-PS	CU25T-PS	CU32T-PS

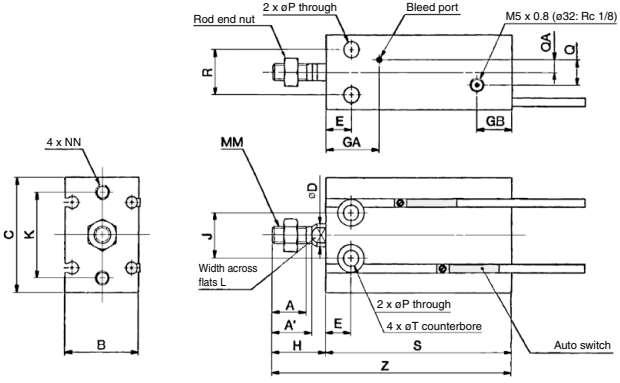
* Seal kit includes ⑱, ⑲. Order the seal kit, based on each bore size.
* Seal kit includes a grease pack (10 g).
  Order with the following part number when only the grease pack is needed.
  Grease pack part number: GR-S-010 (10 g)

Dimensions: Single Acting, Spring Return

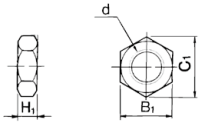
ø6, ø10



ø16 to ø32



Rod End Nut/Accessory



Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H_1	B_1	C_1
NTP-006	**6**	M3 x 0.5	1.8	5.5	6.4
NTP-010	**10**	M4 x 0.7	2.4	7	8.1
NTJ-015A	**16**	M5 x 0.8	4	8	9.2
NT-015A	**20**	M6 x 1.0	5	10	11.5
NT-02	**25**	M8 x 1.25	5	13	15.0
NT-03	**32**	M10 x 1.25	6	17	19.6

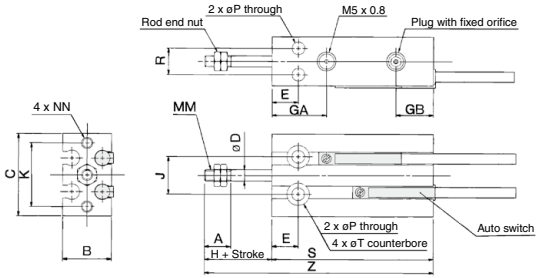
(mm)

Bore size (mm)	A	A'	B	C	D	E	GA	GB	H	J	K	L	MM	NN	P	Q	QA	R	T
6	7	—	13	22	3	7	15	10	13	10	17	—	M3 x 0.5	M3 x 0.5 depth 5	3.2	—	—	7	6 depth 4.8
10	10	—	15	24	4	7	16.5	10	16	11	18	—	M4 x 0.7	M3 x 0.5 depth 5	3.2	—	—	9	6 depth 5
16	11	12.5	20	32	6	7	16.5	11.5	16	14	25	5	M5 x 0.8	M4 x 0.7 depth 6	4.5	4	2	12	7.6 depth 6.5
20	12	14	26	40	8	9	19	12.5	19	16	30	6	M6 x 1.0	M5 x 0.8 depth 8	5.5	9	4.5	16	9.3 depth 8
25	15.5	18	32	50	10	10	21.5	13	23	20	38	8	M8 x 1.25	M5 x 0.8 depth 8	5.5	9	4.5	20	9.3 depth 9
32	19.5	22	40	62	12	11	23	12.5	27	24	48	10	M10 x 1.25	M6 x 1.0 depth 9	6.6	13.5	4.5	24	11 depth 11.5

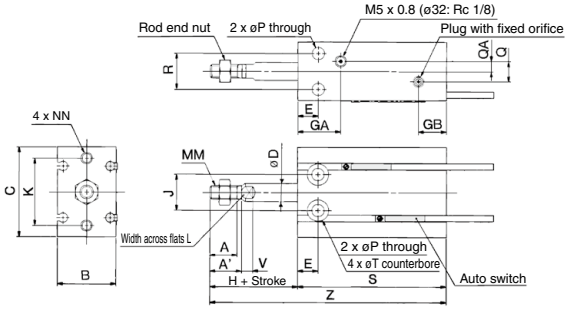
Bore size (mm)	Without auto switch						With auto switch					
	S			Z			S			Z		
	5 st	10 st	15 st	5 st	10 st	15 st	5 st	10 st	15 st	5 st	10 st	15 st
6	38	43	48	51	56	61	38	43	48	51	56	61
10	41	46	56	57	62	72	41	46	56	57	62	72
16	35	40	50	51	56	66	45	50	60	61	66	76
20	41	46	56	60	65	75	51	56	66	70	75	85
25	45	50	60	68	73	83	55	60	70	78	83	93
32	47	52	62	74	79	89	57	62	72	84	89	99

Dimensions: Single Acting, Spring Extend

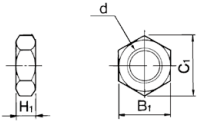
ø6, ø10



ø16 to ø32



Rod End Nut/Accessory



Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H_1	B_1	C_1
NTP-006	**6**	M3 x 0.5	1.8	5.5	6.4
NTP-010	**10**	M4 x 0.7	2.4	7	8.1
NTJ-015A	**16**	M5 x 0.8	4	8	9.2
NT-015A	**20**	M6 x 1.0	5	10	11.5
NT-02	**25**	M8 x 1.25	5	13	15.0
NT-03	**32**	M10 x 1.25	6	17	19.6

(mm)

Bore size (mm)	A	A'	B	C	D	E	GA	GB	H	J	K	L	MM	NN	P	Q	QA	R	T	V
6	7	—	13	22	3	7	15	10	13	10	17	—	M3 x 0.5	M3 x 0.5 depth 5	3.2	—	—	7	6 depth 4.8	—
10	10	—	15	24	4	7	16.5	10	16	11	18	—	M4 x 0.7	M3 x 0.5 depth 5	3.2	—	—	9	6 depth 5	—
16	11	12.5	20	32	6	7	16.5	11.5	16	14	25	5	M5 x 0.8	M4 x 0.7 depth 6	4.5	4	2	12	7.6 depth 6.5	3.5
20	12	14	26	40	8	9	19	12.5	19	16	30	6	M6 x 1.0	M5 x 0.8 depth 8	5.5	9	4.5	16	9.3 depth 8	5
25	15.5	18	32	50	10	10	21.5	13	23	20	38	8	M8 x 1.25	M5 x 0.8 depth 8	5.5	9	4.5	20	9.3 depth 9	5
32	19.5	22	40	62	12	11	23	12.5	27	24	48	10	M10 x 1.25	M6 x 1.0 depth 9	6.6	13.5	4.5	24	11 depth 11.5	5

Bore size (mm)	Without auto switch						With auto switch					
	S			Z			S			Z		
	5 st	10 st	15 st	5 st	10 st	15 st	5 st	10 st	15 st	5 st	10 st	15 st
6	38	43	48	56	66	76	38	43	48	56	66	76
10	41	46	56	62	72	87	41	46	56	62	72	87
16	45	50	60	66	76	91	45	50	60	66	76	91
20	41	46	56	65	75	90	51	56	66	75	85	100
25	45	50	60	73	83	98	55	60	70	83	93	108
32	47	52	62	79	89	104	57	62	72	89	99	114

Auto Switch Mounting

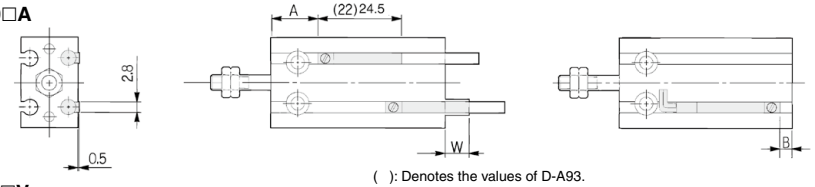
Minimum Stroke for Auto Switch Mounting

(mm)

No. of auto switches mounted	Applicable auto switch		
	D-A9□, D-A9□V	D-M9□, D-M9□V	D-M9□W, D-M9□WV D-M9□A, D-M9□AV
1 pc.	5	5	5
2 pcs.	10	5	10

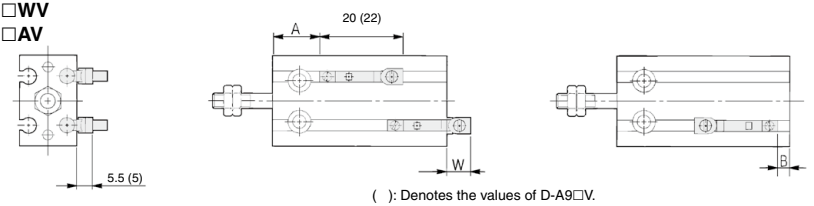
Proper Auto Switch Mounting Position (Detection at Stroke End) and Its Mounting Height: Single Acting, Spring Return

D-A9□
D-M9□
D-M9□W
D-M9□A



( ): Denotes the values of D-A93.

D-A9□V
D-M9□V
D-M9□WV
D-M9□AV



( ): Denotes the values of D-A9□V.

Single Acting, Spring Return

(mm)

Bore size (mm)	Stroke	D-A9□, D-A9□V			D-M9□, D-M9□W			D-M9□V, D-M9□WV			D-M9□A			D-M9□AV		
		A	B	W	A	B	W	A	B	W	A	B	W	A	B	W
6	All stroke	13.5	0	2.5 (5)	17.5	4	6.5	17.5	4	4.5	17.5	4	8.5	17.5	4	6.5
10	5, 10	12.5	3.5	–1.5 (1)	16.5	7.5	2.5	16.5	7.5	0.5	16.5	7.5	4.5	16.5	7.5	2.5
	15	17.5			21.5			21.5			21.5			21.5		
16	5, 10	16	4	–2 (0.5)	20	8	2	20	8	–0.5	20	8	4	20	8	1.5
	15	21			25			25			25			25		
20	5, 10	20	6	–4 (–1.5)	24	10	0	24	10	–2	24	10	2	24	10	0
	15	25			29			29			29			29		
25	5, 10	22.5	7	–5.5 (–3)	26.5	11	–1.5	26.5	11	–3.5	26.5	11	0.5	26.5	11	–1.5
	15	27.5			31.5			31.5			31.5			31.5		
32	5, 10	23.5	8.5	–6.5 (–4)	27.5	12.5	–2.5	27.5	12.5	–4.5	27.5	12.5	–0.5	27.5	12.5	–2.5
	15	28.5			32.5			32.5			32.5			32.5		

Single Acting, Spring Extend

(mm)

Bore size (mm)	Stroke	D-A9□, D-A9□V			D-M9□, D-M9□W			D-M9□V, D-M9□WV			D-M9□A			D-M9□AV		
		A	B	W	A	B	W	A	B	W	A	B	W	A	B	W
6	All stroke	10.5	1.5	0.5 (3)	14.5	5.5	4.5	14.5	5.5	2.5	14.5	5.5	6.5	14.5	5.5	4.5
10	5, 10	12.5	3.5	-1.5 (1)	16.5	7.5	2.5	16.5	7.5	0.5	16.5	7.5	4.5	16.5	7.5	2.5
	15		8.5	-6.5 (-4)		12.5	-2.5		12.5	-4.5		12.5	-0.5		12.5	-2.5
16	5, 10	16	4	-2 (0.5)	20	8	2	20	8	0	20	8	4	20	8	2
	15		9	-7 (-4.5)		13	-3		13	-5		13	-1		13	-3
20	5, 10	20	6	-4 (-1.5)	24	10	0	24	10	-2	24	10	2	24	10	0
	15		11	-9 (-6.5)		15	-5		15	-7		15	-3		15	-5
25	5, 10	22.5	7	-5.5 (-3)	26.5	11	-1.5	26.5	11	-3.5	26.5	11	0.5	26.5	11	-1.5
	15		12	-10.5 (-8)		16	-6.5		16	-8.5		16	-4.5		16	-6.5
32	5, 10	23.5	8.5	-6.5 (-4)	27.5	12.5	-2.5	27.5	12.5	-4.5	27.5	12.5	-0.5	27.5	12.5	-2.5
	15		13.5	-11.5 (-9)		17.5	-7.5		17.5	-9.5		17.5	-5.5		17.5	-7.5

Note 1) Figures in the table above are used as a reference when mounting the auto switches for stroke end detection. In the case of actually setting the auto switches, adjust them after confirming their operation.
Note 2) Negative figures in the table W indicate an auto switch is mounted inward from the edge of the cylinder body.
Note 3) In the case of the 5 stroke or the 10 stroke, there are times in which the auto switch will not turn OFF or 2 auto switches will turn ON simultaneously due to their movement range. Therefore, set the position approximately 1 to 4 mm outward from the values given in the table above. Then, perform an operation inspection to make sure that the auto switches operate normally (if 1 switch is used, make sure that it turns ON and OFF properly; if 2 auto switches are used, make sure that both auto switches turn ON).
Note 4) ( ) in column W is the dimensions of D-A90 and A93.

Free Mount Cylinder: Non-rotating Rod Type
Double Acting, Single Rod
Series CUK
ø6, ø10, ø16, ø20, ø25, ø32

How to Order

CUK **6** **□** **–** **30** **D** **–** **□**

With auto switch **CDUK** **6** **□** **–** **30** **D** **–** **M9BW** **□** **–** **□**

Made to Order
* Refer to page 677 for the Made to Order specifications.

Built-in magnet

Non-rotating rod type

Number of auto switches

Nil	2 pcs.
S	1 pc.

Bore size

6	6 mm
10	10 mm
16	16 mm
20	20 mm
25	25 mm
32	32 mm

Auto switch

Nil	Without auto switch

* Refer to the table below for applicable auto switches.

Action

D	Double acting

Port thread type

Symbol	Type	Bore size
Nil	M5 x 0.8	ø6, ø10, ø16, ø20, ø25
	Rc 1/8	ø32
TN	NPT 1/8	ø32
TF	G 1/8	ø32

Standard stroke (mm)

ø6, ø10, ø16	5, 10, 15, 20, 25, 30
ø20, ø25, ø32	5, 10, 15, 20, 25, 30, 40, 50

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example): CDUK20-25D

Applicable Auto Switches/Refer to pages 1559 to 1673 for further information on auto switches.

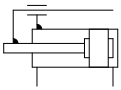
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**M9NV**	**M9N**	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9PV**	**M9P**	●	●	●	○	○		
				2-wire		12 V		**M9BV**	**M9B**	●	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)		5 V, 12 V		**M9NWV**	**M9NW**	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PWV**	**M9PW**	●	●	●	○	○		
				2-wire		12 V		**M9BWV**	**M9BW**	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V		**M9NAV***1	**M9NA***1	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PAV***1	**M9PA***1	○	○	●	○	○		
				2-wire		12 V		**M9BAV***1	**M9BA***1	○	○	●	○	○	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96V**	**A96**	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	**A93V***2	**A93**	●	●	●	●	—	—	Relay, PLC
							100 V or less	**A90V**	**A90**	●	—	●	—	—	IC circuit	

*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMCregarding water resistant types with the above model numbers.
*2 1 m type lead wire is only applicable to D-A93.

* Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
  1 m ····· M (Example) M9NWM
  3 m ····· L (Example) M9NWL
  5 m ····· Z (Example) M9NWZ
* Solid state auto switches marked with "○" are produced upon receipt of order.
* Since there are applicable auto switches other than the above, refer to page 712 for details.
* For detail about auto switches with pre-wired connector, refer to pages 1626 and 1627.
* Auto switches are shipped together but not assembled.

Symbol

Double acting, Single rod, Rubber bumper



Specifications

Bore size (mm)	6	10	16	20	25	32
Fluid	Air					
Proof pressure	1.05 MPa					
Maximum operating pressure	0.7 MPa					
Minimum operating pressure	0.15 MPa	0.10 MPa		0.08 MPa		
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)					
Lubrication	Non-lube					
Piston speed	50 to 500 mm/s					
Cushion	Rubber bumper					
Rod end thread	Male thread					
Stroke length tolerance	$^{+1.0}_{0}$ mm					
Rod non-rotating accuracy Note)	±0.8°			±0.5°		

Note) No load: Rod at retracted

Standard Stroke

Bore size (mm)	Standard stroke (mm)
6, **10**, **16**	5, 10, 15, 20, 25, 30
20, **25**, **32**	5, 10, 15, 20, 25, 30, 40, 50

Note) For long stroke, refer to page 694.

Minimum Stroke for Auto Switch Mounting

(mm)

No. of auto switches mounted	Applicable auto switch		
	D-A9□, D-A9□V	**D-M9□, D-M9□V**	**D-M9□W, D-M9□WV**
1 pc.	5	5	5
2 pcs.	10	5	10

Weight

/( ): Denotes the values with D-A93.

(g)

Bore size (mm)	Stroke (mm)							
	5	10	15	20	25	30	40	50
C(D)UK6-□D	28 (33)	31 (41)	34 (44)	37 (47)	40 (50)	43 (53)	—	—
C(D)UK10-□D	43 (48)	47 (57)	51 (61)	55 (65)	59 (69)	63 (73)	—	—
C(D)UK16-□D	60 (85)	66 (96)	72 (102)	78 (108)	84 (114)	90 (120)	—	—
C(D)UK20-□D	113 (147)	124 (164)	136 (176)	148 (188)	160 (200)	172 (211)	195 (235)	219 (260)
C(D)UK25-□D	212 (266)	229 (288)	246 (305)	263 (322)	280 (339)	297 (356)	335 (390)	370 (424)
C(D)UK32-□D	331 (404)	357 (435)	383 (461)	409 (487)	435 (513)	461 (539)	513 (591)	565 (643)

∗ For the auto switch weight, refer to page 1559.

Allowable Rotational Torque

Bore size (mm)	6	10	16	20	25	32
Allowable rotational torque (N·m)	0.0015	0.02	0.04	0.10	0.15	0.20

Made to Order Specifications

(For details, refer to pages 1699 to 1818.)

Symbol	Specifications
-XB6	Heat resistant (–10 to 150°C)
-XB7	Cold resistant (–40 to 70°C)
-XB9	Low speed (10 to 50 mm/s)
-XB13	Low speed (5 to 50 mm/s)
-XC19	Intermediate stroke (5 mm spacer)
-XC22	Fluororubber seals
-XC34	Non-rotating plate with workpiece mounting screw (No extended part on the rod end)

Moisture Control Tube Series IDK

When operating an actuator with a small diameter and a short stroke at a high frequency, the dew condensation (water droplet) may occur inside the piping depending on the conditions.

Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to **Series IDK in the WEB catalog**.

Tightening Torque

When mounting Series CUK, refer to page 658.

Theoretical Output

Specifications are the same as CU series double acting, single rod. Refer to page 658.

Auto Switch Mounting Position

For the auto switch mounting position of Series CDUK, refer to page 662, since specifications are the same as standard type, double acting, single rod type.

⚠ Precautions

Be sure to read before handling. Refer to front matter 57 for Safety Instructions and pages 3 to 12 for Actuator and Auto Switch Precautions.

Operating Precautions

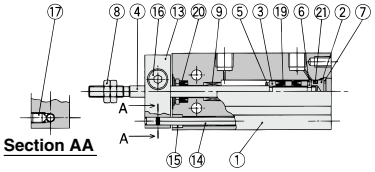
⚠ Caution

1. Do not place your fingers in the clearance between the non-rotating plate and the cylinder tube.
Your fingers could get caught between the non-rotating plate and the cylinder tube when the piston rod retracts. Therefore, never place your finger in this area.
Because the cylinder outputs a great force, it could lead to injury if precautions are not taken to prevent your fingers from getting caught.

2. When using the non-rotating style, make sure that rotational torque is not applied to the piston rod. If rotational torque must be applied due to unavoidable circumstances, make sure to use it at the allowable rotational torque or less, which is shown in the table on the right.

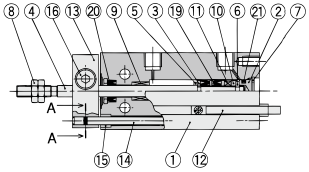
Construction

ø6

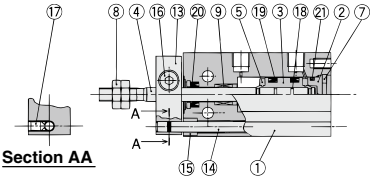


Section AA

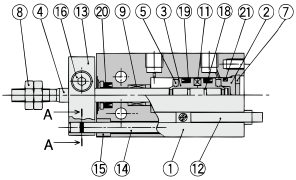
With auto switch



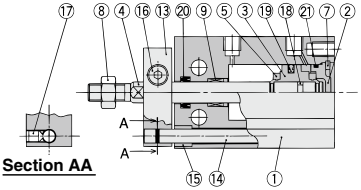
ø10



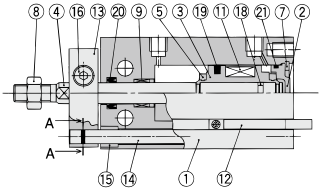
Section AA



ø16 to ø32



Section AA



Component Parts

No.	Description	Material	Note
1	**Cylinder tube**	Aluminum alloy	Hard anodized
2	**Head cover**	Brass	ø6 to ø10, Electroless nickel plated
		Aluminum alloy	ø16 to ø32, Chromated
3	**Piston**	Brass	ø6
		Aluminum alloy	ø10 to ø32, Chromated
4	**Piston rod**	Stainless steel	
5	**Bumper A**	Urethane	
6	**Bumper B**	Urethane	
7	**Retaining ring**	Carbon tool steel	Phosphate coated
8	**Rod end nut**	Carbon steel	Chromated
9	**Bushing**	Oil-impregnated sintered alloy	
10	**Magnet holder**	Brass	ø6

Component Parts

No.	Description	Material	Note
11	**Magnet**	—	
12	**Auto switch**	—	
13	**Non-rotating plate**	Aluminum alloy	Nickel plated
14	**Guide rod**	Stainless steel	
15	**Bushing**	Bearing alloy	
16	**Hexagon socket head cap screw**	Carbon steel	Chromated
17	**Hexagon socket head set screw**	Carbon steel	Chromated
18	**Piston gasket**	NBR	
19*	**Piston seal**		
20*	**Rod seal**		
21*	**Gasket**		

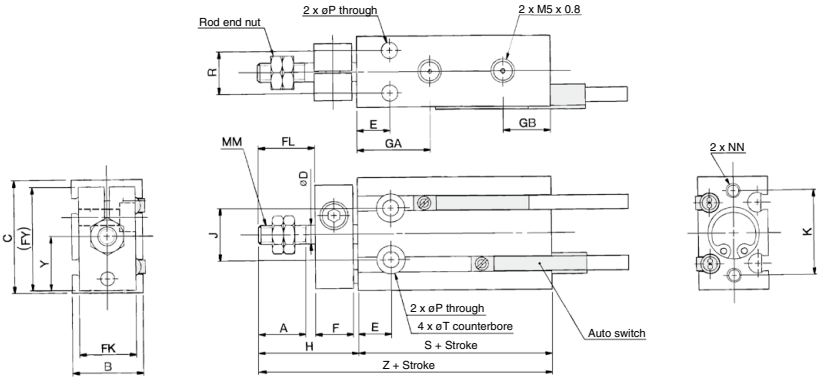
Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
10	CU10D-PS	Set of nos. above ⑲, ⑳, ㉑.
16	CU16D-PS	
20	CU20D-PS	
25	CU25D-PS	
32	CU32D-PS	

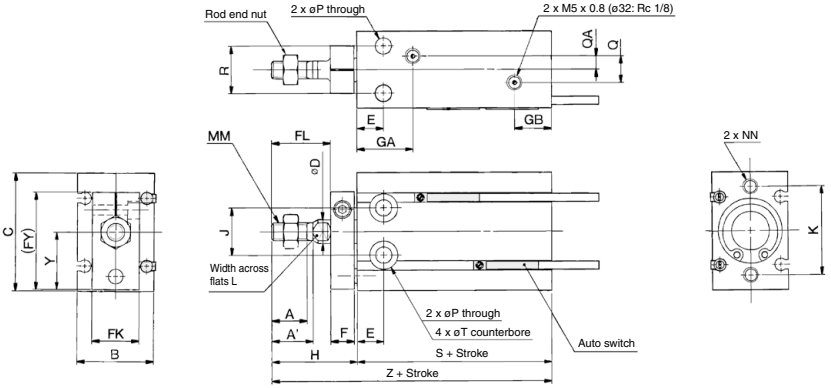
* Seal kit includes ⑲, ⑳, ㉑. Order the seal kit, based on each bore size.
* Seal kit includes a grease pack (10 g).
Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g)

Dimensions: Non-rotating Rod Type; Double Acting, Single Rod

ø6, ø10

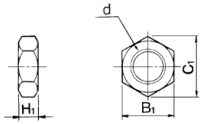


ø16 to ø32



Rod End Nut/Accessory Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H_1	B_1	C_1
NTP-006	**6**	M3 x 0.5	1.8	5.5	6.4
NTP-010	**10**	M4 x 0.7	2.4	7	8.1
NTJ-015A	**16**	M5 x 0.8	4	8	9.2
NT-015A	**20**	M6 x 1.0	5	10	11.5
NT-02	**25**	M8 x 1.25	5	13	15.0
NT-03	**32**	M10 x 1.25	6	17	19.6



(mm)

Bore size (mm)	A	A'	B	C	D	E	F	FL	FK	FY	GA	GB	H	J	K	L	MM
6	7	—	13	22	3	7	8	9	11	20.5	15	10	18	10	17	—	M3 x 0.5
10	10	—	15	24	4	7	8	12	12	22	16.5	10	21	11	18	—	M4 x 0.7
16	11	12.5	20	32	6	7	8	17	13	28	16.5 Note	11.5	26	14	25	5	M5 x 0.8
20	12	14	26	40	8	9	8	20	16	33	19	12.5	29	16	30	6	M6 x 1.0
25	15.5	18	32	50	10	10	10	22	20	43.5	21.5	13	33	20	38	8	M8 x 1.25
32	19.5	22	40	62	12	11	12	29	24	51.5	23	12.5	42	24	48	10	M10 x 1.25

Bore size (mm)	NN	P	Q	QA	R	T	Y	Without auto switch		With auto switch	
								S	Z	S	Z
6	M3 x 0.5 depth 5	3.2	—	—	7	6 depth 4.8	10.5	33	51	33	51
10	M3 x 0.5 depth 5	3.2	—	—	9	6 depth 5	11.5	36	57	36	57
16	M4 x 0.7 depth 6	4.5	4	2	12	7.6 depth 6.5	15.5	30	56	40	66
20	M5 x 0.8 depth 8	5.5	9	4.5	16	9.3 depth 8	19.5	36	65	46	75
25	M5 x 0.8 depth 8	5.5	9	4.5	20	9.3 depth 9	24.5	40	73	50	83
32	M6 x 1.0 depth 9	6.6	13.5	4.5	24	11 depth 11.5	30.5	42	84	52	94

Note) 5 stroke (CUK16-5D): GA = 14.5

Free Mount Cylinder: Non-rotating Rod Type
Double Acting, Double Rod
Series CUKW
ø6, ø10, ø16, ø20, ø25, ø32

How to Order

CUKW 6 □ – 30 D

With auto switch **CDUKW 6 □ – 30 D – M9BW □**

Built-in magnet

Non-rotating rod type

Double rod

Bore size

6	6 mm
10	10 mm
16	16 mm
20	20 mm
25	25 mm
32	32 mm

Port thread type

Symbol	Type	Bore size
Nil	M5 x 0.8	ø6, ø10, ø16, ø20, ø25
	Rc 1/8	ø32
TN	NPT 1/8	ø32
TF	G 1/8	ø32

Standard stroke (mm)

ø6, ø10, ø16	5, 10, 15, 20, 25, 30, 40, 50, 60
ø20, ø25, ø32	5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100

Action

D	Double acting

Auto switch

Nil	Without auto switch

∗ Refer to the table below for applicable auto switches.

Number of auto switches

Nil	2 pcs.
S	1 pc.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example): CDUKW20-25D

Applicable Auto Switches/Refer to pages 1559 to 1673 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**M9NV**	**M9N**	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9PV**	**M9P**	●	●	●	○	○	IC circuit	
				2-wire		12 V		**M9BV**	**M9B**	●	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)		5 V, 12 V		**M9NWV**	**M9NW**	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PWV**	**M9PW**	●	●	●	○	○	IC circuit	
				2-wire		12 V		**M9BWV**	**M9BW**	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V		**M9NAV**∗1	**M9NA**∗1	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PAV**∗1	**M9PA**∗1	○	○	●	○	○	IC circuit	
				2-wire		12 V		**M9BAV**∗1	**M9BA**∗1	○	○	●	○	○	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96V**	**A96**	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	**A93V**∗2	**A93**	●	●	●	●	—	—	Relay, PLC
							100 V or less	**A90V**	**A90**	●	—	●	—	—	IC circuit	

∗1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.
∗2 1 m type lead wire is only applicable to D-A93.

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

∗ Solid state auto switches marked with "○" are produced upon receipt of order.

∗ Since there are applicable auto switches other than the above, refer to page 712 for details.
∗ For detail about auto switches with pre-wired connector, refer to pages 1626 and 1627.
∗ Auto switches are shipped together but not assembled.

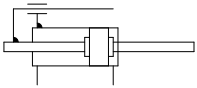
Specifications

Bore size (mm)	6	10	16	20	25	32
Fluid	Air					
Proof pressure	1.05 MPa					
Maximum operating pressure	0.7 MPa					
Minimum operating pressure	0.18 MPa	0.13 MPa		0.11 MPa		
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)					
Lubrication	Non-lube					
Piston speed	50 to 500 mm/s					
Cushion	Rubber bumper					
Rod end thread	Male thread					
Stroke length tolerance	$^{+1.0}_{0}$ mm					
Rod non-rotating accuracy Note)	±0.8°				±0.5°	

Note) No load: Rod in the non-rotating plate side at retracted

Symbol

Non-rotating rod, Rubber bumper



Standard Stroke

Bore size (mm)	Standard stroke (mm)
6, **10**, **16**	5, 10, 15, 20, 25, 30, 40, 50, 60
20, **25**, **32**	5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100

Minimum Stroke for Auto Switch Mounting

(mm)

No. of auto switches mounted	Applicable auto switch		
	D-A9□, D-A9□V	**D-M9□, D-M9□V**	**D-M9□W, D-M9□WV**
1 pc.	5	5	5
2 pcs.	10	5	10

Weight

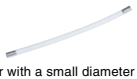
/( ): Denotes the values with D-A93.

(g)

Model	Stroke (mm)												
	5	10	15	20	25	30	40	50	60	70	80	90	100
C(D)UKW6-□D	33 (38)	36 (46)	40 (50)	43 (53)	46 (56)	50 (60)	57 (67)	64 (74)	71 (81)	—	—	—	—
C(D)UKW10-□D	51 (56)	56 (66)	60 (70)	65 (75)	69 (79)	74 (84)	83 (93)	92 (102)	101 (111)	—	—	—	—
C(D)UKW16-□D	84 (109)	91 (121)	98 (128)	105 (135)	112 (142)	119 (149)	133 (163)	147 (177)	161 (191)	—	—	—	—
C(D)UKW20-□D	150 (185)	163 (203)	177 (217)	191 (231)	205 (245)	219 (259)	247 (286)	275 (315)	303 (343)	331 (371)	359 (399)	387 (427)	415 (455)
C(D)UKW25-□D	276 (330)	296 (355)	316 (375)	336 (395)	357 (416)	377 (436)	421 (476)	462 (516)	500 (559)	541 (600)	582 (641)	623 (682)	664 (723)
C(D)UKW32-□D	434 (507)	465 (543)	495 (573)	526 (604)	556 (634)	587 (665)	669 (747)	709 (787)	770 (848)	831 (909)	892 (970)	953 (1031)	1014 (1092)

* For the auto switch weight, refer to page 1559.

Moisture Control Tube Series IDK



When operating an actuator with a small diameter and a short stroke at a high frequency, the dew condensation (water droplet) may occur inside the piping depending on the conditions.
Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to **Series IDK in the WEB catalog**.

Theoretical Output

Specifications are the same as double acting, double rod (Series CUW). Refer to page 665.

Allowable Rotational Torque

Ensure that rotational torque is not applied to the piston rod of Series CUKW. If rotational torque are applied unavoidably, refer to page 677.

Tightening Torque

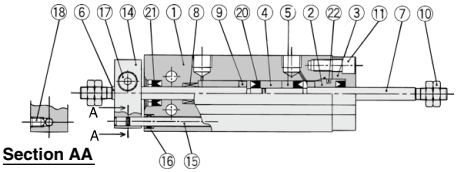
When mounting Series CUKW, refer to page 658.

Auto Switch Mounting Position

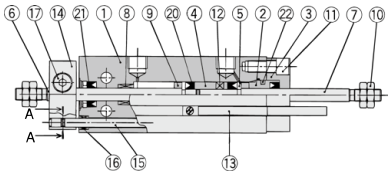
For the auto switch mounting position of Series CUKW, refer to page 668, since specifications are the same as double acting, double rod type.

Construction

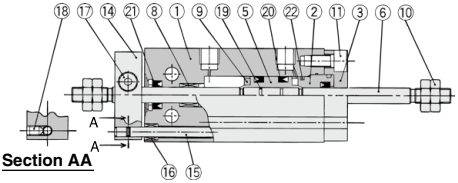
ø6

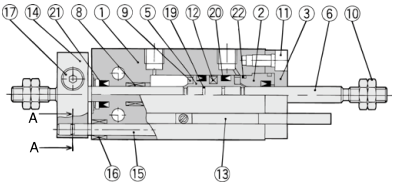


With auto switch

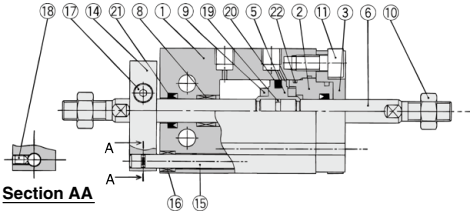


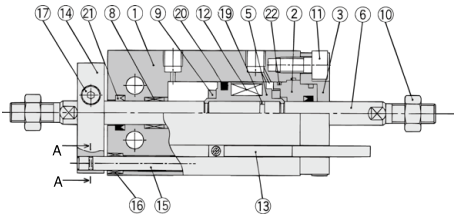
ø10





ø16 to ø32





Component Parts

No.	Description	Material	Note
1	**Cylinder tube**	Aluminum alloy	Hard anodized
2	**Rod cover**	Aluminum alloy	Chromated
3	**Rod cover retainer**	Aluminum alloy	Hard anodized
4	**Piston**	Brass	ø6
5	**Piston**	Brass	ø6
		Aluminum alloy	ø10 to ø32, Chromated
6	**Piston rod**	Stainless steel	
7	**Piston rod**	Stainless steel	ø6
8	**Bushing**	Bearing alloy	
9	**Bumper**	Urethane	
10	**Rod end nut**	Carbon steel	Chromated
11	Hexagon socket head cap screw	Carbon steel	Chromated

Component Parts

No.	Description	Material	Note
12	**Magnet**	—	
13	**Auto switch**	—	
14	**Non-rotating plate**	Aluminum alloy	Nickel plated
15	**Guide rod**	Stainless steel	
16	**Bushing**	Bearing alloy	
17	Hexagon socket head cap screw	Carbon steel	Chromated
18	Hexagon socket head set screw	Carbon steel	Chromated
19	**Piston gasket**	NBR	
20*	**Piston seal**		
21*	**Rod seal**		
22*	**Gasket**		

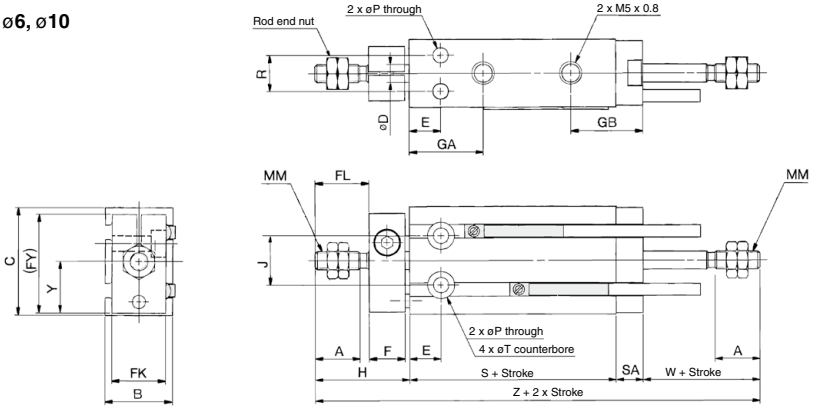
Replacement Parts: Seal Kit

	Bore size (mm) / Part no.				
	10	**16**	**20**	**25**	**32**
Kit no.	CUW10D-PS	CUW16D-PS	CUW20D-PS	CUW25D-PS	CUW32D-PS

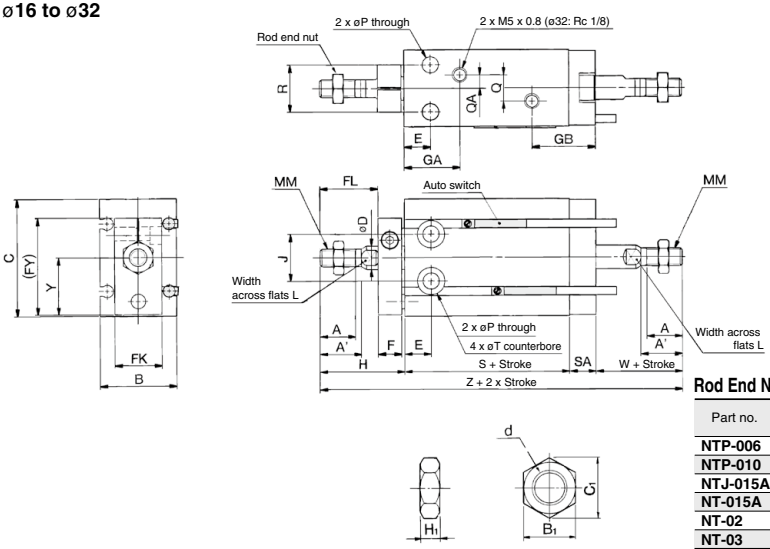
* Seal kit includes 20, 21, 22. Order the seal kit, based on each bore size.
* Seal kit includes a grease pack (10 g).
Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g)

Dimensions: Non-rotating Rod Type; Double Acting, Double Rod

ø6, ø10



ø16 to ø32



Rod End Nut/Accessory Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H_1	B_1	C_1
NTP-006	**6**	M3 x 0.5	1.8	5.5	6.4
NTP-010	**10**	M4 x 0.7	2.4	7	8.1
NTJ-015A	**16**	M5 x 0.8	4	8	9.2
NT-015A	**20**	M6 x 1.0	5	10	11.5
NT-02	**25**	M8 x 1.25	5	13	15.0
NT-03	**32**	M10 x 1.25	6	17	19.6

Bore size (mm)	A	A'	B	C	D	E	F	FL	FK	FY	GA	GB	H	J	L	MM
6	7	—	13	22	3	7	8	9	11	20.5	15	16	18	10	—	M3 x 0.5
10	10	—	15	24	4	7	8	12	12	22	16.5	16	21	11	—	M4 x 0.7
16	11	12.5	20	32	6	7	8	17	13	28	16.5 Note)	19	26	14	5	M5 x 0.8
20	12	14	26	40	8	9	8	20	16	33	19	21.5	29	16	6	M6 x 1.0
25	15.5	18	32	50	10	10	10	22	20	43.5	21.5	22	33	20	8	M8 x 1.25
32	19.5	22	40	62	12	11	12	29	24	51.5	23	22.5	42	24	10	M10 x 1.25

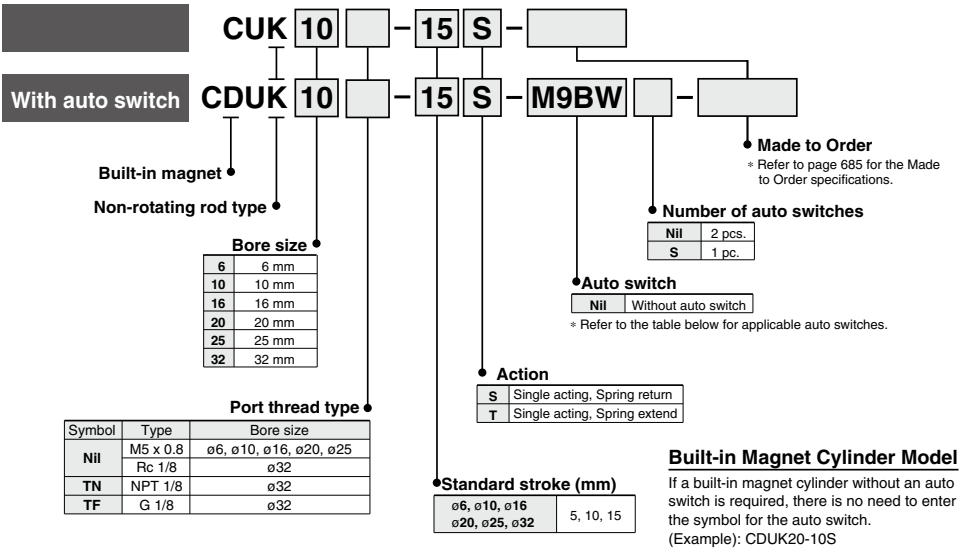
Bore size (mm)	P	Q	QA	R	SA	T	W	Y	Without auto switch		With auto switch	
									S	Z	S	Z
6	3.2	—	—	7	6	6 depth 4.8	13	10.5	38	75	38	75
10	3.2	—	—	9	6	6 depth 5	16	11.5	36	79	36	79
16	4.5	4	2	12	7.5	7.6 depth 6.5	16	15.5	30	79.5	40	89.5
20	5.5	9	4.5	16	9	9.3 depth 8	19	19.5	36	93	46	103
25	5.5	9	4.5	20	9	9.3 depth 9	23	24.5	40	105	50	115
32	6.6	13.5	4.5	24	10	11 depth 11.5	27	30.5	42	121	52	131

Note 1) 5 stroke (CUKW16-5D): GA = 14.5

Note 2) The two chamfered positions for the double rod type are not identical.

Free Mount Cylinder: Non-rotating Rod Type
Single Acting, Spring Return/Extend
Series CUK
ø6, ø10, ø16, ø20, ø25, ø32

How to Order



Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example): CDUK20-10S

Applicable Auto Switches/Refer to pages 1559 to 1673 for further information on auto switches.

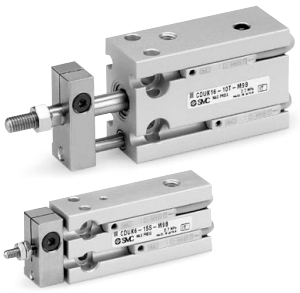
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model Perpendicular	Auto switch model In-line	Lead wire length (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	●	●	○	○		
				2-wire		12 V		M9BV	M9B	●	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)		5 V, 12 V		M9NWV	M9NW	●	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PWV	M9PW	●	●	●	○	○		
				2-wire		12 V		M9BWV	M9BW	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V		M9NAV∗1	M9NA∗1	○	○	●	○	○	IC circuit	
				3-wire (PNP)				M9PAV∗1	M9PA∗1	○	○	●	○	○		
				2-wire		12 V		M9BAV∗1	M9BA∗1	○	○	●	○	○	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	A93V∗2	A93	●	●	●	●	—	—	Relay, PLC
							100 V or less	A90V	A90	●	—	●	—	—	IC circuit	

∗1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMCregarding water resistant types with the above model numbers.
∗2 1 m type lead wire is only applicable to D-A93.

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

∗ Solid state auto switches marked with "○" are produced upon receipt of order.

∗ Since there are applicable auto switches other than the above, refer to page 712 for details.
∗ For detail about auto switches with pre-wired connector, refer to pages 1626 and 1627.
∗ Auto switches are shipped together but not assembled.

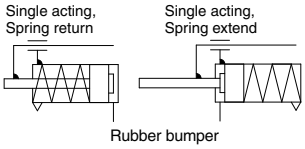


Specifications

Bore size (mm)	6	10	16	20	25	32
Fluid	Air					
Proof pressure	1.05 MPa					
Maximum operating pressure	0.7 MPa					
Minimum operating pressure	0.23 MPa	0.18 MPa		0.16 MPa		
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)					
Lubrication	Non-lube					
Piston speed	50 to 500 mm/s					
Cushion Note 1)	Rubber bumper on both ends					
Rod end thread	Male thread					
Stroke length tolerance	$^{+1.0}_{0}$ mm					
Rod non-rotating accuracy Note 2)	±0.8°			±0.5°		

Note 1) ø6: With auto switch, single rubber bumper
Note 2) No load: Rod at retracted

Symbol



Standard Stroke

(mm)

Bore size (mm)	Standard stroke (mm)
6, 10, 16, 20, 25, 32	5, 10, 15

Minimum Stroke for Auto Switch Mounting

(mm)

No. of auto switches mounted	Applicable auto switch		
	D-A9□, D-A9□V	**D-M9□, D-M9□V**	**D-M9□W, D-M9□WV**
1 pc.	5	5	5
2 pcs.	10	5	10

Made to Order Specifications

(For details, refer to pages 1772 and 1782.)

Symbol	Specifications
-XC22	Fluororubber seals
-XC34	Non-rotating plate with workpiece mounting screw (No extended part on the rod end)

Weight

/( ): Denotes the values with D-A93.

(g)

Model	Stroke (mm)		
	5	10	15
C(D)UK6-□S/T	28 (33)	31 (41)	34 (44)
C(D)UK10-□S/T	43 (48)	47 (57)	55 (65)
C(D)UK16-□S/T	60 (85)	66 (90)	81 (111)
C(D)UK20-□S/T	113 (147)	124 (164)	153 (193)
C(D)UK25-□S/T	212 (266)	229 (288)	271 (330)
C(D)UK32-□S/T	331 (404)	357 (435)	422 (500)

∗ For the auto switch weight, refer to page 1559.

Tightening Torque

When mounting a CUK single acting series, refer to page 658.

Theoretical Output

Specifications are the same as single acting, spring return/spring extend type (Series CU). Refer to page 670.

Spring Reaction Force

For the reactive force of spring return, refer to page 1821.

Auto Switch Mounting Position

For the auto switch mounting position of CDUK series single acting, spring return/spring extend, refer to page 675, since specification are the same as standard type, single acting, spring return/spring extend type.

Allowable Rotational Torque

Make sure that rotational torque is not applied to the piston rod of the CUK series single acting type cylinder. If the rotation torque were applied unavoidably, refer to page 677.

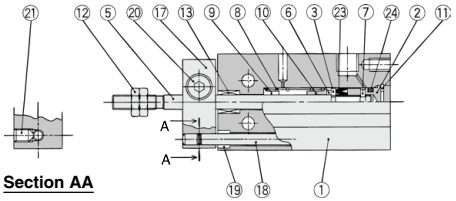
Moisture Control Tube Series IDK

When operating an actuator with a small diameter and a short stroke at a high frequency, the dew condensation (water droplet) may occur inside the piping depending on the conditions. Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to **Series IDK in the WEB catalog**.

Construction

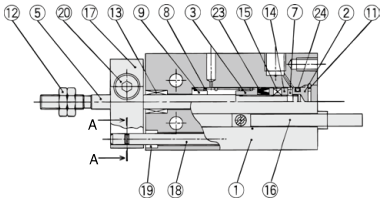
Single acting, Spring return

ø6

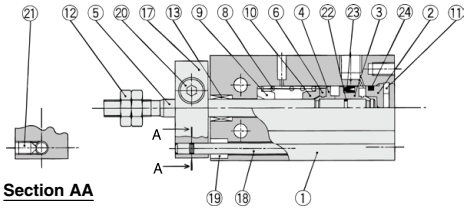


Section AA

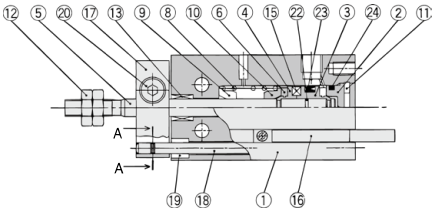
With auto switch



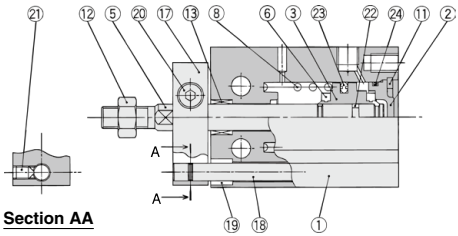
ø10



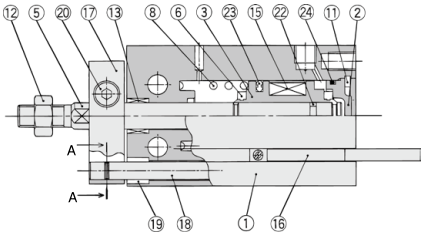
Section AA



ø16 to ø32



Section AA



Component Parts

No.	Description	Material	Note
1	**Cylinder tube**	Aluminum alloy	Hard anodized
2	**Head cover**	Brass	ø6 to ø10, Electroless nickel plated
		Aluminum alloy	ø16 to ø32, Chromated
3	**Piston**	Brass	ø6
		Aluminum alloy	ø10 to ø32, Chromated
4	**Piston**	Aluminum alloy	ø10
5	**Piston rod**	Stainless steel	
6	**Bumper A**	Urethane	
7	**Bumper B**	Urethane	
8	**Return spring**	Piano wire	Zinc chromated
9	**Spring seat**	Brass	
10	**Spring seat**	Brass	

Component Parts

No.	Description	Material	Note
11	**Retaining ring**	Carbon tool steel	Phosphate coated
12	**Rod end nut**	Carbon steel	Chromated
13	**Bushing**	Bearing alloy	
14	**Magnet holder**	Brass	ø6
15	**Magnet**	—	
16	**Auto switch**	—	
17	**Non-rotating plate**	Aluminum alloy	Nickel plated
18	**Guide rod**	Stainless steel	
19	**Bushing**	Bearing alloy	
20	Hexagon socket head cap screw	Carbon steel	Chromated
21	Hexagon socket head set screw	Carbon steel	Chromated
22	**Piston gasket**	NBR	
23*	**Piston seal**		
24*	**Gasket**		

Replacement Parts: Seal Kit

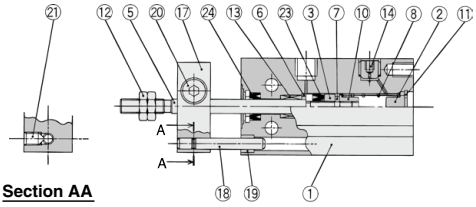
	Bore size (mm) / Part no.				
	10	**16**	**20**	**25**	**32**
Kit no.	CU10S-PS	CU16S-PS	CU20S-PS	CU25S-PS	CU32S-PS

* Seal kit includes 23, 24. Order the seal kit, based on each bore size.
* Seal kit includes a grease pack (10 g).
  Order with the following part number when only the grease pack is needed.
  Grease pack part number: GR-S-010 (10 g)

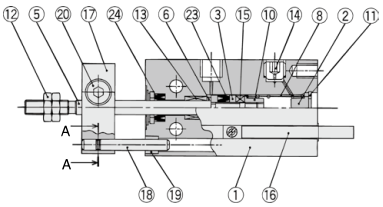
Construction

Single acting, Spring extend

ø6

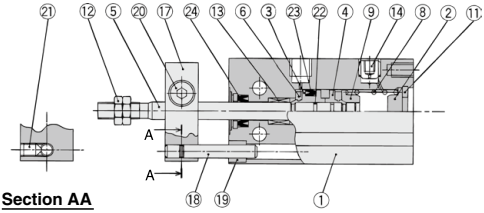


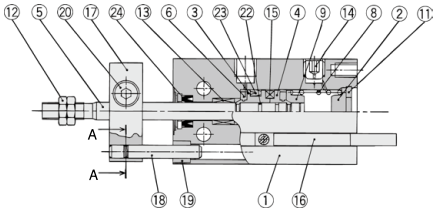
With auto switch



Section AA

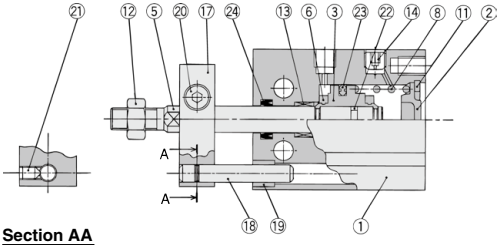
ø10

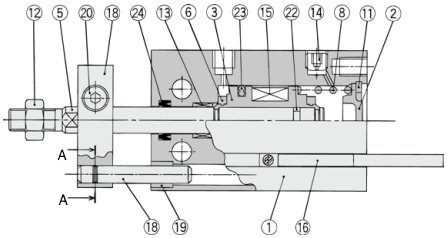




Section AA

ø16 to ø32





Section AA

Component Parts

No.	Description	Material	Note
1	**Cylinder tube**	Aluminum alloy	Hard anodized
2	**Head cover**	Brass	ø6 to ø10, Electroless nickel plated
		Aluminum alloy	ø16 to ø32, Chromated
3	**Piston**	Brass	ø6
		Aluminum alloy	ø10 to ø32, Chromated
4	**Piston**	Aluminum alloy	ø10, Chromated
5	**Piston rod**	Stainless steel	
6	**Bumper A**	Urethane	
7	**Bumper B**	Urethane	
8	**Return spring**	Piano wire	Zinc chromated
9	**Spring seat**	Brass	
10	**Stopper**	Brass	ø6
11	**Retaining ring**	Carbon tool steel	Phosphate coated

Component Parts

No.	Description	Material	Note
12	**Rod end nut**	Carbon steel	Chromated
13	**Bushing**	Bearing alloy	
14	**Plug with fixed orifice**	Alloy steel	Black dyed
15	**Magnet**	—	
16	**Auto switch**	—	
17	**Non-rotating plate**	Aluminum alloy	Nickel plated
18	**Guide rod**	Stainless steel	
19	**Bushing**	Bearing alloy	
20	Hexagon socket head cap screw	Carbon steel	Black zinc chromated
21	Hexagon socket head set screw	Carbon steel	Black zinc chromated
22	**Piston gasket**	NBR	
23*	**Piston seal**		
24*	**Rod seal**		

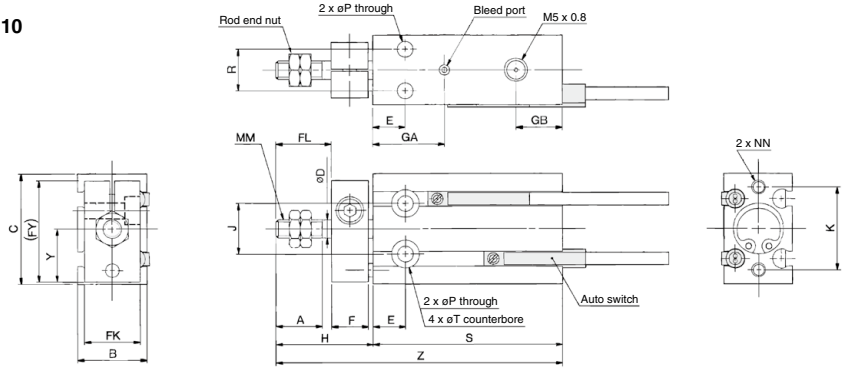
Replacement Parts: Seal Kit

	Bore size (mm) / Part no.				
	10	**16**	**20**	**25**	**32**
Kit no.	CU10T-PS	CU16T-PS	CU20T-PS	CU25T-PS	CU32T-PS

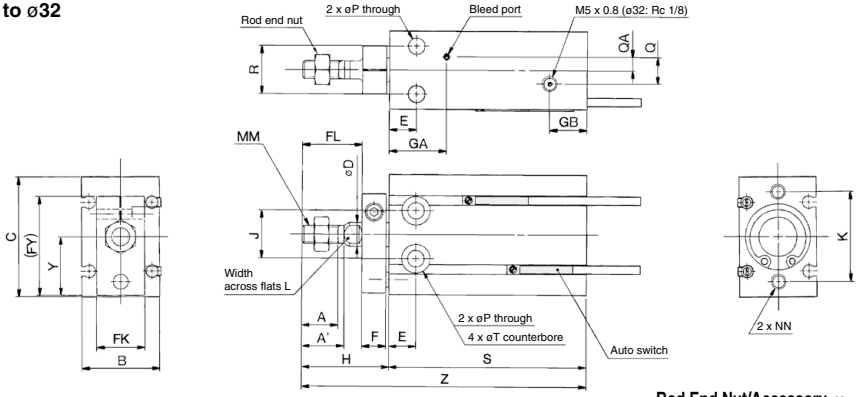
* Seal kit includes 23, 24. Order the seal kit, based on each bore size.
* Seal kit includes a grease pack (10 g).
Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g)

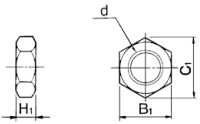
Dimensions: Non-rotating Rod Type; Single Acting, Spring Return

ø6, ø10



ø16 to ø32





Rod End Nut/Accessory Material: Carbon steel

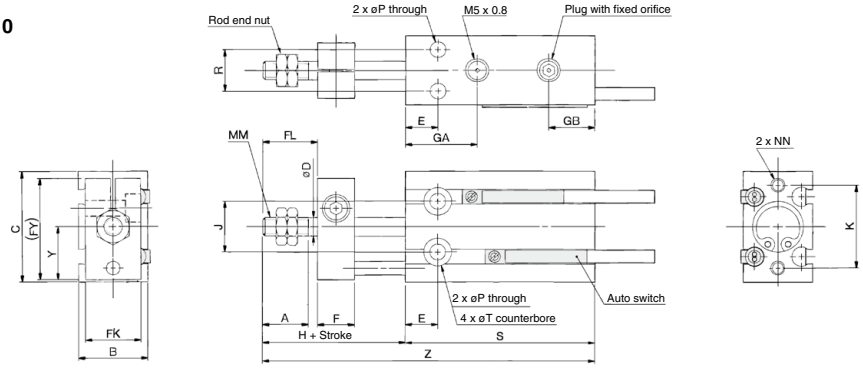
Part no.	Applicable bore size (mm)	d	H_1	B_1	C_1
NTP-006	**6**	M3 x 0.5	1.8	5.5	6.4
NTP-010	**10**	M4 x 0.7	2.4	7	8.1
NTJ-015A	**16**	M5 x 0.8	4	8	9.2
NT-015A	**20**	M6 x 1.0	5	10	11.5
NT-02	**25**	M8 x 1.25	5	13	15.0
NT-03	**32**	M10 x 1.25	6	17	19.6

Bore size (mm)	A	A'	B	C	D	E	F	FL	FK	FY	GA	GB	H	J	K	L	MM	NN
6	7	—	13	22	3	7	8	9	11	20.5	15	10	18	10	17	—	M3 x 0.5	M3 x 0.5 depth 5
10	10	—	15	24	4	7	8	12	12	22	16.5	10	21	11	18	—	M4 x 0.7	M3 x 0.5 depth 5
16	11	12.5	20	32	6	7	8	17	13	28	16.5	11.5	26	14	25	5	M5 x 0.8	M4 x 0.7 depth 6
20	12	14	26	40	8	9	8	20	16	33	19	12.5	29	16	30	6	M6 x 1.0	M5 x 0.8 depth 8
25	15.5	18	32	50	10	10	10	22	20	43.5	21.5	13	33	20	38	8	M8 x 1.25	M5 x 0.8 depth 8
32	19.5	22	40	62	12	11	12	29	24	51.5	23	12.5	42	24	48	10	M10 x 1.25	M6 x 1.0 depth 9

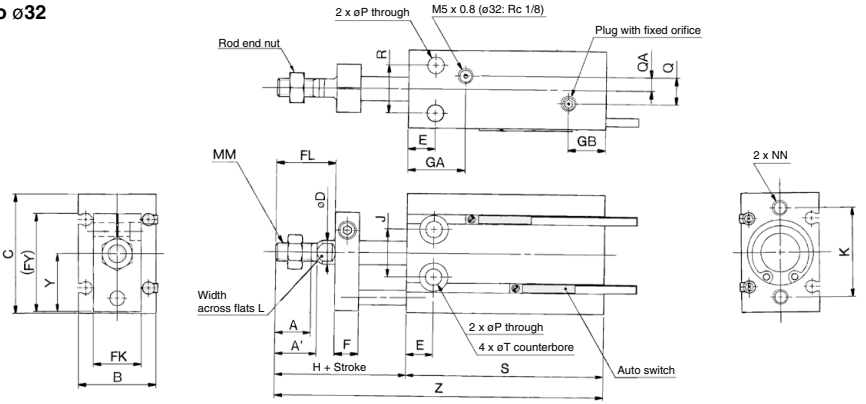
Bore size (mm)	P	Q	QA	R	T	Y	Without auto switch						With auto switch					
							S			Z			S			Z		
							5 st	10 st	15 st	5 st	10 st	15 st	5 st	10 st	15 st	5 st	10 st	15 st
6	3.2	—	—	7	6 depth 4.8	10.5	38	43	48	56	61	66	38	43	48	56	61	66
10	3.2	—	—	9	6 depth 5	11.5	41	46	56	62	67	77	41	46	56	62	67	77
16	4.5	4	2	12	7.6 depth 6.5	15.5	35	40	50	61	66	76	45	50	60	71	76	86
20	5.5	9	4.5	16	9.3 depth 8	19.5	41	46	56	70	75	85	51	56	66	80	85	95
25	5.5	9	4.5	20	9.3 depth 9	24.5	45	50	60	78	83	93	55	60	70	88	93	103
32	6.6	13.5	4.5	24	11 depth 11.5	30.5	47	52	62	89	94	104	57	62	72	99	104	114

Dimensions: Non-rotating Rod Type; Single Acting, Spring Extend

ø6, ø10

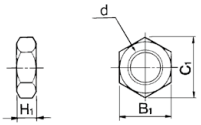


ø16 to ø32



Rod End Nut/Accessory Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H_1	B_1	C_1
NTP-006	**6**	M3 x 0.5	1.8	5.5	6.4
NTP-010	**10**	M4 x 0.7	2.4	7	8.1
NTJ-015A	**16**	M5 x 0.8	4	8	9.2
NT-015A	**20**	M6 x 1.0	5	10	11.5
NT-02	**25**	M8 x 1.25	5	13	15.0
NT-03	**32**	M10 x 1.25	6	17	19.6

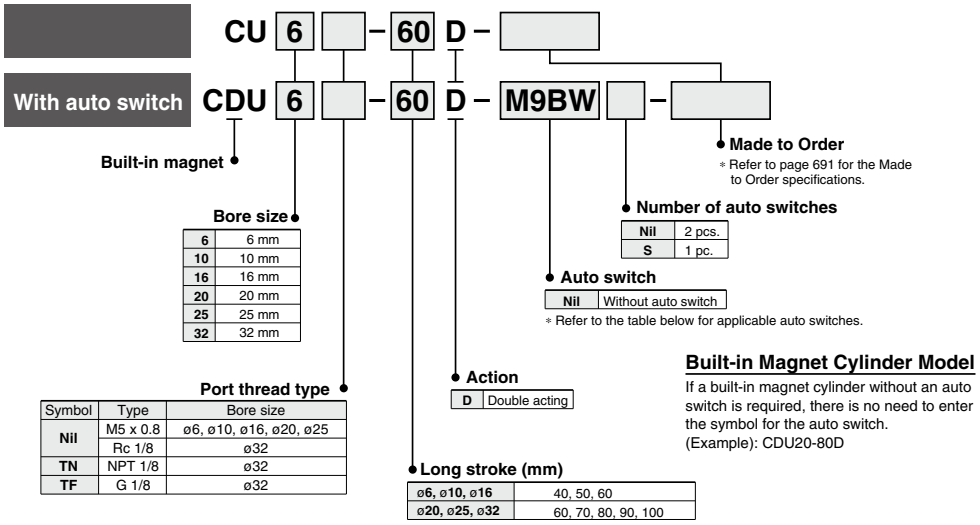


Bore size (mm)	A	A'	B	C	D	E	F	FL	FK	FY	GA	GB	H	J	K	L	MM	NN
6	7	—	13	22	3	7	8	9	11	20.5	15	10	18	10	17	—	M3 x 0.5	M3 x 0.5 depth 5
10	10	—	15	24	4	7	8	12	12	22	16.5	10	21	11	18	—	M4 x 0.7	M3 x 0.5 depth 5
16	11	12.5	20	32	6	7	8	17	13	28	16.5	11.5	26	14	25	5	M5 x 0.8	M4 x 0.7 depth 6
20	12	14	26	40	8	9	8	20	16	33	19	12.5	29	16	30	6	M6 x 1.0	M5 x 0.8 depth 8
25	15.5	18	32	50	10	10	10	22	20	43.5	21.5	13	33	20	38	8	M8 x 1.25	M5 x 0.8 depth 8
32	19.5	22	40	62	12	11	12	29	24	51.5	23	12.5	42	24	48	10	M10 x 1.25	M6 x 1.0 depth 9

Bore size (mm)	P	Q	QA	R	T	Y	Without auto switch						With auto switch					
							S			Z			S			Z		
							5 st	10 st	15 st	5 st	10 st	15 st	5 st	10 st	15 st	5 st	10 st	15st
6	3.2	—	—	7	6 depth 4.8	10.5	38	43	48	61	71	81	38	43	48	61	71	81
10	3.2	—	—	9	6 depth 5	11.5	41	46	56	67	77	92	41	46	56	67	77	92
16	4.5	4	2	12	7.6 depth 6.5	15.5	45	50	60	76	86	101	45	50	60	76	86	101
20	5.5	9	4.5	16	9.3 depth 8	19.5	41	46	56	75	85	100	51	56	66	85	95	110
25	5.5	9	4.5	20	9.3 depth 9	24.5	45	50	60	83	93	108	55	60	70	93	103	118
32	6.6	13.5	4.5	24	11 depth 11.5	30.5	47	52	62	94	104	119	57	62	72	104	114	129

Free Mount Cylinder: Long Stroke Type
Double Acting, Single Rod
Series CU
ø6, ø10, ø16, ø20, ø25, ø32

How to Order



Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example): CDU20-80D

Applicable Auto Switches/Refer to pages 1559 to 1673 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)			M9PV	M9P	●	●	●	○	○		
				2-wire	12 V		M9BV	M9B	●	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)	5 V, 12 V		M9NWV	M9NW	●	●	●	○	○	IC circuit	
				3-wire (PNP)			M9PWV	M9PW	●	●	●	○	○		
				2-wire	12 V		M9BWV	M9BW	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)	5 V, 12 V		M9NAV∗1	M9NA∗1	○	○	●	○	○	IC circuit	
				3-wire (PNP)			M9PAV∗1	M9PA∗1	○	○	●	○	○		
				2-wire	12 V		M9BAV∗1	M9BA∗1	○	○	●	○	○	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	●	—	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	A93V∗2	A93	●	●	●	●	—	—	Relay, PLC
			No				100 V or less	A90V	A90	●	—	●	—	—	IC circuit	

∗1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.
∗2 1 m type lead wire is only applicable to D-A93.

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

∗ Solid state auto switches marked with "○" are produced upon receipt of order.

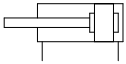
∗ Since there are applicable auto switches other than the above, refer to page 712 for details.
∗ For detail about auto switches with pre-wired connector, refer to pages 1626 and 1627.
∗ Auto switches are shipped together but not assembled.

Specifications

Bore size (mm)	6	10	16	20	25	32
Fluid	Air					
Proof pressure	1.05 MPa					
Maximum operating pressure	0.7 MPa					
Minimum operating pressure	0.12 MPa	0.06 MPa		0.05 MPa		
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)					
Lubrication	Non-lube					
Piston speed	50 to 500 mm/s					
Cushion	Rubber bumper					
Rod end thread	Male thread					
Stroke length tolerance	$^{+1.0}_{0}$ mm					

Symbol

Double acting, Spring rod, Rubber bumper



Standard Stroke

Bore size (mm)	Standard stroke (mm)
6, **10**, **16**	40, 50, 60
20, **25**, **32**	60, 70, 80, 90, 100

Made to Order Specifications

(For details, refer to pages 1699 to 1818.)

Symbol	Specifications
-XB6	Heat resistant (–10 to 150°C)
-XB7	Cold resistant (–40 to 70°C)
-XB9	Low speed (10 to 50 mm/s)
-XB13	Low speed (5 to 50 mm/s)
-XC19	Intermediate stroke (5 mm spacer)
-XC22	Fluororubber seals

Weight

/( ): Denotes the values with D-A93. (g)

Model	Stroke (mm)						
	40	50	60	70	80	90	100
C(D)U6-□D	43 (53)	49 (59)	55 (65)	—	—	—	—
C(D)U10-□D	64 (74)	72 (82)	80 (90)	—	—	—	—
C(D)U16-□D	92 (122)	104 (134)	116 (146)	—	—	—	—
C(D)U20-□D	—	—	216 (253)	238 (275)	260 (297)	282 (319)	304 (341)
C(D)U25-□D	—	—	363 (422)	397 (456)	431 (490)	465 (524)	499 (558)
C(D)U32-□D	—	—	526 (604)	574 (652)	622 (700)	670 (748)	718 (796)

∗ For the auto switch weight, refer to page 1559.

Auto Switch Mounting Position

For the auto switch mounting position of CDU long stroke series, refer to page 662, since specifications are the same as standard type, double acting, single rod type.

Tightening Torque

Refer to page 658 for mounting a long stroke type.

Theoretical Output

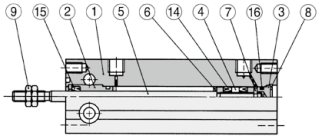
Specifications are the same as CU series double acting, single rod. Refer to page 658.

Moisture Control Tube Series IDK

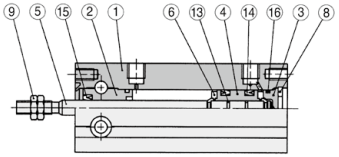
When operating an actuator with a small diameter and a short stroke at a high frequency, the dew condensation (water droplet) may occur inside the piping depending on the conditions.
Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to **Series IDK in the WEB catalog**.

Construction

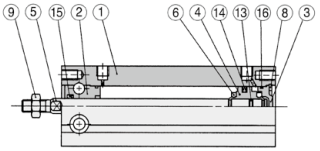
ø6



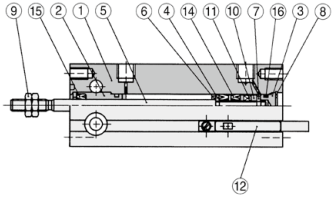
ø10

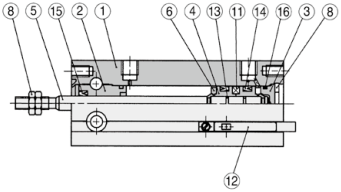


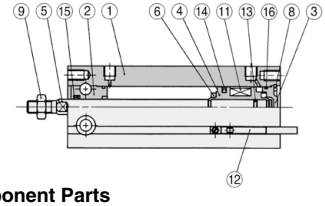
ø16 to ø32



With auto switch







Component Parts

No.	Description	Material	Note
1	**Cylinder tube**	Aluminum alloy	Hard anodized
2	**Rod cover**	Aluminum alloy	Hard anodized
3	**Head cover**	Brass	ø6 to ø10, Electroless nickel plated
		Aluminum alloy	ø16 to ø32, Chromated
4	**Piston**	Brass	ø6
		Aluminum alloy	ø10 to ø32, Chromated
5	**Piston rod**	Stainless steel	
6	**Bumper A**	Urethane	
7	**Bumper B**	Urethane	

Component Parts

No.	Description	Material	Note
8	**Retaining ring**	Carbon tool steel	Phosphate coated
9	**Rod end nut**	Carbon steel	Chromated
10	**Magnet holder**	Brass	ø6
11	**Magnet**	—	
12	**Auto switch**	—	
13	**Piston gasket**	NBR	
14*	**Piston seal**		
15*	**Rod seal**		
16*	**Gasket**		

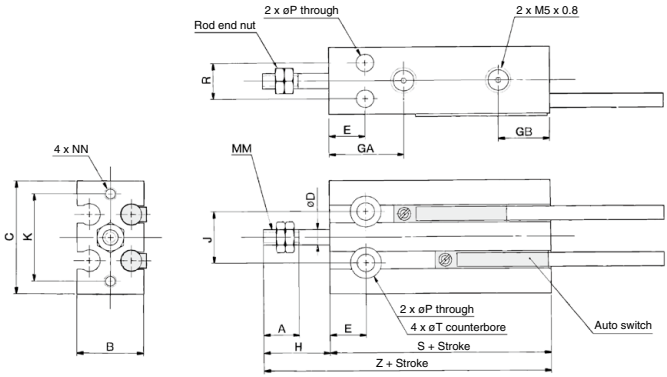
Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
10	CU10D-PS	Set of nos. above ⑭, ⑮, ⑯.
16	CU16D-PS	
20	CU20D-PS	
25	CU25D-PS	
32	CU32D-PS	

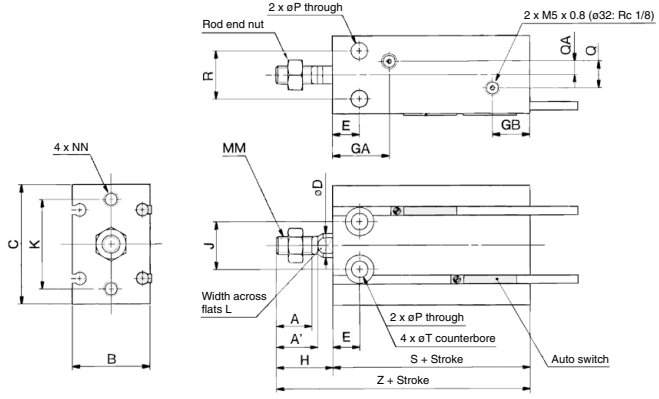
* Seal kit includes ⑭, ⑮, ⑯. Order the seal kit, based on each bore size.
* Seal kit includes a grease pack (10 g).
Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g)

Dimensions: Double Acting, Single Rod

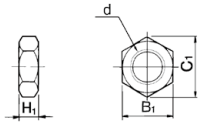
ø6, ø10



ø16 to ø32



Rod End Nut/Accessory



Material: Carbon steel

Part no.	Applicable bore (mm)	d	H_1	B_1	C_1
NTP-006	**6**	M3 x 0.5	1.8	5.5	6.4
NTP-010	**10**	M4 x 0.7	2.4	7	8.1
NTJ-015A	**16**	M5 x 0.8	4	8	9.2
NT-015A	**20**	M6 x 1.0	5	10	11.5
NT-02	**25**	M8 x 1.25	5	13	15.0
NT-03	**32**	M10 x 1.25	6	17	19.6

(mm)

Bore size (mm)	A	A'	B	C	D	E	GA	GB	H	J	K	L	MM	NN	P	Q	QA
6	7	—	13	22	3	7	15	10	13	10	17	—	M3 x 0.5	M3 x 0.5 depth 5	3.2	—	—
10	10	—	15	24	4	7	16.5	10	16	11	18	—	M4 x 0.7	M3 x 0.5 depth 5	3.2	—	—
16	11	12.5	20	32	6	7	16.5	11.5	16	14	25	5	M5 x 0.8	M4 x 0.7 depth 6	4.5	4	2
20	12	14	26	40	8	9	19	12.5	19	16	30	6	M6 x 1.0	M5 x 0.8 depth 8	5.5	9	4.5
25	15.5	18	32	50	10	10	21.5	13	23	20	38	8	M8 x 1.25	M5 x 0.8 depth 8	5.5	9	4.5
32	19.5	22	40	62	12	11	23	12.5	27	24	48	10	M10 x 1.25	M6 x 1.0 depth 9	6.6	13.5	4.5

Bore size (mm)	R	T	Without auto switch		With auto switch	
			S	Z	S	Z
6	7	6 depth 4.8	33	46	33	46
10	9	6 depth 5	36	52	36	52
16	12	7.6 depth 6.5	30	46	40	56
20	16	9.3 depth 8	36	55	46	65
25	20	9.3 depth 9	40	63	50	73
32	24	11 depth 11.5	42	69	52	79

Free Mount Cylinder: Long Stroke Type
Non-rotating Rod, Double Acting, Single Rod

Series CUK

ø6, ø10, ø16, ø20, ø25, ø32

How to Order

CUK **6** **□** **–** **60** **D** **–** **□**

With auto switch **CDUK** **6** **□** **–** **60** **D** **–** **M9BW** **□** **–** **□**

Made to Order
* Refer to page 695 for the Made to Order specifications.

Built-in magnet

Non-rotating rod type

Number of auto switches

Nil	2 pcs.
S	1 pc.

Bore size

6	6 mm
10	10 mm
16	16 mm
20	20 mm
25	25 mm
32	32 mm

Auto switch

Nil	Without auto switch

* Refer to the table below for applicable auto switches.

Action

D	Double acting

Port thread type

Symbol	Type	Bore size
Nil	M5 x 0.8	ø6, ø10, ø16, ø20, ø25
	Rc 1/8	ø32
TN	NPT 1/8	ø32
TF	G 1/8	ø32

Cylinder stroke (mm)

ø6, ø10, ø16	40, 50, 60
ø20, ø25, ø32	60, 70, 80, 90, 100

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example): CDUK20-80D

Applicable Auto Switches/Refer to pages 1559 to 1673 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**M9NV**	**M9N**	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9PV**	**M9P**	●	●	●	○	○		
				2-wire		12 V		**M9BV**	**M9B**	●	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)		5 V, 12 V		**M9NWV**	**M9NW**	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PWV**	**M9PW**	●	●	●	○	○		
				2-wire		12 V		**M9BWV**	**M9BW**	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V		**M9NAV***1	**M9NA***1	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PAV***1	**M9PA***1	○	○	●	○	○		
				2-wire		12 V		**M9BAV***1	**M9BA***1	○	○	●	○	○	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96V**	**A96**	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	**A93V***2	**A93**	●	●	●	●	—	—	Relay, PLC
							100 V or less	**A90V**	**A90**	●	—	●	—	—	IC circuit	

*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.
*2 1 m type lead wire is only applicable to D-A93.

* Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
  1 m ····· M (Example) M9NWM
  3 m ····· L (Example) M9NWL
  5 m ····· Z (Example) M9NWZ
* Solid state auto switches marked with "○" are produced upon receipt of order.
* Since there are applicable auto switches other than the above, refer to page 712 for details.
* For detail about auto switches with pre-wired connector, refer to pages 1626 and 1627.
* Auto switches are shipped together but not assembled.

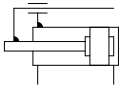
Specifications

Bore size (mm)	6	10	16	20	25	32
Fluid	Air					
Proof pressure	1.05 MPa					
Maximum operating pressure	0.7 MPa					
Minimum operating pressure	0.15 MPa		0.10 MPa		0.08 MPa	
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)					
Lubrication	Non-lube					
Piston speed	50 to 500 mm/s					
Cushion	Rubber bumper					
Rod end thread	Male thread					
Stroke length tolerance	$^{+1.0}_{0}$ mm					
Rod non-rotating accuracy Note)	±0.8°			±0.5°		

Note) No load: Rod at retracted

Symbol

Double acting, Single rod, Rubber bumper



Standard Stroke

(mm)

Bore size (mm)	Standard stroke (mm)
6, **10**, **16**	40, 50, 60
20, **25**, **32**	60, 70, 80, 90, 100

Weight

/( ): Denotes the values with D-A93. (g)

Model	Stroke (mm)						
	40	50	60	70	80	90	100
C(D)UK6-□D	49 (59)	55 (65)	61 (71)	—	—	—	—
C(D)UK10-□D	71 (81)	79 (89)	87 (97)	—	—	—	—
C(D)UK16-□D	102 (132)	114 (144)	126 (156)	—	—	—	—
C(D)UK20-□D	—	—	243 (284)	267 (308)	291 (332)	315 (356)	339 (380)
C(D)UK25-□D	—	—	405 (460)	440 (495)	475 (530)	510 (565)	545 (600)
C(D)UK32-□D	—	—	617 (695)	669 (747)	721 (799)	773 (851)	825 (903)

∗ For the auto switch weight, refer to page 1559.

Made to Order Specifications

(For details, refer to pages 1699 to 1818.)

Symbol	Specifications
-XB6	Heat resistant (–10 to 150°C)
-XB7	Cold resistant (–40 to 70°C)
-XB9	Low speed (10 to 50 mm/s)
-XB13	Low speed (5 to 50 mm/s)
-XC19	Intermediate stroke (5 mm spacer)
-XC22	Fluororubber seals
-XC34	Non-rotating plate with workpiece mounting screw (No extended part on the rod end)

Allowable Rotational Torque

Make sure that rotational torque is not applied to the piston rod of a long stroke type cylinder. If the rotation torque were applied unavoidably, refer to page 677 for details.

Tightening Torque

When mounting a CUK long stroke series, refer to page 658.

Theoretical Output

Specifications are the same as CU series double acting, single rod. Refer to page 658.

Auto Switch Mounting Position

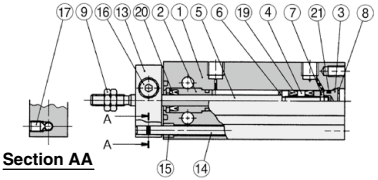
For the auto switch mounting position of CDUK long stroke series, refer to page 662, since specifications are the same as standard type, double acting, single rod type.

Moisture Control Tube Series IDK

When operating an actuator with a small diameter and a short stroke at a high frequency, the dew condensation (water droplet) may occur inside the piping depending on the conditions.
Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to **Series IDK in the WEB catalog**.

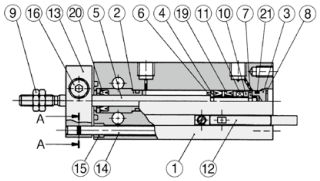
Construction

ø6

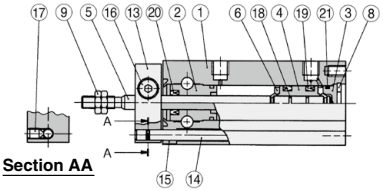


Section AA

With auto switch



ø10



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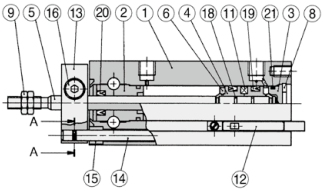
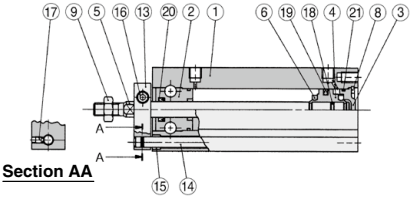
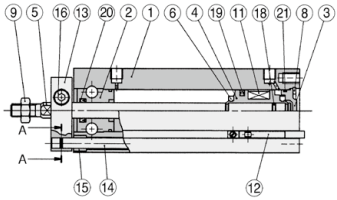


ø16 to ø32



Section AA



Component Parts

No.	Description	Material	Note
1	**Cylinder tube**	Aluminum alloy	Hard anodized
2	**Rod cover**	Aluminum alloy	Hard anodized
3	**Head cover**	Brass	ø6 to ø10, Electroless nickel plated
		Aluminum alloy	ø16 to ø32, Chromated
4	**Piston**	Brass	ø6
		Aluminum alloy	ø10 to ø32, Chromated
5	**Piston rod**	Stainless steel	
6	**Bumper A**	Urethane	
7	**Bumper B**	Urethane	
8	**Retaining ring**	Carbon tool steel	Phosphate coated
9	**Rod end nut**	Carbon steel	Chromated
10	**Magnet holder**	Brass	ø6

Component Parts

No.	Description	Material	Note
11	**Magnet**	—	
12	**Auto switch**	—	
13	**Non-rotating plate**	Aluminum alloy	Nickel plated
14	**Guide rod**	Stainless steel	
15	**Bushing**	Bearing alloy	
16	**Hexagon socket head cap screw**	Carbon steel	Chromated
17	**Hexagon socket head set screw**	Carbon steel	Chromated
18	**Piston gasket**	NBR	
19	**Piston seal**		
20	**Rod seal**		
21	**Gasket**		

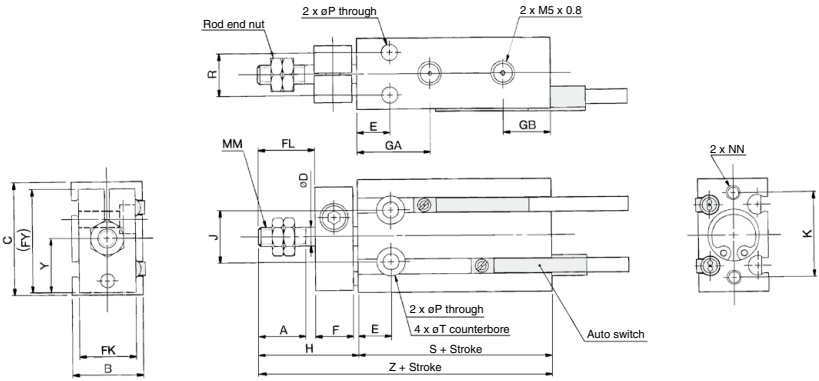
Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
10	CU10D-PS	Set of nos. above ⑲, ⑳, ㉑.
16	CU16D-PS	
20	CU20D-PS	
25	CU25D-PS	
32	CU32D-PS	

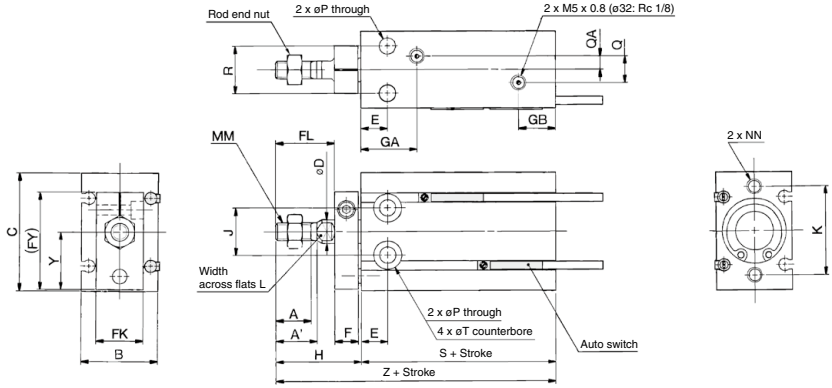
∗ Seal kit includes ⑲, ⑳, ㉑. Order the seal kit, based on each bore size.
∗ Seal kit includes a grease pack (10 g).
Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g)

Dimensions: Non-rotating Rod Type; Double Acting, Single Rod

ø6, ø10



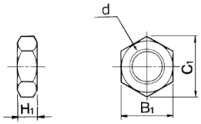
ø16 to ø32



Rod End Nut/Accessory

Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H_1	B_1	C_1
NTP-006	**6**	M3 x 0.5	1.8	5.5	6.4
NTP-010	**10**	M4 x 0.7	2.4	7	8.1
NTJ-015A	**16**	M5 x 0.8	4	8	9.2
NT-015A	**20**	M6 x 1.0	5	10	11.5
NT-02	**25**	M8 x 1.25	5	13	15.0
NT-03	**32**	M10 x 1.25	6	17	19.6



Bore size (mm)	A	A'	B	C	D	E	F	FL	FK	FY	GA	GB	H	J	K	L	MM
6	7	—	13	22	3	7	8	9	11	20.5	15	10	18	10	17	—	M3 x 0.5
10	10	—	15	24	4	7	8	12	12	22	16.5	10	21	11	18	—	M4 x 0.7
16	11	12.5	20	32	6	7	8	17	13	28	16.5	11.5	26	14	25	5	M5 x 0.8
20	12	14	26	40	8	9	8	20	16	33	19	12.5	29	16	30	6	M6 x 1.0
25	15.5	18	32	50	10	10	10	22	20	43.5	21.5	13	33	20	38	8	M8 x 1.25
32	19.5	22	40	62	12	11	12	29	24	51.5	23	12.5	42	24	48	10	M10 x 1.25

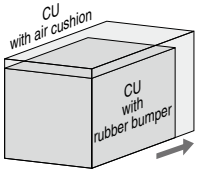
Bore size (mm)	NN	P	Q	QA	R	T	Y	Without auto switch		With auto switch	
								S	Z	S	Z
6	M3 x 0.5 depth 5	3.2	—	—	7	6 depth 4.8	10.5	33	51	33	51
10	M3 x 0.5 depth 5	3.2	—	—	9	6 depth 5	11.5	36	57	36	57
16	M4 x 0.7 depth 6	4.5	4	2	12	7.6 depth 6.5	15.5	30	56	40	66
20	M5 x 0.8 depth 8	5.5	9	4.5	16	9.3 depth 8	19.5	36	65	46	75
25	M5 x 0.8 depth 8	5.5	9	4.5	20	9.3 depth 9	24.5	40	73	50	83
32	M6 x 1.0 depth 9	6.6	13.5	4.5	24	11 depth 11.5	30.5	42	84	52	94

New air cushion mechanism

Extended dimensions (compared to the standard *CU* models) are hardly noticeable.

(with rubber bumper)

- Overall length: ***+1.5 to 7 mm***
- Overall height: ***+0 to 2 mm***
  No air cushion protrusion.
- Overall width: not affected

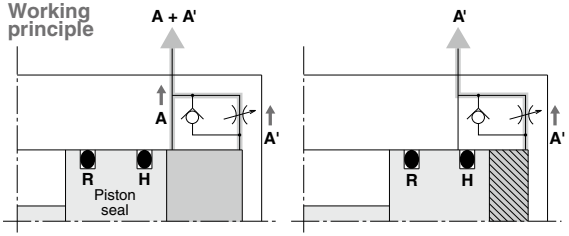


(mm)

Bore size	Extended dimensions	
	Length	Height
ø20	7	2
ø25	1.5	0
ø32	4	0

Unique air cushion construction requires no cushion ring.

Working principle



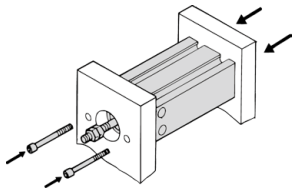
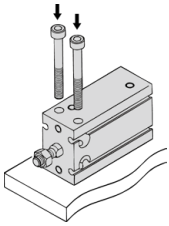
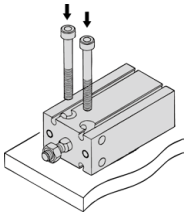
① When the piston is retracting, air is exhausted through both A and A' until piston seal H passes air passage A.

② After piston seal H has passed air passage A, air is exhausted only through A'. The section marked with slanted lines becomes a cushion chamber, and an air cushion effect is achieved.

③ When air is supplied for the piston extension, the check valve opens and the piston extends with no delay.

Free mounting

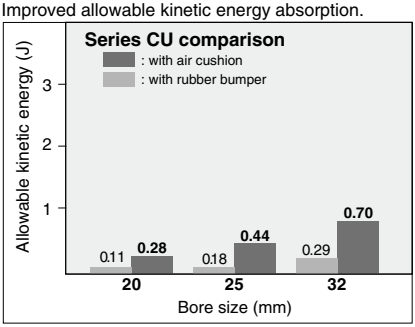
3 types of mounting orientations can be accommodated depending on the installation conditions.

Axial mounting (Tapped hole)	Vertical mounting (Body through-hole)	Lateral mounting (Body through-hole)
		

Approximately 2.4 times of allowable kinetic energy

(Compared to the old Series CU with rubber bumper)

Improved allowable kinetic energy absorption.



Improved repeatability

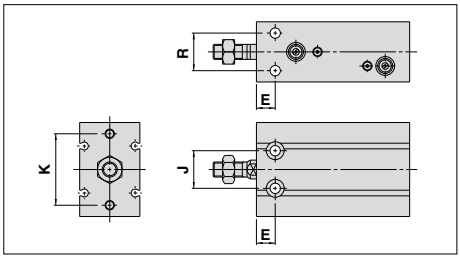
When compared to rubber bumper type actuators, air cushion type cylinders are less likely to be affected by pressure fluctuations, and therefore better able to achieve a stable and smooth stroke.

Improved sound insulation
(Reduced impact noise at the stroke end)

- Noise reduction of more than 11 dB is possible (compared to Series CU20 with rubber bumper).

Interchangeable mounting

Mounting dimensions (J, K, R, and E) are the same as the rubber bumper type Series CU.



Size Variations

Model	Standard stroke									Auto switch
	20	30	40	50	60	70	80	90	100	
C(D)U20	●	●	●	●	●	●	●	●	●	• ø20 to ø32 Direct mounting style auto switch
C(D)U25	●	●	●	●	●	●	●	●	●	
C(D)U32	●	●	●	●	●	●	●	●	●	

Free Mount Cylinder with Air Cushion

Series CU

ø20, ø25, ø32

How to Order

	CU	**32**	□	–	**50**	**A**				
With auto switch	**CDU**	**32**	□	–	**50**	**A**	–	**M9BW**	□	

With auto switch (Built-in magnet)

Bore size

20	20 mm
25	25 mm
32	32 mm

Thread type

Symbol	Type	Bore size
Nil	M5 x 0.8	ø20, ø25
	Rc 1/8	ø32
TN	NPT 1/8	ø32
TF	G 1/8	

Cylinder stroke (mm)
Refer to next page for "Standard Stroke".

Air cushion

A	With air cushion

Auto switch

Nil	Without auto switch

∗ Refer to the table below for applicable auto switches.

Number of auto switches

Nil	2 pcs.
S	1 pc.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example): CDU25-50A

Applicable Auto Switches/Refer to pages 1559 to 1673 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9NV**	**M9N**	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)			**M9PV**	**M9P**	●	●	●	○	○		
				2-wire	12 V		**M9BV**	**M9B**	●	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)	5 V, 12 V		**M9NWV**	**M9NW**	●	●	●	○	○	IC circuit	
				3-wire (PNP)			**M9PWV**	**M9PW**	●	●	●	○	○		
				2-wire	12 V		**M9BWV**	**M9BW**	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)	5 V, 12 V		**M9NAV**∗1	**M9NA**∗1	○	○	●	○	○	IC circuit	
				3-wire (PNP)			**M9PAV**∗1	**M9PA**∗1	○	○	●	○	○		
				2-wire	12 V		**M9BAV**∗1	**M9BA**∗1	○	○	●	○	○	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96V**	**A96**	●	—	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	**A93V**∗2	**A93**	●	●	●	●	—	—	Relay, PLC
			No				100 V or less	**A90V**	**A90**	●	—	●	—	—	IC circuit	

∗1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.
∗2 1 m type lead wire is only applicable to D-A93.

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

∗ Solid state auto switches marked with "○" are produced upon receipt of order.

∗ Since there are applicable auto switches other than the above, refer to page 712 for details.
∗ For detail about auto switches with pre-wired connector, refer to pages 1626 and 1627.
∗ Auto switches are shipped together but not assembled.

Specifications

Type	Pneumatic (Non-lube)
Fluid	Air
Proof pressure	1.0 MPa
Maximum operating pressure	0.7 MPa
Minimum operating pressure	0.08 MPa
Ambient and fluid temperature	Without auto switch: –10°C to 70°C (No freezing)
	With auto switch: –10°C to 60°C (No freezing)
Rod end thread	Male thread
Stroke length tolerance	$^{+1.0}_{0}$
Piston speed	50 to 500 mm/s

Effective Cushion Length

Bore size (mm)	**20**	**25**	**32**
Effective cushion length (mm)	6.6	6.7	7.7

Standard Stroke

Bore size (mm)	Standard stroke (mm)
20, 25, 32	20, 30, 40, 50, 60, 70, 80, 90, 100

∗ Intermediate strokes are also available upon receipt of order. Please contact SMC.
Minimum stroke length is 20 mm.

Tightening Torque/

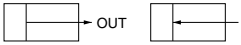
When mounting Series CU refer to the table below.

Bore size (mm)	Hexagon socket head cap screw size	Proper tightening torque (N·m)
20, 25	M5	5.10 ±10%
32	M6	8.04 ±10%

Allowable Kinetic Energy

Refer to "Selection" on page 706 regarding allowable kinetic energy.

Theoretical Output



(N)

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
20	OUT	94.2	157	220
	IN	79.2	132	185
25	OUT	147	246	344
	IN	124	206	288
32	OUT	241	402	563
	IN	207	346	454

Weight

Basic Weight

(g)

Bore size (mm)	Standard stroke (mm)								
	20	30	40	50	60	70	80	90	100
20	186	208	230	252	274	296	318	340	362
25	289	323	357	391	425	459	493	527	561
32	464	512	560	608	656	704	752	800	848

Additional Weight

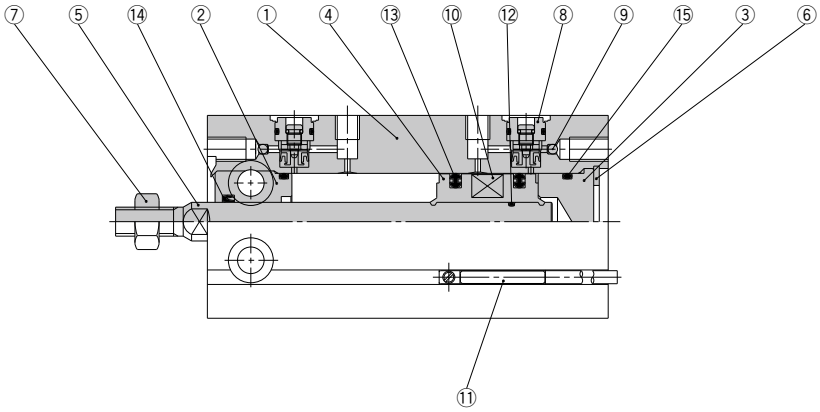
(g)

Bore size (mm)	Magnet
20	5
25	6
32	11

Moisture Control Tube Series IDK

When operating an actuator with a small diameter and a short stroke at a high frequency, the dew condensation (water droplet) may occur inside the piping depending on the conditions.
Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to **Series IDK in the WEB catalog**.

Construction



Component Parts

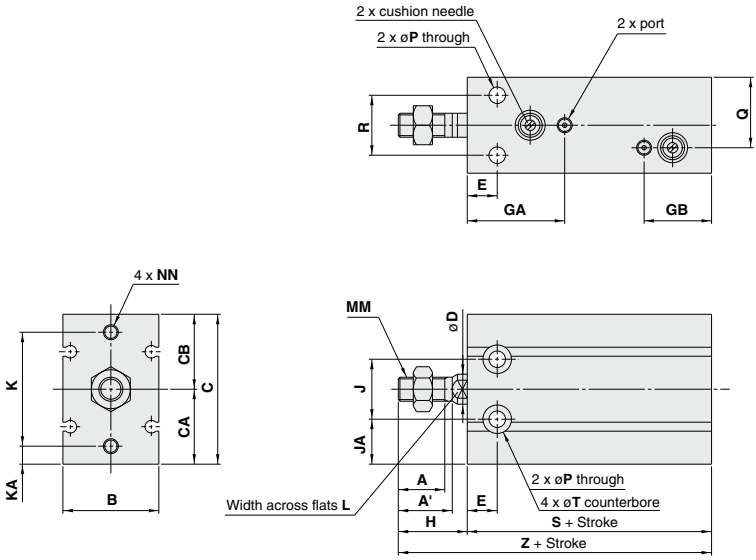
No.	Description	Material	No. of pcs.	Note
1	**Cylinder tube**	Aluminum alloy	1	Hard anodized
2	**Rod cover**	Aluminum alloy	1	Hard anodized
3	**Head cover**	Aluminum alloy	1	Chromated
4	**Piston**	Aluminum alloy	1	Chromated
5	**Piston rod**	Stainless steel	1	
6	**Retaining ring**	Carbon tool steel	1	Phosphate coated
7	**Rod end nut**	Carbon steel	1	Chromated
8	**Cushion needle assembly**	—	(2)	
9	**Steel ball**	Carbon steel	2	
10	**Magnet**	—	1	
11	**Auto switch**	—	(2)	
12	**Piston gasket**	NBR	1	
13	**Piston seal**	NBR	2	
14	**Rod seal**	NBR	1	
15	**Gasket**	NBR	1	

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
ø20	CU20A-PS	Set of nos. above ⑬, ⑭, ⑮.
ø25	CU25A-PS	
ø32	CU32A-PS	

∗ Seal kit includes ⑬, ⑭, ⑮. Order the seal kit, based on each bore size.
∗ Seal kit includes a grease pack (10 g).
Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-S-010 (10 g)

Dimensions

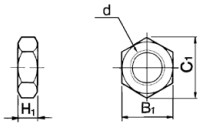


(mm)

Bore size (mm)	Port size	A	A'	B	C	CA	CB	D	E	GA	GB	H	J	JA
20	M5 x 0.8	12	14	26	42	20	22	8	9	29	27	19	16	12
25	M5 x 0.8	15.5	18	32	50	25	25	10	10	32.5	22.5	23	20	15
32	1/8	19.5	22	40	62	31	31	12	11	35	25	27	24	19

Bore size (mm)	K	KA	L	MM	NN	P	Q	R	T	S	Z	Standard stroke
20	30	5	6	M6 x 1.0	M5 x 0.8 depth 8	5.5	13	16	9.3 depth 8	53	72	20, 30, 40, 50, 60, 70, 80, 90, 100
25	38	6	8	M8 x 1.25	M5 x 0.8 depth 8	5.5	23.5	20	9.3 depth 9	51.5	74.5	
32	48	7	10	M10 x 1.25	M6 x 1.0 depth 9	6.6	29	24	11 depth 11.5	56	83	

Rod End Nut/Accessory



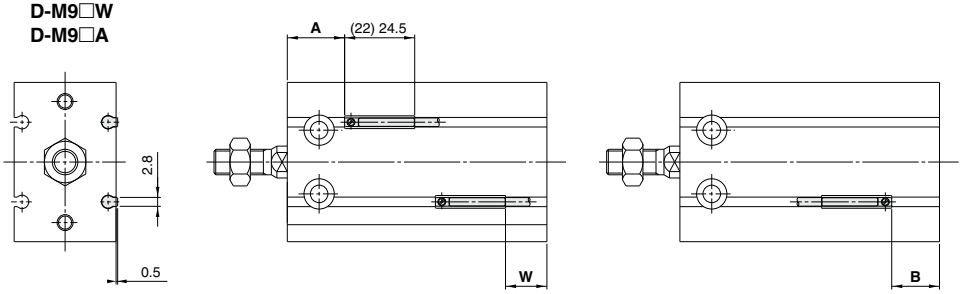
Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H_1	B_1	C_1
NT-015A	**20**	M6 x 1.0	5	10	11.5
NT-02	**25**	M8 x 1.25	5	13	15.0
NT-03	**32**	M10 x 1.25	6	17	19.6

Auto Switch Mounting

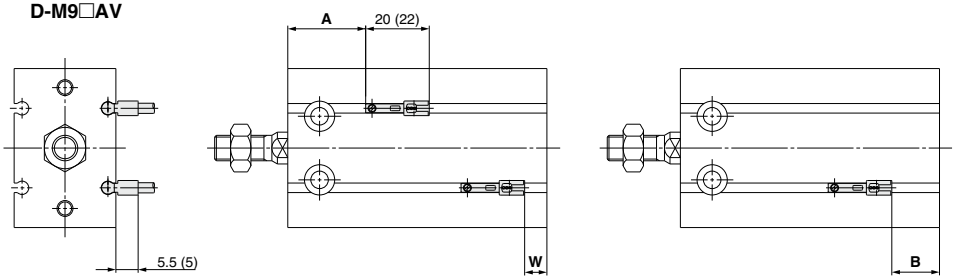
Proper Auto Switch Mounting Position (Detection at stroke end) and Its Mounting Height

D-A9□
D-M9□
D-M9□W
D-M9□A



( ): Denotes the values of D-A96.

D-A9□V
D-M9□V
D-M9□WV
D-M9□AV



( ): Denotes the values of D-M9□V, D-M9□WV.

(mm)

Bore size (mm)	D-A9□, D-A9□V			D-M9□, D-M9□W			D-M9□V, D-M9□WV			D-M9□A			D-M9□AV		
	A	B	W	A	B	W	A	B	W	A	B	W	A	B	W
20	18	15	13 (10.5)	22	19	9	22	19	11	22	19	11	22	19	13
25	20	11	9 (6.5)	24.5	15	5	24.5	15	7	24.5	15	7	24.5	15	9
32	22.5	13.5	11.5 (9)	26.5	17.5	7.5	26.5	17.5	9.5	26.5	17.5	9.5	26.5	17.5	11.5

Note 1) Figures in the table above are used as a reference when mounting the auto switches for stroke end detection. In the case of actually setting the auto switches, adjust them after confirming their operation.
Note 2) Values in ( ) are dimensions for D-A90 and A93 type.

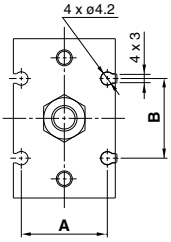
Operating Range

(mm)

Switch model	Bore size (mm)		
	20	**25**	**32**
D-A9□, A9□V	11	12.5	14
D-M9□, M9□V **D-M9□W, M9□WV** **D-M9□A, M9□AV**	7	7	7.5

∗ Since the operating range is provided as a guideline including hysteresis, it cannot be guaranteed (assuming approximately ±30% dispersion).
It may vary substantially depending on an ambient environment.

Auto Switch Rail Position

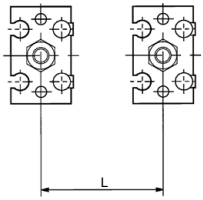


(mm)

Bore size (mm)	A	B
20	21	23
25	27	25
32	35	27

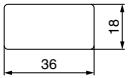
Caution on Proximity Installation

When free mounting cylinders equipped with auto switches are used, the auto switches could activate unintentionally if the installed distance is less than the dimensions shown in the table. Therefore, make sure to provide a greater clearance. Due to unavoidable circumstances, if they must be used with less distance than the dimensions given in the table, the cylinders must be shielded. Therefore, affix a steel plate or a magnetic shielding plate (MU-S025) to the area on the cylinder that corresponds to the adjacent auto switch. (Please contact SMC for details.) Auto switches may malfunction if a shielding plate is not used.



Bore size (mm)	Mounting pitch L (mm)
20	40
25	46
32	56

Dimensions of shielding plate (MU-S025) that is sold separately are indicated as reference.



Material: Ferrite stainless steel, Thickness: 0.3 mm
The product can be attached to the cylinder since the bottom side is a seal type.

Series CU
Specific Product Precautions

Be sure to read before handling. Refer to front matter 53 for Safety Instructions and pages 3 to 12 for Actuator and Auto Switch Precautions.

Installation and Removal of Retaining Rings

⚠Caution

1. Use appropriate pliers (Type C retaining ring installing tool) for installation and removal of retaining rings.

2. Even when using appropriate pliers (Type C retaining ring installing tool), proceed with caution as there is a danger of the retaining ring flying off the end of the pliers (tool) and causing bodily injury or damage to nearby equipment. After installation, make sure that the retaining ring is securely seated into the retaining ring groove before supplying air.

Mounting

⚠Caution

1. Refer to the below table for mounting cylinders.

Tightening Torque

Bore sizes (mm)	Hexagon socket head cap screw (mm)	Proper tightening torque (N·m)
20, 25	M5	5.10 ±10%
32	M6	8.04 ±10%

Selection

⚠Caution

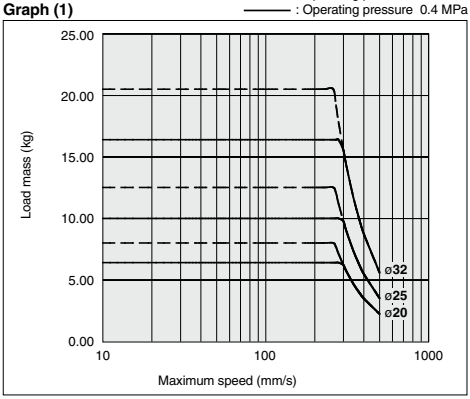
1. Operate the cylinder to the stroke end.

When the stroke is restricted by an external stopper or a clamped workpiece, sufficient cushioning and noise reduction may not be achieved.

2. Strictly observe the limiting ranges for load mass and maximum speed (Graph (1)). Also, the limiting ranges provided here are based on the condition that the cylinder is operated to the stroke end with a proper cushion needle adjustment.

If operated beyond the limiting ranges, excessive impact will occur and this may cause damage to equipment.

Graph (1)



Selection

⚠Caution

3. Adjust the cushion needle to reduce excessive kinetic energy from the piston impact at the stroke end by allowing it to absorb sufficient kinetic energy during the cushion stroke.

If due to improper adjustment, the piston impacts the stroke end with excessive kinetic energy (values above those given in Table (1)), an excessive impact will occur and this may cause damages to equipment.

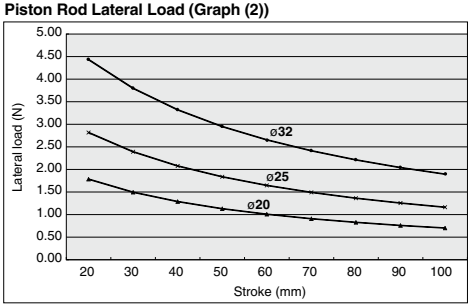
Table (1) Allowable Kinetic Energy at Piston Impact (J)

	20	25	32
Piston speed	50 to 500 mm/s		
Allowable kinetic energy	0.055	0.09	0.15

4. Strictly observe the limiting ranges for the piston rod lateral load (Graph (2)).

If operated beyond the limiting ranges, equipment life may be reduced or damage to equipment may occur.

Piston Rod Lateral Load (Graph (2))



Cushion Needle Adjustment

⚠Caution

1. Keep the adjustment range for the cushion needle between the fully closed position and the rotations shown below.

	Rotations
ø20 to ø32	2.5 rotations or less

Use a 3 mm flat head watchmakers' screwdriver to adjust the cushion needle. The adjustment range for the cushion needle must be between the fully closed position and the open position ranges indicated in the above table. A retaining mechanism prevents the cushion needle from slipping out; however, it may spring out during operation if it is rotated beyond the ranges shown above.

Low Speed Cylinder
Double Acting, Single Rod
Series CUX
ø10, ø16, ø20, ø25, ø32

How to Order

	CUX	10		–	30	D		
With auto switch	CDUX	10		–	30	D	– M9BW	

With auto switch (Built-in magnet)

Low speed cylinder

Bore size

10	10 mm
16	16 mm
20	20 mm
25	25 mm
32	32 mm

Port thread type

Symbol	Type	Bore size
Nil	M5 x 0.8	ø10, ø16, ø20, ø25
	Rc1/8	ø32
TN	NPT1/8	ø32
TF	G1/8	ø32

Cylinder standard stroke (mm)

10, 16	5, 10, 15, 20, 25, 30
20, 25, 32	5, 10, 15, 20, 25, 30, 40, 50

Action

D	Double acting

Auto switch

Nil	Without auto switch

∗ For applicable auto switches, refer to the table below.

Number of auto switches

Nil	2 pcs.
S	1 pc.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDUX20-25D

Applicable Auto Switches/Refer to **the WEB catalog** or Best Pneumatics No. 3 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	——	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**M9NV**	**M9N**	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9PV**	**M9P**	●	●	●	○	○		
				2-wire		12 V		**M9BV**	**M9B**	●	●	●	○	○	—	
	Diagnostic indication (2-color indication)			3-wire (NPN)		5 V, 12 V		**M9NWV**	**M9NW**	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PWV**	**M9PW**	●	●	●	○	○		
				2-wire		12 V		**M9BWV**	**M9BW**	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V		**M9NAV**∗1	**M9NA**∗1	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PAV**∗1	**M9PA**∗1	○	○	●	○	○		
				2-wire		12 V		**M9BAV**∗1	**M9BA**∗1	○	○	●	○	○	—	
Reed auto switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96V**	**A96**	●	—	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	**A93V**∗2	**A93**	●	●	●	●	—	—	Relay, PLC
			No				100 V or less	**A90V**	**A90**	●	—	●	—	—	IC circuit	

∗1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Please consult with SMC regarding water resistant types with the above model numbers.
∗2 1 m type lead wire is only applicable to D-A93.

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

∗ Solid state auto switches marked with "○" are produced upon receipt of order.

∗ Since there are other applicable auto switches than listed, refer to page 171 for details.
∗ For details about auto switches with pre-wired connector, refer to **the WEB catalog** or Best Pneumatics No. 3.
∗ Auto switches are shipped together, (but not assembled).

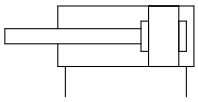
Specifications

Bore size (mm)	10	16	20	25	32
Fluid	Air				
Proof pressure	1.05 MPa				
Maximum operating pressure	0.7 MPa				
Ambient and fluid temperature	Without auto switch: −10°C to 70°C With auto switch: −10°C to 60°C (No freezing)				
Lubrication	Not required (Non-lube)				
Piston speed	ø10, ø16: 1 to 300 mm/s ø20 to ø32: 0.5 to 300 mm/s				
Cushion	Rubber bumper on both ends				
Rod end thread	Male thread				
Stroke length tolerance	$^{+1.0}_{0}$ Note)				
Mounting	Basic				

Note) Tolerance $^{+1.0}_{0}$

Symbol

Double acting, Single rod, Rubber bumper



Minimum Operating Pressure

Unit: MPa

Bore size (mm)	10	16	20	25	32
Minimum operating pressure	0.06	0.06	0.05	0.05	0.05

Standard Strokes

Bore size (mm)	Standard stroke (mm)
10, 16	5, 10, 15, 20, 25, 30
20, 25, 32	5, 10, 15, 20, 25, 30, 40, 50

⚠Precautions

Be sure to read before handling.
Refer to back cover for Safety Instructions. For Actuator and Auto Switch Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com

Mounting

⚠Caution

1. Tightening the cylinder beyond the range of the indicated torque (shown in the table below) may affect operation. Apply a Loctite® (no. 242, Blue) to the mounting threads.

Bore size (mm)	Hexagon socket head (mm)	Proper tightening torque (N·m) (Cylinder body)
10	M3	0.54 ±10%
16	M4	1.23 ±10%
20, 25	M5	2.55 ±10%
32	M6	4.02 ±10%

Operating Precautions

⚠Warning

1. It might not be able to control the CUX10 by meter-out at a low speed operation.

⚠Caution

1. For the CUX10, up to 0.1 N L/min (ANR) of internal leakage is anticipated due to cylinder structure.

Maintenance

⚠Caution

1. Replacement parts/Seal kit
Order it in accordance with the bore size.

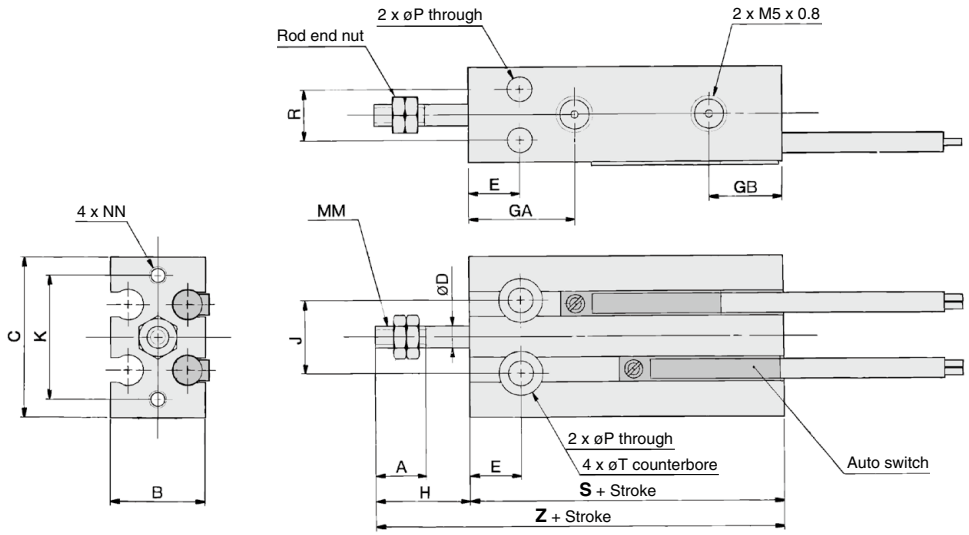
Bore size (mm)	Kit no.	Contents	
16	CUX16-PS	Piston seal:	1 pc.
20	CUX20-PS	Rod seal:	1 pc.
25	CUX25-PS	Gasket:	1 pc.
32	CUX32-PS	Grease pack (10 g):	1 pc.

∗ It is impossible to replace seals in bore size 10 mm.

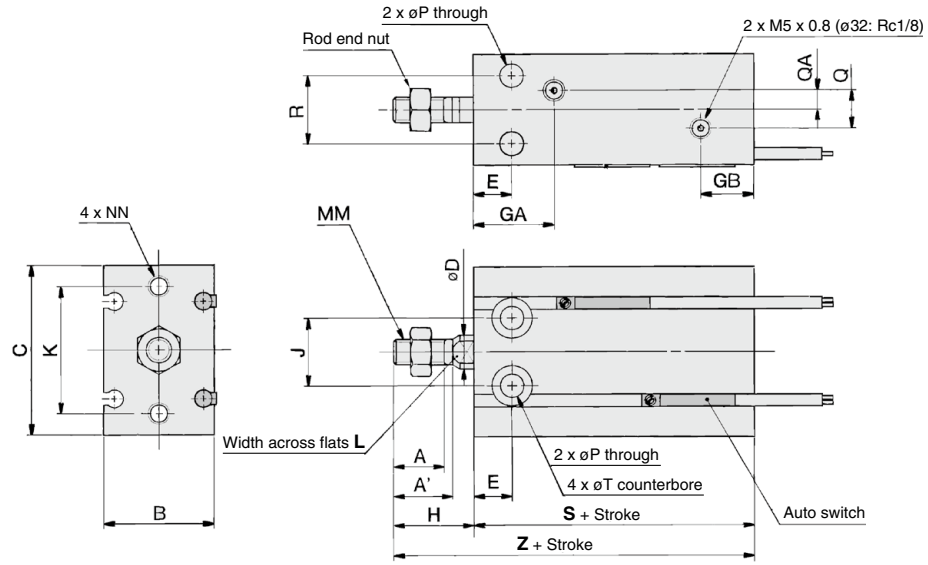
2. Grease pack
When maintenance requires only grease, use the following part numbers to order.
Grease pack part number:
GR-L-005 (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

Dimensions: Double Acting, Single Rod

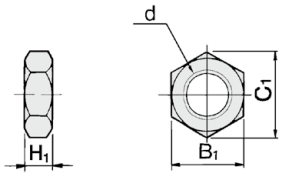
ø10



ø16 to ø32



Rod End Nut/Accessories



Material: Carbon steel

Part no.	Applicable bore size (mm)	d	H_1	B_1	C_1
NTP-010	**10**	M4 x 0.7	2.4	7	8.1
NTJ-015A	**16**	M5 x 0.8	4	8	9.2
NT-015A	**20**	M6 x 1.0	5	10	11.5
NT-02	**25**	M8 x 1.25	5	13	15.0
NT-03	**32**	M10 x 1.25	6	17	19.6

(mm)

Bore size (mm)	A	A'	B	C	D	E	GA	GB	H	J	K	L	MM	NN	P	Q	QA
10	10	—	15	24	4	7	16.5	10	16	11	18	—	M4 x 0.7	M3 x 0.5 depth 5	3.2	—	—
16	11	12.5	20	32	6	7	16.5 Note)	11.5	16	14	25	5	M5 x 0.8	M4 x 0.7 depth 6	4.5	4	2
20	12	14	26	40	8	9	19	12.5	19	16	30	6	M6 x 1.0	M5 x 0.8 depth 8	5.5	9	4.5
25	15.5	18	32	50	10	10	21.5	13	23	20	38	8	M8 x 1.25	M5 x 0.8 depth 8	5.5	9	4.5
32	19.5	22	40	62	12	11	23	12.5	27	24	48	10	M10 x 1.25	M6 x 1.0 depth 9	6.6	13.5	4.5

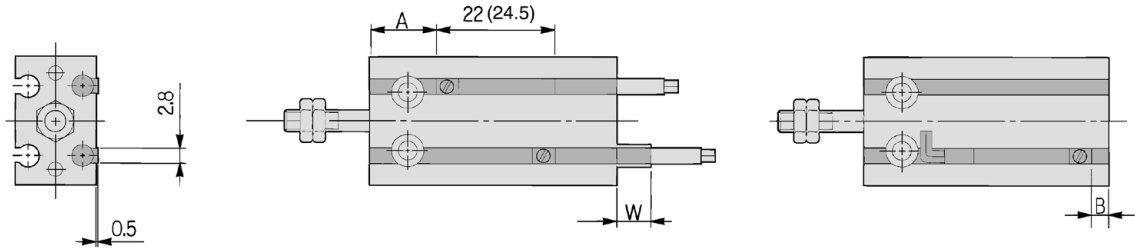
Bore size (mm)	R	T	Without auto switch		With auto switch	
			S	Z	S	Z
10	9	6 depth 5	36	52	36	52
16	12	7.6 depth 6.5	30	46	40	56
20	16	9.3 depth 8	36	55	46	65
25	20	9.3 depth 9	40	63	50	73
32	24	11 depth 11.5	42	69	52	79

Note) 5 stroke (CUX16-5D): 14.5 mm

Auto Switch Mounting

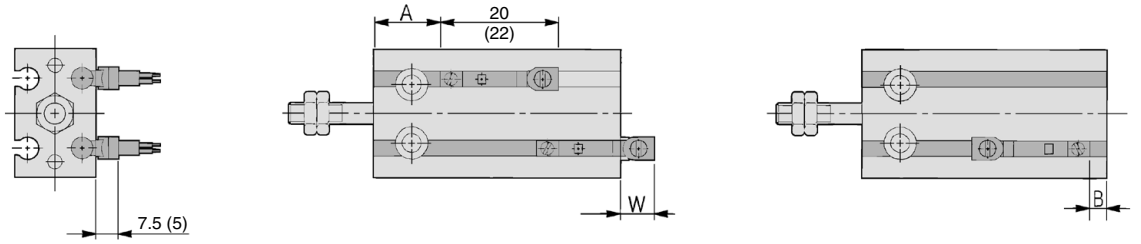
Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

D-M9□
D-M9□W
D-M9□A
D-A9□



( ): Dimension of the D-A93

D-M9□V
D-M9□WV
D-M9□AV
D-A9□V



( ): Dimension of the D-A9□V

CDUX Double Acting, Single Rod

(mm)

Bore size (mm)	D-M9□, D-M9□W			D-M9□V, D-M9□WV			D-M9□A			D-M9□AV			D-A9□, D-A9□V		
	A	B	W	A	B	W	A	B	W	A	B	W	A	B	W
10	16.5	7.5	2.5	16.5	7.5	0.5	16.5	7.5	4.5	16.5	7.5	2.5	12.5	3.5	(–1.5)1
16	20	8	1.5	20	8	–0.5	20	8	3.5	20	8	1.5	16	4	(–2)0.5
20	24	10	0	24	10	–2	24	10	2	24	10	0	20	6	(–4)–1.5
25	26.5	11	–1.5	26.5	11	–3.5	26.5	11	0.5	26.5	11	–1.5	22.5	7	(–5.5)–3
32	27.5	12.5	–2.5	27.5	12.5	–4.5	27.5	12.5	–0.5	27.5	12.5	–2.5	23.5	8.5	(–6.5)–4

Note 1) Figures in the table above are used as a reference when mounting the auto switches for stroke end detection. Adjust the auto switch after confirming the operating condition in the actual setting.
Note 2) Negative figures in the table W indicate an auto switch is mounted inward from the edge of the cylinder body.
Note 3) In the case of the 5 stroke or the 10 stroke, there are times in which the auto switch will not turn OFF or 2 auto switches will turn ON simultaneously due to their movement range. Therefore, set the position approximately 1 to 4 mm outward from the values given in the table above. Then, perform an operation inspection to make sure that the auto switches operate normally (if 1 auto switch is used, make sure that it turns ON and OFF properly; if 2 auto switches are used, make sure that both auto switches turn ON).
Note 4) ( ) in column W is the dimensions of the D-A96.

Operating Range

(mm)

Auto switch model	Bore size				
	10	**16**	**20**	**25**	**32**
D-M9□, M9□V **D-M9□W, M9□WV** **D-M9□A, M9□AV**	4	5.5	7	7	7.5
D-A9□, A9□V	6	9	11	12.5	14

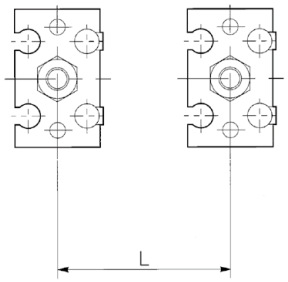
∗ Values which include hysteresis are for guideline purposes only, they are not a guarantee (assuming approximately ±30% dispersion) and may change substantially depending on the ambient environment.

Other than the applicable auto switches listed in "How to Order", the following auto switches are mountable.

∗ Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H) are also available. For details, refer to **the WEB catalog** or Best Pneumatics No. 3.

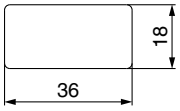
Caution on Proximity Installation

When free mounting cylinders equipped with auto switches are used, the auto switches could activate unintentionally if the installed distance is less than the dimensions shown in the table. Therefore, make sure to provide a greater clearance. Due to unavoidable circumstances, if they must be used with less distance than the dimensions given in the table, the cylinders must be shielded. Therefore, affix a steel plate or a magnetic shielding plate (MU-S025) to the area on the cylinder that corresponds to the adjacent auto switch. (Please contact SMC for details.) Auto switches may malfunction if a shield plate is not used.



Bore size (mm)	Mounting pitch L (mm)
10	30
16	33
20	40
25	46
32	56

Dimensions of shielding plate (MU-S025) that is sold separately are indicated as reference.



Material: Ferrite stainless steel, Thickness: 0.3 mm
Since the back side is treated with adhesive, it is possible to attach to the cylinder.

Smooth Cylinders/Low Speed Cylinders Specific Product Precautions 1

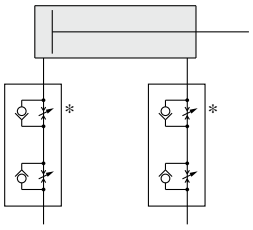
Be sure to read before handling. Refer to back cover for Safety Instructions. For Actuator and Auto Switch Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com

Recommended Pneumatic Circuit

⚠ Warning

Horizontal Operation

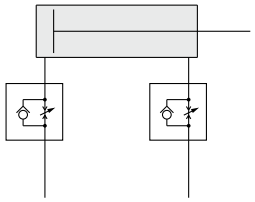
I



Dual speed controller

Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip. More stable low speed operation can be achieved than meter-in circuit alone.

II

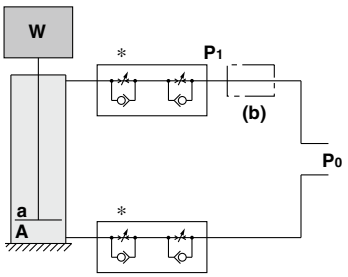


Meter-in speed controller

Meter-in speed controllers can reduce lurching while controlling the speed. The two adjustment needles facilitate adjustment.

Vertical Operation

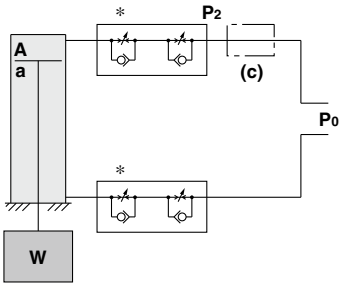
I



(1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.*

(2) Depending on the size of the load, installing a regulator with check valve at position **(b)** can reduce lurching during descent and operation delay during ascent.
As a guide,
when **W + P0a > P0A**,
adjust **P1** to make **W + P1a = P0A**.

II



(1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.*

(2) Installing a regulator with check valve at position **(c)** can reduce lurching during descent and operation delay during ascent.
As a guide,
adjust **P2** to make **W + P2A = P0a**.

W: Load (N) **P0**: Operating pressure (MPa) **P1, P2**: Reduced pressure (MPa) **a**: Rod side piston area (mm^2) **A**: Head side piston area (mm^2)

⚠ Warning

Since the low speed cylinder **C□UX10** is subject to internal leakage due to its construction, the speed may not be fully controlled with the meter-out controller (*) during low speed operation.

Smooth Cylinders/Low Speed Cylinders Specific Product Precautions 2

Be sure to read before handling. Refer to back cover for Safety Instructions. For Actuator and Auto Switch Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com

Design

⚠Caution

1. Provide a construction that does not apply a lateral load to the cylinder.
Applying a lateral load to the cylinder may cause a malfunction. (Only for low speed cylinders)

2. Design the system to prevent vibration from being applied to the cylinder.
A malfunction may occur due to the vibration.

3. Avoid using a guide with obvious variations in operating resistance.
Operation may become unstable when using a guide that manifests variations in operating resistance, or when the external load changes.

4. Avoid a system structure in which the mounting orientation changes.
Operation may become unstable if the mounting orientation changes.

5. Avoid operation where the temperature fluctuates greatly. Also, when using at low temperatures, make sure that frost does not form inside the cylinder and on the piston rod.
Operation may become unstable.

6. Do not use the product at a high frequency.
Use it at 30 cpm or less as a guideline.

7. Adjust the speed in accordance with the operating environment.
When the operating environment changes, the speed adjustment will be off unless it is reset to reflect operation in the new environment.

8. For cylinders with long strokes, sliding resistance will increase due to the deflection of the piston rod and other factors. Take measures such as the installation of a guide. (Only for smooth cylinders)

9. Do not apply excessive lateral load to the piston rod. (Only for smooth cylinders) Note 1)
Note 1) Easy checking method
Minimum operating pressure after the cylinder is mounted to the equipment (MPa) = Minimum operating pressure of cylinder (MPa) + {Load weight (kg) x Friction coefficient of guide/Sectional area of cylinder (mm^2)}
If smooth operation is confirmed within the above value, the load on the cylinder is the resistance of the thrust only and it can be judged as having no lateral load.

Pneumatic Circuit

⚠Caution

1. The piping length between the speed controller and the cylinder port must be kept as short as possible.
If the speed controller and the cylinder port are far apart, speed adjustment may be unstable.

2. Use a speed controller for low speed operation to easily adjust for low speed operation or a dual speed controller (Series ASD) to prevent cylinders from popping out.
(When the speed controller for low speed operation is used, the maximum speed may be limited.)
Refer to "Recommended Pneumatic Circuit" on page 172.

Mounting

⚠Caution

1. Do not apply a lateral load to the piston rod.
Applying a lateral load to the piston rod may cause a malfunction. (Only for low speed cylinders)

2. Do not apply excessive lateral load to the piston rod. (Only for smooth cylinders) Note 1)
Note 1) Easy checking method
Minimum operating pressure after the cylinder is mounted to the equipment (MPa) = Minimum operating pressure of cylinder (MPa) + {Load weight (kg) x Friction coefficient of guide/Sectional area of cylinder (mm^2)}
If smooth operation is confirmed within the above value, the load on the cylinder is the resistance of the thrust only and it can be judged as having no lateral load.

Lubrication

⚠Caution

1. Operate without lubrication from a pneumatic system lubricator.
A malfunction may occur when lubricated in this fashion.

2. Only use the grease recommended by SMC.
The low speed cylinder and the low speed cylinder with clean room specifications use different types of grease. The use of grease other than the specified type can cause a malfunction and particulate generation.
- Order using the following part numbers when only maintenance grease is needed.

Grease

Volume	Part no.
5 g	GR-L-005
10 g	GR-L-010
150 g	GR-L-150

3. Do not wipe out the grease in the sliding part of the air cylinder.
Doing so may cause a malfunction.

Air Supply

⚠Caution

1. Take measures to prevent pressure fluctuation.
A malfunction may occur with the fluctuation of pressure.

Simple Specials/Made to Order

Made to Order

Please contact SMC for detailed specifications, delivery and prices.

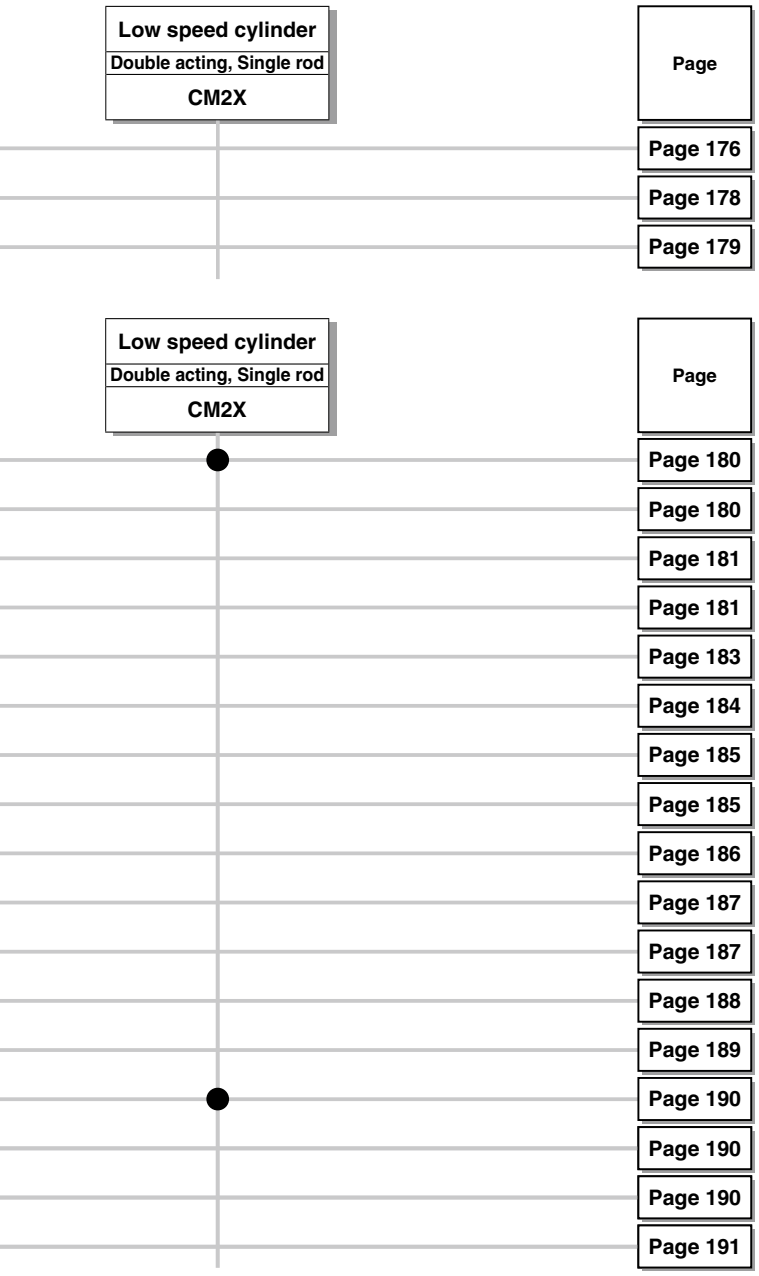
■ Simple Specials

The following special specifications can be ordered as a simplified Made-to-Order.
There is a specification sheet available on paper and CD-ROM. Please contact your SMC sales representatives if necessary.

Symbol	Specifications	Smooth cylinders, Double acting, Single rod					
		CJ2Y	CM2Y	CG1Y	MBY	CA2Y	CS2Y
-XA□	Change of rod end shape	●	●		●	●	●
-XC14	Change of trunnion bracket mounting position				●	●	●
-XC15	Change of tie-rod length					●	●

■ Made to Order

Symbol	Specifications	Smooth cylinders, Double acting, Single rod					
		CJ2Y	CM2Y	CG1Y	MBY	CA2Y	CS2Y
-XC3	Special port location	●	●				●
-XC6	Made of stainless steel		●	●			
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel				●	●	
-XC9	Adjustable stroke cylinder/Adjustable retraction type	●	●				●
-XC10	Dual stroke cylinder/Double rod type		●				●
-XC13	Auto switch rail mounting		●				
-XC20	Head cover axial port		●				
-XC25	No fixed throttle of connection port		●				
-XC26	With split pins for double clevis pin/double knuckle joint pin and flat washers						●
-XC27	Double clevis and double knuckle joint pins made of stainless steel		●		●	●	●
-XC28	Compact flange made of SS400					●	
-XC29	Double knuckle joint with spring pin		●		●	●	
-XC30	Rod trunnion				●	●	●
-XC52	Mounting nut with set screw		●				
-XC65	Made of stainless steel (Combination of XC7 and XC68)				●	●	
-XC68	Made of stainless steel (with hard chrome plated piston rod)				●	●	●
-XC86	With rod end bracket						●


Low speed cylinder
Double acting, Single rod
CM2X
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Low speed cylinder
Double acting, Single rod
CM2X
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Series C□Y/C□X
Simple Specials

These changes are dealt with Simple Specials System.

For details, refer to the Simple Specials System in the WEB catalog.
http://www.smcworld.com

1 Change of Rod End Shape

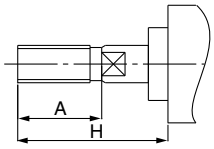
Symbol
-XA0 to XA30

Series	Description	Model	Action	Symbol for change of rod end shape	Note
CJ2-Z	Smooth cylinder	CJ2Y	Double acting, Single rod	XA0, 1, 10, 11	Except pivot bracket and rod end bracket
CM2-Z	Smooth cylinder	CM2Y	Double acting, Single rod	XA0 to 30	Except pivot bracket and rod end bracket
MB-Z	Smooth cylinder	MBY	Double acting, Single rod	XA0 to 30	Except pivot bracket and rod end bracket
CA2-Z	Smooth cylinder	CA2Y	Double acting, Single rod	XA0 to 30	Except pivot bracket and rod end bracket
CS2	Smooth cylinder	CS2Y	Double acting, Single rod	XA0 to 30	

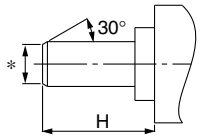
Precautions

1. SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
2. Standard dimensions marked with "*" will be as follows to the rod diameter (D). Enter any special dimension you desire.
   $D \leq 6 \rightarrow D-1$ mm $6 < D \leq 25 \rightarrow D-2$ mm $D > 25 \rightarrow D-4$ mm
3. In the case of double rod type and single acting retraction type, enter the dimensions when the rod is retracted.
4. The XA0 of CJ2Y has no width across flats.

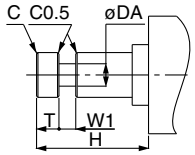
Symbol: A0



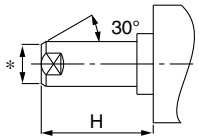
Symbol: A1



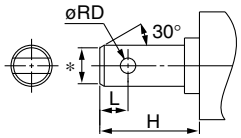
Symbol: A2



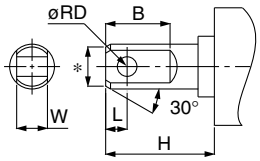
Symbol: A3



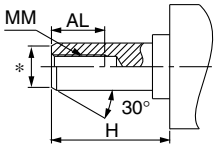
Symbol: A4



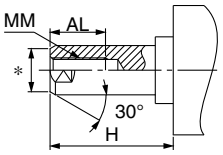
Symbol: A5



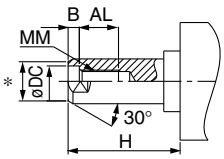
Symbol: A6



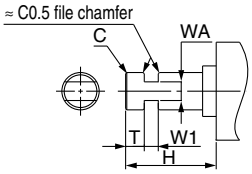
Symbol: A7



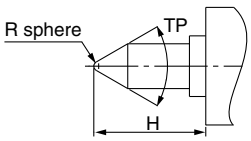
Symbol: A8



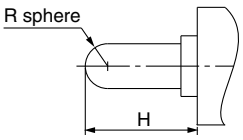
Symbol: A9



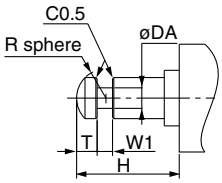
Symbol: A10



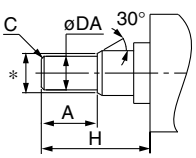
Symbol: A11



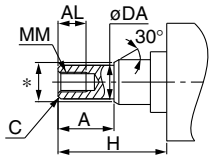
Symbol: A12



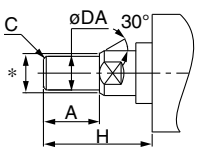
Symbol: A13



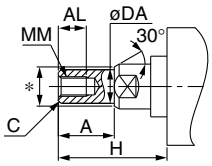
Symbol: A14



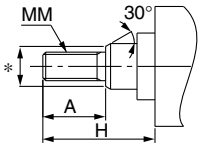
Symbol: A15



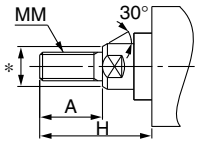
Symbol: A16



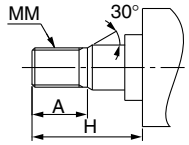
Symbol: A17



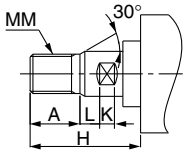
Symbol: A18



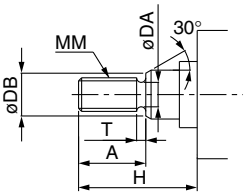
Symbol: A19



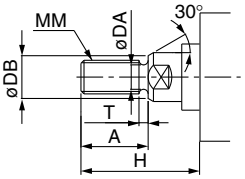
Symbol: A20



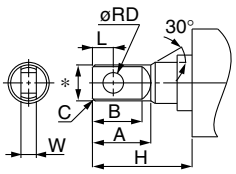
Symbol: A21



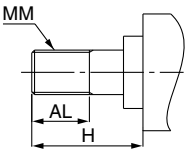
Symbol: A22



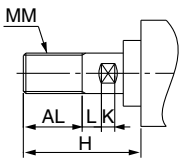
Symbol: A23



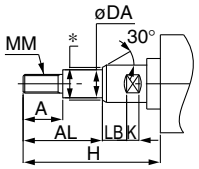
Symbol: A24



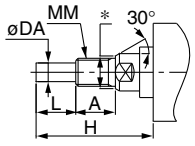
Symbol: A25



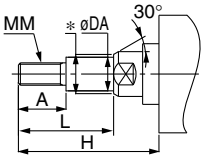
Symbol: A26



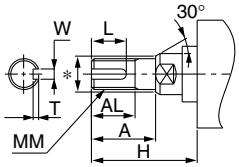
Symbol: A27



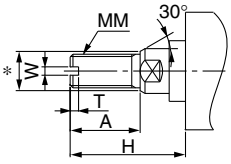
Symbol: A28



Symbol: A29



Symbol: A30



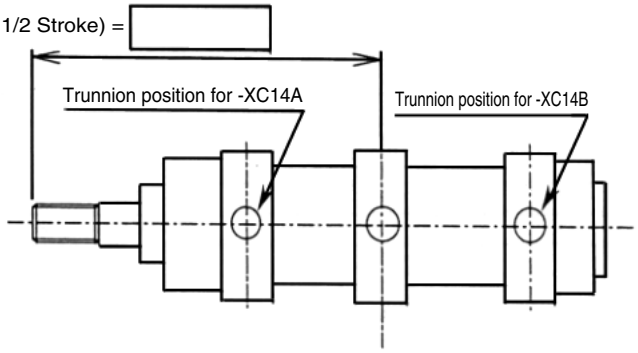
Symbol
-XC14

2 Change of Trunnion Bracket Mounting Position

The position for mounting the trunnion pivot bracket on the cylinder can be moved from the standard mounting position to any desired position.

Series	Description	Model	Action	Note
MB-Z	Smooth cylinder	MBY	Double acting, Single rod	
CA2-Z	Smooth cylinder	CA2Y	Double acting, Single rod	
CS2	Smooth cylinder	CS2Y	Double acting, Single rod	

(**Z** + 1/2 Stroke) =



Precautions

1. Specify "Z + 1/2 Stroke" in the case the trunnion bracket position is not -XC14A, B or trunnion is not a center trunnion.
2. SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
3. The possible range of trunnion bracket mounting position is indicated in the table below.
4. Some trunnion mounting positions do not allow auto switch mounting. Please consult with SMC for more information.
5. The CS2 series has a greater range of trunnion bracket mounting positions than the CS1 series, so the value of "Z + 1/2 Stroke" at -XC14A and -XC14B is different.

MBY

(mm)

Symbol / Bore size	**Z** + 1/2 Stroke					
	For **-XC14A**	For **-XC14B**	For **-XC14**		Reference Standard (Center trunnion)	Minimum stroke
			Minimum	Maximum		
32	82.5	95.5 + Stroke	84	94 + Stroke	89 + 1/2 Stroke	2
40	89	97 + Stroke	90	96 + Stroke	93 + 1/2 Stroke	2
50	100.5	109.5 + Stroke	102	108 + Stroke	105 + 1/2 Stroke	2
63	103.5	106.5 + Stroke	105	105 + Stroke	105 + 1/2 Stroke	2
80	127	131 + Stroke	128	130 + Stroke	129 + 1/2 Stroke	2
100	130	128 + Stroke	131	127 + Stroke	129 + 1/2 Stroke	2

CA2Y

(mm)

Symbol / Bore size	**Z** + 1/2 Stroke					
	For **-XC14A**	For **-XC14B**	For **-XC14**		Reference Standard (Center trunnion)	Minimum stroke
			Minimum	Maximum		
40	89	97 + Stroke	89.5	96.5 + Stroke	93 + 1/2 Stroke	1
50	99	107 + Stroke	99.5	106.5 + Stroke	103 + 1/2 Stroke	1
63	103	111 + Stroke	103.5	110.5 + Stroke	107 + 1/2 Stroke	1
80	125	133 + Stroke	125.5	132.5 + Stroke	129 + 1/2 Stroke	1
100	132	138 + Stroke	132.5	137.5 + Stroke	135 + 1/2 Stroke	1

CS2Y

(mm)

Symbol / Bore size	**Z** + 1/2 Stroke					
	For **-XC14A**	For **-XC14B**	For **-XC14**		Reference Standard (Center trunnion)	Minimum stroke
			Minimum	Maximum		
125	165.5	152.5 + Stroke	166	152 + Stroke	159 + 1/2 Stroke	25
140	168	150 + Stroke	168.5	149.5 + Stroke	159 + 1/2 Stroke	30
160	186	160 + Stroke	186.5	159.5 + Stroke	173 + 1/2 Stroke	35

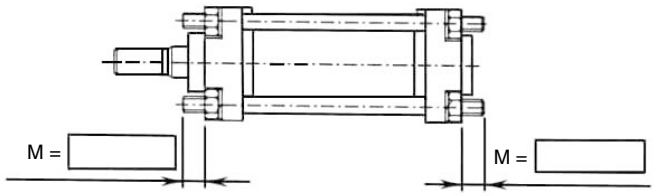
Symbol
-XC15

3 Change of Tie-rod Length

Cylinder with M dimension for tie-rod length changed from the standard length.

Series	Description	Model	Action	Note
CA2-Z	Smooth cylinder	CA2Y	Double acting, Single rod	
CS2	Smooth cylinder	CS2Y	Double acting, Single rod	

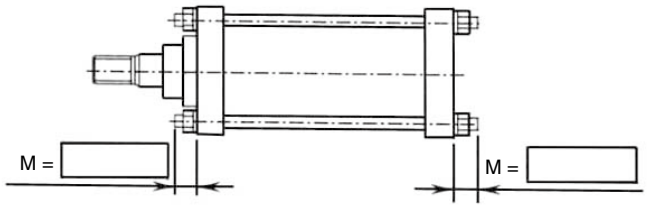
CA2Y



Tie-rod Length Changeable Range (mm)

Bore size	All bore size
M Min.	0
M Max.	300

CS2Y



Tie-rod Length Changeable Range (mm)

Bore size	125		140		160	
Mounting bracket	**L**	**B, F, G, C, D, T**	**L**	**B, F, G, C, D, T**	**L**	**B, F, G, C, D, T**
M Min.	20	12	21	12	23	14
M Max.	270					

Precautions

1. To order, specify the M dimension as well as the part number.
2. SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
3. Tie-rod length changeable range is described in the below.
4. The M dimension of the bracket mounting side of Flange (F, G), Clevis (C, D) types cannot be specified.

Series C□Y/C□X
Made to Order

Please contact SMC for detailed dimensions, specifications and lead times.

Made to Order

1 Special Port Location

Symbol **-XC3**

Compared with the standard type, a cylinder which changes the connection port location of rod/head cover and the location of cushion valve.

Applicable Series

Series	Description	Model	Action	Note
CJ2-Z	Smooth cylinder	CJ2Y	Double acting, Single rod	Rail mounting, Without air cushion
CM2-Z	Smooth cylinder	CM2Y	Double acting, Single rod	Without air cushion
	Low speed cylinder	CM2X	Double acting, Single rod	Without air cushion
CS2	Smooth cylinder	CS2Y	Double acting, Single rod	

Specifications: Same as standard type

How to Order

CJ2Y / CM2Y / CM2X

Standard model no. − XC3 A B

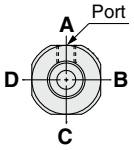
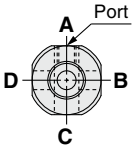
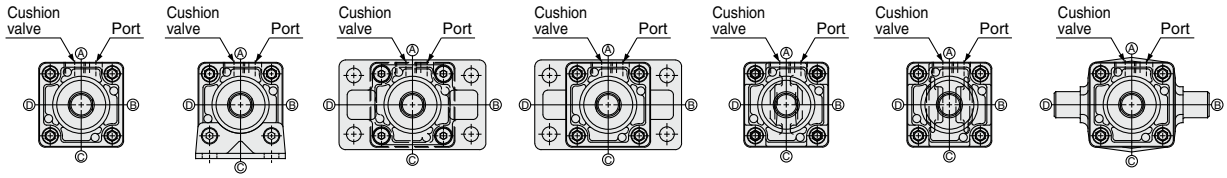
- **Special port location**
- **Rod port location viewed from the rod side**
  - For port location, refer to the following diagrams and show the symbols of A, B, C and D.
- **Head port location viewed from the rod side**

CS2Y

Standard model no. − XC3 A C

- **Special port location**
- **Port location viewed from the rod side**
  - For port location, refer to the following diagrams and show the symbols of A, B, C and D.
- **Cushion valve location viewed from the rod side**

Port Location

Series	Corresponding symbol of mounting bracket (Positional relationship)
CJ2Y CM2Y	 ∗ Viewed from the rod side, the ports are rendered A, B, C, and D, in the clockwise direction.  <Positional relationship between clevis and port> ∗ Viewed from the rod side, with the clevis positioned as shown in the diagram, the ports are rendered A, B, C, and D, in the clockwise direction.
	Positional relationship between port and cushion valve cannot be changed.
CS2Y	
	1. Symbol of position for port and cushion valve has to be looked from the rod side, as figures above. (In the case of standard cylinders, port must be positioned in the upper side.) Define the upper side to be A, and then B, C, and D in a clockwise order. 2. Model of combination between port and cushion valve is applicable only when the position of a port and a cushion valve on the rod cover and the head cover will be changed to the same position against the support bracket, as a rule. 3. -XC3AA is not available in terms of the position between port and cushion valve, since it is available in the standard products.

2 Made of Stainless Steel

Symbol **-XC6**

Suitable for the cases it is likely to generate rust by being immersed in the water and corrosion.

Applicable Series

Series	Description	Model	Action	Note
CM2-Z	Smooth cylinder	CM2Y	Double acting, Single rod	
CG1-Z	Smooth cylinder	CG1Y	Double acting, Single rod	

Specifications

Parts changed to stainless steel	Piston rod, Rod end nut
Specifications other than above and external dimensions	Same as standard type

How to Order

Standard model no. − XC6

- **Made of stainless steel**

SMC

Symbol **-XC7**

3 Tie-rod, Cushion Valve, Tie-rod Nut, etc. Made of Stainless Steel

When using in locations where the rust generation or corrosion likelihood exists, the standard parts material have been partly changed to the stainless steel.

Applicable Series

Series	Description	Model	Action	Note
MB-Z	Smooth cylinder	MBY	Double acting, Single rod	
CA2-Z	Smooth cylinder	CA2Y	Double acting, Single rod	

Specifications

Parts changed to stainless steel	Tie-rod, Tie-rod nut, Mounting bracket nut, Cushion valve, Retaining ring, Washer
Specifications other than above	Same as standard type
Dimensions	Same as standard type

How to Order

Standard model no. – XC7

Tie-rod, Cushion valve, Tie-rod nut, etc. made of stainless steel

Symbol **-XC9**

4 Adjustable Stroke Cylinder/Adjustable Retraction Type

The retract stroke of the cylinder can be adjusted by the adjusting bolt.

Applicable Series

Series	Description	Model	Action	Note
CJ2-Z	Smooth cylinder	CJ2Y	Double acting, Single rod	Except double-side bossed and clevis types, Without air cushion
CM2-Z	Smooth cylinder	CM2Y	Double acting, Single rod	Except clevis and boss-cut types
CS2	Smooth cylinder	CS2Y	Double acting, Single rod	Except head flange and clevis types

Specifications

Series	CJ2Y	CM2Y, CS2Y	
Stroke adjustment symbol	—	A	B
Stroke adjustment range (mm)	0 to 15	0 to 25	0 to 50
Specifications other than above	Same as standard type		

How to Order

CJ2Y [Mounting] [Bore size] – [Stroke] **Z** – [Pivot bracket] [Rod end bracket] – **XC9**

Adjustable stroke cylinder/Adjustable retraction type

CM2Y [Mounting] [Bore size] – [Stroke] [Rod end thread] **Z** – [Pivot bracket] [Rod end bracket] – [Auto switch] – **XC9** **A**

Adjustable stroke cylinder/Adjustable retraction type

Stroke adjustment symbol

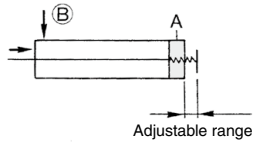
Symbol	Stroke adjustment range
A	0 to 25 mm
B	0 to 50 mm

CS2Y [Mounting] [Bore size] – [Stroke] [Suffix] [Stroke adjustment symbol] – **XC9**

(After the stroke is adjusted, with cushion on both sides is altered to single-sided, with cushion.)

Adjustable stroke cylinder/ Adjustable retraction type

Symbol



⚠Caution

Precautions

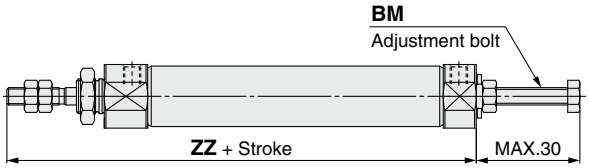
1. When air is supplied to the cylinder, if the stroke adjusting bolt is loosened in excess of the allowable stroke adjustment amount, be aware that the stroke adjusting bolt could fly out or air could be discharged, which could injure personnel or damage the peripheral equipment.
2. Adjust the stroke when the cylinder is not pressurized. If it is adjusted in the pressurized state, the seal of the adjustment section could become deformed, leading to air leakage.

Symbol

4 Adjustable Stroke Cylinder/Adjustable Retraction Type -XC9

Dimensions (Dimensions other than below are the same as standard type.)

CJ2Y

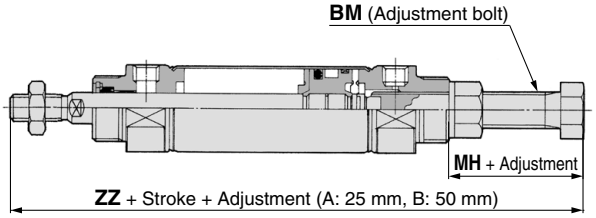


(mm)

Bore size	BM	ZZ
10	M5 x 0.8	74
16	M5 x 0.8	75

∗ Dimensions other than listed above are the same as standard type.

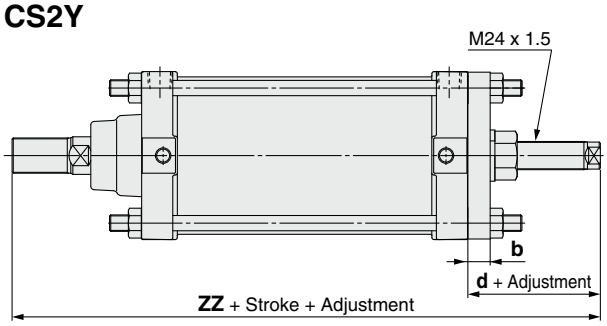
CM2Y

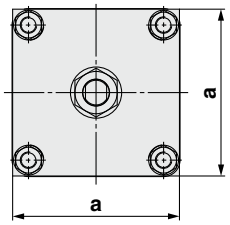


(mm)

Bore size	BM	MH	ZZ
20	M10 x 1.25	26.5	142.5
25	M14 x 1.5	29	149
32	M14 x 1.5	29	151
40	M16 x 1.5	32	186

CS2Y





(mm)

Bore size	a	b	d	ZZ
125	142	19	63	271
140	155	19	63	271
160	174	19	59	285

Symbol
-XC10

5 Dual Stroke Cylinder/Double Rod Type

Two cylinders are constructed as one cylinder in a back-to-back configuration allowing the cylinder stroke to be controlled in three steps.

Applicable Series

Series	Description	Model	Action	Note
CM2-Z	Smooth cylinder	CM2Y	Double acting, Single rod	Except clevis and boss-cut types, pivot bracket, rod end bracket
CS2	Smooth cylinder	CS2Y	Double acting, Single rod	Except clevis and trunnion types

Specifications

Series	CM2Y	CS2Y	
Bore size (mm)	**20 to 40**	**125, 140**	**160**
Maximum manufacturable stroke (mm)	1000	1000	1200
Specifications other than above	Same as standard type		

How to Order

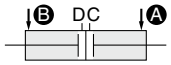
CM2Y [Mounting] [Bore size] − [Stroke A] + [Stroke B] **Z** − **XC10**

Dual stroke cylinder

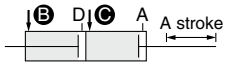
CS2Y [Mounting] [Bore size] − [Stroke A] [Suffix] + [Stroke B] [Suffix] − **XC10**

Dual stroke cylinder

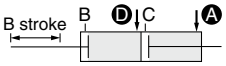
Function



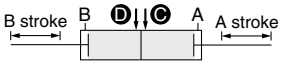
When air pressure is supplied to ports A and B, both A and B strokes retract.



When air pressure is supplied to ports B and C, A out strokes.



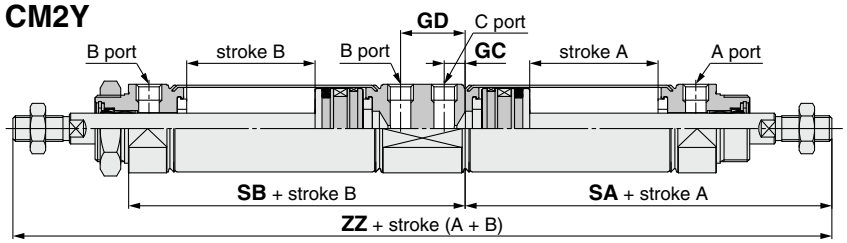
When air pressure is supplied to ports A and D, B out strokes.



When air pressure is supplied to ports C and D, both strokes A and B out strokes.

Dimensions (Dimensions other than below are the same as standard type.)

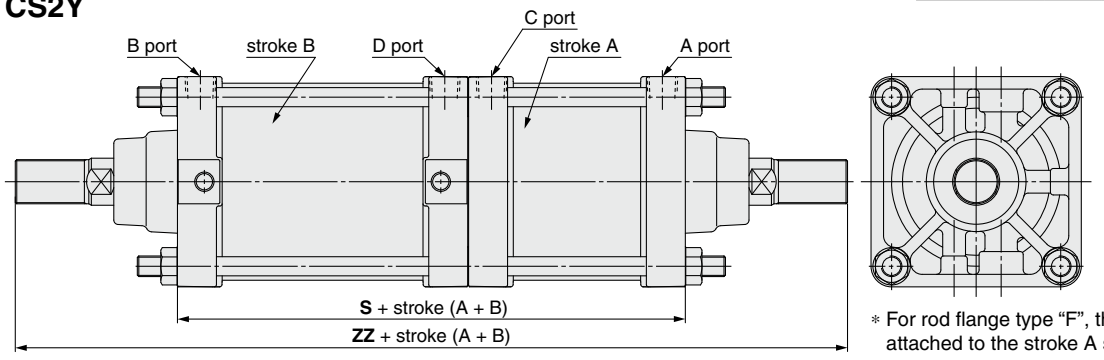
CM2Y



(mm)

Bore size	GC	GD	SA	SB	ZZ
20	7	24	47	78	207
25	7	24	47	78	215
32	7	24	49	80	219
40	10.5	33.5	66.5	110.5	277

CS2Y



(mm)

Bore size	S	ZZ
125	196	416
140	196	416
160	212	452

∗ For rod flange type "F", the flange bracket will be attached to the stroke A side.

Symbol
-XC13

6 Auto Switch Rail Mounting

A cylinder on which a rail is mounted to enable auto switches, in addition to the standard method for mounting auto switches (Band mounting).

Applicable Series

Series	Description	Model	Action	Note
CM2-Z	Smooth cylinder	CDM2Y	Double acting, Single rod	

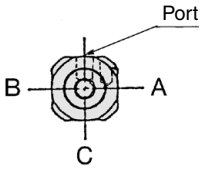
CDM2Y Applicable Auto Switches

Rail mounting	**Solid state**	D-F7□, D-F7□V, D-F7BA, D-F79F, D-F79W, D-F7□WV, D-J79, D-J79C, D-J79W
	Reed	D-A9□/A9□V, D-A7/A8, D-A7□H/A80H, D-A73C/A80C, D-A79W
Auto switch specifications		Refer to **the WEB catalog** or Best Pneumatics No. 2 for additional information on auto switches.

How to Order

Standard model no. − **XC13A**

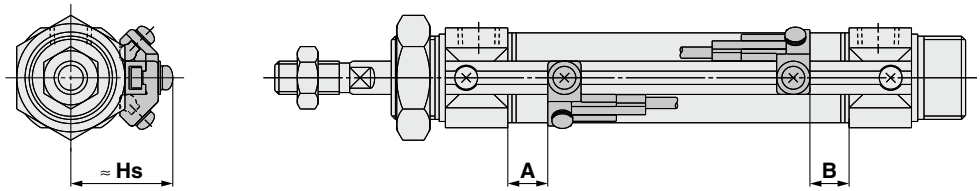
Rail mounting direction



XC13A	Mounted on the right side when viewed from the rod with the ports facing upward.
XC13B	Mounted on the left side when viewed from the rod.
XC13C	Mounted on the underside when viewed from the rod.

CDM2Y

Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height



Auto Switch Proper Mounting Position (Detection at stroke end) (mm)

Auto switch model / Bore size	D-F7□/F79F/F7□V D-J79/J79C D-F7□W/J79W/F7□WV D-F7BA/F7BAV D-A72/A7□H/A80H D-A73C/A80C		D-F7NT		D-A9□ D-A9□V D-A79W		D-A7□ D-A80	
	A	B	A	B	A	B	A	B
20	8.5	7	13.5	12	5.5	4	8	6.5
25	7.5	7.5	12.5	12.5	4.5	4.5	7	7
32	9	8	14	13	6	5	8.5	7.5
40	15	13	20	18	12	10	14.5	12.5

Auto Switch Mounting Height (mm)

D-F7□/F79F D-J79/F7NT D-F7□W/J79W D-F7BA D-A9□/A9□V A7□H/A80H	D-F7□V D-F7□WV D-F7BAV	D-J79C	D-A7□ D-A80	D-A73C D-A80C	D-A79W
Hs	**Hs**	**Hs**	**Hs**	**Hs**	**Hs**
23.5	26	29	22.5	29.5	25
26.5	29	32	25.5	32.5	28
30	32.5	35.5	29	35	31.5
34	36.5	39.5	33	40	35.5

Note) Adjust the auto switch after confirming the operating condition in the actual setting.

Minimum Stroke for Auto Switch Mounting

(mm)

Auto switch model	Number of auto switches		
	With 1 pc.	With 2 pcs. Same surface	With n pcs. (n: Number of auto switches) Same surface
D-F7□V D-J79C	5	5	10 + 10 (n – 2) (n = 4, 6···) Note)
D-F7□ D-J79	5	5	15 + 15 (n – 2) (n = 4, 6···) Note)
D-F7□WV D-F7BAV D-A79W	10	15	10 + 15 (n – 2) (n = 4, 6···) Note)
D-F7□W/J79W D-F7BA D-F79F/F7NT	10	15	15 + 20 (n – 2) (n = 4, 6···) Note)
D-A9□ D-A9□V	5	10	10 + 15 (n – 2) (n = 4, 6···) Note)
D-A7□/A80 D-A7□H/A80H D-A73C/A80C	5	10	15 + 10 (n – 2) (n = 4, 6···) Note)
D-A7□H D-A80H	5	10	15 + 15 (n – 2) (n = 4, 6···) Note)

Note) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation. However, the minimum even number is 4. So, 4 is used for the calculation when "n" is 1 to 3.

Operating Range

(mm)

Auto switch model	Bore size			
	20	**25**	**32**	**40**
D-F7□/F79F/F7□V D-J79/J79C D-F7□W/J79W/F7□WV D-F7BA/F7BAV D-F7NTL	3.5	3.5	4	3.5
D-A9□/D-A9□V	5.5	6	6.5	6.5
D-A7□/A80 D-A7□H/A80H D-A73C/A80C	7.5	8	8.5	8.5
D-A79W	10	10.5	12.5	12.5

∗ Values which include hysteresis are for guideline purposes only, they are not a guarantee (assuming approximately ±30% dispersion) and may change substantially depending on the ambient environment.

Auto Switch Mounting Brackets/Part No.

Auto switch model	Bore size (mm)
	ø20 to **ø40**
D-A9□/A9□V	BQ2-012

Note 1) When adding the D-A9□(V), order a set of auto switch mounting brackets BQ-1 and BQ2-012 for the CDQ2 series (ø12 to ø25) separately. When adding the auto switches other than the D-A9□(V) mentioned above and D-F7BA(V), order an auto switch mounting bracket BQ-1 separately.

Note 2) When adding the auto switch D-F7BA(V), order a stainless steel screw set BBA2 separately.

Symbol
7 Head Cover Axial Port -XC20

Head side port position is changed to the axial direction.

Applicable Series

Series	Description	Model	Action	Note
CM2-Z	Smooth cylinder	CM2Y	Double acting, Single rod	Except clevis type

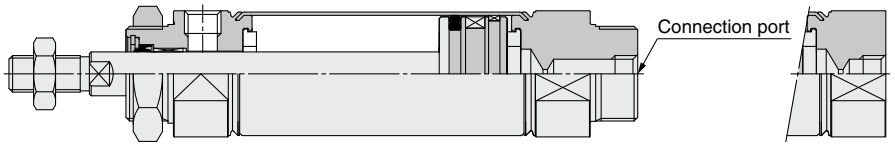
How to Order

Standard model no. – **XC20**

Head cover axial port

Specifications: Same as standard type

Construction (Same dimensions as standard type except port size.)



Boss-cut

Bore size (mm)	Port size
20, 25, 32	Rc 1/8
40	Rc 1/4

Symbol
8 No Fixed Throttle of Connection Port -XC25

Type with no restrictor on the port, since it's using air-hydro type on the rod cover and the head cover of air cylinder CM2 series.

Applicable Series

Series	Description	Model	Action	Note
CM2-Z	Smooth cylinder	CM2Y	Double acting, Single rod	

∗ Except with air cushion

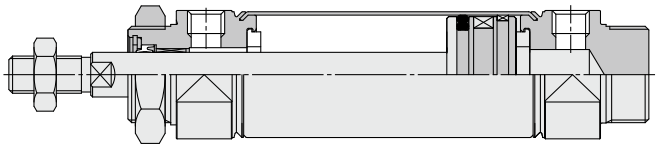
How to Order

Standard model no. – **XC25**

No fixed throttle of connection port

Specifications: Same as standard type

Construction (Dimensions are the same as standard.)



⚠ Caution

1. Use a shock absorber etc.
When the piston speed exceed 750 mm/s, make sure that direct impact does not apply on the cylinder cover by using an external stopper (shock absorber etc).

Symbol

9 With Split Pins for Double Clevis Pin/Double Knuckle Joint Pin and Flat Washers -XC26

Flat washer is added for the double clevis (one of the mounting styles) or double knuckle joint (one of the accessories).

Applicable Series

Series	Description	Model	Action	Note
CS2	Smooth cylinder	CS2Y	Double acting, Single rod	

How to Order

• Product

CS2YD [Standard model no.] **– XC26**

- **CS2YD**: Double clevis type
- **XC26**: With clevis pin, split pin and flat washer

• Parts assembly

CS2 – D 12 – XC26

- **XC26**: With clevis pin, split pin and flat washer
- **12**: Bore size

12	125 mm
14	140 mm
16	160 mm

- **D**: Double clevis

Y – [12A, 14A, 16A] **– XC26**

- **Y**: Double knuckle joint
- **XC26**: With knuckle joint pin, split pin and flat washer

IY – [12, 14, 16] **– XC26**

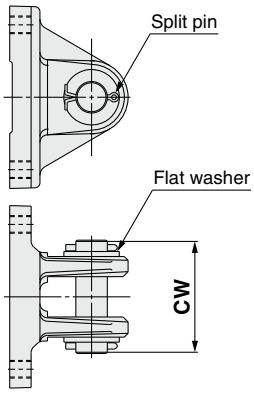
- **IY**: Clevis pin, Knuckle joint pin
- **XC26**: With clevis pin, knuckle joint pin, split pin and flat washer

Specifications

Mounting	Only double clevis type (D), double knuckle joint
Changed parts	Clevis pin, knuckle joint pin, flat washer
Specifications other than above	Same as standard type

Dimensions (Dimensions other than below are the same as standard type.)

Double clevis

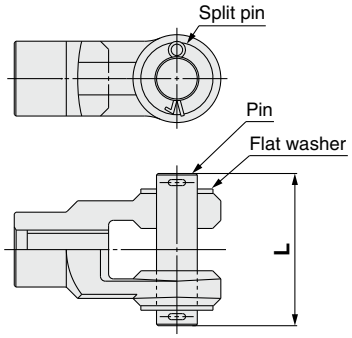


∗ For mounting bracket, split pin, clevis pin and flat washer are shipped together, (but not assembled).
∗ Mounting method is the same as standard type.

(mm)

Bore size	CW
ø**125**	90
ø**140**	104
ø**160**	113

Double knuckle joint



∗ For mounting bracket, split pin, knuckle joint pin and flat washer are shipped together, (but not assembled).
∗ Mounting method is the same as standard type.

(mm)

Bore size	L
ø**125**	90
ø**140**	104
ø**160**	113

Symbol **-XC27**

10 Double Clevis and Double Knuckle Joint Pins Made of Stainless Steel

To prevent the oscillating portion of the double clevis or the double knuckle joint from rusting, the material of the pin and the retaining ring has been changed to stainless steel.

Applicable Series

Series	Description	Model	Action	Note
CM2-Z	Smooth cylinder	CM2Y	Double acting, Single rod	Except rod end bracket
MB-Z	Smooth cylinder	MBY	Double acting, Single rod	Except rod end bracket
CA2-Z	Smooth cylinder	CA2Y	Double acting, Single rod	Except rod end bracket
CS2	Smooth cylinder	CS2Y	Double acting, Single rod	

Specifications

Mounting	Only double clevis type (D), double knuckle joint
Pin, retaining ring, flat washer and split pin material	Stainless steel 304
Specifications other than above	Same as standard type

How to Order

CM2YD / MBYD / CA2YD / CS2YD – **Standard model no.** – **XC27**

- CM2YD / MBYD / CA2YD / CS2YD: Double clevis type
- Standard model no.
- XC27: Double clevis pin made of stainless steel

Knuckle joint

- For CM2Y **Y** – **020B, 032B, 040B** – **XC27**
- For MBY **Y** – **03M, 04M, 05M, 06M, 10M** – **XC27**
- For CA2Y **Y** – **04D, 05D, 08D, 10D** – **XC27**
- For CS2Y **Y** – **12A, 14A, 16A** – **XC27**

Y: Double knuckle joint

XC27: Double knuckle joint pin made of stainless steel

Clevis pin/Knuckle pin

- For CM2Y **CDP** – **1, 2** – **XC27**
- For MBY **CD** – **M03, M05, M08** – **XC27**
- For CA2Y **CDP** – **2A, 3A, 4A, 5A, 6A, 7A** – **XC27**
- For CS2Y **IY** – **12, 14, 16** – **XC27**

CDP / CD / IY: Clevis pin, Knuckle pin

XC27: Clevis pin, Knuckle pin made of stainless steel

Symbol **-XC28**

11 Compact Flange Made of SS400

Width of a flange bracket on the rod and head side has the same dimensions as the cylinder's rod cover to save the mounting space. (Flange shape and FV-dimensions are only different from the standard type.)

Applicable Series

Series	Description	Model	Action	Note
CA2-Z	Smooth cylinder	CA2Y	Double acting, Single rod	

Specifications: Same as standard type

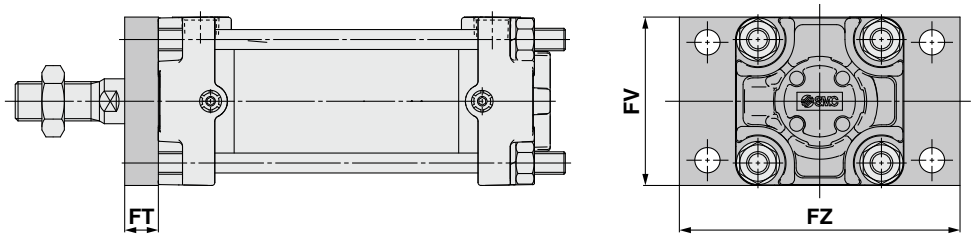
How to Order

CA2Y – **F** – **Standard model no.** – **XC28**

- **F**: Mounting
- Standard model no.
- XC28: Compact flange made of SS400

Mounting	
F	Rod flange
G	Head flange

Dimensions (Dimensions other than below are the same as standard type.)



(mm)

Bore size	FT	FV	FZ
40	12	60	100
50	12	70	110
63	15	85	130
80	18	102	160
100	18	116	180

∗ Other dimensions are the same as flange on the rod side and head side of standard type.
(Figure is the case of flange on the rod side.)

Symbol
12 Double Knuckle Joint with Spring Pin -XC29

To prevent loosening of the double knuckle joint of standard air cylinder.

Applicable Series

Series	Description	Model	Action	Note
CM2-Z	Smooth cylinder	CM2Y	Double acting, Single rod	Except rod end bracket
MB-Z	Smooth cylinder	MBY	Double acting, Single rod	Except rod end bracket
CA2-Z	Smooth cylinder	CA2Y	Double acting, Single rod	Except rod end bracket

How to Order

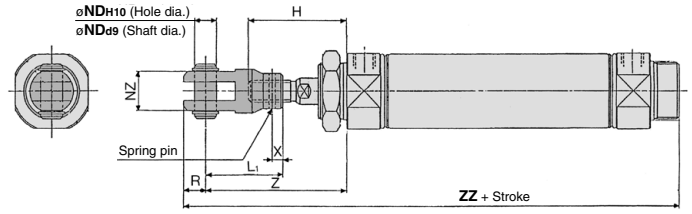
Standard model no. − **XC29**

Double knuckle joint with spring pin

Specifications: Same as standard type

Dimensions (For mounting bracket, pin is shipped together.) (Dimensions other than below are the same as standard type.)

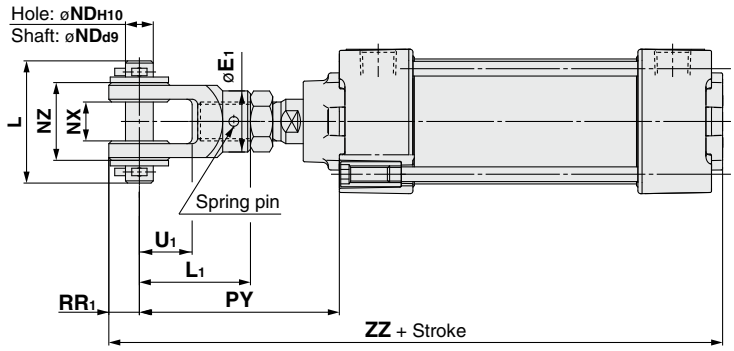
CM2Y



(mm)

Bore size	H	L1	NDH10	NZ	R	X	Z	ZZ	Spring pin
20	41	36	$9^{+0.058}_{0}$	18	10	5	61	146	ø3 x 16L
25	45	38	$9^{+0.058}_{0}$	18	10	5	65	150	ø3 x 16L
32	45	38	$9^{+0.058}_{0}$	18	10	5	65	152	ø3 x 16L
40	50	55	$12^{+0.070}_{0}$	38	13	11	83	200	ø4 x 24L

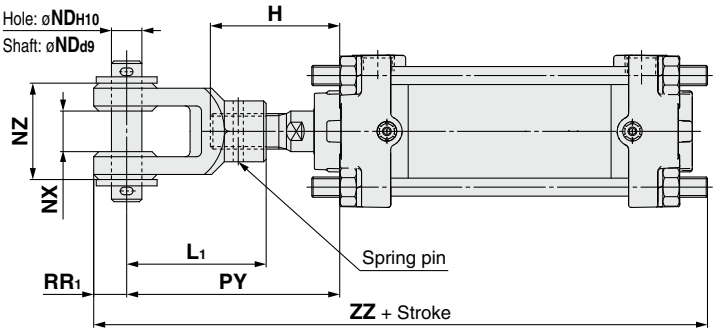
MBY



(mm)

Bore size	øE1	L	L1	øNDd9	øNDH10	NX	NZ	PY	RR1	U1	ZZ
32	20	44	30	$10^{-0.040}_{-0.076}$	$10^{+0.058}_{0}$	$14^{+0.3}_{+0.1}$	$28^{-0.1}_{-0.3}$	63.5	10	16	161.5
40	22	44	40	$10^{-0.040}_{-0.076}$	$10^{+0.058}_{0}$	$14^{+0.3}_{+0.1}$	$28^{-0.1}_{-0.3}$	72	11	19	171
50	28	60	50	$14^{-0.050}_{-0.093}$	$14^{+0.070}_{0}$	$20^{+0.3}_{+0.1}$	$40^{-0.1}_{-0.3}$	87	14	24	199
63	28	60	50	$14^{-0.050}_{-0.093}$	$14^{+0.070}_{0}$	$20^{+0.3}_{+0.1}$	$40^{-0.1}_{-0.3}$	87	14	24	199
80	40	82	65	$22^{-0.065}_{-0.117}$	$22^{+0.084}_{0}$	$30^{+0.3}_{+0.1}$	$60^{-0.1}_{-0.3}$	113	20	34	251
100	40	82	65	$22^{-0.065}_{-0.117}$	$22^{+0.084}_{0}$	$30^{+0.3}_{+0.1}$	$60^{-0.1}_{-0.3}$	116	20	34	254

CA2Y



(mm)

Bore size	H	L1	øNDd9	øNDH10	NX	NZ	PY	RR1	ZZ
40	51	55	$12^{-0.050}_{-0.093}$	$12^{+0.070}_{0}$	$16^{+0.3}_{+0.1}$	38	84	13	192
50	58	60	$12^{-0.050}_{-0.093}$	$12^{+0.070}_{0}$	$16^{+0.3}_{+0.1}$	38	91	15	207
63	58	60	$12^{-0.050}_{-0.093}$	$12^{+0.070}_{0}$	$16^{+0.3}_{+0.1}$	38	91	15	218
80	71	71	$18^{-0.050}_{-0.093}$	$18^{+0.070}_{0}$	$28^{+0.3}_{+0.1}$	55	105	19	257
100	72	83	$20^{-0.065}_{-0.117}$	$20^{+0.084}_{0}$	$30^{+0.3}_{+0.1}$	61	118	21	282

Symbol
-XC30

13 Rod Trunnion

This cylinder shortens the distance between the fulcrum and the rod end by installing a trunnion bracket in front of the rod side cover.

Applicable Series

Series	Description	Model	Action	Note
MB-Z	Smooth cylinder	MBY	Double acting, Single rod	
CA2-Z	Smooth cylinder	CA2Y	Double acting, Single rod	
CS2	Smooth cylinder	CS2Y	Double acting, Single rod	

How to Order

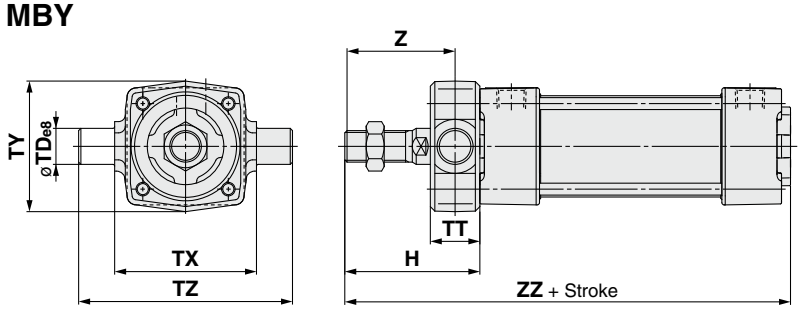
MBY
CA2Y T — **Standard model no.** — **– XC30**
CS2Y

T: **Trunnion bracket**
Rod trunnion

Specifications: Same as standard type

Dimensions (Dimensions other than below are the same as standard type.)

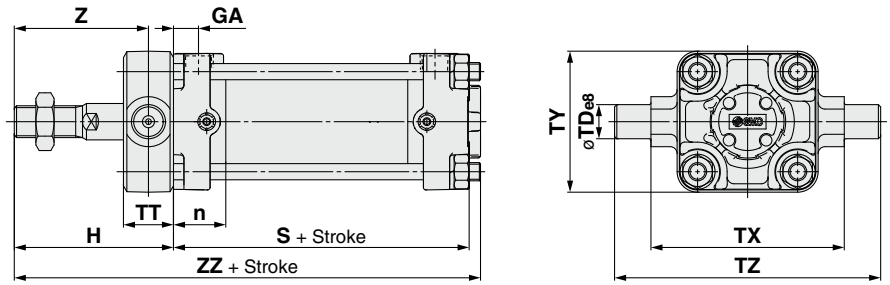
MBY



(mm)

Bore size	H	øTDe8	TT	TX	TY	TZ	Z	ZZ
32	47	$12^{-0.032}_{-0.059}$	17	50	49	74	38.5	135
40	60	$16^{-0.032}_{-0.059}$	22	63	58	95	49	148
50	66	$16^{-0.032}_{-0.059}$	22	75	71	107	55	164
63	72	$20^{-0.040}_{-0.073}$	28	90	87	130	58	170
80	86	$20^{-0.040}_{-0.073}$	34	110	110	150	69	204
100	92	$25^{-0.040}_{-0.073}$	40	132	136	182	72	210

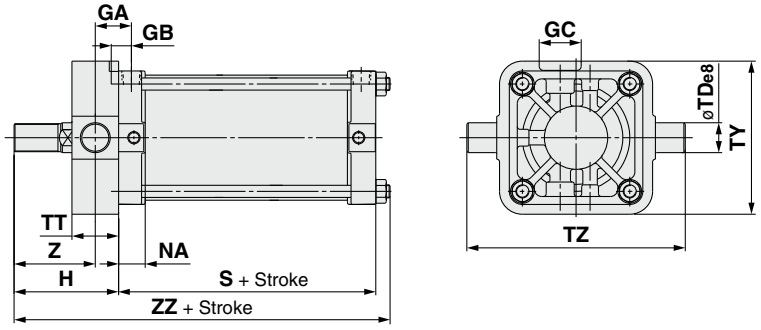
CA2Y



(mm)

Symbol / Bore size	n	GA	H	S	TDe8	TT	TX	TY	TZ	Z	ZZ
40	23	11	66	80	$15^{-0.032}_{-0.059}$	22	85	62	117	55	151
50	26	13	71	86	$15^{-0.032}_{-0.059}$	22	95	74	127	60	163
63	27	13	79	94	$18^{-0.032}_{-0.059}$	28	110	90	148	65	179
80	32	16	94.5	111	$25^{-0.040}_{-0.073}$	34	140	110	192	77.5	212.5
100	35	16	100	121	$25^{-0.040}_{-0.073}$	40	162	130	214	80	229

CS2Y



(mm)

Bore size	GA	GB	GC	NA	S	TDe8
125	38	23	45	28.5	96	$32^{-0.050}_{-0.089}$
140	40.5	23	45	28.5	96	$36^{-0.050}_{-0.089}$
160	46	26	50	32.5	104	$40^{-0.050}_{-0.089}$

Bore size	TT	TY	TZ	H	Z	ZZ
125	50	164	234	112	87	221
140	55	184	262	112	84.5	221
160	60	204	292	122	92	241

Symbol
14 Mounting Nut with Set Screw -XC52

In order to prevent the mounting nut from being loosen, set screw should be tighten from the two directions to fix the mounting nut.

Applicable Series

Series	Description	Model	Action	Note
CM2-Z	Smooth cylinder	CM2Y	Double acting, Single rod	
	Low speed cylinder	CM2X	Double acting, Single rod	

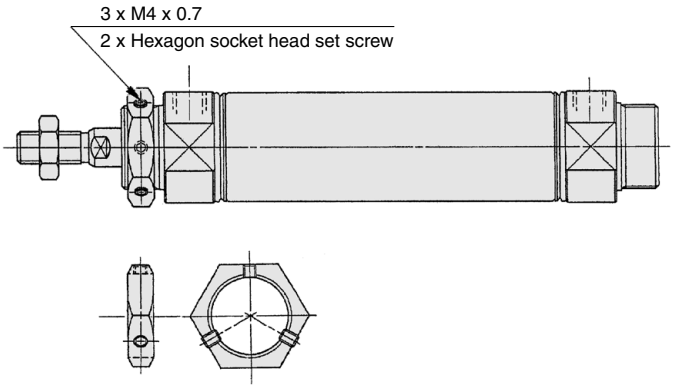
How to Order

Standard model no. – XC52

Mounting nut with set screw

Specifications: Same as standard type

Dimensions (Dimensions other than below are the same as standard type.)



Symbol
15 Made of Stainless Steel (Combination of XC7 and XC68) -XC65

Suitable for the cases it is likely to generate rust by being immersed in the water and corrosion.

Applicable Series

Series	Description	Model	Action	Note
MB-Z	Smooth cylinder	MBY	Double acting, Single rod	
CA2-Z	Smooth cylinder	CA2Y	Double acting, Single rod	

Specifications

Parts changed to stainless steel	Tie-rod, Tie-rod nut, Cushion valve, Piston rod (with hard chrome plated), Rod end nut
Specifications other than above and external dimensions	Same as standard type

How to Order

Standard model no. – XC65

Made of stainless steel
(Combination of XC7 and XC68)

Symbol
16 Made of Stainless Steel (With Hard Chrome Plated Piston Rod) -XC68

Suitable for the cases it is likely to generate rust by being immersed in the water and corrosion.

Applicable Series

Series	Description	Model	Action	Note
MB-Z	Smooth cylinder	MBY	Double acting, Single rod	
CA2-Z	Smooth cylinder	CA2Y	Double acting, Single rod	
CS2	Smooth cylinder	CS2Y	Double acting, Single rod	

Specifications

Parts changed to stainless steel	Piston rod, Rod end nut
Specifications other than above and external dimensions	Same as standard type

Maximum Stroke (mm)

Model	Double acting, Single rod	Double acting, Single rod with rod boot
CS2Y	1600	1400

How to Order

Standard model no. – XC68

Made of stainless steel
(with hard chrome plated piston rod)

Symbol
-XC86

17 With Rod End Bracket

With rod end bracket type to simplify the order process.

Applicable Series

Series	Description	Model	Action	Note
CS2	Smooth cylinder	CS2Y	Double acting, Single rod	

Note 1) Rod end brackets are shipped together.
Note 2) A pin and two split pins are attached for double knuckle joint.
Note 3) XC86A to C: Standard type, XC86D to F: Standard type except for rod end thread length (A and H dimensions)

How to Order

Standard model no. – **XC86** **A**

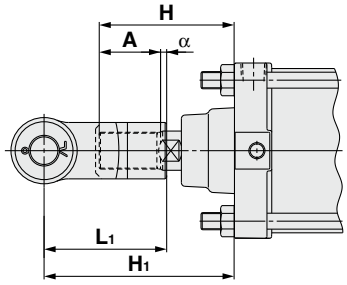
With rod end bracket

Suffix

A	With rod end nut
B	With double knuckle joint
C	With single knuckle joint
D	With double knuckle joint and rod end nut
E	With single knuckle joint and rod end nut
F	With rod end nut (For knuckle joint)

Dimensions (Dimensions other than below are the same as standard type.)

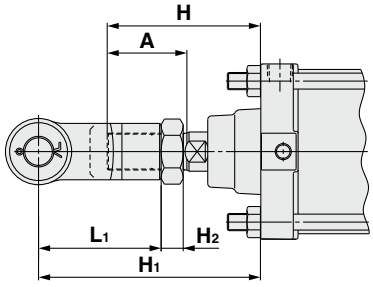
XC86B, XC86C

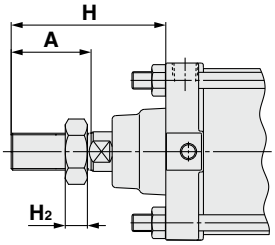


(mm)

Symbol / Bore size	H	A	α	L1	H1	Applicable knuckle joint part no.	
						I type single knuckle	Y type double knuckle
125	110	50	3.5	100	156.5	**I-12A**	**Y-12A**
140	110	50	3.5	105	161.5	**I-14A**	**Y-14A**
160	120	56	3.5	110	170.5	**I-16A**	**Y-16A**

XC86D, XC86E





(mm)

Symbol / Bore size	H	A	L1	H1	H2	Applicable knuckle joint part no.		Applicable rod end nut
						I type single knuckle	Y type double knuckle	
125	125	65	100	181	18	**I-12A**	**Y-12A**	**NT-12**
140	125	65	105	186	18	**I-14A**	**Y-14A**	**NT-12**
160	140	76	110	198	21	**I-16A**	**Y-16A**	**NT-16**

Related Products/Made to Order
-XB13: Low Speed Cylinder
5 to 50 mm/s (CY1/CY3: 7 to 50 mm/s)

Made to Order

1 Low Speed Cylinder

Symbol **-XB13**

CG1 | Standard model no. | – XB13 — Low speed cylinder

CY1 / CY3 | Standard model no. | – XB13

MGP$^{M}_{L}$ | Standard model no. | – XB13

MGGM | Standard model no. | – XB13

MGCM | Standard model no. | – XB13

CX2 | Standard model no. | – XB13

CXW$^{M}_{L}$ | Standard model no. | – XB13

CXS$^{M}_{L}$ | Standard model no. | – XB13

MXH | Standard model no. | – XB13

CXT$^{M}_{L}$ / CXSJ$^{M}_{L}$ | Standard model no. | – XB13 — Low speed cylinder

Note 1) Operate without lubrication from a pneumatic system lubricator.

Specifications

Applicable cylinder	Air cylinder Standard	Magnetically coupled rodless cylinder	Compact guide cylinder	Guide cylinder		Slide unit		Dual rod cylinder		Compact slide	Platform cylinder
				<Slide bearing>							
Series	**CG1**	**CY$^{1}_{3}$**	**MGP$^{M}_{L}$**	**MGGM**	**MGCM**	**CX2**	**CXW$^{M}_{L}$**	**CXSJ$^{M}_{L}$**	**CXS$^{M}_{L}$**	**MXH**	**CXT$^{M}_{L}$**
Action	Double acting, Single rod	Double acting									
Bore size (mm)	20, 25, 32 40, 50, 63 80, 100	[CY3B] 6, 10, 15, 20 25, 32, 40 50, 63 / [CY1S, CY1L] 6 to 40	12, 16 20, 25 32, 40 50, 63 80, 100	20, 25 32, 40 50, 63 80, 100	20, 25 32, 40 50	10, 15 25	10, 16 20, 25 32	6, 10 15, 20 25, 32	6, 10 15, 20 25, 32	6, 10 16, 20	12, 16 20, 25 32, 40
Piston speed	5 to 50 mm/s	7 to 50 mm/s	5 to 50 mm/s	5 to 50 mm/s							
Cushion	Rubber bumper	Rubber bumper		Rubber bumper (Basic cylinder)		Shock absorber (CX2: Option)		Rubber bumper			
Auto switch	Mountable										
Mounting	Basic Foot Flange Trunnion Clevis	Basic Slider	Basic	Basic Front mounting Flange		Basic					
Dimensions	Dimensions and specifications are the same as standard products of double acting.										
Specifications other than above											

∗ No shock absorber is available for the MGGM series.

Related Products:
Speed Controllers for Low Speed Operation

The effective area of controlled flow is approximately 1/10 of the standard type. These controllers are suitable for controlling the speed of low speed cylinders.
The dual type speed controller is especially suitable for cylinders with a small bore size.

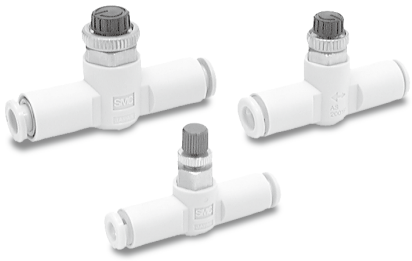
Elbow/Universal Type

Flow Rate and Sonic Conductance

Model		AS12□1FM-M5 AS13□1FM-M5	AS22□1FM-□01 AS23□1FM-□01		AS22□1FM-□02 AS23□1FM-□02		
Tubing O.D.	Metric size	ø3.2, ø4, ø6	ø3.2, ø4	ø6, ø8	ø4	ø6	ø8, ø10
	Inch size	ø1/8", ø5/32" ø3/16", ø1/4"	ø1/8" ø5/32"	ø3/16" ø1/4" ø5/16"	ø5/32"	ø3/16"	ø1/4" ø5/16" ø3/8"
Controlled flow	Flow rate L/min (ANR)	7	12		38		
	Sonic conductance dm³/(s·bar)	0.1	0.2		0.6		
Free flow	Flow rate L/min (ANR)	100	180	230	260	390	460
	Sonic conductance dm³/(s·bar)	1.5	2.7	3.5	4	6	7

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

In-line Type



Flow Rate and Sonic Conductance

Model		AS1001FM	AS2001FM		AS2051FM	
Tubing O.D.	Metric size	ø3.2, ø4, ø6	ø4	ø6	ø6	ø8
	Inch size	ø1/8", ø5/32" ø3/16", ø1/4"	ø5/32"	ø3/16" ø1/4"	ø3/16"	ø1/4" ø5/16"
Controlled flow	Flow rate L/min (ANR)	7	12		38	
	Sonic conductance dm³/(s·bar)	0.1	0.2		0.6	
Free flow	Flow rate L/min (ANR)	100	130	230	290	460
	Sonic conductance dm³/(s·bar)	1.5	2	3.5	4.5	7

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

Elbow Type (Metal body)

Flow Rate and Sonic Conductance

Model		AS12□0M		AS22□0M-□01		AS22□0M-□02	
Port size	Cylinder side	M5 x 0.8	10-32UNF	R1/8	NPT1/8	R1/4	NPT1/4
	Tube side			Rc1/8		Rc1/4	
Controlled flow	Flow rate L/min (ANR)	7		12		38	
	Sonic conductance dm³/(s·bar)	0.1		0.2		0.6	
Free flow	Flow rate L/min (ANR)	105		280		420	
	Sonic conductance dm³/(s·bar)	1.6		4.3		6.5	

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

Dual Type

Flow Rate and Sonic Conductance

Model		ASD230FM-M5	ASD330FM-□01	ASD430FM-□02	
Tubing O.D.	Metric size	ø4, ø6	ø6, ø8	ø6	ø8, ø10
	Inch size	ø1/8", ø5/32" ø3/16", ø1/4"	ø3/16", ø1/4"	—	ø1/4" ø5/16" ø3/8"
Controlled flow (Free flow)	Flow rate L/min (ANR)	7	12	38	
	Sonic conductance dm³/(s·bar)	0.1	0.2	0.6	

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

⚠ Caution: **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

⚠ Warning: **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ Danger : **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

⚠ Warning

1. **The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
   Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.
2. **Only personnel with appropriate training should operate machinery and equipment.**
   The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.
3. **Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.**
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
4. **Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

⚠ Caution

1. **The product is provided for use in manufacturing industries.**
   The product herein described is basically provided for peaceful use in manufacturing industries.
   If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
   If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Series 10-/11-/21-/22-CDU

Free mount cylinder / ø6, ø10, ø16, ø20, ø25

How to Order

Clean series

10	Relief type
11	Vacuum suction type

Built-in magnet

D	Built-in magnet

Bore size (mm)

10-C D U 16 - 30 D - M9B □

21-C D U 16 - 30 D - M9B □

Cylinder stroke (mm)

Copper, fluorine and silicon-free + low particle generation

21	Relief type
22	Vacuum suction type

Number of auto switches

Nil	2 pcs.
S	1 pc.
n	n pcs.

Type of auto switch

Reed switch	D-A93
Solid state switch	D-M9N, D-M9B

Action

D	Double acting

Model

Model		Cushion Bore size (mm)	Port size	Lubrication	Action	Standard stroke (mm)	Auto switch mounting	Cushion	
								Rubber	Air
Relief type	**10-/21-CDU6**	6	M5 x 0.8	Non-lube	Double acting single rod	5, 10, 15, 20, 25, 30	○	○	—
	10-/21-CDU10	10							
	10-/21-CDU16	16							
	10-/21-CDU20	20				5, 10, 15, 20, 25, 30, 40, 50			
	10-/21-CDU25	25							
Vacuum suction type	**11-/22-CDU6**	6				5, 10, 15, 20, 25, 30			
	11-/22-CDU10	10							
	11-/22-CDU16	16							
	11-/22-CDU20	20				5, 10, 15, 20, 25, 30, 40, 50			
	11-/22-CDU25	25							

Specifications

Item \ Bore size (mm)	6	10/16	20/25
Proof pressure	1.05MPa		
Max. operating pressure	0.7MPa		
Min. operating pressure	0.12MPa	0.06MPa	0.05MPa
Ambient and fluid temperature	Without auto switch : –10°C to 70°C With auto switch : –10°C to 60°C (With no condensation)		
Piston speed	50 to 400mm/s		
Stroke length tolerance	$^{+1.0}_{0}$		
Grease	10-/11-: Fluorine grease 21-/22-: Lithium soap base grease		
Particle generation grade (Refer to front matter pages 13 to 22 for details.)	10-: Grade 2, 21-: Grade 3		
	11-/22-: Grade 1		

Suction flow rate of vacuum suction type (Reference values)

Size	Suction flow rate ℓ/min (ANR)
6	6
10	10
16/20/25	12

Auto switch specifications (Refer to Best Pneumatics catalog for detailed specifications and auto switches not in the following table.)

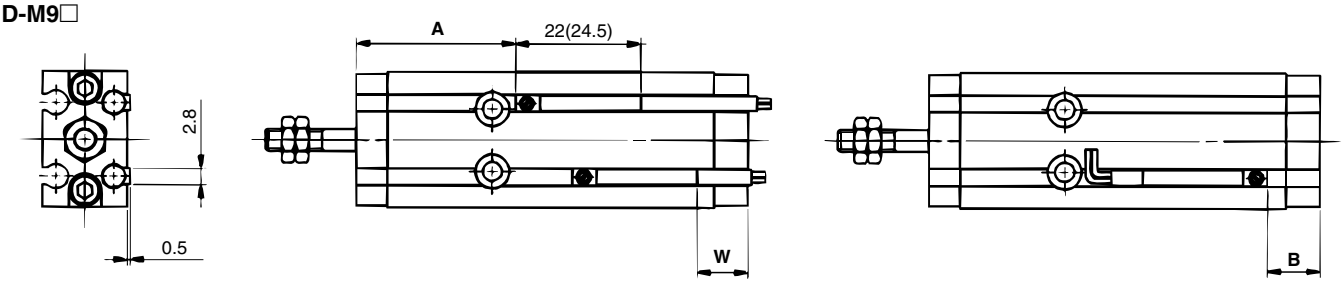
Switch type		Auto switch part no.	Load voltage	Load current range	Indicator light	Application
Reed switch		**D-A93**	24 VDC	5 to 40mA (24 VDC)	○	Relay, PLC
Solid state switch	2-wire type	**D-M9B**	28 VDC or less	40mA or less	○	IC circuit, Relay, PLC
	3-wire type	**D-M9N**	24 VDC (10 to 28 VDC)	5 to 40mA	○	24 VDC Relay, PLC

Refer to applicable auto switch list — Page 182.

PLC: Programmable Logic Controller

Auto switches / Proper mounting position at stroke end detection

D-A9□
D-M9□



( ): Dimensions for D-A93

Bore size (mm)	D-A9□			D-M9□		
	A	**B**	**W**	**A**	**B**	**W**
6	29.5	5.5	-3.5(-1)	33.5	9.5	0.5
10	29.5	9.5	-7.5(-5)	33.5	13.5	-3.5
16	36	11.5	-9.5(-7)	40	15.5	-5.5
20	41	15	-13(-10.5)	45	19	-9
25	40.5	16.5	-14.5(-12)	45.5	20.5	-10.5

Note) The above mentioned values are indicated as a guide for auto switch mounting position for stroke end detection. When actually mounting an auto switch, adjust the position after confirming the operating state of the auto switch.
Note 2) The negative values in the table indicate that the auto switch is mounted inside the cylinder body in case of W and outside in case of B.
Note 3) In case of 5mm stroke (with 1 pc.) or 10mm stroke (2 pcs.), the switch(es) may not go off or more than one switch may turn on simultaneously. Set them at 1 to 4mm out of the values in the above table.
Note 4) ( ): Dimensions for D-A93.

Specific Product Precautions

Be sure to read before handling.

Mounting

⚠Caution

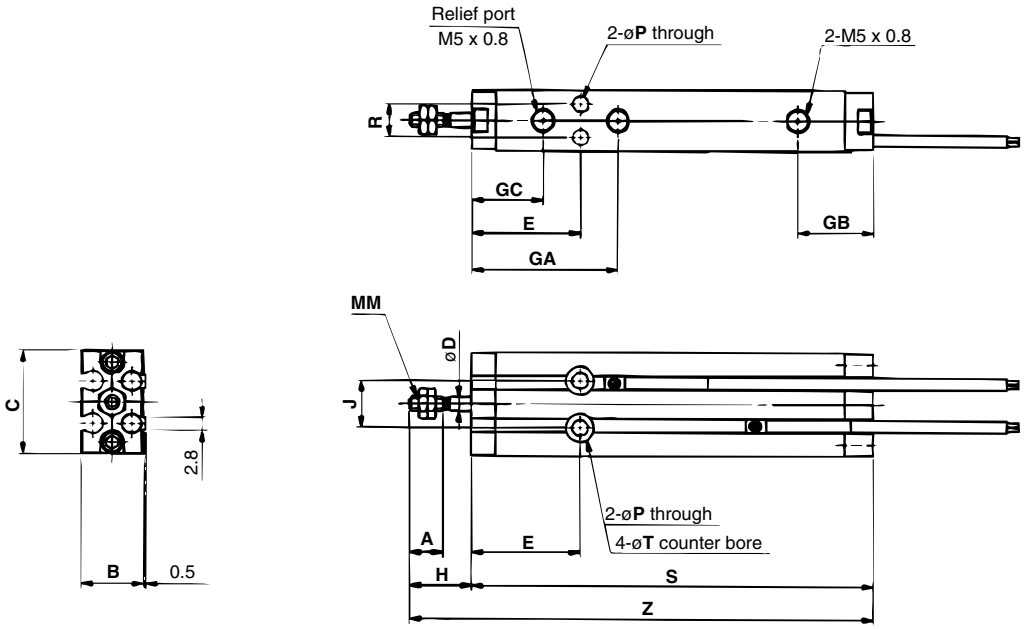
1. Observe the proper tightening torque in the right table in mounting.

Appropriate tightening torque

Bore size (mm)	Hexagon socket head cap bolt size(mm)	Appropriate tightening torque N·m
ø6, ø10	M3	1.08 ±10%
ø16	M4	2.45 ±10%
ø20, ø25	M5	5.10 ±10%

10-11-CDU6 to 25, 21-22-CDU6 to 25

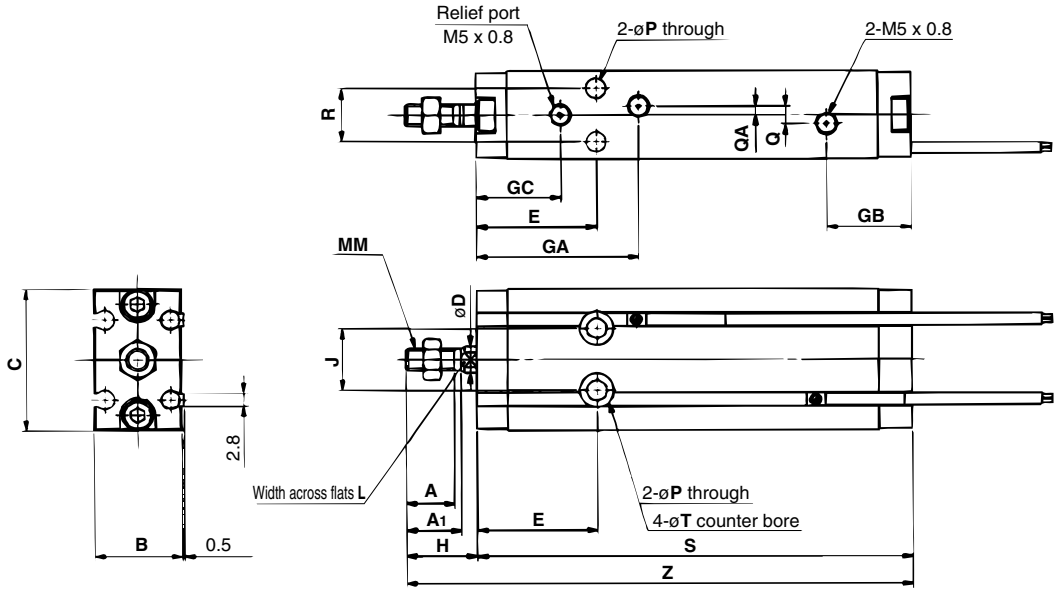
ø6/ø10



(mm)

Bore size	A	B	C	D	E	GA	GB	GC	H	J	MM	P	R	T	S						Z					
															5	10	15	20	25	30	5	10	15	20	25	30
6	7	13	22	3	23	31	16	15	13	10	M3 x 0.5	3.2	7	6 depth 4.8	60	65	70	75	80	85	73	78	83	88	93	98
10	10	15	24	4	24	33.5	16	15.5	16	11	M4 x 0.7	3.2	9	6 depth 5	64	69	74	79	84	89	80	85	90	95	100	105

ø16 to ø25



(mm)

Bore size	A	A1	B	C	D	E	GA	GB	GC	H	J	L	MM	P	Q	QA	R	T	S								Z							
																			5	10	15	20	25	30	40	50	5	10	15	20	25	30	40	50
16	11	12.5	20	32	6	27	36.5	19	19	16	14	5	M5 x 0.8	4.5	4	2	12	7.6 depth 6.5	72.5	77.5	82.5	87.5	92.5	97.5	—	—	88.5	93.5	98.5	103.5	108.5	113.5	—	—
20	12	14	26	40	8	30	40	21.5	22	19	16	6	M6 x 1.0	5.5	9	4.5	16	9.5 depth 8	81	86	91	96	101	106	116	126	100	105	110	115	120	125	135	145
25	15.5	18	32	50	10	29	40.5	22	22	23	20	8	M8 x 1.25	5.5	9	4.5	20	9.5 depth 9	83	88	93	98	103	108	118	128	106	111	116	121	126	131	141	151