Free Mount Cylinder with Air Cushion

Series CU

ø20, ø25, ø32

How to Order

Without auto switch CU 32 □ — 50 A

With auto switch CDU 32 □ — 50 A — F9BW □

Built-in magnet

Bore size

20	20 mm
25	25 mm
32	32 mm

Thread type

Symbol	Type	Bore size
Nil	M thread	ø20, ø25
	Rc	ø32
TN	NPT	
TF	G	

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 7-3-51.

Air cushion

A	With air cushion

Auto switch

Nil	Without auto switch

∗ For the applicable auto switch model, refer to the table below.

Number of auto switches

Nil	2 pcs.
S	1 pc.

Applicable Auto Switch/Refer to page 7-9-1 for further infomation on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage			Auto switch model		Lead wire length (m)∗			Applicable load	
					DC		AC	Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)		
Reed switch	—	Grommet	No	2-wire	24 V	5 V, 12 V	100 V or less	**A90V**	**A90**	●	●	—	IC circuit	Relay PLC
			Yes			12 V	100 V	**A93V**	**A93**	●	●	—	—	
				3-wire (NPN equiv.)	—	5 V	—	**A96V**	**A96**	●	●	—	IC circuit	—
Solid state 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		**F9NWV**	**F9NW**	●	●	○	IC circuit	
				3-wire (PNP)				**F9PWV**	**F9PW**	●	●	○		
				2-wire		12 V		**F9BWV**	**F9BW**	●	●	○	—	

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) A93
3 m ····· L A93L
5 m ····· Z F9NWZ

Note) Solid state switches marked "○" are produced upon receipt of order.

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
Rod end thread tolerance	JIS Class 2
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 (mm)	Proper tightening torque (N◊m)
20, 25	M5	5.10 ±10%
32	M6	8.04 ±10%

Allowable Kinetic Energy

Refer to "Selection" on 7-3-56 regarding allowable kinetic energy.

Theoretical Output

OUT IN

(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)

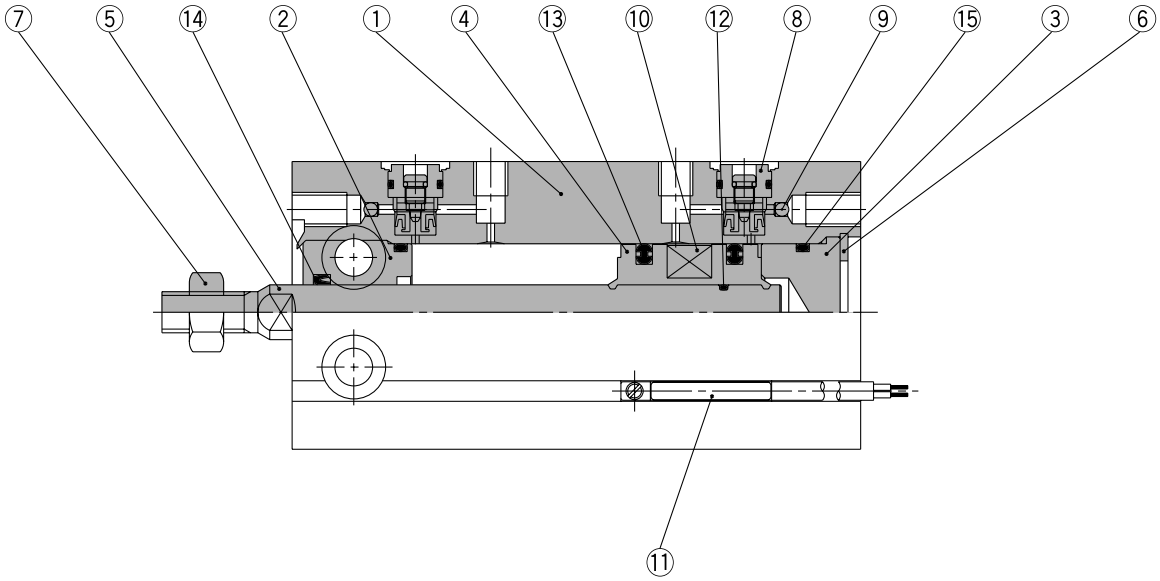
Bore size (mm)	Standard stroke (mm)								
	20	30	40	50	60	70	80	90	100
20	186	208	230	252	274	296	318	340	362
25	289	323	357	391	425	459	493	527	561
32	464	512	560	608	656	704	752	800	848

Additional Weight

(g)

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

Construction



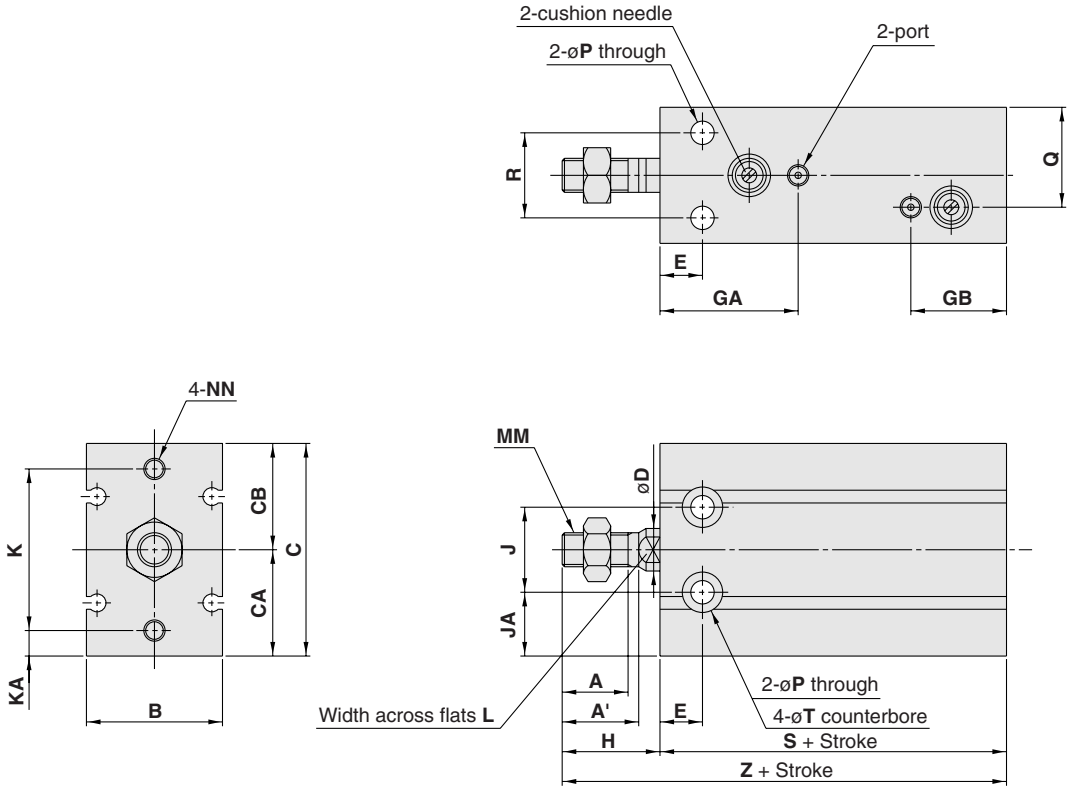
Component Parts

No.	Description	Material	No. of pcs.	Note
①	Cylinder tube	Aluminum alloy	1	Hard anodized
②	Rod cover/Bearing	Aluminum alloy	1	Hard anodized
③	Head cover	Aluminum alloy	1	Clear chromated
④	Piston	Aluminum alloy	1	Chromated
⑤	Piston rod	Stainless steel	1	
⑥	Snap ring	Carbon tool steel	1	Phosphate coated
⑦	Rod end nut	Carbon steel	1	Nickel plated
⑧	Cushion needle assembly	—	(2)	
⑨	Steel ball	Carbon steel	2	
⑩	Magnet	Magnetic material	1	
⑪	Auto switch	—	(2)	D-M9□ type
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
20	CU20A-PS	⑬, ⑭, and ⑮
25	CU25A-PS	
32	CU32A-PS	

Dimensions

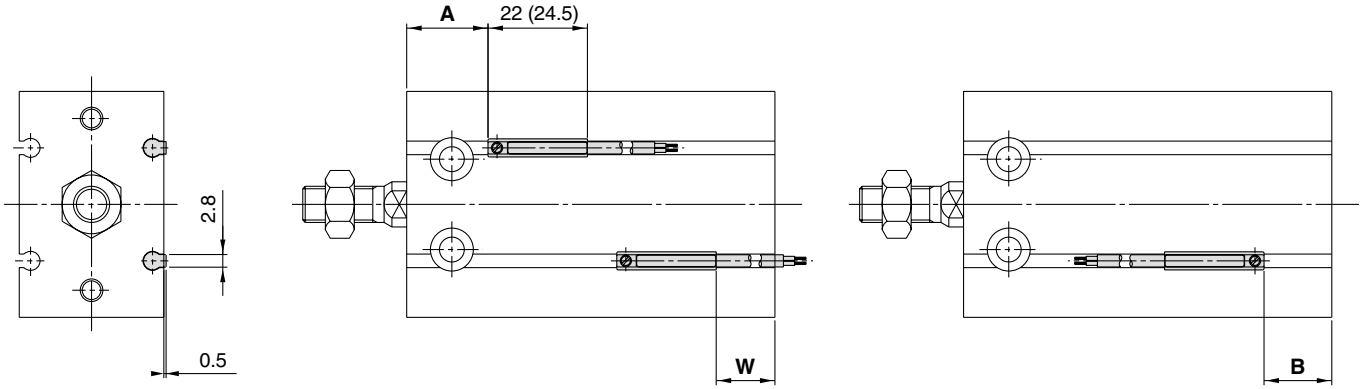


Bore size (mm)	Port size	A	A'	B	C	CA	CB	D	E	GA	GB	H	J	JA
20	M5 x 0.8	12	14	26	42	20	22	8	9	29	27	19	16	12
25	M5 x 0.8	15.5	18	32	50	25	25	10	10	32.5	22.5	23	20	15
32	Rc 1/8	19.5	22	40	62	31	31	12	11	35	25	27	24	19

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

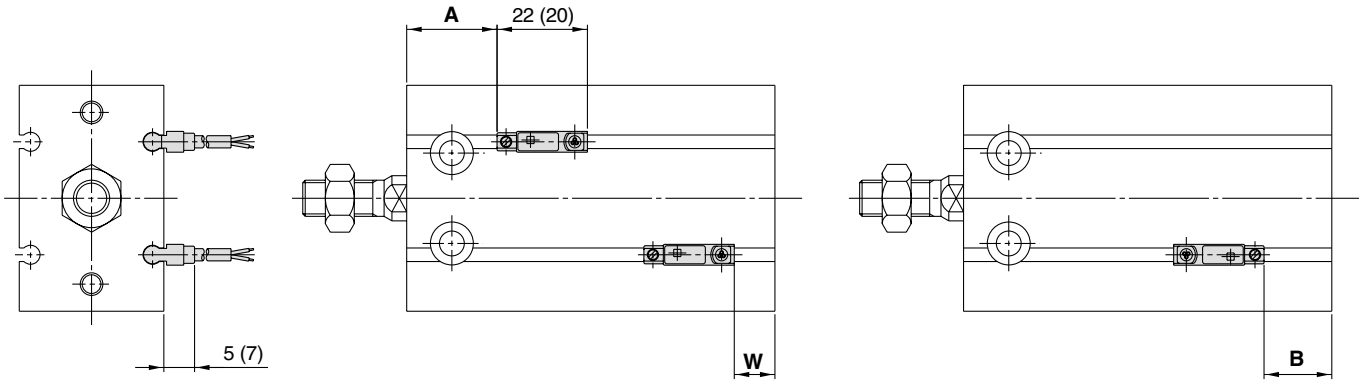
Proper Auto Switch Mounting Position (Detection at stroke end) and Its Height

D-A9□
D-M9□
D-F9□W



The dimension in ( ) is for D-A93 type.

D-A9□V
D-M9□V
D-F9□WV



The dimension in ( ) is for D-M9□V and D-F9□WV.

Bore size (mm)	D-A9□, D-A9□V			D-M9□, D-F9□W			D-M9□V, D-F9□WV		
	A	B	W	A	B	W	A	B	W
20	18	15	13 (10.5)	22	19	9	22	19	11
25	20	11	9 (6.5)	24.5	15	5	24.5	15	7
32	22.5	13.5	11.5 (9)	26.5	17.5	7.5	26.5	17.5	9.5

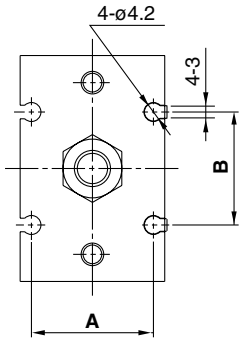
∗ Values in ( ) are dimensions for D-A93 type.

Operating Range

Switch model	Bore size (mm)		
	20	**25**	**32**
D-A9□, D-A9□V	11	12.5	14
D-M9□, D-M9□V	5	5	5
D-F9□W, D-F9□WV	6.5	7	7

∗ Values in this table include hysteresis and are to be used as a guide only. They do not guarantee an actual fixed range (expect approximately ±30% dispersion). Values may vary greatly depending on the operating environment.

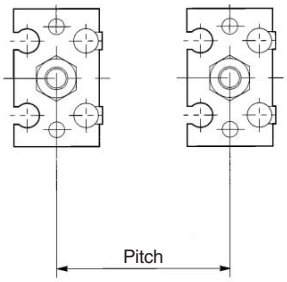
Auto Switch Rail Position



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

Caution on Proximity Installation

When free mount cylinders equipped with D-A9□ or D-F9□ type auto switches are used, be sure to provide an extra clearance in addition to what is suggested in the table at right. If the distance between two cylinders is less than the noted value, auto switches may malfunction. When for some reason you cannot avoid installing cylinders closer than the required clearance, install a steel plate or magnetic shield plate (MU-SO25) on the side of the cylinder facing the auto switches to shield them. (Please contact SMC for details.) Auto switches may malfunction if a shielding plate is not used.



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