

Compact Cylinder/Guide Rod Type

Series CQM

ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Without auto switch

CQM B 20 10

With auto switch

CDQM B 20 10 M9B S

With auto switch

Mounting

B	Through-hole (Standard)
A	Both ends tapped (ø32 to ø100)

Note 1) Cylinder bodies of ø12 to ø25 are common for both B (through hole) and A (both ends tapped) types. Symbol to order is unified to "B" for those sizes.

Note 2) Contact SMC for the other mounting types.

Bore size

12	12mm	40	40mm
16	16mm	50	50mm
20	20mm	63	63mm
25	25mm	80	80mm
32	32mm	100	100mm

Thread type

Symbol	Port thread	Mounting thread	Bore size
Nil	M thread	M thread	ø12 to ø25
	Rc		
TN	NPT	M thread	ø32 to ø100
TF	G		
NN	M thread	Inch thread	ø12 to ø25 ø32 to ø100
	NPT		

Note 3) M thread to be used for without auto switch type of ø32, 5 stroke exceptionally.

Number of auto switches

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

Auto switch type

Nil Without auto switch (Built-in magnet cylinder)

* Refer to the table below for auto switch model numbers.

* Auto switches are packed together when shipped (unassembled). (Except for D-P5DWL)

Cylinder stroke (mm)

Refer to the next page for standard and intermediate strokes.

Applicable Auto Switches/Refer to page 7-9-1 of Best Pneumatics vol. 7 for detailed auto switch specifications.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage			Rail mounting		Direct mounting		Lead wire length (m)*				Applicable load				
					DC	AC	Perpendicular	In-line	Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)	None (N)	IC circuit	Relay, PLC				
																	ø32 to ø100	ø12 to ø100		
Reed switch	—	Grommet	Yes	3-wire (NPN equiv.)	—	5 V	—	—	A76H	A96V	A96	●	●	—	—	IC circuit	—			
				2-wire	24 V	100 V	12 V	A72	A72H	—	—	●	●	—	—	—	—	—	—	
							5 V, 12 V	A80	A80H	A90V	A90	●	●	—	—	—	—	IC circuit	Relay, PLC	
							12 V	—	—	A93V	A93	●	●	—	—	—	—	—		
							12 V	A73C	—	—	—	●	●	—	—	●	●	—		—
							5 V, 12 V	A80C	—	—	—	●	●	—	—	●	●	—		—
				—	A79W	—	—	—	●	●	—	—	—	—	—	—				
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	—	F7NV	F79	M9NV	M9N	●	●	○	—	IC circuit	Relay, PLC			
				3-wire (PNP)				F7PV	F7P	M9PV	M9P	●	●	○	—	—				
		Connector		2-wire	12 V	—	—	F7BV	J79	M9BV	M9B	●	●	○	—	—		—		
				3-wire (NPN)				F7NWW	F79W	F9NWW	F9NW	●	●	○	—	—		—		
		Grommet		3-wire (PNP)	5 V, 12 V	—	—	—	F7PW	F9PWV	F9PW	●	●	○	—	—		—		
				2-wire				F7BWW	J79W	F9BWW	F9BW	●	●	○	—	—		—		
		Water resistant (2-color display)		Grommet	2-wire	12 V	—	—	—	F7BAV	—	—	—	●	●	○		—	—	
										—	P5DW	—	—	—	—	●		●	—	—
		Magnetic field resistant (2-color display)		Grommet	2-wire	5 V, 12 V	—	—	—	—	—	—	—	●	●	○		—	—	
										—	—	—	—	—	—	●		●	—	—

* Lead wire length symbols: 0.5 m.....Nil (Example) A73C

3 m.....L
5 m.....Z
None.....N

A73CL
A73CZ
A73CN

* Solid state switches marked with a "○" symbol are produced upon receipt of order.

- In addition to the models in the above table, there are some other auto switches that are applicable. For more information, please refer to page 12.
- D-P5DWL type: ø40 to ø100 only available.

Made to Order Specifications → Refer to page 7-9-36 of Best Pneumatics Vol. 7.

- -50 Without indicator light
- -61 Flexible lead wire
- Pre-wired connector

Compact Cylinder/Guide Rod Type **Series CQM**



⚠ Caution

- ① Do not use the product as a stopper.
- ② Do not disassemble and modify the product.

Specifications

Model	Pneumatic (non-lube) type	
Action	Double acting, Single rod	
Fluid	Air	
Proof pressure	1.5 MPa	
Maximum operating pressure	1.0 MPa	
Minimum operating pressure	ø12, ø16	0.12 MPa
	ø20 to ø100	0.1 MPa
Ambient and fluid temperature	Without auto switch: -10°C to 70°C (with no freezing) With auto switch: -10°C to 60°C (with no freezing)	
Cushion	Rubber bumper on both ends	
Stroke length tolerance	+1.0 mm	
	0	
Mounting	Through-holes	
Piston speed	ø12 to ø40	50 to 500 mm/s
	ø50 to ø100	50 to 300 mm/s

Standard Stroke

Bore size (mm)	Standard stroke (mm)
12,16	5, 10, 15, 20, 25, 30
20,25	5, 10, 15, 20, 25, 30, 35, 40, 45, 50
32,40	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
50,63,80,100	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

Manufacture of Intermediate Stroke

Description		Intermediate stroke range	
Spacers are installed in a cylinder with standard stroke.		Bore size (mm)	Intermediate stroke range (mm)
		12, 16	1 to 29
		20, 25	1 to 49
		32	1 to 99
Bore size (mm)	Description	40 to 100	5 to 95
12 to 32	Available in 1 mm stroke increments		
40 to 100	Available in 5 mm stroke increments		

Example) Part number: CQMB32-57
Constructed by installing an 18 mm spacer in the standard stroke cylinder CQMB32-75. B dimension: 108 mm.

Theoretical Output

Unit: N

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
12	IN	25	42	59
	OUT	34	57	79
16	IN	45	75	106
	OUT	60	101	141
20	IN	71	118	165
	OUT	94	157	220
25	IN	113	189	264
	OUT	147	245	344
32	IN	181	302	422
	OUT	241	402	563
40	IN	317	528	739
	OUT	377	628	880
50	IN	495	825	1150
	OUT	589	982	1370
63	IN	840	1400	1960
	OUT	936	1560	2184
80	IN	1362	2270	3178
	OUT	1509	2515	3521
100	IN	2145	3575	5005
	OUT	2355	3925	5495

Auto Switch Mounting Bracket Weight

Mounting bracket part no.	Applicable cylinder bore size	Weight (g)
BQ-2	ø32 to ø100	1.5
BQP1-050	ø40 to ø100	16

Weight

Without Auto Switch

Unit: g

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	44	52	60	69	77	86	—	—	—	—	—	—
16	56	67	77	87	97	108	—	—	—	—	—	—
20	92	107	122	137	152	167	183	198	213	227	—	—
25	125	143	162	180	198	216	234	252	270	288	—	—
32	182	205	228	250	274	297	320	343	366	389	553	669
40	269	295	320	345	370	396	421	446	471	497	692	823
50	—	500	540	580	620	661	701	740	780	821	1133	1341
63	—	745	795	845	894	944	993	1043	1093	1143	1535	1791
80	—	1400	1479	1559	1639	1719	1800	1880	1959	2039	2671	3067
100	—	2365	2468	2571	2674	2776	2880	2983	3086	3188	4053	4574

With Auto Switch (Built-in magnet)

Unit: g

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	52	59	68	77	84	93	—	—	—	—	—	—
16	66	77	87	97	107	118	—	—	—	—	—	—
20	122	138	153	168	182	197	213	227	242	257	—	—
25	168	186	205	223	240	258	277	295	313	331	—	—
32	241	264	287	309	333	356	379	401	425	448	564	680
40	345	371	396	421	447	473	498	523	548	574	705	836
50	—	618	658	698	738	779	819	858	898	939	1147	1355
63	—	903	953	1003	1052	1102	1152	1201	1251	1301	1557	1813
80	—	1661	1740	1820	1900	1980	2061	2141	2220	2300	2695	3090
100	—	2745	2848	2950	3053	3156	3260	3362	3465	3568	4088	4609

Add each weight of auto switches and mounting brackets.
Refer to pages 16 to 19 for auto switch weight.

Plate Non-rotating Accuracy

Non-rotating accuracy without load is designed to be same or less than the figures shown in the table below at the retracted cylinder end (plate).

Bore size (mm)	Non-rotating accuracy
12, 16	±0.2°
20 to 100	±0.1°

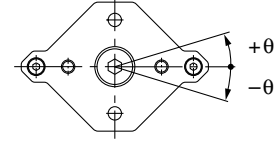
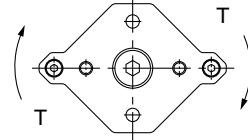


Plate Allowable Rotational Torque

Make sure to operate strictly within the allowable rotation torque range to the plate.

Operation outside of this range may result in shorter service life or damage to the device.



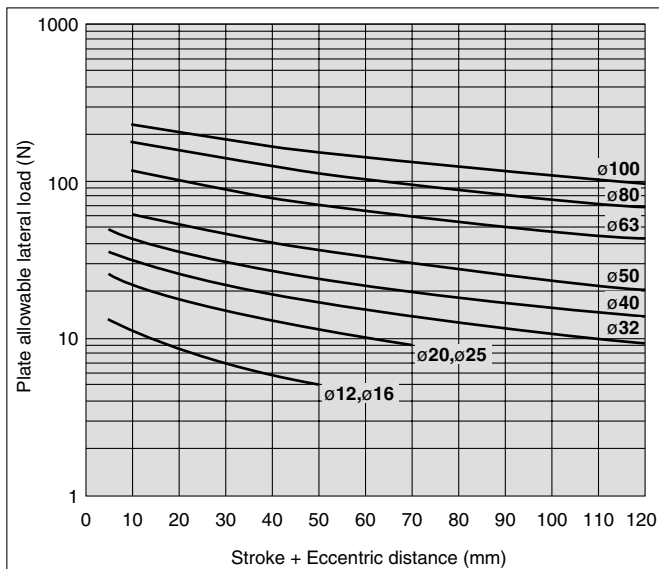
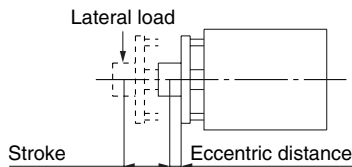
Unit: N·m

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
12	0.11	0.10	0.08	0.07	0.07	0.06	—	—	—	—	—	—
16	0.15	0.12	0.11	0.10	0.09	0.08	—	—	—	—	—	—
20	0.37	0.32	0.28	0.25	0.23	0.21	0.19	0.18	0.17	0.16	—	—
25	0.40	0.35	0.31	0.28	0.25	0.23	0.21	0.20	0.18	0.17	—	—
32	0.66	0.59	0.53	0.49	0.45	0.42	0.39	0.36	0.34	0.32	0.25	0.20
40	1.06	0.96	0.88	0.81	0.75	0.70	0.65	0.61	0.58	0.55	0.43	0.36
50	—	1.70	1.56	1.45	1.35	1.26	1.19	1.12	1.06	1.01	0.80	0.67
63	—	3.90	3.62	3.37	3.15	2.96	2.80	2.65	2.51	2.39	1.92	1.61
80	—	7.44	6.98	6.56	6.20	5.87	5.57	5.31	5.07	4.84	3.98	3.37
100	—	11.85	11.19	10.61	10.08	9.60	9.17	8.77	8.41	8.07	6.73	5.77

Plate Allowable Lateral Load

Make sure to operate strictly within the allowable lateral load range to the plate.

Operation outside of this range may result in shorter service life or damage to the device.

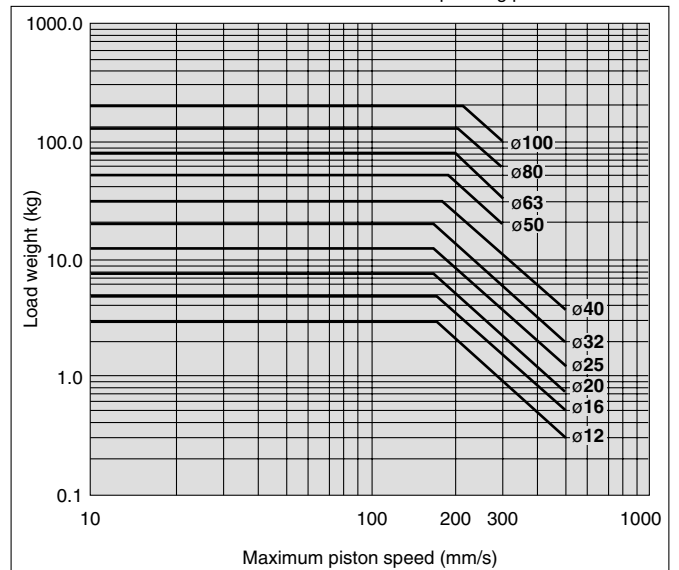


Allowable Kinetic Energy

Make sure to operate strictly within the allowable range of the load weight and maximum speed.

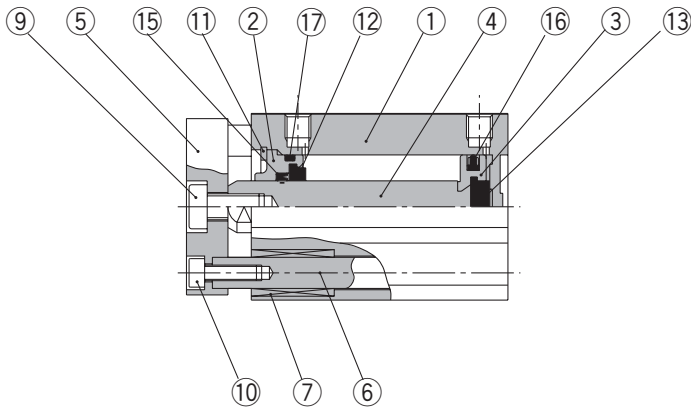
Operation outside of this range may cause excessive impact, which may result in the damage to the device.

Operating pressure: 0.5 MPa

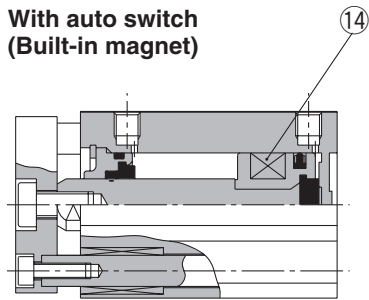


Construction

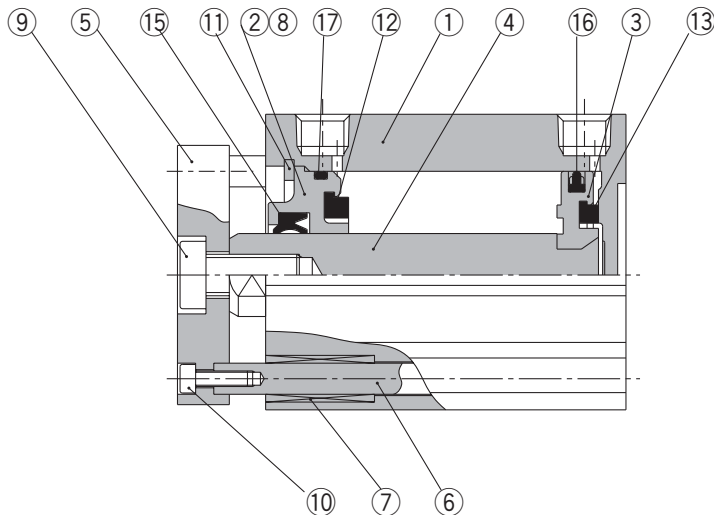
ø12 to ø25



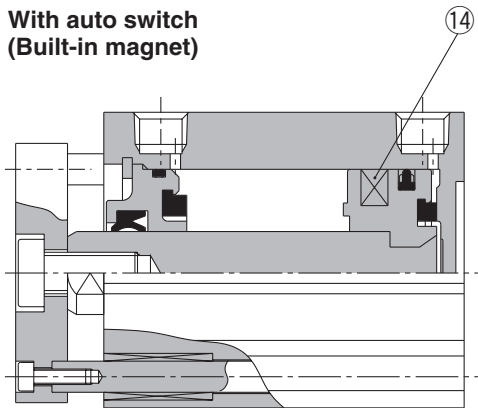
**With auto switch
(Built-in magnet)**



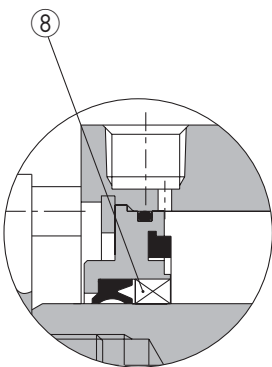
ø32 to ø100



**With auto switch
(Built-in magnet)**



ø50 to ø100



Component Parts

No.	Description	Material	Note
1	Cylinder tube	Aluminum alloy	Hard anodized
2	Collar	Aluminum alloy	ø12 to ø40 Anodized
		Aluminum alloy casted	ø50 to ø100 Chromated, Coated
3	Piston	Aluminum alloy	Chromated
4	Piston rod	Stainless steel	ø12 to ø25
		Carbon steel	ø32 to ø100 Hard chrome plated
5	Plate	Aluminum alloy	Anodized
6	Guide rod	Stainless steel	Hard chrome plated
7	Bushing	Oil-impregnated sintered alloy	
8	Bushing	Bronze alloy	ø50 to ø100
9	Hexagon socket head cap screw	Carbon steel	Nickel plated
10	Hexagon socket head cap screw	Carbon steel	Nickel plated
11	Snap ring	Carbon tool steel	Phosphate coated
12	Bumper A	Urethan	
13	Bumper B	Urethan	
14	Magnet	—	
15	Rod seal	NBR	
16	Piston seal	NBR	
17	Gasket	NBR	

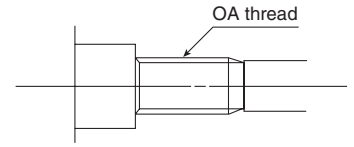
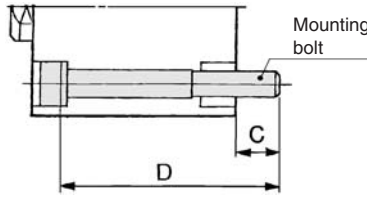
Series CQM

Mounting Bolt

Mounting method: Mounting bolt for through-hole style of CQMB is available as an option.

Ordering: Add the word "Bolt" in front of the bolts to be used.

Example) Bolt M3 x 25ℓ 2 pcs.



Note) To install a cylinder with bore size 12 to 25 mm with through-hole, be sure to use the attached flat washer.

Mounting Bolt for CQM/Without Auto Switch

Model	C	D	Mounting bolt
CQMB12- 5	6.5	25	M3 x 25ℓ
-10		30	x 30ℓ
-15		35	x 35ℓ
-20		40	x 40ℓ
-25		45	x 45ℓ
-30		50	x 50ℓ
CQMB16- 5	6.5	25	M3 x 25ℓ
-10		30	x 30ℓ
-15		35	x 35ℓ
-20		40	x 40ℓ
-25		45	x 45ℓ
-30		50	x 50ℓ
CQMB20- 5	6.5	25	M5 x 25ℓ
-10		30	x 30ℓ
-15		35	x 35ℓ
-20		40	x 40ℓ
-25		45	x 45ℓ
-30		50	x 50ℓ
-35		55	x 55ℓ
-40		60	x 60ℓ
-45		65	x 65ℓ
-50		70	x 70ℓ
CQMB25- 5	8.5	30	M5 x 30ℓ
- 10		35	x 35ℓ
- 15		40	x 40ℓ
- 20		45	x 45ℓ
- 25		50	x 50ℓ
- 30		55	x 55ℓ
- 35		60	x 60ℓ
- 40		65	x 65ℓ
- 45		70	x 70ℓ
- 50		75	x 75ℓ

Model	C	D	Mounting bolt	
CQMB32- 5	9	30	M5 x 30ℓ	
- 10		35	x 35ℓ	
- 15		40	x 40ℓ	
- 20		45	x 45ℓ	
- 25		50	x 50ℓ	
- 30		55	x 55ℓ	
- 35		60	x 60ℓ	
- 40		65	x 65ℓ	
- 45		70	x 70ℓ	
- 50		75	x 75ℓ	
- 75	110	x 110ℓ		
-100	135	x 135ℓ		
CQMB40- 5	7.5	35	M5 x 35ℓ	
- 10		40	x 40ℓ	
- 15		45	x 45ℓ	
- 20		50	x 50ℓ	
- 25		55	x 55ℓ	
- 30		60	x 60ℓ	
- 35		65	x 65ℓ	
- 40		70	x 70ℓ	
- 45		75	x 75ℓ	
- 50		80	x 80ℓ	
- 75		115	x 115ℓ	
-100		140	x 140ℓ	
CQMB50- 10		12.5	45	M6 x 45ℓ
- 15			50	x 50ℓ
- 20	55		x 55ℓ	
- 25	60		x 60ℓ	
- 30	65		x 65ℓ	
- 35	70		x 70ℓ	
- 40	75		x 75ℓ	
- 45	80		x 80ℓ	
- 50	85		x 85ℓ	
- 75	120		x 120ℓ	
-100	145		x 145ℓ	

Model	C	D	Mounting bolt
CQMB63- 10	14.5	50	M8 x 50ℓ
- 15		55	x 55ℓ
- 20		60	x 60ℓ
- 25		65	x 65ℓ
- 30		70	x 70ℓ
- 35		75	x 75ℓ
- 40		80	x 80ℓ
- 45		85	x 85ℓ
- 50		90	x 90ℓ
- 75		125	x 125ℓ
-100	150	x 150ℓ	
CQMB80- 10	15	55	M10 x 55ℓ
- 15		60	x 60ℓ
- 20		65	x 65ℓ
- 25		70	x 70ℓ
- 30		75	x 75ℓ
- 35		80	x 80ℓ
- 40		85	x 85ℓ
- 45		90	x 90ℓ
- 50		95	x 95ℓ
- 75		130	x 130ℓ
-100	155	x 155ℓ	
CQMB100- 10	15.5	65	M10 x 65ℓ
- 15		70	x 70ℓ
- 20		75	x 75ℓ
- 25		80	x 80ℓ
- 30		85	x 85ℓ
- 35		90	x 90ℓ
- 40		95	x 95ℓ
- 45		100	x 100ℓ
- 50		105	x 105ℓ
- 75		140	x 140ℓ
-100	165	x 165ℓ	

Mounting Bolt for CDQM/With Auto Switch (Built-in magnet)

Model	C	D	Mounting bolt
CDQMB12- 5	6.5	30	M3 x 30/
-10		35	x 35/
-15		40	x 40/
-20		45	x 45/
-25		50	x 50/
-30		55	x 55/
CDQMB16- 5	6.5	30	M3 x 30/
-10		35	x 35/
-15		40	x 40/
-20		45	x 45/
-25		50	x 50/
-30		55	x 55/
CDQMB20- 5	6.5	35	M5 x 35/
-10		40	x 40/
-15		45	x 45/
-20		50	x 50/
-25		55	x 55/
-30		60	x 60/
-35		65	x 65/
-40		70	x 70/
-45		75	x 75/
-50		80	x 80/
CDQMB25- 5	8.5	40	M5 x 40/
-10		45	x 45/
-15		50	x 50/
-20		55	x 55/
-25		60	x 60/
-30		65	x 65/
-35		70	x 70/
-40		75	x 75/
-45		80	x 80/
-50		85	x 85/

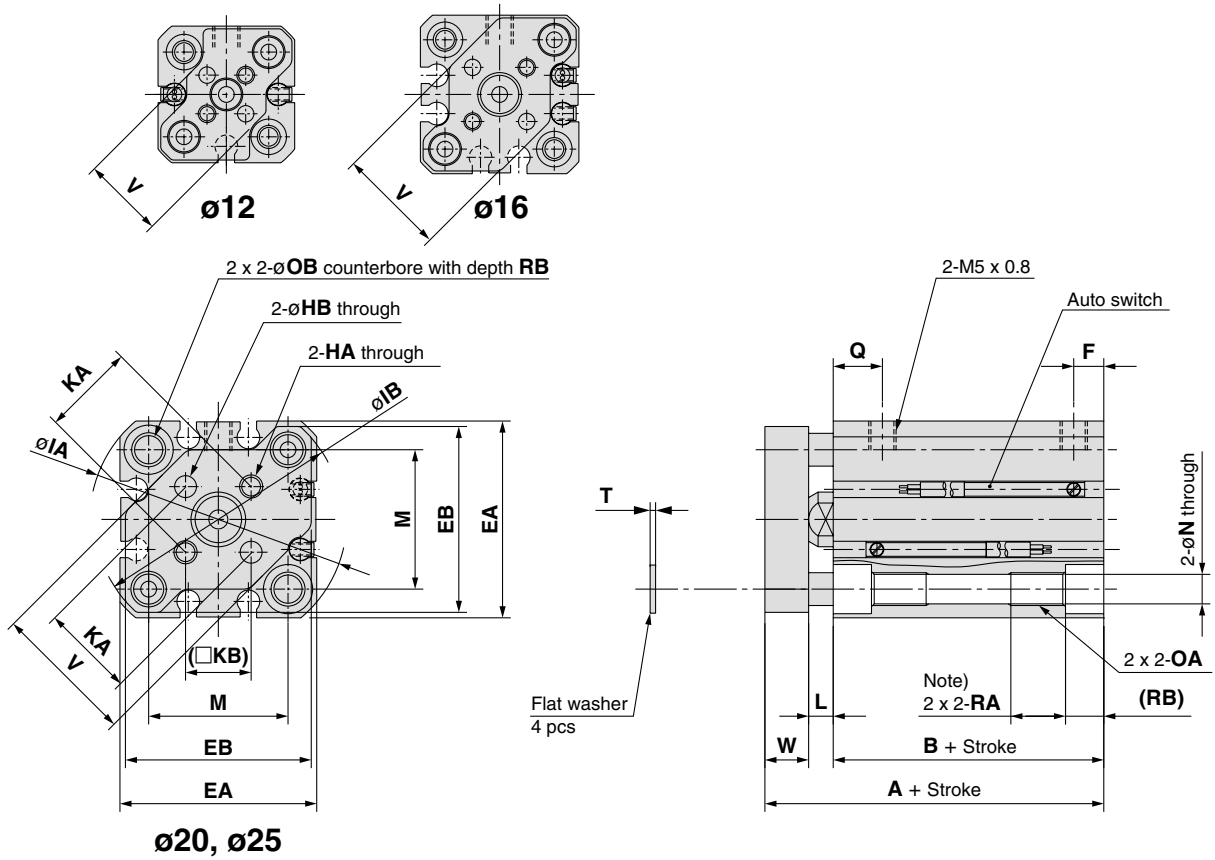
Model	C	D	Mounting bolt
CDQMB32- 5	9	40	M5 x 40/
- 10		45	x 45/
- 15		50	x 50/
- 20		55	x 55/
- 25		60	x 60/
- 30		65	x 65/
- 35		70	x 70/
- 40		75	x 75/
- 45		80	x 80/
- 50		85	x 85/
- 75	110	x 110/	
-100	135	x 135/	
CDQMB40- 5	7.5	45	M5 x 45/
- 10		50	x 50/
- 15		55	x 55/
- 20		60	x 60/
- 25		65	x 65/
- 30		70	x 70/
- 35		75	x 75/
- 40		80	x 80/
- 45		85	x 85/
- 50		90	x 90/
- 75	115	x 115/	
-100	140	x 140/	
CDQMB50- 10	12.5	55	M6 x 55/
- 15		60	x 60/
- 20		65	x 65/
- 25		70	x 70/
- 30		75	x 75/
- 35		80	x 80/
- 40		85	x 85/
- 45		90	x 90/
- 50		95	x 95/
- 75		120	x 120/
-100	145	x 145/	

Model	C	D	Mounting bolt
CDQMB63- 10	14.5	60	M8 x 60/
- 15		65	x 65/
- 20		70	x 70/
- 25		75	x 75/
- 30		80	x 80/
- 35		85	x 85/
- 40		90	x 90/
- 45		95	x 95/
- 50		100	x 100/
- 75		125	x 125/
-100	150	x 150/	
CDQMB80- 10	15	65	M10 x 65/
- 15		70	x 70/
- 20		75	x 75/
- 25		80	x 80/
- 30		85	x 85/
- 35		90	x 90/
- 40		95	x 95/
- 45		100	x 100/
- 50		105	x 105/
- 75		130	x 130/
-100	155	x 155/	
CDQMB100- 10	15.5	75	M10 x 75/
- 15		80	x 80/
- 20		85	x 85/
- 25		90	x 90/
- 30		95	x 95/
- 35		100	x 100/
- 40		105	x 105/
- 45		110	x 110/
- 50		115	x 115/
- 75		140	x 140/
-100	165	x 165/	

Series CQM

Dimensions

ø12 to ø25



(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch		EA	EB	F	HA		OA		HB	IA	IB
		A	B	A	B				—	NN	—	NN			
12	5 to 30	26.5	17	31.5	22	25	24	5	M3 x 0.5	4-40UNC	M4 x 0.7	8-32UNC	3 ^{+0.2} ₀	32	31.5
16	5 to 30	26.5	17	31.5	22	29	28	5	M3 x 0.5	4-40UNC	M4 x 0.7	8-32UNC	3 ^{+0.2} ₀	38	37
20	5 to 50	32	19.5	42	29.5	36	34	5.5	M4 x 0.7	6-32UNC	M6 x 1.0	1/4-20UNC	4 ^{+0.2} ₀	47	45.5
25	5 to 50	35.5	22.5	45.5	32.5	40	38	5.5	M5 x 0.8	10-32UNF	M6 x 1.0	1/4-20UNC	5 ^{+0.2} ₀	52	50.5

Bore size (mm)	KA	KB	L	M	N	OB	Q	RA	RB	T	V	W
12	10 ± 0.1	7.1	3.5	15.5	3.5	6.5	7.5	7	4	0.5	14.9	6
16	14 ± 0.1	9.9	3.5	20	3.5	6.5	7.5	7	4	0.5	20	6
20	17 ± 0.1	12	4.5	25.5	5.4	9	9	10	7	1	26	8
25	22 ± 0.1	15.6	5	28	5.4	9	11	10	7	1	30	8

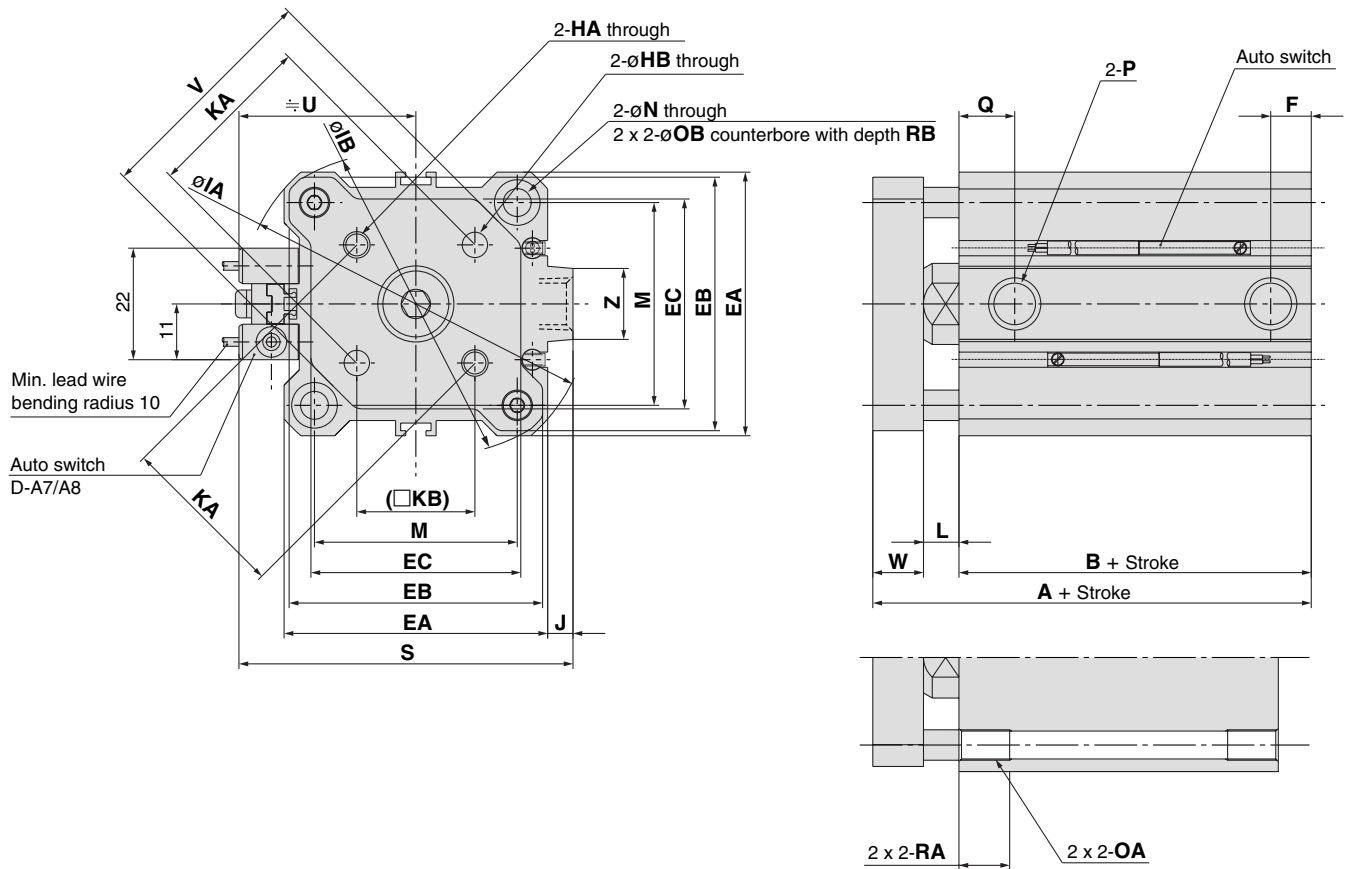
Note) For the following bore/stroke sizes, the through-hole is threaded.

Standard without auto switch: ø12 and ø16; 5 stroke, ø20; 5 to 15 stroke, ø25; 5 and 10 stroke, Built-in magnet with auto switch: ø20; 5 stroke

Compact Cylinder/Guide Rod Type **Series CQM**

Dimensions

ø32 to ø50



Both ends tapped (CQMA)

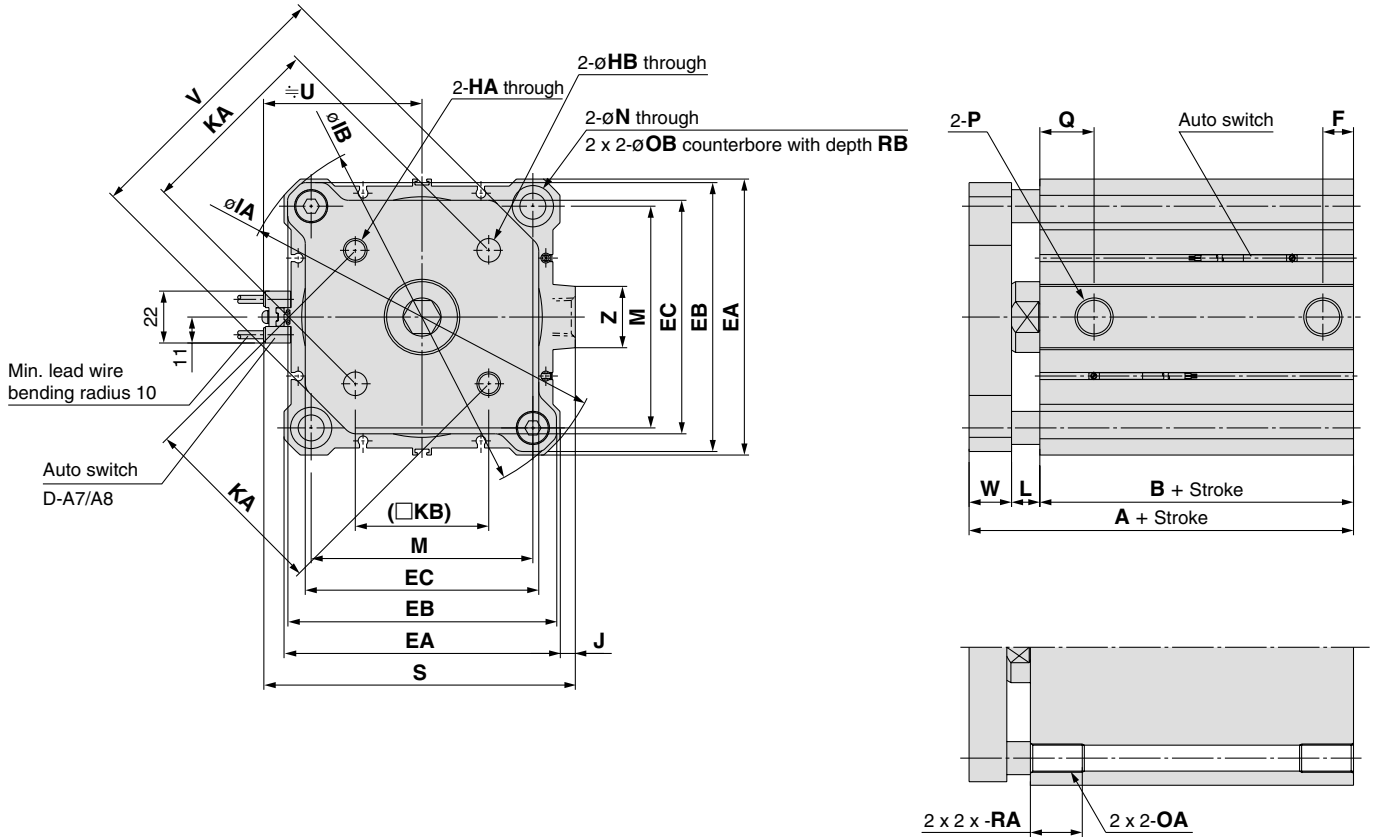
Bore size (mm)	Stroke range (mm)	Without auto switch								With auto switch								EA	EB	EC
		A	B	F	Q	P				A	B	F	Q	P						
						—	TN	TF	NN					—	TN	TF	NN			
32	5	40	23	5.5	11.5	M5 x 0.8	—	—	M5 x 0.8	50	33	7.5	10.5	Rc1/8	NPT1/8	G1/8	NPT1/8	45	43	34.4
	10 to 50	7.5	10.5	Rc1/8	NPT1/8	G1/8	NPT1/8													
	75, 100	50	33	8	11	Rc1/8	NPT1/8	G1/8	NPT1/8											
40	5 to 50	46.5	29.5	8	11	Rc1/8	NPT1/8	G1/8	NPT1/8	56.5	39.5	8	11	Rc1/8	NPT1/8	G1/8	NPT1/8	52	50	41.4
	75, 100	56.5	39.5																	
50	10 to 50	50.5	30.5	10.5	10.5	Rc1/4	NPT1/4	G1/4	NPT1/4	60.5	40.5	10.5	10.5	Rc1/4	NPT1/4	G1/4	NPT1/4	64	62	53.4
	75, 100	60.5	40.5																	

Bore size (mm)	HA		OA		HB	IA	IB	J	KA	KB	L	M	N	OB	RA	RB	S	U	V	W	Z
	—, TN, TF	NN	—, TN, TF	NN																	
32	M5 x 0.8	10-32UNF	M6 x 1.0	1/4-20UNC	5 ^{+0.2} ₀	60	58.5	4.5	28 ± 0.2	19.8	7	34	5.5	9	10	7	58.5	31.5	38	10	14
40	M5 x 0.8	10-32UNF	M6 x 1.0	1/4-20UNC	5 ^{+0.2} ₀	69	67.5	5	33 ± 0.2	23.3	7	40	5.5	9	10	7	66	35	46	10	14
50	M6 x 1.0	1/4-20UNC	M8 x 1.25	5/16-18UNC	6 ^{+0.2} ₀	86	84.5	7	42 ± 0.2	29.7	8	50	6.6	11	14	8	80	41	58	12	19

Series CQM

Dimensions

ø63 to ø100



Both ends tapped (CQMA)

(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch		EA	EB	EC	F	HA		HB	IA	IB	J	KA	KB	L
		A	B	A	B					—, TN, TF	NN							
63	10 to 50	56	36	66	46	77	74	59.6	10.5	M6 x 1	1/4-20UNC	6 ^{+0.2} ₀	103	100	7	50 ± 0.2	35.4	8
	75,100	66	46	66	46	77	74	59.6	10.5	M6 x 1	1/4-20UNC	6 ^{+0.2} ₀	103	100	7	50 ± 0.2	35.4	8
80	10 to 50	67.5	43.5	77.5	53.5	98	95	79.5	12.5	M8 x 1.25	5/16-18UNC	8 ^{+0.2} ₀	132	129	6	65 ± 0.2	46	10
	75,100	77.5	53.5	77.5	53.5	98	95	79.5	12.5	M8 x 1.25	5/16-18UNC	8 ^{+0.2} ₀	132	129	6	65 ± 0.2	46	10
100	10 to 50	79	53	89	63	117	114	99	13	M10 x 1.5	7/16-14UNC	10 ^{+0.2} ₀	156	153	6.5	80 ± 0.2	56.6	10
	75,100	89	63	89	63	117	114	99	13	M10 x 1.5	7/16-14UNC	10 ^{+0.2} ₀	156	153	6.5	80 ± 0.2	56.6	10

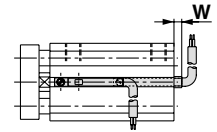
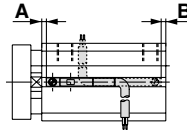
Bore size (mm)	M	N	OA		OB	P				Q	RA	RB	S	U	V	W	Z
			—, TN, TF	NN		—	TN	TF	NN								
63	60	9	M10 x 1.5	7/16-14UNC	14	Rc1/4	NPT1/4	G1/4	NPT1/4	15	18	10.5	93	47.5	69	12	19
80	77	11	M12 x 1.75	1/2-13UNC	17.5	Rc3/8	NPT3/8	G3/8	NPT3/8	16	22	13.5	112.5	57.5	89	14	26
100	94	11	M12 x 1.75	1/2-13UNC	17.5	Rc3/8	NPT3/8	G3/8	NPT3/8	23	22	13.5	132.5	67.5	113	16	26

Auto Switches/Proper Mounting Positions and Height for Stroke End Detection

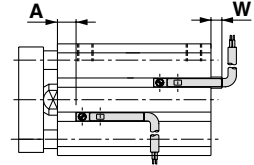
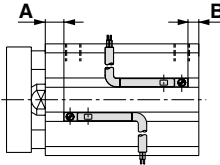
Reed switch
D-A9□

Solid state switch
D-M9□
D-F9BAL
D-F9□W

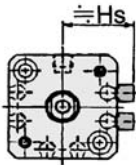
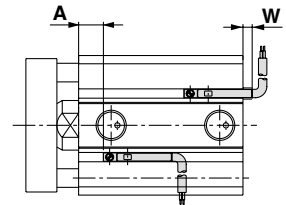
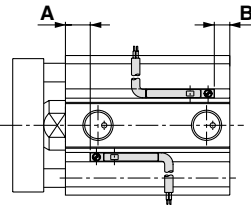
ø12



ø16, ø20, ø25



ø32 to ø100



* Mounting height "Hs" exists only for the D-F9BAL type.

Auto switch model		D-A9□			D-M9□ D-F9□W			D-F9BAL			
Symbol		A	B	W	A	B	W	A	B	W	HS
Bore size (mm)	12	1.5	0.5	1.5 (4)	5.5	4.5	5.5	4.5	3.5	14.5	16.5
	16	2	0	2 (4.5)	6	4	6	5	3	15	18.5
	20	6	3.5	-1.5 (1)	10	7.5	2.5	9	6.5	11.5	22
	25	7	5.5	-3.5 (-1)	11	9.5	0.5	10	8.5	9.5	24
	32	8	5	-3 (-0.5)	12	9	1	11	8	10	26.5
	40	12	7.5	-5.5 (-3)	16	11.5	-1.5	15	10.5	7.5	30
	50	10	10.5	-8.5 (-6)	14	14.5	-4.5	13	13.5	4.5	36
	63	12.5	13.5	-11.5 (-9)	16.5	17.5	-7.5	15.5	16.5	1.5	39.5
	80	15.5	18	-16 (-13.5)	19.5	22	-12	18.5	21	-3	49.5
100	20	23	-21 (-18.5)	24	27	-17	23	26	-8	59.5	

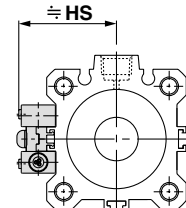
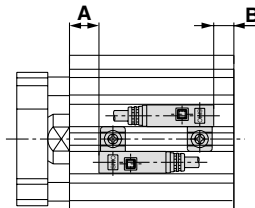
Note 1) The dimension inside () is for D-A93.

Note 2) Minus in "W" column signifies the inner mounting from the edge of a cylinder.

Reed switch
D-A7□H
D-A80H

Solid state switch
D-F7□
D-J79
D-F7□W
D-J79W
D-F7BAL
D-F79F
D-F7NTL

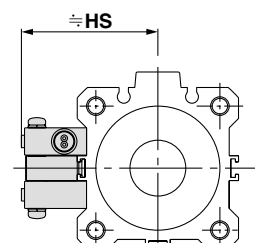
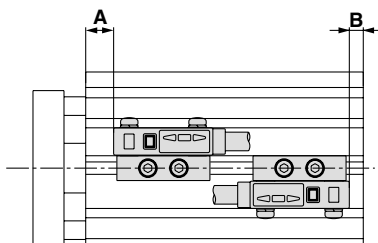
ø32 to ø100



Auto switch model		D-A7□H D-A80H			D-F7□ D-J79 D-F7□W D-F79F			D-F7NTL		
Symbol		A	B	Hs	A	B	Hs	A	B	Hs
Bore size (mm)	32	9.5	6.5	32.5	9.5	6.5	32.5	14.5	11.5	32.5
	40	13.5	9	36	13.5	9	36	18.5	14	36
	50	11.5	12	42	11.5	12	42	16.5	17	42
	63	14	15	48.5	14	15	48.5	15	16	48.5
	80	18	18.5	58.5	18	18.5	58.5	19	19.5	58.5
100	21.5	24.5	68.5	21.5	24.5	68.5	22.5	25.5	68.5	

Solid state switch
D-P5DW

ø40 to ø100



Auto switch model		D-P5DW		
Symbol		A	B	Hs
Bore size (mm)	40	9	4.5	44
	50	7	7.5	50
	63	9.5	10.5	56.5
	80	13.5	14	66.5
100	17	20	76.5	

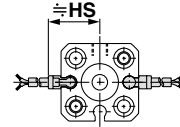
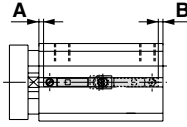
Series CQM

Auto Switches/Proper Mounting Positions and Height for Stroke End Detection

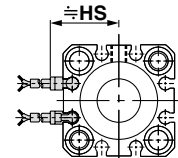
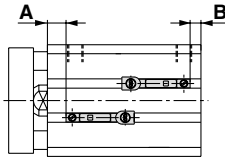
Reed switch
D-A9□V

Solid state switch
D-M9□V
D-F9□WV

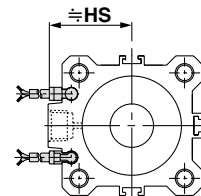
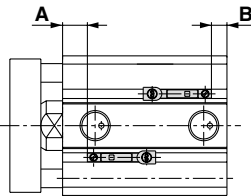
∅12



∅16, ∅20, ∅25



∅32 to ∅100



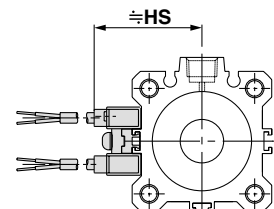
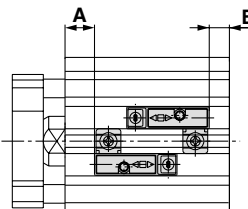
(mm)

Auto switch model		D-A9□V			D-M9□V D-F9□WV		
Symbol		A	B	Hs	A	B	Hs
Bore size (mm)	12	1.5	0.5	17	5.5	4.5	19
	16	2	0	19	6	4	21
	20	6	3.5	22.5	10	7.5	24
	25	7	5.5	24.5	11	9.5	26
	32	8	5	27	12	9	29
	40	12	7.5	30.5	16	11.5	32.5
	50	10	10.5	36.5	14	14.5	42
	63	12.5	13.5	40	16.5	17.5	42
80	16.5	17	50	20.5	21	52	
100	20	23	60	24	27	62	

Reed switch
D-A7□
D-A80
D-A73C
D-A80C
D-A79W

Solid state switch
D-F7□V
D-J79C
D-F7□WV
D-F7BAVL

∅32 to ∅100



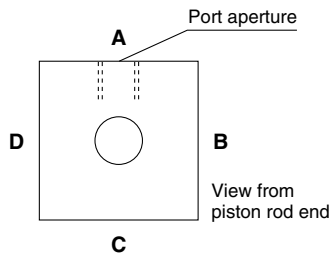
(mm)

Auto switch model		D-A7□ D-A80			D-A73C D-A80C			D-A79W			D-F7□V D-F7BAVL D-F7□WV			D-J79C		
Symbol		A	B	Hs	A	B	Hs	A	B	Hs	A	B	Hs	A	B	Hs
Bore size (mm)	32	9(9.5)	6(6.5)	31.5	9.5	6.5	38.5	6.5	3.5	34	9.5	6.5	35	9.5	6.5	38
	40	13(13.5)	8.5(9)	35	13.5	9	42	10.5	6	37.5	13.5	9	38.5	13.5	9	41.5
	50	11(11.5)	11.5(12)	41	11.5	12	48	12	8.5	43.5	11.5	12	44.5	11.5	12	47.5
	63	13.5(14)	14.5(15)	47.5	14	15	54.5	11	12	50	14	15	51	14	15	54
	80	17.5(18)	18(18.5)	57.5	18	18.5	64.5	15	15.5	60	18	18.5	61	18	18.5	64
100	21(21.5)	24(24.5)	67.5	21.5	24.5	74.5	18.5	21.5	70	21.5	24.5	71	21.5	24.5	74	

The dimension inside () is for D-A72.

The number of surfaces and grooves where an auto switch can be mounted (as direct mounting).

The number of the surfaces and grooves where the auto switch can be mounted, by switch type, are shown in the table below.



Switch type Bore size (mm)	D-A9□(V), M9□(V), F9□W(V)				D-A7□, A8□, F7□, J7□			
	A (Mounting groove no.)	B (Mounting groove no.)	C (Mounting groove no.)	D (Mounting groove no.)	A (Mounting groove no.)	B (Mounting groove no.)	C (Mounting groove no.)	D (Mounting groove no.)
12	—	○ (1)	○ (1)	○ (1)	—	—	—	—
16	—	○ (2)	○ (2)	○ (2)	—	—	—	—
20	○ (2)	○ (2)	○ (2)	○ (2)	—	—	—	—
25	○ (2)	○ (2)	○ (2)	○ (2)	—	—	—	—
32	○ (2)	—	—	—	—	○	○	○
40	○ (2)	—	—	—	—	○	○	○
50	○ (2)	—	—	—	—	○	○	○
63	○ (2)	○ (2)	○ (2)	○ (2)	—	○	○	○
80	○ (2)	○ (2)	○ (2)	○ (2)	—	○	○	○
100	○ (2)	○ (2)	○ (2)	○ (2)	—	○	○	○

Operating Range

Auto switch model	Bore size (mm)									
	12	16	20	25	32	40	50	63	80	100
D-F7□, D-F7□V D-J79, D-J79C D-F7□W, D-F7□WV D-J79W D-F7BAL, D-F7BAVL D-F7NTL, D-F79F	—	—	—	—	6	6	6	6.5	6.5	7
D-F9□W, D-F9□WV D-F9BAL	3	4	5	5.5	5.5	5.5	5.5	6.5	5.5	6.5
D-A7□, D-A80	—	—	—	—	12	11	10	12	12	13
D-A9□(V)	6	7.5	10	10	9.5	9.5	11.5	9	11.5	—
D-M9□, D-M9□(V)	2	2.5	3.5	3.5	4	4	4	5	5	5.5

* The operating ranges are provided as guidelines including hystereses and are not guaranteed values (assuming approximately ±30% variations). They may vary significantly with ambient environments.

Auto Switch Mounting Bracket/Part No.

Bore size (mm)	Mounting bracket part no.	Note	Applicable switch	
			Reed switch	Solid state switch
32, 40 50, 63 80, 100	BQ-2	<ul style="list-style-type: none"> Switch mounting screw (M3 x 0.5 x 10 ℓ) Switch spacer Switch mounting nut 	D-A7□, A80 D-A73C, A80C D-A7□H, A80H D-A79W	D-F7□, J79 D-F7□V D-J79C D-F7□W, J79W D-F7□WV D-F7BAL, F7BAVL D-F79F D-F7NTL
40, 50 63, 80 100	BQP1-050	<ul style="list-style-type: none"> Switch mounting bracket Switch mounting nut Hexagon socket head cap bolt (M3 x 0.5 x 14 ℓ, spring washer 2 pcs.) Round head Phillips screw (M3 x 0.5 x 16 ℓ, spring washer 2 pcs.) 	—	D-P5DWL

[Mounting screws set made of stainless steel]

The following set of mounting screws (nut included) made of stainless steel is also available. Use it in accordance with the operating environment. (Please order the auto switch spacer separately, since it is not included.)

For BBA2: D-A7/A8/F7/J7

"D-F7BAL/F7BAVL" switch is set on the cylinder with the stainless steel screws above when shipped. When a switch is shipped independently, "BBA2" screws are attached.

Minimum Auto Switch Mounting Stroke

Bore size (mm)	Auto switch model Number of auto switch	(mm)						
		D-A9□	D-A9□V	D-M9□	D-F9□W	D-M9□V	D-F9□WV	D-F9BAL
12 to 25	2 pcs.	10	10	15	15	5	10	25
	1 ps.	10	5	15	15	5	10	25
32, 40, 50, 63, 80, 100	2 pcs.	10	10	10	15	5	15	20
	1 pc.	10	5	10	15	5	10	20

Bore size (mm)	Auto switch model Number of auto switches	(mm)							
		D-F7□V D-J79C	D-A7□ D-A8□ D-A73C D-A80C	D-F7□WV D-F7BAVL	D-A7□H D-A80H D-F7□ D-J79	D-A79W	D-F7□W D-J79W D-F7BAL D-F7NTL D-F79F	D-P5DW	
32, 40, 50, 63, 80, 100	2 pcs.	5	10	15	15	20	20	15	
	1 pc.	5	5	10	15	15	20	15	

Besides the models listed in "How to Order," the following auto switches are applicable. Refer to page 7-9-1 of Best Pneumatics vol. 7 for detailed specifications.

Type	Model	Electrical entry	Features	Applicable bore size
Solid state switch	D-F7NTL	Grommet (In-line)	With timer	ø32 to ø100

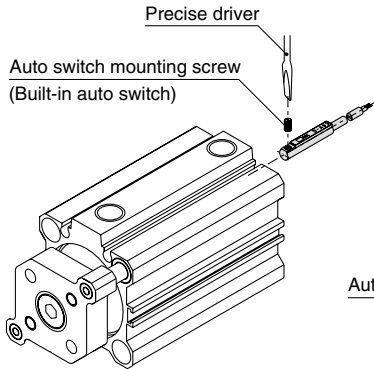
* With pre-wire connector is available for D-F7NTL type, too. Contact SMC for details. For details, refer to page 7-9-36 of Best Pneumatics Vol. 7.

* Contact SMC for detailed normally closed solid (N.C. = b contact) state auto switches such as D-F9G and D-F9H. For details, refer to page 7-9-23 of Best Pneumatics Vol. 7.

Auto Switch Mounting

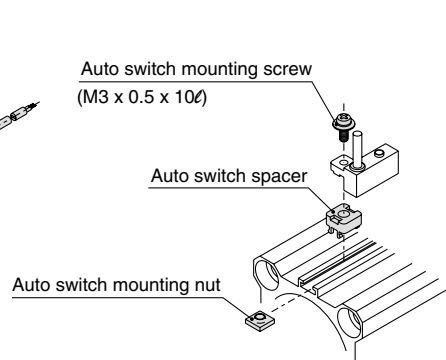
To mount auto switches, follow the instruction illustrated below.

ø12 to ø100/Direct mounting



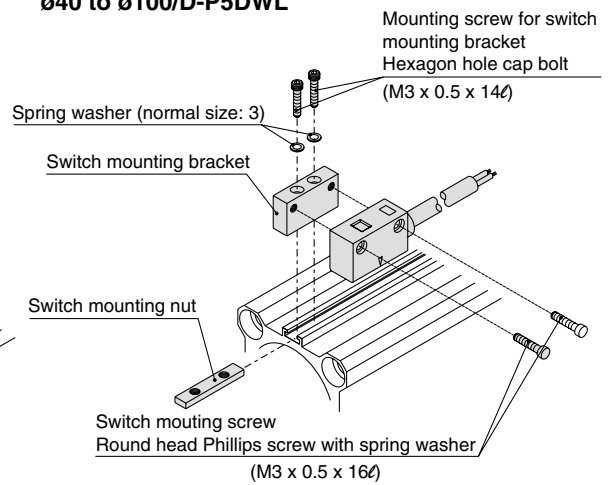
- Use a watchmakers screwdriver with a handle 5 to 6 mm in diameter when tightening the auto switch mounting screw. Tightening torque should be set 0.10 to 0.20 N·m.

ø32 to ø100/Rail mounting



- Tightening torque of auto switch mounting screw should be set 0.5 to 0.7 N·m.
- * In the case of cylinders with built-in magnets, unassembled auto switch mounting brackets are packed together when shipped.

ø40 to ø100/D-P5DWL



1. Mount the switch mounting bracket onto the switch mounting nut by tightening mounting screw for bracket fixing lightly through the mounting hole on the top of bracket.
2. Insert the switch mounting bracket assembly (bracket + nut) into the mounting groove and set it at the auto switch mounting position.
3. Push the auto switch mounting screw lightly into the auto switch through the mounting hole to fix switch mounting bracket tentatively.
4. After reconfirming the detecting position, tighten the mounting screw for switch mounting bracket and switch mounting screw, and fix the auto switch. (Tightening torque should be 0.5 to 0.7 N·m.)

Series CQM

Auto Switch Specifications

Auto Switch Common Specifications

Type	Reed switch	Solid state switch
Leakage current	None	3-wire: 100 μ A or less, 2-wire: 0.8 mA or less
Operating time	1.2 ms	1 ms or less ^{Note 2)}
Impact resistance	300 m/s ²	1000 m/s ²
Insulation resistance	50 M Ω or more at 500 VDC Mega (between lead wire and case)	
Withstand voltage	1500 VAC for 1 min. ^{Note 1)} (between lead wire and case)	1000 VAC for 1 min. (between lead wire and case)
Ambient temperature	-10 to 60°C	
Enclosure	IEC529 standard IP67, watertight (JIS C 0920)	

Note 1) Connector style (D-A73C/A80C) and A9/A9 □V style: 1000 V AC/min. (between lead wire and the case)

Note 2) Except for solid state switch with timer (F7NTL) and solid state switch for strong magnetic field resistant 2-color display (D-P5DWL).

Lead Wire Length

Lead wire length indication

(Example) **D-M9P****L**

Lead wire length

Nil	0.5 m
L	3 m
Z	5 m
N*	None

* Applicable for the connector style (D-□□C) only.

Note 1) Lead wire length Z: 5 m applicable auto switches

Reed switch: D-A73 (C) (H), A80C

Solid state switch: All types are produced upon receipt of order.

Note 2) The standard lead wire length of solid state switch with timer or with water tight 2-color display is 3 meters. (Not available 0.5 m)

Note 3) The standard lead wire length of solid state switch for strong magnetic fields resistant 2-color display is 3 m and 5 m.

Note 4) For solid state switches with flexible wire specification, add "61" at the end of the lead wire length.

(Example) **D-F9PVL-61**

Flexible specification

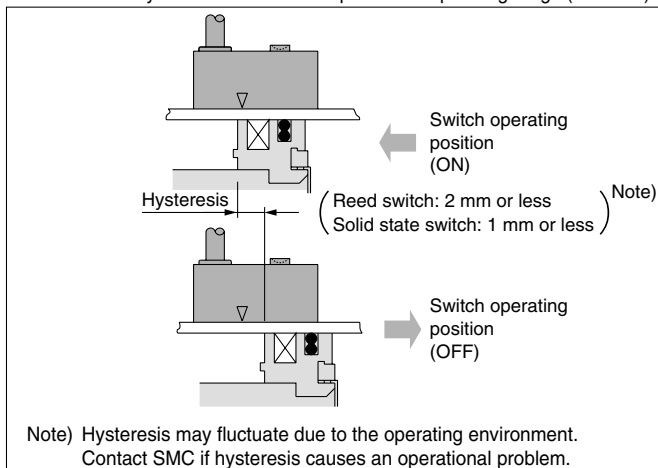
Part no. of lead wires with connectors

(applicable only for connector type)

Model	Lead wire length
D-LC05	0.5 m
D-LC30	3 m
D-LC50	5 m

Auto Switch Hysteresis

Hysteresis is the distance between the position at which piston movement operates an auto switch to the position at which reverse movement turns the switch off. This hysteresis is included in part of the operating range (one side).



Contact Protection Box/CD-P11, CD-P12

<Applicable switch type>

D-A9 and D-A9□V, D-A7□(H), (C) and D-A80□(H), (C) type switches do not have internal contact protection circuits.

① The operated load is an induction load.

② The length of wiring to the load is 5 m or more.

③ The load voltage is 100 VAC and 200 VAC.

A contact protection box should be used in any of the above situations. The lifetime of the contact may be shortened.

D-A72 (H) must be used with the contact protection box regardless of load styles and lead wire length.

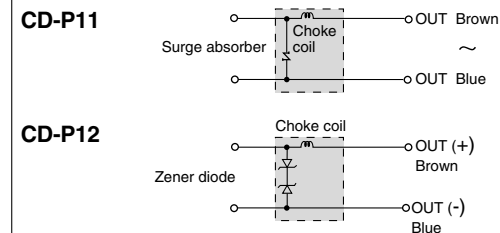
Specifications

Part No.	CD-P11		CD-P12
Load voltage	100 VAC	200 VAC	24 VDC
Max. load current	25 mA	12.5 mA	50 mA

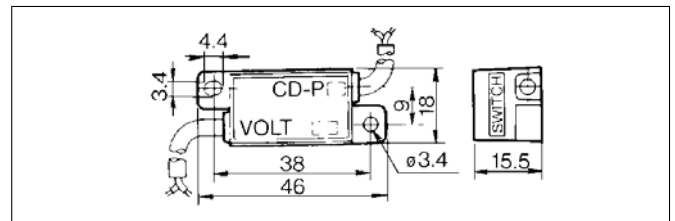
* Lead wire length — Switch connection side: 0.5 m
Load connection side: 0.5 m



Internal Circuit



Dimensions



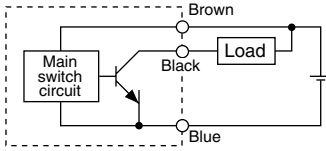
Contact Protection Box/Connection

To connect a switch unit to a contact protection box, connect the lead wire from the side of the contact protection box marked SWITCH to the lead wire coming out of the switch unit. The switch unit should be kept as close as possible to the contact protection box with a lead wire that is no more than 1 meter in length.

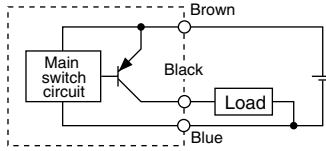
Series CQM Auto Switch Connections and Examples

Basic Wiring

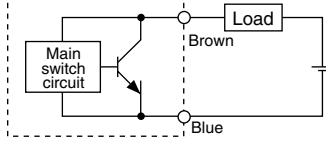
Solid state 3-wire, NPN



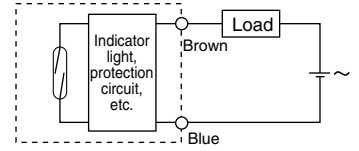
Solid state 3-wire, PNP



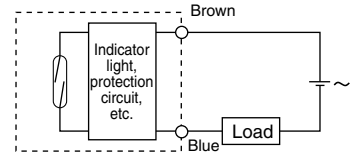
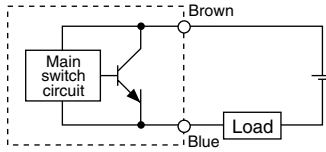
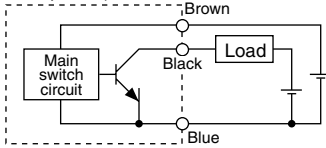
2-wire (Solid state)



2-wire (Reed)



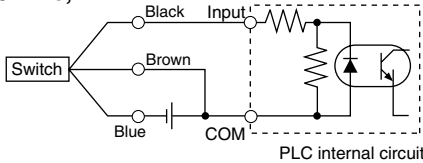
(When power supply for switch and load are separate.)



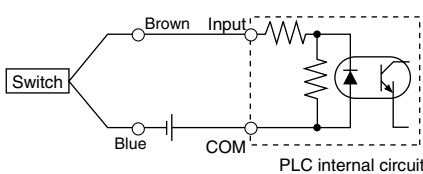
Examples of Connection to PLC

Sink input specifications

3-wire, NPN

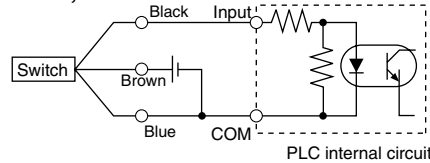


2-wire

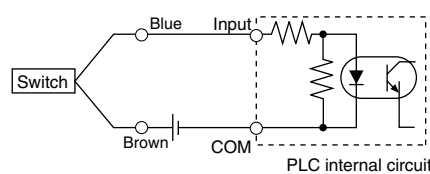


Source input specifications

3-wire, PNP



2-wire

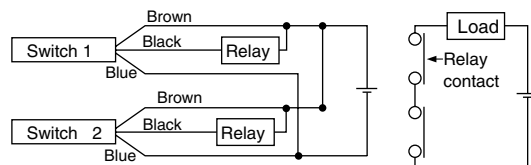


Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

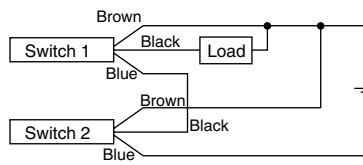
Connection Examples for AND (Series) and OR (Parallel)

3-wire

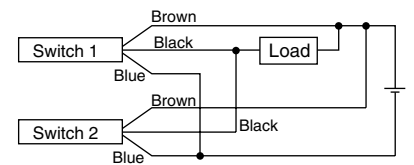
AND connection for NPN output (using relays)



AND connection for NPN output (performed with switches only)

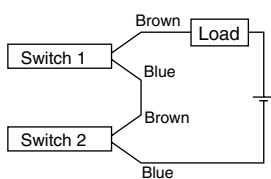


OR connection for NPN output



The indicator lights will light up when both switches are turned ON.

2-wire with 2 switches AND connection

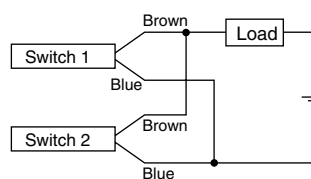


When two switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up if both of the switches are in the ON state.

$$\begin{aligned} \text{Load voltage at ON} &= \text{Power supply voltage} - \text{Residual voltage} \times 2 \text{ pcs.} \\ &= 24\text{V} - 4\text{V} \times 2 \text{ pcs.} \\ &= 16\text{V} \end{aligned}$$

Example: Power supply voltage is 24VDC
Voltage decline in switch is 4V

2-wire with 2 switches OR connection



(Solid state)
When two switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

(Reed)
Because there is no current leakage, the load voltage will not increase when turned OFF. However, depending on the number of switches in the ON state, the indicator lights may sometimes get dark or not light up, because of dispersion and reduction of the current flowing to the switches.

$$\begin{aligned} \text{Load voltage at OFF} &= \text{Leakage current} \times 2 \text{ pcs.} \times \text{Load impedance} \\ &= 1\text{mA} \times 2 \text{ pcs.} \times 3\text{k}\Omega \\ &= 6\text{V} \end{aligned}$$

Example: Load impedance is 3kΩ
Leakage current from switch is 1mA