

Rotary Clamp Cylinder: Heavy Duty Type

Series MK2

ø20, ø25, ø32, ø40, ø50, ø63

How to Order

MK2 B 20 - **10 R F** - **M9BW**

Rotary clamp cylinder
Heavy duty type

Mounting bracket

B	Through-hole/Both ends tapped common (Standard)
G	Head end flange

* Head end flange is equipped with a boss mounting. Be sure to specify body option "F".
* Mounting bracket is included, (but not assembled).

Bore size

20	20 mm	40	40 mm
25	25 mm	50	50 mm
32	32 mm	63	63 mm

Port thread type

Nil	M thread	ø20, ø25
	Rc	
TN	NPT	ø32 to ø63
TF	G	

Clamp stroke

Symbol	Clamp stroke	Applicable bore size
10	10 mm	ø20 to ø40
20	20 mm	ø20 to ø63
50	50 mm	ø50 to ø63

Number of auto switches

Nil	2 pcs.
S	1 pc.

Auto switch type

Nil	Without auto switch (Built-in magnet)
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* For applicable auto switch models, refer to the below table.

Body option

Nil	Standard (Female thread)
F	With boss on head end
N	With arm

* Arms are assembled at the time of shipment.

Rotary direction (Unclamp → Clamp)

R	Clockwise
L	Counterclockwise

Applicable Auto Switches

Refer to page 29 through to 39 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)					Pre-wired connector	Applicable load		
					DC	AC	Perpendicular	In-line		0.5 (Nil)	1 (M)	3 (L)	5 (Z)			None (N)	
								ø20 to ø32	ø40 to ø63								
Solid state switch		Grommet	No	3-wire (NPN)	24 V	5 V, 12 V		M9NV	M9N	●	—	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	—	●	○	—	○		
		Connector	No	2-wire				M9BV	M9B	●	—	●	○	—	○		
				J79C				—	●	—	●	●	—	—			
	Diagnostic indication (2-color indication)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N WV	M9N W	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)				M9P WV	M9P W	●	●	●	○	—	○		
				2-wire				M9B WV	M9B W	●	●	●	○	—	○		
				3-wire (NPN)				M9N AV	M9N A	○	○	●	○	—	○		
				3-wire (PNP)				M9P AV	M9P A	○	○	●	○	—	○		
				2-wire				M9B AV	M9B A	○	○	●	○	—	○		
Diagnostic output (2-color indication)	Grommet	Yes	4-wire	24 V	5 V, 12 V	—	—	F79F	●	—	●	○	—	○	IC circuit		
Magnetic field resistant (2-color indication)			2-wire (No polarity)				—	—	●	—	●	—	○				
Reed switch		Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V	—	A96V	A96	●	—	●	—	—	—	IC circuit	
				—				200 V	A72	A72H	●	—	●	—	—		
				12 V				100 V	A93V	A93	●	—	●	—	—		
				5 V, 12 V				100 V or less	A90V	A90	●	—	●	—	—		
		Connector	No	2-wire	24 V	5 V, 12 V	24 V or less	A73C	—	●	—	●	●	—	—	IC circuit	
				A80C				—	●	—	●	●	—	—			
				A79W				—	●	—	●	—	—	—	—		
				—				—	—	—	—	—	—	—	—		

* Lead wire length symbols: 0.5 m Nil (Example) M9NW
 1 m M (Example) M9NWM
 3 m L (Example) M9NWL
 5 m Z (Example) M9N WZ
 None N (Example) J79CN

* Solid state switches marked with "○" are produced upon receipt of order.
 * For D-P4DW, ø40 to ø63 are available.
 * Only D-P4DW type is assembled at the time of shipment.

* Since there are other applicable auto switches than listed, refer to page 18 for details.
 * For details about auto switches with pre-wired connector, refer to page "Best Pneumatics 2004" catalog.
 * When mounting models D-M9□(V), M9□W(V), M9□A(V), and A9□(V) with between ø32 and ø50 on sides other than the port side, please order a switch mounting bracket separately as per the instructions on page 17, and refer to cases CDQP2B32 to 100 in Information (04-E514) "Cylinder with Compact Auto Switch."
 * Auto switches are included, (but not assembled).

Rotary Clamp Cylinder: Heavy Duty Type *Series MK2*



Specifications

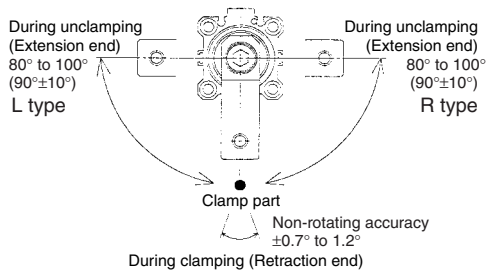
Bore size (mm)	20	25	32	40	50	63
Action	Double acting					
Rotation angle ^{Note 1)}	90° ±10°					
Rotary direction ^{Note 2)}	Clockwise, Counterclockwise					
Rotary stroke (mm)	9.5		15		19	
Clamp stroke (mm)	10, 20				20, 50	
Theoretical clamp force (N) ^{Note 3)}	100	185	300	525	825	1400
Fluid	Air					
Proof pressure	1.5 MPa					
Operating pressure range	0.1 to 1 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					
Piping port size	M5 x 0.8		Rc1/8, NPT1/8, G1/8		Rc1/4, NPT1/4, G1/4	
Mounting	Through-hole/Both ends tapped common, Head end flange					
Cushion	Rubber bumper					
Stroke length tolerance	+0.6 -0.4					
Piston speed	50 to 200 mm/s					
Non-rotating accuracy (Clamp part)	±1.2°		±0.9°		±0.7°	

Note 1) Refer to "Rotary Angle" figure.

Note 2) Direction of rotation viewed from the rod end when the piston rod is retracting.

Note 3) At 0.5 MPa.

Rotary Angle



Theoretical Output

Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (cm ²)	Operating pressure (MPa)			
				0.3	0.5	0.7	1.0
20	12	R	2	60.8	100	139	200
		H	3	90.2	149	208	298
25	12	R	3.7	112	185	258	370
		H	4.9	149	245	341	490
32	16	R	6	182	300	418	600
		H	8	243	400	557	800
40	16	R	10.5	319	525	731	1050
		H	12.5	380	625	870	1250
50	20	R	16.5	502	825	1149	1648
		H	19.6	596	980	1365	1961
63	20	R	28	851	1400	1950	2801
		H	31.2	948	1560	2172	3121

Note) Theoretical output (N) = Pressure (MPa) x Piston area (cm²) x 100

Operating direction
R: Rod end (Clamp)
H: Head end (Unclamp)

Option/Arm

Bore size (mm)	Part no.	Accessories
20	MK-A020	Clamp bolt, Hexagon socket head cap screw,
25		
32	MK-A032	Hexagon nut, Spring washer
40		
50		
63	MK-A050	

Weight/Through-hole Mounting

Unit: g

Clamp stroke (mm)	Bore size (mm)					
	20	25	32	40	50	63
10	260	295	353	635	—	—
20	300	335	555	680	1170	1620
50	—	—	—	—	1420	1890

Mounting Bracket/Flange

Bore size (mm)	Part no.	Accessories
20	MK2-F020	Centering location ring,
25	MK2-F025	
32	MK2-F032	Set pin, Bolt for cylinder body
40	MK2-F040	
50	MK2-F050	
63	MK2-F063	

Additional Weight

Unit: g

Bore size (mm)	20	25	32	40	50	63
With boss on head end	2	3	5	7	13	25
With arm	100	100	200	200	350	350
Head end flange (including mounting bolt)	133	153	166	198	345	531

Calculation: (Example) MK2G20-10RFN

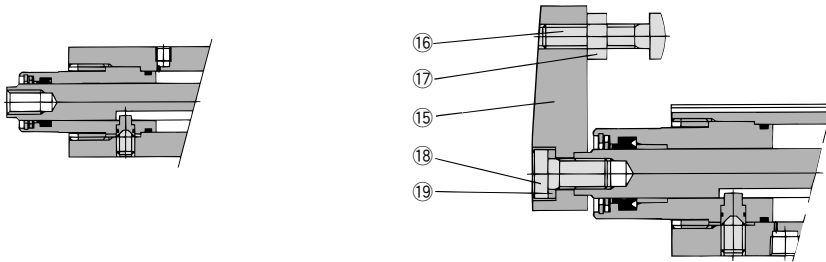
- Standard calculation: MK2B20-10R 260 g
 - Extra weight calculation: Head end flange 133 g
 - With boss on head end 2 g
 - With arm 100 g
- 495 g

Series MK2

Construction

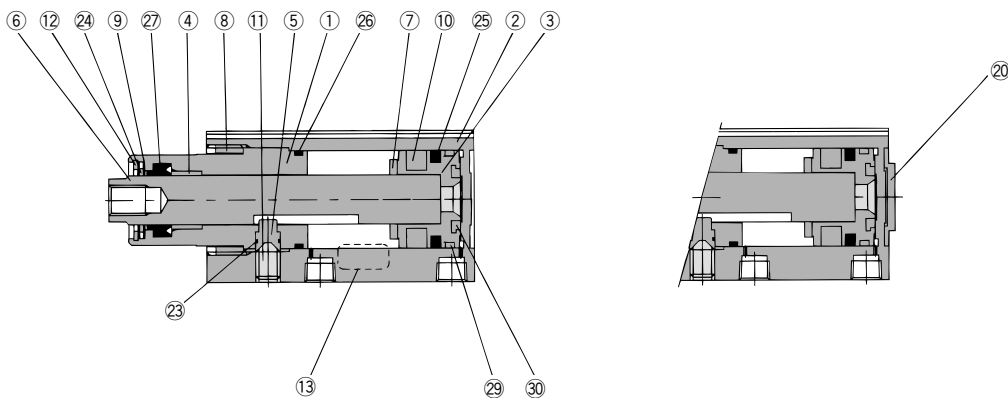
MK2□20, 25

With arm (N)



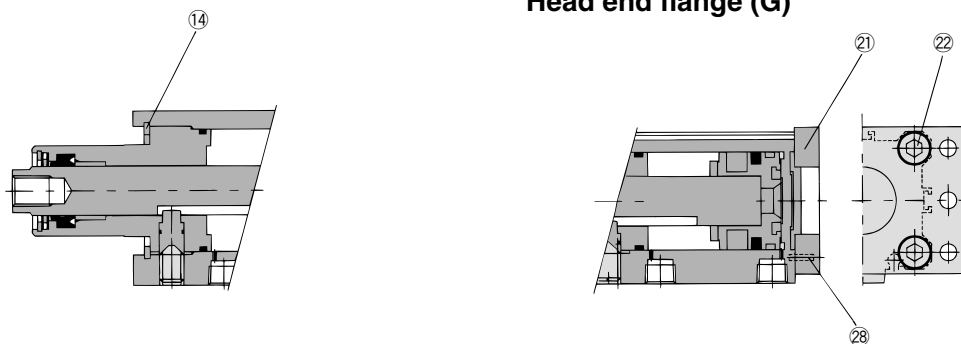
MK2□32

With boss on head end (F)



MK2□40 to 63

Head end flange (G)



Component Parts

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	
2	Cylinder tube	Aluminum alloy	
3	Piston	Aluminum alloy	
4	Bushing	Copper bearing material	ø32 to ø63 only
5	Guide pin	Stainless steel	Nitrided
6	Piston rod	Stainless steel	ø20, ø25 Nitrided
		Carbon steel	ø32 to ø63 Heated, Nickel plated
7	Bumper	Urethane	
8	Ring nut	Copper alloy	ø20 to ø32 only
9	Scraper pressure	Stainless steel	
10	Magnet	—	
11	Hexagon socket head set screw	Chromium molybdenum steel	Sharp end section: 90°
12	Round R-type retaining ring	Spring steel	
13	Name plate	Aluminum	
14	C-type retaining ring	Carbon tool steel	ø40 to ø63 only
15	Arm	Rolled steel	

Component Parts

No.	Description	Material	Note
16	Clamp bolt	Chromium molybdenum steel	
17	Hexagon nut	Rolled steel	
18	Hexagon socket head cap screw	Chromium molybdenum steel	
19	Spring washer	Hard steel	
20	Centering location ring	Aluminum alloy	
21	Flange	Rolled steel	
22	Hexagon socket head cap screw	Chromium molybdenum steel	Qty. ø20, ø25: 2 ø32 to ø63: 4
23	O-ring	NBR	
24	Coil scraper	Phosphor bronze	
25	Piston seal	NBR	
26	Gasket	NBR	
27	Rod seal	NBR	
28	Parallel pin	Stainless steel	
29	Wear ring	Resin	
30	Bumper B	Urethane	

Replacement Parts: Seal Kit

Bore size (mm)	20	25	32	40	50	63
Kit no.	Not able to disassemble			MK2-40-PS	MK2-50-PS	MK2-63-PS
Content	Set of nos. above 23 24 25 26 27					

* Seal kit includes 23 to 27. Order the seal kit, based on each bore size.

⚠️ Precautions

Be sure to read this before handling. Refer to the back of page 1 for Safety Instructions and "Precautions for Handling Pneumatic Devices" (M-03-E3A) for Common Precautions.

⚠️ Caution

Clamp Arm Mounting

- Use a clamp arm that is available as an option. To fabricate a clamp arm, make sure that the allowable bending moment and the inertial moment will be within the specified range. If a clamp arm that exceeds the specified value is installed, the internal mechanism in the cylinder could become damaged.

Ensuring Safety

- If one side of the piston is pressurized by supplying air with the clamp arm attached, the piston will move vertically while the clamp arm rotates. This operation could be hazardous to personnel, as their hands or feet could get caught by the clamp arm, or could lead to equipment damage. Therefore, it is important to secure as a danger zone a cylindrical area with the length of the clamp arm as its radius, and the stroke plus 20 mm as its height.

Installation and Adjustment/ Clamp Arm Removal and Reinstallation

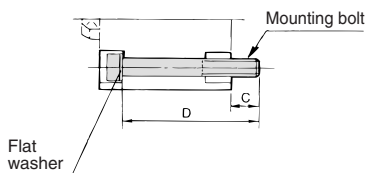
- During the removal or reinstallation of the clamp arm, make sure to use a wrench or a vise to secure the clamp arm before removing or tightening the bolt. This is to prevent the bolt tightening torque from being applied to the piston rod, which could damage the cylinder's internal mechanism.

Mounting Bolt for MK2B

Mounting: Mounting bolt for through-hole type is available.

Ordering: Add the word "MK2B" to the mounting bolt size.

Example) **M5 x 75 L (MK2B)**



Note) Be sure to use a flat washer to mount cylinders via through-holes.

Cylinder model	C	D	Mounting bolt size
MK2B20-10	8.5	75	M5 x 75 L
MK2B20-20		85	M5 x 85 L
MK2B25-10	10.5	80	M5 x 80 L
MK2B25-20		90	M5 x 90 L
MK2B32-10	10	90	M5 x 90 L
MK2B32-20		100	M5 x 100 L
MK2B40-10	6	80	M5 x 80 L
MK2B40-20		90	M5 x 90 L
MK2B50-20	10.5	105	M6 x 105 L
MK2B50-50	10.5	135	M6 x 135 L
MK2B63-20	9	105	M8 x 105 L
MK2B63-50		135	M8 x 135 L

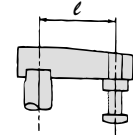
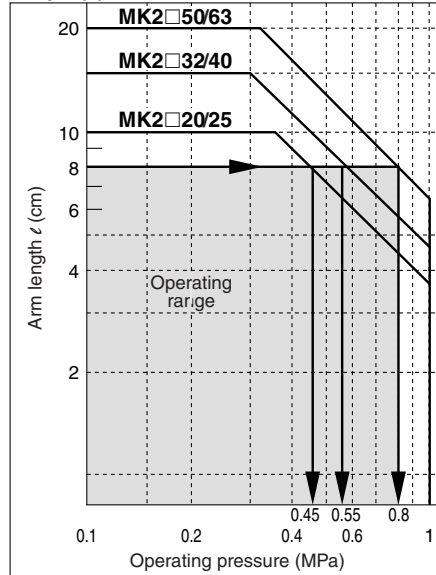
Precautions for Designing and Mounting Arms

When arms are to be made separately, their length and weight should be within the following range.

1. Allowable bending moment

Use the arm length and operating pressure within Graph (1) for allowable bending moment loaded piston rod.

Graph (1)

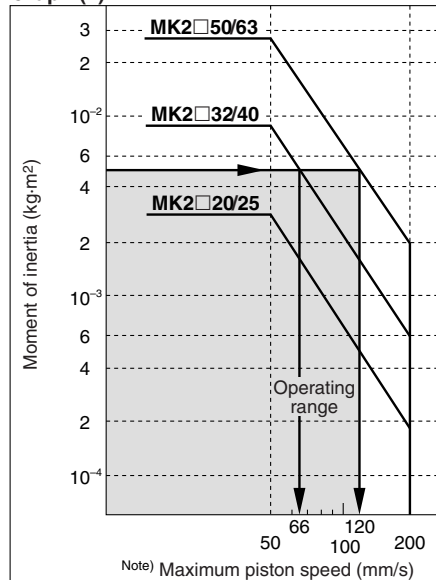


When arm length is 8 cm, pressure should be less than
 MK2□20/25: 0.45 MPa
 MK2□32/40: 0.55 MPa
 MK2□50/63: 0.8 MPa.

2. Moment of inertia

When the arm is long and heavy, damage of internal parts may be caused due to inertia. Use the inertia moment and cylinder speed within Graph (2) based on arm requirements.

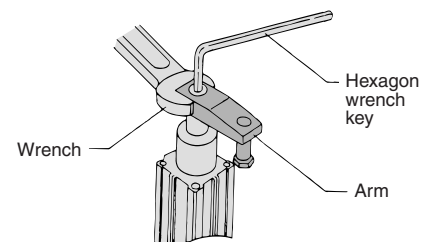
Graph (2)



When arm's moment of inertia is 5×10^{-3} kg·m², cylinder speed should be less than
 MK2□32/40: 66 mm/s
 MK2□50/63: 120 mm/s.
 For calculating moment of inertia, refer to front matter 1, 2, back page 8.

Note) Maximum piston speed is equivalent to approximately 1.6x the average piston speed. (Rough indication)

- To attach and detach the arm to and from the piston rod, fix the arm with a wrench or vise and then tighten the bolt. (If an excessive force is applied in the rotary direction, it may bring about the damage to the internal mechanism.) Refer to the following table for the tightening torque for mounting.

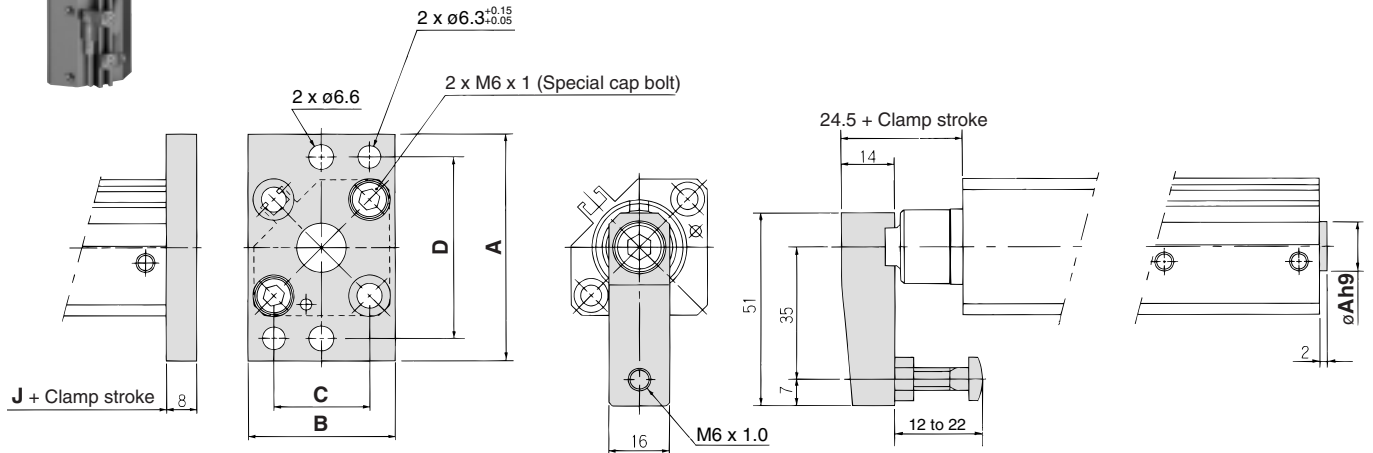


Bore size (mm)	Proper tightening torque (N·m)
20, 25	4 to 6
32, 40	8 to 10
50, 63	14 to 16

Series MK2



Dimensions: $\phi 20$, $\phi 25$



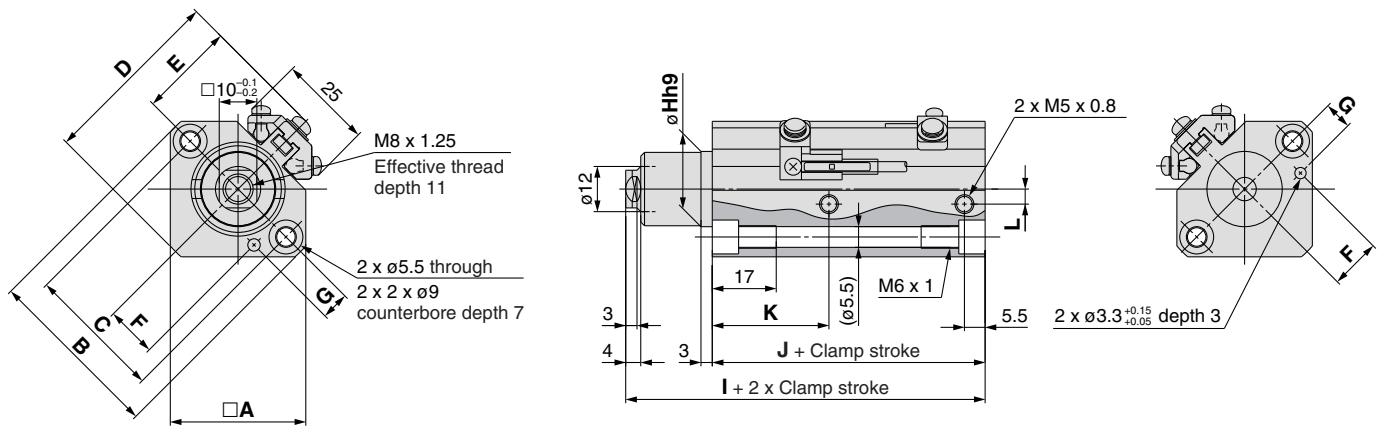
With arm

Head End Flange (mm)

Model	A	B	C	D
MK2G20	60	39	25.5 $^{+0.1}$	48 $^{+0.15}$
MK2G25	64	42	28 $^{+0.1}$	52 $^{+0.15}$

With Boss on Head End (mm)

Model	$\phi Ah9$
MK2□20-□□F	13 $^{0}_{-0.043}$
MK2□25-□□F	15 $^{0}_{-0.043}$



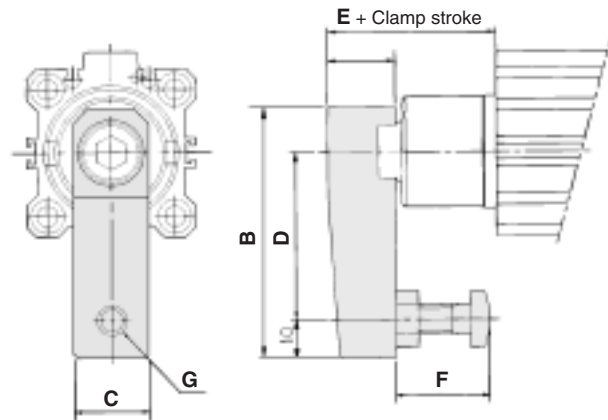
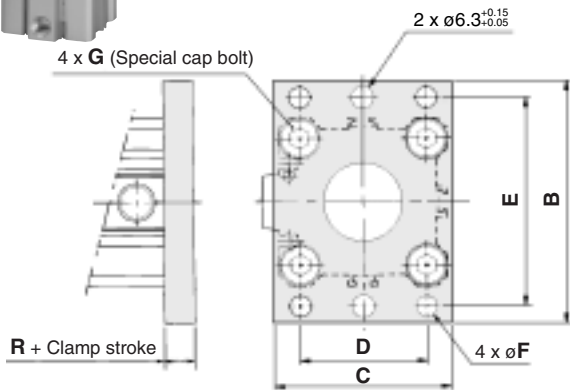
Through-hole/Both Ends Tapped Common (Standard) (mm)

Model	□A	B	C	D	E	F	G	$\phi Hh9$	I	J	K	L
MK2B20	36	46.8	36	49	25.5	13.5 $^{+0.15}$	7.5 $^{+0.15}$	20 $^{0}_{-0.052}$	75.5	62.5	31	4
MK2B25	40	52	40	54.5	28.5	16 $^{+0.15}$	8 $^{+0.15}$	23 $^{0}_{-0.052}$	78.5	65.5	32	5

Note) Dimension when the rod is extended is to be added to clamp stroke plus rotary stroke.



Dimensions: $\phi 32$, $\phi 40$, $\phi 50$, $\phi 63$



Head End Flange

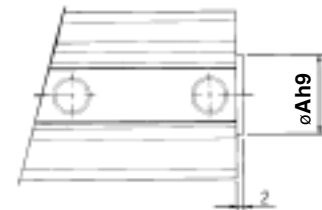
(mm)

Model	A	B	C	D	E	ϕF	G
MK2G32	8	65	48	34 $_{\pm 0.1}$	56 $_{\pm 0.15}$	5.5	M6 x 1.0
MK2G40	8	72	54	40 $_{\pm 0.1}$	62 $_{\pm 0.15}$	5.5	M6 x 1.0
MK2G50	9	89	67	50 $_{\pm 0.1}$	76 $_{\pm 0.15}$	6.6	M8 x 1.25
MK2G63	9	108	80	60 $_{\pm 0.1}$	92 $_{\pm 0.15}$	9	M10 x 1.5

With Arm

(mm)

Model	A	B	C	D	E	F	G
MK2□32-□□N	18	67	20	45	39	15 to 25	M8 x 1.25
MK2□40-□□N	18	67	20	45	46		M8 x 1.25
MK2□50-□□N	22	88	22	65	58	30 to 40	M10 x 1.5
MK2□63-□□N	22	88	22	65	57.5		M10 x 1.5

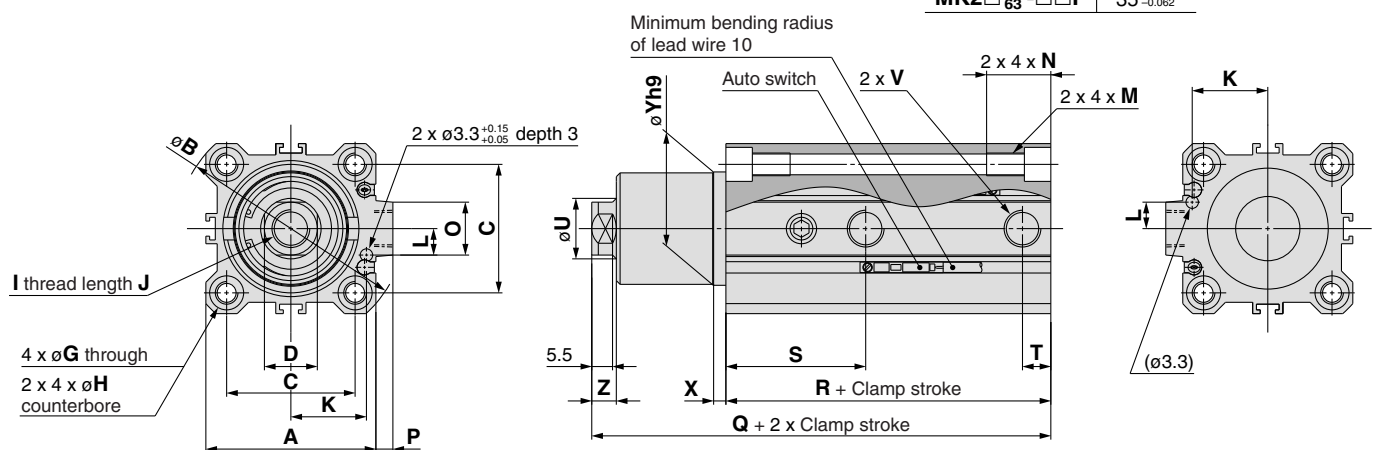


With Boss on Head End

(mm)

Model	$\phi Ah9$
MK2□32-□□F	21 $_{-0.052}^0$
MK2□40-□□F	28 $_{-0.052}^0$
MK2□$\frac{50}{63}$-□□F	35 $_{-0.062}^0$

Note) The below figures illustrate auto switches D-M9□, M9□W, M9□A, and A9□.



Through-hole/Both Ends Tapped Common (Standard)

(mm)

Model	□A	B	C	D	E	F	ϕG	ϕH	I	J	K	L	M	N	O	P	Q	R	S	T	ϕU	V			X	$\phi Yh9$	Z
																						—	TN	TF			
MK2B32	45	60	34	14 $_{-0.2}^{-0.1}$	54	31.5	5.5	9 depth 7	M10 x 1.5	12	20 $_{\pm 0.15}$	7 $_{\pm 0.15}$	M6 x 1.0	17	14	4.5	101.5	76	37	7.5	16	Rc1/8	NPT1/8	G1/8	3	30 $_{-0.062}^0$	6.5
MK2B40	52	69	40	14 $_{-0.2}^{-0.1}$	61	35	5.5	9 depth 7	M10 x 1.5	12	24 $_{\pm 0.15}$	7 $_{\pm 0.15}$	M6 x 1.0	17	14	5	102.5	70	29.5	8	16	Rc1/8	NPT1/8	G1/8	3	30 $_{-0.062}^0$	6.5
MK2B50	64	86	50	17 $_{-0.2}^{-0.1}$	73	41	6.6	11 depth 8	M12 x 1.75	15	30 $_{\pm 0.15}$	8 $_{\pm 0.15}$	M8 x 1.25	22	19	7	122	81.5	34	10.5	20	Rc1/4	NPT1/4	G1/4	3.5	37 $_{-0.062}^0$	7.5
MK2B63	77	103	60	17 $_{-0.2}^{-0.1}$	86	47.5	9	14 depth 10.5	M12 x 1.75	15	35 $_{\pm 0.15}$	9 $_{\pm 0.15}$	M10 x 1.5	28.5	19	7	125	85	35	10.5	20	Rc1/4	NPT1/4	G1/4	3.5	48 $_{-0.062}^0$	7.5

- Note 1) The cylinder rod is retracted.
- Note 2) Rotary direction is viewed from the rod end when the piston rod is retracting.
- Note 3) Dimension when the rod is extended is to be added to clamp stroke plus rotary stroke.

Series MK/MK2

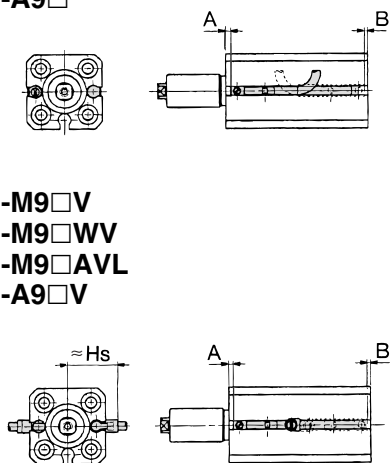
Auto Switch Proper Mounting Position (Detection at Stroke End) and its Mounting Height

Applicable Cylinders: MK Series

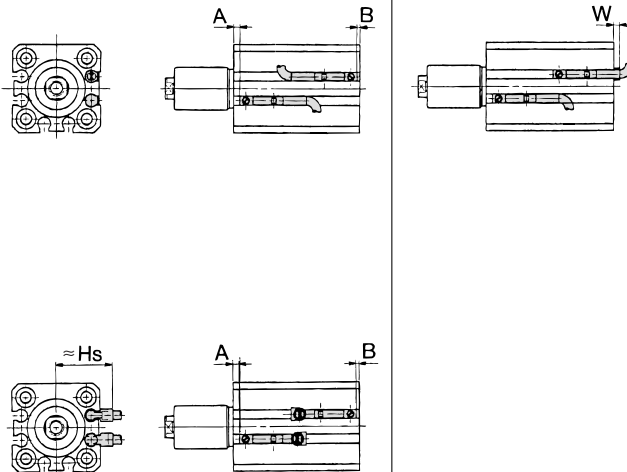
ø12

D-M9□
D-M9□W
D-M9□AL
D-A9□

D-M9□V
D-M9□WV
D-M9□AVL
D-A9□V



ø16



Auto Switch Proper Mounting Position

(mm)

Auto switch model	D-M9□/M9□V D-M9□W/M9□WV D-M9□AL/M9□AVL			D-A9□ D-A9□V		
	A	B	W	A	B	W
Bore size 12	11.5	4.5	5.5	7.5	0	1.5 (4)
Bore size 16	12	4	6	8	0	2 (4.5)

Note 1) (): D-A93

Note 2) Size W is suitable for mounting models D-M9□, D-M9□W, D-M9□AL, and D-A9□.

Note 3) When setting an auto switch, confirm the operation and adjust its mounting position.

Auto Switch Mounting Height

(mm)

Auto switch model	D-M9□V D-M9□WV D-M9□AVL		D-A9□V
	Hs	Hs	Hs
Bore size 12	19	17	17
Bore size 16	21	19	19

Auto Switch Proper Mounting Position (Detection at Stroke End) and its Mounting Height

Applicable Cylinders: MK, MK2 Series

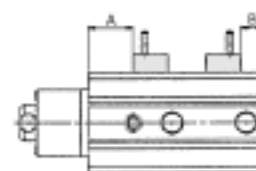
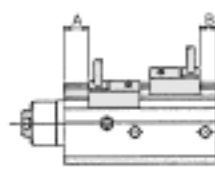
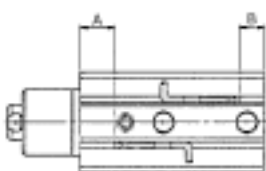
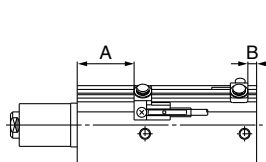
D-M9□
D-M9□V
D-M9□W
D-M9□WV
D-M9□AL
D-M9□AVL
D-A9□
D-A9□V

ø20, ø25

ø32 to ø63

ø20, ø25

ø32 to ø63



Auto Switch Proper Mounting Position

Applicable Cylinders: MK Series

Auto switch model	D-M9□ D-M9□V D-M9□WV D-M9□W D-M9□AL D-M9□AVL		D-A9□ D-A9□V		D-A73 D-A80		D-A72/A7□H D-A80H/A73C D-A80C/F7□/F79F D-J79/F7□V/J79C D-F7BA□/F7□W D-J79W/F7□WV		D-F7NTL		D-A79W		D-P4DWL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Bore size 20	30	7.5	26	3.5	28.5	6	29	6.5	34	11.5	26	3.5	—	—
25	30.5	8	26.5	4	29	6.5	29.5	7	34.5	12	26.5	4	—	—
32	35.5	9	31.5	5	32.5	6	33	6.5	38	11.5	30	3.5	—	—
40	26.5	11.5	22.5	7.5	23.5	8.5	24	9	29	14	21	6	19.5	4.5
50	31	14.5	27	10.5	28	11.5	28.5	12	33.5	17	25.5	9	24	7.5
63	31.5	17.5	27.5	13.5	28.5	14.5	29	15	34	20	26	12	24.5	10.5

Note) When setting an auto switch, confirm the operation and adjust its mounting position.

Auto Switch Proper Mounting Position

Applicable Cylinders: MK2 Series

Auto switch model	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□AL D-M9□AVL		D-A9□ D-A9□V		D-A73 D-A80		D-A72/A7□H D-A80H/A73C D-A80C/F7□/F79F D-J79/F7□V/J79C D-F7BA□/F7□W D-J79W/F7□WV		D-F7NTL		D-A79W		D-P4DWL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Bore size 20	30	8	26	4	28.5	6.5	29	7	34	12	26	4	—	—
25	31	10	27	6	29.5	8.5	30	9	34.5	14	27	6	—	—
32	36	13	32	9	33	10	33.5	10.5	38	15.5	30.5	7.5	—	—
40	27	16	23	12	24	13	24.5	13.5	29	18.5	21.5	10.5	20	9
50	31	19.5	27	15.5	28	16.5	28.5	17	33.5	22	25.5	14	24	12.5
63	31.5	22.5	27.5	18.5	28.5	19.5	29	20	34	25	26	17	24.5	15.5

Note) When setting an auto switch, confirm the operation and adjust its mounting position.

Operating Range

Auto switch model	Bore size (mm)							
	12	16	20	25	32	40	50	63
D-M9□/M9□V	2	2.5	3.5	3.5	4	4	4	5
D-M9□W/M9□WV D-M9□AL/M9□AVL	3	4	4.5	5	6.5	5.5	6.5	6.5
D-A9□/A9□V	6	7.5	10	10	9.5	9.5	9.5	11.5
D-F7□/J79 D-F7□V/J79C D-F7□W/F7□WV D-J79W D-F79F/F7BAL D-F7BAVL/F7NTL	—	—	5.5	5	6	6	6	6.5
D-A7□/A80 D-A7H/A80H D-A73C/A80C	—	—	12	12	12	11	10	12
D-A79W	—	—	13	13	13	14	14	16
D-P4DWL	—	—	—	—	—	5	5	5

* Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion.)
There may be the case it will vary substantially depending on an ambient environment.
* Figures for models D-M9□(V), M9□W(V), M9□A(V)L, and A9□(V) with ø12 or ø16 (MK), or ø32 or more (MK, MK2), indicate the operating range when using the existing switch-mounting groove, without using switch mounting bracket BQ2-012.

Series MK/MK2

Auto Switch Mounting Bracket/Part No.

Auto switch mounting surface	Bore size (mm)			
	ø12, ø16	ø20, ø25	ø32, ø40, ø50	ø63
Auto switch model	A, B, C side	Only on auto switch mounting rail side	Port side	A, B, C side
	No auto switch mounting bracket necessary.	①BQ-1 ②BQ-012 Two types of auto switch mounting bracket are used as a set. 	No auto switch mounting bracket necessary.	①BQ-2 ②BQ-012 Two types of auto switch mounting bracket are used as a set.
D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□AL D-M9□AVL D-A9□ D-A9□V				

Note 1) For ø32 to ø50 of each cylinder series, when mounting compact auto switches on one of the three sides other than the port side (above A, B, C side) in the figure above, a separate auto switch mounting bracket is necessary as shown in the table above, so please order one separately from the cylinder.

(The same is true when mounting compact auto switches with the auto switch mounting rail, not using the compact auto switch mounting groove, for diameters ø63 to ø100.)

Example

MKA32-10R-M9BW 1 unit

BQ-2 2 pcs.

BQ-012 2 pcs.

Note 2) When the cylinder is shipped, an auto switch mounting bracket and auto switch are included in the shipment.

Auto switch model	Bore size (mm)					
	20	25	32	40	50	63
D-F7□/J79 D-F7□V D-J79C D-F7□W/J79W D-F7□WV D-F7BAL/F7BAVL D-F79F/F7NTL D-A7□/A80 D-A73C/A80C D-A7□H/A80H D-A79W	BQ-1		BQ-2			
D-P4DWL	—		BQP1-050			

Note) When the cylinder is shipped, an auto switch mounting bracket and auto switch are included in the shipment. However, ø40 to ø63 with the D-P4DWL are assembled at the time of shipment.

[Mounting screws set made of stainless steel]

The set of stainless steel mounting screws (with nuts) described below is available and can be used depending on the operating environment. (Please order the auto switch spacer BQ-2, since it is not included.)

The "D-F7BAL/F7BAVL" switch is set on the cylinder with the stainless steel screws above when shipped.

When only a switch is shipped independently, "BBA2" screw set is attached.

Detailed Contents of Stainless Steel Mounting Screw Set

Part no.	Content			Applicable auto switch mounting bracket part no.	Applicable auto switch
	Description	Size	Qty.		
BBA2	Auto switch mounting screw	M3 x 0.5 x 8 ℓ	1	BQ-1	D-A7 D-A8 D-F7 D-J7
		M3 x 0.5 x 10 ℓ	1	BQ-2	
	Auto switch mounting nut (Square nut)	M3 x 0.5	1	BQ-1	
	Auto switch mounting nut (Convex type)	M3 x 0.5	1	BQ-2	

Note) When using BQ-1, BBA2 may be used by itself.

When using BQ-2, BQ-2 and BBA2 should be used together as a set, and used in combination with the spacer (black resin material) and stainless steel screws.

Auto Switch Mounting Bracket Weight

Mounting bracket part no.	Weight (g)
BQ-1	1.5
BQ-2	1.5
BQ2-012	5
BQP1-050	16

Other than the models listed in “How to Order”, the following auto switches are applicable.
For detailed specifications, refer to “Best Pneumatics 2004” Vol. 10 catalog.

Type	Model	Electrical entry	Features
Solid state switch	D-F7NV, F7PV, F7BV	Grommet (Perpendicular)	—
	D-F7NWV, F7BWV		Diagnostic indication (2-color indication)
	D-F7BAVL		Water resistant
	D-F79, F7P, J79	Grommet (In-line)	—
	D-F79W, F7PW, J79W		Diagnostic indication (2-color indication)
	D-F7BAL		Water resistant (2-color indication)
	D-F7NTL		With timer
D-P4DWL		Magnetic field resistant	
Reed switch	D-A73	Grommet (Perpendicular)	—
	D-A80		Without indicator light
	D-A73H, A76H	Grommet (In-line)	—
	D-A80H		Without indicator light

* With pre-wired connector is available for solid state switches, too. For details, refer to “Best Pneumatics 2004” Vol. 10 catalog.

* Normally closed (NC = b contact), solid state switch (D-F9G/F9H type) are also available. For details, refer to “Best Pneumatics 2004” Vol. 10 catalog.

* The D-A7, A8, F7, and J7 cannot be mounted for $\phi 12$ and $\phi 16$ models.

Series MK/MK2/MK2T

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 *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 minute (between lead wire and case) *1)	1000 VAC for 1 minute (between lead wire and case)
Ambient temperature	-10 to 60°C	
Enclosure	IEC60529 standard IP67, JIS C 0920 waterproof construction	
Standards	Conforming to CE standards	

*1) For connector type D-A73C and A80C, 1000 VAC for 1 minute (between lead wire and case).

*2) Except solid state switch with timer D-F7NLT, and magnetic field resistant 2-color indication solid state switch D-P4DWL.

Lead Wire Length

Lead wire length indication

(Example) **D-M9BW** **L**

Lead wire length

Nil	0.5 m
M	1 m
L	3 m
Z	5 m

Note 1) Applicable auto switch with 5 m lead wire "Z"

Solid state switch: Manufactured upon receipt of order as standard.

Note 2) To designate solid state switch with flexible specifications, add "-61" after the lead wire length. Flexible cable is used for the D-M9□(V), D-M9□W(V), D-M9□A(V), D-M9□A(V) as standard. There is no need to place the suffix -61 to the end of part number.

(Example) **D-F79F-61**

Flexible specification

Note 3) 1 m (M): D-M9□W, D-M9□A(V)

Lead Wire Part No. with Connector (applicable to connector type only)

Model	Lead wire length	Standard/Flexible
D-LC05	0.5 m	Standard
D-LC30	3.0 m	Standard
D-LC50	5.0 m	Standard

Contact Protection Box: CD-P11/CD-P12

<Applicable switch model>

D-A9/A9□V, A7□(H)(C), A80(H)(C), A79W type

The above auto switch type does not have a built-in contact protection circuit.

① Where the operation load is an inductive load.

② Where the wiring length to load is greater than 5 m.

③ Where the load voltage is 100/200 VAC.

Therefore, use a contact protection box with the switch for any of the above cases:

The contact life may be shortened (due to permanent energizing conditions).

④ Where the load voltage is 110 VAC.

When the load voltage is increased by more than 10% to the rating of applicable auto switches (except D-A73C/A80C/A79W) above, use a contact protection box (CD-P11) to reduce the upper limit of the load current by 10% so that it can be set within the range of the load current range, 110 VAC.

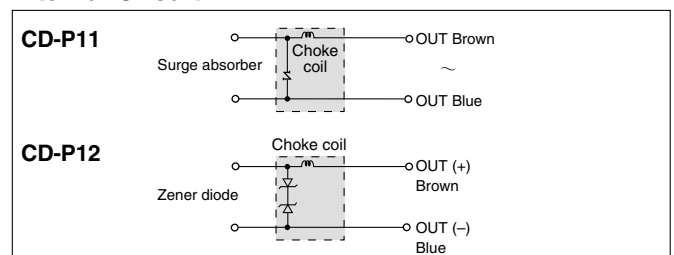
Specifications

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

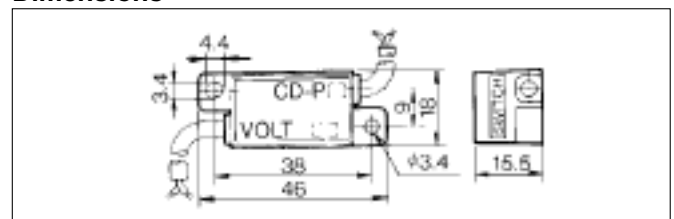
* Lead wire length — Switch connection side 0.5 m
Load connection side 0.5 m



Internal Circuit



Dimensions



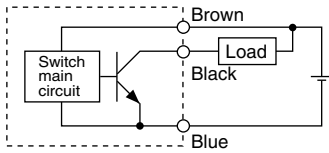
Connection

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. Keep the switch as close as possible to the contact protection box, with a lead wire length of no more than 1 meter.

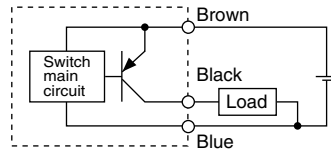
Auto Switch Connections and Examples

Basic Wiring

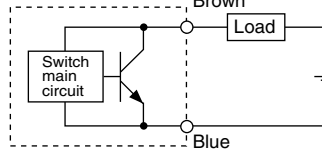
Solid state 3-wire, NPN



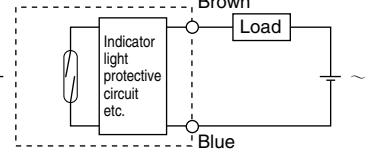
Solid state 3-wire, PNP



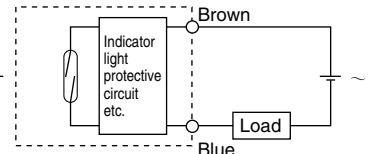
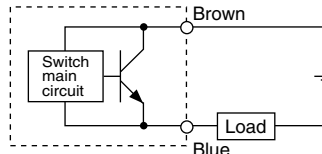
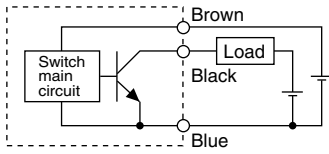
2-wire (Solid state)



2-wire (Reed)

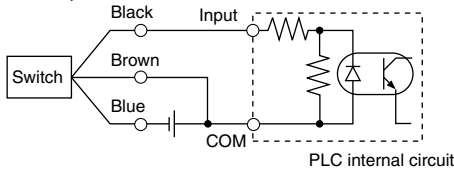


(Power supplies for switch and load are separate.)

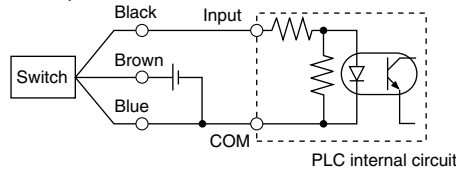


Example of Connection to PLC (Programmable Logic Controller)

• Sink input specification 3-wire, NPN

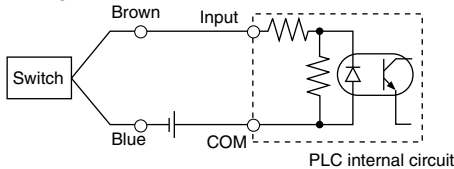


• Source input specification 3-wire, PNP

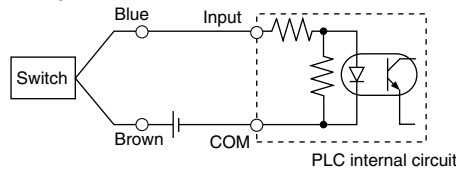


Connect according to the applicable PLC input specifications, since the connection method will vary depending on the PLC input specifications.

2-wire



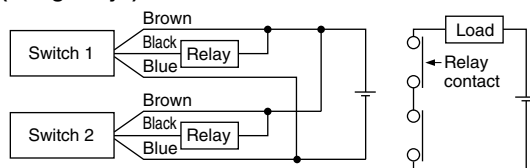
2-wire



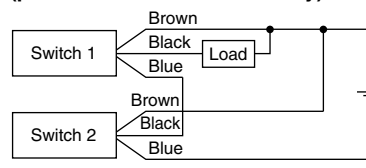
Example of AND (Serial) and OR (Parallel) Connection

• 3-wire

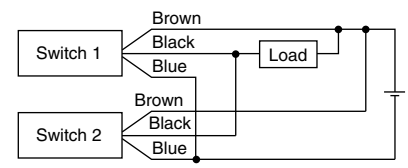
AND connection for NPN output (using relays)



AND connection for NPN output (performed with switches only)

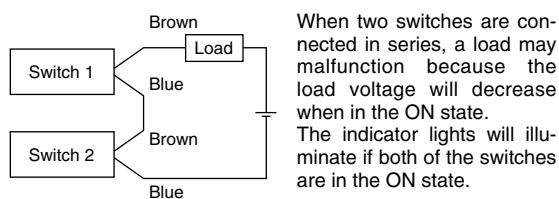


OR connection for NPN output



The indicator lights will illuminate when both switches are turned ON.

2-wire with 2-switch AND connection

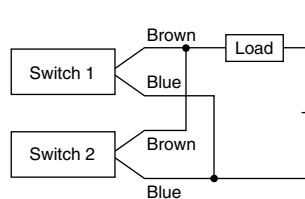


When two switches are connected in series, a load may malfunction because the load voltage will decrease when in the ON state. The indicator lights will illuminate if both of the switches are in the ON state.

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

Example: Power supply is 24 VDC.
Internal voltage drop in switch is 4 V.

2-wire with 2-switch OR connection



(Solid state)

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

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

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

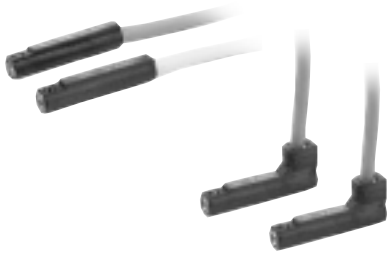
(Reed)

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 dim or not light because of the dispersion and reduction of the current flowing to the switches.

Reed Switch: Direct Mounting Style

D-A90(V)/D-A93(V)/D-A96(V)

Grommet



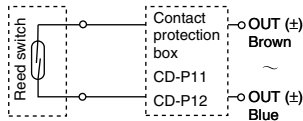
Caution

Precautions

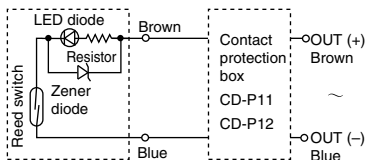
Fix the switch with the existing screw installed on the switch body. The switch may be damaged if a screw other than the one supplied is used.

Auto Switch Internal Circuit

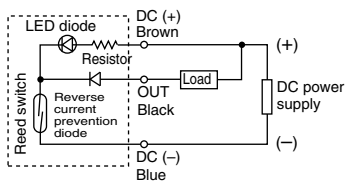
D-A90(V)



D-A93(V)



D-A96(V)



- Note) ① In a case where the operation load is an inductive load.
 ② In a case where the wiring load is greater than 5 m.
 ③ In a case where the load voltage is 100 VAC.

Use the auto switch with a contact protection box in any of the above mentioned cases. (For details about the contact protection box, refer to page 27.)

Auto Switch Specifications

PLC: Programmable Logic Controller

D-A90(V) (Without indicator light)						
Auto switch model	D-A90	D-A90V	D-A90	D-A90V	D-A90	D-A90V
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Applicable load	IC circuit, Relay, PLC					
Load voltage	24 VAC/DC or less		48 VAC/DC or less		100 VAC/DC or less	
Maximum load current	50 mA		40 mA		20 mA	
Contact protection circuit	None					
Internal resistance	1 Ω or less (including lead wire length of 3 m)					
Standards	Conforming to CE standards					
D-A93(V)/D-A96(V) (With indicator light)						
Auto switch model	D-A93	D-A93V	D-A93	D-A93V	D-A96	D-A96V
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Applicable load	Relay, PLC				IC circuit	
Load voltage	24 VDC		100 VAC		4 to 8 VDC	
Load current range and max. load current	5 to 40 mA		5 to 20 mA		20 mA	
Contact protection circuit	None					
Internal voltage drop	D-A93 — 2.4 V or less (to 20 mA)/3 V or less (to 40 mA) D-A93V — 2.7 V or less				0.8 V or less	
Indicator light	Red LED illuminates when turned ON.					
Standards	Conforming to CE standards					

Lead wires

D-A90(V)/D-A93(V) — Oilproof heavy-duty vinyl cable: $\phi 2.7$, 0.18 mm² x 2 cores (Brown, Blue), 0.5 m
 D-A96(V) — Oilproof heavy-duty vinyl cable: $\phi 2.7$, 0.15 mm² x 3 cores (Brown, Black, Blue), 0.5 m

Note 1) Refer to page 27 for reed switch common specifications.

Note 2) Refer to page 27 for lead wire lengths.

Weight

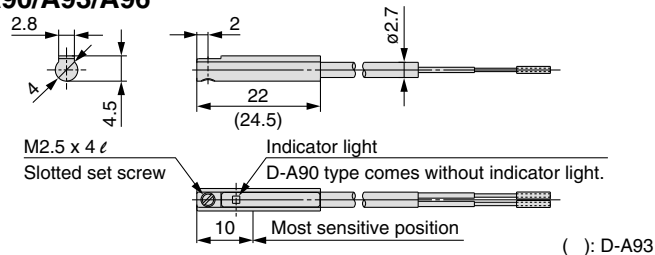
Unit: g

Auto switch model	D-A90(V)	D-A93(V)	D-A96(V)
Lead wire length (m)	0.5	6	8
	3	30	41

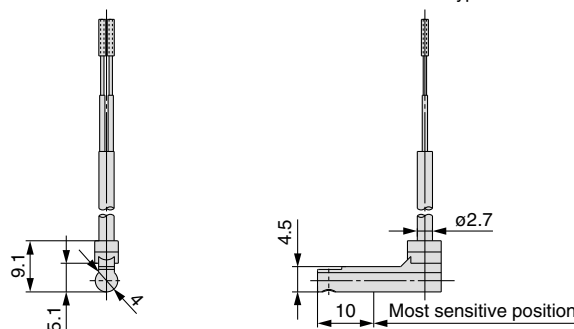
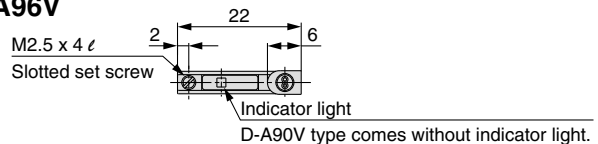
Dimensions

Unit: mm

D-A90/A93/A96



D-A90V/A93V/A96V



Reed Switch: Rail Mounting Style D-A72



Grommet
Electrical entry direction: Perpendicular



Auto Switch Specifications

PLC: Programmable Logic Controller

D-A72 (With indicator light)	
Auto switch model	D-A72
Applicable load	Relay, PLC
Load voltage	200 VAC
Load current range ^{Note 3)}	5 to 10 mA
Contact protection circuit	None
Internal resistance	2.4 V or less
Indicator light	Red LED illuminates when turned ON.
Standards	Conforming to CE standards

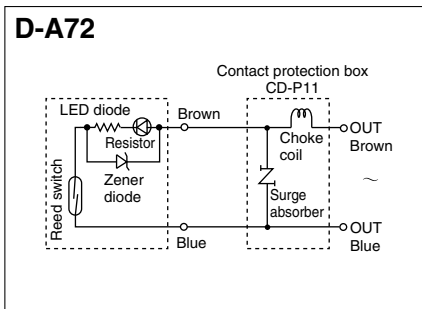
● Lead wires — Oilproof heavy-duty vinyl cable: $\phi 3.4$, $0.2 \text{ mm}^2 \times 2$ cores (Brown, Blue), 0.5 m
 Note 1) Refer to page 27 for reed switch common specifications.

Note 2) Refer to page 27 for lead wire lengths.

Note 3) Under 5 mA, the strength of the indicator light is poor. In some cases, visibility of the indicator light will not be possible where the output signal is less than 2.5 mA. However, there is no problem in terms of contact output, when an output signal exceeds 1 mA or more.

Auto Switch Internal Circuit

D-A72



Note) For D-A72, be sure to use the contact protection box. (For details about the contact protection box, refer to page 27).

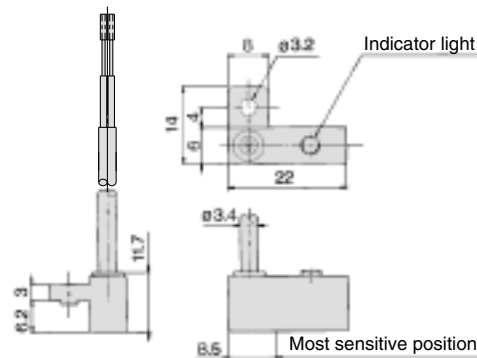
Weight

Unit: g

Auto switch model	D-A72	
Lead wire length (m)	0.5	10
	3	47
	5	—

Dimensions

Unit: mm



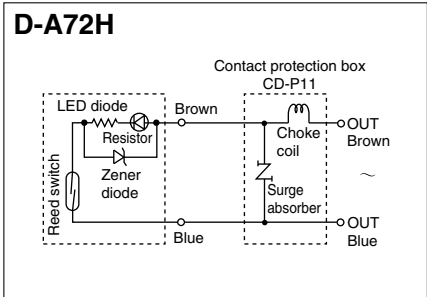
Reed Switch: Rail Mounting Style D-A72H



Grommet
Electrical entry direction: In-line



Auto Switch Internal Circuit



Note) For D-A72H, be sure to use the contact protection box. (For details about the contact protection box, refer to page 27.)

Auto Switch Specifications

PLC: Programmable Logic Controller

D-A72H (With indicator light)	
Auto switch model	D-A72H
Applicable load	Relay, PLC
Load voltage	200 VAC
Maximum load current and Load current range ^{Note 3)}	5 to 10 mA
Contact protection circuit	None
Internal resistance	2.4 V or less
Indicator light	Red LED illuminates when turned ON.
Standards	Conforming to CE standards

• Lead wires — Oilproof heavy-duty vinyl cable: 0.2 mm² x 2 cores (Brown, Blue), 0.5 m

Note 1) Refer to page 27 for reed switch common specifications.

Note 2) Refer to page 27 for lead wire lengths.

Note 3) Under 5 mA, the strength of the indicator light is poor. In some cases, visibility of the indicator light will not be possible where the output signal is less than 2.5 mA. However, there is no problem in terms of contact output, when an output signal exceeds 1 mA or more.

Weight

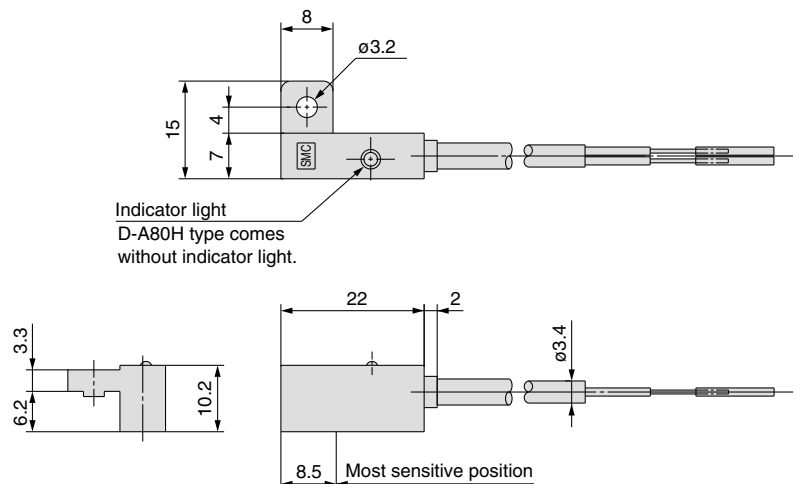
Unit: g

Auto switch model	D-A72H	
Lead wire length (m)	0.5	10
	3	47
	5	—

Dimensions

Unit: mm

D-A7□H/A80H



Reed Switch: Rail Mounting Style D-A73C/D-A80C



Connector



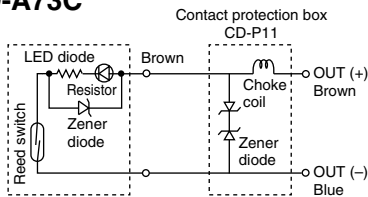
Caution

Precautions

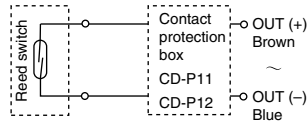
1. Confirm that the connector is appropriately tightened. If tightened insufficiently, the waterproof performance will deteriorate.
2. For how to handle a connector, refer to the below figures.

Auto Switch Internal Circuit

D-A73C



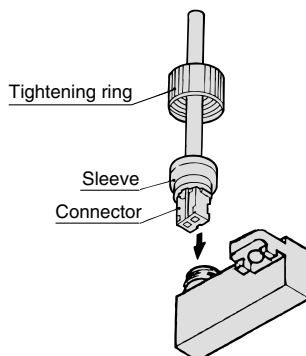
D-A80C



- Note) ① In a case where the operation load is an inductive load.
② In a case where the wiring load is greater than 5 m.

Use the auto switch with a contact protection box in any of the above mentioned cases. (For details about the contact protection box, refer to page 27.)

How to Insert the Connector



Turn the connector so it faces in the direction shown in the figure, and after inserting it until the sleeve hits the auto switch, screw on the tightening ring. (Do not screw it on using pliers or other tools.)

Auto Switch Specifications

PLC: Programmable Logic Controller

D-A73C (With indicator light)	
Auto switch model	D-A73C
Applicable load	Relay, PLC
Load voltage	24 VDC
Load voltage ^{Note 4)}	5 to 40 mA
Contact protection circuit	None
Internal resistance	2.4 V or less
Indicator light	Red LED illuminates when turned ON.
Standards	Conforming to CE standards
D-A80C (Without indicator light)	
Auto switch model	D-A80C
Applicable load	Relay, IC circuit, PLC
Load voltage	24 VAC/DC
Maximum load current	50 mA
Contact protection circuit	None
Internal resistance	1 Ω or less (including lead wire length of 3 m)
Standards	Conforming to CE standards

- Lead wires — Oilproof heavy-duty vinyl cable: 3.4 mm² x 2 cores (Brown, Blue), 0.5 m

Note 1) Refer to page 27 for reed switch common specifications.

Note 2) Refer to page 27 for lead wire lengths.

Note 3) Lead wire with connector may be shipped attached to the switch.

Note 4) Under 5 mA, the strength of the indicator light is poor. In some cases, visibility of the indicator light will not be possible where the output signal is less than 2.5 mA. However, there is no problem in terms of contact output, when an output signal exceeds 1 mA or more.

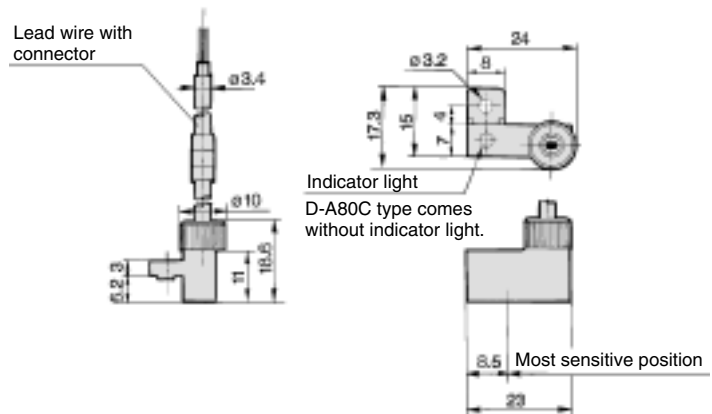
Weight

Unit: g

Auto switch model	D-A73C	D-A80C
Lead wire length (m)	0.5	12
	3	54
	5	84

Dimensions

Unit: mm



2-Color Indication Solid State Switch: Rail Mounting Style D-A79W

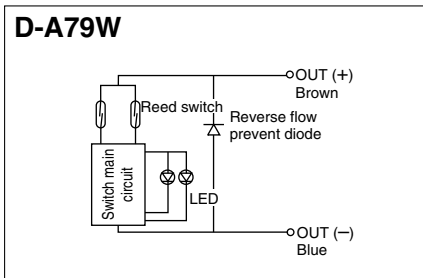


Grommet

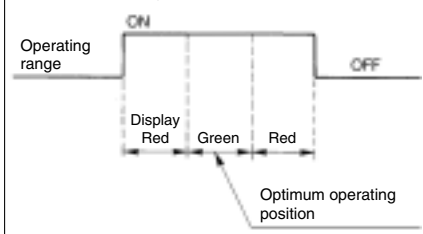
- The optimum operating position can be determined by the color of the light. (Red → Green ← Red)



Auto Switch Internal Circuit



Indicator light / Display method



- Note) ① In a case where the operation load is an inductive load.
② In a case where the wiring load is greater than 5 m.

Use the auto switch with a contact protection box in any of the above mentioned cases. (For details about the contact protection box, refer to page 27.)

Auto Switch Specifications

PLC: Programmable Logic Controller

D-A79W (With indicator light)	
Auto switch model	D-A79W
Applicable load	Relay, PLC
Load voltage	24 VDC
Load current range ^{Note 3)}	5 to 40 mA
Contact protection circuit	None
Internal voltage drop	4 V or less
Indicator light	Operating position Red LED illuminates. Optimum operating position Green LED illuminates.
Standards	Conforming to CE standards

- Lead wires — Oilproof heavy-duty vinyl cable: $\phi 3.4$, 0.2 mm² x 2 cores (Brown, Blue), 0.5 m

Note 1) Refer to page 27 for reed switch common specifications.

Note 2) Refer to page 27 for lead wire lengths.

Note 3) Under 5 mA, the strength of the indicator light is poor. In some cases, visibility of the indicator light will not be possible where the output signal is less than 2.5 mA. However, there is no problem in terms of contact output, when an output signal exceeds 1 mA or more.

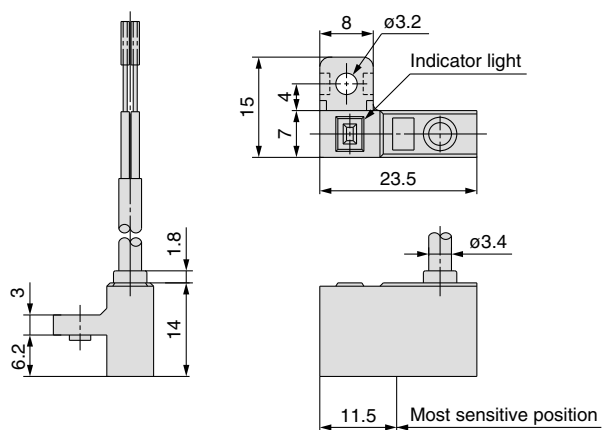
Weight

Unit: g

Auto switch model	D-A79W	
Lead wire length (m)	0.5	11
	3	53
	5	—

Dimensions

Unit: mm



Solid State Switch: Direct Mounting Style D-M9N(V)/D-M9P(V)/D-M9B(V)

Grommet

- 2-wire load current is reduced (2.5 to 40 mA).
- UL certified (style 2844) lead cable is used.
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard spec.



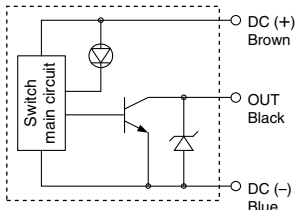
Caution

Precautions

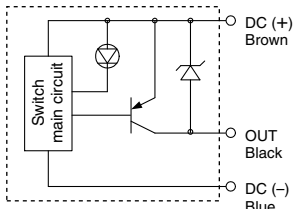
Fix the switch with the existing screw installed on the switch body. The switch may be damaged if a screw other than the one supplied is used.

Auto Switch Internal Circuit

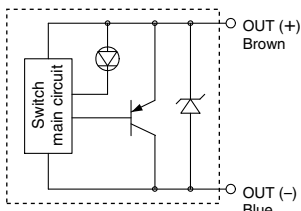
D-M9N(V)



D-M9P(V)



D-M9B(V)



Auto Switch Specifications

PLC: Programmable Logic Controller

D-M9□(V) (With indicator light)						
Auto switch model	D-M9N	D-M9NV	D-M9P	D-M9PV	D-M9B	D-M9BV
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less				4 V or less	
Leakage current	100 μA or less at 24 VDC				0.8 mA or less	
Indicator light	Red LED illuminates when turned ON.					
Standards	Conforming to CE standards					

- Lead wires — Oilproof heavy-duty vinyl cable: $\phi 2.7 \times 3.2$ ellipse
 D-M9B(V) 0.15 mm² x 2 cores
 D-M9N(V), D-M9P(V) 0.15 mm² x 3 cores

Note 1) Refer to page 27 for solid state switch common specifications.

Note 2) Refer to page 27 for lead wire lengths.

Weight

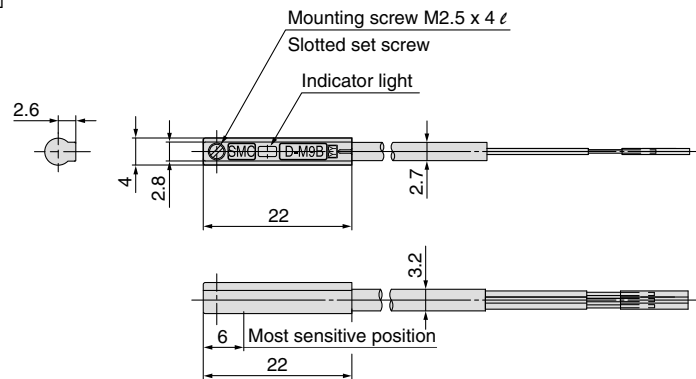
Unit: g

Auto switch model	D-M9N(V)	D-M9P(V)	D-M9B(V)
Lead wire length (m)	0.5	8	7
	3	41	38
	5	68	63

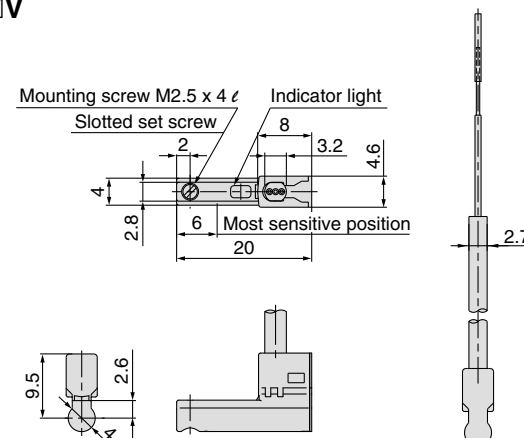
Dimensions

Unit: mm

D-M9□



D-M9□V



Solid State Switch: Rail Mounting Style D-J79C



Connector



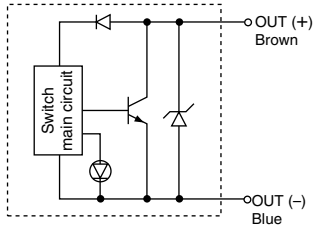
Caution

Precautions

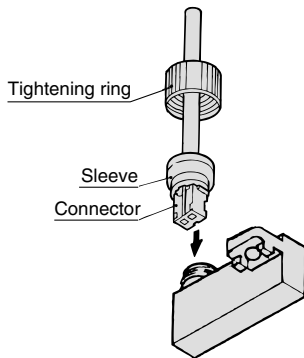
1. Confirm that the connector is appropriately tightened. If tightened insufficiently, the waterproof performance will deteriorate.
2. For how to handle a connector, refer to the below figure.

Auto Switch Internal Circuit

D-J79C



How to Insert the Connector



Turn the connector so it faces in the direction shown in the figure, and after inserting it until the sleeve hits the auto switch, screw on the tightening ring.
(Do not screw it on using pliers or other tools.)

Auto Switch Specifications

PLC: Programmable Logic Controller

D-J79C	
Auto switch model	D-J79C
Wiring type	2-wire
Output type	—
Applicable load	24 VDC Relay, PLC
Power supply voltage	—
Current consumption	—
Load voltage	24 VDC (10 to 28 VDC)
Load current	5 to 40 mA
Internal voltage drop	4 V or less
Leakage current	0.8 mA or less at 24 VDC
Indicator light	Red LED illuminates when ON.
Standards	Conforming to CE standards

- Lead wires — Oilproof heavy-duty vinyl cable: $\phi 3.4$, $0.2 \text{ mm}^2 \times 2$ cores (Brown, Blue), 0.5 m
- Note 1) Refer to page 27 for solid state switch common specifications.
Note 2) Refer to page 27 for lead wire lengths and lead wire with connector.

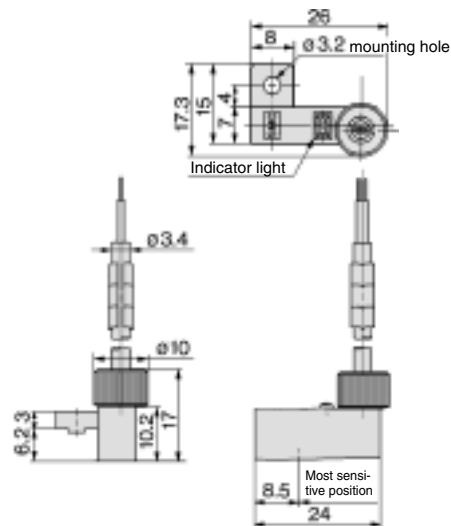
Weight

Unit: g

Auto switch model		D-J79C
Lead wire length (m)	0.5	13
	3	52
	5	83

Dimensions

Unit: mm



2-Color Indication Solid State Switch: Direct Mounting Style

D-M9NW(V)/D-M9PW(V)/D-M9BW(V)



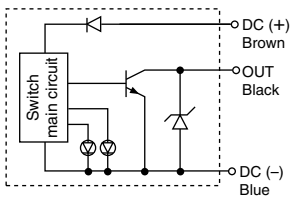
Grommet

- 2-wire load current is reduced (2.5 to 40 mA).
- UL certified (style 2844) lead cable is used.
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard spec.
- The optimum operating position can be determined by the color of the light. (Red → Green ← Red)

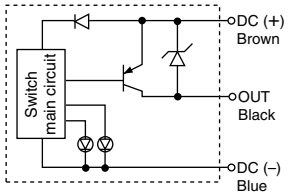


Auto Switch Internal Circuit

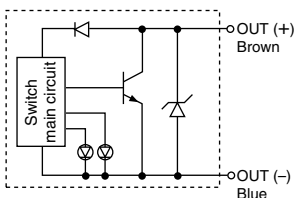
D-M9NW(V)



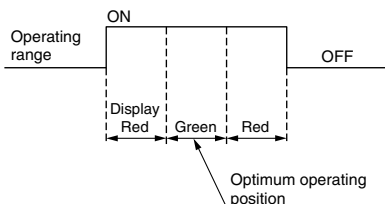
D-M9PW(V)



D-M9BW(V)



Indicator light / Display method



Auto Switch Specifications

PLC: Programmable Logic Controller

D-M9□W(V) (With indicator light)						
Auto switch model	D-M9NW	D-M9NWV	D-M9PW	D-M9PWV	D-M9BW	D-M9BWV
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)				4 V or less	
Leakage current	100 μA or less at 24 VDC				0.8 mA or less	
Indicator light	Operating position Red LED illuminates. Optimum operating position Green LED illuminates.					
Standards	Conforming to CE standards					

- Lead wires — Oilproof flexible heavy-duty vinyl cable: $\phi 2.7 \times 3.2$ ellipse
D-M9BW(V) 0.15 mm² x 2 cores
D-M9NW(V), D-M9PW(V) 0.15 mm² x 3 cores

Note 1) Refer to page 27 for solid state switch common specifications.

Note 2) Refer to page 27 for lead wire lengths.

Weight

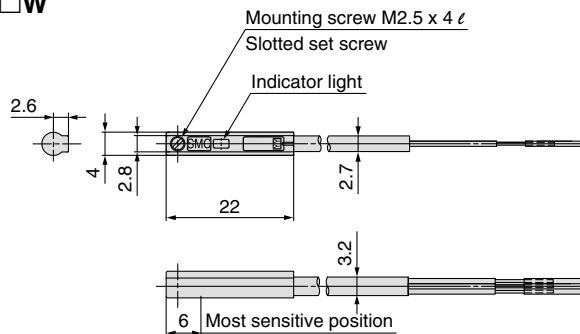
Unit: g

Auto switch model	D-M9NW(V)	D-M9PW(V)	D-M9BW(V)
Lead wire length (m)	0.5	8	7
	1	14	13
	3	41	38
	5	68	63

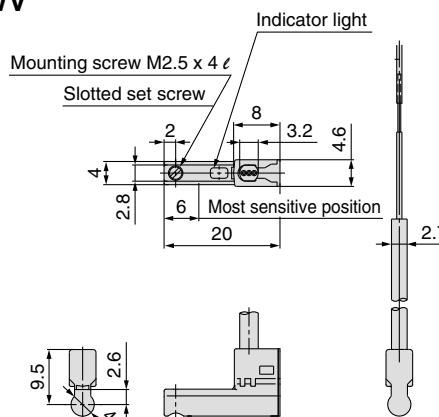
Dimensions

Unit: mm

D-M9□W



D-M9□WV



Water Resistant 2-Color Indication Solid State Switch: Direct Mounting Style

D-M9NA(V)/D-M9PA(V)/D-M9BA(V)

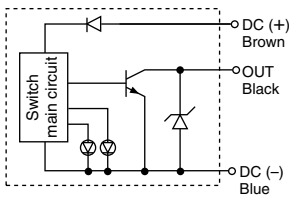
Grommet

- Water (coolant) resistant type
- 2-wire load current is reduced (2.5 to 40 mA).
- UL certified (style 2844) lead cable is used.
- Using flexible cable as standard spec.
- The optimum operating position can be determined by the color of the light. (Red → Green ← Red)

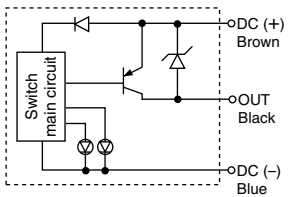


Auto Switch Internal Circuit

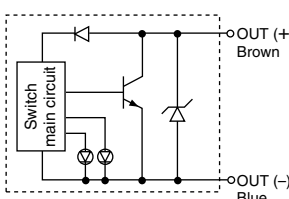
D-M9NA(V)



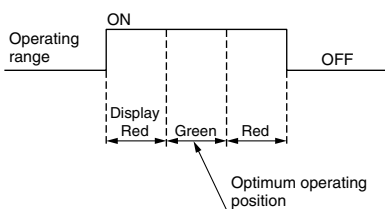
D-M9PA(V)



D-M9BA(V)



Indicator light / Display method



Auto Switch Specifications

PLC: Programmable Logic Controller

D-M9□A(V) (With indicator light)						
Auto switch model	D-M9NA	D-M9NAV	D-M9PA	D-M9PAV	D-M9BA	D-M9BAV
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)				4 V or less	
Leakage current	100 μA or less at 24 VDC				0.8 mA or less	
Indicator light	Operating position Red LED illuminates. Optimum operating position Green LED illuminates.					
Standards	Conforming to CE standards					

- Lead wires — Oilproof flexible heavy-duty vinyl cable: $\phi 2.7 \times 3.2$ ellipse
D-M9BA(V) 0.15 mm² x 2 cores
D-M9NA(V), D-M9PA(V) 0.15 mm² x 3 cores

Note 1) Refer to page 27 for solid state switch common specifications.

Note 2) Refer to page 27 for lead wire lengths.

Weight

Unit: g

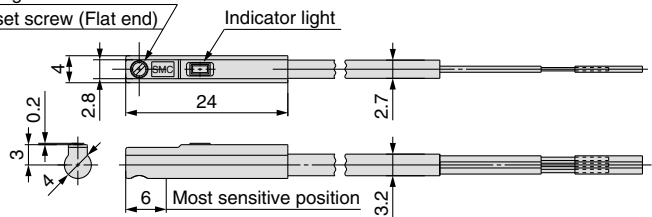
Auto switch model	D-M9NA(V)	D-M9PA(V)	D-M9BA(V)
Lead wire length (m)	0.5	8	7
	1	14	13
	3	41	38
	5	68	63

Dimensions

Unit: mm

D-M9□A Mounting screw M2.5 x 4 ℓ

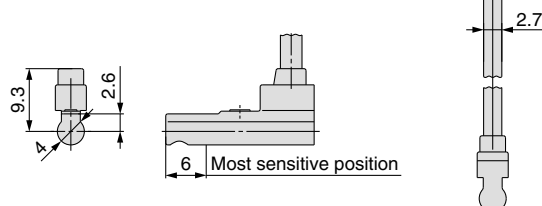
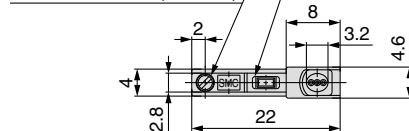
Slotted set screw (Flat end)



D-M9□AV

Mounting screw M2.5 x 4 ℓ

Slotted set screw (Flat end)



2-Color Indication with Diagnostic Output Solid State Switch: Rail Mounting Style D-F79F

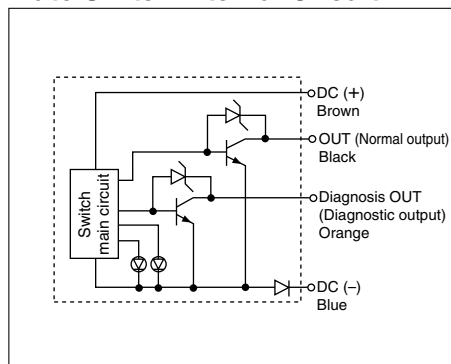


Grommet

- Since the output signal can be detected in an unsteady detecting area, the difference of detecting position can be confirmed by the side of PLC (Programmable Logic Controller).
- The optimum operating position can be determined by the color of the light. (Red → Green ← Red)



Auto Switch Internal Circuit



Auto Switch Specifications

PLC: Programmable Logic Controller

D-F79F (With indicator light)	
Auto switch model	D-F79F
Wiring type	4-wire
Output type	NPN
Diagnostic output type	Normal operation
Applicable load	IC circuit, Relay, PLC
Power supply voltage	5, 12, 24 VDC (4.5 to 28 VDC)
Current consumption	10 mA or less
Load voltage	28 VDC or less
Load current	50 mA or less at the total amount of normal output and diagnostic output
Internal voltage drop	1.5 V or less (0.8 V or less at 5 mA)
Leakage current	100 μA or less at 24 VDC
Indicator light	Operating position Red LED illuminates. Optimum operating position Green LED illuminates.
Standards	Conforming to CE standards

- Lead wires — Oilproof heavy-duty vinyl cable: $\phi 3.4$, 0.2 mm² x 4 cores (Brown, Black, Orange, Blue), 0.5 m
- Note 1) Refer to page 27 for solid state switch common specifications.
- Note 2) Refer to page 27 for lead wire lengths.

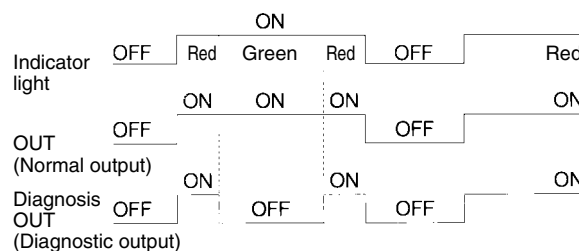
Weight

Unit: g

Auto switch model		D-F79F
Lead wire length (m)	0.5	13
	3	56
	5	90

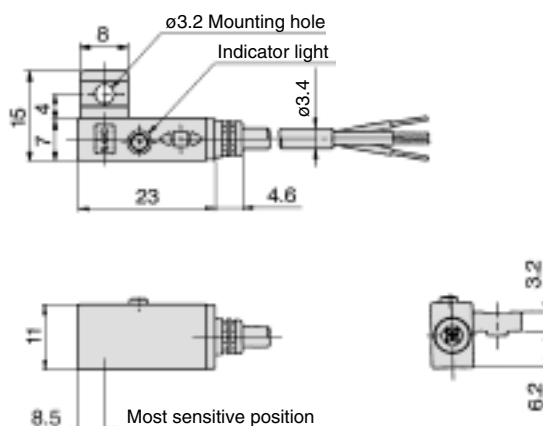
Diagnostic Output Operation

The diagnostic signal is output within unsteady detecting area (where indicator light is Red), and the diagnostic output becomes OFF when the detecting position remains within the optimum operating position (where indicator is Green). When the detecting position is not adjusted, the diagnostic output becomes ON.



Dimensions

Unit: mm



Magnetic Field Resistant 2-Color Indication Solid State Switch: Rail Mounting Style

D-P4DWL/Z



Grommet

- It is possible to use in an environment which generates a magnetic field disturbance (AC magnetic field).
- The optimum operating position can be determined by the color of the light. (Red → Green ← Red)

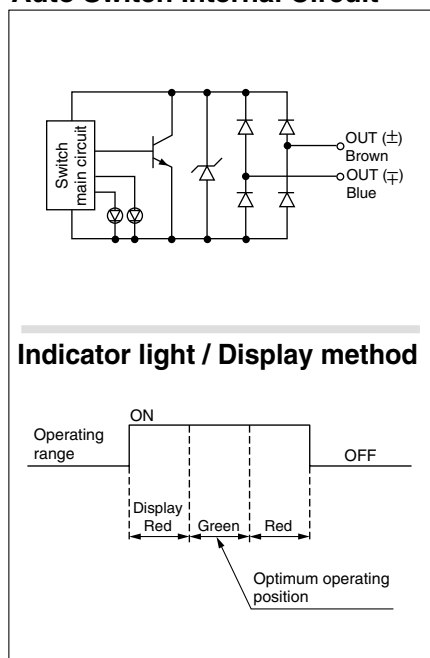


Caution

Precautions

For single-phase AC welding machines
Not applicable for DC inverter welding machines (including rectifying type) and or condenser type welding.

Auto Switch Internal Circuit



Auto Switch Specifications

PLC: Programmable Logic Controller

D-P4DW□ (With indicator light)		
Auto switch model	D-P4DWL	D-P4DWZ
Wiring type	2-wire (No polarity)	
Applicable load	24 VDC relay, PLC	
Load voltage	24 VDC (20 to 28 VDC)	
Load current	6 to 40 mA or less	
Internal voltage drop	5 V or less	
Leakage current	1 mA or less at 24 VDC	
Operating time	40 ms or less	
Indicator light	Operating position.....Red LED illuminates when turned ON. Optimum operating position.....Green LED illuminates when turned ON.	
Standards	Conforming to CE standards	

- Lead wire — Oilproof fire resistant heavy-duty vinyl cable, $\phi 6$, 0.5 mm², 2 cores, D-P4DWL: 3 m, D-P4DWZ: 5 m
 - Impact resistance — Switch part 1000 m/s²
 - Insulation resistance — 50 M Ω or more at 500 VDC Mega (between lead wire and case)
 - Withstand voltage — 1000 VAC for 1 minute (between lead wire and case)
 - Ambient temperature — -10 to 60°C
 - Enclosure — IEC60529 standard IP67, JIS 0920 waterproof construction
- Note 1) Refer to page 27 for solid state switch common specifications.
Note 2) Refer to page 27 for lead wire lengths.

Weight

Unit: g

Auto switch model		D-P4DW
Lead wire length (m)	0.5	—
	3	150
	5	244

Magnetic Field Resistance

If the current of the AC welding machine is 16000 A or lower, the switch can be used, even if the distance between the welding conductor (gun cable) and the cylinder or switch is 0 mm. Please contact SMC when the AC welding current exceeds 16000 A.

Dimensions

Unit: mm

