

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
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)	1000 VAC for 1 minute (between lead wire and case)
Ambient temperature	-10 to 60°C	
Enclosure	IEC529 standard IP67, JIS C 0920 waterproof construction	
Standard	Conforming to CE Standards	

Lead Wire Length

Lead wire length indication

(Example) D-M9P **L**

Lead wire length

Nil	0.5 m
L	3 m

Note) Lead wire length tolerance

Lead wire length	Tolerance
0.5 m	\pm 15 mm
3 m	\pm 90 mm

Contact Protection Boxes: CD-P11, CD-P12

<Applicable switch model>

D-A9□ type

The auto switches below do not have a built-in contact protection circuit. Therefore, please use a contact protection box with the switch for any of the following cases:

- 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.

The contact life may be shortened (due to permanent energizing conditions). Since the solid state auto switch is a semiconductor switch which has no contacts, no contact protection box is needed.

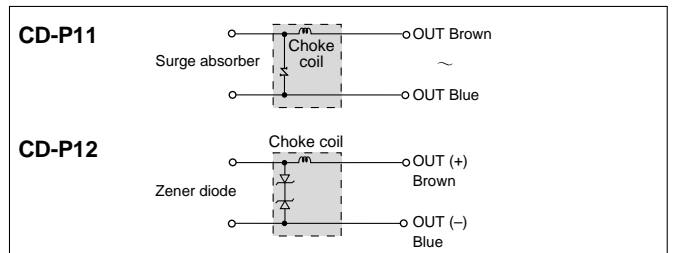
Specifications

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

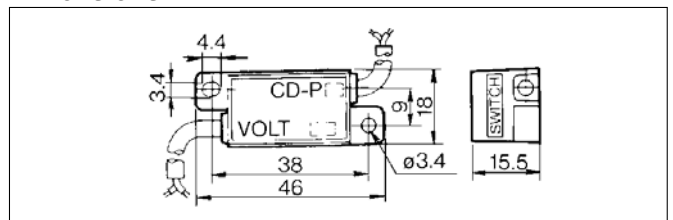
* Lead wire length — Switch connection side 0.5 m
Load connection side 0.5 m



Internal Circuit



Dimensions



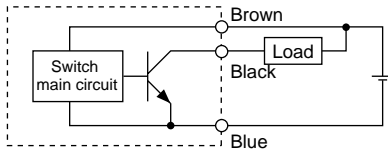
Connection

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.

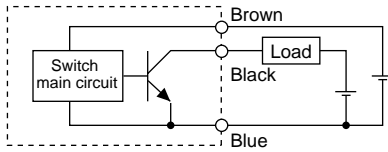
Auto Switch Connections and Examples

Basic Wiring

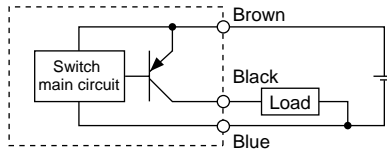
Solid state 3-wire, NPN



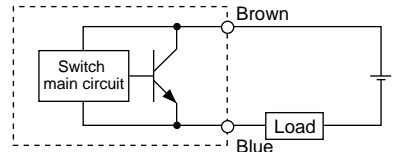
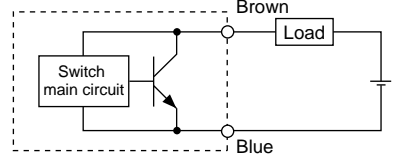
(Power supplies for switch and load are separate.)



Solid state 3-wire, PNP

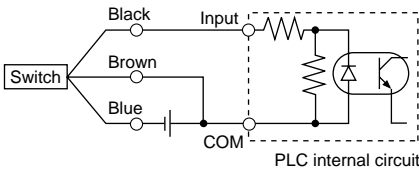


2-wire (Solid state)

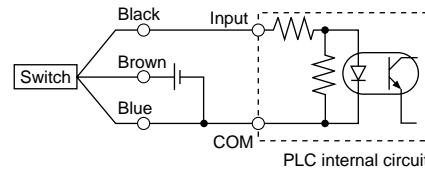


Example of Connection to PLC (Programmable Logic Controller)

• Sink input specification 3-wire, NPN

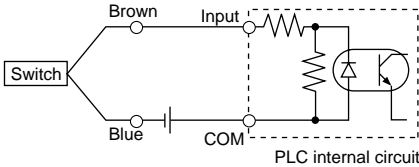


• Source input specification 3-wire, PNP

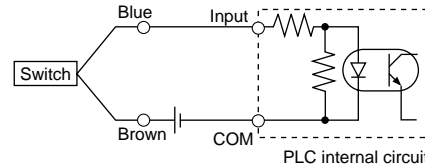


Connect according to the applicable PLC input specifications, since the connection method will vary depending on the PLC input specifications.

2-wire



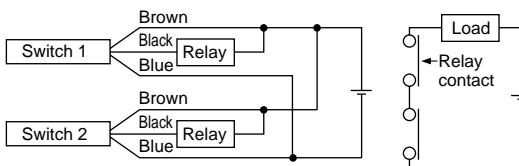
2-wire



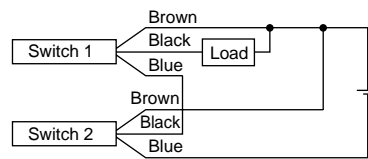
Example of AND (Serial) and OR (Parallel) Connection

• 3-wire

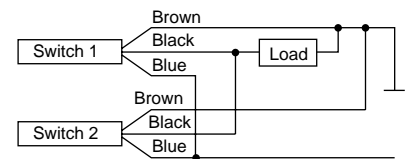
AND connection for NPN output (using relays)



AND connection for NPN output (performed with switches only)

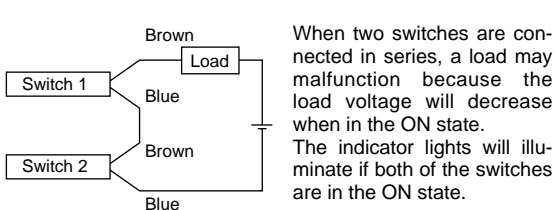


OR connection for NPN output



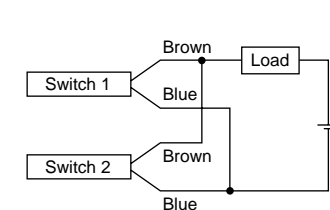
The indicator lights will illuminate when both switches are turned ON.

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.

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.

(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.

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

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

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

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

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



Grommet

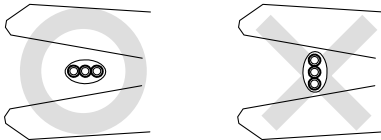
- 2-wire load current is reduced (2.5 to 40 mA).
- Lead free
- UL certified (style 2844) lead cable is used.
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard spec.



Caution

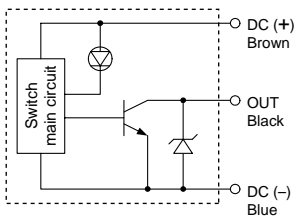
Precautions

When the cable sheath is stripped, confirm the stripping direction.
The insulator may be split or damaged depending on the direction.

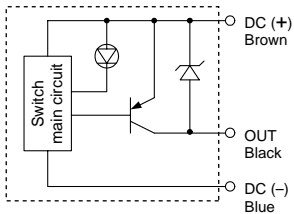


Auto Switch Internal Circuit

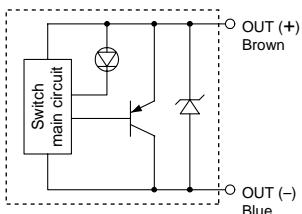
D-M9N



D-M9P



D-M9B



Auto Switch Specifications

PLC: Programmable Logic Controller

D-M9□ (With indicator light)			
Auto switch part no.	D-M9N	D-M9P	D-M9B
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.		
Standard	Conforming to CE Standards		

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

Note 1) Refer to page 48 for solid state switch common specifications.

Note 2) Refer to page 48 for lead wire lengths.

Weight

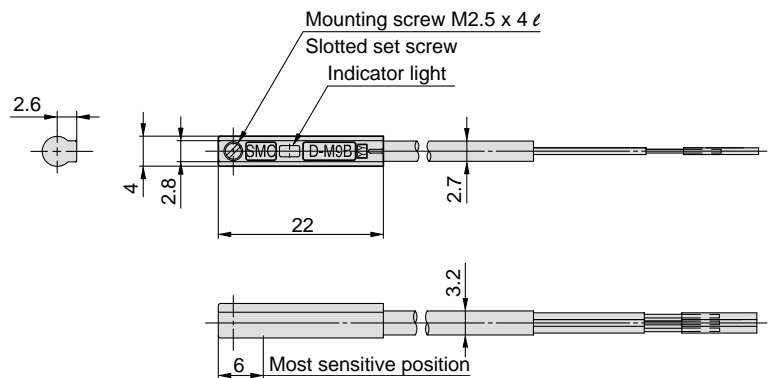
Unit: g

Auto switch part no.	D-M9N	D-M9P	D-M9B
Lead wire length (m)	0.5	8	8
	3	41	41
		41	38

Dimensions

Unit: mm

D-M9□



Reed Switch: Direct Mounting Style D-A90/D-A93



Grommet



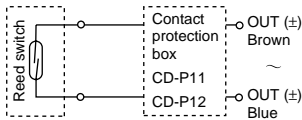
Caution

Precautions

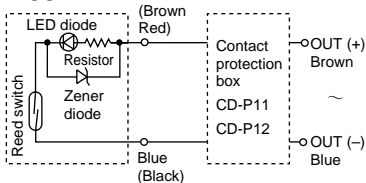
Fix the switch with the existing screw installed on the switch body. The switch may be damaged if a screw other than the one supplied is used.

Auto Switch Internal Circuit

D-A90



D-A93



- 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 48.)

Auto Switch Specifications

PLC: Programmable Logic Controller

D-A90 (Without indicator light)			
Auto switch part no.	D-A90		
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)		
D-A93 (With indicator light)			
Auto switch part no.	D-A93		
Applicable load	Relay, PLC		
Load voltage	24 VDC	100 VAC	
Load current range and max. load current	5 to 40 mA	5 to 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)		
Indicator light	Red LED illuminates when turned ON.		
Standard	Conforming to CE Standards		

Lead wires

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

Note 1) Refer to page 48 for reed switch common specifications.

Note 2) Refer to page 48 for lead wire lengths.

Weight

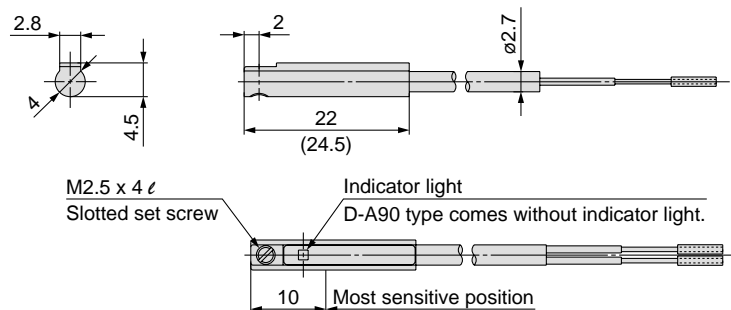
Unit: g

Auto switch part no.	D-A90	D-A93
Lead wire length (m)	0.5	6
	3	30

Dimensions

Unit: mm

D-A90/D-A93



() : dimensions for D-A93