

# Auto Switch Guide

## Reed Switch

## Solid State Switch

### Reed Switch



P 5.3-8

- **General Purpose Style** ..... P 5.3-9  
Band, Rail, Tie-rod, Direct mounting
- **2 Colour Indication Style** ..... P 5.3-25  
Band, Rail, Tie-rod Mounting

### Solid State Switch



P 5.3-28

- **General Purpose Style** ..... P 5.3-29  
Band, Rail, Tie-rod, Direct mounting
- **2 Colour Indication Style** ..... P 5.3-42  
Band, Rail, Tie-rod, Direct mounting
- **2 Colour Indication Style with Diagnostic Output** ..... P 5.3-49  
Band, Rail, Tie-rod Mounting
- **Water Resistant 2 Colour Indication Style** ..... P 5.3-55  
Band, Rail, Tie-rod, Direct mounting
- **With Timer** ..... P 5.3-59  
Band, Rail, Tie-rod, Direct mounting
- **Strong Magnetic Field Resistant 2 Colour Indication Style** ..... P 5.3-64  
Rail Mounting

RB

J

D

-X

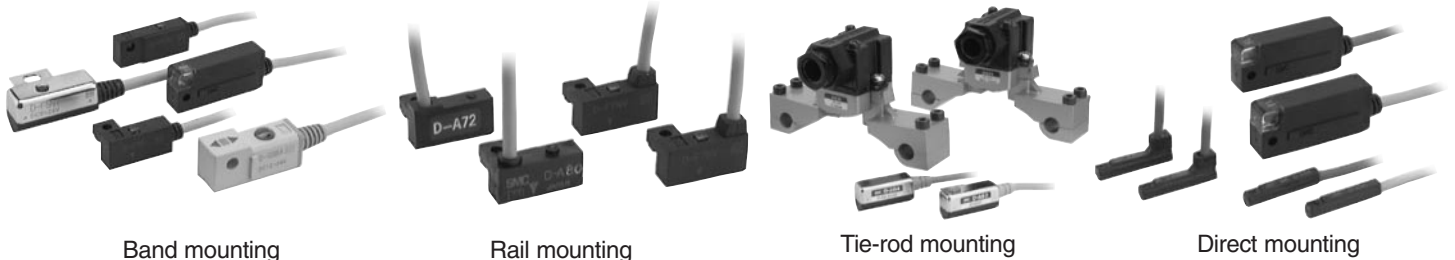
20-

Technical  
Data

# SMC Auto Switch Variations

Function	Style	Mounting method	Electrical entry	Auto switch model No.	Page	
General purpose auto switch	Reed switch	Band	Grommet	D-C73/C76/C80	5.3-9	
			Connector	D-B53/B54/B64	5.3-10	
			Terminal conduit	D-C73C/C80C	5.3-11	
			DIN terminal	D-A33/A34	5.3-12	
			DIN terminal	D-A33A/A34A	5.3-13	
		Rail	Grommet	D-A44	5.3-12	
			Grommet	D-A44A	5.3-13	
			Grommet	D-A72/A73/A80	5.3-14	
			Grommet	D-A72H/A73H/A76H/A80H	5.3-15	
		Tie-rod	Connector	D-A73C/A80C	5.3-16	
			Grommet	D-A53/A54/A56/A64/A67	5.3-17	
			Terminal conduit	D-A33C/A34C	5.3-18	
		Direct	DIN terminal	D-A44C	5.3-18	
			Grommet	D-A90/A93/A96	5.3-19	
				D-A90V/A93V/A96V	5.3-20	
				D-90/97	5.3-21	
				D-90A/93A	5.3-22	
				D-Z73/Z76/Z80	5.3-23	
				D-E73A/E76A/E80A	5.3-24	
				Solid state switch	Band	Grommet
	Connector	D-G59/G5P/K59				5.3-30
	Terminal conduit	D-H7C	5.3-31			
	Terminal conduit	D-G39/K39	5.3-32			
	Rail	Terminal conduit	D-G39A/K39A		5.3-33	
		Grommet	D-F79/F7P/J79		5.3-34	
		Grommet	D-F7NV/F7PV/F7BV		5.3-35	
		Connector	D-J79C		5.3-36	
	Tie-rod	Grommet	D-F59/F5P/J59/J51		5.3-37	
		Terminal conduit	D-G39C/K39C		5.3-38	
	Direct	Grommet	D-M9N/M9P/M9B		5.3-39	
			D-M9NV/M9PV/M9BV		5.3-39	
			D-Y59A/Y7P/Y59B	5.3-40		
			D-Y69A/Y7PV/Y69B	5.3-40		
			D-M5N/M5P/M5B	5.3-41		

General purpose auto switch



# SMC Auto Switch Variations

Function	Style	Mounting method	Electrical entry	Auto switch model No.	Page
----------	-------	-----------------	------------------	-----------------------	------

The suitable operating point can be indicated with green light. (Red→Green←Red)

2 colour indication style	Reed switch	Band	Grommet	D-B59W	5.3-25
		Rail	Grommet	D-A79W	5.3-26
		Tie-rod	Grommet	D-A59W	5.3-27
	Solid state switch	Band	Grommet	D-H7NW/H7PW/H7BW	5.3-42
				D-G59W/G5PW/K59W	5.3-43
				D-F79W/F7PW/J79W	5.3-44
		Rail	Grommet	D-F7NWW/F7BWW	5.3-45
				D-F59W/F5PW/J59W	5.3-46
				D-M5NW/M5PW/M5BW	5.3-47
		Tie-rod	Grommet	D-Y7NW/Y7PW/Y7BW	5.3-48
				D-Y7NWW/Y7PWW/Y7BWW	5.3-48
				D-F9NW/F9PW/F9BW	5.3-66
				D-F9NWW/F9PWW/F9BWW	5.3-66
				Direct	Grommet

The output signal can be detected in an unsteady detecting area.

2 colour indication style with diagnostic output	Solid state switch	Band	Grommet	D-H7LF (Latching style)	5.3-49
				D-H7NF	5.3-50
				D-G59F	5.3-51
		Rail	Grommet	D-F7LF (Latching style)	5.3-52
				D-F79F	5.3-53
				D-F5LF (Latching style)	5.3-65
Tie-rod	Grommet	D-F59F	5.3-54		

Water (coolant) resistant performance

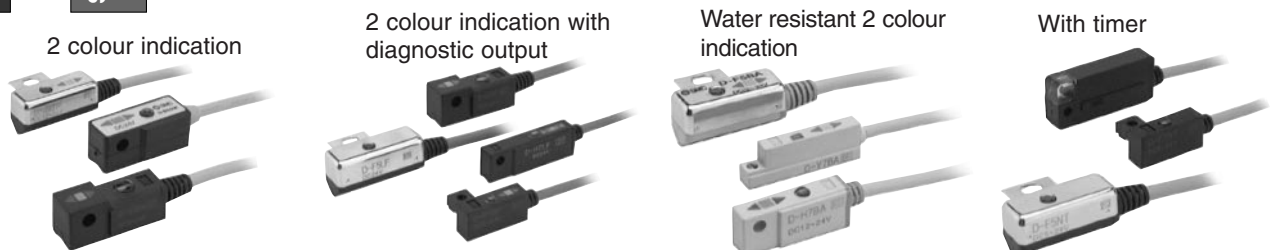
Water resistant 2 colour indication	Solid state switch	Band	Grommet	D-H7BAL	5.3-55
				D-G5BAL	5.3-56
		Rail	Grommet	D-F7BAL	5.3-57
				D-F5BAL	5.3-58
		Direct	Grommet	D-Y7BAL	5.3-63
		D-F9BAL	5.3-67		

With built-in OFF-delay timer (200ms)

With timer	Solid state switch	Band	Grommet	D-G5NTL	5.3-59
		Rail	Grommet	D-F7NTL	5.3-60
		Tie-rod	Grommet	D-F5NTL	5.3-61
		Direct	Grommet	D-M5NTL/M5PTL	5.3-62

Possible to use in an environment where disturbance magnetic fields are generated.

Strong magnetic field resistant	Solid state switch	Rail	Grommet	D-P5DWL	5.3-64
---------------------------------	--------------------	------	---------	---------	--------



# Prior to Use Auto Switch Specifications

## ⚠ Precautions

Refer to "Auto Switch Precautions" in p.0-44 to 0-46 before handling.

### Auto Switch Common Specifications

Auto switch style	Reed switch	Solid state switch
Current leakage	None	3 wire: 100 $\mu$ A or less, 2 wire: 1mA or less
Operating time	1.2ms	1ms or less <sup>(3)</sup>
Shock resistance	300m/s <sup>2</sup>	1000m/s <sup>2</sup>
Insulation resistance	50 M $\Omega$ or more at 500MV DC (between lead wire and the case)	
Withstand voltage	1500V AC/min. (between lead wire and the case) <sup>(1)</sup>	1000V AC/min. (between lead wire and the case)
Ambient temperature	-10 to 60°C	
Protective construction	IEC529 Standard IP67, Waterproof construction (JISC0920) <sup>(2)</sup>	

Note 1) Connector style (D-A73C/A80C/C73C/C80C) and D-9/9□A/A9/A9□V style: 1000V AC/min. (between lead wire and the case)

Note 2) IEC529 Standard IP63, Rainproof construction (JISC0920) for Terminal conduit style (D-A3/A3□A/A3□C/G39/G39A/G39C/K39/K39A/K39C) and DIN terminal style (D-A44/A44A/A44C).

Note 3) Except solid state switch with timer (D-M5□TL, G5NTL, F7NTL, F5NTL) and **Auto switch for strong magnetic field resistance (D-P5DWL)**.  
D-J51: 5ms or less

### Lead Wire Length

#### How to Order Ex.)

D-A73 **L**

#### •Lead wire length

—	0.5m
<b>L</b>	3m
<b>Z</b>	5m
<b>N*</b>	None

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

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

Reed switch: D-B53/B54, D-C73 (C)/C80C, D-A73(C)(H)/A80C  
D-A53/A54, D-Z73, D-90/97/90A/93A

Solid state switch: Manufactured upon receipt of order as standard  
(Except D-F9/F9□V)

Note 2) The standard lead wire length of solid state switch with timer or with water resistant 2 colour indication is 3 meters. (Not available 0.5m)

Note 3) The standard lead wire length of strong magnetic field resistant solid state switch is 3 or 5 meters. (Not available 0.5m.)

#### Part No. of lead wire with connector

(Available for connector style only.)

Part No.	Lead wire length
D-LC05	0.5m
D-LC30	3m
D-LC50	5m

### Change of Lead Wire Colour

Lead wire colours of SMC auto switches have been changed in order to meet Nippon Electric Control Equipment Industries Association Standard No. 402.

#### 2 wire auto switch

	Old	New
Output (+)	Red	Brown
Output (-)	Black	Blue

#### Solid state auto switch with diagnostic output

	Old	New
Power supply	Red	Brown
GND	Black	Blue
Output	White	Black
Diagnostic output	Yellow	Orange

#### 3 wire auto switch

	Old	New
Power supply	Red	Brown
GND	Black	Blue
Output	White	Black

#### Solid state auto switch with latching style diagnostic output

	Old	New
Power supply	Red	Brown
GND	Black	Blue
Output	White	Black
Latching style diagnostic output	Yellow	Orange

# Prior to Use

## Auto Switch Hysteresis/Contact Protection Box

### Contact Protection Box/CD-P11, CD-P12

1

The following auto switches are not incorporated with the contact protection box.

D-A7/A8, D-A7□H/A80H, D-A73C, A80C, D-C7/C8, D-C73C/C80C, D-E7□A, E80A, D-Z7/Z8, D-9/9□A, D-A9/A9□V, and D-A79W type

Use an auto switch with a contact protection box in any case listed below. Unless using a contact protection box, the contact life may be shortened.

(Due to permanent energizing conditions.)

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

- ① Operating load is an inductive load.
- ② The wiring length to load is more than 5m.
- ③ The load voltage is 100 or 200 V AC.

2

Contact SMC when using built-in contact protection circuit style (D-A34[A] [C], D-A44[A] [C], D-A54/A64, D-B54/B64, D-A59W, D-B59W) in the following conditions:

- ① The wiring length to load is more than 30m.
- ② When using PLC with large flow current

#### Contact Protection Box/Specifications

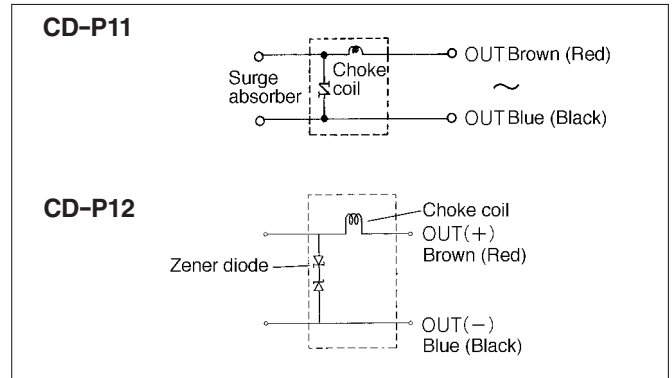
Part No.	CD-P11		CD-P12
Load voltage	100V AC max.	200V AC	24V DC
Max. load current	25mA	12.5mA	50mA

Lead wire length - Switch connecting side 0.5m  
Load connecting side 0.5m

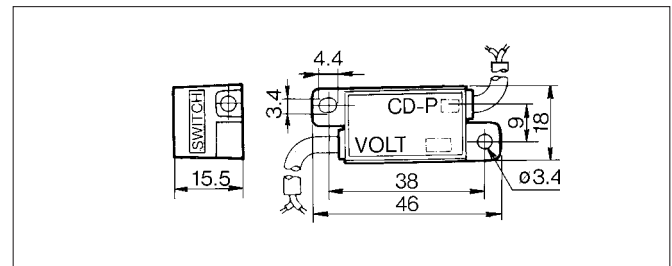


#### Contact Protection Box/Internal Circuit

( ): If applicable for IEC Standard

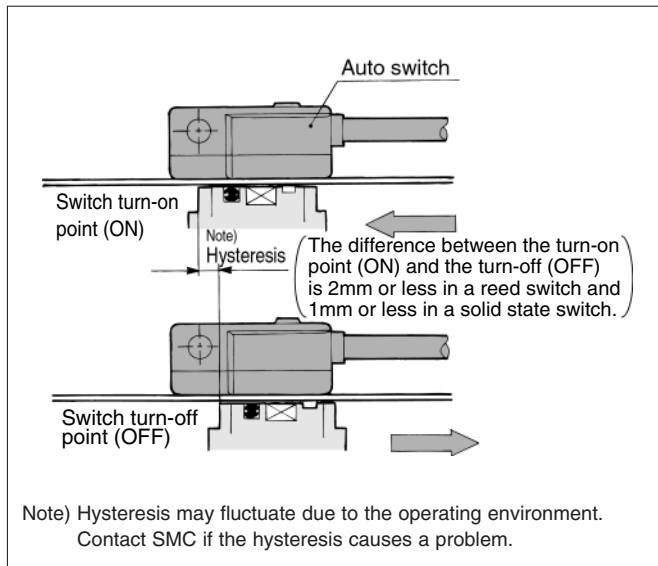


#### Contact Protection Box/Dimensions



### Auto Switch Hysteresis

The distance between the turn-on point (ON) of the switch by moving the piston to the turn-off point (OFF) is called "Hysteresis". This hysteresis is included as part of the operating range (one side).



### Contact Protection Box/Connection Method

For connection of the switch body and the contact protection box, connect the lead wire in the side indicated as "SWITCH" on the contact protection box to the lead wire from the switch body. The length of lead wire between the switch body and the contact protection box should be within 1m and they should be set as close together as possible.

RB

J

D

-X

20-

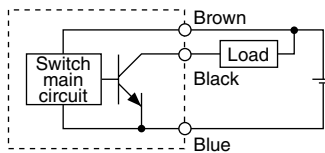
Technical Data

# Prior to Use

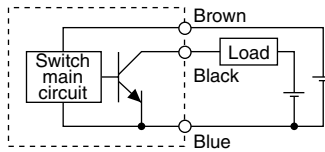
## Auto Switch Connection Method/Connection Example

### Basic Wiring

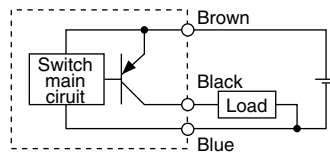
#### •Solid state switch 3 wire NPN



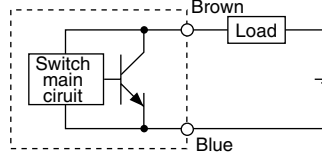
(When power source for switch and load is not common.)



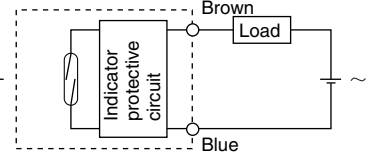
#### 3 wire PNP



#### 2 wire

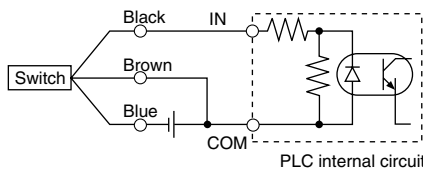


#### •Reed switch 2 wire

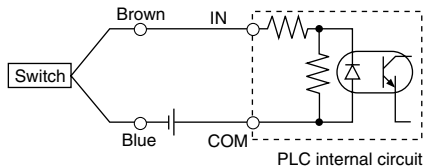


### Typical PLC (Programmable Logic Controller) Connection Circuits

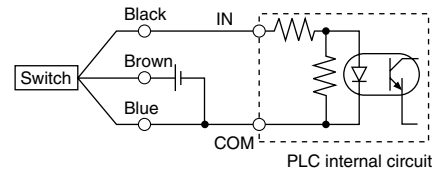
#### •Sink input 3 wire NPN



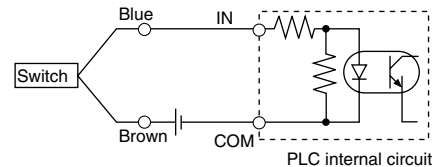
#### 2 wire



#### •Source input 3 wire PNP



#### 2 wire

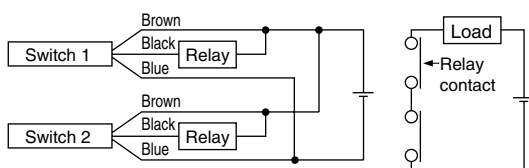


Connect according to the input specification of PLC because the connection method varies with the input specification of PLC.

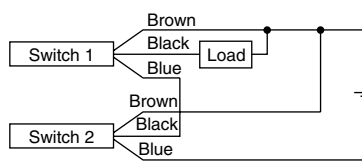
### AND (Serial), OR (Parallel) Connection Examples

#### •3 wire

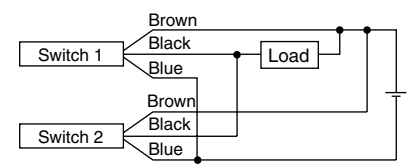
##### NPN/AND connection (with relay)



##### NPN/AND connection (with switch)

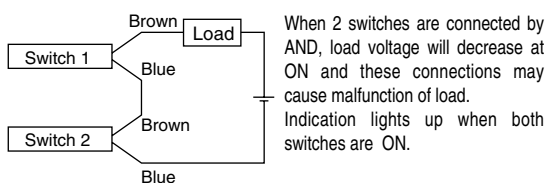


##### NPN/OR connection



Indication lights up when both switches are ON.

#### •2 wire (2 pcs.) AND connection

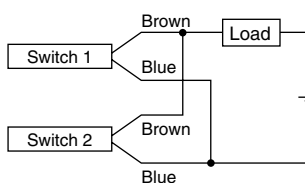


When 2 switches are connected by AND, load voltage will decrease at ON and these connections may cause malfunction of load. Indication lights up when both switches are ON.

Load voltage at ON=Supply voltage-Internal drop voltage X 2 pcs.  
=24V-4V X 2 pcs.  
=16V

Example) Supply voltage 24V DC, switch internal drop voltage 4V

#### OR connection



[Solid state switch]

When 2 switches are connected by OR, load voltage will increase at OFF and these connections may cause malfunction.

[Reed switch]

There is no current leakage so that load voltage does not increase at OFF.

The flowing current is broken up into the ON-state switches, so indicator light becomes dark or may not turn ON due to the lack of the current.

Load voltage at OFF=Leakage current X 2 pcs. X Load impedance  
=1mA X 2 pcs. X 3kΩ  
=6V

Example) Load impedance 3kΩ, switch leakage current 1mA

# Reed Switch

## General Purpose Auto Switch 2 colour Indication Style

### Reed Switch Variations

Style	Function	Mounting method	Electrical entry	Auto switch model No.	Page
<b>Reed switch</b>	<b>General purpose auto switch</b>	Band	Grommet	<b>D-C73/C76/C80</b>	5.3-9
			Connector	<b>D-B53/B54/B64</b>	5.3-10
			Terminal conduit	<b>D-C73C/C80C</b>	5.3-11
			DIN terminal	<b>D-A33/A34</b>	5.3-12
				<b>D-A33A/A34A</b>	5.3-13
				<b>D-A44</b>	5.3-12
			<b>D-A44A</b>	5.3-13	
		Rail	Grommet	<b>D-A72/A73/A80</b>	5.3-14
			Connector	<b>D-A72H/A73H/A76H/A80H</b>	5.3-15
				<b>D-A73C/A80C</b>	5.3-16
		Tie-rod	Grommet	<b>D-A53/A54/A56/A64/A67</b>	5.3-17
			Terminal conduit	<b>D-A33C/A34C</b>	5.3-18
			DIN terminal	<b>D-A44C</b>	
		Direct	Grommet	<b>D-A90/A93/A96</b>	5.3-19
				<b>D-A90V/A93V/A96V</b>	5.3-20
				<b>D-90/97</b>	5.3-21
				<b>D-90A/93A</b>	5.3-22
				<b>D-Z73/Z76/Z80</b>	5.3-23
				<b>D-E73A/E76A/E80A</b>	5.3-24
	<b>2 colour indication</b>	Band	Grommet	<b>D-B59W</b>	5.3-25
		Rail	Grommet	<b>D-A79W</b>	5.3-26
		Tie-rod	Grommet	<b>D-A59W</b>	5.3-27

**RB**  
**J**  
**D**  
**-X**  
**20-**

Technical Data



# Reed Switch/Band Mounting

## D-C73/D-C76/D-C80

### Grommet



### Applicable Actuator Series

Series	Bore size (mm)
CDJ2	ø6, ø10, ø16
CDVJ	ø10, ø16
CDLJ2	ø16
CDM2/CDBM2/CDVM3, 5 CDLM2	ø20, ø25, ø32, ø40
CDG1/MGG	ø20, ø25, ø32, ø40, ø50, ø63
CDLG1	ø20, ø25, ø32, ø40
RSDG	ø40, ø50
MGC	ø20, ø25, ø32, ø40, ø50
MLGC/RHC/REC	ø20, ø25, ø32, ø40

### Specifications

PLC: Programmable Logic Controller

#### D-C7 (With indicator light)

Auto switch model number	D-C73		D-C76
Application	Relay/PLC		IC circuit
Load voltage	24V DC	100V AC	4 to 8V DC
Max. load current and range	5 to 40mA	5 to 20mA	20mA
Contact protection circuit	None		
Internal voltage drop	≤ 2.4V		≤ 0.8V
Indicator light	ON: When red light emitting diode		

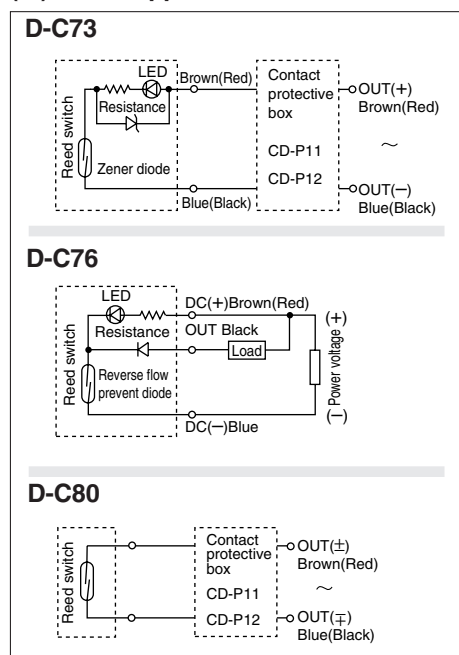
#### D-C8 (Without indicator light)

Auto switch model number	D-C80		
Application	Relay/PLC/IC circuit		
Load voltage	24V <sup>AC</sup> DC or less	48V <sup>AC</sup> DC	100V <sup>AC</sup> DC
Max. load current	50mA	40mA	20mA
Contact protection circuit	None		
Internal resistance	1Ω or less (Including 3m lead wire)		

Lead wire - Oilproof vinyl heavy insulation cable, ø3.4, 0.2mm<sup>2</sup>, 3 cores (Brown, Black, Blue), 2 cores (Brown, Blue), 0.5m  
 Note 1) Refer to common specifications on p.5.3-5.  
 Note 2) Refer to p.5.3-5 for lead wire length.

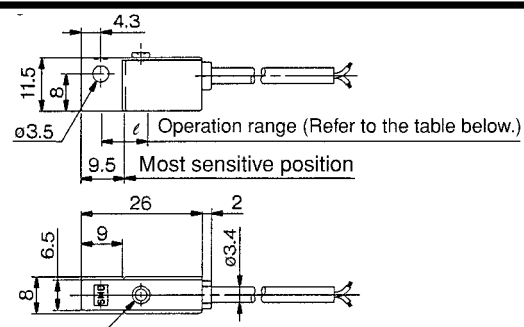
### Internal Circuit

( ) : If not applicable for IEC Standard



Note) ① In the case operation load is an inductive load.  
 ② In the case the wiring length to load is more than 5m.  
 ③ In the case the load voltage is 100V AC.  
 Be sure to use the auto switch with the contact protection box in any case mentioned above. Refer to p.5.3-6 for the details of contact protection box.

### Dimensions



Indicator light  
 D-C80: without indicator light

### Operation Range (ℓ Dimension)

Actuator series	Bore size								
	6	10	16	20	25	32	40	50	63
CDJ2	6	7	7	-	-	-	-	-	-
CDVJ	-	7	7	-	-	-	-	-	-
CDLJ2	-	-	7	-	-	-	-	-	-
CDM2/CDBM2/CDVM3, 5/CDLM2	-	-	-	7	8	8	8	-	-
CDG1/MGG	-	-	-	8	10	9	10	10	11
CDLG1	-	-	-	8	10	9	10	-	-
RSDG	-	-	-	-	-	-	10	10	-
MGC	-	-	-	8	10	9	10	10	-
MLGC/RHC/REC	-	-	-	8	10	9	10	-	-

Note) Average value at normal temperature including hysteresis. (Tolerance ± 30%)

# Reed Switch/Band Mounting

## D-B53/D-B54/D-B64

### Grommet



### Applicable Actuator Series

Series	Bore size (mm)
CDM2, CDBM2, CDVM3/5, CDLM2	ø20, ø25, ø32, ø40
CDG1, MGG	ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100
CDLG1	ø20, ø25, ø32, ø40
CDA1, CDBA1, CDV3, CDVS, CDLA, CDL1, CE2, CNA	ø40, ø50, ø63, ø80, ø100
MGC	ø20, ø25, ø32, ø40, ø50
MLGC, RHC, REC	ø20, ø25, ø32, ø40

### Specifications

PLC: Programmable Logic Controller

#### D-B5 (With indicator light)

Auto switch model number	D-B53	D-B54		
Application	PLC	Relay/PLC		
Load voltage	24V DC	24V DC	100V AC	200V AC
Load current range	5 to 50mA	5 to 50mA	5 to 25mA	5 to 12.5mA
Contact protection circuit	None	Built-in		
Internal voltage drop	≤ 2.4V	≤ 2.4V		
Indicator light	ON: When red light emitting diode			

#### D-B6 (Without indicator light)

Auto switch model number	D-B64		
Application	Relay/PLC		
Load voltage	24V <sup>AC</sup> / <sub>DC</sub> or less	100V AC	200V AC
Max. load current	Max.50mA	Max.25mA	Max.12.5mA
Contact protection circuit	Built-in		
Internal resistance	10Ω or less		

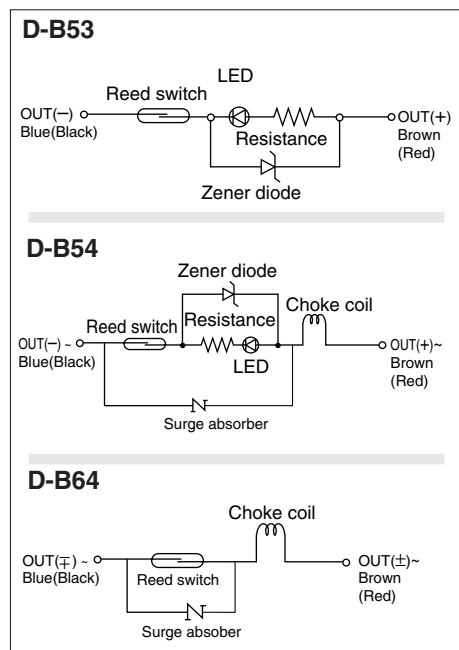
Lead wire — Oilproof vinyl heavy insulation cable, ø4, 0.3mm<sup>2</sup>, 2 cores (Brown, Blue), 0.5m

Note 1) Refer to common specifications on p.5.3-5.

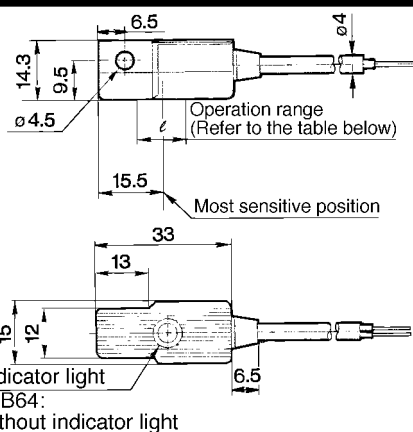
Note 2) Refer to p.5.3-5 for lead wire length.

### Internal Circuit

( ): If not applicable for IEC Standard



### Dimensions



### Operation Range (ℓ Dimension)

(mm)

Actuator series	Bore size							
	20	25	32	40	50	63	80	100
CDM2, CDBM2, CDVM3, 5 CDLM2	8	8	9	9	—	—	—	—
CDG1, MGG	8	10	9	10	10	11	11	11
CDLG1	8	10	9	10	—	—	—	—
CDA1, CDBA1, CDV3, CDVS, CDLA, CDL1, CE2, CNA	—	—	—	9	10	11	11	11
MGC	8	10	9	10	10	—	—	—
MLGC, RHC, REC	8	10	9	10	—	—	—	—

Note) Average value at normal temperature including hysteresis. (Tolerance ± 30%)

RB

J

D

-X

20-

Technical Data