SMC Quick Reference Auto Switch Chart with (PnP) M-8 (3 pin) & M-12 (4 pin) Connectors,

2-Apr-01

M-8 Switch #	M-12 Switch #	SMC Actuator	Type of Mounting	Auto Switch Mounting Hardware (brackets,bands, screws & nuts)
-F5PSAPC	**-F5PSC**	CDA1	Tie Rod Mounting	BT-03 (32/40 Bore) BT-04 (50/63 Bore) BT-06 (80/100 Bore)
	The above older	CDLA	Tie Rod Mounting	BT-04 (40/50 Bore) BT-06 (63 Bore) BT-08 (80/100 Bore)
	"SC" auto switch	CDRA1	Rail Mounting	P294020-24 Screw & Nut Kit for 2 Auto Switches (50/63/80/100 Bore)
	is identical to our	CDS1	Tie Rod Mounting	BT-12 (125/140 Bore) BT-16 (160 Bore) BT-18 (180 Bore) BT-20 (200 Bore)
	our new part #	C95D	Tie Rod Mounting	BT-03 (32/40 Bore) BT-05 (50/63 Bore) BT-06 (80/100 Bore)
	-F5PSDPC	NCDA1	Tie Rod Mounting	NBT-150 (1.5" Bore) NBT-200 (2" & 2.5" Bore) NBT-325 (3.25" & 4" Bore)
-F7PSAPC	**-F7PSC**	CD85-A	Rail Mounting	BQ-1 (8/10/12/16/20/25 Bore) Screw & Nut Kit included with cylinder
	The above older	CDQ2/NCDQ	Direct Body Mount	BQ-1 (12/16/20/25 Bore) Screw & Nut Kit included with cylinder
	"SC" auto switch	CDQ2/NCDQ	Direct Body Mount	BQ-2 (32/40/50/63/80/100 Bore) Screw & Nut Kit included with cylinder
	is identical to our	CDRA1	Rail Mounting	P294010-24 Screw & Nut Kit for 2 Auto Switches (30 Bore Only)
	our new part #	CE1	Direct Body Mount	BQ-1 (12 & 20 Bore) Screw & Nut Kit included with cylinder
	-F7PSDPC	CE1	Direct Body Mount	BQ-2 (32/40/50 & 63 Bore) Screw & Nut Kit included with cylinder
		CDY2S	Rail Mounting	BQ-1 (6/10/15/25/32 & 40 Bore) Screw & Nut Kit included with cylinder
		CDX2	Rail Mounting	BQ-1 (10/15 & 25 Bore) Screw & Nut Kit included with cylinder
		CDPXW	Rail Mounting	BQ-1 (10/16/20/25 & 32 Bore) Screw & Nut Kit included with cylinder
		CXT	Direct Body Mount	BQ-2 (32 & 40 Bore) Screw & Nut Kit included with Auto Switches on cylinder
		MHT2	Direct Body Mount	32, 40, 50 & 63 Gripper Bore sizes
		MK2	Direct Body Mount	BQ-1 (20 & 25 Bore) Screw & Nut Kit included with cylinder
		MK2	Direct Body Mount	BQ-2 (32/40/50 & 63 Bore) Screw & Nut Kit included with cylinder
		MRQ	Direct Body Mount	BQ-2 (32 & 40 Bore) Screw & Nut Kit included with cylinder
		MDU	Rail Mounting	BMU1-025 Switch Mounting Screw, 2 Required (25/32/40/50 & 63 Bore)
		RSDQ	Direct Body Mount	BQ-1 (20 Bore) BQ-2 (32/40 & 50 Bore) Screw & Nut Kit included with cylinder
-Y7PSAPC	**-Y7PSC**	CXS, CXSW	Direct Body Mount	All applicable bore sizes in each series uses this Auto Switch
	The above older	MDB1	Direct Body Mount	32, 40, 50, 63, 80 & 100 Bore sizes (Auto Switch Spacer # BMP1-032 required)
	"SC" auto switch	MGF, MGP	Direct Body Mount	All applicable bore sizes in each series uses this Auto Switch
	is identical to our	MHC2	Direct Body Mount	10, 16, 20 & 25 Gripper Bore sizes
	our new part #	MHL,	Direct Body Mount	10, 16, 20, 25, 32 & 40 Gripper Bore sizes
	-Y7PSDPC	MHQG2	Direct Body Mount	32 & 40 Gripper Bore sizes
		MHS2/3/4	Direct Body Mount	32, 40, 50, 63, 80, 100, 125 & 200 Gripper Bore sizes (sizes depend on series)
		MHW2	Direct Body Mount	20, 25, 32, 40 & 50 Gripper Bore sizes
		MY1B/M/C	Direct Body Mount	25, 32, 40, 50 & 63 Bore sizes
		MY1H	Direct Body Mount	25, 32 & 40 Bore sizes
		RSH	Direct Body Mount	20, 32, 50, 63 & 80 Stopper Cylinder Bore sizes

-H7A2SAPC	**-H7A2SC**	CD85-B	Band Mount	BJ2-008, BJ2-010, BJ2-012, BJ2-016, BM2-020, BM2-025,(BJ2-"bore size") **Page 2/2**
	The above older	CDJ2	Band Mount	BJ2-006, BJ2-010, BJ2-016, (BJ2-"bore size")
	"SC" auto switch	CDG1/NCDG	Band Mount	BMA2-020/-025/-032/-040/-050/-063 (BMA2-"bore size"), BA-08/BA-10 (CDG1 only)
	is identical to our	CDM2	Band Mount	BM2-020/-025/-032/-040 (BM2-"bore size")
	our new part #	MGG	Band Mount	BMA2-020/-025/-032/-040/-050/-063 (BMA2-"bore size") MGG's use CDG1cylinder
	-H7A2SDPC	NCM	Band Mount	NBM2-075/-088/-106/-125/-150 (NBM2- "bore size") imperial sized only cylinder
-F9PSAPC	**-F9PSC**	CDJP	Mounting Bracket	6, 10 & 15 Bore sizes (requires Bracket # BP-1 to mount Auto Switch)
	The above older	CDQ2/NCDQ	Direct Body Mount	32, 40, 50, 63, 80 & 100 Bore sizes (compact alternative to standard F7P switch)
	"SC" auto switch	CDU, CDUW	Direct Body Mount	6, 10, 16, 20, 25 & 32 Bore sizes
	is identical to our	CE1	Direct Body Mount	32 & 40 Bore sizes only
	our new part #	CQS	Direct Body Mount	12, 16, 20 & 25 Bore sizes
	-F9PSDPC	CXT	Direct Body Mount	12, 16, 20, 25, 32 & 40 Bore sizes
		MHK, MHKL	Direct Body Mount	12, 16, 20 & 25 Gripper Bore sizes
		MHS2/3/4	Direct Body Mount	16, 20 & 25 Gripper Bore sizes
		MHQ2-6	Direct Body Mount	6 mm Gripper Bore size
		MHR2/3	Direct Body Mount	10, 15, 20 & 30 Gripper Bore sizes (bore sizes depend on series)
		MHY2	Direct Body Mount	10, 16, 20 & 25 Gripper Bore sizes
		MHZ2	Direct Body Mount	10, 16, 20 & 25 Gripper Bore sizes (new replacement for SMC's older MHQ2 series)
		MK2	Direct Body Mount	32, 40, 50 & 63 Bore sizes (compact alternative to standard F7P switch)
		MSQ	Direct Body Mount	10, 20, 30, 50, 70, 100 & 200 Bore Rotary Actuator use this SMC Auto Switch
		MTS	Direct Body Mount	20, 25, 32 & 40 Bore sizes
		MXF/P/Q	Direct Body Mount	All applicable bore sizes in each series use this SMC Auto Switch
		MXS, MXU/H	Direct Body Mount	All applicable bore sizes in each series use this SMC Auto Switch
		MXW	Direct Body Mount	All applicable bore sizes in each series use this SMC Auto Switch
		MY1B/M/C	Direct Body Mount	16 & 20 Bore sizes
		MY1H	Direct Body Mount	16 & 20 Bore sizes
		ZCDUK	Direct Body Mount	10, 16, 20, 25 & 32 Vacuum Cylinder Bore sizes
-S9P1SAPC	**-S9P1SDPC**	MDSUB-1/-3	Body Mount	Right Hand Mounted Switch (each MDSUB requires a left & right mounted switch)
-S9P2SAPC	**-S9P2SDPC**	MDSUB-1/-3	Body Mount	Left Hand Mounted Switch (each MDSUB requires a left & right mounted switch)
-S7P1SAPC	**-S7P1SDPC**	MDSUB-7/-20	Body Mount	Right Hand Mounted Switch (each MDSUB requires a left & right mounted switch)
-S7P2SAPC	**-S7P2SDPC**	MDSUB-7/-20	Body Mount	Left Hand Mounted Switch (each MDSUB requires a left & right mounted switch)

Notes: Specify "**D**" (Auto Switch Capable) in the actuator part number, if applicable. Auto Switch capable is an option on most SMC actuators.
Specify "**D-**" the SMC Auto Switch part number when ordering SMC Auto Switches separately without the actuator.
Auto Switch Mounting Hardware is included from SMC when auto switches are specified in the actuator model number
All of the above prewired **PnP** Auto Switch cable & connector assemblies are approximately .5m long
This PnP Chart covers most of SMC's Actuators **Created By: Tony Bucci of SMC Pneumatics Canada Ltd on April 2, 2001**

Rotary Actuator/Air Gripper

Auto Switch Guide
Reed Switch/Solid State Switch

Applicable Auto Switch Table

Type	Mounting	Electrical entry	Auto switch model no.	Applicable rotary actuator Size	Applicable air gripper Size	Page
				CDRA1 30 / CDRB* 50-100 / CDRB 10/15 / CDRB 20-100 / CDRQ 10/15 / CDRQ 20-40 / MRQ 32/40 / MDSUB 1/3 / MDSUB 7/20 / MSQ 10-200	MHZ2 10-25 / MHZJ2 10-25 / MHL2 10-40 / MDHR 10-30 / MHK 12-25 / MHS 16-25 / MHS 32-125 / MHC2 10-25 / MHT2 32-63 / MHW2 20-50 / MHY 10-25 / MRHQ 10/16	
Reed switch	Rail	Grommet	D-A72/A73/A80			2.11-8
			D-A72H/A73H D-A76H/A80H			2.11-9
		Connector	D-A73C/A80C			2.11-10
		Grommet	D-A53/A54/A56 D-A64/A67			2.11-11
	Direct mounting	Grommet	D-90/97			2.11-12
			D-A90/A93/A96 D-A90V/A93V/A96V			2.11-13
			D-90A/93A			2.11-14
			D-R731/R732			2.11-15
			D-R801/R802			2.11-15
		Connector	D-R731C/R732C			2.11-16
			D-R801C/R802C			2.11-16
2 color indication	Rail	Grommet	D-A79W			2.11-17
	Tie rod	Grommet	D-A59W			2.11-18
Solid state switch	Rail	Grommet	D-F79/F7P/J79			2.11-19
			D-F7NV/F7PV/F7BV			2.11-20
		Connector	D-J79C			2.11-21
		Grommet	D-F59/F5P/J51/J59			2.11-22
	Direct mounting	Grommet	D-S991/S992/D-S99V1/S99V2			2.11-23
			D-T991/T992/D-T99V1/T99V2			2.11-23
			D-S9P1/S9P2/D-S9PV1/S9PV2			2.11-23
			D-S791/S792			2.11-24
			D-T791/T792			2.11-24
			D-S7P1/S7P2			2.11-24
		Connector	D-T791C/T792C			2.11-24
		Grommet	D-F9N/F9P/F9B D-F9NV/F9PV/F9BV			2.11-25
			D-Y59A/Y59B/Y7P D-Y69A/Y69B/Y7PV			2.11-26
2 color indication	Rail	Grommet	D-F79W/F7PW/J79W			2.11-27
	Direct mounting	Grommet	D-Y7NW/7PW/7BW D-Y7NWV/7PWV/7BWV			2.11-28
			D-F9NW/F9PW/F9BW D-F9NWV/F9PWV/F9BWV			2.11-29
	Tie rod	Grommet	D-F59W/F5PW/J59W			2.11-30
With diagnosis output	Rail	Grommet	D-7LF(Latch type)			2.11-31
			D-F79F			2.11-32
			D-F59F			2.11-33
Water resistant 2 color indication	Rail	Grommet	D-F7BAL			2.11-34
	Tie rod		D-F5BAL			2.11-35
	Direct mounting		D-Y7BAL			2.11-36
			D-F9BAL			2.11-37
With timer	Rail	Grommet	D-F7NTL			2.11-38
	Tie rod		D-F5NTL			2.11-39

Auto Switch Precautions ①

Be sure to read before handling.
Refer to main text for detailed precautions on every series.

Design & Selection

⚠Warning

❶Confirm the specifications.

Read the specifications carefully and use this product appropriately. The product may be damaged or malfunction if it is used outside the range of specifications of current load, voltage, temperature or impact.

❷Take precautions when multiple cylinders are used close together.

When multiple auto switch cylinders are used in close proximity, magnetic field interference may cause the switches to malfunction. Maintain a minimum cylinder separation of 40 mm. (When the allowable separation is indicated for each cylinder series, use the specified value.)

❸Pay attention to the length of time that a switch is ON at an intermediate stroke position.

When an auto switch is placed at an intermediate position of the stroke and a load is driven at the time the piston passes, the auto switch will operate, but if the speed is too great the operating time will be shortened and the load may not operate properly. The maximum detectable piston speed is:

$$V\ (mm/s) = \frac{\text{Auto switch operating range (mm)}}{\text{Time load applied (ms)}} \times 1000$$

In cases of high piston speed, the use of an auto switch (D-F5 NT, F7NT, G5NT, M5□T) with a built-in OFF delay timer (approx. 200ms) makes it possible to extend the load operating time.

❹Wiring should be kept as short as possible.

<Reed switch>

As the length of the wiring to a load gets longer, the rush current at switching ON becomes greater, and this may shorten the product's life. (The switch will stay ON all the time.)

1) For an auto switch without a contact protection circuit, use a contact protection box when the wire length is 50m or longer.
2) Even if an auto switch has a built-in contact protection circuit, when the wiring is more than 30m long, it is not able to adequately absorb the rush current and its life may be reduced. It is again necessary to connect a contact protection box in order to extend its life. Please contact SMC in this case.

<Solid state switch>

3) Although wire length should not affect switch function, use a wire 100m or shorter.

❺Take precautions for the internal voltage drop of the switch.

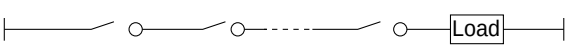
<Reed switch>

1) Switches with an indicator light (Except D-A56, A76H, A96, A96V, C76, E76A, Z76)

● If auto switches are connected in series as shown below, take note that there will be a large voltage drop because of internal resistance in the light emitting diode. (Refer to internal voltage drop in the auto switch specifications.)

[The voltage drop will be "n" times larger when "n" auto switches are connected.]

Even though an auto switch operates normally, the load may not operate.



● In the same way, when operating under a specified voltage, although an auto switch may operate normally, the load may not operate. Therefore, the formula below should be satisfied after confirming the minimum operating voltage of the load.

$$\text{Supply voltage} - \text{Internal voltage drop of switch} > \text{Minimum operating voltage of load}$$

2) If the internal resistance of a light emitting diode causes a problem, select a switch without an indicator light (Model D-A6□, A80, A80H, A90, A90V, C80, R80, 90, E80A, Z80).

<Solid state switch>

3) Generally, the internal voltage drop will be greater with a 2 wire solid state auto switch than with a reed switch. Take the same cautions as in 1).

Also, note that a 12V DC relay is not applicable.

❻Watch for current leakage.

<Solid state switch>

With a 2 wire solid state auto switch, current (leakage) flows to the load to operate the internal circuit even when in the OFF state.

Operating Current of Load (OFF condition) > Leakage Current

If the criteria given in the above formula are not met, it will not reset correctly (stays ON). Use a 3 wire switch if this specification will not be satisfied.

Moreover, leakage current flow to the load will be "n" times larger when "n" auto switches are connected in parallel.

❼Do not use a load that generates surge voltage.

<Reed switch>

If driving a load such as a relay that generates a surge voltage, use a switch with a built-in contact protection circuit or use a contact protection box.

<Solid state switch>

Although a zener diode for surge protection is connected at the output side of a solid state auto switch, damage may still occur if the surge is applied repeatedly. When a load, such as a relay solenoid, which generates surge is directly driven, use a type of switch with a built-in surge absorbing element.

❽Cautions for use in interlock circuit.

When an auto switch is used for an interlock signal requiring high reliability, devise a double interlock system to avoid trouble by providing a mechanical protection function, or by also using another switch (sensor) together with the auto switch. Also perform periodic maintenance and confirm proper operation.

❾Ensure sufficient clearance for maintenance activities.

When designing an application, be sure to allow sufficient clearance for maintenance and inspections.

Auto Switch Precautions ②

Be sure to read before handling.
Refer to main text for detailed precautions on every series.

Mounting & Adjustment

⚠ Warning

❶Do not drop or bump

Do not drop, bump or apply excessive impacts (300m/s^2 or more for reed switches and 1000m/s^2 or more for solid state switches) with handling.

Although the body of the switch may not be damaged, the inside of the switch could be damaged and malfunction.

❷Do not carry a cylinder by the auto switch lead wires.

Never carry a cylinder by its lead wires. This may not only break lead wires, but it may cause internal elements of the switch to be damaged by the stress.

❸Mount switches using the proper fastening torque.

When a switch is tightened beyond the range of fastening torque, the mounting screws, mounting bracket or switch may be damaged. On the other hand, tightening below the range of fastening torque may allow the switch to slip out of position. (Refer to p.5.3-68 through 5.3-74 in Best Pneumatics 2 regarding mounting, moving, and fastening torque, etc. of switches.)

❹Mount a switch at the center of the operating range.

Adjust the mounting position of an auto switch so that the piston stops at the center of the operating range (the range in which a switch is ON.)

(The mounting position shown in a catalog indicates the optimum position at stroke end.) If mounted at the end of the operating range (around the borderline of ON and OFF), operation will be unstable.

Wiring

⚠ Warning

❶Avoid repeatedly bending or stretching lead wires.

Broken lead wires will result from applying bending stress or tension in the lead wires.

❷Be sure to connect the load before power is applied.

<2 wire type>

If the power is turned ON when an auto switch is not connected to a load, the switch will be instantly damaged because of excess current.

❸Confirm proper insulation of wiring.

Be certain that there is no faulty wiring insulation (contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

❹Do not wire with power lines or high voltage lines.

Wire separately from power lines or high voltage lines, avoiding parallel wiring or wiring in the same conduit with these lines. Control circuits, including auto switches, may malfunction due to noise from these other lines.

❺Do not allow short circuit of loads.

<Reed switch>

If the power is turned ON with a load in a short circuited condition, the switch will be instantly damaged because of excess current flow into the switch.

<Solid state switch>

Model D-F9□(V), F9□W(V), J51, G5NB and all models of PNP output type switches do not have built-in short circuit prevention circuits. If loads are short circuited, the switches will be instantly damaged.

Take special care to avoid reverse wiring with the brown (red) power supply line and the black (white) output line on 3 wire type switches.

❻Avoid incorrect wiring.

<Reed switch>

A 24V DC switch with indicator light has polarity. The brown lead wire is (+), and the blue lead wire is (–). [D-97: No indication side (+), Black line side (–).]

1) If connections are reversed, a switch will operate, however, the light emitting diode will not illuminate.

   Also note that a current greater than that specified will damage a light emitting diode and it will no longer operate.

   Applicable models:
   D-A73, A73H, A73C, R73,
   D-97, 93A, A93, A93V,
   D-A53, A54.

2) Note however, that in the case of 2 color indicator type auto switches (D-79W, A59W, B59W), if the wiring is reversed, the switch will be in a normally ON condition.

<Solid state switch>

1) If connections are reversed on a 2 wire type switch, the switch will not be damaged if protected by a protection circuit, but the switch will always stay in an ON state. However, it is still necessary to avoid reversed connections, since the switch could be damaged by a load short circuit in this condition.

2) If connections are reversed (power supply line + and power supply line –) on a 3 wire type switch, the switch will be protected by a protection circuit. However, if the power supply line (+) is connected to the blue wire and the power supply line (–) is connected to the black wire, the switch will be damaged.

Auto Switch Precautions ③

Be sure to read before handling.
Refer to main text for detailed precautions on every series.

Environment

⚠ Warning

❶Never use in an atmosphere with explosive gases.

The structure of auto switches is not intended to prevent explosion. However, never use in an atmosphere with an explosive gas since this may cause a serious explosion.

❷Do not use in an area where a magnetic field is generated.

Auto switches will malfunction or magnets inside cylinders will become demagnetized. (Consult SMC regarding the availability of a magnetic field resistant auto switch.)

❸Do not use in an environment where the auto switch will be continually exposed to water.

Although switches satisfy the IEC standard IP67 structure (JIS C0920: anti-immersion structure) (except D-A3□, A44□, G39□, K39□), do not use switches in applications where they are continually exposed to water splash or spray. Poor insulation or swelling of the potting resin inside switches may cause a malfunction.

❹Do not use in an environment with oil or chemicals.

Consult SMC if auto switches will be used in an environment with coolant, cleaning solvent, various oils or chemicals. If auto switches are used under these conditions for even a short time, they may be adversely affected by improper insulation, malfunction due to swelling of the potting resin, or hardening of the lead wires.

❺Do not use in an environment with temperature cycles.

Consult SMC if auto switches are used where there are temperature cycles other than normal temperature changes, as they may be adversely affected.

❻Do not use in an environment where there is excessive impact shock.

<Reed switch>

When excessive impact (300m/s^2 or more) is applied to a reed switch during operation, the contact point will malfunction and generate or cut off a signal momentarily (1ms or less). Consult SMC regarding the need to use a solid state switch depending upon the environment.

❼Do not use in an area where surges are generated.

<Solid state switch>

When there are units (solenoid type lifter, high frequency induction furnace, motor, etc.) which generate a large amount of surge in the area around cylinders with solid state auto switches, this may cause deterioration or damage to the switch. Avoid sources of surge generation and disorganized lines.

❽Avoid accumulation of iron powder or close contact with magnetic substances.

When a large amount of ferrous powder such as machining chips or spatter is accumulated, or a magnetic substance (something attracted by a magnet) is brought into close proximity with an auto switch cylinder, it may cause the auto switch to malfunction due to a loss of the magnetic force inside the cylinder.

Maintenance

⚠ Warning

❶Perform the following maintenance periodically in order to prevent possible danger due to unexpected auto switch malfunction.

1) Secure and tighten switch mounting screws.

If screws become loose or the mounting position is dislocated, retighten them after readjusting the mounting position.

2) Confirm that there is no damage to lead wires.

To prevent faulty insulation, replace switches or repair lead wires, etc., if damage is discovered.

3) Confirm the lighting of the green light on 2 color indicator type switch.

Confirm that the green LED is on when stopped at the established position. If the green LED is on, the mounting position is not appropriate. Readjust the mounting position until the green LED lights up.

Others

⚠ Warning

❶Consult SMC concerning water resistance, elasticity of lead wires, and usage at welding sites, etc.

Prior to Use

Auto Switch Common Specifications

Auto Switch Common Specifications

Type	Reed switch	Solid state switch
Leakage current	None	3wire: 10μA or less, 2 wire: 1mA or less
Operating time	1.2ms	1ms or less ∗2
Impact resistance	300m/s^2	1000m/s^2
Insulance resistance	50MΩ or more under the test voltage 500VDC (between case and cable)	
Withstand voltage	1500V AC for 1 min. ∗1 (between case and cable)	1000V AC for 1 min. (between case and cable)
Ambient temperature	–10 to 60°C	
Protective structure	IEC529 standard IP67, JISC0920	

∗ 1) Electrical entry---Connector type (A73C, A80C, R73C, R80C) and D-9, 9□A, A9, A9□V: 1000V AC for 1 min. (between case and cable)
∗ 2) Except solid state switch with timer (D-M5□TL, G5NTL, F7NTL, F5NTL), except magnetic field resistance solid state switch (D-P5DWL). D-J51: 5ms or less

Lead Wire Length

How to specify lead wire length

(Example)

D-A73 L

Lead wire length

—	0.5m
L	3m
Z	5m
N∗	None

∗ Applicable to only connector type switch D-∗∗C

Note 1) Lead wire length Z: 5m
Applicable to
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: Made to order (Except D-F9, F9□V, F7□WV)

Note 2) Solid state switch with timer, water resistant 2 color indication solid state switch: Standard wire length is 3m. (0.5m is not available)

Lead wire with connector
(Applicable to only connector type)

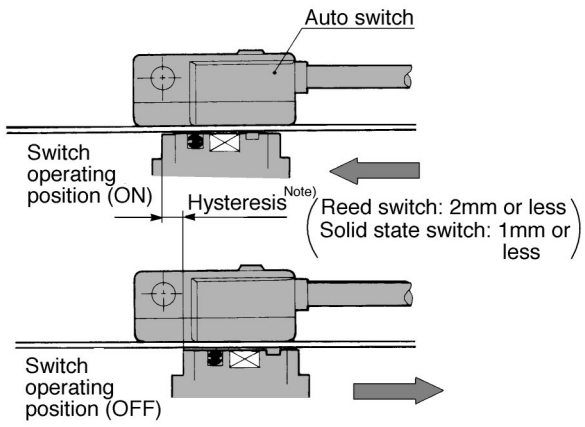
Model	Lead wire length
D-LC05	0.5m
D-LC30	3m
D-LC50	5m

Prior to Use

Auto Switch Hysteresis/Contact Protection Box

Auto Switch Hysteresis

The position where the auto switch is ON for piston movement and OFF for piston reverse movement is hysteresis. A part (one side) of operating range includes this hysteresis.



Note) This depends on operating environment, not guaranteed. Contact SMC when hysteresis is problem.

Contact Protection Box/CD-P11, CD-P12

1

<Applicable switch>

D-A7, A8, A7□H, A80H, A73C, A80C, 9, 9□A, A9, A9□V, A79W
The above switches do not have built-in contact protection circuits.

① Operating load is an induction load.
② Wiring to the load is 5m or longer.
③ Load voltage is 100, 200VAC.

Use a contact protection box in any of the above listed situations.

The contact point life may decrease. (Maintain ON)
Especially D-A72 (H) are majorly influenced, use contact protection box without regard to load type and wiring current.

2

Even when built-in contact protection circuit type (D-A54, A64, A59W) is used contact protection box may be needed, if wire length to load is long (30m or more), or PLC (Programmable Logic Controller) has large inrush current.

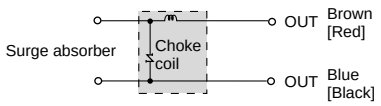
Contact Protection Box Specifications

Part number	CD-P11		CD-P12
Load voltage	100VAC	200VAC	24VDC
Max. load current	25mA	12.5mA	50mA

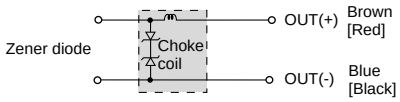
∗ Lead wire length —— Switch contact side 0.5m
Load connection side 0.5m

Contact protection box internal circuits

CD-P11

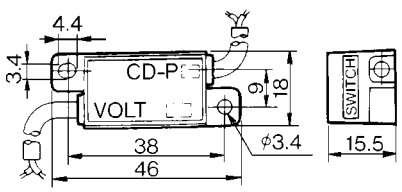


CD-P12



( ) is color before corresponding to IEC standard.

Contact protection box/Dimensions



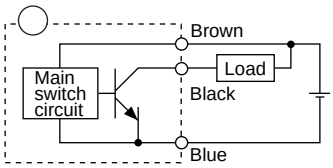
Contact protection box/Connection method

In order to connect a switch unit to a contact protection box, connect the lead wires from the contact protection box on the side labeled SWITCH to the lead wires coming out of the switch unit.
Further, the length of the lead wires between the contact protection box and the switch unit should be kept as short as possible, but no more than 1m.

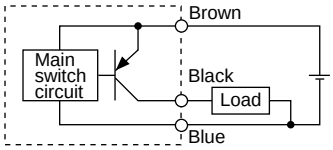
Prior to Use
Auto Switches/Connections and Wiring

Basic Wiring

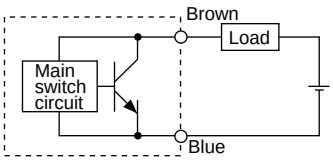
Solid state 3 wire NPN



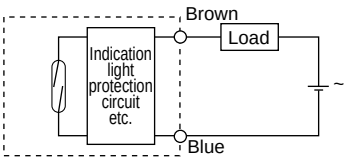
Solid state 3 wire PNP



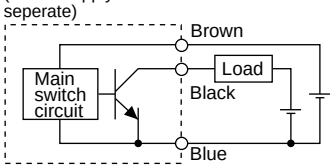
Solid state 2 wire

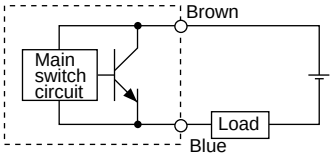


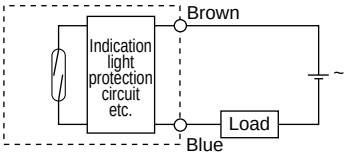
Reed switch 2 wire



(Power supply for switch and load are seperate)

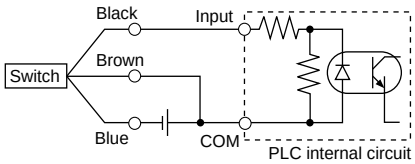




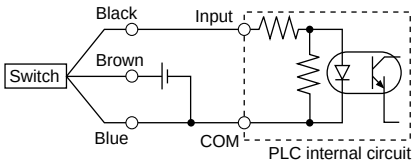


Examples of Connection to PLC (Programmable Logic Controller)

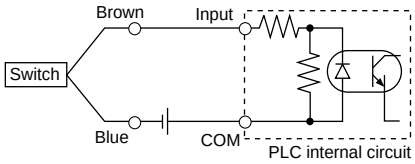
Specification for sink input
3 wire, NPN



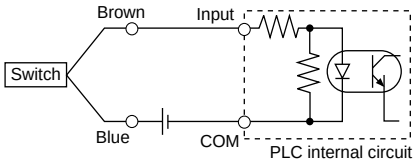
Specification for source input
3 wire, PNP



2 wire



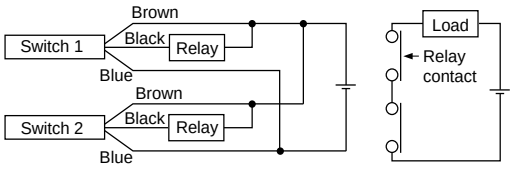
2 wire



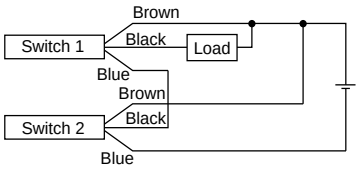
Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

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

● **3 wire**
AND Connection for NPN Output (using relays)

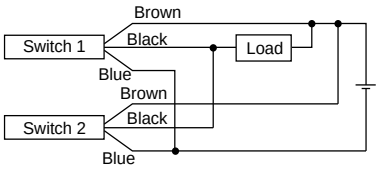


AND connection for NPN output (Performed with switches only)

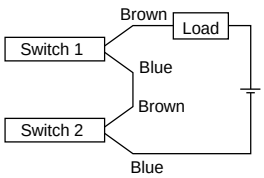


The indicator lights will light up when both switches are turned ON.

OR connection for NPN output



● **2 wire with 2 switch AND connection**

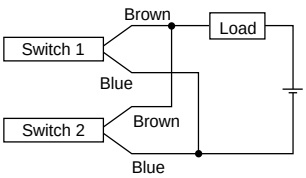


When two switches are connected in series, a load may be malfunction because the load voltage will decline when in the ON state.
The indicator lights will light up if both of the switches are in the ON state.

Load voltage at ON = $\frac{\text{Power supply voltage}}{} - \frac{\text{Residual voltage}}{} \times 2$ pcs.
= 24V – 4V x 2 pcs.
= 16V

Example: Power supply is 24V DC
Switch internal voltage drop is 4V

2 wire with 2 switch OR connection



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

Load voltage at OFF = $\frac{\text{Leakage current}}{} \times 2$ pcs. $\times \frac{\text{Load Impendance}}{}$
= 1mA x 2 pcs. x 3kΩ
= 6V

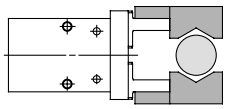
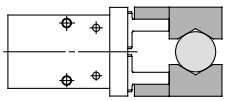
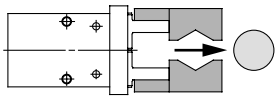
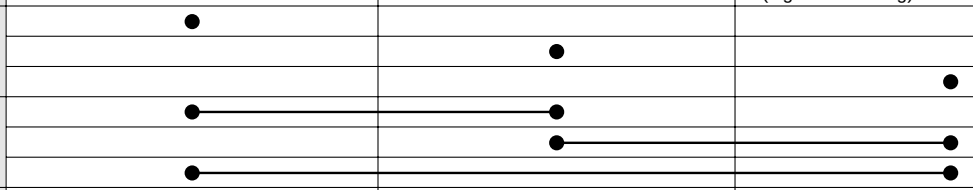
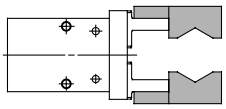
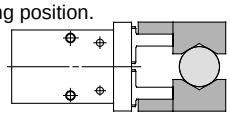
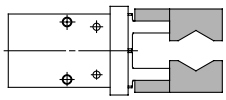
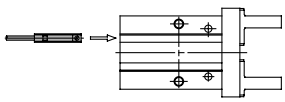
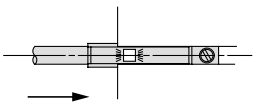
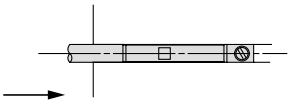
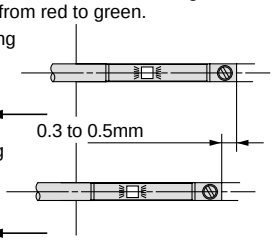
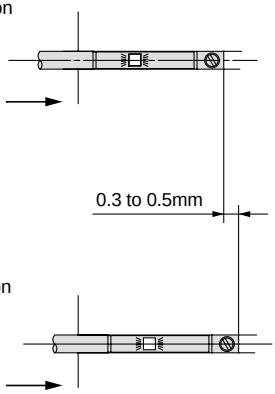
Example: Load impendence is 3kΩ
Leakage current from switch is 1mA

<Reed switch>
Because there is no current leakage, the load voltage will not increase when turned OFF, but due the number of switches in the ON state, the indicator lights will sometimes get dark or not light up, because of dispersion and reduction of the current flowing to the switches.

Series MHZ2, MHZJ2, MHK2, MHKL2, MHC2, MHT2
Installation and Setting of Auto Switch

Auto switches can be used in various ways depending on the number installed and the required detecting position.

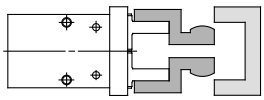
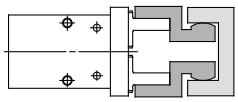
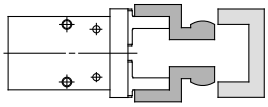
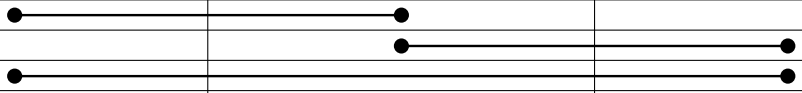
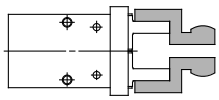
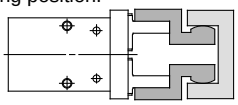
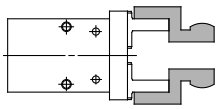
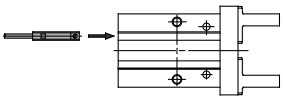
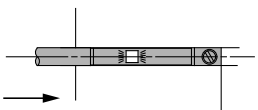
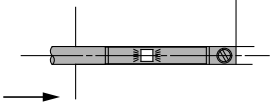
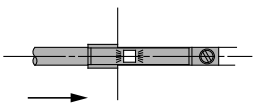
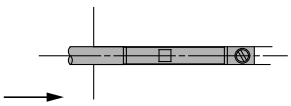
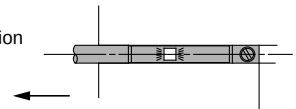
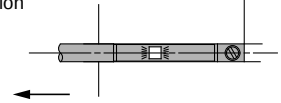
1) External Holding

Detection example	① Confirmation of fingers in reset position	② Confirmation of work held	③ Confirmation of work released
Detecting position	Fingers fully opened position 	Work holding position 	Fingers fully closed position 
Operation of auto switch	Switch to turn ON when fingers are reset position (Light illuminating)	Switch to turn ON when work is held (Light illuminating)	When work is held (Normal operation): Switch to turn OFF (Light not illuminating) When work is not held (Abnormal operation): Switch to turn ON (Light illuminating)
Detection Combinations — One Auto Switch			
Detection Combinations — Two Auto Switches			
How to determine the auto switch installation position "Set up as directed with power connected under no pressure or low pressure."	**Step 1)** Completely open fingers. 	**Step 1)** Locate the fingers in the work holding position. 	**Step 1)** Completely close fingers. 
	Step 2) Insert auto switch into the switch installation groove in the direction shown in the following drawing. 		
	Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.  **Step 4)** Slide the auto switch further in the direction of the arrow until the indicator light goes out.  **Step 5)** Move the auto switch in the opposite direction and fasten it at a position 0.3 to 0.5mm beyond the position where the indicator light illuminates. In case of 2 color indicator type, fasten it at the location when the indicator light color changes from red to green. Illuminating position 0.3 to 0.5mm Fastening position 	**Step 3)** Slide auto switch in the direction of the arrow until the light and fasten it at a position 0.3 to.0.5 mm in the direction of the arrow beyond the position where the indicator light illuminates. In case of 2 color type, fasten it at the location where the indicator light color changes from red to green. Light illuminating position 0.3 to 0.5mm Switch fastening position 	

Note) • It is recommended that work is held around the center of the finger stroke.
• If work is held around the finger opening/closing stroke end, the above detection combination may be limited due to hysteresis of the auto switches.

Auto switches can be used in various ways depending on the number installed and the required detecting position.

2) Internal Holding

Detection example	① Confirmation of fingers in reset position	② Confirmation of work held	③ Confirmation of work released
Detecting position	Fingers fully closed position 	Work holding position 	Fingers fully opened position 
Operation of auto switch	Switch to turn ON when fingers are reset position (Light illuminating)	Switch to turn ON when work is held position (Light illuminating)	When work is held (Normal operation): Switch to turn OFF (Light not illuminating) When work is not held (Abnormal operation): Switch to turn ON (Light illuminating)
Detection Combinations: One Auto Switch			
Detection Combinations: Two Auto Switches			
How to determine the auto switch installation position "Set up as directed with power connected under no pressure or low pressure."	**Step 1)** Completely close fingers. 	**Step 1)** Locate the fingers in the work holding position. 	**Step 1)** Completely open the fingers. 
	Step 2) Insert auto switch into the switch installation groove in the direction shown in the following drawing. 		
	Step 3) Move the auto switch in the direction of the arrow and fasten it at a position 0.3 to 0.5mm beyond the position where the indicatior light illuminates. In case of 2 color indicator type, fasten it at the location when the indicator light color changes from red to green. Light illuminating position  0.3 to 0.5mm Switch fastening position 	**Step 3)** Slide the auto switch in the direction of the arrow until the indicator light illuminates.  **Step 4)** Slide auto switch further in the direction of the arrow until the indicator light goes out.  **Step 5)** Move the auto switch in the opposite direction 0.3 to 0.5mm in the direction indicated by the arrow from its location when the indicator light comes on again. In case of 2 color indicator type, fasten it at the location when the indicator light color changes from red to green. Light illuminating position  0.3 to 0.5mm Switch fastening position 

Note) • It is recommended that work is held around the center of the finger stroke.
• If work is held around the finger opening/closing stroke end, the above detection combination may be limited due to hysteresis of the auto switches.

Installation and Setting of Auto Switch

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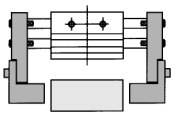
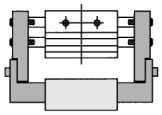
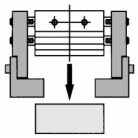
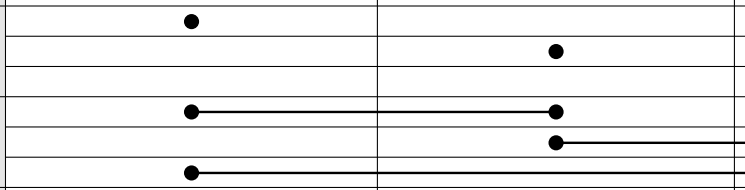
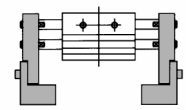
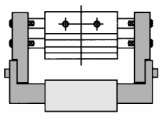
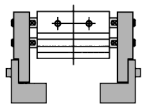
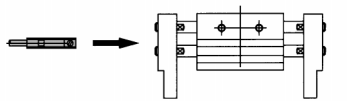
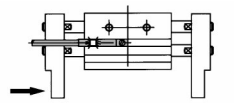
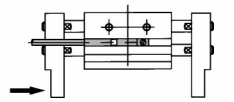
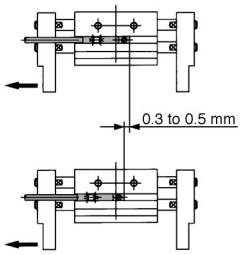
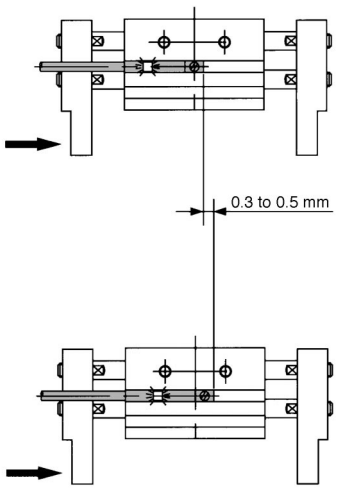
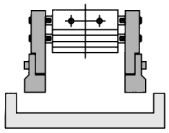
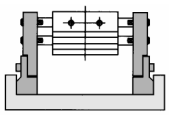
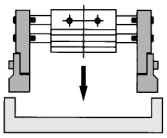
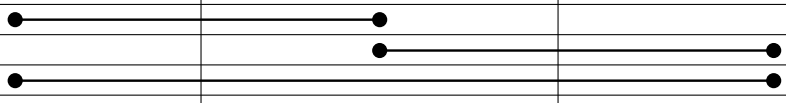
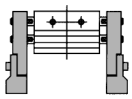
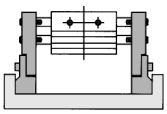
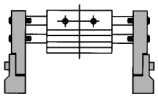
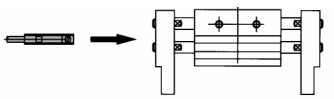
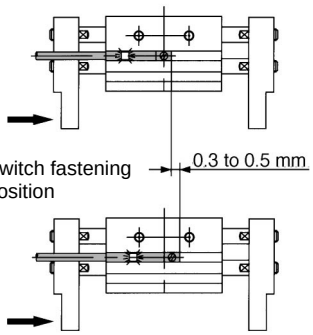
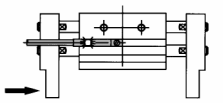
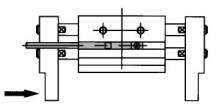
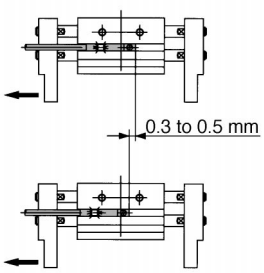
Detection example	① Confirmation of fingers in reset position	② Confirmation of work held	③ Confirmation of work released
Detecting position	Fingers fully opened position 	Work holding position 	Fingers fully closed position 
Operation of auto switch	Switch to turn ON when fingers are reset position (Light illuminating)	Switch to turn ON when work is held (Light illuminating)	When work is held (Normal operation): Switch to turn OFF (Light not illuminating) When work is not held (Abnormal operation): Switch to turn ON (Light illuminating)
Detection Combinations: One Auto Switch			
Detection Combinations: Two Auto Switches			
How to determine the auto switch installation position "Set up as directed with power connected under no pressure or low pressure."	**Step 1)** Completely open fingers. 	**Step 1)** Locate the fingers in the work holding position. 	**Step 1)** Completely close fingers. 
	Step 2) Insert auto switch into the switch installation groove in the direction shown in the following drawing. 		
	Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.  **Step 4)** Slide the auto switch further in the direction of the arrow until the indicator light goes out.  **Step 5)** Move the auto switch in the opposite direction and fasten it at a position 0.3 to 0.5mm beyond the position where the indicator light illuminates. In case of 2 color indicator type, fasten it at the location when the indicator light color changes from red to green. 	**Step 3)** Slide auto switch in the direction of the arrow until the light and fasten it at a position 0.3 to.0.5 mm in the direction of the arrow beyond the position where the indicator light illuminates. In case of 2 color type, fasten it at the location where the indicator light color changes from red to green. Light illuminating position 

Note) • It is recommended that work is held around the center of the finger stroke.
• If work is held around the finger opening/closing stroke end, the above detection combinations may be limited due to hysteresis of the auto switches.

Auto switches can be used in various ways depending on the number installed and the required detecting position.

2) Internal Holding

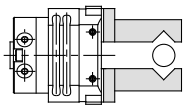
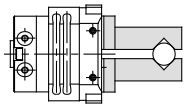
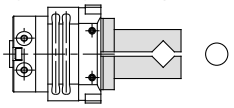
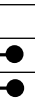
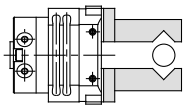
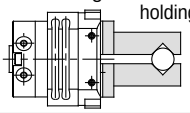
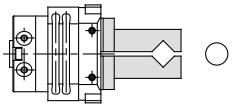
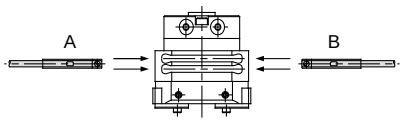
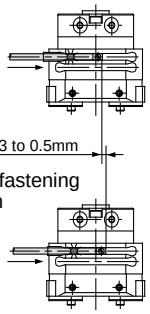
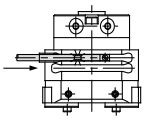
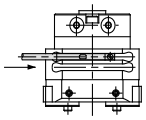
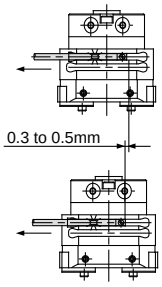
Detection example	① Confirmation of fingers in reset position	② Confirmation of work held	③ Confirmation of work released
Detection position	Fingers fully closed position 	Work holding position 	Fingers fully opened position 
Operation of auto switch	Switch to turn ON when fingers are reset position (Light illuminating)	Switch to turn ON when work is held (Light illuminating)	When work is held (Normal operation): Switch to turn OFF (Light not illuminating) When work is not held (Abnormal operation): Switch to turn ON (Light illuminating)
Detection Combinations — **One Auto Switch**			
Detection Combinations — **Two Auto Switches**			
How to determine the auto switch installation position "Set up as directed with power connected under no pressure or low pressure."	**Step 1)** Completely close fingers 	**Step 1)** Locate the fingers in the work holding position. 	**Step 1)** Completely open fingers 
	Step 2) Insert the auto switch into the switch installation groove in the direction shown in the following drawing. 		
	Step 3) Slide auto switch in the direction of the arrow until the light and fasten it at a position 0.3 to 0.5 mm in the direction of the arrow beyond the position where the indicator light illuminates. In case of 2 color type, fasten it at the location where the indicator light color changes from red to green. Light illuminating position 	**Step 3)** Slide the auto switch in the direction of the arrow until the indicator light illuminates.  **Step 4)** Slide auto switch a further distance in the direction of the arrow until the indictor light goes out.  **Step 5)** Move the auto switch in the opposite direction and fasten it at a position 0.3 to 0.5mm beyond the position where the indicator light illuminates. In case of 2 color indicator type, fasten it at the location when the indicator light color changes from red to green. Light illuminating position Switch fastening position 

Note) • It is recommended that work is held around the center of the finger stroke.
• If work is held around the finger opening/closing stroke end, the above detection combination may be limited due to hysteresis of the auto switches.

Installation and Setting of Auto Switch

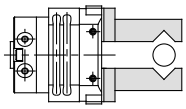
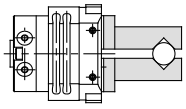
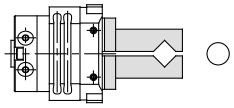
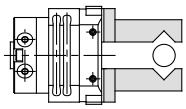
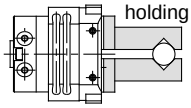
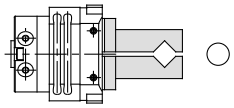
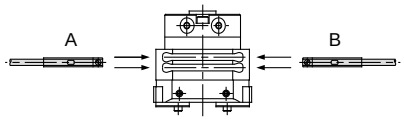
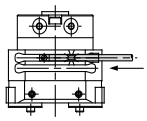
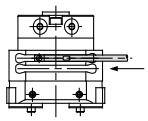
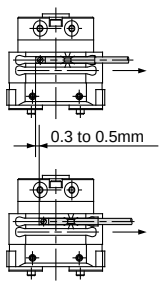
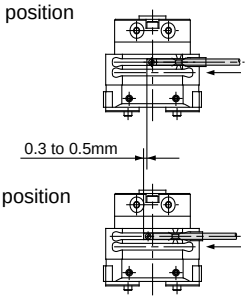
Auto switches can be used in various ways depending on the number installed and the required detecting position.

1) External Holding/Auto Switch Mounted from Direction A

Detection example	① Confirmation of fingers in reset position	② Confirmation of work held	③ Confirmation of work released
Detecting position	Fingers fully opened position 	Work holding position 	Fingers fully closed position 
Operation of auto switch	Switch to turn ON when fingers are reset position (Light illuminating)	Switch to turn ON when work is held (Light illuminating)	When work is held (Normal operation): Switch to turn OFF (Light not illuminating) When work is not held (Abnormal operation): Switch to turn ON (Light illuminating)
Detection Combinations: One Auto Switch			
Detection Combinations: Two Auto Switches			
How to determine the auto switch installation position "Set up as directed with power connected under no pressure or low pressure."	**Step 1)** Completely open fingers. 	**Step 1)** Locate the fingers in the work holding position. 	**Step 1**) Completely close fingers. 
	Step 2) Insert auto switch into the switch installation groove from direction A. 		
	Step 3) Slide auto switch in the direction of the arrow until the indicator light illuminates. Move the switch an additional 0.3 to 0.5 mm in the direction of the arrow and fasten it. Light illuminating position 	**Step 3)** Slide the auto switch in the direction of the arrow until the indicator light illuminates.  **Step 4)** Slide the auto switch in the direction of the arrow until the indicator light goes out.  **Step 5)** Move the auto switch in the opposite direction, and fasten it at a position 0.3 to 0.5 mm in the direction of the arrow beyond the position where the indicator light illuminates. Light illuminating position 

Note) • It is recommended that work is held around the center of the finger stroke.
• If work is held around the finger opening/closing stroke end, the above detection combination may be limited due to hysteresis differential of the auto switches.

2) External Holding/Auto Switch Mounted from Direction B.

Detection example	① Confirmation of fingers in reset position	② Confirmation of work held	③ Confirmation of work released
Detecting position	Fingers fully opened position 	Work holding position 	Fingers fully closed position 
Operation of auto switch	Switch to turn ON when fingers are reset position (Light illuminating)	Switch to turn ON when work is held (Light illuminating)	When work is held (Normal operation): Switch to turn OFF (Light not illuminating) When work is not held (Abnormal operation): Switch to turn ON (Light illuminating)
Detection Combinations — One Auto Switch	●	●	●
Detection Combinations — Two Auto Switches	●	●	●
How to determine the auto switch installation position "Set up as directed with power connected under no pressure or low pressure."	**Step 1)** Completely open fingers. 	**Step 1)** Locate the fingers in the work holding position. 	**Step 1)** Completely close fingers. 
	Step 2) Insert auto switch into the switch installation groove from direction B. 		
	Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.  **Step 4)** Slide the auto switch in the direction of the arrow until the indicator light goes out.  **Step 5)** Move the auto switch in the opposite direction, and fasten it at a position 0.3 to 0.5 mm in the direction of the arrow beyond the position where the indicator light illuminates. Light illuminating position 0.3 to 0.5mm Switch fastening position 	**Step 3)** Slide the auto switch in the direction of the arrow until the indicator light illuminates. Move the switch an additional 0.3 to 0.5 mm in the direction of the arrow and fasten it. Light illuminating position 0.3 to 0.5mm Switch fastening position 	

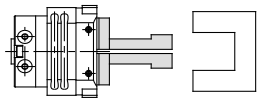
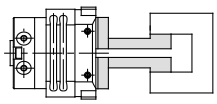
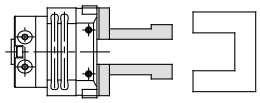
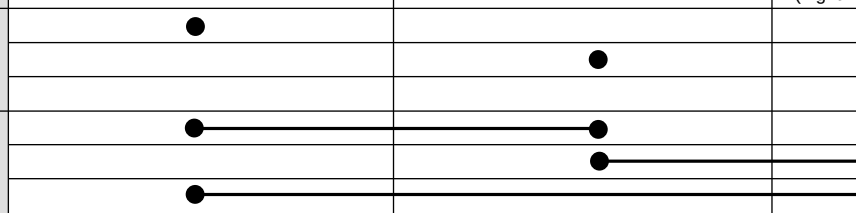
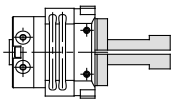
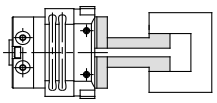
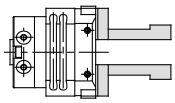
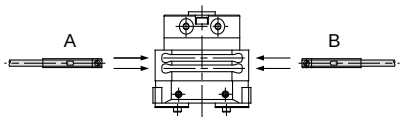
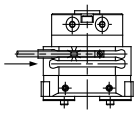
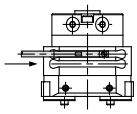
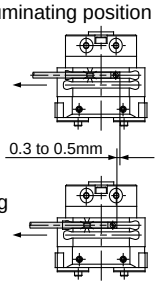
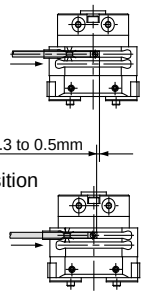
Note) • It is recommended that work is held around the center of the finger stroke.
• If work is held around the finger opening/closing stroke end, the above detection combination may be limited due to hysteresis of the auto switches.

MHZ2
MHZJ2
MHQ
MHL2
MHR
MHK
MHS
MHC2
MHT2
MHY2
MHW2
MRHQ
Auto switch

Installation and Setting of Auto Switch

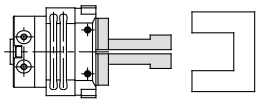
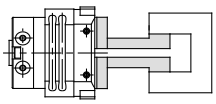
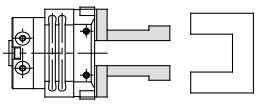
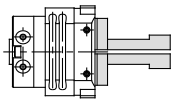
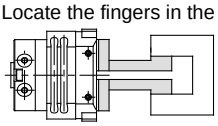
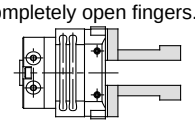
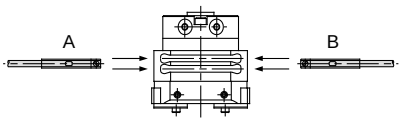
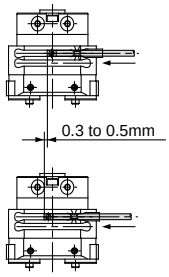
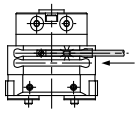
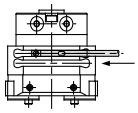
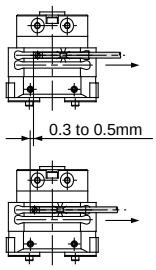
Auto switches can be used in various ways depending on the number installed and the required detecting position.

3) Internal Holding/Auto Switch Mounted from Direction A

Detection example	① Confirmation of fingers in reset position	② Confirmation of work held	③ Confirmation of work released
Detecting position	Fingers fully closed position 	Work holding position 	Fingers fully opened position 
Operation of auto switch	Switch to turn ON when fingers are reset position (Light illuminating)	Switch to turn ON when work is held (Light illuminating)	When work is held (Normal operation): Switch to turn OFF (Light not illuminating) When work is not held (Abnormal operation): Switch to turn ON (Light illuminating)
Detection Combinations — One Auto Switch			
Detection Combinations — Two Auto Switches			
How to determine the auto switch installation position "Set up as directed with power connected under no pressure or low pressure."	**Step 1)** Completely close fingers. 	**Step 1)** Locate the fingers in the work holding position. 	**Step 1)** Completely open fingers. 
	Step 2) Insert auto switch into the switch installation groove from direction A. 		
	Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.  **Step 4)** Slide the auto switch in the direction of the arrow until the indicator light goes out.  **Step 5)** Move the auto switch in the opposite direction, and fasten it at a position 0.3 to 0.5 mm in the direction of the arrow beyond the position where the indicator light illuminates. Light illuminating position 	**Step 3)** Slide the auto switch in the direction of the arrow until the indicator light illuminates. Move the switch an additional 0.3 to 0.5 mm in the direction of the arrow and fasten it. Light illuminating position 	

Note) • It is recommended that work is held around the center of the finger stroke.
• If work is held around the finger opening/closing stroke end, the above detection combination may be limited due to hysteresis differential of the auto switches.

4) Internal Holding/Auto Switch Mounted from Direction B

Detection example	① Confirmation of fingers in reset position	② Confirmation of work held	③ Confirmation of work released
Detecting position	Fingers fully closed position 	Work holding position 	Fingers fully opened position 
Operation of auto switch	Switch to turn ON when fingers are reset position (Light illuminating)	Switch to turn ON when work is held (Light illuminating)	When work is held (Normal operation): Switch to turn OFF (Light not illuminating) When work is not held (Abnormal operation): Switch to turn ON (Light illuminating)
Detection Combinations: One Auto Switch	●	●	●
Detection Combinations: Two Auto Switches	●	●	●
How to determine the auto switch installation position "Set up as directed with power connected under no pressure or low pressure."	**Step 1)** Completely close fingers. 	**Step 1)** Locate the fingers in the work holding position. 	**Step 1)** Completely open fingers. 
	Step 2) Insert auto switch into the switch installation groove from direction B. 		
	Step 3) Slide the auto switch in the direction of the arrow until the light illuminates. Move the switch an additional 0.3 to 0.5 mm in the direction of the arrow and fasten it. Light illuminating position Switch fastening position 	**Step 3)** Slide the auto switch in the direction of the arrow until the indicator light illuminates appears.  **Step 4)** Slide the auto switch in the direction of the arrow until the indicator light goes out.  **Step 5)** Move the auto switch in the opposite direction, and fasten it at a position 0.3 to 0.5 mm in the direction of the arrow beyond the position where the indicator light illuminates. Light illuminating position Switch fastening position 

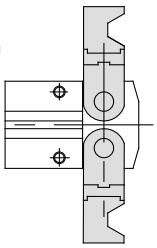
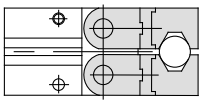
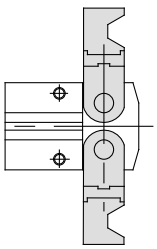
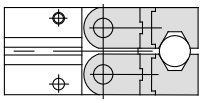
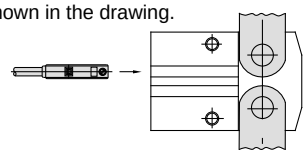
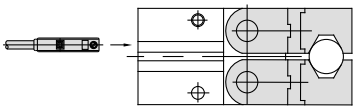
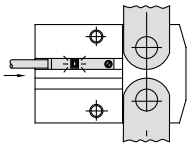
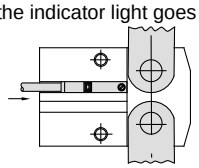
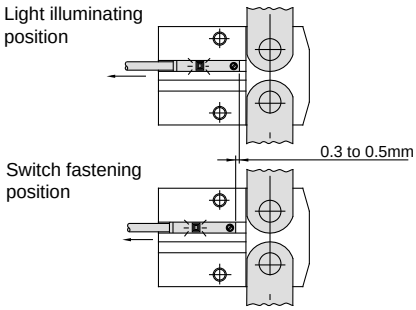
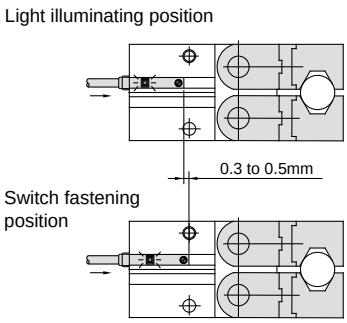
Note) • It is recommended that work is held around the center of the finger stroke.
• If work is held around the finger opening/closing stroke end, the above detection combination may be limited due to hysteresis of the auto switches.

MHZ2
MHZJ2
MHQ
MHL2
MHR
MHK
MHS
MHC2
MHT2
MHY2
MHW2
MRHQ
Auto switch

Installation and Setting of Auto Switch

Auto switches can be used in various ways depending on number of switches installed and the required detecting position.

External Holding

Detection example	① Confirmation of the fingers in reset position	② Confirmation of work held
Detection position	Fingers fully opened position 	Work holding position 
Operation of auto switch	Switch to turn ON when fingers are in reset position (Light illuminating)	Switch to turn ON when work is held (Light illuminating)
How to determine the auto switch installation position "Set up as directed with power connected under no pressure or low pressure."	**Step 1)** Completely open the fingers. 	**Step 1)** Locate the fingers in the work holding position. 
	Step 2) Insert auto switch into the switch groove in the direction shown in the drawing. 	**Step 2)** Insert auto switch into the switch groove in the direction shown in the drawing. 
	Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.  **Step 4)** Slide the auto switch further in the direction of the arrow until the indicator light goes out.  **Step 5)** Move the auto switch in the opposite direction and fasten it at a position 0.3 to 0.5mm beyond the position where the indicator light illuminates. In case of 2 color indicator type, fasten it at the location when the indicator light color changes from red to green. 	**Step 3)** Slide auto switch in the direction of the arrow until the indicator light illuminates. Move the switch further 0.3 to 0.5 mm in the direction of the arrow and fasten it. In case of 2 color indicator type, fasten it at the location when the indicator light color changes from red to green. 

SMC **P.G. Information**

SP 99 5 X - 077 E

Flexible cable spec. auto switch

D-※※※-61

Application : Use when flexing stress is applied on switch lead wire.

Feature : Flexibility performance of lead wire is improved 5~10 times. (comparison within SMC)

Specifications: Same as standard product

How to order

D - ※※※ □ - 61

- - : Length of lead wire 0.5 [m]
- L: 〃 3 [m]
- Z: 〃 5 [m]
- Model No. (Refer to following table)

○ Table for applicable auto switch

Mounting method	Function	Electrical entry	Model No.	Length of lead wire [m]		
				0.5 (-)	3 (L)	5 (Z)
Rail	-	Grommet: In-line	F79, F7P, J79	●	●	●
		Grommet: Perpendicular	F7NV, F7PV, F7BV	●	●	●
	2 colors indication	Grommet: In-line	F79W, F7PW, J79W	●	●	●
		Grommet: Perpendicular	F7NWV, F7BWV	●	●	●
	Water resistant	Grommet: In-line	F7BA	-	●	●
	With timer		F7NT	-	●	●
Band	-	Grommet: In-line	H7A1, H7A2, H7B	●	●	●
	2 colors indication		H7NW, H7PW, H7BW	●	●	●
	Water resistant		H7BA	-	●	●
Direct (mechanical joint)	-	Grommet: In-line	M5N, M5P, M5B	●	●	●
	2 colors indication		M5NW, M5PW, M5BW	●	●	●
	With timer		M5NT, M5PT	-	●	●
Direct (small groove mounting)	-	Grommet: In-line	F9N, F9P, F9B	●	●	●
		Grommet: Perpendicular	F9NV, F9PV, F9BV	●	●	●
	2 colors indication	Grommet: In-line	F9NW, F9PW, F9BW	●	●	●
		Grommet: Perpendicular	F9NWV, F9PWV, F9BWV	●	●	●
	Water resistant	Grommet: In-line	F9BA	-	●	●
Rotary actuator	-	Grommet: In-line	S791/2, S7P1/2, T791/2	●	●	●
			S991/2, S9P1/2, T991/2	●	●	●
		Grommet: Perpendicular	S99V1/2, S9PV1/2, T99V1/2	●	●	●

Dimension: Same as standard product

SMC **P.G. Information**

SP 99 5 X - 078 E

10m lead wire spec. auto switch

D-※※※-44

Application: Use when equipment and control board (relay box) are apart

Feature : Length of switch lead wire is changed to 10 [m]

Specifications: Same as standard product

How to order

D - ※※※ - 44

└— Model No. (Refer to following table)

○ Table for applicable auto switch

Mounting method	Function	Model No.
Rail	-	F79, F7P, J79, F7NV, F7PV, F7BV
	2 colors indication	F79W, F7PW, J79W, F7NWV, F7BWV
	Water resistant	F7BAL
Band	-	H7A1, H7A2, H7B, G59, G5P, K59
	2 colors indication	H7NW, H7PW, H7BW, G59W, G5PW, K59W
	Water resistant	H7BAL, G5BAL
Tie rod	-	F59, F5P, J59
	2 colors indication	F59W, F5PW,J59W
	Water resistant	F5BAL
Direct (mechanical joint)	-	M5N, M5P, M5B
	2 colors indication	M5NW, M5PW, M5BW
Direct (small groove mounting)	-	F9N, F9P, F9B, F9NV, F9PV, F9BV
	2 colors indication	F9NW, F9PW, F9BW, F9NWV, F9PWV, F9BWV
	Water resistant	F9BAL
Direct (groove mounting)	-	Y59A, Y59B, Y69A, Y69B, Y7P, Y7PV
	2 colors indication	Y7NW, Y7PW, Y7BW, Y7NWV, Y7PWV, Y7BWV
	Water resistant	Y7BAL
Rotary actuator	-	S791/2, S7P1/2, T791/2
		S991/2, S9P1/2, T991/2
		S99V1/2, S9PV1/2, T99V1/2

Dimension: Same as standard product

SMC **P.G. Information**

SP 99 5 X - 076 E

B contact spec. auto switch

D-Y59A※-232

Application: Used in case inverse signal is necessary at ON/OFF output signal

Feature : Output (indicator light) is ON at non-detection
Output (indicator light) is OFF at detection

Comparison with standard products
Inverse ON/OFF output signal

Specifications

Power voltage	DC4.5~28V
Current consumption	10mA or less
Load voltage	DC28V or less
Internal voltage drop	1.5V or less (0.8V or less at 10mA or less)
Current leakage	100μA or less
Operating time	1ms or less
Indicator light	Red light emitting diode at non-detection
Shock resistant	1000m/s² (102G)
Insulation resistance	50[MΩ]or more at DC500V Mega (lead wire, between cases)
Withstand voltage	AC1000V 1 minute (lead wire, between cases)
Ambient temperature	-10~60°C

How to order

D-Y59A□-232

- : Length of lead wire 0.5 [m]
L: 〃 3 [m]
Z: 〃 5 [m]

Dimension

Same as standard product

SMC **P.G. Information**

SP 99 5 X - 079 E

Polyurethane code spec. solid state auto switch
D-※※※-318

Application : Adopt a cable which sheath material is the same with the one mainly used in EU

Comparison with standard products: Polyurethane cable is used

Specifications: Same as standard product

How to order

D - ※※※ - 318

Standard product No. — Special order No.

D-F9PZ
D-F9PVZ
D-Y7PZ
D-Y7PVZ

Dimension: Same as standard product

SMC **P.G. Information**

SP 99 5 X - 080 E

Solid state auto switch with timer
D-※※※-214

Application: Use to detect intermediate position of actuator which operates at high speed

Feature: When switch operating time is very short (actuator operates at high speed), direct input to PLC is available since switch output is maintained at +200[ms] even if switch detection time is over.

Comparison with standard products:
Built-in 200[ms] OFF delay timer

Specifications

Auto switch product No.	D-Y59AL-214	D-Y7PL-214	D-F7PL-214	D-G5PL-214
Wiring method	3 wires			
Power voltage	DC4.5~28[V]			
Current consumption	10[mA] or less			
Load voltage	DC28[V] or less			
Load current	80[mA] or less			
Internal current drop	1.5[V] or less (0.8[V] or less at load current 10[mA])	0.8[V] or less		
Current leakage	100[μA] or less			
Operation	OFF delay			
Operating time	1[ms] or less (operation range/piston speed)			
OFF delay time	200±50[ms]			
Indicator light	ON: when red light emitting diode			
Shock resistant	1,000[m/s²] (102[G])			
Insulation resistance	50[MΩ] or more at DC500[V] mega (between lead wire and case)			
Withstand voltage	AC1,000[V], 1 minute (between lead wire and case)			
Ambient temperature	-10~+60[°C]			

How to order

D-※※※ -214

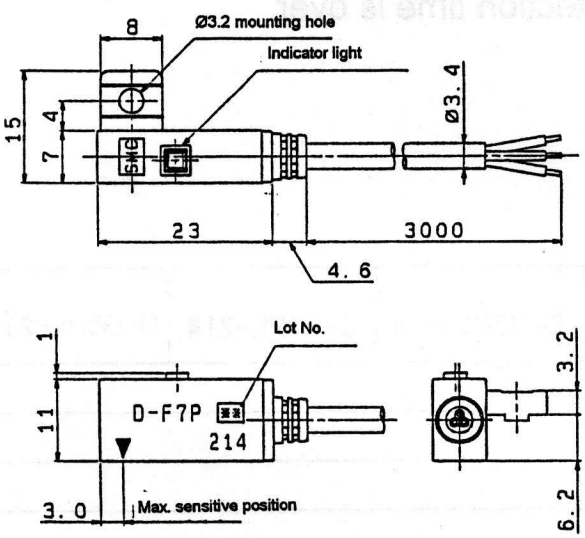
Special order No.

Standard product No.

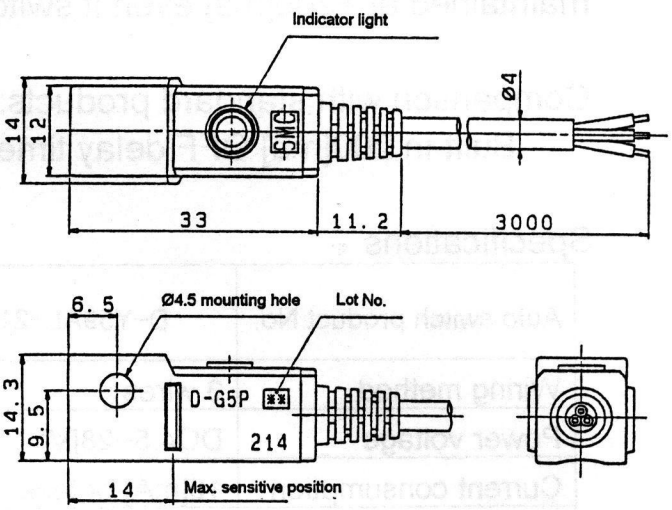
D-F7PL
D-Y59AL
D-Y7PL
D-G5PL

Dimension

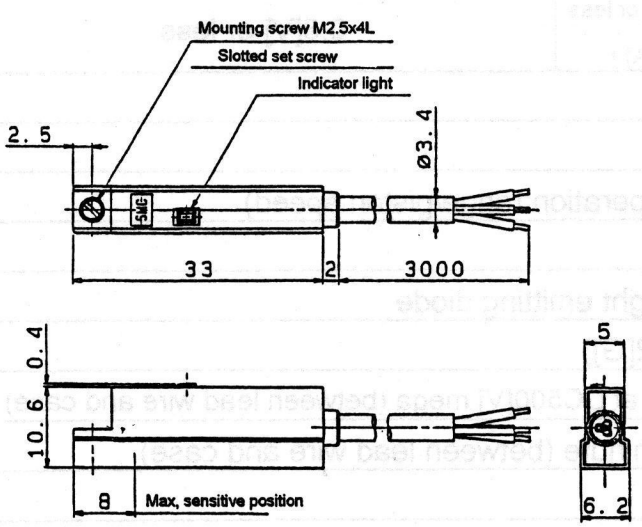
○D-F7PL-214



○D-G5PL-214



○D-Y59AL/Y7PL-214



SP995X-081E

SMC **P. G. Information**

SMC CORPORATION
1-16-4 Shimbashi, Minato-ku
Tokyo 105-8659, JAPAN

Solid state auto switch with pre-wire connector

D-* * * * *P C

Application: Use to solve complication of wiring

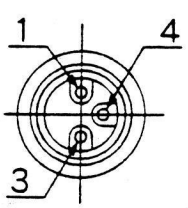
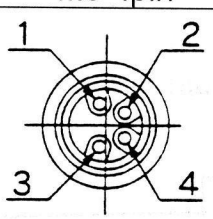
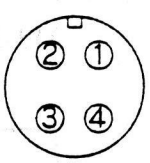
Feature: Reduce the harness work and improve the maintainability of equipment

Comparison with standard products:

Install the connector at the tip of cable

Specifications:

- Sensor is identical with the standard product.
- Connector

Connector style	M8-3pin	M8-4pin	M12-4pin
Pin arrangement			
Applicable standards	JIS C 4524, JIS C 4525, IEC 947-5-2, NECA 0402		
Impact resistant	300m/s^2		
IP degrees of protection	IP-67 (IEC529 standard)		
Insulation resistance	100MΩ or more at 500VDC meg.		
Withstand voltage	1500VAC 1 minute (between contacts), leakage current 1mA or less		

Sensor type	Lead wire color				Meaning of contact No.			
	1 pin	2 pin	3 pin	4 pin	1 pin	2 pin	3 pin	4 pin
DC 2 wire	Brown	-	-	Blue	OUT(+)	-	-	OUT(-)
DC 2 wire non-polar	-	-	Brown	Blue	-	-	OUT(±)	OUT(∓)
DC 3 wire	Brown	-	Blue	Black	DC(+)	-	DC(-)	OUT
DC 4 wire	Brown	Orange	Blue	Black	DC(+)	Diagnostic output	DC(-)	OUT

How to order

D - F9N S A PC

Standard part No.
(Refer to the table on the next page.)

Connector type

A	M8-3 pins
B	M8-4 pins
D	M12-4 pins

Lead wire length

S	0.5 [m]
M	1.0 [m]
L	3.0 [m]

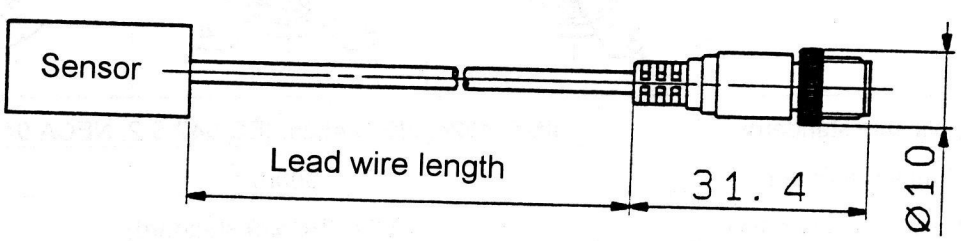
* Series D-P5DW is applicable to D (connector) type only.

* DC 4 wire type is not applicable to A (connector) type.

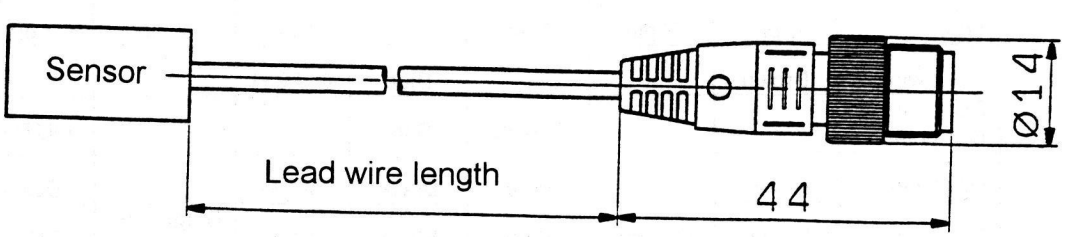
* L (3.0m) is applicable to Series D-P5DW only.

Dimensions

- Sensor is identical with the standard product.
- Connector
  - · M8-3 pin / 4 pin



  - · M12-4 pin



Standard Product No.

Mounting method	Function	Electrical entry	Model	Lead wire length [m]		
				0.5 (S)	1.0 (M)	3.0 (L)
Rail	-	Grommet in-line	F79,F7P,J79	•	•	-
		Grommet perpendicular	F7NV,F7PV,F7BV	•	•	-
	2 color indication	Grommet in-line	F79W, F7PW, J79W	•	•	-
		Grommet perpendicular	F7NWV, F7BWV	•	•	-
	With diagnostic output	Grommet in-line	F7LF, F79F	•	•	-
	Improved water resistance		F7BA	•	•	-
	With timer		F7NT	•	•	-
	Magnetic field resistance		P5DW	•	•	•
Band	-		H7A1, H7A2, H7B	•	•	-
			G59, G5P, K59	•	•	-
	2 color indication		H7NW, H7PW, H7BW	•	•	-
			G59W, G5PW, K59W	•	•	-
	With diagnostic output		H7LF, H7NF, G59F	•	•	-
	Improved water resistance		H7BA, G5BA	•	•	-
	With timer		G5NT	•	•	-
	Wide area detection		G5NB	•	•	-
Tie-rod	-		F59. F5P, J59	•	•	-
	2 color indication		F59W, F5PW, J59W	•	•	-
	With diagnostic output		F5LF, F59F	•	•	-
	Improve water resistance		F5BA	•	•	-
	With timer		F5NT	•	•	-
Direct	-		M5N, M5P, M5B	•	•	-
			Y59A, Y7P, Y59B	•	•	-
		Grommet perpendicular	Y69A, Y7PV, Y69B	•	•	-
	2 color indication	Grommet in-line	M5NW, M5PW, M5BW	•	•	-
			Y7NW, Y7PW, Y7BW	•	•	-
		Grommet perpendicular	Y7NWV, Y7PWV, Y7BWV	•	•	-
	Improved water resistance	Grommet in-line	Y7BA	•	•	-
	With timer		M5NT, M5PT	•	•	-
Direct (Small groove mounting)	-		F9N, F9P, F9B	•	•	-
		Grommet perpendicular	F9NV, F9PV, F9BV	•	•	-
	2 color indication	Grommet in-line	F9NW, F9PW, F9BW	•	•	-
		Grommet perpendicular	F9NWV, F9PWV, F9BWV	•	•	-
	Improved water resistance	Grommet in-line	F9BA	•	•	-
Rotary actuator	-		S791/2, S7P1/2, T791/2	•	•	-
			S991/2, S9P1/2, T991/2	•	•	-
		Grommet perpendicular	S99V1/2, S9PV1/2, T99V1/2	•	•	-

Note

• Connector cable of the counterpart (female side)

SMC does not supply connector cable, so that please refer to the applicable examples in the following table. (Contact each maker as for details such as catalogs.)

Connector size	Number of pins	Maker	Applicable Series
M8	3	Correns	M8-3D
	4		M8-4D
		Omron	XS3
M12		Correns	VA-4D
		Omron	XS2
		Yamatake-Honeywell	PA5-4I
		Hirose	HR24
		Daiichi-Denshi-Kogyo	CM01-8DP4S

SMC **P.G. Information**

SP 99 5 X - 082 E

Non-polar spec. solid state auto switch
D-※※DW※※

SMC CORPORATION
1-16-4 Shimbashi, Minato-ku
Tokyo 105-8659, JAPAN

Application: Use to wire without care for polarity

Feature: Without mistakes on wiring of polarity, maintenance of equipment is improved

Comparison with standard products:

1: No polarity of switch

2: Compared to standard 2 wires solid state auto switch, internal voltage drop is 1[V] larger

Specifications

Load voltage	DC10 to 28[V]
Load current	5 to 40[mA]
Internal current drop	5[V] or less
Current leakage	0.8[mA] or less
Operating time	1[ms] or less
Indicator light	Operating point: red light, Suitable operating point: green light
Shock resistant (with connector)	Switch: 1,000[m/s²] (102[G])
	Connector: 300[m/s²] (30[G])
Insulation resistance	50[M Ω] or more at DC500[V] mega (between lead wire and case)
Withstand voltage	AC1,000[V], 1 minute (between lead wire and case)
Ambient temperature	−10 to +60[°C]

How to order

D-※※DW ※※

Standard product No. ——— Special order additional No.

Standard product No.
D-F5DW
D-Y7DW
D-H7DW
D-G5DW

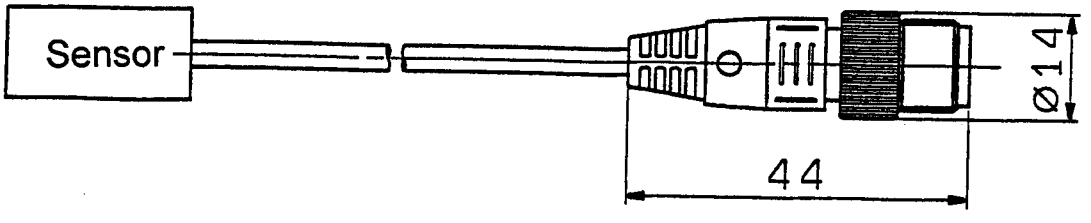
Add. No.	(Special order) specifications	Applicable model
-	0.5[m]	D-F7/H7/G5
L	3.0[m]	D-F5/F7/H7/G5
-124-NS	0.5[m], with M12 connector at the end of cable Connector pin: 3(OUT(±)), 4(OUT(∓)) With cable maker	D-F5/F7/G5
-355	UL cable spec. 0.5[m] With M12 connector at the end of cable Connector pin: 3(OUT(±)), 4(OUT(∓)) Set cable with UL spec. female side connector (2[m])	D-H7
SC	UL cable spec. 0.5[m] With M12 connector at the end of cable Connector pin: 3(OUT(±)), 4(OUT(∓))	D-F5/F7/H7/G5
MC	1.0[m], with M12 connector at the end of cable Connector pin: 3(OUT(±)), 4(OUT(∓))	D-F5/F7/H7/G5

Dimension

○ Sensor part is the same as standard product

D-F5DW*→ Standard product D-F59W
D-F7DW*→ 〃 D-F79W
D-H7DW*→ 〃 D-H7BW
D-G5DW*→ 〃 D-G59W

○ Dimension of connector is as following.



PRODUCT OF THE WEEK

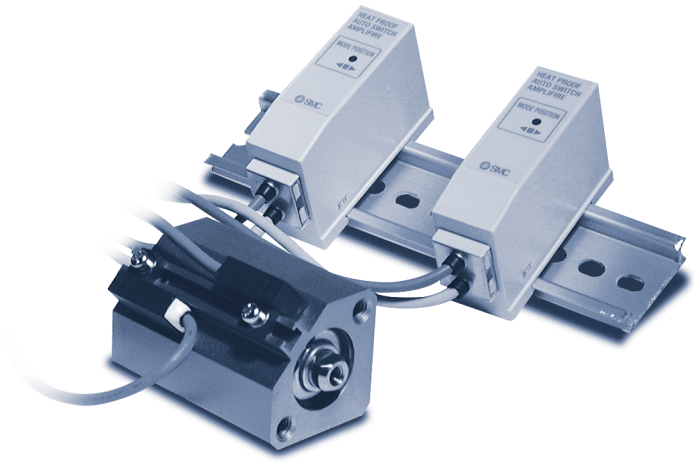
Please insert into your SMC Pneumatics Product Binder

SMC Corporation of America

The world's leader in pneumatics

A New Solution for High Temperature Applications with SMC's Series CQ2...

"Compact Cylinder with Heat Resistant Switch"



Automotive

Semiconductor

Specialty Machine Builder

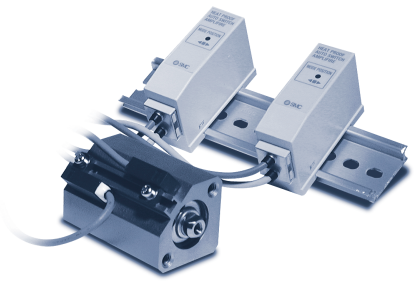
PRODUCT OF THE WEEK

Compact Cylinder with Heat Resistant Switch

High temperature environments do not permit the use of standard cylinder products. Heat melts the seals and cylinder lubrication. Proximity switches are also limited by this temperature constraint. SMC solves these limitations with our XB14 option, the market's *original* compact cylinder with the D-F7NJ heat resistant switch. Special seals and heat resistant grease allow this product to be placed on designs located in environments up to 300°F, making high temperature environments no longer a restriction. This is achieved by mounting the switch sensor on the cylinder separate from the amplifier.

Features and Benefits

- Compact body design for tight spaces
- Heat resistant cylinder seals and lubrication
- Solid-state, heat-resistant switch
- Switch sensor separate from amplifier
- Local manufacturing



Cylinder Specifications

Fluid	Air
Max. operating pressure	150 psi
Min. operating pressure	7.25 psi
Ambient and fluid temperature	32° to 300°F (0° to 150°C)
Operating piston speed	2 to 19 in/s (50 to 500mm/s)
Grease used	Heat resistant grease
Seal material	Fluorine rubber

Switch Specifications

Wiring	D-F7NL	D-F7NJZ
Lead wire length	3m	5m
Output	NPN type	
Power supply voltage	24VDC (20 to 26VDC)	
Ambient temperature	Sensor: 32° to 300°F (0° to 150°C) Amplifier: 32° to 140°F (0° to 60°C)	
Current consumption	25mA or less	
Load voltage	28VDC or less	
Load current	40mA or less	
Internal voltage drop	0.8V or less	
Leakage current	100µA or less	
Operation time	1ms or less	

How to Order

N CDQ2B 20 - 30 D [ ] F7NJL [ ] - XB14

Thread type

-	Metric
N	Inch/NPT

W/auto switch (built-in magnet)

Bore (mm)
16, 20, 25, 32, 40, 50, 63

Cylinder stroke (mm)

Action

D	Double acting

Body option

-	Standard
M	Male rod end thread

*Combination of body option is possible
Note 3) Air-hydro with rubber bumper is not available

Auto switch

F7NJL	3m lead wire
F7NJZ	5m lead wire

Number of auto switches

-	2 pcs.
S	1 pc.
N	"n" pcs.

For further information, contact your local SMC branch office . . .

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