



Installation & Maintenance Manual

Auto Switch (Reed switch type)

Series D-R731-588 / D-R732-588

D-R801-588 / D-R802-588



II 3G Ex nA II T5 X -10°C ≤ Ta ≤ +60°C
II 3D tD A22 IP67 T93°C X

Read this manual before using this product.

For future reference, please keep this manual in a safe place.

This manual should be read in conjunction with the current catalogue.

1.1 General recommendation

These safety instructions are intended to prevent a hazardous situation and/or equipment damage.

These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger".

To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

Caution : Operator error could result in injury or equipment damage.

Warning: Operator error could result in serious injury or loss of life.

Danger : In extreme conditions, there is a possible result of serious injury or loss of life.

Warning

1.1.1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements.

1.1.2. Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

1.1.3. Do not service machinery/equipment or attempt to remove component until safety is confirmed.

- 1) Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
- 2) When equipment is to be removed, confirm the safety process as mentioned above. Switch off air and electrical supplies and exhaust all residual compressed air in the system.
- 3) Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of actuators etc. (Supply air into the system gradually to create backpressure, i.e. incorporate a soft-start valve).

1.1.4. Contact SMC if the product is to be used in any of the following conditions:

- 1) Conditions and environments beyond the given specifications, or if product is used outdoors.
- 2) Installations in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.
- 3) Equipment intended for use in potentially explosive atmospheres. Applications which have the possibility of having negative effects on people, property or animals. Special safety analysis is required.

ATEX Marking description

II 3G Ex nA II T5 X -10°C ≤ Ta ≤ +60°C

II 3D tD A22 IP67 T93°C X

Equipment Group II	tD - protected by enclosure
Category 3	A22 - for zone 22
Gas (G) and Dust (D) environment	IP67 - Protection structure
Ex - European standards apply	Ta - Ambient temperature
nA - Non-sparking apparatus	T93°C – max. surface temperature
II - for all types of gas	X - special conditions apply, see instructions
T5 - temperature classification	

2. INSTALLATION AND OPERATING ENVIRONMENT

Warning

Design and selection

- 1) Confirm 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 for load current, voltage, temperature or impact.
- 2) Take precautions when multiple actuators are used close together.
When two or more auto switch actuators are lined up in close proximity to each other, magnetic field interference may cause the switches to malfunction. Maintain a minimum actuator separation of 10mm. (When the allowable interval is specified for each actuator series, use the indicated value)
- 3) Keep wiring as short as possible
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.)
Use a contact protection box when the wire length is 5m or longer.

4) Pay attention to the internal voltage drop of the switch.

1) Switches with an indicator light

- 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 diodes. (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 below 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-R80-588)

Do not use a load that generates surge voltage.

If driving a load such as a relay that generates a surge voltage, use a contact protection box.

6) Cautions for use in an 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.

7) Also perform periodic maintenance and confirm proper operation.

Ensure sufficient clearance for maintenance activities.

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

Warning

Mount / adjustment

- 1) Do not drop or bump.
Do not drop, bump or apply excessive impacts (300m/s² or more for reed switches) while handling. Although the body of the switch may not be damaged, the inside of the switch could be damaged and cause a malfunction.
- 2) Do not carry a actuator by the auto switch lead wires.
Never carry an actuator by its lead wires. This may not only cause broken lead wires, but it may cause internal elements of the switch to be damaged by the stress.
- 3) Mount switches using the proper tightening torque.
If a switch is tightened beyond the range of tightening torque, the mounting screws, mounting brackets or switch may be damaged.
On the other hand, tightening below the range of tightening torque may allow the switch to slip out of position.
- 4) Mount a switch at the center of the operating range.
Adjust the mounting position of an auto switch so that the magnet stops at the center of the operating range (the range in which a switch is ON). (The mounting position shown in the catalog indicates the optimum position at rotation end.) If mounted at the end of the operating range (around the borderline of ON and OFF), operation may be unstable.

Wiring

- 1) Avoid repeatedly bending or stretching lead wires.
Broken lead wires can result from wiring patterns which repeatedly apply bending stress or stretching force to the lead wires.
- 2) Be sure to connect the load before power is applied.
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.
- 3) Confirm 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.
- 4) Do 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 containing auto switches may malfunction due to noise from these other lines.

5) Do not allow short circuit of loads.

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..

6) Avoid incorrect wiring

A 24VDC switch with indicator light has polarity. The brown [red] lead wire is (+), and the blue [black] lead wire is (-).

- 1) If connections are reversed, a switch will operate, however, the light emitting diode will not light up.
Also note that a current greater than that specified will damage a light emitting diode and it will no longer operate.
Applicable models: D-R73 -588

Operating environment

- 1) Do not use in an area where a magnetic field is generated.
Auto switches can malfunction or magnets inside actuators can become demagnetized.
- 2) Do not use in an environment where the auto switch will be continually exposed to water.
Although switches satisfy IEC standard IP67 construction (JIS C 0920: watertight construction), avoid using switches in applications where continually exposed to water splash or spray. Poor insulation or swelling of the potting resin inside switches may cause malfunction.
- 3) Do 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.
- 4) Do not use in an environment with temperature cycles.
Consult SMC if switches are used where there are temperature cycles other than normal air temperature changes, as there may be adverse effects inside the switches.
- 5) Do not use in an environment where there is excessive impact shock.
When excessive impact (300m/s² 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.

Warning

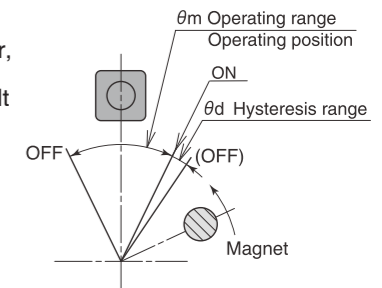
- 6) Avoid accumulation of iron waste or close contact with magnetic substances.
When a large amount of iron waste such as machining chips or spatter is accumulated, or a magnetic substance (something attracted by a magnet) is brought into close proximity with an auto switch actuator, it may cause auto switches to malfunction due to a loss of the magnetic force inside the actuator.

Maintenance

- 1) Perform the following maintenance periodically in order to prevent possible danger due to unexpected auto switch malfunction.
 - 1) Securely 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.

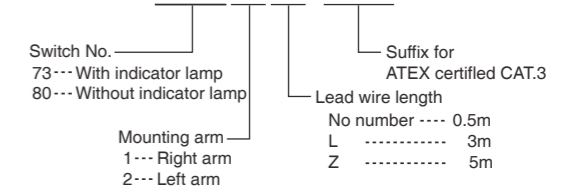
Others

- 1) For durability against water, elasticity, application at welding site, please consult us.
- 2) If ON and OFF position (hysteresis) cause problems, please consult us.



3. Model Indication Method

D-R-588



This product is a Reed Switch type Auto Switch of direct mounting specification.

Switch should only be used in areas in which potentially explosive atmospheres are unlikely to be present or only present for short periods of time.

4. INTENDED CONDITIONS OF USE

The auto switch should be used within the range of specifications below and the auto switch catalogue. If labelled with X: special conditions apply:

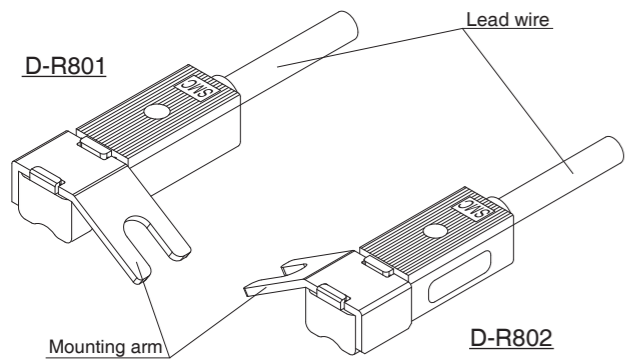
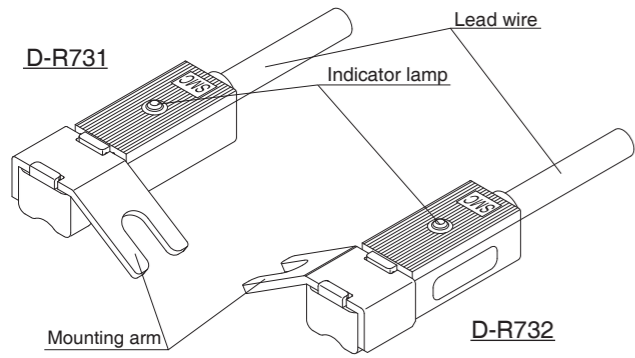
Protect the autoswitch and cable against all impact or mechanical damage.

Protect the autoswitch from sources of heat which can generate surface temperatures higher than the temperature classification.

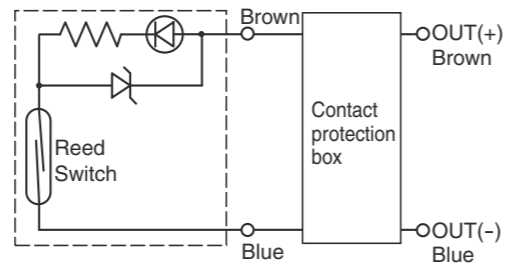
Protect the autoswitch from direct sunlight or UV light using a suitable protective cover.

Model number	D-R731-588/D-R732-588	D-R801-588/D-R802-588
Wiring style	2 wire type	
Application	Relay, PLC	IC, Relay, PLC
Load voltage	24V DC	24V AC or less / 48V AC or less
Load current	5 to 40mA	50mA / 40mA
Internal voltage drop	2.4V or less	—
Internal resistance	—	1Ω or less (Including 3m lead wire)
Contact protection circuit	None	
Operating time	1.2ms	
Operating indicator lamp	Red LED lights when ON	—
Proof impact	300m/s ²	
Insulation resistance	50MΩ or more at DC500V mega	
Proof voltage	AC1500V for 1 minute (lead wire, between cases)	
Ambient temperature	-10 to 60°C	
Protection structure	IP67 to IEC60529, JISC0920	

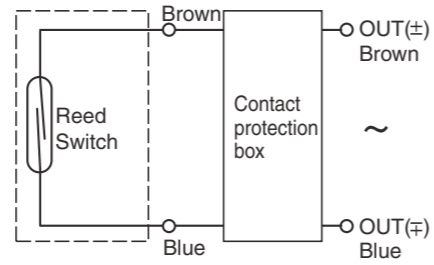
5.Names and Functions of Individual Parts



7.Basic wiring D-R731/R732



D-R801/R802

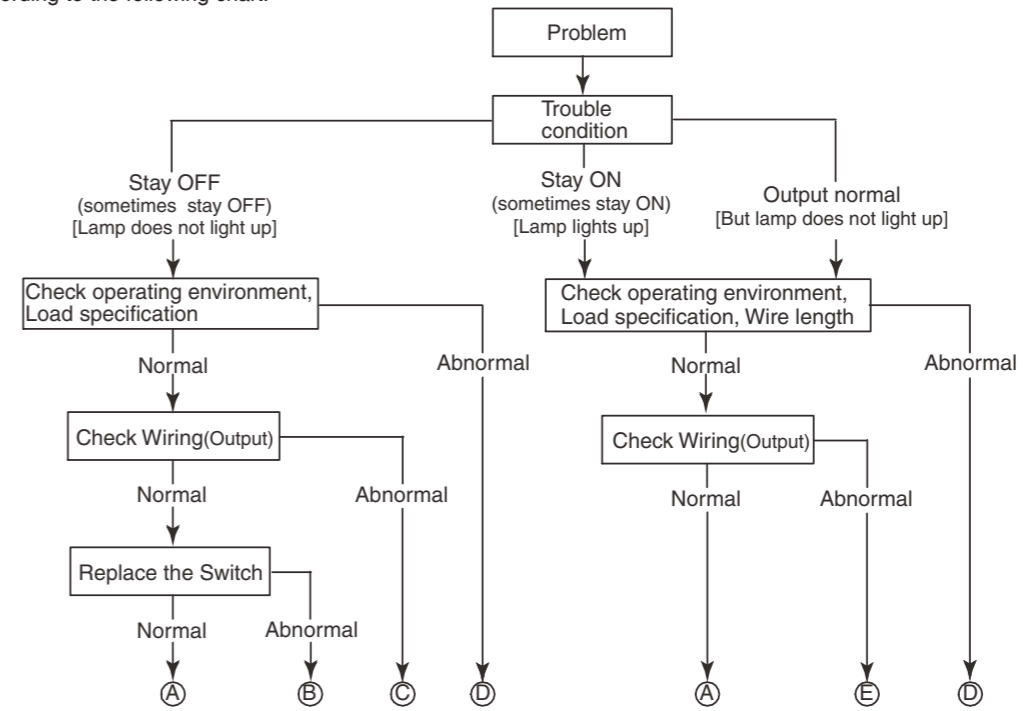


Connection with PLC (sequence controller)

PLC input specification	2 wire output type
Sink input	Sink output
Source input	Source output

9.Check flow

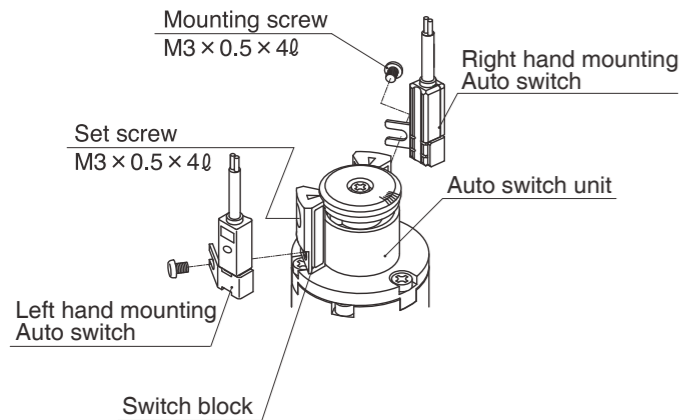
When detection failure occurs (stays On/OFF), please check the switch according to the following chart.



- (A) --- Autoswitch failure
- (B) --- Replace actuator. Detectable magnetic field inadequate (or no magnet)
- (C) --- Correct wiring, replace load or replace autoswitch after correcting the wiring
- (D) --- After checking the operating environment, replace autoswitch
- (E) --- Replace autoswitch after correcting the wiring

6.How to mount

When an autoswitch is mounted for the first time, please ensure the actuator is "with switch unit" type. Please refer to the actuator catalogue for switch unit.



• How to mount auto switch

- ① Loosen the switch mounting screw on the auto switch unit and insert the auto switch arm.
- ② Fix the switch mounting screw by tightening it.

• How to change detecting position of auto switch

- ① When changing the detecting position of the auto switch, loosen the switch block mounting screw and move the auto switch to any position required.
- ② Fix the set screw by tightening it.

• When fixing the auto switch

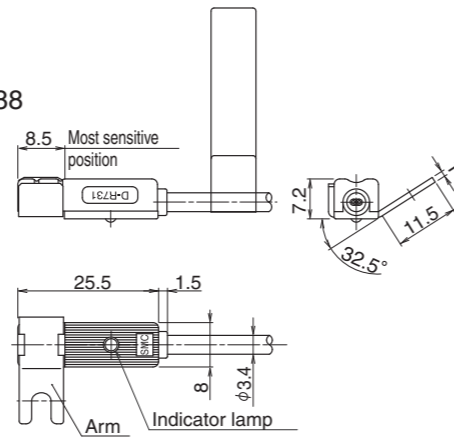
Tightening torque for the switch mounting screw: around 0.49Nm

• When changing the detecting position of the auto switch

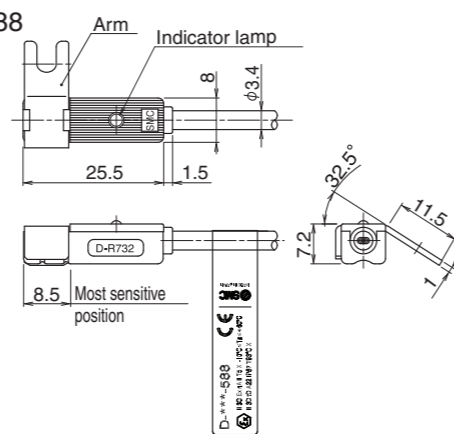
Tightening torque for the switch block set screw: around 0.49Nm

8.Exterior dimension

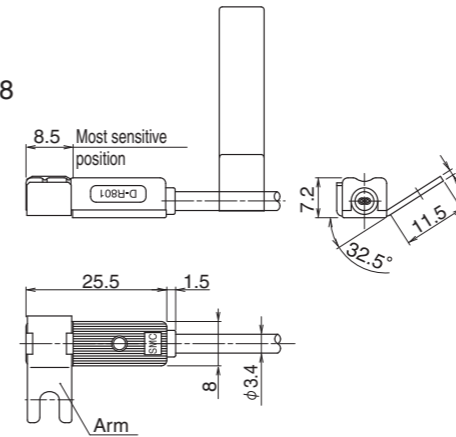
D-R731-588



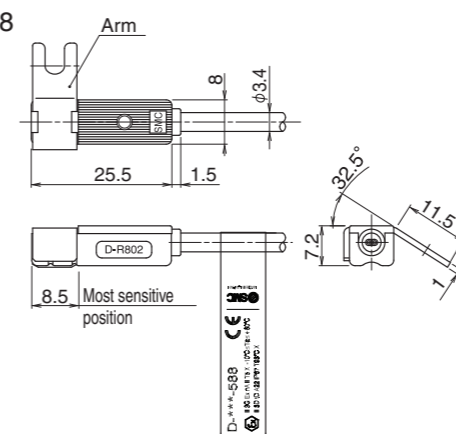
D-R732-588



D-R801-588



D-R802-588



Manufacture's batch marking

Year		Month	
Mark	Year	Mark	Month
6	2006	1	January
7	2007	2	February
8	2008	3	March
9	2009	4	April
⋮	⋮	5	May
		6	June
		7	July
		8	August
		9	September
		X	October
		Y	November
		Z	December

AUSTRIA	(43) 2262 62280	NETHERLANDS	(31) 20 531 8888
BELGIUM	(32) 3 355 1464	NORWAY	(47) 67 12 90 20
CZECH REP.	(420) 541 424 611	POLAND	(48) 22 211 9600
DENMARK	(45) 7025 2900	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	SLOVAKIA	(421) 2 444 56725
FRANCE	(33) 1 6476 1000	SLOVENIA	(386) 73 885 412
GERMANY	(49) 6103 4020	SPAIN	(34) 945 184 100
GREECE	(30) 210 271 7265	SWEDEN	(46) 8 603 1200
HUNGARY	(36) 23 511 390	SWITZERLAND	(41) 52 396 3131
IRELAND	(353) 1 403 9000	UNITED KINGDOM	(44) 1908 563888
ITALY	(39) 02 92711		

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URL <http://www.smcworld.com> (Global) <http://www.smceu.com> (Europe)

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