



# Electric Actuators/Cylinders Precautions 1

Be sure to read before handling.

## General

### Handling

#### Caution

1. In order to ensure proper operation, be certain to read the operation manual carefully. As a rule, handling or usage/operation other than those contained in the operation manual are prohibited.
2. If the actuator will be used in an environment where it will be exposed to chips, dust, cutting oil (water, liquids), etc., a cover or other protection should be provided.
3. Operate with cables such that they are not easily moved. Avoid bending cables at sharp angles where they enter the electric actuator, and also be certain that cables are fixed in position.

### Design

#### Warning

1. In cases where dangerous conditions may result from power failure or malfunction of the product, install safety equipment to prevent damage to machinery and human injury. Consideration must also be given to drop prevention with regard to suspension equipment and lifting mechanisms.
2. Consider possible loss of power sources.  
Take measures to protect against human injury and machine damage in the event that there is a loss of air pressure, electricity or hydraulic power.
3. Consider emergency stops.  
Design so that human injury and/or damage to machinery and equipment will not be caused when machinery is stopped by a safety device under abnormal conditions such as a power outage or a manual emergency stop.
4. Consider the action when operation is restarted after an emergency stop or abnormal stop.  
Design the machinery so that human injury or equipment damage will not occur upon restart of operation.

### Selection

#### Warning

1. Confirm the specifications.  
The products in this catalog should not be used outside of the range of specifications, since this may cause damage or malfunction, etc. (Refer to the specifications.)

### Mounting

#### Caution

1. Be careful that cables are not caught by actuator movement.
2. Do not use in locations where there is vibration or impact shock. Please contact SMC before using in this kind of environment, as damage may result.
3. Give adequate consideration to the arrangement of wiring, etc., when mounting. If wiring is forced into inappropriate arrangement, this may lead to breaks in the wiring and result in malfunction.

### Operating Environment

#### Caution

1. Avoid use in the following environments.
  - 1) Locations with a lot of debris or dust, or where chips may enter.
  - 2) Locations where the ambient temperature exceeds the specified range. (Refer to the specifications.)
  - 3) Locations where the ambient humidity exceeds the specified range. (Refer to the specifications.)
  - 4) Locations where corrosive or combustible gases are generated.
  - 5) Locations where strong magnetic or electric fields are generated.
  - 6) Locations where direct vibration or impact shock, etc., will be applied to the actuator unit.
  - 7) Locations where a lot of dusts, water drops and oil drops are applied to a product.

### Maintenance

#### Warning

1. Perform maintenance inspection according to the procedures indicated in the operation manual.  
If handled improperly, malfunction and damage of machinery or equipment may occur.
2. Removal of equipment  
When equipment is removed, first confirm that measures are in place to prevent dropping or runaway of driven objects, etc., and then proceed after cutting off the electric power. When starting up again, proceed with caution after confirming that conditions are safe.



# Electric Actuators/Cylinders Precautions 2

Be sure to read before handling.

## Electric Actuator/Electric Cylinder

### Design

#### ⚠ Warning

1. There is a possibility of dangerous sudden action by electric actuators/cylinders if sliding parts of machinery are twisted due to external forces, etc.

In such cases, human injury may occur, e.g., by catching hands or feet in the machinery, or damage to the machinery itself may occur. Therefore, the machine should be adjusted for smooth operation and designed to avoid such dangers.

2. A protective cover is recommended to minimize the risk of human injury.

If a driven object and moving parts of an electric actuator/cylinder pose a danger of human injury, design the structure to avoid contact with the human body.

3. Securely tighten all stationary parts and connected parts of electric actuators/cylinders so that they will not become loose.

Avoid use in locations where direct vibration or impact shock, etc., will be applied to the body of the actuator/cylinder.

### Operation

#### ⚠ Caution

1. Conduct the following inspection before electric actuator/cylinder/controller/driver is operated.
  - a) Confirm that the power supply line or each signal line for electric actuator/cylinder/controller/driver is not broken.
  - b) Confirm that the power supply line or each signal line for electric actuator/cylinder/controller/driver is not loosened.
  - c) Confirm that the electric actuator/cylinder/controller/driver is not mounted loosely.
  - d) Confirm that the electric actuator/cylinder/controller/driver is operated correctly.
  - e) Confirm the function of the emergency stop.
2. Take measures such as installing a fence, etc., to prevent any person from entering the operational area of the electric actuator/cylinder/controller/driver and related equipment.
3. If a person should enter an area as previously mentioned 2), take measures to ensure that the emergency stop is controlled by a sensor, etc.
4. In case the electric actuator/cylinder/controller/driver is stopped by abnormalities, take necessary measures to prevent danger from related equipment.
5. In case of abnormalities of related equipment, take the necessary measures to prevent danger from an electric actuator/cylinder/controller/driver.
6. Take necessary measures to prevent broken or cut power lines or signal lines by pinching, shearing, curling, scratching and grazing.

### Operation

#### ⚠ Caution

7. In case there is abnormal heat, fume and flame, etc., cut off the power supply immediately.
8. In the event of an installation, adjustment, inspection or maintenance of an electric actuator/cylinder/controller/driver, as well as related equipment, be certain to cut off the power supply and take measures such as locking or safety-lock, etc., so that persons other than workers are not able to restart the operation again. Furthermore, display the information for doing those jobs at the places where anyone can see easily.
9. In case several persons are doing the job, determine the procedure, signs, measures against abnormality and restarting measures in advance. Then, let the person who is not doing the job, supervise that job.

### Handling

#### ⚠ Caution

1. The actuator/cylinder can be used with a load directly applied to it, as long as it is within the allowable range. However, it is necessary to design an appropriate connecting method and use careful alignment when a load with external support and guide mechanisms is connected. The longer the stroke is, the larger the variation in the axial center becomes. Therefore, devise a connection method to absorb the variation.
2. Since the bearing parts and parts surrounding the lead screw are adjusted at the time of shipment, do not change the setting of the adjusted parts.
3. The product can be used without lubrication. In case the product is lubricated, special grease is required. Please contact the distributor or SMC.
4. If the electric actuator is repeatedly operated with the short stroke cycles (20 mm for LJ/LT, 10 mm for LX), loss of grease may occur. Therefore, operate the actuator with a full stroke once every scores of cycles.
5. When using an electric actuator with stepping motor specifications, use it at speeds of one motor revolution per second or more.  
Confirm the operating conditions, since a low speed (2 revolutions or less) causes the motor to generate large vibrations that may affect the workpiece.

LJ1

LG1

LTf

LC1

LC7

LC8

LXF

LXP

LXS

LC6

LZ

LC3F2

X

D-

E-MY



# Electric Actuators/Cylinders Precautions 3

Be sure to read before handling.

## Electric Actuator/Electric Cylinder

### Mounting

#### **Caution**

1. Do not use until you verify that the equipment can operate properly.
2. The product should be mounted and operated after thoroughly reading the operation manual and understanding its contents.
3. Do not dent, scratch or cause other damage to the body and table mounting surfaces.  
This may cause a loss of parallelism in the mounting surfaces, looseness in the guide unit, an increase in operating resistance or other problems.
4. When attaching a workpiece, do not apply strong impact shock or a large moment.  
If an outside force exceeding the allowable moment is applied, this may cause looseness in the guide unit, an increase in sliding resistance or other problems.
5. When connecting a load having an external support or guide mechanism, be certain to select a suitable connection method and perform careful alignment.
6. Be certain to tighten properly so that there is no possibility of the fixed or connecting parts of the electric actuator or cylinder coming loose.  
Be certain to adopt anti-loosening adhesive or a reliable connecting method if the cylinder is used very frequently or if it is used in a location that is exposed to a large amount of vibrations.

### Grounding

#### **Warning**

1. Be certain to ground the electric cylinder.
2. Dedicated grounding should be used as much as possible. Grounding should be to a type 3 ground. (Ground resistance of 100  $\Omega$  or less.)
3. Grounding should be as close as possible to the electric cylinder, and the ground wires should be as short as possible.



# Electric Actuators/Cylinders Precautions 4

Be sure to read before handling.

## Controller/Driver/Directional Control Valve

### Handling

#### ⚠ Warning

1. Never touch the controller or driver inside. It will likely lead to an electrical shock or other trouble.
2. Use only the designated combination between motor and controller/driver.

#### ⚠ Caution

1. Do not disassemble and modify. It may result in the trouble, malfunction, fire, etc.
2. Do not touch for a while when being energized or after cutting off the power source because it is high temperature.
3. If a fire or danger against the human being is expected by abnormal heat generation of the product, emitting fume and catching on fire, etc., cut off the power supply for the main body and the system immediately.

### Power Supply

#### ⚠ Caution

1. In cases where voltage fluctuations greatly exceed the required voltage, a constant voltage transformer, etc., should be used to allow operation within the required range.
2. Use a power supply that has low noise between lines and between power and ground. In cases where noise is high, an isolation transformer should be used.
3. The power supply line to the controller and the interface power supply line to general input/output and control terminals (24 VDC) must be wired separately in different systems.
4. The wire must not be bundled with or arranged in close proximity to the input/output lines of control terminals or encoder signal lines.
5. To prevent surges from lightning, connect a varistor for lightning. Ground the surge absorber for lightning separately from the grounding of the controller.

### Grounding

#### ⚠ Caution

1. Be certain to carry out grounding in order to ensure the noise tolerance of the controller/driver.
2. Dedicated grounding should be used as much as possible. Grounding should be to a type 3 ground. (Ground resistance of 100 Ω or less.)
3. Grounding should be as close as possible to the controller/driver, and the ground wires should be as short as possible.
4. In the unlikely event that malfunction is caused by the ground, it may be disconnected.

### Mounting

#### ⚠ Caution

1. Mount the controller driver on incombustible materials. Mounting on combustible materials directly or mounting closely to it may lead to a fire.
2. Consider the cooling period so that the operating temperature of main body should be within the range of specifications. Also, allow enough distance from each side of the main body, construction and the parts.
3. Avoid placing with large-sized solenoid contact apparatus or vibrating source such as no fuse insulator and then make a separate panel or mount in the distance.
4. The construction of this product enables the connectors to be inserted or removed after installation.
5. If there are concave or convex or distorted parts on the mounting face, an unreasonable force can be applied to the frame or case, which can cause trouble. Mount on the flat face.

### Wiring

#### ⚠ Danger

1. Adjustment, installation, or wiring changes should be conducted after power supply to this product is turned off. Otherwise, there is a possibility of an electrical shock.

#### ⚠ Caution

1. **Wiring should be done correctly.**  
For each terminal, voltages other than stipulated in the operation manual should not be applied. Otherwise, the product may break.
2. **Connect the connector securely.**  
Check the display adequately, and pay attention to the direction the connector is facing before connecting. Otherwise, the product may malfunction or break.
3. **Treat the noise securely.**  
If the noise is at the same wavelength as the signal lines, it will lead to malfunction. As a countermeasure, separate the high and low electrical lines and shorten the length of wiring, etc.
4. **Never disassemble the motor power lines for the electric actuator/cylinder and the encoder signal lines. Also, in the event of using a cable prepared by customer (user), use it only after confirming the cable size can provide enough electricity as stipulated in the operating manual and that there is no noise effect.**
5. The motor power lines for the electric actuators/cylinders and the encoder signal lines, 100 VAC lines, as well as other high voltage lines, should not be bundled together. They should be placed as far away as possible.
6. Terminals for controlling, for general-purpose input/output, motor power lines and encoder signal lines should never be inserted or pulled out while the main power supply for the controller is ON.

LJ1

LG1

LTF

LC1

LC7

LC8

LXF

LXP

LXS

LC6□

LZ□

LC3F2

X□

D-□

E-MY



# Electric Actuators/Cylinders Precautions 5

Be sure to read before handling.

## Brake

In the unlikely event of brake failure, the brake will become ineffective and the machine may continue moving. Take all available safety precautions in case this should occur. Especially when using as a safety brake, we highly recommend that thorough safety measures be taken.

### Structure

#### Danger

1. **Do not use in an environment where there is a danger of fire or explosion.**

Sparks are sometimes generated during starting or braking. Do not use a brake in environments where there is oil, grease, or flammable gas.

2. **Do not use for braking.**

This is a non-excitation operation type brake designed specifically for maintenance or emergency shutdown purposes. Using it as a brake on a regular basis will quickly cause its performance to decline and disengagement to become impossible. Continued use in this manner will result in a breakdown, meaning that there will be no means of braking and the machine will be out of control. Accidents may occur. When wiring, be careful to follow the operation manual strictly. Perform regular checks to make sure the brake is functioning properly.

### Before Mounting

#### Danger

1. **Use a cable size that is suitable for the power supply capacity.**

Using cables with a small power supply capacity may cause the insulating membrane to melt, resulting in electric shocks, shorts and possible fires.

2. **Check the brake wiring before using.**

If the brake is kept in a de-energized state, it will lock. Unlocking it requires 24 VDC power. Confirm that the wiring suits the application or objective of use.

### During Operation

#### Danger

1. **Stop operation at once if there are abnormal noises or vibrations.**

Abnormal noises or vibrations may mean that the product is not properly mounted, and if allowed to continue in this state, damage to the equipment may occur. Stop operation at once.

2. **Do not touch the brake during operation.**

The surface temperature of the brake part can rise to about 90 to 100°C due to the heat generated by friction or by the built-in coil. Burns may result, so do not touch the brake part with fingers or hands during operation. The surface temperature may rise just through being energized, so do not touch the brake at any time.

### Maintenance

#### Danger

1. **Do not coat with water, oil, or grease.**

Using water, oil or grease on the friction surface or anywhere on the unit may cause it to stick to the friction surface and cause severe reduction in torque. This may cause the machine to coast or to go out of control.

### Operation

#### Caution

1. **The brake coil has no polarity.**
2. **The customer must prepare a power supply for the brake. Do not use the same power supply for the brake and for the control signal (VDC).**
3. **Mount a surge absorber to control the surge voltage generated by the on/off of the relay (RY). Be aware that using a diode will cause a longer time to be taken than using a surge absorber between brake release and start of operation. A varistor is attached.**
4. **To operate the brake during a power outage, perform a connection such as momentarily cutting off the brake power supply.**
5. **When the brake is shut off during inspections, etc., the workpiece will fall by its own weight, so be certain to take adequate safety precautions.**
6. **Opening and closing the brake requires at least 0.1 s\* of operation time. Take this into account during the design process.**

\* Opening/closing time of the brake may change depending on the sequence circuit, relay, etc.

### Mounting

#### Caution

1. **For perpendicular mounting of the unit, select a brake-equipped type for safety reasons. Mount the unit so that the brake side is facing downward.**



# Auto Switches Precautions 1

Be sure to read before handling.

## Design / Selection

### Warning

#### 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 specification range for current load, voltage, temperature or impact.

We do not guarantee against any damage if the product is used outside of the specification range.

#### 2. 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. Also, perform periodic maintenance and confirm proper operation.

#### 3. Do not make any modifications (including exchanging the printed circuit boards) to the product.

It may cause human injuries and accidents.

### Caution

#### 1. Pay 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:

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

In cases of high piston speed, the use of an auto switch (D-F5NTL, F7NTL, G5NTL, M5NTL, M5PTL) with a built-in OFF delay timer (approx. 200 ms) makes it possible to extend the load operating time.

The wide-range detection type D-G5NBL (operating range 35 to 50 mm) may also be useful, depending on the application. Please consult with SMC for other models.

### Caution

#### 2. Keep wiring as short as possible.

##### <Reed>

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) Use a contact protection box when the wire length is 5 m or longer.

2) Even if an auto switch has a built-in contact protection circuit, when the wiring is more than 30 m 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 consult with SMC in this case.

##### <Solid state>

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

If the wiring is longer it will likely increase noise although the length is less than 100 m.

When the wire length is long, we recommend the ferrite core is attached to the both ends of the cable to prevent excess noise.

A contact protection box is not necessary for solid state switches due to the nature of this product construction.

#### 3. Do not use a load that generates surge voltage. If a surge voltage is generated, the discharge occurs at the contact, possibly resulting in the shortening of product life.

If driving a load such as a relay that generates a surge voltage,

##### <Reed>

Use an auto switch with built-in contact protection circuit or use a contact protection box.

##### <Solid state>

Use a built-in surge absorbing element type device.

#### 4. Take precautions when multiple cylinders/actuators are used close together.

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

The auto switches may malfunction due to the interference from the magnetic fields.

Use of a magnetic screen plate (MU-S025) or commercially available magnetic screen tape can reduce the interference of magnetic force.

LJ1

LG1

LTF

LC1

LC7

LC8

LXF

LXP

LXS

LC6□

LZ□

LC3F2

X□

D-□

E-MY



# Auto Switches Precautions 2

Be sure to read before handling.

## Design / Selection

### ⚠ Caution

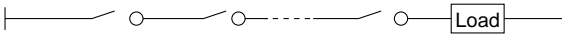
#### 5. Pay attention to the internal voltage drop of the auto switch.

<Reed>

1) Auto switch 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 diodes. (Refer to the 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.

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

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

<Solid state/2-wire type>

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

Also, take note that a 12 VDC relay is not applicable.

#### 6. Pay attention to leakage current.

<Solid state/2-wire type>

Current (leakage current) 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.

#### 7. Ensure sufficient clearance for maintenance activities.

When designing an application, be certain to allow sufficient clearance for maintenance.

#### 8. When multiple auto switches are required.

“n” indicates the number of auto switches which can be physically mounted on the cylinders/actuators. Detection intervals depends on the auto switch mounting structure and set position, therefore some required interval and set positions may not be available.

#### 9. Limitations of detectable positioning

When using certain mounting brackets, the surface and position where an auto switch can be mounted maybe restricted due to physical interference. For example, when using some bracket types the auto switch cannot be surface mounted at the bottom side of foot bracket, etc.

Select the set position of the auto switch so that it does not interfere with the mounting bracket of the cylinders/actuators (such as trunnion or reinforcement ring).

#### 10. Use the cylinder and auto switch in proper combination.

The auto switch is pre-adjusted to activate properly for an auto-switch-capable SMC cylinder/actuator.

If the auto switch is mounted improperly, used for another brand of cylinders/actuators or used after the alternation of the machine installation, the auto switch may not activate properly.

## Mounting / Adjustment

### ⚠ Caution

#### 1. Do not drop or bump.

Do not drop, bump or apply excessive impacts (300 m/s<sup>2</sup> or more for reed auto switches and 1000 m/s<sup>2</sup> or more for solid state auto switches) while handling. Although the body of the auto switch may not be damaged, the inside of the auto switch could be damaged and cause malfunction.

#### 2. Observe the proper tightening torque for mounting an auto switch.

When an auto switch is tightened beyond the range of tightening torque, auto switch mounting screws, auto switch mounting brackets or auto switch may be damaged.

On the other hand, tightening below the range of tightening torque may allow the auto switch to slip out of position.

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

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

#### 4. Fix the auto switch with appropriate screw installed on the switch body. If using other screws, auto switch may be damaged.



# Auto Switches Precautions 3

Be sure to read before handling.

## Wiring

### ⚠ Caution

#### 1. 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.

#### 2. 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.

#### 3. Avoid repeatedly bending or stretching lead wires.

Broken lead wires will result from repeatedly applying bending stress or stretching force to the lead wires.

Stress and tensile force applied to the connection between the cable and auto switch increases the possibility of disconnection.

Fix the cable in the middle so that it is not movable in the area where it connects with the auto switch.

#### 4. Be certain 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 auto switch will be instantly damaged because of excess current (short circuit).

It is the same as when the 2-wire brown lead wire (+, output) is directly connected to the (+) power supply terminal.

#### 5. Do not allow short-circuit of loads.

##### <Reed>

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

##### <Solid state>

All models of D-J51, G5NB and PNP output type auto switches do not have built-in short circuit protection circuits.

If a load is short circuited, the auto switch will be instantly damaged as in the case of reed auto switches.

Take special care to avoid reverse wiring with the brown power supply line and the black output line on 3-wire type auto switches.

#### 6. Avoid incorrect wiring.

##### <Reed>

A 24 VDC auto switch with indicator light has polarity. The brown lead wire or terminal No. 1 is (+), and the blue lead wire or terminal No. 2 is (-).

[For D-97, (+) is on the no-displayed side, (-) is on the black line side.]

1) If connections are reversed, an auto switch will operate, however, the light emitting diode will not light up.

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

Applicable model:

D-A73, A73H, A73C, C73, C73C, E73A, Z73

D-R73, R73C, 97, 93A, A93, A93V

D-A33, A34, A33A, A34A, A44, A44A

D-A53, A54, B53, B54

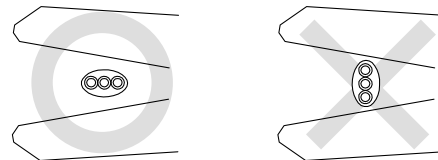
2) When using a 2-color indicator type auto switch (D-A79W, A59W and B59W), the auto switch will constantly remain ON if the connections are reversed.

##### <Solid state>

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

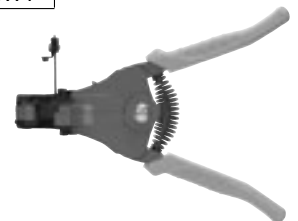
#### 7. When the cable sheath is stripped, confirm the stripping direction. The insulator may be split or damaged depending on the direction. (D-M9□ only)



#### Recommended Tool

Description	Model
Wire stripper	D-M9N-SWY

\* Stripper for a round cable (ø2.0) can be used for a 2-wire type cable.



LJ1

LG1

LTF

LC1

LC7

LC8

LXF

LXP

LXS

LC6□

LZ□

LC3F2

X□

D-□

E-MY



# Auto Switches Precautions 4

Be sure to read before handling.

## Operating Environment

### ⚠ Warning

#### 1. Never use in an atmosphere of explosive gases.

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

Please contact SMC concerning ATEX compliant products.

### ⚠ Caution

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

Auto switches will malfunction or magnets inside cylinders/actuators will become demagnetized. (Please consult with SMC if a magnetic field resistant auto switch can be used.)

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

Although auto switches satisfy IEC standard IP67 construction (JIS C 0920: waterproof construction) except some models (D-A3□, A44□, G39□, K39□, RNK, RPK) do not use auto switches in applications where continually exposed to water splash or spray. Poor insulation or swelling of the potting resin inside auto switches may cause malfunction.

#### 3. Do not use in an environment with oil or chemicals.

Please consult with 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.

Please consult with SMC if auto switches are used where there are temperature cycles other than normal temperature changes, as there may be adverse effects inside the auto switches.

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

<Reed>

When excessive impact (300 m/s<sup>2</sup> or more) is applied to a reed auto switch during operation, the contact point will malfunction and generate or cut off a signal momentarily (1 ms or less). Please consult with SMC if a solid state auto switch can be used according to the environment.

#### 6. Do not use in an area where surges are generated.

<Solid state>

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

### ⚠ Caution

#### 7. 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 a cylinder with auto switches, or an actuator, it may cause the auto switch to malfunction due to a loss of the magnetic force inside the cylinder/actuator.

#### 8. Please contact SMC concerning water resistance, elasticity of lead wires, usage at welding sites, etc.

#### 9. Do not use in direct sunlight.

#### 10. Do not mount the product in locations where it is exposed to radiant heat.

## Maintenance

### ⚠ Warning

#### 1. Removal of equipment, and supply/exhaust of compressed air

Before any machinery or equipment is removed, first ensure that the appropriate measures are in place to prevent the fall or erratic movement of driven objects and equipment, then cut off the electric power and reduce the pressure in the system to zero. Only then should you proceed with the removal of any machinery and equipment.

When machinery is restarted, proceed with caution after confirming that appropriate measures are in place to prevent actuators from moving suddenly.

### ⚠ Caution

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

##### 1) Secure and tighten auto 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 auto switches or repair lead wires, etc., if damage is discovered.

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

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