




Caution for safety

 **PLEASE READ BEFORE USING**

Before selecting model and servicing of the product, read throughly this CAUTIONS for SAFETY for the proper usage.

- The following cautions are for the purpose of preventing your personnel from suffering injury, by following the proper usage of the products.
- Items are classified in three categories, DANGER, WARNING, and CAUTION. All items are crucial for the safety and need to be followed without exception.

 DANGER	Obviously dangerous, which may cause death or serious injury of personnel, and damage or destruction of property.
 WARNING	Not immediately subject to danger, however not avoiding the displayed danger when mishandling the product may cause death or serious injury of personnel and damage or destruction of property.
 CAUTION	Not immediately subject to danger, however not avoiding the displayed danger when mishandling the product may cause injury of personnel and damage or destruction of property.

For the correct handling, please read the instruction manual before installing and servicing of the product.

DANGER

(Applies to all products on the catalogue)

- 1 Do not use any of our products for the purpose of maintenance and care of human life or body.
- 2 Do not use any product in the condition or the environment other than stipulated in the specification or where the hazardous stuff exists.
- 3 When installing a product, refer to the instruction manual for mounting style and fix securely (including the work carrier). Otherwise products may topple, fall, and operates out of control causing the injury of personnel.
- 4 Disassembling and reassembling of products should be made by the personnel who has enough knowledge and experience.
- 5 Depressurize products before disassembling or reassembling.
- 6 Do not remodel the products.

WARNING

(Applies to all products on the catalogue)

- 1 When servicing, keep within the working pressure range and voltage.
- 2 At a place where water or oil drops and where is much dust, cover the equipment. Otherwise damage and trouble will be caused.
- 3 Do not operate if the fluid or atmosphere contains the substance which may cause corrosion. Otherwise damage and trouble will be caused.
- 4 Do not touch the terminal part or switches, etc. when the product is energized. It may cause the inaccurate operation and the electric shock from the short circuit and the circuit trouble.
- 5 Do not stand on, use as a footing, or put things on the product. You may miss your step and fall, and the falling product may cause the injury of personnel. Also the product may get damaged causing the inaccurate operation and hazardous moves out of control.

(Pneumatic Actuator)

- 1 When starting operation, pay the full attention to the cylinder's moving direction.
- 2 Do not put hands where the cylinder moves.
- 3 Please use a speed control valve to adjust the piston speed within the limited value in our catalogue.
- 4 The value of dividing operation time into cylinder stroke is the average speed rather than max speed.

The max. speed of cushion pad type cylinders occur at the end of the stroke.

The max. speed of air cushion type cylinders occur at the start point of cushioning structure.
- 5 The max. speed of cylinders usually uses the value of average speed times 1.4~1.5.
- 6 When the load on cylinder is large, we suggest to use ourter shock absorber - even the max speed is within the limited value.
- 7 Cords such as the sensor switch's lead wire should not be damaged. Damaging, forcing, twisting tugging, winding, putting on a heavy object, and pinching will cause fire, electric shock abnormal operation by short circuit or circuit error.

(Pneumatic Valve. Pneumatic Accessories. Sensor Switch)

- 1 Cords such as the pressure switch's lead wire, solenoid valve's power supply cord should not be damaged. Damaging, forcing, twisting, tugging, winding, putting heavy object on, and pinching will cause fire, electric shock, abnormal operation by short circuit or circuit error.
- 2 Do not use filter or lubricator without a case guard.
- 3 For filter and lubricator, do not use a flawed or stained case.

Caution for safety

 PLEASE READ BEFORE USING

CAUTION

(Applies to all products on the catalogue)

- 1 If necessary, use protection glove, protection glasses, and safety shoes to secure the safety when operating products.
- 2 For the easy maintenance, enough space around the product should be provided.
- 3 When mounting, flush inside thoroughly to remove chips from piping, and seal tape, rust and dusts, in order to prevent troubles such as air leak.
- 4 When screwing in the fittings, fasten with the tie torque of proper size to the connection size.
- 5 Use clean air. Equip an air filter near the equipment to remove drain, dusts and etc. Periodically remove drain from the filter.
- 6 Spindle oil and machine oil must not be used for lubrication, or the swelled packings will cause operation troubles.
- 7 Operation below the temperature 5°C must be paid the full attention since it may cause the freezing of drain.
- 8 Magnetic products such as disk card, tape, and tester must be kept away from the magnet-equipped cylinder and solenoid valve's solenoid part.
- 9 When the product is no longer available for operation or needed, discard in a proper way as an industrial waste.
- 10 Do not throw the product into fire. The product may explode or the toxic gas may be generated.

(Pneumatic Actuator)

- 1 Products should be mounted on the plane face. Mounting on the warped face causes poor accuracy, air leak and troubles.
- 2 Flaw or dent on the mounting part of the cylinder may make the uneven face.
- 3 The chafing parts of piston rod and guide rod must be free from flaw or dent. Otherwise packings got damaged and air will leak.
- 4 When the cylinder draws, be careful not to put yourself between the cylinder and the link bar at the top (Twin guide cylinder).
- 5 Products do not need lubrication since they are initially lubricated. For lubrication, use turbine oil first class (ISO VG32) or the equivalent.
- 6 Sensor switch which senses the cylinder position must not be operated in the magnetically disturbed area. It will react to the magnetism and the sensing accuracy will be disturbed.
- 7 If the two switch-equipped cylinders are mounted close in parallel, a switch may react to the another cylinder's moving magnet, and effects on the sensing accuracy.
- 8 Avoid the load over the switch's allowable maximum load.

- 9 It is difficult for a valve to control more than two cylinders to act at the same time, because the friction coefficient of each pneumatic cylinder is different. Even if the pipes, joints, solenoid valves, and speed control valves have the same conditions, they can only approach the same movement, but cannot achieve absolute synchronization. So please avoid this way of use as much as possible to avoid increasing the burden on the cylinder and shortening the life of the cylinder.

(Pneumatic Valve. Pneumatic Accessories. Sensor Switch)

- 1 Flaw or dent on the mounting part of the cylinder may make the uneven face.
- 2 Do not use solenoid valve, pressure switch, flow switch, on foot switch in the environment where the large electric current or the strong magnetism exist.
- 3 Products do not need lubrication. As for directional valve, check in the instruction manual whether the lubrication is needed. If needed, use turbine oil first class ISO VG32 on the equivalent.
- 4 In the case of double solenoid valve, do not energize both solenoids.
- 5 Avoid the load over the switch's allowable maximum load.
- 6 The setting range of the secondary pressure of the pressure regulation valve use as 85% of primary pressure or below to achieve better pressure setting and regulation.
- 7 The swing button of the pressure regulator must be pulled before tuning, increase pressure while turning in clockwise direction and vice versa to decrease. Press in and secure the swing button after operation. After turning to max value (either positive or reverse)(with no pressure variation anymore), don't turn by force or use tool to avoid damage.

Caution for safety

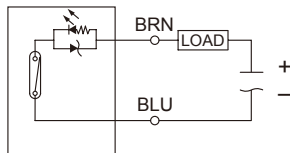
! SENSOR SWITCH

Technical information

! CAUTION

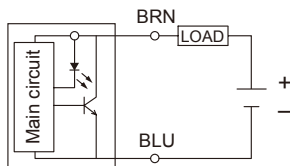
Do not exceed specification, permanent damage to the sensor may occur.

1. The 2-wire type magnetic sensor must be connected in series with load. Or the sensor may malfunction.
2. For reed switch type sensors, polarity must also be observed for the proper function of LED. Connect the brown wire in series with load to positive (+) and the blue wire to negative (-) of DC power source. If the polarity is reversed, reed sensor remain functional but LED will remain in "OFF" state.

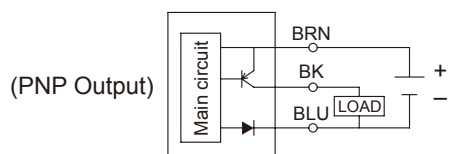
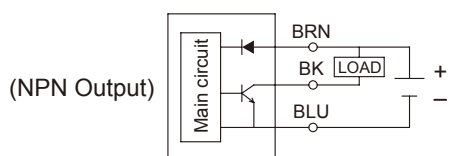


3. For solid-state type sensors, connect brown wire to the positive (+) and the blue to the negative (-) of DC power source. For 3-wire type, the black wire must be connected to the load only. If the black wire is accidentally connected to the power source, sensor may malfunction.

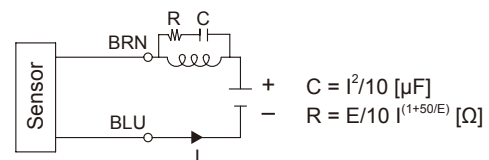
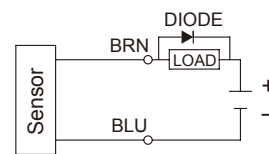
2-wire type



3-wire type



4. An external protection circuit may be required if the magnetic sensor is used with inductive load, such as relay or solenoid. For DC inductive load, attach an external diode parallel to the load and use R-C circuit parallel with AC inductive load as illustrated below.



C: Capacitor I: Load current
R: Resistance E: AC power

$$C = I^2/10 \text{ } [\mu\text{F}]$$

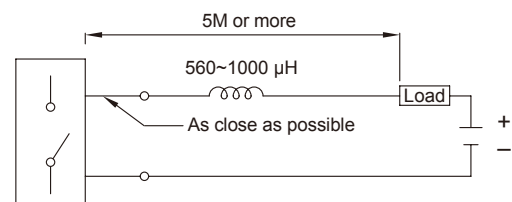
$$R = E/10 \text{ } |^{(1+50/E)} \text{ } [\Omega]$$

5. Keep sensors away from strong magnetic field to prevent malfunction.
6. Reed sensors are without protection circuit.

When a reed sensor is used with a capacitive load or with more than 5 meters lead wire, the life of the contact will be shortened. (especially when the switch is always ON)

Note

Please install a surge suppressor within 1 meter or an inductor (560~1000 μ H) in series of the sensor to prevent damage.



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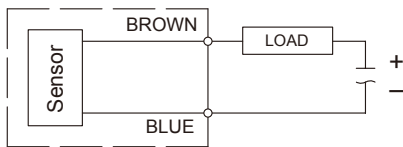
⚠️ SENSOR SWITCH

Connection method

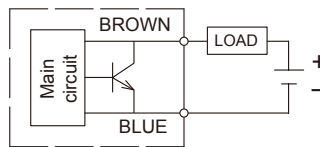
2 wire sensor connection

► General connection

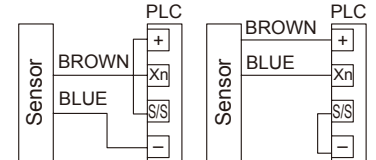
Reed switch



Solid-state type



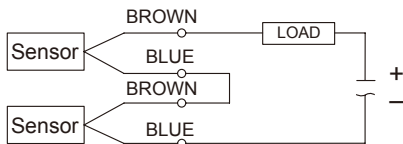
PLC



Connection to NPN input module

Connection to PNP input module

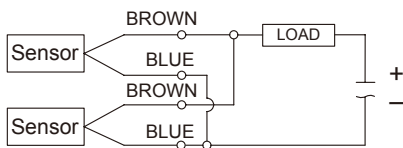
► Series connection (AND)



Note

1. When connecting 2-wire sensors in series (AND), don't exceed more than two sensors due to the internal voltage drop (Typical V drop=2.5~4V per switch). Excessive Voltage drop will cause the load fail to operate.

► Parallel connection (OR)

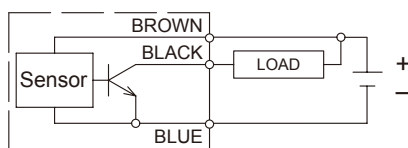


Note

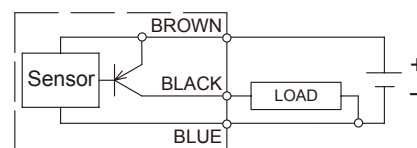
1. When connecting solid state 2-wire sensors in parallel (OR), current leakage will increase and cause improper load operation.
2. When connecting two magnetic sensors in parallel (OR), possible concurrent operation will cause dim LED illumination due to lower current distribution.

3 wire NPN connection

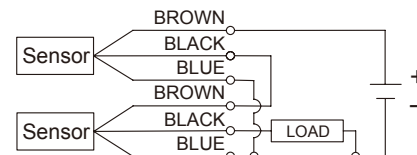
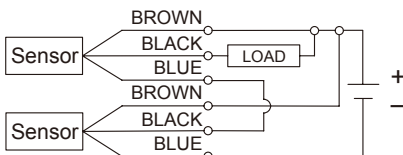
► General connection



3 wire PNP connection



► Series connection (AND)



► Parallel connection (OR)

