

INSTRUCTION SHEET

Photoelectric Switch SA1E Series (Transparent Object Sensing)

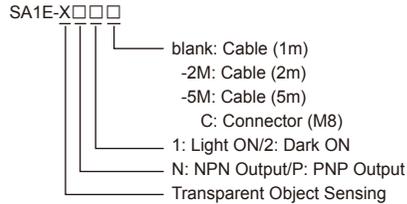
Confirm that the delivered product is what you have ordered. Read this instruction sheet to make sure of correct operation. Make sure that the instruction sheet is kept by the end user.

SAFETY PRECAUTIONS

CAUTION

Caution notices are used where inattention might cause personal injury or damage to equipment.

1 Type

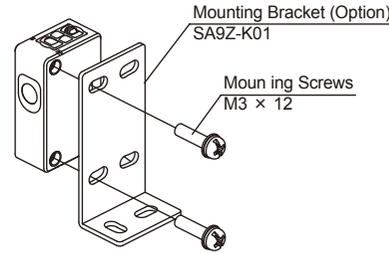


2 Specifications

Detection System	Coaxial Retro-Reflection
Power Voltage	12 to 24V DC ripple 10% p-p maximum (Operating voltage range 10 to 30V DC)
Current Consumption	20 mA maximum
Detection Range	2m (IAC-R9)
Control Output	Open collector output (NPN/PNP output selectable) Load voltage: 30V DC maximum Load current: 100 mA maximum Voltage drop: 2V maximum
Protection Circuit	Reverse polarity protection Load short circuit protection
Interference prevention	2 units can be installed in close proximity
Response Time	500 μs maximum
Ambient Temperature *1	Operating: -25 to 55 °C Storage: -40 to 70 °C (no freezing)
Ambient Humidity	Operating: 35 to 85% RH Storage: 35 to 85% RH (no condensation)
Degree of protection	IP67 (IEC60529)
Material	Housing: PBT Lens: PMMA Knob: POM
Cable	φ 3.5 mm, 3-core, 0.2 mm ² , 1m / 2m / 5m cabtyre cable

3 Installation

- Do not apply excessive impact on the sensor during the installation process, so as to prevent damage or deterioration in the degree of protection.
- To install the sensor, tighten the mounting screws to a torque of 0.4 to 0.5N · m .



4 Notes for Operation

- Use an optional reflector (IAC-R9, IAC-R10, or IAC-R11).
- Do not use the sensor during the transient time of 200 ms after turning on the power.
- If the sensor and the load are connected to different power supplies, the sensor must always be turned on first.
- Do not install the sensor outdoors, near induction device, or heat source. Choose locations free from frequent vibrations, shocks, dust, toxic gases, water, oil, and chemicals, so as to prevent malfunctions and damage.
- Do not expose the sensor to sunlight or other direct light projections.
- Do not use the sensor with drops of water remaining on the lens.
- When using the sensor at a place where the temperature changes greatly, the sensing characteristics may change depending on the sensing object. Be sure to confirm the operation under the actual operating condition.

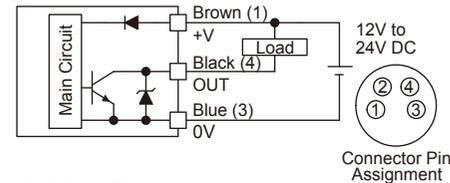
CAUTION

- Do not connect the sensor to AC power supply, so as to prevent explosion and burning.

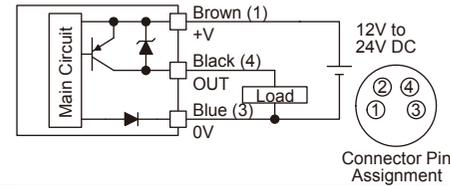
5 Wiring

- Turn off the power before wiring.
- Connect correctly to prevent damage.
- The power voltage must not exceed the rated range.
- When using a switching power supply, be sure to ground the FG (frame ground) terminal.
- Do not install the sensor wiring in the same conduit with high-voltage lines and power lines.
- Cable extension is allowed up to 100m using a cabtyre cable with core wires of 0.3 mm² or more.
- To connect the sensor with connector cable, tighten connector to a torque of 0.2 to 0.4N · m.

NPN Output Type



PNP Output Type



6 Adjustment

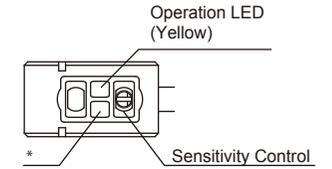
Optical Axis Alignment (For Light ON)

Install the reflector perpendicularly to the optical axis. Move the SA1E photoelectric switch up, down, right and left to find the range where the operation LED turns on. Fasten the switch in the middle of the range. Coaxial retro-reflective type can be installed also by finding the position where the reflection of projected red light is most intense, while observing the reflection on the reflector from behind the switch.

Sensitivity Adjustment (For Light ON)

- Sensitivity is set to the maximum at the factory before shipment. Referring to the table below, adjust the sensitivity. The table explains the status of operation LED when the operation mode is set to light ON.
- After adjusting the sensitivity, make sure that operation LED and control output turn on at stable incident and turn off at stable interruption.
- When adjusting the sensitivity, use an insulated screwdriver matching the slot in the knob to turn the sensitivity control, to a torque of 0.05 N · m maximum.
- When the reflector is located near the sensor and sensitivity adjustment is difficult, use an optional vertical slit (SA9A-S06, SA9A-S07, or SA9A-S08).

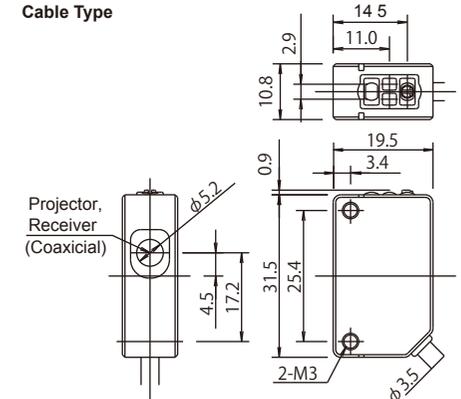
Step	Photoelectric Switch Status	Sensitivity Control	Adjusting Procedure
①	Receiving light (No object detected)	Max Min. A	Turn the control counter-clockwise to the minimum. Then turn clockwise until the operation LED turns on (turns off with dark ON type) (point A).
②	Light is interrupted (Object detected)	Max Min. B A	At interruption status, turn the control clockwise until the operation LED turns on (turns off with dark ON type) (point B)
③	—	Max Min. B A C	Determine point C at middle point between A and B. Turn the control to the minimum, then turn it back to point C. When points A and B are close to each other, set the control at point A.



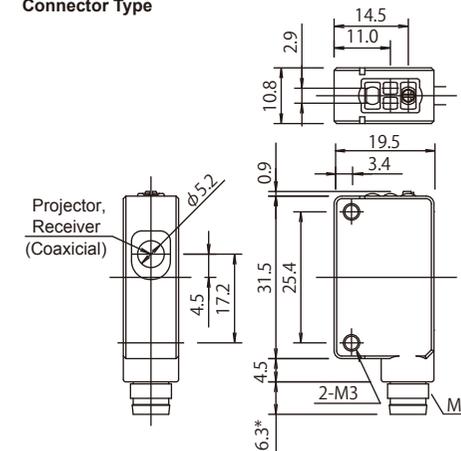
*: Stable LED is not provided on this product.

7 Dimensions (All dimensions in mm)

Cable Type



Connector Type



*: The connector length is 18 mm when a connector cable of right angle type (SA9Z-CM8K-4L□) is attached.