OMRON

Clear Glass Sensor

E3S-CR67/62

Optimum Sensor for Detecting Transparent Glass and Plastic Bottles

- Retroreflective Sensor smoothly detects 5-mm gaps.
- Detects transparent bottles that have a lens effect.
- Ensures smooth detection of transparent objects at a 1-m sensing distance.
- Employs a visible LED light source.
- Water and oil resistive.
- Easy sensitivity adjustment.

CE

ISO9001 and 14001 Approved
OMRON Corporation, Ayabe Factory, Sensing Components and Systems

Ordering Information

■ E3S-CR67/62 Clear Glass Sensors

Connections	Appearance	Sensing method	Control output	Model	Sensing distance	Reflector
Plug-in connector (M12)	Vertical	Retroreflective	PNP open collector, NPN open collector (switch selectable)	E3S-CR67-C	0 to 250 mm	E39-R6
					250 to 1,000 mm	E39-R1
Pre-wired	Vertical			E3S-CR62-C	0 to 250 mm	E39-R6
					250 to 1,000 mm	E39-R1

■ Accessories (Order Separately)

Reflectors

Model	Application
E39-R1	At a sensing distance of 250 mm min.
E39-R6	At a sensing distance of 250 mm max. The distance between adjacent objects, such as transparent bottles, is short.

Specifications

Item	E3S-CR67-C	E3S-CR62-C
Light source	Red LED (670 nm)	
Sensitivity adjustment	Two-turn endless potentiometer	
Connection method	Plug-in connector	Pre-wired
Output configuration	NPN or PNP (selectable) open collector output	
Control output	Light ON or Dark ON (selectable)	
Circuit protection	Load short-circuit protection and reverse connection protection	
Mutual interference prevention function	Available	
Indicators	Stability indicator (green), light reception indicator (red)	
Materials	Case: Zinc die-cast Operation panel: Sulfonated polyether Lens: Acrylic Mounting bracket: Stainless steel	
Weight	Approx. 80 g	Approx. 115 g (with 2-m cord)
Attachments	Mounting bracket, screwdriver for adjustment, M4 hexagonal bolts, and instruction sheet	

■ Ratings/Characteristics

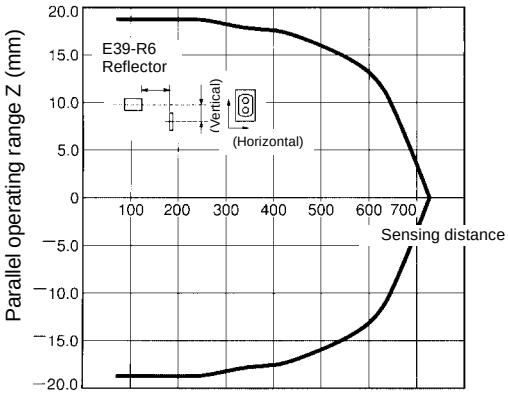
Item	E3S-CR67-C	E3S-CR62-C
Sensing method	Retroreflective	
Power supply voltage	10 to 30 VDC; ripple: 10% max.	
Current consumption	40 mA max.	
Sensing distance	0 to 250 mm (with E39-R6 Reflector) 250 to 1,000 mm (with E39-R1 Reflector)	
Standard sensing object	30 dia. x 150 mm glass tube (thickness: 1.8 mm)	
Directional angle	Sensor: 2° to 6° Reflector: 30° min.	
Response time	1 ms max. for both operation and release	
Control output	30 VDC, 100 mA max. (residual voltage: NPN output: 1.2 V max., PNP output: 2.0 V max.), open collector (NPN/PNP switch selectable)	
Ambient illumination	Incandescent lamp: illumination on optical spot: 5,000 ℓx max. Sunlight: illumination on optical spot: 10,000 ℓx max.	
Ambient temperature	Operating: −25°C to 55°C (with no icing)	
Ambient humidity	Operating: 35% to 85%	
Insulation resistance	20 MΩ min. (at 500 VDC)	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min	
Vibration resistance	Destruction: 10 to 2,000 Hz, 1.5-mm double amplitude, or 300 m/s^2 (approx. 30G), for 0.6 hrs each in X, Y, and Z directions	
Shock resistance	Destruction: 1,000 m/s^2 (approx. 100G) 3 times each in X, Y, and Z directions	
Degree of protection	IP67 (IEC529), NEMA*: 6P (indoors only)	

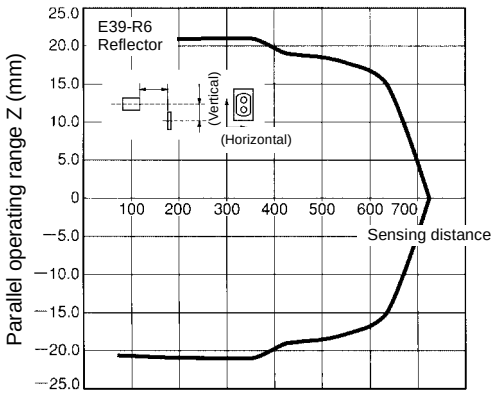
*NEMA: National Electrical Manufacturers Association

Engineering Data

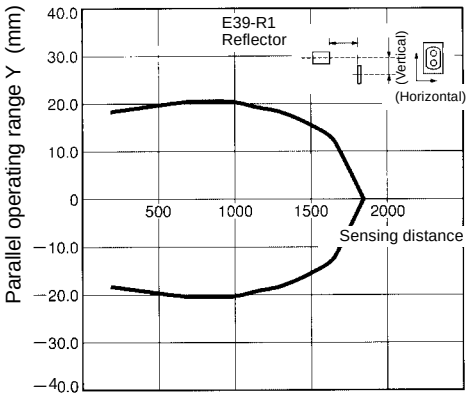
Reflector Parallel Movement (Typical)

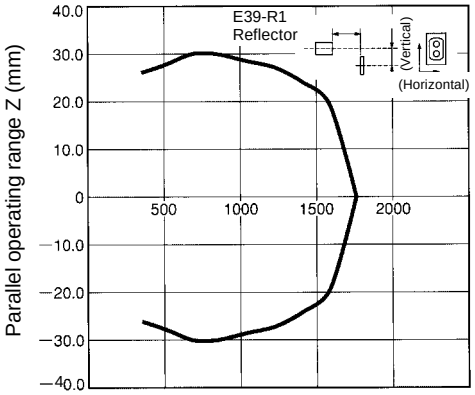
E3S-CR67/62 (E39-R6 Reflector)





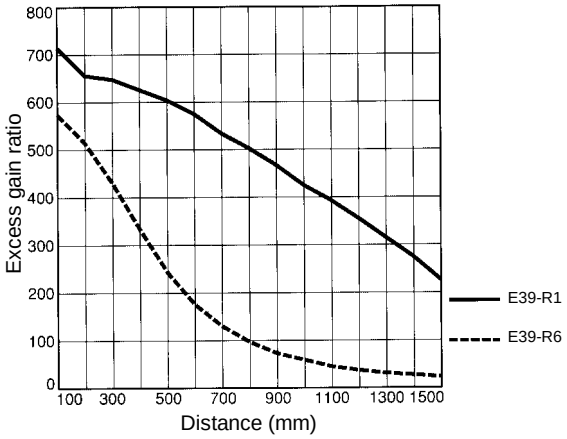
E3S-CR67/62 (E39-R1 Reflector)



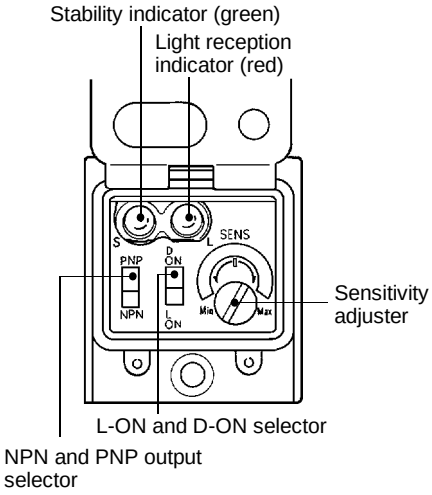


Set Distance vs. Excess Gain (Typical)

E3S-CR67/62



Nomenclature



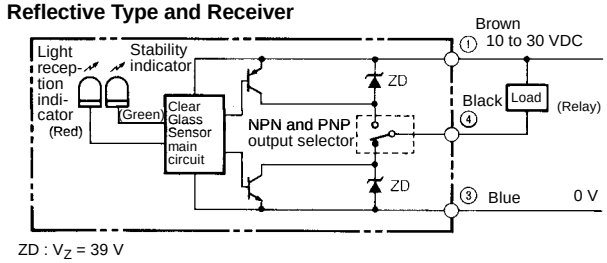
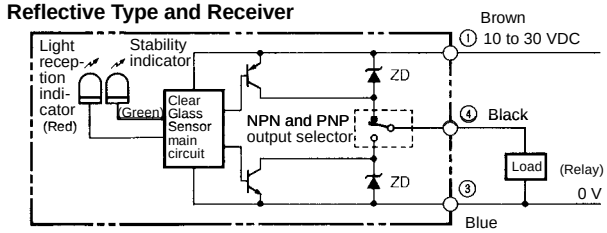
Operation Panel

Use the NPN and PNP output selector on the operation panel to select the type of output transistor.

Use the Light ON and Dark ON selector on the operation panel to select the operation mode of the E3S-CR67/62.

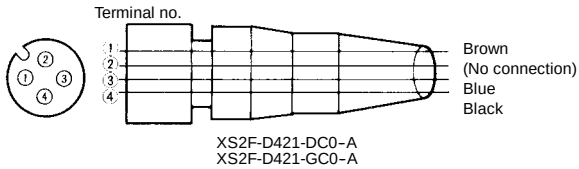
Operation

■ Output Circuits

Output configuration	Mode switch	Output transistor	Output circuits
NPN	Light ON	On when light is received.	**Reflective Type and Receiver**  ZD : V_Z = 39 V **Connector Pin Arrangement** 
	Dark ON	ON when light is not received.	
PNP	Light ON	On when light is received.	**Reflective Type and Receiver**  ZD : V_Z = 39 V **Connector Pin Arrangement** 
	Dark ON	ON when light is not received.	

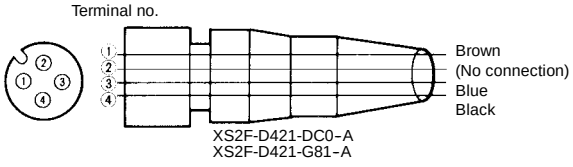
I/O Connector Plug

NPN Output



XS2F-D421-DC0-A
XS2F-D421-GC0-A

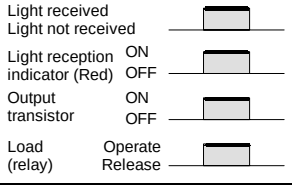
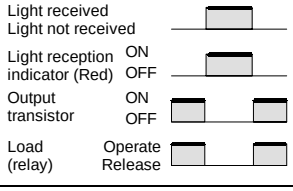
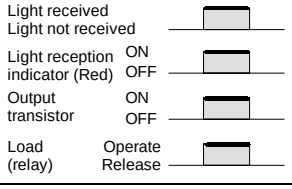
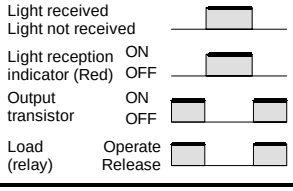
PNP Output



XS2F-D421-DC0-A
XS2F-D421-G81-A

NPN output				PNP output			
Type	**Conductor**	**Connector pin**	**Application**	**Type**	**Conductor**	**Connector pin**	**Application**
DC	Brown	1	Power supply (+V)	DC	Brown	1	Power supply (+V)
	Black	4	Output		Black	4	Output
	Blue	3	Power supply (0 V)		Blue	3	Power supply (0 V)
	---	2	No connection		---	2	No connection

■ Timing Chart

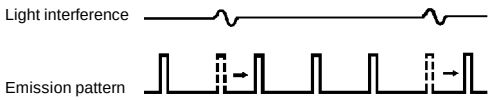
Output configuration	Mode switch	Output transistor	Timing chart
NPN	Light ON	On when light is received.	 (Between terminals 1 and 4 or between brown and black)
	Dark ON	ON when light is not received.	 (Between terminals 1 and 4 or between brown and black)
PNP	Light ON	On when light is received.	 (Between terminals 3 and 4 or between blue and black)
	Dark ON	ON when light is not received.	 (Between terminals 3 and 4 or between blue and black)

■ Fuzzy Mutual Interference Prevention Function

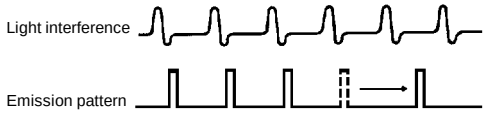
If reflective Clear Glass Sensors are installed side by side, each reflective Clear Glass Sensor may be influenced by the light emitted from the other Clear Glass Sensors.

The fuzzy mutual interference prevention function of the E3S-CR67/62 enables the E3S-CR67/62 to monitor any light interference for a certain period before the E3S-CR67/62 starts emitting light so that the E3S-CR67/62 can retrieve the intensity and frequency of the light interference as data. Using this data, the E3S-CR67/62 estimates with fuzzy inference the risk of the malfunctioning of the E3S-CR67/62 and controls the timing of the E3S-CR67/62 light emission.

When the risk is low:
The E3S-CR67/62 waits until there is no light interference and emits light.



When the risk is high:
The E3S-CR67/62 emits light between each light interference moment.

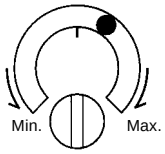
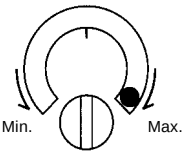
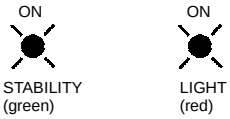


■ Optical Axis Adjustment

Move the Sensor and Reflector upwards, downwards, left, and right within areas respectively to locate the Sensor and Reflector in the center of each area where the red incident indicator is lit. Then check that the green stability indicator is lit.

■ Sensitivity Adjustment

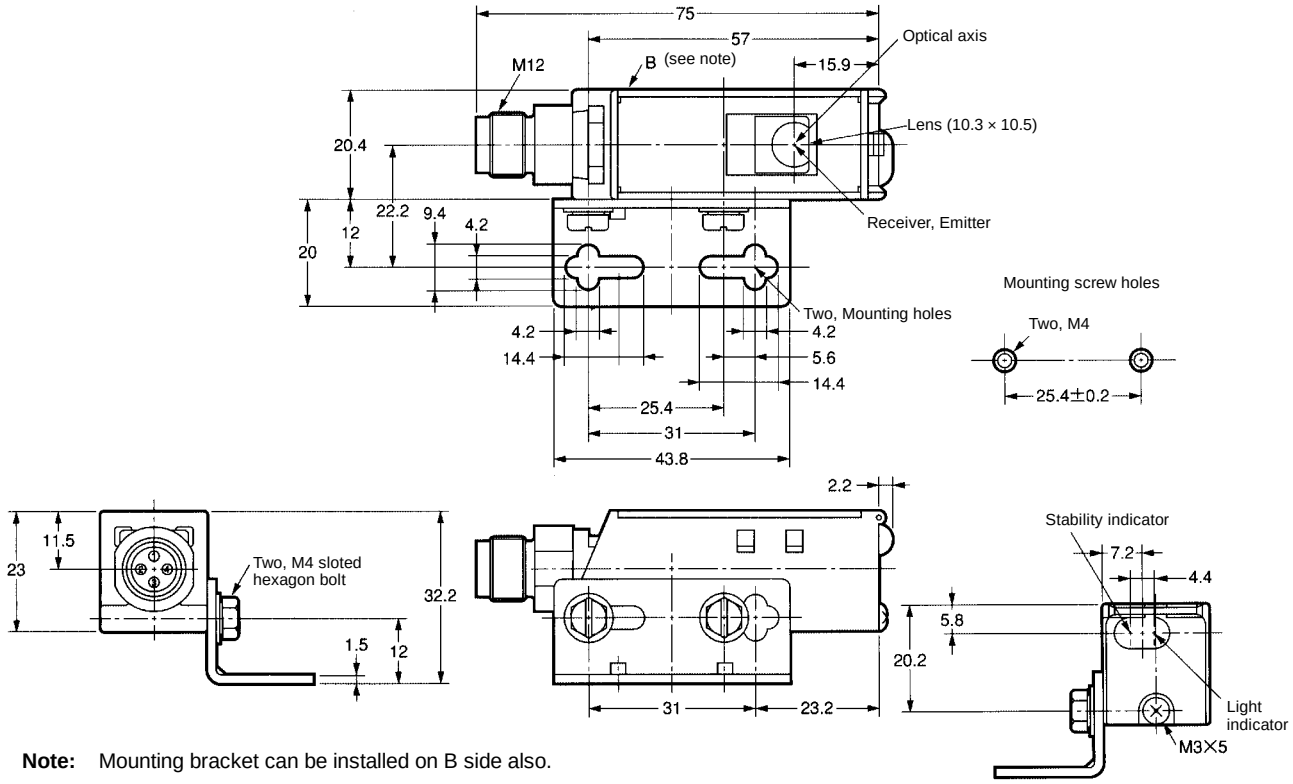
After optical axis adjustment, make the following sensitivity adjustment according to the type of sensing object.

Item	Transparent bottle or glass plate	Non-transparent object
Sensing condition	Without sensing object	With or without sensing object
Sensitivity adjuster		
Indicators		
Procedure	Turn the sensitivity adjuster from minimum to maximum and set the sensitivity adjuster to the position where a stable incident can be obtained.	If the sensing object is larger than the lens diameter, set the sensitivity adjuster to maximum. If the sensing object is the same or smaller than the lens diameter, turn the sensitivity adjuster from minimum to maximum to set the sensitivity adjuster to the position where a stable incident can be obtained.

Dimensions

Note: All units are in millimeters unless otherwise indicated.

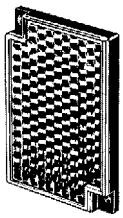
■ E3S-CR67/62

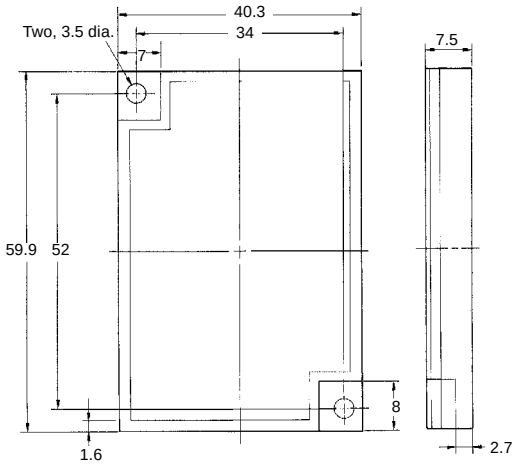


Note: Mounting bracket can be installed on B side also.

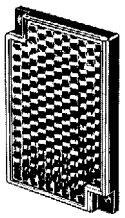
■ Attachments

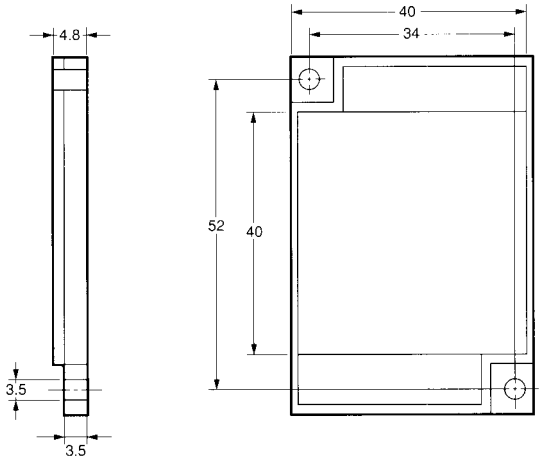
E39-R1 Reflector



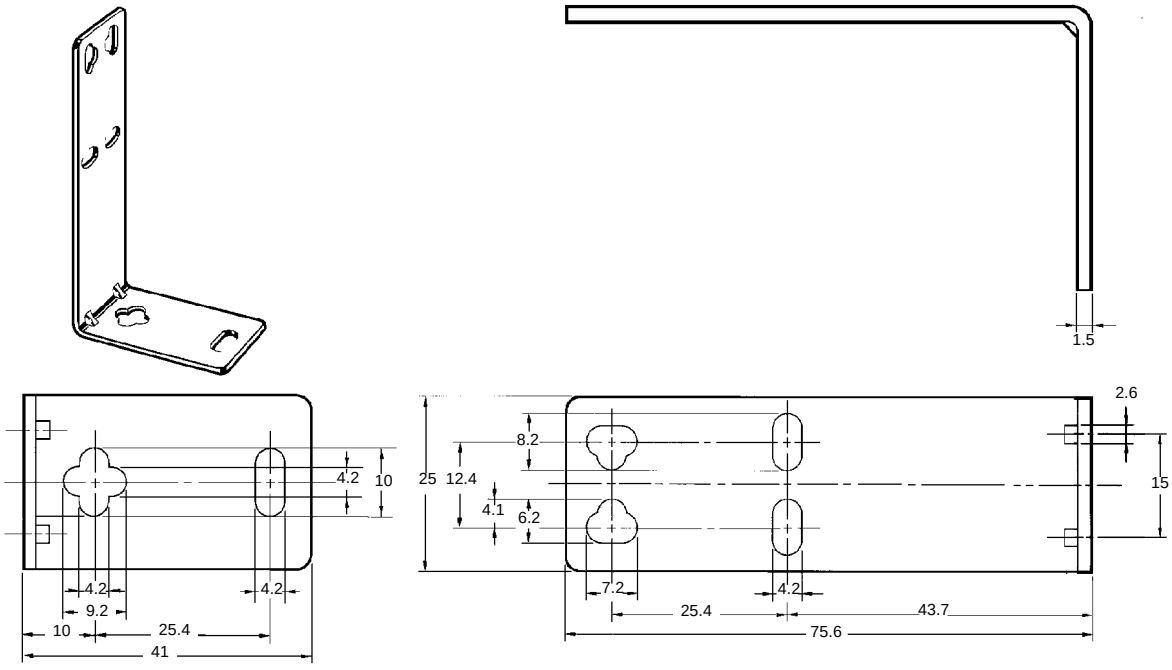


E39-R6 Reflector





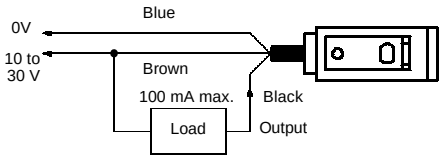
E39-L87 Special Mounting Bracket



Installation

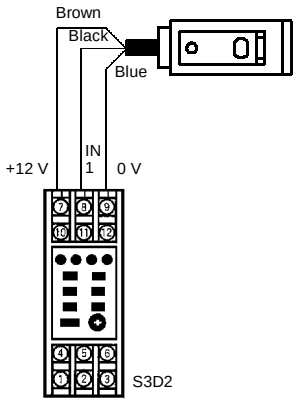
■ Connections

Load (Relay)



Note: If the load is a relay, insert a surge absorbing diode between the coils of the relay.
The connection examples are for Sensors with the NPN output.

With Sensor Controller (S3D2)



Precautions

Connection

If the input/output lines of the Clear Glass Sensor are placed in the same conduit or duct as power lines or high-voltage lines, the Clear Glass Sensor could be induced to malfunction, or even be damaged, by electrical noise. Either separate the wiring, or use shielded lines as input/output lines to the Clear Glass Sensor.

The cord connected to the E3S-CR67/62 can be extended up to 100 m provided that the diameter of each wire of the cord is 0.3 mm^2 minimum.

Startup Operation

A maximum of 100 ms is required from the time power is turned on until the E3S-CR67/62 is able to detect objects. If power is supplied to the loads and the E3S-CR67/62 from different sources, turn on power to the E3S-CR67/62 first.

Power Supply

If a standard switching regulator is used as a power supply, the frame ground (FG) terminal and the ground (G) terminal must be grounded, or otherwise the E3S-CR67/62 may malfunction, due to the switching noise of the power supply.

Water Resistivity

Do not use the E3S-CR67/62 in water, in the rain, or outdoors.

To ensure the water resistivity of the E3S-CR67/62, tighten the screws of the operation panel cover to a torque of 3.5 to 5.5 kgf S cm (0.34 N S m to 0.54 N S m).

Oil and Chemical Resistivity

Do not use the E3S-CR67/62 in oils or liquid chemicals.

Cable

The E3S-CR67/62 uses an oil-resistive cord to ensure oil resistivity.

Do not allow the cable to be repeatedly bent during application.

Do not allow the cable to be bent to a radius of less than 25 mm.

Mounting

When mounting the E3S-CR67/62, do not hit the E3S-CR67/62 with a hammer, or the E3S-CR67/62 will loose watertightness.

Use M4 screws to mount the E3S-CR67/62.

The tightening torque of each screw must be 12 kgf S m (1.18 N S m) maximum.

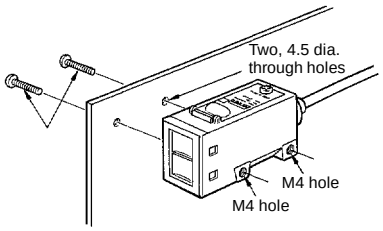
Mounting Bracket

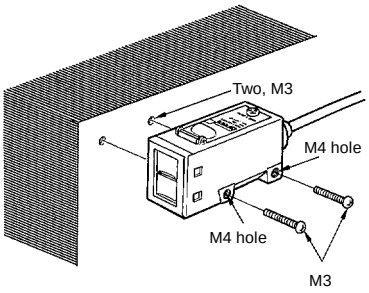
When mounting the E3S-CR67/62 with the mounting bracket so that sensing objects will be in the direction of the mechanical axis, use the optical axis lock holes.

If it is not possible to mount the E3S-CR67/62 so that the sensing objects will be in the direction the mechanical axis, move the E3S-CR67/62 upwards, downwards, to the left, or to the right and secure the E3S-CR67/62 in the center of the range where the light indicator will be lit, at which time make sure that the stability indicator is lit.

Direct Mounting

Mount the E3S-CR67/62 as shown in the following illustration.





Malfunctioning

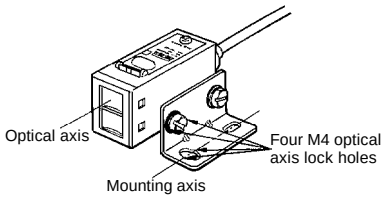
If an inverter motor or servomotor is used with the E3S-CR67/62, the frame ground (FG) terminal and the ground (G) terminal must be grounded, or otherwise the E3S-CR67/62 may malfunction.

Optical Axis Adjustment

Direct the mounting axis of the mounting bracket in the direction where sensing objects will be located. The optical axis of the E3S-CR67/62 coincides with the mounting axis of the mounting bracket, which enables the user to adjust the optical axis of the E3S-CR67/62 with ease.

Optical Lock Holes

By tightening the optical axis lock holes with screws, the mounting bracket will be in the direction of the optical axis of the E3S-CR67/62.



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. E268-E1-1 **In the interest of product improvement, specifications are subject to change without notice.**

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