


### Ideal for Detecting Labels on Bottles

- Satisfies the requirements of IP67.
- Ensures a vibration resistance of 10 Hz to 2 kHz and a shock resistance of 1,000 m/s<sup>2</sup> (approximately 100G).
- Incorporates an NPN and PNP output selector, thus reducing the required stock of photoelectric sensors.
- Incorporates a fuzzy mutual interference prevention function.
- M12 plug-in connector provides easy mounting.

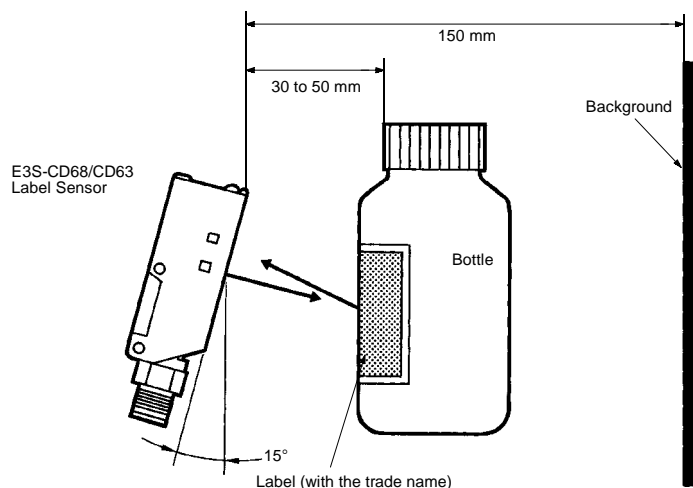


### Ordering Information

#### ■ E3S-CD68/CD63 Label Sensor

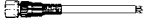
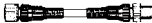

Connections	Appearance	Sensing method	Sensing distance	Operating mode	Model
Plug-in connector		Diffuse reflective	40±10 mm	Light-ON Dark-ON (selectable)	E3S-CD68
Prewired					E3S-CD63

### Application Example



## ■ Accessories (Order Separately)

### I/O Connector

Appearance	Cord		Model
<b>Single-mold Connector on one end only</b> 	2 m	3-wired	XS2F-D421-DC0-A
	5 m	3-wired	XS2F-D421-GC0-A
<b>Single-mold Connector on each end</b> 	2 m	4-wired	XS2W-D421-D81-A
	5 m	4-wired	XS2W-D421-G81-A
<b>Connector Junction Box</b> 	5 m	4-point input (NPN)	XW3A-P445-G11
		4-point input (PNP)	XW3A-P443-G11

### Mounting Bracket

Name	Model	Remarks
Mounting Bracket	E39-L113	Angle adjustment range: $\pm 20^\circ$

## Specifications

### Label Sensor

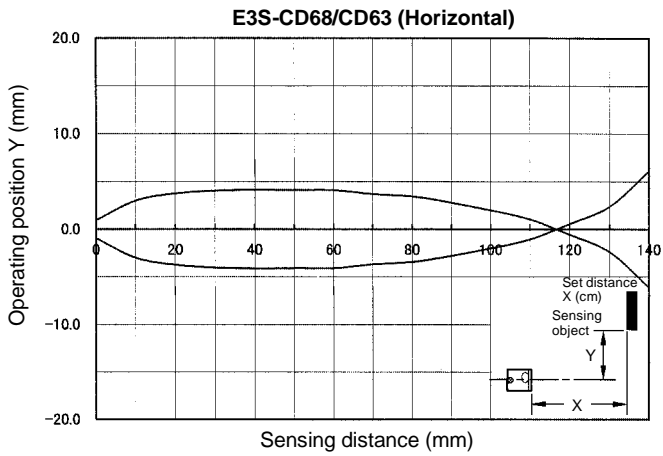
Item	E3S-CD68	E3S-CD63
<b>LED for emitter</b>	Infrared LED (880 nm)	
<b>Sensitivity adjustment</b>	Two-turn endless adjustor with an indicator	
<b>Connection method</b>	Plug-in connector	Prewired
<b>Output configuration</b>	NPN or PNP (selectable) open collector current output	
<b>Control output</b>	Light ON or Dark ON (selectable)	
<b>Circuit protection</b>	Load short-circuit protection, reversed connection protection, and mutual interference prevention function	
<b>Indicator</b>	Stability indicator (green), light indicator (red)	
<b>Materials</b>	Case: Zinc die-cast Operation panel: Sulfonated polyether Lens: Acrylic Mounting Bracket: Stainless steel	
<b>Accessories</b>	Mounting Bracket, screw driver for adjustment, and M4 hexagonal bolts.	
<b>Weight</b>	Approx. 76 g	Approx. 115 g with 2-m cable

## ■ Ratings/Characteristics

Item	E3S-CD68/CD63
Power supply voltage	10 to 30 VDC; ripple: 10% max.
Current consumption	40 mA max.
Sensing distance (white paper)	40±10 mm
Sensing method	Diffuse reflective
Standard sensing object label	20 x 20 mm, reflection factor: 18% min. (Kodak Gray Card)
Hysteresis	20% max. of sensing distance
Difference in direction between optical axis and mounting direction	±2° max.
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 output 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 <sup>2</sup> (approx. 30G) 0.5 hrs each in X, Y, and Z directions
Shock resistance	Destruction: 1,000 m/s <sup>2</sup> (approx. 100G) 3 times each in X, Y, and Z directions
Enclosure ratings	IEC: IP67

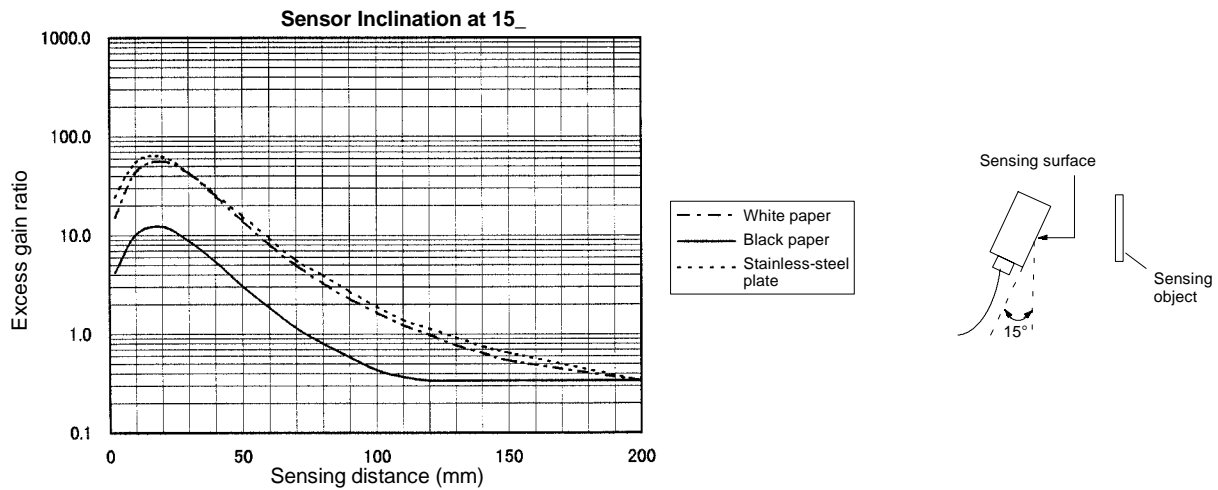
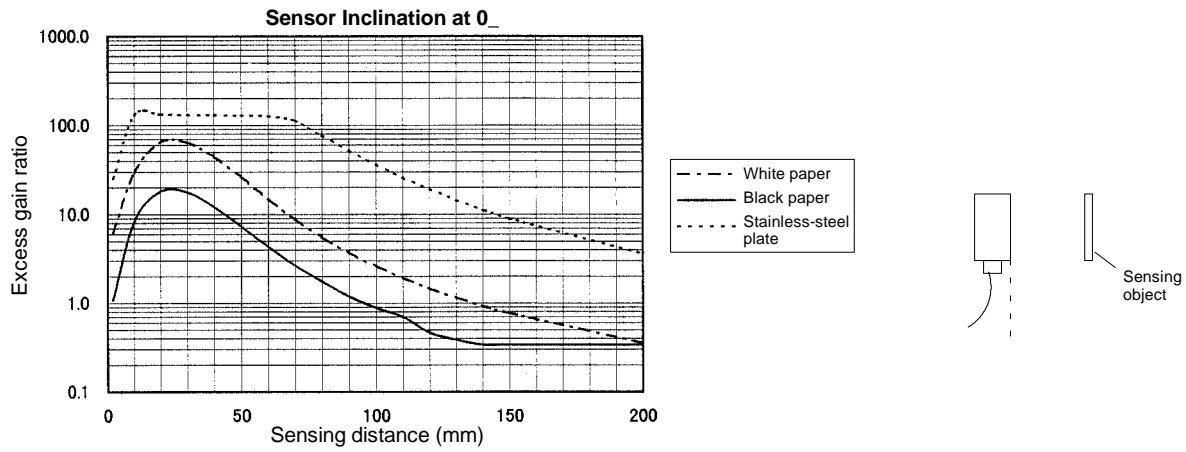
# Engineering Data

## Operating Range (Typical)



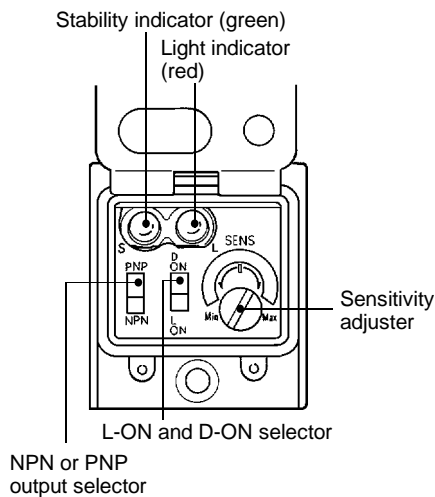
## Excess Gain vs. Set Distance (Typical)

E3S-CD68/CD63 (Horizontal)



# Nomenclature

## Vertical Model



## Operation Panel

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

Use the Light ON or Dark ON selector on the operation panel to select the operation mode of the E3S-CD68/CD63.

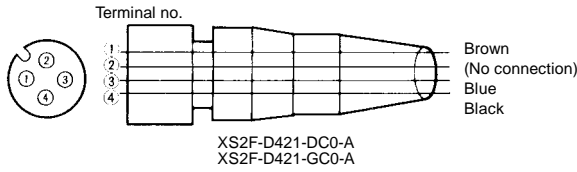
## Output Circuits

### Label Sensor

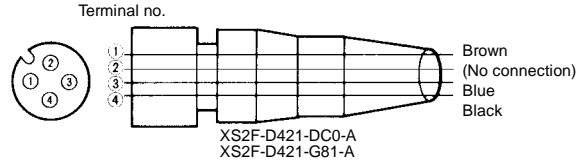
Output configuration	Mode selector	Output transistor	Output circuits
NPN	Light ON	On when light is received.	<p>ZD : <math>V_Z = 39\text{ V}</math> <b>Note:</b> Set the NPN or PNP output selector to NPN.</p> <p><b>Connector Pin Arrangement</b></p>
	Dark ON	ON when light is not received.	<p>ZD : <math>V_Z = 39\text{ V}</math> <b>Note:</b> Set the NPN or PNP output selector to NPN.</p> <p><b>Connector Pin Arrangement</b></p>
PNP	Light ON	On when light is received.	<p>ZD : <math>V_Z = 39\text{ V}</math> <b>Note:</b> Set the NPN or PNP output selector to NPN.</p> <p><b>Connector Pin Arrangement</b></p>
	Dark ON	ON when light is not received.	<p>ZD : <math>V_Z = 39\text{ V}</math> <b>Note:</b> Set the NPN or PNP output selector to NPN.</p> <p><b>Connector Pin Arrangement</b></p>

I/O Connector Plug

NPN Output



PNP Output



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 selector	Output transistor	Timing chart
NPN	Light ON	On when light is received.	Light received: [Pulse] / Light not received: [Blank] Light indicator (Red): ON [Pulse] / OFF [Blank] Output transistor: ON [Pulse] / OFF [Blank] Load (relay): Operate [Pulse] / Release [Blank] (Between terminals 1 and 4 or between brown and black)
	Dark ON	ON when light is not received.	Light received: [Blank] / Light not received: [Pulse] Light indicator (Red): ON [Pulse] / OFF [Blank] Output transistor: ON [Blank] / OFF [Pulse] Load (relay): Operate [Blank] / Release [Pulse] (Between terminals 1 and 4 or between brown and black)
PNP	Light ON	On when light is received.	Light received: [Pulse] / Light not received: [Blank] Light indicator (Red): ON [Pulse] / OFF [Blank] Output transistor: ON [Blank] / OFF [Pulse] Load (relay): Operate [Blank] / Release [Pulse] (Between terminals 3 and 4 or between black and blue)
	Dark ON	ON when light is not received.	Light received: [Blank] / Light not received: [Pulse] Light indicator (Red): ON [Pulse] / OFF [Blank] Output transistor: ON [Blank] / OFF [Pulse] Load (relay): Operate [Blank] / Release [Pulse] (Between terminals 3 and 4 or between black and blue)

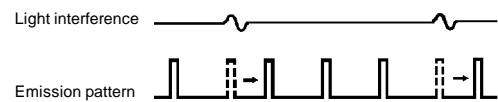
## ■ Fuzzy Mutual Interference Prevention Function

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

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

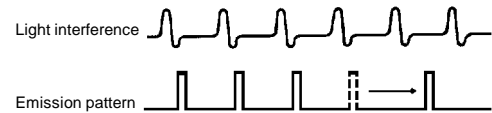
When the risk is low:

The E3S-C waits until there is no light interference and emits light.



When the risk is high:

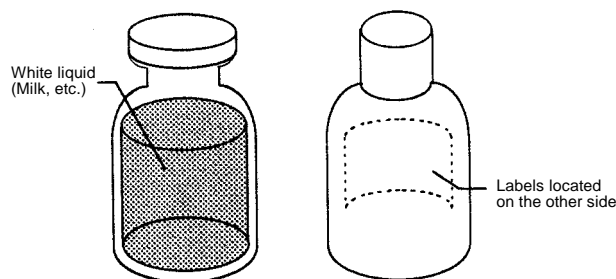
The E3S-C emits light between each light interference moment.



## ■ Settings

### Bottles

In the case of transparent bottles, target labels may not be stably detected due to influences from labels located on the other side of the bottle and colored substances contained in the bottles.

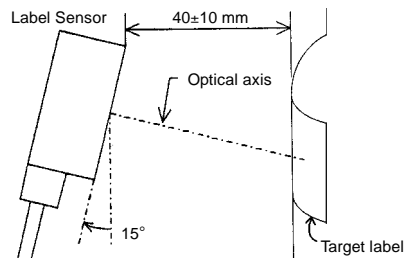


Since label detection depends on the label or bottle materials and color combination, be sure to confirm that detection is possible by using an actual product.

### Optical Axis Adjustment

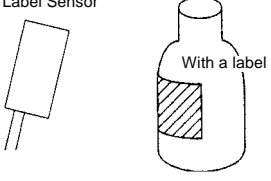
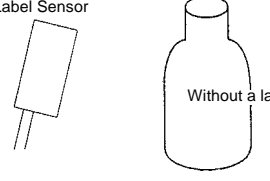
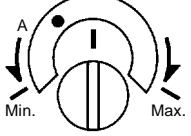
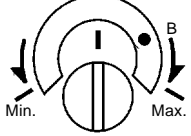
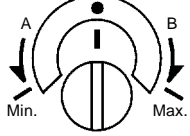
Adjust the mounting angle of the Label Sensor as shown below until it is located in a position where it will not be affected by sensing objects. Label detection will become stable when the Sensor is inclined by 15°.

Align the target label center to the optical axis of the Label Sensor.

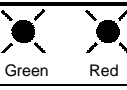
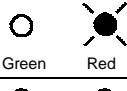
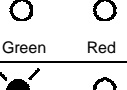
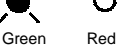


### Sensitivity Adjustment

Following the optical axis adjustment, carry out the sensitivity adjustment as shown below if detection is unstable due to influences from labels located on the other side of sensing bottle surfaces or bottle materials.

Item	Position A	Position B	Setting
<b>Sensing condition</b>	 <p>Label Sensor With a label</p>	 <p>Label Sensor Without a label</p>	---
<b>Sensitivity adjustor</b>	 <p>Min. Max.</p>	 <p>Min. Max.</p>	 <p>Min. Max.</p>
<b>Indicators</b>	<p>ON to OFF      OFF to ON</p> <p>○ STABILITY (green)      ● LIGHT (red)</p>	<p>ON to OFF      ON to OFF</p> <p>○ STABILITY (green)      ○ LIGHT (red)</p>	<p>ON      OFF</p> <p>● STABILITY (green)      ○ LIGHT (red)</p>
<b>Procedure</b>	Place a sensing bottle label at the specified position, set the sensitivity adjustor to the minimum scale position, and gradually increase sensitivity by turning the sensitivity adjustor clockwise until the light indicator (red LED) turns ON. Position A is where the light indicator has turned ON.	Place a bottle without a label at the specified position, set the sensitivity adjustor to the maximum scale position, and gradually decrease sensitivity by turning the sensitivity adjustor counterclockwise until the light indicator turns OFF. Position B is where the light indicator has turned OFF.	Set the sensitivity indicator to the middle position between positions A and B.

### ■ Indicators

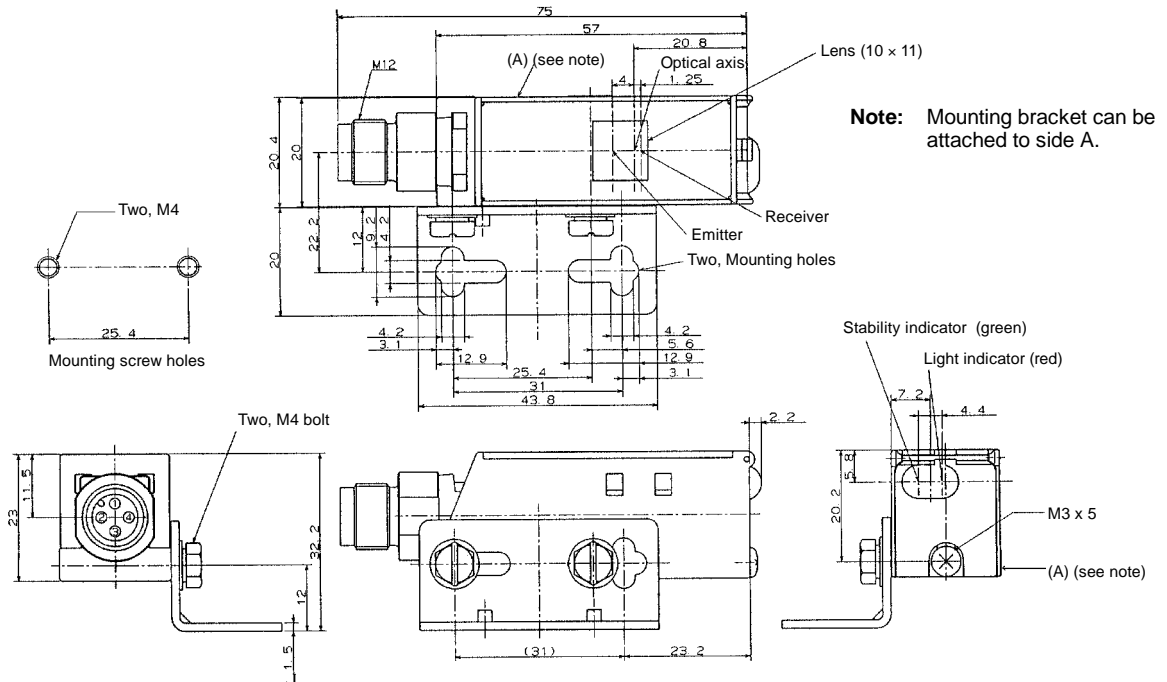
Status	Indicators	ON/OFF as indicated by the red indicator	Excess gain as indicated by the green indicator for temperature changes	Excess gain
Stable ON	 <p>Green      Red</p>	ON (Red indicator is ON.)	Stable detection is possible at the rated temperature range. (Green indicator is ON.)	Operating level x 1.2
Unstable ON	 <p>Green      Red</p>			
Unstable OFF	 <p>Green      Red</p>	OFF (Red indicator is OFF.)	Stable detection is possible at the rated temperature range. (Green indicator is ON.)	Operating level x 0.8
Stable OFF	 <p>Green      Red</p>			



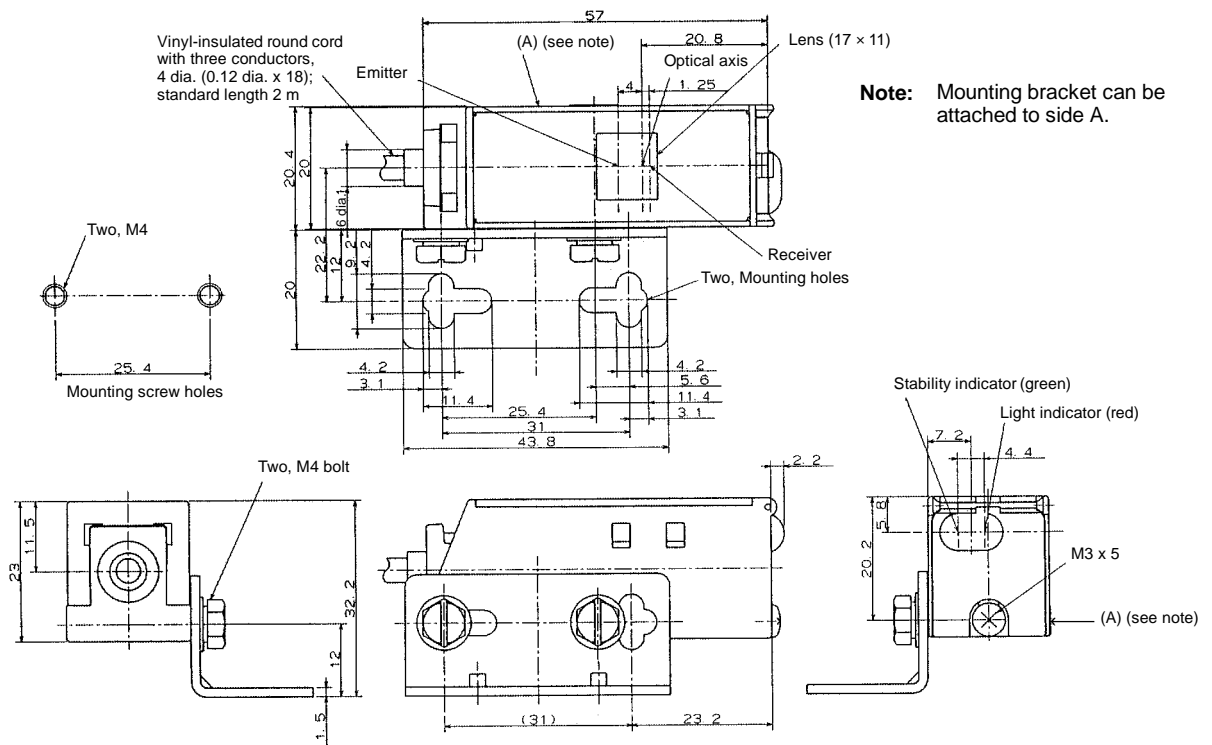
# Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

## E3S-CD68

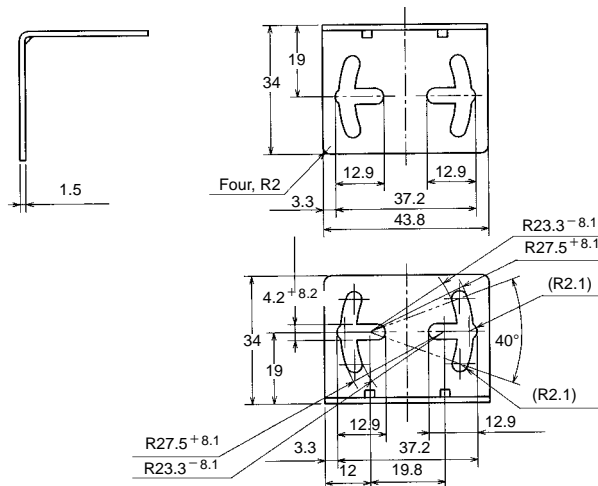


## E3S-CD63

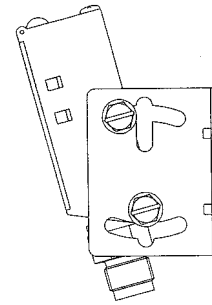


## Accessories

### E39-L113 Mounting Bracket



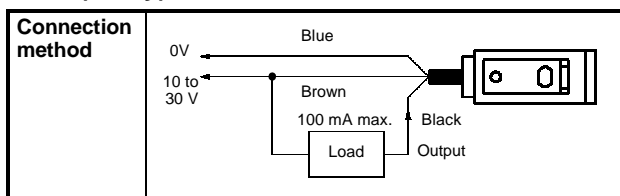
### Application Example



## Installation

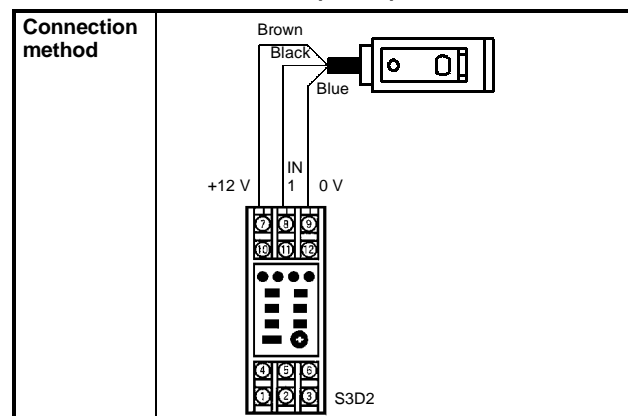
### ■ Connections

#### Load (Relay)



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

#### With Sensor Controller (S3D2)



## Precautions

### Connection

If the input/output lines of the Label Sensor are placed in the same conduit or duct as power lines or high-voltage lines, the Label 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 Label Sensor.

The cord connected to the E3S-CD68/CD63 can be extended up to 100 m provided that the diameter of each wire of the cord is 0.3 mm<sup>2</sup> minimum.

### Startup Operation

A maximum of 100 ms is required from the time power is turned on until the E3S-CD68/CD63 is able to detect objects. If power is supplied to the loads and the E3S-CD68/CD63 from different sources, turn on power to the E3S-CD68/CD63 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-CD68/CD63 may malfunction, due to the switching noise of the power supply.

### Water Resistivity

Do not use the E3S-CD68/CD63 in water, in the rain, or outdoors.

To ensure the water resistivity of the E3S-CD68/CD63, 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-CD68/CD63 in oils or liquid chemicals.

### Cable

The E3S-CD68/CD63 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-CD68/CD63, do not hit the E3S-CD68/CD63 with a hammer, or the E3S-CD68/CD63 will lose its watertightness.

Use M4 screws to mount the E3S-CD68/CD63.

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

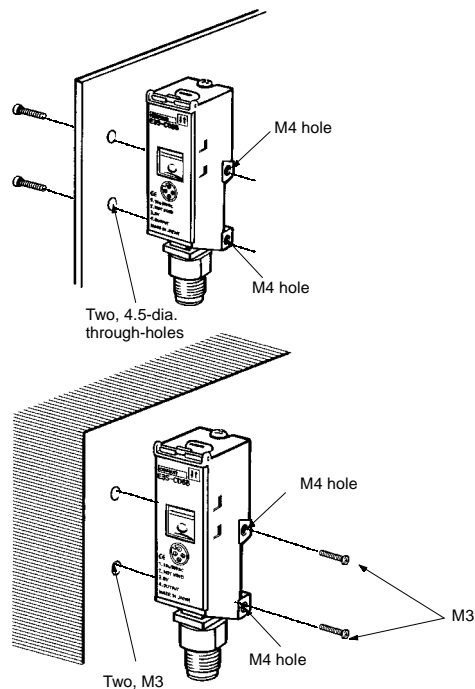
### Mounting Bracket

When mounting the E3S-CD68/CD63 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-CD68/CD63 so that the sensing objects will be in the direction the mechanical axis, move the E3S-CD68/CD63 upwards, downwards, to the left, or to the right and secure the E3S-CD68/CD63 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-CD68/CD63 as shown in the following illustration.



### Malfunctioning

If an inverter motor or servomotor is used with the E3S-CD68/CD63, the frame ground (FG) terminal and the ground (G) terminal must be grounded, or otherwise the E3S-CD68/CD63 may malfunction.

**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. E254-E1-1 **In the interest of product improvement, specifications are subject to change without notice.**

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