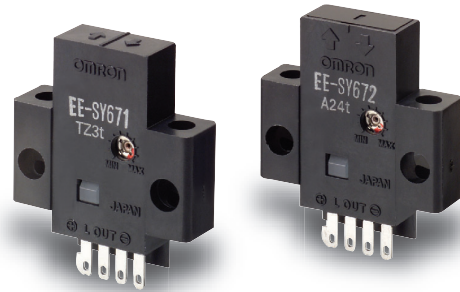


## Reflective Photomicrosensor with Sensitivity Adjuster (Non-modulated)

# EE-SY671/672

### Photomicrosensor with sensitivity adjuster.

- Easy adjustment with a built-in sensitivity adjuster.
- Easy optical axis monitoring with a bright light indicator.
- Compact design incorporating a built-in amplifier and special IC enables direct switching capacity of up to 100 mA.
- Wide operating voltage range: 5 to 24 VDC
- Connection possible with a range of ICs, relays, and Programmable Controllers (PLCs).



Refer to *Precautions* on page 76.

### Ordering Information

#### List of Models

Infrared light

Appearance	Sensing method	Sensing distance	Output type	Output configuration	Model
Horizontal type	Reflective type	1 to 5 mm	NPN output	Dark-ON or Light-ON (Selectable) *	EE-SY671
Vertical type		EE-SY672			

\* The Dark-ON/Light-ON (selectable) models are normally used as dark-ON models. To use them as light-ON models, short-circuit the L terminal and positive (+) terminal.  
An EE-1001-1 Connector with the terminals already short-circuited is also available.

#### Accessories (Order Separately)

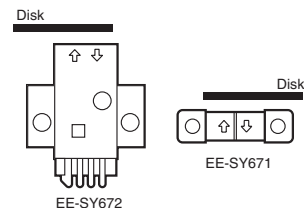
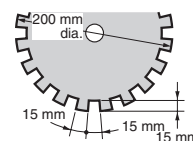
Type	Cable length	Model	Remarks
Connector		EE-1001	
		EE-1001-1	L terminal and positive (+) terminal are already short-circuited.
		EE-1009	
Connector with Cable	1 m	EE-1006 EE-1010	
	2 m	EE-1006 EE-1010	
Connector with Robot Cable	1 m	EE-1010-R	
	2 m	EE-1010-R	

Refer to *Accessories* on page 97 for details.

## Ratings/Characteristics

Item	Models	EE-SY671, EE-SY672
<b>Sensing distance</b>		1 to 5 mm (Reflection factor: 90%; white paper 15 × 15 mm)
<b>Sensing object</b>		Transparent or opaque: 15 × 15 mm min.
<b>Differential distance</b>		0.5 max. (with a sensing distance of 3 mm, horizontally)
<b>Light source</b>		GaAs infrared LED with a peak wavelength of 940 nm
<b>Indicator *</b>		Light indicator (red)
<b>Supply voltage</b>		5 to 24 VDC ±10%, ripple (p-p): 10% max.
<b>Current consumption</b>		40 mA max.
<b>Control output</b>		NPN open collector: Load power supply voltage: 5 to 24 VDC Load current: 100 mA max. 100 mA load current with a residual voltage of 0.8 V max. 40 mA load current with a residual voltage of 0.4 V max.
<b>Response frequency</b> *2		50 Hz min. (Average: 500 Hz)
<b>Ambient illumination</b> *3		1,500 lx max. with fluorescent light on the surface of the receiver
<b>Ambient temperature</b>		Operating: -25 to +55°C Storage: -30 to +80°C
<b>Ambient humidity</b>		Operating: 5% to 85% Storage: 5% to 95%
<b>Vibration resistance</b>		Destruction: 20 to 2,000 Hz (peak acceleration: 100 m/s <sup>2</sup> ) 1.5-mm double amplitude for 2 h (4-min periods) each in X, Y, and Z directions
<b>Shock resistance</b>		Destruction: 500m/s <sup>2</sup> for 3 times each in X, Y, and Z directions
<b>Enclosure rating</b>		IEC IP50
<b>Connecting method</b>		Special connector (direct soldering possible)
<b>Weight</b>		Approx. 3.5 g (including screwdriver for adjustment)
<b>Material</b>	<b>Case</b>	Polybutylene phthalate (PBT)
	<b>Emitter/receiver</b>	Polycarbonate
<b>Accessories</b>		Screwdriver for adjustment

- \* 1. The indicator is a GaP red LED (peak emission wavelength: 690 nm).
- \* 2. The response frequency was measured by detecting the following rotating disk.

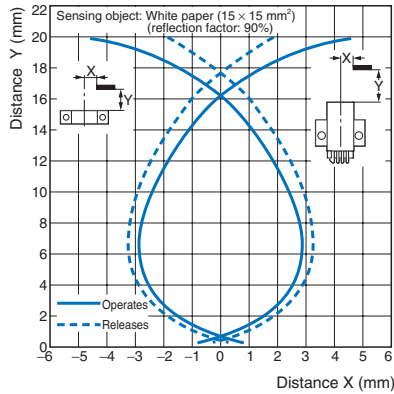


- \* 3. The ambient illuminance is measured on the surface of the receiver.

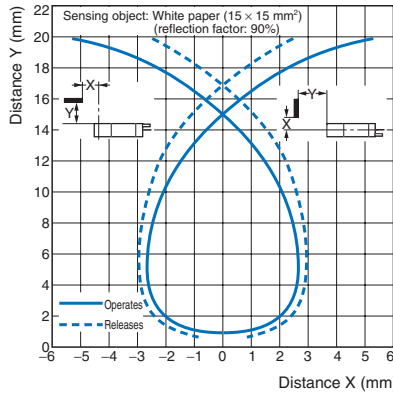
Engineering Data

Operating Range Characteristics  
(Max. Sensitivity) (Typical)

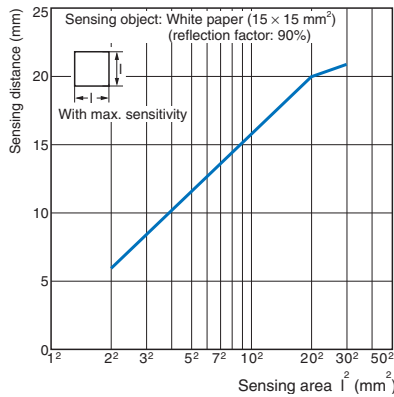
EE-SY67□



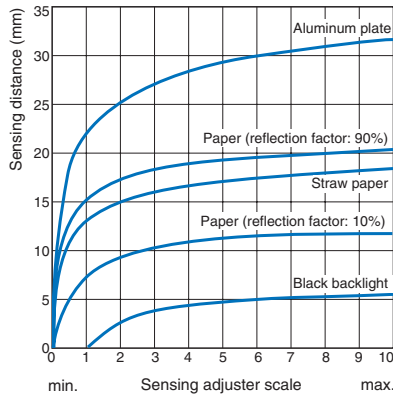
EE-SY67□



Sensing Distance vs. Object Area  
Characteristics (Typical)



Sensing Distance vs. Sensitivity  
Volume (Typical)



I/O Circuits

NPN Output

Model	Output configuration	Timing charts	Terminal connections	Output circuit
EE-SY671 EE-SY672	Light-ON	Incident Interrupted Light indicator (red) ON OFF Output transistor ON OFF Load 1 (relay) Operates Releases Load 2 H L	Short-circuited between ⓪ terminal and positive ⊕ terminal	
	Dark-ON	Incident Interrupted Light indicator (red) ON OFF Output transistor ON OFF Load 1 (relay) Operates Releases Load 2 H L	Open between ⓪ terminal and positive ⊕ terminal	

## Precautions

Refer to *General Precautions* on page 23 to 28 for general precautions.

### Warning

Do not use this product in sensing devices designed to provide human safety.



### Precautions for Correct Use

Make sure that this product is used within the rated ambient environment conditions.

#### Wiring

##### Soldering

- When direct soldering to the terminal, use the following guidelines.

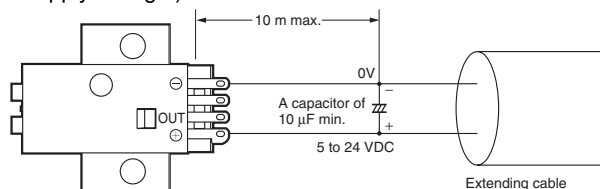
##### Soldering Conditions

Item	Temperature	Permissible time	Remarks
Soldering iron	350°C max.	3 s max.	The portion between the base of the terminals and the position 1.5 mm from the terminal base must not be soldered.

- The terminal base uses a polycarbonate resin, which could be deformed by excessive soldering heat, resulting in damage to the product's functionality.

##### Cable Extension

- When extending the cable, use an extension cable with conductors having a total cross-section area of 0.3 mm<sup>2</sup>. The total cable length must be 10 m maximum.
- To use a cable length longer than 10 m, attach a capacitor with a capacitance of approximately 10 μF to the wires as shown below. The distance between the terminal and the capacitor must be within 10 m. (Use a capacitor with a dielectric strength that is at least twice the Sensor's power supply voltage.)



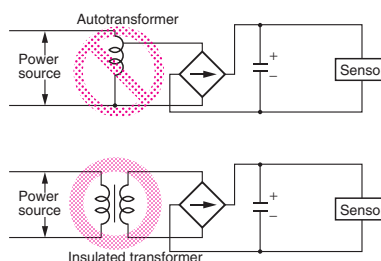
#### Installation

The photomicrosensor is built into the device being used and so is not equipped to deal with interference from an external light source. When using the sensor in an area exposed to an incandescent lamp, install so as to minimize the effects of external light sources.

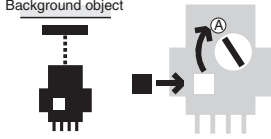
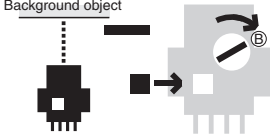
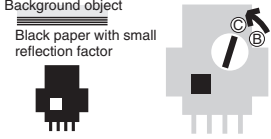
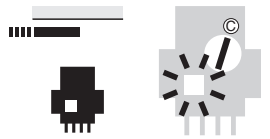
#### Sensitivity Adjustment

Use the special screwdriver (sold together) for sensitivity adjustment.

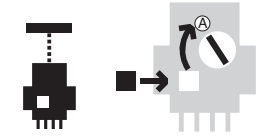
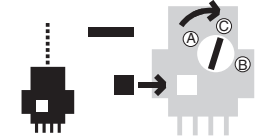
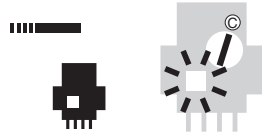
- The sensitivity adjuster can be turned clockwise and counterclockwise endlessly. This means when the sensitivity of the photomicrosensor is at the maximum, turning the adjuster further clockwise will abruptly drop the sensitivity to the minimum. For this reason, use due caution when using the photomicrosensor at its maximum sensitivity.
- The shaft of the sensitivity adjuster is charged. Connect a DC power supply incorporating an insulated transformer to the photomicrosensor. Do not connect a DC power supply incorporating an autotransformer or the user may receive an electric shock when adjusting the sensitivity.



**Sensitivity Adjustment with Background Object**

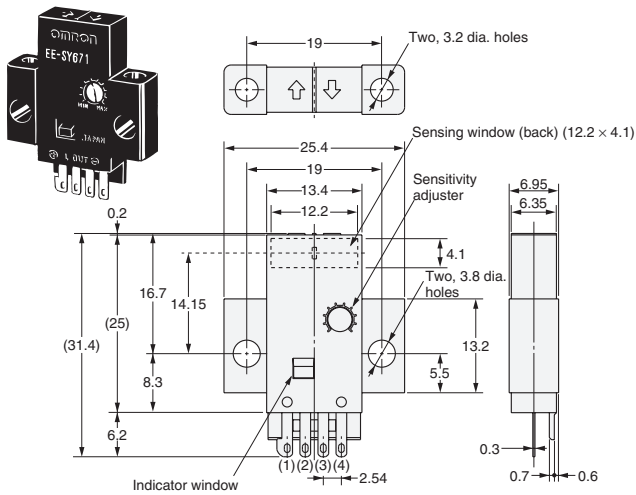
		Point A	Point B	Setting	Check
Sensing conditions	Adjuster indicator				
Adjustment Procedure		1. Set the sensitivity of the photomicrosensor to minimum, place the sensing object in the sensing position, turn the sensitivity adjuster clockwise slowly until the light indicator is lit (point A).	2. Remove the sensing object, at which time the light indicator will be OFF. Further turn the sensitivity adjuster clockwise slowly until the light indicator is lit again (point B). The operation indicator will not light again if the background object does not reflect light, in which case refer to <i>Sensitivity Adjustment with No Background Object</i> .	3. Set the sensitivity adjuster at the center (point C) between point A and B. Points A and B will be very close if the sensor is influenced by excessive light reflected by the background object, in which case take the following preventive measures. (1) Separate the sensor and the background object by a distance of 20 mm min. (2) Cover the surface of the background object with a material with a small reflection factor, such as black sponge.	4. After setting the sensitivity adjuster to point C, check if the light indicator is lit on placing the sensing object and not lit on removing the sensing object.

**Sensitivity Adjustment with No Background Object**

		Point A	Point B	Check
Sensing conditions	Adjuster indicator			
Adjustment Procedure		1. Set the sensitivity of the photomicrosensor to minimum, place the sensing object at the sensing position, turn the sensitivity adjuster clockwise slowly until the light indicator is lit (point A).	2. Set the sensitivity adjuster at the center (point C) between points A and B (the point where the sensitivity is maximum).	3. After setting the sensitivity adjuster to point C, check if the light indicator is not lit on removing the sensing object.

Dimensions (Unit: mm)

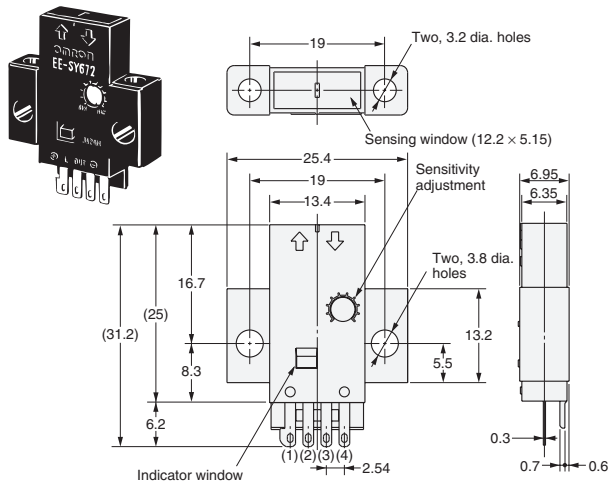
EE-SY671



Terminal Arrangement

(1)	+	Vcc
(2)	L	L
(3)	OUT	OUTPUT
(4)	-	GND (0 V)

EE-SY672



Terminal Arrangement

(1)	+	Vcc
(2)	L	L
(3)	OUT	OUTPUT
(4)	-	GND (0 V)

Accessories (Order Separately)

Refer to *Connectors* on page 97 for details on [connectors](#).