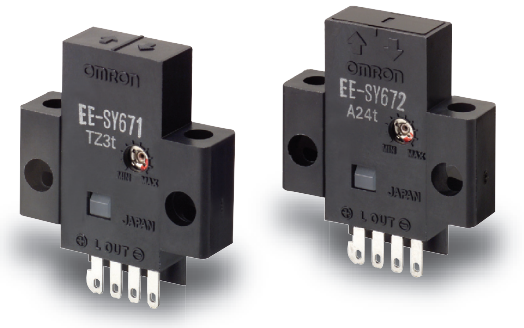
Reflective Photomicrosensor with Sensitivity Adjuster (Non-modulated)

EE-SY671/672

CSM_EE-SY671_672_DS_E_3_1

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).

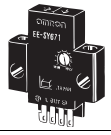


⚠ Be sure to read *Safety Precautions* on page 4.

Ordering Information

Sensors

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)

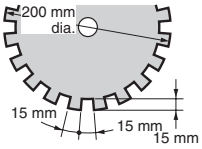
Type		Cable length	Model	Remarks
Connector			**EE-1001**	
			EE-1001-1	L terminal and positive (+) terminal are already short-circuited.
			EE-1009	
	Connector with Cable	1 m	**EE-1006**	
			EE-1010	
		2 m	**EE-1006**	
			EE-1010	
	Connector with Robot Cable	1 m	**EE-1010-R**	
		2 m	**EE-1010-R**	

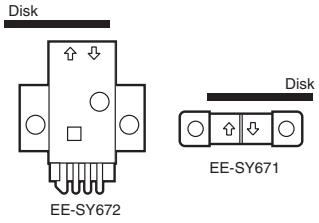
* Refer to *Accessories* for details.

Ratings and Specifications

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

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



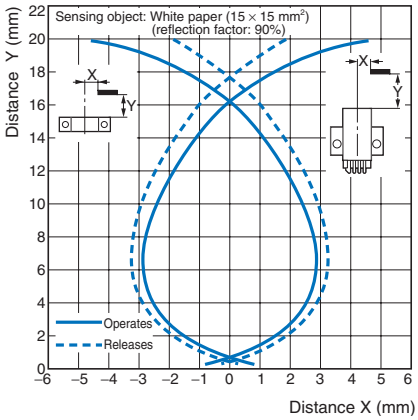


*3. The ambient illuminance is measured on the surface of the receiver.

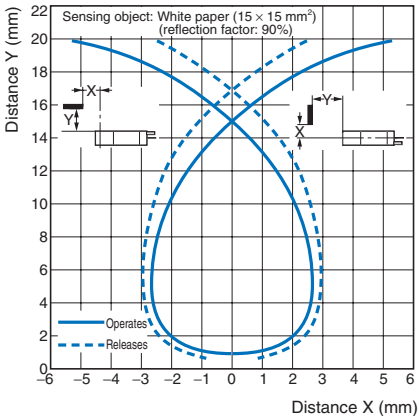
Engineering Data (Typical)

Operating Range Characteristics (Max. Sensitivity)

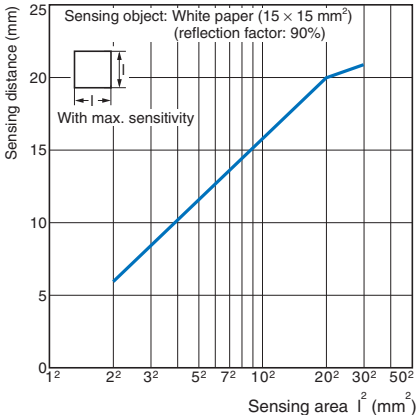
EE-SY67□



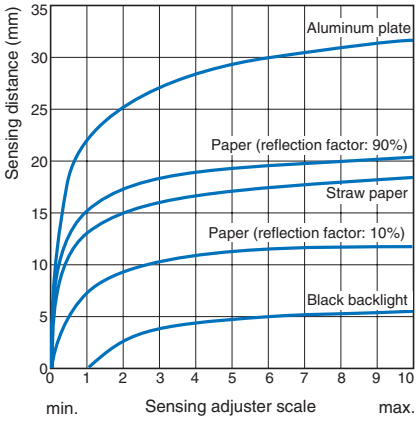
EE-SY67□



Sensing Distance vs. Object Area Characteristics

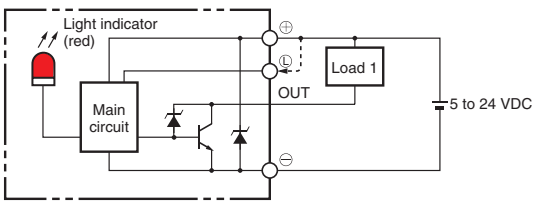


Sensing Distance vs. Sensitivity Volume



I/O Circuit Diagrams

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	Short-circuited between Ⓛ terminal and positive ⊕ terminal	
	Dark-ON	Incident Interrupted Light indicator (red) ON / OFF Output transistor ON / OFF Load 1 (relay) Operates / Releases	Open between Ⓛ terminal and positive ⊕ terminal	

Safety Precautions

Refer to *Warranty and Limitations of Liability*.

⚠ WARNING

This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.

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^2. The total cable length must be less than 10 m.

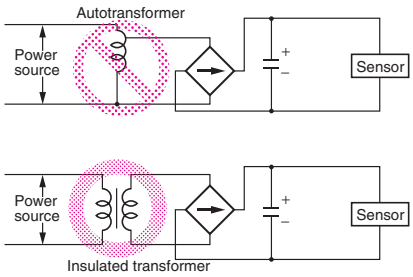
● Installation

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.

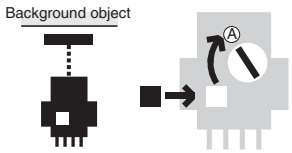
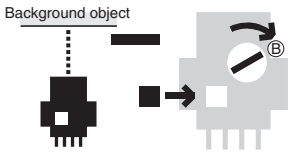
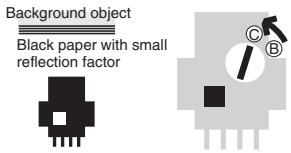
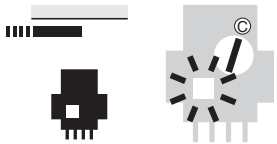
● Sensitivity Adjustment

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

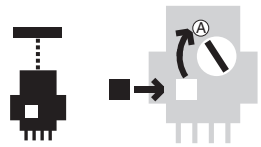
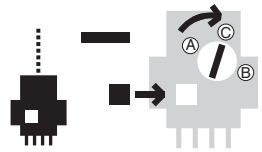
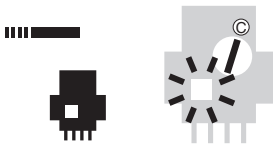
- When an excessive force is applied to sensitivity adjuster, it may be damaged.
- The shaft of the sensitivity adjuster is charged. Connect a DC power supply incorporating an insulated transformer to the photomicrosensor. Do not connect a DC power supply incorporating an autotransformer or the user 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 'Sensitivity Adjustment with No Background Object".	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 at the sensing position 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.

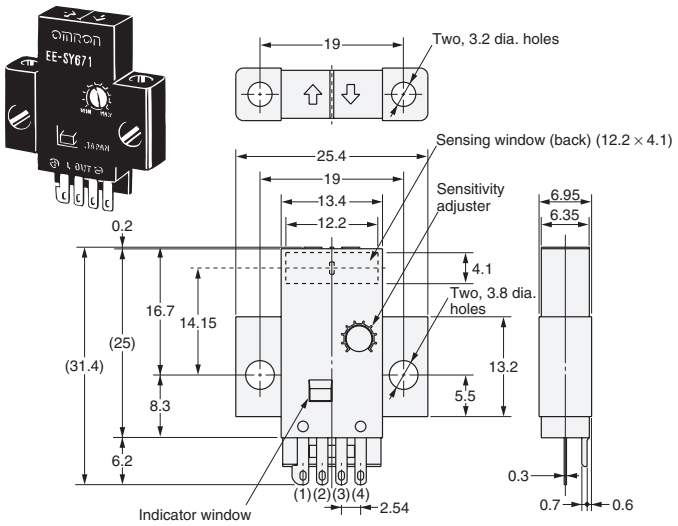
(Unit: mm)

Dimensions

Tolerance class IT16 applies to dimensions in this datasheet unless otherwise specified.

Sensors

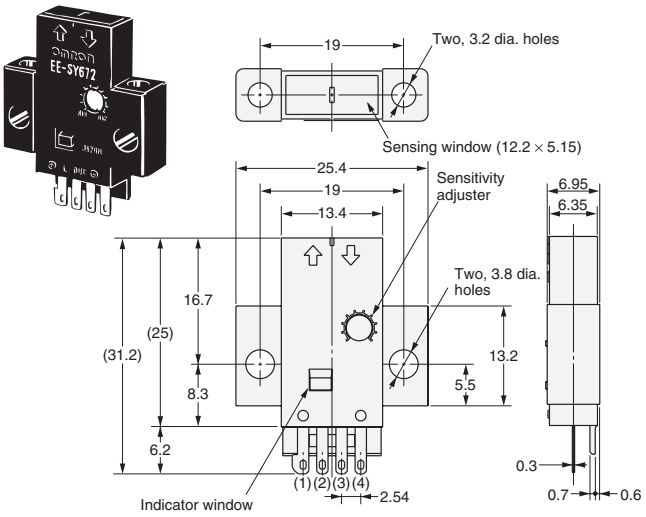
EE-SY671



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 *Accessories* for details.

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2008.11

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Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru
moschip.ru_4
moschip.ru_6
moschip.ru_9