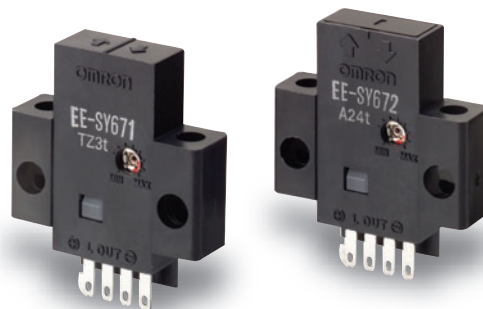



# EE-SY671/672

## 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).



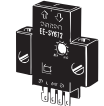


 Be sure to read *Safety Precautions* on page 4.

## Ordering Information

### Sensors

 Infrared light

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

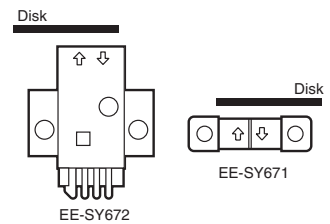
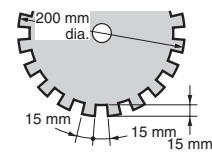
| Type                       | Cable length | Model        | Remarks   |
|----------------------------|--------------|--------------|---|
| Connector                  |              | EE-1001      |   |
|                            |              | EE-1001-1    | L terminal and positive (+) terminal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

\* 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:<br>Load power supply voltage: 5 to 24 VDC<br>Load current: 100 mA max.<br>OFF current: 0.5 mA max.<br>100 mA load current with a residual voltage of 0.8 V max.<br>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<br>Storage: -30 to +80°C  |
| Ambient humidity range    |                  | Operating: 5% to 85%<br>Storage: 5% to 95%  |
| Vibration resistance      |                  | Destruction: 20 to 2,000 Hz (peak acceleration: 100 m/s <sup>2</sup> )<br>1.5-mm double amplitude for 2 h (4-min periods) each in X, Y, and Z directions  |
| Shock resistance          |                  | Destruction: 500m/s <sup>2</sup> 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.

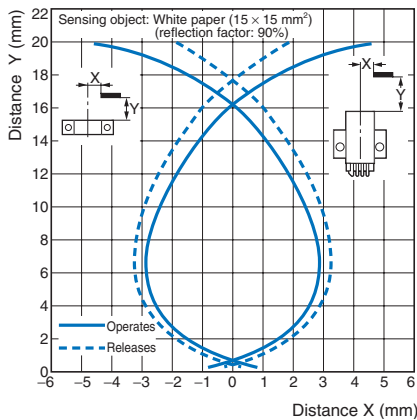


\*3. The ambient illuminance is measured on the surface of the receiver.

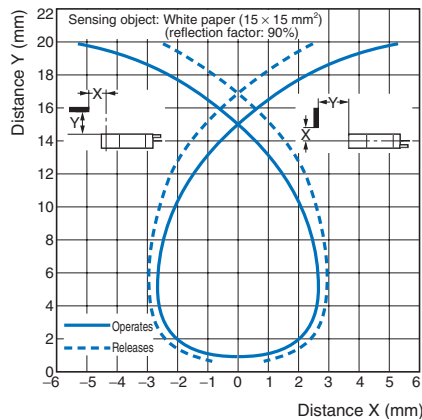
## Engineering Data (Typical)

### Operating Range Characteristics (Max. Sensitivity)

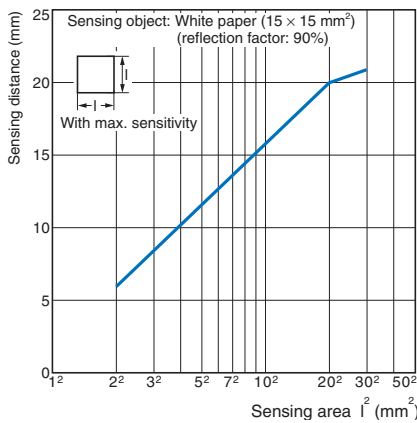
EE-SY67□



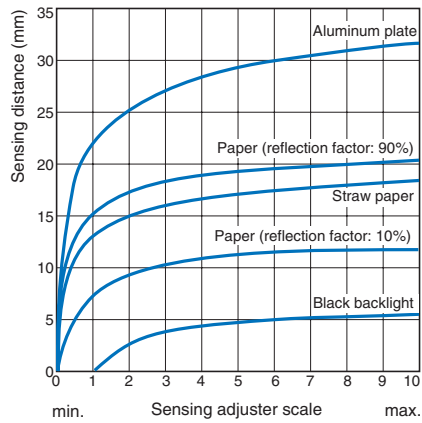
EE-SY67□



### 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<br>EE-SY672 | Light-ON             | Incident Interrupted<br>Light indicator (red) ON OFF<br>Output transistor ON OFF<br>Load 1 (relay) Operates Releases | Short-circuited between<br>⓪ terminal and positive<br>⊕ terminal |                |
|                      | Dark-ON              | Incident Interrupted<br>Light indicator (red) ON OFF<br>Output transistor ON OFF<br>Load 1 (relay) Operates Releases | Open between<br>⓪ terminal and positive<br>⊕ 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<sup>2</sup>. The total cable length must be less than 10 m.

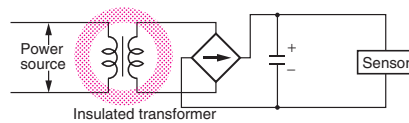
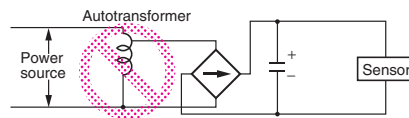
● **Installation**

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.

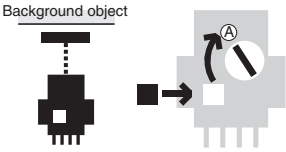
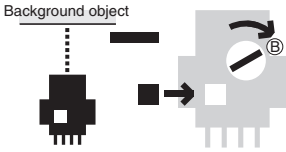
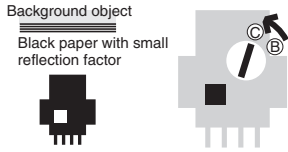
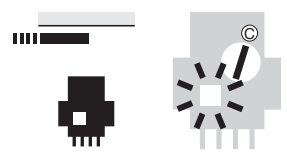
● **Sensitivity Adjustment**

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

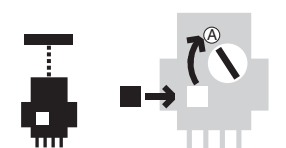
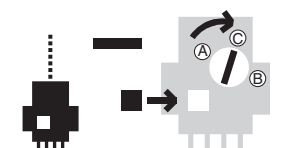
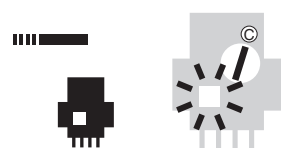
- When an excessive force is applied to sensitivity adjuster, it may be damaged.
- The shaft of the sensitivity adjuster is charged. Connect a DC power supply incorporating an insulated transformer to the photomicrosensor. Do not connect a DC power supply incorporating an autotransformer or the user may receive an electric shock when adjusting the sensitivity.



**Sensitivity Adjustment with Background Object**

|                    |                    | Point A  | Point B   | Setting   | Check  |
|--------------------|--------------------|--|---|---|--|
| Sensing conditions | Adjuster indicator |   |    |   |   |
|                    |                    | <p>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).</p> | <p>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".</p> | <p>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.</p> <p>(1) Separate the sensor and the background object by a distance of 20 mm min.</p> <p>(2) Cover the surface of the background object with a material with a small reflection factor, such as black sponge.</p> | <p>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.</p> |

**Sensitivity Adjustment with No Background Object**

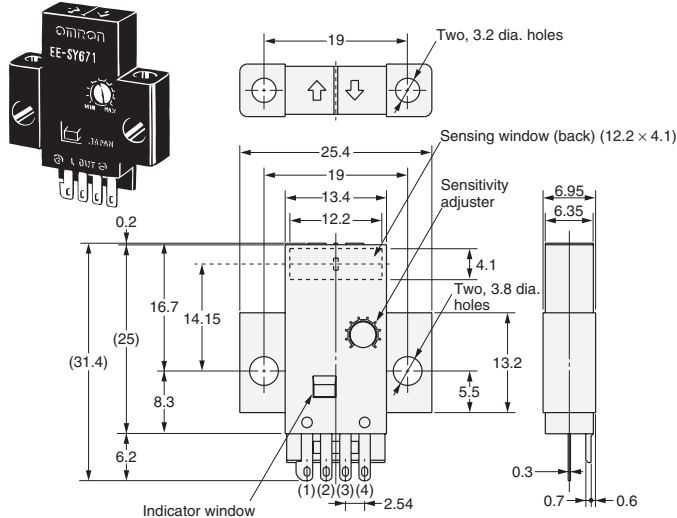
|                    |                    | Point A  | Point B   | Check  |
|--------------------|--------------------|--|---|--|
| Sensing conditions | Adjuster indicator |    |   |   |
|                    |                    | <p>1. Set the sensitivity of the photomicrosensor to minimum, place the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

Dimensions

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

Sensors

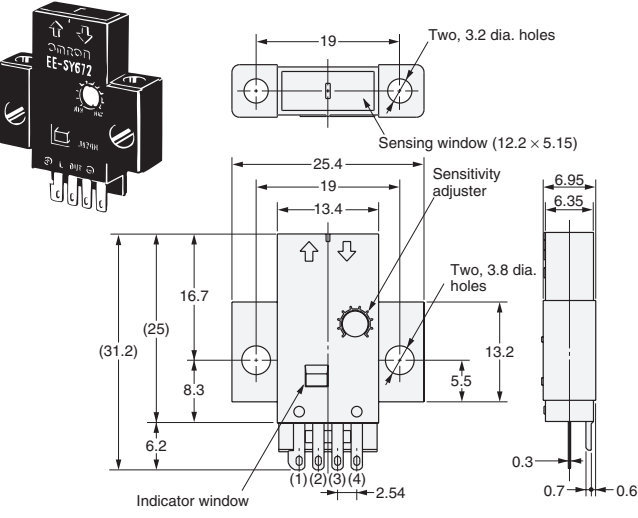
EE-SY671



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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