

## Through-beam Photomicrosensor with a sensing distance as long as 1 m.

- Easy operation monitoring with bright light indicator.
- Wide operating voltage range: 5 to 24 VDC
- Light modulation effectively reduces external light interference.
- Easy-to-wire connector assures ease of maintenance.



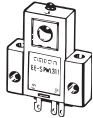
 Be sure to read *Safety Precautions* on page 3.



## Ordering Information

### Sensors

 Infrared light

| Appearance                                                                         | Sensing method    | Sensing distance                                                                       |  | Output type | Output configuration | Model            |
|------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------|--|-------------|----------------------|------------------|
|  | Through-beam type |  1m |  | NPN output  | Dark-ON              | <b>EE-SPW311</b> |
|                                                                                    |                   |                                                                                        |  |             | Light-ON             | <b>EE-SPW411</b> |

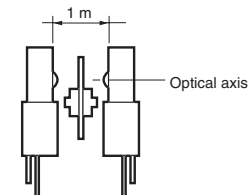
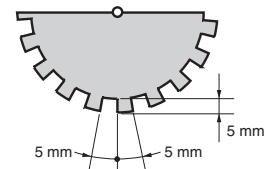
\* Both an EE-1006L Connector with Cable for the Emitter and an EE-1006D Connector with Cable for the Receiver are included with the Photomicrosensor. Refer to *Accessories* when using non-standard connectors, including Robot Cables and PNP Adapters.

## Ratings and Specifications

| Item                      | Models | EE-SPW311, EE-SPW411                                                                                                                                                                                                                            |
|---------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sensing distance          |        | 1 m                                                                                                                                                                                                                                             |
| Sensing object            |        | Opaque: 5 mm dia. min.                                                                                                                                                                                                                          |
| Directional angle         |        | 5 to 20°                                                                                                                                                                                                                                        |
| Light source              |        | GaAs infrared LED (pulse lighting) with a peak wavelength of 940 nm                                                                                                                                                                             |
| Indicator *1              |        | Light indicator (red)                                                                                                                                                                                                                           |
| Supply voltage            |        | 5 (–5%) to 24 (+10%) VDC, ripple (p-p): 5% max.                                                                                                                                                                                                 |
| Current consumption       |        | Emitter: 20 mA max., Receiver: 20 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>10 mA load current with a residual voltage of 0.4 V max. |
| Response frequency *2     |        | 100 Hz min.                                                                                                                                                                                                                                     |
| Ambient illumination      |        | 3,000 lx max. with incandescent light on the surface of the receiver                                                                                                                                                                            |
| Ambient temperature range |        | Operating: –10 to +55°C<br>Storage: –25 to +65°C                                                                                                                                                                                                |
| Ambient humidity range    |        | Operating: 5% to 85%<br>Storage: 5% to 95%                                                                                                                                                                                                      |
| Vibration resistance      |        | Destruction: 200 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: 500 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions                                                                                                                                                                    |
| Degree of protection      |        | IEC IP60                                                                                                                                                                                                                                        |
| Connecting method         |        | Special connector (soldering not possible)                                                                                                                                                                                                      |
| Weight (packaged)         |        | Approx. 8.8 g                                                                                                                                                                                                                                   |
| Material                  | Case   | Polybutylene phthalate (PBT)                                                                                                                                                                                                                    |
|                           | Lens   | Polycarbonate                                                                                                                                                                                                                                   |
| Accessories               |        | EE-1006L/D Connectors with Cables, Instruction Manual                                                                                                                                                                                           |

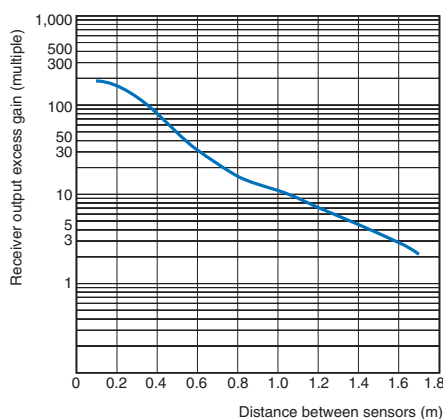
\*1. The indicator is a GaP red LED (peak wavelength: 700 nm).

\*2. The response frequency was measured by detecting the following rotating disk.

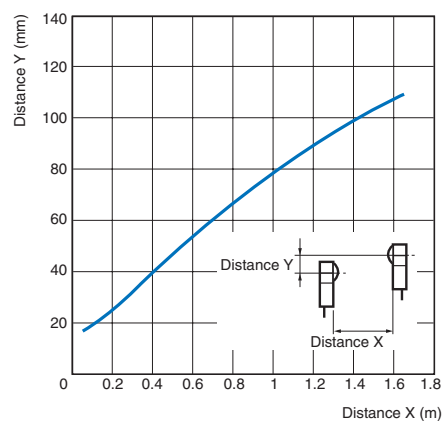


## Engineering Data (Typical)

Receiver Output Excess Gain Vs. Sensing Distance Characteristics



Parallel Movement Characteristics



## I/O Circuit Diagrams

### NPN Output

| Model     | Output configuration | Timing charts                                                                                                                             | Output circuit |
|-----------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| EE-SPW411 | Light-ON             | Incident<br>Interrupted<br>Light indicator (red)<br>ON<br>OFF<br>Output transistor<br>ON<br>OFF<br>Load 1 (relay)<br>Operates<br>Releases |                |
| EE-SPW311 | Dark-ON              | Incident<br>Interrupted<br>Light indicator (red)<br>ON<br>OFF<br>Output transistor<br>ON<br>OFF<br>Load 1 (relay)<br>Operates<br>Releases |                |

## 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.

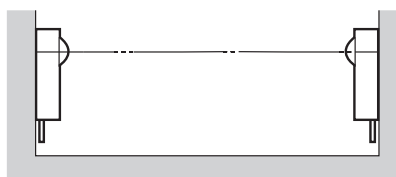
#### ● Wiring

- Connection is made using a connector. Do not solder to the pins (leads).
- 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.

#### ● Axis Adjustment

- (1) Tentatively mount the emitter and receiver so that the center of each lens is in a single line.

Side view

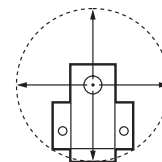


Top view



- (2) Turn ON the emitter and receiver after making sure that they have been wired correctly. When power is turned ON, the light indicator on the receiver will light. Make sure that the light indicator is OFF when an object intercepts the optical axis and that the light indicator lights again when the object is removed.

- (3) Fix the position of the receiver (or emitter) securely, move the emitter (or receiver) horizontally and vertically to check the range in which the operation indicator is lit. Then locate the emitter (or receiver) in the center of the range and fix the position securely.



## Dimensions

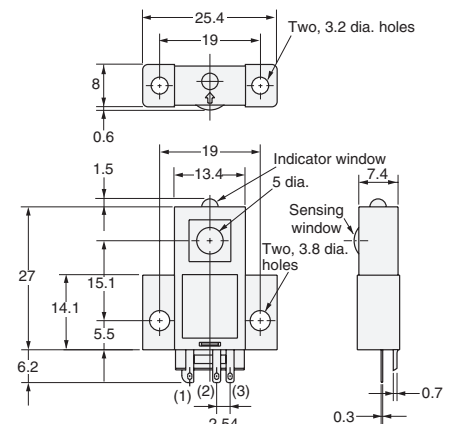
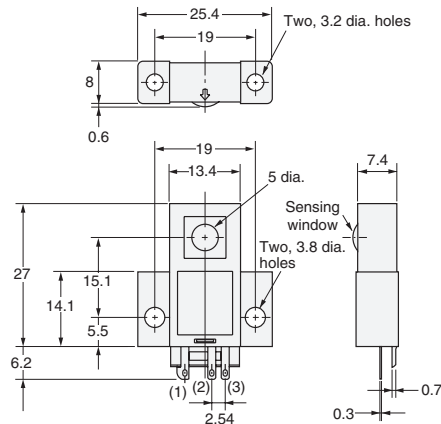
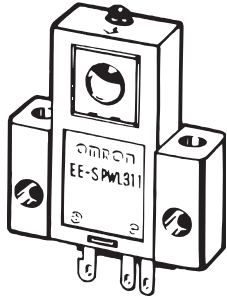
Tolerance class IT16 applies to dimensions in this datasheet unless otherwise specified.

## Sensors

EE-SPW311  
EE-SPW411

### Emitter (EE-SPWL□11)

### Receiver (EE-SPWD□11)



#### Terminal Arrangement

|     |     |           |
|-----|-----|-----------|
| (1) | +   | Vcc       |
| (2) | --- | Vacant    |
| (3) | -   | GND (0 V) |

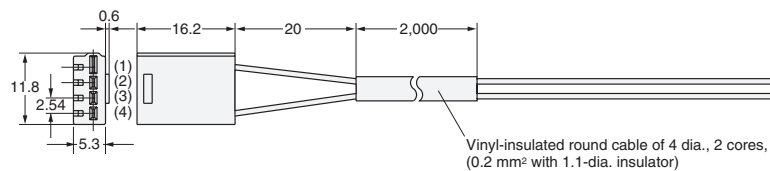
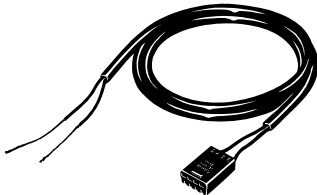
#### Terminal Arrangement

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

## Accessories (Included)

### Connector with Cable for Emitter

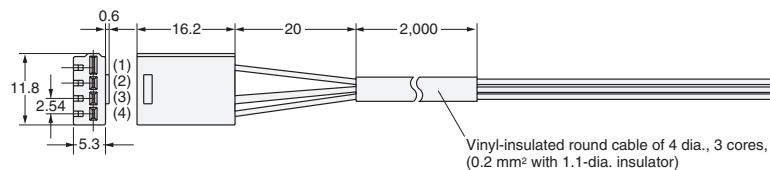
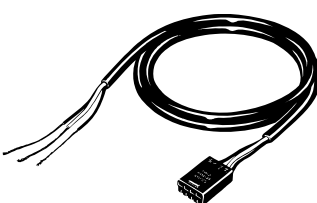
EE-1006L



|     |       |   |
|-----|-------|---|
| (1) | Brown | + |
| (4) | Blue  | - |

### Connector with Cable for Receiver

EE-1006D



|     |       |     |
|-----|-------|-----|
| (1) | Brown | +   |
| (3) | Black | OUT |
| (4) | Blue  | -   |

Note: These cables can also be ordered separately.

\* Refer to *Accessories* for details.

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