


## Optical Fiber Photomicrosensor EE-SPZ

### Optical Fiber Photomicrosensor resists interference from external light.

- Easy adjustment and optical axis monitoring with a light indicator.
- Wide operating voltage range: 5 to 24 VDC
- Supports connection with Programmable Controllers (PLCs).
- Easy-to-wire connectors assure easy maintenance.









 Refer to *Precautions* on page 87.

### Ordering Information

#### List of Models

 Infrared light

Appearance	Sensing method	Sensing distance	Output type	Output configuration	Model
	Through-beam type (with lens)	 30 mm	NPN output	Dark-ON	<b>EE-SPZ301W-01</b>
				Light-ON	<b>EE-SPZ401W-01</b>
	Through-beam type	 5 mm		Dark-ON	<b>EE-SPZ301W-02</b>
				Light-ON	<b>EE-SPZ401W-02</b>
	Reflective type	 1 to 3 mm		Dark-ON	<b>EE-SPZ301Y-01</b>
				Light-ON	<b>EE-SPZ401Y-01</b>

#### Accessories (Order Separately)

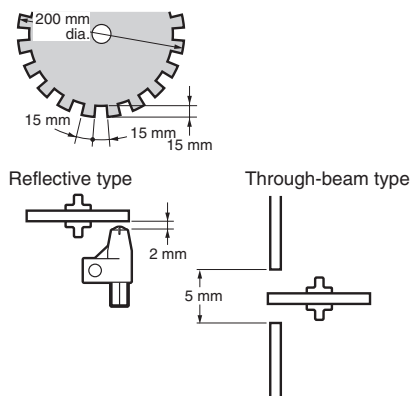
Type	Cable length	Model	Remarks
Connector		<b>EE-1002</b>	
Connector with Cable	1 m	<b>EE-1003</b>	
NPN/PNP Conversion Connector	0.46 m (total length)	<b>EE-2001</b>	
Connector Hold-down Clip		<b>EE-1003A</b>	For EE-1003 only.

Refer to *Accessories* on page 97 for details.

## Ratings/Characteristics

Item	Sensing method	Through-beam (with lens)	Through-beam	Reflective
	Models	EE-SPZ301W-01 EE-SPZ401W-01	EE-SPZ301W-02 EE-SPZ401W-02	EE-SPZ301Y-01 EE-SPZ401Y-01
<b>Sensing distance</b>		30 mm	5 mm	1 to 3 mm White paper (15 × 15 mm) (reflection factor: 90%)
<b>Sensing object</b>		Opaque: 4 mm dia. min.	Opaque: 1 mm dia. min.	---
<b>Light source</b>	GaAs infrared LED with a peak wavelength of 940 nm			
<b>Indicator *1</b>	Light indicator (red)			
<b>Supply voltage</b>	5 to 24 VDC ±10%, ripple (p-p): 5% max.			
<b>Current consumption</b>	Average: 15 mA max., Peak: 50 mA max.			
<b>Control output</b>	NPN voltage output Load power supply voltage: 5 to 24 VDC Load current: 80 mA max. 80 mA load current with a residual voltage of 1.0 V max. 10 mA load current with a residual voltage of 0.4 V max.			
<b>Response frequency *2</b>	100 Hz min.			
<b>Ambient illumination</b>	3,000 lx max. with fluorescent light or incandescent light on the surface of the receiver			
<b>Ambient temperature</b>	Operating: -10 to +55°C Storage: -25 to +65°C			
<b>Ambient humidity</b>	Operating: 5% to 85% Storage: 5% to 95%			
<b>Vibration resistance</b>	Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 h each in X, Y, and Z directions			
<b>Shock resistance</b>	Destruction: 500 m/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 (soldering not possible)			
<b>Weight</b>	Approx. 7.3 g	Approx. 7.0 g	Approx. 7.2 g	
<b>Material</b>	Case, Lens: Polycarbonate, Fiber sheath: Black polyethylene			

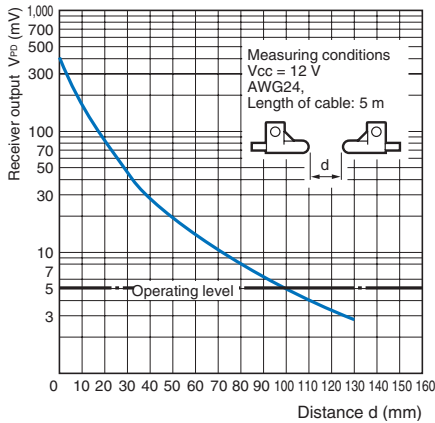
- \* 1. The indicator is a GaP red LED (peak emission wavelength: 700 nm).
- \* 2. The response frequency was measured by detecting the following rotating disk.



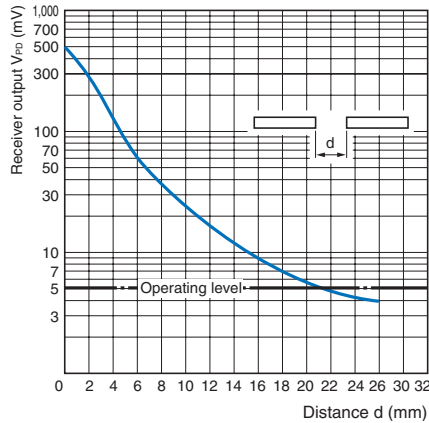
Engineering Data

Receiver Output vs. Sensing Distance Characteristics (Typical)

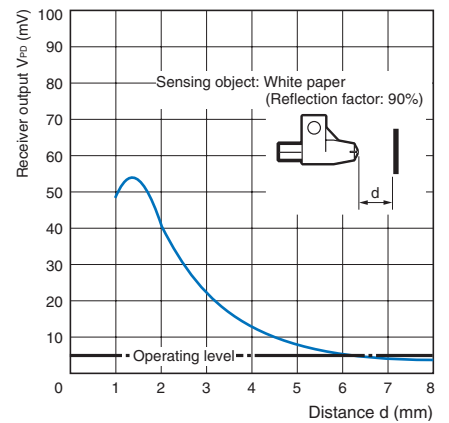
EE-SPZ301W-01, EE-SPZ401W-01



EE-SPZ301W-02, EE-SPZ401W-02

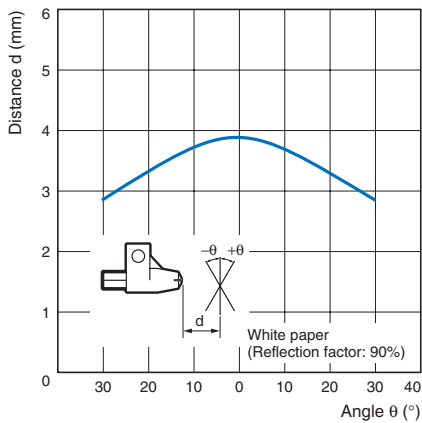


EE-SPZ301Y-01, EE-SPZ401Y-01



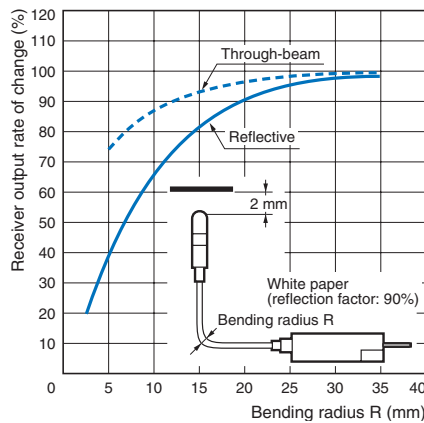
Sensing Angle vs. Sensing Distance Characteristics (Typical)

EE-SPZ301Y-01, EE-SPZ401Y-01



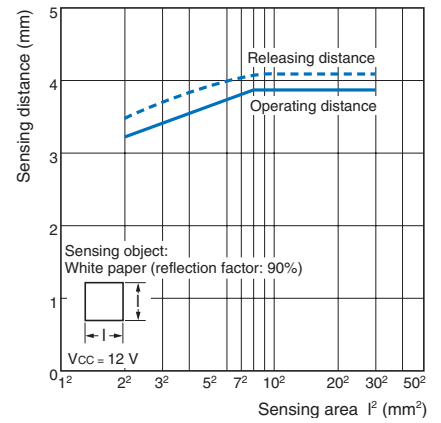
Receiver Output vs. Bending Radius Characteristics (Typical)

EE-SPZ301Y-01, EE-SPZ401Y-01



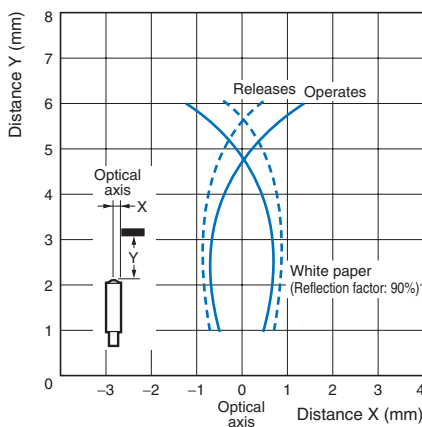
Sensing Distance vs. Object Area Characteristics (Typical)

EE-SPZ301Y-01, EE-SPZ401Y-01

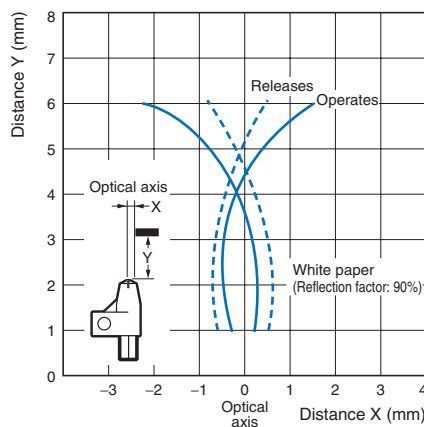


Operating Range Characteristics (Typical)

EE-SPZ301Y-01, EE-SPZ401Y-01

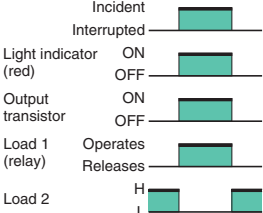
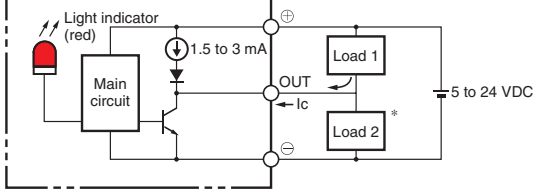
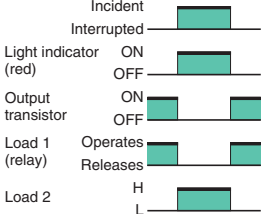


EE-SPZ301Y-01, EE-SPZ401Y-01



I/O Circuit

NPN Output

Model	Output configuration	Timing charts	Output circuit
EE-SPZ401W-02 EE-SPZ401Y-01	Light-ON		 <p data-bbox="893 627 1364 649">* Voltage output (when the sensor is connected to a transistor circuit)</p>
EE-SPZ301W-02 EE-SPZ301Y-01	Dark-ON		

## 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.**

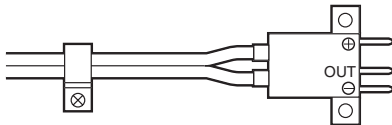


### Precautions for Correct Use

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

#### ● Installation

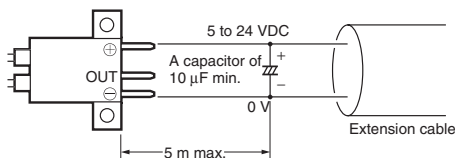
The connection force of the fiber and the Photomicrosensor will decrease when the ambient temperature is high. If high ambient temperatures can be expected, install the fiber with a holder or clip, and do not pull on the fiber.



Install the fiber with a holder or clip.

#### ● Wiring

- A fiber that has been once connected cannot be disconnected for reuse.
- Connection is made using a Connector. Do not solder to the pin (lead).
- 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 5 m maximum.
- To use a cable length longer than 5 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 5 m. (Use a capacitor with a dielectric strength that is at least twice the Sensor's power supply voltage.)

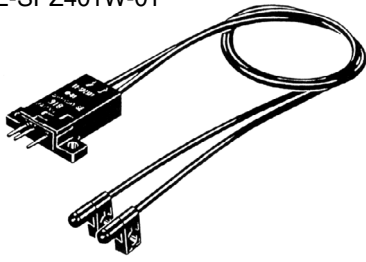


#### ● Adjustment

- The sensing distance of the EE-SPZ301Y-01 and EE-SPZ401Y-01 must be 1 mm maximum or operation will become unstable. Always operate at a distance of minimum 1 mm.
- When the EE-SPZ301Y-01 and EE-SPZ401Y-01 detect a piece of white paper with a reflection factor of 90%, the sensing distance varies from 4 to 10 mm depending on the product. The background object must not be glossy.

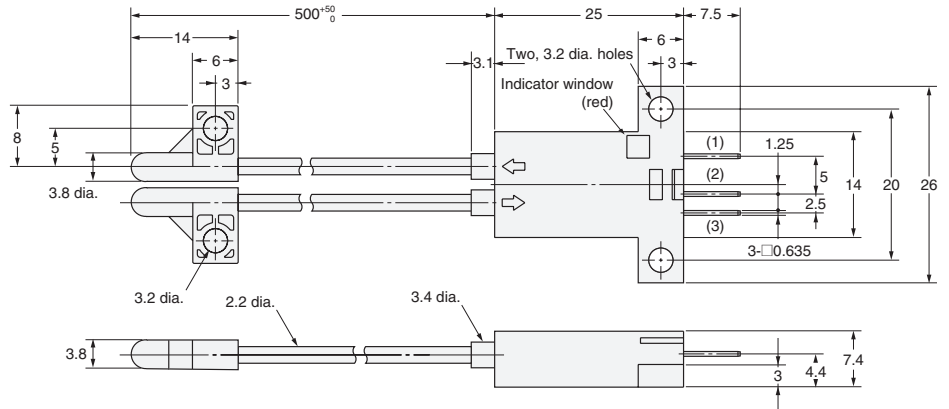
Dimensions (Unit: mm)

EE-SPZ301W-01  
EE-SPZ401W-01

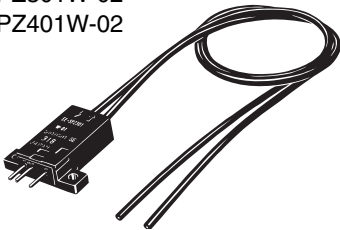


Terminal Arrangement

(1)	⊕	Vcc
(2)	OUT	OUTPUT
(3)	⊖	GND (0 V)

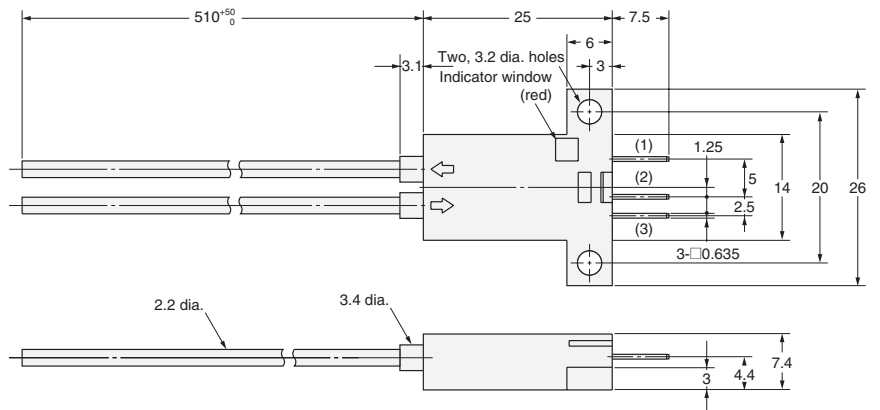


EE-SPZ301W-02  
EE-SPZ401W-02

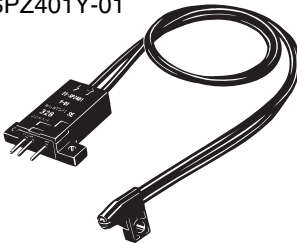


Terminal Arrangement

(1)	⊕	Vcc
(2)	OUT	OUTPUT
(3)	⊖	GND (0 V)

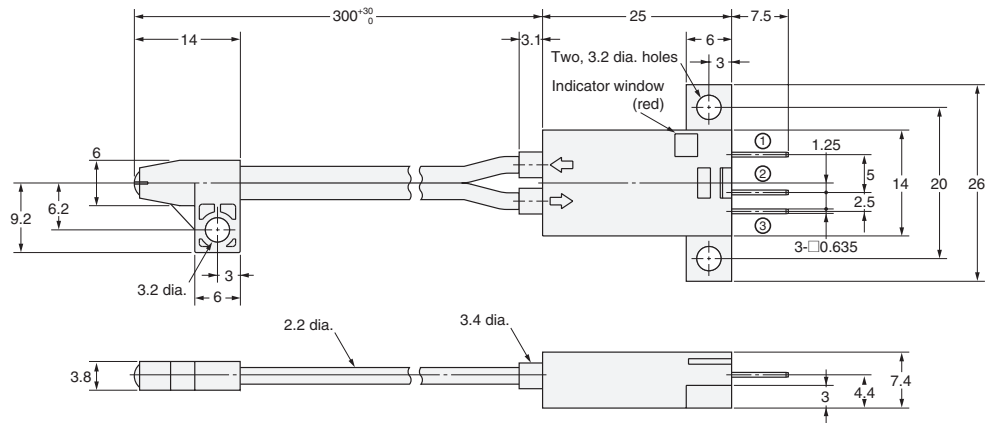


EE-SPZ301Y-01  
EE-SPZ401Y-01



Terminal Arrangement

(1)	⊕	Vcc
(2)	OUT	OUTPUT
(3)	⊖	GND (0 V)



Accessories (Order separately)

Refer to *Connectors* on page 97 for details on connectors.