

## 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.


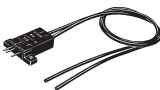



Be sure to read *Safety Precautions* on page 5.

## Ordering Information

### Sensors

Infrared light

Appearance	Sensing method	Sensing distance		Output type	Output configuration	Model
	Through-beam type (with lens)	<span style="border: 1px solid pink; display: inline-block; width: 40px; height: 10px;"></span>	30 mm	NPN output	Dark-ON	<b>EE-SPZ301W-01</b>
					Light-ON	<b>EE-SPZ401W-01</b>
	Through-beam type	<span style="border: 1px solid pink; display: inline-block; width: 40px; height: 10px;"></span>	5 mm		Dark-ON	<b>EE-SPZ301W-02</b>
					Light-ON	<b>EE-SPZ401W-02</b>
	Reflective type	<span style="border: 1px solid pink; display: inline-block; width: 20px; height: 10px;"></span>	1 to 3 mm		Dark-ON	<b>EE-SPZ301Y-01</b>
					Light-ON	<b>EE-SPZ401Y-01</b>

### Accessories (Order Separately)

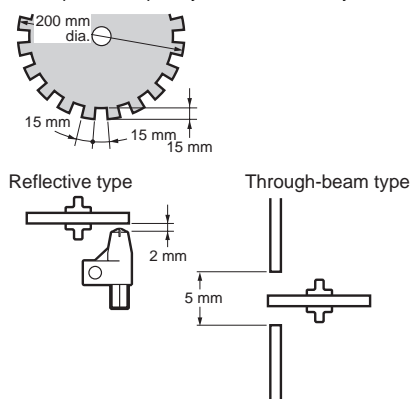
Type		Cable length	Model	Remarks
Connector			<b>EE-1002</b>	
	Connector with Cable	1 m	<b>EE-1003</b>	
NPN/PNP Conversion Connector		0.46 m (total length)	<b>EE-2001</b>	
Connector Hold-down Clip			<b>EE-1003A</b>	For EE-1003 only.

## Ratings and Specifications

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
Sensing distance		30 mm	5 mm	1 to 3 mm White paper (15 × 15 mm) (reflection factor: 90%)
Sensing object		Opaque: 4 mm dia. min.	Opaque: 1 mm dia. min.	---
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): 5% max.		
Current consumption		Average: 15 mA max., Peak: 50 mA max.		
Control output		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.		
Response frequency *2		100 Hz min.		
Ambient illumination		3,000 lx max. with fluorescent light or incandescent light on the surface of the receiver		
Ambient temperature range		Operating: -10 to +55°C Storage: -25 to +65°C		
Ambient humidity range		Operating: 5% to 85% Storage: 5% to 95%		
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 h 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		
Enclosure rating		IEC IP50		
Connecting method		Special connector (soldering not possible)		
Weight		Approx. 7.3 g	Approx. 7.0 g	Approx. 7.2 g
Material		Case, Lens: Polycarbonate, Fiber sheath: Black polyethylene		

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

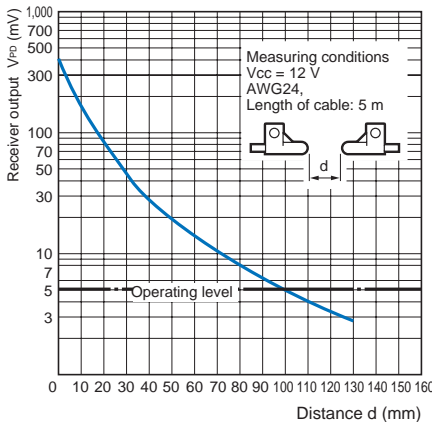
\*2. The response frequency was measured by detecting the following rotating disk.



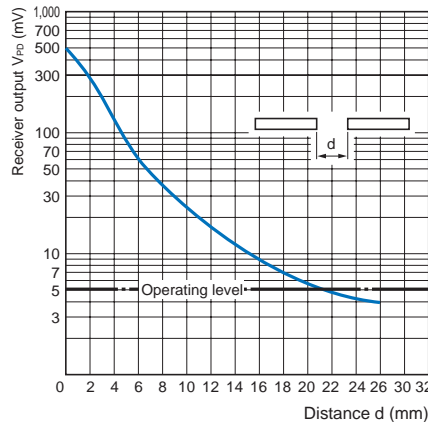
Engineering Data (Typical)

Receiver Output vs. Sensing Distance  
Characteristics

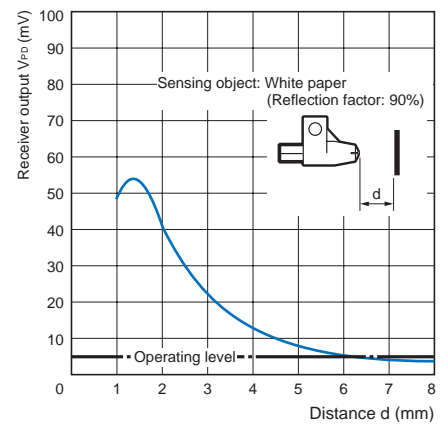
EE-SPZ301W-01, EE-SPZ401W-01



EE-SPZ301W-02, EE-SPZ401W-02

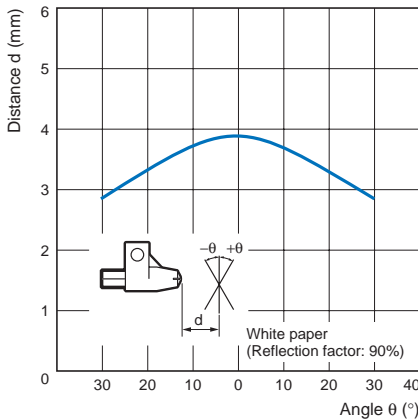


EE-SPZ301Y-01, EE-SPZ401Y-01



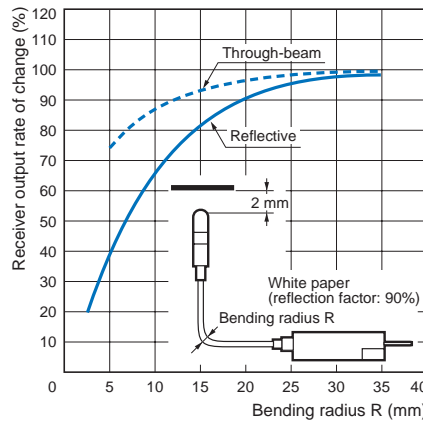
Sensing Angle vs. Sensing Distance  
Characteristics

EE-SPZ301Y-01, EE-SPZ401Y-01



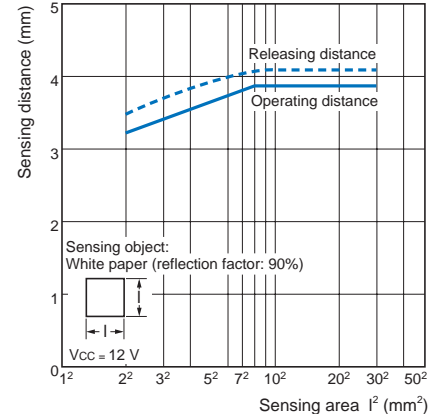
Receiver Output vs. Bending Radius

EE-SPZ301Y-01, EE-SPZ401Y-01



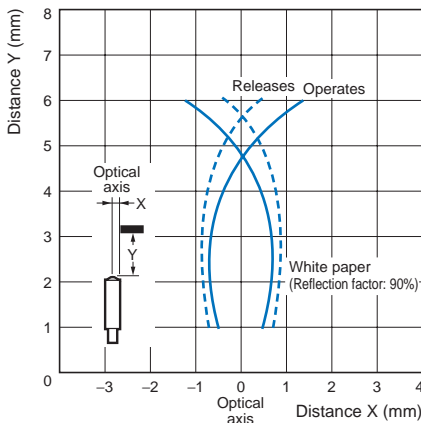
Sensing Distance vs. Object Area  
Characteristics

EE-SPZ301Y-01, EE-SPZ401Y-01

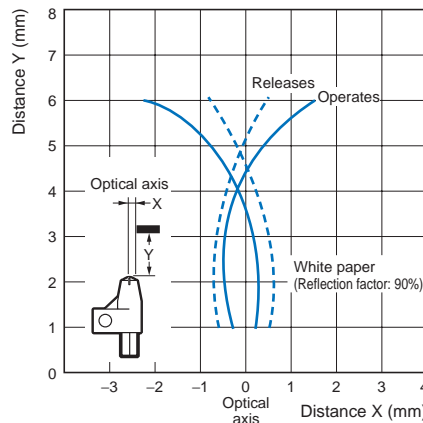


Operating Range Characteristics

EE-SPZ301Y-01, EE-SPZ401Y-01










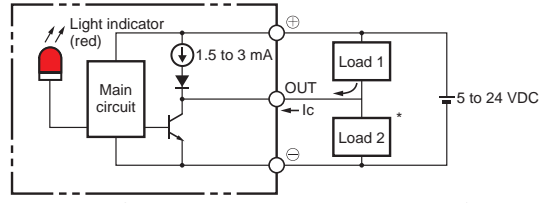











EE-SPZ301Y-01, EE-SPZ401Y-01



## I/O Circuit Diagrams

## NPN Output

Model	Output configuration	Timing charts	Output circuit
EE-SPZ401W-02 EE-SPZ401Y-01	Light-ON	Incident Interrupted  Light indicator (red) ON  OFF  Output transistor ON  OFF  Load 1 (relay) Operates  Releases  Load 2 H  L 	 <p>* Voltage output (when the sensor is connected to a transistor circuit)</p>
EE-SPZ301W-02 EE-SPZ301Y-01	Dark-ON	Incident Interrupted  Light indicator (red) ON  OFF  Output transistor ON  OFF  Load 1 (relay) Operates  Releases  Load 2 H  L 	

# 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.

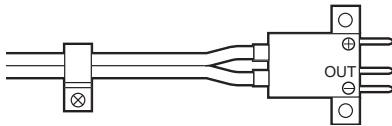


## Precautions for Correct Use

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

### ● Installation

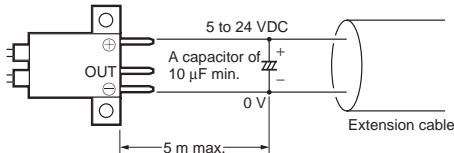
The connection force of the fiber and the Photomicrosensor will decrease when the ambient temperature is high. If high ambient temperatures can be expected, install the fiber with a holder or clip, and do not pull on the fiber.



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.)

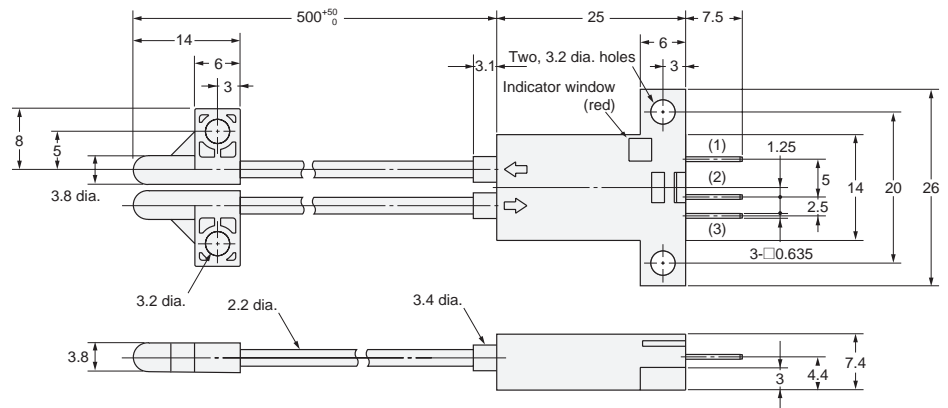


### ● Adjustment

- 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.

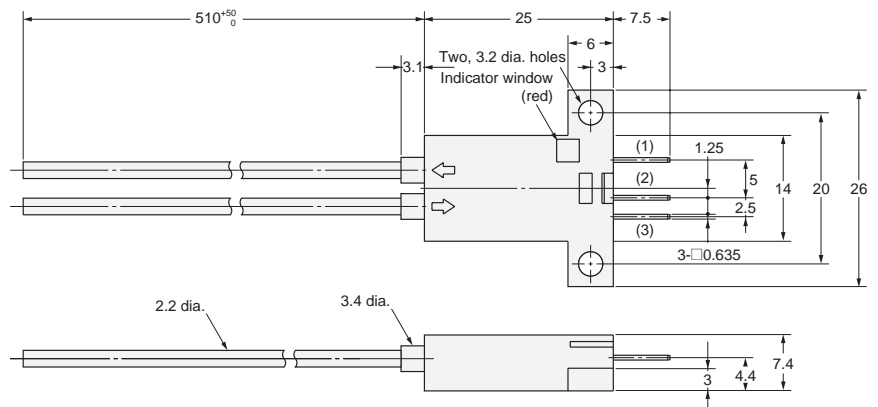
Unless otherwise specified, the tolerance class IT16 is used for dimensions in this data sheet.

(1)	$\oplus$	Vcc
(2)	OUT	OUTPUT
(3)	$\ominus$	GND (0 V)

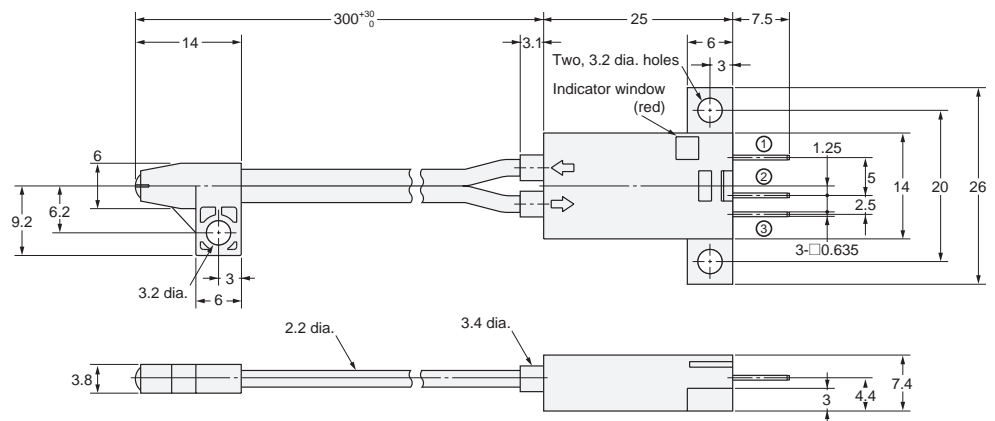


**PZ401W-02**

(1)	$\oplus$	Vcc
(2)	<b>OUT</b>	OUTPUT
(3)	$\ominus$	GND (0 V)



(1)	$\oplus$	Vcc
(2)	OUT	OUTPUT
(3)	$\ominus$	GND (0 V)



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