

Photomicrosensor

EE-SPZ

External Light Interference Resistant Optical Fiber-type Photomicrosensor with Built-in Amplifier

- Easy adjustment and optical axis monitoring with a Light-ON indicator.
- Wide operating voltage range (5 to 24 VDC) makes smooth connection possible with programmable controllers (PC).
- Easy-to-wire connector assures ease of maintenance.



Ordering Information

Appearance	Sensing method	Sensing distance	Output configuration	Model	Weight
Optical fiber	Transmissive type	5 mm	Light-OFF	EE-SPZ301W-02	Approx. 7.0 g
			Light-ON	EE-SPZ401W-02	
	Reflective type (with lens)	1 to 3 mm	Light-OFF	EE-SPZ301Y-01	Approx. 7.2 g
			Light-ON	EE-SPZ401Y-01	

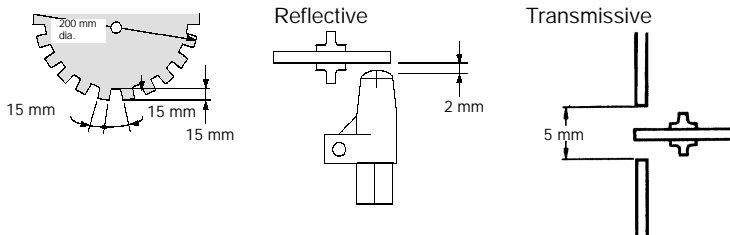
Specifications

■ Ratings

Item	Transmissive		Reflective (with lens)	
	EE-SPZ301W-02	EE-SPZ401W-02	EE-SPZ301Y-01	EE-SPZ401Y-01
Supply voltage	5 to 24 VDC $\pm 10\%$, ripple (p-p): 5% max.			
Current consumption	Average: 15 mA max.; Peak: 50 mA max.			
Sensing distance	5 mm		1 to 3 mm (reflection factor: 90%; white paper 15 x 15 mm)	
Standard sensing object	Opaque: 1 dia. min.		Transparent, opaque	
Control output	At 5 to 24 VDC: 80-mA load current (I_C) with a residual voltage of 1.0 V max. When driving TTL 10-mA load current (I_C) with a residual voltage of 0.4 V max.			
Indicator (see note 1)	Light indicator (red)			
Response frequency (see note 2)	100 Hz			
Connecting method	Dedicated connector (no soldering possible), EE-1002, EE-1003(A) (with 1-m code attached)			
Light source	GaAs infrared LED with a peak wavelength of 940 nm			
Receiver	Si photodiode with a sensing wavelength of 850 nm max.			

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

2. The response frequency was measured by detecting the EE-SPZ rotating disks (refer to the following illustrations.)

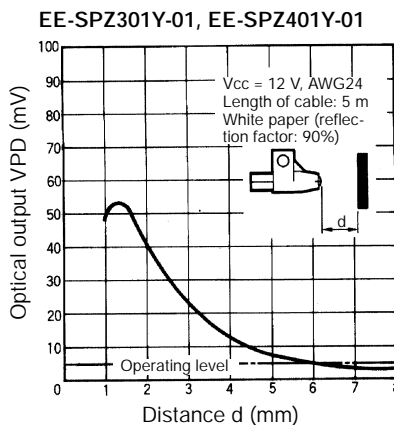
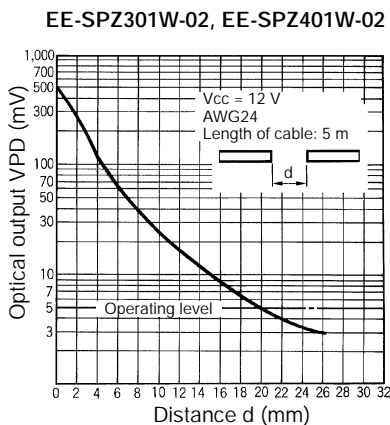


■ Characteristics

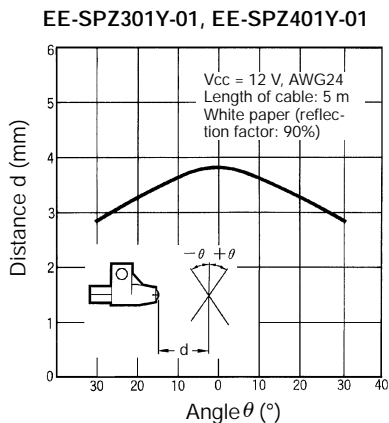
Ambient illumination	Incandescent/fluorescent light: 3,000 lx max.
Enclosure ratings	IEC IP50
Ambient temperature	Operating: -10° to 55°C Storage: -25° to 65°C
Ambient humidity	Operating: 5% to 85% Storage: 5% to 95%
Vibration resistance	Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hrs each in X, Y, and Z directions
Shock resistance	Destruction: 500 m/s ² (approx. 50G) for 3 times each in X, Y, and Z directions
Cable	5 m max. (AWG24 min.)

Engineering Data

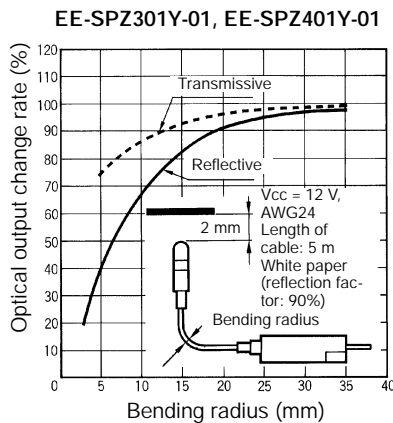
Receiver Output vs. Sensing Distance (Typical)



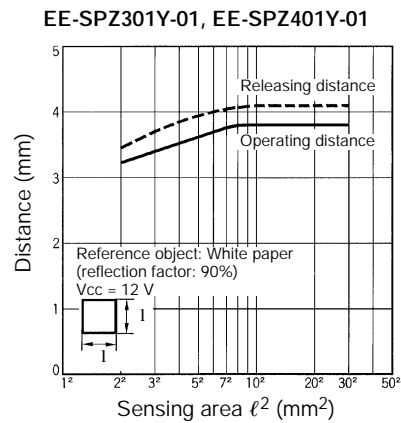
Sensing Angle vs. Sensing Distance (Typical)



Receiver Output vs. Bending Radius of Fiber (Typical)

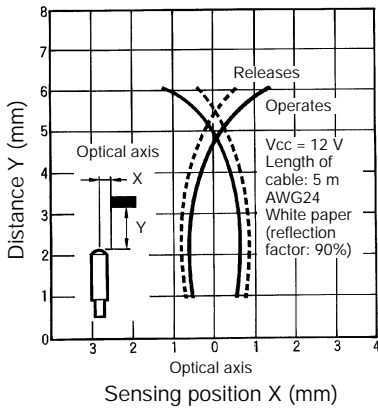


Sensing Distance vs. Object Area (Typical)

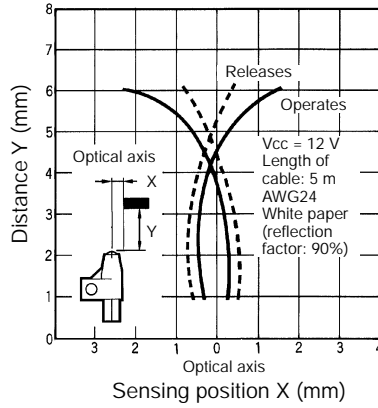


Operating Range (Typical)

EE-SPZ301Y-01, EE-SPZ401Y-01



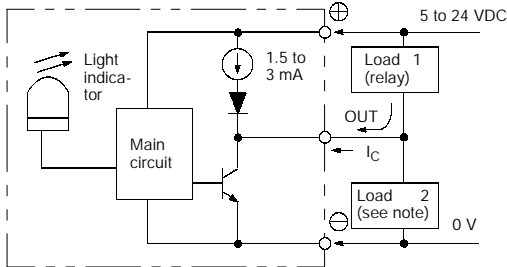
EE-SPZ301Y-01, EE-SPZ401Y-01



Operation

Output Circuit Diagrams

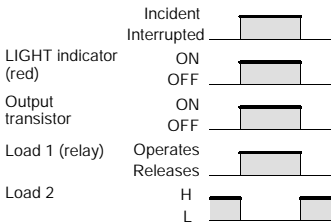
Light ON/OFF



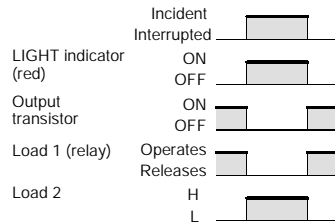
Note: Voltage output (when connected to a transistor circuit)

Timing Chart

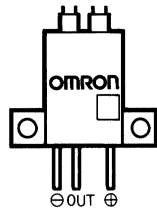
Light ON



Light OFF



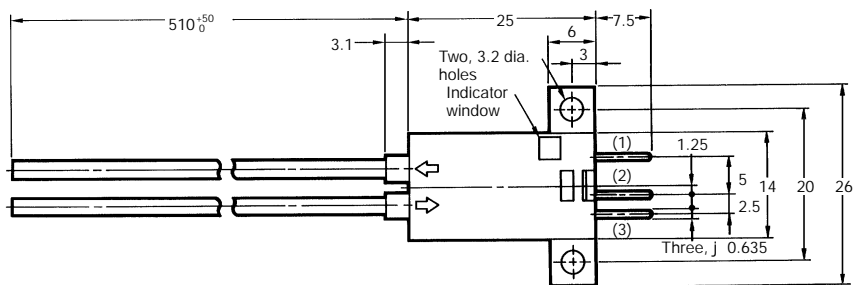
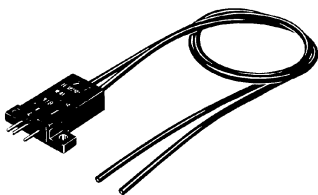
Terminal Arrangement



Dimensions

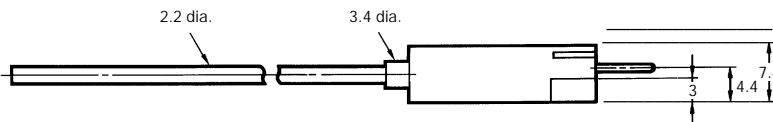
Note: All units are in millimeters unless otherwise indicated.

EE-SPZ301W-02
EE-SPZ401W-02

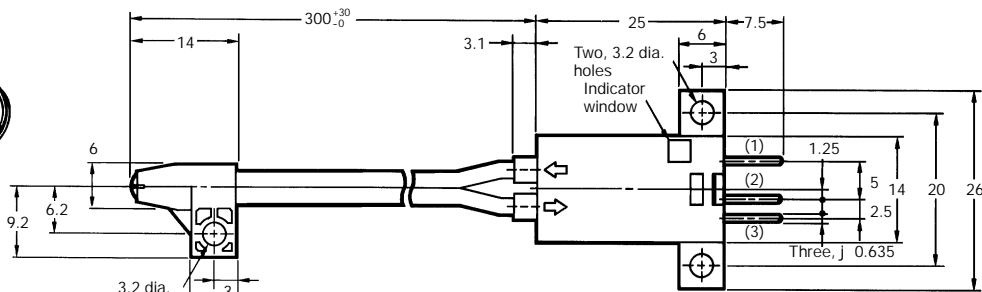
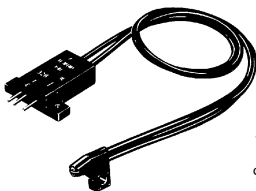


Terminal Arrangement

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

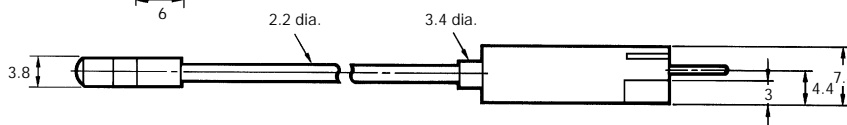


EE-SPZ301Y-01
EE-SPZ401Y-01



Terminal Arrangement

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



Applicable Connectors

EE-1002, EE-1003(A)
Refer to page 70 for dimensions.

Precautions

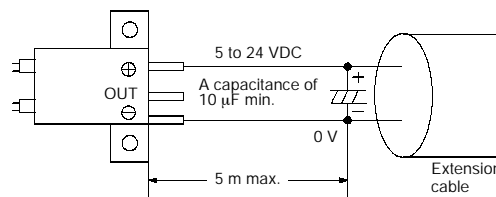
Refer to page NO TAG, *Precautions* in *Technical Information*, for general precautions.

Wiring

A fiber that has been once connected cannot be disconnected for re-use.

A cable with a thickness of AWG24 min. and a length of 5 m max. must be connected to the output terminals.

To use a cable 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):

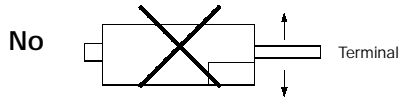


The sensing distance of the EE-SPZ301Y-01 and the EE-SPZ401Y-01 must be 1 mm maximum or operation will become unstable. Always operate at a distance of minimum 1 mm.

Connection is made using the Connector system. Do not solder the pin (lead) to the connectors.

Use the EE-1002 Connector or the EE-1003 Connector (with a 1-m cable attached) to connect the cable to the output terminals. Use the EE1003A Connector Holder to prevent accidental disconnection of the EE-1003 Connector from the EE-SPZ Photomicrosensor.

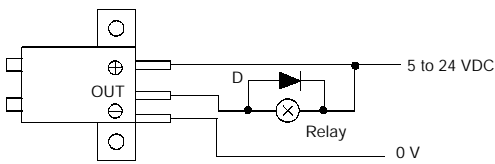
Do not impose excessive force on the terminals (refer to the diagram below). Excess force will damage the terminals.



If the metal mounting base is subject to inductive electrical noise, the photomicrosensor can be activated accidentally. If noise is a problem, take the following countermeasures:

1. Connect the negative terminal to the mounting base so that there will be no difference in electric potential between the photomicrosensor and mounting base.
2. Connect the negative terminal to the mounting base via a 0.47- μ F capacitor.
3. Insert a plastic insulating plate with a thickness of approximately 10 mm between the photomicrosensor and mounting base.

Wire as shown by the following illustration to connect a small inductive load (a relay for example) to the photomicrosensor. A diode must be connected parallel to the relay to absorb the reverse voltage.

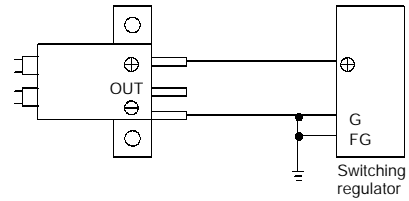


When the EE-SPZ detects a piece of white paper with a reflection factor of 90%, the sensing distance of each product varies from one to another by 4 to 10 mm.

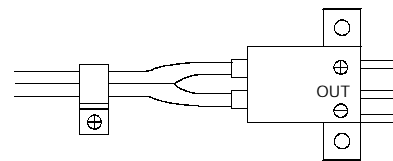
The background object must not be glossy.

Power Supply

When using a standard switching regulator, ground the FG and G terminal so that the photomicrosensor will be in a stable operating condition.



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 off the fiber.



Install the fiber with a holder or clip.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.