

EE-SPW321(-A)/421(-A)

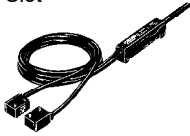
Compact, Thin-profile
Photomicrosensor with Special
Amplifier

- Slim amplifier with NPN output for easy handling and mounting
- Operation indicator allows monitoring from the amplifier housing or sensor head
- Simple wiring with a 3-conductor cable
- Light modulation effectively reduces external light interference



Ordering Information

■ PHOTOMICROSENSORS

| Sensing method | Sensing distance | Sensing object | Output configuration | Part number |
|--|------------------|------------------------|----------------------|--------------------|
|  | 30 cm | Opaque: 2 mm dia. min. | Dark-ON | EE-SPW321 |
| | | | | EE-SPW321-A |
| | | | Light-ON | EE-SPW421 |
| | | | | EE-SPW421-A |

■ SENSING DISTANCE WITH APERTURE*

| Size of aperture | Sensing distance | Sensing object |
|------------------|------------------|--------------------------|
| 0.5 x 3 mm | 10 cm | Opaque: 0.5 mm dia. min. |
| 1 x 3 mm | 20 cm | Opaque: 1 mm dia. min. |

*Four apertures comprised of 2 different widths are provided with sensor unit.

Specifications

■ RATINGS

| | |
|-----------------------------|--|
| Supply voltage | 12 VDC -10% to 24 VDC +10% |
| Current consumption | 30 mA max. |
| Sensing distance* | 30 cm |
| Standard reference object** | Opaque: 2 mm dia. min. |
| Directional angle | 10° to 40° |
| Response time | 1 ms max. for both detection and reset |
| Control output | Load current: 100 mA (residual voltage: 1 V max.) |
| Light source | GaAs infrared LED (pulse modulated) with a peak wavelength of 940 nm |
| Operation indicator | Light-ON (red LEDs on sensor and amplifier) |
| Connecting method | Pre-wired with 2 m cable |

*Refer to *Receiver Output vs. Sensing Distance Characteristics* in *Engineering Data*.

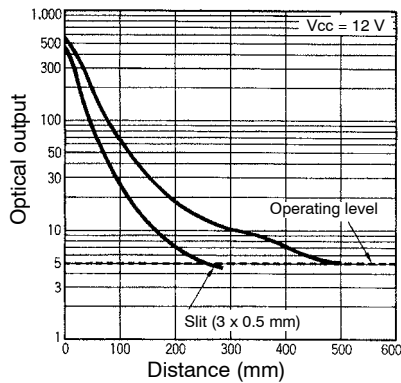
**An object as minute as 0.5 mm dia. can be sensed when an aperture is attached to the sensor.

CHARACTERISTICS

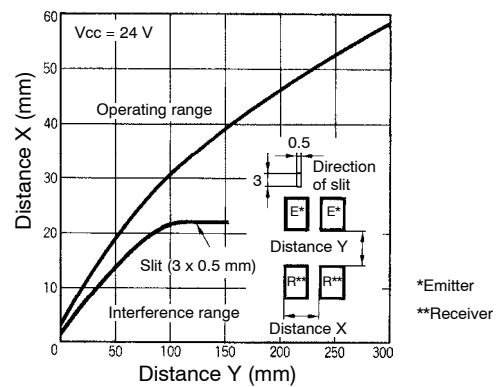
| | | |
|----------------------|-----------|--|
| Ambient illumination | | Sensing face: 3,000 lx max. (incandescent light); 10,000 lx max. (sunlight) |
| Enclosure ratings | | IP64 |
| Ambient temperature | Operating | -20°C to 55°C (-4°F to 131°F) |
| Ambient humidity | Operating | 35% to 85% |
| Vibration 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) |
| Material | Case | ABS resin |
| | Lens | Acrylate resin |

Engineering Data

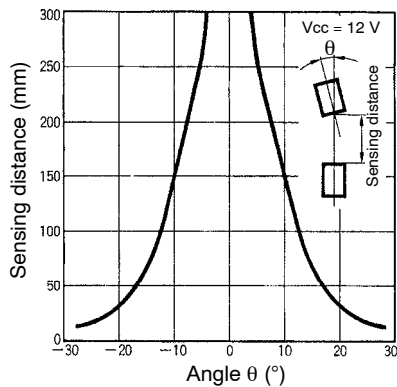
RECEIVER OUTPUT VS. SENSING DISTANCE



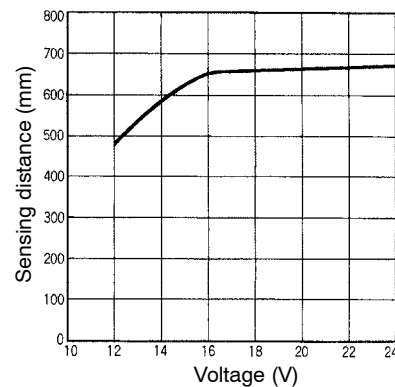
MUTUAL INTERFERENCE



SENSING ANGLE CHARACTERISTICS



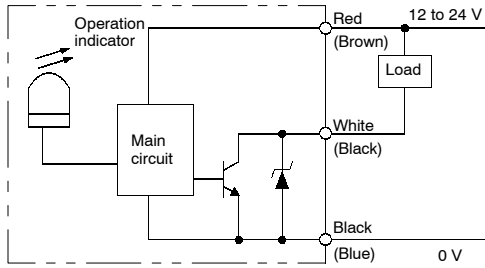
SENSING DISTANCE VS. INPUT VOLTAGE



Operation

INTERNAL/EXTERNAL CIRCUIT DIAGRAM

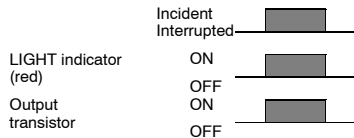
Light-ON/Dark-ON



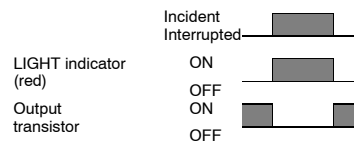
Note: IEC colors are shown in parentheses.

TIMING CHART

Light-ON



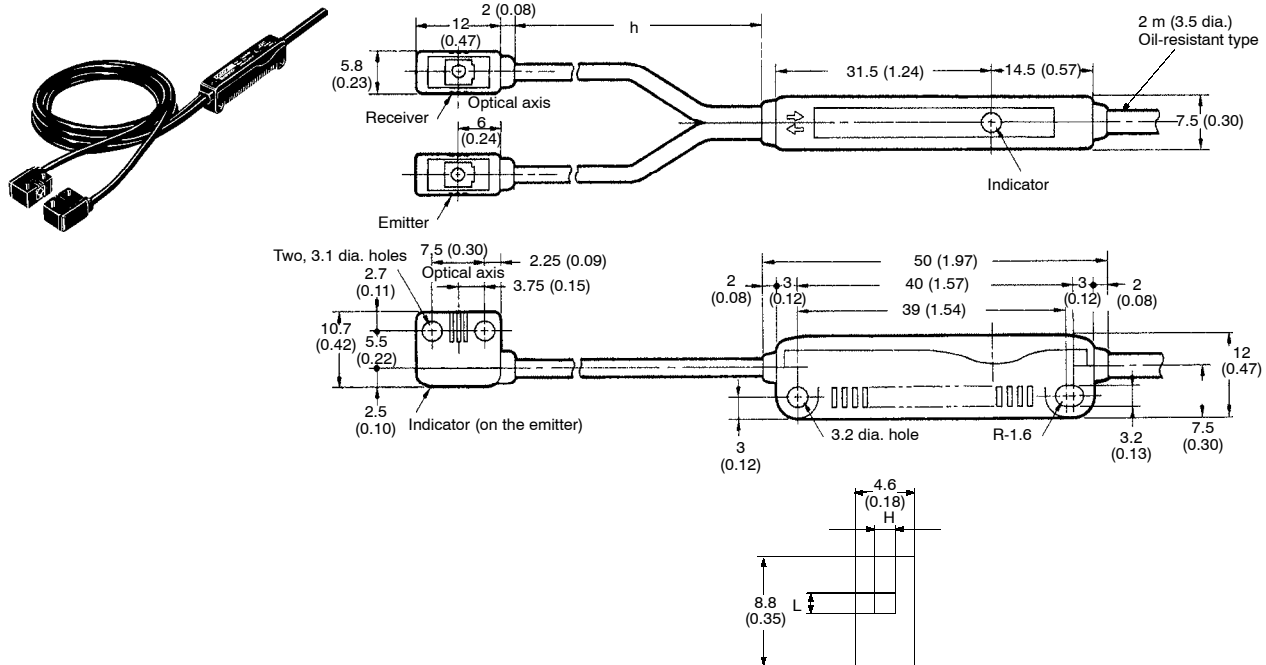
Dark-ON



Dimensions

Unit: mm (inch)

EE-SPW321(-A)/SPW421(-A)



Sensing head to amplifier cable length

| Model | h (mm) |
|-------------|--------|
| EE-SPW321 | 500 |
| EE-SPW321-A | 1,000 |
| EE-SPW421 | 500 |
| EE-SPW421-A | 1,000 |

Aperture Size

| Aperture | Size L | Size H |
|----------|--------|--------|
| Slit A | 0.5 mm | 3 mm |
| Slit B | 1 mm | 3 mm |
| Slit C | 3 mm | 0.5 mm |
| Slit D | 3 mm | 1 mm |

Precautions

Refer to the Technical Information section for general precautions.

■ OPTICAL AXIS ADJUSTMENT

Move the light source head and the receiver vertically and horizontally to obtain a proper angular range in which the operation indicator turns ON. Then fix both of the heads securely.

■ MOUNTING

The main body and both heads must be fitted to a warping-free mount using the attached screws with a torque of 5.5 kg • cm or below.

■ APERTURES

Four kinds of reticles are included with the sensor as follows:

- (A) 0.5 mm by 3 mm, horizontal slit
- (B) 1 mm by 3 mm, horizontal slit
- (C) 3 mm by 0.5 mm, vertical slit
- (D) 3 mm by 1 mm, vertical slit

Use the reticles when the detected surface of object is smaller than 2 mm in width, or when mutual interference must be reduced. Select a pair of reticles the same size according to the above conditions.

Attach the selected reticles on the lens of the light source head and receiver head respectively.

■ CONNECTIONS

Routing the wire of the photomicrosensor in close proximity to high potential power lines may result in malfunction or damage because of inductive effects. Be sure to route the sensor wires separate from the power lines or through a separate conduit.

For extending the sensor wires, use a cable greater than AWG 22 in diameter and shorter than 100 m. As impedance of the extended cable increases, the supply voltage applied to the sensor terminal will decrease, and the low level output voltage at the cable end will increase. For this reason, consider the voltage fluctuation when extending the sensor cable.

■ POWER SOURCE

When using a commercially available switching regulator, be sure to ground the FG (Frame Ground) and G (Ground) terminals; otherwise, faulty operation of the sensor may be caused by the switching noise.

■ EFFECT OF ELECTRICAL NOISE

The sensor output may be affected by noise from switching regulators or the other instruments. In this case, place a 0.47 μF capacitor between the 0 V terminal and the frame.

■ MATERIALS OF SENSOR HOUSING

The main body and the heads are made of ABS resin. The lens sections of the both heads are made of acrylic resin. They may be dissolved by organic solvent and strong acidic substances.

Excessive forces (hitting by hammer, or the like) should not be applied to the product because they may damage its water-resistance ability.

■ WATER RESISTANCE

The photomicrosensor does not have a complete water-resistant construction. The water-resistant level of the product is IP64 (IEC529). Therefore, do not use or store it in water or in rainfall.

NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.

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