

Transparent object detection sensor in compact M18 housing

E3FZ-B

The E3FZ-B provides enhanced detection stability for the detection of transparent objects. It allows an easy and intuitive adjustment by potentiometer to adjust to individual requirements.

- Easy adjustment to individual requirements for all transparent materials
- Easy mounting due to short M18 housing
- Coaxial optics for stable, distance-independant detection



Ordering Information

| Sensor type | Sensing distance | Connection method | | | | Order code | |
|----------------------------------|---------------------------|-------------------|---|-----|---|-------------|-------------|
| | | | | | | NPN output | PNP output |
| Retro-reflective with M.S.R. | 0 to 700 mm ^{*2} | - | - | 2 m | - | E3FZ-B61 2M | E3FZ-B81 2M |
| | | - | ■ | - | - | E3FZ-B66 | E3FZ-B86 |

*1. For ordering pigtail versions contact your OMRON representative. Available options on request are:
 - M3J: for M8 4-pin pigtail connector with 30 cm cable
 - M5J: for M8 3-pin pigtail connector with 30 cm cable
 - M1TJ: for M12 4-pin XS5 smart-click connector with 30 cm cable.
 *2. Sensing distance is rated on reflector E39-R1S. Reflector is sold separately.

Mounting Brackets

| Shape | Type | Material | Order code |
|-------|------------------------------------|-----------------|------------|
| | 90° Mounting Bracket ^{*1} | Stainless Steel | E39-EL12 |

*1. Bracket fitting to M18 screw mounting.

Note: for the complete range of mounting brackets refer to accessory datasheet E26E.



Cable connectors

For the complete list of cable connectors refer to E26E accessory datasheet

| Shape | Length | Wire | Material | Order code |
|--------------|--------|--------|-------------------|-------------------|
| Straight | 2 m | 4-wire | PVC | XS2F-D421-D80-A |
| | | | PUR | Y92E-M12PUR4S2M-L |
| | 5 m | | PVC | XS2F-D421-G80-A |
| | | | PUR | Y92E-M12PUR4S5M-L |
| L-shaped | 2 m | PVC | XS2F-D422-D80-A | |
| | | PUR | Y92E-M12PUR4A2M-L | |
| | 5 m | PVC | XS2F-D422-G80-A | |
| | | PUR | Y92E-M12PUR4A5M-L | |

Reflectors

For the complete list of reflectors refer to E26E accessory datasheet.

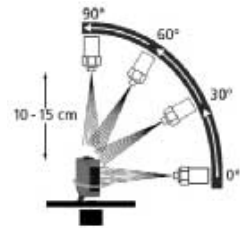
| Shape | Type | Material | Features | Size in mm | Order code |
|---|----------------------------|-----------------------------|---|------------|------------|
|  | General purpose reflectors | ABS base Acrylic surface | Surface screw mounting (diagonal holes) | 40x60x7.5 | E39-R1S |
|  | Reflective foil | Acrylics | self-adhesive foil | 40x35 | E39-RS2 |

Ratings and Specifications

| | | |
|---------------------------|---------|---|
| Item | | E3FZ-B_ |
| Sensing distance | | 0 to 700 mm (Using E39-R1S, other reflectors see diagram operating range) |
| Directional angle | | Sensor: 3° to 10° Reflector: 30° max. |
| Light source (wavelength) | | Red LED (650 nm) |
| Power supply voltage | | 10 to 30 VDC, including 10% ripple (p-p) |
| Current consumption | | 25 mA max. |
| Control output | | Load power supply voltage: 30 VDC max., Load current: 100 mA max. (Residual voltage: 2 V max.) Open-collector output (NPN/PNP output depending on model) |
| Operating modes | | Light-ON/Dark-ON selectable by wire |
| Protective circuits | | Reversed power supply polarity, load short-circuit protection, mutual interference prevention, reversed output polarity protection |
| Response time | | Operation or reset: 1 ms max. |
| Sensitivity adjustment | | one-turn adjuster |
| Ambient illumination | | Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max. |
| Ambient temperature range | | Operating: -25 to 55°C, Storage: -40 to 70°C (with no icing or condensation) |
| Ambient humidity range | | Operating: 35% to 85%, Storage: 35% to 95% (with no condensation) |
| Insulation resistance | | 20 MΩ min. at 500 VDC |
| Dielectric strength | | 1,000 VAC, 50/60 Hz for 1 min |
| Vibration resistance | | Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions |
| Shock resistance | | Destruction: 500 m/s ² 3 times each in X, Y, and Z directions |
| Degree of protection | | IEC 60529: IP67, DIN 40050-9: IP69K ^{*1} |
| Connection method | | Pre-wired cable (standard length: 2 m) or M12 4-pin connector |
| Indicator | | Operating indicator (yellow), Stability indicator (green) |
| Weight | | Pre-wired models: Approx. 60 g Connector models: Approx. 20 g |
| Materials | Housing | ABS |
| | Lens | PMMA (polymethylmethacrylate) |
| | Cable | PVC (polyvinyl chloride) |
| Accessories | | Instruction sheet, 2x M18 nuts ^{*2} |

^{*1} IP69K is a protection standard against high temperature and high-pressure water defined in the German standard DIN 40050, Part 9. The test piece is sprayed with water at 80°C at a water pressure of 80 to 100 BAR using a specified nozzle shape at a rate of 14 to 16 liters/min. The distance between the test piece and nozzle is 10 to 15 cm, and water is sprayed horizontally for 30 seconds each at 0°, 30°, 60°, and 90° while rotating the test piece on a horizontal plane.

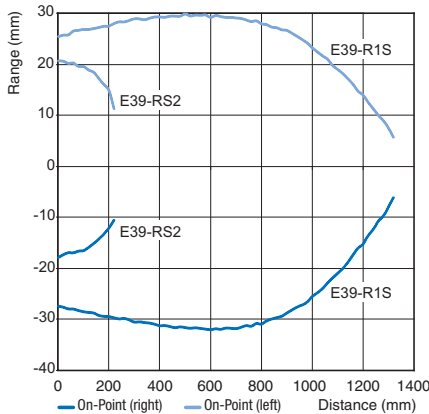
^{*2} For reflectors and mounting brackets refer to Accessories.



Engineering Data (Typical)

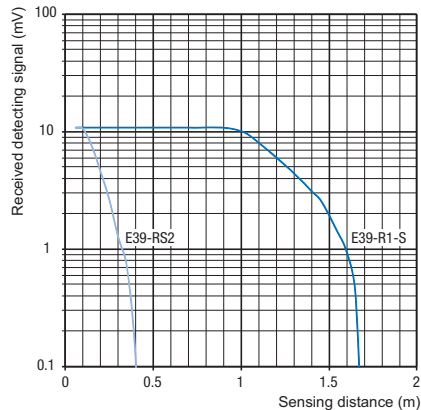
Parallel Operating Range

E3FZ-B



Excess Gain vs. Distance

E3FZ-B



Output Circuit Diagram

PNP Output

| Model | Operation mode | Timing charts | Connection method | Output circuit |
|----------|----------------|---------------|---|----------------|
| E3FZ-B8□ | Light ON | | Connect the pink wire (Pin(2)) to the brown wire (Pin(1)) or open the pink wire (Pin(2)). | |
| | Dark ON | | Connect the pink wire (Pin(2)) to the blue wire (Pin(3)). | |

NPN Output

| Model | Operation mode | Timing charts | Connection method | Output circuit |
|----------|----------------|---------------|---|----------------|
| E3FZ-B6□ | Light ON | | Connect the pink wire (2) to the blue wire (3) or leave open. | |
| | Dark ON | | Connect the pink wire (2) to the brown wire (1). | |

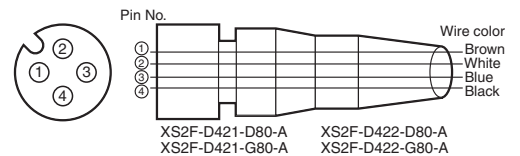
Connector Pin Arrangement

- M12 Pre-wired Connector (-M1J)
- M12 Connector Pin Arrangement



Connectors (Sensor I/O connectors)

M12 4-wire Connectors




| Classification | Wire color | Connector pin No. | Application |
|----------------|------------|-------------------|---------------------|
| DC | Brown | ① | Power supply (+V) |
| | White | ② | Operation selection |
| | Blue | ③ | Power supply (0 V) |
| | Black | ④ | Output |

Precautions

 Warning

This product is not designed or rated for directly or indirectly ensuring safety of persons. Do not use it for such a purpose.



 Caution

Do not use the product with voltage in excess of the rated voltage. Excess voltage may result in malfunction or fire.



Never use the product with an AC power supply. Otherwise, explosion may result.



When cleaning the product, do not apply a high-pressure spray of water to one part of the product. Otherwise, parts may become damaged and the degree of protection may be degraded.



High-temperature environments may result in burn injury.



Precautions for Safe Use

The following precautions must be observed to ensure safe operation of the Sensor.

Operating Environment

Do not use the Sensor in an environment where explosive or flammable gas is present.

Connecting Connectors

Be sure to hold the connector cover when inserting or removing the connector. Be sure to tighten the connector lock by hand; do not use pliers or other tools. If the tightening is insufficient, the degree of protection will not be maintained and the Sensor may become loose due to vibration. The appropriate tightening torque is 0.39 to 0.49 N·m for M12 connectors.

Load

Do not use a load that exceeds the rated load.

Rotation Torque for Sensitivity Adjustment

Adjust with a torque of 0.05 Nm or less.

Environments with Cleaners and Disinfectants (e.g. Food Processing Lines)

Do not use the Sensor in environments subject to cleaners and disinfectants. They may reduce the degree of protection.

Modifications

Do not attempt to disassemble, repair, or modify the Sensor.

Outdoor Use

Do not use the Sensor in locations subject to direct sunlight.

Cleaning

Do not use thinner, alcohol, or other organic solvents. Otherwise, the optical properties and degree of protection may be degraded.

Surface Temperature

Burn injury may occur. The Sensor surface temperature rises depending on application conditions, such as the surrounding temperature and the power supply voltage. Use caution when operating or washing the Sensor.

Precautions for Correct Use

Do not use the Sensor in any atmosphere or environment that exceeds the ratings.

Do not install the Sensor in the following locations.

- (1) Locations subject to direct sunlight
- (2) Locations subject to condensation due to high humidity
- (3) Locations subject to corrosive gas
- (4) Locations where the Sensor may receive direct vibration or shock

Connecting and Mounting

- (1) The maximum power supply voltage is 30 VDC. Before turning the power ON, make sure that the power supply voltage does not exceed the maximum voltage.
- (2) Laying Sensor wiring in the same conduit or duct as high-voltage wires or power lines may result in malfunction or damage due to induction. As a general rule, wire the Sensor in a separate conduit or use shielded cable.
- (3) Use an extension cable with a minimum thickness of 0.3 mm² and less than 100 m long.
- (4) Do not pull on the cable with excessive force.
- (5) Pounding the Photoelectric Sensor with a hammer or other tool during mounting will impair water resistance.
- (6) Mount the Sensor either using the bracket (sold separately) or on a flat surface.
- (7) Be sure to turn OFF the power supply before inserting or removing the connector.

Sensitivity adjustment

Setup is completed by teaching the sensor to the reflector (without object). For transparent object detection or detection of very small objects: Turn the sensitivity adjuster slowly from minimum to maximum and stop at the position where the output LED changes state (orange LED turns from on/off to off/on) and green stability LED is on. For opaque object detection: Set the sensitivity adjuster to maximum. Confirm correct operation by testing stable detection with reference object.

Cleaning

Never use thinner or other solvents. Otherwise, the Sensor surface may be dissolved.

Power Supply

If a commercial switching regulator is used, ground the FG (frame ground) terminal.

Power Supply Reset Time

The Sensor will be able to detect objects 100 ms after the power supply is tuned ON. Start using the Sensor 100 ms or more after turning ON the power supply. If the load and the Sensor are connected to separate power supplies, be sure to turn ON the Sensor first.

Turning OFF the Power Supply

Output pulses may be generated even when the power supply is OFF. Therefore, it is recommended to first turn OFF the power supply for the load or the load line.

Load Short-circuit Protection

This Sensor is equipped with load short-circuit protection, but be sure to not short circuit the load. Be sure to not use an output current flow that exceeds the rated current. If a load short circuit occurs, the output will turn OFF, so check the wiring before turning ON the power supply again. The short-circuit protection circuit will be reset. The load short-circuit protection will operate when the current flow reaches 1.8 times the rated load current. When using a capacitive load, use an inrush current of 1.8 times the rated load current or higher.

Water Resistance

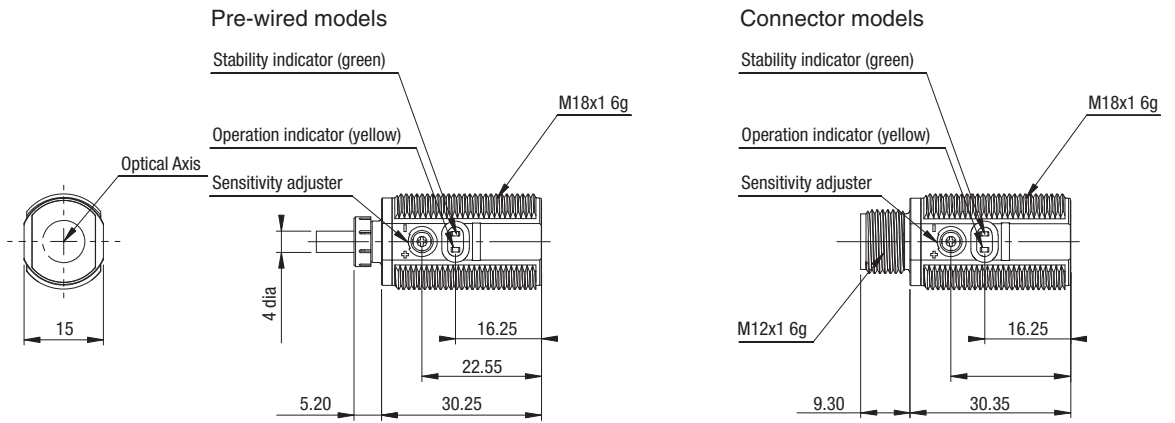
Do not use the Sensor in water, rainfall, or outdoors.

Dimensions

Note: All units are in millimeters unless otherwise stated.

E3FZ-Series

E3FZ-B□



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