Cylindrical photoelectric sensors in M18 plastic or brass housings

# E3F2

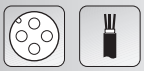
- Complete sensor portfolio in plastic and metal housing
- IP67, IP69K for highest water resistance
- High immunity against electro-magnetic noise and ambient light
- Special beam models
- High power LED to compensate for dirt and misalignment


## Performance and portfolio variety

| Sensing method | Shape | Plastic | Metal[*1] | 90° Optics | AC power supply[*2] |
|---|---|---|---|---|---|
| Through-beam | | 7 m | 7 m | - | 3 m |
| Retro-reflective | | 4 m | 4 m | 2 m | 1 m |
| Diffuse-reflective | | 1 m | 1 m | 0.3 m | 0.3 m |
| Diffuse-reflective (background suppression) | | 0.1 m | 0.1 m | | |

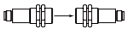
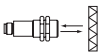
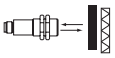
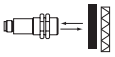
[*1]SUS types see seperate datasheet
[*2]AC-types see seperate datasheet

L-on / D-on selectable by wiring M12 connector or pre-wired.



# Selection Guide

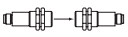
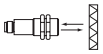
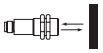
## Housing Material: Plastic

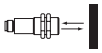
| Sensing method | Sensing distance | Connection method | | | | Order code | |
|---|---|---|---|---|---|---|---|
| | |  |  |  |  *1 | PNP output | NPN output |
| Through-beam  | 7 m | – | – | 2 m | – | E3F2-7B4 2M | E3F2-7C4 2M |
| | | – | ■ | – | – | E3F2-7B4-P1 | E3F2-7C4-P1 |
| Retro-reflective with M.S.R.*2  | 0.1 to 4 m (adjustable)*3 | – | – | 2 m | – | E3F2-R4B4-E 2M | E3F2-R4C4-E 2M |
| | | – | ■ | – | – | E3F2-R4B4-P1-E | E3F2-R4C4-P1-E |
| Retro-reflective with M.S.R.*2  | 0.1 to 2 m*4 | – | – | 2 m | – | E3F2-R2RB41-E 2M | E3F2-R2RC41-E 2M |
| | | – | ■ | – | – | E3F2-R2RB41-P1-E | E3F2-R2RC41-P1-E |
| Diffuse-reflective  | 0.1 m (fixed, wide-beam) | – | – | 2 m | – | E3F2-DS10B4-N 2M | E3F2-DS10C4-N 2M |
| | | – | ■ | – | – | E3F2-DS10B4-P1 | E3F2-DS10C4-P1 |
| | 0.3 m (adjustable) | – | – | 2 m | – | E3F2-DS30B4 2M | E3F2-DS30C4 2M |
| | | – | ■ | – | – | E3F2-DS30B4-P1 | E3F2-DS30C4-P1 |
| | 1 m (adjustable) | – | – | 2 m | – | E3F2-D1B4 2M | E3F2-D1C4 2M |
| | | – | ■ | – | – | E3F2-D1B4-P1 | E3F2-D1C4-P1 |
| Diffuse-reflective  | 0.3 m (adjustable) | – | – | 2 m | – | E3F2-DS30B41 2M | E3F2-DS30C41 2M |
| | | – | ■ | – | – | E3F2-DS30B41-P1 | E3F2-DS30C41-P1 |
| Diffuse reflective (background suppression)  | 0.1 m (fixed) | – | – | 2 m | – | E3F2-LS10B4 2M | E3F2-LS10C4 2M |
| | | – | ■ | – | – | E3F2-LS10B4-P1 | E3F2-LS10C4-P1 |

*1. Pre-wired connectors are available on request. Please contact your OMRON representative.
*2. Order reflector seperately. Models with reflector included are also available. Please contact your OMRON representative.
*3. Measured with reflector E39-R1S
*4. Measured with reflector E39-R1

Note: Standard cable length is 2 m. Models provided with a 5 m long cable are available. When ordering, specify the cable length by adapting the length of the cable (e.g. E3F2-R4B4-E 5M). For other cable length please contact your OMRON sales representative.

## Housing material: Metal (Nickel plated brass)

| Sensing method | Sensing distance | Connection method | | | | Order code | |
|---|---|---|---|---|---|---|---|
| | |  |  |  |  *1 | PNP output | NPN output |
| Through-beam  | 7 m | – | – | 2 m | – | E3F2-7B4-M 2M | E3F2-7C4-M 2M |
| | | – | ■ | – | – | E3F2-7B4-M1-M | E3F2-7C4-M1-M |
| Retro-reflective with M.S.R.*2  | 0.1 to 4 m (adjustable)*3 | – | – | 2 m | – | E3F2-R4B4-M-E 2M | E3F2-R4C4-M-E 2M |
| | | – | ■ | – | – | E3F2-R4B4-M1-M-E | E3F2-R4C4-M1-M-E |
| Retro-reflective with M.S.R.*2  | 0.1 to 2 m*4 | – | – | 2 m | – | E3F2-R2RB41-M-E 2M | E3F2-R2RC41-M-E 2M |
| | | – | ■ | – | – | E3F2-R2RB41-M1-M-E | E3F2-R2RC41-M1-M-E |
| Diffuse-reflective  | 0.1 m (fixed, wide-beam) | – | – | 2 m | – | E3F2-DS10B4-M 2M | E3F2-DS10C4-M 2M |
| | | – | ■ | – | – | E3F2-DS10B4-M1-M | E3F2-DS10C4-M1-M |
| | 0.3 m (adjustable) | – | – | 2 m | – | E3F2-DS30B4-M 2M | E3F2-DS30C4-M 2M |
| | | – | ■ | – | – | E3F2-DS30B4-M1-M | E3F2-DS30C4-M1-M |
| | 1 m (adjustable) | – | – | 2 m | – | E3F2-D1B4-M 2M | E3F2-D1C4-M 2M |
| | | – | ■ | – | – | E3F2-D1B4-M1-M | E3F2-D1C4-M1-M |
| Diffuse-reflective  | 0.3 m (adjustable) | – | – | 2 m | – | E3F2-DS30B41-M 2M | E3F2-DS30C41-M 2M |
| | | – | ■ | – | – | E3F2-DS30B41-M1-M | E3F2-DS30C41-M1-M |

| Sensing method | Sensing distance | Connection method | | | | Order code | |
|---|---|---|---|---|---|---|---|
| | |  |  |  |  *1 | PNP output | NPN output |
| Diffuse-reflective (background suppression)  | 0.1 m (fixed) | – | – | 2 m | – | E3F2-LS10B4-M 2M | E3F2-LS10C4-M 2M |
| | | – | ■ | – | – | E3F2-LS10B4-M1-M | E3F2-LS10C4-M1-M |

*1. Pre-wired connectors are available on request. Please contact your OMRON representative.
*2. Order reflector separately. Models with reflector E39-R1S included are available. Please contact your OMRON representative.
*3. with reflector E39-R1S
*4. with reflector E39-R1

Note: Standard cable length is 2 m. Models provided with a 5 m long cable are available. When ordering, specify the cable length by adapting the length of the cable (e.g. E3F2-R4B4-E 5M). For other cable length please contact your OMRON sales representative.

## Accessories (Order Separately)

| Name | Sensing distance (typical)*1 | Remark | Order code |
|---|---|---|---|
| Reflectors | 3 m [100 mm] (axial types)<br>2 m [100 mm] (radial types) | 60 x 40 mm | E39-R1 |
| | 4 m [100 mm] (axial types)<br>2 m [100 mm] (radial types) | 60 x 40 mm | E39-R1S |
| | 5 m [100 mm] (axial types)<br>2.5 m [100 mm] (radial types) | ∅ 84 mm | E39-R7 |
| | 6 m [100 mm] (axial types)<br>3 m [100 mm] (radial types) | 100 x 100 mm | E39-R8 |
| | 5 m [100 mm] (axial types)<br>2.5 m [100 mm] (radial types) | 80 x 80 mm | E39-R40 |
| Tape Reflectors | 0.7 m [150 mm] (axial types)<br>1.1 m [150 mm] (axial types)<br>1.4 m [150 mm] (axial types) | 35 x 10 mm | E39-RS1 |
| | | 35 x 40 mm | E39-RS2 |
| | | 80 x 70 mm | E39-RS3 |
| Lens Cap | | | E39-F31 |
| Mounting Bracket | | screw mount | Y92E-B18 |

*1. Values in parentheses indicate the minimum required distance between the sensor and reflector.

For detailed information about Accessories, refer to the main chapter “Accessories” at the end of the document.

## Sensor I/O Connectors

| Cord | Shape | Cable type | | Order code |
|---|---|---|---|---|
| Standard | Straight  | 2 m | Four-wire type | XS2F-D421-D80-A |
| | | 5 m | | XS2F-D421-G80-A |
| | L-shaped  | 2 m | | XS2F-D422-D80-A |
| | | 5 m | | XS2F-D422-G80-A |
| Vibration-proof robot cable | Straight  | 2 m | | XS2F-D421-D80-R |
| | | 5 m | | XS2F-D421-G80-R |
| | L-shaped  | 2 m | | XS2F-D422-D80-R |
| | | 5 m | | XS2F-D422-G80-R |

# Specifications

## Ratings

| Item | | E3F2-7□ | E3F2-R4□-□ | E3F2-DS10□ | E3F2-DS30□ | E3F2-D1□4-□ | E3F2-LS10□4-□ |
|---|---|---|---|---|---|---|---|
| Sensing method | | Through-beam | Retro-reflective with M.S.R. | Diffuse-reflective | | | |
| | | | | Wide beam | Potentiometer adjustment | | Background suppression |
| Power supply voltage | | 10 to 30 VDC | | | | | |
| Current consumption | | 50 mA max. | 30 mA max. | 25 mA max. | 30 mA max. | | |
| Sensing distance | | 7 m | 0.1 to 4 m (with E39-R1S) | 0.1 m (5 x 5 cm white mat paper) | 0.3 m (10 x 10 cm white mat paper) | 1 m (30 x 30 cm white mat paper) | 0.1 m (10 x 10 cm white mat paper) |
| Standard object | | Opaque: 11 mm dia. min. | Opaque: 56 mm dia. min. | – | | | |
| Directional angle | | 3° to 20° | | – | | | |
| Differential travel (hysteresis) | | – | | 20% max. | | | 5% max |
| Black/white error | | – | | | | | 3% |
| Response time | | Operation and Reset: 2.5 ms max. | 1 ms max | 2.5 ms max. | | 1 ms max. | |
| Control output | | Transistor (open collector), load current: 100 mA max. (residual voltage: 2 V max.) | | | | | |
| Power reset time | | 50 ms | 100 ms max. | 50 ms | | 100 ms | |
| Ambient illumination | | Incandescent lamp:3000 lx max. / Sunlight:10000 lx max. | | | | | |
| Ambient temperature | | Operating: -25 to 55 °C / Storage: -30 to 70 °C (with no icing or condensation) | | | | | |
| Ambient humidity | | Operating: 35% to 85% / Storage: 35% to 95% (with no condensation) | | | | | |
| Insulation resistance | | 20 MΩ min. at 500 V DC between energized parts and case | | | | | |
| Dielectric strength | | 1000 VAC max., 50 / 60 Hz for 1 min between energized parts and case | | | | | |
| Vibration resistance | | 10 to 55 Hz, 1.5 mm double amplitude for 2 hrs each direction (X, Y, Z) | | | | | |
| Shock resistance | | Destruction: 500 $m/s^2$ each direction (X, Y, Z) | | | | | |
| Degree of protection[*1] | | IEC 60529 IP67, IP69K after DIN 40050-9 | | | | | |
| Light source (wave length) | | Infrared LED (950 nm) | Red LED (660 nm) | Infrared LED (880 nm) | | | Red LED (660 nm) |
| Indicators | | Light incident / power indicator for light source (red) | Light incident (red) / stability (green) | Light incident / power indicator for light source (red) | | Light incident (red) / stability (green) | Output indicator (orange) / stability (green) |
| Sensitivity adjustment | | Fixed | Adjustable | Fixed | Adjustable | | Fixed |
| Connection method | | 2 m, 5 m pre-wired cable (PVC, dia. 4 mm (18 / 0.12)[*2]) or M12-connector | | | | | |
| Operation mode | | Light-ON or Dark-ON selectable by wiring | | | | | |
| Weight (approx.) | | | | | | | |
| Plastic case | pre-wired (2 m) | 120 g | 60 g | | | | |
| | connector | 40 g | 20 g | | | | |
| Metal case | pre-wired (2 m) | 180 g | 90 g | | | | |
| | connector | 120 g | 50 g | | | | |
| Circuit protection | | Output short-circuit and power supply reverse polarity | | | | | |
| Housing materials[*3] | | Case: ABS (plastic models) or nickel brass (metal models); lens: PMMA | | | | | |

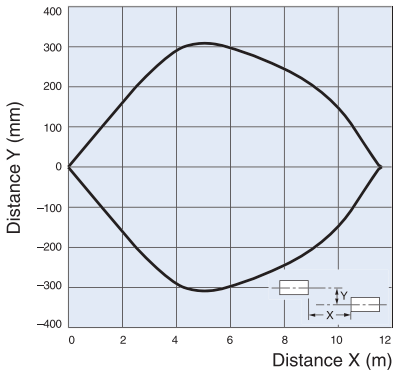
*1. The IP69k test according to DIN 40 050 part 9 is intended to simulate high pressure/steam cleaning. During the test 14-16 l/min water at 80°C is sprayed onto the sensor from different angles with 8000-10000 kPa. The sensor may not suffer any damaging effects from high pressure water in appearance and functionality.
*2. For other cable materials (e.g. PUR) contact your OMRON sales representative.
*3. For stainless steel types refer to separate datasheet E3F2 SUS

# Engineering Data (Typical)

## Operating Range (typical)

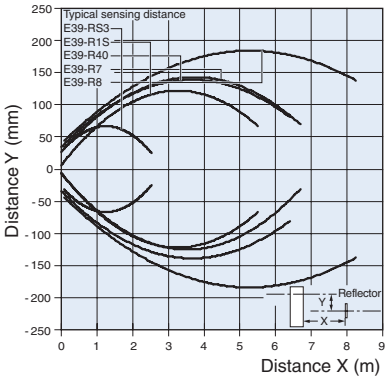
### Through-beam Models (axial)

E3F2-7□4-□



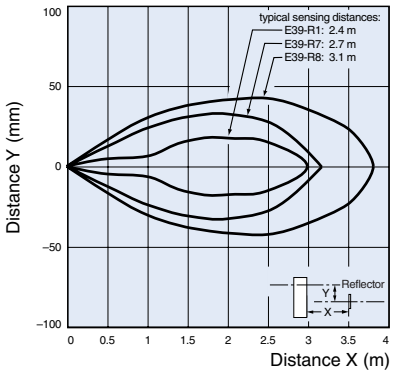

### Retro-reflective Models (axial)

E3F2-R4□4□-□ (polarizing)



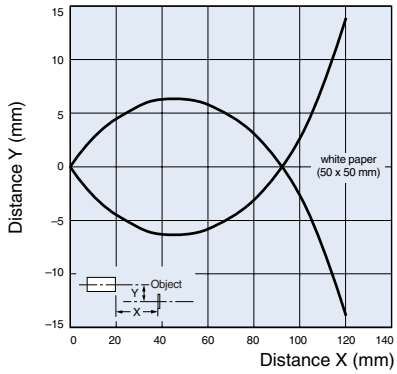

### Retro-reflective Models (radial)

E3F2-R2R□41-□ (polarizing) and reflectors



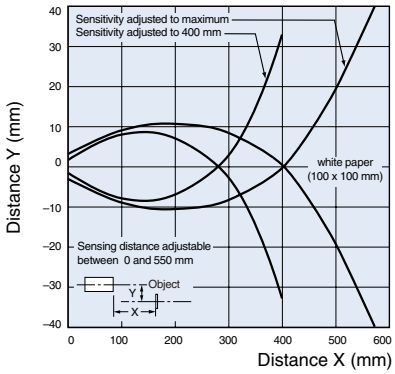

### Diffuse-reflective Models (axial)

E3F2-DS10□4-□ (wide-beam type)



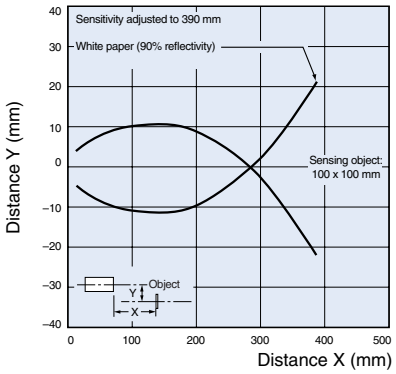

### Diffuse-reflective Models (axial)

E3F2-DS30□4-□



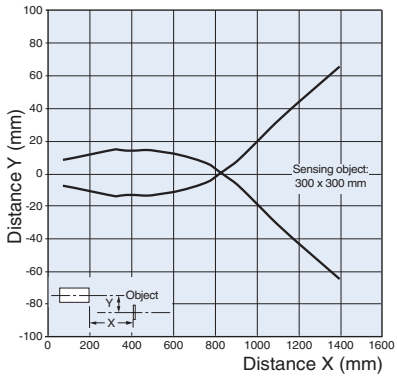

### Diffuse-reflective Models (radial)

E3F2-DS30□41-□




### Diffuse-reflective Models (axial)

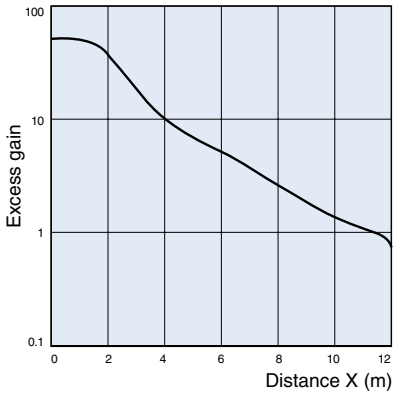
E3F2-D1□4-□



## Excess Gain Ratio vs. Distance (typical)

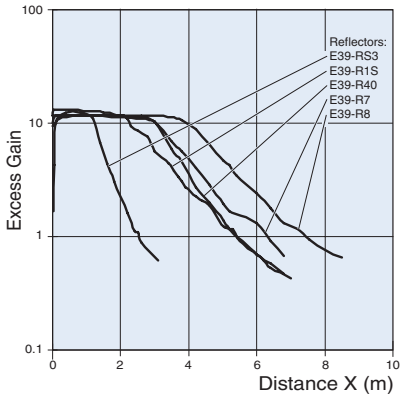
### Through-beam Models (axial)

E3F2-7□4-□



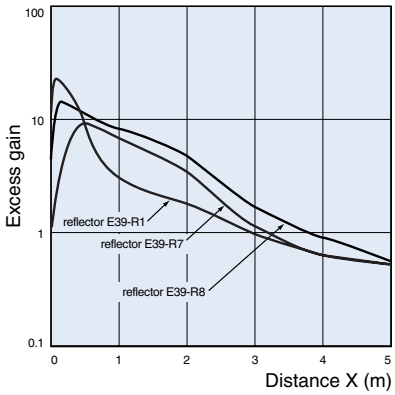

### Retro-reflective Models (axial)

E3F2-R4□4□-□



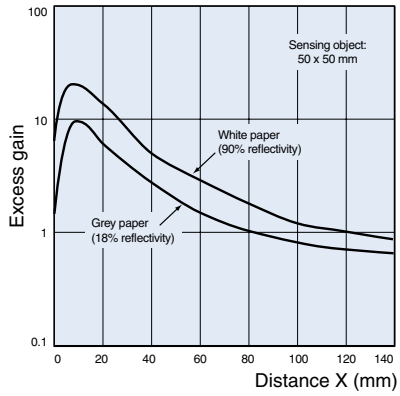

### Retro-reflective Models (radial)

E3F2-R2R□41-□ (polarizing) and reflectors



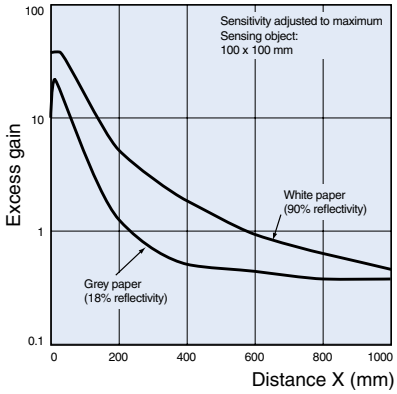

### Diffuse-reflective Models (axial)

E3F2-DS10□4-□ (wide-beam type)



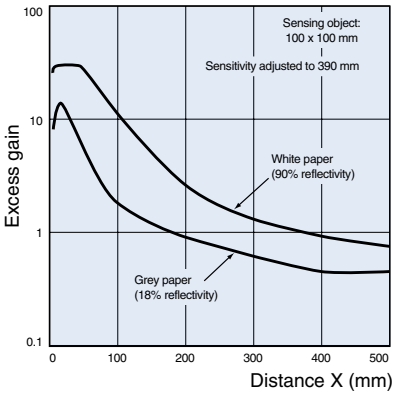

### Diffuse-eflective Models (axial)

E3F2-DS30□4-□



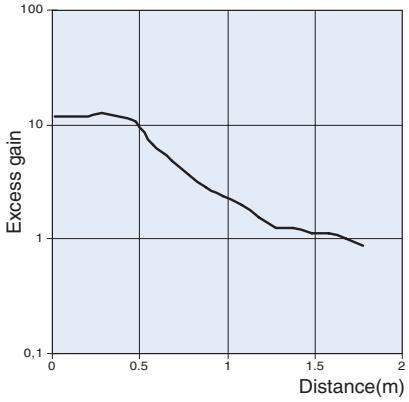

### Diffuse-reflective Models (radial)

E3F2-DS30□41-□




### Diffuse-reflective Models (axial)

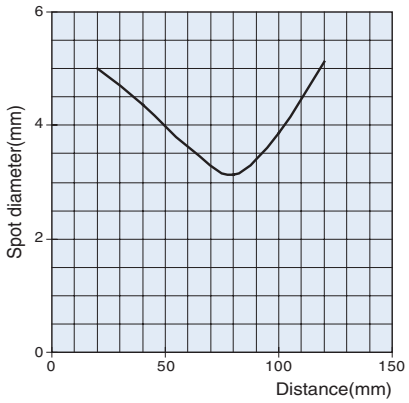
E3F2-D1□4-□



## Light spot vs sensing distance

Background suppression Models

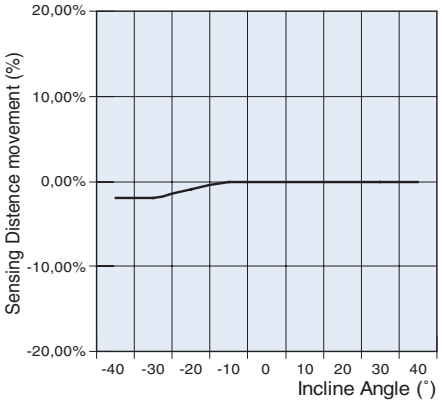
E3F2-LS□




## Incline (horizontal)

Background suppression Models

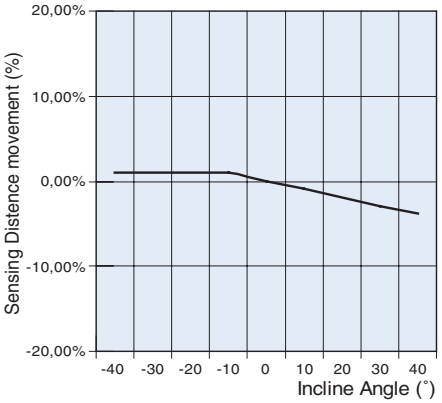
E3F2-LS□




## Incline (vertical)

Background suppression Models

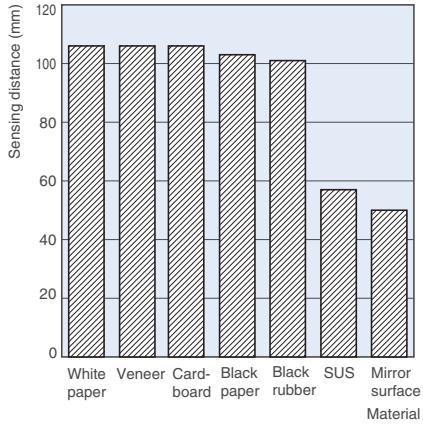
E3F2-LS□




## Object material vs sensing distance

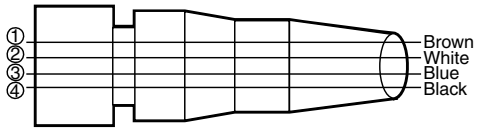
Background suppression Models

E3F2-LS□



# Operation

## Output Circuits

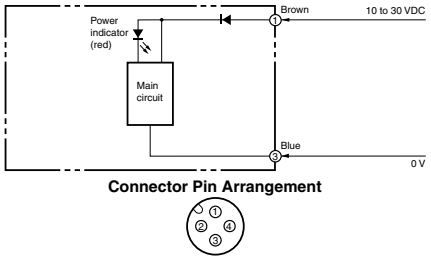
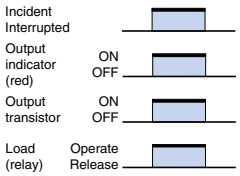
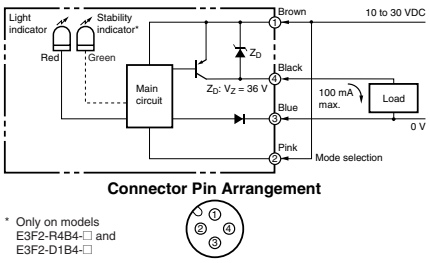
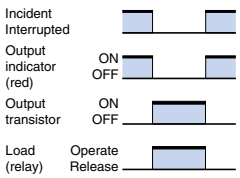
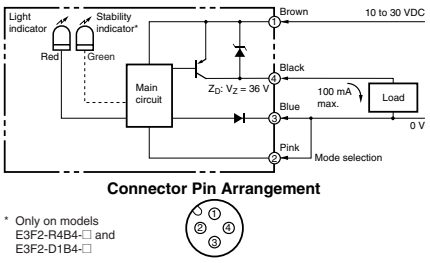
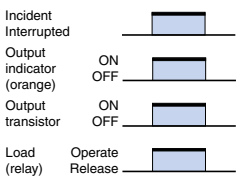
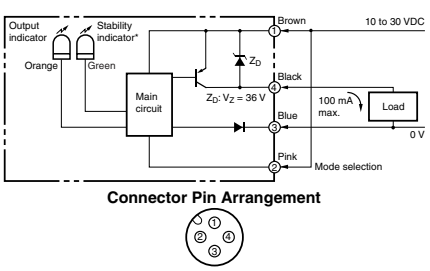
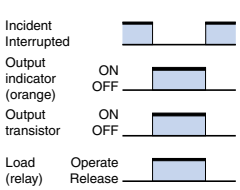
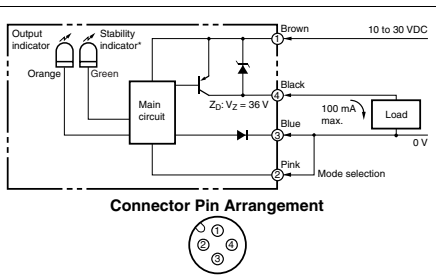



XS2F-D42□-D80-□
XS2F-G42□-G80-□

## Structure of Sensor I/O Connector

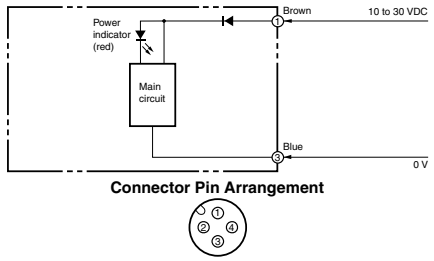
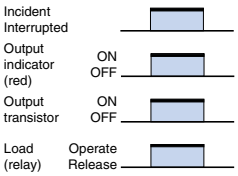
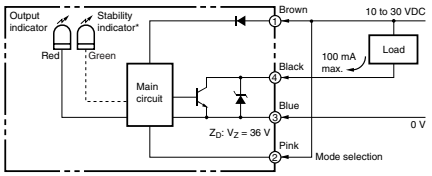
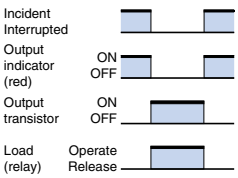
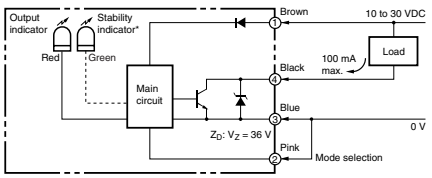
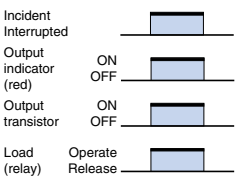
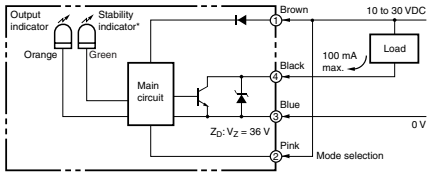
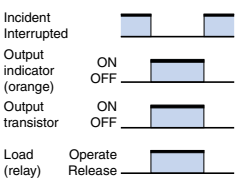
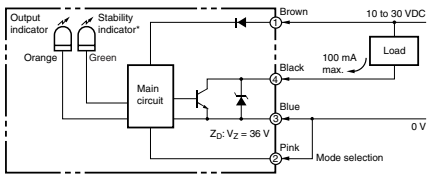
| Classification | Wire color | Connector pin No. | Use |
|---|---|---|---|
| DC | Brown | ① | Power supply (+V) |
| | White | ② | Mode selection Lon/Don |
| | Blue | ③ | Power supply (0 V) |
| | Black | ④ | Output |

## PNP Output

| Model | Output transistor status | Timing chart | Connection method | Output circuit |
|---|---|---|---|---|
| E3F2-□B4-□ (except for E3F2-LS10B4-□) | – | – | – | Through-beam emitter<br>  |
| | ON when light is incident. (Light-ON) |  | Connect the pink (Pin ②) and brown (Pin ①) cords or open the pink cord (Pin ②). |  <br>* Only on models E3F2-R4B4-□ and E3F2-D1B4-□ |
| | ON when light is interrupted. (Dark-ON) |  | Connect the pink (Pin ②) and blue (Pin ③) cords. |  <br>* Only on models E3F2-R4B4-□ and E3F2-D1B4-□ |
| E3F2-LS10B4-□ | ON when light is incident. (Light-ON) |  | Connect the pink (Pin ②) and brown (Pin ①) cords or open the pink cord (Pin ②). |  |
| | ON when light is interrupted. (Dark-ON) |  | Connect the pink (Pin ②) and blue (Pin ③) cords. |  |

Note: Terminal numbers for connector type.

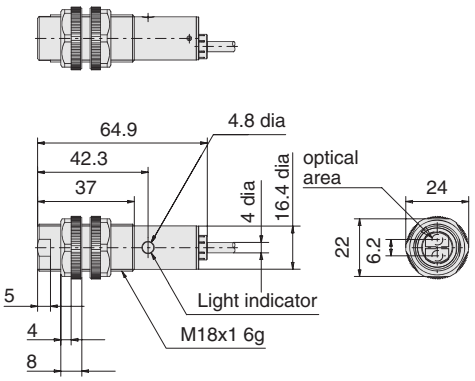
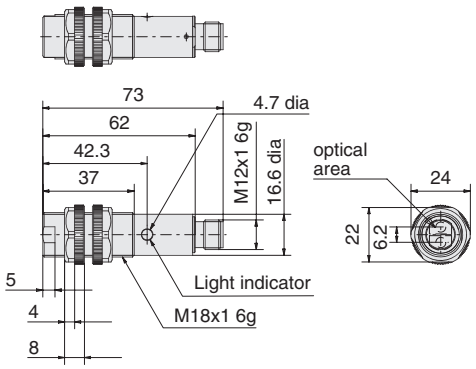
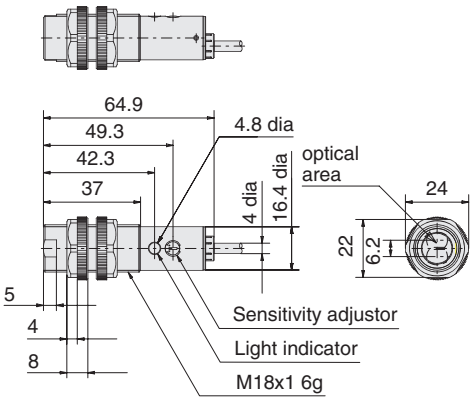
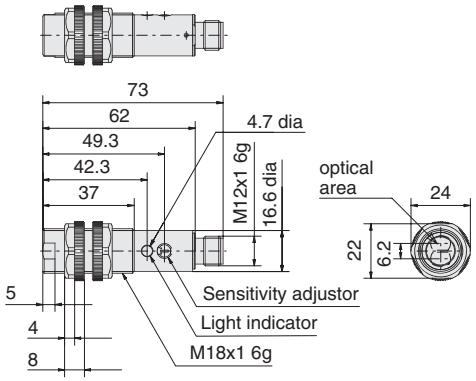
## NPN Output

| Model | Output transistor status | Timing chart | Connection method | Output circuit |
|---|---|---|---|---|
| E3F2-□C4-□ (except for E3F2-LS10C4-□) | – | | – | Through-beam emitter<br>  |
| | ON when light is incident. (Light-ON) |  | Connect the pink (Pin ②) and brown (Pin ①) cords or open the pink cord (Pin ②). |  <br>* Only on models E3F2-R4C4-□ and E3F2-D1C4-□ |
| | ON when light is interrupted. (Dark-ON) |  | Connect the pink (Pin ②) and blue (Pin ③) cords. |  <br>* Only on models E3F2-R4C4-□ and E3F2-D1C4-□ |
| E3F2-LS10C4-□ | ON when light is incident. (Light-ON) |  | Connect the pink (Pin ②) and brown (Pin ①) cords or open the pink cord (Pin ②). |  |
| | ON when light is interrupted. (Dark-ON) |  | Connect the pink (Pin ②) and blue (Pin ③) cords. |  |

Note: Terminal numbers for connector type.

## Dimensions Note: All units are in millimeters unless otherwise indicated

### Plastic models, axial type

<table>
<tr><th>Cable type</th><th>Connector type</th></tr>
<tr><td colspan="2">Without potentiometer</td></tr>
<tr><td>E3F2-7□<br>E3F2-DS10□4-N<br>E3F2-LS10□4<br> 
</td><td>E3F2-7□-P1<br>E3F2-DS10□4-P1<br>E3F2-LS10□4-P1<br> 
</td></tr>
<tr><td colspan="2">With potentiometer</td></tr>
<tr><td>E3F2-DS30□4<br>E3F2-D1□4<br>E3F2-R4□<br> 
</td><td>E3F2-DS30□4-P1<br>E3F2-D1□4-P1<br>E3F2-R4□-P1<br> 
</td></tr>
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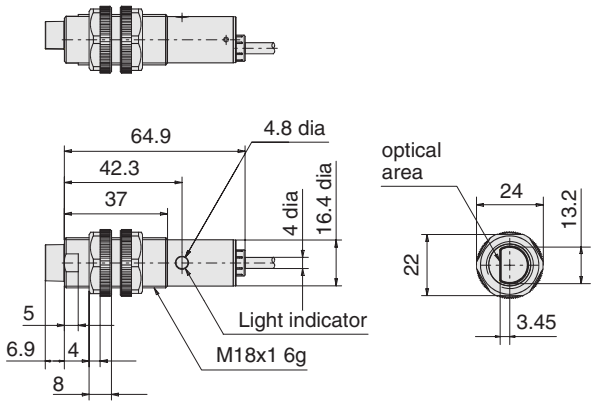
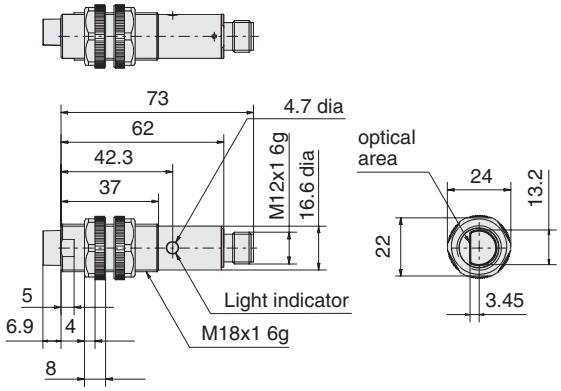
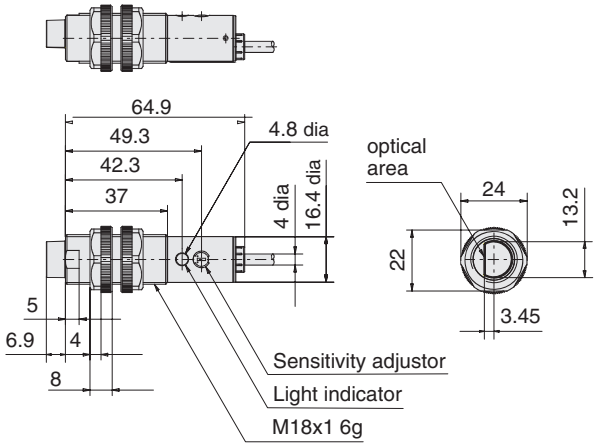
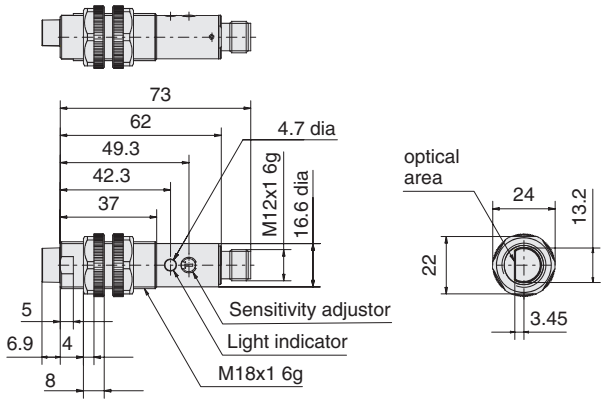
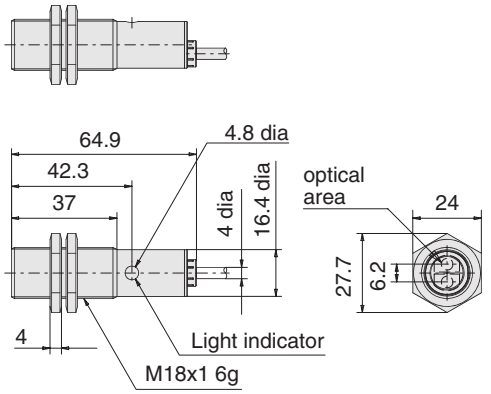
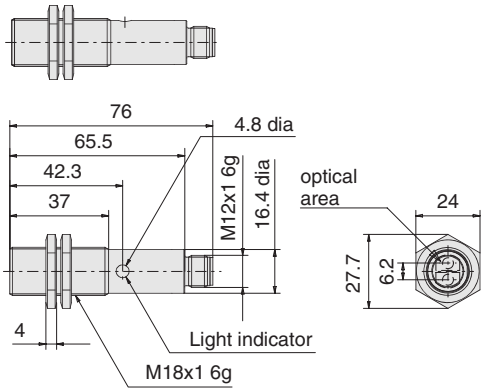
## Plastic models, radial type

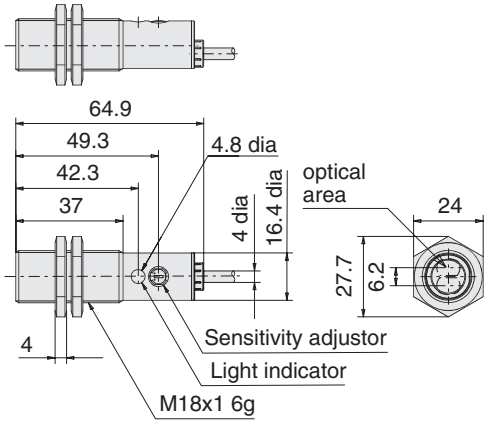
| Cable type | Connector type |
|---|---|
| Without potentiometer | |
| E3F2-R2R□41<br>  | E3F2-R2R□41-P1<br>  |
| With potentiometer | |
| E3F2-DS30□41<br>  | E3F2-DS30□41-P1<br>  |

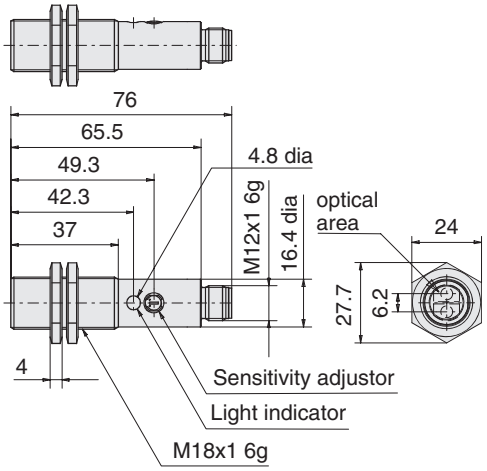
## Metal Models, axial type

| Cable type | Connector type |
|---|---|
| Without potentiometer | |
| E3F2-7□-M<br>E3F2-DS10□4-M<br>E3F2-LS10□4-M | E3F2-7□-M1-M<br>E3F2-DS10□4-M1-M<br>E3F2-LS10□4-M1-M |
| With potentiometer | |
| E3F2-DS30□4-M<br>E3F2-R4□4-M<br>E3F2-D1□4-M | E3F2-DS30□4-M1-M<br>E3F2-R4□4-M1-M<br>E3F2-D1□4-M1-M |

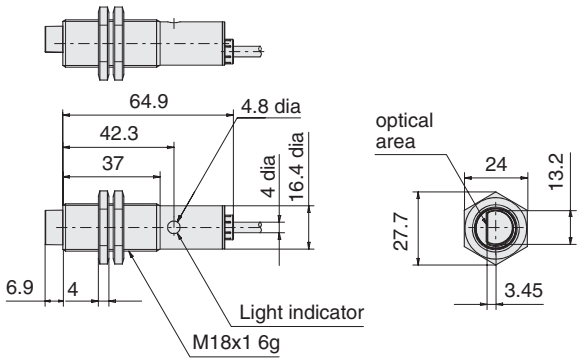
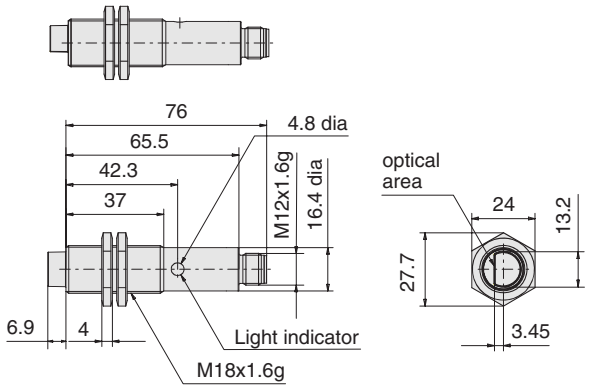
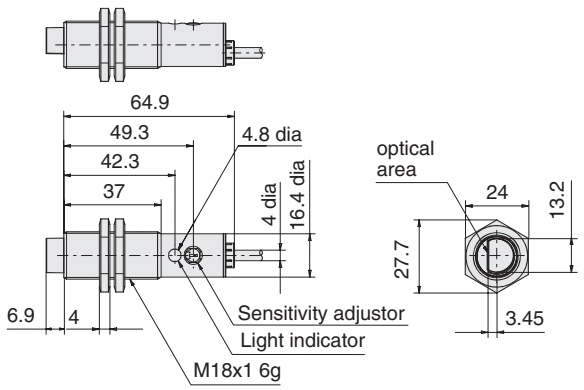
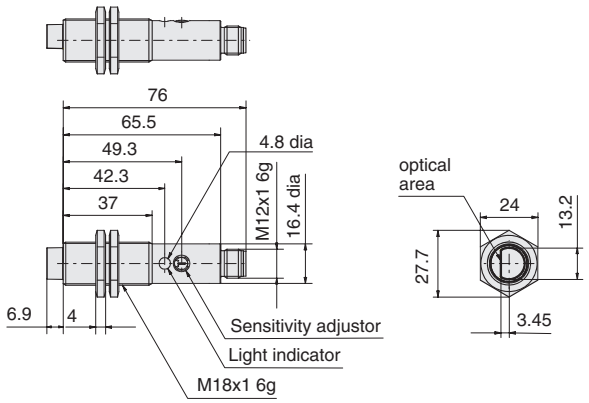


## Metal Models, radial type

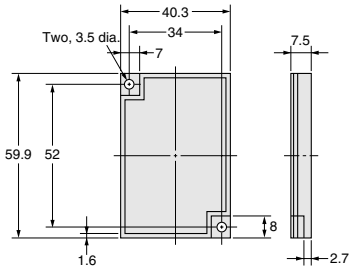
| Cable type | Connector type |
|---|---|
| Without potentiometer | |
| E3F2-R2R□41-M | E3F2-R2R□41-M1 |
|  |  |
| With potentiometer | |
| E3F2-DS30□41-M | E3F2-DS30□41-M1-M |
|  |  |

## Accessories (Order Separately)

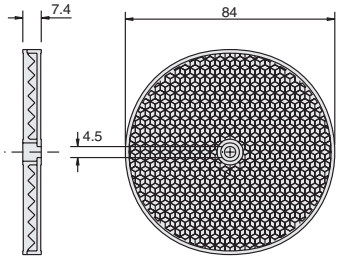
### Reflector

E39-R1
E39-R1S

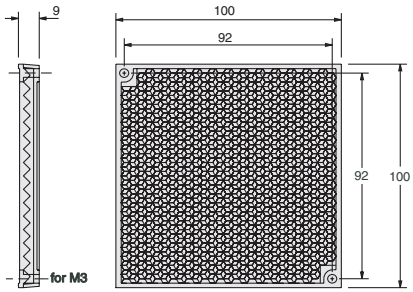
Material, reflective surface: acrylic
Rear surface: ABS



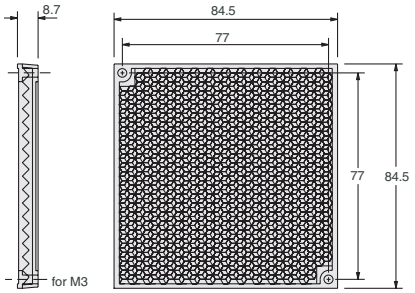

E39-R7




E39-R8

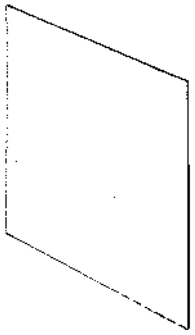


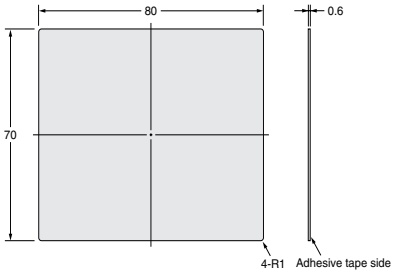

E39-R40



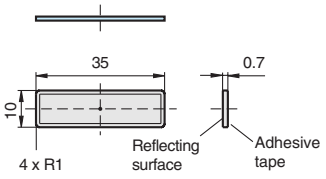

### Tape relectors

E39-RS3

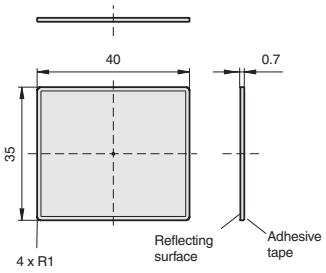





E39-RS1



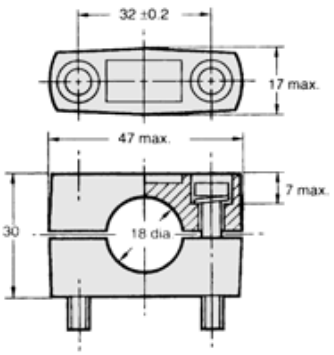

E39-RS2



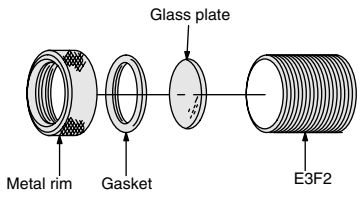

### Installation

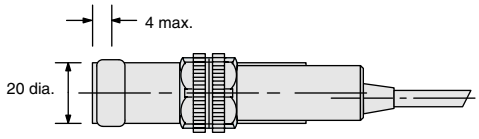
Mounting Bracket
Y92E-B18

Note: Hexagon bolt: M5 x 32
Material: plastic




Lens Cap
E39-F31



# Safety 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, explostion 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 N·m or less.

### Environements with Cleaners and Disinfectants (e.g., Food Processing Lines)

Do not use the Sensor in environments subject to cleaners and disifectants. 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 $mm^2$ 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 using a bracket (sold separately). Do not exceed a torque of 2.0 Nm when tightening mounting nuts for plastic models or 20.0 Nm when tightening mounting nuts for metal models
(7) Be sure to turn OFF the power supply before inserting or removing the connector.

### 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.

### Water Resistance

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

## WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

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- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

## PERFORMANCE DATA

Performance data given in this document is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

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## DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

## ERRORS AND OMISSIONS

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OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Cat. No. E58E-EN-01 **In the interest of product improvement, specifications are subject to change without notice.**

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