PHOTOELECTRIC SENSORS

# E3FA/E3RA/E3FB/E3RB

## A new generation in sensing performance

- Simplicity
  - Simple selection
  - Simple installation
- One family for all
  - All standard applications covered
  - A wide variety of models
  - Models designed for special applications
- Non-stop detection
  - High quality and reliability
  - High EMC protection
  - High light immunity
  - Robust and waterproof housing
  - UL certification (UL60947-5-2) and CSA certification (CSA-C22.2 No.60947-5-2)

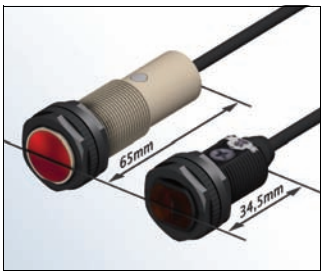
**Refer to *Safety Precautions* on page 15.**

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

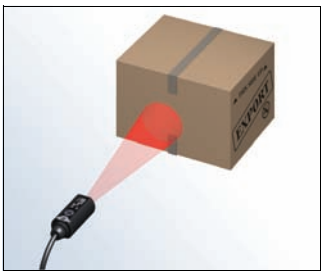
## Features

### Simplicity

Omron's compact E3FA series of photoelectric sensors is simple and quick to mount, as well as easy and intuitive to set-up.
The large and robust adjuster makes life much easier for installers to adjust the sensor, as does the bright, high-power red LED, which is clearly visible for easy alignment, even over longer distances. Similarly, the sensor's LED status indicator can be viewed from long distances and wide angles.

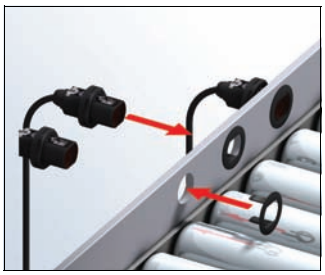



Compact size and shape. Can be installed almost anywhere.



Visible LED light for easy alignment.

Bright LED indicators for the easy operational status checking.

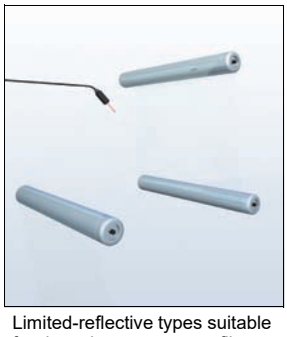


Flush mounting option for smooth installation.

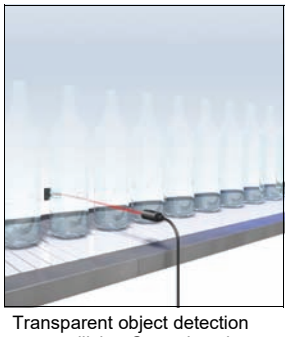
### One family for all

Typically installed in industrial plants ranging from food and beverage, textiles, ceramics and brick production, through to logistics, there's always an E3FA model to fit your application.
This extensive photoelectric sensor series with high reliability and enhanced performance includes through-beam, retroreflective and diffuse-reflective types in straight and radial versions. Straight versions are also available with background-suppression, limited-reflective detection, and transparent object detection types for special applications.

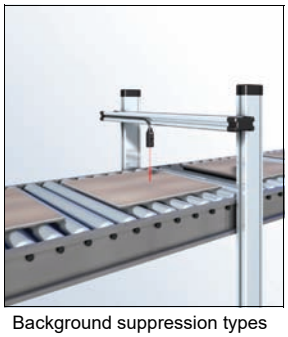
**Application specific models**



Limited-reflective types suitable for detecting transparant film to shiny, mirror film.



Transparent object detection types utilising Omron's unique technology for detecting objects with birefringent (double refraction) properties.



Background suppression types for the stable detection of different objects with various colours.

### Non-stop detection

Especially designed for machines that never stop, the rugged E3FA series offers completely reliable sensing in a robust and waterproof housing that can withstand even high-pressure cleaning. Exceeding market standards, this series also has high EMC protection and light immunity. In addition, there is the added benefit of the high-power LED, which contributes to high sensing stability even in environments with dust or vibrations.

## Ordering Information

### Sensors (E3FA Plastic housing) [Refer to *Dimensions on page 16.*]

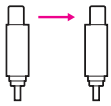
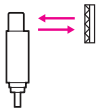
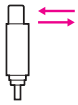
Red light / Infrared light

| Sensor type | Sensing distance | Connection method | Model | |
|---|---|---|---|---|
| | | | NPN output | PNP output |
| Through-beam *1. | 20 m | pre-wired | **set E3FA-TN11 2M**<br>Emitter E3FA-TN11-L 2M<br>Receiver E3FA-TN11-D 2M | **set E3FA-TP11 2M**<br>Emitter E3FA-TP11-L 2M<br>Receiver E3FA-TP11-D 2M |
| | | M12 connector | **set E3FA-TN21**<br>Emitter E3FA-TN21-L<br>Receiver E3FA-TN21-D | **set E3FA-TP21**<br>Emitter E3FA-TP21-L<br>Receiver E3FA-TP21-D |
| | 15 m | pre-wired | **set E3FA-TN12 2M**<br>Emitter E3FA-TN12-L 2M<br>Receiver E3FA-TN12-D 2M | **set E3FA-TP12 2M**<br>Emitter E3FA-TP12-L 2M<br>Receiver E3FA-TP12-D 2M |
| | | M12 connector | **set E3FA-TN22**<br>Emitter E3FA-TN22-L<br>Receiver E3FA-TN22-D | **set E3FA-TP22**<br>Emitter E3FA-TP22-L<br>Receiver E3FA-TP22-D |
| Retro-reflective with MSR function *2. | 0.1 to 4 m with E39-R1S | pre-wired | **E3FA-RN11 2M** | **E3FA-RP11 2M** |
| | | M12 connector | **E3FA-RN21** | **E3FA-RP21** |
| Coaxial Retro-reflective with MSR function *2. | 0 to 500 mm with E39-R1S | pre-wired | **E3FA-RN12 2M** | **E3FA-RP12 2M** |
| | | M12 connector | **E3FA-RN22** | **E3FA-RP22** |
| Diffuse-reflective | 100 mm | pre-wired | **E3FA-DN11 2M** | **E3FA-DP11 2M** |
| | | M12 connector | **E3FA-DN21** | **E3FA-DP21** |
| | 300 mm | pre-wired | **E3FA-DN12 2M** | **E3FA-DP12 2M** |
| | | M12 connector | **E3FA-DN22** | **E3FA-DP22** |
| | 1 m | pre-wired | **E3FA-DN13 2M** | **E3FA-DP13 2M** |
| | | M12 connector | **E3FA-DN23** | **E3FA-DP23** |
| | 100 mm | pre-wired | **E3FA-DN14 2M** | **E3FA-DP14 2M** |
| | | M12 connector | **E3FA-DN24** | **E3FA-DP24** |
| | 300 mm | pre-wired | **E3FA-DN15 2M** | **E3FA-DP15 2M** |
| | | M12 connector | **E3FA-DN25** | **E3FA-DP25** |
| | 1 m | pre-wired | **E3FA-DN16 2M** | **E3FA-DP16 2M** |
| | | M12 connector | **E3FA-DN26** | **E3FA-DP26** |
| BGS (background suppression) | 100 mm | pre-wired | **E3FA-LN11 2M** | **E3FA-LP11 2M** |
| | | M12 connector | **E3FA-LN21** | **E3FA-LP21** |
| | 200 mm | pre-wired | **E3FA-LN12 2M** | **E3FA-LP12 2M** |
| | | M12 connector | **E3FA-LN22** | **E3FA-LP22** |
| Limited distance reflective | 10 to 50 mm | pre-wired | **E3FA-VN11 2M** | **E3FA-VP11 2M** |
| | | M12 connector | **E3FA-VN21** | **E3FA-VP21** |
| Transparent detected with P-opaquing function *2. | 100 to 500 mm with E39-RP1 | pre-wired | **E3FA-BN11 2M** | **E3FA-BP11 2M** |
| | | M12 connector | **E3FA-BN21** | **E3FA-BP21** |
| Transparent detected with P-opaquing function *2. | 0.1 to 2 m with E39-RP1 | pre-wired | **E3FA-BN12 2M** | **E3FA-BP12 2M** |
| | | M12 connector | **E3FA-BN22** | **E3FA-BP22** |

*1. The set type includes the emitter and receiver.
*2. The Reflector is sold separately. Select the Reflector model most suited to the application.

## Sensors (E3RA Plastic housing) [Refer to *Dimensions on page 16.*]

Red light

| Sensor type | Sensing distance | Connection method | Model | |
|---|---|---|---|---|
| | | | NPN output | PNP output |
| Through-beam *1.  | 15 m | pre-wired | **set E3RA-TN11 2M**<br>Emitter E3RA-TN11-L 2M<br>Receiver E3RA-TN11-D 2M | **set E3RA-TP11 2M**<br>Emitter E3RA-TP11-L 2M<br>Receiver E3RA-TP11-D 2M |
| | | M12 connector | **set E3RA-TN21**<br>Emitter E3RA-TN21-L<br>Receiver E3RA-TN21-D | **set E3RA-TP21**<br>Emitter E3RA-TP21-L<br>Receiver E3RA-TP21-D |
| Retro-reflective with MSR function *2.  | 0.1 to 3 m<br>with E39-R1S | pre-wired | **E3RA-RN11 2M** | **E3RA-RP11 2M** |
| | | M12 connector | **E3RA-RN21** | **E3RA-RP21** |
| Diffuse-reflective  | 100 mm | pre-wired | **E3RA-DN11 2M** | **E3RA-DP11 2M** |
| | | M12 connector | **E3RA-DN21** | **E3RA-DP21** |
| | 300 mm | pre-wired | **E3RA-DN12 2M** | **E3RA-DP12 2M** |
| | | M12 connector | **E3RA-DN22** | **E3RA-DP22** |
| | 700 mm | pre-wired | **E3RA-DN13 2M** | **E3RA-DP13 2M** |
| | | M12 connector | **E3RA-DN23** | **E3RA-DP23** |

*1. The set type includes the emitter and receiver.
*2. The Reflector is sold separately. Select the Reflector model most suited to the application.

## Sensors (E3FB/E3RB Metal housing) [Refer to *Dimensions on page 17.*]

Red light

| Sensor type | Sensing distance | Connection method | Model | |
|---|---|---|---|---|
| | | | NPN output | PNP output |
| Through-beam *1. | 20 m | pre-wired | **set E3FB-TN11 2M**<br>Emitter E3FB-TN11-L 2M<br>Receiver E3FB-TN11-D 2M | **set E3FB-TP11 2M**<br>Emitter E3FB-TP11-L 2M<br>Receiver E3FB-TP11-D 2M |
| | | M12 connector | **set E3FB-TN21**<br>Emitter E3FB-TN21-L<br>Receiver E3FB-TN21-D | **set E3FB-TP21**<br>Emitter E3FB-TP21-L<br>Receiver E3FB-TP21-D |
| Retro-reflective with MSR function *2. | 0.1 to 4 m with E39-R1S | pre-wired | **E3FB-RN11 2M** | **E3FB-RP11 2M** |
| | | M12 connector | **E3FB-RN21** | **E3FB-RP21** |
| Coaxial Retro-reflective with MSR function *2. | 0 to 500 mm with E39-R1S | pre-wired | **E3FB-RN12 2M** | **E3FB-RP12 2M** |
| | | M12 connector | **E3FB-RN22** | **E3FB-RP22** |
| Diffuse-reflective | 100 mm | pre-wired | **E3FB-DN11 2M** | **E3FB-DP11 2M** |
| | | M12 connector | **E3FB-DN21** | **E3FB-DP21** |
| | 300 mm | pre-wired | **E3FB-DN12 2M** | **E3FB-DP12 2M** |
| | | M12 connector | **E3FB-DN22** | **E3FB-DP22** |
| | 1 m | pre-wired | **E3FB-DN13 2M** | **E3FB-DP13 2M** |
| | | M12 connector | **E3FB-DN23** | **E3FB-DP23** |
| BGS (background suppression) | 100 mm | pre-wired | **E3FB-LN11 2M** | **E3FB-LP11 2M** |
| | | M12 connector | **E3FB-LN21** | **E3FB-LP21** |
| | 200 mm | pre-wired | **E3FB-LN12 2M** | **E3FB-LP12 2M** |
| | | M12 connector | **E3FB-LN22** | **E3FB-LP22** |
| Limited distance reflective | 10 to 50 mm | pre-wired | **E3FB-VN11 2M** | **E3FB-VP11 2M** |
| | | M12 connector | **E3FB-VN21** | **E3FB-VP21** |
| Transparent detected with P-opaquing function *2. | 100 to 500 mm with E39-RP1 | pre-wired | **E3FB-BN11 2M** | **E3FB-BP11 2M** |
| | | M12 connector | **E3FB-BN21** | **E3FB-BP21** |
| Transparent detected with P-opaquing function *2. | 0.1 to 2 m with E39-RP1 | pre-wired | **E3FB-BN12 2M** | **E3FB-BP12 2M** |
| | | M12 connector | **E3FB-BN22** | **E3FB-BP22** |
| Through-beam *1. | 15 m | pre-wired | **set E3RB-TN11 2M**<br>Emitter E3RB-TN11-L 2M<br>Receiver E3RB-TN11-D 2M | **set E3RB-TP11 2M**<br>Emitter E3RB-TP11-L 2M<br>Receiver E3RB-TP11-D 2M |
| | | M12 connector | **set E3RB-TN21**<br>Emitter E3RB-TN21-L<br>Receiver E3RB-TN21-D | **set E3RB-TP21**<br>Emitter E3RB-TP21-L<br>Receiver E3RB-TP21-D |
| Retro-reflective with MSR function *2. | 0.1 to 3 m with E39-R1S | pre-wired | **E3RB-RN11 2M** | **E3RB-RP11 2M** |
| | | M12 connector | **E3RB-RN21** | **E3RB-RP21** |
| Diffuse-reflective | 100 mm | pre-wired | **E3RB-DN11 2M** | **E3RB-DP11 2M** |
| | | M12 connector | **E3RB-DN21** | **E3RB-DP21** |
| | 300 mm | pre-wired | **E3RB-DN12 2M** | **E3RB-DP12 2M** |
| | | M12 connector | **E3RB-DN22** | **E3RB-DP22** |
| | 700 mm | pre-wired | **E3RB-DN13 2M** | **E3RB-DP13 2M** |
| | | M12 connector | **E3RB-DN23** | **E3RB-DP23** |

*1. The set type includes the emitter and receiver.
*2. The Reflector is sold separately. Select the Reflector model most suited to the application.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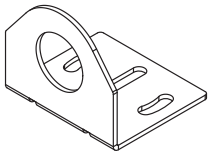
## Reflectors [Refer to *Dimensions on page 18.*]

**Reflectors required for Retro-reflective Sensors: A Reflector is not provided with the Sensor. Be sure to order a Reflector separately.**

| Sensor | Sensing distance | Appearance | Model | Quantity | Remarks |
|---|---|---|---|---|---|
| E3FA-R□1<br>E3FB-R□1 | 0.1 to 4 m |  | **E39-R1S** | 1 | for E3FA-R□, E3RA-R□, E3FB-R□ and E3RB-R□ |
| E3FA-R□2<br>E3FB-R□2 | 0 to 500 mm | | | | |
| E3FA-B□1<br>E3FB-B□1 | 100 to 500 mm |  | **E39-RP1** | 1 | for E3FA-B□ and E3FB-B□ |
| E3FA-B□2<br>E3FB-B□2 | 0.1 to 2 m | | | | |

## Mounting brackets [Refer to *Dimensions on page 18.*]

**A Mounting Bracket is not enclosed with the Sensor. Order a Mounting Bracket separately if required.**

| Sensor | Appearance | Model (Material) | Quantity | Remarks |
|---|---|---|---|---|
| all types |  | **E39-L183** (SUS304) | 1 | Mounting bracket |
| E3FA-□<br>E3RA-□ |  | **E39-L182** (POM) | 1 | Flush mounting bracket |

## Sensor I/O connectors

**Models for Connectors: A Connector is not provided with the Sensor. Be sure to order a Connector separately.**

| Sensor | Size | Cable | Appearance | Cable type | | Model |
|---|---|---|---|---|---|---|
| M12 connector types | M12 | Standard | Straight  | 2 m | 4-wire | **XS2F-M12PVC4S2M** |
| | | | | 5 m | | **XS2F-M12PVC4S5M** |
| | | | Angle  | 2 m | | **XS2F-M12PVC4A2M** |
| | | | | 5 m | | **XS2F-M12PVC4A5M** |

## Model Number Legend

**E3□-□□□□-(□)□**

1 2 3 4 5 6 7

**1. Series name**
FA: Cylindrical, Straight type, Plastic housing
RA: Cylindrical, Radial type, Plastic housing
FB: Cylindrical, Straight type, Metal housing
RB: Cylindrical, Radial type, Metal housing

**2. Sensing method**
T: Through-beam
R: Retro-reflective with MSR function
D: Diffuse-reflective
L: Background suppression
V: Limited distance reflective
B: Transparent detected with P-opaquing function

**3. Output**
P: PNP
N: NPN

**4. Connection**
1: Cable
2: Connector, M12, 4-pin

**5. Difference of sensing distance, difference of light source**
Sequential number

**6. Emitter/Receiver**
D: Receiver
L: Emitter

**7. Cable length**
Blank: Connector type

**e.g., E3FA-TP11 2M;**
Cylindrical, Straight type, Plastic housing/ Through-beam/ PNP/ Cable/ Difference of Sensing distance/ Cable length of 2M
**E3RA-TN21-D;**
Cylindrical, Radial type, Plastic housing/ Through-beam/ NPN/ Connector, M12, 4-pin/ Difference of Sensing distance/ Receiver/ Connector type
**E3FA-VP21;**
Cylindrical, Straight type, Plastic housing/ Limited distance reflective/ PNP/ Connector, M12, 4-pin/ Difference of Sensing distance/ Connector type

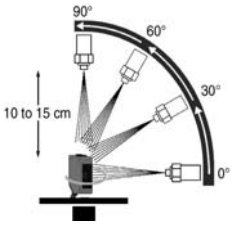
# E3FA/E3RA/E3FB/E3RB

## Ratings and Specifications

### Straight type (E3FA/E3FB)

| Item | Sensing method | | Through-beam | | Retro-reflective with MSR function | Coaxial Retro-reflective with MSR function |
|---|---|---|---|---|---|---|
| Model | NPN output | Pre-wired | E3F□-TN11 2M | E3FA-TN12 2M | E3F□-RN11 2M | E3F□-RN12 2M |
| | | M12 Connector | E3F□-TN21 | E3FA-TN22 | E3F□-RN21 | E3F□-RN22 |
| | PNP output | Pre-wired | E3F□-TP11 2M | E3FA-TP12 2M | E3F□-RP11 2M | E3F□-RP12 2M |
| | | M12 Connector | E3F□-TP21 | E3FA-TP22 | E3F□-RP21 | E3F□-RP22 |
| Sensing distance | | | 20 m | 15 m | 0.1 to 4 m (with E39-R1S) | 0 to 500 mm (with E39-R1S) |
| Spot diameter (reference value) | | | — | | | |
| Standard sensing object | | | Opaque: 7 mm dia.min. | | Opaque: 75 mm dia.min. | |
| Differential travel | | | — | | | |
| Directional angle | | | 2° min. | | | |
| Light source (wavelength) | | | Red LED (624 nm) | Infrared LED (850 nm) | Red LED (624 nm) | |
| Power supply voltage *1 | | | 10 to 30 VDC (include voltage ripple of 10%(p-p) max.) | | | |
| Current consumption | | | 40 mA max. (Emitter 25 mA max. Receiver 15 mA max.) | | 25 mA max. | |
| Control output | | | NPN/PNP (open collector) Load current: 100 mA max. (Residual voltage: 3 V max.), Load power supply voltage: 30 VDC max. *2 | | | |
| Operation mode | | | Light-ON/Dark-ON selectable by wiring | | | |
| Indicator | | | Operation indicator (orange) Stability indicator (green) Power indicator (green): only Emitter of Through-beam | | | |
| Protection circuits | | | Power supply reverse polarity protection, Output short-circuit protection, and Output reverse polarity protection | | | |
| Response time | | | 0.5 ms | | | |
| Sensitivity adjustment | | | One-turn adjuster | | | |
| Ambient illumination (Receiver side) | | | Incandescent lamp: 3,000 lx max./ Sunlight: 10,000 lx max. | | | |
| Ambient temperature range *3 | | | Pre-wired Models Operating: -25 to 55°C/ Storage: -40 to 70°C (with no icing or condensation) M12 Connector Models Operating: -40 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 at 50/60 Hz for 1 min. between current-carrying parts and case | | | |
| 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: IP67, DIN 40050-9: IP69K *4 | | | |
| Weight (packed state/only sensor) | Pre-wired cable (2M) | | **E3FA:** Approx. 110 g/ Approx. 50 g, respectively, **E3FB:** Approx. 175 g/ Approx. 65 g, respectively | | **E3FA:** Approx. 60 g/ Approx. 50 g, **E3FB:** Approx. 95 g/ Approx. 65 g | |
| | Connector | | **E3FA:** Approx. 30 g/ Approx. 10 g, respectively, **E3FB:** Approx. 85 g/ Approx. 20 g, respectively | | **E3FA:** Approx. 20 g/ Approx. 10 g, **E3FB:** Approx. 50 g/ Approx. 20 g | |
| Material | Case | | **E3FA:** ABS, **E3FB:** Nickel-brass | | | |
| | Lens and Display | | PMMA | | | |
| | Adjuster | | POM | | | |
| | Nut | | **E3FA:** POM, **E3FB:** Nickel-brass | | | |
| Accessories | | | Instruction sheet M18 nuts (4 pcs) | | Instruction sheet M18 nuts (2 pcs) | |

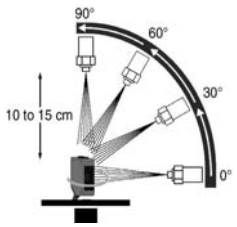
Note: 1. Altitude: Up to 2,000 m, Pollution degree: 3, Enclosure type: Type1.
*1. UL power supply voltage rating is 10 to 26.4 VDC.
*2. UL load power supply voltage rating is 26.4 VDC max.
*3. UL temperature rating is 40°C maximum in operation.
*4. IP69K Degree of Protection Specifications
IP69K is a protection specification stipulated by DIN 40050 Part 9 of the German standards.
The test item is sprayed with 80°C water from a nozzle of a specified shape at a water pressure of 80 to 100 bar. The amount of water is 14 to 16 liters per minute.
The distance between the test item and the nozzle is 10 to 15 cm. The water is discharged at angles of 0°, 30°, 60°, and 90° from the horizontal plane for 30 seconds at each angle while the test item is rotated horizontally.



## Straight type (E3FA/E3FB)

| Item | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Model | Sensing method | | Diffuse-reflective | | | | | |
| | NPN output | Pre-wired | E3F□-DN11 2M | E3F□-DN12 2M | E3F□-DN13 2M | E3FA-DN14 2M | E3FA-DN15 2M | E3FA-DN16 2M |
| | | M12 Connector | E3F□-DN21 | E3F□-DN22 | E3F□-DN23 | E3FA-DN24 | E3FA-DN25 | E3FA-DN26 |
| | PNP output | Pre-wired | E3F□-DP11 2M | E3F□-DP12 2M | E3F□-DP13 2M | E3FA-DP14 2M | E3FA-DP15 2M | E3FA-DP16 2M |
| | | M12 Connector | E3F□-DP21 | E3F□-DP22 | E3F□-DP23 | E3FA-DP24 | E3FA-DP25 | E3FA-DP26 |
| Sensing distance | | | 100 mm (white paper: 300 × 300 mm) | 300 mm (white paper: 300 × 300 mm) | 1 m (white paper: 300 × 300 mm) | 100 mm (white paper: 300 × 300 mm) | 300 mm (white paper: 300 × 300 mm) | 1 m (white paper: 300 × 300 mm) |
| Spot diameter (reference value) | | | 40 × 45 mm Sensing distance of 100 mm | 40 × 50 mm Sensing distance of 300 mm | 120 × 150 mm Sensing distance of 1 m | 40 × 45 mm Sensing distance of 100 mm | 40 × 50 mm Sensing distance of 300 mm | 120 × 150 mm Sensing distance of 1 m |
| Standard sensing object | | | — | | | | | |
| Differential travel | | | 20% max. | | | | | |
| Directional angle | | | — | | | | | |
| Light source (wavelength) | | | Red LED (624 nm) | | | Infrared LED (850 nm) | | |
| Power supply voltage *1 | | | 10 to 30 VDC (include voltage ripple of 10%(p-p) max.) | | | | | |
| Current consumption | | | 25 mA max. | | | | | |
| Control output | | | NPN/PNP (open collector)<br>Load current: 100 mA max. (Residual voltage: 3 V max.), Load power supply voltage: 30 VDC max. *2 | | | | | |
| Operation mode | | | Light-ON/Dark-ON selectable by wiring | | | | | |
| Indicator | | | Operation indicator (orange)<br>Stability indicator (green) | | | | | |
| Protection circuits | | | Power supply reverse polarity protection, Output short-circuit protection, and Output reverse polarity protection | | | | | |
| Response time | | | 0.5 ms | | | | | |
| Sensitivity adjustment | | | One-turn adjuster | | | | | |
| Ambient illumination (Receiver side) | | | Incandescent lamp: 3,000 lx max./ Sunlight: 10,000 lx max. | | | | | |
| Ambient temperature range *3 | | | Pre-wired Models<br>Operating: -25 to 55°C/ Storage: -40 to 70°C (with no icing or condensation)<br>M12 Connector Models<br>Operating: -40 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 at 50/60 Hz for 1 min. between current-carrying parts and case | | | | | |
| 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: IP67, DIN 40050-9: IP69K *4 | | | | | |
| Weight (packed state/only sensor) | Pre-wired cable (2M) | | **E3FA:** Approx. 60 g/ Approx. 50 g,<br>**E3FB:** Approx. 95 g/ Approx. 65 g | | | | | |
| | Connector | | **E3FA:** Approx. 20 g/ Approx. 10 g,<br>**E3FB:** Approx. 50 g/ Approx. 20 g | | | | | |
| Material | Case | | **E3FA:** ABS, **E3FB:** Nickel-brass | | | | | |
| | Lens and Display | | PMMA | | | | | |
| | Adjuster | | POM | | | | | |
| | Nut | | **E3FA:** POM, **E3FB:** Nickel-brass | | | | | |
| Accessories | | | Instruction sheet<br>M18 nuts (2 pcs) | | | | | |

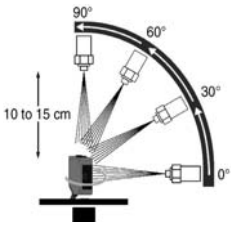
Note: 1. Altitude: Up to 2,000 m, Pollution degree: 3, Enclosure type: Type1.
*1. UL power supply voltage rating is 10 to 26.4 VDC.
*2. UL load power supply voltage rating is 26.4 VDC max.
*3. UL temperature rating is 40°C maximum in operation.
*4. IP69K Degree of Protection Specifications
IP69K is a protection specification stipulated by DIN 40050 Part 9 of the German standards.
The test item is sprayed with 80°C water from a nozzle of a specified shape at a water pressure of 80 to 100 bar. The amount of water is 14 to 16 liters per minute.
The distance between the test item and the nozzle is 10 to 15 cm. The water is discharged at angles of 0°, 30°, 60°, and 90° from the horizontal plane for 30 seconds at each angle while the test item is rotated horizontally.



## Straight type (E3FA/E3FB)

| Item \ Model | Sensing method | | BGS (Background suppression) | | Limited distance reflective | Transparent detected with P-opaquing function | |
|---|---|---|---|---|---|---|---|
| | NPN output | Pre-wired | E3F□-LN11 2M | E3F□-LN12 2M | E3F□-VN11 2M | E3F□-BN11 2M | E3F□-BN12 2M |
| | | M12 Connector | E3F□-LN21 | E3F□-LN22 | E3F□-VN21 | E3F□-BN21 | E3F□-BN22 |
| | PNP output | Pre-wired | E3F□-LP11 2M | E3F□-LP12 2M | E3F□-VP11 2M | E3F□-BP11 2M | E3F□-BP12 2M |
| | | M12 Connector | E3F□-LP21 | E3F□-LP22 | E3F□-VP21 | E3F□-BP21 | E3F□-BP22 |
| **Sensing distance** | | | 100 mm (white paper: 300 × 300 mm) | 200 mm (white paper: 300 × 300 mm) | 10 to 50 mm (glass(t = 1.0 mm): 150 × 150 mm) | 100 to 500 mm (with E39-RP1) | 0.1 to 2 m (with E39-RP1) |
| **Spot diameter (reference value)** | | | 10 × 10 mm Sensing distance of 100 mm | 10 × 15 mm Sensing distance of 200 mm | 10 × 10 mm Sensing distance of 50 mm | — | |
| **Standard sensing object** | | | — | | | glass(t = 1.0 mm): 150 × 150 mm | |
| **Differential travel** | | | 20% max. | | — | | |
| **Directional angle** | | | — | | | | |
| **Light source (wavelength)** | | | Red LED (624 nm) | | | | |
| **Power supply voltage *1** | | | 10 to 30 VDC (include voltage ripple of 10%(p-p) max.) | | | | |
| **Current consumption** | | | 25 mA max. | | | | |
| **Control output** | | | NPN/PNP (open collector)<br>Load current: 100 mA max. (Residual voltage: 3 V max.), Load power supply voltage: 30 VDC max. *2 | | | | |
| **Operation mode** | | | Light-ON/Dark-ON selectable by wiring | | | | |
| **Indicator** | | | Operation indicator (orange)<br>Stability indicator (green) | | | | |
| **Protection circuits** | | | Power supply reverse polarity protection, Output short-circuit protection, and Output reverse polarity protection | | | | |
| **Response time** | | | 0.5 ms | | | | |
| **Sensitivity adjustment** | | | Fixed | | One-turn adjuster | | |
| **Ambient illumination (Receiver side)** | | | Incandescent lamp: 3,000 lx max./ Sunlight: 10,000 lx max. | | | | |
| **Ambient temperature range *3** | | | Pre-wired Models<br>Operating: -25 to 55°C/ Storage: -40 to 70°C (with no icing or condensation)<br>M12 Connector Models<br>Operating: -40 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 at 50/60 Hz for 1 min. between current-carrying parts and case | | | | |
| **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: IP67, DIN 40050-9: IP69K *4 | | | | |
| **Weight (packed state/only sensor)** | **Pre-wired cable (2M)** | | **E3FA:** Approx. 60 g/ Approx. 50 g,<br>**E3FB:** Approx. 95 g/ Approx. 65 g | | | | |
| | **Connector** | | **E3FA:** Approx. 20 g/ Approx. 10 g,<br>**E3FB:** Approx. 50 g/ Approx. 20 g | | | | |
| **Material** | **Case** | | **E3FA:** ABS, **E3FB:** Nickel-brass | | | | |
| | **Lens and Display** | | PMMA | | | | |
| | **Adjuster** | | POM | | | | |
| | **Nut** | | **E3FA:** POM, **E3FB:** Nickel-brass | | | | |
| **Accessories** | | | Instruction sheet<br>M18 nuts (2 pcs) | | | | |

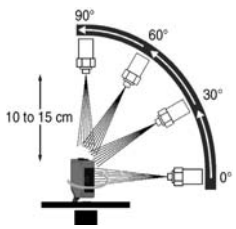
Note: 1. Altitude: Up to 2,000 m, Pollution degree: 3, Enclosure type: Type1.
*1. UL power supply voltage rating is 10 to 26.4VDC.
*2. UL load power supply voltage rating is 26.4 VDC max.
*3. UL temperature rating is 40°C maximum in operation.
*4. IP69K Degree of Protection Specifications
IP69K is a protection specification stipulated by DIN 40050 Part 9 of the German standards.
The test item is sprayed with 80°C water from a nozzle of a specified shape at a water pressure of 80 to 100 bar. The amount of water is 14 to 16 liters per minute.
The distance between the test item and the nozzle is 10 to 15 cm. The water is discharged at angles of 0°, 30°, 60°, and 90° from the horizontal plane for 30 seconds at each angle while the test item is rotated horizontally.



## Radial type (E3RA/E3RB)

| Item | Sensing method | | Through-beam | Retro-reflective with MSR function | Diffuse-reflective | | |
|---|---|---|---|---|---|---|---|
| Model | NPN output | Pre-wired | E3R□-TN11 2M | E3R□-RN11 2M | E3R□-DN11 2M | E3R□-DN12 2M | E3R□-DN13 2M |
| | | M12 Connector | E3R□-TN21 | E3R□-RN21 | E3R□-DN21 | E3R□-DN22 | E3R□-DN23 |
| | PNP output | Pre-wired | E3R□-TP11 2M | E3R□-RP11 2M | E3R□-DP11 2M | E3R□-DP12 2M | E3R□-DP13 2M |
| | | M12 Connector | E3R□-TP21 | E3R□-RP21 | E3R□-DP21 | E3R□-DP22 | E3R□-DP23 |
| **Sensing distance** | | | 15 m | 0.1 to 3 m (with E39-R1S) | 100 mm (white paper: 300 × 300 mm) | 300 mm (white paper: 300 × 300 mm) | 700 mm (white paper: 300 × 300 mm) |
| **Spot diameter (reference value)** | | | — | | 35 × 40 mm Sensing distance of 100 mm | 40 × 45 mm Sensing distance of 300 mm | 90 × 120 mm Sensing distance of 700 mm |
| **Standard sensing object** | | | Opaque: 7 mm dia.min. | Opaque: 75 mm dia.min. | — | | |
| **Differential travel** | | | — | | 20% max. | | |
| **Directional angle** | | | 2° min. | | — | | |
| **Light source (wavelength)** | | | Red LED (624 nm) | | | | |
| **Power supply voltage *1** | | | 10 to 30 VDC (include voltage ripple of 10%(p-p) max.) | | | | |
| **Current consumption** | | | 40mA max. (Emitter 25 mA max. Receiver 15 mA max.) | 25 mA max. | | | |
| **Control output** | | | NPN/PNP (open collector) Load current: 100 mA max. (Residual voltage: 2 V max.), Load power supply voltage: 30 VDC max. *2 | | | | |
| **Operation mode** | | | Light-ON/Dark-ON selectable by wiring | | | | |
| **Indicator** | | | Operation indicator (orange) Stability indicator (green) Power indicator (green): only Emitter of Through-beam | | | | |
| **Protection circuits** | | | Power supply reverse polarity protection, Output short-circuit protection, and Output reverse polarity protection | | | | |
| **Response time** | | | 0.5 ms | | | | |
| **Sensitivity adjustment** | | | One-turn adjuster | | | | |
| **Ambient illumination (Receiver side)** | | | Incandescent lamp: 3,000 lx max./ Sunlight: 10,000 lx max. | | | | |
| **Ambient temperature range *3** | | | Pre-wired Models Operating: -25 to 55°C/ Storage: -40 to 70°C (with no icing or condensation) M12 Connector Models Operating: -40 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 at 50/60 Hz for 1 min. between current-carrying parts and case | | | | |
| **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/s² 3 times each in X, Y and Z directions | | | | |
| **Degree of protection** | | | IEC: IP67, DIN 40050-9: IP69K *4 | | | | |
| **Weight (packed state/only sensor)** | **Pre-wired cable (2M)** | | **E3RA:** Approx. 110 g/ Approx. 50 g, respectively, **E3RB:** Approx. 175 g/ Approx. 65 g, respectively | **E3RA:** Approx. 60 g/ Approx. 50 g, **E3RB:** Approx. 95 g/ Approx. 65 g | | | |
| | **Connector** | | **E3RA:** Approx. 30 g/ Approx. 10 g, respectively, **E3RB:** Approx. 85 g/ Approx. 20 g, respectively | **E3RA:** Approx. 20 g/ Approx. 10 g, **E3RB:** Approx. 50 g/ Approx. 20 g | | | |
| **Material** | **Case** | | **E3RA:** ABS, **E3RB:** Nickel-brass | | | | |
| | **Lens and Display** | | PMMA | | | | |
| | **Adjuster** | | POM | | | | |
| | **Nut** | | **E3RA:** POM, **E3RB:** Nickel-brass | | | | |
| **Accessories** | | | Instruction sheet M18 nuts (4 pcs) | Instruction sheet M18 nuts (2 pcs) | | | |

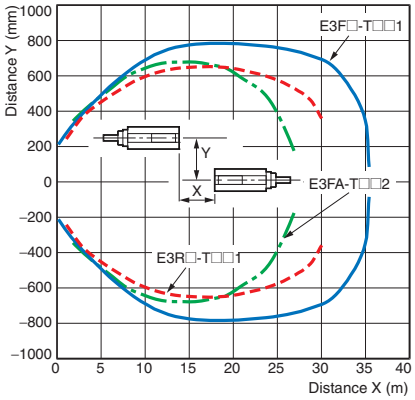
Note: 1. Altitude: Up to 2,000 m, Pollution degree: 3, Enclosure type: Type1.
*1. UL power supply voltage rating is 10 to 26.4VDC.
*2. UL load power supply voltage rating is 26.4 VDC max.
*3. UL temperature rating is 40°C maximum in operation.
*4. IP69K Degree of Protection Specifications
IP69K is a protection specification stipulated by DIN 40050 Part 9 of the German standards.
The test item is sprayed with 80°C water from a nozzle of a specified shape at a water pressure of 80 to 100 bar. The amount of water is 14 to 16 liters per minute.
The distance between the test item and the nozzle is 10 to 15 cm. The water is discharged at angles of 0°, 30°, 60°, and 90° from the horizontal plane for 30 seconds at each angle while the test item is rotated horizontally.



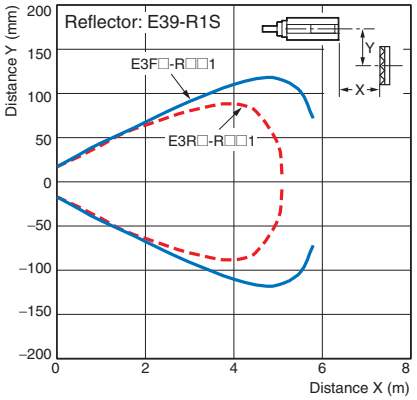
## Engineering Data (Reference Value)

### Parallel Operating Range

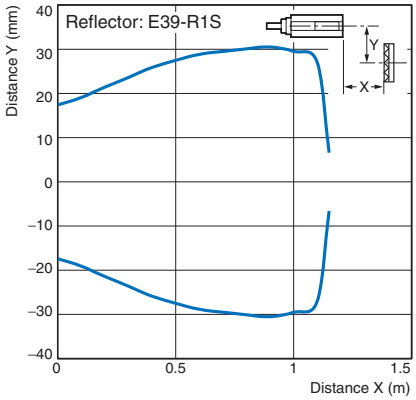
**Through-beam Models**
**E3F□-T□, E3R□-T□**



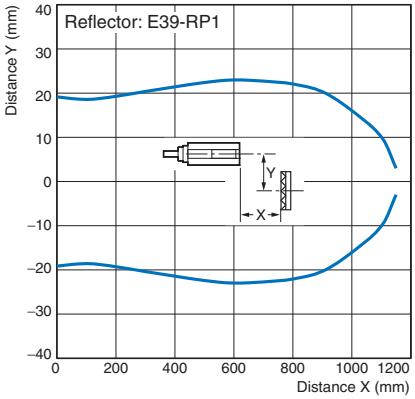

**Retro-reflective Models (with MSR function)**
**E3F□-R□1, E3R□-R□1**



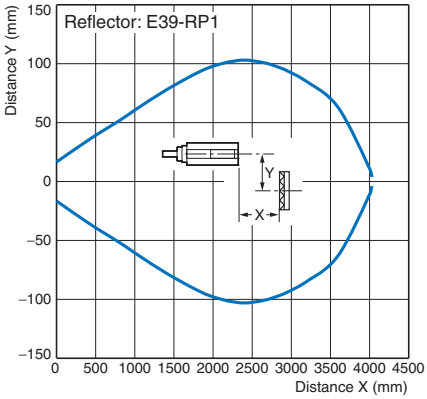

**E3F□-R□2**




**Transparent detected with P-opaquing function**
**E3F□-B□1**

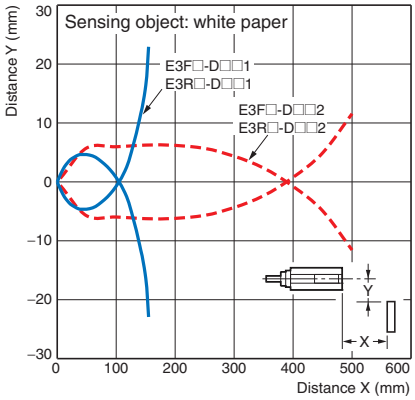



**E3F□-B□2**

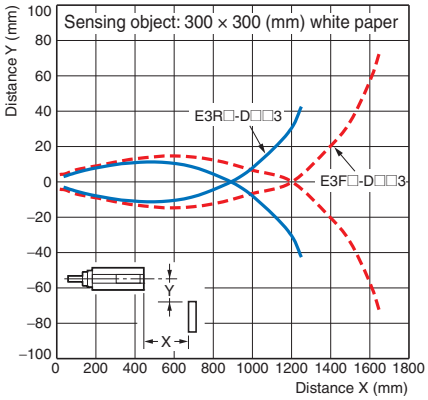



### Operating Range

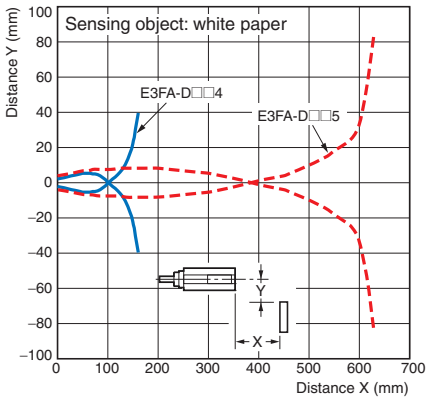
**Diffuse-reflective Models**
**E3F□-D□1, E3F□-D□2**
**E3R□-D□1, E3R□-D□2**



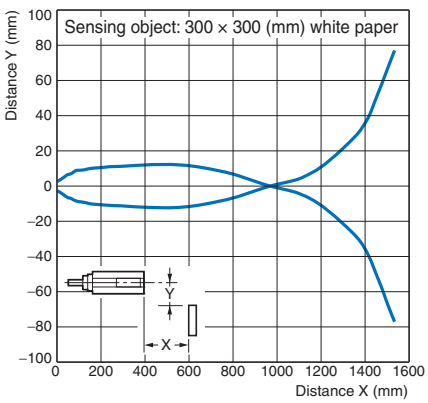

**E3F□-D□3, E3R□-D□3**



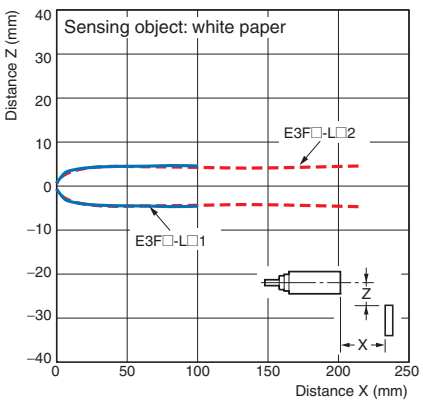

**E3FA-D□4, E3FA-D□5**



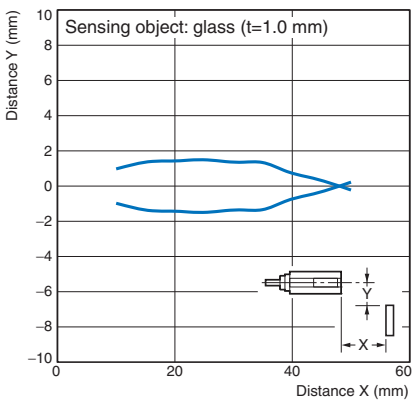

**E3FA-D□6**




**BGS Models**
**E3F□-L□1, E3F□-L□2**

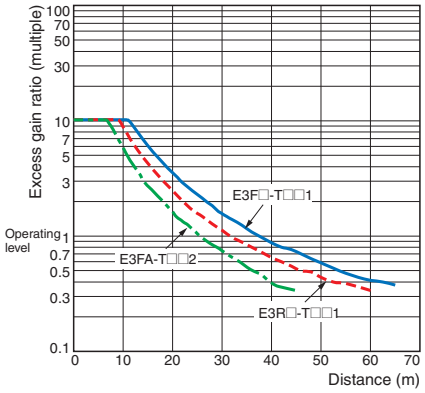



**Limited distance reflective**
**E3F□-V□**

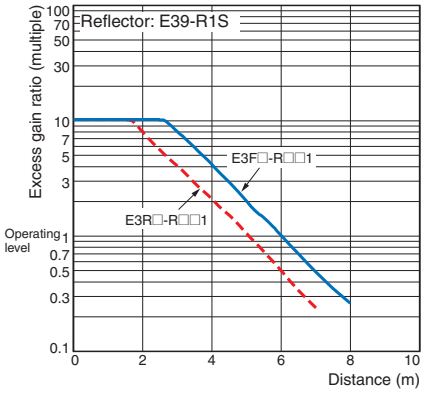


## Excess Gain vs. Distance

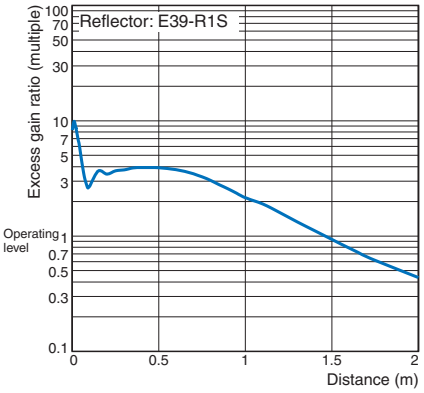
### Through-beam Models
### E3F□-T□, E3R□-T□



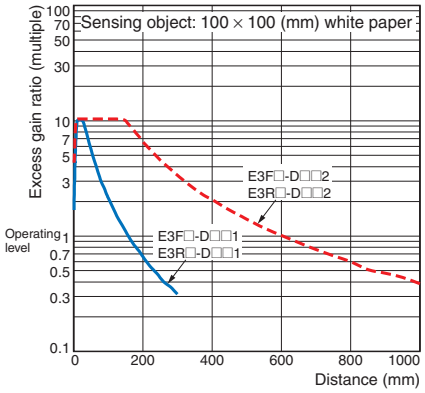

### Retro-reflective Models (with MSR function)
### E3F□-R□1, E3R□-R□1



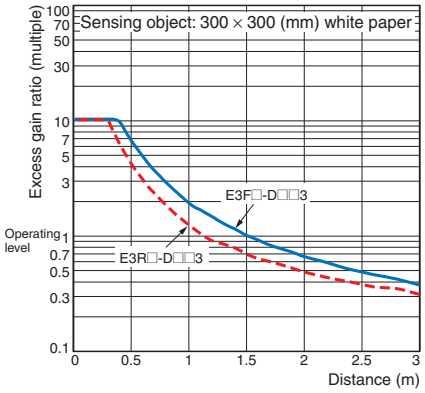

### E3F□-R□2



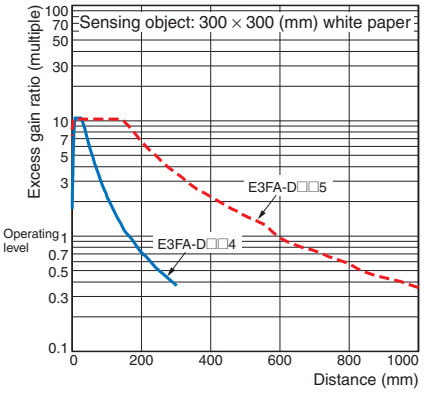

### Diffuse-reflective Models
### E3F□-D□1, E3F□-D□2
### E3R□-D□1, E3R□-D□2



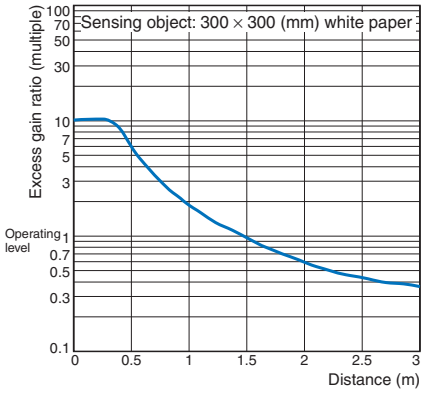

### E3F□-D□3, E3R□-D□3



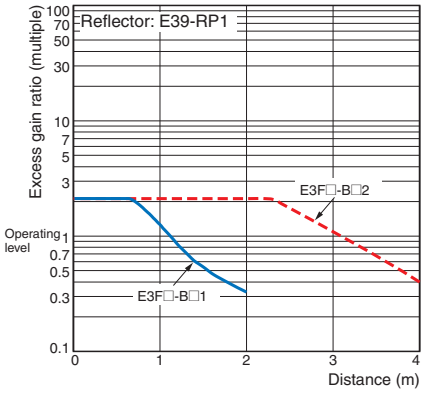

### E3FA-D□4, E3FA-D□5



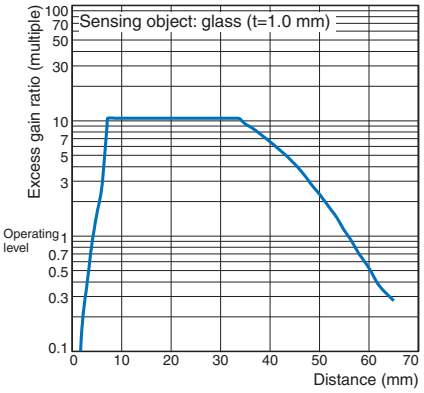

### E3FA-D□6




### Transparent detected with P-opaquing function
### E3F□-B□1, E3F□-B□2

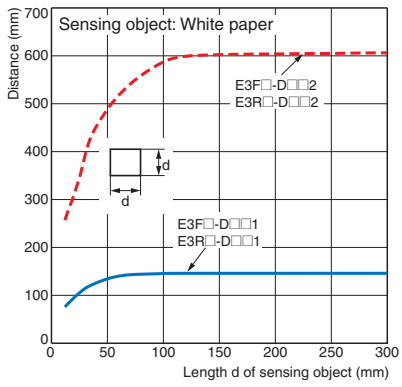



### Limited distance reflective
### E3F□-V□

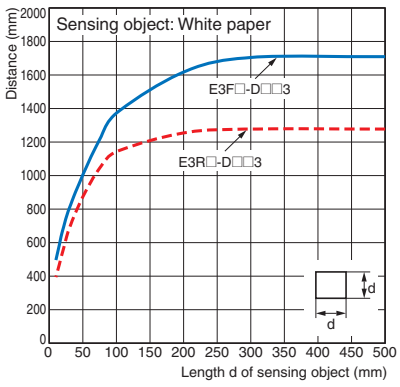



## Sensing Object Size vs. Distance

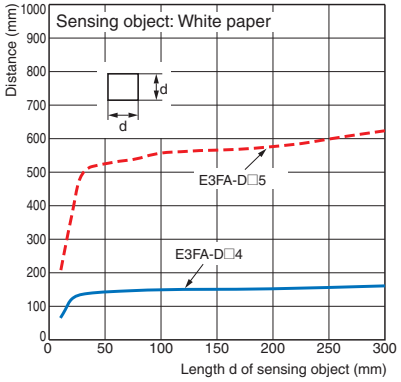
### Diffuse-reflective Models
### E3F□-D□1, E3F□-D□2
### E3R□-D□1, E3R□-D□2



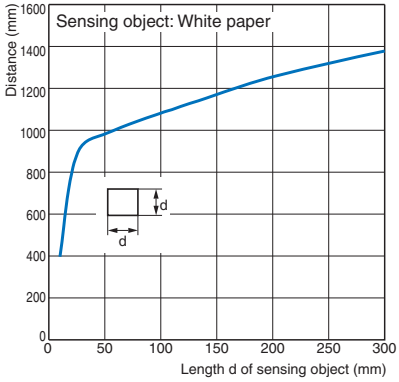

### E3F□-D□3, E3R□-D□3



### E3FA-D□4, E3FA-D□5



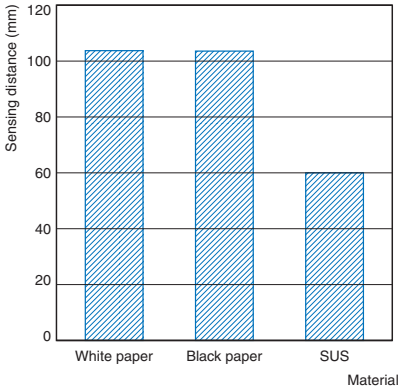

### E3FA-D□6



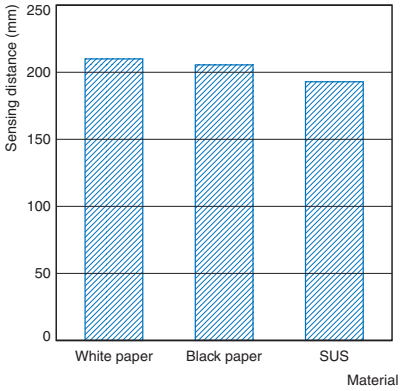

## Sensing Distance vs. Sensing Object Material

### BGS Models

### E3F□-L□1



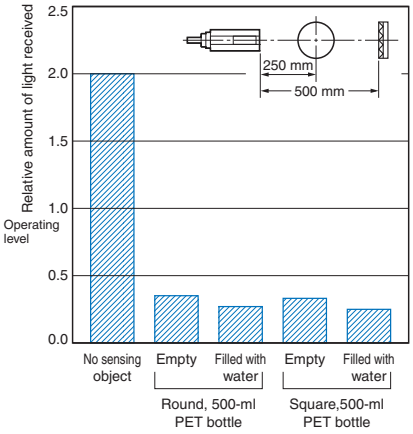

### E3F□-L□2



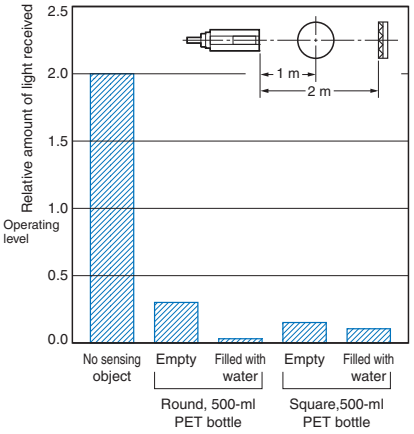

## Dark Excess Gain vs. Sensing Object Characteristics

### Transparent detected with P-opaquing function

### E3F□-B□1



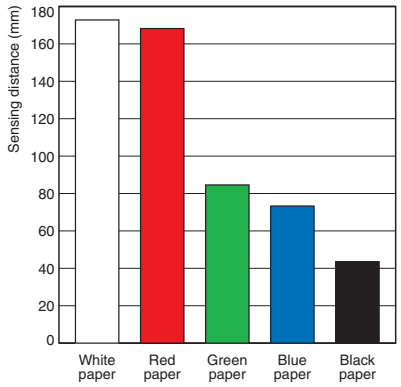

### E3F□-B□2



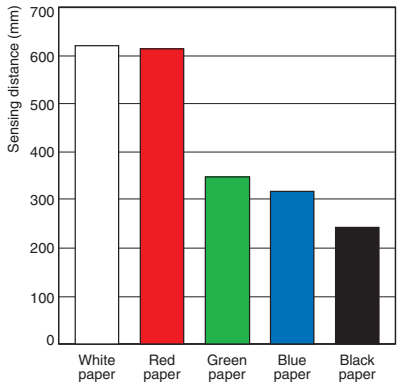
## Object Surface Color vs. Sensing Distance

### Diffuse-reflective Models

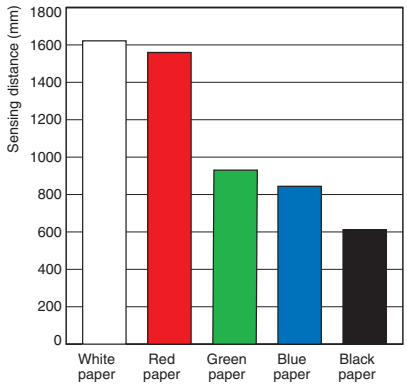
**E3FA-D□1**



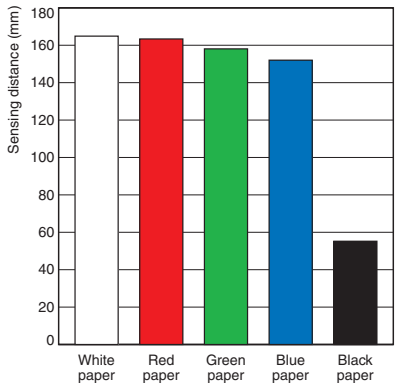

**E3FA-D□2**



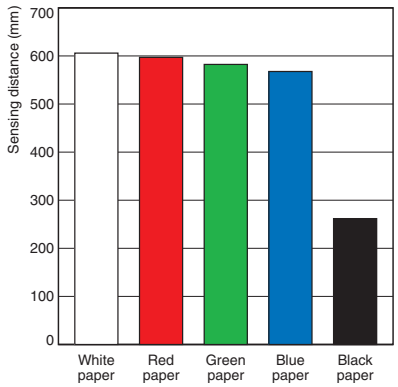

**E3FA-D□3**



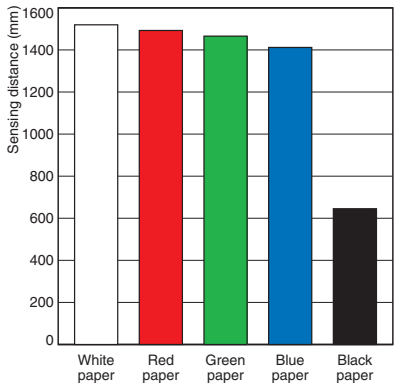

**E3FA-D□4**




**E3FA-D□5**

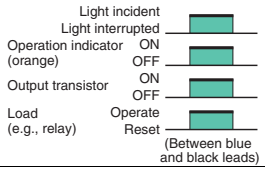
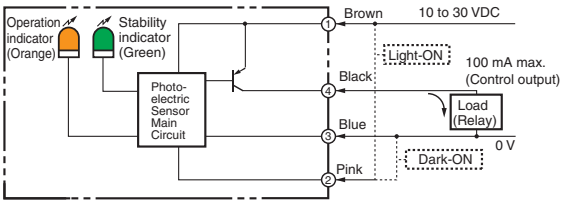
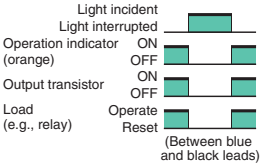
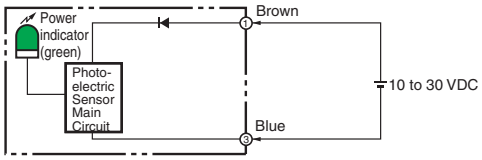
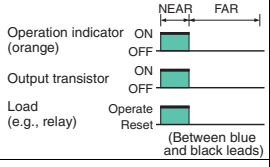
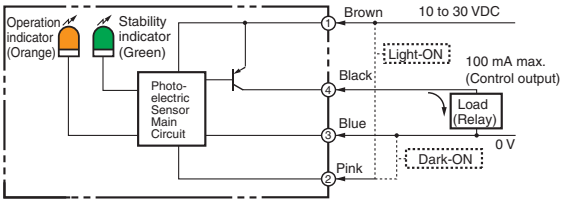
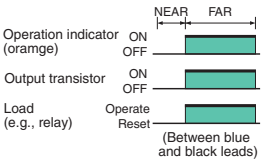



**E3FA-D□6**

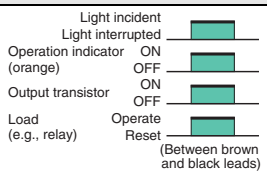
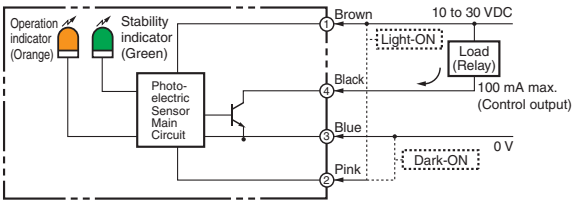



# Output circuit diagram

## PNP Output

| Model | Operation mode | Timing charts | Operation selector | Output circuit |
|---|---|---|---|---|
| E3F□-TP□<br>E3F□-RP□<br>E3F□-DP□<br>E3F□-VP□<br>E3F□-BP□<br>E3R□-TP□<br>E3R□-RP□<br>E3R□-DP□ | Light-ON |  | Connect the pink wire (Pin(2)) to the brown (Pin(1)) | Through-beam Receivers, Retro-reflective Models, Diffuse-reflective Models, Limited reflective Models. Transparent detected with P-opaquing function.<br>  |
| | Dark-ON |  | Connect the pink wire (Pin(2)) to the blue (Pin(3)) or open the pink wire (Pin(2)) | |
| | | Through-beam Emitter<br>  | | |
| E3F□-LP□ | Light-ON |  | Connect the pink wire (Pin(2)) to the brown (Pin(1)) | Background suppression.<br>  |
| | Dark-ON |  | Connect the pink wire (Pin(2)) to the blue (Pin(3)) or open the pink wire (Pin(2)) | |

## NPN Output

<table>
<tr><th>Model</th><th>Operation mode</th><th>Timing charts</th><th>Operation selector</th><th>Output circuit</th></tr>
<tr><td rowspan="3">E3F□-TN□<br>E3F□-RN□<br>E3F□-DN□<br>E3F□-VN□<br>E3F□-BN□<br>E3R□-TN□<br>E3R□-RN□<br>E3R□-DN□</td><td>Light-ON</td><td> 
</td><td>Connect the pink wire (Pin(2)) to the brown (Pin(1)) or open the pink wire (Pin(2))</td><td rowspan="2">Through-beam Receivers, Retro-reflective Models, Diffuse-reflective Models, Limited reflective Models.<br>Transparent detected with P-opaquing function.<br> 
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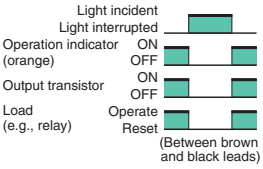
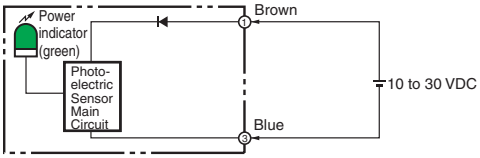
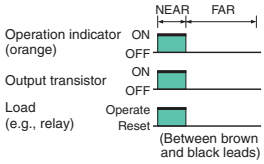
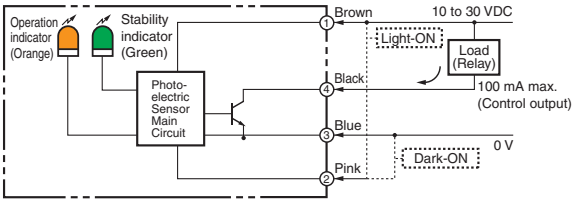
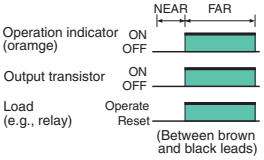
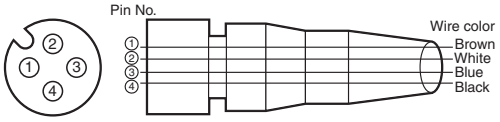
<tr><td>Dark-ON</td><td> 
</td><td>Connect the pink wire (Pin(2)) to the blue (Pin(3))</td></tr>
<tr><td colspan="4">Through-beam Emitter<br> 
</td></tr>
<tr><td rowspan="2">E3F□-LN□</td><td>Light-ON</td><td> 
</td><td>Connect the pink wire (Pin(2)) to the brown (Pin(1)) or open the pink wire (Pin(2))</td><td rowspan="2">Background suppression.<br> 
</td></tr>
<tr><td>Dark-ON</td><td> 
</td><td>Connect the pink wire (Pin(2)) to the blue (Pin(3))</td></tr>
</table>

## Connector Pin Arrangement

### M12 Connector Pin Arrangement


## Connectors (Sensor I/O connectors)

### M12 4-wire Connectors

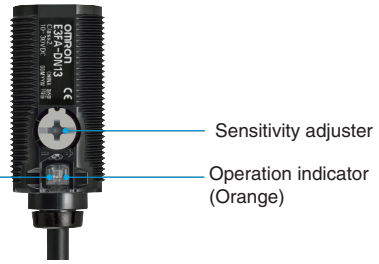



| Classification | Wire color | Connector pin No. | Application |
|---|---|---|---|
| DC | Brown | (1) | Power supply (+V) |
| | White | (2) | L/on · D/on selectable |
| | Blue | (3) | Power supply (0 V) |
| | Black | (4) | Output |

## Nomenclature

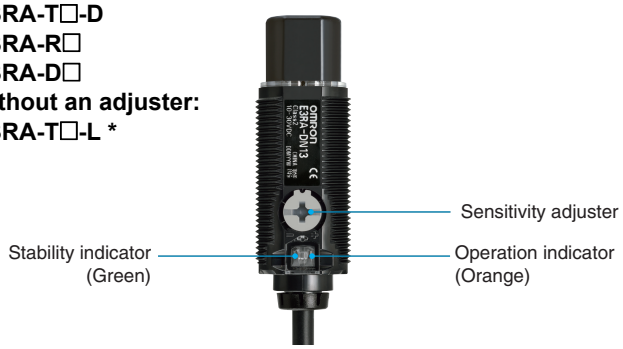
### Straight type, Plastic housing

**with an adjuster:**
**E3FA-T□-D**
**E3FA-R□**
**E3FA-D□**
**E3FA-V□**
**E3FA-B□**
**without an adjuster:**
**E3FA-T□-L ***
**E3FA-L□**




### Radial type, Plastic housing

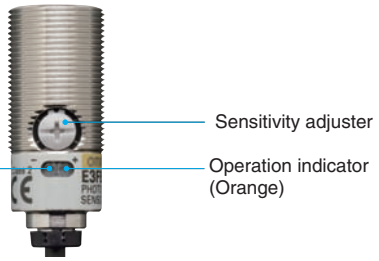
**with an adjuster:**
**E3RA-T□-D**
**E3RA-R□**
**E3RA-D□**
**without an adjuster:**
**E3RA-T□-L ***




* The Emitter has two Power indicators (Green) instead of the Stability indicator (Green) and the Operation indicator (Orange).

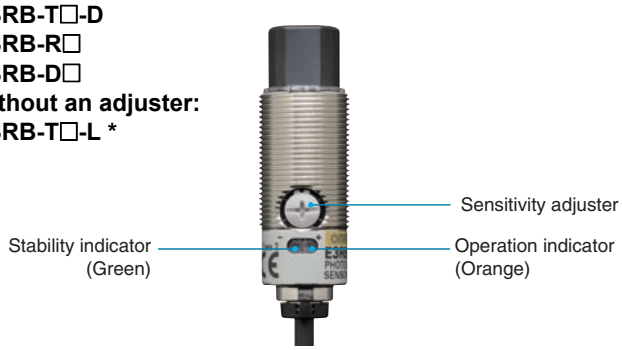
### Straight type, Metal housing

**with an adjuster:**
**E3FB-T□-D**
**E3FB-R□**
**E3FB-D□**
**E3FB-V□**
**E3FB-B□**
**without an adjuster:**
**E3FB-T□-L ***
**E3FB-L□**




### Radial type, Metal housing

**with an adjuster:**
**E3RB-T□-D**
**E3RB-R□**
**E3RB-D□**
**without an adjuster:**
**E3RB-T□-L ***




* The Emitter has two Power indicators (Green) instead of the Stability indicator (Green) and the Operation indicator (Orange).

## Safety Precautions

**Refer to *Warranty and Limitations of Liability*.**

**⚠ 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**

**Never use the product with an AC power supply.**
**Do not use the product with voltage in excess of the rated voltage.**

**Do not use the product with incorrect wiring.**
**Otherwise, explosion, fire, malfunction may result.**

### Precautions for Safe Use

Be sure to follow the safety precautions below for added safety.

1. Do not use the sensor under the environment with explosive, flammable or corrosive gas.
2. Do not use the sensor under the oil or chemical environment.
3. Do not use the sensor in the water, rain or outdoors.
4. Do not use the sensor in the environment where humidity is high and condensation may occur.
5. Do not use the sensor under the environment under the other conditions in excess of rated.
6. Do not use the sensor in place that is exposed by direct sunlight.
7. Do not use the sensor in place where the sensor may receive direct vibration or shock.
8. Do not use the thinner, alcohol, or other organic solvents.
9. Never disassemble, repair nor tamper with the sensor.
10. Please process it as industrial waste.

### Precautions for Correct Use

1. Laying Sensor wiring in the same conduit or duct as high-voltage wires or power lines may result in malfunction or damage due to conduit or use shielded cable.
2. Do not pull on the cable with excessive force.
3. If a commercial switching regulator is used, ground the FG (frame ground) terminal.
4. The sensor will be available 100 ms after the power supply is tuned ON. Start to use 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.
5. 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.
6. The sensor must be mounted using the provided nuts. The proper tightening torque range of E3FA/E3RA plastic housing series is between 0.4 and 0.5 N·m. The proper tightening torque of E3FB/E3RB metal housing series is 20 N·m max..

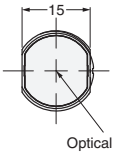
## Dimensions

(Unit: mm)
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

### Sensors (E3FA/E3RA Plastic housing)

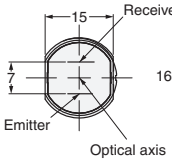
#### E3FA series
**Pre-wired Models**
**E3FA-T□1□**
**E3FA-R□1□**
**E3FA-D□1□**
**E3FA-L□1□**
**E3FA-V□11**
**E3FA-B□1□**

**Left side view**



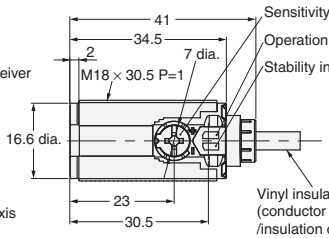

**Suitable models**
**E3FA-T□1□**
**E3FA-R□12**
**E3FA-B□11**

**Left side view**



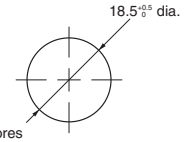

**Suitable models**
**E3FA-R□11**
**E3FA-D□1□**
**E3FA-L□1□**
**E3FA-V□11**
**E3FA-B□12**

**Front view**



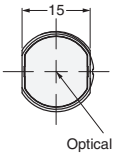

*** Suitable models**
**E3FA-T□1□-D**
**E3FA-R□12**
**E3FA-D□1□**
**E3FA-V□11**
**E3FA-B□12**

**Mounting Holes**



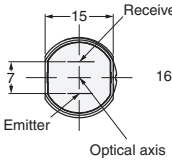

#### E3FA series
**M12 Connector Models**
**E3FA-T□2□**
**E3FA-R□2□**
**E3FA-D□2□**
**E3FA-L□2□**
**E3FA-V□21**
**E3FA-B□2□**

**Left side view**



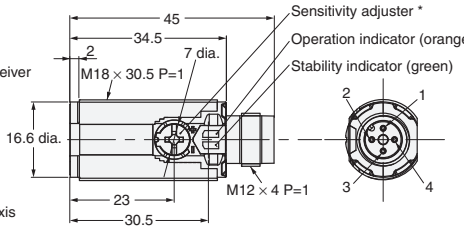

**Suitable models**
**E3FA-T□2□**
**E3FA-R□22**
**E3FA-B□21**

**Left side view**



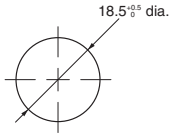

**Suitable models**
**E3FA-R□21**
**E3FA-D□2□**
**E3FA-L□2□**
**E3FA-V□21**
**E3FA-B□22**

**Front view** / **Right side view**




*** Suitable models**
**E3FA-T□2□-D**
**E3FA-R□22**
**E3FA-D□2□**
**E3FA-V□21**
**E3FA-B□22**

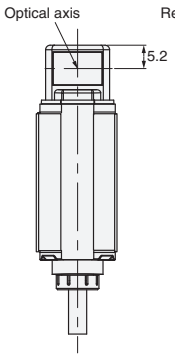
**Mounting Holes**




| Terminal No. | Specification |
|---|---|
| 1 | +V |
| 2 | L/on · D/on selectable |
| 3 | 0V |
| 4 | Output |

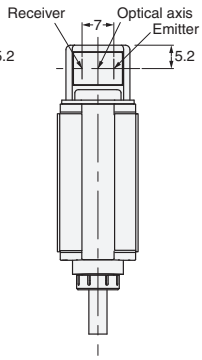
#### E3RA series
**Pre-wired Models**
**E3RA-T□11**
**E3RA-R□11**
**E3RA-D□1□**

**Rear view**



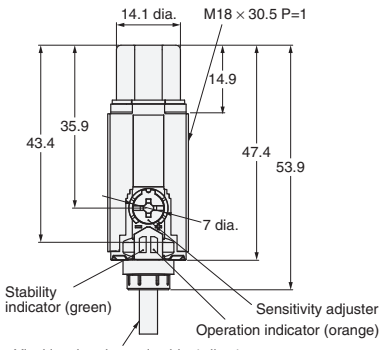

**Suitable models**
**E3RA-T□11**

**Rear view**

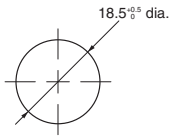



**Suitable models**
**E3RA-R□11**
**E3RA-D□1□**

**Front view**

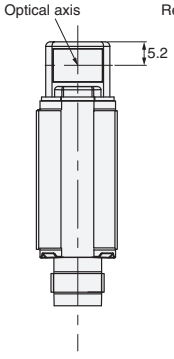



**Mounting Holes**



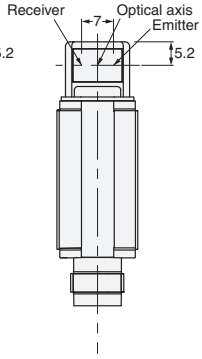

#### E3RA series
**M12 Connector Models**
**E3RA-T□21**
**E3RA-R□21**
**E3RA-D□2□**

**Rear view**



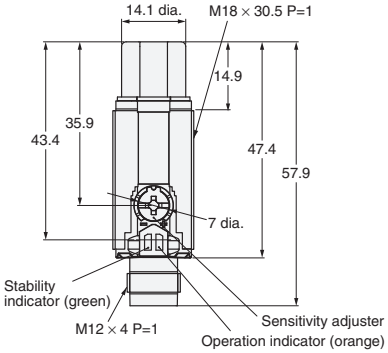

**Suitable models**
**E3RA-T□21**

**Rear view**

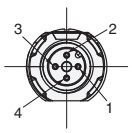



**Suitable models**
**E3RA-R□21**
**E3RA-D□2□**

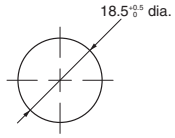
**Front view**




**Bottom view**




**Mounting Holes**

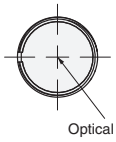



| Terminal No. | Specification |
|---|---|
| 1 | +V |
| 2 | L/on · D/on selectable |
| 3 | 0V |
| 4 | Output |

## Sensors (E3FB/E3RB Metal housing)

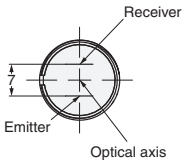
### E3FB series
**Pre-wired Models**
**E3FB-T□11**
**E3FB-R□1□**
**E3FB-D□1□**
**E3FB-L□1□**
**E3FB-V□11**
**E3FB-B□1□**

**Left side view**



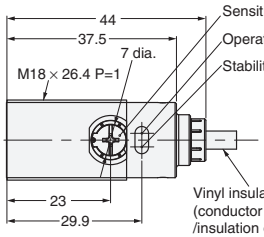

**Suitable models**
**E3FB-T□11**
**E3FB-R□12**
**E3FB-B□11**

**Left side view**



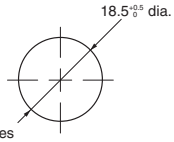

**Suitable models**
**E3FB-R□11**
**E3FB-D□1□**
**E3FB-L□1□**
**E3FB-V□11**
**E3FB-B□12**

**Front view**



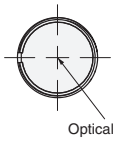

*** Suitable models**
**E3FB-T□11-D**
**E3FB-R□12**
**E3FB-D□1□**
**E3FB-V□11**
**E3FB-B□12**

**Mounting Holes**



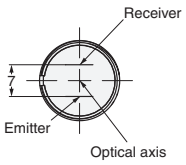

### E3FB series
**M12 Connector Models**
**E3FB-T□21**
**E3FB-R□2□**
**E3FB-D□2□**
**E3FB-L□2□**
**E3FB-V□21**
**E3FB-B□2□**

**Left side view**



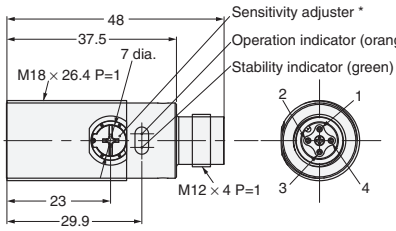

**Suitable models**
**E3FB-T□21**
**E3FB-R□22**
**E3FB-B□21**

**Left side view**



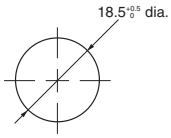

**Suitable models**
**E3FB-R□21**
**E3FB-D□2□**
**E3FB-L□2□**
**E3FB-V□21**
**E3FB-B□22**

**Front view** **Right side view**




*** Suitable models**
**E3FB-T□21-D**
**E3FB-R□22**
**E3FB-D□2□**
**E3FB-V□21**
**E3FB-B□22**

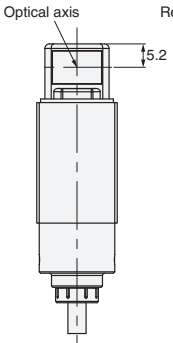
**Mounting Holes**




| Terminal No. | Specification |
|---|---|
| 1 | +V |
| 2 | L/on · D/on selectable |
| 3 | 0V |
| 4 | Output |

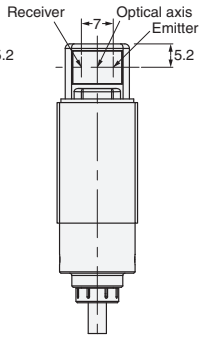
### E3RB series
**Pre-wired Models**
**E3RB-T□11**
**E3RB-R□11**
**E3RB-D□1□**

**Rear view**



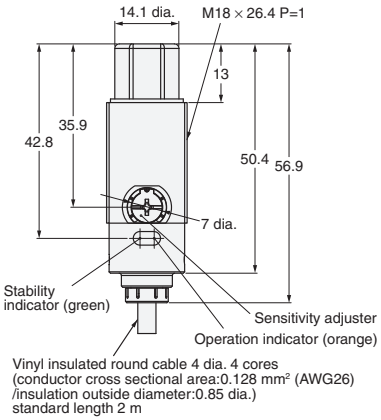

**Suitable models**
**E3RB-T□11**

**Rear view**

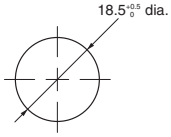



**Suitable models**
**E3RB-R□11**
**E3RB-D□1□**

**Front view**

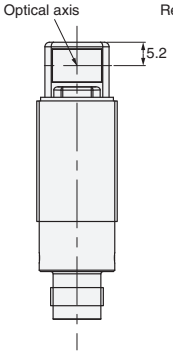



**Mounting Holes**



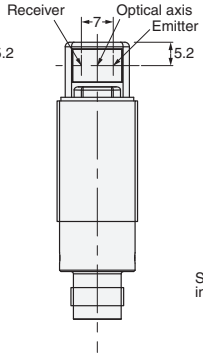

### E3RB series
**M12 Connector Models**
**E3RB-T□21**
**E3RB-R□21**
**E3RB-D□2□**

**Rear view**



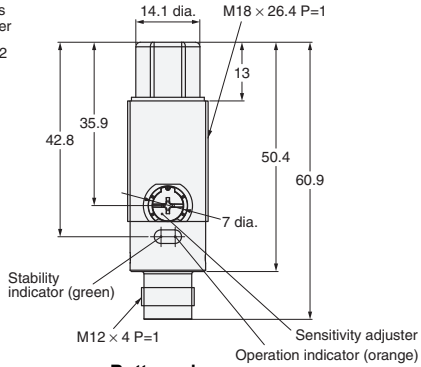

**Suitable models**
**E3RB-T□21**

**Rear view**



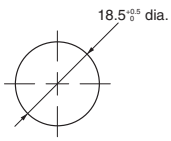

**Suitable models**
**E3RB-R□21**
**E3RB-D□2□**

**Front view**



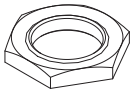

**Bottom view**

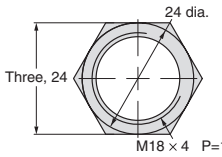

**Mounting Holes**

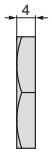



| Terminal No. | Specification |
|---|---|
| 1 | +V |
| 2 | L/on · D/on selectable |
| 3 | 0V |
| 4 | Output |

## Attached nut





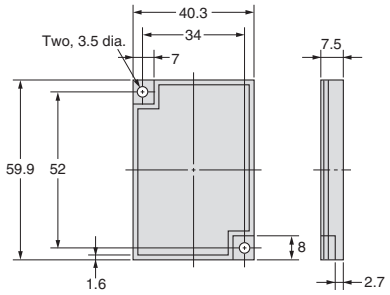




Material:POM(for E3FA/E3RA)
Nickel-brass(for E3FB/E3RB)

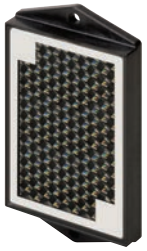
## Accessories (Order Separately)

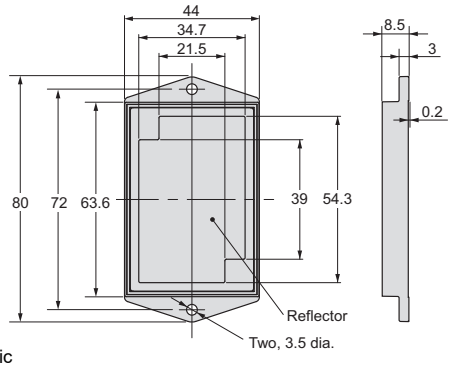
### Reflectors

**E39-R1S**




**E39-RP1**

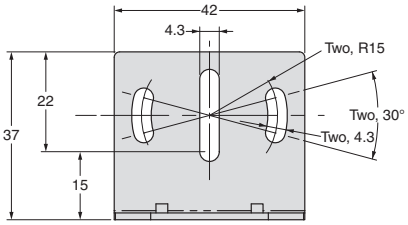


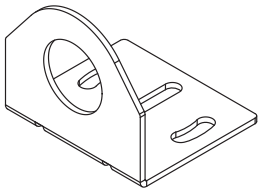


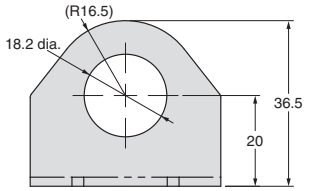

Material,
reflective surface: acrylic
Rear surface: ABS

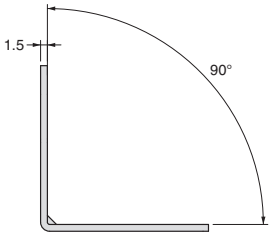
### Mounting brackets

**E39-L183**



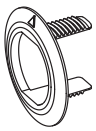



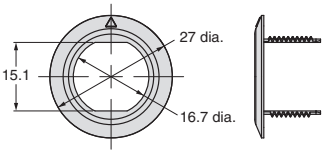



### Mounting brackets

**E39-L182**



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**Note: Do not use this document to operate the Unit.**


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