Distance-setting Photoelectric Sensor

# E3G-L1/L3

CSM_E3G-L1_L3_DS_E_2_1

## Effectively Cuts the Influence of Workpiece Characteristics, Such as Gloss, Incline, and Color.

Be sure to read *Safety Precautions* on page 12.

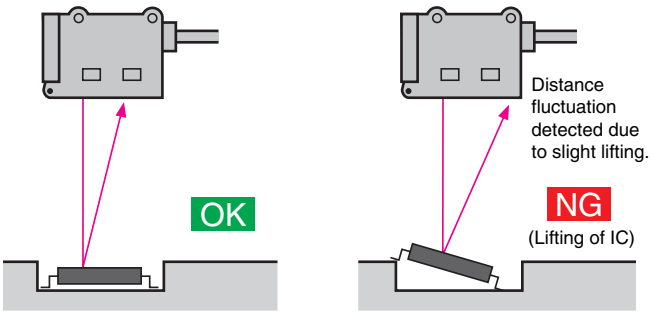
## Features

### A 1-mm-dia. Pin-point Beam Allows Detection of Minute Objects

Smallest in the Industry

**E3G-L1**

OMRON's unique Hyper LED achieves a pin-point light source only 1/7 the size of conventional light sources, with uniform light-intensity distribution. The Hyper LED achieves stable detection of small objects by eliminating the dead band that results from the drop-out that commonly occurs at the center of conventional LEDs.
The clearly visible spot makes it easy to check the optical axis adjustment and sensing position.

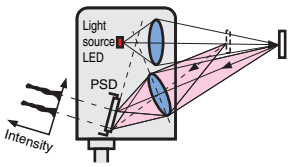



### Stable Detection Based Not Only on Object Color, But Also on Inclination and Glossiness

First in the Industry

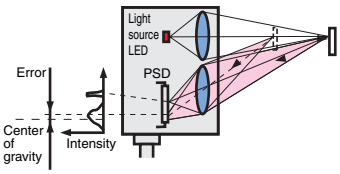
**The E3G-L1 is 2.6 times more stable than previous models with inclination characteristics.**
The use of the shine-proof optical system with conventional triangulation reduces the discrepancies in sensing distance due to object color, surface, and inclination.
(The E3G-L3 is 2.2 times more stable than previous models.)

**Shine-proof Optical System (E3G-L1, E3G-L3)**




A low-error distance signal is assured because an image is formed on the photosensing device (PSD), irrespective of the sensing distance. Detection is also stable with respect to the inclination of the object.

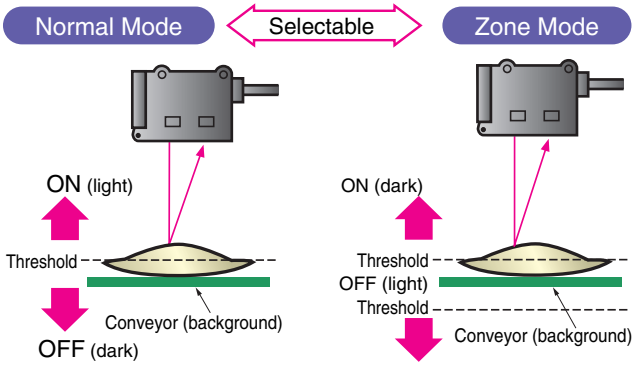
**Previous Distance-setting Models**




At some distances, images cannot be formed on the photosensing device (PSD). The spot diameter is large, distance errors occur due to displacement of the center of gravity, and detection is unstable with respect to the inclination of the object.

## Simple Detection of Glossy, Uneven Objects

First in the Industry




Triangulation with hysteresis of 4% or less (E3G-L1) is used, so objects beyond the set distance are not detected.
At a set distance of 30 mm, steps that are 1.2 mm high can be detected.

Glossy, uneven objects are reliably detected because OFF (light) status occurs only when the conveyor is detected, and ON (dark) status occurs when an object is present.

- **IP67 Waterproofing**
- **CE Marking**

  The Sensor meets the European EMC Directive, allowing it to be mounted in export devices with confidence.

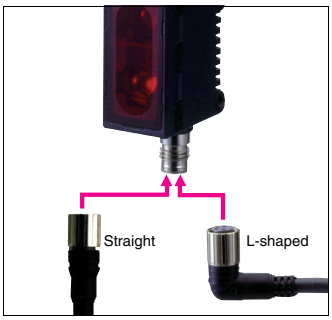
## Optimal Background and Conveyor Teaching. Double-bar Display Shows Excess Gain at a Glance.

The Sensor features one-touch teaching settings. After the workpiece, background, and conveyor teaching are complete, fine adjustment of the sensitivity can be made in 13 levels for Normal Mode or 5 levels for Zone Mode.
The excess gain in distance or detecting of small steps can be easily set.

The operation indicator turns ON when the light incident level exceeds a certain threshold. Excess gain can also be checked at a glance.


## A Lineup of M8 Connectors

Easy to disconnect, making maintenance simple.

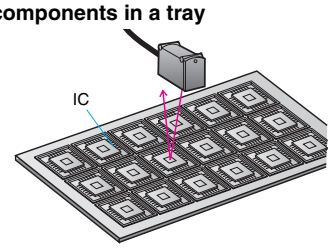



## Meets the Needs of All Industries, Including Semiconductors, Electronic Components, Food, and Packaging

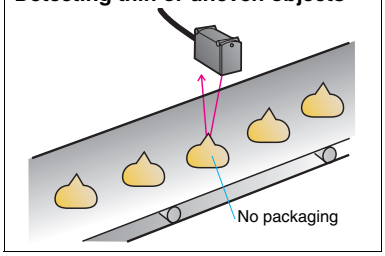
### Normal Mode

**E3G-L1 (50-mm Models)**

**Detecting minute electronic components in a tray**

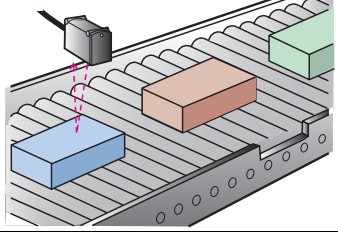



**Detecting thin or uneven objects**




**E3G-L3 (200-mm Models)**

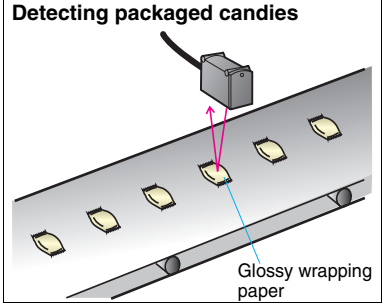
**Detecting objects on a production line with a glossy background**



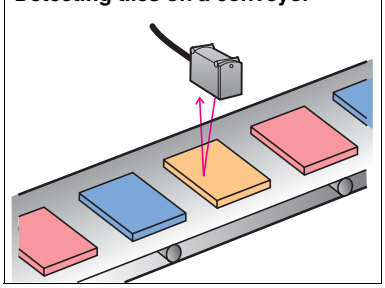
### Zone Mode

**E3G-L1 (50-mm Models)**

**Detecting packaged candies**

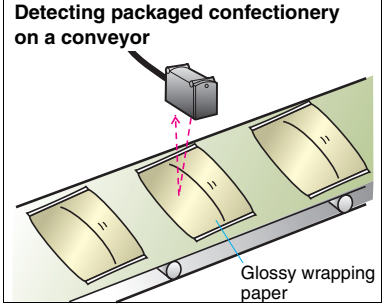



**Detecting tiles on a conveyor**



**E3G-L3 (200-mm Models)**

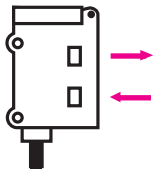
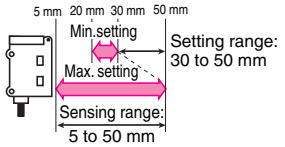
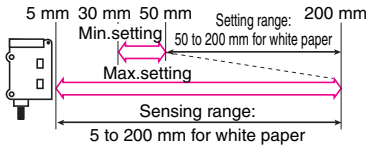
**Detecting packaged confectionery on a conveyor**



# Ordering Information

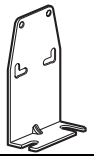
## Sensors

Red light  Infrared light

| Appearance | Connection method | Sensing/Setting range | Operation mode | Model | |
|---|---|---|---|---|---|
| | | | | NPN output | PNP output |
|  | Pre-wired |   | Light ON Dark ON (selectable) | E3G-L11 | E3G-L12 |
| | Connector (M8) | | | E3G-L15 | E3G-L16 |
| | Pre-wired |   | | E3G-L31 | E3G-L32 |
| | Connector (M8) | | | E3G-L35 | E3G-L36 |

## Accessories (Order Separately)

### Mounting Brackets

| Appearance | Model | Quantity | Remarks |
|---|---|---|---|
|  | **E39-L139** | 1 | Provided with the E3G-L□1/-L□2 |
|  | **E39-L140** | 1 | Provided with the E3G-L□5/-L□6 |

### Sensor I/O Connectors (M8)

| Cable specifications | Appearance | Cable type | | Model |
|---|---|---|---|---|
| Standard Cable | Straight  | 2 m | Four-wire type | **XS3F-M421-402-A** |
| | | 5 m | | **XS3F-M421-405-A** |
| | L-shaped  | 2 m | | **XS3F-M422-402-A** |
| | | 5 m | | **XS3F-M422-405-A** |

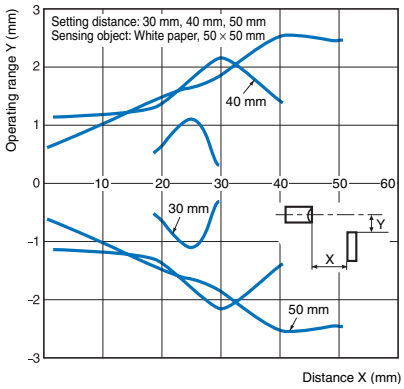
## Ratings and Specifications

| Item | Sensing method | Distance-setting | | | |
|---|---|---|---|---|---|
| Model | NPN output | E3G-L11 | E3G-L15 | E3G-L31 | E3G-L35 |
| | PNP output | E3G-L12 | E3G-L16 | E3G-L32 | E3G-L36 |
| Sensing range | | 5 to 50 mm (50 × 50 mm white paper, setting distance: 50 mm) | | 50 to 200 mm (50 × 50 mm white paper, setting distance: 200 mm)<br>50 to 150 mm (50 × 50 mm black paper, setting distance: 150 mm) | |
| Setting range | | 30 to 50 mm (50 × 50 mm white paper, black paper) | | 50 to 200 mm (50 × 50 mm white paper)<br>5 to 150 mm (50 × 50 mm black paper) | |
| Differential travel | | 4% max. of setting distance | | 10% max. of setting distance (typical) | |
| Reflectivity characteristics (black/white error) | | 4% max. of setting distance | | 10% max. of setting distance<br>(at 50 to 150-mm setting distance) | |
| Light source (wavelength) | | Red LED (670 nm) | | Infrared LED (860 nm) | |
| Spot size | | 1-mm dia. max. (at 38-mm sensing distance) | | 15-mm dia. max. (at 150-mm sensing distance) | |
| Power supply voltage | | 10 to 30 VDC including 10% (p-p) ripple | | | |
| Current consumption | | 55 mA max. | | 65 mA max. | |
| Control output | | Load power supply voltage: 30 VDC max., Load current: 100 mA max.<br>(Residual voltage: NPN output: 1.2 V max., PNP output: 2.0 V max.)<br>Open collector output (NPN/PNP, depends on the model)<br>Light ON/Dark ON selectable | | | |
| Protection circuit | | Power supply reverse polarity protection, Load short-circuit protection, Mutual interference prevention | | | |
| Response time | | Operate or reset: 1.5 ms max. | | Operate or reset: 2.5 ms max. | |
| Distance setting | | Teaching (in NORMAL or ZONE mode) | | | |
| Fine distance adjustment | | Manual fine threshold adjustment (NORMAL mode: 13 levels, ZONE mode: 5 levels) | | | |
| Indications | | Operation indicator (orange), Distance indicator (green: 8 levels), Threshold indicator (red, NORMAL mode: 13 levels, ZONE mode: 5 levels) | | | |
| Ambient illumination (Receiver side) | | Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max. | | | |
| Ambient temperature | | Operating: –25°C to 55°C, Storage: –30°C 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 VDC | | | |
| Dielectric strength | | 1,000 VAC, 50/60Hz for 1 min | | | |
| Vibration resistance (destruction) | | 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions | | | |
| Shock resistance (destruction) | | 500m/s$^2$ 3 times each in X, Y, and Z directions | | | |
| Degree of protection | | IEC IP67 (with protective cover) | | | |
| Connection method | | Pre-wired<br>(Standard length: 2 m) | Connector (M8) | Pre-wired<br>(Standard length: 2 m) | Connector (M8) |
| Weight (packed state) | | Approx. 64 g | Approx. 21 g | Approx. 64 g | Approx. 21 g |
| Material | Case | PBT (polybutylene terephthalate) | | | |
| | Cover | Methacrylic resin | | | |
| | Mounting Bracket | Stainless steel (SUS304) | | | |
| Accessories | | Mounting Bracket (with screws), Instruction sheet | | | |

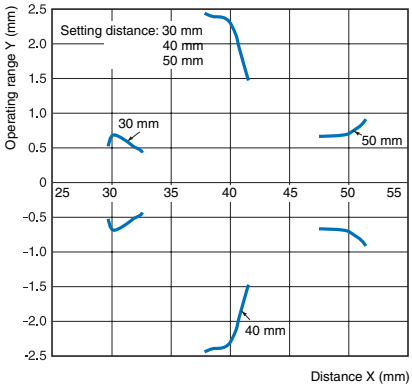
# Engineering Data (Typical)

## Operating Range

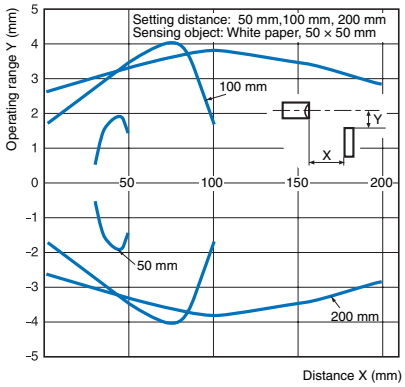
### E3G-L1□ (in NORMAL Mode)



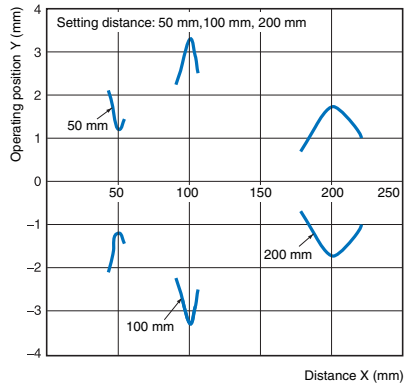

### E3G-L1□ (in ZONE Mode)




### E3G-L3□ (in NORMAL Mode)

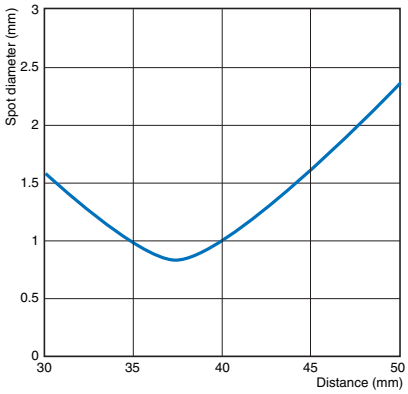



### E3G-L3□ (in ZONE Mode)

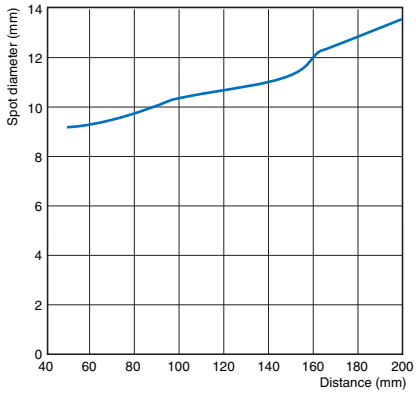



## Spot Diameter vs. Sensing Distance

### E3G-L1□

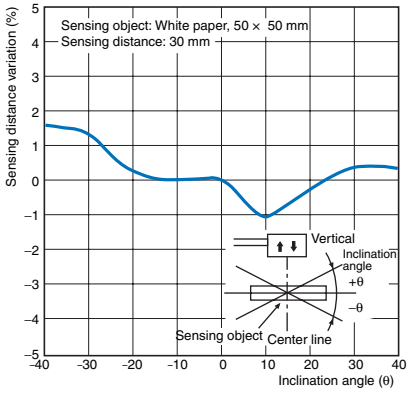



### E3G-L3□

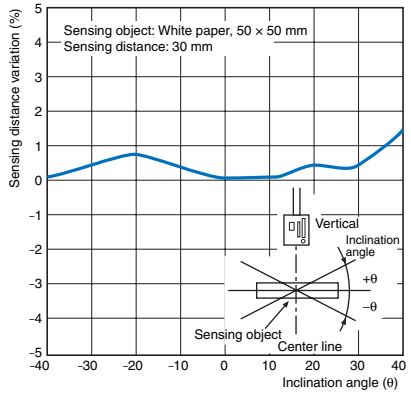



## Angle Characteristics

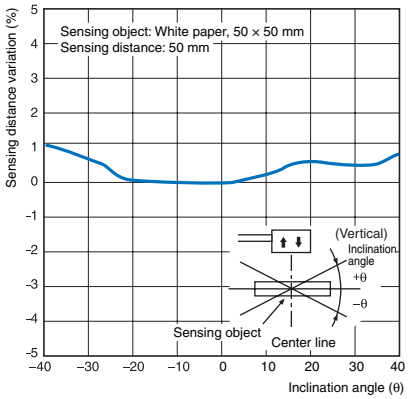
### E3G-L1□ (Vertical)



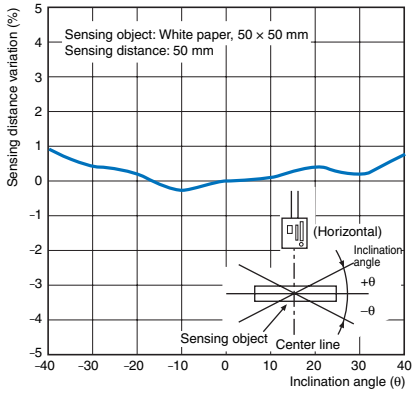

### E3G-L1□ (Horizontal)




### E3G-L1□ (Vertical)

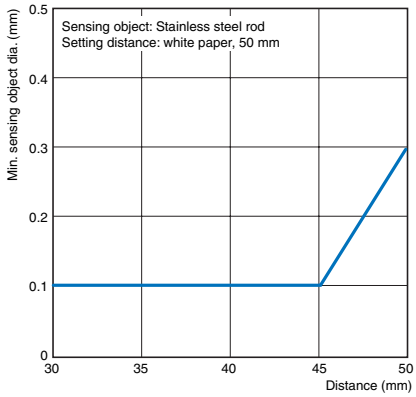



### E3G-L1□ (Horizontal)

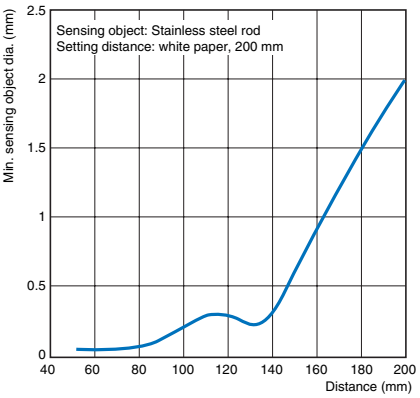



## Sensing Object Size vs. Setting Distance

### E3G-L1□

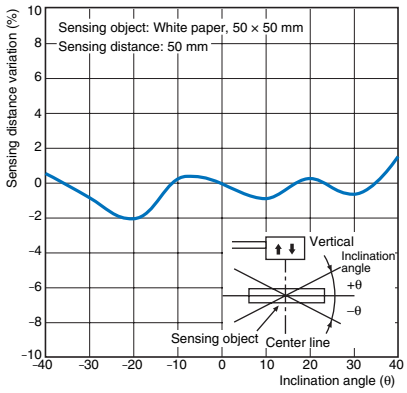



### E3G-L3□

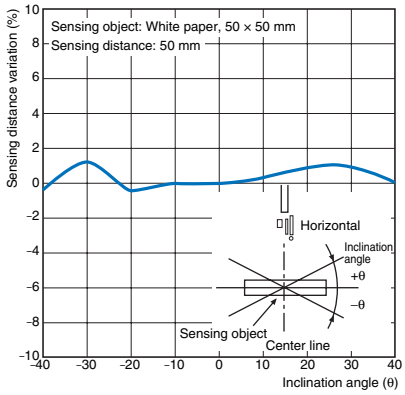


## Angle Characteristics

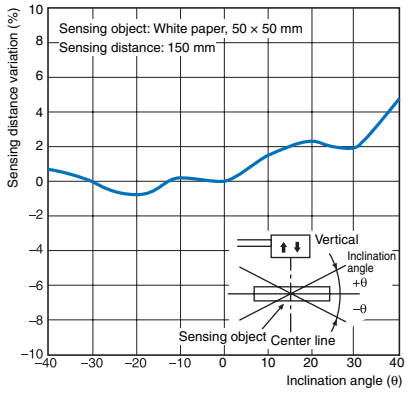
### E3G-L3□ (Vertical)



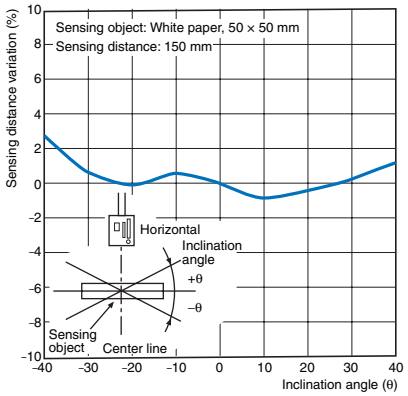

### E3G-L3□ (Horizontal)




### E3G-L3□ (Vertical)

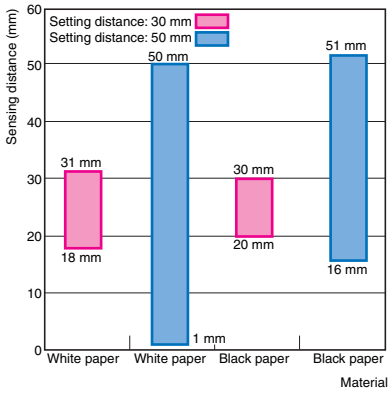



### E3G-L3□ (Horizontal)

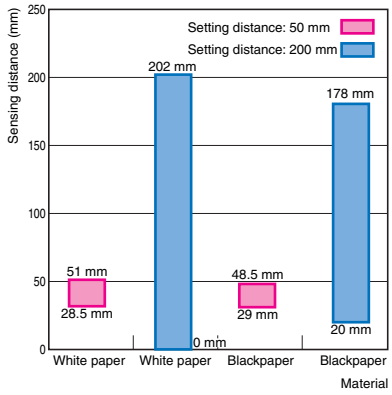



## Close-range Characteristics

### E3G-L1□

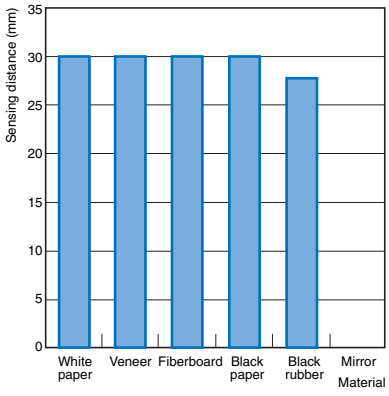



### E3G-L3□

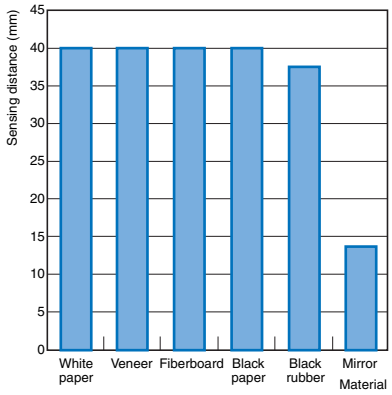



## Sensing Distance vs. Sensing Object Material

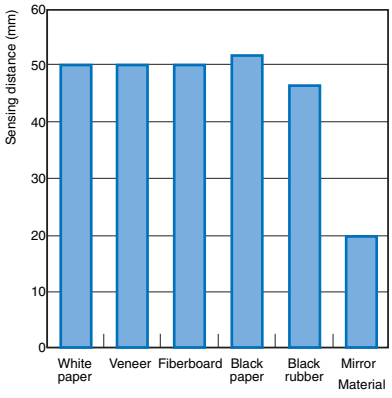
### E3G-L1□ (at 30-mm Setting Distance)



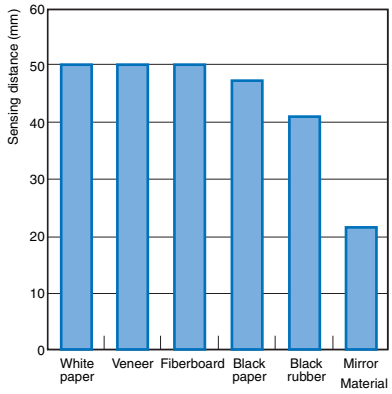

### E3G-L1□ (at 40-mm Setting Distance)



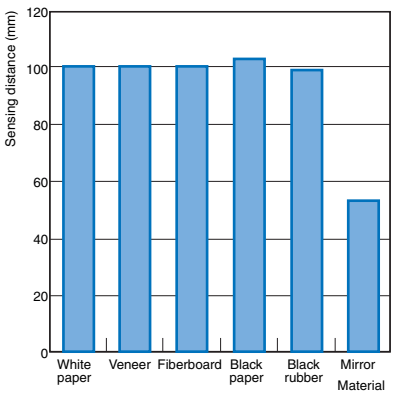

### E3G-L1□ (at 50-mm Setting Distance)



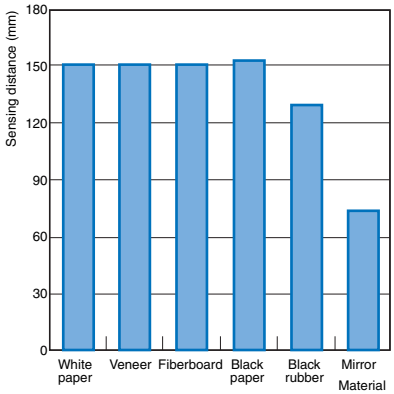

### E3G-L3□ (at 50-mm Setting Distance)




### E3G-L3□ (at 100-mm Setting Distance)

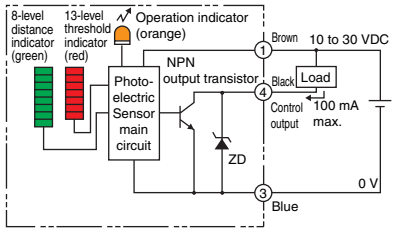



### E3G-L3□ (at 150-mm Setting Distance)

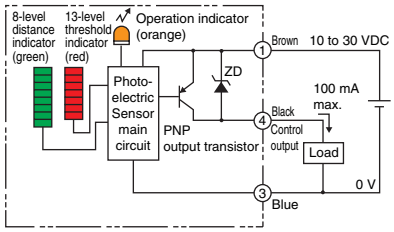


# I/O Circuit Diagrams

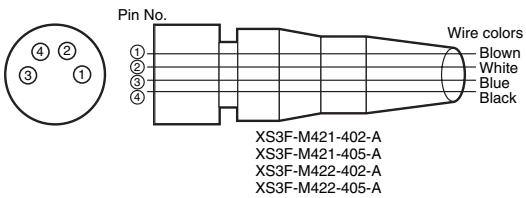
## NPN Output

| Model | Operation mode | Timing charts | Mode selector switch | Output circuit |
|---|---|---|---|---|
| E3G-L11<br>E3G-L15<br>E3G-L31<br>E3G-L35 | Light-ON | Incident light<br>No incident light<br>Operation indicator (orange) ON / OFF<br>Output transistor ON / OFF<br>Load (e.g., relay) Operate / Reset<br>(Between brown and black) | L-ON<br>(LIGHT ON) |  <br>Connector Pin Arrangement<br>  <br>Note: Pin 2 is not used. |
| | Dark-ON | Incident light<br>No incident light<br>Operation indicator (orange) ON / OFF<br>Output transistor ON / OFF<br>Load (e.g., relay) Operate / Reset<br>(Between brown and black) | D-ON<br>(DARK ON) | |

## PNP Output

| Model | Operation mode | Timing charts | Mode selector switch | Output circuit |
|---|---|---|---|---|
| E3G-L12<br>E3G-L16<br>E3G-L32<br>E3G-L36 | Light-ON | Incident light<br>No incident light<br>Operation indicator (orange) ON / OFF<br>Output transistor ON / OFF<br>Load (e.g., relay) Operate / Reset<br>(Between blue and black) | L-ON<br>(LIGHT ON) |  <br>Connector Pin Arrangement<br>  <br>Note: Pin 2 is not used. |
| | Dark-ON | Incident light<br>No incident light<br>Operation indicator (orange) ON / OFF<br>Output transistor ON / OFF<br>Load (e.g., relay) Operate / Reset<br>(Between blue and black) | D-ON<br>(DARK ON) | |

## Plugs (Sensor I/O Connectors)

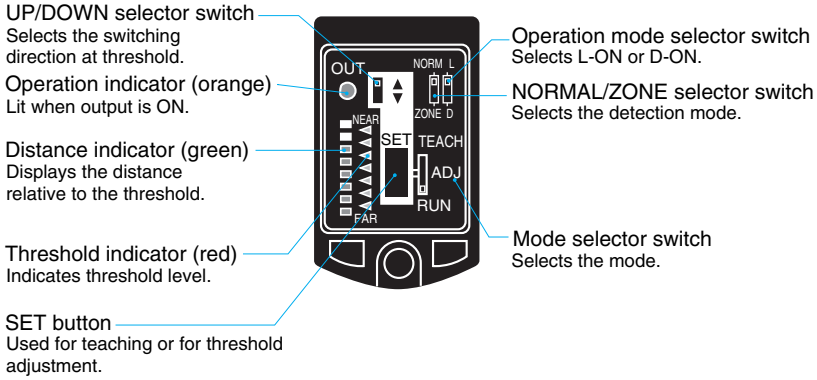



XS3F-M421-402-A
XS3F-M421-405-A
XS3F-M422-402-A
XS3F-M422-405-A

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

Note: Pin 2 is not used.

# Nomenclature



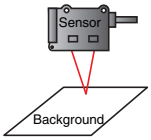
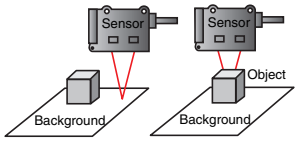
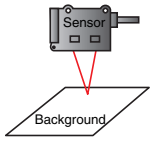
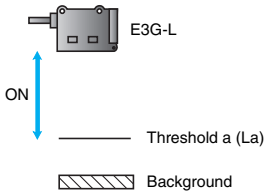
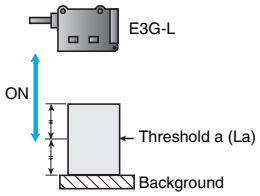
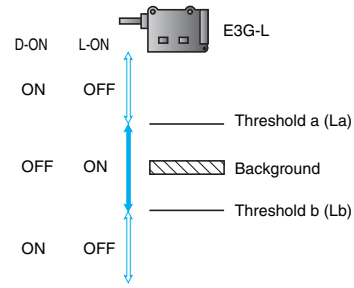
# Adjustments

## Adjustment Procedure

| Step | Operation |
|---|---|
| 1 | Install, wire, and turn ON the Sensor. |
| 2 | Perform distance setting (teaching). ➜Refer to *Distance Setting (Teaching)*, below. |
| 3 | Make a fine adjustment of the threshold, if necessary. Refer to *Manual Teaching (Fine Distance Setting)*. ➜Page 11 |
| 4 | Check that the mode selector switch is set to RUN. |

## Distance Setting (Teaching)

Select the most appropriate teaching method in reference to the following descriptions.

| | 1 | 2 | 3 |
|---|---|---|---|
| **Application** | • Teaching without sensing objects (i.e., teaching the background). | • Detection of slight differences in surface level.<br>• Setting a threshold in the middle between the background and sensing object for operation. | • Detection of glossy objects in front of the background. |
| **Teaching** | **1 Normal one-point teaching** | **2 Normal two-point teaching** | **3 Zone one-point teaching** |
| **Setting method** | Press the TEACH button with the background object.<br>  | Press the TEACH button with the background object and with the sensing object.<br>  | Press the TEACH button with the background object (conveyor, etc.).<br>  |
| **Set threshold** | Threshold (a) is set immediately in front of the background. | Threshold (a) is set approximately in the middle between the background and sensing object. | A pair of thresholds, (a) and (b), are set. |
| **Output ON range** | The output is ON between the Sensor and La.<br>  | The output is ON between the Sensor and La.<br>  | The output is ON between La and Lb.<br>  |

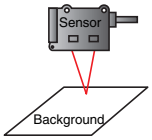
La: Distance equivalent to threshold (a)
Lb: Distance equivalent to threshold (b)

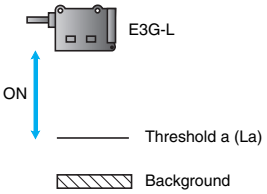
- The following settings are also possible:
  Setting the maximum sensing distance of the Sensor: Maximum distance setting.
  Setting the minimum differential travel of the Sensor: Minimum distance setting.
- Distance from Sensor to background must not exceed the values shown below during normal one-point or zone one-point teaching.

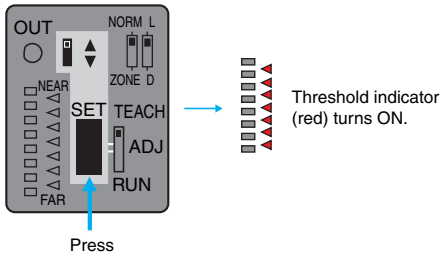
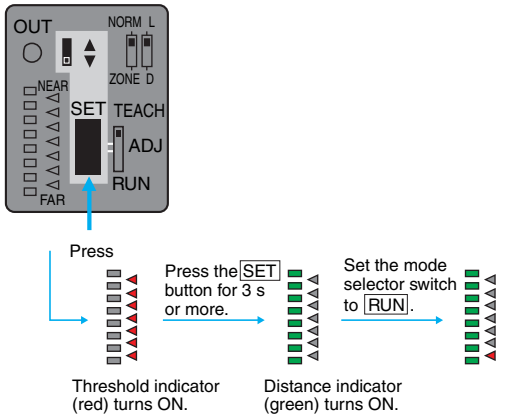
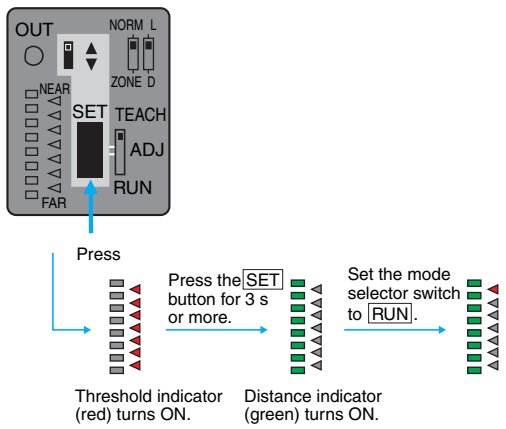
| Model | Distance from Sensor to background |
|---|---|
| E3G-L1□ | 32 mm min. |
| E3G-L3□ | 55 mm min. |

- Maximum sensing distance of the E3G-L3□ may differ depending on the color of the sensing object when setting distance is more than 150 mm. Confirm the operation of the Sensor before actual operation.

## 1 Normal One-point Teaching

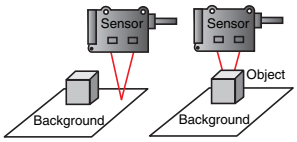


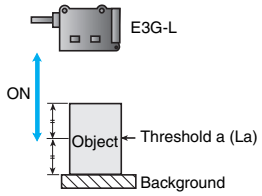



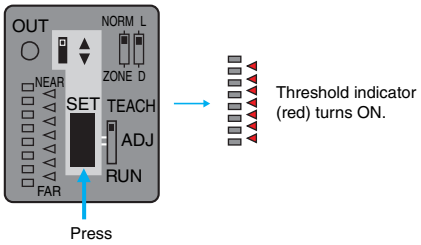
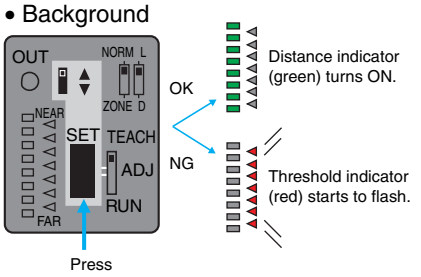

| Step | Operation | Panel status |
|---|---|---|
| 1 | Set the mode selector switch to TEACH. |  |
| 2 | Set the NORMAL/ZONE mode selector switch to NORMAL. | |
| 3 | Press the SET button with the background.<br>• The threshold indicator (red) will turn ON. | |
| 4 | Set the mode selector switch to RUN. | |
| 5 | Set to L-ON or D-ON mode with the operation mode selector switch.<br>L-ON: Output ON between background and Sensor.<br>D-ON: Output OFF between background and Sensor. | |
| | **Application Example 1**<br>**Adjusting the Sensor differential travel to the minimum distance.** |  |
| 1 | Set the mode selector switch to TEACH. | |
| 2 | Set the NORMAL/ZONE mode selector switch to NORMAL. | |
| 3 | Set the UP/DOWN selector switch to DOWN. | |
| 4 | Press the SET button for at least 3 s.<br>• The threshold indicator (red) will turn ON. | |
| 5 | The distance indicator (green) will turn ON. This means that teaching is successful.<br>Set the mode selector switch to RUN to complete the teaching operation. | |
| 6 | Set to L-ON or D-ON mode with the operation mode selector switch.<br>(Refer to Normal One-point Teaching) | |
| | **Application Example 2**<br>**Setting the Sensor to the maximum distance.** |  |
| 1 | Set the mode selector switch to TEACH. | |
| 2 | Set the NORMAL/ZONE mode selector switch to NORMAL. | |
| 3 | Set the UP/DOWN selector switch to UP. | |
| 4 | Press the SET button for 3 s or more.<br>• The threshold indicator (red) will turn ON. | |
| 5 | The distance indicator (green) will turn ON. This means that teaching is successful. Set the mode selector switch to RUN to complete the teaching operation. | |
| 6 | Set to L-ON or D-ON mode with the operation mode selector switch.<br>(Refer to Normal One-point Teaching) | |

La: Distance equivalent to threshold (a)

## 2 Normal Two-point Teaching

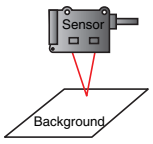


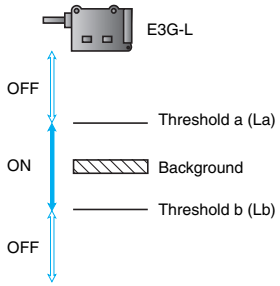



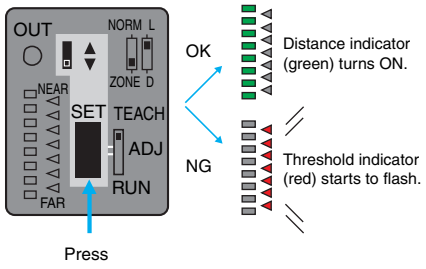

| Step | Operation | Panel status |
|---|---|---|
| 1 | Set the mode selector switch to TEACH. | • Object<br>  <br> |
| 2 | Set the NORMAL/ZONE mode selector switch to NORMAL. | |
| 3 | Press the SET button with a sensing object located at sensing position.<br>• The threshold indicator (red) will turn ON. | |
| 4 | Move the sensing object and press the SET button with the background.<br>• If the teaching is successful, the distance indicator (green) will turn ON.<br>• If the teaching is not successful, the threshold indicator (red) will start to flash. | |
| 5 | If the teaching is successful, set the mode selector switch to RUN to complete the teaching operation. If the teaching is not successful, change the position of the object and setting distance that have been set and repeat from the above step 3. | • Background<br>  <br> |
| 6 | Set to L-ON or D-ON mode with the operation mode selector switch. | |

La: Distance equivalent to threshold (a)

## 3 Zone One-point Teaching



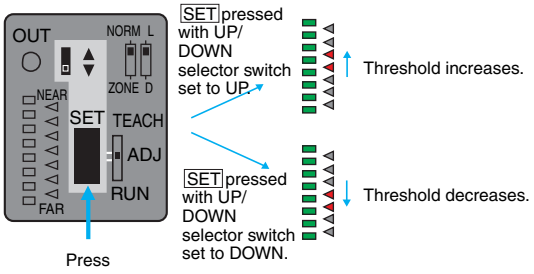




| Step | Operation | Panel status |
|---|---|---|
| 1 | Set the mode selector switch to TEACH. |  <br> |
| 2 | Set the NORMAL/ZONE mode selector switch to ZONE. | |
| 3 | Press the SET button with the background. All threshold indicators (red) will turn ON while the SET button is pressed. When the SET button is released:<br>• If the teaching is successful, the distance indicator (green) will turn ON.<br>• If the teaching is not successful, the threshold indicator (red) will start to flash. | |
| 4 | Set the mode selector switch to RUN. | |
| 5 | Set to L-ON or D-ON mode with the operation mode selector switch.<br>L-ON: Output ON with the background.<br>D-ON: Output OFF with the background. | |

La: Distance equivalent to threshold (a)

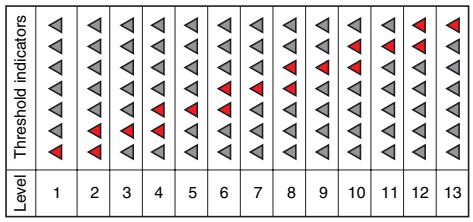
## Manual Teaching (Fine Distance Setting)

| Step | Operation | Panel status |
|---|---|---|
| | Fine adjustment of the threshold is possible after teaching. | |
| 1 | Set the mode selector switch to ADJ. | |
| 2 | Set the adjustment direction in the ADJ mode with the UP/DOWN selector switch.<br>The threshold changes each time the SET button is pressed. The setting can be made in up to 13 levels (for normal one-point or two-point teaching). | |
| 3 | After the adjustment is complete, set the mode selector switch to RUN. | |

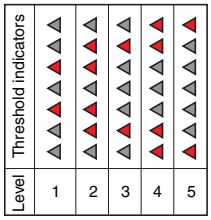



Threshold Indicator Display during Distance Adjustment

Max. 13 adjustment levels for normal teaching.



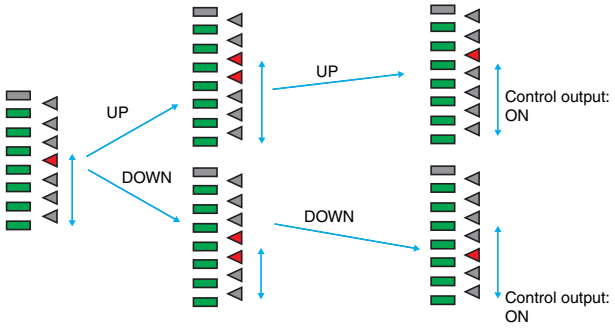

Five adjustment levels for zone teaching.




## Threshold and Distance Indicator Displays

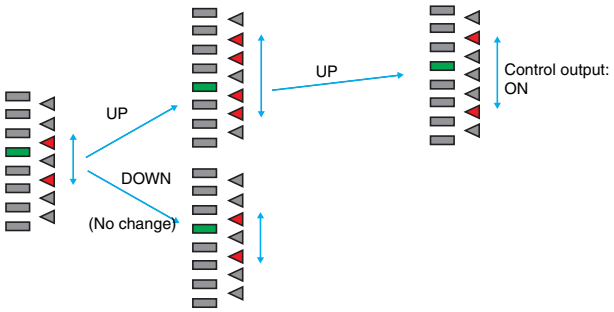
**Display for Distance Setting with Normal One-point or Two-point Teaching**

The distance indicators show the distance level. The distance indicators show distances relative to the threshold. The threshold can be shifted using the UP/DOWN selector and SET button. The differential travel cannot be changed.




**Display for Distance Setting with Zone Teaching**

The distance indicators show the current distance band. The distance indicators show distances relative to the threshold. The ON range can be shifted using the UP/DOWN selector and SET button. The differential travel cannot be changed.



## Safety Precautions

**⚠ WANINNG**

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

### Precautions for Correct Use

Do not use the product in atmospheres or environment that exceed product ratings.

● **Wiring**

**Cable**

The bending radius of the cable must be no smaller than 25 mm.

**Avoiding Malfunctions**

If using the Photoelectric Sensor with an inverter or servomotor, be sure to ground the FG (frame ground) and G (ground) terminals, otherwise the Sensor may malfunction.

● **Mounting**

**Mounting Conditions**

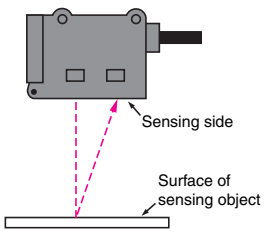
- If Sensors are mounted face-to-face, make sure that no optical axes cross each other. Otherwise, mutual interference may result.
- Be sure to install the Sensor carefully so that the directional angle range of the Sensor will not be directly exposed to intensive light, such as sunlight, fluorescent light, or incandescent light.
- Do not strike the Photoelectric Sensor with a hammer or any other tool during the installation of the Sensor, or the Sensor will loose its water-resistant properties.
- Use M3 screws to mount the Sensor.
- When mounting the case, make sure that the tightening torque applied to each screw does not exceed 0.54 N·m.

**M8 Connector**

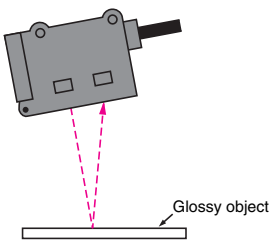
- Always turn OFF the Sensor before connecting or disconnecting the M8 connector.
- Be sure to hold the connector cover when connecting or disconnecting the M8 connector.
- Secure the M8 connector by hand. Do not use any pliers, otherwise the connector may be damaged.
- If the M8 connector is not connected securely, the M8 connector may be disconnected by vibration or the proper degree of protection of the Sensor may not be maintained.

**Mounting Directions**

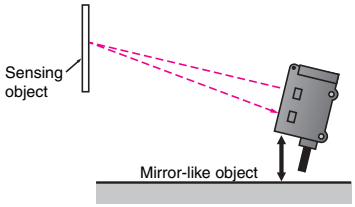
- Make sure that the sensing side of the Sensor is parallel with the surface of each sensing object. Do not incline the Sensor towards the sensing object.



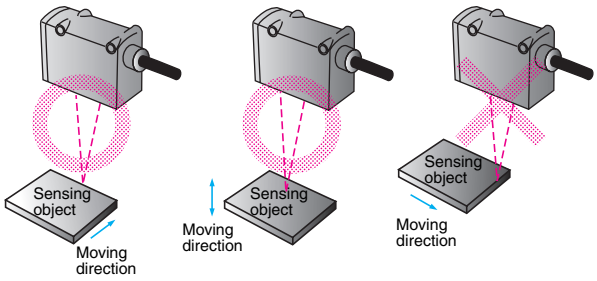

If the sensing object has a glossy surface, incline the Sensor by 5° to 10° as shown below, provided that the Sensor is not influenced by any background objects.



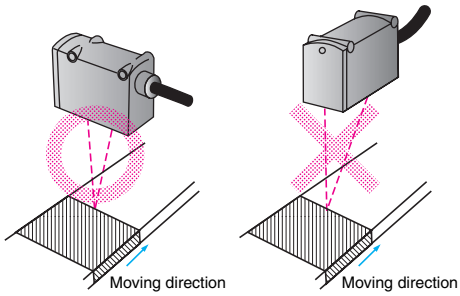

- If there is a mirror-like object below the Sensor, the Sensor may not be in stable operation. Therefore, incline the Sensor or keep the Sensor a distance away from the mirror-like object as shown below.




- Make sure not to install the Sensor in the incorrect direction. Refer to the following.




Install the Sensor as shown in the following if each sensing object greatly differs in color or material.




● **Adjustments**

If the Sensor is not in stable operation due to color differences, make a fine adjustment of the threshold level and confirm that Sensor operation is stable. Refer to *Manual Teaching (Fine Distance Setting)* ➜ Page 11

● **Maintenance and Inspection**

**Cleaning**

Paint thinner will damage the casing of the Sensor. Do not use paint thinner to clean the Sensor.

● **Others**

**EEPROM Writing Error**

If a teaching data error occurs with the operation indicator flashing due to a power failure or static noise, perform the teaching operation of the Sensor again.

**Water Resistivity**

To ensure the water resistivity of the Sensor, tighten the screws of the operation panel cover to a torque of 0.2 to 0.3 N·m.

(Unit: mm)

# Dimensions

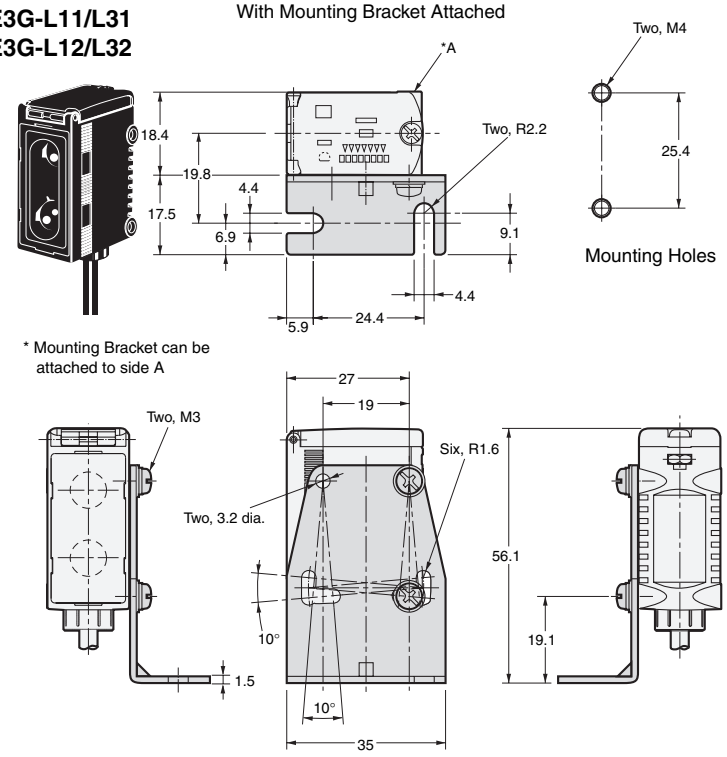
Unless otherwise specified, the tolerance class IT16 is used for dimensions in this data sheet.

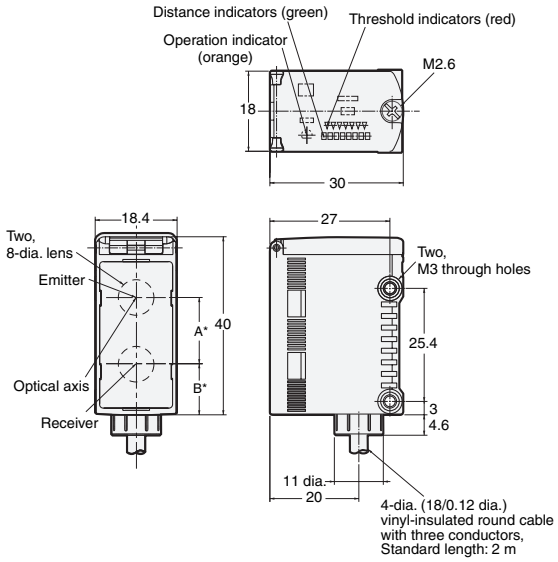
## Sensors

### Pre-wired Models

**E3G-L11/L31**
**E3G-L12/L32**

With Mounting Bracket Attached



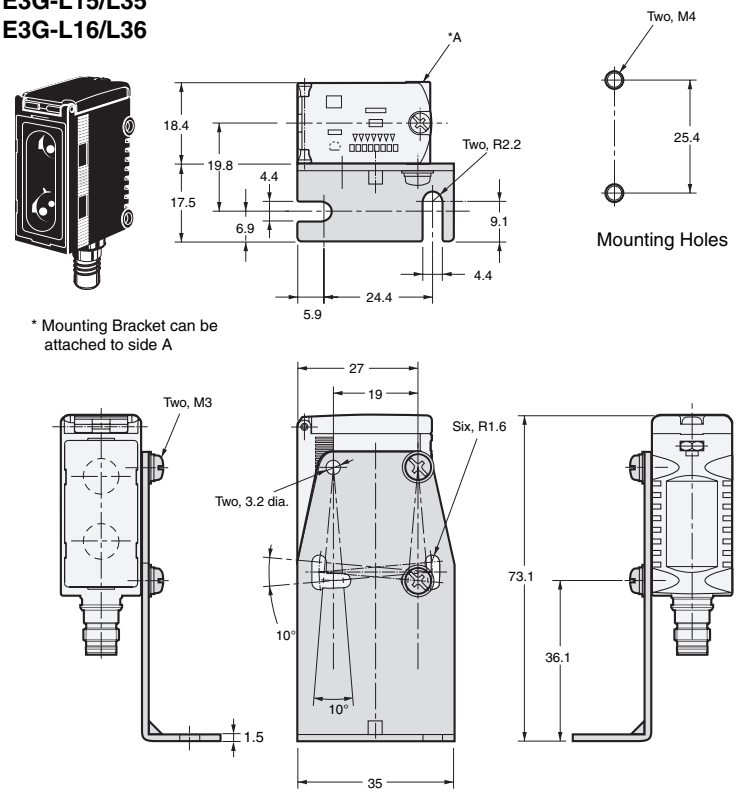

*

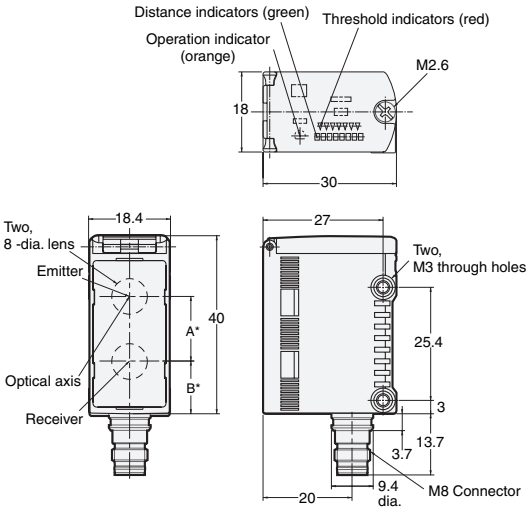
| Model | A | B |
|---|---|---|
| E3G-L1□ | 14.5 | 11.88 |
| E3G-L3□ | 16 | 10.35 |

### Connector Models

**E3G-L15/L35**
**E3G-L16/L36**

With Mounting Bracket Attached




*

| Model | A | B |
|---|---|---|
| E3G-L1□ | 14.5 | 11.88 |
| E3G-L3□ | 16 | 10.35 |

## Accessories (Order Separately)

### Mounting Brackets

**In the interest of product improvement, specifications are subject to change without notice.**

## Read and Understand This Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

## Warranty and Limitations of Liability

### 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.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

### LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

## Application Considerations

### SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- 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 PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

### PROGRAMMABLE PRODUCTS

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

## Disclaimers

### CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

### DIMENSIONS AND WEIGHTS

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

### PERFORMANCE DATA

Performance data given in this catalog 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.

### ERRORS AND OMISSIONS

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

2008.9

**In the interest of product improvement, specifications are subject to change without notice.**

**OMRON Corporation**
**Industrial Automation Company**

**http://www.ia.omron.com/**