

## Small 2.5-mm-diameter Spot Ideal for Detecting Small Workpieces

- Tiny workpieces as little as 0.1 mm in diameter can be detected with the 2.5-mm-dia. spot.
- The narrow beam enables sensing from small slots or holes.
- The small spot of light enables visual checking of sensing spot position.
- IP67 degree of protection, mutual interference prevention, and EN standard compliance.



CE

 Be sure to read *Safety Precautions* on page 4.

## Ordering Information

### Sensors

 Infrared light

| Sensing method         | Appearance                                                                         | Connection method     | Sensing distance                                                                            | Model            |                |
|------------------------|------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------|------------------|----------------|
|                        |                                                                                    |                       |                                                                                             | NPN output       | PNP output     |
| Narrow-beam reflective |  | Pre-wired             |  90±30 mm | <b>E3Z-L61 *</b> | <b>E3Z-L81</b> |
|                        |                                                                                    | Connector (M8, 4pins) |                                                                                             | <b>E3Z-L66</b>   | <b>E3Z-L86</b> |

\* The following table shows the model numbers of e-CON Pre-wired Connectors that are available.  
The Ratings and Specifications are the same as those for the E3Z-L61.

| Cable length | Model                    |
|--------------|--------------------------|
| 0.3 m        | <b>E3Z-L61-ECON 0.3M</b> |
| 0.5 m        | <b>E3Z-L61-ECON 0.5M</b> |
| 2 m          | <b>E3Z-L61-ECON 2M</b>   |

### Accessories (Order Separately)

#### Mounting Brackets

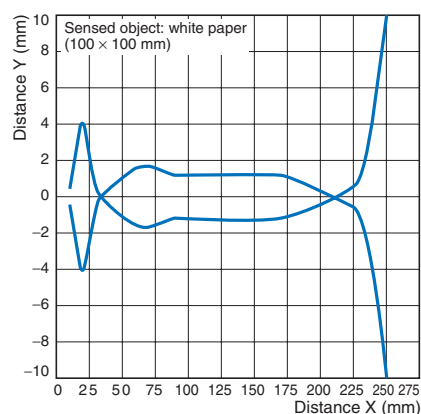
#### Sensor I/O Connectors

## Ratings and Specifications

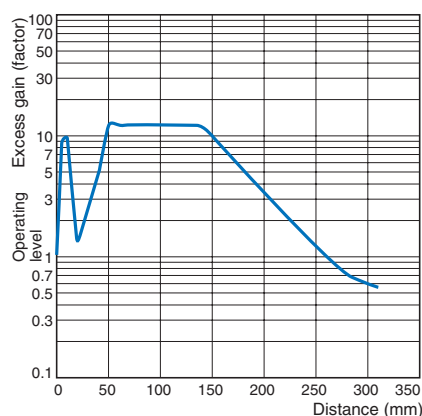
| Item                                 | Sensing method |            | Narrow-beam reflective                                                                                                                                                                                                                                             |                        |
|--------------------------------------|----------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
|                                      | Model          | NPN output | E3Z-L61                                                                                                                                                                                                                                                            | E3Z-L66                |
|                                      |                | PNP output | E3Z-L81                                                                                                                                                                                                                                                            | E3Z-L86                |
| Sensing distance                     |                |            | White paper (100 × 100 mm): 90±30 mm                                                                                                                                                                                                                               |                        |
| Spot diameter (typical)              |                |            | 2.5-mm dia. min. (at sensing distance of 90 mm)                                                                                                                                                                                                                    |                        |
| Minimum detectable object (typical)  |                |            | 0.1-mm dia. (copper wire)                                                                                                                                                                                                                                          |                        |
| Differential travel (typical)        |                |            | Refer to <i>Differential Travel vs. Sensing Distance</i> on page 2.                                                                                                                                                                                                |                        |
| Light source (wavelength)            |                |            | Red LED (650 nm)                                                                                                                                                                                                                                                   |                        |
| Power supply voltage                 |                |            | 12 to 24 VDC ±10%, ripple (p-p): 10% max.                                                                                                                                                                                                                          |                        |
| Current consumption                  |                |            | 30 mA max.                                                                                                                                                                                                                                                         |                        |
| Control output                       |                |            | Load power supply voltage: 26.4 V max.; Load current: 100 mA max.<br>Residual voltage: Load current of less than 10 mA: 1 V max.<br>Load current of 10 to 100 mA: 2 V max.<br>Open collector output (NPN or PNP depending on model)<br>Light-ON/Dark-ON selectable |                        |
| Protection circuits                  |                |            | Power supply reverse polarity protection, Output short-circuit protection, Mutual interference prevention, Reverse output polarity protection                                                                                                                      |                        |
| Response time                        |                |            | Operate or reset: 1 ms max.                                                                                                                                                                                                                                        |                        |
| Sensitivity adjustment               |                |            | One-turn adjuster                                                                                                                                                                                                                                                  |                        |
| Ambient illumination (Receiver side) |                |            | Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.                                                                                                                                                                                                         |                        |
| Ambient temperature range            |                |            | Operating: -25 to 55°C, Storage: -40 to 70°C (with no icing or condensation)                                                                                                                                                                                       |                        |
| Ambient humidity range               |                |            | Operating: 35 to 85%, Storage: 35 to 95% (with no condensation)                                                                                                                                                                                                    |                        |
| Insulation resistance                |                |            | 20 MΩ min. at 500 VDC                                                                                                                                                                                                                                              |                        |
| Dielectric strength                  |                |            | 1,000 VAC 50/60 Hz for 1 min                                                                                                                                                                                                                                       |                        |
| Vibration resistance                 |                |            | Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions.                                                                                                                                                                      |                        |
| Shock resistance                     |                |            | Destruction: 500m/s <sup>2</sup> 3 times each in the X, Y, and Z directions                                                                                                                                                                                        |                        |
| Degree of protection                 |                |            | IP67 (IEC 60529)                                                                                                                                                                                                                                                   |                        |
| Connection method                    |                |            | Pre-wired (standard length: 2 m and 0.5 m)                                                                                                                                                                                                                         | Connector (M8, 4 pins) |
| Indicators                           |                |            | Operation indicator (orange), Stability indicator (green)                                                                                                                                                                                                          |                        |
| Weight (packed state)                |                |            | Pre-wired type, 2 m: Approx. 65 g                                                                                                                                                                                                                                  | Approx. 20 g           |
| Material                             | Case           |            | PBT (polybutylene terephthalate)                                                                                                                                                                                                                                   |                        |
|                                      | Lens           |            | Modified polyarylate                                                                                                                                                                                                                                               |                        |
| Accessories                          |                |            | Instruction manual (Mounting Brackets must be ordered separately.)                                                                                                                                                                                                 |                        |

## Engineering Data

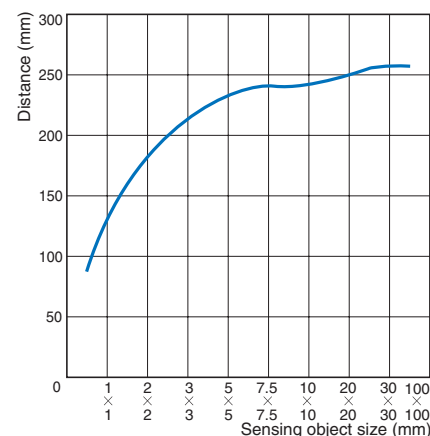
### Operating Range



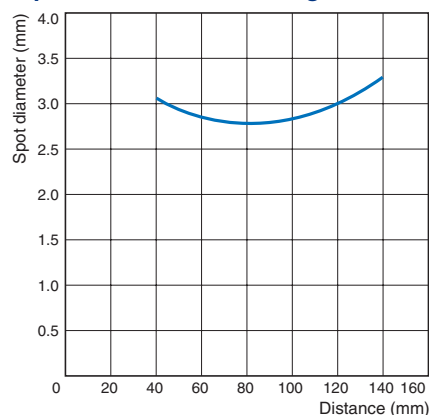
### Excess Gain vs. Sensing Distance



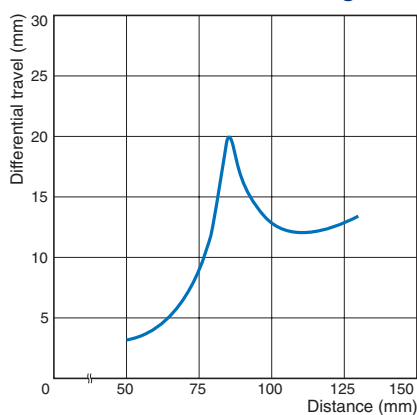
### Sensing Object Size vs. Sensing Distance



### Spot Diameter vs. Sensing Distance



### Differential Travel vs. Sensing Distance



## I/O Circuit Diagrams

## NPN Output

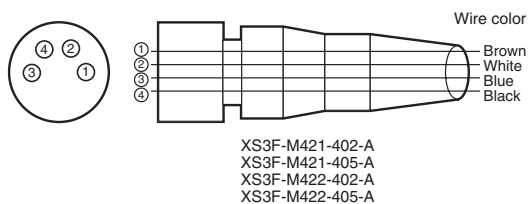
| Model              | Operation mode | Timing charts | Operation selector   | Output circuit |
|--------------------|----------------|---------------|----------------------|----------------|
| E3Z-L61<br>E3Z-L66 | Light-ON       |               | L side<br>(LIGHT ON) |                |
|                    | Dark-ON        |               | D side<br>(DARK ON)  |                |

## PNP Output

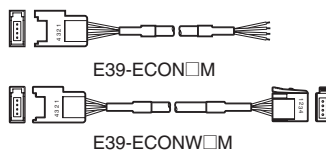
| Model              | Operation mode | Timing charts                                                                                                                                                                                            | Operation selector   | Output connector                                           |
|--------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------------------------------------|
| E3Z-L81<br>E3Z-L86 | Light-ON       | <p>Incident light</p> <p>No incident light</p> <p>Operation indicator (orange) OFF</p> <p>Output transistor Operate</p> <p>Load (e.g., relay) Reset</p> <p>(Between brown and black leads)</p>           | L side<br>(LIGHT ON) | <p>Narrow-beam Reflective Models</p>                       |
|                    | Dark-ON        | <p>Incident light</p> <p>No incident light</p> <p>Operation indicator (orange) ON</p> <p>Output transistor OFF</p> <p>Load Operate</p> <p>(e.g., relay) Reset</p> <p>(Between brown and black leads)</p> | D side<br>(DARK ON)  | <p>Connector Pin Arrangement</p> <p>Pin 2 is not used.</p> |

## Plugs (Sensor I/O Connectors)

### M8 connector



### e-CON connector



### Pin arrangement

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

Note: Pin 2 is not used.

## Safety Precautions

Refer to *Warranty and Limitations of Liability*.

### ⚠ WARNING

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



### Precautions for Correct Use

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

## Dimensions

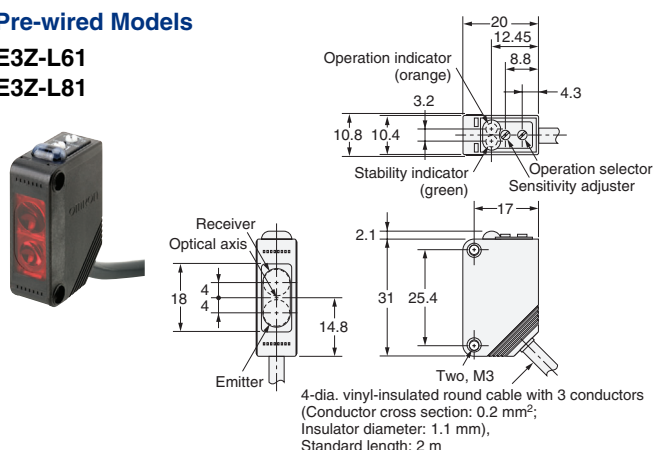
(Unit: mm)

### Sensors

#### Pre-wired Models

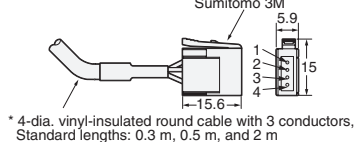
E3Z-L61

E3Z-L81



#### e-CON Pre-wired Connector

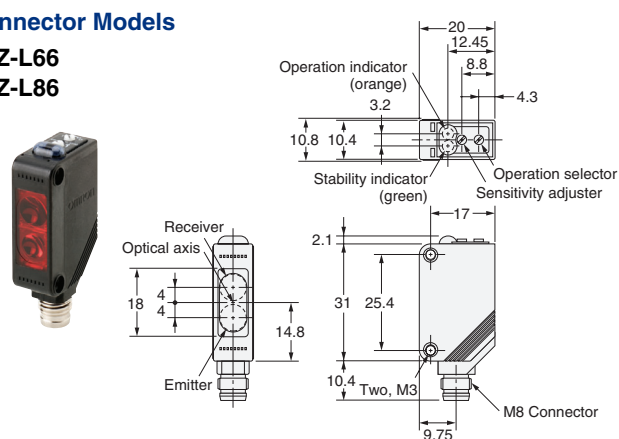
Connector: Model No.37104-3122-000FL  
Sumitomo 3M



#### Connector Models

E3Z-L66

E3Z-L86



## Accessories (Order Separately)

### Mounting Brackets

## 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.

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## Application Considerations

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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.

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## Disclaimers

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