


E3Z-L

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.





 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 | E3Z-L61 | E3Z-L81 |
| | | Connector (M8, 4pins) | | E3Z-L66 | E3Z-L86 |

Accessories (Order Separately)

[Mounting Brackets](#)

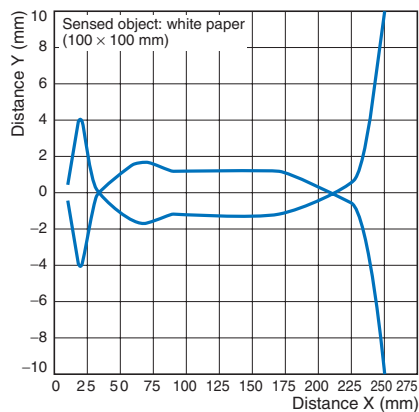
[Sensor I/O Connectors](#)

Ratings and Specifications

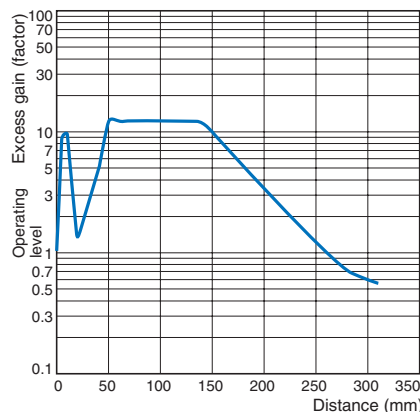
| Sensing method | | Narrow-beam reflective | |
|--------------------------------------|-------|--|------------------------|
| Item | Model | NPN output | E3Z-L61 |
| | | PNP output | E3Z-L81 |
| | | E3Z-L66 | |
| | | E3Z-L86 | |
| Sensing distance | | White paper (100 × 100 mm): 90±30 mm | |
| Spot 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. Residual voltage: Load current of less than 10 mA: 1 V max. Load current of 10 to 100 mA: 2 V max. Open collector output (NPN or PNP depending on model) 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 ² 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

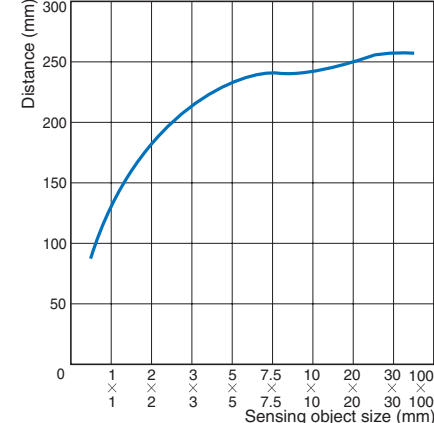
Operating Range



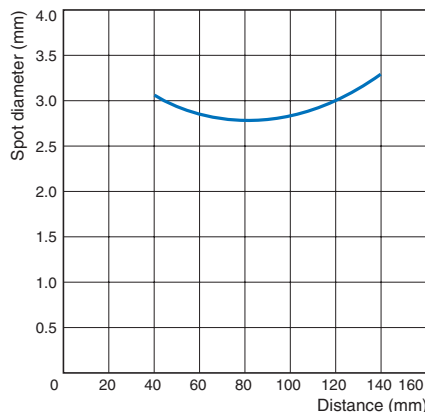
Excess Gain vs. Sensing Distance



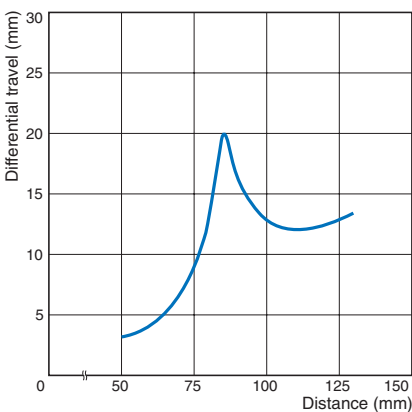
Sensing Object Size vs. Sensing Distance



Spot Diameter vs. Sensing Distance

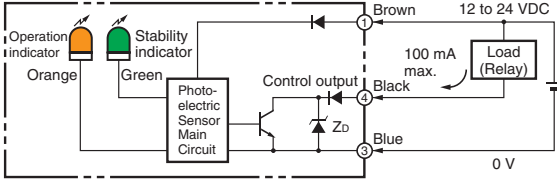



Differential Travel vs. Sensing Distance

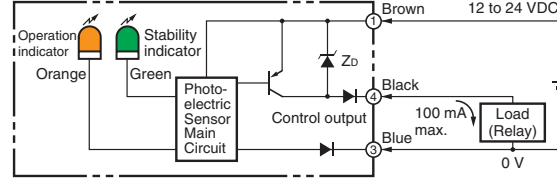



I/O Circuit Diagrams

NPN Output

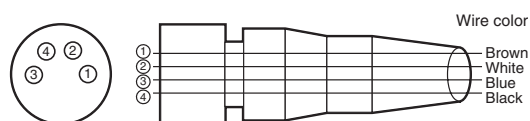
| Model | Operation mode | Timing charts | Operation selector | Output circuit |
|--------------------|----------------|---|----------------------|---|
| E3Z-L61 E3Z-L66 | Light-ON | Incident light: [Pulse] No incident light: [Blank] Operation indicator (orange): ON [Pulse] OFF [Blank] Output transistor: ON [Pulse] OFF [Blank] Load (e.g., relay): Operate [Pulse] Reset [Blank] (Between brown and black leads) | L side (LIGHT ON) | Narrow-beam Reflective Models  Connector Pin Arrangement  Pin 2 is not used. |
| | Dark-ON | Incident light: [Pulse] No incident light: [Blank] Operation indicator (orange): ON [Blank] OFF [Pulse] Output transistor: ON [Blank] OFF [Pulse] Load (e.g., relay): Operate [Blank] Reset [Pulse] (Between brown and black leads) | D side (DARK ON) | |

PNP Output

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

Plugs (Sensor I/O Connectors)

M8 connector



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

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

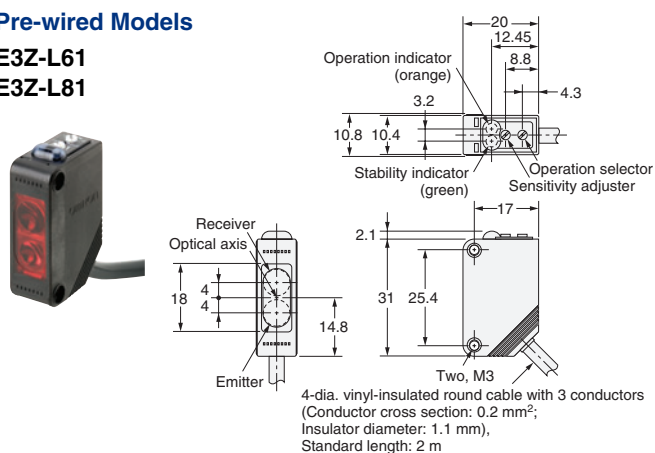
(Unit: mm)

Sensors

Pre-wired Models

E3Z-L61

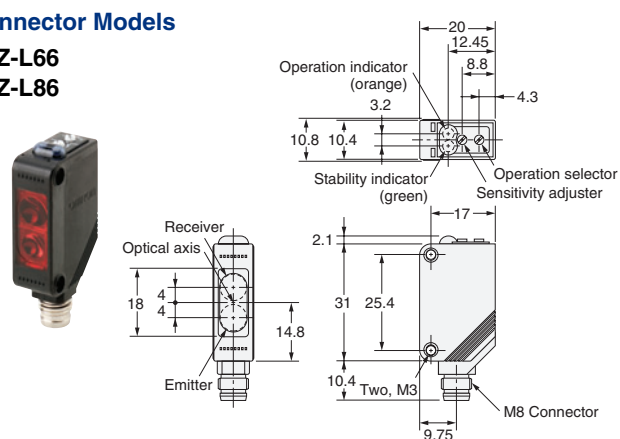
E3Z-L81



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.

Warranty and Limitations of Liability

WARRANTY

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Application Considerations

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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:

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

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

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON 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.

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