


# 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	<b>E3Z-L61</b>	<b>E3Z-L81</b>
		Connector (M8, 4pins)		<b>E3Z-L66</b>	<b>E3Z-L86</b>

### Accessories (Order Separately)

[Mounting Brackets](#)

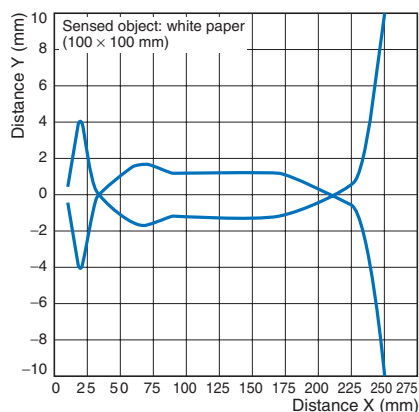
[Sensor I/O Connectors](#)

## Ratings and Specifications

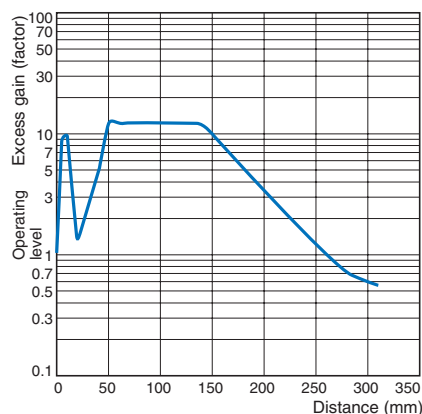
Sensing method		Narrow-beam reflective		
Item	Model	NPN output	E3Z-L61	E3Z-L66
		PNP output	E3Z-L81	E3Z-L86
Sensing distance		White paper (100 × 100 mm): 90±30 mm		
Spot diameter (typical)		2.5-mm dia. min. (at sensing distance of 90 mm)		
Minimum detectable object (typical)		0.1-mm dia. (copper wire)		
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. 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 <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

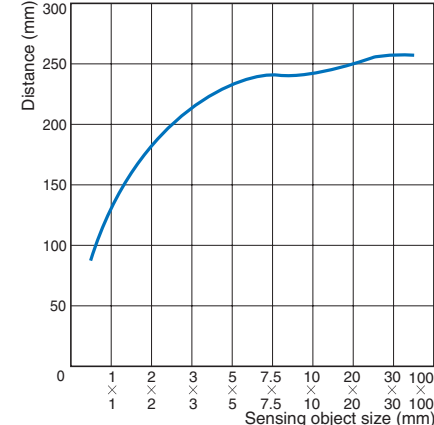
Operating Range



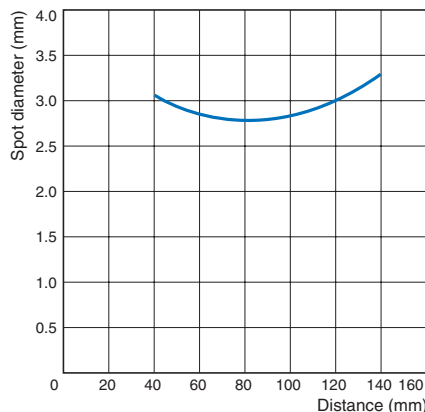
Excess Gain vs. Sensing Distance



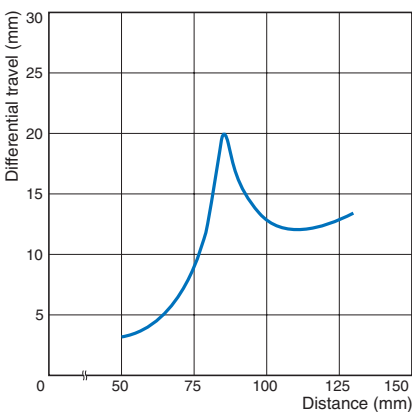
Sensing Object Size vs. Sensing Distance



Spot Diameter vs. Sensing Distance

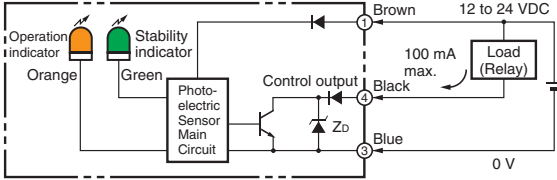



Differential Travel vs. Sensing Distance

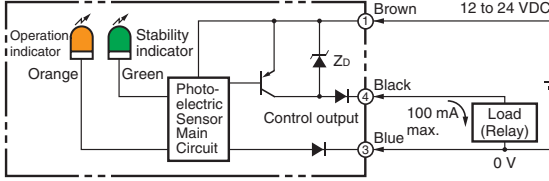



## I/O Circuit Diagrams

### NPN Output

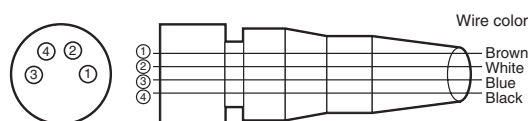
Model	Operation mode	Timing charts	Operation selector	Output circuit
E3Z-L61 E3Z-L66	Light-ON	Incident light: [Pulse] No incident light: [Blank] Operation indicator (orange): ON [Pulse] OFF [Blank] Output transistor: ON [Pulse] OFF [Blank] Load (e.g., relay): Operate [Pulse] Reset [Blank] (Between brown 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

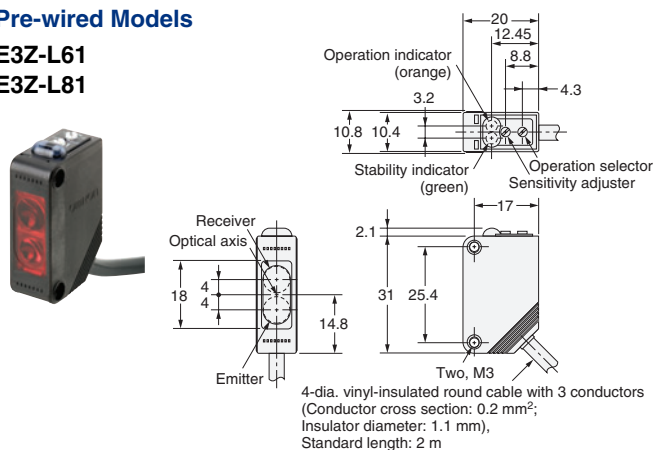
(Unit: mm)

### Sensors

#### Pre-wired Models

E3Z-L61

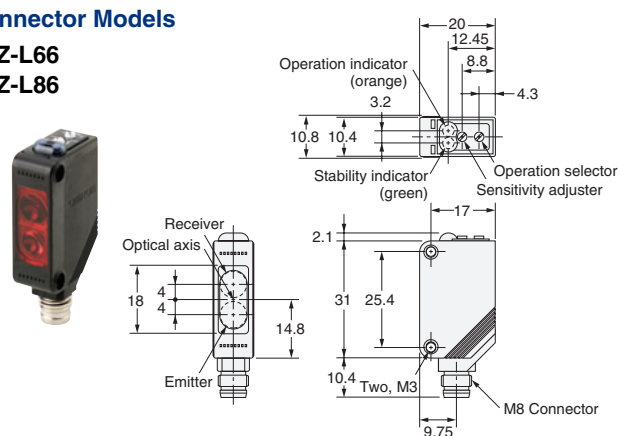
E3Z-L81



#### Connector Models

E3Z-L66

E3Z-L86



## Accessories (Order Separately)

### Mounting Brackets

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