

Photoelectric Sensor with Built-in Amplifier with New Connector Options

E3Z

Compact Sensor Offers Long Sensing Distance and Superior Noise-Immunity

- Photo-IC provides long sensing distance: 15 m and 10 m for through-beam, 4 m for retroreflective, and 1 m for diffuse.
- Integrated Photo-IC improves noise immunity to interference from inverters and other inductive loads.
- New injection molding technology assures IP67 rating to withstand water and dust.
- Switch-selectable, Light-ON/Dark-ON operation.
- M8 connector-ready and 2 m, pre-wired models.
- NPN or PNP output models available.



Ordering Information

■ Sensors

Stock Note: Shaded models are normally stocked.

Sensing method	Light source	Appearance	Connection method	Sensing distance	Model	
					NPN output	PNP output
Through-beam	IR/RED		Pre-wired	15 m (IR) 10 m (RED) (See Note 1.)	E3Z-T61(A)	E3Z-T81(A)
			Connector		E3Z-T66(A)	E3Z-T86(A)
			Pigtail 3 pin (M8)		E3Z-T61(A)-M5J	E3Z-T81(A)-M5J
			Pigtail 4 pin (M8)		E3Z-T61(A)-M3J	E3Z-T81(A)-M3J
			Pigtail 4 pin (M12)		E3Z-T61(A)-M1J	E3Z-T81(A)-M1J
Polarized retroreflective	RED		Pre-wired	100 mm to 4 m 100 mm to 3 m (See Note 3.)	E3Z-R61	E3Z-R81
			Connector		E3Z-R66	E3Z-R86
			Pigtail 3 pin (M8)		E3Z-R61-M5J	E3Z-R81-M5J
			Pigtail 4 pin (M8)		E3Z-R61-M3J	E3Z-R81-M3J
			Pigtail 4 pin (M12)		E3Z-R61-M1J	E3Z-R81-M1J
Diffuse reflective	IR		Pre-wired	5 to 100 mm (wide view)	E3Z-D61	E3Z-D81
			Connector		E3Z-D66	E3Z-D86
			Pigtail 3 pin (M8)		E3Z-D61-M5J	E3Z-D81-M5J
			Pigtail 4 pin (M8)		E3Z-D61-M3J	E3Z-D81-M3J
			Pigtail 4 pin (M12)		E3Z-D61-M1J	E3Z-D81-M1J
			Pre-wired	1 m	E3Z-D62	E3Z-D82
			Connector		E3Z-D67	E3Z-D87
			Pigtail 3 pin (M8)		E3Z-D62-M5J	E3Z-D82-M5J
			Pigtail 4 pin (M8)		E3Z-D62-M3J	E3Z-D82-M3J
			Pigtail 4 pin (M12)		E3Z-D62-M1J	E3Z-D82-M1J

Note: 1. Model numbers that end with (A) are red LED versions.

2. The Reflector is sold separately. Select the Reflector model most suited to the application.

3. Sensing distance can be extended to 4 meters when the E39-R1S reflector is used. The sensing distance is 3 meters when the E39-R1 reflector is used.

■ **Accessories (order separately)**

Stock Note: Shaded models are normally stocked.

Slit for Through-beam Models (E3Z-T□□)

Order a slit for each emitter and receiver.

Slit width	Sensing distance (typical)	Minimum sensing object (typical)	Model
0.5 mm dia.	50 mm	0.5 mm dia.	E39-S65A
1 mm dia.	200 mm	1 mm dia.	E39-S65B
2 mm dia.	800 mm	2 mm dia.	E39-S65C
0.5 × 10 mm	1 m	0.7 mm dia.	E39-S65D
1 × 10 mm	2.2 m	1.2 mm dia.	E39-S65E
2 × 10 mm	5 m	2.4 mm dia.	E39-S65F

■ **Reflectors for Retroreflective Models**

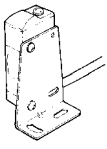
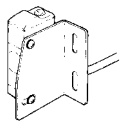
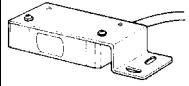
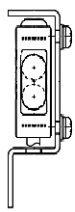
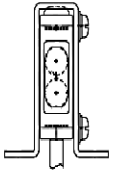
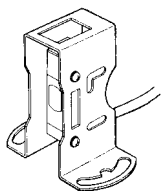
Stock Note: Shaded models are normally stocked.

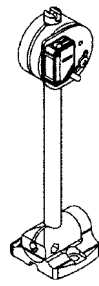
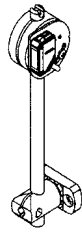
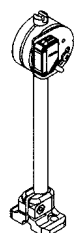
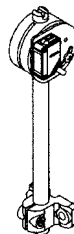
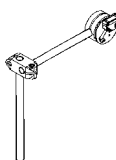
Name	Sensing distance (typical)	Model
Reflector	100 mm to 3 m	E39-R1
	100 mm to 4 m	E39-R1S
	100 mm to 5 m	E39-R2
	100 mm to 2.5 m	E39-R9
	100 mm to 3.5 m	E39-R10
Miniature Reflector	50 mm to 1.5 m	E39-R3
Tape Reflector	150 mm to 700 mm	E39-RS1
	150 mm to 1.1 m	E39-RS2
	150 mm to 1.4 m	E39-RS3

Note: The actual sensing distance may be reduced to approximately 70% of the typical sensing distance when using a Reflector other than the E39-R1 or the E39-R1S.

■ Mounting Brackets

Stock Note: Shaded models are normally stocked.

Appearance	Description	Model
	L-bracket, horizontal	E39-L104
	L-bracket, vertical	E39-L44
	Open top, 20° angle adjustability	E39-L43
	Protected top 5° angle adjustability	E39-L144
	Compact vertical protective cover bracket	E39-L142
	Vertical protective cover bracket	E39-L98

Appearance	Description	Model
	Adjustable height and angle bracket for sensors; horizontal mounting rotates every 45 degrees Mounted to the aluminum frame rails of conveyors, easily adjustable	E39-L93FH
	Adjustable height and angle bracket for sensors; vertical mounting rotates every 45 degrees	E39-L93FV
	Adjustable height and angle bracket for sensors; fixed horizontal base mounting	E39-L93H
	Adjustable height and angle bracket for sensors; fixed vertical base mounting	E39-L93V
	Adjustable height and angle bracket for sensors; free range of X and Y axis positioning; no base included for vertical post	E39-L93XY

Note: If a through-beam model is used, order two Mounting Brackets — one for the emitter and one for the receiver.

■ M8 CONNECTORS

Appearance	Cable type		Model
Straight	2 m (6.56 ft)	Four-wire type	XS3F-M421-402-A
	5 m (16.40 ft)		XS3F-M421-405-A
Right angle	2 m (6.56 ft)		XS3F-M422-402-A
	5 m (16.40 ft)		XS3F-M422-405-A
Straight	2 m (6.56 ft)	Three-wire type	Y96E-M833SD2
	5 m (16.40 ft)		Y96E-M833SD5
Right angle	2 m (6.56 ft)		Y96E-M833RD2
	5 m (16.40 ft)		Y96E-M833RD5

■ M12 CONNECTORS

Appearance	Cable type		Model
Straight	2 m (6.56 ft)	Four-wire type	Y96E-44SD2
	5 m (16.40 ft)		Y96E-44SD5
Right angle	2 m (6.56 ft)		Y96E-44RD2
	5 m (16.40 ft)		Y96E-44RD5

Specifications

Item	Sensing method	Through-beam	Polarized retroreflective	Diffuse reflective		
		NPN output	E3Z-T61/T66 (A) (Note 3)	E3Z-R61/R66	E3Z-D61/D66	E3Z-D62/D67
	PNP output	E3Z-T81/T86 (A) (Note 3)	E3Z-R81/R86	E3Z-D81/D86	E3Z-D82/D87	
Sensing distance		15 m 10 m (A) (Note 3)	100 mm (4 m Note 1) (when using E39-R1S) 100 mm (3 m Note 2) (when using E39-R1)	White paper (100 × 100 mm): 100 mm	White paper (300 × 300 mm): 1 m	
Standard sensing object		Opaque: 12 mm (dia. min.)	Opaque: 75 mm (dia. min.)	---		
Hysteresis		---		20% max. of setting distance		
Directional angle		Both emitter and re- ceiver: 3 to 15°	2 to 10°	---		
Light source (wave length)		Infrared LED (870 nm)	Red LED (660 nm)	Infrared LED (860 nm)		
Power supply voltage		12 to 24 VDC ±10% including 10% (p-p) max. ripple				
Current consumption		Emitter: 15 mA Receiver: 20 mA	30 mA max.			
Control output		100 mA max. at 26.4 VDC, open collector output (residual voltage: 2 V max.) < 10 mA (residual voltage: 1 V max.) L-ON/D-ON, switch selectable				
Circuit protection		Load short-circuit, re- versed power supply protection, and output reverse protection	Reversed power supply connection, output short-circuit, and mutual interference protection, and output reverse protection			
Response time		1 ms max.				
Sensitivity adjustment		One-turn potentiometer				
Ambient illumination (receiver side)	Incandescent lamp	3,000 ℓ max.				
	Sunlight	10,000 ℓ max.				
Ambient temperature	Operating	-25°C to 55°C (-13°F to 131°F)				
	Storage	-40°C to 70°C (-40°F to 158°F) 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, 50/60 Hz for 1 min				
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude or 300 m/s ² for 2 hours each in X, Y, and Z axes				
Shock resistance	Destruction	500 m/s ² 3 times each in X, Y, and Z axes				
Enclosure rating		IP67 (IEC60529) 1200 PSI Washdown (NEMA ICS5, ANNEX F)				
Approvals		CE				
Connection method		2 m cable or M8 connector				
Indicator		Operation indicator (orange) Stability indicator (green) Emitter has power indicator (orange) only				
Weight (packed state)	Pre-wired cable (2 m)	Approx. 120 g (4.2 oz)	Approx. 65 g (2.3 oz)			
	Connector	Approx. 30 g (1.1 oz)	Approx. 20 g (0.7 oz)			
Material		Case: PBT (polybutylene terephthalate); Lens: Denatured polyallylate				
Accessories		Instruction manual (Order Reflector and Mounting Bracket separately.)				

Note: 1. Sensing distance can be extended up to 4 meters when the E39-R1S reflector is used.

2. Sensing distance can be extended up to 3 meters when the E39-R1 reflector is used.

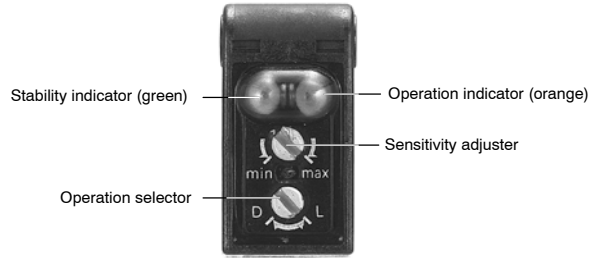
3. Sensing distance is 10 meters when using the (A) versions (visible red LED, 660 nm).

Nomenclature

Through-beam Models
E3Z-T6□ Receiver

Retroreflective Models
E3Z-R6□

Diffuse-reflective Models
E3Z-D6□



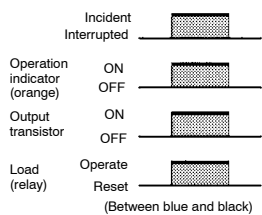
Operation

Output Circuits

Model	E3Z-T61/-T66/-R61/-R66/-D61/-D66/-D62/-D67	
NPN output	Through-beam receiver Retroreflective model Diffuse reflective model	Through-beam emitter
Model	E3Z-T81/-T86/-R86/-D81/-D86/-D82/-D87	
PNP output	Through-beam receiver Retroreflective model Diffuse reflective model	Through-beam emitter
Connector pin arrangement	<p>Pin 2 is open.</p>	<p>Pins 2, 4 are open.</p>

Timing Charts

Light-ON (L-ON) Operation



Dark-ON (D-ON) Operation

