

The Standard for Photoelectric Sensors with a Secure Track Record of One Million Sold Yearly.

- Long sensing distance of 30 m for Through-beam Models, 4 m for Retro-reflective Models, and 1 m for Diffuse-reflective Models.
- Mechanical axis and optical axis offset of less than $\pm 2.5^\circ$ simplifies optical axis adjustment.
- High stability with unique algorithm that prevents interference of external light.



For the most recent information on models that have been certified for safety standards, refer to your OMRON website.



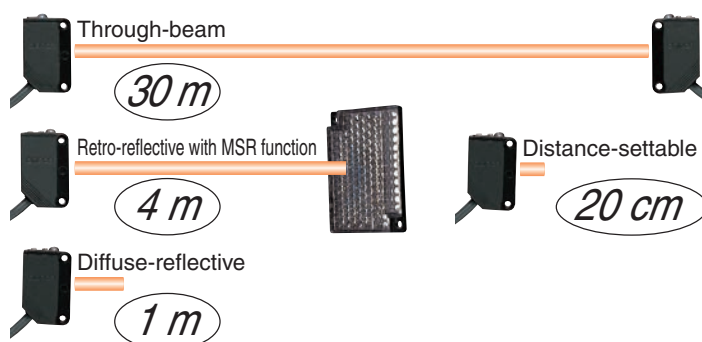
Be sure to read *Safety Precautions* on page 13.

Features

Industry's Top-level Sensing Distance with Built-in Amplifier

A separately sold filter is available to prevent mutual interference for Through-beam Models with red lights sources and a sensing distance of 10 m. Reflective Models include functionality to prevent mutual interference (up to 2 sensors).

Long-distance, Through-beam Sensors with a detection distance of 30 m (response time: 2 ms) are also available.

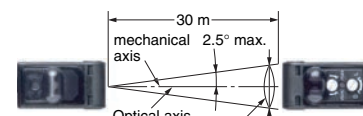


Low-temperature Operation for Applications in Cold-storage Warehouses

A wider ambient operating range from -40 to 55°C (main models with connectors). We also provide Sensor I/O Connectors with PUR Cables for high resistance to cold environments.

Improved Matching of Optical Axis and Mechanical Axis for Through-beam Models and Retro-reflective Models

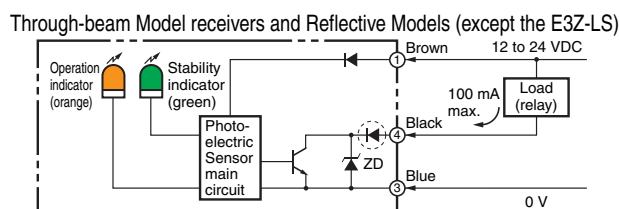
The offset between the optical axis and the mechanical axis is kept within $\pm 2.5^\circ$, so the optical axis can be accurately set simply by mounting the Sensor according to the mechanical axis.



The receiver will always be in the range of light diffusion.

Sensor Protection against Incorrect Wiring

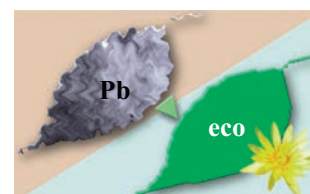
The Sensor includes output reverse polarity protection. (A diode to protect against reverse polarity is added to the output line.)



Protection for NPN output models

Complete Compliance with the EU's RoHS Directive

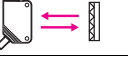
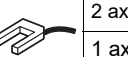
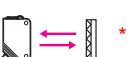
Lead, mercury, cadmium hexachrome, polybrominated biphenyl (PBB), and polybrominated diphenyl ether (PBDE) have all been eliminated. Also, burnable polyethylene packaging has been used.



Ordering Information

Sensors [Refer to Dimensions on page 14.]

 Red light
  Infrared light

Sensing method	Appearance	Connection method	Sensing distance	Model	
				NPN output	PNP output
Through-beam (Emitter + Receiver) *3		Pre-wired (2 m)	 15 m	E3Z-T61 2M *4 *5 Emitter E3Z-T61-L 2M Receiver E3Z-T61-D 2M	E3Z-T81 2M *4 *5 Emitter E3Z-T81-L 2M Receiver E3Z-T81-D 2M
		Standard M8 connector		E3Z-T66 Emitter E3Z-T66-L Receiver E3Z-T66-D	E3Z-T86 Emitter E3Z-T86-L Receiver E3Z-T86-D
		Pre-wired (2 m)	 10 m	E3Z-T61A 2M *4 Emitter E3Z-T61-A-L 2M Receiver E3Z-T61-A-D 2M	E3Z-T81A 2M *4 Emitter E3Z-T81-A-L 2M Receiver E3Z-T81-A-D 2M
		Standard M8 connector		E3Z-T66A Emitter E3Z-T66-A-L Receiver E3Z-T66-A-D	E3Z-T86A Emitter E3Z-T86-A-L Receiver E3Z-T86-A-D
		Pre-wired (2 m)	 30m	E3Z-T62 2M *4 Emitter E3Z-T62-L 2M Receiver E3Z-T62-D 2M	E3Z-T82 2M Emitter E3Z-T82-L 2M Receiver E3Z-T82-D 2M
		Standard M8 connector		E3Z-T67 Emitter E3Z-T67-L Receiver E3Z-T67-D	E3Z-T87 Emitter E3Z-T87-L Receiver E3Z-T87-D
Retro-reflective with MSR function		Pre-wired (2 m)	 4 m *2 (100 mm)	E3Z-R61 2M *4 *5	E3Z-R81 2M *4 *5
		Standard M8 connector		E3Z-R66	E3Z-R86
Diffuse-reflective		Pre-wired (2 m)	 5 to 100 mm (wide view)	E3Z-D61 2M *4	E3Z-D81 2M *4 *5
		Standard M8 connector		E3Z-D66	E3Z-D86
		Pre-wired (2 m)	 1 m	E3Z-D62 2M *4 *5	E3Z-D82 2M *4 *5
		Standard M8 connector		E3Z-D67	E3Z-D87
		Pre-wired (2 m)	 90±30 mm (narrow beam)	E3Z-L61 2M *4 *5	E3Z-L81 2M *4 *5
		Standard M8 connector		E3Z-L66	E3Z-L86
Distance-settable Refer to E3Z-LS .		Pre-wired (2 m)	 20 to 40 mm (BGS min setting) 20 to 200 mm (BGS max setting)	E3Z-LS61 2M *4	E3Z-LS81 2M *4
		Standard M8 Connector		E3Z-LS66	E3Z-LS86
		Pre-wired (2 m)	 2 to 20 mm (BGS min setting) 2 to 80 mm (BGS max setting)	E3Z-LS63 2M	E3Z-LS83 2M *5
		Standard M8 connector		E3Z-LS68	E3Z-LS88
Slit-type Through-beam Refer to E3Z-G .		1 axis	 25 mm	E3Z-G61 2M *4 *5	E3Z-G81 2M *4 *5
		2 axes		E3Z-G62 2M *4	E3Z-G82 2M *4
		1 axis		E3Z-G61-M3J	E3Z-G81-M3J
		2 axes		E3Z-G62-M3J	E3Z-G82-M3J
Limited-reflective for transparent glasses		Pre-wired (2 m)	 30±20 mm	E3Z-L63 2M	E3Z-L83 2M
		Standard M8 connector		E3Z-L68	E3Z-L88
Retro-reflective with- out MSR function for clear, plastic bottles		Pre-wired (2 m)	 500 mm (80 mm) *2	E3Z-B61 2M	E3Z-B81 2M *4
		Standard M8 connector		E3Z-B66	E3Z-B86
		Pre-wired (2 m)	 2 m (500 mm) *2	E3Z-B62 2M *4	E3Z-B82 2M *4
		Standard M8 connector		E3Z-B67	E3Z-B87

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

*2. The sensing distance specified is possible when the E39-R1S is used. Values in parentheses indicate the minimum required distance between the Sensor and Reflector.

*3. Through-beam Sensors are normally sold in sets that include both the Emitter and Receiver.

*4. M12 Standard Pre-wired Connector Models are also available.

When ordering, add "-M1J 0.3M" to the end of the model number (e.g., E3Z-T61-M1J 0.3M).

The cable is 0.3 m long. The applicable Sensor I/O Connector is the XS2 Series. For details, refer to the XS2 information available on the OMRON website.

*5. M12 Pre-wired Smartclick Connector Models are also available.

When ordering, add "-M1TJ 0.3M" to the end of the model number (e.g., E3Z-T61-M1TJ 0.3M).

The cable is 0.3 m long. The applicable Sensor I/O Connector is the XS5 Series. For details, refer to the XS5 information available on the OMRON website.

Oil-resistive Sensors [Refer to Dimensions on page 14.]

Red light Infrared light

Sensing method	Appearance	Connection method	Sensing distance	Model	
				NPN output	PNP output
Through-beam (Emitter + Receiver) *3		Pre-wired (2 m)	15 m	E3Z-T61K 2M *4 Emitter E3Z-T61K-L 2M Receiver E3Z-T61K-D 2M	E3Z-T81K 2M *4 Emitter E3Z-T81K-L 2M Receiver E3Z-T81K-D 2M
		Pre-wired M8 connector		E3Z-T61K-M3J 0.3M Emitter E3Z-T61K-L-M3J 2M Receiver E3Z-T61K-D-M3J 2M	E3Z-T81K-M3J 0.3M Emitter E3Z-T81K-L-M3J 2M Receiver E3Z-T81K-D-M3J 2M
Retro-reflective with MSR function		Pre-wired (2 m)	3 m (150 mm)	E3Z-R61K 2M *4	E3Z-R81K 2M
		Pre-wired M8 connector		E3Z-R61K-M3J 0.3M	E3Z-R81K-M3J 0.3M
Diffuse-reflective		Pre-wired (2 m)	5 to 100 mm (wide view)	E3Z-D61K 2M *4	E3Z-D81K 2M
		Pre-wired M8 connector		E3Z-D61K-M3J 0.3M	E3Z-D81K-M3J 0.3M
		Pre-wired (2 m)		E3Z-D62K 2M *4	E3Z-D82K 2M
		Pre-wired M8 connector		E3Z-D62K-M3J 0.3M	E3Z-D82K-M3J 0.3M

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

*2. The sensing distance specified is possible when the E39-R1S is used. Values in parentheses indicate the minimum required distance between the Sensor and Reflector.

*3. Through-beam Sensors are normally sold in sets that include both the Emitter and Receiver.

*4. M12 Standard Pre-wired Connector Models are also available.

When ordering, add "-M1J 0.3M" to the end of the model number (e.g., E3Z-T61-M1J 0.3M).

The cable is 0.3 m long. The applicable Sensor I/O Connector is the XS2 Series. For details, refer to the XS2 information available on the OMRON website.

Accessories (Order Separately)

Slit (A Slit is not provided with Through-beam Sensors) Order a Slit separately if required. [Refer to Dimensions on page 16.]

Slit width	Sensing distance		Minimum detectable object (Reference value)	Model	Contents
	E3Z-T□□	E3Z-T□□A			
0.5-mm dia.	50 mm	35 mm	0.2-mm dia.	E39-S65A	One set (contains Slits for both the Emitter and Receiver)
1-mm dia.	200 mm	150 mm	0.4-mm dia.	E39-S65B	
2-mm dia.	800 mm	550 mm	0.7-mm dia.	E39-S65C	
0.5 × 10 mm	1 m	700 mm	0.2-mm dia.	E39-S65D	
1 × 10 mm	2.2 m	1.5 m	0.5-mm dia.	E39-S65E	
2 × 10 mm	5 m	3.5 m	0.8-mm dia.	E39-S65F	

Reflectors (Reflector required for Retroreflective Sensors) A Reflector is not provided with the Sensor. Be sure to order a Reflector separately.
[Refer to Dimensions on E39-L/E39-S/E39-R]

Name	Sensing distance *					Model	Quantity	Remarks
	E3Z-R		E3Z-R□K	E3Z-B□1/-B□6	E3Z-B□2/-B□7			
	Rated value (sensing distance of 15 m)	Reference value (sensing distance of 10 m)	Rated value	Rated value	Rated value			
Reflector	3 m (100 mm)	---	2 m (100 mm)	---	---	E39-R1	1	- Retro-reflective models are not provided with Reflectors. - The MSR function is enabled.
	4 m (100 mm)	---	3 m (150 mm)	500 mm (80 mm)	2 m (500 mm)	E39-R1S	1	
	---	5 m (100 mm)	---	---	---	E39-R2	1	
	---	2.5 m (100 mm)	---	---	---	E39-R9	1	
	---	3.5 m (100 mm)	---	---	---	E39-R10	1	
Fog Preventive Coating	---	3 m (100 mm)	---	500 mm (80 mm)	2 m (500 mm)	E39-R1K	1	
Small Reflector	---	1.5 m (50 mm)	---	---	---	E39-R3	1	
Tape Reflector	---	700 mm (150 mm)	---	---	---	E39-RS1	1	
	---	1.1 m (150 mm)	---	---	---	E39-RS2	1	
	---	1.4 m (150 mm)	---	---	---	E39-RS3	1	

Note: 1. If you use the Reflector at any distance other than the rated distance, make sure that the stability indicator lights properly when you install the Sensor.

2. For details, refer to Reflectors on the E39-L/E39-S/E39-R information available on the OMRON website.

* Values in parentheses indicates the minimum required distance between the Sensor and Reflector.

Mutual Interference Protection Filter A Filter is not provided with the Sensor (for the through-beam E3Z-T□□A). Order a Filter separately if required.

Sensing distance	Appearance/Dimensions	Model	Quantity	Remarks
3 m		E39-E11	Two sets each for the Emitter and Receiver (total of four pieces)	Can be used with the E3Z-T□□A Through-beam models. The arrow indicates the direction of polarized light. Mutual interference can be prevented by altering the direction of polarized light from or to adjacent Emitters and Receivers.

Note: The polarization directions of the Filters are offset by 90° to prevent interference. When you install the Emitter and Receiver, install them at the same angle to maintain this offset.

Mounting Brackets A Mounting Bracket is not enclosed with the Sensor. Order a Mounting Bracket separately if required.

[Refer to Dimensions on E39-L/E39-S/E39-R]

Appearance	Model (material)	Quantity	Remarks	Appearance	Model (material)	Quantity	Remarks
	E39-L153 (SUS304) *1	1	Mounting Brackets		E39-L98 (SUS304) *2	1	Metal Protective Cover Bracket
	E39-L104 (SUS304) *1	1			E39-L150 (SUS304)	1	(Sensor adjuster)
	E39-L43 (SUS304) *2	1	Horizontal Mounting Brackets		E39-L151 (SUS304)	1	Easily mounted to the aluminum frame rails of conveyors and easily adjusted.
	E39-L142 (SUS304) *2	1	Horizontal Protective Cover Bracket				For left to right adjustment
	E39-L44 (SUS304)	1	Rear Mounting Bracket		E39-L144 (SUS304) *2	1	Compact Protective Cover Bracket (For E3Z only)

Note: 1. When using Through-beam models, order one bracket for the Receiver and one for the Emitter.

2. For details, refer to *Mounting Brackets* on the E39-L/E39-S/E39-R information available on the OMRON website.

*1. Cannot be used for Standard Connector models with mounting surface on the bottom. In that case, use Pre-wired Connector models.

*2. Cannot be used for Standard Connector models.

Sensor I/O Connectors (Sockets on One Cable End)

(Models for Connectors and Pre-wired Connectors: A Connector is not provided with the Sensor. Be sure to order a Connector separately.)

[Refer to Dimensions for XS3.]

Size	Cable	Appearance	Cable type	Model
M8	Standard	Straight *2 	2 m	XS3F-M421-402-A
			5 m	XS3F-M421-405-A
		L-shaped *2 *3 	2 m	XS3F-M422-402-A
			5 m	XS3F-M422-405-A
	PUR (Polyurethane) cable *1	Straight *2 	2 m	XS3F-M421-402-L
			5 m	XS3F-M421-405-L
		L-shaped *2 *3 	2 m	XS3F-M422-402-L
			5 m	XS3F-M422-405-L
	Vibration-proof robot cable	Straight *2 	2 m	XS3F-M421-402-R
			5 m	XS3F-M421-405-R
		L-shaped *2 *3 	2 m	XS3F-M422-402-R
			5 m	XS3F-M422-405-R

Note: 1. When using Through-beam models, order one connector for the Receiver and one for the Emitter.

2. For details, refer to the XS3 information available on the OMRON website.

*1. The Sensor can be used in low-temperature environments (–25°C to –40°C). Do not use the Sensor in locations that are subject to oil.

*2. The connector will not rotate after connecting.

*3. The cable is fixed at an angle of 180° from the sensor emitter/receiver surface.

Ratings and Specifications

Item	Sensing method		Through-beam			Retro-reflective with MSR function	Diffuse-reflective		(Narrow-beam Models)	
	Model	NPN out-put	Pre-wired	E3Z-T61	E3Z-T62	E3Z-T61A	E3Z-R61	E3Z-D61	E3Z-D62	E3Z-L61
		Connector (M8)	E3Z-T66	E3Z-T67	E3Z-T66A	E3Z-R66	E3Z-D66	E3Z-D67	E3Z-L66	
		PNP out-put	Pre-wired	E3Z-T81	E3Z-T82	E3Z-T81A	E3Z-R81	E3Z-D81	E3Z-D82	E3Z-L81
		Connector (M8)	E3Z-T86	E3Z-T87	E3Z-T86A	E3Z-R86	E3Z-D86	E3Z-D87	E3Z-L86	
Sensing distance			15 m	30 m	10 m	4 m (100 mm) *1 (when using E39-R1S) 3 m (100 mm) *1 (when using E39-R1)	100 mm (white paper: 100 × 100 mm)	1 m (white paper: 300 × 300 mm)	90 + 30 mm (white paper, 100 x 100 mm)	
Spot diameter (reference value)			---						(2.5 dia. and sensing distance of 90 mm)	
Standard sensing object			Opaque: 12-mm dia. min.			Opaque: 75-mm dia. min.		---		
Minimum detectable object (reference value)			---						0.1 mm (cop- per wire)	
Differential travel			---				20% max. of setting distance		Refer to <i>Engi- neering data</i> on page 8.	
Directional angle			Both emitter and receiver: 3 to 15°			2 to 10°		---		
Light source (wavelength)			Infrared LED (870 nm)		Red LED (660 nm)	Red LED (660 nm)		Infrared LED (870 nm)		Red LED (650 nm)
Current consumption			35 mA max. (Emitter: 15 mA max., Receiv- er: 20 mA max.)			30 mA max.				
Protection circuits			Reversed power supply polarity protection, Output short-circuit protection, and Re- versed output polarity protection			Reversed power supply polarity protection, Output short-circuit protection, Mutual interference prevention, and Reversed output polarity protection				
Response time			Operate or reset: 1 ms max.	Operate or reset: 2 ms max.	Operate or reset: 1 ms max.					
Degree of protection			IEC, IP67							
Connection method			Pre-wired cable (standard length: 2 m and 0.5 m), Connector (M8)							
Weight (packedstate)	Pre-wired cable (2 m)		Approx. 120 g			Approx. 65 g				
	Connector		Approx. 30 g			Approx. 20 g				
Material	Case		PBT (polybutylene terephthalate)							
	Lens		Modified polyarylate			Methacrylic resin		Modified polyarylate		
MTTFd (Year)			754			1,012		1,012		2,165

Model		Sensing method	Retro-reflective for clear, plastic bottles (without MSR function)			
		NPN output	E3Z-B61	E3Z-B66	E3Z-B62	E3Z-B67
Item		PNP output	E3Z-B81	E3Z-B86	E3Z-B82	E3Z-B87
Sensing distance			500 mm (80 mm) *1 (using E39-R1S)		2 m (500 mm) *1 *2 (using E39-R1S)	
Standard sensing object			Opaque materials, 75mm dia. min. (Standard detectable object :glass Cylinder 15mm dia. thickness 1.1mm length 50mm, and the transmission factor 92% or less in wave length 660nm)			
Light source (wavelength)			Red LED (660 nm)			
Current consumption			30 mA max.			
Protection circuits			Reversed power supply polarity protection, Output short-circuit protection, Mutual interference prevention, and Reversed output polarity protection			
Response time			Operate or reset: 1 ms max.			
Degree of protection			IEC, IP67			
Connection method			Pre-wired cable (standard length: 2 m and 0.5 m)	Connector (M8, 4 pins)	Pre-wired cable (standard length: 2 m and 0.5 m)	Connector (M8, 4 pins)
Weight (packed state)	Pre-wired cable (2 m)		Approx. 65 g			
	Standard Connector		Approx. 20 g			
Material	Case		PBT (polybutylene terephthalate)			
	Lens		Modified polyarylate			
MTTFd (Year)			2,056			

*1. Values in parentheses indicate the minimum required distances between the Sensors and Reflectors.

*2. Plastic bottles must pass with the minimum clearance of 500 mm.

Item	Sensing method		Transparent glass Limited-reflective (for transparent object detection)	
	Model	NPN output	E3Z-L63	E3Z-L68
		PNP output	E3Z-L83	E3Z-L88
Sensing distance			30±20 mm (transparent glasses 100 × 100 mm)	
Spot diameter (reference value)			2-mm dia. min. (at sensing distance of 30 mm)	
Minimum detectable object (reference value)			0.1 mm dia. (copper wire)	
Light source (wavelength)			Red LED (660 nm)	
Current consumption			30 mA max.	
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.	
Degree of protection			IEC, IP67	
Connection method			Pre-wired (standard length: 2 m)	M8 connector
Weight (packed state)	Pre-wired cable (2 m)		Approx. 65 g	
	Standard Connector		Approx. 20 g	
Material	Case		PBT (polybutylene terephthalate)	
	Lens		Modified polyarylate	
MTTFd (Year)			1,028	

Oil-resistant

Item	Model	Sensing method		Through-beam	Retro-reflective	Diffuse-reflective	
		NPN out-put	Pre-wired Models	E3Z-T61K	E3Z-R61K	E3Z-D61K	E3Z-D62K
			M8 Pre-wired connector	E3Z-T61K-M3J	E3Z-R61K-M3J	E3Z-D61K-M3J	E3Z-D62K-M3J
		PNP out-put	Pre-wired Models	E3Z-T81K	E3Z-R81K	E3Z-D81K	E3Z-D82K
		M8 Pre-wired connector	E3Z-T81K-M3J	E3Z-R81K-M3J	E3Z-D81K-M3J	E3Z-D82K-M3J	
Sensing distance			15 m	3 m (150 mm) * (when using E39-R1S) 2 m (100 mm) * (when using E39-R1)	100 mm (white paper: 100 × 100 mm)	1 m (white paper: 300 × 300 mm)	
Standard sensing object			Opaque: 12-mm dia. min.	Opaque: 75-mm dia. min.	---		
Differential travel			---		20% max. of setting distance		
Directional angle			Both emitter and receiver: 3 to 15°	2 to 10°	---		
Light source (wavelength)			Infrared LED (870 nm)	Red LED (660 nm)	Infrared LED (860 nm)		
Current consumption			35 mA max. (Emitter: 15 mA max., Receiver: 20 mA max.)	30 mA max.			
Protection circuits			Reversed power supply polarity protection, Output short-circuit protection, and Reversed output polarity protection	Reversed power supply polarity protection, Output short-circuit protection, Mutual interference prevention, and Reversed output polarity protection			
Response time			Operate or reset: 1 ms max.				
Degree of protection			IP67 (IEC), Oil resistant models: IP67 (IEC) (in-house standards: oilproof), excluding cables and connectors				
Connection method			Pre-wired cable (standard length: 2 m), M8 Pre-wired Connector				
Weight (packed state)	Pre-wired cable (2 m)		Approx. 120 g	Approx. 65 g			
	Connector (M8, 4 pins)		Approx. 50 g	Approx. 30 g			
Material	Case		PBT (polybutylene terephthalate)				
	Lens		Modified polyarylate	Methacrylic resin	Modified polyarylate		
MTTFd (Year)			494	636	636		

* Values in parentheses indicate the minimum required distance between the Sensor and Reflector.

Common

Power supply voltage	12 to 24 VDC±10%, ripple (p-p): 10% max.
Control output	Load power supply voltage: 26.4 VDC 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/PNP depending on model) Light-ON/Dark-ON selectable
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, Some connector models: -40°C to 55°C * (with no icing or condensation) 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: 500 m/s ² 3 times each in X, Y, and Z directions
Indicator	Operation indicator (orange) Stability indicator (green) Through-beam Emitter has power indicator (red) only.
Accessories	Instruction manual (Neither Reflectors nor Mounting Brackets are provided with any of the above models.)

* The ambient temperature range during operation for connector models depends on the model. For the E3Z-T66/T86/R66/R86, the range is -40°C to 55°C. For the E3Z-D66/D86/D67/D87, the range is -30°C to 55°C. For other connector models, the range is -25°C to -55°C.

The sensing distance for Retro-reflective Models (E3Z-R66/R86) between -40°C to -25°C, however, will be as follows (not the values in the table):
With E39-R1S: 3 m (100 mm), With E39-R1: 2 m (100 mm).

Also, use the XS3F-M42□-4□□-L Sensor I/O Connector (PUR cable) for applications between -25°C to -40°C. (Refer to page 4.)