


# E3Z

## The New Standard for Compact, Long-range Photoelectric Sensors Conserves Energy and Natural Resources, One Million Sold Yearly

- Long sensing distance of 15 m for Through-beam Models, 4 m for Retro-reflective Models, and 1 m for Diffuse-reflective Models.
- Unique algorithm minimizes external interference from inverter fluorescent lighting.
- Conserves energy and represents ongoing efforts aimed at eliminating materials containing lead.
- Provides a high degree of protection (IP67), mutual interference prevention, and EN standard compliance.
- Mechanical axis and optical axis offset always less than  $\pm 2.5^\circ$  greatly simplifies optical axis alignment.







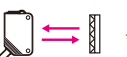













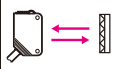
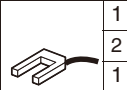
 Be sure to read *Safety Precautions* on page 9.

### Ordering Information

#### Sensors

 Red light  Infrared light

Sensing method	Appearance	Connection method	Sensing distance	Model	
				NPN output	PNP output
Through-beam		Pre-wired (2 m) *3, *4		E3Z-T61 <sup>*5</sup> E3Z-T61 <sup>*6</sup>	E3Z-T81
		Connector (M8, 4 pins)		E3Z-T66	E3Z-T86
		Pre-wired (2 m) *3		E3Z-T61A <sup>*5</sup>	E3Z-T81A
		Connector (M8, 4 pins)		E3Z-T66A	E3Z-T86A
		Pre-wired (2 m) *3		E3Z-T62	E3Z-T82
		Connector (M8, 4 pins)		E3Z-T67	E3Z-T87
		Pre-wired (2 m) *3		E3Z-T62-G0	E3Z-T82-G0
		Connector (M8, 4 pins)		E3Z-T67-G0	E3Z-T87-G0
Oil-resistant Through-beam		Pre-wired (2 m)		E3Z-T61K	E3Z-T81K
		Pre-wired Connector (M8, 4 pins)		E3Z-T61K-M3J	E3Z-T81K-M3J
Retro-reflective with MSR function	 *1	Pre-wired (2 m) *3, *4		E3Z-R61 <sup>*5</sup> E3Z-R61 <sup>*6</sup>	E3Z-R81
	Connector (M8, 4 pins)	E3Z-R66		E3Z-R86	
Oil-resistant Retro-reflective with MSR function	 *1	Pre-wired (2 m)		E3Z-R61K	E3Z-R81K
		Pre-wired Connector (M8, 4 pins)		E3Z-R61K-M3J	E3Z-R81K-M3J
Diffuse-reflective		Pre-wired (2 m) *3, *4		E3Z-D61 <sup>*5</sup> E3Z-D61 <sup>*6</sup>	E3Z-D81
		Connector (M8, 4 pins)		E3Z-D66	E3Z-D86
		Pre-wired (2 m) *3, *4		E3Z-D62 <sup>*5</sup> E3Z-D62 <sup>*6</sup>	E3Z-D82
		Connector (M8, 4 pins)		E3Z-D67	E3Z-D87
Oil-resistant Diffuse-reflective		Pre-wired (2 m)		E3Z-D61K	E3Z-D81K
		Pre-wired Connector (M8, 4 pins)		E3Z-D61K-M3J	E3Z-D81K-M3J
		Pre-wired (2 m)		E3Z-D62K	E3Z-D82K
		Pre-wired Connector (M8, 4 pins)		E3Z-D62K-M3J	E3Z-D82K-M3J

Sensing method	Appearance	Connection method	Sensing distance	Model	
				NPN output	PNP output
Distance-settable		Pre-wired (2 m) *3	20 to 40 mm (BGS min setting) 20 to 200 mm (BGS max setting)	E3Z-LS61 *5	E3Z-LS81
		Standard M8 Connector	40 min. Incident threshold (FGS min setting) 200 min. Incident threshold (FGS max setting)	E3Z-LS66	E3Z-LS86
		Pre-wired (2 m) *3	2 to 20 mm (BGS min setting)	E3Z-LS63	E3Z-LS83
		Standard M8 Connector	2 to 80 mm (BGS max setting)	E3Z-LS68	E3Z-LS88
Narrow-beam Reflective		Pre-wired (2 m) *3	90±30 mm	E3Z-L61 *5	E3Z-L81
		Standard M8 Connector		E3Z-L66	E3Z-L86
Retro-reflective without MSR function for clear, plastic bottles		Pre-wired (2 m) *3	500 mm (80 mm) *2	E3Z-B61 *5	E3Z-B81
		Standard M8 Connector		E3Z-B66	E3Z-B86
		Pre-wired (2 m) *3	2 m (500 mm) *2	E3Z-B62 *5	E3Z-B82
		Standard M8 Connector		E3Z-B67	E3Z-B87
Slit-type Through-beam		1 axis	25 mm	E3Z-G61 *5	E3Z-G81
		2 axes		E3Z-G62 *5	E3Z-G82
		1 axis		E3Z-G61-M3J	E3Z-G81-M3J
		2 axes		E3Z-G62-M3J	E3Z-G82-M3J

Note: The sensing distance of Oil-resistive Retro-reflective models is different from that of standard Retro-reflective models.

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

\*3. Models with a 0.5-m cable are available as a standard feature for products marked \*3. When ordering, specify the cable length by adding the code "0.5M" to the model number (e.g., E3Z-T61 0.5M).

\*4. Pre-wired M12 Connectors are available for models in the table marked \*4. These models have the -M1J suffix. (Example: E3Z-T61-M1J)

\*5. Press-fit e-CON Pre-wired Connectors are available with 0.3-m, 0.5-m, and 2-m cables for models in the table marked \*5.

The model number is E3Z-□□-ECON. The connector is the E39-ECON□□ with a 2-m or 5-m cable and a connector on one end or the E39-ECONW□□ with a 0.5-m to 2-m cable (length increases in 0.1-m increments) and connectors at both ends.

This e-CON specification is rapidly becoming the standard for FA equipment and connector manufacturers.

\*6. Clamp-type e-CON Pre-wired Connectors are available with a 2-m cable. The suffix for these models is -ECON-C. (Example: E3Z-T61-ECON-C 2 M) The connectors are E-39-ECON□□ with a 2-m or 5-m cable and a connector on one end or the E39-ECONW□□ with a 0.5-m to 2-m cable (length increases in 0.1-m increments) and connectors at both ends. This e-CON specification is rapidly becoming the standard for FA equipment and connector manufacturers.

## Accessories (Order Separately)

### Slit

Slit width	Sensing distance		Minimum detectable object (typical)	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

Name	E3Z-R Sensing distance (typical)*	Model	Quantity	Remarks
Reflector	3 m (100 mm) (rated value)	E39-R1	1	<ul style="list-style-type: none"> <li>Retro-reflective models are not provided with Reflectors.</li> <li>The MSR function is enabled.</li> </ul>
	4 m (100 mm) (rated value)	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)	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: The actual sensing distance may be reduced to approximately 70% of the typical sensing distance when using a Reflector other than E39-R1 or E39-R1S.

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

**Mutual Interference Protection Filter**

Sensing distance	Appearance/Dimensions	Model	Quantity	Remarks
3 m		<b>E39-E11</b>	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.

**Mounting Brackets**

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

Note: When using Through-beam models, order one bracket for the Receiver and one for the Emitter.  
\* Cannot be used for Standard Connector models.

**Sensor I/O Connectors**

Size	Cable	Appearance	Cable type	Model
M8 *	Standard	Straight	2 m	<b>XS3F-M421-402-A</b>
			5 m	<b>XS3F-M421-405-A</b>
		L-shaped	2 m	<b>XS3F-M422-402-A</b>
			5 m	<b>XS3F-M422-405-A</b>
M12 * (For -M1J models)	Standard	Straight	2 m	<b>XS2F-D421-DC0-A</b>
			5 m	<b>XS2F-D421-GC0-A</b>
		L-shaped	2 m	<b>XS2F-D422-DC0-A</b>
			5 m	<b>XS2F-D422-GC0-A</b>
e-CON	Standard	Single-end connector	2 m	<b>E39-ECON2M</b>
			5 m	<b>E39-ECON5M</b>
		Double-end connectors	0.5 to 1 m	<b>E39-ECONW□M</b> □ indicates cable length (in units of m). Specify with 0.1-increments.
			1.1 to 1.5 m	
			1.6 to 2 m	

## Ratings and Specifications

Item	Sensing method		Through-beam			Retro-reflective with MSR function		Diffuse-reflective	
	Model	NPN output	E3Z-T61(K) E3Z-T66	E3Z-T62 E3Z-T67	E3Z-T61A E3Z-T66A	E3Z-R61/R66	E3Z-R61K	E3Z-D61(K)/D66	E3Z-D62(K)/D67
		PNP output	E3Z-T81(K) E3Z-T86	E3Z-T82 E3Z-T87	E3Z-T81A E3Z-T86A	E3Z-R81/R86	E3Z-R81K	E3Z-D81(K)/D86	E3Z-D82(K)/D87
Sensing distance		15 m	30 m	10 m	4 m (100 mm)* (when using E39-R1S) 3 m (100 mm)* (when using E39-R1)	3 m (150 mm)* (when using E39-R1S) 2 m (100 mm)* (when using E39-R1)	White paper (100 × 100 mm): 100 mm	White paper (300 × 300 mm): 1 m	
Spot diameter		---							
Standard sensing object		Opaque: 12-mm dia. min.			Opaque: 75-mm dia. min.		---		
Minimum detectable object		---							
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)	Red LED (660 nm)		Infrared LED (860 nm)		
Power supply voltage		12 to 24 VDC±10%, ripple (p-p): 10% max.							
Current consumption		35 mA max. (Emitter: 15 mA max., Receiver: 20 mA max.)			30 mA 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							
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.	Operate or reset: 2 ms max.	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: 500 m/s <sup>2</sup> 3 times each in X, Y, and Z directions							
Degree of protection		IP67 (IEC 60529), Oil resistive models: IP67 (IEC 60529) (in-house standards: oilproof), excluding cables and connectors							
Connection method		Pre-wired cable (standard length: 2 m and 0.5m), Connector (M8, 4 pins), Pre-wired Connector (M8, 4 pins) (Oil-resistive models only)							
Indicator		Operation indicator (orange) Stability indicator (green) Emitter has power indicator (orange) only.							
Weight (packed state)	Pre-wired cable (2 m)	Approx. 120 g			Approx. 65 g				
	Connector (M8, 4 pins)	Approx. 30 g			Approx. 20 g				
	Pre-wired Connector (M8, 4 pins) (oil-resistive models only)	Approx. 50 g			Approx. 30 g				
Material	Case	PBT (polybutylene terephthalate)							
	Lens	Modified polyarylate			Methacrylic resin		Modified polyarylate		
Accessories		Instruction manual (Neither Reflectors nor Mounting Brackets are provided with any of the above models.)							

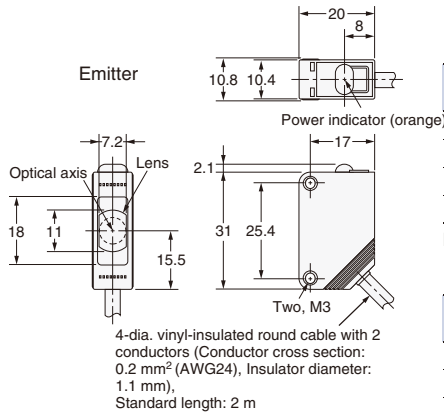
Note: Oil-resistive Retro-reflective models have a different sensing distance than standard Retro-reflective models.

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

Dimensions

Sensors

**Through-beam  
Pre-wired Models**  
E3Z-T61(K)  
E3Z-T81(K)  
E3Z-T61A  
E3Z-T81A  
E3Z-T62(-G0)  
E3Z-T82(-G0)



4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.2 mm<sup>2</sup> (AWG24), Insulator diameter: 1.1 mm), Standard length: 2 m

(Excluding -G0)

Terminal No.	Specifications
1	+V
2	--
3	0V
4	--

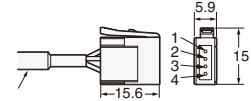
Pins 2 and 4 are not used.

(-G0)

Terminal No.	Specifications
1	+V
2	Input
3	0V
4	--

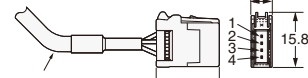
4 is not used.

Press-fit e-CON Pre-wired Connector



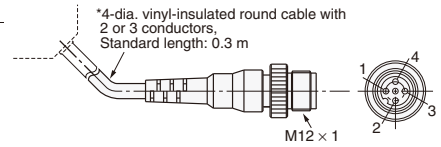
\*4-dia. vinyl-insulated round cable with 2 or 3 conductors. Standard lengths: 0.3 m, 0.5 m, and 2 m

Clamp-type e-CON Pre-wired Connector (E3Z-T61-ECON-C)

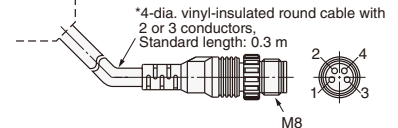


\*4-dia. vinyl-insulated round cable with 2 or 3 conductors. Standard length: 2 m

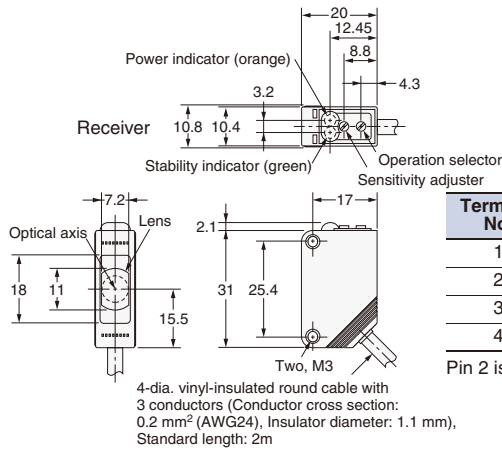
M12 Pre-wired Connector (E3Z-T□□-M1J)



M8 Pre-wired Connector (E3Z-T□□-M3J)



\* The Emitter cable has two conductors and the Receiver cable has three conductors.

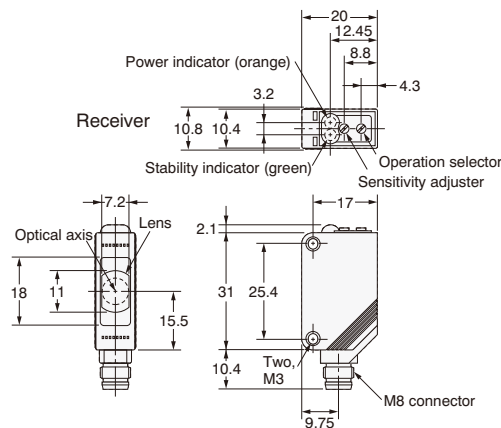
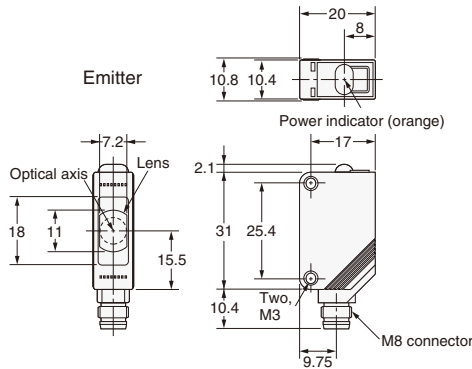


4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.2 mm<sup>2</sup> (AWG24), Insulator diameter: 1.1 mm), Standard length: 2m

Terminal No.	Specifications
1	+V
2	--
3	0V
4	Output

Pin 2 is not used.

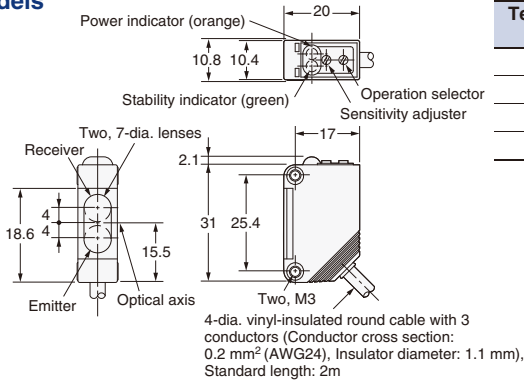
**Through-beam  
Connector Models**  
E3Z-T66  
E3Z-T86  
E3Z-T66A  
E3Z-T86A  
E3Z-T67(-G0)  
E3Z-T87(-G0)



**Retro-reflective Models**

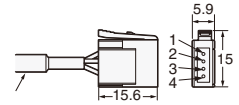
**Pre-wired Models**

**E3Z-R61(K)**  
**E3Z-R81(K)**



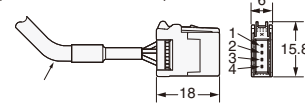
Terminal No.	Specifications
1	+V
2	---
3	0V
4	Output

**Press-fit e-CON Pre-wired Connector**



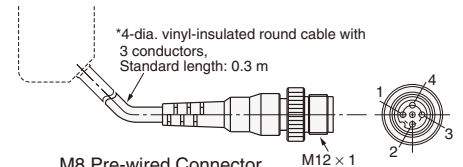
\*4-dia. vinyl-insulated round cable with 3 conductors, Standard lengths: 0.3 m, 0.5 m, and 2 m

**Clamp-type e-CON Pre-wired Connector (E3Z-□6□-ECON-C)**

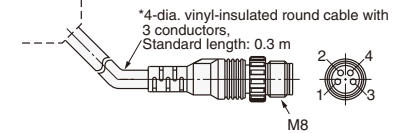


\*4-dia. vinyl-insulated round cable with 3 conductors, Standard length: 2 m

**M12 Pre-wired Connector (E3Z-□□□-M1J)**

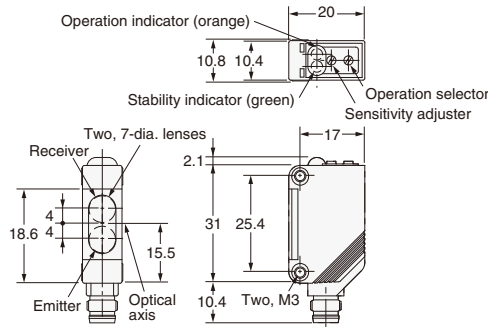


**M8 Pre-wired Connector (E3Z-T□□K-M3J)**



**Connector Models**

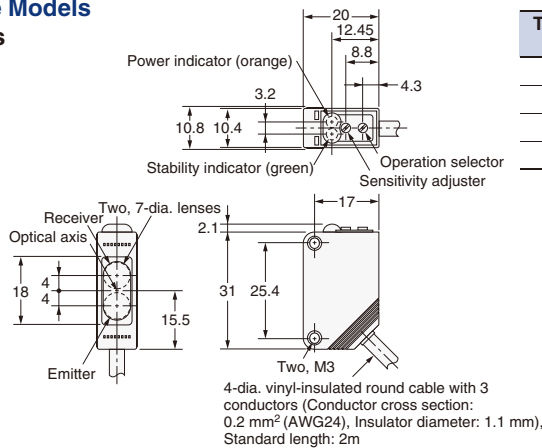
**E3Z-R66**  
**E3Z-R86**



**Diffuse-reflective Models**

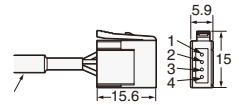
**Pre-wired Models**

**E3Z-D61(K)**  
**E3Z-D81(K)**  
**E3Z-D62(K)**  
**E3Z-D82(K)**



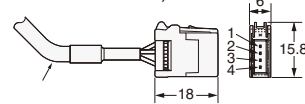
Terminal No.	Specifications
1	+V
2	---
3	0V
4	Output

**Press-fit e-CON Pre-wired Connector**



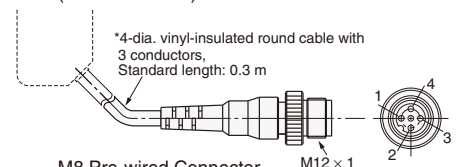
\*4-dia. vinyl-insulated round cable with 3 conductors, Standard lengths: 0.3 m, 0.5 m, and 2 m

**Clamp-type e-CON Pre-wired Connector (E3Z-□6□-ECON-C)**

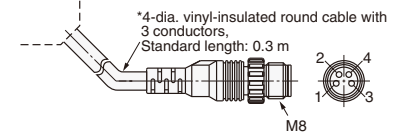


\*4-dia. vinyl-insulated round cable with 3 conductors, Standard length: 2 m

**M12 Pre-wired Connector (E3Z-□□□-M1J)**

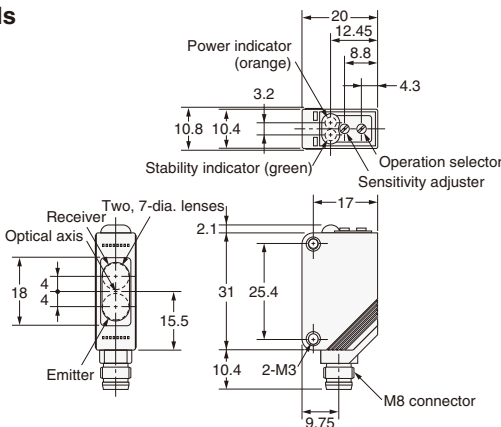


**M8 Pre-wired Connector (E3Z-T□□K-M3J)**



**Connector Models**

**E3Z-D66**  
**E3Z-D86**  
**E3Z-D67**  
**E3Z-D87**



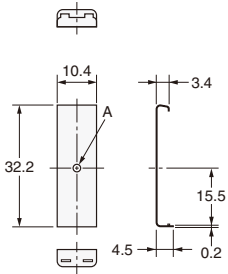
e-CON Connector Configurations

Wiring method	Sensor connectors
Press-fit	37104-3122-000FL (made by Sumitomo 3M)
Clamp	XN2A-1430 (made by OMRON)

Accessories (Order Separately)

Slits

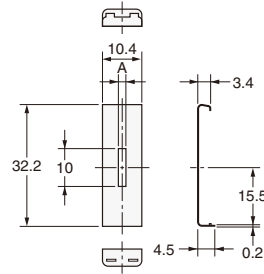
E39-S65A  
E39-S65B  
E39-S65C



Model	Size A	Material
E39-S65A	0.5 dia.	SUS301 stainless steel
E39-S65B	1.0 dia.	SUS301 stainless steel
E39-S65C	2.0 dia.	SUS301 stainless steel

Slits

E39-S65D  
E39-S65E  
E39-S65F



Model	Size A	Material
E39-S65D	0.5	SUS301 stainless steel
E39-S65E	1.0	SUS301 stainless steel
E39-S65F	2.0	SUS301 stainless steel

Reflectors

Mounting Brackets