

# E3ZM-C



## Photoelectric Sensor for the Automotive and Machine Tool Industries

- Oil-resistant, rugged body made of stainless steel.
- Spot visibility improved to as far as 1 m away.  
Product lineup includes Through-beam Models with Orange Spot.
- Product lineup includes M12 Smartclick pre-wired connector models.

Refer to *Safety Precautions* on page 11.



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

## Features

**Industry Top** A Sensor with Stainless Steel Housing That's Strong, Compact, and Easy to Use!

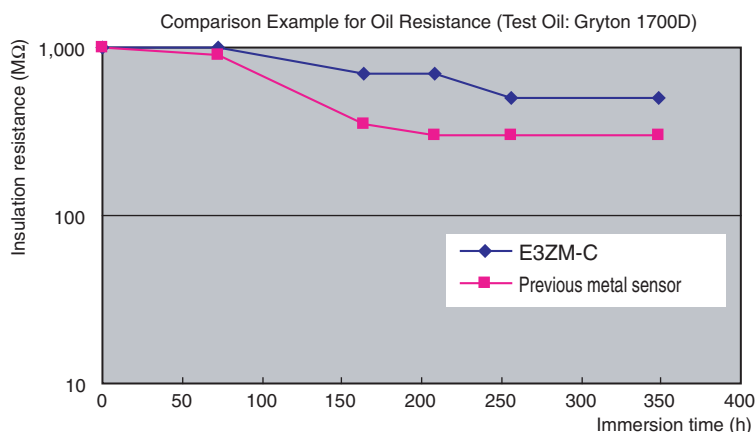
### Resists Oils and Coolants

The E3ZM-C features a simple shape and structure, and yet provides IP67 protection and oil resistance (oil resistant to OMRON in-house standard). This performance exceeds any previous models from OMRON.

The protective structure eliminates the need for screws to hold a cover, so there are no worries about loose screws leading to liquid penetration.

And the model number is laser-marked on the housing so it's always readable when the time comes to order maintenance parts.

The compact, easy-to-use E3ZM-C with built-in amplifier is ideal for oily environments.



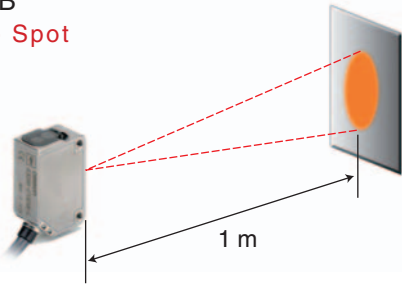
E3ZM-C Laser Marking

**Industry Top** Perfectly Reliable Detection Performance and Connection Method

**Visible Beam.**  
**Long-distance Operation Even in Dusty, Dirty Environments**

The E3ZM-CT□2B uses a bright orange LED to generate a spot that's visible 1 m away. And the sensing distance of 20 m provides more leeway in detection (response time: 2 ms). It all adds up to a more visible, more dependable worksite.

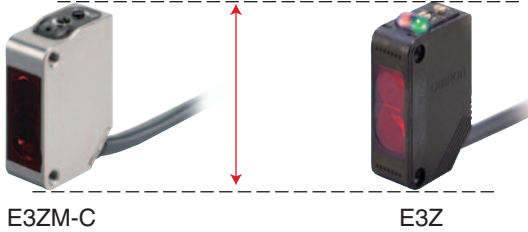
E3ZM-CT□2B  
Bright Orange Spot



**World's Smallest, and Yet Robust** Patent Pending

The E3ZM-C is the same compact size as the E3Z, making it the smallest square metal photoelectric sensor in the world (according to OMRON investigation).

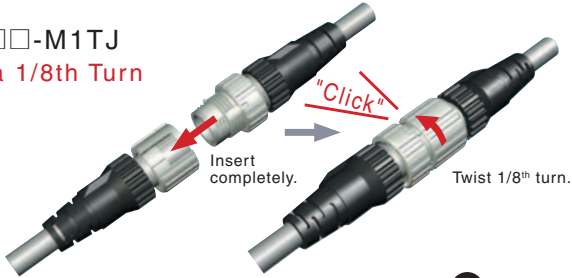
The SUS316L housing makes it robust, and removes all worries of the coating coming off.



**Simple, Yet Dependable M12 Twist-and-Click Pre-wired Connectors**

These Connectors match the XS5 Connectors released from August 2006, which reduce wiring work. They eliminate the troublesome need to control torque when tightening connectors, and remove worries about screws loosening due to vibration.

E3ZM-C□□□-M1TJ  
Locks with a 1/8th Turn



**Unique Miniaturization and Modularization Technologies**

**Sensing Module**

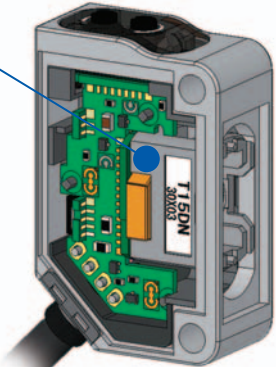
The optical system and signal processing are all contained in one module, providing all the main functions required of a Photoelectric Sensor.

**Optical System**

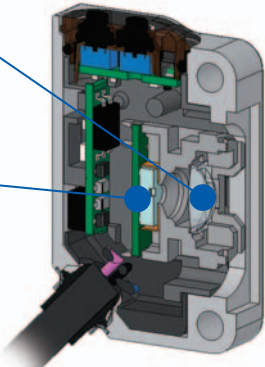
Maximizes manufacturing technology, including sophisticated inline optical axis adjustment.

**Signal Processing**

Leading-edge technology for stabilization and miniaturization is obvious in the photo IC, which includes an external light interference prevention algorithm, CSP\* mounting, and other components.  
\*Chip Scale Package



Internal Structure



Cross Section

**Application Precaution** Use the E3ZM-T/-R/-D/-LS in food processing or beverage filling applications where cleaners or disinfectants are present.

Ordering Information

Sensors (Refer to Dimensions on page 13.)

Orange light   Red light   Infrared light

Sensing method	Appearance	Connection method	Sensing distance	Model		
				NPN output	PNP output	
Through-beam (Emitter + Receiver)*1		Pre-wired (2 m)			<b>E3ZM-CT61 2M</b> Emitter E3ZM-CT61-L 2M Receiver E3ZM-CT61-D 2M	<b>E3ZM-CT81 2M</b> Emitter E3ZM-CT81-L 2M Receiver E3ZM-CT81-D 2M
		Pre-wired (5 m)			<b>E3ZM-CT61 5M</b> Emitter E3ZM-CT61-L 5M Receiver E3ZM-CT61-D 5M	<b>E3ZM-CT81 5M</b> Emitter E3ZM-CT81-L 5M Receiver E3ZM-CT81-D 5M
		M12 twist-and-click pre-wired connector (0.3 m)			<b>E3ZM-CT61-M1TJ 0.3M</b> Emitter E3ZM-CT61-L-M1TJ 0.3M Receiver E3ZM-CT61-D-M1TJ 0.3M	<b>E3ZM-CT81-M1TJ 0.3M</b> Emitter E3ZM-CT81-L-M1TJ 0.3M Receiver E3ZM-CT81-D-M1TJ 0.3M
		Pre-wired (2 m)			<b>E3ZM-CT62B 2M</b> Emitter E3ZM-CT62B-L 2M Receiver E3ZM-CT62B-D 2M	<b>E3ZM-CT82B 2M</b> Emitter E3ZM-CT82B-L 2M Receiver E3ZM-CT82B-D 2M
		Pre-wired (5 m)			<b>E3ZM-CT62B 5M</b> Emitter E3ZM-CT62B-L 5M Receiver E3ZM-CT62B-D 5M	<b>E3ZM-CT82B 5M</b> Emitter E3ZM-CT82B-L 5M Receiver E3ZM-CT82B-D 5M
		M12 twist-and-click pre-wired connector (0.3 m)			<b>E3ZM-CT62B-M1TJ 0.3M</b> Emitter E3ZM-CT62B-L-M1TJ 0.3M Receiver E3ZM-CT62B-D-M1TJ 0.3M	<b>E3ZM-CT82B-M1TJ 0.3M</b> Emitter E3ZM-CT82B-L-M1TJ 0.3M Receiver E3ZM-CT82B-D-M1TJ 0.3M
Retro-reflective		Pre-wired (2 m)			<b>E3ZM-CR61 2M</b>	<b>E3ZM-CR81 2M</b>
		M12 twist-and-click pre-wired connector (0.3 m)		(Using E39-R1S)	<b>E3ZM-CR61-M1TJ 0.3M</b>	<b>E3ZM-CR81-M1TJ 0.3M</b>
Diffuse-reflective		Pre-wired (2 m)			<b>E3ZM-CD62 2M</b>	<b>E3ZM-CD82 2M</b>
		M12 twist-and-click pre-wired connector (0.3 m)			<b>E3ZM-CD62-M1TJ 0.3M</b>	<b>E3ZM-CD82-M1TJ 0.3M</b>
BGS reflective (fixed distance)		Pre-wired (2 m)			<b>E3ZM-CL61H 2M</b>	<b>E3ZM-CL81H 2M</b>
		M12 twist-and-click pre-wired connector (0.3 m)			<b>E3ZM-CL61H-M1TJ 0.3M</b>	<b>E3ZM-CL81H-M1TJ 0.3M</b>
		Pre-wired (2 m)			<b>E3ZM-CL62H 2M</b>	<b>E3ZM-CL82H 2M</b>
		M12 twist-and-click pre-wired connector (0.3 m)			<b>E3ZM-CL62H-M1TJ 0.3M</b>	<b>E3ZM-CL82H-M1TJ 0.3M</b>
		Pre-wired (2 m)			<b>E3ZM-CL64H 2M</b>	<b>E3ZM-CL84H 2M</b>
		M12 twist-and-click pre-wired connector (0.3 m)			<b>E3ZM-CL64H-M1TJ 0.3M</b>	<b>E3ZM-CL84H-M1TJ 0.3M</b>

\*1. Through-beam Sensors are normally sold in sets that include both the Emitter and Receiver.

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


\*3. Set the distance between the Sensor and the Reflector so that it is at least the value in parentheses.

## Accessories

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

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

(Refer to *Dimensions on XS5.*)










Size	Cable specifications	Appearance	Cable		Model
M12 (For -M1TJ models)	Fire-retardant, robot cable		2 m	4-wire	XS5F-D421-D80-F
			5 m		XS5F-D421-G80-F
	Oil-resistant cable (polyurethane)		2 m		XS5F-D421-D80-P
			5 m		XS5F-D421-G80-P

Note 1. When using a Through-beam Sensor, order one Connector for the Receiver and one for the Emitter.

2. Ask your OMRON representative about connectors with other specifications.

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

(Refer to *Dimensions on E39-L/E39-S/E39-R.*)

Appearance	Model	Quantity	Remarks	Appearance	Model	Quantity	Remarks
	<b>E39-L153</b> (SUS304)	1	Mounting Brackets		<b>E39-L98</b> (SUS304)	1	Metal Protective Cover Bracket *
	<b>E39-L104</b> (SUS304)	1			<b>E39-L150</b> (SUS304)	1 set	(Sensor adjuster) Easily mounted to the aluminum frame rails of conveyors and easily adjusted. For vertical angle adjustment
	<b>E39-L43</b> (SUS304)	1	Horizontal Mounting Bracket *		<b>E39-L151</b> (SUS304)	1 set	
	<b>E39-L142</b> (SUS304)	1	Horizontal Protective Cover Bracket *				
	<b>E39-L44</b> (SUS304)	1	Rear Mounting Bracket		<b>E39-L144</b> (SUS304)	1	Compact Protective Cover Bracket *

Note: When using a Through-beam Sensor, order one Mounting Bracket for the Receiver and one for the Emitter.

\*Cannot be used for Standard Connector models.

### Reflector (A Reflector is required for each Retro-reflective Sensor: A Reflector is not provided with the Sensor. Be sure to order a Reflector.)

(Refer to *Dimensions on E39-L/E39-S/E39-R.*)

Name	E3ZM-CR sensing distance *		Model	Quantity	Remarks
	Rated value	Reference value			
Reflector	3 m (100 mm)	---	<b>E39-R1</b>	1	· Reflectors are not provided with Retroreflective models. · The MSR function is enabled.
	4 m (100 mm)	---	<b>E39-R1S</b>	1	
	---	5 m (100 mm)	<b>E39-R2</b>	1	
	---	2.5 m (100 mm)	<b>E39-R9</b>	1	
	---	3.5 m (100 mm)	<b>E39-R10</b>	1	
Small Reflector	---	1.5 m (50 mm)	<b>E39-R3</b>	1	

Note: 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.

\*Set the distance between the Sensor and the Reflector so that it is at least the value in parentheses.

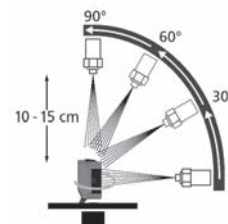
## Ratings and Specifications

Model		Sensing method		Through-beam		Retro-reflective with MSR function	Diffuse-reflective		
		NPN output	E3ZM-CT61 (-M1TJ)	E3ZM-CT62B (-M1TJ)	E3ZM-CR61 (-M1TJ)	E3ZM-CD62 (-M1TJ)			
Item	PNP output		E3ZM-CT81 (-M1TJ)	E3ZM-CT82B (-M1TJ)	E3ZM-CR81 (-M1TJ)	E3ZM-CD82 (-M1TJ)			
	Sensing distance		15 m	20 m	4 m [100 mm] *1 (Using E39-R1S) 3 m [100 mm] *1 (Using E39-R1)		1 m (White paper 300 × 300 mm)		
Spot diameter		---							
Standard sensing object		Opaque: 12-mm dia. min.			Opaque: 75-mm dia. min.		---		
Differential travel		---						20% of sensing distance max.	
Reflectivity characteristic (black/white error)		---							
Directional angle		Emitter, Receiver: 3° to 15° (Distance between emitter and receiver. Rated sensing distance)			Sensor: 3° to 10° Reflector: 30° (Distance to Reflector. Rated sensing distance)		---		
Light source (wavelength)		Infrared LED (870 nm)		Orange LED (615 nm)		Red LED (660 nm)		Infrared LED (860 nm)	
Power supply voltage		10 to 30 VDC, including 10% ripple (p-p)							
Current consumption		40 mA (Emitter 20 mA max., Receiver 20 mA max.)				25 mA max.			
Control output		Load power supply voltage: 30 VDC max., Load current: 100 mA max. (Residual voltage: 2 V max.) Open-collector output (NPN/PNP output depending on model) Light ON/Dark ON switch selectable							
Protection circuits		Reversed power supply polarity protection, Output short-circuit protection, Reversed output polarity protection				Reversed power supply polarity protection, Output short-circuit protection, Reversed output polarity protection, Mutual interference prevention			
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 *2		IEC IP67 (oil resistance to OMRON in-house standard), DIN 40050-9: IP69K							
Connection method		Pre-wired (standard length: 2 m), -M1TJ: Pre-wired connector (standard length: 300 mm)							
Indicators		Operation indicator (yellow), Stability indicator (green) (Emitter has only power supply indicator (green).)							
Weight (packed state)	Pre-wired models		Approx. 150 g			Approx. 90 g			
Housing material		SUS316L							
Cable material		Oil-resistant vinyl chloride							
Lens material		PMMA (polymethylmethacrylate)							
Indicator material		PES (polyethersulfone)							
Sensitivity adjustment and mode selector switch		PEEK (polyetheretherketone)							
Seal material		Fluoro rubber							
Accessories		Instruction sheet (Note: Reflectors and Mounting Brackets are sold separately.)							

\*1. Values in parentheses indicate the minimum required distance between the Sensor and Reflector.

\*2. IP69K Degree of Protection Specification

IP69K is a protection standard against high temperature and high-pressure water defined in the German standard DIN 40050, Part 9. The test piece is sprayed with water at 80°C at a water pressure of 80 to 100 BAR using a specified nozzle shape at a rate of 14 to 16 liters/min. The distance between the test piece and nozzle is 10 to 15 cm, and water is sprayed horizontally for 30 seconds each at 0°, 30°, 60° and 90° while rotating the test piece on a horizontal plane.



Sensing method		BGS Reflective		
		Model	NPN output	PNP output
Item		E3ZM-CL61H (-M1TJ)	E3ZM-CL62H (-M1TJ)	E3ZM-CL64H (-M1TJ)
		E3ZM-CL81H (-M1TJ)	E3ZM-CL82H (-M1TJ)	E3ZM-CL84H (-M1TJ)
Sensing distance		10 to 100 mm (White paper 100 × 100 mm)	10 to 150 mm (White paper 100 × 100 mm)	10 to 200 mm (White paper 100 × 100 mm)
Spot diameter		4-mm dia. at sensing distance of 100 mm	12-mm dia. at sensing distance of 150 mm	18-mm dia. at sensing distance of 200 mm
Standard sensing object		---		
Differential travel		3% of sensing distance max.	15% of sensing distance max.	20% of sensing distance max.
Reflectivity characteristics (black/white error)		5% of sensing distance max.	10% of sensing distance max.	20% of sensing distance max.
Directional angle		---		
Light source (wavelength)		Red LED (650 nm)	Red LED (660 nm)	
Power supply voltage		10 to 30 VDC, including 10% ripple (p-p)		
Current consumption		25 mA max.		
Control output		Load power supply voltage: 30 VDC max., Load current: 100 mA max. (Residual voltage: 2 V max.) Open-collector output (NPN/PNP output depending on model) Light ON/Dark ON cable connection selectable		
Protection circuits		Reversed power supply polarity protection, Output short-circuit protection, Reversed output polarity protection, Mutual interference protection		
Response time		Operate or reset: 1 ms max.		
Sensitivity adjustment		---		
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 *		IEC IP67 (oil resistance to OMRON standards), DIN 40050-9: IP69K		
Connection method		Pre-wired (standard length: 2 m), -M1TJ: Pre-wired connector (standard length: 300-mm)		
Indicators		Operation indicator (yellow), Stability indicator (green)		
Weight (packed state)	Pre-wired models	Approx. 90 g		
Housing material		SUS316L		
Cable material		Oil-resistant vinyl cable		
Lens material		PMMA (polymethylmethacrylate)		
Indicator material		PES (polyethersulfone)		
Seal material		Fluoro rubber		
Accessories		Instruction sheet (Note: Mounting Brackets are sold separately.)		

\*IP69K Degree of Protection Specification

IP69K is a protection standard against high temperature and high-pressure water defined in the German standard DIN 40050, Part 9. The test piece is sprayed with water at 80°C at a water pressure of 80 to 100 BAR using a specified nozzle shape at a rate of 14 to 16 liters/min. The distance between the test piece and nozzle is 10 to 15 cm, and water is sprayed horizontally for 30 seconds each at 0°, 30°, 60°, and 90° while rotating the test piece on a horizontal plane.

