

Transparent Object Detection Photoelectric Sensor E3S-DB

Superb Detection of Many Types of Transparent Objects



- Double slits inside Sensor prevent incorrect operation.
- P-opaqing function* improves detection of PET bottles and transparent films.
- Smart Teaching for optimum settings in as little as 3 seconds.
- Maximum sensing distance of 3.5 m.
- IP69K protection recommended for food and beverage industry. Third-party certification from Ecolab in Europe for detergent resistance.
- Variable connector and cable directions, and 360° indicators for greater usability.



* This function uses polarization to opaque transparent objects that exhibit double refraction.

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

Refer to the **Safety Precautions** on page 7.

Ordering Information

Sensors (Refer to *Dimensions* on page 8.)

Red light



Sensing method	Appearance	Sensitivity adjustment	Connection method	Sensing distance *2	Model			
					NPN output	PNP output		
Retro-reflective (with MSR function)		Smart Teaching	Pre-wired (2 m)		E3S-DBN11 2M	E3S-DBP11 2M		
			Connector (M12)		E3S-DBN21	E3S-DBP21		
			M12 Smartclick pre-wired connector (0.3 m)		(with E39-R8)	E3S-DBN31 0.3M	E3S-DBP31 0.3M	
			Pre-wired (2 m)			E3S-DBN12 2M	E3S-DBP12 2M	
			Connector (M12)			Narrow beam	E3S-DBN22	E3S-DBP22
			M12 Smartclick pre-wired connector (0.3 m)			(with E39-R21)	E3S-DBN32 0.3M	E3S-DBP32 0.3M
		Eleven-turn adjuster	Pre-wired (2 m)			E3S-DBN11T 2M	E3S-DBP11T 2M	
			Connector (M12)			E3S-DBN21T	E3S-DBP21T	
			M12 Smartclick pre-wired connector (0.3 m)			(with E39-R8)	E3S-DBN31T 0.3M	E3S-DBP31T 0.3M
			Pre-wired (2 m)			E3S-DBN12T 2M	E3S-DBP12T 2M	
			Connector (M12)			Narrow beam	E3S-DBN22T	E3S-DBP22T
			M12 Smartclick pre-wired connector (0.3 m)			(with E39-R21)	E3S-DBN32T 0.3M	E3S-DBP32T 0.3M

*1. A Reflector is not included with the Sensor. Select a Reflector (sold separately) according to the application.

*2. There is no close-range dead zone between the Sensor and Reflector.

Accessories (Sold Separately)

Sensor I/O Connectors (Connector on One End) (A Connector is required for a Sensor with a connector or pre-wired connector.) Connectors are not provided with the Sensors. Be sure to order a Connector separately.


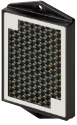



Size	Cable specifications	Appearance	Cable length	Model
*1 M12 (4 pins)	Fire-retardant robot cable	Straight  *2	2 m	XS2F-D421-D80-F
			5 m	XS2F-D421-G80-F
		Straight  *2	2 m	XS5F-D421-D80-F
			5 m	XS5F-D421-G80-F

*1 Refer to your OMRON website for details on the XS2 and XS5.

*2 The connectors will not rotate after they are connected.

Reflectors (A Reflector is required for each Retro-reflective Sensor.) (Refer to Dimensions on page 10.)

Reflectors are not provided with the Sensors. Be sure to order a Reflector separately.

Appearance	Sensing distance* (reference value)	Model	Quantity	Applicable Sensors	Remarks
	3.5 m	E39-R1S	1	E3S-DB□□1(T)	Standard model
	2 m	E39-R1K		E3S-DB□□1(T)	Non-fogging reflective plate
	3 m	E39-RP1		E3S-DB□□1(T)	Special Polarizing Reflector
	0.5 m (rated value)	E39-R21		E3S-DB□□2(T)	Narrow-beam Reflector
	3.5 m (rated value)	E39-R8		E3S-DB□□1(T)	Standard model
	1.5 m	E39-RS10		E3S-DB□□1(T)	Sheets
0.5 m	E3S-DB□□2(T)				
	2.5 m	E39-RS11		E3S-DB□□1(T)	
	0.5 m			E3S-DB□□2(T)	



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. Refer to *Engineering Data (Reference Value)* on page 4 for details.

* There is no close-range dead zone between the Sensor and Reflector.

Mounting Brackets (Refer to Dimensions on page 11.)

A Mounting Bracket is not provided with the Sensor. It must be ordered separately as required.

Type	Appearance	Model	Quantity
Bottom-mounting		E39-L192	1
Side-mounting		E39-L193	

Note: For details, refer to the *Mounting Brackets* on E39-L/E39-S/E39-R which can be accessed from your OMRON website.

Ratings and Specifications

Item	Model	Sensing method	Retro-reflective (with MSR function)			
		NPN output	E3S-DBN□1	E3S-DBN□1T	E3S-DBN□2	E3S-DBN□2T
		PNP output	E3S-DBP□1	E3S-DBP□1T	E3S-DBP□2	E3S-DBP□2T
Sensing distance		0 to 3.5 m (with E39-R8)			0 to 0.5 m (with E39-R21)	
Spot diameter (reference value)*1		6-mm dia. (at sensing distance of 250 mm)			2.5-mm dia. (at sensing distance of 200 mm)	
Light source (wavelength)		Red LED (624 nm)				
Power supply voltage		10 to 30 VDC, including 10% ripple (p-p)				
Power consumption		720 mW max. (current consumption: 30 mA max. at power supply voltage of 24 VDC)				
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.)				
Indicators		Light indicator (orange) and stability indicator (green)				
Protection circuits		Reversed power supply polarity protection, output short-circuit protection, reversed output polarity protection, and mutual interference prevention				
Response time		Operate or reset: 0.5 ms max.				
Sensitivity adjustment		Smart Teaching	Eleven-turn adjuster	Smart Teaching	Eleven-turn adjuster	
Smart Teaching lock function		Provided.	---	Provided.	---	
Automatic compensation (AC ³)		Provided (OFF by default).	---	Provided (OFF by default).	---	
Ambient illumination		(Receiver side) Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.				
Ambient temperature range		Operating: -25 to 60°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 at 50/60 Hz for 1 minute				
Vibration resistance		Destruction: 10 to 55 Hz with double amplitude of 1.5 mm 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				
Degree of protection*2		IEC IP67, DIN 40050-9 IP69K				
Connection method		Pre-wired cable (standard cable length: 2 m) Connector (M12, 4 pins) Pre-wired connector (standard cable length: 0.3 m/M12, 4 pins)				
Weight (packed state/Sensor only)	Pre-wired models	Approx. 80 g/approx. 60 g				
	Models with connector	Approx. 60 g/approx. 40 g				
	Models with pre-wired connector	Approx. 180 g/approx. 160 g				
Materials	Case	Polybutylene terephthalate (PBT)/ABS				
	Lens	Methacrylic resin (PMMA)				
	Indicators	Methacrylic resin (PMMA)				
	Sensitivity adjuster and Threshold adjuster	Polyester elastomer				
	Cable	Polyvinyl chloride (PVC)				
Accessories		Instruction manual				

*1. Refer to *Emission Spot Diameter vs. Distance in Engineering Data (Reference Value)* on page 4 for details.

*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.

