

## Photoelectric Sensor E3F3

**Threaded Cylindrical Photoelectric Sensor with Built-in Amplifier for Use as an Optical Proximity Sensor**

**High Noise-immunity with Photo-IC Technology**

- Up-to-date photo-IC to increase noise immunity.
- M18 DIN-sized cylindrical housing, ABS resin case.
- Long sensing distance (30 cm) with sensitivity adjuster for diffuse type.
- Short-circuit and reverse connection protection.



**<READ AND UNDERSTAND THIS CATALOG>**

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

## Ordering Information

□ Infrared light    ■ Red light

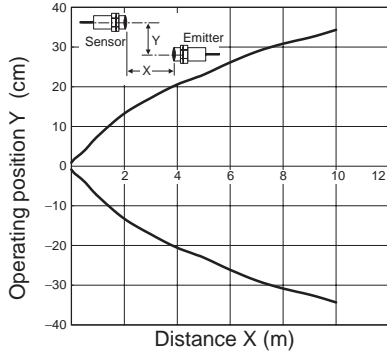
Sensing method	Appearance	Connection method	Sensing distance	Operating modes		Model					
						Plastic housing		Metal housing			
						NPN output	PNP output	NPN output	PNP output		
Through-beam		Pre-wired M12 CN		Light-ON		E3F3-T11	E3F3-T31	E3F3-T11M	E3F3-T31M		
						E3F3-T16	E3F3-T36	E3F3-T16M	E3F3-T36M		
		Pre-wired M12 CN		Dark-ON		E3F3-T61	E3F3-T81	E3F3-T61M	E3F3-T81M		
						E3F3-T66	E3F3-T86	E3F3-T66M	E3F3-T86M		
Retro-reflective		Pre-wired M12 CN		Light-ON	Non-polarized	E3F3-R11	E3F3-R31	E3F3-R11M	E3F3-R31M		
						E3F3-R16	E3F3-R36	E3F3-R16M	E3F3-R36M		
				Pre-wired M12 CN		Dark-ON	E3F3-R61	E3F3-R81	E3F3-R61M	E3F3-R81M	
							E3F3-R66	E3F3-R86	E3F3-R66M	E3F3-R86M	
		Pre-wired M12 CN		Light-ON		Polarized	E3F3-R12	E3F3-R32	E3F3-R12M	E3F3-R32M	
							E3F3-R17	E3F3-R37	E3F3-R17M	E3F3-R37M	
				Pre-wired M12 CN			Dark-ON	E3F3-R62	E3F3-R82	E3F3-R62M	E3F3-R82M
								E3F3-R67	E3F3-R87	E3F3-R67M	E3F3-R87M
Diffuse reflective		Pre-wired M12 CN		Light-ON			E3F3-D11	E3F3-D31	E3F3-D11M	E3F3-D31M	
							E3F3-D16	E3F3-D36	E3F3-D16M	E3F3-D36M	
				Pre-wired M12 CN			Dark-ON	E3F3-D61	E3F3-D81	E3F3-D61M	E3F3-D81M
								E3F3-D66	E3F3-D86	E3F3-D66M	E3F3-D86M
		Pre-wired M12 CN		Light-ON		E3F3-D12	E3F3-D32	E3F3-D12M	E3F3-D32M		
						E3F3-D17	E3F3-D37	E3F3-D17M	E3F3-D37M		
				Pre-wired M12 CN		Dark-ON	E3F3-D62	E3F3-D82	E3F3-D62M	E3F3-D82M	
							E3F3-D67	E3F3-D87	E3F3-D67M	E3F3-D87M	



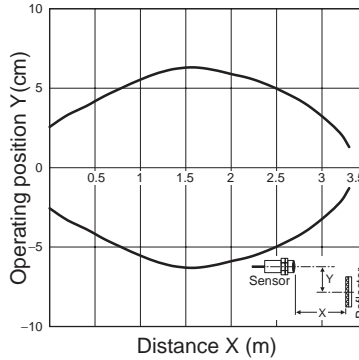
# Engineering Data

## Parallel Operating Range (Typical)

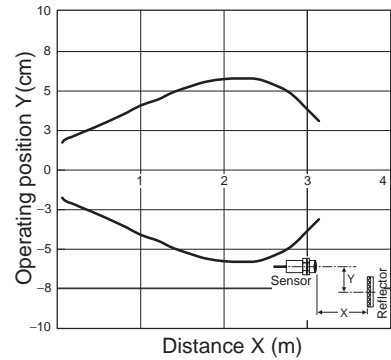
**Through-beam Models**  
E3F3-T□1□/T□6□



**Retroreflective Models**  
E3F3-R□1□/R□6□+E39-R1

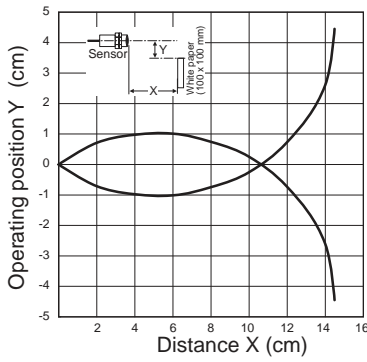


**Retroreflective Models**  
E3F3-R□2□/R□7□+E39-R1

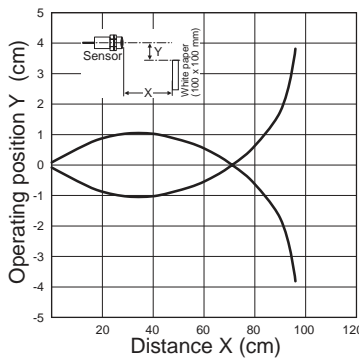


## Operating Range (Typical)

**Diffuse-reflective Models**  
E3F3-D□1□/D□6□

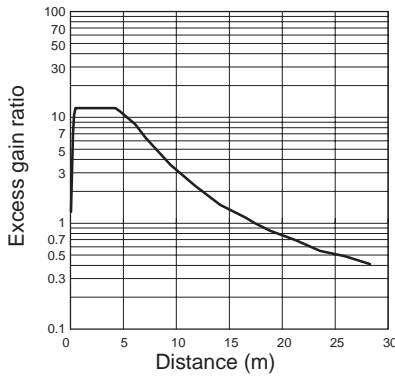


**Diffuse-reflective Models**  
E3F3-D□2□/D□7□

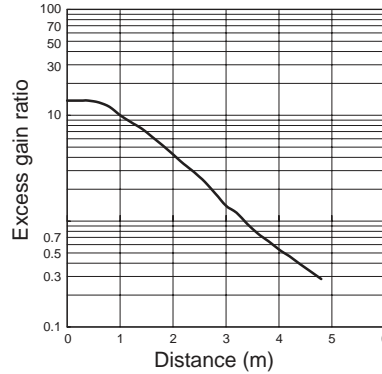


## Excess Gain Ratio vs. Set Distance (Typical)

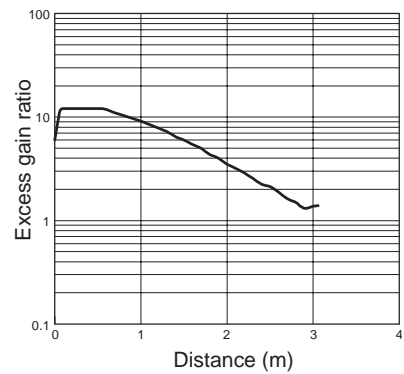
**Through-beam Models**  
E3F3-T□1□/T□6□



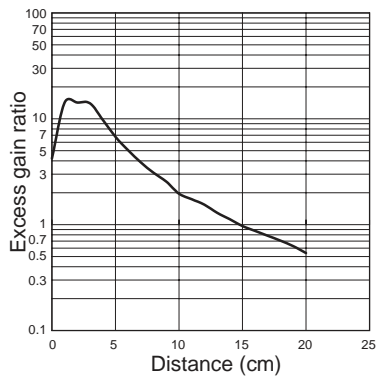
**Retroreflective Models**  
E3F3-R□1□/R□6□+E39-R1



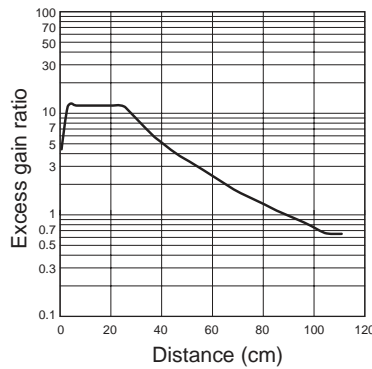
**Retroreflective Models**  
E3F3-R□2□/R□7□+E39-R1



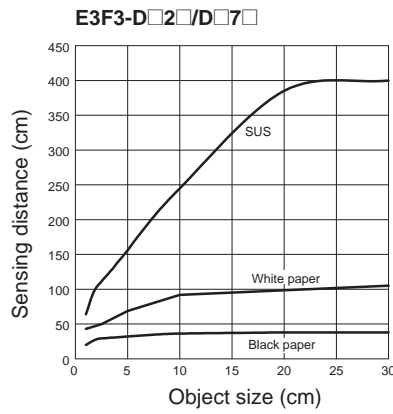
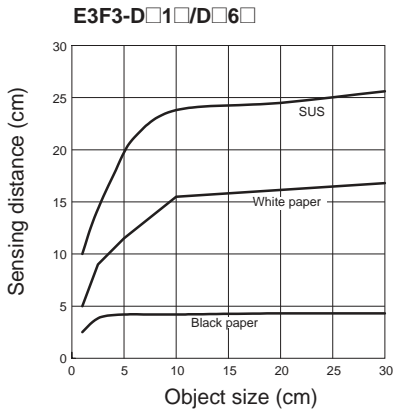
**Diffuse-reflective Models**  
E3F3-D□1□/D□6□



**Diffuse-reflective Models**  
E3F3-D□2□/D□7□



Sensing Distance vs. Object Size (Typical)



Operation

■ NPN Output

Model	Output transistor status	Timing chart	Output circuit
E3F3-T1 E3F3-R1 E3F3-D1	Light-ON	<p>Incident light: ON (High), No incident light: OFF (Low)</p> <p>Operation indicator (orange): ON (High), OFF (Low)</p> <p>Control output: ON (High), OFF (Low)</p> <p>Load (relay): Operate (High), Release (Low) (Between brown and black)</p>	
E3F3-T6 E3F3-R6 E3F3-D6	Dark-ON	<p>Incident light: ON (High), No incident light: OFF (Low)</p> <p>Operation indicator (orange): ON (High), OFF (Low)</p> <p>Control output: ON (High), OFF (Low)</p> <p>Load (relay): Operate (High), Release (Low) (Between brown and black)</p>	

■ PNP Output

Model	Output transistor status	Timing chart	Output circuit
E3F3-T3 E3F3-R3 E3F3-D3	Light-ON	<p>Incident light: ON (High), No incident light: OFF (Low)</p> <p>Operation indicator (orange): ON (High), OFF (Low)</p> <p>Control output: ON (High), OFF (Low)</p> <p>Load (relay): Operate (High), Release (Low) (Between blue and black)</p>	
E3F3-T8 E3F3-R8 E3F3-D8	Dark-ON	<p>Incident light: ON (High), No incident light: OFF (Low)</p> <p>Operation indicator (orange): ON (High), OFF (Low)</p> <p>Control output: ON (High), OFF (Low)</p> <p>Load (relay): Operate (High), Release (Low) (Between blue and black)</p>	

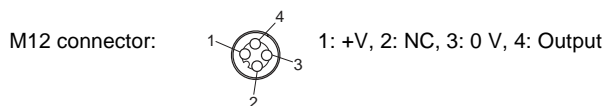
# Dimensions

Note: All units are in millimeters unless otherwise indicated.

## Sensors

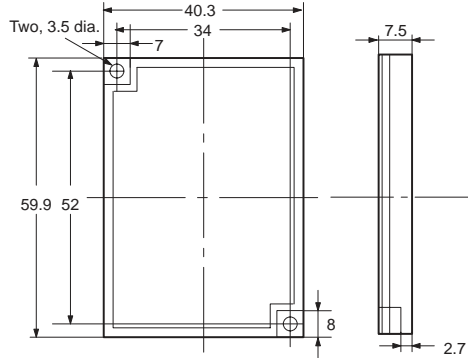
	Plastic housing	Metal housing
Pre-wired	<b>E3F3-D□2</b> 	<b>E3F3-D□2M</b> 
M12 connector	<b>E3F3-D□7</b> 	<b>E3F3-D□7M</b> 
Pre-wired	<b>E3F3-T□1</b> <b>E3F3-R□1</b> <b>E3F3-R□2</b> <b>E3F3-D□1</b> 	<b>E3F3-T□1M</b> <b>E3F3-R□1M</b> <b>E3F3-R□2M</b> <b>E3F3-D□1M</b> 
M12 connector	<b>E3F3-T□6</b> <b>E3F3-R□6</b> <b>E3F3-R□7</b> <b>E3F3-D□6</b> 	<b>E3F3-T□6M</b> <b>E3F3-R□6M</b> <b>E3F3-R□7M</b> <b>E3F3-D□6M</b> 

Note: Pre-wired Cord: Polyvinyl chloride-covered cord, 4-mm dia. (18/0.12),  
 Standard length: 2 m  
 Emitter: 2-conductor (brown and blue)  
 Receiver and Reflective model: 3-conductor (brown, blue, and black)

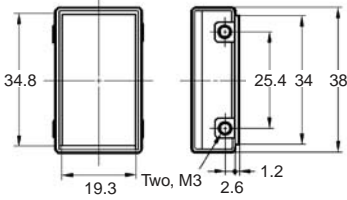
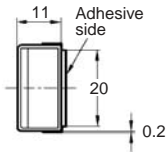


■ Accessories (Order Separately)

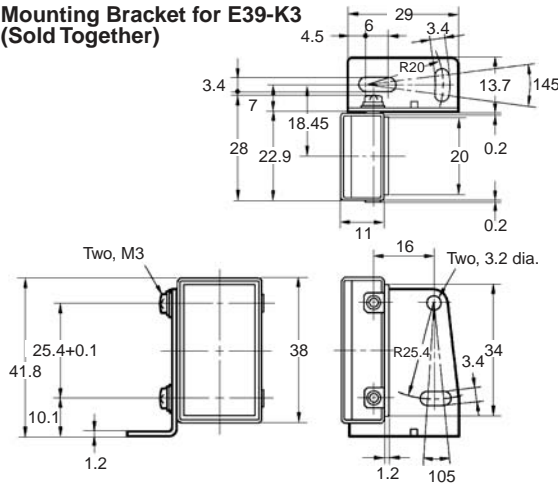
E39-R1 Retroreflector



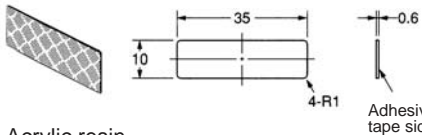
E39-R3 Retroreflector



Mounting Bracket for E39-K3 (Sold Together)

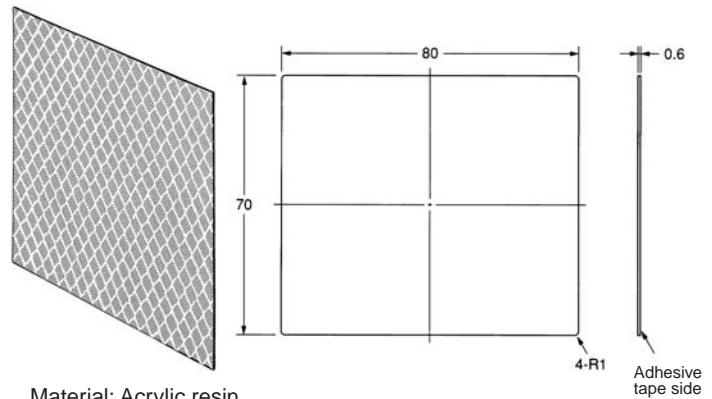


E39-RS1 Retroreflector



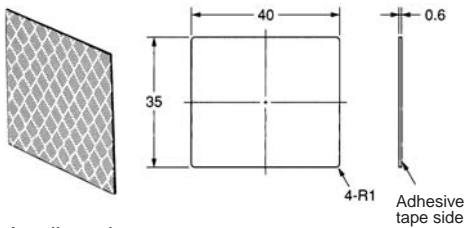
Material: Acrylic resin

E39-RS3 Retroreflector



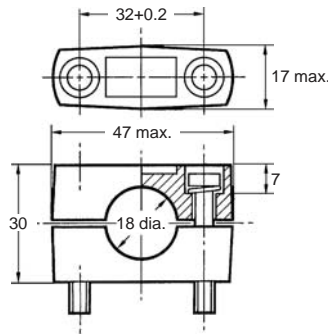
Material: Acrylic resin

E39-RS2 Retroreflector



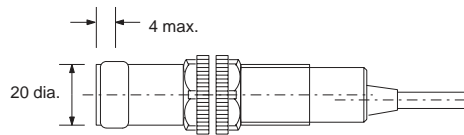
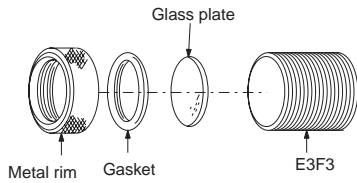
Material: Acrylic resin

**Y92E-B18 Mounting Bracket**



**Note: Hexagonal bolt: M5 x 32**  
Material: plastic

**E39-F31 Lens Cap**



## Precautions

If the input/output lines of the photoelectric sensor are placed in the same conduit or duct as power lines or high-voltage lines, the photoelectric sensor could be induced to malfunction, or even be damaged, by electrical noise. Separate the wiring, or use shielded lines as input/output lines to the photoelectric sensor.

Do not subject the photoelectric sensor to excessive shock when mounting, in keeping with IP66 standards.

When you use the photoelectric sensor in the vicinity of an inverter motor, be sure to connect the protective ground wire of the motor to ground. Failure to ground the motor may result in malfunction of the sensor.

## Mounting

Do not exceed a torque of 20 kgf-cm (2.0 N-m) when tightening mounting nuts.



**⚠ WARNING**

The E3F3 Photoelectric sensor is not a safety component for ensuring the safety of people as defined by EC Directives (91/386 EEC) and covered by separate European standards or by any other regulations or standards.

**READ AND UNDERSTAND THIS DOCUMENT**

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**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. E365-E1-01

**In the interest of product improvement, specifications are subject to change without notice.**

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