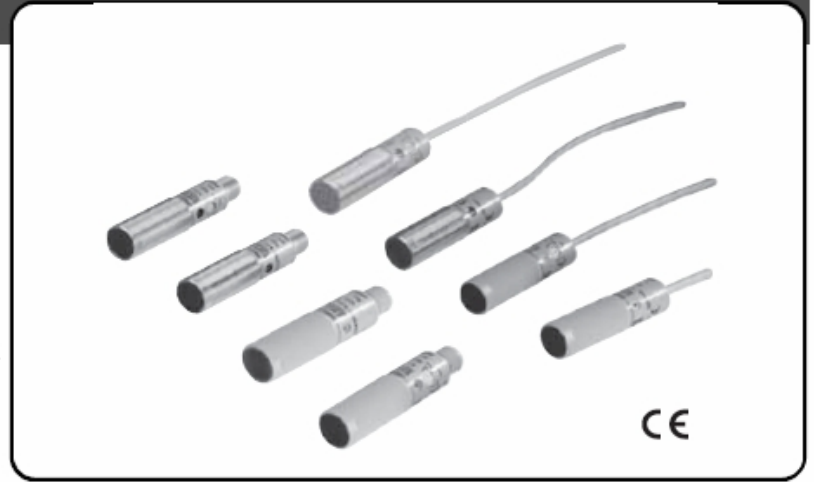


Photoelectric Sensor E3F3

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/brass case.
- Compact and space-saving.
- Long sensing distance(30cm)with sensitivity adjustor for diffuse type.
- Short-circuit and reverse connection protection.



<READ AND UNDERSTAND THIS CATALOG>

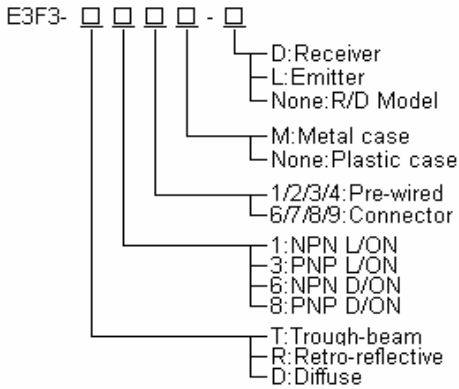
Please read and understand this catalog before purchasing the products.
Please consult your OMRON representative if you have any questions or comments.

Ordering Information

Sensing method	Appearance	Connection method	Sensing distance	Operation modes		Model								
						Plastic case		Metal case						
						NPN Output	PNP Output	NPN Output	PNP Output					
Through-beam		Pre-wired	5m	Light-ON		E3F3-T11	E3F3-T31	E3F3-T11M	E3F3-T31M					
		M12 CN				E3F3-T16	E3F3-T36	E3F3-T16M	E3F3-T36M					
		Pre-wired		Dark-ON		E3F3-T61	E3F3-T81	E3F3-T61M	E3F3-T81M					
		M12 CN				E3F3-T66	E3F3-T86	E3F3-T66M	E3F3-T86M					
Retro-reflective		Pre-wired	3m	Light-ON		E3F3-R11	E3F3-R31	E3F3-R11M	E3F3-R31M					
		M12 CN				E3F3-R16	E3F3-R36	E3F3-R16M	E3F3-R36M					
		Pre-wired		Dark-ON		E3F3-R61	E3F3-R81	E3F3-R61M	E3F3-R81M					
		M12 CN				E3F3-R66	E3F3-R86	E3F3-R66M	E3F3-R86M					
		Pre-wired	2m	Light-ON		With MSR Function	E3F3-R12	E3F3-R32	E3F3-R12M	E3F3-R32M				
		M12 CN					E3F3-R17	E3F3-R37	E3F3-R17M	E3F3-R37M				
		Pre-wired		Dark-ON			E3F3-R62	E3F3-R82	E3F3-R62M	E3F3-R82M				
		M12 CN					E3F3-R67	E3F3-R87	E3F3-R67M	E3F3-R87M				
		Diffuse					Pre-wired	100mm	Light-ON		E3F3-D11	E3F3-D31	E3F3-D11M	E3F3-D31M
							M12 CN				E3F3-D13	E3F3-D36	E3F3-D16M	E3F3-D36M
Pre-wired	Dark-ON		E3F3-D61		E3F3-D81	E3F3-D61M	E3F3-D81M							
M12 CN			E3F3-D66		E3F3-D86	E3F3-D66M	E3F3-D86M							
Pre-wired	300mm		Light-ON		E3F3-D12	E3F3-D32	E3F3-D12M	E3F3-D32M						
M12 CN					E3F3-D17	E3F3-D37	E3F3-D17M	E3F3-D37M						
Pre-wired			Dark-ON		E3F3-D62	E3F3-D82	E3F3-D62M	E3F3-D82M						
M12 CN					E3F3-D67	E3F3-D87	E3F3-D67M	E3F3-D87M						

Infrared light Red light

■Model Nomenclature



■Accessories (Order Separately)

Name	Model
Reflector	E39-R1, E39-R3
Reflector(tape type)	E39-RS1, E39-RS2, E39-RS3
Lens Cap	E39-F31
Mounting Bracket	Y92E-B18

Ratings/Characteristics

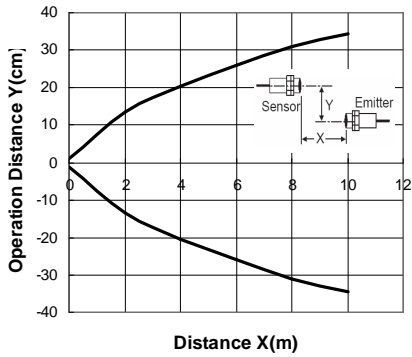
Item	Sensing Method	Through-beam	Retro-reflective (When using E39-R1)		Diffuse		
	NPN Output	E3F3-T11/T11M	E3F3-R11/R11M	E3F3-R12/R12M	E3F3-D11/D11M	E3F3-D12/D12M	E3F3-D13
		E3F3-T16/T16M	E3F3-R16/R16M	E3F3-R17/R17M	E3F3-T16/D16M	E3F3-T17/D17M	—
		E3F3-T61/T61M	E3F3-R61/R61M	E3F3-R62/R62M	E3F3-D61/D61M	E3F3-D62/D62M	—
		E3F3-T66/T66M	E3F3-R66/R66M	E3F3-R67/R67M	E3F3-D66/D66M	E3F3-D67/D67M	—
	PNP Output	E3F3-T31/T31M	E3F3-R31/R31M	E3F3-R32/R32M	E3F3-D31/D31M	E3F3-D32/D32M	—
		E3F3-T36/T36M	E3F3-R36/R36M	E3F3-R37/R37M	E3F3-D36/D36M	E3F3-D37/D37M	—
		E3F3-T81/T81M	E3F3-R81/R81M	E3F3-R82/R82M	E3F3-D81/D81M	E3F3-D82/D82M	—
		E3F3-T86/T86M	E3F3-R86/R86M	E3F3-R87/R87M	E3F3-D86/D86M	E3F3-D87/D87M	—
Sensing distance	5m	3m (without M.S.R Function)	2m (with M.S.R Function)	0.1m	0.3m	0.1m	
Standard sensing object	Opaque object: 11mm min	Opaque object: 56mm min		100×100mm white mat paper			
Hysteresis	—			20% max. of sensing distance		30% max. of sensing distance	
Light source (wavelength)	Infrared LED	Red LED		Infrared LED			
Power supply voltage	DC 12~24V±10%, ripple (p-p) 10% max.						
Current consumption	DC: 45mA max	DC: 25mA max.					
Control output	Load power supply voltage DC26.4Vmax. Load current 100mA max. (Residual voltage 1V max.)					Load power supply voltage DC26.4Vmax. Load current 100mA max. (Residual voltage 2V max.)	
Protective circuit	Output short-circuit protection, DC power supply polarity protection					DC power supply polarity protection / Output polarity protection / Output short-circuit protection /	
Response time	Operating/Response each 1.0ms max						
Sensitivity adjustment	No					Yes	
Ambient illumination	Incandescent lamp: 3000lx max., Sunlight: 10,000lx max.						
Ambient temperature	Operating: -25~+55℃ (with no icing) Storage: -30~+70℃ (with no icing)						
Ambient humidity	Operating: 35%~85%RH(with no icing) Storage: 35%~95%RH(with no icing)						
Insulation resistance	20MΩ min. (at500VDC) between current carry parts and case						
Dielectric strength	1,000 VAC at 50/60 Hz for 1 min between current carry parts and case						
Vibration resistance (destruction)	10 to 55 Hz, 1.5mm double amplitude for 1 hour each in X, Y and Z directions						
Shock resistance (destruction)	500m/s ² for 3 times each in X, Y and Z directions						
Degree of protection	IEC60529 IP66						
Connecting method	Pre-wired(standard length:2m)/M12 connector						
Weight	Pre-wired	Metal case : 200g max.	Metal case: 100g max.				
		Plastic case : 170g max.	Plastic case: 85g max.				
Weight	Connector	Metal case : 120g max.	Metal case: 60g max.				
		Plastic case : 40g max.	Plastic case: 20g max.				
Packing method	Nylon bag						
Material	Case	ABS or BRASS					
	Lens	PMMA					
	Accessories	Screw nuts: ABS or BRASS					
Accessories	Screw nuts (4); instruction sheet	Screw nut (2); reflector; instruction sheet	Screw nuts (2); instruction sheet		Screw (2); instruction sheet; adjusting Driver		

Engineering Data

Parallel Operating Range

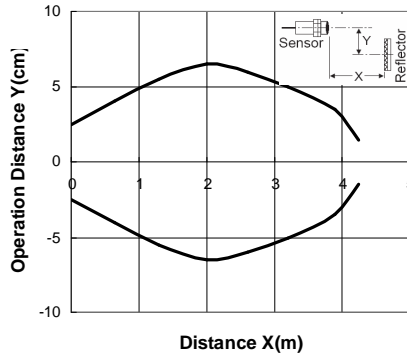
Through-beam Models

E3F3-T□1□/T□6□



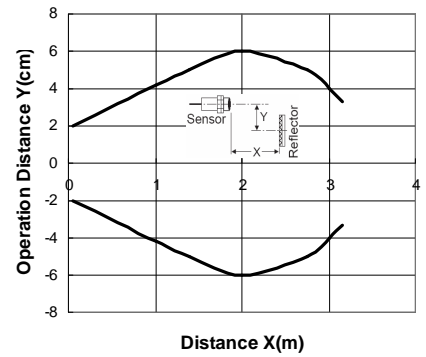
Retro-reflective Models

E3F3-R□1□/R□6□



Retro-reflective Models

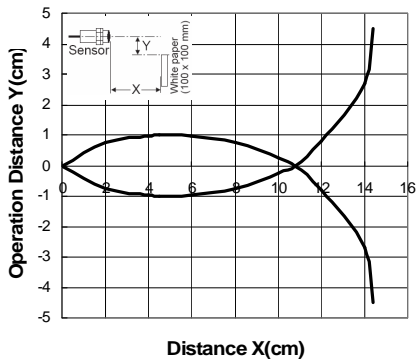
E3F3-R□2□/R□7□



Operating Range (Typical)

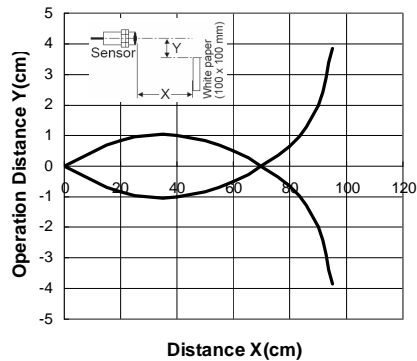
Diffuse Models

E3F3-D□1□/D□3□/D□6□



Diffuse Models

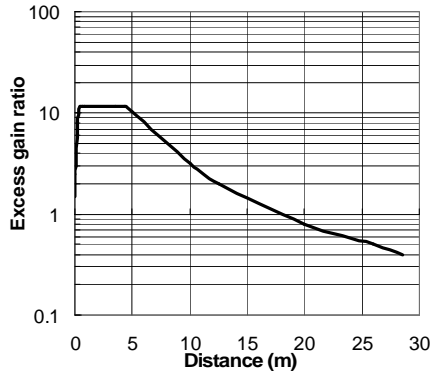
E3F3-D□2□/D□7□



Excess Gain Ratio vs. Set Distance (Typical)

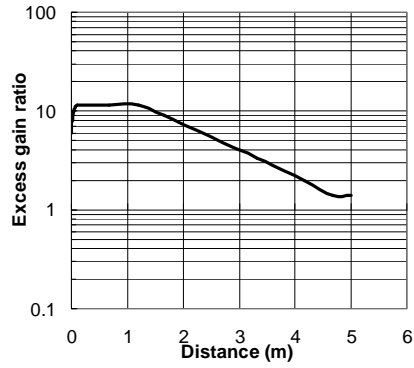
Through-beam Models

E3F3-T□1□/T□6□



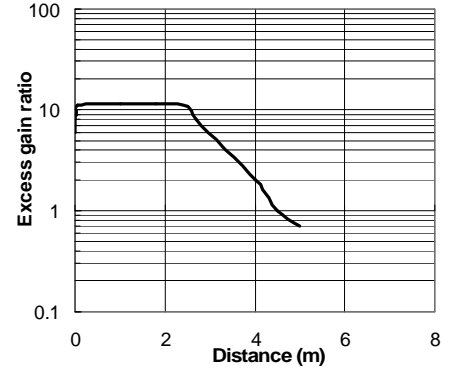
Retro-reflective Models

E3F3-R□1□/R□6□



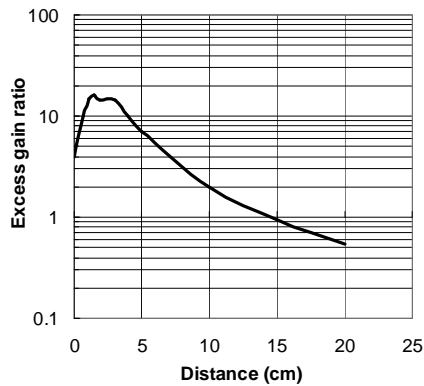
Retro-reflective Models

E3F3-R□2□/R□7□



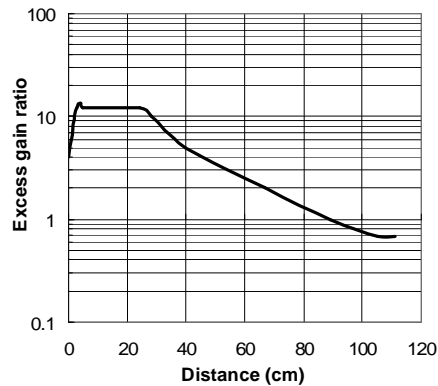
Diffuse Models

E3F3- D□1□/D□3□/D□6□



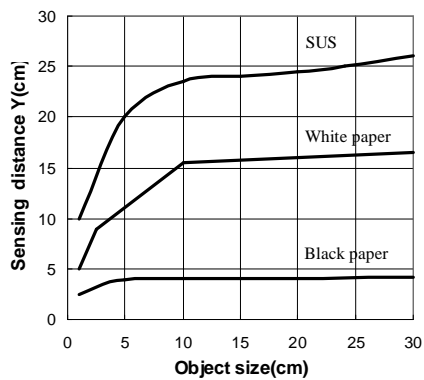
Diffuse Models

E3F3-D□2□/D□7□

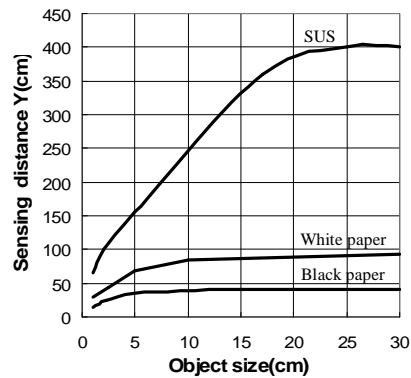


Sensing Distance vs. Object Size (Typical)

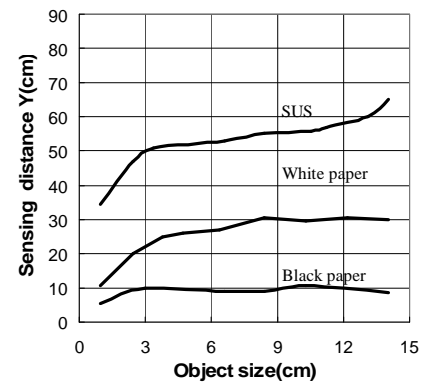
E3F3- D□1□/D□6□



E3F3-D□2□/D□7□



E3F3-D13



Operation

■ NPN Output

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

■ PNP output

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

Dimensions

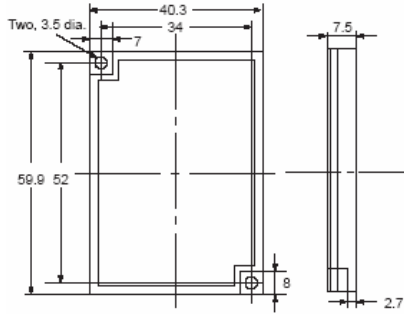
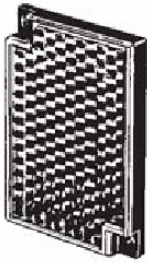
Note: All units are in millimeters unless otherwise indicated.

■ NPN output

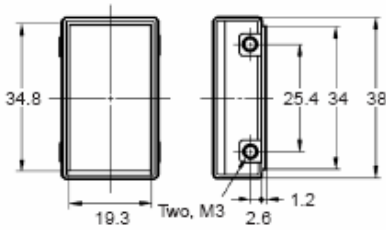
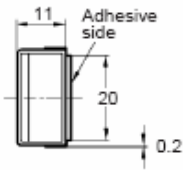
	Heat proof ABS case	Metal BRASS case
Pre-wired	<p>E3F3-D□2/D□3</p>	<p>E3F3-D□2M</p>
Connector	<p>E3F3-D□7</p>	<p>E3F3-D□7M</p>
Pre-wired	<p>E3F3-T□1 E3F3-R□1 E3F3-R□2 E3F3-D□1</p>	<p>E3F3-T□1M E3F3-R□1M E3F3-R□2M E3F3-D□1M</p>
Connector	<p>E3F3-T□6 E3F3-R□6 E3F3-R□7 E3F3-D□6</p>	<p>E3F3-T□6M E3F3-R□6M E3F3-R□7M E3F3-D□6M</p>

Accessories (Order Separately)

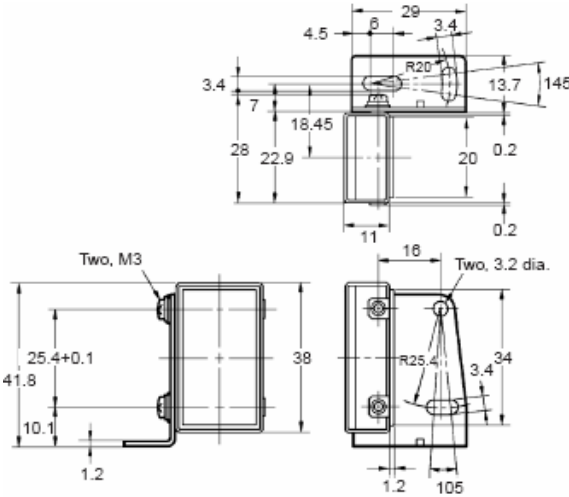
E39-R1 Reflector



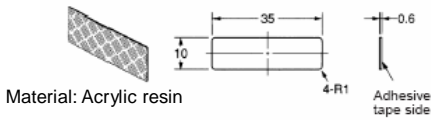
E39-R3 Reflector



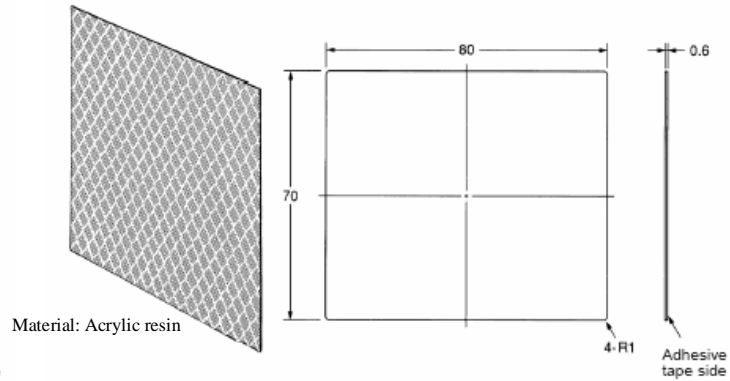
E39-K3 Mounting Bracket (Sold Together)



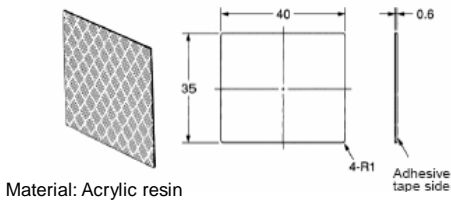
E39-RS1 Reflector



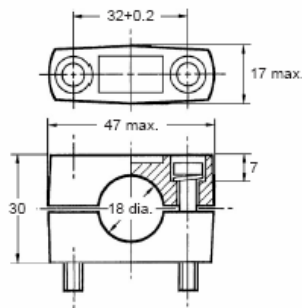
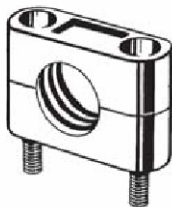
E39-RS3 Reflector



E39-RS2 Reflector



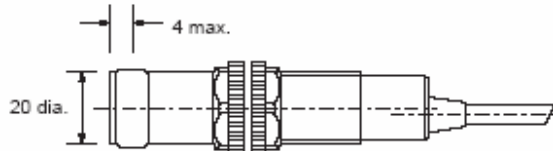
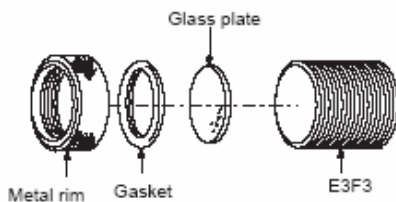
Y92E-B18 Mounting Bracket



Note: Hexagonal bolt: M5×32

Material: Plastic

E39-F31 Lens cap



Precautions

If the input/output lines of 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 IP 66 Standards.

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

Mounting

Do not exceed a torque of 20kgf·cm(2.0 N·m)when tightening mounting the nuts to the ABS case. Do not exceed a torque of 200kgf·cm(20.0 N·m)when tightening mounting the nuts to the metal case.



—WARNING—

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