Photoelectric sensor in compact M18 housing

- M18 size Photoelectric sensor with best value at competitive price
- Bright visible red LED enabling easy alignment
- Compact and robust housing for easy integration into machines
- Reliable operation in all industrial environments



Ordering Information

Sensors [Refer to Dimensions on page 5.]

Red light

Model						
Sensor type	Sensing distance	Connection method	NPN output	PNP output		
Through-beam		pre-wired	E3F1-TN11 2M*1	E3F1-TP11 2M*1		
	15 m	M12 connector	E3F1-TN21*1	E3F1-TP21*1		
Retro-reflective*2		pre-wired	E3F1-RN11 2M	E3F1-RP11 2M		
	0.1 to 3 m with E39-R1S	M12 connector	E3F1-RN21	E3F1-RP21		
Diffuse-reflective	1400	pre-wired	E3F1-DN11 2M	E3F1-DP11 2M		
	100 mm	M12 connector	E3F1-DN21	E3F1-DP21		
□ ≒		pre-wired	E3F1-DN12 2M	E3F1-DP12 2M		
	300 mm	M12 connector	E3F1-DN22	E3F1-DP22		

^{*1} Includes the emitter and receiver.

Reflectors [Refer to Dimensions on page 6.]

Reflectors required for Retro-reflective Sensors: A Reflector is not provided with the Sensor. Be sure to order a Reflector separately.

Sensor	Sensing distance	Appearance	Model	Quantity	Remarks
E3F1-R□	0.1 to 3 m		E39-R1S	1	for E3F1-R□

Mounting brackets [Refer to *Dimensions* on page 6.]

A Mounting Bracket is not enclosed with the Sensor. Order a Mounting Bracket separately if required.

Sensor	Appearance	Model (Material)	Quantity	Remarks
all types		E39-L183 (SUS304)	1	Mounting bracket
		E39-L182 (POM)	1	Flush mounting bracket

^{*2} The Reflector is sold separately.

Sensor I/O connectors

Models for Connectors: A Connector is not provided with the Sensor. Be sure to order a Connector separately.

Sensor	Size	Cable	Appearance		Cable type		Model
			Straight		2 m		XS2F-M12PVC4S2M-EU
M12 connector types	M40	Standard	Ottaignt	O July Service Control of the Contro	5 m	4-wire	XS2F-M12PVC4S5M-EU
	M12 Standard		Angle		2 m		XS2F-M12PVC4A2M-EU
		Aligie	gic Control	5 m		XS2F-M12PVC4A5M-EU	

Specifications

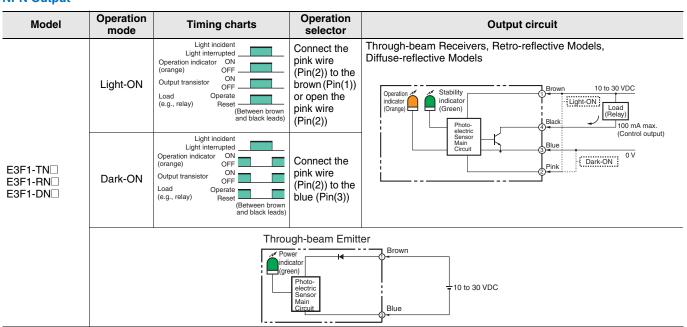
	Sensing method		Through-beam	Retro-reflective	Diffu	Diffuse-reflective			
Model	NPN	Pre-wired	E3F1-TN11 2M	E3F1-RN11 2M	E3F1-DN11 2M	E3F1-DN12 2M E3F1-DN22			
	output	M12 Connector	E3F1-TN21	E3F1-RN21	E3F1-DN21				
	PNP	Pre-wired	E3F1-TP11 2M	E3F1-RP11 2M	E3F1-DP11 2M	E3F1-DP12 2M			
Item	output	M12 Connector	E3F1-TP21	E3F1-RP21	E3F1-DP21	E3F1-DP22			
Sensing distance		15 m	0.1 to 3 m (with E39-R1S)	100 mm (white paper: 300 × 300 mm)	300 mm (white paper: 300 × 300 mm)				
Spot diameter (typical)		_	_	40 × 45 mm Sensing distance of 100 mm	40 × 50 mm Sensing distance of 300 mm				
Directional	angle		2° min.	2° min.	_	_			
Light source	ce (wavele	ength)	Red LED (624 nm)						
Power sup	ply voltag	je	10 to 30 VDC (include v	oltage ripple of 10%(p-p) max.)				
Current co	nsumptio	n	40 mA max. (Emitter 25 mA max. Receiver 15 mA max.)	25 mA max.					
Control ou	tput		NPN/PNP (open collector) Load current: 100 mA max. (Residual voltage: 3 V max.), Load power supply voltage: 30 VDC max.						
Operation	mode		Light-ON/Dark-ON selectable by wiring						
Indicator			Operation indicator (orange) Stability indicator (green) Power indicator (green): only Emitter of Through-beam						
Protection	circuits		Reversed power supply polarity protection, Output short-circuit protection and Reversed output polarity protection						
Response	time		0.5 ms						
Sensitivity	adjustme	nt	One-turn adjuster						
Ambient te	mperatur	e range	Operating: -25 to 55°C/ Storage: -30 to 70°C (with no icing or condensation)						
Ambient hu	umidity ra	inge	Operating: 35 to 85%RH/ Storage: 35 to 95%RH (with no condensation)						
Degree of	orotection)	IEC: IP66		·	•			
Weight Pre-wired cable (2M)		Approx. 110 g/ Approx. 50 g, respectively	Approx. 60 g/ Approx. 50 g						
state/only sensor)	Connect	or	Approx. 30 g/ Approx. 10 g, respectively	Approx. 20 g/ Approx. 10 g					
Case		ABS							
Motorial	Lens and Display		PMMA						
Material	Adjuster		POM						
	Nut		ABS						
Accessorie	es		Instruction sheet M18 nuts (4 pcs)	Instruction sheet M18 nuts (2 pcs)					

Output circuit diagram

PNP Output

Model	Operation mode	Timing charts	Operation selector	Output circuit		
Light-ON (orange) Output t Load		Light incident Light interrupted Operation indicator ON (orange) OFF Output transistor OFF Load Operate (e.g., relay) Reset (Between blue and black leads)	Connect the pink wire (Pin(2)) to the brown (Pin(1))	Through-beam Receivers, Retro-reflective Models, Diffuse-reflective Models Operation Stability indicator (Green) Brown 10 to 30 VDC indicator (Green) Black (Control output)		
E3F1-TP□ E3F1-RP□ E3F1-DP□	Dark-ON	Light incident Light interrupted Operation indicator ON (orange) OFF Output transistor OFF Load Operate (e.g., relay) Perset (Between blue and black leads)	Light interrupted in indicator ON OFF OFF ON	Sensor Main Blue Load (Relay) Circuit Pink Dark-ON		
	Through-beam Emitter Power indicator (green) Photo-sensor Main Dirauit Blue					

NPN Output



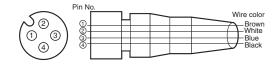
Connector Pin Arrangement

M12 Connector Pin Arrangement



Connectors (Sensor I/O connectors)

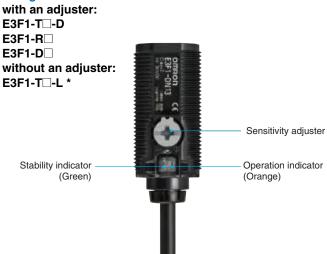
M12 4-wire Connectors



Classification	Wire color	Connector pin No.	Application
	Brown	1	Power supply (+V)
DC	White	2	L/on · D/on selectable
	Blue	3	Power supply (0 V)
	Black	4	Output

Nomenclature

Straight



^{*} The Emitter has two Power indicators (Green) instead of the Stability indicator (Green) and the Operation indicator (Orange).

Safety Precautions

Refer to Warranty and Limitations of Liability.



This product is not designed or rated for directly or indirectly ensuring safety of persons. Do not use it for such a purpose.





Never use the product with an AC power supply. Do not use the product with voltage in excess of the rated voltage.



Do not use the product with incorrect wiring.

Otherwise, explosion, fire, malfunction may result.



Precautions for Safe Use

Be sure to follow the safety precautions below for added safety.

- Do not use the sensor under the environment with explosive, flammable or corrosive gas.
- 2. Do not use the sensor under the oil or chemical environment.
- 3. Do not use the sensor in the water, rain or outdoors.
- Do not use the sensor in the environment where humidity is high and condensation may occur.
- Do not use the sensor under the environment under the other conditions in excess of rated.
- 6. Do not use the sensor in place that is exposed by direct sunlight.
- Do not use the sensor in place where the sensor may receive direct vibration or shock.
- 8. Do not use the thinner, alcohol, or other organic solvents.
- 9. Never disassemble, repair nor tamper with the sensor.
- 10. Please process it as industrial waste.

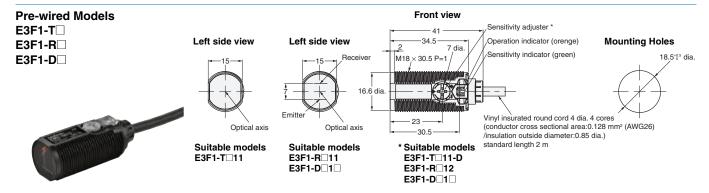
Precautions for Correct Use

- Laying Sensor wiring in the same conduit or duct as high-voltage wires or power lines may result in malfunction or damage due to conduit or use shielded cable.
- 2. Do not pull on the cable with excessive force.
- If a commercial switching regulator is used, ground the FG (frame ground) terminal.
- 4. The sensor will be available 100 ms after the power supply is tuned ON. Start to use the sensor 100 ms or more after turning ON the power supply. If the load and the sensor are connected to separate power supplies, be sure to turn ON the sensor first.
- 5. Output pulses may be generated even when the power supply is OFF. Therefore, it is recommended to first turn OFF the power supply for the load or the load line.
- 6. The sensor must be mounted using the provided nuts. The proper tightening torque range is between 0.4 and 0.5 N⋅m.

Dimensions

(Unit: mm)

Sensors



M12 Connector Models

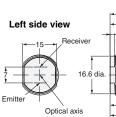
E3F1-T□

E3F1-R□

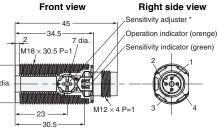
E3F1-D□



Suitable models E3F1-T□21



Suitable models E3F1-R□21 E3F1-D□2□



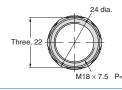
* Suitable models E3F1-T□21-D E3F1-R□22 E3F1-D□2□

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Terminal No.	Specification
1	+V
2	L/on · D/on selectable
3	0V
4	Output

Mounting Holes

Attached nut



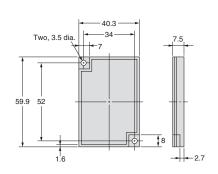




Reflectors

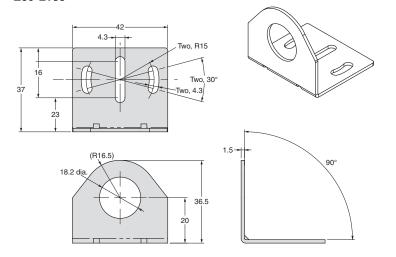
E39-R1S





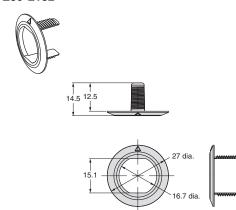
Mounting brackets

E39-L183



Mounting brackets

E39-L182



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

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