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Photoelectric sensor in compact M18 housing

E3F1

- 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

Sensor type	Sensing distance	Connection method	Model		
Selisor type		Connection method	NPN output	PNP output	
Through-beam	(45	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	100	pre-wired	E3F1-DN11 2M	E3F1-DP11 2M	
	100 mm	M12 connector	E3F1-DN21	E3F1-DP21	
□ ≒	000	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

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

Specifications

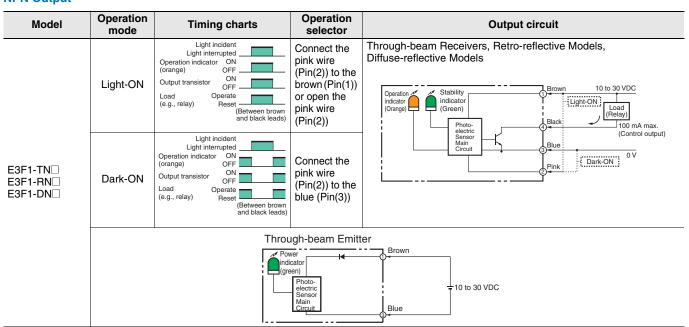
Sensing me		nsing method	Through-beam	Retro-reflective	Diffuse-reflective				
Model	NPN	Pre-wired	E3F1-TN11 2M	E3F1-RN11 2M	E3F1-DN11 2M	E3F1-DN12 2M			
0	output	M12 Connector	E3F1-TN21	E3F1-RN21	E3F1-DN21	E3F1-DN22			
	PNP	Pre-wired	E3F1-TP11 2M	E3F1-RP11 2M	E3F1-DP11 2M	E3F1-DP12 2M			
Item	output	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 diame	ter (typic	al)	_	_	40 × 45 mm Sensing distance of 100 mm	40 × 50 mm Sensing distance of 300 mm			
Directional	angle		2° min.	2° min.	_	_			
Light source	e (wavele	ength)	Red LED (624 nm)	<u> </u>		<u> </u>			
Power sup	oly 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 output		NPN/PNP (open collector) Load current: 100 mA max. (Residual voltage: 3 V max.), Load power supply voltage: 30 VDC max.							
Operation	node		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	ime		0.5 ms						
Sensitivity	adjustme	ent	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	ımidity ra	nge	Operating: 35 to 85%RH/ Storage: 35 to 95%RH (with no condensation)						
Degree of	rotection)	IEC: IP66	<u>-</u>	·				
Weight (packed	Pre-wire	d 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 an	d Display	PMMA						
Material	Adjuster		POM						
	Nut		ABS						
Accessorie	s		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	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 Orange Stability Indicator (Grape) Photo-electric 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) Reset (Between blue and black leads)	Connect the pink wire (Pin(2)) to the blue (Pin(3)) or open the pink wire (Pin(2))	Sensor Main Blue (Relay) Circuit 3 Pink Dark-ON
		AND PON	cator	Brown T 10 to 30 VDC

NPN Output



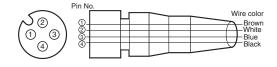
Connector Pin Arrangement

M12 Connector Pin Arrangement



Connectors (Sensor I/O connectors)

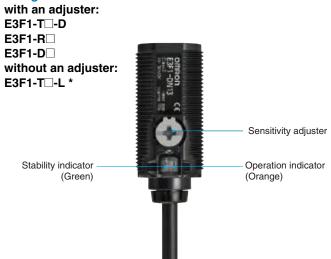
M12 4-wire Connectors



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

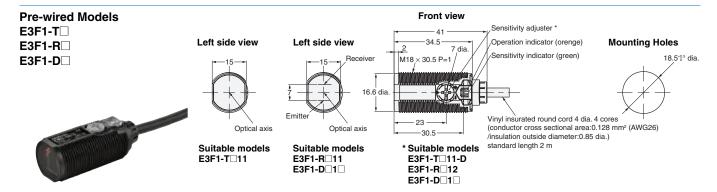
Precautions for Correct Use

- 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.

(Unit: mm)

Dimensions

Sensors





E3F1-T□

E3F1-R□

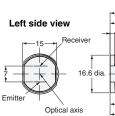
E3F1-D□



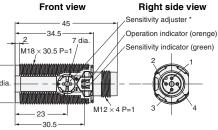
Left side view



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□

Specification
+V

L/on · D/on selectable

0V

Output

Terminal No.

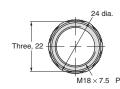
3

Mounting Holes

18.5^{+0.5} dia.

Attached nut



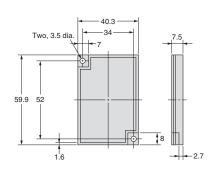




Reflectors

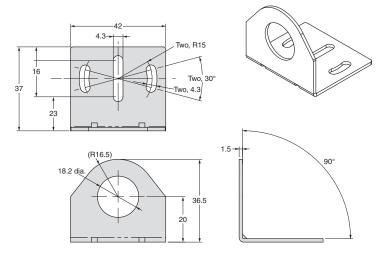
E39-R1S





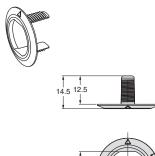
Mounting brackets

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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Product	Code	Reference	Product link
M18 Photoelectric sensor, diffuse, 100mm, M12 connector, PNP, Lite range	369809	E3F1-DP21	Buy on EAN
Photoelectric sensor, flush mounting bracket panel E3FA	370092	E39-L182	Buy on EAN
Photoelectric sensor, metal mounting bracket for E3FA	370093	E39-L183	Buy on EAN
M18 Photoelectric sensor, thru-beam, 15m, 2m cable, NPN, Lite range	371309	E3F1-TN11 2M	Buy on EAN
M18 Photoelectric sensor, retro-reflective, 3m, M12 connector, NPN, Lite range	371310	E3F1-RN21	Buy on EAN
M18 Photoelectric sensor, diffuse, 300mm, M12 connector, NPN, Lite range	371335	E3F1-DN22	Buy on EAN
Proximity sensor, M12 PVC cable 2m Right Angle 4-wire uL	373357	XS2F- M12PVC4A2M-EU	Buy on EAN
Proximity sensor, PVC M12 4-wire cable Right Angle 5m uL	373358	XS2F- M12PVC4A5M-EU	Buy on EAN
Proximity sensor, M12 PVC cable 4 wire 2m Straight uL	373362	XS2F- M12PVC4S2M-EU	Buy on EAN
Proximity sensor, M12 PVC cable 4 wire 5m Straight uL	373363	XS2F- M12PVC4S5M-EU	Buy on EAN
Photoelectric sensor, Plastic Barrier Lite M12 PNP 15m	378946	E3F1-TP21	Buy on EAN
Photoelectric Sensor, Reflex 100mm Plastic PNP 2m Cable Lite	378944	E3F1-DP11 2M	Buy on EAN
Photoelectric Sensor, Reflex 300mm Plastic PNP 2m Cable Lite	378945	E3F1-DP12 2M	Buy on EAN
Photoelectric sensor, Plastic Barrier 15m PNP 2m Cable Lite	378942	E3F1-TP11 2M	Buy on EAN

Photoelectric sensor, Plastic Reflex 300mm M12 PNP Lite	378949	E3F1-DP22	Buy on EAN
M18 Photoelectric sensor, thru-beam, 15m, M12 connector, NPN, Lite range	371585	E3F1-TN21	Buy on EAN
Photoelectric sensor, Plastic mirror (not included) 0,1-3m PNP M12 Lite	378947	E3F1-RP21	Buy on EAN
Photoelectric sensor, Plastic M12 NPN 100mm Reflex Lite	378940	E3F1-DN21	Buy on EAN
Photoelectric sensor, Plastic mirror (not included) 0,1-3m PNP 2m Cable Lite	378943	E3F1-RP11 2M	Buy on EAN
Photoelectric sensor, Plastic mirror (not included) 0,1-3m NPN 2m Cable Lite	378935	E3F1-RN11 2M	Buy on EAN
Photoelectric Sensor, Reflex 300mm Plastic NPN 2m Cable Lite	378937	E3F1-DN12 2M	Buy on EAN
Photoelectric Sensor, Reflex 100mm Plastic NPN 2m Cable Lite	378936	E3F1-DN11 2M	Buy on EAN