CSM_E2F_DS_E_6_1

Proximity Sensor with Resin Case with Superb Water Resistance

- IP68 protection.
- Mutual interference prevention with models with different frequencies is also available.



Be sure to read Safety Precautions on page 5.

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

Ordering Information

Sensors [Refer to Dimensions on page 6.]

Model		Sensing distance		Output configuration	Model		
					Operation mode		
					NO	NC	
Shielded	M8	1.5 mm		DC 3-wire, NPN	E2F-X1R5E1 2M	E2F-X1R5E2 2M	
			m 	AC 2-wire	E2F-X1R5Y1 2M	E2F-X1R5Y2 2M	
	N40	2 mm		DC 3-wire, NPN	E2F-X2E1 2M *1	E2F-X2E2 2M *1	
	M12			AC 2-wire	E2F-X2Y1 2M *1	E2F-X1R5Y2 2M E2F-X1R5Y2 2M E2F-X2E2 2M *1 E2F-X2Y2 2M *1 E2F-X5E2 2M *1	
	N440			DC 3-wire, NPN	E2F-X5E1 2M *1	E2F-X5E2 2M *1	
	M18	5 mm		AC 2-wire	E2F-X5Y1 2M *1	E2F-X5Y2 2M *1	
	M30		10 mm	DC 3-wire, NPN	E2F-X10E1 2M *1	E2F-X10E2 2M *1	
				AC 2-wire	E2F-X10Y1 2M *1	E2F-X10Y2 2M *1	

Accessories (Order Separately)

Protective Covers

Refer to Y92 ☐ for details.

^{*1.} Models with different frequencies are also available. The model numbers are E2F-X□□□5 (e.g., E2F-X5E15).
*2. Models are also available with short-circuit protection. The model numbers are E2F-X□Y□-53 (e.g., E2F-X5Y1-53). The power supply voltage, however, is 100 to 120 VAC.

Ratings and Specifications

Item	Model	E2F-X1R5E□ E2F-X1R5Y□	E2F-X2E□ E2F-X2Y□	E2F-X5E□ E2F-X5Y□	E2F-X10E□ E2F-X10Y□		
Sensing distance		1.5 mm ±10%	2 mm ±10%	5 mm ±10%	10 mm ±10%		
Set distance		0 to 1.2 mm	0 to 1.6 mm	0 to 4 mm	0 to 8 mm		
Differentia	al travel	10% max. of sensing distance	ce				
Detectable	e object	Ferrous metal (The sensing	distance decreases with n	on-ferrous metal. Refer to Er	ngineering Data on page 3.)		
Standard object	sensing	Iron, $8 \times 8 \times 1$ mm Iron, $12 \times 12 \times 1$ mm		Iron, 18 × 18 × 1 mm	Iron, 30 × 30 × 1 mm		
Response *1	frequency	E Models: 2 kHz, Y Models: 25 Hz	E Models: 1.5 kHz, Y Models: 25 Hz	E Models: 600 Hz, Y Models: 25 Hz	E Models: 400 Hz, Y Models: 25 Hz		
Power sup (operating range)	oply voltage g voltage	E Models: 12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max. Y Models: 24 to 240 VAC (20 to 264 VAC)					
Current co	onsumption	E Models: 17 mA max.					
Leakage o	urrent	Y Models: 1.7 mA max. at 20	00 VAC (Refer to Enginee	ring Data on page 3.)			
Control	Load current	E Models: 200 mA max. Y Models: 5 to 100 mA		E Models: 200 mA max. Y Models: 5 to 300 mA			
output	Residual voltage	E Models: 2 V max. (Load current: 200 mA, Cable length: 2 m) Y Models: Refer to Engineering Data on page 4.					
Indicators		E1 Models: Detection indicator (red), E2 Models: Operation indicator (red) Y Models: Operation indicator (red)					
Operation mode (with sensing object approaching)		E1/Y1 Models: NO E2/Y2 Models: NC Refer to the timing charts under <i>I/O Circuit Diagrams</i> on page 4 for details.					
Protection circuits		E Models: Reverse polarity protection, Load short-circuit protection, Surge suppressor; Y Models: None					
Ambient temperature range		Operating/Storage: -25 to 70°C (with no icing or condensation)					
Ambient humidity ı	range	Operating/Storage: 35% to 95%					
Temperate	ure influence	±10% max. of sensing distance at 23°C in the temperature range of –25 to 70°C					
Voltage in	fluence	E Models: ±2.5% max. of sensing distance at rated voltage in rated voltage ±15% range Y Models: ±1% max. of sensing distance at rated voltage in rated voltage ±10% range					
Insulation	resistance	50 MΩ min. (at 500 VDC) between current-carrying parts and case					
Dielectric	strength	E Models: 1,000 VAC, 50/60 Hz for 1 min between current-carrying parts and case Y Models: (M8 Models): 2,000 VAC, 50/60 Hz for 1 min between current-carrying parts and case (Other M8 Models): 4,000 VAC, 50/60 Hz for 1 min between current-carrying parts and case					
Vibration	resistance	Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions					
Shock res	istance	Destruction: 1,000 m/s ² 10 times each in X, Y, and Z directions					
Degree of	protection	IEC 60529 IP68, in-house standards: oil-resistant *2					
Connectio	n method	Pre-wired Models (Standard cable length: 2 m)					
Weight (packed state)		Approx. 40 g	Approx. 50 g	Approx. 130 g	Approx. 170 g		
Case							
Materials	Sensing surface	Polyarylate resin					
	Clamping nuts	Polyacetal					
		Instruction manual					

^{*1.} The response frequency is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and

OMRON Test Method

Usage conditions: 10 m or less under water in natural conditions

- 1. No water ingress after 1 hour under water at 2 atmospheres of pressure.

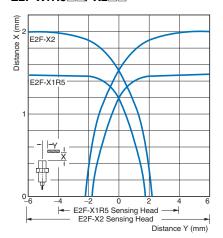
 2. Sensing distance and insulation resistance specifications must be met after 20 repetitions of 1 hour in 0°C water and 1 hour in 70°C water.

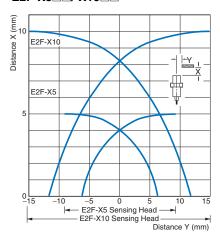
a set distance of half the sensing distance.

*2. When using the Sensor in environments subject to splashing cutting oil, deterioration may result due to the additives in the oil. The E2E is recommended in such environments.

Engineering Data (Reference Value)

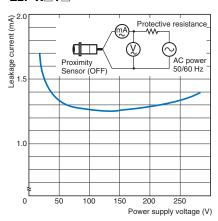
Sensing Area





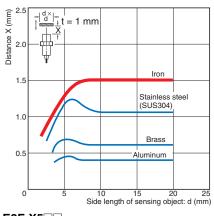
Leakage Current



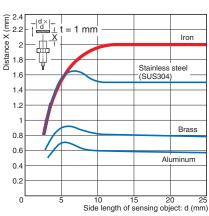


Influence of Sensing Object Size and Material

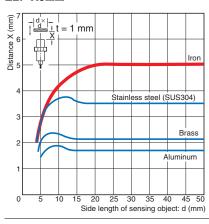
E2F-X1R5



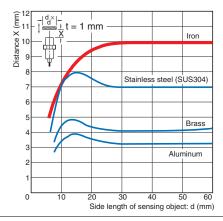
E2F-X2□□





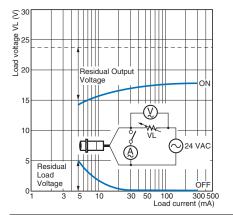


E2F-X10□□

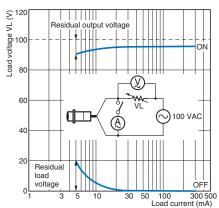


Residual Output Voltage

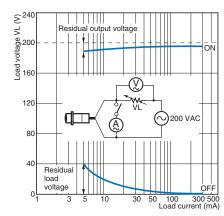
E2F-X□Y□ at 24 VAC



E2F-X□Y□ at 100 VAC



E2F-X□Y□ at 200 VAC



I/O Circuit Diagrams

Output configuration	Operation mode	Model	Timing chart	Output circuit
DC 3-wire	NO	E2F-X1R5E1 E2F-X2E1 E2F-X5E1 E2F-X10E1	Sensing object Present Not present Load (between brown Operate and black leads) Reset Output voltage (between black and blue leads) Low Detection indicator (red) ON OFF	E2F-X1R5 Brown 330 Ω Load Proximity Sensor main circuit Output 2 Tr
	NC	E2F-X1R5E2 E2F-X2E2 E2F-X5E2 E2F-X10E2	Sensing object Present Not present Load (between brown Operate and black leads) Reset Output voltage (between black and blue leads) Low Detection indicator (red) ON OFF	*1. Load current: 200 mA max. *2. When a transistor is connected. Except the E2F-X1R5 Proximity Sensor
AC 2-wire	NO	E2F-X1R5Y1 E2F-X2Y1 E2F-X5Y1 E2F-X10Y1	Sensing object Present Not present Load Operate Reset Operation ON indicator (red) OFF	Proximity Sensor
	NC	E2F-X1R5Y2 E2F-X2Y2 E2F-X5Y2 E2F-X10Y2	Sensing object Present Not present Load Operate Reset Operation indicator ON (red) OFF	main circuit

Safety Precautions

Refer to Warranty and Limitations of Liability.



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



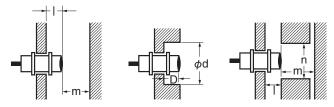
Precautions for Correct Use

Do not use this product under ambient conditions that exceed the ratings.

Design

Influence of Surrounding Metal

When mounting the Sensor within a metal panel, ensure that the clearances given in the following table are maintained. Failure to maintain these distances may cause deterioration in the performance of the Sensor.



Influence of Surrounding Metal

	mm

Model	Item	ı	d	D	m	n
E2F-X1R5□□			8		4.5	12
E2F-X2□□		0	12	0	8	18
E2F-X5		U	18	U	20	27
E2F-X10□□			30		40	45

Mutual Interference

When installing Sensors face-to-face or side-by-side, ensure that the minimum distances given in the following table are maintained.



Mutual Interference

(Unit: mm)

Model Iter	n A	В
E2F-X1R5	20	15
E2F-X2	30 (20)	20 (12)
E2F-X5	50 (30)	35 (18)
E2F-X10□□	100 (50)	70 (35)

Note: Values in parentheses apply to Sensors operating at different frequencies. Models numbers for Sensors with different frequencies are E2F-X□□□5.

Mounting

Do not tighten the nut with excessive force.

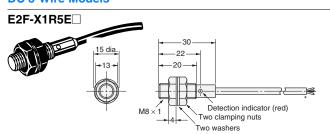


Model	Torque	
E2F-X1R5□□	0.78 N·m	
E2F-X2		
E2F-X5	2 N⋅m	
E2F-X10	2 IV·III	

Maintenance and Inspection

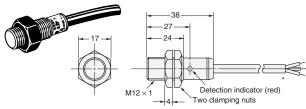
Do not use AC 2-Wire Models in water or in locations subject to water if the sensing surface or any other part of the Sensor is damaged, e.g., from contact with the sensing object. Electric shock may result.

DC 3-Wire Models



* 3.5-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.14 mm², Insulator diameter: 1 mm), Standard length: 2 m The cable can be extended up to 200 m (separate metal conduit).

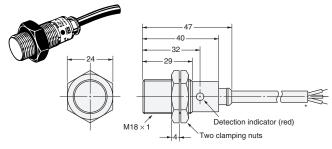
E2F-X2E



* 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m

The cable can be extended up to 200 m (separate metal conduit).

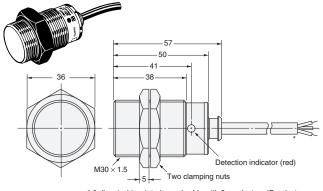
E2F-X5E



* 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m

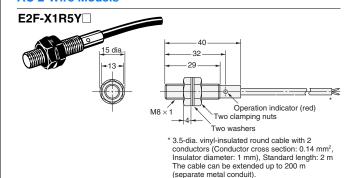
The cable can be extended up to 200 m (separate metal conduit).

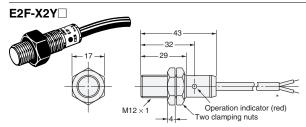
E2F-X10E



* 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard

AC 2-Wire Models

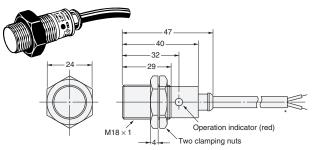




* 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard

The cable can be extended up to 200 m (separate metal conduit).

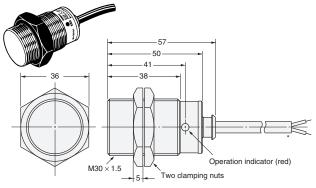
E2F-X5Y



* 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard

The cable can be extended up to 200 m (separate metal conduit).

E2F-X10Y



* 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard

length: 2 m The cable can be extended up to 200 m (separate metal conduit).

Mounting Hole Dimensions



Model	E2F-X1R5□□	E2F-X2□□	E2F-X5□□	E2F-X10□□
F (mm)	8.5 ^{+0.5} dia.	12.5 ₀ ^{+0.5} dia.	18.5 ₀ ^{+0.5} dia.	30.5 ₀ ^{+0.5} dia.

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