

Chemical Resistant Inductive Proximity Sensor

# E2FQ

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*Fluoro plastic housing for highest chemical and detergent resistance*



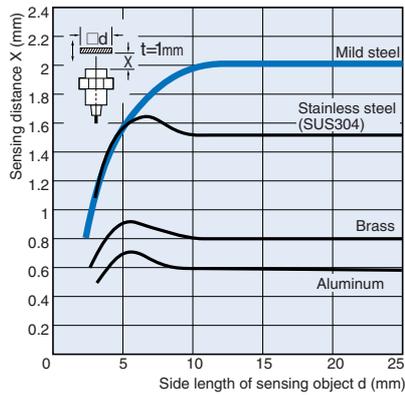
Ordering Information

Shape	Sensing distance	DC 3-wire models			DC 2-wire models		
		PNP (NO)	NPN (NO)	Response frequency	NO	Response frequency	
 Shielded	M12	2mm	E2FQ-X2F1	E2FQ-X2E1	1.5 kHz	E2FQ-X2D1	800 Hz
	M18	5mm	E2FQ-X5F1	E2FQ-X5E1	600 Hz	E2FQ-X5D1	500 Hz
	M30	10mm	E2FQ-X10F1	E2FQ-X10E1	400 Hz	E2FQ-X10D1	300 Hz

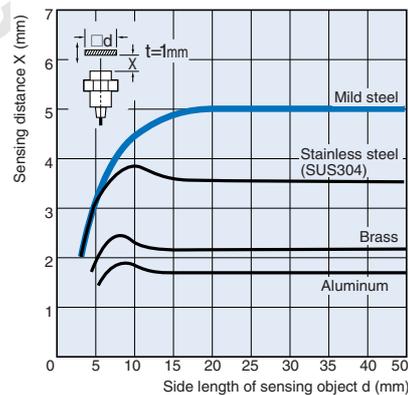
Characteristic data (typical)

Sensing Distance vs. Sensing Object

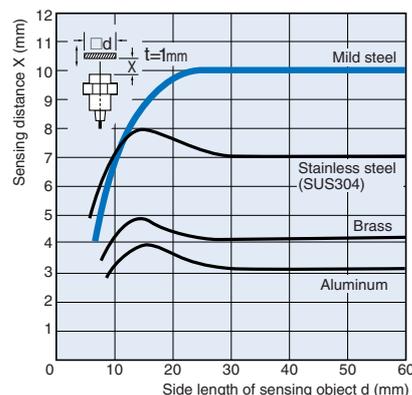
E2FQ-X2



E2FQ-X5



E2FQ-X10



Rating/Performance

Item	Model	E2FQ-X2□	E2FQ-X5□	E2FQ-X10□
Sensing distance		2 mm ±10%	5 mm ±10%	10 mm ±10%
Setting distance		0 to 1.6 mm	0 to 4 mm	0 to 8 mm
Differential distance		E1, F1 models: 10% max. of sensing distance		
Sensing object		Ferrous metal (Sensitivity lowers with non-ferrous metals)		
Standard sensing object (mild steel)		12 x 12 x 1 mm	18 x 18 x 1 mm	30 x 30 x 1 mm
Response frequency*1		E1, F1 models: 1.5 kHz D1 models: 800 Hz	E1, F1 models: 600 Hz, D1 models: 500 Hz	E1, F1 models: 400 Hz, D1 models: 300 Hz
Power supply (Operating voltage range)		E1, F1 models: 12 to 24 VDC, ripple (p-p) : 10% max., (10 to 30 VDC) D1 models: 12 to 24 VDC, ripple (p-p) : 20% max., (10 to 36 VDC)		
Current consumption		E1, F1 models: 17 mA max.		
Leakage current		D1 models: 0.8 mA max.		
Control output	Switching capacity	E1, F1 models: 200 mA max., D1 models: 5 to 100 mA DC		
	Residual voltage	E1, F1 models: 2 V max. (load current: 200 mA with cable length: 2 m) D1 models: 3.0 V max. (under load current of 100 mA with cable length of 2 m)		
Indicator lamp		E models: operation indicator (red) D models: operation indicator (green for stable detection, red for detection close to threshold)		
Operating status (with sensing object approaching)		Normally open (NO)		
Protective circuits		E1, F1 models: Protection for reverse polarity, load short circuit, surge voltage		
Ambient temperature		Operating/Storage: -25°C to 70°C (with no icing or condensation)		
Ambient humidity		Operating/Storage: 35% to 95%RH (with no condensation)		
Temperature influence		10% max. of sensing distance at 23°C within temperature range of -25°C to 70°C		
Voltage influence		E1, F1 models: ±2.5% max. of sensing distance within rated voltage range ±15%		
Insulation resistance		50 MW min. (at 500 VDC) between energized parts and case		
Dielectric strength		E1, F1, D1 models: 1,000 VAC 50/60 Hz for 1 min between energized 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 resistance		Destruction: 500 m/s <sup>2</sup> for 10 times each in X, Y, and Z directions	Destruction: 1,000 m/s <sup>2</sup> for 10 times each in X, Y, and Z directions	
Protective structure		IEC60529 IP67		
Connection method		Pre-wired models (standard length: 2 m)		
Weight (Packed state)		Approx. 70 g	Approx. 130 g	Approx. 170 g
Material	Case	Fluoro plastic		
	Sensing surface			
Accessories		Instruction manual		

\*1. The response frequencies are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.

## Output Circuit Diagram

Operating status	Output specifications	Model	Timing chart	Output circuit
NO	PNP	E2FQ-X□F1		
	NPN	E2FQ-X□E1		<p>Note: 1. 200 mA max.(load current) 2. When a transistor is connected</p>
	DC 2-wire	E2FQ-X□D1		<p>Note: The load can be connected to either the +V or the 0-V line.</p>

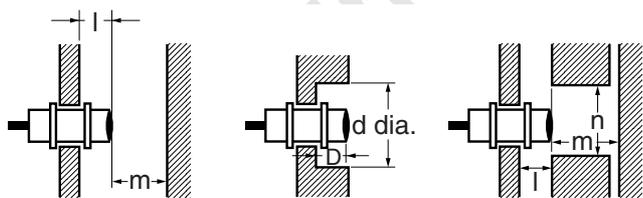
## Precautions

### Correct Use

#### Design

#### Effects of Surrounding Metal

Provide a minimum distance between the Sensor and the surrounding metal as shown in the table below.



Effects of Surrounding Metal

(Unit: mm)

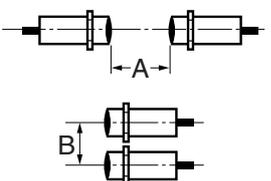
Model	Item	l	d	D	m	n
E2FQ-X2□	0	0	12	0	8	18
E2FQ-X5□			18		20	27
E2FQ-X10□			30		40	45

#### Mutual Interference

If more than one Proximity Sensor is installed face to face or in parallel, ensure that the distances between two Units adjacent to each other are the same as or larger than the corresponding values shown in the following table.

#### Mutual Interference (Unit: mm)

Model	Item	A	B
E2FQ-X2□		30	20
E2FQ-X5□		50	35
E2FQ-X10□		100	70



#### Installation

Do not tighten the nut with excessive force. A washer must be used with the nut.



Note: The table below shows the value of tightening torques when using toothed washers.

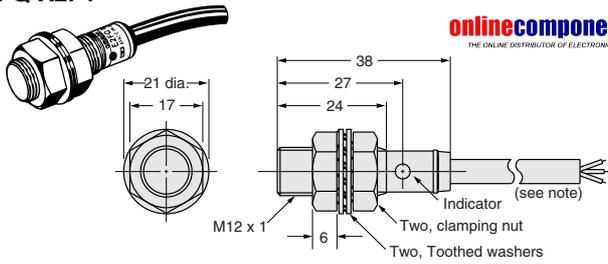
Model	Torque	Tensile strength (torque)
E2FQ-X2□		0.98 Nm
E2FQ-X5□		2 Nm
E2FQ-X10□		

#### Others

#### Chemical resistance

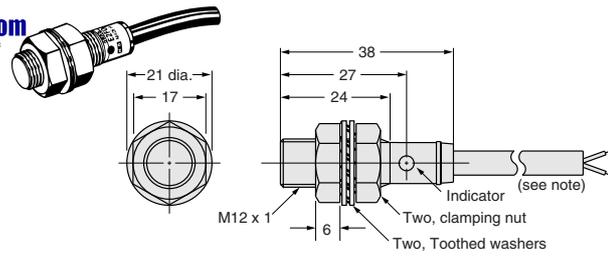
Dimensions (Unit: mm)

E2FQ-X2E1  
E2FQ-X2F1



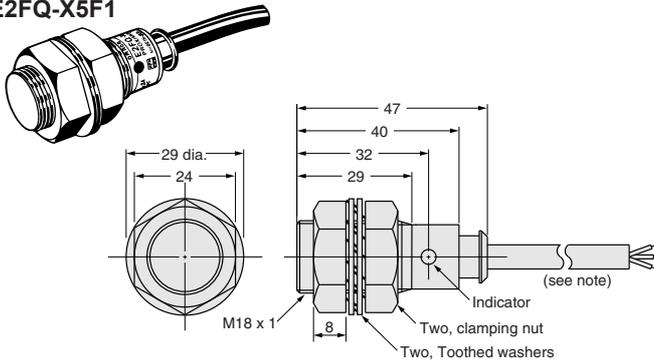
Note:  
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 3 cores, standard length: 2 m  
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X2D1



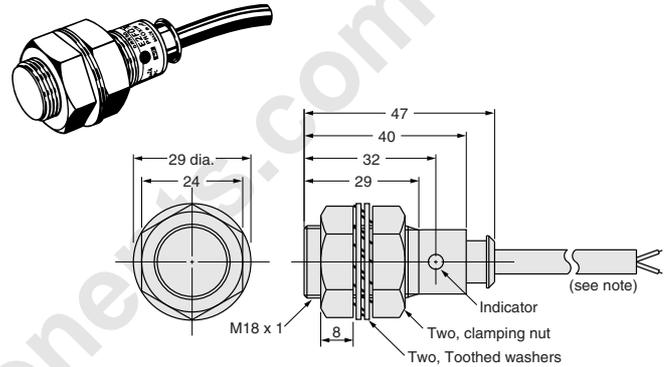
Note:  
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 2 cores, standard length: 2 m  
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X5E1  
E2FQ-X5F1



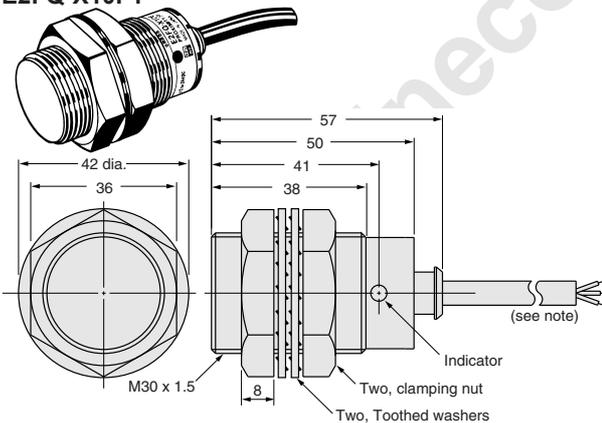
Note:  
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 3 cores, standard length: 2 m  
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X5D1



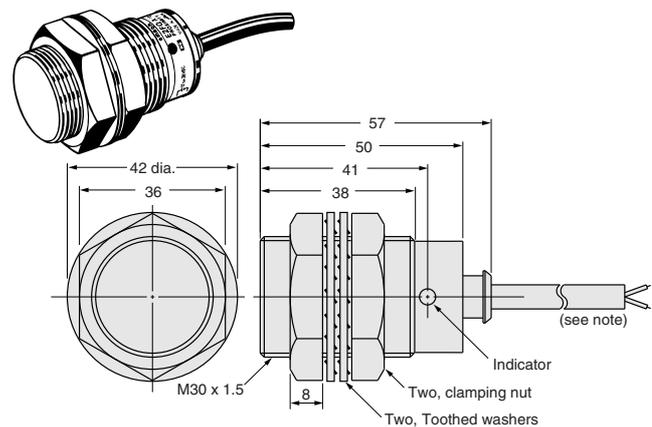
Note:  
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 2 cores, standard length: 2 m  
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X10E1  
E2FQ-X10F1



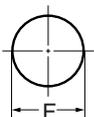
Note:  
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 3 cores, standard length: 2 m  
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X10D1



Note:  
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 2 cores, standard length: 2 m  
The cord can be extended in an independent conduit for 200 m maximum.

Mounting Holes



Model	F (mm)
E2FQ-X2□	12.5 mm dia. <sup>+0.5</sup> / <sub>0</sub>
E2FQ-X5□	18.5 mm dia. <sup>+0.5</sup> / <sub>0</sub>
E2FQ-X10□	30.5 mm dia. <sup>+0.5</sup> / <sub>0</sub>

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