


Chemical Resistant Inductive Proximity Sensor

# E2FQ

*Fluoro plastic housing for highest chemical and detergent resistance*



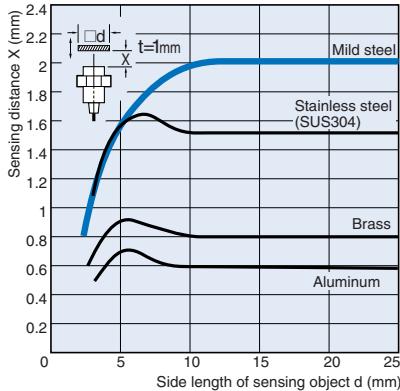
Ordering Information

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

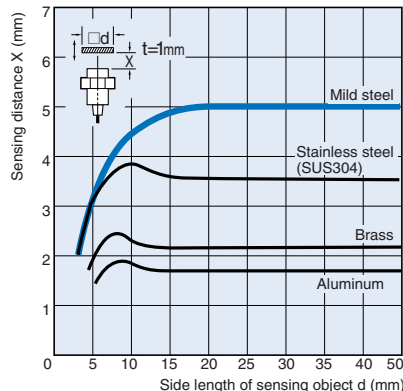
Characteristic data (typical)

Sensing Distance vs. Sensing Object

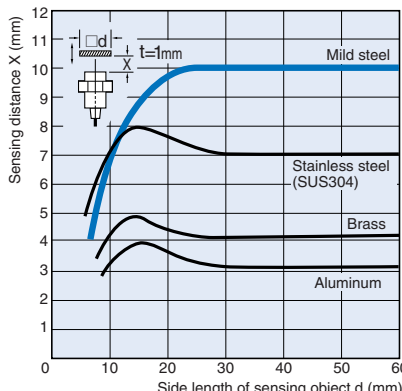
E2FQ-X2



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	<p>Sensing object: Yes (High), No (Low)</p> <p>Load (between black and blue leads): Operates (High), Releases (Low)</p> <p>Output voltage (between black and blue leads): H, L</p> <p>Operation indicator: ON, OFF</p>	
	NPN	E2FQ-X□E1	<p>Sensing object: Yes (High), No (Low)</p> <p>Load (between black and blue leads): Operates (High), Releases (Low)</p> <p>Output voltage (between black and blue leads): H, L</p> <p>Operation indicator: ON, OFF</p>	<p>Note: 1. 200 mA max.(load current) 2. When a transistor is connected</p>
	DC 2-wire	E2FQ-X□D1	<p>Sensing object: Yes (High), No (Low)</p> <p>Load: Operates (High), Releases (Low)</p> <p>Operation indicator: ON, OFF</p>	<p>Note: The load can be connected to either the +V or the 0-V line.</p>

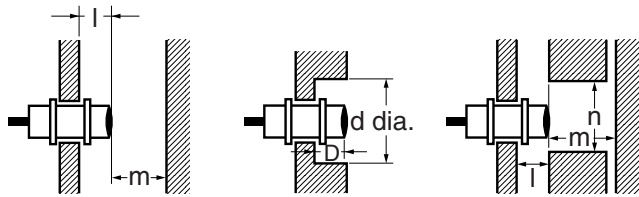
## Precautions

### 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

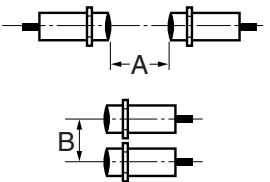
#### Mutual Interference

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

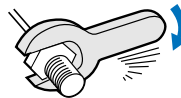
(Unit: mm)

Model	Item	A	B
E2FQ-X2□	0	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.

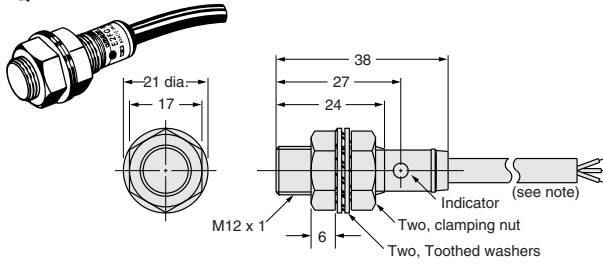
Model	Torque	Tensile strength (torque)
E2FQ-X2□	0	0.98 Nm
E2FQ-X5□		2 Nm
E2FQ-X10□		

#### Others

#### Chemical resistance

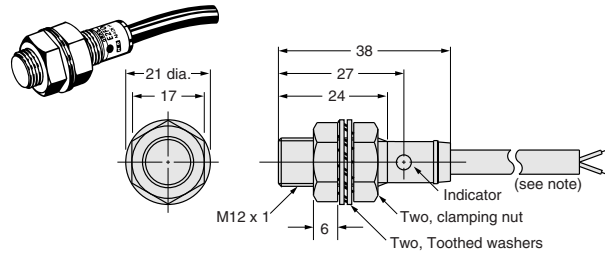
Dimensions (Unit: mm)

E2FQ-X2E1  
E2FQ-X2F1



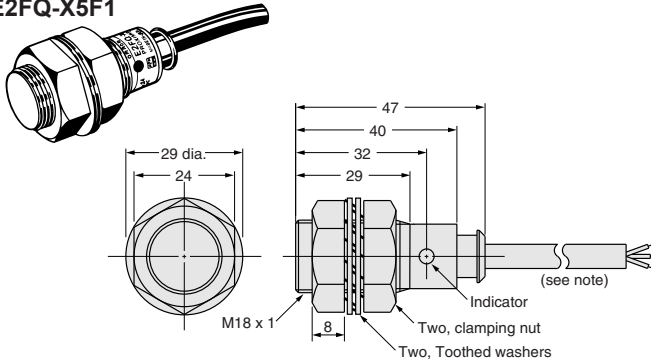
Note:  
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 3 cores, standard length: 2 m  
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X2D1



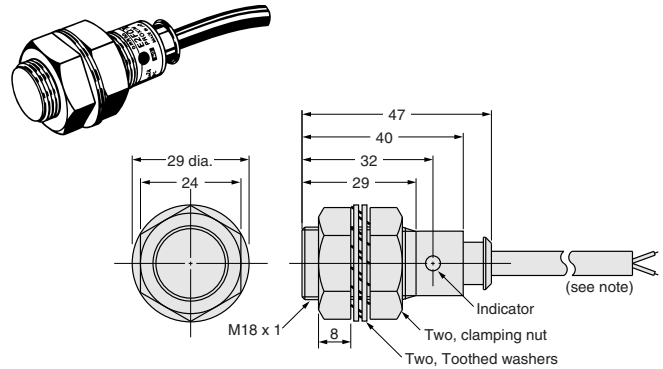
Note:  
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 2 cores, standard length: 2 m  
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X5E1  
E2FQ-X5F1



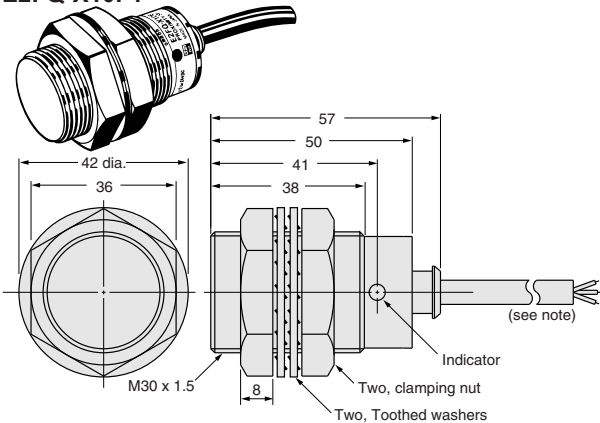
Note:  
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 3 cores, standard length: 2 m  
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X5D1



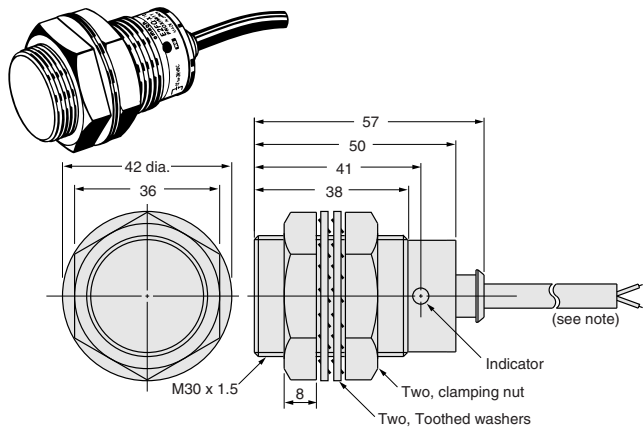
Note:  
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 2 cores, standard length: 2 m  
The cord can be extended in an independent conduit for 200 m maximum.

E2FQ-X10E1  
E2FQ-X10F1



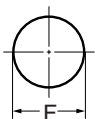
Note:  
Oil-resistant, vibration-resistant, and fire-retardant vinyl-insulated round cord, 6 dia. x 3 cores, standard length: 2 m  
The cord can be extended in an independent conduit for 200 m maximum.

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>



---

**WARRANTY**

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

**LIMITATIONS OF LIABILITY**

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

**SUITABILITY FOR USE**

THE PRODUCTS CONTAINED IN THIS DOCUMENT ARE NOT SAFETY RATED. THEY ARE NOT DESIGNED OR RATED FOR ENSURING SAFETY OF PERSONS, AND SHOULD NOT BE RELIED UPON AS A SAFETY COMPONENT OR PROTECTIVE DEVICE FOR SUCH PURPOSES. Please refer to separate catalogs for OMRON's safety rated products.

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the product.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

**PERFORMANCE DATA**

Performance data given in this document is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

**CHANGE IN SPECIFICATIONS**

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the product may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

**DIMENSIONS AND WEIGHTS**

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

**ERRORS AND OMISSIONS**

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

**PROGRAMMABLE PRODUCTS**

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

---

Cat. No. D029-E2-05A-X **In the interest of product improvement, specifications are subject to change without notice.**

**OMRON EUROPE B.V.**

Wegalaan 67-69,  
 NL-2132 JD, Hoofddorp,  
 The Netherlands  
 Phone: +31 23 568 13 00  
 Fax: +31 23 568 13 88  
 www.industrial.omron.eu