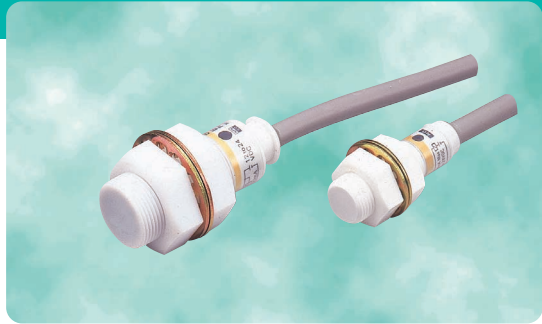


Inductive Proximity Sensor

E2FQ

Spatter Immune Sensor for Welding Application



* Teflon is a registered trademark of the Dupont Company and the Mitsui Dupont Chemical Company for their fluoride resin.

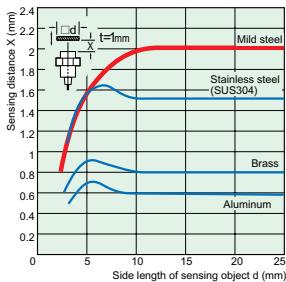
Ordering Information

Shape		Sensing distance		Output specifications	Operating status	Model
Shielded 	M12	2mm		DC 2-wire	NO	E2FQ-X2D1
				DC 3-wire NPN		E2FQ-X2E1
				DC 2-wire		E2FQ-X5D1
	M18	5mm		DC 3-wire NPN		E2FQ-X5E1
				AC 2-wire Models		E2FQ-X5Y1
				DC 2-wire		E2FQ-X10D1
	M30	10mm		DC 3-wire NPN		E2FQ-X10E1
				AC 2-wire Models		E2FQ-X10Y1

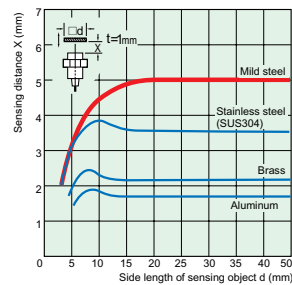
Characteristic data (typical)

Sensing Distance vs. Sensing Object

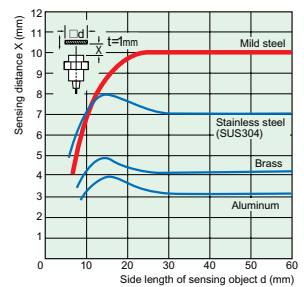
E2FQ-X2



E2FQ-X5



E2FQ-X10



Rating/performance

Item	Model	E2FQ-X2E1 E2FQ-X2D1	E2FQ-X5E1 E2FQ-X5D1, E2FQ-X5Y1	E2FQ-X10E1 E2FQ-X10D1, E2FQ-X10Y1
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, Y1 models: 10% max. of sensing distance		
Sensing object		Ferrous metal (Sensitivity lowers with non-ferrous metals)		
Standard sensing object (mild steel)		12 × 12 × 1 mm	18 × 18 × 1 mm	30 × 30 × 1 mm
Response frequency*1		E1 models: 1.5 kHz D1 models: 800 Hz	E1 models: 600 Hz, D1 models: 500 Hz Y1 models: 25 Hz	E1 models: 400 Hz, D1 models: 300 Hz
Power supply(Operating voltage range)		E1 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 models: 17 mA max.		
Leakage current		D1 models: 0.8 mA max., Y models: 5 to 300 mA		
Control output	Switching capacity	E1 models: 200 mA max., D1 models: 5 to 100 mA DC, Y models: 5 to 300 mA		
	Residual voltage	E1 models: 2 V max. (load current: 200 mA with cable length: 2 m) Y models: Refer to the Specifications. D1 models: 4.0 V max. (under load current of 100 mA with cable length of 2 m)		
Indicator lamp		E, D models: detection indicator (red), Y models: operation indicator (red)		
Operating status (with sensing object approaching)		E1 models, D1 models and Y1 models: NO		
Protective circuits		E1 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 in the temperature range of -25°C to 70°C		
Voltage influence		E1 models: ±2.5% max. of sensing distance in rated voltage range ±15%		
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case		
Dielectric strength		E1, D1 models: 1,000 VAC 50/60 Hz for 1 min between current carry 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 ² for 10 times each in X, Y, and Z directions	Destruction: 1,000 m/s ² 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	Teflon *2		
	Sensing surface			
Accessories		Instruction manual		

*1. The response frequencies for DC switching 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.

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Output Circuit Diagram

Operating status	Output specifications	Model	Timing chart	Output circuit
NO	NPN	E2FQ-X2E1 E2FQ-X5E1 E2FQ-X10E1	<p>Sensing object: Yes (High pulse), No (Low pulse)</p> <p>Load: Operates (High pulse), Releases (Low pulse)</p> <p>Output voltage (between black and blue leads): H (High pulse), L (Low pulse)</p> <p>Operation indicator: ON (High pulse), OFF (Low pulse)</p>	<p>Note: 1. 200 mA max. (load current) 2. When a transistor is connected</p>
	DC 2-wire	E2FQ-X2D1 E2FQ-X5D1 E2FQ-X10D1	<p>Sensing object: Yes (High pulse), No (Low pulse)</p> <p>Load: Operates (High pulse), Releases (Low pulse)</p> <p>Operation indicator: ON (High pulse), OFF (Low pulse)</p>	<p>Note: The load can be connected to either the +V or the 0-V line.</p>
	AC 2-wire Models	E2FQ-X5Y1 E2FQ-X10Y1	<p>Sensing object: Yes (High pulse), No (Low pulse)</p> <p>Load: Operates (High pulse), Releases (Low pulse)</p> <p>Operation indicator: ON (High pulse), OFF (Low pulse)</p>	

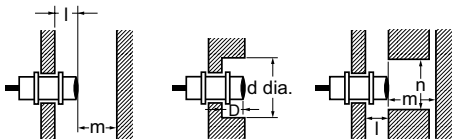
Precautions

Correct Use

Design

Effects of Surrounding Metal

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



Effects of Surrounding Metal

(Unit: mm)

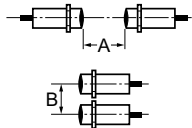
Model	Item	l	d	D	m	n
E2FQ-X2□	0		12	0	8	18
E2FQ-X5□			18		20	27
E2FQ-X10□			30		40	45

Mutual Interference

If more than one Proximity Sensor is mounted face to face or in parallel, make sure 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



Mounting

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 N•m
E2FQ-X5□		2 N•m
E2FQ-X10□		

Others

Chemical resistance

