


A Series of Sputter-preventing Proximity Sensors with a Teflon-coated Metal Housing

- Teflon*-coated metal housing endures high tightening torque.
- Pre-wired and plug-in models are available.


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

Ordering Information

Pre-wired Models

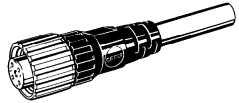

Shield	Size	Sensing distance	Output configuration	Models
Shielded 	M12	3 mm	NO	E2EQ-X3D1
	M18	7 mm		E2EQ-X7D1
	M30	10 mm		E2EQ-X10D1

Plug-in Models

Shield	Size	Sensing distance	Output configuration	Models
Shielded 	M12	3 mm	NO	E2EQ-X3D1-M1GJ
	M18	7 mm		E2EQ-X7D1-M1GJ
	M30	10 mm		E2EQ-X10D1-M1GJ

■ Accessories (Sold Separately)

Sensor I/O Connectors

Appearance	Cord length	Applicable Proximity Sensor	Models
Straight type 	2 m	E2EQ-Xj D1-M1GJ	XS2F-D421-DA0-A
	5 m		XS2F-D421-GA0-A
L type 	2 m		XS2F-D422-DA0-A
	5 m		XS2F-D422-GA0-A

Specifications

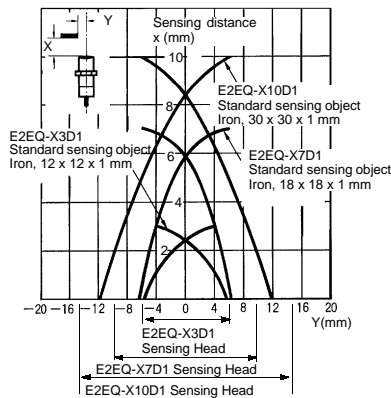
■ Ratings/Characteristics

Item	E2EQ-X3D1 E2EQ-X3D1-M1GJ	E2EQ-X7D1 E2EQ-X7D1-M1GJ	E2EQ-X10D1 E2EQ-X10D1-M1GJ
Supply voltage (operating voltage range)	12 to 24 VDC (10 to 30 VDC)		
Leakage current	0.8 mA max.		
Sensing object	Magnetic metals (refer to <i>Engineering Data</i> for non-magnetic metals)		
Sensing distance	3 mm ±10%	7 mm ±10%	10 mm ±10%
Sensing distance (standard object)	0 to 2.4 mm (Iron, 12 x 12 x 1 mm)	0 to 5.6 mm (Iron, 18 x 18 x 1 mm)	0 to 8.0 mm (Iron, 30 x 30 x 1 mm)
Differential travel	10% max. of sensing distance		
Response frequency (see note 1)	1.0 kHz	0.5 kHz	0.4 kHz
Operating status (with sensing object approaching)	Load ON		
Control output (switching capacity)	3 to 100 mA		
Circuit protection	Reverse connection protection, surge absorber, short-circuit protection		
Indicators	Operation indicator (red LED), operation set indicator (green LED)		
Ambient temperature	Operating: -25°C to 70°C (with no icing)		
Ambient humidity	Operating: 35% to 95%		
Temperature influence	±10% max. of sensing distance at 23°C in the temperature range of -25°C and 70°C		
Voltage influence	±2.5% max. of sensing distance within a range of ±15% of the rated power supply voltage		
Residual voltage	3.0 V max. under load current of 100 mA with cable length of 2 m		
Insulation resistance	50 MΩ min. (at 500 VDC) between current carry parts and case		
Dielectric strength	1,000 VAC for 1 min between current carry parts and case		
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude for 2 hrs each in X, Y, and Z directions		
Shock resistance	1,000 m/s ² (approx. 100G) for 10 times each in X, Y, and Z directions		
Enclosure rating	IEC IP67		
Weight (pre-wired models)	Approx. 120 g	Approx. 160 g	Approx. 220 g
Material	Case	Teflon resin coating (base: brass) (see note 2)	
	Sensing surface	Teflon resin (see note 2)	

- Note:**
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 standard object and the sensing distance set is half of the maximum sensing distance.
 2. Teflon is a registered trademark of the Dupont Company and the Mitsui Dupont Chemical Company for their fluoride resin.

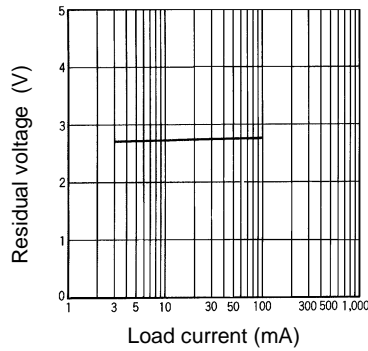
Engineering Data

Operating Range (Typical)

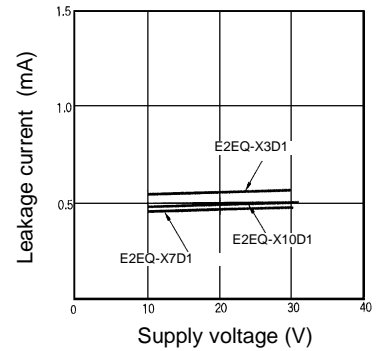


Residual Output Voltage Characteristics (Typical)

E2EQ-Xj D1

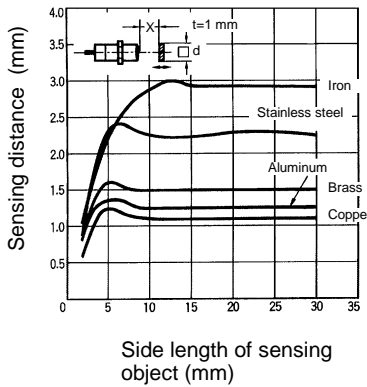


Leakage Current Characteristics (Typical)

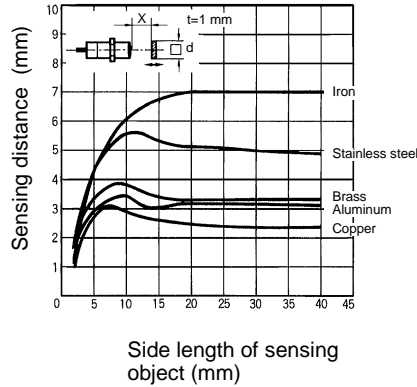


Sensing Distance vs. Sensing Object (Typical)

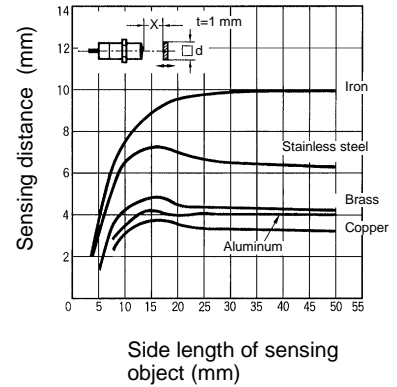
E2EQ-X3D1



E2EQ-X7D1

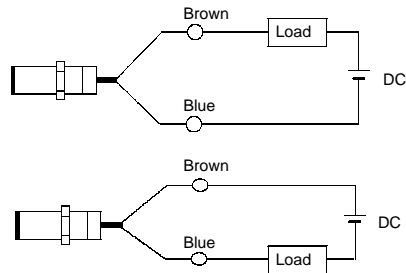
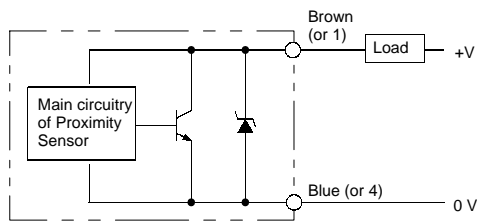


E2EQ-X10D1



Operation

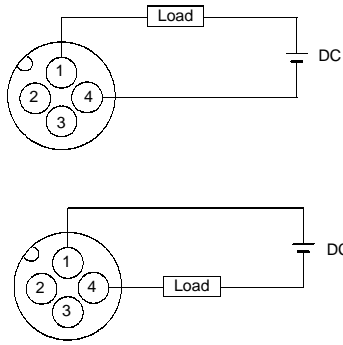
Output Circuit Diagram



Note: It is possible to connect the load in two ways as shown in the above diagrams.

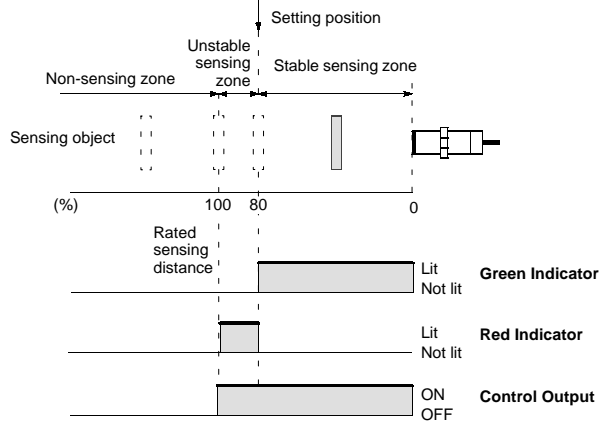
■ Wiring

E2EQ-Xj D1-M1GJ



Note: Terminals 2 and 3 are not used.

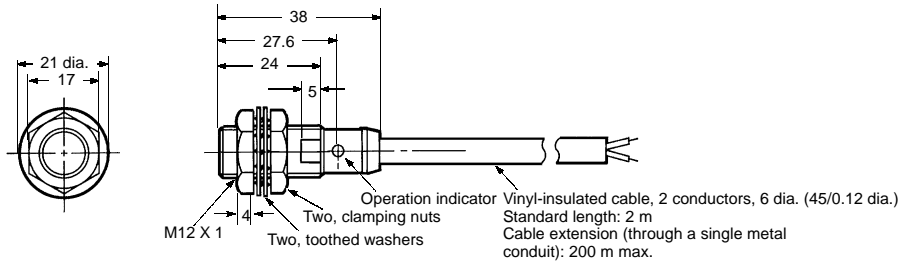
■ Operating Chart



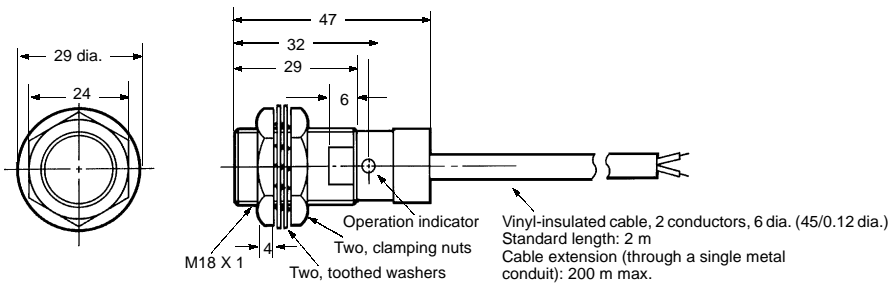
Dimensions

Note: All units are in millimeters unless otherwise indicated.

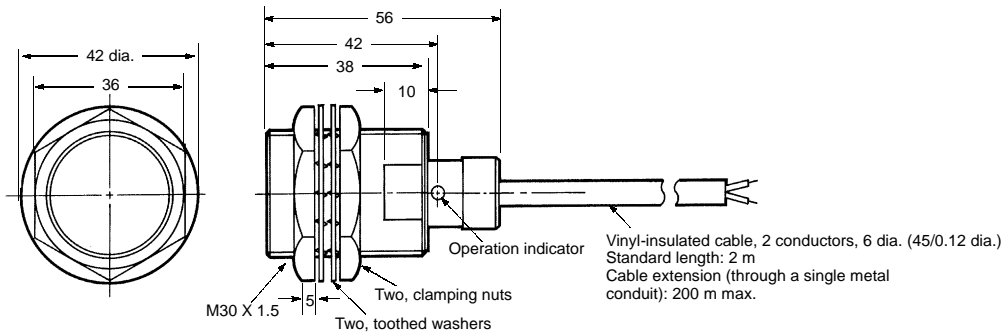
E2EQ-X3D1



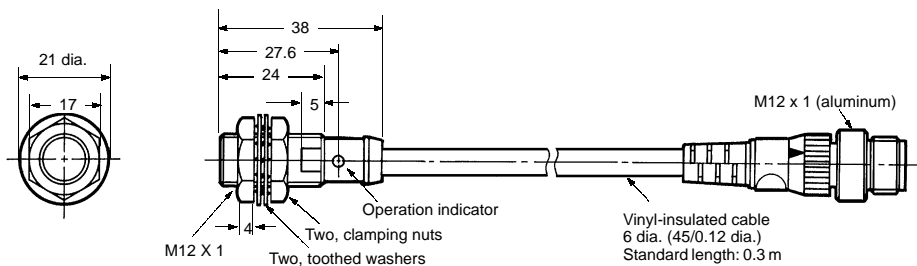
E2EQ-X7D1



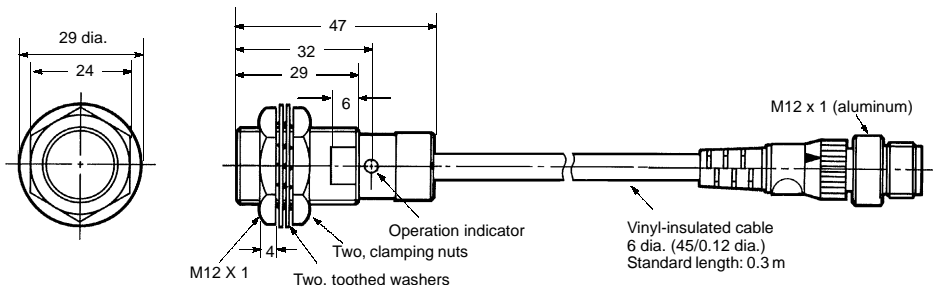
E2EQ-X10D1



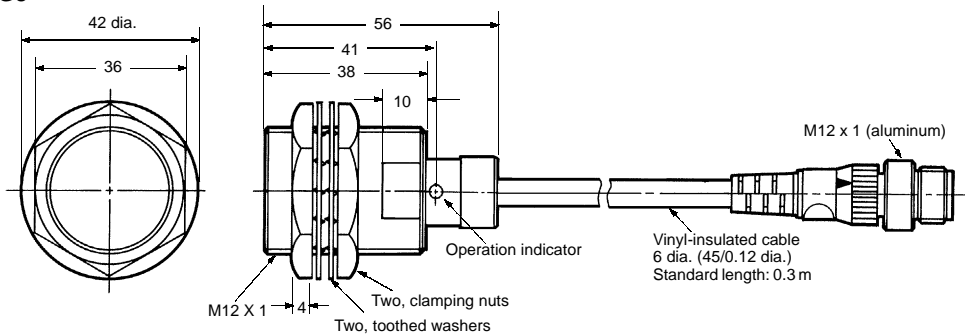
E2EQ-X3D1-M1GJ



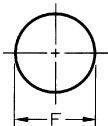
E2EQ-X7D1-M1GJ



E2EQ-X10D1-M1GJ



Mounting Hole Dimensions

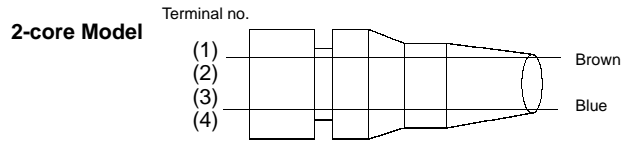
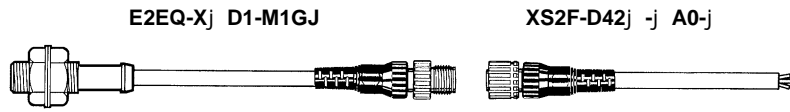


Models	F (mm)
E2EQ-X3	12.5 ^{+0.5} ₀ dia.
E2EQ-X7	18.5 ^{+0.5} ₀ dia.
E2EQ-X10	30.5 ^{+0.5} ₀ dia.

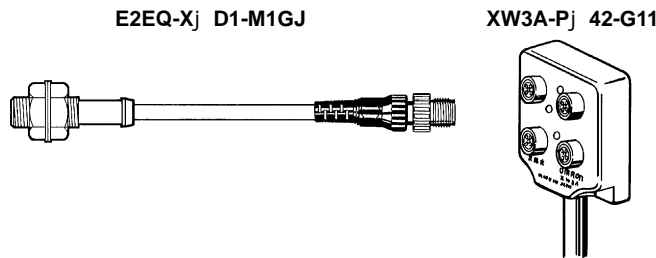
Installation

■ Connection with FA Connector

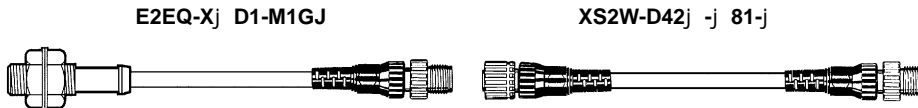
E2EQ-Xj D1-M1GJ to Terminal Board



E2EQ-Xj D1-M1GJ to XW3A (Connector Junction Box)



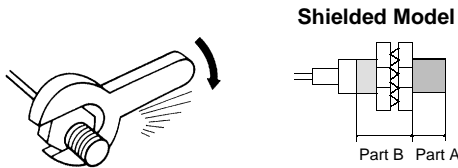
Connector Extension



Precautions

Installation and Surroundings

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

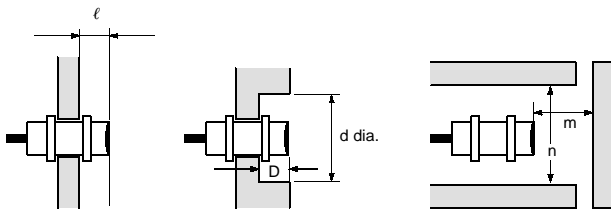


Note: The table below shows the tightening torques for part A and part B nuts. In the above example, the nut is on the sensor head side (part B) and hence the tightening torque for part B applies. If this nut is in part A, the tightening torque for part A applies instead.

Model	Part A		Part B
	Length	Torque	Torque
E2EQ-X3D1-j	24 mm	150 kgf S cm (15 N S m)	---
E2EQ-X7D1-j	29 mm		---
E2EQ-X10D1-j	26 mm	400 kgf S cm (39 N S m)	800 kgf S cm (78 N S m)

Effects of Surrounding Metal

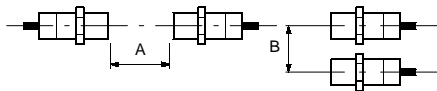
When mounting the E2EQ within a metal panel, ensure that the clearances given in the following table are maintained. Failure to maintain these distances may cause deterioration in the performance of the Sensor.



Model	E2EQ-X3D1-j	E2EQ-X7D1-j	E2EQ-X10D1-j
ℓ	0 mm	0 mm	0 mm
d	12 mm	18 mm	30 mm
D	0 mm	0 mm	0 mm
m	8 mm	20 mm	40 mm
n	18 mm	27 mm	45 mm

Mutual Interference

When installing two or more E2EQ face-to-face or side-by-side, ensure that the minimum distances given in the following table are maintained.



Model	A	B
E2EQ-X3D1-j	30 mm	20 mm
E2EQ-X7D1-j	50 mm	35 mm
E2EQ-X10D1-j	100 mm	70 mm

Sensing Object

Sensing Object Material

The sensing distance is reduced for non-magnetic metals. The sensing distance for non-magnetic metal foils less than 0.01 mm thick is the same as that for magnetic metals. However, if the foil becomes so thin (e.g., from vaporization) that it loses its conductivity, then it will become undetectable.

Metal Plating

The sensing distance will change if the sensing object is plated. The following table shows the sensing distance of a plated object as a percentage of the sensing distance of an un-plated object.

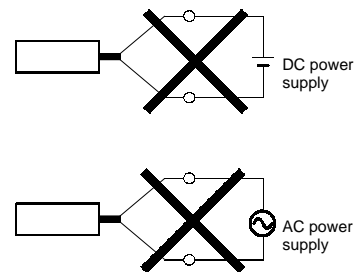
Plating thickness	Iron	Brass
No plating	100%	100%
Zn 5 to 15 μm	90% to 120%	95% to 105%
Cd 5 to 15 μm	100% to 110%	95% to 105%
Ag 5 to 15 μm	60% to 90%	85% to 100%
Cu 10 to 20 μm	70% to 95%	95% to 105%
Cu 5 to 15 μm	---	95% to 105%
Cu (5 to 10 μm) + Ni (10 to 20 μm)	75% to 95%	---
Cu (5 to 10 μm) + Ni (10 μm) + Cr (0.3 μm)	75% to 95%	---

Parallel Connection (OR Circuit)

When constructing OR circuits by connecting 2 or more Proximity Sensors in parallel, the leakage current through the load will be 0.8 mA times n, where n is the number of Proximity Sensors connected in parallel.

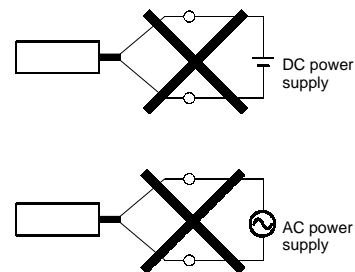
Direct Connection to a Power Supply

Never connect the Proximity Sensor directly to a power supply without a load in the circuit.



Direct Connection to a Power Supply

Never connect the Proximity Sensor directly to a power supply without a load in the circuit.



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D055-E1-2 **In the interest of product improvement, specifications are subject to change without notice.**

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