Spatter-resistant Proximity Sensor



CSM_E2EQ_DS_E_9_1

Spatter-resistant Fluororesincoated Proximity Sensor

- Superior spatter resistance.
- Long Sensing-distance Models added for sensing distances up to 15 mm.
- Pre-wired Smartclick Connector Models are also available.



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 7.] Pre-wired Models

Long Sensing-distance Models

Appearar	nce	Sensing distance		Output configuration	Operation mode	Model
Shielded	M12	4 mm				E2EQ-X4X1 2M
	M18	8 mm		DC 2-wire (no polarity)	NO	E2EQ-X8X1 2M
	M30	15 ו	mm			E2EQ-X15X1 2M

Standard Models

Appearar	nce	Sensing distance		Output configuration	Operation mode	Model
Shielded	M12	3 mm				E2EQ-X3D1 2M
	M18	7 mm		DC 2-wire	NO	E2EQ-X7D1 2M
	M30	10 mm				E2EQ-X10D1 2M

Pre-wired Smartclick Connector Models (M12)

Long Sensing-distance Models

Appearance		Sensing distance	Output configuration	Operation mode	Model
Shielded	M12	4 mm	DC 2-wire (no polarity) (3)-(4) pin arrangement		E2EQ-X4X1-M1TJ 0.3M
	M18	8 mm		NO	E2EQ-X8X1-M1TJ 0.3M
	M30	15 mm			E2EQ-X15X1-M1TJ 0.3M

Standard Models

Standard Models		Sensing distance	e Output configuration	Operation mode	Model
Shielded	M12	3 mm	DC 2-wire	NO	E2EQ-X3D1-M1TGJ 0.3M
	M18	7 mm	(1)-(4)		E2EQ-X7D1-M1TGJ 0.3M
	M30	10 mm	pin analysement		E2EQ-X10D1-M1TGJ 0.3M

Pre-wired Connector Models (M12)

Long Sensing-distance Models

Appearar	nce	Sensing distance		Output configuration	Operation mode	Model
	M12	4 mm		DC 2-wire	NO	E2EQ-X4X1-M1J 0.3M
Shielded	M18	8 mm		(without polarity) (3)-(4)		E2EQ-X8X1-M1J 0.3M
	M30		15 mm	pin arrangement		E2EQ-X15X1-M1J 0.3M

Standard Models

Standard Models		Sensing distance		Output configuration	Operation mode	Model
Shielded	M12	3 mm		DC 2-wire (1)-(4) pin arrangement		E2EQ-X3D1-M1GJ 0.3M
	M18	7 mm			NO	E2EQ-X7D1-M1GJ 0.3M
	M30	10 mm				E2EQ-X10D1-M1GJ 0.3M

Accessories (Order Separately)

Sensor I/O Connectors (M12, Sockets on One Cable End)

(Models with Pre-wired Connectors: A Connector is not provided with the Sensor. Be sure to order a Connector separately.) [Refer to XS2, XS5.]

Appearance	Cable length	Sensor I/O Connector model number	Applicable Proximity Sensor model number	
Straight	2 m	XS2F-D421-DC0-F		
	5 m	XS2F-D421-GC0-F	E2EO-X□X1-M1.I	
I-shape	2 m	XS2F-D422-DC0-F		
L-shape	5 m	XS2F-D422-GC0-F		
Straight	2 m	XS2F-D421-DA0-F		
a state	5 m	XS2F-D421-GA0-F	F2FQ-X□D1-M1GJ	
L-shape	2 m	XS2F-D422-DA0-F		
	5 m	XS2F-D422-GA0-F]	
Smartclick	2 m	XS5F-D421-D80-F	E2EQ-X□X1-M1TJ	
Straight	5 m	XS5F-D421-G80-F	E2EQ-X□D1-M1TGJ	

Note: Refer to Introduction to Sensor I/O Connectors/Sensor Controllers for details.

Ratings and Specifications

Long Sensing-distance Models

	Model	E2EQ-X4X1	E2EQ-X8X1	E2EQ-X15X1				
Item		E2EQ-X4X1-M1(T)J	E2EQ-X8X1-M1(T)J	E2EQ-X15X1-M1(T)J				
Sensing d	istance	4 mm ±10%	8 mm ±10%	15 mm ±10%				
Set distan	ce *1	0 to 3.2 mm	0 to 6.4 mm	0 to 12 mm				
Differentia	ll travel	15% max. of sensing distance						
Standard s	sensing object	Iron, $12 \times 12 \times 1$ mm	Iron, $18 \times 18 \times 1$ mm	Iron, $30 \times 30 \times 1$ mm				
Response frequency *2		1 kHz	0.5 kHz	0.25 kHz				
Control	Load current	3 to 100 mA						
output	Residual voltage *3	5 V max. (Load current: 100 mA, Cable le	5 V max. (Load current: 100 mA, Cable length: 2 m)					
Operation object app	Operation mode (with sensing object approaching) Load ON: NO; For details, refer to the timing charts on page 5.							
Protection	circuits	Load short-circuit protection, Surge suppr	essor					
Ambient te	emperature range	Operating: -25 to 70°C, Storage: -40 to 8	35°C, (with no icing or condensation)					
Temperatu	ure influence	$\pm 15\%$ max. of sensing distance at 23°C ir $\pm 10\%$ max. of sensing distance at 23°C ir	n the temperature range of -40 to 85°C n the temperature range of -25 to 70°C	$\pm 15\%$ max. of sensing distance at 23°C in the temperature range of –25 to 70°C				
Voltage in	fluence	$\pm 1\%$ max. of sensing distance at rated vo	Itage in the rated voltage $\pm 15\%$ range					
Shock res	istance	Destruction: 1,000m/s ² 10 times each in λ	K, Y, and Z directions					
Connectio	n method	Pre-wired Models (Standard cable length: 2 m), Pre-wired Connector Models						
Weight	Pre-wired Models	Approx. 65 g	Approx. 140 g	Approx. 190 g				
(packed state)	Pre-wired Connector Models	Approx. 20 g	Approx. 40 g	Approx. 90 g				

*1. Use the Sensor within the range in which the green indicator is ON.
*2. The response frequency is an average value.
*3. The residual voltage is 5 V. Make sure that the device connected to the Sensor can withstand the residual voltage.

Standard Models

	Model	E2EQ-X3D1	E2EQ-X7D1	E2EQ-X10D1			
Item		E2EQ-X3D1-M1(T)GJ	E2EQ-X7D1-M1(T)GJ	E2EQ-X10D1-M1(T)GJ			
Sensing dista	ince	3 mm ±10%	7 mm ±10%	10 mm ±10%			
Set distance		0 to 2.4 mm	0 to 5.6 mm	0 to 8 mm			
Differential tra	avel	10% max. of sensing distance					
Standard sen	sing object	Iron, $12 \times 12 \times 1$ mm	Iron, $18 \times 18 \times 1$ mm	Iron, $30 \times 30 \times 1 \text{ mm}$			
Response fre	quency *	1 kHz	500 Hz	400 Hz			
Control	Load current	3 to 100 mA					
output	Residual voltage	3 V max. (Load current: 100 mA, Cable length: 2 m)					
Operation mode (with sensing object approaching)		Load ON: NO; For details, refer to the timing charts on page 5.					
Protection cir	cuits	Load short-circuit protection, Surge suppressor					
Ambient temp	perature range	Operating/Storage: -25 to 70°C (with no icing or condensation)					
Temperature	influence	\pm 10% max. of sensing distance at 23°C in the temperature range of –25 to 70°C					
Voltage influe	ence	$\pm 2.5\%$ max. of sensing distance at rated voltage in the rated voltage $\pm 15\%$ range					
Shock resista	ince	Destruction: 1,000 m/s ² 10 times each in X, Y, and Z directions					
Connection method		E2EQ-X D1: Pre-wired Models (Standard cable length: 2 m) E2EQ-X D1-M1GJ: Pre-wired Connector Models (Standard cable length: 300mm)					
Weight	Pre-wired Models	Approx. 120 g	Approx. 160 g	Approx. 220 g			
(packed state)	Pre-wired Connector Models	Approx. 80 g	Approx. 110 g	Approx. 190 g			

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

Common Ratings and Performance

ltem	Model	E2EQ-X4X1 E2EQ-X4X1-M1(T)J E2EQ-X3D1 E2EQ-X3D1-M1(T)GJ	E2EQ-X8X1 E2EQ-X8X1-M1(T)J E2EQ-X7D1 E2EQ-X7D1-M1(T)GJ	E2EQ-X15X1 E2EQ-X15X1-M1(T)J E2EQ-X10D1 E2EQ-X10D1-M1(T)GJ			
Detectable object Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to Engineering 4.)							
Power supply (operating vo	/ voltage Itage range)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.					
Leakage curr	ent	0.8 mA max.					
Indicators		Operation indicator (red), Setting indicator (green)					
Ambient hum	hidity range	Operating/Storage: 35% to 95% (with no condensation)					
Insulation res	sistance	50 M Ω min. (at 500 VDC) between current-carrying parts and case					
Dielectric str	ength	1,000 VAC for 1 min between current-carrying parts and case					
Vibration res	istance	Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions					
Degree of pro	otection	IEC 60529 IP67, in-house standards: oil-resistant					
	Case	Fluororesin coating (Base material:	brass)				
Matoriale	Sensing surface	Fluororesin					
Wateriais	Clamping nuts	Fluororesin coating (Base material: brass)					
	Toothed washer	Zinc-plated iron					
Accessories		Instruction manual					





Influence of Sensing Object Size and Material

E2EQ-X4X1(-M1(T)J)



E2EQ-X3D1(-M1(T)GJ)





E2EQ-X7D1(-M1(T)GJ)

E2EQ-X8X1(-M1(T)J)



E2EQ-X15X1(-M1(T)J)



E2EQ-X10D1(-M1(T)GJ)



Residual Output Voltage E2EQ-X X (-M1(T)J) E2EQ-XDD(-M1(T)GJ) Residual output voltage (V) Residual output voltage (V) 3 3 2 2 1 0 0L 3 5 10 30 50 100

Load current (mA)



I/O Circuit Diagrams

Long Sensing-distance Models



300 500 1.000

Load current (mA)

Standard Models

Model	Operation mode	Timing Chart	Output circuit
E2EQ-X3D1 E2EQ-X7D1 E2EQ-X10D1 E2EQ-X3D1-M1(T)GJ E2EQ-X7D1-M1(T)GJ E2EQ-X10D1-M1(T)GJ	NO	Unstable Set position sensing object (%) 100 80 (TYP) 0 Rated sensing distance ON Setting indicator OFF (green) ON Operation indicator (red) OFF Control output	Brown +v Image: Sensor Image: Sensor Brown +v Image: Sensor Image: Sensor Image: Sensor Image: Sensor

Pre-wired Connector Model Connections



Safety Precautions

Refer to Warranty and Limitations of Liability.

<u> WARNING</u>

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 (Unit: mm)

Model Iter	n I	d	D	m	n
E2EQ-X4X1(-M1(T)J)	2.4	18	2.4	12	18
E2EQ-X8X1(-M1(T)J)	3.6	27	3.6	24	27
E2EQ-X15X1(-M1(T)J)	6	45	6	45	45
E2EQ-X3D1(-M1(T)GJ)		12		8	18
E2EQ-X7D1(-M1(T)GJ)	0	18	0	20	27
E2EQ-X10D1(-M1(T)GJ)		30	1	40	45

Mutual Interference

When installing two or more 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	Item	Α	В
E2EQ-X4X1(-M1(T)J)		30	20
E2EQ-X8X1(-M1(T)J)		60	35
E2EQ-X15X1(-M1(T)J)		110	90
E2EQ-X3D1(-M1(T)GJ)		30	20
E2EQ-X7D1(-M1(T)GJ)		50	35
E2EQ-X10D1(-M1(T)GJ)		100	70

Mounting

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





- Note: 1. The allowable tightening strength depends on the distance from the edge of the head, as shown in the following table. (A is the distance from the edge of the head. B includes the nut on the head side. If the edge of the nut is in part A, the tightening torque for part A applies instead.)
 - 2. The following torque assume washers are being used.

Torque	Part A		Part B	
Model	Dimension (mm)	Torque	Torque	
E2EQ-X4X1(-M1(T)J)		30 N⋅m		
E2EQ-X8X1(-M1(T)J)		70 N⋅m		
E2EQ-X15X1(-M1(T)J)		180 N·m		
E2EQ-X3D1(-M1(T)GJ)	24	15 N m		
E2EQ-X7D1(-M1(T)GJ)	29	15 11-111		
E2EQ-X10D1(-M1(T)GJ)	26	39 N∙m	78 N∙m	

Dimensions

Pre-wired Models

Long Sensing-distance Models



Pre-wired Connector Models

Long Sensing-distance Models



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