

# E2EF



## Metal Head for long-distance Detection that Withstands Harsh Environments Where the Workpiece Can Rub against the Sensor

- Completely stainless-steel housing
- Long-distance detection equivalent to or greater than Proximity Sensors with Resin Heads \*1
- More than 20 times \*2 the durability of Proximity Sensors with Resin Heads
- Spatter-resistant Models with fluororesin coating are available.
- Aluminum chip immunity
- Pre-wired Smartclick Connector Models are also available.

\*1. The actual sensing distance will vary with the size or material of the object.  
For details, refer to Engineering Data.

\*2. Test results for stainless-steel brush rotating at 130 rpm.



Be sure to read *Safety Precautions* on page 4.

Note: Models with a fluororesin coating also use vinyl chloride for the cable material and require separate protection.

## Ordering Information

### Sensors [Refer to Dimensions on page 5.]

#### Standard Models (Completely stainless-steel housing)

Connection method	Appearance	Sensing distance	Output	Operation mode	Model
Pre-wired Models (2m)		M8  2mm	DC 2-Wire (polarity)	NO	E2EF-X2D1 2M
		M12  3mm			E2EF-X3D1 2M
		M18  7mm			E2EF-X7D1 2M
		M30  12mm			E2EF-X12D1 2M
Pre-wired Smartclick Connector Models (M12)		M8  2mm			E2EF-X2D1-M1TGJ 0.3M
		M12  3mm			E2EF-X3D1-M1TGJ 0.3M
		M18  7mm			E2EF-X7D1-M1TGJ 0.3M
		M30  12mm			E2EF-X12D1-M1TGJ 0.3M

#### Spatter-resistant Models (Completely stainless-steel housing with fluororesin coating)

Connection method	Appearance	Sensing distance	Output	Operation mode	Model
Pre-wired Models (2m)		M8  2mm	DC 2-Wire (polarity)	NO	E2EF-QX2D1 2M
		M12  3mm			E2EF-QX3D1 2M
		M18  7mm			E2EF-QX7D1 2M
		M30  12mm			E2EF-QX12D1 2M
Pre-wired Smartclick Connector Models (M12)		M8  2mm			E2EF-QX2D1-M1TGJ 0.3M
		M12  3mm			E2EF-QX3D1-M1TGJ 0.3M
		M18  7mm			E2EF-QX7D1-M1TGJ 0.3M
		M30  12mm			E2EF-QX12D1-M1TGJ 0.3M

Note: Vinyl chloride is used for the cable material, and separate protection is required.

### Accessories (Order Separately)

#### Sensor I/O Connectors

#### Smart Click Connectors

Cable connection direction	Cable specifications	Cable length	No. of cable conductors	Model	Applicable Proximity Sensor model number
	Flame-retardant, flexible cable	2m	4	XS5F-D421-D80-F	E2EF-X□D1-M1TGJ
		5m	4	XS5F-D421-G80-F	E2EF-QX□D1-M1TGJ

Note: Refer to *Sensor I/O Connector/Sensor Controller* on your OMRON website for details.

# Ratings and Specifications

Item	Size Shielded	M8		M12		M18		M30	
		Shielded							
		Completely stainless-steel housing	Fluororesin coating	Completely stainless-steel housing	Fluororesin coating	Completely stainless-steel housing	Fluororesin coating	Completely stainless-steel housing	Fluororesin coating
Model	E2EF-X2D1 (-M1TGJ)	E2EF-QX2D1 (-M1TGJ)	E2EF-X3D1 (-M1TGJ)	E2EF-QX3D1 (-M1TGJ)	E2EF-X7D1 (-M1TGJ)	E2EF-QX7D1 (-M1TGJ)	E2EF-X12D1 (-M1TGJ)	E2EF-QX12D1 (-M1TGJ)	
Sensing distance	2mm±10%		3mm±10%		7mm±10%		12mm±10%		
Set distance	0 to 1.4 mm		0 to 2.1mm		0 to 4.9mm		0 to 8.4mm		
Differential travel	15% max. of sensing distance								
Sensing object	Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to Engineering Data on page 6.)								
Standard sensing object	Iron, 12 × 12 × 1 mm		Iron, 12 × 12 × 1 mm		Iron, 30 × 30 × 1 mm		Iron, 54 × 54 × 1 mm		
Response frequency *	200Hz		80Hz		100Hz		50Hz		
Power supply voltage	10 to 30 VDC, ripple (p-p) : 10% max.								
Leakage current	0.8 mA max.								
Output configuration	With polarity								
Control output	Switching capacity	3 to 100 mA							
	Residual voltage	3 V max.(Load current : 100 mA max., Cable length : 2 m)							
Indicators	Operation indicator (red LED), Setting indicator (green LED)								
Operation mode (with sensing object approaching)	NO(normally open)								
Protection circuits	Surge suppressor, Load short-circuit protection								
Ambient temperature range	Operating : -10 to 70°C, Storage : -25 to 70°C (with no icing or condensation)								
Ambient humidity range	Operating/Storage : 35% to 95% (with no condensation)								
Temperature influence	±20% max. of sensing distance at 23°C in the temperature range of -10 to 70°C.								
Voltage influence	±1% max. of sensing distance at rated voltage in the rated voltage ±15% range								
Insulation resistance	50 MΩ min. (at 500 VDC) between current-carrying parts and case								
Dielectric strength	1,000 VAC, 50/60 Hz for 1 minute between current-carrying 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> 10 times each in X, Y, and Z directions		Destruction : 1,000 m/s <sup>2</sup> 10 times each in X, Y, and Z directions						
Degree of protection	IEC 60529 IP67								
Connection method	Unmarked : Pre-wired Models (Standard cable length : 2 m) Models ending with -M1TGJ : Pre-wired Connector Models (Standard cable length : 300 mm)								
Weight (packed state)	Pre-wired Models (2 m)	Approx. 105 g		Approx. 190 g		Approx. 215 g		Approx. 295 g	
	Pre-wired Connector Models	Approx. 65 g		Approx. 85 g		Approx. 110 g		Approx. 190 g	
Materials	Case	Stainless steel (SUS303) (E2EF-QX□D : SUS303, with fluororesin coating)							
	Sensing surface (thickness)	Stainless steel (SUS303) (E2EF-QX□D : SUS303, with fluororesin coating)		0.2mm		0.4mm		0.5mm	
		0.2mm		0.4mm		0.4mm		0.5mm	
	Clamping nuts	Stainless steel (SUS303) (E2EF-QX□D : SUS303, with fluororesin coating)							
	Toothed washer	Zinc-plated iron							
Cable	PVC (flame retardant)								
Accessories	Instruction manual								

\* The response frequency of the DC switching section 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.

## I/O Circuit Diagrams

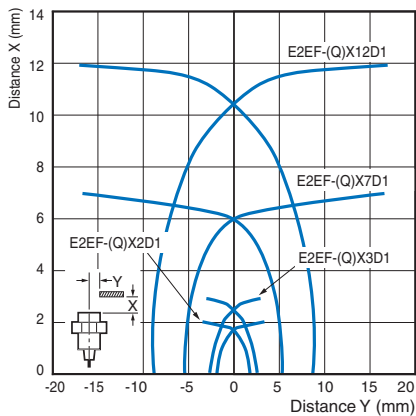
Operation mode	Model	Timing chart	Output circuit
NO	E2EF-(Q)X□D1 (-M1TGJ)	<p>The timing chart shows a sensing object moving through three areas: Non-sensing area, Unstable sensing area, and Stable sensing area. The 'Set position' is marked at the start of the stable area. The 'Rated sensing distance' is indicated. The output states are: Setting indicator (ON/OFF green), Operation indicator (ON/OFF red), and Control output (ON/OFF).</p>	<p>The output circuit diagram shows a proximity sensor main circuit connected to a load between pins 1 (Brown) and 4 (Blue). The power supply is 10 to 30 VDC. Note: Pins 2 and 3 are not used.</p>

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## Engineering Data (Reference Value)

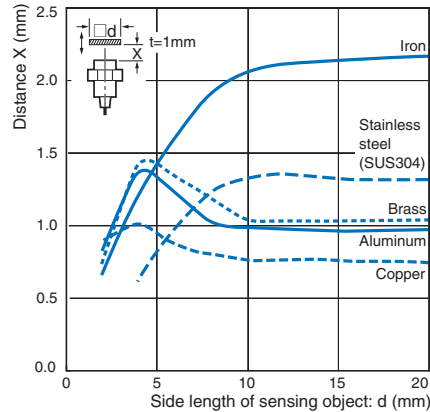
### Sensing Area

E2EF-X□  
-QX□

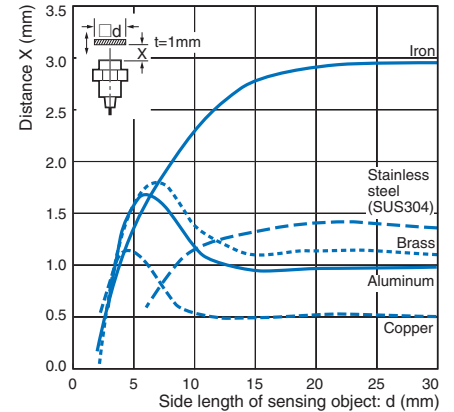


### Influence of Sensing Object Size and Material

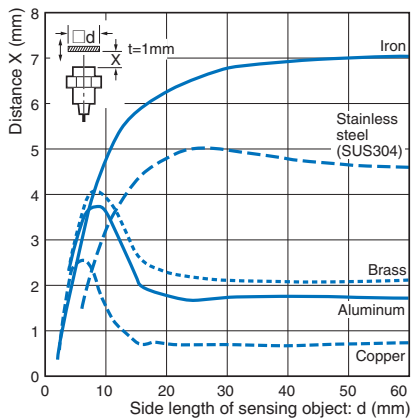
E2EF-X2D1  
-QX2D1



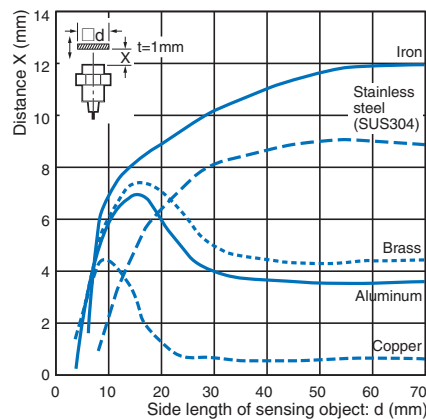
E2EF-X3D1  
-QX3D1



E2EF-X7D1  
-QX7D1

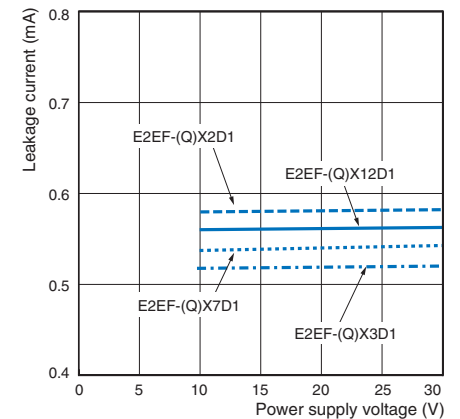


E2EF-X12D1  
-QX12D1



### Leakage Current

E2EF-X□D1



### Residual Output Voltage

E2EF-X□D1  
-QX□D1

