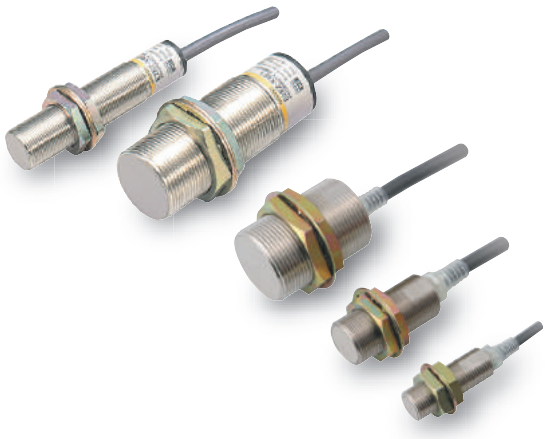
Chip-immune Inductive Proximity Sensor

- Correct operation even with aluminum or iron chips sticking to the Sensor.
  Only the sensing object is detected.
- Pre-wired Smartclick Connector Models also available.



Be sure to read *Safety Precautions* on page 7.

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 8.]

Pre-wired Models

Appearance		Sensing distance	Output configuration	Model	
				Operation mode	
				NO	NC
Shielded	M12	2 mm	DC 2-Wire Models	**E2EZ-X2D1-N 2M**	**E2EZ-X2D2-N 2M**
	M18	4 mm	DC 3-wire, NPN	**E2EZ-X4C1 2M**	—
			DC 2-wire	**E2EZ-X4D1-N 2M**	**E2EZ-X4D2-N 2M**
	M30	8 mm	DC 3-wire, NPN	**E2EZ-X8C1 2M**	—
			DC 2-wire	**E2EZ-X8D1-N 2M**	**E2EZ-X8D2-N 2M**

Pre-wired Smartclick Connector Models (M12)

Appearance		Sensing distance	Output configuration	Model	
				Operation mode	
				NO	NC
Shielded	M12	2 mm	DC 2-wire, (3)-(4) pin arrangement	**E2EZ-X2D1-M1TJ 0.3M**	—
			DC 2-wire, (1)-(4) pin arrangement	**E2EZ-X2D1-M1TGJ 0.3M**	—
	M18	4 mm	DC 2-wire, (3)-(4) pin arrangement	**E2EZ-X4D1-M1TJ 0.3M**	—
			DC 2-wire, (1)-(4) pin arrangement	**E2EZ-X4D1-M1TGJ 0.3M**	—
	M30	8 mm	DC 2-wire, (3)-(4) pin arrangement	**E2EZ-X8D1-M1TJ 0.3M**	—
			DC 2-wire, (1)-(4) pin arrangement	**E2EZ-X8D1-M1TGJ 0.3M**	—

Pre-wired Connector Models (M12)

Appearance		Sensing distance	Output configuration	Model	
				Operation mode	
				NO	NC
Shielded 	M12	2 mm	DC 2-wire, (3)-(4) pin arrangement	**E2EZ-X2D1-M1J 0.3M**	—
			DC 2-wire, (1)-(4) pin arrangement	**E2EZ-X2D1-M1GJ 0.3M**	—
	M18	4 mm	DC 2-wire, (3)-(4) pin arrangement	**E2EZ-X4D1-M1J 0.3M**	—
			DC 2-wire, (1)-(4) pin arrangement	**E2EZ-X4D1-M1GJ 0.3M**	—
	M30	8 mm	DC 2-wire, (3)-(4) pin arrangement	**E2EZ-X8D1-M1J 0.3M**	—
			DC 2-wire, (1)-(4) pin arrangement	**E2EZ-X8D1-M1GJ 0.3M**	—

Accessories (Order Separately)

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

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

Appearance	Cable length	Sensor I/O Connector model number	Applicable Proximity Sensor model number
Straight 	2 m	**XS2F-D421-DD0**	E2EZ-X□D1-M1J
	5 m	**XS2F-D421-GD0**	
L-shape 	2 m	**XS2F-D422-DD0**	
	5 m	**XS2F-D422-GD0**	
Straight 	2 m	**XS2F-D421-DA0-F**	E2EZ-X□D1-M1GJ
	5 m	**XS2F-D421-GA0-F**	
L-shape 	2 m	**XS2F-D422-DA0-F**	
	5 m	**XS2F-D422-GA0-F**	
Smartclick Connector Straight 	2 m	**XS5F-D421-D80-F**	E2EZ-X□D1-M1TJ E2EZ-X□D1-M1TGJ
	5 m	**XS5F-D421-G80-F**	

Mounting Brackets
Protective Covers
Sputter Protective Covers

Refer to *Y92□* for details.

Ratings and Specifications

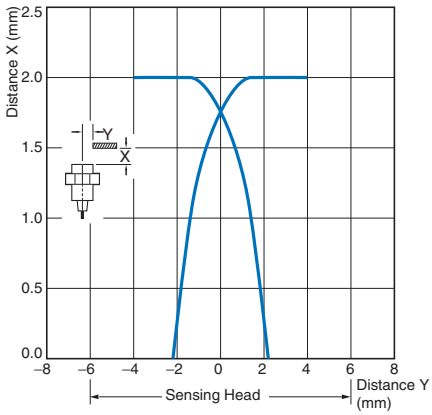
Item \ Model		E2EZ-X2D□-N E2EZ-X2D□-M1J E2EZ-X2D□-M1GJ	E2EZ-X4D□-N E2EZ-X4D□-M1J E2EZ-X4D□-M1GJ	E2EZ-X8D□-N E2EZ-X8D□-M1J E2EZ-X8D□-M1GJ	E2EZ-X4C1	E2EZ-X8C1
Sensing distance		2 mm ±10%	4 mm ±10%	8 mm ±10%	4 mm ±10%	8 mm ±10%
Set distance *1		0 to 1.6 mm	0 to 3.2 mm	0 to 6.4 mm	0 to 3.2 mm	0 to 6.4 mm
Differential travel		20% max. of sensing distance				
Detectable object		Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to *Engineering Data* on page 4.)				
Standard sensing object		Iron, 12 × 12 × 1 mm	Iron, 30 × 30 × 1 mm	Iron, 54 × 54 × 1 mm	Iron, 30 × 30 × 1 mm	Iron, 54 × 54 × 1 mm
Response frequency *2		200 Hz	100 Hz	30 Hz	C Models: 12 Hz	C Models: 8 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			C Models: 12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.	
Current consumption		---			C Models: 15 mA max.	
Leakage current		0.8 mA max.			---	
Control output	**Load current**	3 to 100 mA max.			C Models: NPN open-collector output 100 mA max. at 12 VDC (30 VDC max.) 200 mA max. at 24 VDC (30 VDC max.)	
	Residual voltage	3 V max. (Load current: 100 mA, Cable length: 2 m)			C Models: 2 V max. (Load current: 200 mA, Cable length: 2 m)	
Indicators		D1 Models: Operation indicator (red), Setting indicator (green) D2 Models: Operation indicator (red)			C Models: Detection indicator (red)	
Operation mode (with sensing object approaching)		D1 Models: NO D2 Models: NC For details, refer to the *Timing chart* on page 5.			NO For details, refer to the *Timing chart* on page 5.	
Protection circuits		Load short-circuit protection, Surge suppressor			C Models: Load short-circuit protection, Reverse polarity protection, Surge suppressor	
Ambient temperature range		Operating/Storage: 0 to 50°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 0 to 50°C				
Voltage influence		±2.5% max. of sensing distance at rated voltage in the rated voltage ±10% 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			C Models: 1,000 VAC, 50/60 Hz for 1 min 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: 1,000 m/s^2 10 times each in X, Y, and Z directions				
Degree of protection		IEC 60529 IP67, in-house standards: oil-resistant				
Connection method		Pre-wired Models (Standard cable length: 2 m) and Pre-wired Connector Models				
Weight (packed state)		E2EZ-X2D□-N: Approx. 70 g E2EZ-X2D□-M1J: Approx. 40 g E2EZ-X2D□-M1GJ: Approx. 40 g	E2EZ-X4D□-N: Approx. 160 g E2EZ-X4D□-M1J: Approx. 90 g E2EZ-X4D□-M1GJ: Approx. 90 g	E2EZ-X8D□-N: Approx. 220 g E2EZ-X8D□-M1J: Approx. 160 g E2EZ-X8D□-M1GJ: Approx. 160 g	Approx. 170 g	Approx. 270 g
Materials	**Case**	Nickel-plated brass				
	Sensing surface	PBT			Heat-resistant ABS	
	Clamping nuts	Zinc-plated iron				
	Toothed washer	Zinc-plated iron				
Accessories		Instruction manual				

*1. Use the Sensor within the range in which the green indicator is ON.
*2. 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.

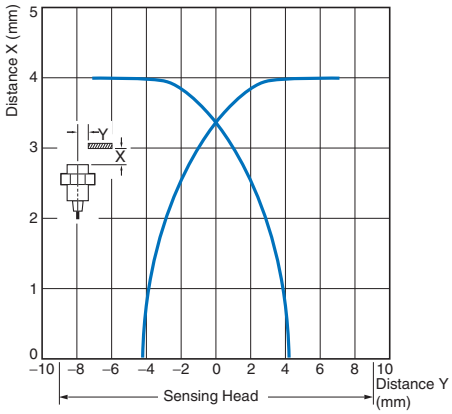
Engineering Data (Reference Value)

Sensing Area

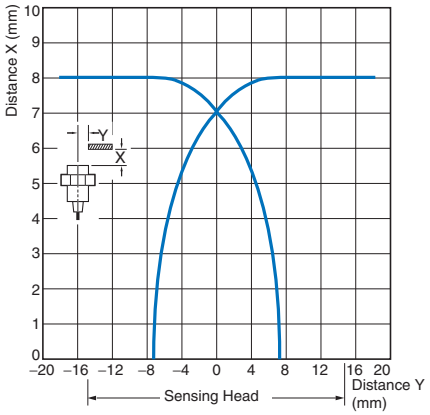
E2EZ-X2□



E2EZ-X4□

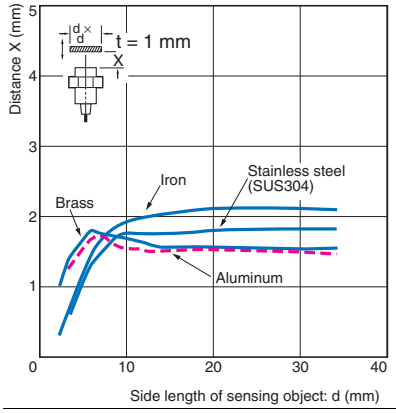


E2EZ-X8□

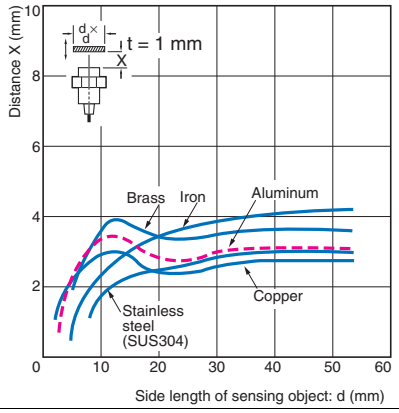


Influence of Sensing Object Size and Material

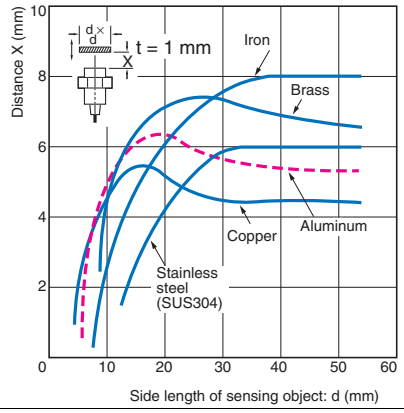
E2EZ-X2□



E2EZ-X4□

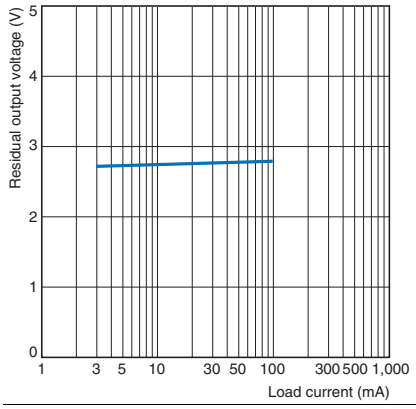


E2EZ-X8□



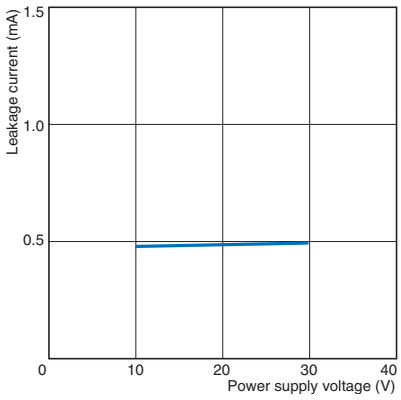
Residual Output Voltage

E2EZ-X□D□-N



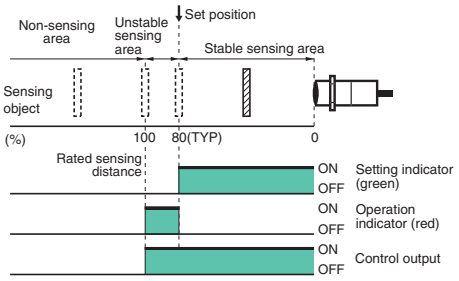
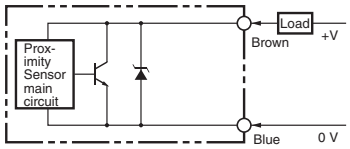
Leakage Current

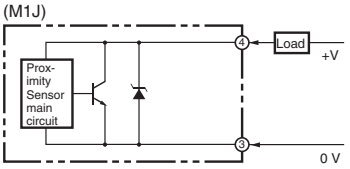
E2EZ-X□D□-N

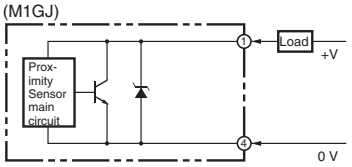


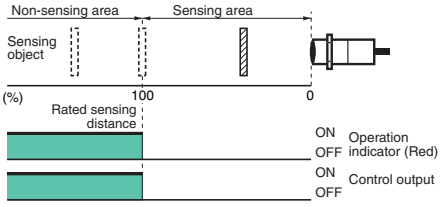
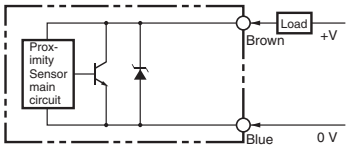
I/O Circuit Diagrams

DC 2-Wire Models

<table>
<tr><th>Operation mode</th><th>Model</th><th>Timing chart</th><th>Output circuit</th></tr>
<tr><td rowspan="2">NO</td><td>E2EZ-X2D1-N
E2EZ-X4D1-N
E2EZ-X8D1-N</td><td rowspan="2"> 
</td><td> 

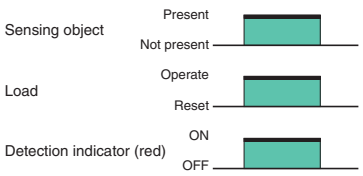
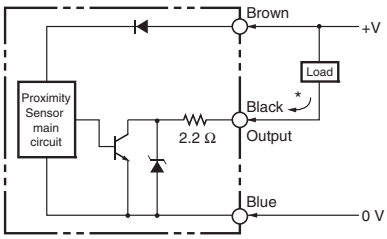
Note: The load can be connected to either the +V or 0 V side.</td></tr>
<tr><td>E2EZ-X2D1-M1J
E2EZ-X2D1-M1GJ
E2EZ-X4D1-M1J
E2EZ-X4D1-M1GJ
E2EZ-X8D1-M1J
E2EZ-X8D1-M1GJ</td><td>(M1J)
 

Connector Pin Arrangement
 
Note: Pins 1 and 2 are not used.
Note: The load can be connected to either the +V or 0 V side.
(M1GJ)
 

Connector Pin Arrangement
 
Note: Pins 2 and 3 are not used.
Note: The load can be connected to either the +V or 0 V side.</td></tr>
<tr><td>NC</td><td>E2EZ-X2D2-N
E2EZ-X4D2-N
E2EZ-X8D2-N</td><td> 
</td><td> 

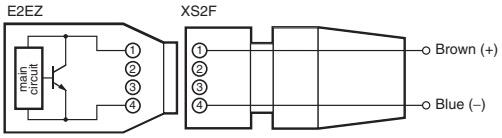
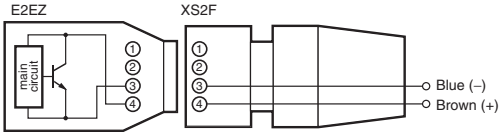
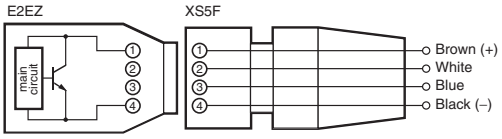
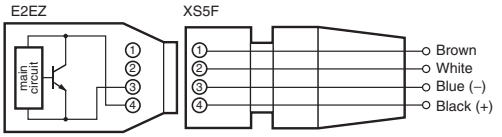
Note: The load can be connected to either the +V or 0 V side.</td></tr>
</table>

DC 3-wire Models

<table>
<tr><th>Operation mode</th><th>Model</th><th>Timing chart</th><th>Output circuit</th></tr>
<tr><td>NO</td><td>E2EZ-X4C1
E2EZ-X8C1</td><td> 
</td><td> 

* 100 mA max. at 12 V, 200 mA max. at 24 V (load current).</td></tr>
</table>

Connections for Sensor I/O Connectors

<table>
<tr><th colspan="3">Proximity Sensor</th><th>Sensor I/O Connectors</th><th rowspan="2">Connections</th></tr>
<tr><th>Model</th><th>Operation mode</th><th>Model</th><th>Model</th></tr>
<tr><td>DC 2-Wire Models (IEC pin wiring)</td><td rowspan="4">NO</td><td>E2EZ-X□D1-M1GJ</td><td>1: Straight
2: L-shape
XS2F-D42□-□A0-F
D: 2-m cable
G: 5-m cable</td><td> 
</td></tr>
<tr><td>DC 2-Wire Models (previous pin wiring)</td><td>E2EZ-X□D1-M1J</td><td>1: Straight
2: L-shape
XS2F-D42□-□D0
D: 2-m cable
G: 5-m cable</td><td> 
</td></tr>
<tr><td>DC 2-Wire Models (IEC pin wiring)</td><td>E2EZ-X□D1-M1TGJ</td><td rowspan="2">XS5F-D421-□80-F
D: 2-m cable
G: 5-m cable</td><td> 
</td></tr>
<tr><td>DC 2-Wire Models (previous pin wiring)</td><td>E2EZ-X□D1-M1TJ</td><td> 
</td></tr>
</table>

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

Safety Precautions

Refer to *Warranty and Limitations of Liability*.

⚠ WARNING

This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.

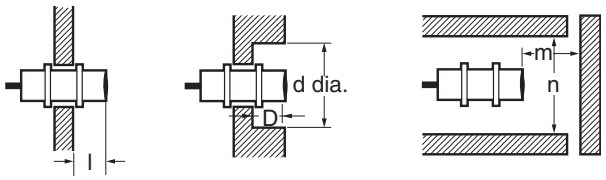
Precautions for Correct Use

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)

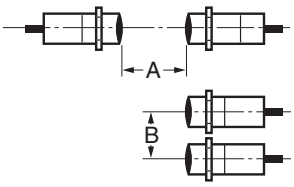
Model \ Item / Embedded material		l	d	D	m	n
E2EZ-X2□	Iron	0	12	0	8	18
	Aluminum	2	25	2		36
E2EZ-X4□	Iron	0	18	0	16	27
	Aluminum	5	40	5		54
E2EZ-X8□	Iron	0	30	0	32	45
	Aluminum	10	70	10		90

Mutual Interference

When installing 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	A	B
E2EZ-X2□		30	20
E2EZ-X4□		40	50
E2EZ-X8□		60	100



Aluminum and Iron Cuttings

Normally aluminum or iron cuttings will not be detected even if they adhere to or accumulate on the sensing surface.
Detection signals may be output for the following:
If this occurs, remove the cuttings from the sensing surface.

1. Relationship between the Size of the Cutting (d) and the Size of the Sensing Surface (D)

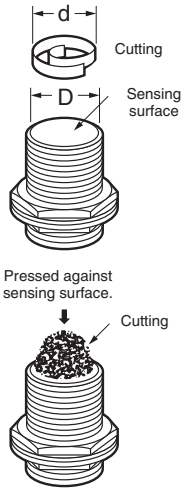
Cuttings of the size $d \geq \frac{2}{3}D$ on the sensing surface *

Cuttings of the size d* (Unit: mm)

Model \ Size	D
E2EZ-X2□	10 *
E2EZ-X4□	16
E2EZ-X8□	28

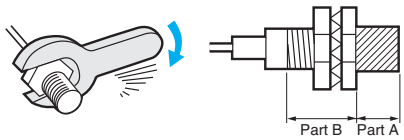
* E2EZ-X2□: $d \geq \frac{1}{3}D$ on the sensing surface.

2. Cuttings Pressed against the Sensing Surface



● Mounting

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



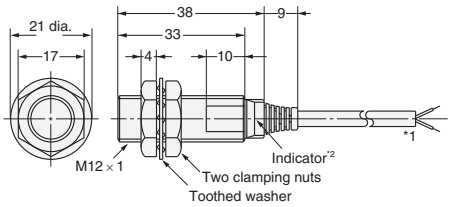
Note: 1. The allowable tightening strength depends on the distance from the edge of the head, as shown in the following table. (A is the distance from the edge of the head. B includes the nut on the head side. If the edge of the nut is in part A, the tightening torque for part A applies instead.)
2.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

Tightening Torque / Model	Part A		Part B
	Dimension (mm)	Torque	Torque
E2EZ-X2D□-□	30 N·m		
E2EZ-X4D□-□	70 N·m		
E2EZ-X8D□-□	180 N·m		
E2EZ-X4C1	20	15 N·m	29 N·m
E2EZ-X8C1	22	29 N·m	39 N·m

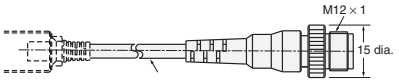
Dimensions

(Unit: mm)
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

E2EZ-X2D□-N



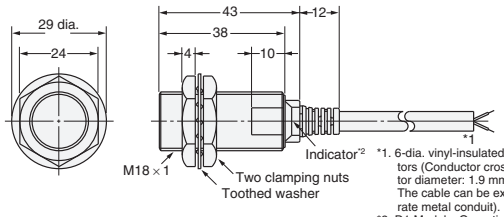
Pre-wired Connector Models (-M1J/M1GJ)



4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: 300 mm

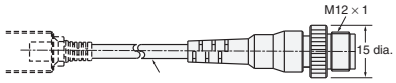
*1. 4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: 2 m
*2. D1 Models: Operation indicator (red), Setting indicator (green), D2 Models: Operation indicator (red)

E2EZ-X4D□-N



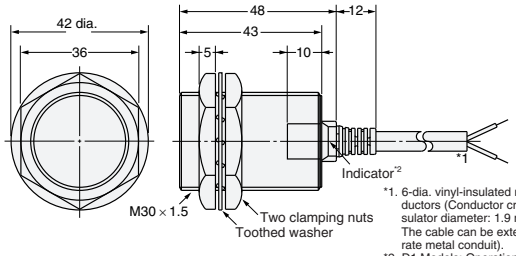
*1. 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m
The cable can be extended up to 200 m (separate metal conduit).
*2. D1 Models: Operation indicator (red), Setting indicator (green)
D2 Models: Operation indicator (red)

Pre-wired Connector Models (-M1J/M1GJ)



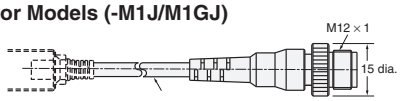
6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 300 mm

E2EZ-X8D□-N



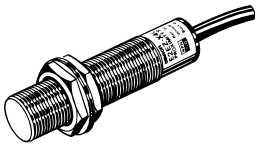
*1. 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m
The cable can be extended up to 200 m (separate metal conduit).
*2. D1 Models: Operation indicator (red), Setting indicator (green)
D2 Models: Operation indicator (red)

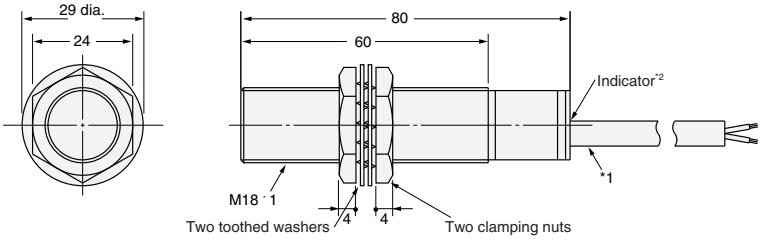
Pre-wired Connector Models (-M1J/M1GJ)



6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 300 mm

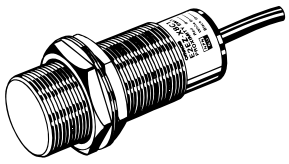
E2EZ-X4C1

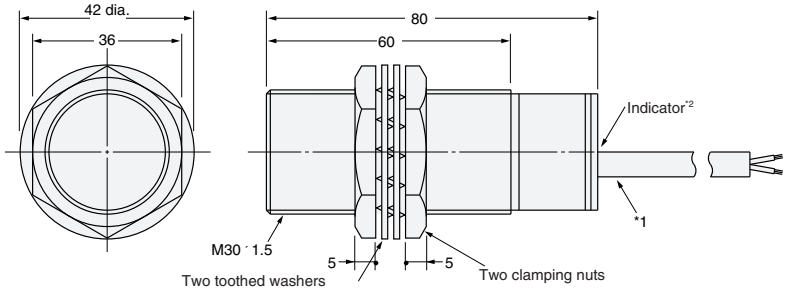




*1. C Models: 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m
*2. C Models: Detection indicator (red)

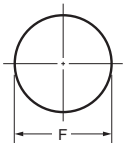
E2EZ-X8C1





*1. C Models: 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m
*2. C Models: Detection indicator (red)

Mounting Hole Dimensions



Model	F (mm)
E2EZ-X2□	12.5 dia. $^{+0.5}_{-0}$
E2EZ-X4□	18.5 dia. $^{+0.5}_{-0}$
E2EZ-X8□	30.5 dia. $^{+0.5}_{-0}$

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