


## 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.

## Ordering Information


**Sensors** [Refer to *Dimensions* on page 8.]  
**Pre-wired Models**

| Appearance  | Sensing distance | Output configuration | Model            |                |                |
|---|------------------|----------------------|------------------|----------------|----------------|
|   |                  |                      | Operation mode   |                |                |
|   |                  |                      | NO               | NC             |                |
|  | 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 |
|   |                  |                      | AC 2-wire        | E2EZ-X4Y1 2M   | —              |
|   | M30              | 8 mm                 | DC 3-wire, NPN   | E2EZ-X8C1 2M   | —              |
|   |                  |                      | DC 2-wire        | E2EZ-X8D1-N 2M | E2EZ-X8D2-N 2M |
|   |                  |                      | AC 2-wire        | E2EZ-X8Y1 2M   |                |

### Pre-wired Smartclick Connector Models (M12)

| Appearance  | Sensing distance | Output configuration | Model                              |                      |   |
|---|------------------|----------------------|------------------------------------|----------------------|---|
|   |                  |                      | Operation mode                     |                      |   |
|   |                  |                      | NO                                 | NC                   |   |
|  | 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 |
| <br>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)

(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-A                   | E2EZ-X□D1-M1GJ                           |
|  | 5 m          | XS2F-D421-GA0-A                   |  |
| L-shape                            | 2 m          | XS2F-D422-DA0-A                   |  |
|  | 5 m          | XS2F-D422-GA0-A                   |  |
| Smartclick Connector<br>Straight  | 2 m          | XS5F-D421-D80-A                   | E2EZ-X□D1-M1TJ<br>E2EZ-X□D1-M1TGJ        |
|  | 5 m          | XS5F-D421-G80-A                   |  |

Mounting Brackets

Protective Covers

Sputter Protective Covers

Refer to Y92□ for details.

## Ratings and Specifications

| Item   | Model            | E2EZ-X2D□-N<br>E2EZ-X2D□-M1J<br>E2EZ-X2D□-M1GJ   | E2EZ-X4D□-N<br>E2EZ-X4D□-M1J<br>E2EZ-X4D□-M1GJ  | E2EZ-X8D□-N<br>E2EZ-X8D□-M1J<br>E2EZ-X8D□-M1GJ  | E2EZ-X4C1<br>E2EZ-X4Y1   | E2EZ-X8C1<br>E2EZ-X8Y1           |
|--|------------------|--|---|---|--|----------------------------------|
| Sensing distance                                 |                  | 2 mm ±10%  | 4 mm ±10%   | 8 mm ±10%   | 4 mm ±10%  | 8 mm ±10%                        |
| Set distance <sup>*1</sup>                       |                  | 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 <i>Engineering Data</i> 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 <sup>*2</sup>                 |                  | 200 Hz   | 100 Hz  | 30 Hz   | C Models: 12 Hz<br>Y Models: 5 Hz  | C Models: 8 Hz<br>Y Models: 5 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.<br>Y Models: 100 to 220 VAC (90 to 250 VAC), 50/60 Hz  |                                  |
| Current consumption                              |                  | ---  |   |   | C Models: 15 mA max.   |                                  |
| Leakage current                                  |                  | 0.8 mA max.  |   |   | Y Models: 2 mA max. at 100 VAC, 3 mA max. at 200 VAC   |                                  |
| Control output                                   | Load current     | 3 to 100 mA max.   |   |   | C Models: NPN open-collector output<br>100 mA max. at 12 VDC (30 VDC max.)<br>200 mA max. at 24 VDC (30 VDC max.)<br>Y Models: 10 to 200 mA                        |                                  |
|  | 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)<br>Y Models: Refer to residual voltage characteristic data<br>Refer to page 4.                        |                                  |
| Indicators                                       |                  | D1 Models: Operation indicator (red), Setting indicator (green)<br>D2 Models: Operation indicator (red)            |   |   | C Models: Detection indicator (red)<br>Y Models: Operation indicator (red)   |                                  |
| Operation mode (with sensing object approaching) |                  | D1 Models: NO<br>D2 Models: NC<br>For details, refer to the <i>Timing chart</i> on page 5.                         |   |   | NO<br>For details, refer to the <i>Timing chart</i> on page 6.   |                                  |
| Protection circuits                              |                  | Load short-circuit protection, Surge suppressor  |   |   | C Models: Load short-circuit protection, Reverse polarity protection, Surge suppressor<br>Y Models: 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<br>Y Models: 2,000 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 <sup>2</sup> 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<br>E2EZ-X2D□-M1J: Approx. 40 g<br>E2EZ-X2D□-M1GJ: Approx. 40 g                           | E2EZ-X4D□-N: Approx. 160 g<br>E2EZ-X4D□-M1J: Approx. 90 g<br>E2EZ-X4D□-M1GJ: Approx. 90 g | E2EZ-X8D□-N: Approx. 220 g<br>E2EZ-X8D□-M1J: Approx. 160 g<br>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   |   |   |  |                                  |

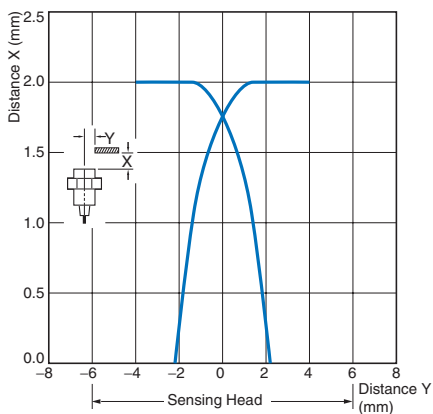
\*1. Use the Sensor within the range in which the green indicator is ON.

\*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.

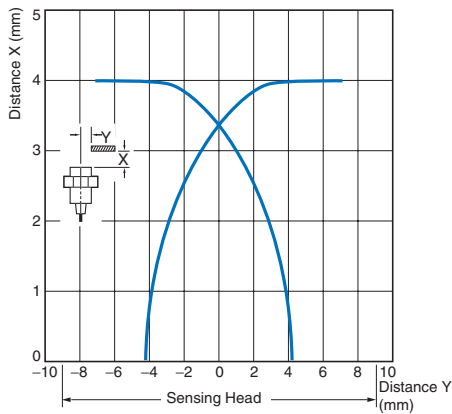
# Engineering Data (Typical)

## Sensing Area

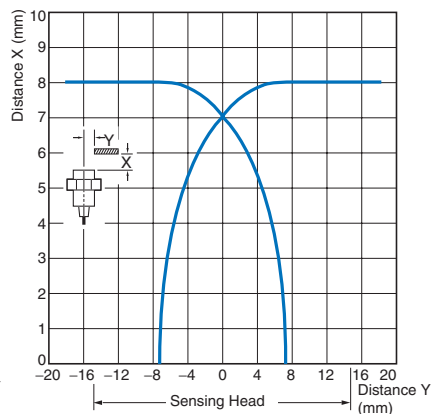
E2EZ-X2



E2EZ-X4

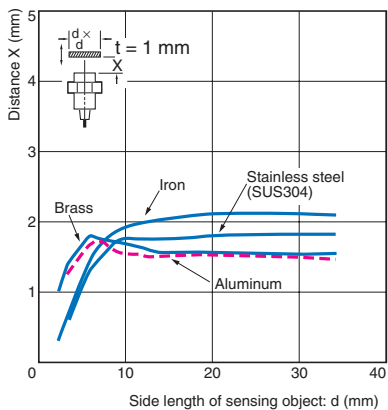


E2EZ-X8

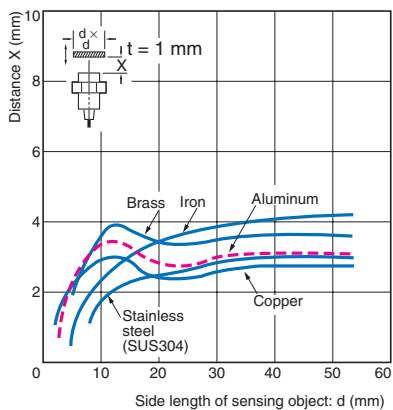


## Influence of Sensing Object Size and Material

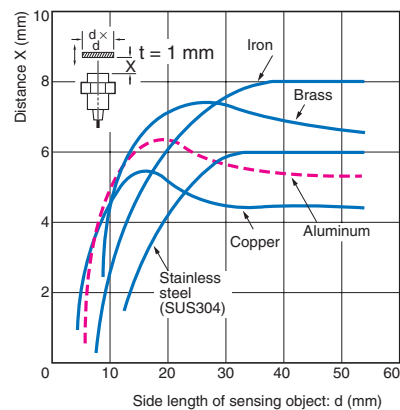
E2EZ-X2



E2EZ-X4

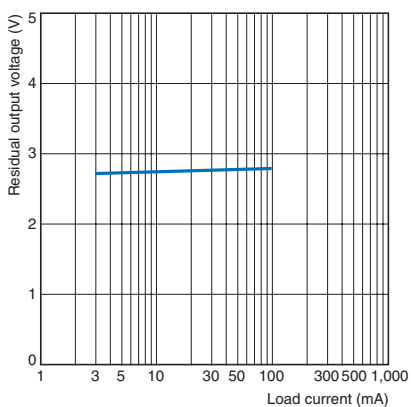


E2EZ-X8

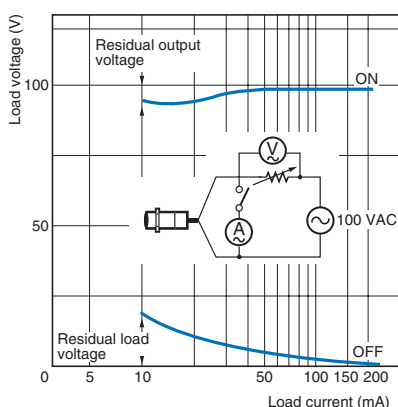


## Residual Output Voltage

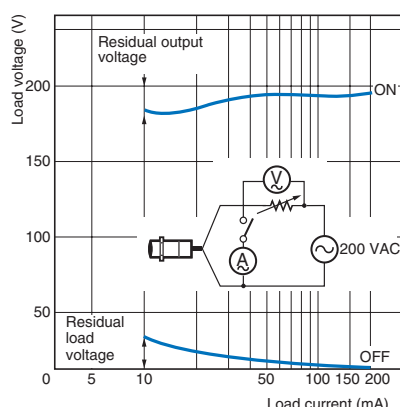
E2EZ-X□D□-N



E2EZ-X4Y1/-X8Y1 at 100 VAC

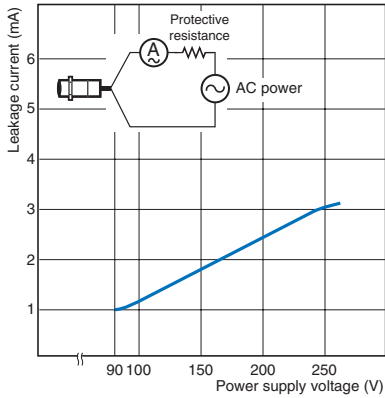


E2EZ-X4Y1/-X8Y1 at 200 VAC

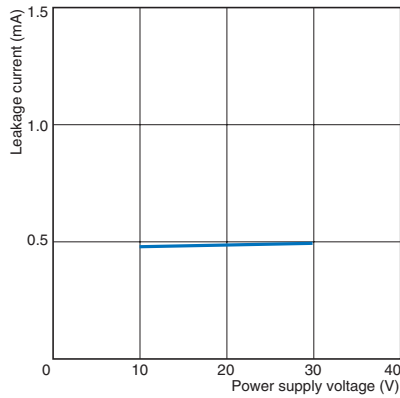


Leakage Current

E2EZ-X4Y1/-X8Y1



E2EZ-X□D□-N



I/O Circuit Diagrams

DC 2-Wire Models

| Operation mode | Model   | Timing chart   | Output circuit  |
|----------------|---|--|---|
| NO             | E2EZ-X2D1-N<br>E2EZ-X4D1-N<br>E2EZ-X8D1-N   | <p>Non-sensing area    Unstable sensing area    Stable sensing area</p> <p>Set position</p> <p>Sensing object (%)</p> <p>Rated sensing distance: 100, 80(TYP), 0</p>                       | <p>Note: The load can be connected to either the +V or 0 V side.</p>  |
|                | E2EZ-X2D1-M1J<br>E2EZ-X2D1-M1GJ<br>E2EZ-X4D1-M1J<br>E2EZ-X4D1-M1GJ<br>E2EZ-X8D1-M1J<br>E2EZ-X8D1-M1GJ | <p>ON Setting indicator (green)</p> <p>OFF Operation indicator (red)</p> <p>ON Control output</p> <p>OFF</p>   | <p>(M1J) Connector Pin Arrangement: Pins 1 and 2 are not used.</p> <p>(M1GJ) Connector Pin Arrangement: Pins 2 and 3 are not used.</p> <p>Note: The load can be connected to either the +V or 0 V side.</p> |
| NC             | E2EZ-X2D2-N<br>E2EZ-X4D2-N<br>E2EZ-X8D2-N   | <p>Non-sensing area    Sensing area</p> <p>Sensing object (%)</p> <p>Rated sensing distance: 100, 0</p> <p>ON Operation indicator (Red)</p> <p>OFF Control output</p> <p>ON</p> <p>OFF</p> | <p>Note: The load can be connected to either the +V or 0 V side.</p>  |

DC 3-wire Models

| Operation mode | Model                  | Timing chart   | Output circuit  |
|----------------|------------------------|--|---|
| NO             | E2EZ-X4C1<br>E2EZ-X8C1 | <p>Sensing object: Present (high), Not present (low)</p> <p>Load: Operate (high), Reset (low)</p> <p>Detection indicator (red): ON (high), OFF (low)</p> | <p>* 100 mA max. at 12 V, 200 mA max. at 24 V (load current).</p> |

AC 2-Wire Models

| Operation mode | Model                  | Timing chart   | Output circuit |
|----------------|------------------------|--|----------------|
| NO             | E2EZ-X4Y1<br>E2EZ-X8Y1 | <p>Sensing object: Present (high), Not present (low)</p> <p>Load: Operate (high), Reset (low)</p> <p>Operation indicator (red): ON (high), OFF (low)</p> |                |

Connections for Sensor I/O Connectors

| Proximity Sensor                       |                | Sensor I/O Connectors |  | Connections |
|--|----------------|-----------------------|--|-------------|
| Model                                  | Operation mode | Model                 | Model  |             |
| DC 2-Wire Models (IEC pin wiring)      | NO             | E2EZ-X□D1-M1GJ        | XS2F-D42□-□A0-A<br>1: Straight<br>2: L-shape<br>D: 2-m cable<br>G: 5-m cable |             |
| DC 2-Wire Models (previous pin wiring) |                | E2EZ-X□D1-M1J         | XS2F-D42□-□D0<br>1: Straight<br>2: L-shape<br>D: 2-m cable<br>G: 5-m cable   |             |
| DC 2-Wire Models (IEC pin wiring)      |                | E2EZ-X□D1-M1TGJ       | XS5F-D421-□80-A<br>D: 2-m cable<br>G: 5-m cable                              |             |
| DC 2-Wire Models (previous pin wiring) |                | E2EZ-X□D1-M1TJ        |  |             |

Refer to the *Sensor I/O Connector Group Catalog* (Cat. No. X073) 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.



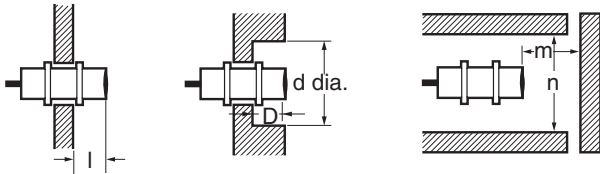
### Precautions for Correct Use

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)

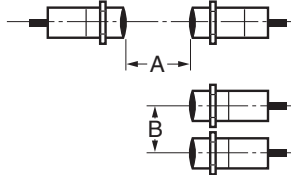
| Model    | Item Embedded material | l  | d  | D  | m  | n  |
|----------|------------------------|----|----|----|----|----|
| E2EZ-X2□ | Iron                   | 0  | 12 | 0  | 8  | 18 |
|          | Aluminum               | 2  | 25 | 2  |    | 36 |
| E2EZ-X4□ | Iron                   | 0  | 18 | 0  | 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)

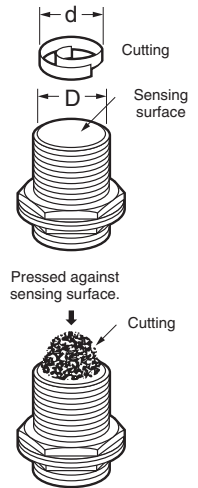
Cuttings of the size  $d \geq \frac{2}{3}D$  on the sensing surface \*

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.

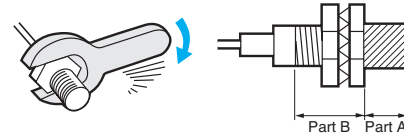
2. Cuttings Pressed against the Sensing Surface



#### ● 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.)

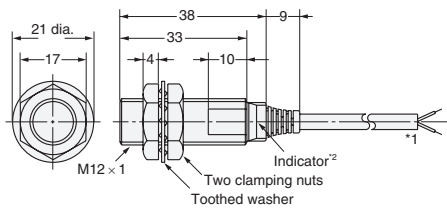
2. The following torque assume washers are being used.

| Model       | Tightening Torque |        |
|-------------|-------------------|--------|
|             | Part A            | Part B |
| E2EZ-X2D□-□ | Dimension (mm)    | Torque |
| E2EZ-X4D□-□ | 20                | 15 N·m |
| E2EZ-X8D□-□ | 22                | 29 N·m |
| E2EZ-X4C1   |                   |        |
| E2EZ-X4Y1   |                   |        |
| E2EZ-X8C1   |                   |        |
| E2EZ-X8Y1   |                   |        |

## Dimensions

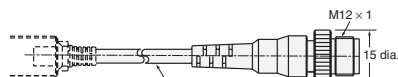
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

### E2EZ-X2D□-N



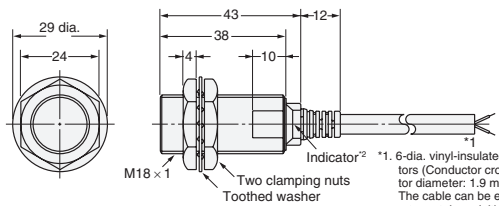
- \*1. 4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.3 mm<sup>2</sup>, Insulator diameter: 1.3 mm), Standard length: 2 m
- \*2. D1 Models: Operation indicator (red), Setting indicator (green), D2 Models: Operation indicator (red)

### Pre-wired Connector Models (-M1J/M1GJ)



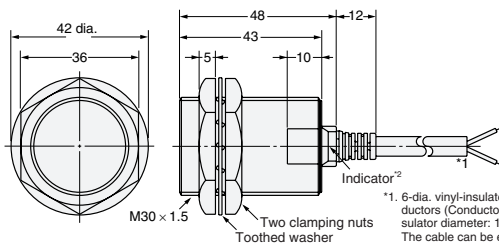
4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.3 mm<sup>2</sup>, Insulator diameter: 1.3 mm), Standard length: 300 mm

### E2EZ-X4D□-N



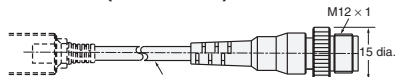
- \*1. 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm<sup>2</sup>, Insulator diameter: 1.9 mm), Standard length: 2 m. The cable can be extended up to 200 m (separate metal conduit).
- \*2. D1 Models: Operation indicator (red), Setting indicator (green), D2 Models: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

### E2EZ-X8D□-N



- \*1. 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm<sup>2</sup>, 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)



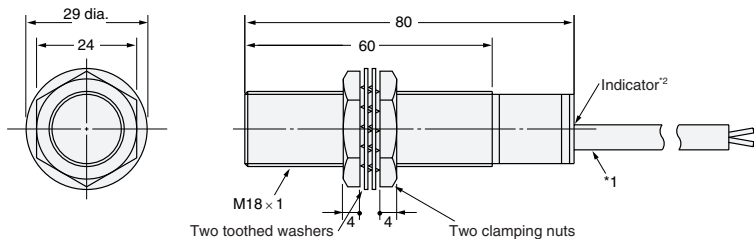
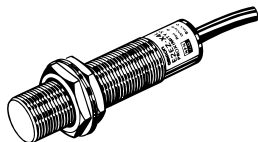
6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm<sup>2</sup>, Insulator diameter: 1.9 mm), Standard length: 300 mm

### Pre-wired Connector Models (-M1J/M1GJ)



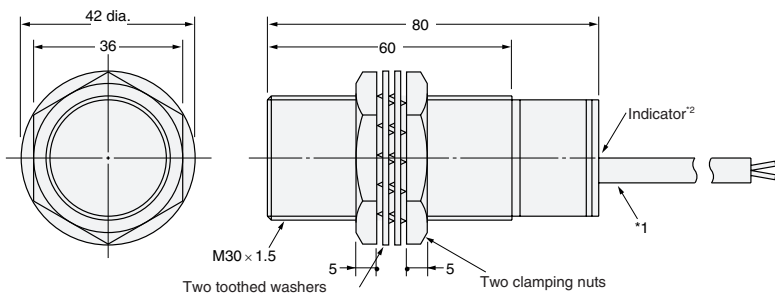
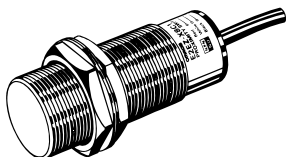
6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm<sup>2</sup>, Insulator diameter: 1.9 mm), Standard length: 300 mm

### E2EZ-X4C1 E2EZ-X4Y1



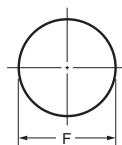
- \*1. C Models: 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm<sup>2</sup>, Insulator diameter: 1.9 mm), Standard length: 2 m  
Y Models: 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm<sup>2</sup>, Insulator diameter: 1.9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

### E2EZ-X8C1 E2EZ-X8Y1



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

### Mounting Hole Dimensions



| Model    | F (mm)                                    |
|----------|---|
| E2EZ-X2□ | 12.5 dia. <sup>+0.5</sup> / <sub>-0</sub> |
| E2EZ-X4□ | 18.5 dia. <sup>+0.5</sup> / <sub>-0</sub> |
| E2EZ-X8□ | 30.5 dia. <sup>+0.5</sup> / <sub>-0</sub> |



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