

## Proximity Sensor with a Long Screw Length



- Increased tightening strength. Cable protectors provided as a standard feature.
- Increased indicator visibility. A milled section for wrench grip on all models.



Be sure to read *Safety Precautions* on page 9.

### Ordering Information

#### Sensors

##### DC 2-Wire Models

Appearance		Sensing distance		Model	
				Operation mode	
				NO	NC
Shielded 	M12	3 mm		E2E2-X3D1 2M *	E2E2-X3D2 2M
	M18	7 mm		E2E2-X7D1 2M *	E2E2-X7D2 2M
	M30	10 mm		E2E2-X10D1 2M *	E2E2-X10D2 2M
Unshielded 	M12	8 mm		E2E2-X8MD1 2M *	E2E2-X8MD2 2M
	M18	14 mm		E2E2-X14MD1 2M *	E2E2-X14MD2 2M
	M30	20 mm		E2E2-X20MD1 2M *	E2E2-X20MD2 2M

\* Models with different frequencies are also available. The model numbers are E2E2-X□D15 (example: E2E2-X3D15).

##### DC 3-Wire Models

Appearance		Sensing distance		Model	
				Operation mode	
				NO	NC
Shielded 	M12	2 mm		E2E2-X2C1 2M	E2E2-X2C2 2M
	M18	5 mm		E2E2-X5C1 2M	E2E2-X5C2 2M
	M30	10 mm		E2E2-X10C1 2M	E2E2-X10C2 2M
Unshielded 	M12	5 mm		E2E2-X5MC1 2M	E2E2-X5MC2 2M
	M18	10 mm		E2E2-X10MC1 2M	E2E2-X10MC2 2M
	M30	18 mm		E2E2-X18MC1 2M	E2E2-X18MC2 2M

##### AC 2-Wire Models

Appearance		Sensing distance		Model	
				Operation mode	
				NO	NC
Shielded 	M12	2 mm		E2E2-X2Y1 2M	E2E2-X2Y2 2M
	M18	5 mm		E2E2-X5Y1 2M	E2E2-X5Y2 2M
	M30	10 mm		E2E2-X10Y1 2M	E2E2-X10Y2 2M
Unshielded 	M12	5 mm		E2E2-X5MY1 2M	E2E2-X5MY2 2M
	M18	10 mm		E2E2-X10MY1 2M	E2E2-X10MY2 2M
	M30	18 mm		E2E2-X18MY1 2M	E2E2-X18MY2 2M

## Accessories (Order Separately)

Mounting Brackets

Protective Covers

Sputter Protective Covers

## Ratings and Specifications

### E2E2-X□D□ DC 2-Wire Models

Item	Size Shielding Model	M12		M18		M30	
		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
		E2E2-X3D□	E2E2-X8MD□	E2E2-X7D□	E2E2-X14MD□	E2E2-X10D□	E2E2-X20MD□
<b>Sensing distance</b>		3 mm±10%	8 mm±10%	7 mm±10%	14 mm±10%	10 mm±10%	20 mm±10%
<b>Set distance *1</b>		0 to 2.4 mm	0 to 6.4 mm	0 to 5.6 mm	0 to 11.2 mm	0 to 8 mm	0 to 16 mm
<b>Differential travel</b>		10% max. of sensing distance					
<b>Sensing object</b>		Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to <i>Engineering Data</i> on page 5.)					
<b>Standard sensing object</b>		Iron, 12 × 12 × 1 mm	Iron, 30 × 30 × 1 mm	Iron, 18 × 18 × 1 mm	Iron, 30 × 30 × 1 mm	Iron, 30 × 30 × 1 mm	Iron, 54 × 54 × 1 mm
<b>Response frequency *2</b>		1 kHz	800 Hz	500 Hz	400 Hz		100 Hz
<b>Power supply voltage (operating voltage range)</b>		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.					
<b>Leakage current</b>		0.8 mA max.					
<b>Control output</b>	<b>Switching capacity</b>	3 to 100 mA					
	<b>Residual voltage</b>	3 V max. (Load current: 100 mA, Cable length: 2 m)					
<b>Indicators</b>		D1 Models: Operation indicator (red) and setting indicator (green) D2 Models: Operation indicator (red)					
<b>Operation mode (with sensing object ap- proaching)</b>		D1 Models: NO    Refer to the timing charts under <i>I/O Circuit Diagrams</i> on page 8 for details. D2 Models: NC					
<b>Protection circuits</b>		Surge absorber, Load short-circuit protection					
<b>Ambient temperature</b>		Operating/Storage: -25 to 70°C (with no icing or condensation)					
<b>Ambient humidity</b>		Operating/Storage: 35% to 95% (with no condensation)					
<b>Temperature influence</b>		±10% max. of sensing distance at 23°C in the temperature range of -25 to 70°C					
<b>Voltage influence</b>		±1% max. of sensing distance at rated voltage in the rated voltage ±15% range					
<b>Insulation resistance</b>		50 MΩ min. (at 500 VDC) between current-carrying parts and case					
<b>Dielectric strength</b>		1000 VAC, 50/60 Hz for 1 minute between current-carrying parts and case					
<b>Vibration resistance (destruction)</b>		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions					
<b>Shock resistance (destruction)</b>		1,000 m/s <sup>2</sup> 10 times each in X, Y, and Z directions					
<b>Degree of protection</b>		IEC IP67, in-house standard for oil resistance					
<b>Connection method</b>		Pre-wired Models (Standard cable length: 2 m)					
<b>Weight (packed state)</b>		Approx. 65 g		Approx. 150 g		Approx. 210 g	
<b>Material- als</b>	<b>Case</b>	Brass					
	<b>Sensing surface</b>	PBT					
	<b>Clamping nuts</b>	Nickel-plated brass					
	<b>Toothed washer</b>	Zinc-plated iron					
<b>Accessories</b>		Instruction sheet					

\*1. Use the E2E2 within the range in which the setting indicator (green LED) is ON (except D2 Models).

\*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.

## E2E2-X□□ DC 3-Wire Models

Item	Size Shielding Model	M12		M18		M30	
		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
		E2E2-X2C□	E2E2-X5MC□	E2E2-X5C□	E2E2-X10MC□	E2E2-X10C□	E2E2-X18MC□
<b>Sensing distance</b>		2 mm±10%	5 mm±10%	5 mm±10%	10 mm±10%	10 mm±10%	18 mm±10%
<b>Set distance</b>		0 to 1.6 mm	0 to 4 mm	0 to 4 mm	0 to 8 mm	0 to 8 mm	0 to 14 mm
<b>Differential travel</b>		10% max. of sensing distance					
<b>Sensing object</b>		Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to <i>Engineering Data</i> on page 5.)					
<b>Standard sensing object</b>		Iron, 12 × 12 × 1 mm	Iron, 15 × 15 × 1 mm	Iron, 18 × 18 × 1 mm	Iron, 30 × 30 × 1 mm	Iron, 30 × 30 × 1 mm	Iron, 54 × 54 × 1 mm
<b>Response frequency *1</b>		1.5 kHz	400 Hz	600 Hz	200 Hz	400 Hz	100 Hz
<b>Power supply voltage (operating voltage range) *2</b>		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.					
<b>Leakage current</b>		13 mA max.					
<b>Control output</b>	<b>Load current</b>	NPN open-collector output, 200 mA max. (30 VDC max.)					
	<b>Residual voltage</b>	2 V max. (Load current: 200 mA, Cable length: 2 m)					
<b>Indicators</b>		Operation indicator (red)					
<b>Operation mode (with sensing object approaching)</b>		C1 Models: NO    Refer to the timing charts under <i>I/O Circuit Diagrams</i> on page 8 for details. C2 Models: NC					
<b>Protection circuits</b>		Reverse polarity protection, Surge absorber, Load short-circuit protection					
<b>Ambient temperature</b>		Operating/Storage: -40 to 85°C (with no icing or condensation)					
<b>Ambient humidity</b>		Operating/Storage: 35% to 95% (with no condensation)					
<b>Temperature influence</b>		±15% max. of sensing distance at 23°C in the temperature range of -40 to 85°C ±10% max. of sensing distance at 23°C in the temperature range of -25 to 70°C					
<b>Voltage influence</b>		±1% max. of sensing distance at rated voltage in the rated voltage ±15% range					
<b>Insulation resistance</b>		50 MΩ min. (at 500 VDC) between current-carrying parts and case					
<b>Dielectric strength</b>		1,000 VAC, 50/60 Hz for 1 minute between current carry parts and case					
<b>Vibration resistance (destruction)</b>		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions					
<b>Shock resistance (destruction)</b>		1,000 m/s <sup>2</sup> 10 times each in X, Y, and Z directions					
<b>Degree of protection</b>		IEC IP67, in-house standard for oil resistance					
<b>Connection method</b>		Pre-wired Models (Standard cable length: 2 m) and Connector Models					
<b>Weight (packed state)</b>		Approx. 75 g		Approx. 160 g		Approx. 220 g	
<b>Materials</b>	<b>Case</b>	Brass					
	<b>Sensing surface</b>	PBT					
	<b>Clamping nuts</b>	Nickel-plated brass					
	<b>Toothed washer</b>	Zinc-plated iron					
<b>Accessories</b>		Instruction sheet					

\*1. 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.

\*2. A full-wave rectification power supply of 24 VDC ±20% (average value) can be used.

## E2E2-X□Y□ AC 2-Wire Models

Item	Size Shielding Model	M12		M18		M30	
		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
		E2E2-X2Y□	E2E2-X5MY□	E2E2-X5Y□	E2E2-X10MY□	E2E2-X10Y□	E2E2-X18MY□
<b>Sensing distance</b>		2 mm±10%	5 mm±10%	5 mm±10%	10 mm±10%	10 mm±10%	18 mm±10%
<b>Set distance</b>		0 to 1.6 mm	0 to 4 mm	0 to 4 mm	0 to 8 mm	0 to 8 mm	0 to 14 mm
<b>Differential travel</b>		10% max. of sensing distance					
<b>Sensing object</b>		Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to <i>Engineering Data</i> on page 5.)					
<b>Standard sensing object</b>		Iron, 12 × 12 × 1 mm	Iron, 15 × 15 × 1 mm	Iron, 18 × 18 × 1 mm	Iron, 30 × 30 × 1 mm	Iron, 30 × 30 × 1 mm	Iron, 54 × 54 × 1 mm
<b>Response frequency</b>		25 Hz					
<b>Power supply voltage (operating voltage range) *1</b>		24 to 240 VAC (20 to 264 VAC), 50/60 Hz					
<b>Leakage current</b>		1.7 mA max.					
<b>Control output</b>	<b>Load current *2</b>	5 to 200 mA		5 to 300 mA			
	<b>Residual voltage</b>	Refer to <i>Engineering Data</i> on page 5.					
<b>Indicators</b>		Operation indicator (red)					
<b>Operation mode (with sensing object approaching)</b>		Y1 Models: NO    Refer to the timing charts under <i>I/O Circuit Diagrams</i> on page 8 for details. Y2 Models: NC					
<b>Ambient temperature *1, 2</b>		Operating/Storage: -40 to 85°C (with no icing or condensation)					
<b>Ambient humidity</b>		Operating/Storage: 35% to 95% (with no condensation)					
<b>Temperature influence</b>		±15% max. of sensing distance at 23°C in the temperature range of -40 to 85°C, ±10% max. of sensing distance at 23°C in the temperature range of -25 to 70°C					
<b>Voltage influence</b>		±1% max. of sensing distance at rated voltage in the rated voltage ±15% range					
<b>Insulation resistance</b>		50 MΩ min. (at 500 VDC) between current-carrying parts and case					
<b>Dielectric strength</b>		4,000 VAC, 50/60 Hz for 1 minute between current carry parts and case					
<b>Vibration resistance (destruction)</b>		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions					
<b>Shock resistance (destruction)</b>		1,000 m/s <sup>2</sup> 10 times each in X, Y, and Z directions					
<b>Degree of protection</b>		IEC IP67, in-house standard for oil resistance					
<b>Connection method</b>		Pre-wired Models (Standard cable length: 2 m) and Connector Models					
<b>Weight (packed state)</b>		Approx. 65 g		Approx. 150 g		Approx. 210 g	
<b>Materials</b>	<b>Case</b>	Brass					
	<b>Sensing surface</b>	PBT					
	<b>Clamping nuts</b>	Nickel-plated brass					
	<b>Toothed washer</b>	Zinc-plated iron					
<b>Accessories</b>		Instruction sheet					

\*1. When supplying 24 VAC to any of the above models, make sure that the operating ambient temperature range is at least -25°C to 85°C.

\*2. When using an M18 or M30 Connector Model at an ambient temperature between 70 and 85°C, make sure that the Sensor has a control output (load current) of 5 to 200 mA max.

# Engineering Data (Reference Value)

## Sensing Area Shielded Models E2E2-X□D□



## E2E2-X□C□/-X□Y□



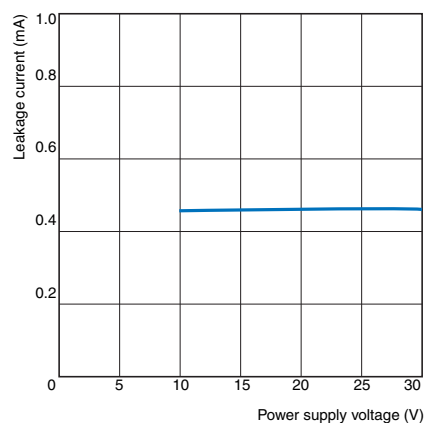
## Unshielded Models E2E2-X□MD□



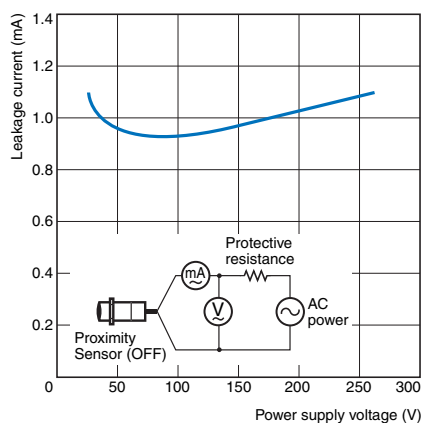
## E2E2-X□MC□/-X□MY□



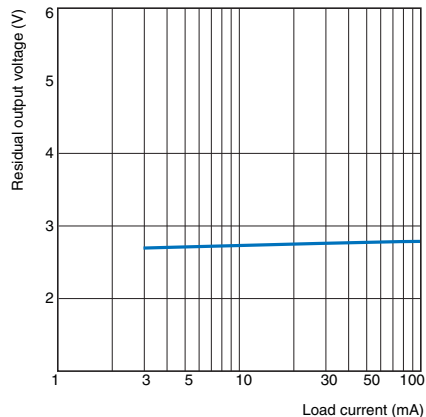
## Leakage Current E2E2-X□D□



## E2E2-X□Y□

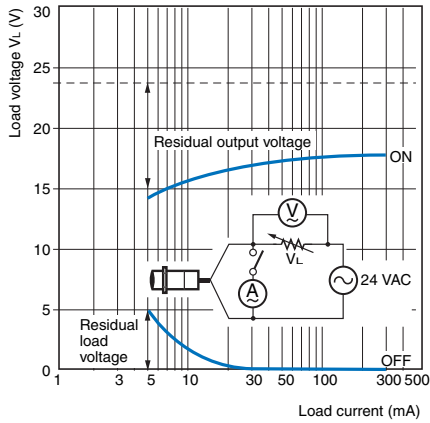


## Residual Output Voltage E2E2-X□D□



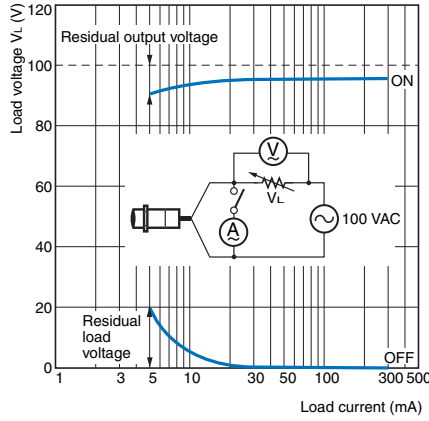
E2E2-X□Y□

at 24 VAC



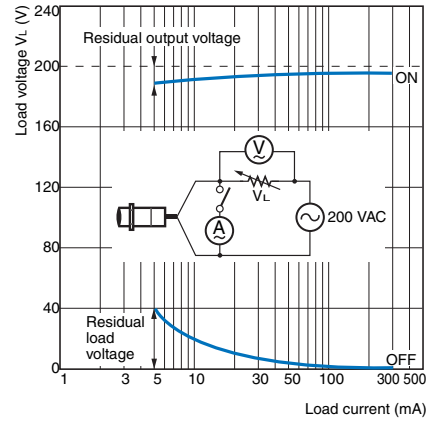
E2E2-X□Y□

at 100 VAC



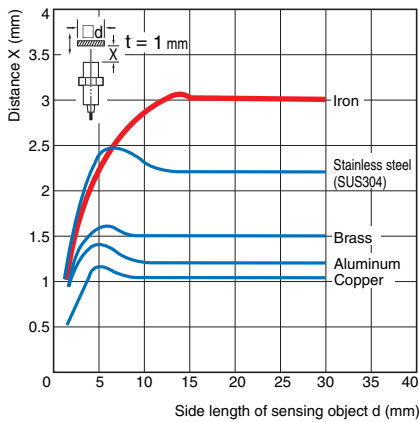
E2E2-X□Y□

at 200 VAC

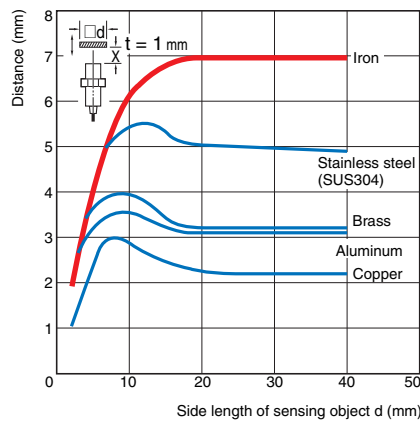


Influence of Sensing Object Size and Material

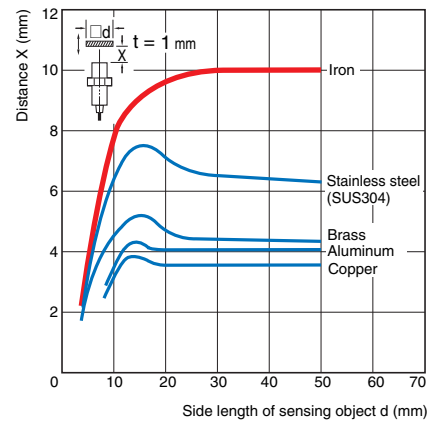
E2E2-X3D□



E2E2-X7D□



E2E2-X10D□



E2E2-X8MD□



E2E2-X14MD□



E2E2-X20MD□



**E2E2-X2C□/-X2Y□**



**E2E2-X5C□/-X5Y□**



**E2E2-X10C□/-X10Y□**



**E2E2-X5MC□/-X5MY□**



**E2E2-X10MC□/-X10MY□**



**E2E2-X18MC□/-X18MY□**



## I/O Circuit Diagrams

### DC 2-Wire Models

Operation mode	Model	Timing Charts	Output circuit
NO	E2E2-X3D1 E2E2-X7D1 E2E2-X10D1 E2E2-X8MD1 E2E2-X14MD1 E2E2-X20MD1		<p>Note: The load can be connected to either the +V or 0 V side.</p>
NC	E2E2-X3D2 E2E2-X7D2 E2E2-X10D2 E2E2-X8MD2 E2E2-X14MD2 E2E2-X20MD2		

### DC 3-Wire Models

Operation mode	Model	Timing Charts	Output circuit
NO	E2E2-X2C1 E2E2-X5C1 E2E2-X10C1 E2E2-X5MC1 E2E2-X10MC1 E2E2-X18MC1		
NC	E2E2-X2C2 E2E2-X5C2 E2E2-X10C2 E2E2-X5MC2 E2E2-X10MC2 E2E2-X18MC2		



AC 2-Wire Models

Operation mode	Model	Timing Charts	Output circuit
NO	E2E2-X2Y1	<p>Sensing object Present (ON), Not present (OFF)                      Operation indicator (red) ON, OFF                      Control output ON, OFF</p>	
	E2E2-X5Y1		
	E2E2-X10Y1		
	E2E2-X5MY1		
	E2E2-X10MY1		
NC	E2E2-X2Y2	<p>Sensing object Present (ON), Not present (OFF)                      Operation indicator (red) ON, OFF                      Control output ON, OFF</p>	
	E2E2-X5Y2		
	E2E2-X10Y2		
	E2E2-X5MY2		
	E2E2-X10MY2		

Safety Precautions

**WARNING**

This product is not designed or rated for ensuring safety of persons either directly or indirectly.



Do not use it for such purposes.

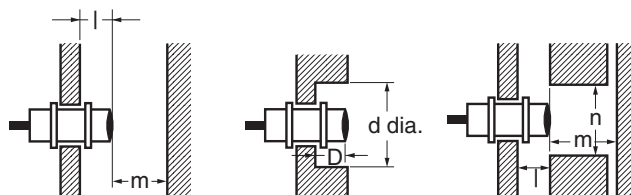
**Precautions for Correct Use**

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.

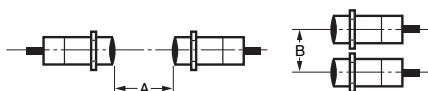


(Unit: mm)

Model	Item	M12	M18	M30	
DC 2-Wire Models E2E2-X□D□	Shielded	l	0	0	0
		d	12	18	30
		D	0	0	0
		m	8	20	40
		n	18	27	45
	Unshielded	l	15	22	30
		d	40	70	90
		D	15	22	30
		m	20	40	70
		n	40	70	90
DC 3-Wire Models E2E2-X□C□ AC 2-Wire Models E2E2-X□Y□	Shielded	l	0	0	0
		d	12	18	30
		D	0	0	0
		m	8	20	40
		n	18	27	45
	Unshielded	l	15	22	30
		d	40	55	90
		D	15	22	30
		m	20	40	70
		n	36	54	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	M12	M18	M30	
DC 2-Wire Models E2E2-X□D□	Shielded	A	30 (20)	50 (30)	100 (50)
		B	20	35 (18)	70 (35)
	Unshielded	A	120 (60)	200 (100)	300 (100)
		B	100 (50)	110 (60)	200 (100)
DC 3-Wire Models E2E2-X□C□	Shielded	A	30	50	100
		B	20	35	70
AC 2-Wire Models E2E2-X□Y□	Unshielded	A	120	200	300
		B	100	110	200

Note: Values in parentheses apply to Sensors operating at different frequencies.

### Relationship between Sizes and Models

Size	Model		
M12	Shielded	E2E2-X3D□ E2E2-X2C□ E2E2-X2Y□	
	Unshielded	E2E2-X8MD□ E2E2-X5MC□ E2E2-X5MY□	
		M18	Shielded
Unshielded			E2E2-X14MD□ E2E2-X10MC□ E2E2-X10MY□
	M30		Shielded
		Unshielded	E2E2-X20MD□ E2E2-X18MC□ E2E2-X18MY□

### ● Mounting



### tening Torque

Do not tighten the nut with excessive force.

A washer must be used with the nut.

The following strengths assume washers are being used.

Model	Torque
M12	30 N·m
M18	70 N·m
M30	180 N·m

Dimensions

Unless otherwise specified, the tolerance class IT16 is used for dimensions in this data sheet.

Shielded



Unshielded



E2E2-X3D□/E2E2-X2C□/E2E2-X2Y□



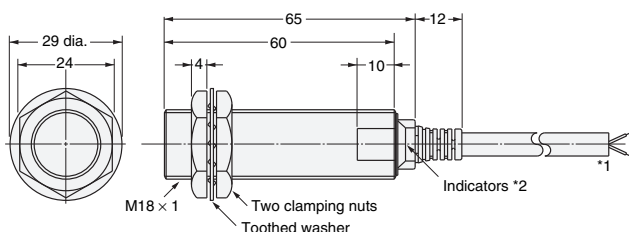
- \*1. 4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.3 mm<sup>2</sup>, Insulator diameter: 1.3 mm), Standard length: 2 m
- 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.3 mm<sup>2</sup>, Insulator diameter: 1.3 mm), Standard length: 2 m
- The cable can be extended to up to 200 m (Separate metal conduit.)
- \*2. D Models: Operation indicator (red) and setting indicator (green), C/Y Models: Operation indicator (red)

E2E2-X8MD□/E2E2-X5MC□/E2E2-X5MY□



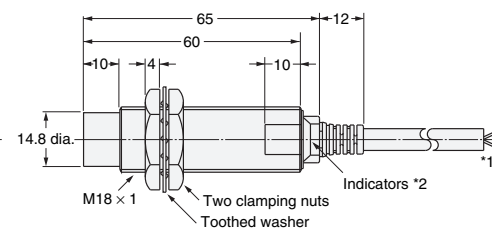
- \*1. 4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.3 mm<sup>2</sup>, Insulator diameter: 1.3 mm), Standard length: 2 m
- 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.3 mm<sup>2</sup>, Insulator diameter: 1.3 mm), Standard length: 2 m
- The cable can be extended to up to 200 m (Separate metal conduit.)
- \*2. D Models: Operation indicator (red) and setting indicator (green), C/Y Models: Operation indicator (red)

E2E2-X7D□/E2E2-X5C□/E2E2-X5Y□



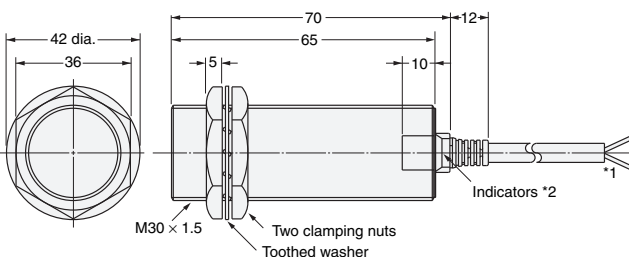
- \*1. 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm<sup>2</sup>, Insulator diameter: 1.9 mm), Standard length: 2 m
- 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm<sup>2</sup>, Insulator diameter: 1.9 mm), Standard length: 2 m
- The cable can be extended to up to 200 m (Separate metal conduit.)
- \*2. D Models: Operation indicator (red) and setting indicator (green), C/Y Models: Operation indicator (red)

E2E2-X14MD□/E2E2-X10MC□/E2E2-X10MY□



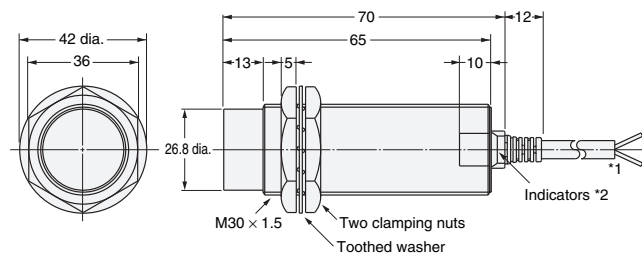
- \*1. 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm<sup>2</sup>, Insulator diameter: 1.9 mm), Standard length: 2 m
- 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm<sup>2</sup>, Insulator diameter: 1.9 mm), Standard length: 2 m
- The cable can be extended to up to 200 m (Separate metal conduit.)
- \*2. D Models: Operation indicator (red) and setting indicator (green), C/Y Models: Operation indicator (red)

E2E2-X10D□/E2E2-X10C□/E2E2-X10Y□



- \*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
- 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
- The cable can be extended to up to 200 m (Separate metal conduit.)
- \*2. D Models: Operation indicator (red) and setting indicator (green), C/Y Models: Operation indicator (red)

E2E2-X20MD□/E2E2-X18MC□/E2E2-X18MY□



- \*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
- 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
- The cable can be extended to up to 200 m (Separate metal conduit.)
- \*2. D Models: Operation indicator (red) and setting indicator (green), C/Y Models: Operation indicator (red)

Mounting Hole Dimensions



Dimension	M12	M18	M30
F (mm)	12.5 <sup>+0.5</sup> <sub>0</sub> dia.	18.5 <sup>+0.5</sup> <sub>0</sub> dia.	30.5 <sup>+0.5</sup> <sub>0</sub> dia.

- Note 1. Two clamping nuts and one toothed washer are provided with each Sensors.
- 2. The model number is laser-marked on the cable section and milled section.

In the interest of product improvement, specifications are subject to change without notice.

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