Long-barrel Inductive Proximity Sensor

E2E2

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.

CE

⚠ 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 *	E2E2-X3D2
	M18	7 mm	E2E2-X7D1 *	E2E2-X7D2
	M30	10 mm	E2E2-X10D1 *	E2E2-X10D2
Unshielded	M12	8 mm	E2E2-X8MD1 *	E2E2-X8MD2
	M18	14 mm	E2E2-X14MD1 *	E2E2-X14MD2
	M30	20 mm	E2E2-X20MD1 *	E2E2-X20MD2

*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	E2E2-X2C2
	M18	5 mm	E2E2-X5C1	E2E2-X5C2
	M30	10 mm	E2E2-X10C1	E2E2-X10C2
Unshielded	M12	5 mm	E2E2-X5MC1	E2E2-X5MC2
	M18	10 mm	E2E2-X10MC1	E2E2-X10MC2
	M30	18 mm	E2E2-X18MC1	E2E2-X18MC2

AC 2-Wire Models

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

Accessories (Order Separately)

Mounting Brackets
Protective Covers
Sputter Protective Covers

Ratings and Specifications

E2E2-X□D□ DC 2-Wire Models

Item	Size	M12		M18		M30	
	Shielding	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
	Model	E2E2-X3D□	E2E2-X8MD□	E2E2-X7D□	E2E2-X14MD□	E2E2-X10D□	E2E2-X20MD□
Sensing distance		3 mm±10%	8 mm±10%	7 mm±10%	14 mm±10%	10 mm±10%	20 mm±10%
Set distance *1		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
Differential travel		10% max. of sensing distance					
Sensing object		Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to *Engineering Data* on page 5.)					
Standard sensing object		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
Response frequency *2		1 kHz	800 Hz	500 Hz	400 Hz		100 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.					
Leakage current		0.8 mA max.					
Control output	Switching capacity	3 to 100 mA					
	Residual voltage	3 V max. (Load current: 100 mA, Cable length: 2 m)					
Indicators		D1 Models: Operation indicator (red) and setting indicator (green) D2 Models: Operation indicator (red)					
Operation mode (with sensing object approaching)		D1 Models: NO D2 Models: NC Refer to the timing charts under *I/O Circuit Diagrams* on page 8 for details.					
Protection circuits		Surge absorber, Load short-circuit protection					
Ambient temperature		Operating/Storage: –25 to 70°C (with no icing or condensation)					
Ambient humidity		Operating/Storage: 35% to 95% (with no condensation)					
Temperature influence		±10% max. of sensing distance at 23°C in the temperature range of –25 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		1000 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)		1,000 m/s² 10 times each in X, Y, and Z directions					
Degree of protection		IEC IP67, in-house standard for oil resistance					
Connection method		Pre-wired Models (Standard cable length: 2 m)					
Weight (packed state)		Approx. 65 g		Approx. 150 g		Approx. 210 g	
Materials	Case	Brass					
	Sensing surface	PBT					
	Clamping nuts	Nickel-plated brass					
	Toothed washer	Zinc-plated iron					
Accessories		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□C□ DC 3-Wire Models

Item	Model	Size	M12		M18		M30	
		Shielding	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
			E2E2-X2C□	E2E2-X5MC□	E2E2-X5C□	E2E2-X10MC□	E2E2-X10C□	E2E2-X18MC□
Sensing distance			2 mm±10%	5 mm±10%	5 mm±10%	10 mm±10%	10 mm±10%	18 mm±10%
Set distance			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
Differential travel			10% max. of sensing distance					
Sensing object			Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to *Engineering Data* on page 5.)					
Standard sensing object			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
Response frequency *1			1.5 kHz	400 Hz	600 Hz	200 Hz	400 Hz	100 Hz
Power supply voltage (operating voltage range) *2			12 to 24 VDC (10 to 55 VDC), ripple (p-p): 10% max.					
Leakage current			13 mA max.					
Control output	Load current		NPN open-collector output, 200 mA max. (55 VDC max.)					
	Residual voltage		2 V max. (Load current: 200 mA, Cable length: 2 m)					
Indicators			Operation indicator (red)					
Operation mode (with sensing object approaching)			C1 Models: NO C2 Models: NC Refer to the timing charts under *I/O Circuit Diagrams* on page 8 for details.					
Protection circuits			Reverse polarity protection, Surge absorber, Load short-circuit protection					
Ambient temperature			Operating/Storage: –40 to 85°C (with no icing or condensation)					
Ambient humidity			Operating/Storage: 35% to 95% (with no condensation)					
Temperature influence			±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					
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 carry 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 IP67, in-house standard for oil resistance					
Connection method			Pre-wired Models (Standard cable length: 2 m) and Connector Models					
Weight (packed state)			Approx. 75 g		Approx. 160 g		Approx. 220 g	
Materials	Case		Brass					
	Sensing surface		PBT					
	Clamping nuts		Nickel-plated brass					
	Toothed washer		Zinc-plated iron					
Accessories			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.

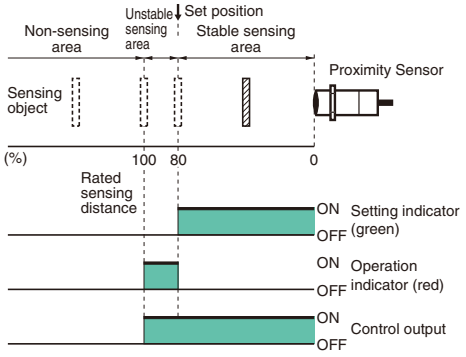
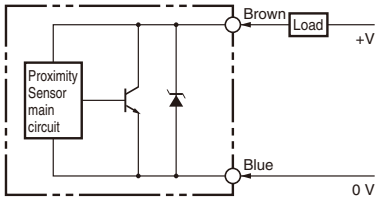
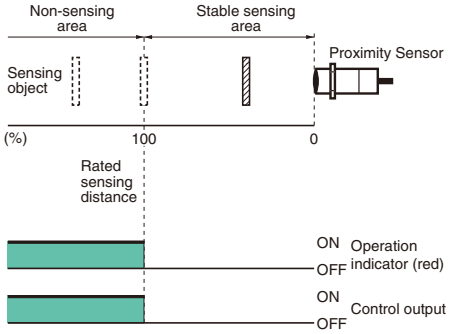
E2E2-X□Y□ AC 2-Wire Models

Item	Size	M12		M18		M30	
	Shielding	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
	Model	E2E2-X2Y□	E2E2-X5MY□	E2E2-X5Y□	E2E2-X10MY□	E2E2-X10Y□	E2E2-X18MY□
Sensing distance		2 mm±10%	5 mm±10%	5 mm±10%	10 mm±10%	10 mm±10%	18 mm±10%
Set distance		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
Differential travel		10% max. of sensing distance					
Sensing object		Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to *Engineering Data* on page 5.)					
Standard sensing object		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
Response frequency		25 Hz					
Power supply voltage (operating voltage range) *1		24 to 240 VAC (20 to 264 VAC), 50/60 Hz					
Leakage current		1.7 mA max.					
Control output	Load current *2	5 to 200 mA		5 to 300 mA			
	Residual voltage	Refer to *Engineering Data* on page 5.					
Indicators		Operation indicator (red)					
Operation mode (with sensing object approaching)		Y1 Models: NO Y2 Models: NC	Refer to the timing charts under *I/O Circuit Diagrams* on page 8 for details.				
Ambient temperature *1, 2		Operating/Storage: –40 to 85°C (with no icing or condensation)					
Ambient humidity		Operating/Storage: 35% to 95% (with no condensation)					
Temperature influence		±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					
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		4,000 VAC, 50/60 Hz for 1 minute between current carry 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 IP67, in-house standard for oil resistance					
Connection method		Pre-wired Models (Standard cable length: 2 m) and Connector Models					
Weight (packed state)		Approx. 65 g		Approx. 150 g		Approx. 210 g	
Materials	Case	Brass					
	Sensing surface	PBT					
	Clamping nuts	Nickel-plated brass					
	Toothed washer	Zinc-plated iron					
Accessories		Instruction sheet					

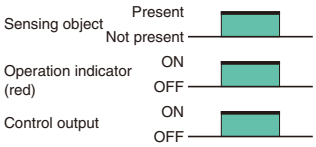
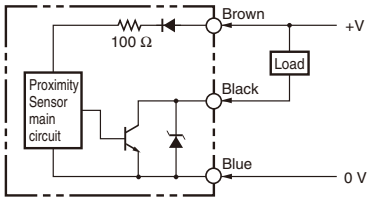
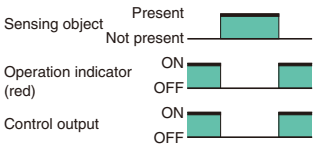
*1. When supplying 24 VAC to any of the above models, make sure that the operating ambient temperature range is at least –25°C to 85°C.
*2. When using an M18 or M30 Connector Model at an ambient temperature between 70 and 85°C, make sure that the Sensor has a control output (load current) of 5 to 200 mA max.

I/O Circuit Diagrams

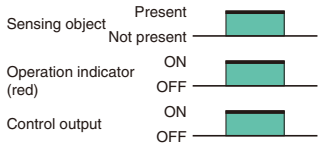
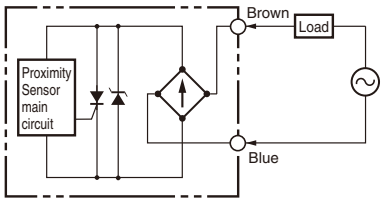
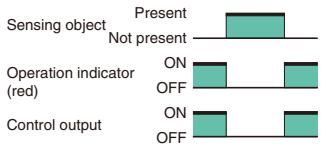
DC 2-Wire Models

Operation mode	Model	Timing Charts	Output circuit
NO	E2E2-X3D1 E2E2-X7D1 E2E2-X10D1 E2E2-X8MD1 E2E2-X14MD1 E2E2-X20MD1		 Note: The load can be connected to either the +V or 0 V side.
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 E2E2-X5Y1 E2E2-X10Y1 E2E2-X5MY1 E2E2-X10MY1 E2E2-X18MY1		
NC	E2E2-X2Y2 E2E2-X5Y2 E2E2-X10Y2 E2E2-X5MY2 E2E2-X10MY2 E2E2-X18MY2		

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.

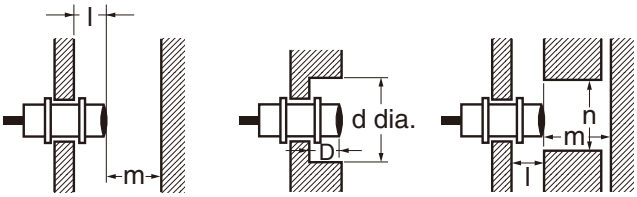
Precautions for Correct Use

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.

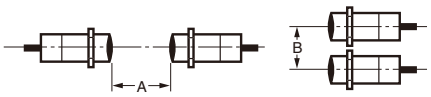


(Unit: mm)

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 (12)	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□ AC 2-Wire Models E2E2-X□Y□	Shielded	A	30	50	100
		B	20	35	70
	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	E2E2-X7D□ E2E2-X5C□ E2E2-X5Y□
	Unshielded	E2E2-X14MD□ E2E2-X10MC□ E2E2-X10MY□
M30	Shielded	E2E2-X10D□ E2E2-X10C□ E2E2-X10Y□
	Unshielded	E2E2-X20MD□ E2E2-X18MC□ E2E2-X18MY□

● Mounting

Tightening Torque

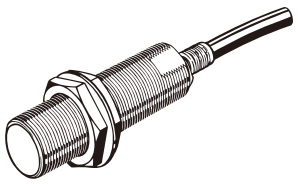
Do not tighten the nut with excessive force.
A washer must be used with the nut.
The following strengths assume washers are being used.

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

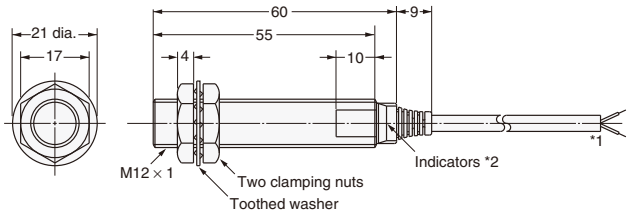
Dimensions

(Unit: mm)

Shielded

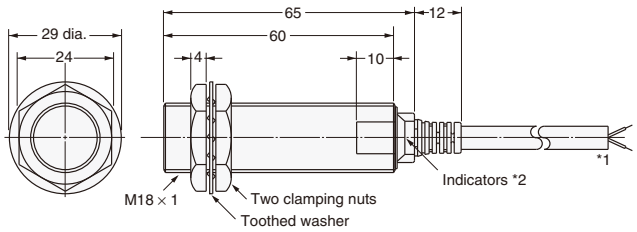


E2E2-X3D□/E2E2-X2C□/E2E2-X2Y□



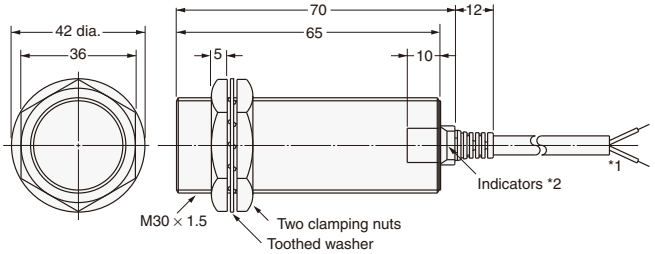
*1. 4-dia. vinyl-insulated round cable with 2 conductors
(Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm),
Standard length: 2 m
4-dia. vinyl-insulated round cable with 3 conductors
(Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm),
Standard length: 2 m
The cable can be extended 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□



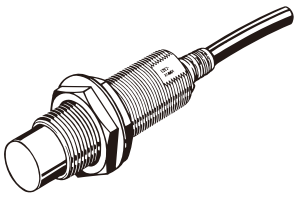
*1. 6-dia. vinyl-insulated round cable with 2 conductors
(Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm),
Standard length: 2 m
6-dia. vinyl-insulated round cable with 3 conductors
(Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm),
Standard length: 2 m
The cable can be extended 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□

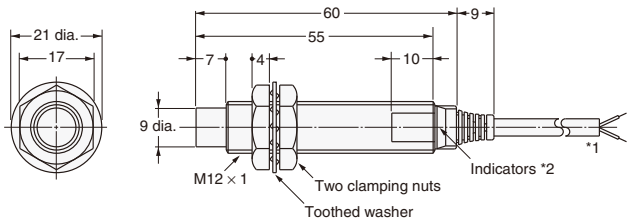


*1. 6-dia. vinyl-insulated round cable with 2 conductors
(Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm),
Standard length: 2 m
6-dia. vinyl-insulated round cable with 3 conductors
(Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm),
Standard length: 2 m
The cable can be extended to up to 200 m (Separate metal conduit.)
*2. D Models: Operation indicator (red) and setting indicator (green),
C/Y Models: Operation indicator (red)

Unshielded

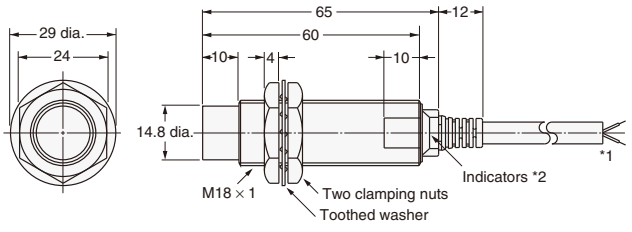


E2E2-X8MD□/E2E2-X5MC□/E2E2-X5MY□



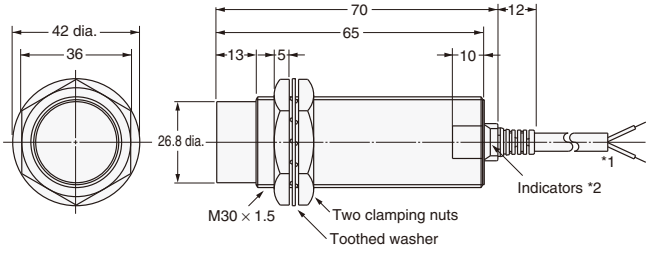
*1. 4-dia. vinyl-insulated round cable with 2 conductors
(Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm),
Standard length: 2 m
4-dia. vinyl-insulated round cable with 3 conductors
(Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm),
Standard length: 2 m
The cable can be extended 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-X14MD□/E2E2-X10MC□/E2E2-X10MY□



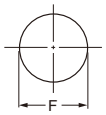
*1. 6-dia. vinyl-insulated round cable with 2 conductors
(Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm),
Standard length: 2 m
6-dia. vinyl-insulated round cable with 3 conductors
(Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm),
Standard length: 2 m
The cable can be extended 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 mm², Insulator diameter: 1.9 mm),
Standard length: 2 m
6-dia. vinyl-insulated round cable with 3 conductors
(Conductor cross section: 0.5 mm², 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)	$12.5^{+0.5}_{0}$ dia.	$18.5^{+0.5}_{0}$ dia.	$30.5^{+0.5}_{0}$ 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.