OMRON

Cylindrical Inductive Proximity Sensor | E2E2

Long Barrel Metal Body Inductive Proximity Sensors in a Wide Range of Configurations

- Available in prewired or quick-disconnect versions
- Quick-disconnect versions feature metal connectors for durability
- Easy-to-see LED indicator
- Flats for wrench tightening
- Ideal for a wide variety of applications

Ordering Information

■ SENSORS

DC 2-wire Models

Type	Size	Sensing Distance	Output Configuration	**Part Number**
Shielded	M12	3 mm	NO (see note)	**E2E2-X3D1**
			NC	**E2E2-X3D2**
	M18	7 mm	NO (see note)	**E2E2-X7D1**
			NC	**E2E2-X7D2**
	M30	10 mm	NO (see note)	**E2E2-X10D1**
			NC	**E2E2-X10D2**
Unshielded	M12	8 mm	NO (see note)	**E2E2-X8MD1**
			NC	**E2E2-X8MD2**
	M18	14 mm	NO (see note)	**E2E2-X14MD1**
			NC	**E2E2-X14MD2**
	M30	20 mm	NO (see note)	**E2E2-X20MD1**
			NC	**E2E2-X20MD2**

Note: A different oscillating frequency is available to reduce mutual interference and allow closer mounting. Add a “5” to the part number (e.g., E2E2-X3D15). Consult OMRON for availability.

DC 3-wire/Pre-wired Models

Type	Size	Sensing Distance	Output Configuration	**Part Number**
Shielded	M12	2 mm	NPN NO	**E2E2-X2C1**
			NPN NC	**E2E2-X2C2**
			PNP NO	**E2E2-X2B1**
			PNP NC	**E2E2-X2B2**
	M18	5 mm	NPN NO	**E2E2-X5C1**
			NPN NC	**E2E2-X5C2**
			PNP NO	**E2E2-X5B1**
			PNP NC	**E2E2-X5B2**
	M30	10 mm	NPN NO	**E2E2-X10C1**
			NPN NC	**E2E2-X10C2**
			PNP NO	**E2E2-X10B1**
			PNP NC	**E2E2-X10B2**
Unshielded	M12	5 mm	NPN NO	**E2E2-X5MC1**
			NPN NC	**E2E2-X5MC2**
			PNP NO	**E2E2-X5MB1**
			PNP NC	**E2E2-X5MB2**
	M18	10 mm	NPN NO	**E2E2-X10MC1**
			NPN NC	**E2E2-X10MC2**
			PNP NO	**E2E2-X10MB1**
			PNP NC	**E2E2-X10MB2**
	M30	18 mm	NPN NO	**E2E2-X18MC1**
			NPN NC	**E2E2-X18MC2**
			PNP NO	**E2E2-X18MB1**
			PNP NC	**E2E2-X18MB2**

DC 3-wire/Connector Models

Type	Size	Sensing Distance	Output Configuration	**Part Number**
Shielded	M12	2 mm	NPN NO	**E2E2-X2C1-M1**
			NPN NC	**E2E2-X2C2-M1**
			PNP NO	**E2E2-X2B1-M1**
			PNP NC	**E2E2-X2B2-M1**
	M18	5 mm	NPN NO	**E2E2-X5C1-M1**
			NPN NC	**E2E2-X5C2-M1**
			PNP NO	**E2E2-X5B1-M1**
			PNP NC	**E2E2-X5B2-M1**
	M30	10 mm	NPN NO	**E2E2-X10C1-M1**
			NPN NC	**E2E2-X10C2-M1**
			PNP NO	**E2E2-X10B1-M1**
			PNP NC	**E2E2-X10B2-M1**
Unshielded	M12	5 mm	NPN NO	**E2E2-X5MC1-M1**
			NPN NC	**E2E2-X5MC2-M1**
			PNP NO	**E2E2-X5MB1-M1**
			PNP NC	**E2E2-X5MB2-M1**
	M18	10 mm	NPN NO	**E2E2-X10MC1-M1**
			NPN NC	**E2E2-X10MC2-M1**
			PNP NO	**E2E2-X10MB1-M1**
			PNP NC	**E2E2-X10MB2-M1**
	M30	18 mm	NPN NO	**E2E2-X18MC1-M1**
			NPN NC	**E2E2-X18MC2-M1**
			PNP NO	**E2E2-X18MB1-M1**
			PNP NC	**E2E2-X18MB2-M1**

Note: Connector cordsets: Use OMRON Y96E-44□D□ or equivalent.

AC 2-wire/Pre-wired Models

Type	Size	Sensing Distance	Output Configuration	**Part Number**
Shielded	M12	2 mm	NO	**E2E2-X2Y1–US**
			NC	**E2E2-X2Y2–US**
	M18	5 mm	NO	**E2E2-X5Y1–US**
			NC	**E2E2-X5Y2–US**
	M30	10 mm	NO	**E2E2-X10Y1–US**
			NC	**E2E2-X10Y2–US**
Unshielded	M12	5 mm	NO	**E2E2-X5MY1–US**
			NC	**E2E2-X5MY2–US**
	M18	10 mm	NO	**E2E2-X10MY1–US**
			NC	**E2E2-X10MY2–US**
	M30	18 mm	NO	**E2E2-X18MY1–US**
			NC	**E2E2-X18MY2–US**

AC 2-wire/Connector Models

Type	Size	Sensing Distance	Output Configuration	**Part Number**
Shielded	M12	2 mm	NO	**E2E2-X2Y1-M4**
			NC	**E2E2-X2Y2-M4**
	M18	5 mm	NO	**E2E2-X5Y1-M4**
			NC	**E2E2-X5Y2-M4**
	M30	10 mm	NO	**E2E2-X10Y1-M4**
			NC	**E2E2-X10Y2-M4**
Unshielded	M12	5 mm	NO	**E2E2-X5MY1-M4**
			NC	**E2E2-X5MY2-M4**
	M18	10 mm	NO	**E2E2-X10MY1-M4**
			NC	**E2E2-X10MY2-M4**
	M30	18 mm	NO	**E2E2-X18MY1-M4**
			NC	**E2E2-X18MY2-M4**

Note: Connector cordsets: Use OMRON Y96E-33□A□ or equivalent.

■ ACCESSORIES

Description		**Part Number**
Mounting brackets	Fits M12 size sensors Fits M18 size sensors Fits M30 size sensors	**Y92E-B12** **Y92E-B18** **Y92E-B30**
Silicone rubber covers for shielded sensors	Fits M12 size sensors Fits M18 size sensors Fits M30 size sensors	**Y92E-E12-2** **Y92E-E18-2** **Y92E-E30-2**
Connector cordsets	See Y96E Connector Cordsets data sheet for details	

■ REPLACEMENT PARTS

Description		**Part Number**
Mounting hardware including one pair of metal nuts and one washer	Fits M12 size sensors Fits M18 size sensors Fits M30 size sensors	**M12-MHWS** **M18-MHWS** **M30-MHWS**

Specifications

E2E2-X□D□ DC 2-wire Models

Part number		E2E2-X3D□	E2E2-X8MD□	E2E2-X7D□	E2E2-X14MD□	E2E2-X10D□	E2E2-X20M□
Size		M12		M18		M30	
Type		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Sensing distance		3 mm (0.12 in) ±10%	8 mm (0.31 in) ±10%	7 mm (0.28 in) ±10%	14 mm (0.55) ±10%	10 mm (0.39) ±10%	20 mm (0.79 in) ±10%
Supply voltage (operating voltage range)		12 to 24 VDC, ripple (p-p): 10% max., (10 to 30 VDC)					
Leakage current		0.8 mA max.					
Sensing object		Magnetic metals (refer to *Engineering Data* for non-magnetic metals)					
Setting distance		0 to 2.4 mm (0 to 0.09 in)	0 to 6.4 mm (0 to 0.25 in)	0 to 5.6 mm (0 to 0.22 in)	0 to 11.2 mm (0 to 0.44 in)	0 to 8.0 mm (0 to 0.31 in)	0 to 16.0 mm (0 to 0.63 in)
Standard object (mild steel)		12 x 12 x 1 mm (0.47 x 0.47 x 0.04 in)	30 x 30 x 1 mm (1.18 x 1.18 x 0.04 in)	18 x 18 x 1 mm (0.71 x 0.71 x 0.04 in)	30 x 30 x 1 mm (1.18 x 1.18 x 0.04 in)	30 x 30 x 1 mm (1.18 x 1.18 x 0.04 in)	54 x 54 x 1 mm (2.13 x 2.13 x 0.04 in)
Differential travel		10% max. of sensing distance					
Response frequency		1.0 kHz	0.8 kHz	0.5 kHz	0.4 kHz	0.4 kHz	0.1 kHz
Operation (with sensing object approaching)		D1 models: Load ON D2 models: Load OFF					
Control output (switching capacity)		3 to 100 mA					
Circuit protection		Surge absorber, load short-circuit protection					
Indicator		D1 models: Operation indicator (red LED), operation set indicator (green LED) D2 models: Operation indicator (red LED)					
Ambient temperature		Operating: −25°C to 70°C with no icing (−13°F to 158°F)					
Ambient humidity		Operating: 35% to 95%					
Temperature influence		±10% max. of sensing distance at 23°C in temperature range of −25°C to 70°C (−13°F to 158°F)					
Voltage influence		±1% max. of sensing distance in rated voltage range ±15%					
Residual voltage		3.0 V max. (under load current of 100 mA with cable length of 2 m)					
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case					
Dielectric strength		1,000 VAC for 1 min between current carry parts and case					
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 10 times each in X, Y, and Z directions					
Shock resistance		Destruction: 1,000 m/s^2 (approx. 100G) for 10 times each in X, Y, and Z directions					
Enclosure rating	IEC	IP67					
	NEMA	1, 4, 6, 12, 13					
Weight		65 g		150 g		220 g	
Material	Body	Brass					
	Sensing face	PBT					

E2E2-X□C□/B□ DC 3-wire Models

Part number		E2E2-X2C□/B□	E2E2-X5MC□/B□	E2E2-X5C□/B□	E2E2-X10MC□/B□	E2E2-X10C□/B□	E2E2-X18MC□/B□
Size		M12		M18		M30	
Type		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Sensing distance		2 mm (0.08 in) ±10%	5 mm (0.20 in) ±10%	5 mm (0.20 in) ±10%	10 mm (0.39 in) ±10%	10 mm (0.39 in) ±10%	18 mm (0.71 in) ±10%
Supply voltage (operating voltage range)		12 to 24 VDC, ripple (p-p): 10% max., (10 to 55 VDC)					
Current consumption		13 mA max.					
Sensing object		Magnetic metals (refer to *Engineering Data* for non-magnetic metals)					
Setting distance		0 to 1.6 mm (0 to 0.06 in)	0 to 4.0 mm (0 to 0.16 in)	0 to 4.0 mm (0 to 0.16 in)	0 to 8.0 mm (0 to 0.31 in)	0 to 8.0 mm (0 to 0.31 in)	0 to 14.0 mm (0 to 0.55 in)
Standard object (mild steel)		12 x 12 x 1 mm (0.47 x 0.47 x 0.04 in)	15 x 15 x 1 mm (0.59 x 0.59 x 0.04 in)	18 x 18 x 1 mm (0.71 x 0.71 x 0.04 in)	30 x 30 x 1 mm (1.18 x 1.18 x 0.04 in)	30 x 30 x 1 mm (1.18 x 1.18 x 0.04 in)	54 x 54 x 1 mm (2.13 x 2.13 x 0.04 in)
Differential travel		10% max. of sensing distance					
Response frequency		1.5 kHz	0.4 kHz	0.6 kHz	0.2 kHz	0.4 kHz	0.1 kHz
Operation (with sensing object approaching)		B1/C1 models: Load ON B2/C2 models: Load OFF					
Control output (switching capacity)		200 mA max., open collector					
Circuit protection		Reverse connection protection, surge absorber, load short-circuit protection					
Indicator		Operation indicator (red LED)					
Ambient temperature		Operating: −40°C to 85°C with no icing (−40°F to 185°F)					
Ambient humidity		Operating: 35% to 95%					
Temperature influence		±15% max. of sensing distance at 23°C in temperature range of −40°C to 85°C (−40°F to 185°F) ±10% max. of sensing distance at 23°C in temperature range of −25°C to 70°C (−13°F to 158°F)					
Voltage influence		±1% max. of sensing distance in rated voltage range ±15%					
Residual voltage		2.0 V max. (under load current of 200 mA with cable length of 2 m)					
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case					
Dielectric strength		1,000 VAC for 1 min between current carry parts and case					
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 10 times each in X, Y, and Z directions					
Shock resistance		Destruction: 1,000 m/s^2 (approx. 100G) for 10 times each in X, Y, and Z directions					
Enclosure rating	IEC	IP67					
	NEMA	1, 4, 6, 12, 13					
Weight		65 g		150 g		220 g	
Material	Body	Brass					
	Sensing face	PBT					

E2E2-X□Y□ AC 2-wire Models

Part number		E2E2-X2Y□-US	E2E2-X5M□-US	E2E2-X5Y□-US	E2E2-X10MY□-US	E2E2-X10□-US	E2E2-X18MY□-US
Size		M12		M18		M30	
Type		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Sensing distance		2 mm (0.08 in) ±10%	5 mm (0.20 in) ±10%	5 mm (0.20 in) ±10%	10 mm (0.39 in) ±10%	10 mm (0.39 in) ±10%	18 mm (0.71 in) ±10%
Supply voltage (operating voltage range) (see note 1)		24 to 240 VAC, 50/60 Hz (20 to 264 VAC)					
Leakage current		1.7 mA max.					
Sensing object		Magnetic metals					
Setting distance		0 to 1.6 mm (0 to 0.06 in)	0 to 4.0 mm (0 to 0.16 in)	0 to 4.0 mm (0 to 0.16 in)	0 to 8.0 mm (0 to 0.31 in)	0 to 8.0 mm (0 to 0.31 in)	0 to 14.0 mm (0 to 0.55 in)
Standard object (mild steel)		12 x 12 x 1 mm (0.47 x 0.47 x 0.04 in)	15 x 15 x 1 mm (0.59 x 0.59 x 0.04 in)	18 x 18 x 1 mm (0.71 x 0.71 x 0.04 in)	30 x 30 x 1 mm (1.18 x 1.18 x 0.04 in)	30 x 30 x 1 mm (1.18 x 1.18 x 0.04 in)	54 x 54 x 1 mm (2.13 x 2.13 x 0.04 in)
Differential travel		10% max. of sensing distance					
Response frequency		25 Hz					
Operation (with sensing object approaching)		Y1 models: Load ON Y2 models: Load OFF					
Control output (switching capacity)		5 to 200 mA		5 to 300 mA (see note 2)			
Indicator		Operation indicator (red LED)					
Ambient temperature		Operating: −40°C to 85°C with no icing (−40°F to 185°F)					
Ambient humidity		Operating: 35% to 95%					
Temperature influence		±15% max. of sensing distance at 23°C in temperature range of −40°C to 85°C (−40°F to 185°F) ±10% max. of sensing distance at 23°C in temperature range of −25°C to 70°C (−13°F to 158°F)					
Voltage influence		±1% max. of sensing distance in rated voltage range ±15%					
Residual voltage		Refer to *Engineering Data*					
Insulation resistance		50 MΩ min. (at 500 VDC) between current carry parts and case					
Dielectric strength		4,000 VAC for 1 min between current carry parts and case					
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 10 times each in X, Y, and Z directions					
Shock resistance		Destruction: 1,000 m/s^2 (approx. 100G) for 10 times each in X, Y, and Z directions					
Enclosure rating	IEC	IP67					
	NEMA	1, 4, 6, 12, 13					
Weight		65 g		150 g		220 g	
Approvals	UL	Recognized, File Number E76675					
	CSA	Certified, File Number LR45951					
Material	Body	Brass					
	Sensing face	PBT					

Note: 1. When using an M18 or M30 size E2E2 at an ambient temperature between 70°C and 85°C, make sure the E2E2 has a control output of 200 mA maximum.

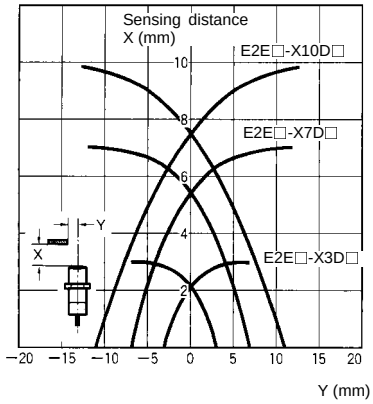
2. When supplying 24 VAC to any of the above models, make sure that the operating ambient temperature range is −25°C to 85°C (−13°F to 185°F).

Engineering Data

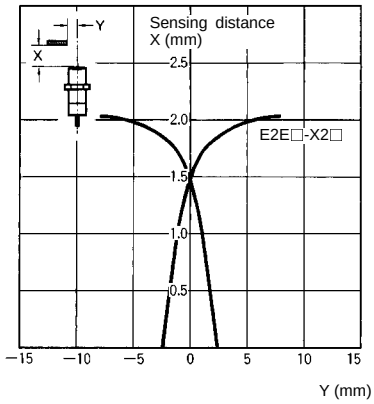
■ OPERATING RANGE (TYPICAL)

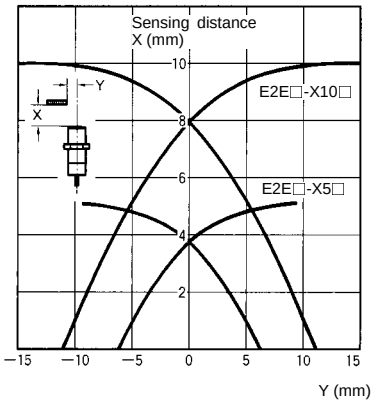
Shielded Models

E2E2-X□D□



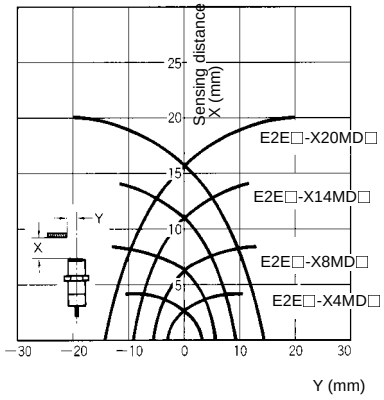
E2E2-X□C□/B□
E2E2-X□Y□



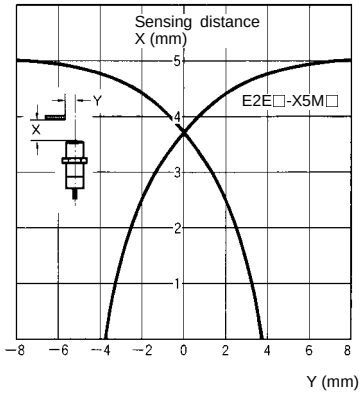


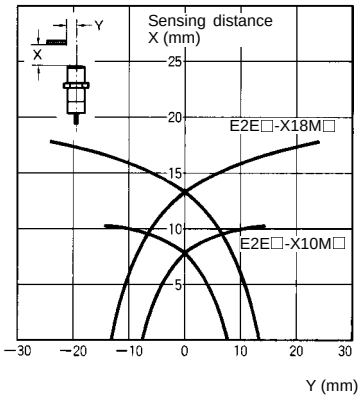
Unshielded Models

E2E2-X□MD□



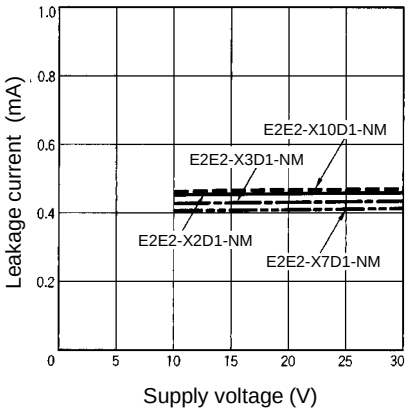
E2E2-X□MC□/B□
E2E2-X□MY□



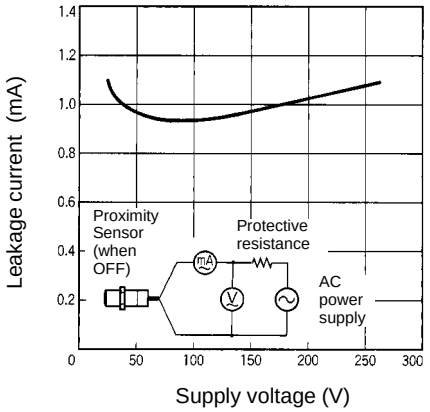


■ LEAKAGE CURRENT (TYPICAL)

E2E2-X□D□

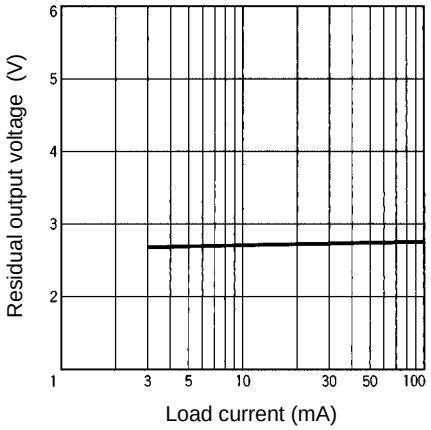


E2E2-X□Y□

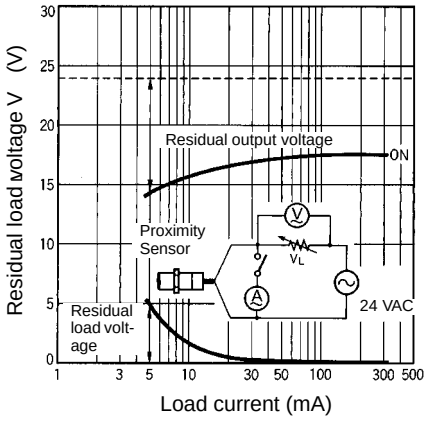


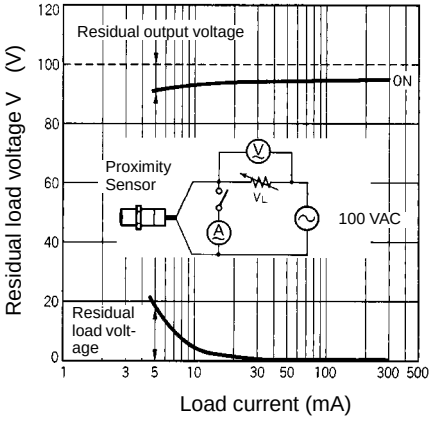
■ RESIDUAL OUTPUT VOLTAGE (TYPICAL)

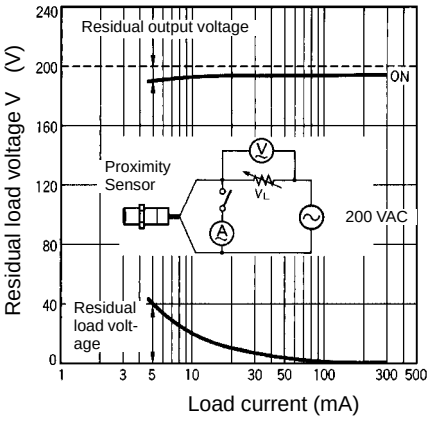
E2E2-X□D□



E2E2-X□Y□

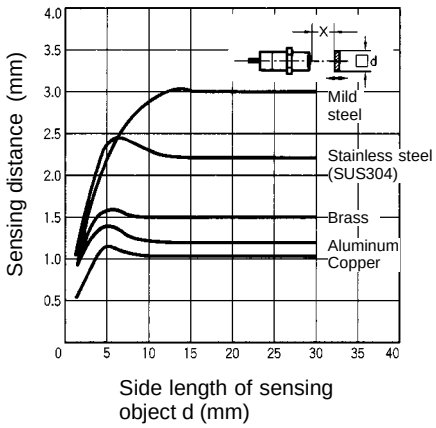




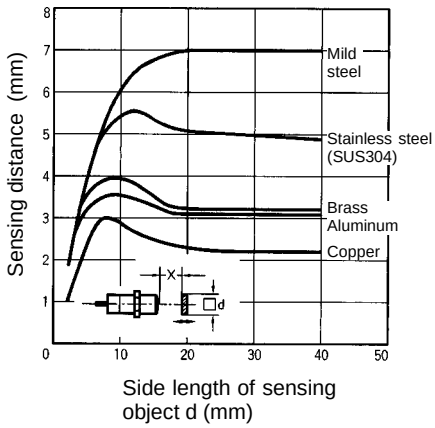


■ SENSING DISTANCE VS. SENSING OBJECT (TYPICAL)

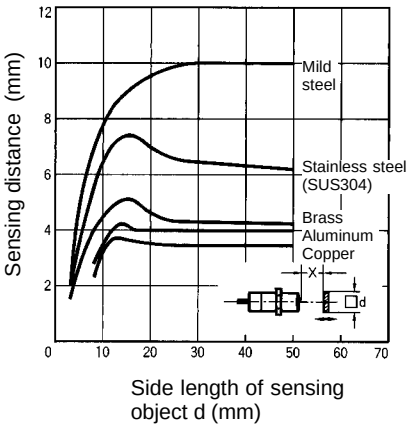
E2E2-X3D□



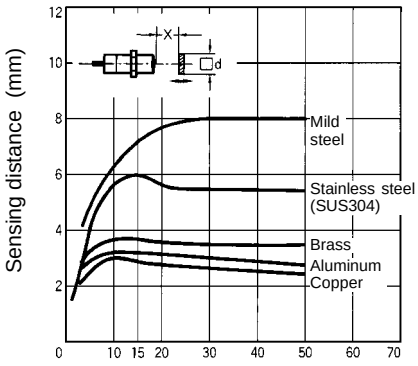
E2E2-X7D□



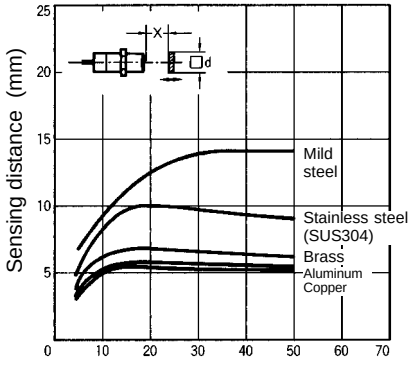
E2E2-X10D□



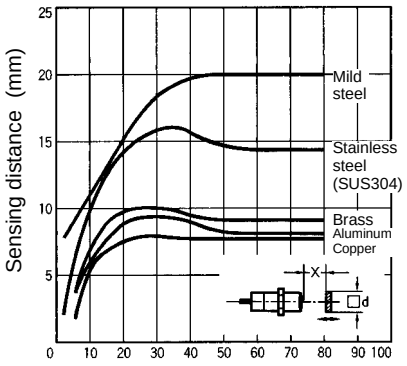
E2E2-X8MD□



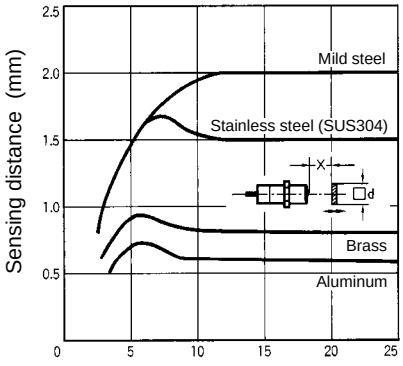
E2E2-X14MD□



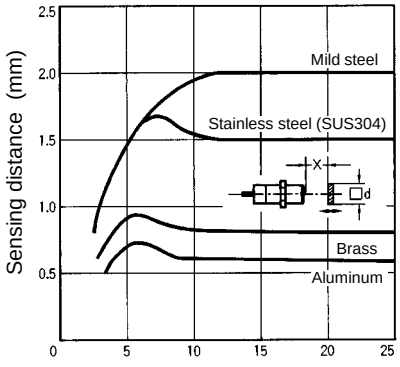
E2E2-X20MD□



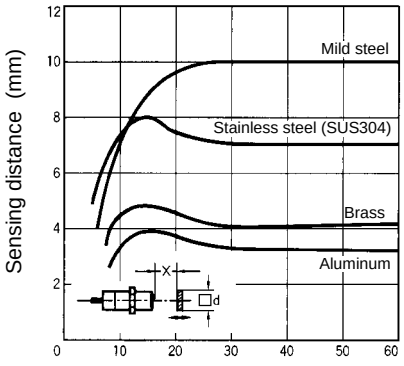
E2E2-X2C□/B□
E2E2-X2Y□



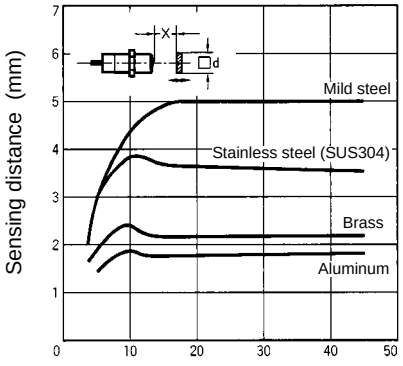
E2E2-X5C□/B□
E2E2-X5Y□



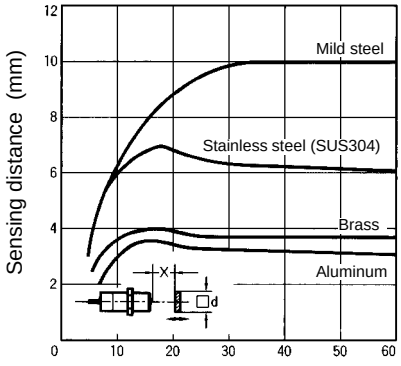
E2E2-X10C□/B□
E2E2-X10Y□



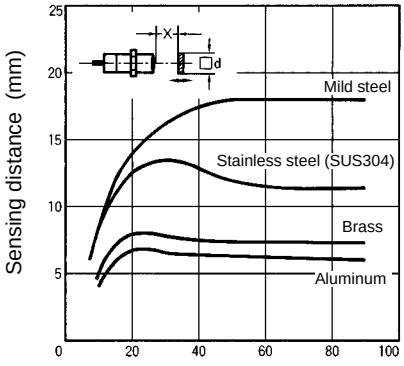
E2E2-X5MC□/B□
E2E2-X5MY□



E2E2-X10MC□/B□
E2E2-X10MY□



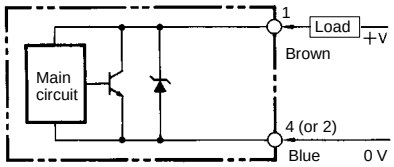
E2E2-X18MC□/B□
E2E2-X18MY□



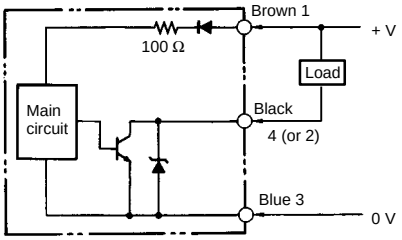
Operation

■ OUTPUT CIRCUITS

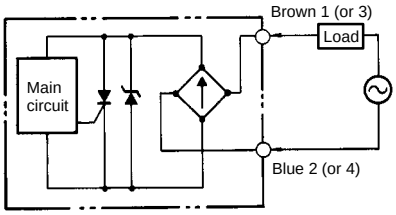
E2E2-X□D□ DC 2-wire Models



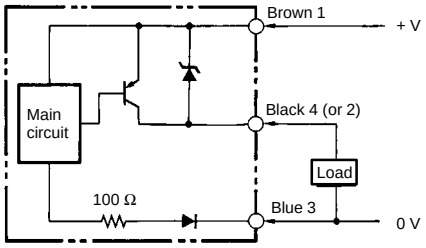
E2E2-X□C□ DC 3-wire Models



E2E2-X□Y□ AC 2-wire Models



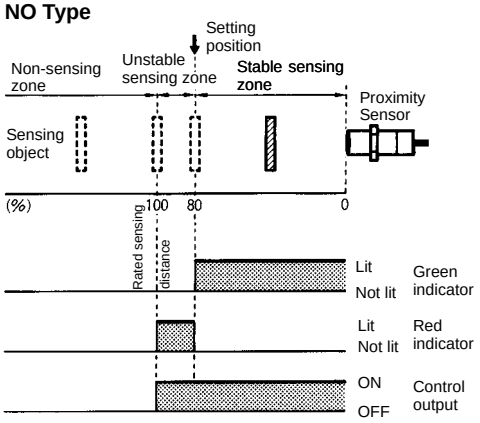
E2E2-X□B□ DC 3-wire Models



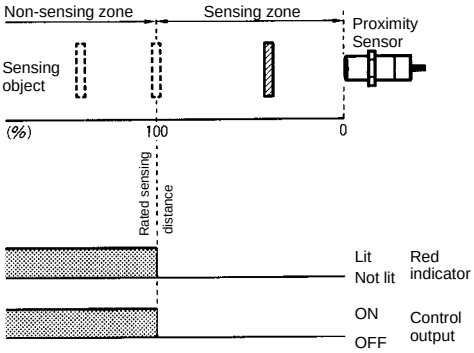
■ OPERATING CHARTS

E2E2-X□D□ DC 2-wire Models

NO Type

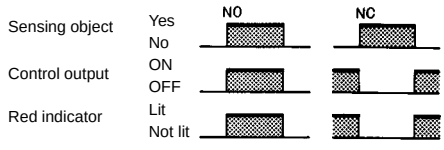


NC Type

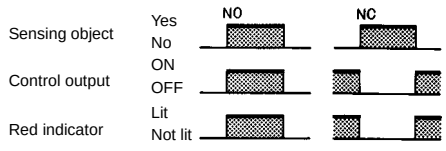


E2E2-X□C□/B□ DC 3-wire Models

NPN/PNP Open Collector Output



E2E2-X□Y□ AC 2-wire Models

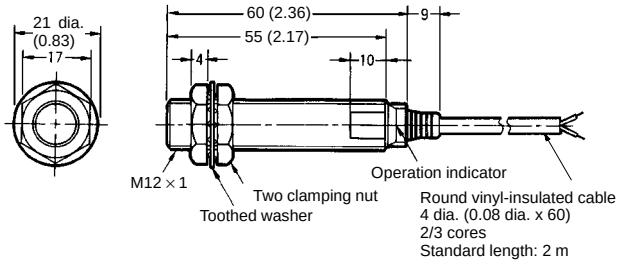


Dimensions

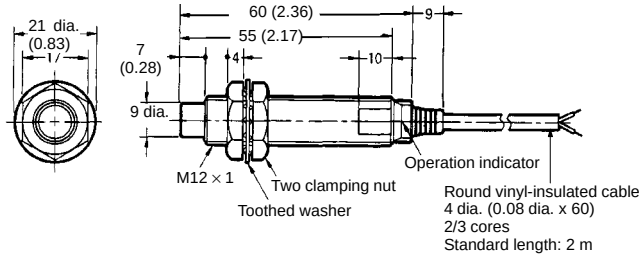
Unit: mm (inch)

■ PRE-WIRED MODELS

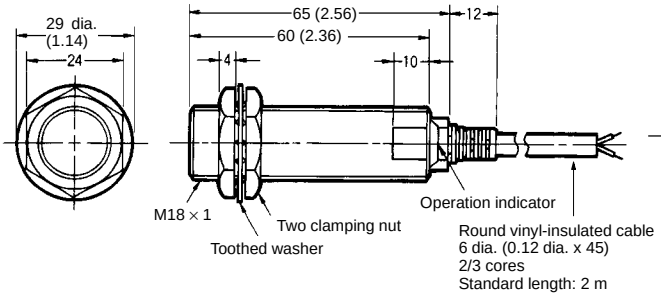
E2E2-X3D□
E2E2-X2□□



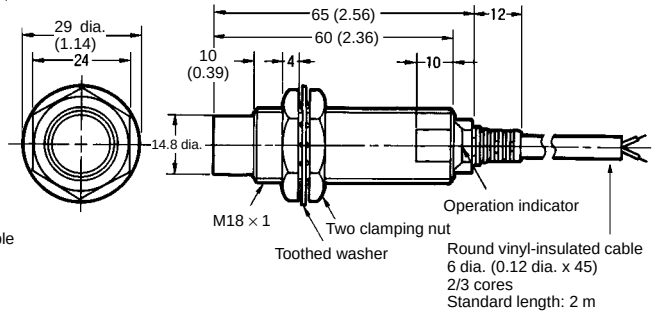
E2E2-X8MD□
E2E2-X5M□□



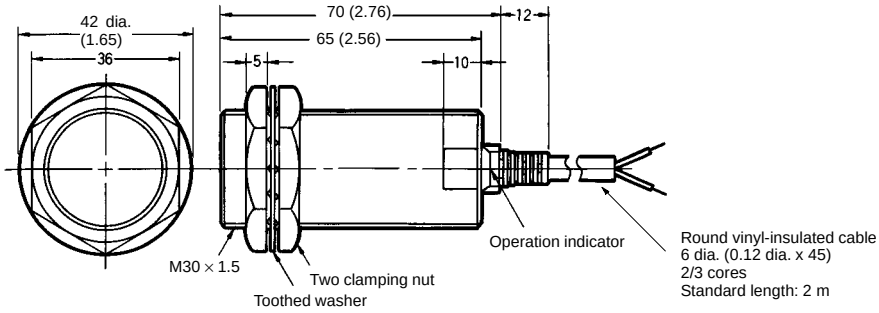
E2E2-X7D□
E2E2-X5□□



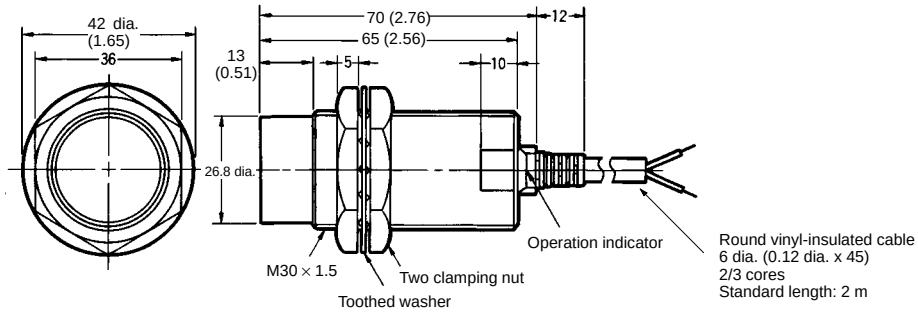
E2E2-X14MD□
E2E2-X10M□□



E2E2-X10D□□

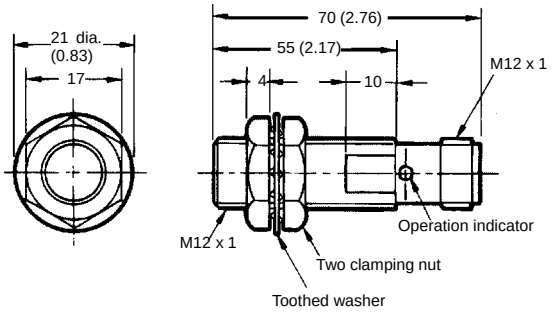


E2E2-X20MD□
E2E2-X18M□□

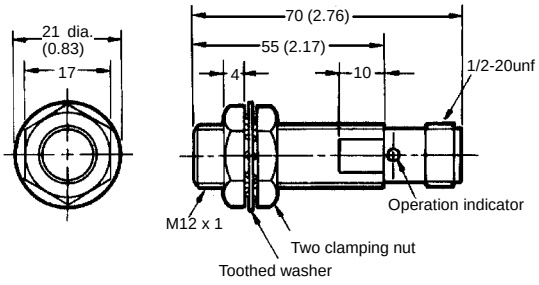


■ CONNECTOR MODELS (SHIELDED)

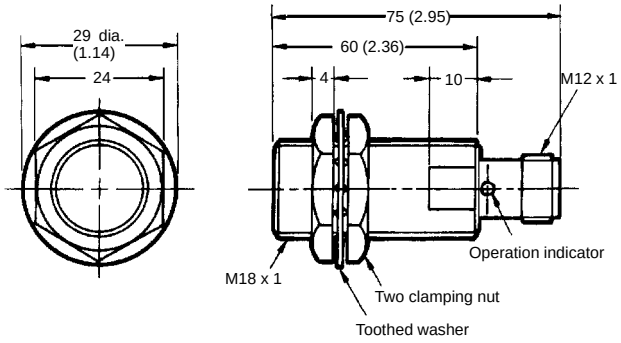
E2E2-X2C□-M1/B□-M1



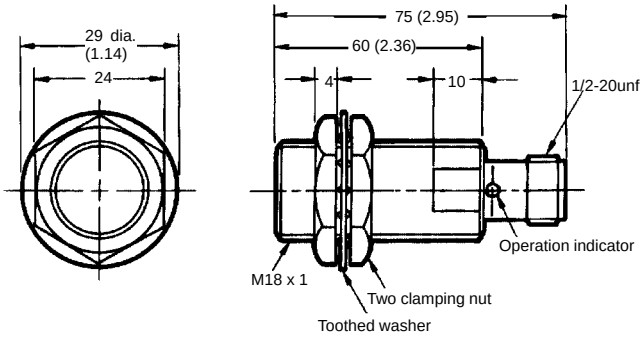
E2E2-X2Y□-M4



E2E2-X5C□-M1/B□-M1

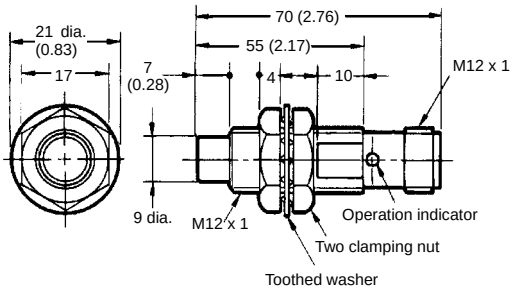


E2E2-X5Y□-M4

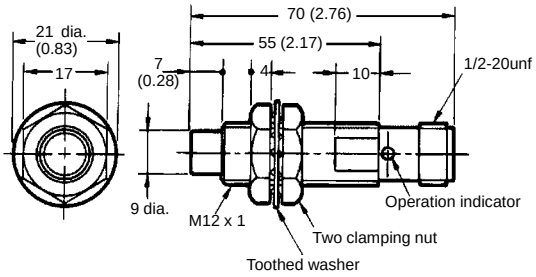


■ CONNECTOR MODELS (UNSHIELDED)

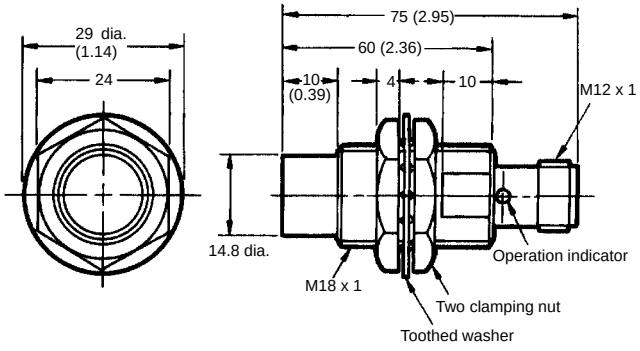
E2E2-X5MC□-M1/B□-M1



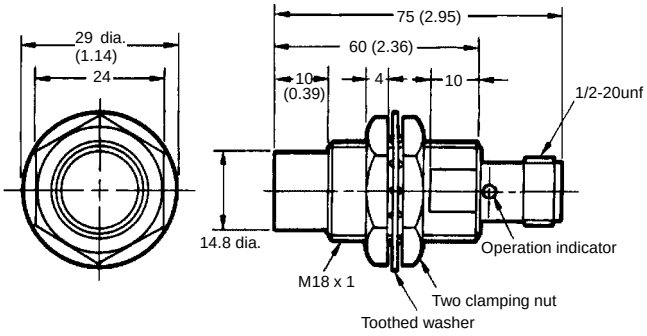
E2E2-X5MY□-M4



E2E2-X10MC□-M1/B□-M1

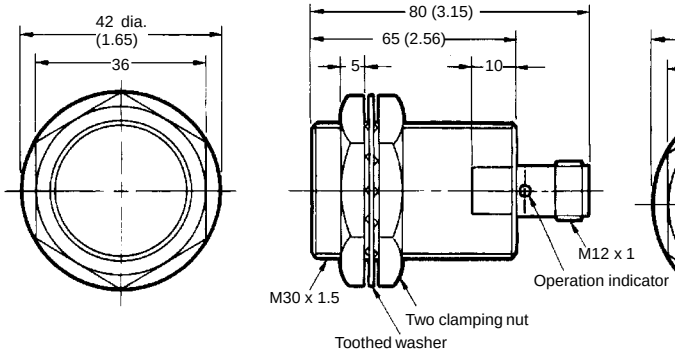


E2E2-X10MY□-M4

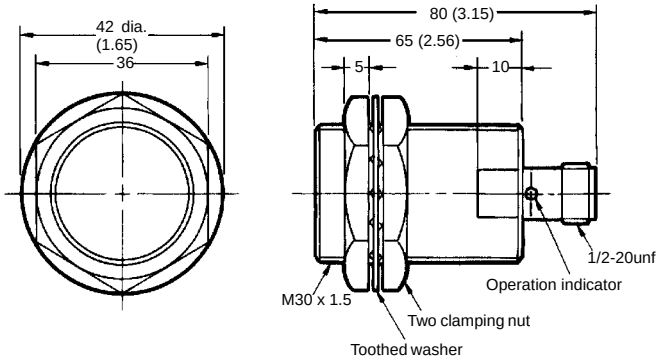


■ CONNECTOR MODELS (SHIELDED)

E2E2-X10C□-M1/B□-M1

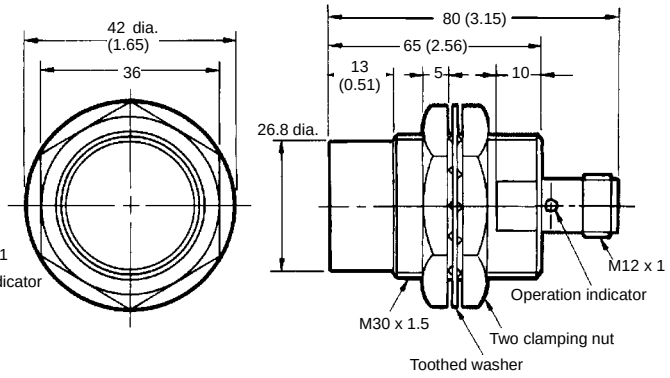


E2E2-X10Y□-M4

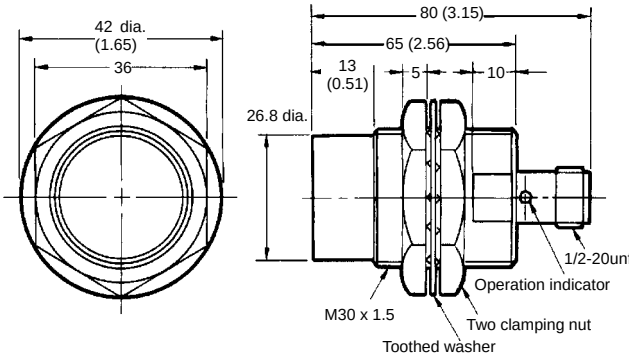


■ CONNECTOR MODELS (UNSHIELDED)

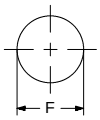
E2E2-X18MC□-M1/B□-M1



E2E2-X18MY□-M4



Mounting Holes



Dimensions	M12	M18	M30
F (mm)	12.5 dia.	18.5 dia.	30.5 dia.

Installation

■ CONNECTION

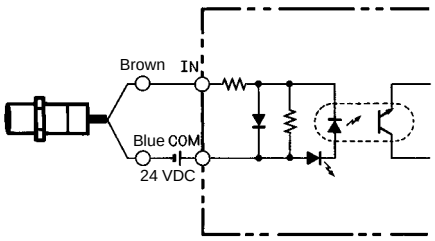
E2E2-X□D□
DC 2-wire Models

E2E2-X□Y□
AC 2-wire Models

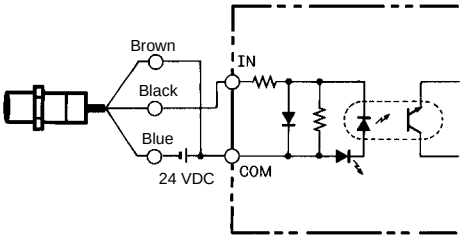
Note: The load can be connected as shown in the above diagrams.

Connected to PC

E2E2-X□D□
DC 2-wire Models

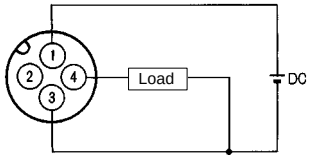
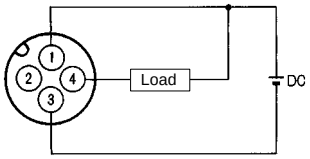
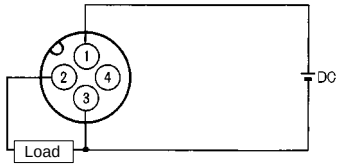
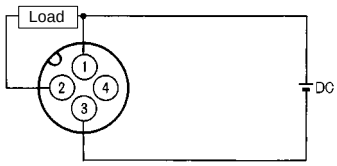


E2E2-X□C□
DC 3-wire Models

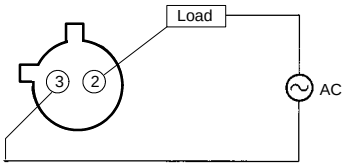


■ PIN ARRANGEMENT

E2E2-X□B□-M1 DC 3-wire Models

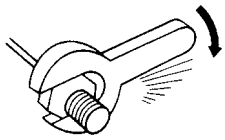
Output Configuration	Applicable Models	Pin Arrangement
NO	E2E2-X□B1-M1	 Note: Terminal 2 is not used.
	E2E2-X□C1-M1	 Note: Terminal 2 is not used.
NC	E2E2-X□B2-M1	 Note: Terminal 4 is not used.
	E2E2-X□C2-M1	 Note: Terminal 4 is not used.

E2E2-X□Y□-M4 AC 2-wire Model

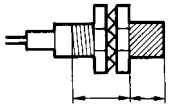
Applicable Models	Pin Arrangement
E2E2-X□Y□-M4	

■ MOUNTING

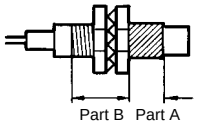
Do not tighten the nut with excessive force. A washer must be used with the nut.



Shielded Model



Unshielded Model

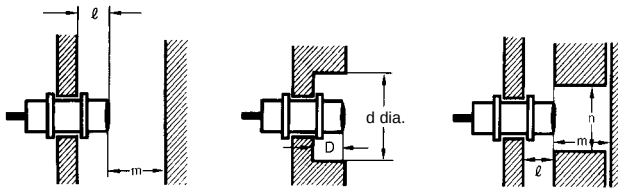


Note: The table below shows the tightening torques for part A and part B nuts. In the previous examples, the nut is on the sensor head side (part B) and hence the tightening torque for part B applies. If this nut is in part A, the tightening torque for part A applies instead.

Type	Torque
M12	30 N • m (310 kgf • cm)
M18	70 N • m (710 kgf • cm)
M30	180 N • m (1,800 kgf • cm)

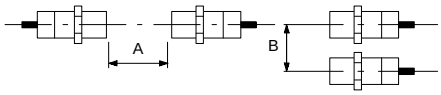
Effects of Surrounding Metal

When mounting the E2E2 within a metal panel, ensure that the clearances given in the table below are maintained. Failure to maintain these distances may cause deterioration in the performance of the sensor.



Type		Item	M12	M18	M30
E2E2-X□D□ DC 2-wire	Shielded	ℓ	0 mm	0 mm	0 mm
		d	12 mm	18 mm	30 mm
		D	0 mm	0 mm	0 mm
		m	8 mm	20 mm	40 mm
		n	18 mm	27 mm	45 mm
	Unshielded	ℓ	15 mm	22 mm	30 mm
		d	40 mm	70 mm	90 mm
		D	15 mm	22 mm	30 mm
		m	20 mm	40 mm	70 mm
		n	40 mm	70 mm	90 mm
E2E2-X□B□ E2E2-X□C□ DC 3-wire E2E2-X□Y□ AC 2-wire	Shielded	ℓ	0 mm	0 mm	0 mm
		d	12 mm	18 mm	30 mm
		D	0 mm	0 mm	0 mm
		m	8 mm	20 mm	40 mm
		n	18 mm	27 mm	45 mm
	Unshielded	ℓ	15 mm	22 mm	30 mm
		d	40 mm	55 mm	90 mm
		D	15 mm	22 mm	30 mm
		m	20 mm	40 mm	70 mm
		n	36 mm	54 mm	90 mm

■ MUTUAL INTERFERENCE



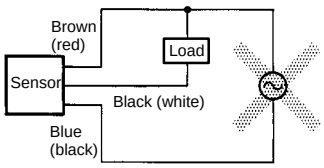
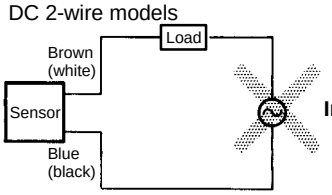
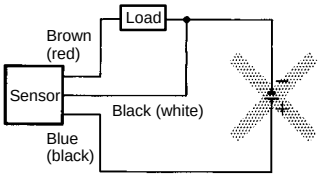
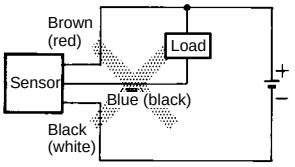
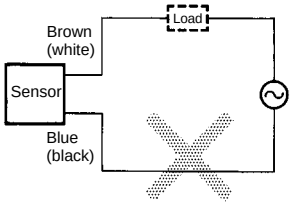
When installing two or more Sensors face to face or side by side, ensure that the minimum distances given in the following table are maintained.

Type		Item	M12	M18	M30
E2E2-X□D□ DC 2-wire	Shielded	A	30 (20) mm	50 (30) mm	100 (50) mm
		B	20 (12) mm	35 (18) mm	70 (35) mm
	Unshielded	A	120 (60) mm	200 (100) mm	300 (100) mm
		B	100 (50) mm	110 (60) mm	200 (100) mm
E2E2-X□B□ E2E2-X□C□ DC 3-wire E2E2-X□Y□ AC 2-wire	Shielded	A	30 mm	50 mm	100 mm
		B	20 mm	35 mm	70 mm
	Unshielded	A	120 mm	200 mm	300 mm
		B	100 mm	110 mm	200 mm

Note: The figures in parentheses refer to Sensors operating at different frequencies.

⚠ Caution

The colors in parentheses are previous wire colors.

Item	Examples
Power supply Do not impose an excessive voltage on the E2E, otherwise it may explode or burn. Do not impose 100 VAC on any E2E DC model, otherwise it may explode or burn.	DC 3-wire models  **Incorrect** DC 2-wire models  **Incorrect**
Wiring Be sure to wire the E2E and load correctly, otherwise it may explode or burn.	DC 3-wire models  **Incorrect**  **Incorrect**
Connection with no load Make sure to connect a proper load to the E2E in operation, otherwise it may explode or burn.	DC 2-wire models  **Incorrect**

Precautions

■ INSTALLATION

Power Reset Time

The Proximity Sensor is ready to operate within 100 ms after power is supplied. If power supplies are connected to the Proximity Sensor and load respectively, be sure to supply power to the Proximity Sensor before supplying power to the load.

Power OFF

The Proximity Sensor may output a pulse signal when it is turned off. Therefore, it is recommended to turn off the load before turning off the Proximity Sensor.

Power Supply Transformer

When using a DC power supply, make sure that the DC power supply has an insulated transformer. Do not use a DC power supply with an auto-transformer.

Sensing Object

Metal Coating:
The sensing distances of the Proximity Sensor vary with the metal coating on sensing objects.

■ WIRING

High-tension Lines:

Wiring through Metal Conduit

If there is a power or high-tension line near the cord of the Proximity Sensor, wire the cord through an independent metal conduit to prevent against Proximity Sensor damage or malfunctioning.

Cord Tractive Force

Do not pull cords with the tractive forces exceeding the following.

Diameter	Tractive force
4 mm dia. max.	30 N max.
4 mm dia. min.	50 N max.

■ MOUNTING

The Proximity Sensor must not be subjected to excessive shock with a hammer when it is installed, otherwise the Proximity Sensor may be damaged or lose its water-resistance.

■ ENVIRONMENT

Water Resistance

Do not use the Proximity Sensor underwater, outdoors, or in the rain.

Operating Environment

Be sure to use the Proximity Sensor within its operating ambient temperature range and do not use the Proximity Sensor outdoors so that its reliability and life expectancy can be maintained. Although the Proximity Sensor is water resistant, a cover to protect the Proximity Sensor from water or water soluble machining oil is recommended so that its reliability and life expectancy can be maintained. Do not use the Proximity Sensor in an environment with chemical gas (e.g., strong alkaline or acid gasses including nitric, chromic, and concentrated sulfuric acid gases).

■ CONNECTING LOAD TO AC OR DC 2-WIRE SENSOR

Refer to the following before using AC or DC 2-wire Proximity Sensors.

Surge Protection

Although the Proximity Sensor has a surge absorption circuit, if there is any machine that has a large surge current (e.g., a motor or welding machine) near the Proximity Sensor, connect a surge absorber to the machine.

Leakage Current

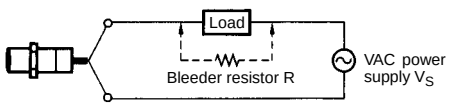
When the Proximity Sensor is OFF, the Proximity Sensor has leakage current. Refer to Leakage Current Characteristics. In this case, the load is imposed with a small voltage and the load may not be reset. Before using the Proximity Sensor, make sure that this voltage is less than the load reset voltage. The AC 2-wire Proximity Sensor cannot be connected to any card-lift-off relay (e.g., the G2A) because contact vibration of the relay will be caused by the leakage current and the life of the relay will be shortened.

Countermeasures Against Leakage Current

AC 2-wire Models

Connect a bleeder resistor as the bypass for the leakage current so that the current flowing into the load will be less than the load reset current.

As shown in the following diagram, connect the bleeder resistor so that the current flowing into the Proximity Sensor will be 10 mA minimum and the residual voltage imposed on the load will be less than the load reset voltage.



Refer to the following to calculate the bleeder resistance and the allowable power of the bleeder resistor.

$R \leqq V_S/(10 - I)$ (kΩ)

$P > V_S^2/R$ (mW)

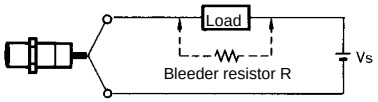
P: The allowable power of the bleeder resistor. (The actual power capacity of the bleeder resistor must be at least a few times as large as the allowable power of the bleeder resistor.)

I: Load current (mA)

The following resistors are recommended.
100 VAC (supply voltage): A resistor with a resistance of 10 kΩ maximum and an allowable power of 3 W minimum
200 VAC (supply voltage): A resistor with a resistance of 20 kΩ maximum and an allowable power of 10 W minimum
If these resistors generate excessive heat, use a resistor with a resistance of 10 kΩ maximum and an allowable power of 5 W minimum at 100 VAC and a resistor with a resistance of 20 kΩ maximum and an allowable power of 10 W minimum at 200 VAC instead.

DC 2-wire Models

Connect a bleeder resistor as the bypass for the leakage current so that the current flowing into the load will be less than the load reset current.



DC 2–wire Models, continued

Refer to the following to calculate the bleeder resistance and the allowable power of the bleeder resistor.

$R \leqq V_S/(i_R - i_{OFF})$ (kΩ)

$P > V_S^2/R$ (mW)

P: The allowable power of the bleeder resistor. (The actual power capacity of the bleeder resistor must be at least a few times as large as the allowable power of the bleeder resistor.)

i_R: Leakage current of Sensors (mA)

i_{OFF}: Release current of load (mA)

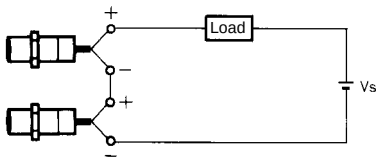
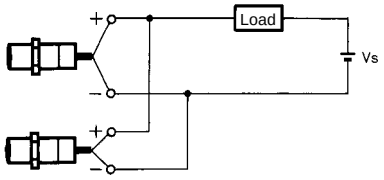
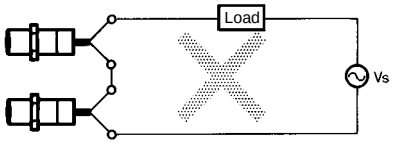
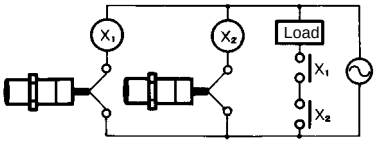
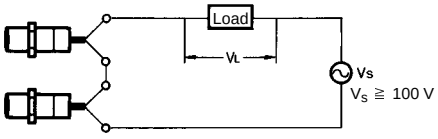
The following resistors are recommended.
12 VDC (supply voltage): A resistor with a resistance of 15 kΩ maximum and an allowable power of 450 mW minimum
24 VDC (supply voltage): A resistor with a resistance of 30 kΩ maximum and an allowable power of 0.1 W minimum

Inrush Current

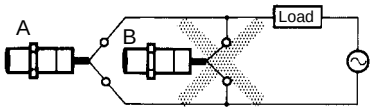
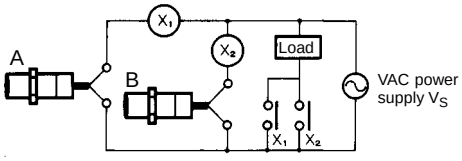
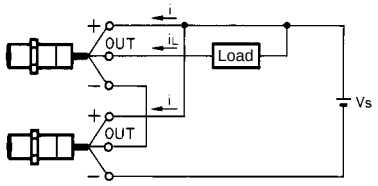
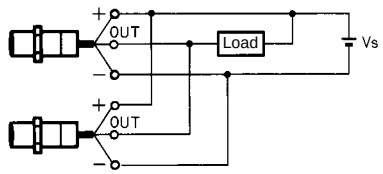
A load that has a large inrush current (e.g., a lamp or motor) will damage the Proximity Sensor, in which case connect the load to the Proximity Sensor through a relay.

■ PRECAUTIONS FOR AC OR DC 2-WIRE PROXIMITY SENSORS IN OPERATION

Connection

Model	Connection Type	Method	Description
DC 2-wire	AND (serial connection)	**Correct** 	The Sensors connected together must satisfy the following conditions. $V_S - N \times V_R \geqq$ Load operating voltage N: No. of Sensors V_R: Residual voltage of each Sensor V_S: Supply voltage If each Proximity Sensor is not supplied with the rated voltage and current, the indicator will not be lit properly or unnecessary pulses may be output for approximately 1 ms.
	OR (parallel connection)	**Correct** 	The Sensors connected together must satisfy the following conditions. N x i ≦ Load operating voltage N: No. of Sensors i: Leakage current of each Sensor If the MY Relay, which operates at 24 VDC, is used as a load for example, a maximum of four Proximity Sensors can be connected to the load.
AC 2-wire	AND (serial connection)	**Incorrect**  **Correct**  	If 100 or 200 VAC is imposed on the Proximity Sensors, V_L (i.e., the voltage imposed on the load) will be obtained from the following. $V_L = V_S$ – (residual voltage x no. of Proximity Sensors) (V) Therefore, if V_L is lower than the load operating voltage, the load will not operate. A maximum of three Proximity Sensors can be connected in series provided that the supply voltage is 100 V minimum.

■ PRECAUTIONS FOR AC OR DC 2-WIRE PROXIMITY SENSORS IN OPERATION, CONTINUED

Model	Connection Type	Method	Description
AC 2-wire	OR (parallel connection)	**Incorrect**  **Correct** 	In principle, more than two Proximity Sensors cannot be connected in parallel. Provided that Proximity Sensor A does not operate with Proximity Sensor B simultaneously and there is no need to keep the load operating continuously, the Proximity Sensors can be connected in parallel. In this case, however, due to the total leakage current of the Proximity Sensors, the load may not reset properly. It is not possible to keep the load operating continuously with Proximity Sensors A and B in simultaneous operation to sense sensing objects due to the following reason. When Proximity Sensor A is ON, the voltage imposed on Proximity Sensor A will drop to approximately 10 V and the load current flows into Proximity Sensor A, and when one of the sensing objects is close to Proximity Sensor B, Proximity Sensor B will not operate because the voltage imposed on Proximity Sensor B is 10 V, which is too low. When Proximity Sensor A is OFF, the voltage imposed on Proximity Sensor B will reach the supply voltage and Proximity Sensor B will be ON. Then, Proximity Sensor A as well as Proximity Sensor B will be OFF for approximately 10 ms, which resets the load for an instant. To prevent the instantaneous resetting of the load, use a relay as shown on the left.
DC 3-wire	AND (serial connection)	**Correct** 	The Sensors connected together must satisfy the following conditions. i_L + (N −1) x i ≦ Upper-limit of control output of each Sensor V_S − N x V_R ≧ Load operating voltage N: No. of Sensors V_R: Residual voltage of each Sensor V_S: Supply voltage i: Current consumption of the Sensor i_L: Load current If the MY Relay, which operates at 24 VDC, is used as a load for example, a maximum of two Proximity Sensors can be connected to the load.
	OR (parallel connection)	**Correct** 	A minimum of three Sensors with current outputs can be connected in parallel. The number of Sensors connected in parallel varies with the Proximity Sensor model.

NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.

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