OMRON ELECTRONICS

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OMRON

Cylindrical Inductive Proximity Sensor

E2E

Short 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

WHEN ORDERING, PLEASE NOTE: Omron has added the suffix "-N" to E2E part numbers, for ordering purposes only; the suffix "-N" will not appear on the product.

DC 2-wire/Pre-wired Models

Self-diagnostic Output Function	Type	Size	Sensing Distance	Part Number	
				NO	**NC**
Yes	Shielded	M12	3 mm	**E2E-X3D1S-N (see note 1)**	**---**
		M18	7 mm	**E2E-X7D1S-N (see note 1)**	**---**
		M30	10 mm	**E2E-X10D1S-N (see note 1)**	**---**
	Unshielded	M12	8 mm	**E2E-X8MD1S-N (see note 1)**	**---**
		M18	14 mm	**E2E-X14MD1S-N (see note 1)**	**---**
		M30	20 mm	**E2E-X20MD1S-N (see note 1)**	**---**
No	Shielded	M8	2 mm	**E2E-X2D1-N-N (see notes 1 and 2)**	**E2E-X2D2-N-N**
		M12	3 mm	**E2E-X3D1-N-N (see notes 1 and 2)**	**E2E-X3D2-N-N**
		M18	7 mm	**E2E-X7D1-N-N (see notes 1 and 2)**	**E2E-X7D2-N-N**
		M30	10 mm	**E2E-X10D1-N-N (see notes 1 and 2)**	**E2E-X10D2-N-N**
	Unshielded	M8	4 mm	**E2E-X4MD1-N (see notes 1 and 2)**	**E2E-X4MD2-N**
		M12	8 mm	**E2E-X8MD1-N (see notes 1 and 2)**	**E2E-X8MD2-N**
		M18	14 mm	**E2E-X14MD1-N (see notes 1 and 2)**	**E2E-X14MD2-N**
		M30	20 mm	**E2E-X20MD1-N (see notes 1 and 2)**	**E2E-X20MD2-N**

Note: 1. A different oscillating frequency is available to reduce mutual interference and allow closer mounting. Add a "5" to the part number (e.g. E2E-X3D15-N-N). Consult OMRON for availability.

2. E2E models with a robotics cable are available as well. The model number of a model with a robotics cable has the suffix "-R" (e.g. E2E-X3D1-R-N).

DC 2-wire/Plug-in Models

Connector Size	Self-diagnostic Output Function	Type	Size	Sensing Distance	**Part Number**	
					NO	**NC**
M12/Micro Change®	Yes	Shielded	M12	3 mm	**E2E-X3D1S-M1-N**	**---**
			M18	7 mm	**E2E-X7D1S-M1-N**	**---**
			M30	10 mm	**E2E-X10D1S-M1-N**	**---**
		Unshielded	M12	8 mm	**E2E-X8MD1S-M1-N**	**---**
			M18	14 mm	**E2E-X14MD1S-M1-N**	**---**
			M30	20 mm	**E2E-X20MD1S-M1-N**	**---**
	No	Shielded	M8	2 mm	**E2E-X2D1-M1G-N**	**E2E-X2D2-M1G-N**
			M12	3 mm	**E2E-X3D1-M1G-N (see note 1)**	**E2E-X3D2-M1G-N**
			M18	7 mm	**E2E-X7D1-M1G-N (see note 1)**	**E2E-X7D2-M1G-N**
			M30	10 mm	**E2E-X10D1-M1G-N (see note 1)**	**E2E-X10D2-M1G-N**
		Unshielded	M8	4 mm	**E2E-X4MD1-M1G-N**	**E2E-X4MD2-M1G-N**
			M12	8 mm	**E2E-X8MD1-M1G-N (see note 1)**	**E2E-X8MD2-M1G-N**
			M18	14 mm	**E2E-X14MD1-M1G-N (see note 1)**	**E2E-X14MD2-M1G-N**
			M30	20 mm	**E2E-X20MD1-M1G-N (see note 1)**	**E2E-X20MD2-M1G-N**
M8/Nano Change®		Shielded	M8	2 mm	**E2E-X2D1-M3G**	**E2E-X2D2-M3G**
		Unshielded		4 mm	**E2E-X4MD1-M3G**	**E2E-X4MD2-M3G**

Note: 1. A different oscillating frequency is available to reduce mutual interference and allow closer mounting. Add a "5" to the part number (e.g., E2E-X3D15-M1G-N). Consult OMRON for availability.

2. Connector cordsets: For Micro Change® use OMRON Y96E-44□D□ or equivalent.
For Nano Change®, use OMRON XS3F-M42□-40□-R Brad Harrison 45410-001 or equivalent.

DC 2-wire/Connector Extension Models

Type	Size	Sensing Distance	Output Configuration	Polarity	**Part Number**
Shielded	M12	3 mm	NO	Yes	**E2E-X3D1-M1GJ-N**
				No	**E2E-X3D1-M1J-T-N**
	M18	7 mm		Yes	**E2E-X7D1-M1GJ-N**
				No	**E2E-X7D1-M1J-T-N**
	M30	10 mm		Yes	**E2E-X10D1-M1GJ-N**
				No	**E2E-X10D1-M1J-T-N**
Unshielded	M12	8 mm		Yes	**E2E-X8MD1-M1GJ-N**
	M18	14 mm			**E2E-X14MD1-M1GJ-N**
	M30	20 mm			**E2E-X20MD1-M1GJ-N**

Note: 1. A model with no polarity has a residual voltage of 5 V, which must be taken into consideration together with the interface condition (the PLC's ON voltage, for example) when connecting the Proximity Sensor to a load.

2. The standard cord length is 30 cm. 50-cm and 1-m models are also available.

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

DC 2-wire Model/Connector Pin Assignments

The connector pin assignments of each new E2E DC 2-wire conforms to IEC947-5-2 Table III.

Type	Size	Output Configuration	**Part Number**	Sensing Head		Output Configuration	**Part Number**
Shielded	M8	NO	**E2E-X2D1-M1-N**	Unshielded	M8	NO	**E2E-X4MD1-M1-N**
		NC	**E2E-X2D2-M1-N**			NC	**E2E-X4MD2-M1-N**
	M12	NO	**E2E-X3D1-M1-N**		M12	NO	**E2E-X8MD1-M1-N**
		NC	**E2E-X3D2-M1-N**			NC	**E2E-X8MD2-M1-N**
	M18	NO	**E2E-X7D1-M1-N**		M18	NO	**E2E-X14MD1-M1-N**
		NC	**E2E-X7D2-M1-N**			NC	**E2E-X14MD2-M1-N**
	M30	NO	**E2E-X10D1-M1-N**		M30	NO	**E2E-X20MD1-M1-N**
		NC	**E2E-X10D2-M1-N**			NC	**E2E-X20MD2-M1-N**

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

DC 3-wire/Pre-wired Models

Type	Size	Sensing Distance	Output Configuration	**Part Number**
Shielded	M8	1.5 mm	NPN NO	**E2E-X1R5E1-N**
			NPN NC	**E2E-X1R5E2-N**
			PNP NO	**E2E-X1R5F1-N**
			PNP NC	**E2E-X1R5F2-N**
	M12	2 mm	NPN NO	**E2E-X2E1-N**
			NPN NC	**E2E-X2E2-N**
			PNP NO	**E2E-X2F1-N**
			PNP NC	**E2E-X2F2-N**
	M18	5 mm	NPN NO	**E2E-X5E1-N**
			NPN NC	**E2E-X5E2-N**
			PNP NO	**E2E-X5F1-N**
			PNP NC	**E2E-X5F2-N**
	M30	10 mm	NPN NO	**E2E-X10E1-N**
			NPN NC	**E2E-X10E2-N**
			PNP NO	**E2E-X10F1-N**
			PNP NC	**E2E-X10F2-N**
Unshielded	M8	2 mm	NPN NO	**E2E-X2ME1-N**
			NPN NC	**E2E-X2ME2-N**
			PNP NO	**E2E-X2MF1-N**
			PNP NC	**E2E-X2MF2-N**
	M12	5 mm	NPN NO	**E2E-X5ME1-N**
			NPN NC	**E2E-X5ME2-N**
			PNP NO	**E2E-X5MF1-N**
			PNP NC	**E2E-X5MF2-N**
	M18	10 mm	NPN NO	**E2E-X10ME1-N**
			NPN NC	**E2E-X10ME2-N**
			PNP NO	**E2E-X10MF1-N**
			PNP NC	**E2E-X10MF2-N**
	M30	18 mm	NPN NO	**E2E-X18ME1-N**
			NPN NC	**E2E-X18ME2-N**
			PNP NO	**E2E-X18MF1-N**
			PNP NC	**E2E-X18MF2-N**

Note: A different oscillating frequency is available to reduce mutual interference and allow closer mounting. Add a “5” to the part number (e.g., E2E-X5E15-N) Consult OMRON for availability.
E2E DC 3-wire with a robotics cable are available as well. The model number of a model with a robotics cable has the suffix “-R” (e.g, E2E-X5E1-R-N).

DC 3-wire/Plug-in Models

Connector Size	Type	Size	Sensing Distance	Output Configuration	**Part Number**
M12/Micro Change®	Shielded	M8	1.5 mm	NPN NO	**E2E-X1R5E1-M1-N**
				NPN NC	**E2E-X1R5E2-M1-N**
				PNP NO	**E2E-X1R5F1-M1-N**
				PNP NC	**E2E-X1R5F2-M1-N**
		M12	2 mm	NPN NO	**E2E-X2E1-M1-N**
				NPN NC	**E2E-X2E2-M1-N**
				PNP NO	**E2E-X2F1-M1-N**
				PNP NC	**E2E-X2F2-M1-N**
		M18	5 mm	NPN NO	**E2E-X5E1-M1-N**
				NPN NC	**E2E-X5E2-M1-N**
				PNP NO	**E2E-X5F1-M1-N**
				PNP NC	**E2E-X5F2-M1-N**
		M30	10 mm	NPN NO	**E2E-X10E1-M1-N**
				NPN NC	**E2E-X10E2-M1-N**
				PNP NO	**E2E-X10F1-M1-N**
				PNP NC	**E2E-X10F2-M1-N**
	Unshielded	M8	2 mm	NPN NO	**E2E-X2ME1-M1-N**
				NPN NC	**E2E-X2ME2-M1-N**
				PNP NO	**E2E-X2MF1-M1-N**
				PNP NC	**E2E-X2MF2-M1-N**
		M12	5 mm	NPN NO	**E2E-X5ME1-M1-N**
				NPN NC	**E2E-X5ME2-M1-N**
				PNP NO	**E2E-X5MF1-M1-N**
				PNP NC	**E2E-X5MF2-M1-N**
		M18	10 mm	NPN NO	**E2E-X10ME1-M1-N**
				NPN NC	**E2E-X10ME2-M1-N**
				PNP NO	**E2E-X10MF1-M1-N**
				PNP NC	**E2E-X10MF2-M1-N**
		M30	18 mm	NPN NO	**E2E-X18ME1-M1-N**
				NPN NC	**E2E-X18ME2-M1-N**
				PNP NO	**E2E-X18MF1-M1-N**
				PNP NC	**E2E-X18MF2-M1-N**
M8/Nano Change®	Shielded	M8	1.5 mm	NPN NO	**E2E-X1R5E1-M3**
				NPN NC	**E2E-X1R5E2-M3**
				PNP NO	**E2E-X1R5F1-M3**
				PNP NC	**E2E-X1R5F2-M3**
	Unshielded	M8	2 mm	NPN NO	**E2E-X2ME1-M3**
				NPN NC	**E2E-X2ME2-M3**
				PNP NO	**E2E-X2MF1-M3**
				PNP NC	**E2E-X2MF2-M3**

Note: Connector cordsets: For Micro Change® use OMRON Y96E-44□D□ or equivalent.
For Nano Change®, use OMRON XS3F-M42□-40□-R, Brad Harrison 45410-001 or equivalent.

AC 2-wire/Pre-wired Models

Type	Size	Sensing Distance	Output Configuration	Part Number
Shielded	M8	1.5 mm	NO	**E2E-X1R5Y1-N**
			NC	**E2E-X1R5Y2-N**
	M12	2 mm	NO	**E2E-X2Y1-US-N**
			NC	**E2E-X2Y2-US-N**
	M18	5 mm	NO	**E2E-X5Y1-US-N (see note)**
			NC	**E2E-X5Y2-US-N**
	M30	10 mm	NO	**E2E-X10Y1-US-N (see note)**
			NC	**E2E-X10Y2-US-N**
Unshielded	M8	2 mm	NO	**E2E-X2MY1-N (see note)**
			NC	**E2E-X2MY2-N**
	M12	5 mm	NO	**E2E-X5MY1-US-N (see note)**
			NC	**E2E-X5MY2-US-N**
	M18	10 mm	NO	**E2E-X10MY1-US-N (see note)**
			NC	**E2E-X10MY2-US-N**
	M30	18 mm	NO	**E2E-X18MY1-US-N (see note)**
			NC	**E2E-X18MY2-US-N**

Note: A different oscillating frequency is available to reduce mutual interference and allow closer mounting. Add a “5” to the part number (e.g., E2E-X5Y15-US-N). Consult OMRON for availability.

Sensors with Short-Circuit Protection

Type	Size	Sensing Distance	Output Configuration	Part Number
Shielded	M18	5 mm	NO	**E2E-X5Y1-53-US**
			NC	**E2E-X5Y2-53-US**
	M30	10 mm	NO	**E2E-X10Y1–53–US**
			NC	**E2E-X10Y2–53–US**
Unshielded	M18	10 mm	NO	**E2E-X10MY1-53-US**
			NC	**E2E-X10MY2-53-US**
	M30	18 mm	NO	**E2E-X18MY1-53-US**
			NC	**E2E-X18MY2-53-US**

AC 2-wire/Plug-in Models

Type	Size	Sensing Distance	Output Configuration	Part Number
Shielded	M12	2 mm	NO	**E2E-X2Y1-M1-N**
			NC	**E2E-X2Y2-M1-N**
	M18	5 mm	NO	**E2E-X5Y1-M1-N**
			NC	**E2E-X5Y2-M1-N**
	M30	10 mm	NO	**E2E-X10Y1-M1-N**
			NC	**E2E-X10Y2-M1-N**
Unshielded	M12	5 mm	NO	**E2E-X5MY1-M1-N**
			NC	**E2E-X5MY2-M1-N**
	M18	10 mm	NO	**E2E-X10MY1-M1-N**
			NC	**E2E-X10MY2-M1-N**
	M30	18 mm	NO	**E2E-X18MY1-M1-N**
			NC	**E2E-X18MY2-M1-N**

Note: Connector cordsets: Use OMRON Y96E-44□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

■ RATINGS/CHARACTERISTICS

E2E-X□D□ DC 2-wire Models

Part number	E2E-X2D□-N	E2E-X4MD□-N	E2E-X3D□-N	E2E-X8MD□-N	E2E-X7D□-N	E2E-X14MD□-N	E2E-X10D□-N	E2E-X20MD□-N
Size	M8		M12		M18		M30	
Type	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Sensing distance	2 mm (0.08 in) ±10%	4 mm (0.16 in) ±10%	3 mm (0.12 in) ±10%	8 mm (0.31 in) ±10%	7 mm (0.28 in) ±10%	14 mm (0.55 in) ±10%	10 mm (0.39 in) ±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 1.6 mm (0 to 0.06 in)	0 to 3.2 mm (0 to 0.13 in)	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)	8 x 8 x 1 mm (0.31 x 0.31 x 0.04 in)	20 x 20 x 1 mm (0.79 x 0.79 x 0.04 in)	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	15% max. of sensing distance		10% max. of sensing distance					
Response frequency	1.5 kHz	1.0 kHz	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 (5 to 100 mA for -M1J-T models) Diagnostic output: 50 mA for -D1S models							
Diagnostic output delay	0.3 to 1 s							
Circuit protection	Surge absorber, load short-circuit protection (for control and diagnostic output)							
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	±15% max. of sensing distance at 23°C in temperature range of −25°C to 70°C (−13°F to 158°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 (see note)	3.0 V max. (under load current of 100 mA with cable length of 2 m) 5.0 V min. for -M1J-T models							
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							

Part number		E2E-X2D□ -N	E2E-X4MD □-N	E2E-X3D□ -N	E2E-X8MD □-N	E2E-X7D□ -N	E2E-X14M D□-N	E2E-X10D □-N	E2E-X20M D□-N
Shock resistance		Destruction: 500 m/s^2 (approx. 50G) for 10 times each in X, Y, and Z directions		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		Approx. 45 g		Approx. 120 g		Approx. 160 g		Approx. 220 g	
Material	Body	Stainless steel		Brass					
	Sensing face	PBT							

Note: The residual voltage of each E2E model with the model number suffix “-M1J-T” is 5 V. When connecting an E2E model with the suffix “-M1J-T” to a device, make sure that the device can withstand the residual voltage.

E2E-X□E□/F□ DC 3-wire Models

Part number	E2E-X1R5 E□/F□-N	E2E-X2ME □/ F□-N	E2E-X2E□ / F□-N	E2E-X5ME □/F□-N	E2E-X5E□ / F□-N	E2E-X10M E□/F□-N	E2E-X10E □/ F□-N	E2E-X18M E□/ F□-N
Size	M8		M12		M18		M30	
Type	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Sensing distance	1.5 mm (0.06 in) ±10%	2 mm (0.08 in) ±10%	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)	12 to 24 VDC, ripple (p-p): 10% max., (10 to 40 VDC)							
Current consumption	13 mA max.							
Sensing object	Magnetic metals (refer to *Engineering Data* for non-magnetic metals)							
Setting distance	0 to 1.2 mm (0 to 0.05 in)	0 to 1.6 mm (0 to 0.06 in)	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)	8 x 8 x 1 mm (0.31 x 0.31 x 0.04 in)	12 x 12 x 1 mm (0.47 x 0.47 x 0.04 in)	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	2.0 kHz	0.8 kHz	1.5 kHz	0.4 kHz	0.6 kHz	0.2 kHz	0.4 kHz	0.1 kHz
Operation (with sensing object approaching)	E1 models: Load ON E2 models: Load OFF							
Control output (switching capacity)	200 mA max.							
Circuit protection	Reverse connection protection, surge absorber, load short-circuit protection							
Indicator	Operation indicator (red LED)							
Ambient temperature (see note 2)	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 2 hrs each in X, Y, and Z directions							
Shock resistance	Destruction: 500 m/s^2 (approx. 50G) for 10 times each in X, Y, and Z directions		Destruction: 1,000 m/s^2 (approx. 50G) for 10 times each in X, Y, and Z directions 500 m/s^2 (approx. 50G) for E2E-X5M					

E2E-X□E□/F□ DC 3-wire Models, Continued

Part number		E2E-X1R5 E□/F□-N	E2E-X2ME □/ F□-N	E2E-X2E□ / F□-N	E2E-X5ME □/F□-N	E2E-X5E□ / F□-N	E2E-X10M E□/F□-N	E2E-X10E □/ F□-N	E2E-X18M E□/ F□-N
Enclosure rating	IEC	IP67							
	NEMA	1, 4, 6, 12, 13							
Weight	Pre-wired	Approx. 45 g		Approx. 120 g		Approx. 160 g		Approx. 270 g	
	Connector	---	Approx. 25 g			Approx. 45 g		Approx. 125 g	Approx. 124 g
Material	Body	Stainless steel		Brass					
	Sensing face	PBT							

Note: 1. E2E models with an M18 or M30 connector operate at a non-smoothed, all-wave rectified, mean voltage range of 24 VDC ±20%.

2. When using an E2E with an M8 connector at an ambient temperature range between 70°C and 85°C (158°F and 185°F), supply 10 to 30 VDC to the E2E and make sure that the E2E has a control output of 100 mA maximum.

E2E-X□Y□ AC 2-wire Models

Part number	E2E-X1R5 Y□-N	E2E-X2MY □-N	E2E-X2Y□ -US-N	E2E-X5MY □-US-N	E2E-X5Y□ -US-N	E2E-X10M Y□-US-N	E2E-X10Y □-US-N	E2E-X18 MY□-US -N
Size	M8		M12		M18		M30	
Type	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Sensing distance	1.5 mm (0.06 in) ±10%	2 mm (0.08 in) ±10%	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)							
Current consumption	1.7 mA max.							
Sensing object	Magnetic metals (refer to *Engineering Data* for non-magnetic metals)							
Setting distance	0 to 1.2 mm (0 to 0.05 in)	0 to 1.6 mm (0 to 0.06 in)	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)	8 x 8 x 1 mm (0.31 x 0.31 x 0.04 in)	12 x 12 x 1 mm (0.47 x 0.47 x 0.04 in)	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 100 mA max.		5 to 200 mA max.		5 to 300 mA max.			
Indicator	Operation indicator (red LED)							
Ambient temperature (see note 2)	Operating: −25°C to 70°C with no icing (−13°F to 158°F)		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 (2,000 VAC for M8 types)							

Note: 1. When using an M18 or M30 size E2E at an ambient temperature between 70°C and 85°C (158°F and 185°F), make sure that the E2E 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).

Part number		E2E-X1R5 Y□-N	E2E-X2MY □-N	E2E-X2Y□ -US-N	E2E-X5MY □-US-N	E2E-X5Y□ -US-N	E2E-X10M Y□-US-N	E2E-X10Y □-US-N	E2E-X18 MY□-US -N
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hrs each in X, Y, and Z directions							
Shock resistance		Destruction: 500 m/s^2 (approx. 50G) for 10 times each in X, Y, and Z directions		Destruction: 1,000 m/s^2 (approx. 50G) for 10 times each in X, Y, and Z directions 500 m/s^2 (approx. 50G) for E2E-X5M					
Enclosure rating	IEC	IP67							
	NEMA	1, 4, 6, 12, 13							
Approvals	UL	–		Recognized, File Number E76675					
	CSA	–		Certified, File Number LR45951					
Weight	Pre-wired	Approx. 45 g		Approx. 120 g		Approx. 160 g		Approx. 270 g	
	Connector	---	Approx. 25 g			Approx. 45 g		Approx. 125 g	Approx. 124 g
Material	Body	Stainless steel		Brass					
	Sensing face	PBT							

Note: 1. When using an M18 or M30 size E2E at an ambient temperature between 70°C and 85°C (158°F and 185°F), make sure that the E2E 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).

E2E-X□Y□ AC 2-wire Models with Short Circuit Protection

Part number			E2E-X5Y□-53-US	E2E-X10MY□-53-US	E2E-X10Y□-53-US	E2E-X18MY□-53-US
Body		Size	M18		M30	
		Type	Shielded	Unshielded	Shielded	Unshielded
Supply voltage			90 to 140 VAC, 50/60 Hz			
Effective maximum detecting distance (with standard target)			5 mm (0.20 in) ±10%	10 mm (0.40 in) ±10%		18 mm (0.71 in) ±10%
Usable detecting range (with standard target)			0 to 4 mm (0 to 0.16 in)	0 to 8 mm (0 to 0.31 in)		0 to 14 mm (0 to 0.55 in)
Standard target size (mild steel, L x W x H)			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)		54 x 54 x 1 mm (2.13 x 2.13 x 0.04 in)
Differential travel			10% max. of effective detecting distance			
Control output	AC solid state	Type	SCR-NO (E2E-X□□□Y1-□□-□□) SCR-NC (E2E-X□□□Y2-□□-□□)			
		Max. load	300 mA			
		Min. load	5 mA			
		Max. offstate leakage current	1.5 mA (See “Leakage Current Characteristics” graph in *Engineering Data*.)			
		Max. on-state voltage drop	(See “Leakage Current Characteristics” graph in *Engineering Data*.)			
Response frequency			25 Hz			
Circuit protection		Output short-circuit	Provided			
		Weld field immunity	Not provided			
		RFI immunity	Not provided			
Indicators			Target present (red LED)			
Materials		Housing	Nickel-plated brass			
		Sensing face	Plastic			
		Cable sheath	Plastic			
Mounting			Two lock washers and M18 nuts included. Bracket Y92E-B18 optional.		Two lock washers and M30 nuts included. Bracket Y92E-B30 optional.	
Connections		Prewired	2-conductor cable, 2 m (6.56 ft) length			
Weight with cable			Approx. 160 g (5.6 oz.)		Approx. 270 g (9.5 oz.)	

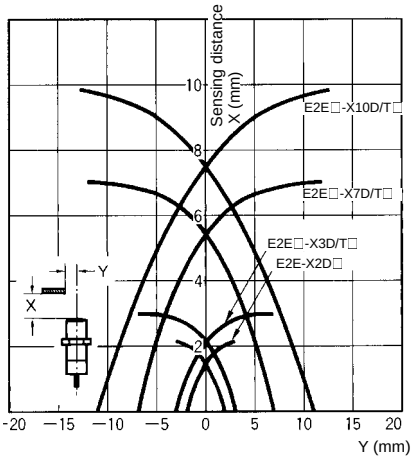
Part number		E2E-X5Y□-53-US	E2E-X10MY□-53-US	E2E-X10Y□-53-US	E2E-X18MY□-53-US
Enclosure ratings	UL	1			
	NEMA	1, 4, 6, 12, 13			
	IEC 144	IP67			
Approvals	UL	Recognized, File Number E76675			
	CSA	Certified, File Number LR45951			
Ambient operating temperature		-25° to 70°C (-13° to 158°F)			
Vibration		10 to 55 Hz, 1.5 mm (0.06 in) double amplitude			
Shock		Approx. 100 G's			

Engineering Data

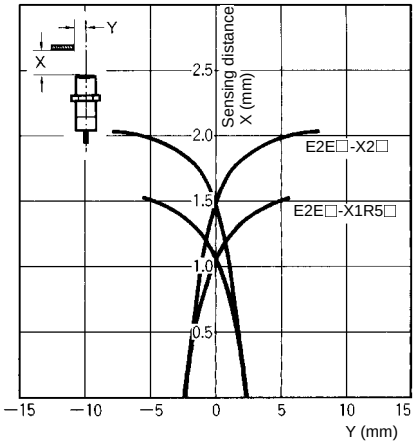
■ OPERATING RANGE (TYPICAL)

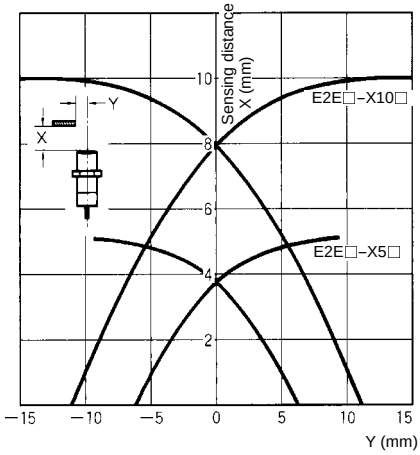
Shielded Models

E2E-X□D□-N



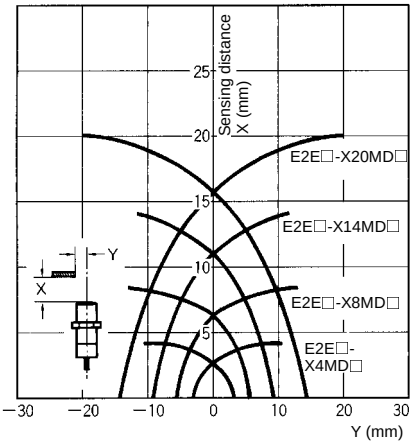
E2E-X□E□/F□-N
E2E-X□Y□-N



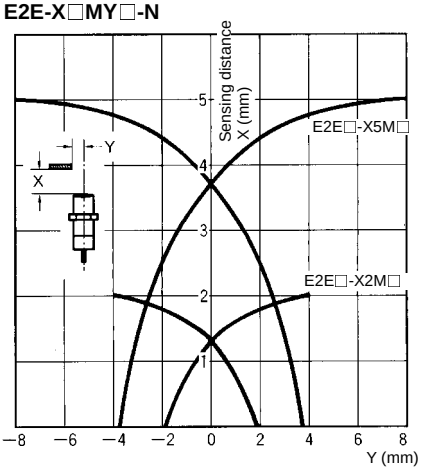


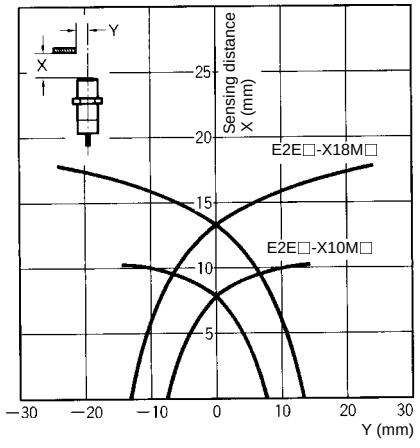
Unshielded Models

E2E-X□MD□-N



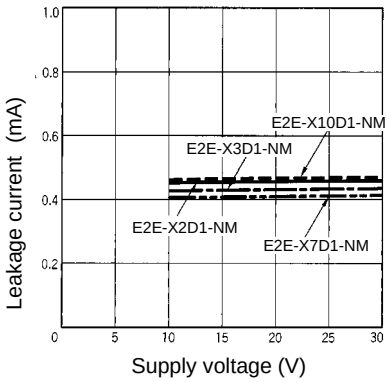
E2E-X□ME□/F□-N
E2E-X□MY□-N



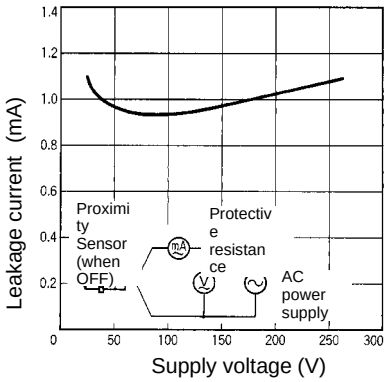


■ LEAKAGE CURRENT (TYPICAL)

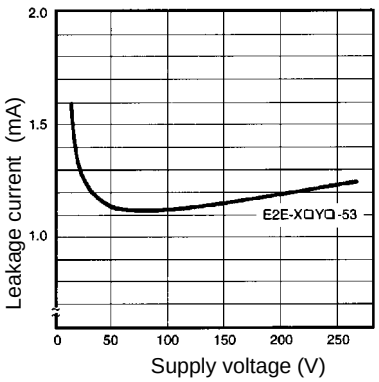
E2E-X□D□-N



E2E-X□Y□-N

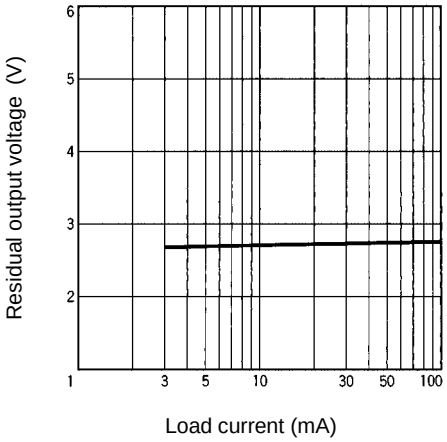


E2E-X□Y□-53-US

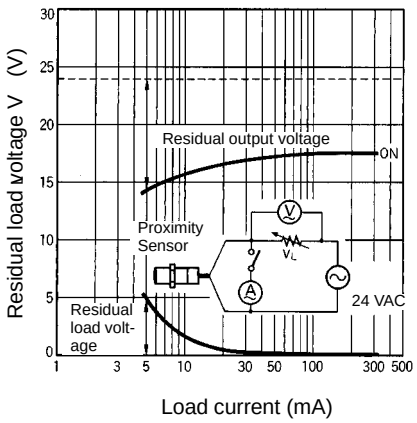


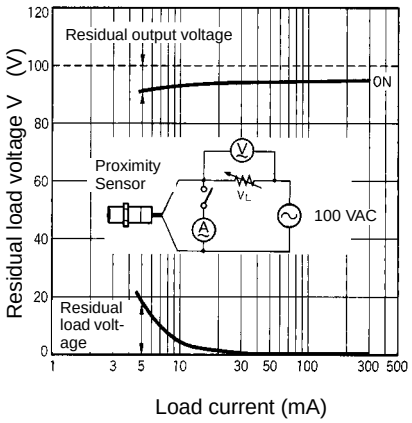
■ RESIDUAL OUTPUT VOLTAGE (TYPICAL)

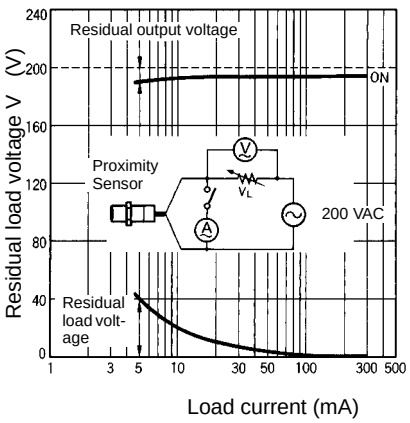
E2E-X□D□-N



E2E-X□Y□-N

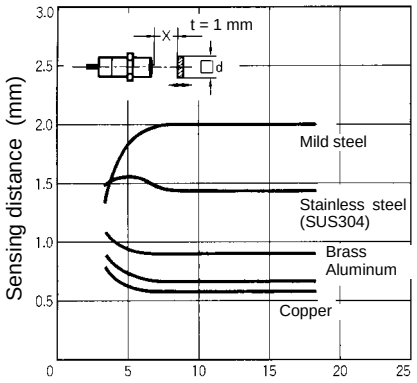




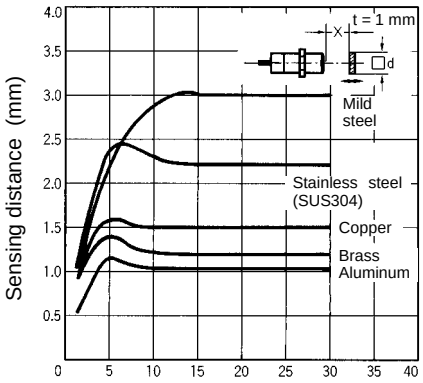


■ SENSING DISTANCE VS. SENSING OBJECT (TYPICAL)

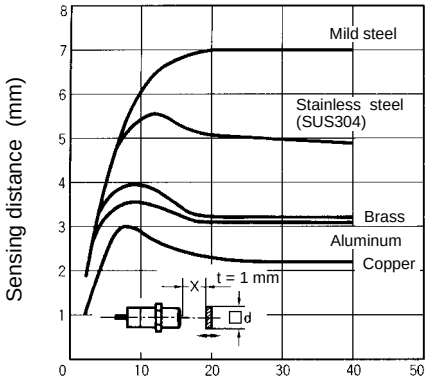
E2E-X2D□-N



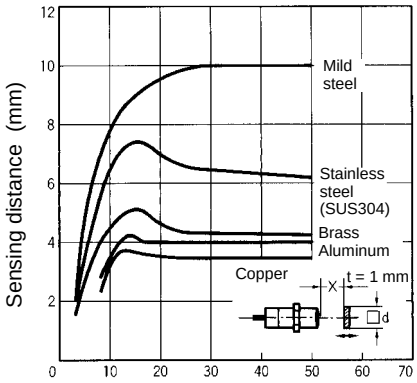
E2E-X3D□-N



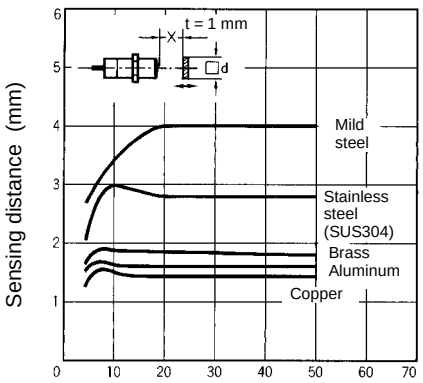
E2E-X7D□-N



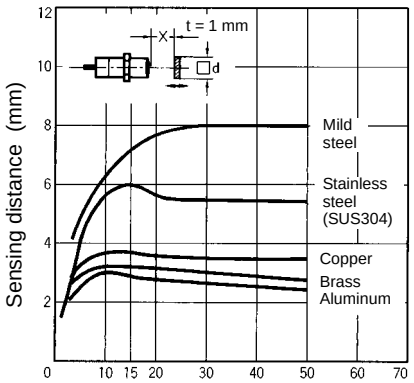
E2E-X10D□-N



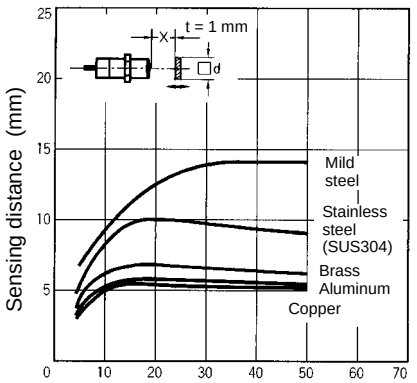
E2E-X4MD□-N



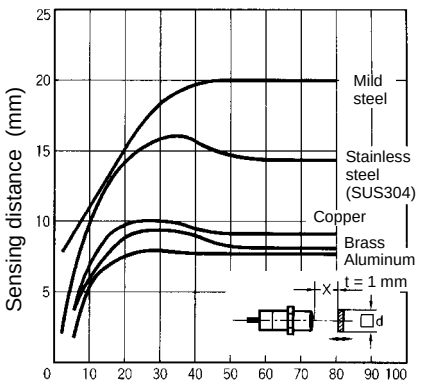
E2E-X8MD□-N



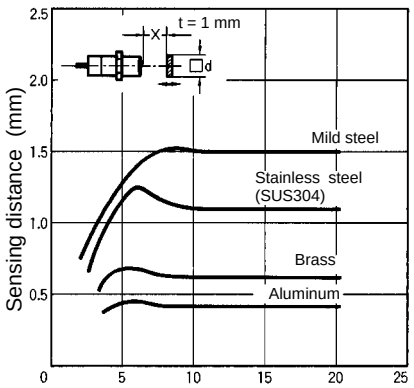
E2E-X14MD□-N



E2E-X20MD□-N

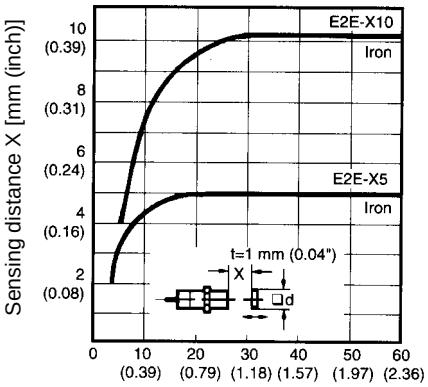


E2E-X1R5E□/F□-N
E2E-X1R5Y□-N

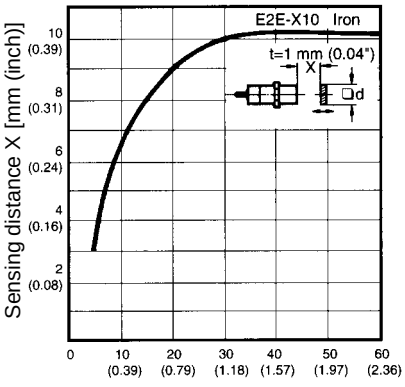


E2E-X□Y□-53-US AC 2-Wire Models with Short Circuit Protection

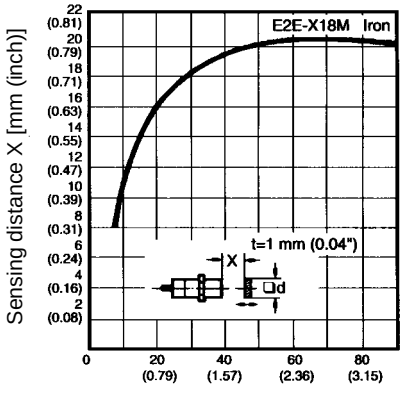
E2E-X5□□, E2E-X10□□



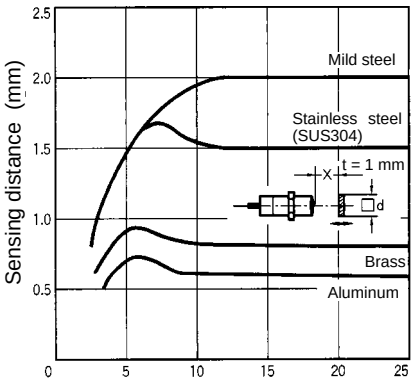
E2E-X10M□□



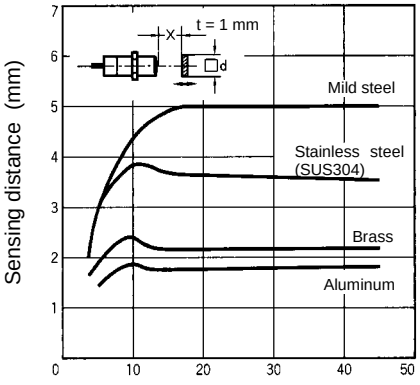
E2E-X18□□



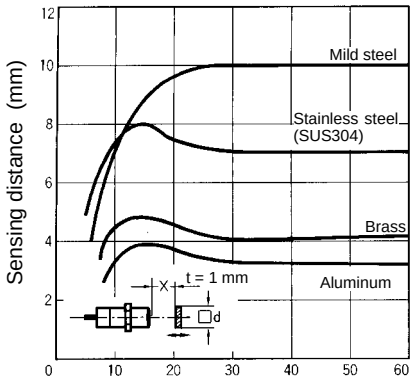
E2E-X2E□/F□-N
E2E-X2Y□-N



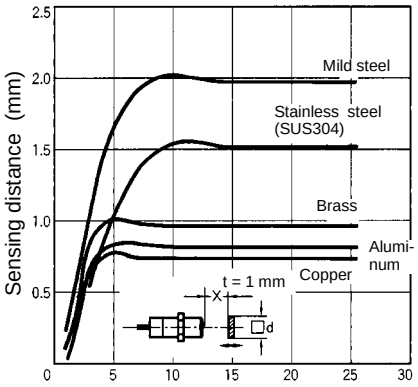
E2E-X5E□/F□-N
E2E-X5Y□-N



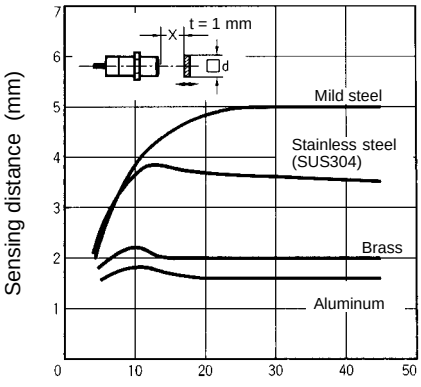
E2E-X10E□F□-N
E2E-X10Y□-N



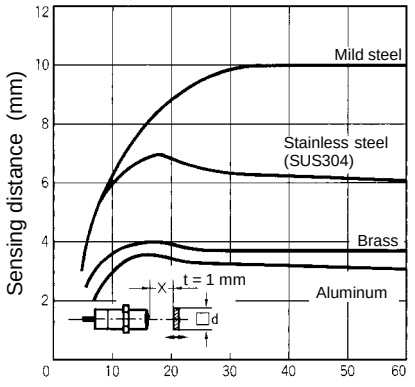
E2E-X2ME□/F□-N
E2E-X2MY□-N



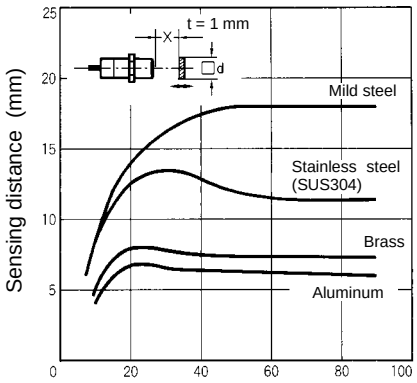
E2E-X5ME□/F□-N
E2E-X5MY□-N



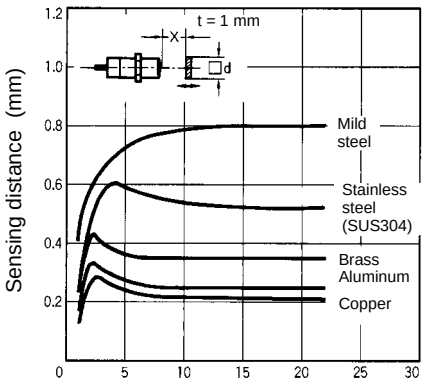
E2E-X10ME□/F□-N
E2E-X10MY-N



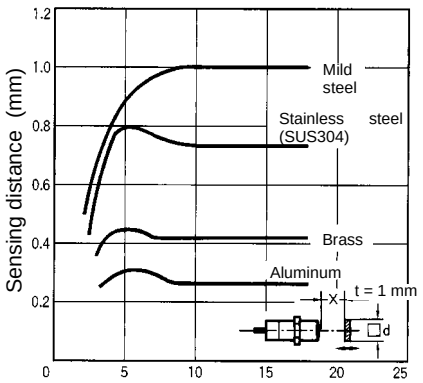
E2E-X18ME□/F□-N
E2E-X18MY□-N



E2E-CR8□□-N



E2E-X1□□-N
E2E-C1□□-N

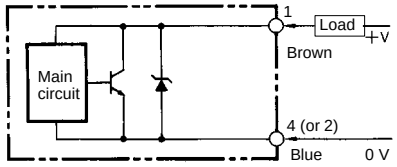


Operation

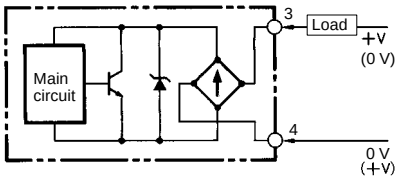
■ OUTPUT CIRCUITS

E2E-X□D□-N DC 2-wire Models

E2E-X□D□-N
Without Diagnostic Output

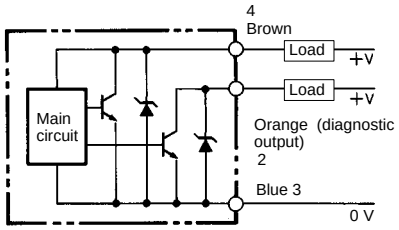


E2E-X□D1-M1J-T-N
No Polarity



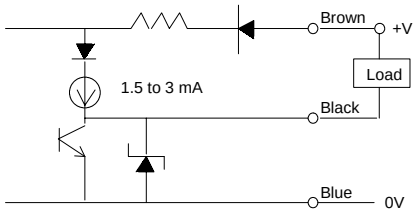
Note: 1. The load can be connected to either the +V or 0-V side.
2. The E2E-X□D1-M1J-T has no polarity. Therefore, terminals 3 and 4 have no polarity.

E2E-X□D1S-N
With Diagnostic Output

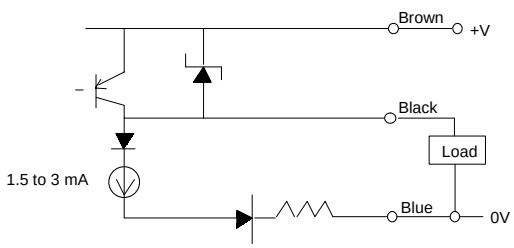


DC 3-wire Models

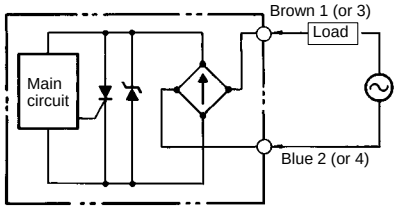
E2E-X□E□-N
NPN Output



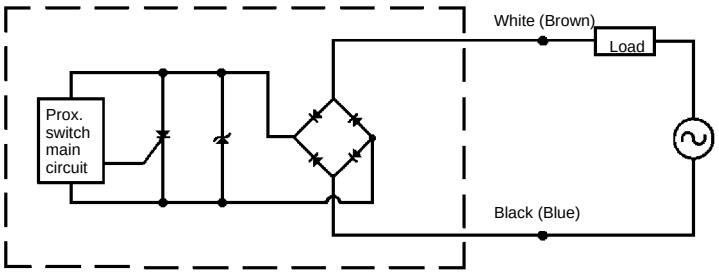
E2E-X□F□-N
PNP Output



E2E-X□Y□-N AC 2-wire Models



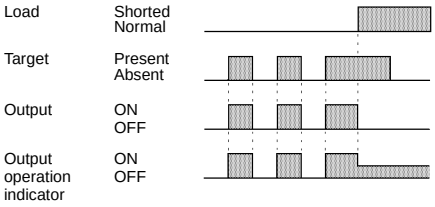
E2E-X□Y□ AC 2-wire Models with Short Circuit Protection



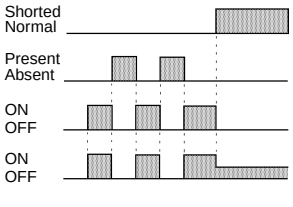
Note: IEC colors are shown in parenthesis

With Short-Circuit Protection

E2E-X□Y1-53
NO



E2E-X□Y2-53
NC



Short-Circuit Indication

The LED dims when the load is shorted and the load output immediately turns off and remains off until the short-circuit protection is reset.

Resetting Short-Circuit Protection

Before the short-circuit protection can be reset, the short must be repaired. We recommend turning the power off before repairing the short. If this approach is taken, no further action is required to reset the short-circuit protection.

If the short must be repaired with power on, the following resetting steps are required:

For NO sensors, the target must be removed to reset the short-circuit protection.

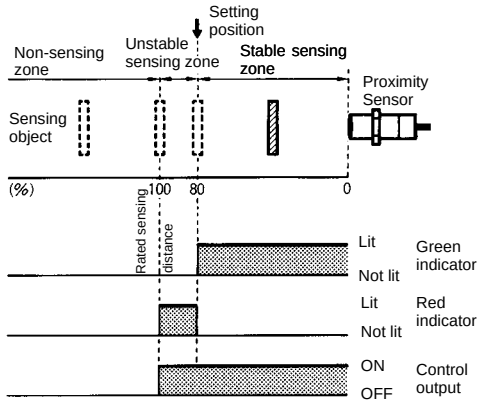
For NC sensors, the target must be presented then removed to reset the short-circuit protection.

■ OPERATING CHARTS

E2E-X□D□-N DC 2-wire Models

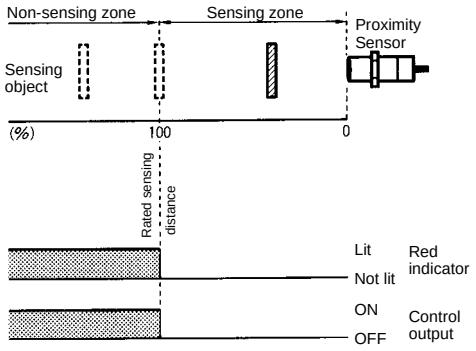
E2E-X□D1-N

NO Type

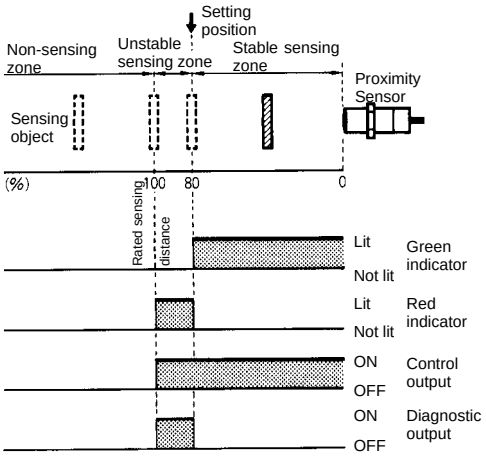


E2E-X□D2-N

NC Type



E2E-X□D1S-N

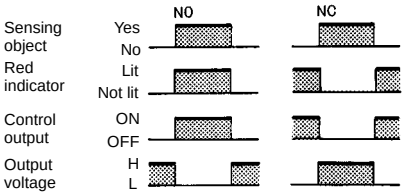


Note: The diagnostic output of the E2E-X□D1S-N is ON when there is a coil burnout or the sensing object is located in the unstable sensing range for 0.3 s or more.

DC 3-Wire Models

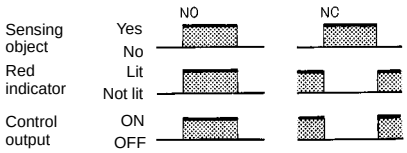
E2E-X□E□-N

NPN Output



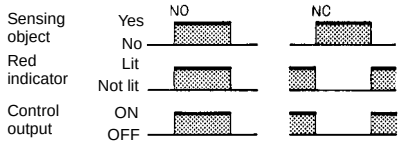
E2E-X□F□-N

PNP Output



AC 2-wire Models

E2E-X□Y□-N



Dimensions

Unit: mm (inch)

Type			DC 2-wire		DC 3-wire		AC 2-wire	
			Part Number	Figure No.	Part Number	Figure No.	Part Number	Figure No.
Pre-wired	Shielded	M8	E2E-X2D□-N-N	1	E2E-X1R5E□/F□-N	1	E2E-X1R5Y□-N	3
		M12	E2E-X3D□-N-N	5	E2E-X2E□/F□-N	5	E2E-X2Y□-N	7
		M18	E2E-X7D□-N-N	9	E2E-X5E□/F□-N	9	E2E-X5Y□-N	9
		M30	E2E-X10D□-N-N	11	E2E-X10E□/F□-N	11	E2E-X10Y12-N	11
	Unshielded	M8	E2E-X4MD□-N	2	E2E-X2ME□/F□-N	2	E2E-X2MY□-N	4
		M12	E2E-X8MD□-N	6	E2E-X5ME□/F□-N	6	E2E-X5MY□-N	8
		M18	E2E-X14MD□-N	10	E2E-X10ME□/F□-N	10	E2E-X10MY□-N	10
		M30	E2E-X20MD□-N	12	E2E-X18ME□/F□-N	12	E2E-X18MY□-N	12
Connector (M12)	Shielded	M8	E2E-X2D□-M1G-N	13	E2E-X1R5EM1/F□-M1-N	13	---	---
		M12	E2E-X3D□-M1G-N	15	E2E-X2E□-M1/F□-M1-N	15	E2E-X2Y1-M1-N	17
		M18	E2E-X7D□-M1G-N	19	E2E-X5E□-M1/F□-M1-N	19	E2E-X5Y1-M1-N	19
		M30	E2E-X10D□-M1G-N	21	E2E-X10E□-M1/F□-M1-N	21	E2E-X10Y1-M1-N	21
	Unshielded	M8	E2E-X4MD□-M1G-N	14	E2E-X2ME□-M1/F□-M1-N	14	---	---
		M12	E2E-X8MD□-M1G-N	16	E2E-X5ME□-M1/F□-M1-N	16	E2E-X5MY□-M1-N	18
		M18	E2E-X14MD□-M1G-N	20	E2E-X10ME□-M1/F□-M1-N	20	E2E-X10MY□-M1-N	20
		M30	E2E-X20MD□-M1G-N	22	E2E-X18ME□-M1/F□-M1-N	22	E2E-X18MY□-M1-N	22

Type			DC 2-wire		DC 3-wire	
			Part Number	Figure Number	Part Number	Figure Number
Connector (M8)	Shielded	M8	E2E-X2D□-M3G-N	23	E2E-X1R5E□-M3/F□-M3-N	23
	Unshielded		E2E-X4MD□-M3G-N	24	E2E-X2ME□-M3/F□-M3-N	24
Connector extension	Shielded	M12	E2E-X3D1-M1GJ-N	25	---	---
		M18	E2E-X7D1-M1GJ-N	27		
		M30	E2E-X10D1-M1GJ-N	29		
	Unshielded	M12	E2E-X8MD1-M1GJ-N	26	---	---
		M18	E2E-X14MD1-M1GJ-N	28		
		M30	E2E-X20MD1-M1GJ-N	30		
Connector extension (no polarity)	Shielded	M12	E2E-X3D1-M1J-T-N	25	---	---
		M18	E2E-X7D1-M1J-T-N	27		
		M30	E2E-X10D1-M1J-T-N	29		

Type			AC 2-wire with Short-circuit protection	
			Part Number	Figure Number
Pre-wired	Shielded	M18	E2E-X5Y□-53-US	31
	Unshielded	M30	E2E-X10Y□-53-US	33
	Shielded	M18	E2E-X10MY□-53-US	32
	Unshielded	M30	E2E-X18MY□-53-US	34

Pre-wired Models (Shielded)

Fig. 1: **E2E-X2D□-N**
E2E-X1R5E□/F□-N

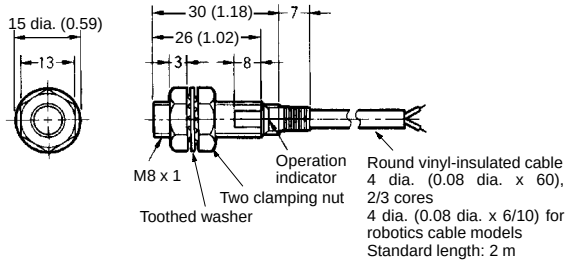


Fig. 3: **E2E-1R5Y□-N**

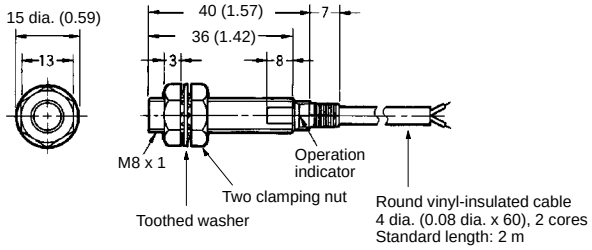


Fig. 5: **E2E-X3D□-N**
E2E-X2E□/F□-N

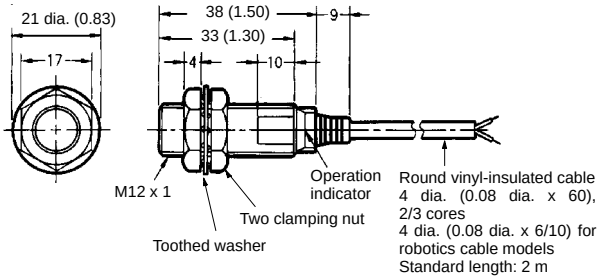
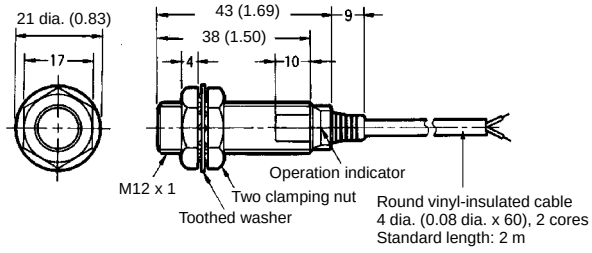


Fig. 7: **E2E-X2Y□-N**



Pre-wired Models (Unshielded)

Fig. 2: **E2E-X4MD□-N**
E2E-X2ME□/F□-N

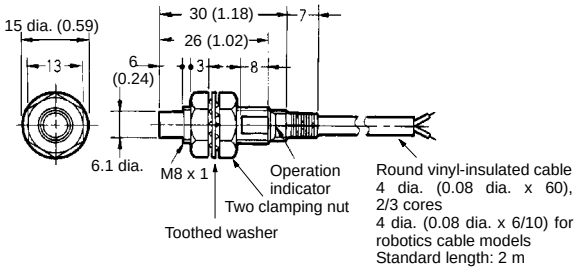


Fig. 4: **E2E-X2MY□-N**

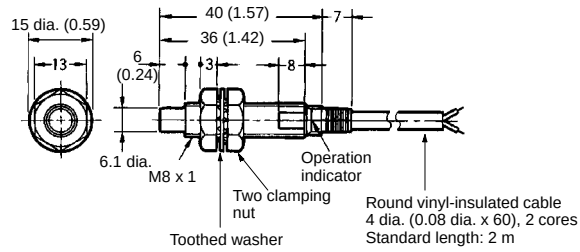


Fig. 6: **E2E-X8MD□-N**
E2E-X5ME□/F□-N

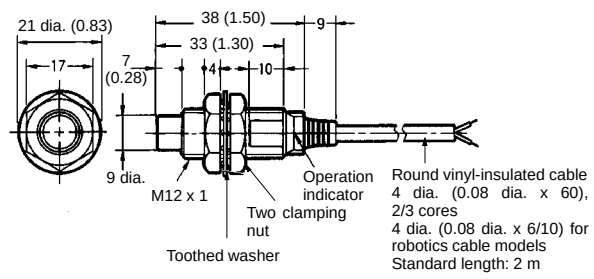
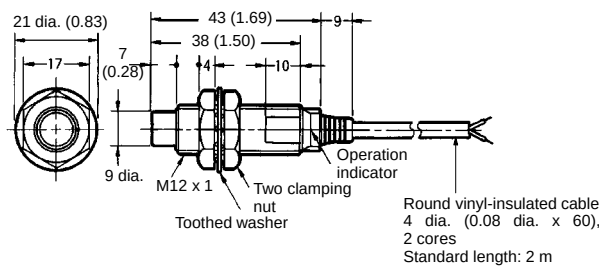
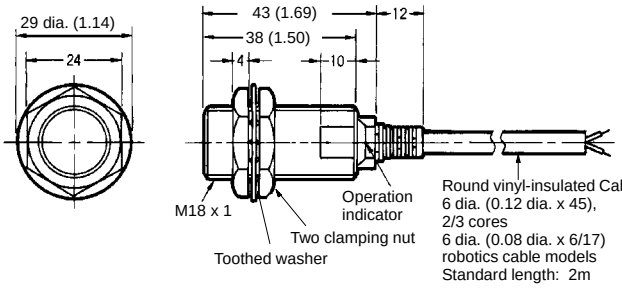


Fig. 8: **E2E-X5MY□-N**



Pre-wired Models (Shielded)

Fig. 9: **E2E-X7D□-N/E2E-X5E□/F□-N**
E2E-X5Y□-N



Pre-wired Models (Unshielded)

Fig. 10: **E2E-X14MD□/E2E-X10ME□/F□-N**
E2E-X10MY□-N

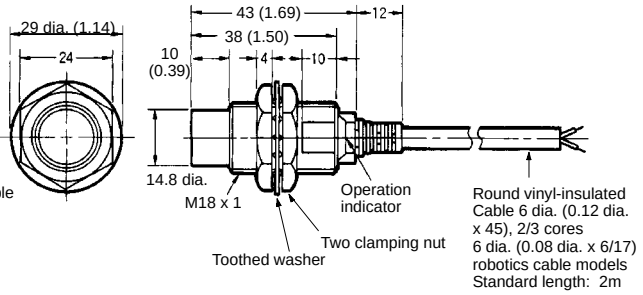


Fig. 11: **E2E-X10D□-N/E2E-X10E□/F□-N**
E2E-X10Y□-N

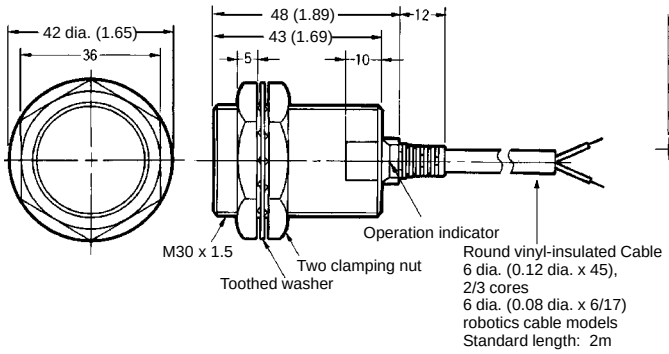
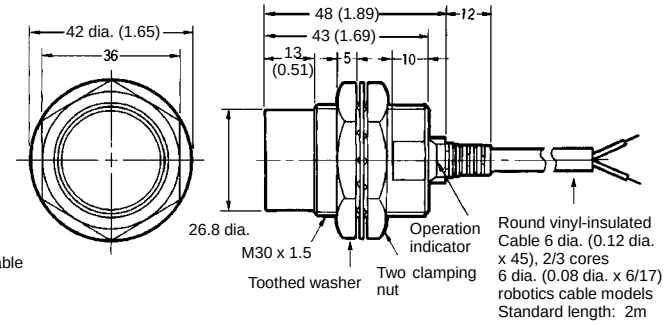
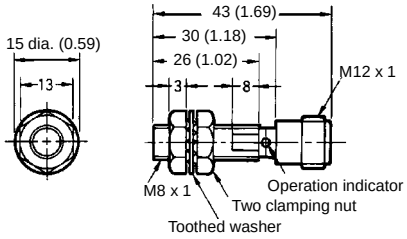


Fig. 12: **E2E-X20MD□/E2E-X18ME□/F□-N**
E2E-X18MY□-N



Connector Models (Shielded)

Fig. 13: **E2E-X2D□-M1G-N**
E2E-X1R5E□-M1/F□-M1-N



Connector Models (Unshielded)

Fig. 14: **E2E-X4MD□-M1G-N**
E2E-X2ME□-M1/F□-M1-N

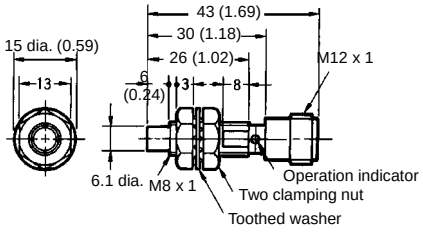


Fig. 15: **E2E-X3D□-M1G-N**
E2E-X2E□-M1/F□-M1-N

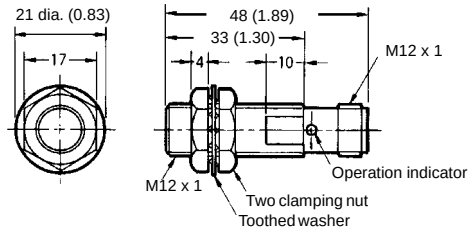
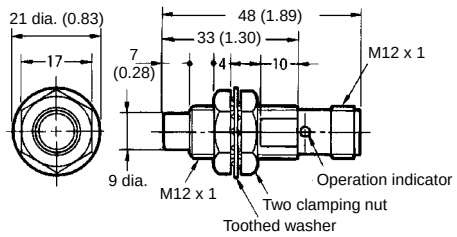
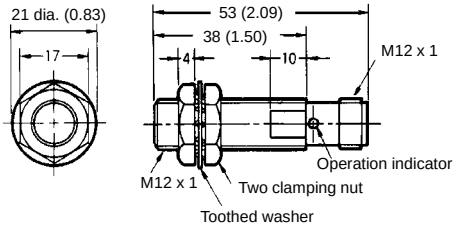


Fig. 16: **E2E-X8MD□-M1G-N**
E2E-X5ME□-M1/F□-M1-N



Connector Models (Shielded), continued

Fig. 17: E2E-X2Y1-M1-N



Connector Models (Unshielded), continued

Fig. 18: E2E-X5MY□-M1-N

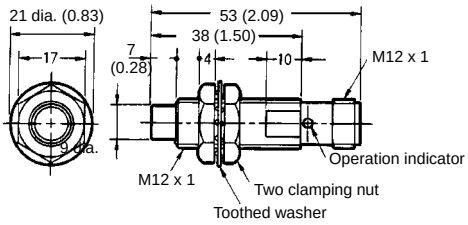


Fig. 19: E2E-X7D□-M1G/E2E-X5E□-M1/F□-M1-N E2E-X5Y1-M1-N

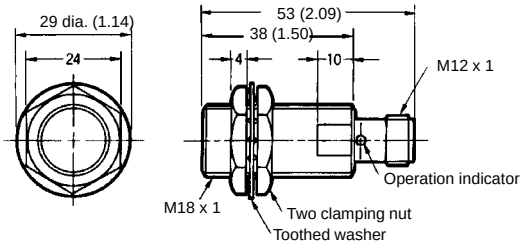


Fig. 20: E2E-X14MD□-M1G/E2E-X10ME□-M1/F□-M1-N E2E-X10MY□-M1-N

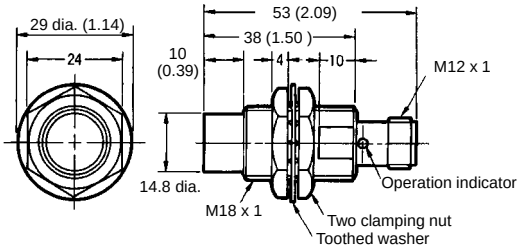


Fig. 21: E2E-X10D□-M1G/E2E-X10E□-M1/F□-M1-N E2E-X10Y1-M1-N

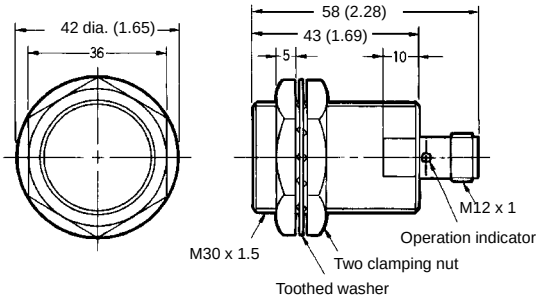
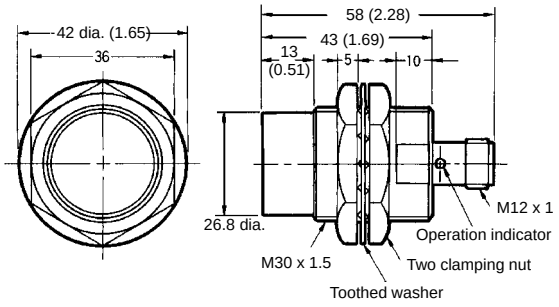
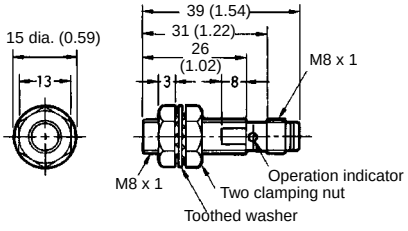


Fig. 22: E2E-X20MD□-M1G/E2E-X18ME□-M1/F□-M1-N E2E-X18MY□-M1-N



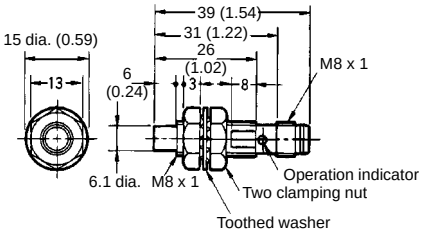
M8 Connector Models (Shielded)

Fig. 23: E2E-X2D□-M3G/E2E-X1R5E□-M3/F□-M3-N



M8 Connector Models (Unshielded)

Fig. 24: E2E-X4MD□-M3G/E2E-X2ME□-M3/F□-M3-N



Connector Extension Models

Fig. 25: **E2E-X3D1-M1GJ-N**
E2E-X3D1-M1J-T-N

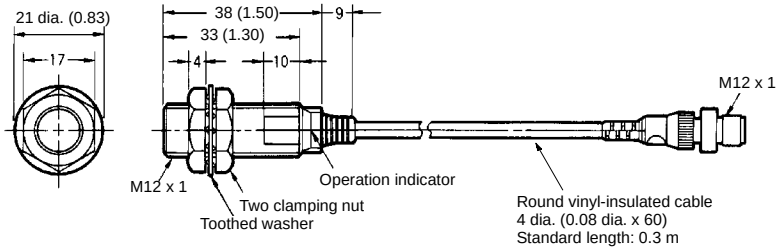


Fig. 26: **E2E-X8MD1-M1GJ-N**

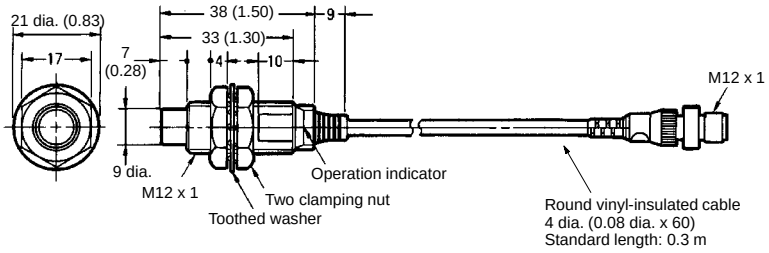


Fig. 27: **E2E-X7D1-M1GJ-N**
E2E-X7D1-M1J-T-N

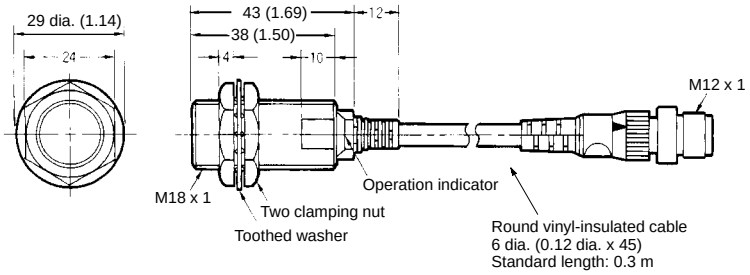
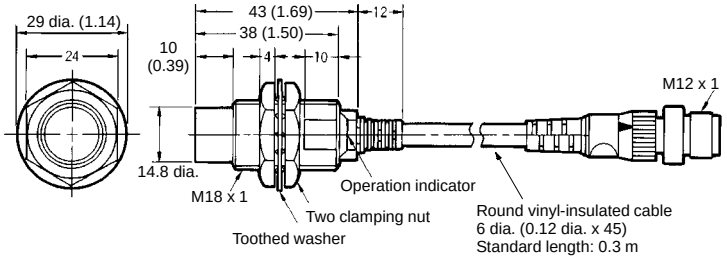


Fig. 28: **E2E-X14MD1-M1GJ-N**



Connector Extension Models, continued

Fig. 29: **E2E-X10D1-M1GJ-N**
E2E-X10D1-M1J-T-N

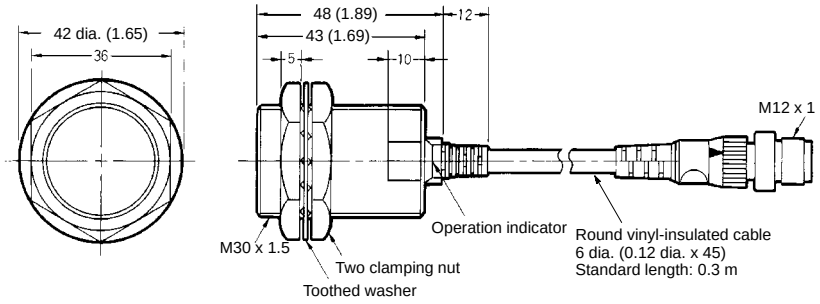
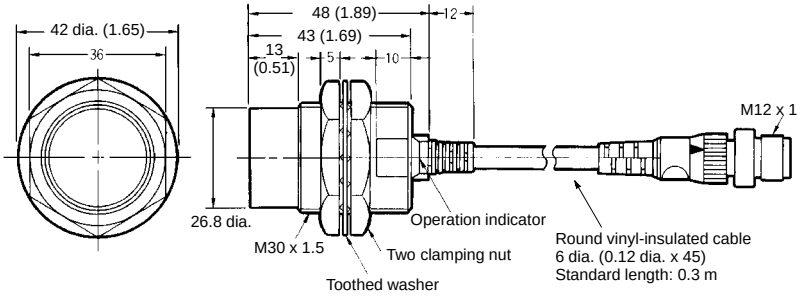
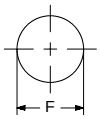


Fig. 30: **E2E-X20MD1-M1GJ-N**



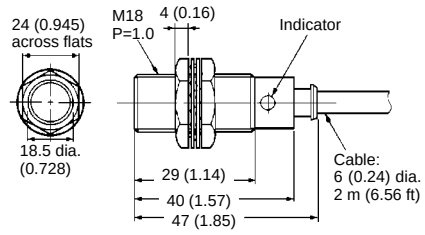
Mounting Holes



Dimensions	4 dia.	M5	5.4 dia.	M8	M12	M18	M30
F (mm)	$4.2^{+0.5}/_{0}$ dia.	$5.5^{+0.5}/_{0}$ dia.	$5.7^{+0.5}/_{0}$ dia.	$8.5^{+0.5}/_{0}$ dia.	$12.5^{+0.5}/_{0}$ dia.	$18.5^{+0.5}/_{0}$ dia.	$30.5^{+0.5}/_{0}$ dia.

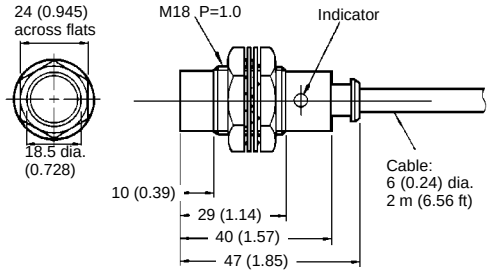
AC Shielded M18

Fig. 31: E2E-X5Y□-53-US



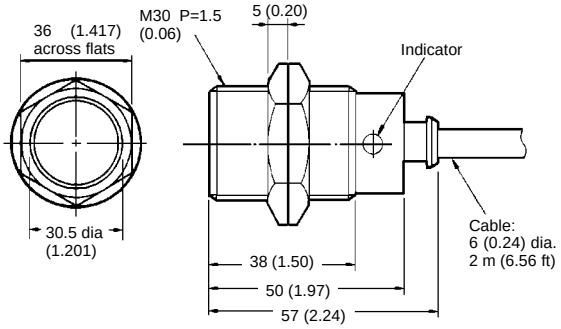
AC Unshielded M18

Fig. 32: E2E-X10MY□-53-US



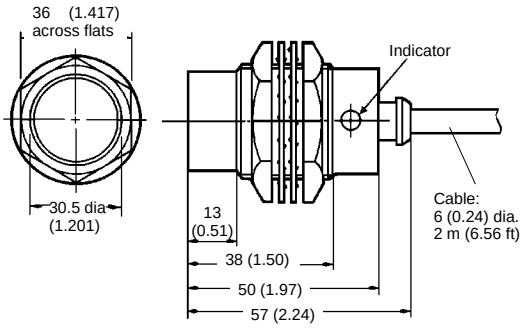
AC Shielded M30 Size

Fig. 33: E2E-X10Y□-53-US



AC Unshielded M30 Size

Fig. 34: E2E-X18MY□-53-US

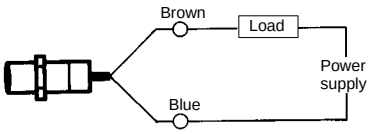


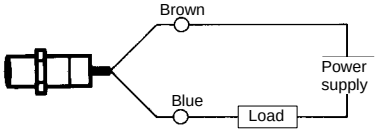
Installation

■ CONNECTION

E2E-X□D□-N
DC 2-wire Models
(Without Diagnostic Output)

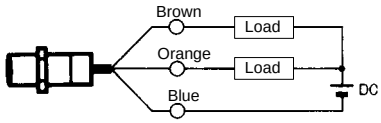
E2E-X□Y□-N
AC 2-wire Models





Note: The load can be connected as shown above.

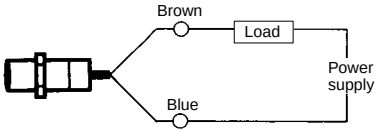
E2E-X□D1S-N
DC 3-wire Models
(With Diagnostic Output)



Note: The control output and diagnostic output share the negative common terminal. Therefore, the loads must be connected to the positive sides of the control output and diagnostic output.

E2E-X□D1-M1J-1-T-N
DC 2-wire Models
(No Polarity)

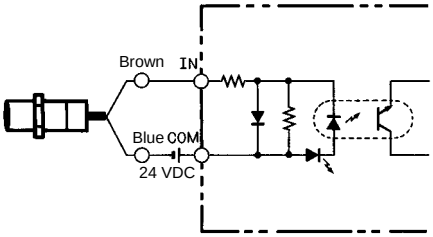
E2E-X□Y□-N
AC 2-wire Models



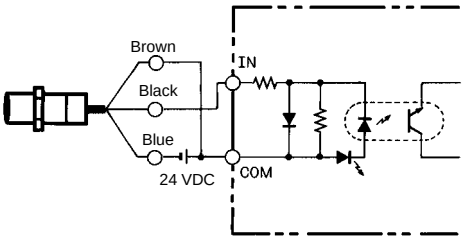
Note: There is no need to be concerned about the polarity (Brown/Blue) of the Proximity Sensor.

Connected to PC

E2E-X□D□-N
DC 2-wire Models

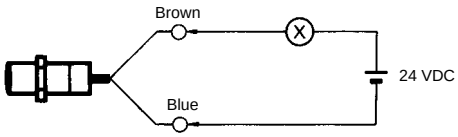


E2E-X□E□-N
DC 3-wire Models

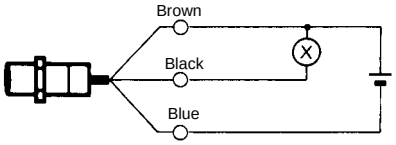


Connected to Relay Load

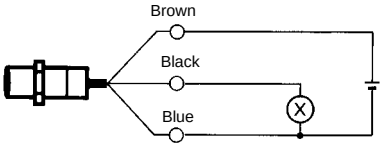
E2E-X□D□-N
DC 2-wire Models



E2E-X□E□-N
DC 3-wire Models

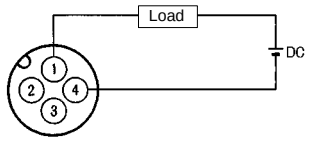
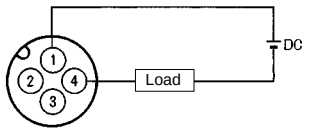
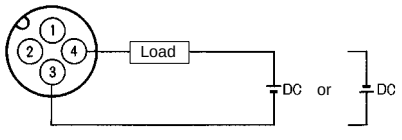
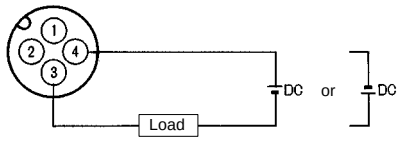
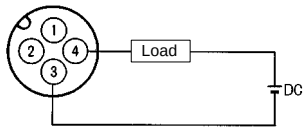
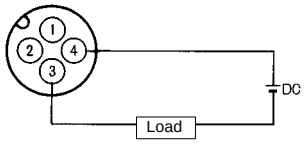
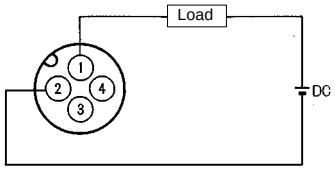
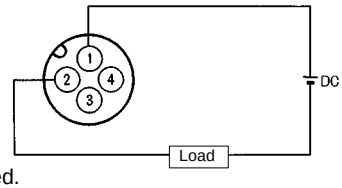


E2E-X□F□-N
DC 3-wire Models

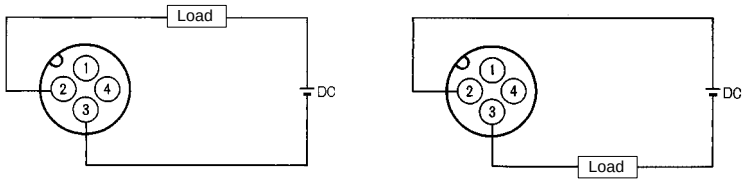
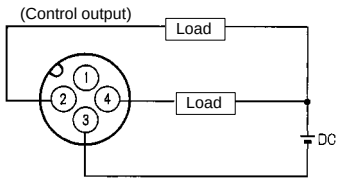
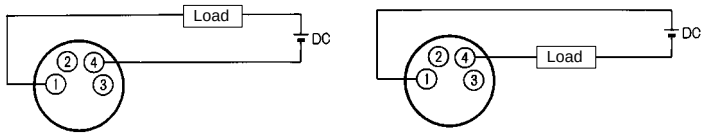
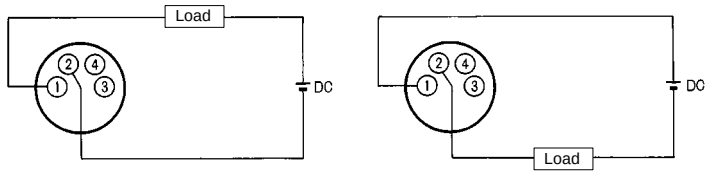


■ PIN ARRANGEMENT

E2E-X□D□-M□-N DC 2-wire Models

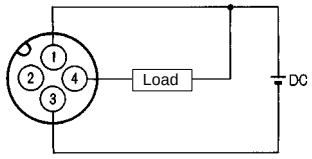
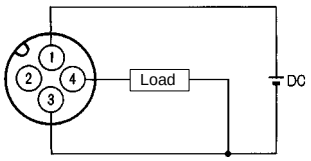
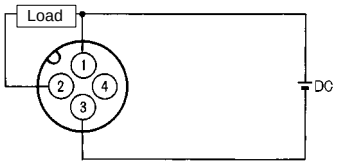
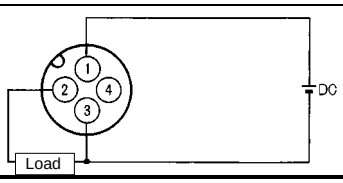
Connector	Self-diagnostic Output	Output Configuration	Applicable Models	Pin Arrangement
M12 Micro Change®	No	NO	E2E-X□D1-M1G□-N (see note)	  Note: Terminals 2 and 3 are not used.
			E2E-X□D1-M1J-T-N	  Note: 1. Terminals 1 and 2 are not used. 2. Terminals 3 and 4 have no polarity.
			E2E-X□D1-M1-N	  Note: Terminals 1 and 2 are not used.
		NC	E2E-X□D2-M1G-N (see note)	  Note: Terminals 3 and 4 are not used.

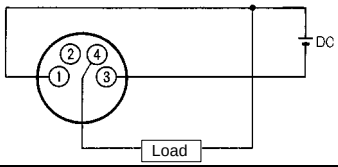
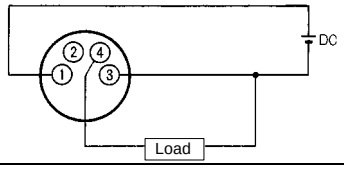
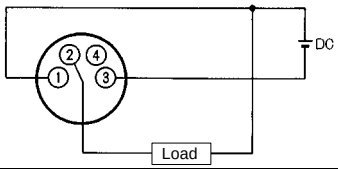
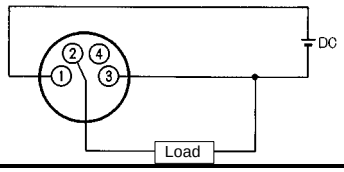
Note: The above pin arrangements conform to IEC standards.

Connector	Self-diag-nostic Out-put	Out-put Con-figu-ration	Applicable Models	Pin Arrangement
M12 Micro Change®	No	NC	E2E-X□D2-M1-N	 Note: Terminals 1 and 4 are not used.
	Yes	NO	E2E-X□D1S-M1-N	 Note: Terminal 1 is not used.
M8 Nano Change®	No	NO	E2E-X□D1-M3G-N	 Note: Terminals 2 and 3 are not used.
		NC	E2E-X□D2-M3G-N	 Note: Terminals 3 and 4 are not used.

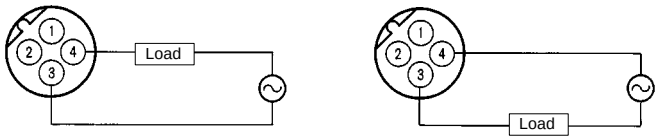
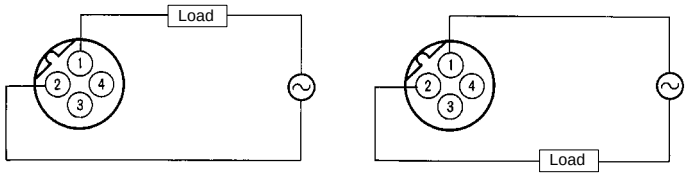
Note: The above pin arrangements conform to IEC standards.

E2E-X□E□-M1 DC 3-wire Models

Connector	Output Configuration	Applicable Models	Pin Arrangement
M12 Micro Change®	NO	E2E-X□E1-M1-N	 Note: Terminal 2 is not used.
		E2E-X□F1-M1-N	 Note: Terminal 2 is not used.
	NC	E2E-X□E2-M1-N	 Note: Terminal 4 is not used.
		E2E-X□F2-M1-N	 Note: Terminal 4 is not used.

Connector	Output Configuration	Applicable Models	Pin Arrangement
M8 Nano Change®	NO	E2E-X□E1-M3-N	 Note: Terminal 2 is not used.
		E2E-X□F1-M3-N	 Note: Terminal 2 is not used.
	NC	E2E-X□E2-M3-N	 Note: Terminal 4 is not used.
		E2E-X□F2-M3-N	 Note: Terminal 4 is not used.

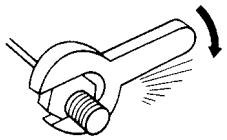
E2E-X□Y□-M1 AC 2-wire Models

Output Configuration	Applicable Models	Pin Arrangement
NO	E2E-X□Y1-M1-N	 Note: Terminals 1 and 2 are not used.
NC	E2E-X□Y2-M1-N	 Note: Terminals 3 and 4 are not used.

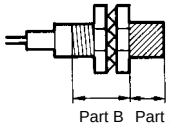
Precautions

■ MOUNTING

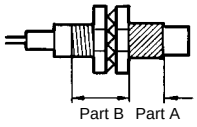
Do not tighten the nut with excessive force. A washer must be used with the nut.



Shielded Model



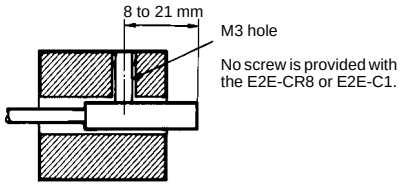
Unshielded Model



Note: The table above right 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		Part A		Part B
		Length	Torque	Torque
M8	Shielded	9 mm	9 N • m (90 kgf • cm)	12 N • m (120 kgf • cm)
	Unshielded	3 mm		
M12		30 N • m (310 kgf • cm)		
M18		70 N • m (710 kgf • cm)		
M30		180 N • m (1,800 kgf • cm)		

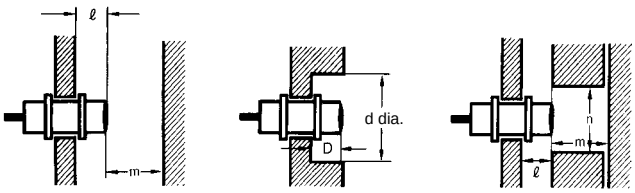
Refer to the following to mount the E2E-CR8 and E2E-C1 non-screw models.



Tighten the screw to a torque of 0.20 N • m (2 kgf • cm) maximum to secure the E2E-CR8 and a torque of 0.39 N • m (4 kgf • cm) maximum to secure the E2E-C1.

Effects of Surrounding Metal

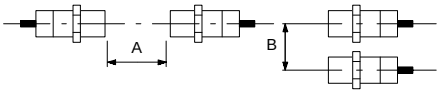
When mounting the E2E within a metal panel, ensure that the clearances given in the following table are maintained. Failure to maintain these distances may cause deterioration in the performance of the sensor.



Type		Item	M8	M12	M18	M30
E2E-X□D□-N DC 2-wire	Shielded	ℓ	0 mm	0 mm	0 mm	0 mm
		d	8 mm	12 mm	18 mm	30 mm
		D	0 mm	0 mm	0 mm	0 mm
		m	4.5 mm	8 mm	20 mm	40 mm
		n	12 mm	18 mm	27 mm	45 mm
	Unshielded	ℓ	12 mm	15 mm	22 mm	30 mm
		d	24 mm	40 mm	70 mm	90 mm
		D	12 mm	15 mm	22 mm	30 mm
		m	8 mm	20 mm	40 mm	70 mm
		n	24 mm	40 mm	70 mm	90 mm
E2E-X□E□-N E2E-X□F□-N DC 3-wire E2E-X□Y□-N AC 2-wire	Shielded	ℓ	0 mm	0 mm	0 mm	0 mm
		d	8 mm	12 mm	18 mm	30 mm
		D	0 mm	0 mm	0 mm	0 mm
		m	4.5 mm	8 mm	20 mm	40 mm
		n	12 mm	18 mm	27 mm	45 mm
	Unshielded	ℓ	6 mm	15 mm	22 mm	30 mm
		d	24 mm	40 mm	55 mm	90 mm
		D	6 mm	15 mm	22 mm	30 mm
		m	8 mm	20 mm	40 mm	70 mm
		n	24 mm	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.

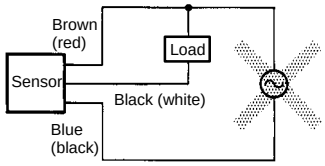
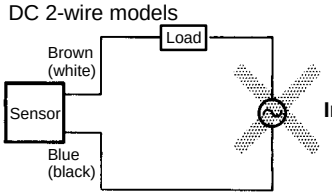
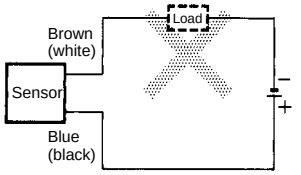
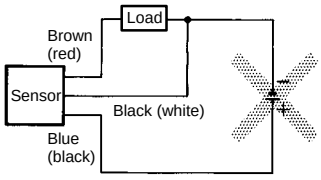
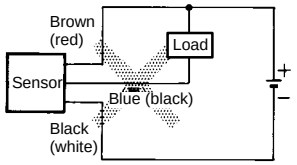
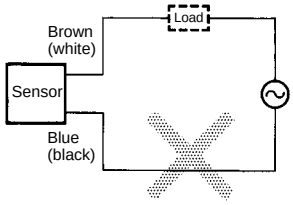


Type		Item	M8	M12	M18	M30
E2E-X□D□-N DC 2-wire	Shielded	A	20 mm	30 (20) mm	50 (30) mm	100 (50) mm
		B	15 mm	20 (12) mm	35 (18) mm	70 (35) mm
	Unshielded	A	80 mm	120 (60) mm	200 (100) mm	300 (100) mm
		B	60 mm	100 (50) mm	110 (60) mm	200 (100) mm
E2E-X□E□-N E2E-X□F□-N DC 3-wire	Shielded	A	20 mm	30 (20) mm	50 (30) mm	100 (50) mm
		B	15 mm	20 (12) mm	35 (18) mm	70 (35) mm
E2E-X□Y□-N AC 2-wire	Unshielded	A	80 mm	120 (60) mm	200 (100) mm	300 (100) mm
		B	60 mm	100 (50) mm	110 (60) mm	200 (100) mm

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

⚠ Caution

The color 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**
Load short-circuit Do not short-circuit the load, or the E2E may explode or burn. The E2E's short-circuit protection function is valid if the polarity of the supply voltage imposed is correct and within the rated voltage range.	DC 2-wire models The following diagram shows that the load is short-circuited while the polarity of the supply voltage imposed on the E2E is wrong, in which case the E2E may explode or burn.  **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

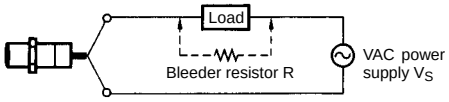
When it is OFF, the Proximity Sensor has leakage current. Refer to Leakage Current Characteristics. In this case, the load is imposed with a small voltage and the load may not be reset. Before using the Proximity Sensor, make sure that this voltage is less than the load reset voltage. The AC 2-wire Proximity 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)

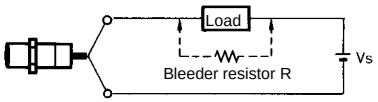
P: The allowable power of the bleeder resistor. (The actual power capacity of the bleeder resistor must be at least a few times as large as the allowable power of the bleeder resistor.)

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.



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)

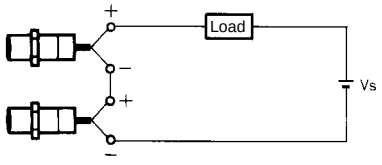
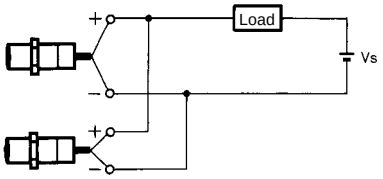
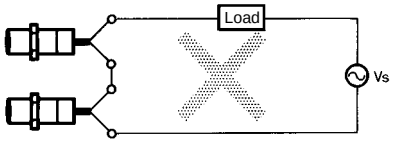
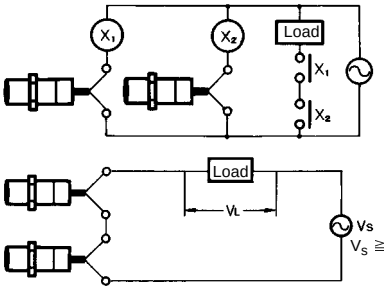
The following resistors are recommended.
12 VDC (supply voltage): A resistor with a resistance of 15 kΩ maximum and an allowable power of 450 mW minimum
24 VDC (supply voltage): A resistor with a resistance of 30 kΩ maximum and an allowable power of 0.1 W minimum

Inrush Current

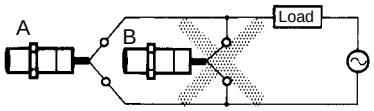
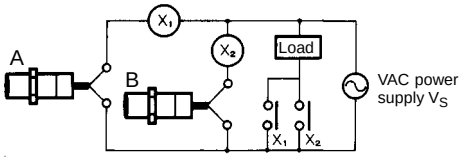
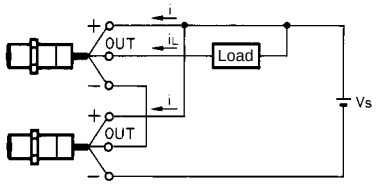
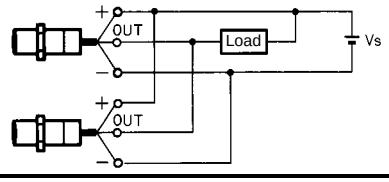
A load that has a large inrush current (e.g., a lamp or motor) will damage the Proximity Sensor, in which case connect the load to the Proximity Sensor through a relay.

■ 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. $N \times i \leqq$ 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. $i_L + (N - 1) \times i \leqq$ Upper-limit of control output of each Sensor $V_S - N \times V_R \geqq$ Load operating voltage N: No. of Sensors V_R: Residual voltage of each Sensor V_S: Supply voltage 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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