OMRON

Short Barrel Inductive Prox | **E2E 3-WIRE DC**

## Short Barrel 3-Wire Prox Sensors Meet IP67

- Thick nickel-plated brass barrel has wrench flats for easy installation
- Solid potted internal circuitry withstands shocks and water washdown to IP67
- High visibility indicator
- Miniature and standard sizes

# Ordering Information

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

### ■ PREWIRED MINIATURE SENSORS

| Type | Size | Sensing distance | Output configuration | **Part number** | |
|---|---|---|---|---|---|
| | | | | NO | NC |
| Shielded  | 4 mm dia. | 0.8 mm | NPN | **E2E-CR8C1** | **E2E-CR8C2** |
| | | | PNP | **E2E-CR8B1** | **E2E-CR8B2** |
| | M5 | 1 mm | NPN | **E2E-X1C1** | **E2E-X1C2** |
| | | | PNP | **E2E-X1B1** | **E2E-X1B2** |
| | 5.4 mm dia. | 1 mm | NPN | **E2E-C1C1** | **E2E-C1C2** |
| | | | PNP | **E2E-C1B1** | **E2E-C1B2** |

### ■ PREWIRED SHIELDED STANDARD SENSORS

| Type | Size | Sensing distance | Output configuration | **Part number** | |
|---|---|---|---|---|---|
| | | | | NO | NC |
| Shielded  | M8 | 1.5 mm | NPN | **E2E-X1R5E1-N** | **E2E-X1R5E2-N** |
| | | | PNP | **E2E-X1R5F1-N** | **E2E-X1R5F2-N** |
| | M12 | 2 mm | NPN | **E2E-X2E1-N** | **E2E-X2E2-N** |
| | | | PNP | **E2E-X2F1-N** | **E2E-X2F2-N** |
| | M18 | 5 mm | NPN | **E2E-X5E1-N** | **E2E-X5E2-N** |
| | | | PNP | **E2E-X5F1-N** | **E2E-X5F2-N** |
| | M30 | 10 mm | NPN | **E2E-X10E1-N** | **E2E-X10E2-N** |
| | | | PNP | **E2E-X10F1-N** | **E2E-X10F2-N** |

Note: 1. A different oscillating frequency is available. Add a "5" to the part number (e.g., E2E-X5E15-N).
2. E2E sensors with robotic cable are available. Add a "-R" in the part number (e.g., E2E-X5E1-R-N).

## ■ PREWIRED UNSHIELDED STANDARD SENSORS

| Type | Size | Sensing distance | Output configuration | Part number | |
|---|---|---|---|---|---|
| | | | | NO | NC |
| Unshielded  | M8 | 2 mm | NPN | **E2E-X2ME1-N** | **E2E-X2ME2-N** |
| | | | PNP | **E2E-X2MF1-N** | **E2E-X2MF2-N** |
| | M12 | 5 mm | NPN | **E2E-X5ME1-N** | **E2E-X5ME2-N** |
| | | | PNP | **E2E-X5MF1-N** | **E2E-X5MF2-N** |
| | M18 | 10 mm | NPN | **E2E-X10ME1-N** | **E2E-X10ME2-N** |
| | | | PNP | **E2E-X10MF1-N** | **E2E-X10MF2-N** |
| | M30 | 18 mm | NPN | **E2E-X18ME1-N** | **E2E-X18ME2-N** |
| | | | PNP | **E2E-X18MF1-N** | **E2E-X18MF2-N** |

Note: 1. A different oscillating frequency is available. Add a “5” to the part number (e.g., E2E-X5E15-N).
2. E2E sensors with robotic cable are available. Add a “-R” in the part number (e.g., E2E-X5E1-R-N).

## ■ SENSORS WITH BUILT-IN M12 MICROCHANGE® CONNECTOR

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

Note: Connector cordsets: For MicroChange® models, use OMRON Y96E-4□D□.

## ■ SENSORS WITH BUILT-IN M8 NANOCHANGE® CONNECTOR

| Type | Size | Sensing distance | Output configuration | Part number | |
|---|---|---|---|---|---|
| | | | | NO | NC |
| Shielded  | M8 | 1.5 mm | NPN | **E2E-X1R5E1-M3** | **E2E-X1R5E2-M3** |
| | | | PNP | **E2E-X1R5F1-M3** | **E2E-X1R5F2-M3** |
| Unshielded  | M8 | 2 mm | NPN | **E2E-X2ME1-M3** | **E2E-X2ME2-M3** |
| | | | PNP | **E2E-X2MF1-M3** | **E2E-X2MF2-M3** |

Note: Connector cordsets: For NanoChange® models, use OMRON X3SF-M42□-40□-R or Brad Harrison equivalent.

# Specifications

## ■ MINIATURE SENSORS

| Part number | | E2E-CR8□□ | E2E-X1□□ | E2E-C1□□ |
|---|---|---|---|---|
| Size | | 4 mm (0.16 in) dia. | M5 | 5.5 mm (0.21 in) dia. |
| Type | | Shielded | | |
| Sensing distance | | 0.8 mm (0.03 in) ± 15% | 1 mm (0.04 in) ± 15% | |
| Supply voltage | | 10 to 30 VDC, 10% max. permissible ripple peak to peak | | |
| Current consumption | | 17 mA max. | | |
| Sensing object | | Magnetic metals | | |
| Setting distance | | 0 to 0.5 mm (0 to 0.02 in) | 0 to 7 mm (0 to 0.03 in) | |
| Standard object (mild steel, L x W x H) | | 5 x 5 x 1 mm (0.2 x 0.2 x 0.04 in) | | 8 x 8 x 1 mm (0.3 x 0.3 x 0.04 in) |
| Differential travel | | 15% max. of effective distance | | |
| Response frequency | | 3 kHz | | |
| Control output | Operation | C1 models: NPN-NO open collector<br>C2 models: NPN-NC open collector<br>B1 models: PNP-NO open collector<br>B1 models: PNP-NC open collector | | |
| | Max. load | 100 mA switching capacity | | |
| | Max. on-state voltage drop | 2 VDC | | |
| Circuit protection | | DC power supply reverse polarity | | |
| Indicators | | Operation indicator (red LED) | | |
| Ambient temperature | Operating | -25°C to 70°C (-13°F to 158°F) with no icing | | |
| Ambient humidity | Operating | 35% to 95% | | |
| Vibration resistance | | 10 to 55 Hz, 1.5 mm (0.06 in) double amplitude | | |
| Shock resistance | | Approx. 50 G's | | |
| Enclosure rating | UL | — | | |
| | NEMA | 1, 3, 4, 6, 12, 13 | | |
| | IEC 144 | IP67 | | |
| Weight with cable | | Approx. 30 g (1.1 oz.) | | |
| Materials | Housing | Stainless steel | Nickel-plated brass | Nickel-plated brass |
| | Sensing face | Plastic PBT | | |
| | Cable sheath | Polyvinyl chloride | | |

## ■ STANDARD SIZE SENSORS

| 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<br>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 (-40°F to 185°F) with no icing | | | | | | | |
| 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)<br>±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 | | 10 to 55 Hz, 1.5-mm double amplitude for 2 hrs each in X, Y, and Z axes | | | | | | | |
| Shock resistance | | 500 m/s$^2$ (approx. 50G) for 10 times each in X, Y, and Z axes | | 1,000 m/s$^2$ (approx. 50G) for 10 times each in X, Y, and Z axes<br>500 m/s$^2$ (approx. 50G) for E2E-X5M | | | | | |
| 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.

# Dimensions

## ■ DRAWING LOCATOR

| Type | | | Part number | Figure number |
|---|---|---|---|---|
| Prewired | Shielded | 4 mm dia. | E2E-CR8□ | 1 |
| | | M5 | E2E-X1□ | 2 |
| | | 5.4 mm dia. | E2E-C1□ | 3 |
| | | M8 | E2E-X1R5E□/F□-N | 4 |
| | | M12 | E2E-X2E□/F□-N | 6 |
| | | M18 | E2E-X5E□/F□-N | 8 |
| | | M30 | E2E-X10E□/F□-N | 10 |
| Prewired | Unshielded | M8 | E2E-X2ME□/F□-N | 5 |
| | | M12 | E2E-X5ME□/F□-N | 7 |
| | | M18 | E2E-X10ME□/F□-N | 9 |
| | | M30 | E2E-X18ME□/F□-N | 11 |
| 4-pin connector (M12) | Shielded | M8 | E2E-XR5ME□-M1/F□-M1-N | 12 |
| | | M12 | E2E-X2ME□-M1/F□-M1-N | 14 |
| | | M18 | E2E-X5ME□-M1/F□-M1-N | 16 |
| | | M30 | E2E-X10ME□-M1/F□-M1-N | 18 |
| | Unshielded | M8 | E2E-X2ME□-M1/F□-M1-N | 13 |
| | | M12 | E2E0-X5ME□-M1/F□-M1-N | 15 |
| | | M18 | E2E-X10ME□-M1/F□-M1-N | 17 |
| | | M30 | E2E-X18ME□-M1/F□-M1-N | 19 |
| M8 connector | Shielded | M8 | E2E-X1R5E□-M3/□F-M3-N | 20 |
| | Unshielded | | E2E-X2ME□-M3/□F-M3-N | 21 |

Unit: mm (inch)

## ■ SENSORS

### Miniature Shielded DC Types

**Fig. 1: E2E-CR8C(B)□**

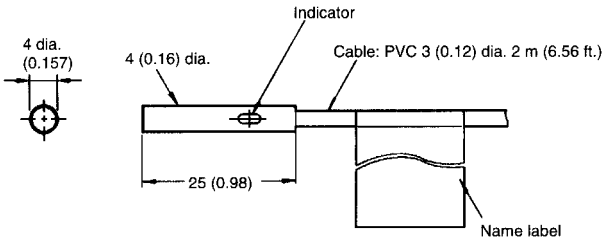



**Fig. 2: E2E-X1C(B)□**

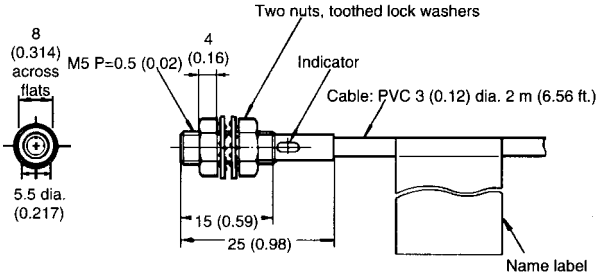
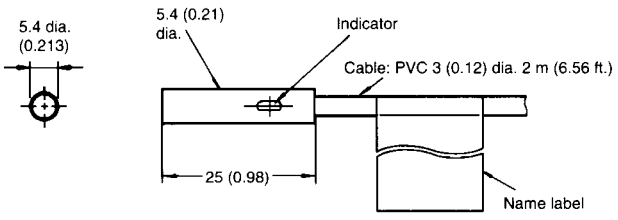



**Fig. 3: E2E-C1C(B)□**



## Prewired Models (Shielded)

**Fig. 4: E2E-X1R5E□/F□-N**

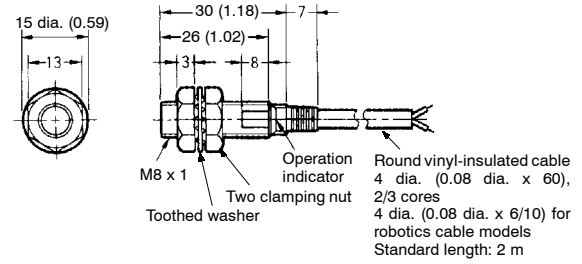



**Fig. 6: E2E-X2E□/F□-N**

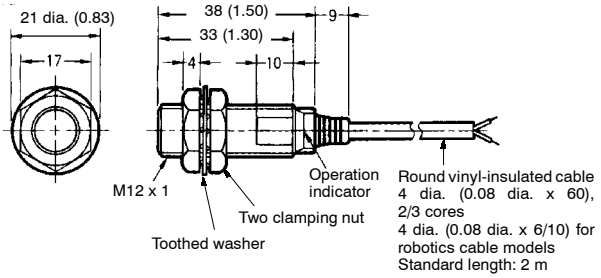



**Fig. 8: E2E-X5E□/F□-N**

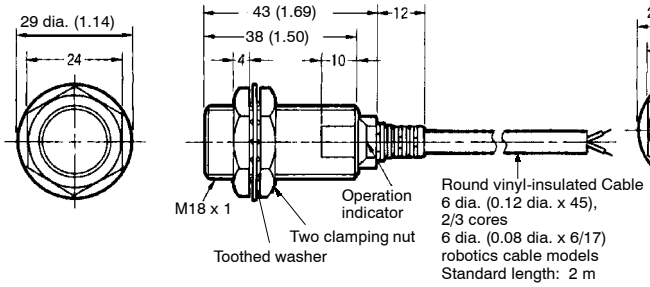
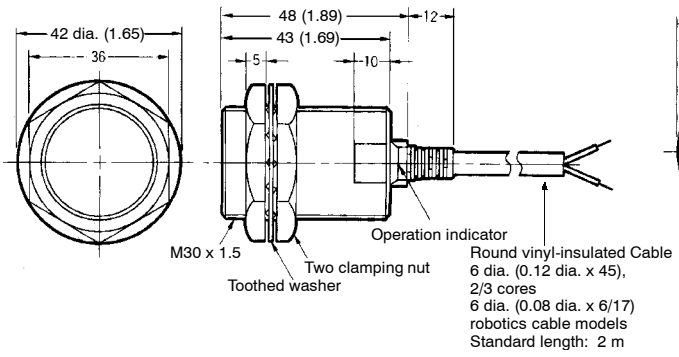



**Fig. 10: E2E-X10E□/F□-N**




## Prewired Models (Unshielded)

**Fig. 5: E2E-X2ME□/F□-N**

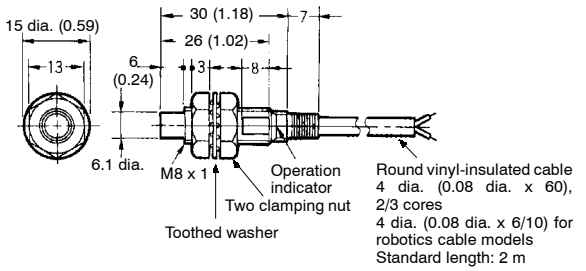



**Fig.7: E2E-X5ME□/F□-N**

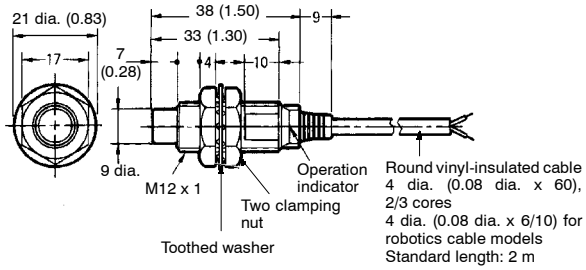



**Fig. 9: E2E-X10ME□/F□-N**

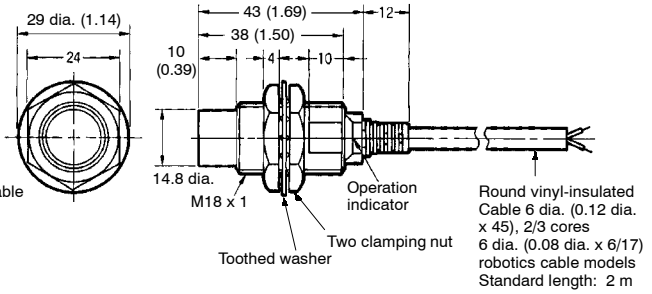
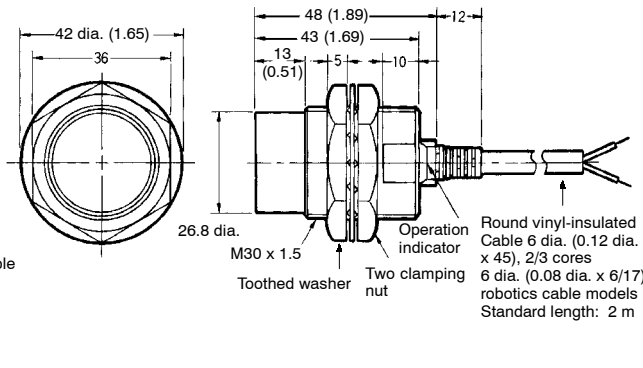
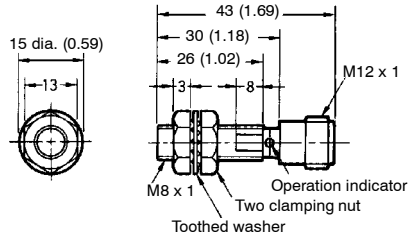



**Fig. 11: E2E-X18ME□/F□-N**



**Connector Models (Shielded)**

**Fig. 12: E2E-X1R5E□-M1/F□-M1-N**




**Connector Models (Unshielded)**

**Fig. 13: E2E-X2ME□-M1/F□-M1-N**

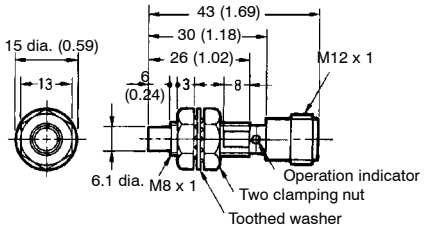



**Fig. 14: E2E-X2E□-M1/F□-M1-N**

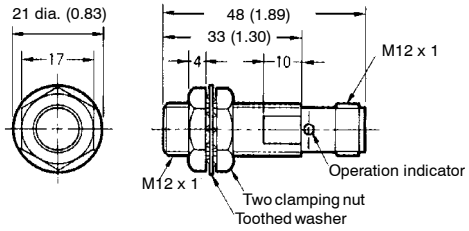



**Fig. 15: E2E-X5ME□-M1/F□-M1-N**

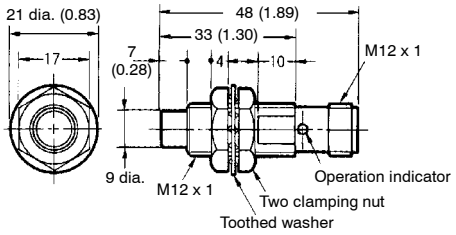



**Fig. 16: E2E-X5E□-M1/F□-M1-N**

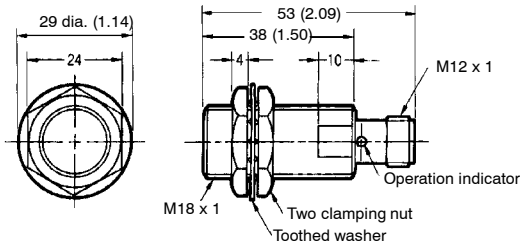



**Fig.17: E2E-X10ME□-M1/F□-M1-N**

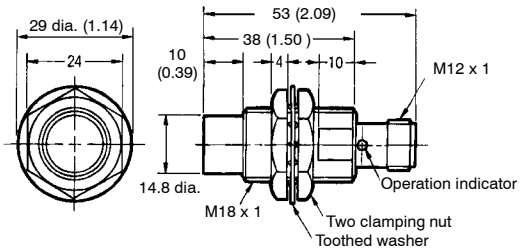



**Fig.18: E2E-X10E□-M1/F□-M1-N**

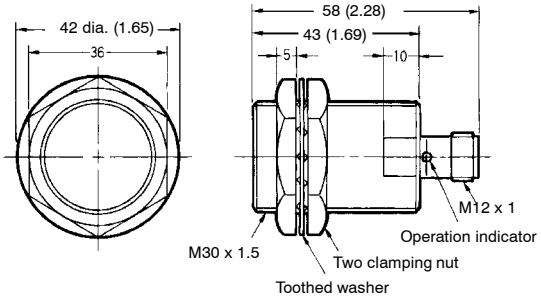
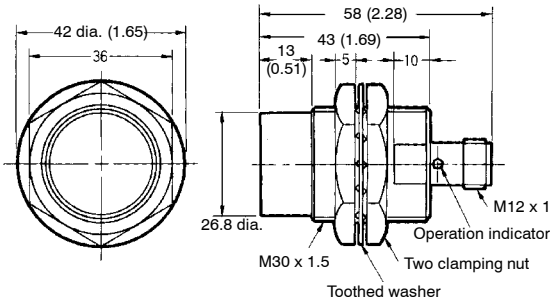
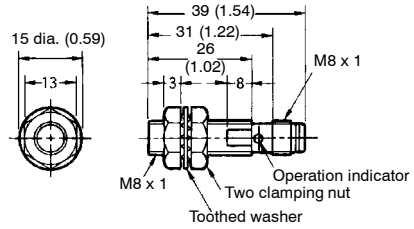



**Fig. 19: E2E-X18ME□-M1/F□-M1-N**



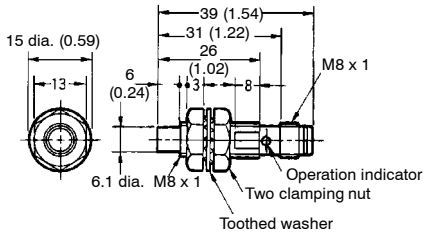
**M8 Connector Models (Shielded)**

**Fig. 20: E2E-X1R5E□-M3/F□-M3-N**

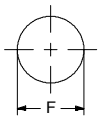



**M8 Connector Models (Unshielded)**

**Fig. 21: E2E-X2ME□-M3/F□-M3-N**




**Mounting Holes**

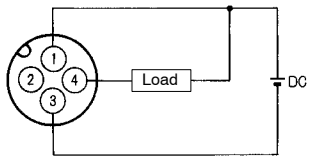
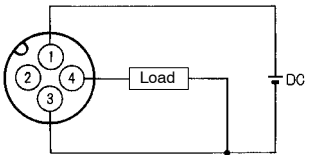
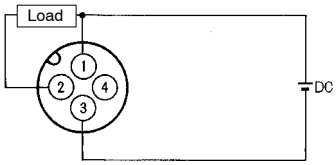
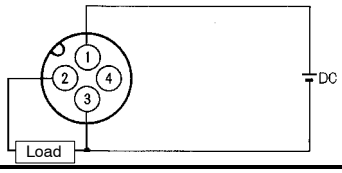



| Dimensions | 4 dia. | M5 | 5.4 dia. | M8 | M12 | M18 | M30 |
|---|---|---|---|---|---|---|---|
| F (mm) | $4.2^{+0.5}/_{0}$ dia. | $5.5^{+0.5}/_{0}$ dia. | $5.7^{+0.5}/_{0}$ dia. | $8.5^{+0.5}/_{0}$ dia. | $12.5^{+0.5}/_{0}$ dia. | $18.5^{+0.5}/_{0}$ dia. | $30.5^{+0.5}/_{0}$ dia. |

# Connection

## ■ PIN ARRANGEMENT

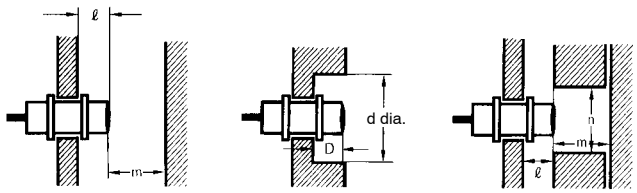
**E2E-X□E□-M1**

| 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. |

(This table continues on the next page.)

## ■ EFFECTS OF SURROUNDING METAL

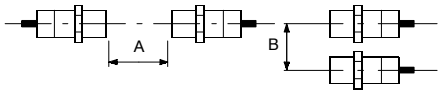
When mounting the E2E within a metal panel, ensure that the clearances given in the following table are maintained. Failure to maintain these distances may cause deterioration in the performance of the sensor.




| Type | | Dimension | 4 mm dia. | M5 | 5.4 mm dia. | M8 | M12 | M18 | M30 |
|---|---|---|---|---|---|---|---|---|---|
| E2ECR8□<br>E2E-X1□<br>E2E-C1□<br>E2E-X□E□-N<br>E2E-X□F□-N<br>DC 3-wire | Shielded | ℓ | 0 mm | 0 mm | 0 mm | 0 mm | 0 mm | 0 mm | 0 mm |
| | | d | 4 mm | 5 mm | 5.4 mm | 8 mm | 12 mm | 18 mm | 30 mm |
| | | D | 0 mm | 0 mm | 0 mm | 0 mm | 0 mm | 0 mm | 0 mm |
| | | m | 2.9 mm | 3 mm | 3 mm | 4.5 mm | 8 mm | 20 mm | 40 mm |
| | | n | 6 mm | 8 mm | 8 mm | 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 | | Dimension | 4 mm dia. | M5 | 5.4 mm dia. | M8 | M12 | M18 | M30 |
|---|---|---|---|---|---|---|---|---|---|
| E2ECR8□<br>E2E-X1□<br>E2E-C1□<br>E2E-X□E□-N<br>E2E-X□F□-N<br>DC 3-wire | Shielded | A | 20 mm | 20 mm | 20 mm | 20 mm | 30 (20) mm | 50 (30) mm | 100 (50) mm |
| | | B | 15 mm | 15 mm | 15 mm | 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 |

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