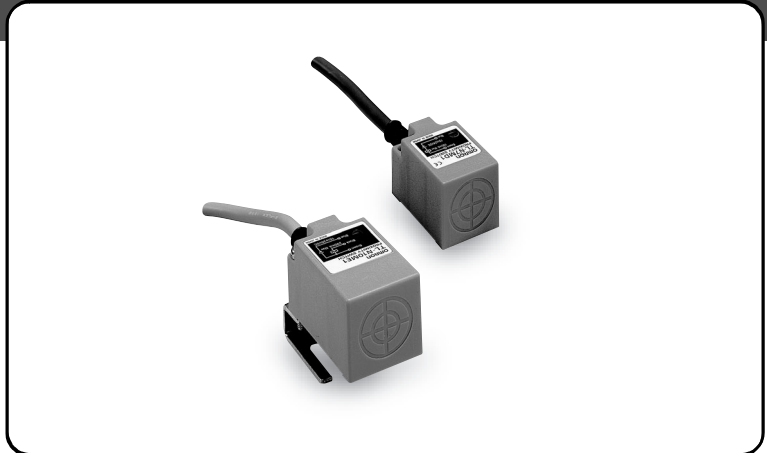


Rectangular Proximity Sensor TL-N

**A Variety of Models Available
for a Wide Range of Applica-
tions**





<READ AND UNDERSTAND THIS CATALOG>

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.






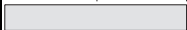
Ordering Information

■ TL-N□□MD DC 2-wire Models

| Shield | Sensing distance | Operation mode | Model |
|---|---|----------------|-----------|
| Non-shielded  |  7 mm | NO | TL-N7MD1 |
| | | NC | TL-N7MD2 |
| |  12 mm | NO | TL-N12MD1 |
| | | NC | TL-N12MD2 |
| |  20 mm | NO | TL-N20MD1 |
| | | NC | TL-N20MD2 |

Note: Models with a different frequency are available to prevent mutual interference. The model numbers are TL-N□□MD□5 (e.g., TL-N7MD15).

■ DC 3-wire and AC 2-wire Models

| Shield | Sensing distance | Operation mode | | Model | | |
|---|---|---|------------------|-----------|--------------------------------|--------------------------------|
| Non-shielded  |  5 mm | DC 3-wire Models | NPN | NO | TL-N5ME1 (See notes 2 and 3.) | |
| | | | NPN | NC | TL-N5ME2 (See notes 2.) | |
| | | AC 2-wire Models | | NO | TL-N5MY1 | |
| | | | | NC | TL-N5MY2 | |
| | |  10 mm | DC 3-wire Models | NPN | NO | TL-N10ME1 (See notes 2 and 3.) |
| | | | | NPN | NC | TL-N10ME2 (See notes 2.) |
| | AC 2-wire Models | | NO | TL-N10MY1 | | |
| | | | NC | TL-N10MY2 | | |
| |  20 mm | DC 3-wire Models | NPN | NO | TL-N20ME1 (See notes 2 and 3.) | |
| | | | NPN | NC | TL-N20ME2 | |
| | | AC 2-wire Models | | NO | TL-N20MY1 | |
| | | | | NC | TL-N20MY2 | |

Note 1. Models with a different frequency are available to prevent mutual interference. The model numbers are TL-N□□ME□5 (e.g., TL-N5ME15).

2. Each of these models has a cable with a standard length of 5 m.

3. Each of these models with a robot cable is available and classified with the suffix "R" added to the model number (e.g., TL-N5ME1-R).

Specifications

■ Ratings/Characteristics

TL-N□MD DC 2-wire Models

| Item | TL-N7MD□ | TL-N12MD□ | TL-N20MD□ |
|--|--|---|--------------------------------------|
| Power supply voltage (operating voltage range) | 12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max. | | |
| Leakage current | 0.8 mA max. | | |
| Sensing object | Ferrous metal (Refer to <i>Engineering Data</i> for non-ferrous metal) | | |
| Sensing distance | 7 mm ±10% | 12 mm ±10% | 20 mm ±10% |
| Set distance (standard sensing object) | 0 to 5.6 mm (iron, 30 x 30 x 1 mm) | 0 to 9.6 mm (iron, 40 x 40 x 1 mm) | 0 to 16 mm (iron, 50 x 50 x 1 mm) |
| Differential travel | 10% max. of sensing distance | | |
| Response speed (See note.) | 0.5 kHz | | 0.3 kHz |
| Operation mode (with sensing object approaching) | D1 Models: NO D2 Models: NC | | |
| Control output | Load current | 3 to 100 mA DC | |
| | Residual voltage | 3.3 V max. (Load current: 100 mA , Cable length: 2 m) | |
| Protection circuits | Short-circuit protection and surge suppressor | | |
| Indicator | D1 Models: Operation indicator (red LED) and setting indicator (green LED) D2 Models: Operation indicator (red LED) | | |
| Ambient temperature | Operating/storage: -25°C to 70°C (with no icing or condensation) | | |
| Ambient humidity | Operating/storage: 35% to 95% | | |
| Temperature influence | ±10% max. of sensing distance at 23°C in the temperature range of -25°C to 70°C | | |
| Voltage influence | ±2.5% max. of sensing distance in the rated voltage range ±15% | | |
| Insulation resistance | 50 MΩ min. (at 500 VDC) between current-carrying parts and case | | |
| Dielectric strength | 1,000 VAC for 1 min between current-carrying parts and case | | |
| Vibration resistance | 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions | | |
| Shock resistance | 1,000 m/s ² 10 times each in X, Y, and Z directions | | |
| Degree of protection | IEC 60529 IP67 | | |
| Weight (with 2-m cable) | Approx. 145 g | Approx. 170 g | Approx. 240 g |
| Material | Case | Heat-resistant ABS resin | |
| | Sensing surface | Heat-resistant ABS resin | |

Note: The response speed is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing objects, and a set distance of half the sensing distance.

DC 3-wire and AC 2-wire Models

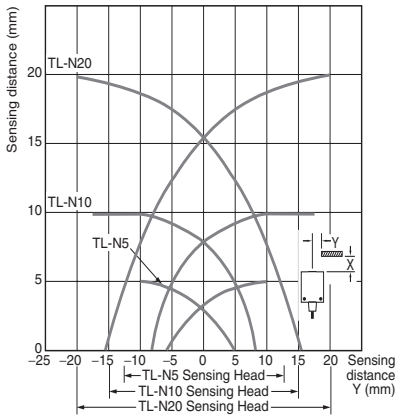
| Item | | TL-N5ME□, TL-N5MY□ | TL-N10ME□, TL-N10MY□ | TL-N20ME□, TL-N20MY□ |
|---|-------------------------|--|-------------------------------------|--------------------------------------|
| Power supply voltage (operating voltage range) (See note 1.) | | E Models: 12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max. Y Models: 100 to 220 VAC (90 to 250 VAC), 50/60 Hz | | |
| Current consumption | | E Models: 8 mA at 12 V, 15 mA at 24 V | | |
| Leakage current | | Y Models: Refer to <i>Engineering Data</i> . | | |
| Sensing object | | Ferrous metal (Refer to <i>Engineering Data</i> for non-ferrous metal) | | |
| Sensing distance | | 5 mm ±10% | 10 mm ±10% | 20 mm ±10% |
| Set distance (standard sensing object) | | 0 to 4 mm (iron, 30 x 30 x 1 mm) | 0 to 8 mm (iron, 40 x 40 x 1 mm) | 0 to 16 mm (iron, 50 x 50 x 1 mm) |
| Differential travel | | 15% max. of sensing distance | | |
| Response speed (See note 2.) | | E Models: 500 Hz Y Models: 10 Hz | | E Models: 40 Hz Y Models: 10 Hz |
| Operation mode (with sensing object approaching) | | E1 Models: NO E2 Models: NC Y1 Models: NO Y2 Models: NC | | |
| Control output | Load current | E Models: 100 mA max. at 12 VDC, 200 mA max. at 24 VDC Y Models: 10 to 200 mA | | |
| | Residual voltage | E Models: 1 V max. (Load current: 200 mA) Y Models: Refer to <i>Engineering Data</i> . | | |
| Protection circuits | | E Models: Reverse polarity protection and surge suppressor Y Models: Surge suppressor | | |
| Ambient temperature | | Operating/storage: -25°C to 70°C (with no icing or condensation) | | |
| Ambient humidity | | Operating/storage: 35% to 95% | | |
| Temperature influence | | ±10% max. of sensing distance at 23°C in the temperature range of -25°C to 70°C | | |
| Voltage influence | | E Models: ±2.5% max. of sensing distance in the rated voltage range ±10% Y Models: ±1% max. of sensing distance in the rated voltage range ±10% | | |
| Insulation resistance | | 50 MΩ min. (at 500 VDC) between current-carrying parts and case | | |
| Dielectric strength | | DC Models: 1,000 VAC, 50/60 Hz for 1 min between current-carrying parts and case AC Models: 2,000 VAC, 50/60 Hz for 1 min between current-carrying parts and case | | |
| Vibration resistance | | 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions | | |
| Shock resistance | | 500 m/s ² 10 times each in X, Y, and Z directions | | |
| Degree of protection | | IEC 60529: IP67 | | |
| Weight (with 2-m cable) | | Approx. 145 g | Approx. 170 g | Approx. 240 g |
| Material | Case | Heat-resistant ABS resin | | |
| | Sensing surface | Heat-resistant ABS resin | | |

Note: The response speed is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing objects, and a set distance of half the sensing distance.

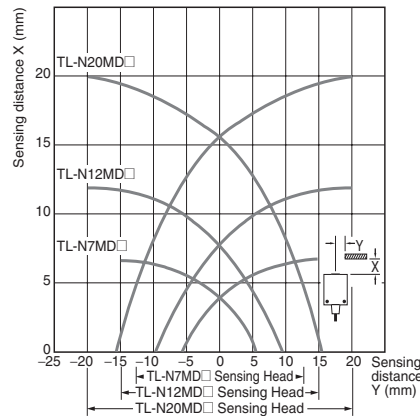
Engineering Data

Operating Range (Typical)

TL-N□ME, TL-N□MY

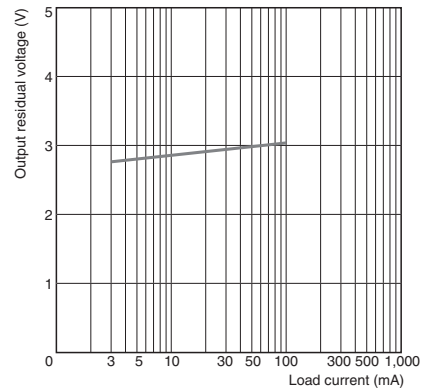


TL-N□MD DC 2-wire Models



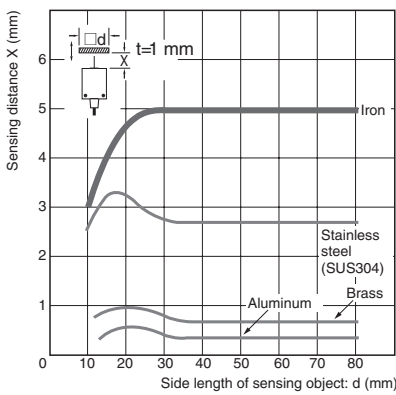
Output Residual Voltage Characteristics (Typical)

TL-N□MD DC 2-wire Models

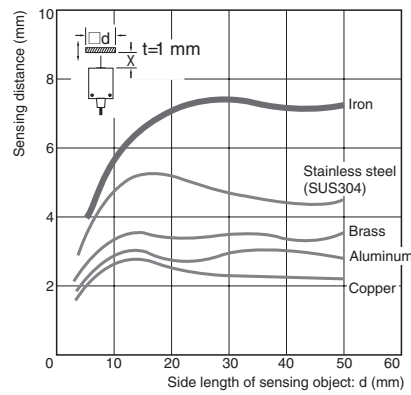


Sensing Object Size and Material vs. Sensing Distance (Typical)

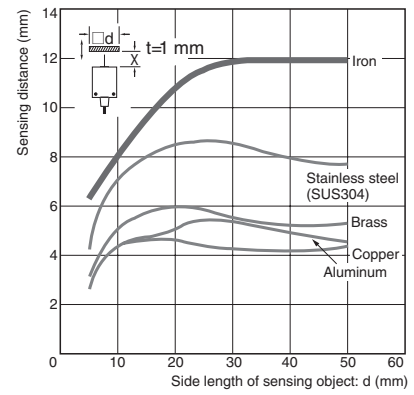
TL-N5



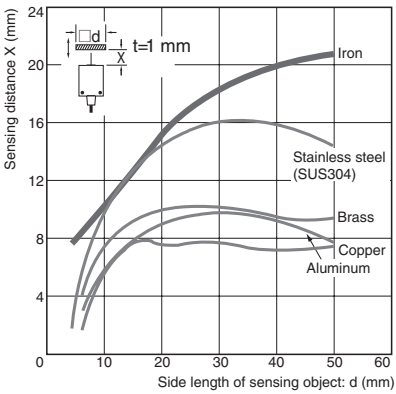
TL-N7MD DC 2-wire Models



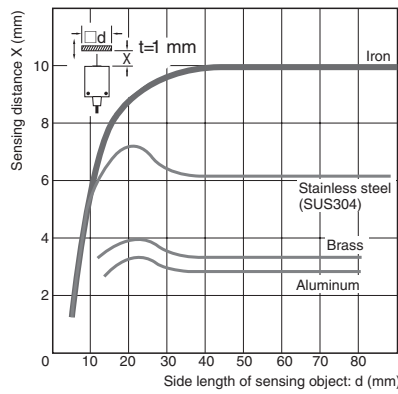
TL-N12MD DC 2-wire Models



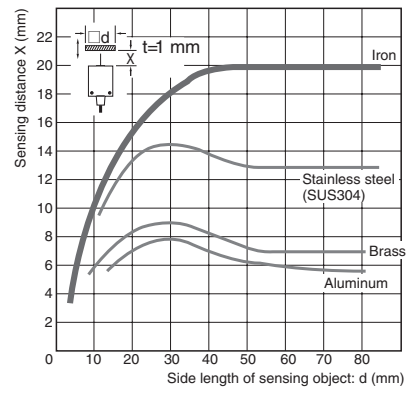
TL-N20MD DC 2-wire Models



TL-N10

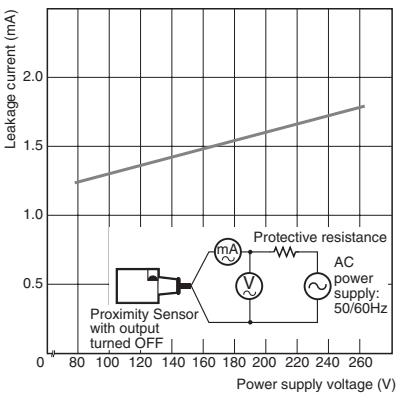


TL-N20



Leakage Current Characteristics (Typical)

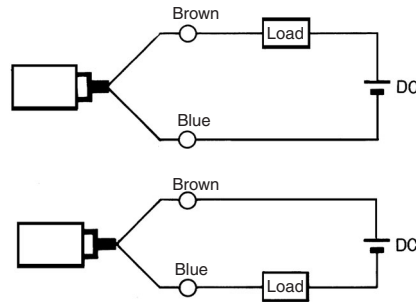
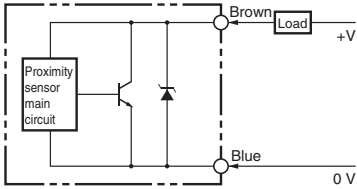
TL-N□MY



Operation

Output Circuits

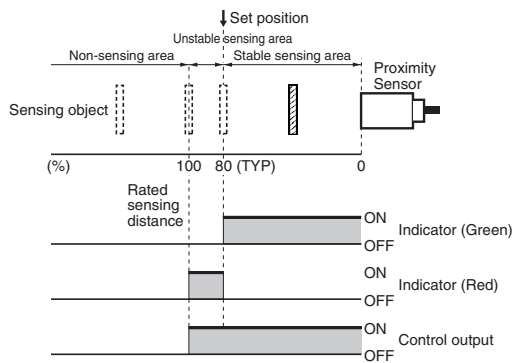
DC 2-wire Models



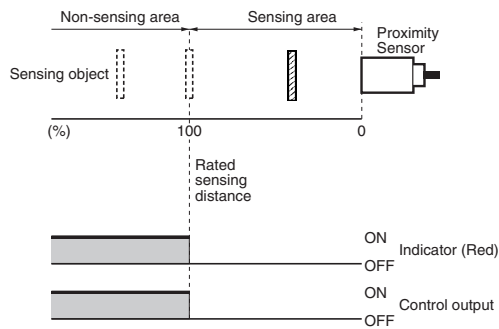
Note: The load can be connected in two ways as shown in the above diagrams.

Timing Charts

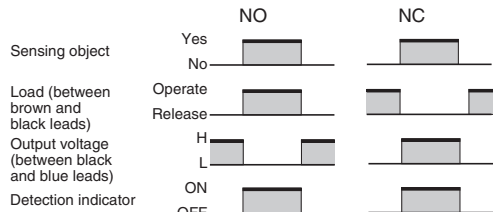
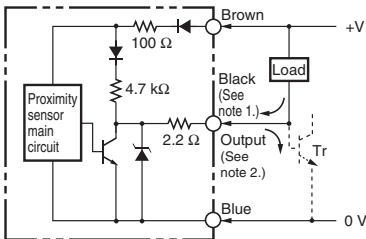
Normally Open Model



Normally Closed Model

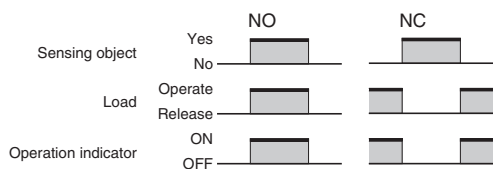
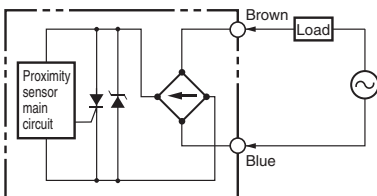


DC 3-wire Models



Note 1. 200 mA max. (load current)
Note 2. When a transistor is connected.

AC 2-wire Models



Precautions

⚠ WARNING

Do not use this Sensor in applications related to human safety.

This product is not designed or rated for ensuring safety of persons. Do not use it for such purposes.

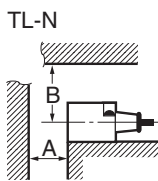
Do not short-circuit the load, otherwise the TL-N may be damaged. Do not supply power to the TL-N with no load, otherwise the TL-N may be damaged.

Applicable Models: AC 2-wire Models

■ Precautions for Correct Use

Influence of Surrounding Metals

When the TL-N is surrounded by metal, keep at least the following distances between the TL-N and the metal.



(Unit: mm)

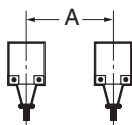
| Distance | TL-N7MD□ | TL-N12MD□ | TL-N20MD□ | TL-N5ME□ TL-N5MY□ | TL-N10ME□ TL-N10MY□ | TL-N20ME□ TL-N20MY□ |
|---------------|----------|-----------|-----------|----------------------|------------------------|------------------------|
| A (See note.) | 40 | 50 | 70 | 20 | 40 | 80 |
| B (See note.) | 35 | 40 | 60 | 23 | 30 | 45 |

Note: The figures are applicable for one metal object, otherwise the figure must be multiplied by the number of metal objects.

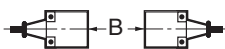
Mutual Interference

When two or more Sensors are mounted face-to-face or side-by-side, keep them separated at the following distances or greater.

Side-by side



Face-to-face



(Unit: mm)

| Distance | TL-N7MD□ | TL-N12MD□ | TL-N20MD□ | TL-N5ME□ TL-N5MY□ | TL-N10ME□ TL-N10MY□ | TL-N20ME□ TL-N20MY□ |
|----------|----------|-----------|-----------|----------------------|------------------------|------------------------|
| A | 100 (50) | 120 (60) | 200 (100) | 80 (40) | 80 (40) | 120 (60) |
| B | 120 (60) | 200 (100) | 200 (100) | 80 (40) | 90 (40) | 120 (60) |

Note: Figures in parentheses will apply if the Sensors in use are different to each other in response speed.

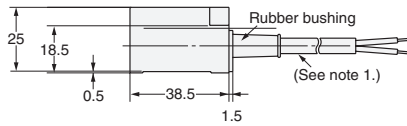
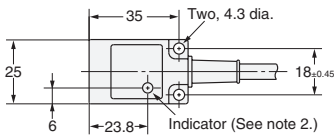
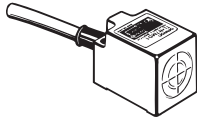
Mounting

Make sure that each screw is tightened with a torque within a range of 0.9 to 1.5 N·m.

Dimensions

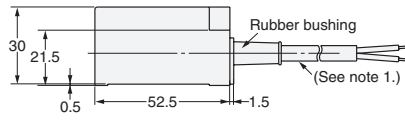
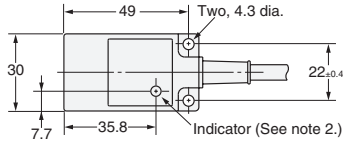
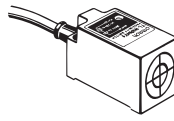
Note: All units are in millimeters unless otherwise indicated.

TL-N7MD



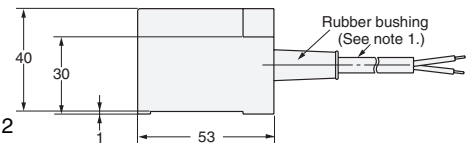
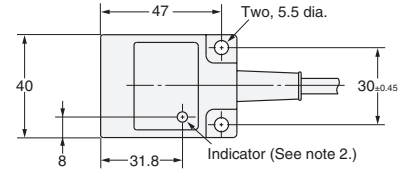
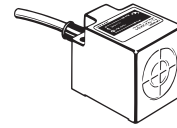
- Note 1.** 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm dia.), Standard length: 2 m
- D1 Models: Operation indicator (red) and setting indicator (green)
D2 Models: Operation indicator (red)
 - The Y92E-C5 Mounting Bracket is provided with the TL-N7MD.

TL-N12MD



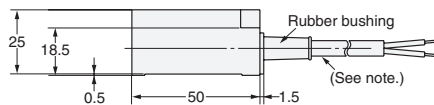
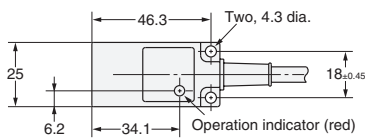
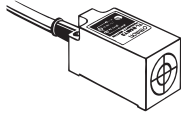
- Note 1.** 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm dia.), Standard length: 2 m
- D1 Models: Operation indicator (red) and setting indicator (green)
D2 Models: Operation indicator (red)
 - The Y92E-C10 Mounting Bracket is provided with the TL-N12MD.

TL-N20MD



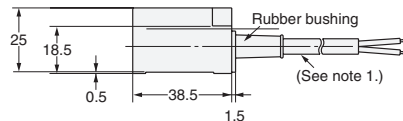
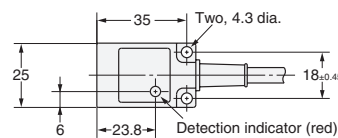
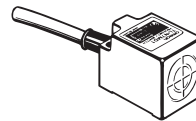
- Note 1.** 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm dia.), Standard length: 2 m
- D1 Models: Operation indicator (red) and setting indicator (green)
D2 Models: Operation indicator (red)
 - The Y92E-C20 Mounting Bracket is provided with the TL-N20MD.

TL-N5MY



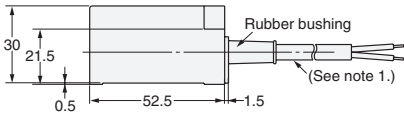
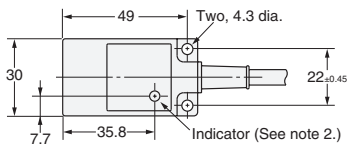
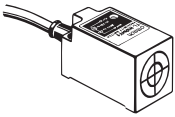
- Note 1.** 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm dia.), Standard length: 2 m

TL-N5ME



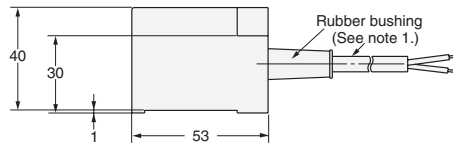
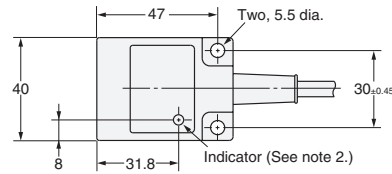
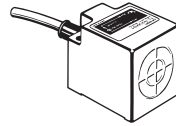
- Note 1.** 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm dia.), Standard length: 2 m
- The Y92E-C5 Mounting Bracket is provided with the TL-N5ME.

TL-N10ME/N10MY



- Note 1.** E Models: 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm dia.), Standard length: 2 m
 Y Models: 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm dia.), Standard length: 2 m
- 2.** E Models: Detection indicator (red)
 Y Models: Operation indicator (red)
- 3.** The Y92E-C10 Mounting Bracket is provided with the TL-N10ME□.

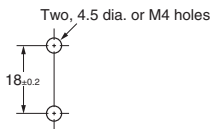
TL-N20ME/N20MY



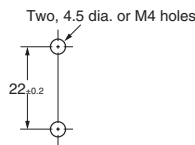
- Note 1.** E Models: 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm dia.), Standard length: 2 m
 Y Models: 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm dia.), Standard length: 2 m
- 2.** E Models: Detection indicator (red)
 Y Models: Operation indicator (red)
- 3.** The Y92E-C20 Mounting Bracket is provided with the TL-N20ME□.

Mounting Holes

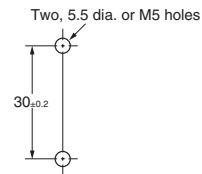
TL-N5ME/N5MY/N7MD



TL-N10ME/N10MY/N12MD



TL-N20ME/N20MY/N20MD

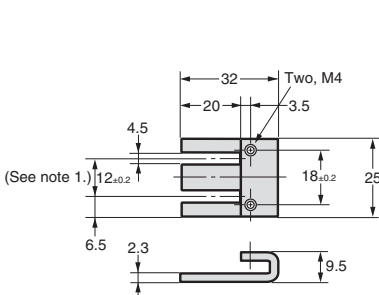


Mounting Brackets

The Mounting Bracket is provided with TLN□-ME□/D□ DC models. The Mounting Bracket as an optional accessory is available to all models.

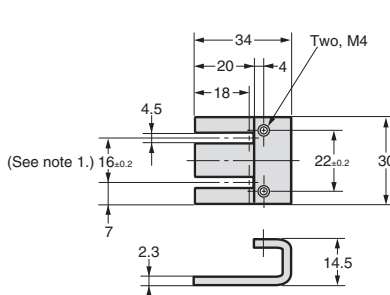
Y92E-C5

Applicable Models: TL-N5ME, TL-N5MY, and TL-N7MD



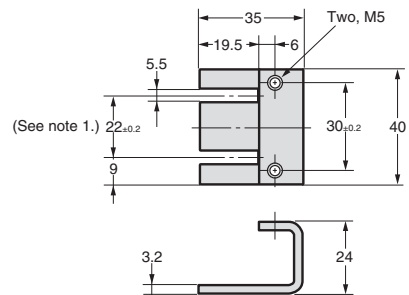
Y92E-C10

Applicable Models: TL-N10ME, TL-N10MY, and TL-N12MD



Y92E-C20

Applicable Models: TL-N20ME, TL-N20MY, and TL-N20MD

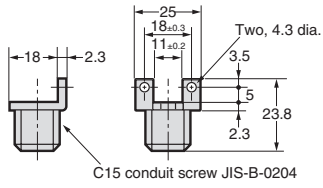


Note: These are the mounting dimensions of the base of the Mounting Bracket.

Mounting Brackets for Wiring Conduit Use (Sold Separately)

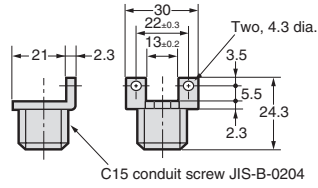
Y92E-N5C15

Applicable Models: TL-N5ME, TL-N5MY, and TL-N7MD



Y92E-N10C15

Applicable Models: TTL-N10ME, TL-N10MY, and TL-N12MD



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Cat. No. D079-E1-02

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Printed in Japan

0205-0.5C (0398) (M)