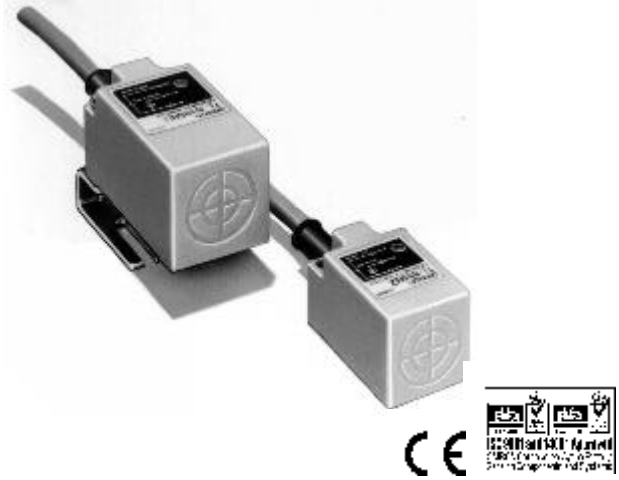


Rectangular Proximity Sensor





TL-N

A Variety of Models Available for a Wide Range of Applications







Ordering Information

■ TL-N□□MD DC 2-wire Models

Shield	Sensing distance	Output form	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 that are different in response frequency are available for the prevention of mutual interference. These models are classified under the TL-N□□MD□5 model numbers (e.g., TL-N7MD15).

■ DC 3-wire and AC 2-wire Models

Shield		Sensing distance	Output form			Model	
Non-shielded 	Rectangular	 5 mm	DC 3-wire	NPN	NO	TL-N5ME1 (see notes 2 and 3)	
				NPN	NC	TL-N5ME2 (see notes 2 and 3)	
			AC 2-wire	NO	TL-N5MY1		
				NC	TL-N5MY2		
			 10 mm	DC 3-wire	NPN	NO	TL-N10ME1 (see notes 2 and 3)
					NPN	NC	TL-N10ME2 (see notes 2 and 3)
	AC 2-wire	NO		TL-N10MY1			
		NC		TL-N10MY2			
	 20 mm	DC 3-wire	NPN	NO	TL-N20ME1 (see notes 2 and 3)		
			NPN	NC	TL-N20ME2 (see notes 2 and 3)		
		AC 2-wire	NO	TL-N20MY1			
			NC	TL-N20MY2			

Note: 1. Models that are different in response frequency are available for the prevention of mutual interference. These models are classified under the TL-□□M□□5 model numbers (e.g., TL-N5ME15).

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

3. Each of these models with a robot cord 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□
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%
Sensing distance (standard 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 frequency (see note)	0.5 kHz		0.3 kHz
Operating status (with sensing object approaching)	D1 models: Load ON D2 models: Load OFF		
Control output (switching capacity)	3 to 100 mA DC		
Circuit protection	Load short-circuit protection and surge absorber		
Indicator	D1 models: Operation indicator (red LED) and setting indicator (green LED) D2 models: Operation indicator (red LED)		
Ambient temperature	Operating: -25°C to 70°C (with no icing)		
Ambient humidity	Operating: 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 within a range of ±15% of the rated power supply voltage		
Residual voltage	3.3 V max. (with a load current of 100 mA and a cord 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 hours each in X, Y, and Z directions		
Shock resistance	1,000 m/s ² (approx. 100G) for 10 times each in X, Y, and Z directions		
Degree of protection	IEC60529 IP67		
Weight (with 2-m cord)	Approx. 145 g	Approx. 170 g	Approx. 240 g

Note: Response frequencies are average values measured with identical standard sensing objects, on condition that the space between any adjacent sensing objects was twice the width of a single sensing object and the setting distance was half the maximum sensing distance. Refer to *Precautions* for details.

DC 3-wire and AC 2-wire Models

Item	TL-N5ME□, TL-N5MY□	TL-N10ME□, TL-N10MY□	TL-N20ME□, TL-N20MY□
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%
Setting distance (standard 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	1% to 15% of sensing distance		
Response frequency (see note 2)	E models: 500 Hz Y models: 10 Hz		E models: 40 Hz Y models: 10 Hz
Operating status (with sensing object approaching)	E1 models: L output signal with load ON E2 models: H output signal with load OFF Y1 models: Load ON Y2 models: Load OFF		
Control output (switching capacity)	E models: 100 mA max. at 12 VDC and 200 mA max. at 24 VDC Y models: 10 to 200 mA		
Circuit protection	E models: Reverse connection protection and surge absorber Y models: Surge absorber		
Ambient temperature	Operating: -25°C to 70°C (with no icing)		
Ambient humidity	Operating: 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 within a range of ±10% of the rated power supply voltage Y models: ±1% max. of sensing distance within a range of ±10% of the rated power supply voltage		
Residual voltage	E models: 1 V max. with a current of 200 mA Y models: Refer to <i>Engineering Data</i> .		
Insulation resistance	50MΩ min. (at 500 VDC) between current carry parts and case		
Dielectric strength	DC models: 1,000 VAC, 50/60 Hz for 1 min between current carry parts and case AC models: 2,000 VAC, 50/60 Hz for 1 min between current carry 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 (approx. 50G) for 10 times each in X, Y, and Z directions		
Degree of protection	IEC IP67		
Weight (with 2-m cord)	Approx. 145 g	Approx. 170 g	Approx. 240 g
Material	Case	Heat-resistant ABS resin	
	Sensing surface	Heat-resistant ABS resin	

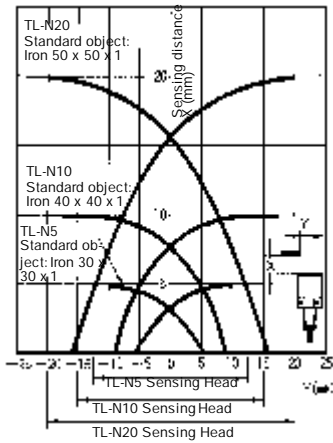
Note: 1. The E models (DC switching type) can be used with a full-wave rectification power of 24 VDC ±10%.

2. Values in parentheses indicate reference data.

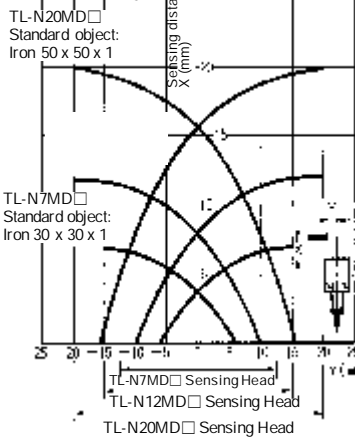
Engineering Data

Operating Range (Typical)

TL-N□ME, TL-N□MY

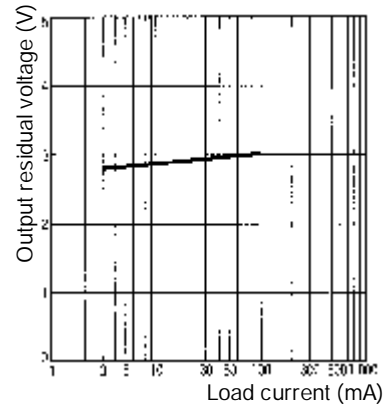


TL-N□MD DC 2-wire Models



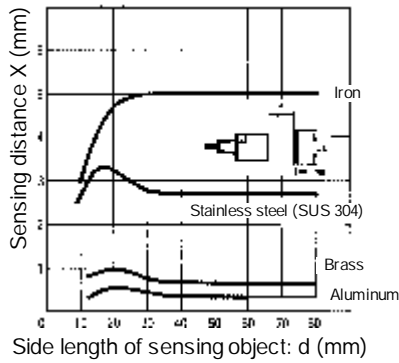
Output Residual Voltage Characteristics (Typical)

TL-N□MD DC 2-wire Models

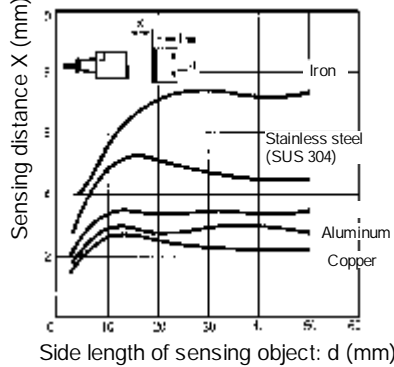


Sensing Object Size and Material vs. Sensing Distance (Typical)

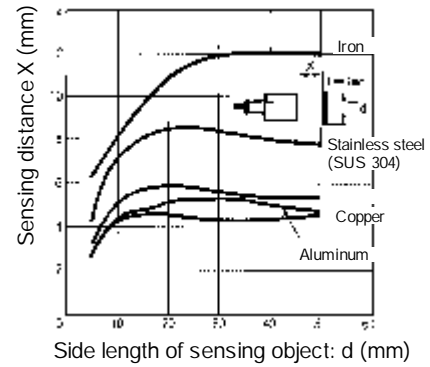
TL-N5



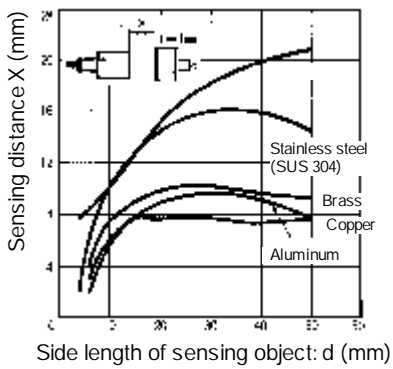
TL-N7MD DC 2-wire Models



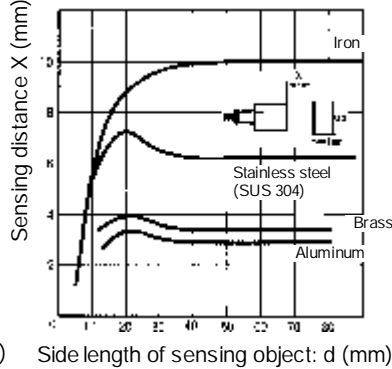
TL-N12MD DC 2-wire Models



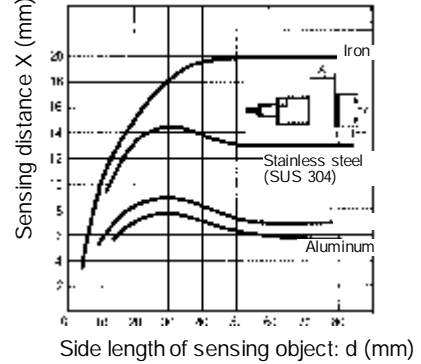
TL-N20MD DC 2-wire Models



TL-N10

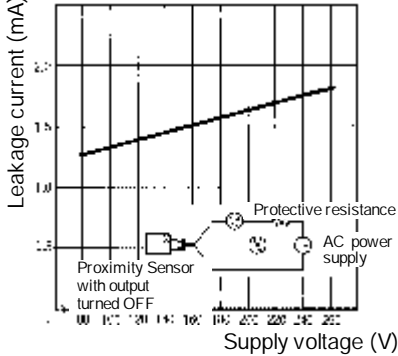


TL-N20



Leakage Current Characteristics (Typical)

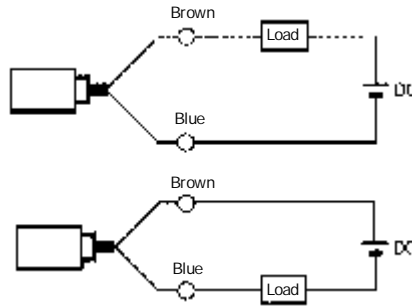
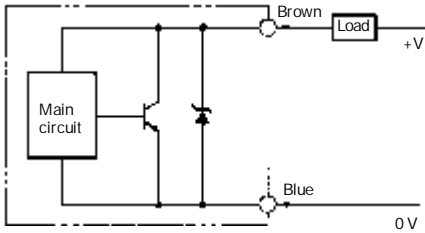
TL-N□MY



Operation

Output Circuits

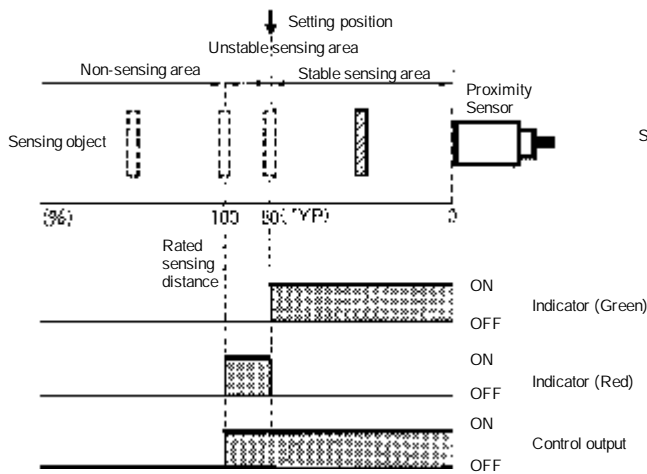
DC 2-wire Models



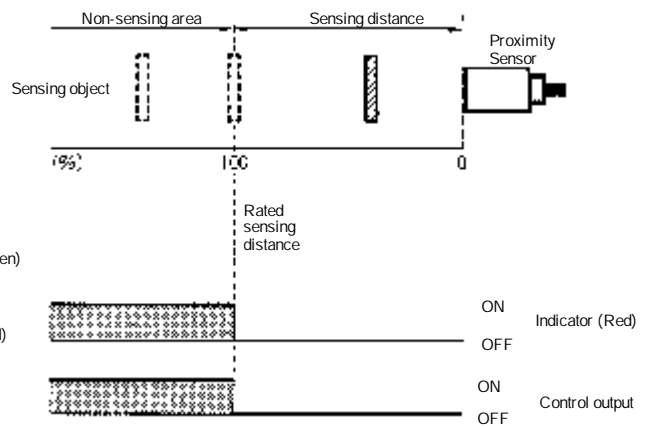
Note: The load can be connected in two ways as shown in the above diagrams.

Timing Charts

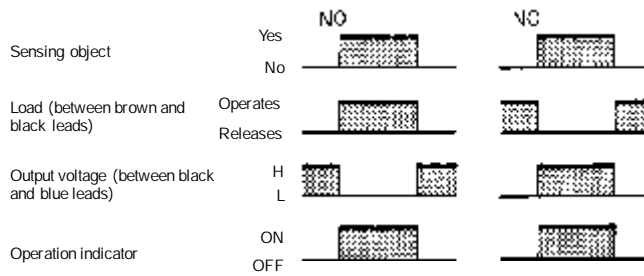
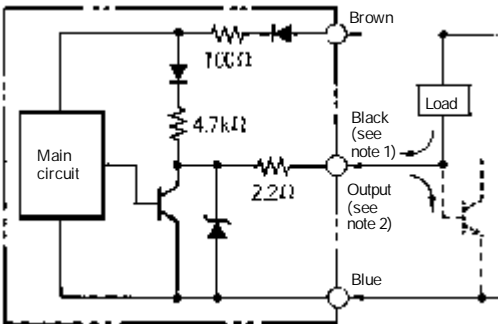
Normally Open Model



Normally Closed Model

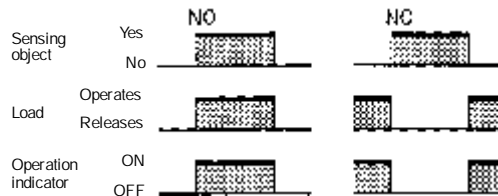
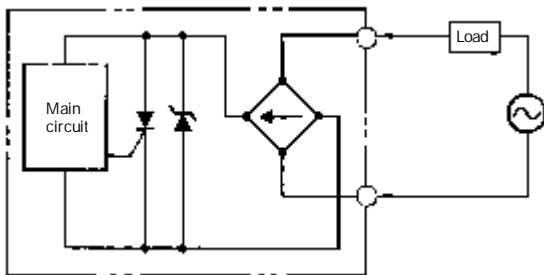


DC 3-wire Models



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

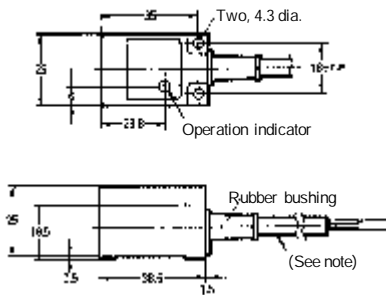
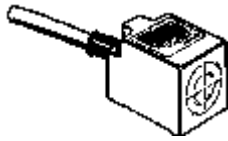
AC 2-wire Models



Dimensions

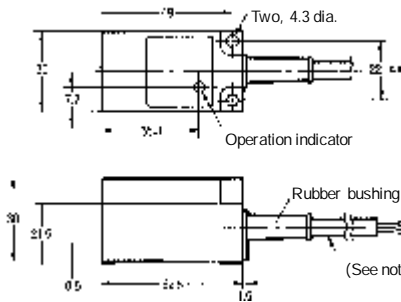
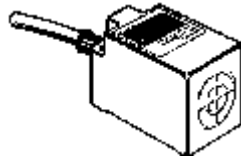
Note: All units are in millimeters unless otherwise indicated.

TL-N7MD



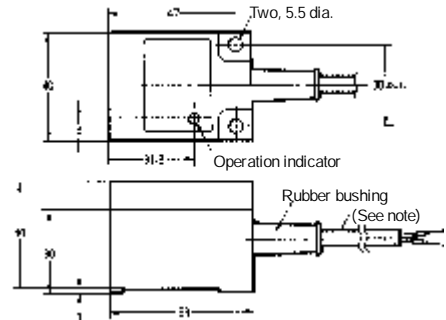
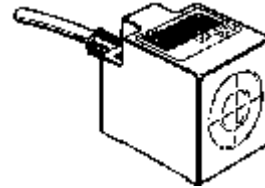
Note: Vinyl-insulated round cord (6 dia., 0.5 mm²), 2 cores; standard length: 2 m

TL-N12MD



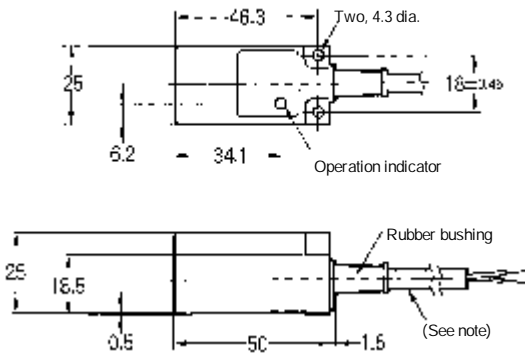
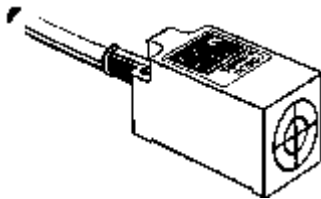
Note: Vinyl-insulated round cord (6 dia., 45/0.12), 2 cores; standard length: 2 m

TL-N20MD



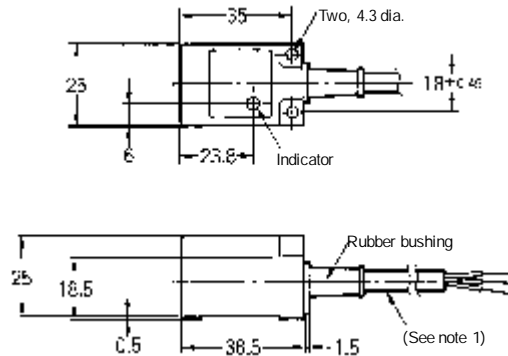
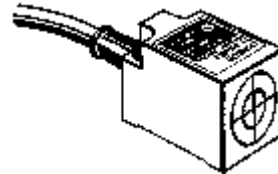
Note: Vinyl-insulated round cord (6 dia., 45/0.12), 2 cores; standard length: 2 m

TL-N5MY



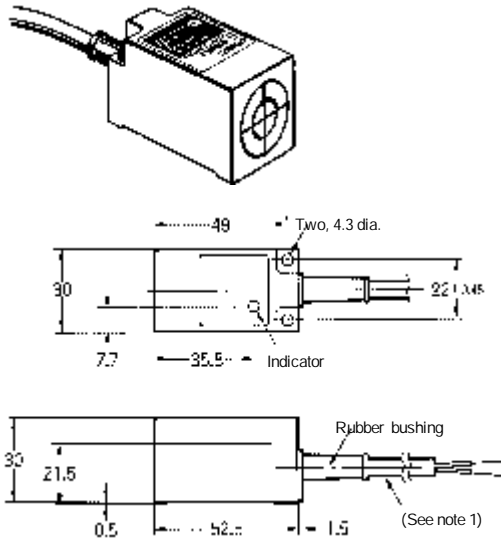
Note: Vinyl-insulated round cord, oil- and vibration-resistant, 0.5 mm², 2 cores, 6 dia.; standard length: 2 m

TL-N5ME



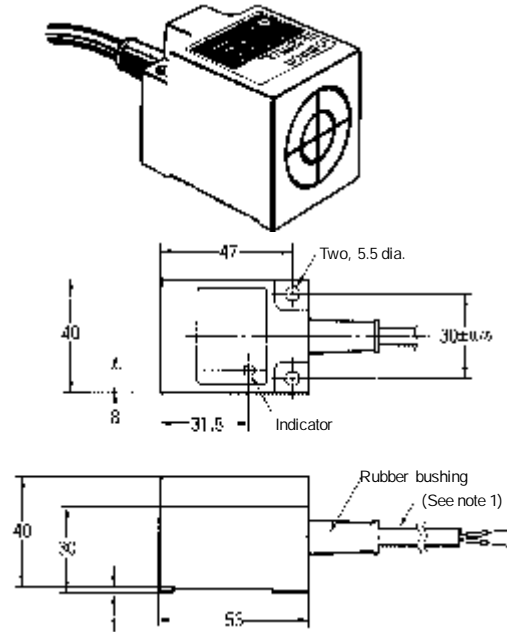
Note: 1. Vinyl-insulated round cord, oil- and vibration-resistant, 0.5 mm², 3 cores, 6 dia.; standard length: 2 m
2. The Y92E-C5 Mounting Bracket is provided with the TL-N5ME.

TL-N10ME/N10MY



- Note:**
1. Vinyl-insulated round cord, oil- and vibration-resistant, 0.5-mm², 6 dia., 2 cores for TL-N10MY, 3 cores for TL-N10ME.
 2. The Y92E-C10 Mounting Bracket is provided with the TL-N10ME□.

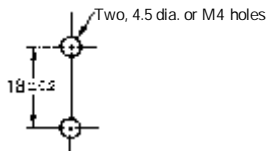
TL-N20ME/N20MY



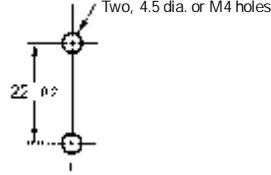
- Note:**
1. Vinyl-insulated round cord, oil- and vibration-resistant, 0.5-mm², 6 dia., 2 cores for TL-N20MY, 3 cores for TL-N20ME.
 2. The Y92E-C20 Mounting Bracket is provided with the TL-N20ME□.

Mounting Holes

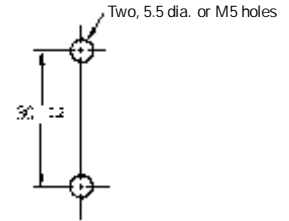
TL-N5ME/N5MY/N7MD



TL-N10ME/N10MY/N12MD



TL-N20ME/N20MY/N20MD

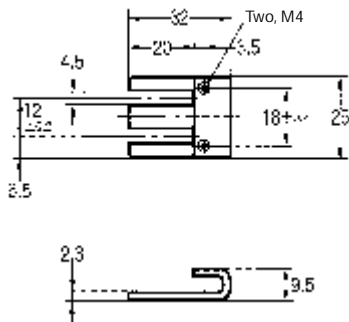


Mounting Brackets

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

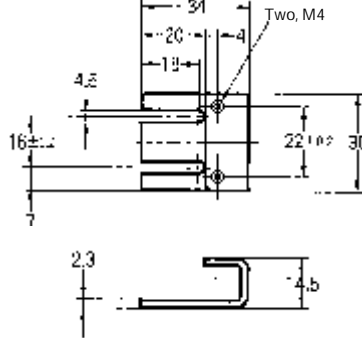
Y92E-C5

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



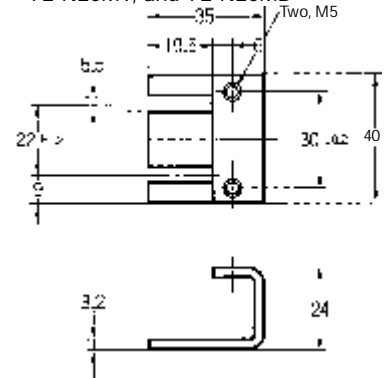
Y92E-C10

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



Y92E-C20

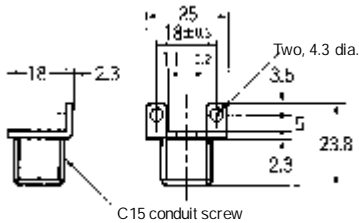
Applicable Models: TL-N20ME, TL-N20MY, and TL-N20MD



Mounting Brackets for Wiring Conduit Use (Sold Separately)

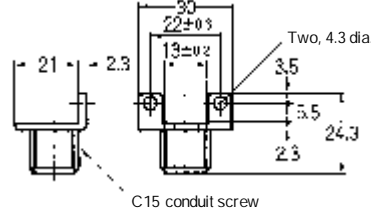
Y92E-N5C15

Applicable Models: TL-N5ME and TL-N5MY



Y92E-N10C15

Applicable Models: TL-N10ME and TL-N10MY



Precautions

■ Warnings

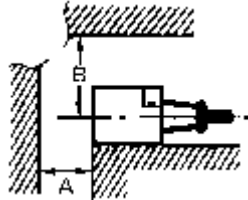
Do not short-circuit the load, otherwise the TL-N may be damaged.
 Do not supply power to the TL-N with no load, otherwise the TL-N may be damaged.

Applicable Models: AC 2-wire models

■ Correct Use

Effects 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)

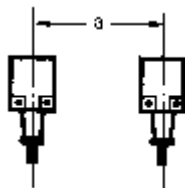
Distance	TL-N7MD□	TL-N12MD□	TL-N20MD□	TL-N5ME□ TL-N5MY□	TL-N10ME□ TL-N10MY□	TL-N20ME□ TL-N20MY□
A (see note)	40	50	70	20	40	80
B (see note)	35	40	60	23	30	45
C (see note)	---	---	---	---	---	---

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

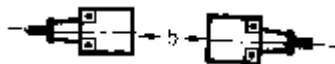
Mutual Interference

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)	200 (100)
b	120 (60)	200 (100)	300 (150)	80 (40)	90 (40)	120 (60)	200 (100)

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

Mounting

Make sure that each screw is tightened with a torque within a range of 9.3 to 15 kgf • cm (0.9 to 1.5 N • m).

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D79-E1-1 **In the interest of product improvement, specifications are subject to change without notice.**

OMRON Corporation

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