

Inductive Proximity Sensor

TL-M

General-purpose Type in a Basic Switch Housing

- Mounting pitch compatible with that of mechanical basic switch.
- Wide operating voltage range: 10 to 30 VDC or 90 to 250 VAC.
- LED operation indicator.
- Watertight construction conforming to IEC IP67.



Ordering Information

Shield	Sensing distance	Output form		
		DC 3-wire models, NPN		AC 2-wire models
		NO	NC	NO
Unshielded	2 mm	TL-M2ME1	TL-M2ME2	TL-M2MY1
	5 mm	TL-M5ME1	TL-M5ME2	TL-M5MY1

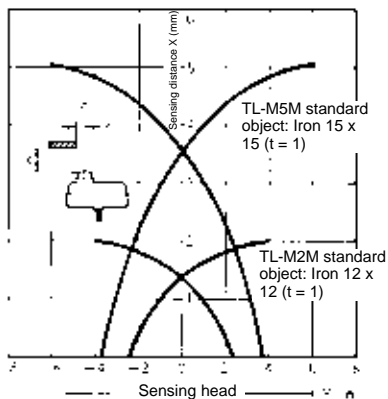
Specifications

■ Ratings/Characteristics

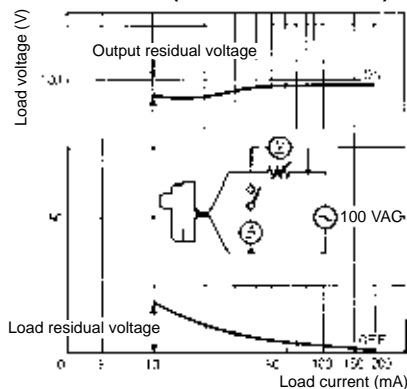
Item	TL-M2ME1, TL-M2MY1, TL-M2ME2	TL-M5ME1, TL-M5MY1, TL-M5ME2
Supply voltage (operating voltage range)	E models: 12 to 24 VDC (10 to 30 VDC), ripple (p-p): 20% max. Y models: 100 to 220 VAC (90 to 250 VAC), 50/60 Hz	
Current consumption	E models: 15 mA max. at 24 V with no load.	
Leakage current	Y models: 2.5 mA max. at 200 VAC	
Sensing object	Ferrous metal (The sensing distance decreases with non-ferrous metal.)	
Sensing distance	2 mm \pm 10%	5 mm \pm 10%
Sensing distance (standard object)	0 to 1.6 mm (iron, 15 x 15 x 1 mm)	0 to 4 mm (iron, 15 x 15 x 1 mm)
Differential travel	10% max. of sensing distance	
Response frequency	E models: 500 Hz, Y models: 20 Hz	E models: 250 Hz, Y models: 20 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	
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	\pm 10% max. of sensing distance at 23°C in the temperature range of -25°C to 70°C	
Voltage influence	E models: \pm 2.5% max. of sensing distance within a range of \pm 15% of the rated power supply voltage Y models: \pm 1% max. of sensing distance within a range of \pm 10% of the rated power supply voltage	
Residual voltage	E models: 1 V max. Y models: Refer to <i>Engineering Data</i> .	
Insulation resistance	50 M Ω min. (at 500 VDC) between current carry parts and case	
Dielectric strength	DC switching models: 500 VAC, 50/60 Hz for 1 min between current carry parts and case AC switching 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	IEC60529 IP67	
Weight (with 2-m cord)	Approx. 75 g	
Material	Case	Heat-resistant ABS resin
	Sensing surface	Heat-resistant ABS resin

Engineering Data

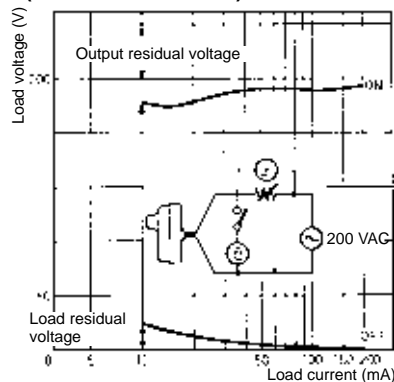
Operating Range (Typical)



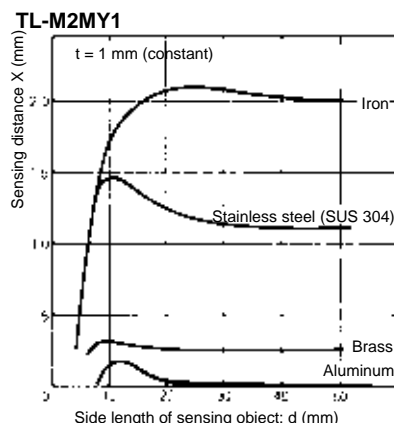
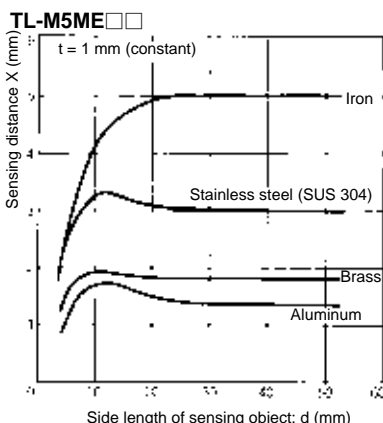
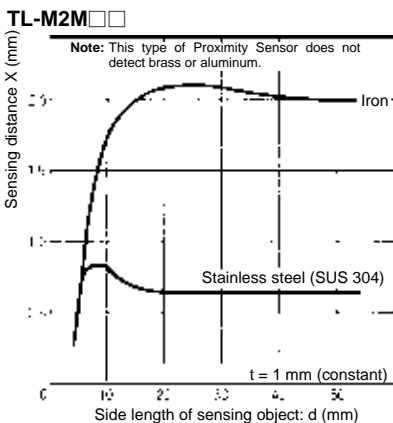
Residual Load Voltage (Typical) TL-M□MY1 (at constant 100 VAC)



(at constant 200 VAC)

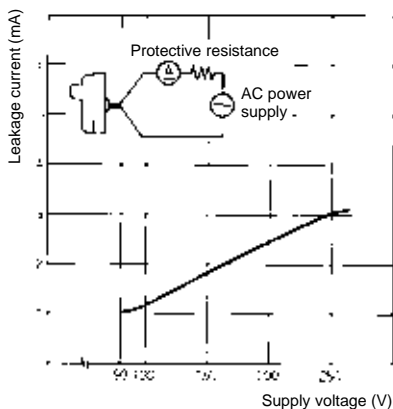


Sensing Object Size and Material vs. Sensing Distance (Typical)



Leakage Current (Typical)

TL-M□MY1

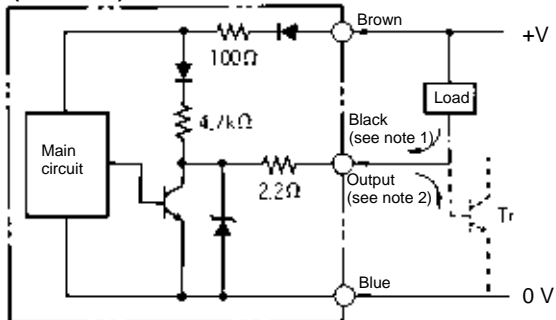


Operation

Output Circuits

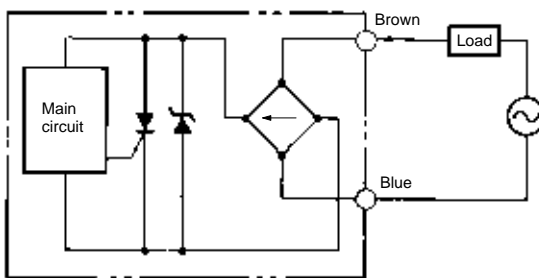
TL-M□ME

(DC 3-wire)



TL-M□MY

(AC 2-wire)

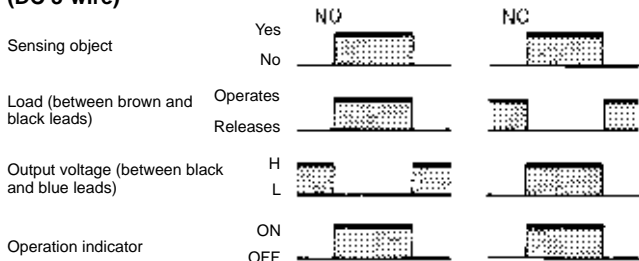


- Note:**
1. 200 mA max. (load current)
 2. When a transistor is connected

Timing Charts

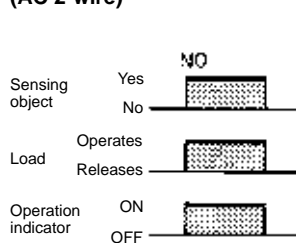
TL-M□ME

(DC 3-wire)



TL-M□MY

(AC 2-wire)



Dimensions

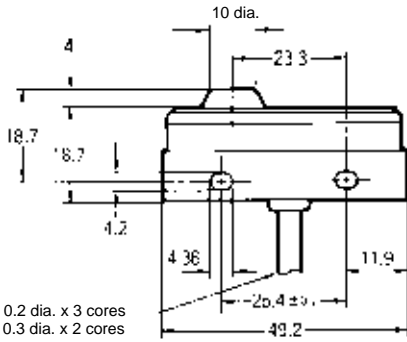
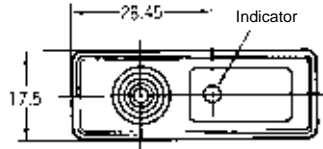
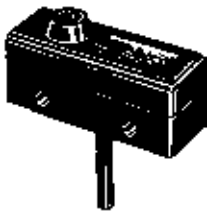
Note: All units are in millimeters unless otherwise indicated.

**TL-M2ME1
TL-M2ME2
TL-M2MY1**

Weight: Approx. 75 g

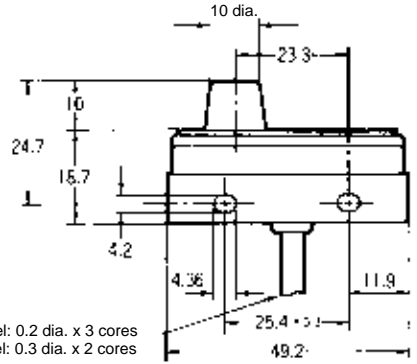
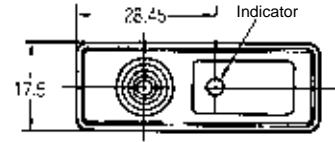
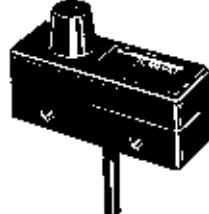
**TL-M5ME1
TL-M5ME2
TL-M5MY1**

Weight: Approx. 75 g



DC switching model: 0.2 dia. x 3 cores
AC switching model: 0.3 dia. x 2 cores

Oil-resistant and vibration-resistant round cord,
4 dia., standard length: 2 m



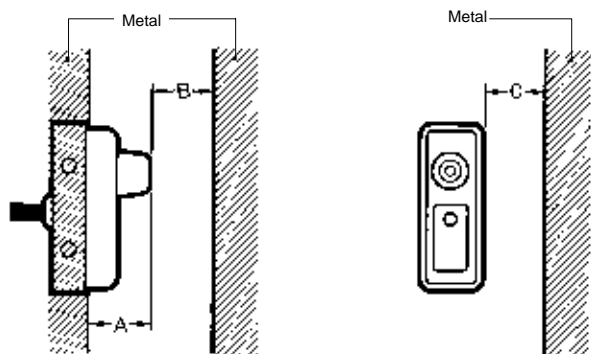
DC switching model: 0.2 dia. x 3 cores
AC switching model: 0.3 dia. x 2 cores

Oil-resistant and vibration-resistant round cord,
4 dia., standard length: 2 m

Precautions

Effects of Surrounding Metals

When mounting a Proximity Sensor flush with a metallic panel, be sure to provide a minimum distance as shown for each model in the table below, to prevent the Sensor from being affected by metallic objects other than the sensing object.



(Direct mounting)

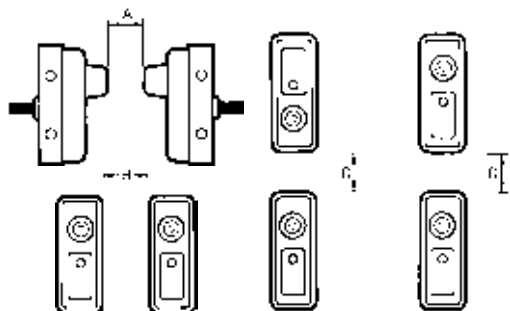
Note: The distance "c" becomes 0 only in the shaded section of the above-left side section.

(Unit: mm)

Distance	Model	
	TL-M2M□□	TL-M5M□□
A	12	18
B	10	25
C	15	30

Mutual Interference

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



(Unit: mm)

Distance	Model	
	TL-M2M	TL-M5M
A	60 (30)	120 (60)
B	40 (0)	80 (40)
C	30 (0)	70 (30)
D	10 (0)	50 (10)

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

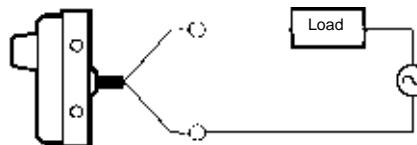
Mounting

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527. Do not apply a tightening torque exceeding 10 kgf • cm (0.98 N • m) when tightening any mounting screw.

Connection to Power Source

Be sure to connect the Proximity Sensor to a power source through a load. Direct connection may damage the Sensor.



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. D06-E1-6 **In the interest of product improvement, specifications are subject to change without notice.**

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