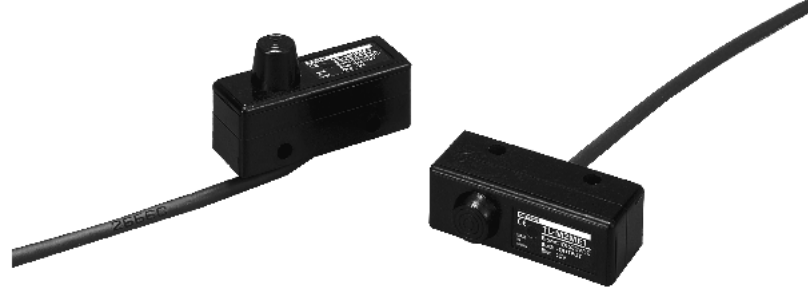


Basic Switch Style Inductive Prox




TL-M

General-purpose Inductive Prox in a Basic Switch Housing

- Mounting pitch compatible with that of a 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	Part number		
		DC 3-wire models, NPN		AC 2-wire models
		NO	NC	NO
Unshielded 	 2 mm (0.08 in)	TL-M2ME1	TL-M2ME2	TL-M2MY1
	 5 mm (0.20 in)	TL-M5ME1	TL-M5ME2	TL-M5MY1

Specifications

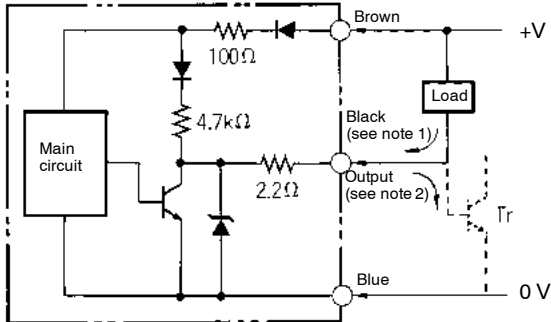
■ RATINGS/CHARACTERISTICS

Part number		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% (0.08 in)	5 mm \pm 10% (0.20 in)
Sensing distance (standard object)		0 to 1.6 mm (0.06 in) iron, 15 x 15 x 1 mm	0 to 4 mm (0.16 in) 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	
Residual voltage		E models: 1 V max. Y models: Refer to <i>Engineering Data</i> .	
Circuit protection		E models: Reverse connection protection and surge absorber Y models: Surge absorber	
Ambient temperature	Operating	-25°C to 70°C (-13°F to 158°F) with no icing	
Ambient humidity	Operating	35% to 95%	
Temperature influence		\pm 10% max. of sensing distance at 23°C (73.4°F) in the temperature range of -25°C to 70°C (-13°F to 158°F)	
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	
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 (1640.4 ft/sec ²) approx. 50G for 10 times each in X, Y, and Z directions	
Degree of protection		IEC60529 IP67	
Weight (with 2-m cable)		Approx. 75 g (2.66 oz)	
Material	Case	Heat-resistant ABS resin	
	Sensing surface	Heat-resistant ABS resin	

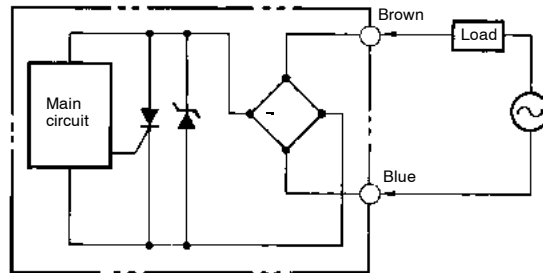
Operation

OUTPUT CIRCUITS

TL-M□ME
(DC 3-wire)



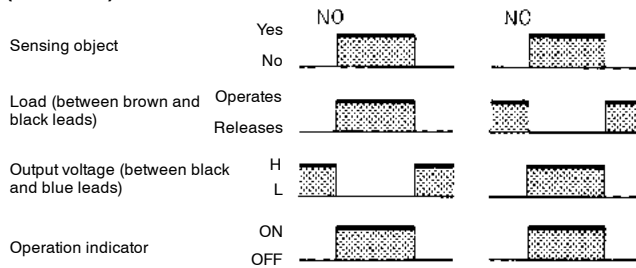
TL-M□MY
(AC 2-wire)



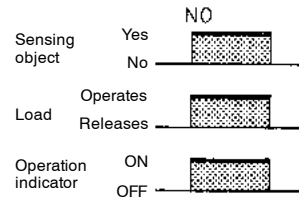
- Note: 1. 200 mA max. (load current)
2. When a transistor is connected

TIMING CHARTS

TL-M□ME
(DC 3-wire)

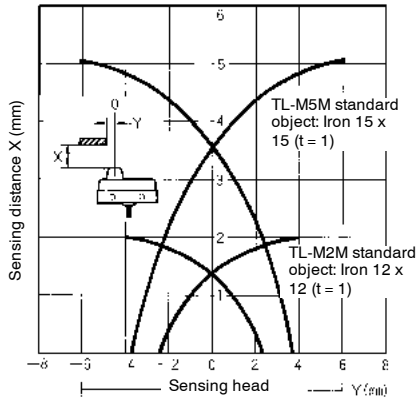


TL-M□MY
(AC 2-wire)



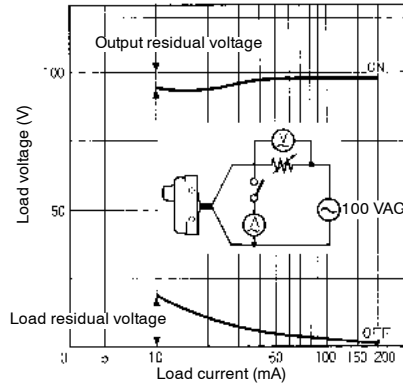
Engineering Data

OPERATING RANGE (TYPICAL)

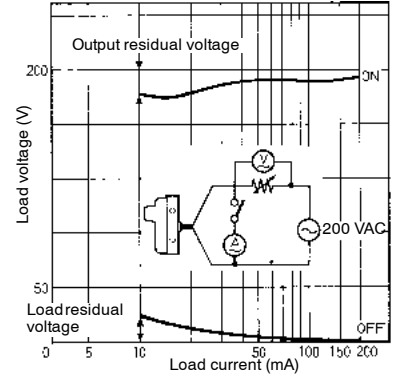


RESIDUAL LOAD VOLTAGE (TYPICAL)

TL-M□MY1 (at constant 100 VAC)

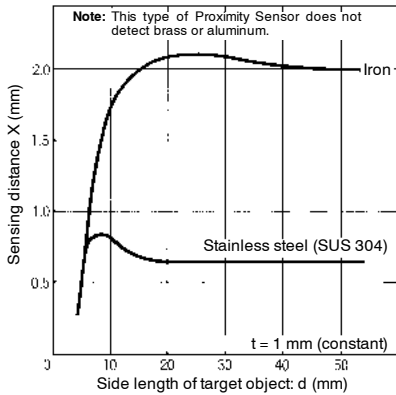


(at constant 200 VAC)

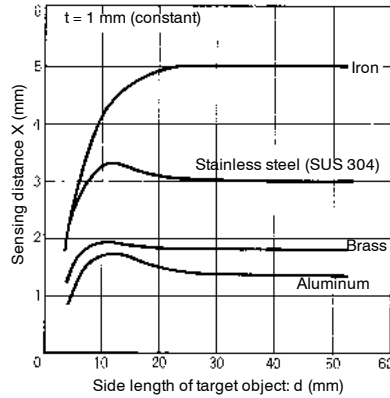


SENSING OBJECT SIZE AND MATERIAL VS. SENSING DISTANCE (TYPICAL)

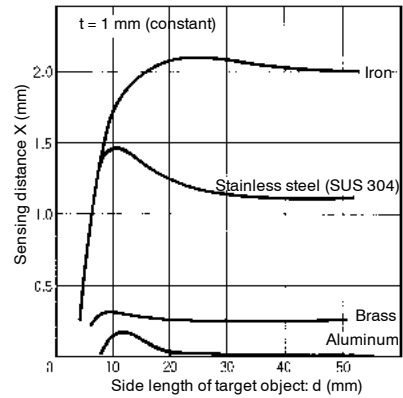
TL-M2M□□



TL-M5ME□□

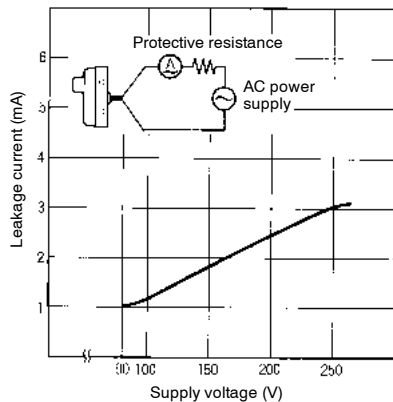


TL-M2MY1



LEAKAGE CURRENT (TYPICAL)

TL-M□MY1

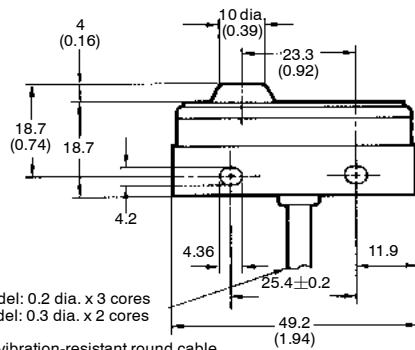
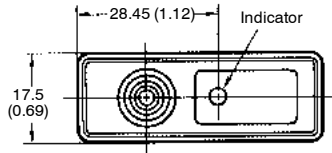
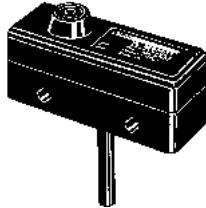


Dimensions

Unit: mm (inch)

■ TL-M2ME1
TL-M2ME2
TL-M2MY1

Weight: Approx. 75 g

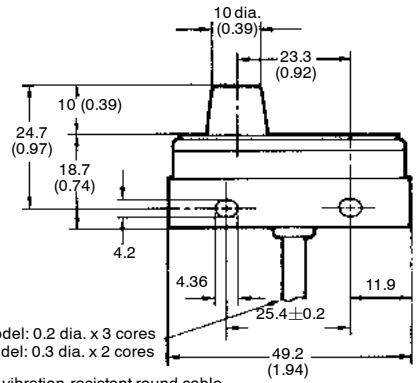
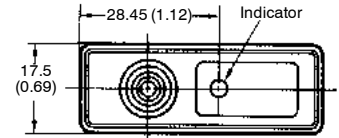
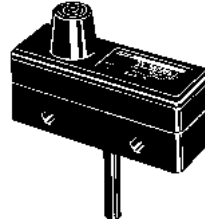


DC switching model: 0.2 dia. x 3 cores
AC switching model: 0.3 dia. x 2 cores

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

■ TL-M5ME1
TL-M5ME2
TL-M5MY1

Weight: Approx. 75 g



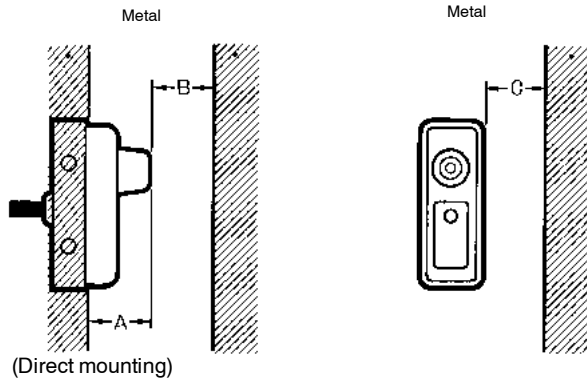
DC switching model: 0.2 dia. x 3 cores
AC switching model: 0.3 dia. x 2 cores

Oil-resistant and vibration-resistant round cable,
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.

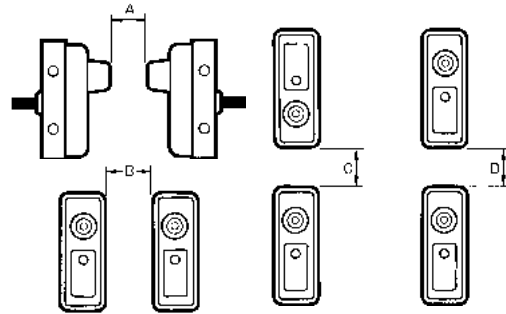


Note: The distance “c” becomes 0 only in the shaded section of the above-left side section.

Distance	Part number	
	TL-M2M□□	TL-M5M□□
A	12 mm (0.47 in)	18 mm (0.71 in)
B	10 mm (0.39 in)	25 mm (0.98 in)
C	15 mm (0.59 in)	30 mm (1.18 in)

■ 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.



Same Frequency Type

Distance	Part number	
	TL-M2M	TL-M5M
A	60 mm (2.36 in)	120 mm (4.72 in)
B	40 mm (1.57 in)	80 mm (3.15 in)
C	30 mm (1.18 in)	70 mm (2.76 in)
D	10 mm (0.39 in)	50 mm (1.97 in)

Alternate Frequency Type

Distance	Part number	
	TL-M2M	TL-M5M
A	30 mm (1.18 in)	60 mm (2.36 in)
B	0 mm (0 in)	40 mm (1.57 in)
C	0 mm (0 in)	30 mm (1.18 in)
D	0 mm (0 in)	10 mm (0.39 in)

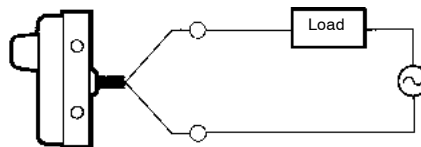
These figures will apply if the Sensors in use are different from each other in response frequency.

■ TIGHTENING TORQUE

Do not apply a tightening torque exceeding 10 kgf • cm (0.98 N • m) 0.72 ft • lbf 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.



NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.

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