TL-M

As Easy To Install as a Microswitch

■ A compact Proximity Sensor with the feel of a microswitch.

⚠	Be sure to read *Safety Precautions* on page 4.

Ordering Information

Appearance	Sensing distance	Output specifications	Model	
			Operation mode	
			NO	NC
Microswitch type	2 mm	DC 3-wire, NPN voltage output	**TL-M2ME1**	**TL-M2ME2**
		AC 2 wire	**TL-M2MY1**	---
	5 mm	DC 3-wire, NPN voltage output	**TL-M5ME1**	**TL-M5ME2**
		AC 2 wire	**TL-M5MY1**	---

Note: Models with different frequencies are also available. The model numbers are TL-M□M□□5 (e.g., TL-M2ME15).

Ratings and Specifications

Item Model	TL-M2ME1, TL-M2ME2, TL-M2MY1	TL-M5ME1, TL-M5ME2, TL-M5MY1
Sensing distance	2 mm ±10%	5 mm ±10%
Set distance	0 to 1.6 mm	0 to 4 mm
Differential travel	10% max. of sensing distance	
Detectable object	Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to *Engineering Data* on page 2.)	
Standard sensing object	Iron, $15 \times 15 \times 1$ mm	
Response frequency	E Models: 500 Hz, Y Models: 20 Hz	E Models: 250 Hz, Y Models: 20 Hz
Power 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 VDC (no-load)	
Leakage current	Y Models: 2.5 mA max. at 200 VAC	
Control output — Load current	E Models: 100 mA max. at 12 VDC, 200 mA max. at 24 VDC Y Models: 10 to 200 mA	
Control output — Residual voltage	E Models: 1 V max. Y Models: Refer to *Residual Output Voltage* under *Engineering Data* on page *3*.	
Indicators	E Models: Detection indicator (red) Y Models: Operation indicator (red)	
Operation mode (with sensing object approaching)	E1/Y1 Models: NO E2 Models: NC Refer to the timing charts under *I/O Circuit Diagrams* on page 3 for details.	
Protection circuits	E Models: Reverse polarity protection, Surge suppressor Y Models: Surge suppressor	
Ambient temperature range	Operating/Storage: −25 to 70°C (with no icing or condensation)	
Ambient humidity range	Operating/Storage: 35% to 95% (with no condensation)	

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Item	Model	TL-M2ME1, TL-M2ME2, TL-M2MY1	TL-M5ME1, TL-M5ME2, TL-M5MY1
Temperature influence		±10% max. of sensing distance at 23°C in the temperature range of −25 to 70°C	
Voltage influence		E Models: ±2.5% max. of sensing distance at rated voltage in the rated voltage ±15% range Y Models: ±1% max. of sensing distance at rated voltage in the rated voltage ±10% range	
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case	
Dielectric strength		E Models: 500 VAC, 50/60 Hz for 1 min between current-carrying parts and case Y Models: 2,000 VAC, 50/60 Hz for 1 min between current-carrying parts and case	
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions	
Shock resistance		Destruction: 500 m/s² 10 times each in X, Y, and Z directions	
Degree of protection		IEC 60529 IP67, in-house standards: oil-resistant	
Connection method		Pre-wired Models (Standard cable length: 2 m)	
Weight (packed state)		Approx. 75 g	
Materials	Case	Heat-resistant ABS	
	Sensing surface		
Accessories		Instruction manual	

Engineering Data (Typical)
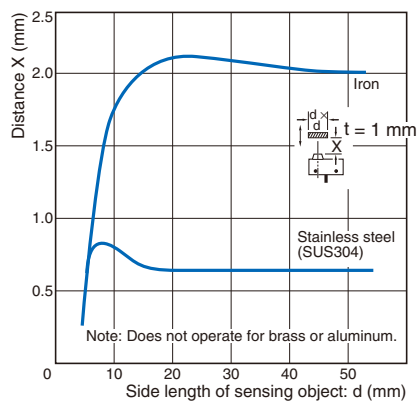
Sensing Area
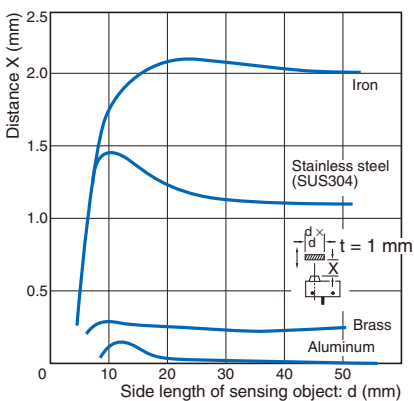**TL-M2☐/M5☐**
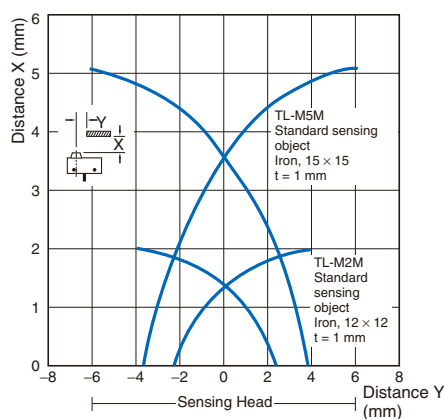
Leakage Current
TL-M☐MY1
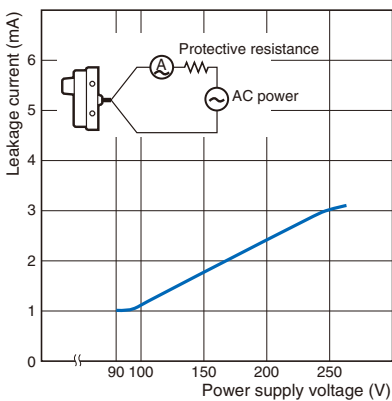
Influence of Sensing Object Size and Material
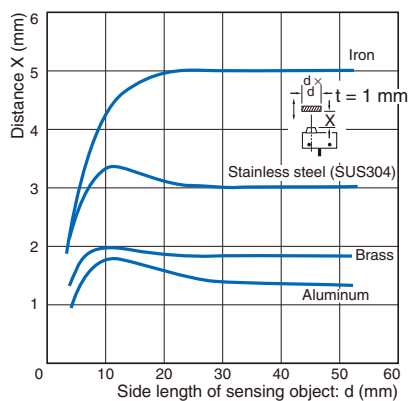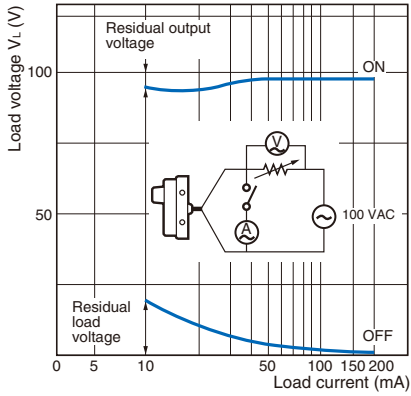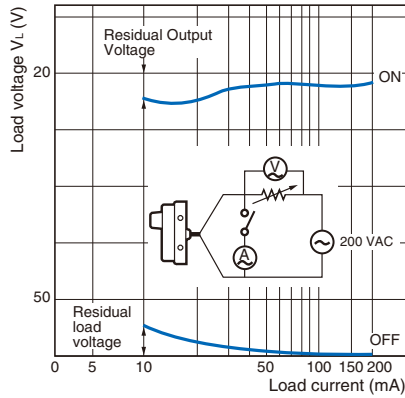**TL-M2ME** **TL-M2MY1** **TL-M5M**

Residual Output Voltage

TL-M□MY1 at 100 VAC

TL-M□MY1 at 200 VAC

I/O Circuit Diagrams

DC 3-Wire Models

Operation mode	Output specifi-cations	Model	Timing chart	Output circuit
NO	NPN	TL-M2ME1 TL-M5ME1	Sensing object: Present/None; Load (between brown and black leads): Operate/Reset; Output voltage (between black and blue leads): High/Low; Detection indicator (red): ON/OFF	
NC		TL-M2ME2 TL-M5ME2	Sensing object: Present/None; Load (between brown and black leads): Operate/Reset; Output voltage (between black and blue leads): High/Low; Detection indicator (Red): ON/OFF	*1. 200 mA max. (load current). *2. When a transistor is connected.

AC 2-Wire Models

Operation mode	Model	Timing chart	Output circuit
NO	TL-M2MY1 TL-M5MY1	Sensing object: Present/None; Load: Operate/Reset; Operation indicator (Red): ON/OFF	

Safety Precautions

Refer to *Warranty and Limitations of Liability*.

⚠ WARNING

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

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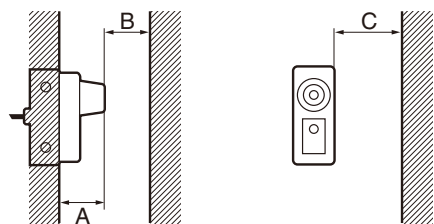| Precautions for Correct Use |
|---|

Do not use this product under ambient conditions that exceed the ratings.

● Design

Influence of Surrounding Metal

When installing Sensors on metal surfaces or near metal, ensure that the minimum distances given in the following table are maintained.

Note: For direct mounting, the distance "C" will equal 0 only in the shaded section of the above left-side section.
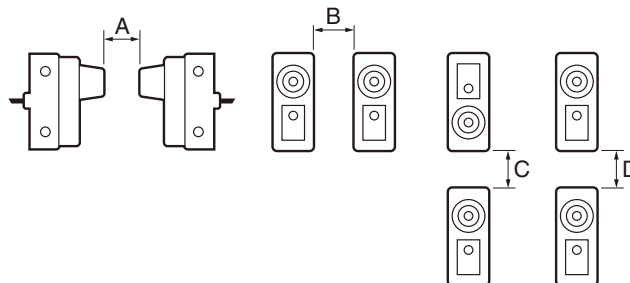
Influence of Surrounding Metal (Unit: mm)

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

Mutual Interference

When installing Sensors face-to-face or side-by-side, ensure that the minimum distances given in the following table are maintained.

Mutual Interference (Unit: mm)

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

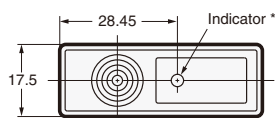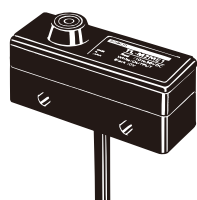Note: Values in parentheses apply to Sensors operating at different frequencies.

● Mounting

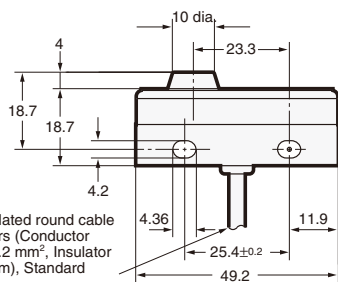The maximum tightening torque that should be applied to the mounting screws is 0.98 N·m.

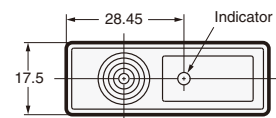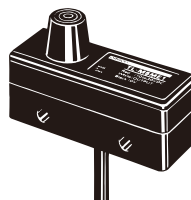## Dimensions (Unit: mm)

TL-M2M

Indicator *

* E Models: Detection indicator (red),
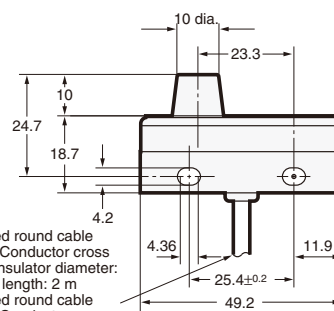Y Models: Operation indicator (red)

E Models: 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.2 mm², Insulator diameter: 1.2 mm), Standard length: 2 m
Y Models: 4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: 2 m

28.45
17.5
10 dia.
4
23.3
18.7
18.7
4.2
4.36
11.9
25.4±0.2
49.2

TL-M5M

Indicator *

* E Models: Detection indicator (red),
Y Models: Operation indicator (red)

E Models: 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.2 mm², Insulator diameter: 1.2 mm), Standard length: 2 m
Y Models: 4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: 2 m

28.45
17.5
10 dia.
10
23.3
24.7
18.7
4.2
4.36
11.9
25.4±0.2
49.2

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