

## 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<br> | 2 mm             |  |                       | DC 3-wire, NPN voltage output | TL-M2ME1 2M    | TL-M2ME2 2M |
|   |                  |  |                       | AC 2 wire                     | TL-M2MY1 2M    | ---         |
|   | 5 mm             |  |                       | DC 3-wire, NPN voltage output | TL-M5ME1 2M    | TL-M5ME2 2M |
|   |                  |  |                       | AC 2 wire                     | TL-M5MY1 2M    | ---         |

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

## Ratings and Specifications

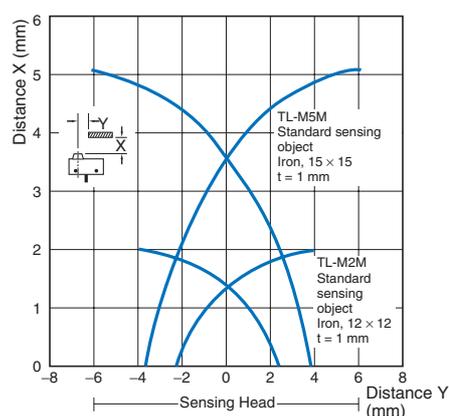
| Item   | Model            | TL-M2ME1, TL-M2ME2, TL-M2MY1  | TL-M5ME1, TL-M5ME2, TL-M5MY1      |
|--|------------------|---|-----------------------------------|
| Sensing distance                                 |                  | 2 mm ±10%   | 5 mm ±10%                         |
| Set distance                                     |                  | 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 <i>Engineering Data</i> on page 2.)    |                                   |
| Standard sensing object                          |                  | Iron, 15 × 15 × 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.<br>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<br>Y Models: 10 to 200 mA                                      |                                   |
|  | Residual voltage | E Models: 1 V max.<br>Y Models: Refer to <i>Residual Output Voltage</i> under <i>Engineering Data</i> on page 3.      |                                   |
| Indicators                                       |                  | E Models: Detection indicator (red)<br>Y Models: Operation indicator (red)  |                                   |
| Operation mode (with sensing object approaching) |                  | E1/Y1 Models: NO<br>E2 Models: NC Refer to the timing charts under <i>I/O Circuit Diagrams</i> on page 3 for details. |                                   |
| Protection circuits                              |                  | E Models: Reverse polarity protection, Surge suppressor<br>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)  |                                   |

| 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<br>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<br>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/s <sup>2</sup> 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)

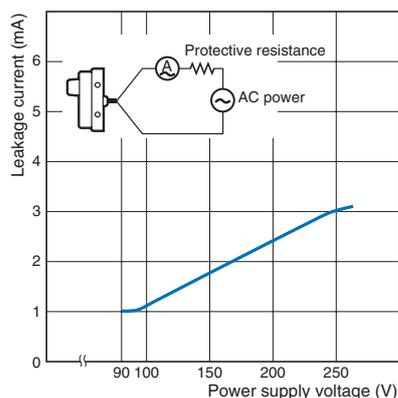
### Sensing Area

#### TL-M2□/M5□



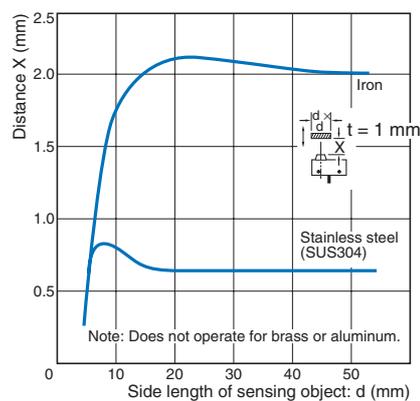
### Leakage Current

#### TL-M□MY1

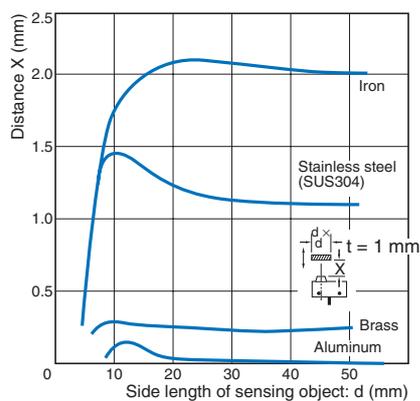


### Influence of Sensing Object Size and Material

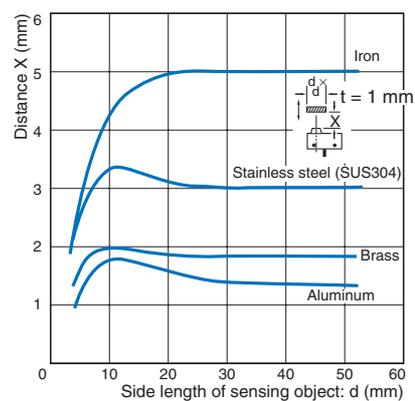
#### TL-M2ME



#### TL-M2MY1

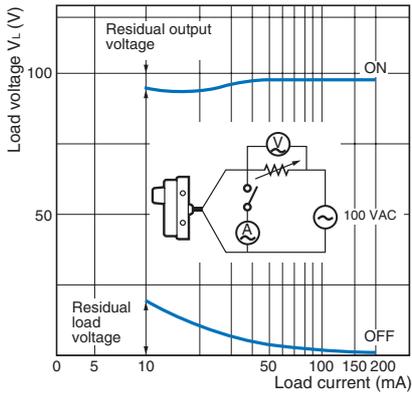


#### TL-M5M

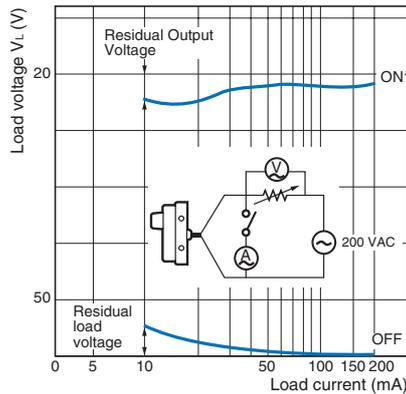


Residual Output Voltage

TL-M□MY1 at 100 VAC



TL-M□MY1 at 200 VAC



I/O Circuit Diagrams

DC 3-Wire Models

| Operation mode | Output specifications | Model                | Timing chart  | Output circuit |
|----------------|-----------------------|----------------------|---|----------------|
| NO             | NPN                   | TL-M2ME1<br>TL-M5ME1 | Sensing object: Present (High), None (Low)<br>Load (between brown and black leads): Operate (High), Reset (Low)<br>Output voltage (between black and blue leads): High, Low<br>Detection indicator (red): ON, OFF |                |
|                |                       | TL-M2ME2<br>TL-M5ME2 | Sensing object: Present (High), None (Low)<br>Load (between brown and black leads): Operate (High), Reset (Low)<br>Output voltage (between black and blue leads): High, Low<br>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<br>TL-M5MY1 | Sensing object: Present (High), None (Low)<br>Load: Operate (High), Reset (Low)<br>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.



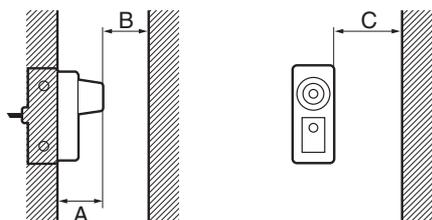
### Precautions for Correct Use

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.

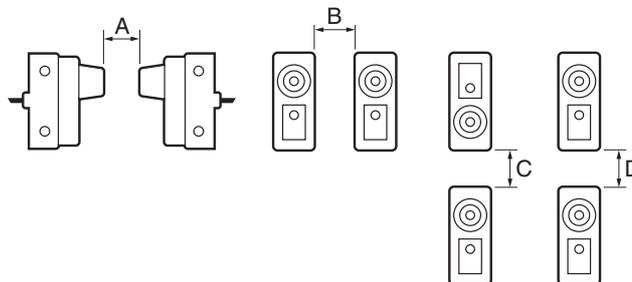
##### Influence of Surrounding Metal

(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.

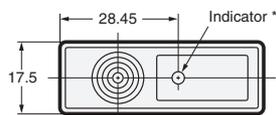
#### ● Mounting

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

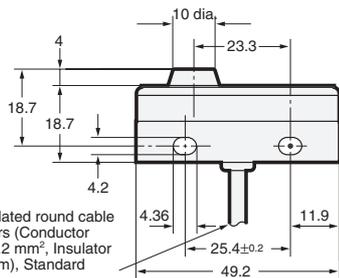
## Dimensions

(Unit: mm)  
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

### TL-M2M



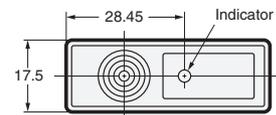
\* E Models: Detection indicator (red),  
Y Models: Operation indicator (red)



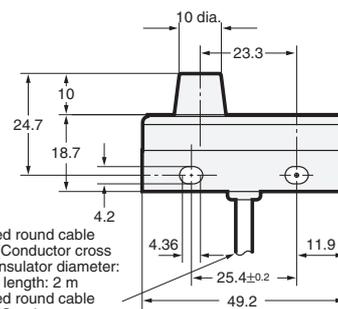
E Models: 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.2 mm<sup>2</sup>, Insulator diameter: 1.2 mm), Standard length: 2 m

Y Models: 4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.3 mm<sup>2</sup>, Insulator diameter: 1.3 mm), Standard length: 2 m

### TL-M5M



\* 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 mm<sup>2</sup>, 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 mm<sup>2</sup>, Insulator diameter: 1.3 mm), Standard length: 2 m

## 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.

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2008.11

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