

General-purpose Threaded Capacitive Sensor



- Product lineup with M12, M18, and M30 models.
- Fixed sensing distance requires no sensitivity adjustment.



Be sure to read *Safety Precautions* on page 5.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Ordering Information

Sensors [Refer to *Dimensions* on page 6.]

| Appearance | | Sensing distance | | | Output configuration | Model | |
|----------------|-----|------------------|--|--|----------------------|----------------|---------------|
| | | | | | | Operation mode | |
| | | | | | | NO | NC |
| Unshielded | M12 | 4 mm | | | DC 3-wire, NPN | E2K-X4ME1 2M | E2K-X4ME2 2M |
| | | | | | DC 3-wire, PNP | E2K-X4MF1 2M | E2K-X4MF2 2M |
| | | | | | AC 2-wire | E2K-X4MY1 2M | E2K-X4MY2 2M |
| | M18 | 8 mm | | | DC 3-wire, NPN | E2K-X8ME1 2M | E2K-X8ME2 2M |
| | | | | | DC 3-wire, PNP | E2K-X8MF1 2M | E2K-X8MF2 2M |
| | | | | | AC 2-wire | E2K-X8MY1 2M | E2K-X8MY2 2M |
| | M30 | 15 mm | | | DC 3-wire, NPN | E2K-X15ME1 2M | E2K-X15ME2 2M |
| | | | | | DC 3-wire, PNP | E2K-X15MF1 2M | E2K-X15MF2 2M |
| | | | | | AC 2-wire | E2K-X15MY1 2M | E2K-X15MY2 2M |

Accessories (Order Separately)

Mounting Brackets

Refer to Y92□ for details.

Ratings and Specifications

| Item | Model | E2K-X4ME□, E2K-X4MF□, E2K-X4MY□ | E2K-X8ME□, E2K-X8MF□, E2K-X8MY□ | E2K-X15ME□, E2K-X15MF□, E2K-X15MY□ |
|---|------------------|--|---------------------------------------|--|
| Sensing distance | | 4mm ±10% | 8 mm ±10% | 15 mm ±10% |
| Set distance *1 | | 0 to 2.8 mm | 0 to 5.6 mm | 0 to 10 mm |
| Differential travel | | 4% to 20% of sensing distance | | |
| Detectable object | | Conductors and dielectrics | | |
| Standard sensing object | | Grounded metal plate: 50 × 50 × 1 mm | | |
| Response frequency | | E and F Models: 100 Hz, Y Models: 10 Hz | | |
| Power supply voltage*2 (operating voltage range) | | E and F Models: 12 to 24 VDC (10 to 30 VDC) Y Models: 100 to 220 VAC (90 to 250 VAC) | | |
| Current consumption | | E and F Models: 15 mA max. | | |
| Leakage current | | Y Models: 2.2 mA max. (Refer to page 4.) | | |
| Control output | Load current | E and F Models: 200 mA max. *2, Y Models: 10 to 200 mA | | |
| | Residual voltage | E and F Models: 2 V max. (Load current: 200 mA, Cable length: 2 m), Y Models: Refer to <i>Engineering Data</i> on page 4. | | |
| Indicators | | E and F Models: Detection indicator (red), Y Models: Operation indicator (red) | | |
| Operation mode (with sensing object approaching) | | E1, F1, and Y1 Models: NO E2, F2, and Y2 Models: NC Refer to the timing charts under <i>I/O Circuit Diagrams</i> on page 4 for details. | | |
| Protection circuits | | E and F Models: Reverse polarity protection, Surge suppressor, load short-circuit protection, output reverse polarity protection, Y Models: Surge suppressor | | |
| Ambient temperature range | | Operating/Storage: -25 to 70°C (with no icing or condensation) | | Operating/Storage: -10 to 55°C (with no icing or condensation) |
| Ambient humidity range | | Operating/Storage: 35% to 95% (with no condensation) | | |
| Temperature influence | | ±20% max. of sensing distance at 23°C in the operating temperature range | | |
| Voltage influence | | E and F Models: ±2% max. of sensing distance at rated voltage at rated voltage ±20% Y Models: ±2% max. of sensing distance at rated voltage at rated voltage ±10% | | |
| Insulation resistance | | 50 MΩ min. (at 500 VDC) between current-carrying parts and case | | |
| Dielectric strength | | E and F Models: 1,000 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/s ² 3 times each in X, Y, and Z directions | | |
| Degree of protection | | IP66 (IEC), in-house standards: oil-resistant | | |
| Connection method | | Pre-wired Models (Standard cable length: 2 m) | | |
| Weight (packed state) | | Approx. 65 g | Approx. 145 g | Approx. 205 g |
| Materials | Case | Heat-resistant ABS | | |
| | Sensing surface | | | |
| | Clamping nuts | Polyacetal | | |
| Accessories | | Instruction manual | | |

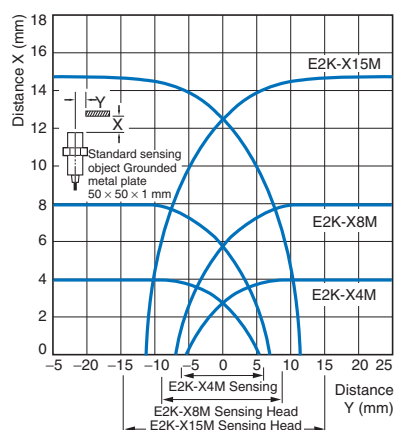
*1. The above values are sensing distances for the standard sensing object. Refer to *Engineering Data* on page 3 for other materials.

*2. E and F Models (DC switching models): A full-wave rectification power supply of 24 VDC ±20% (average value) can be used.

Engineering Data (Reference Value)

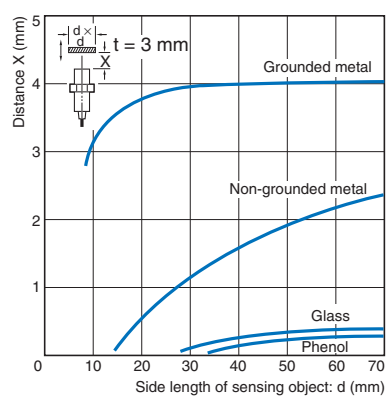
Sensing Area (Grounded Metal Plate)

E2K-X4M

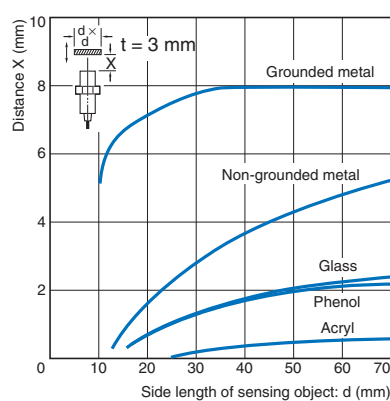


Influence of Sensing Object Size and Material

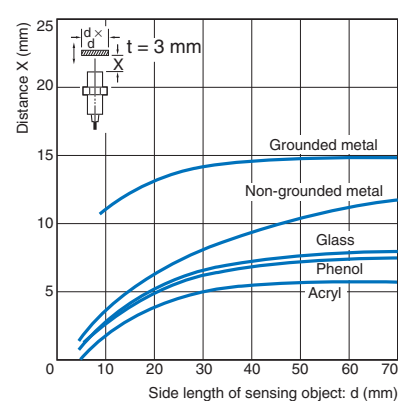
E2K-X4M



E2K-X8M

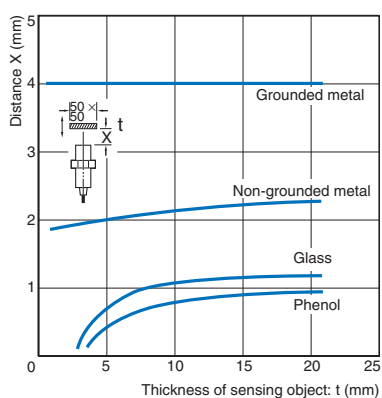


E2K-X15M

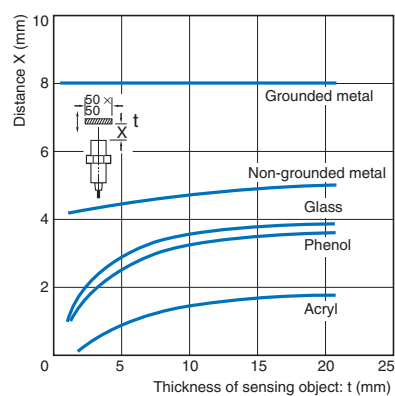


Sensing Object Thickness and Material vs. Sensing Distance

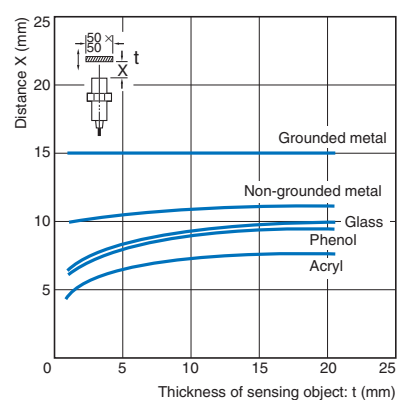
E2K-X4M



E2K-X8M

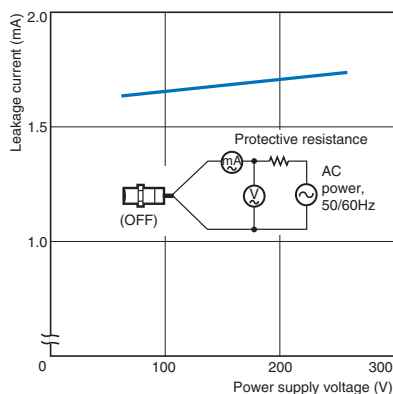


E2K-X15M



Leakage Current

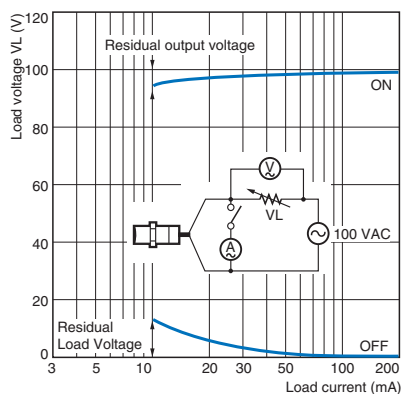
E2K-X□MY



Residual Output Voltage

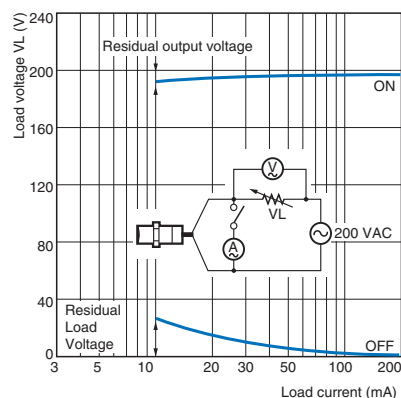
E2K-X□MY□

at 100 VAC



E2K-X□MY□

at 200 VAC



I/O Circuit Diagrams

DC 3-Wire Models (NPN)

| Operation mode | Model | Timing chart | Output circuit |
|----------------|--------------------------------------|---|--|
| NO | E2K-X4ME1 E2K-X8ME1 E2K-X15ME1 | <p>Sensing object: Present (High), Not present (Low)</p> <p>Load (between brown and black leads): Operate (High), Reset (Low)</p> <p>Output voltage (between black and blue leads): High, Low</p> <p>Detection indicator (red): ON, OFF</p> | <p>*1. Load current: 200 mA max. *2. When a transistor is connected.</p> |
| NC | E2K-X4ME2 E2K-X8ME2 E2K-X15ME2 | <p>Sensing object: Present (High), Not present (Low)</p> <p>Load (between brown and black leads): Operate (High), Reset (Low)</p> <p>Output voltage (between black and blue leads): High, Low</p> <p>Detection indicator (red): ON, OFF</p> | |

DC 3-Wire Models (PNP)

| Operation mode | Model | Timing chart | Output circuit |
|----------------|--------------------------------------|---|--|
| NO | E2K-X4MF1 E2K-X8MF1 E2K-X15MF1 | <p>Sensing object: Present (High), Not present (Low)</p> <p>Load (between blue and black leads): Operate (High), Reset (Low)</p> <p>Output voltage (between black and brown leads): High, Low</p> <p>Detection indicator (red): ON, OFF</p> | <p>*1. Load current: 200 mA max. *2. When a transistor is connected.</p> |
| NC | E2K-X4MF2 E2K-X8MF2 E2K-X15MF2 | <p>Sensing object: Present (High), Not present (Low)</p> <p>Load (between blue and black leads): Operate (High), Reset (Low)</p> <p>Output voltage (between black and brown leads): High, Low</p> <p>Detection indicator (red): ON, OFF</p> | |

AC 2-Wire Models

| Operation mode | Model | Timing chart | Output circuit |
|----------------|--------------------------------------|---|----------------|
| NO | E2K-X4MY1 E2K-X8MY1 E2K-X15MY1 | <p>Sensing object: Present (High), Not present (Low)</p> <p>Load: Operate (High), Reset (Low)</p> <p>Operation indicator (red): ON, OFF</p> | |
| NC | E2K-X4MY2 E2K-X8MY2 E2K-X15MY2 | <p>Sensing object: Present (High), Not present (Low)</p> <p>Load: Operate (High), Reset (Low)</p> <p>Operation indicator (red): ON, OFF</p> | |

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

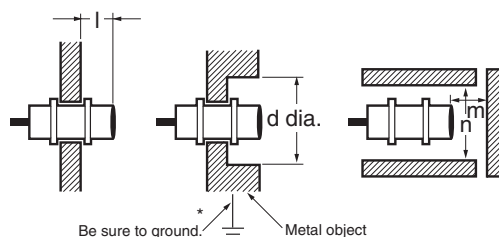
Ambient Environment

The Sensor may malfunction if subjected to water, oil, chemicals, or condensation by falsely detecting these as sensing objects. In addition, the sensing distance may vary when used in an environment with high temperatures or high humidity.

The E2K-X15M is highly sensitive to inductive objects and can thus be affected even by small quantities of water drops.

Influence of Surrounding Objects

If the Sensor is embedded in metal, maintain at least the following distances between the Sensor and the metal. The Sensor is also affected by other materials, such as resins. Separate the Sensor from other materials by the same distance as for metal.



* Be sure to ground the metal object, otherwise Sensor operation will not be stable.

Influence of Surrounding Metal (Unit: mm)

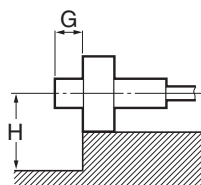
| Model | Dimension | l | d | m | n |
|----------|-----------|----|----|----|----|
| E2K-X4M | | 20 | | 8 | |
| E2K-X8M | | | 50 | 12 | 60 |
| E2K-X15M | | 10 | | 25 | |

If a mounting bracket is used, be sure that at least the following distances are maintained.

Influence of Surrounding Metal

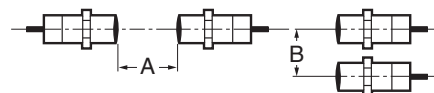
(Unit: mm)

| Model | Dimension | G | H |
|----------|-----------|----|----|
| E2K-X4M | | 20 | 30 |
| E2K-X8M | | | |
| E2K-X15M | | 10 | |



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 | Dimension | A | B |
|----------|-----------|-----|-----|
| E2K-X4M | | 80 | 70 |
| E2K-X8M | | 150 | 110 |
| E2K-X15M | | 300 | 200 |

Sensing Objects

The maximum sensing distance will decrease if the sensing object is a non-grounded metal object or dielectric object.

● Sensing Object Material

The E2K-X can detect almost any type of object. The sensing distance of the E2K-X, however, will vary with the electrical characteristics of the object, such as the conductance and inductance of the object, and the water content and capacity of the object. The maximum sensing distance of the E2K-X will be obtained if the object is made of grounded metal.

- There are objects that cannot be detected indirectly. Therefore, be sure to test the E2K-X in a trial operation with the objects before using the E2K-X in actual applications.

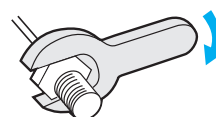
Effects of a High-frequency Electromagnetic Field

The E2K-X may malfunction if there is an ultrasonic washer, high-frequency generator, transceiver, or inverter nearby.

For major measures, refer to *Noise of Warranty and Limitations of Liability* for Photoelectric Sensors.

Mounting

Do not tighten the nut with excessive force. Always use washers when tightening the nuts and do not exceed the torque in the following table.



| Model | Torque |
|----------|----------|
| E2K-X4M | 0.78 N·m |
| E2K-X8M | |
| E2K-X15M | 2 N·m |

● Miscellaneous

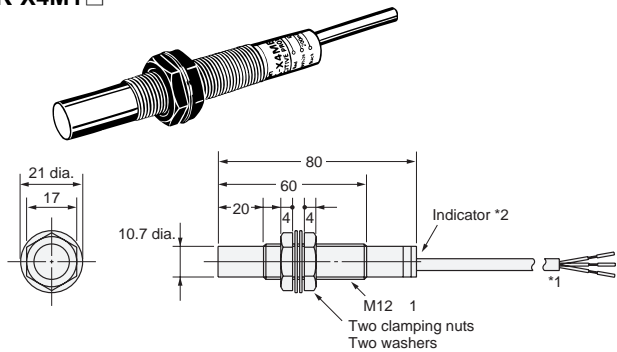
Organic Solvents

The Sensor has a case made of heat-resistant ABS resin. Be sure that the case is free from organic solvents or solutions containing organic solvents.

Dimensions

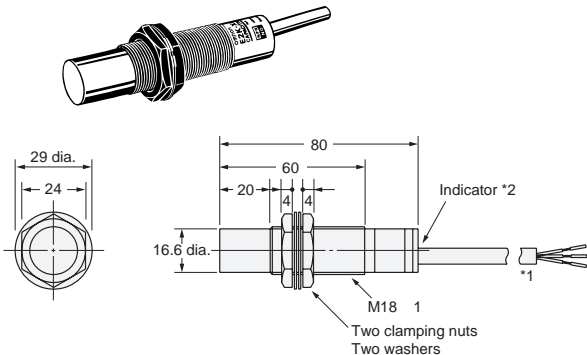
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

E2K-X4ME□
E2K-X4MF□
E2K-X4MY□



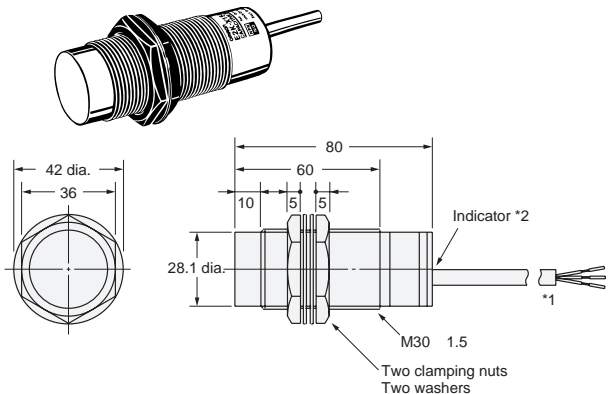
*1. E and F Models: 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.2 mm², Insulator diameter: 1.2 mm), Standard length: 2 m
Y Models: 4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.3 mm², Insulator diameter: 1.3 mm), Standard length: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

E2K-X8ME□
E2K-X8MF□
E2K-X8MY□



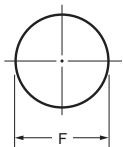
*1. E and F Models: 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m
Y Models: 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m
*2. E and F Models: Detection indicator (red)
Y Models: Operation indicator (red)

E2K-X15ME□
E2K-X15MF□
E2K-X15MY□



*1. E and F Models: 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m
Y Models: 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m
*2. E and F Models: Detection indicator (red)
Y Models: Operation indicator (red)

Mounting Hole Dimensions



| Model | F (mm) |
|------------|--|
| E2K-X4M□□ | 12.5 ^{+0.5} ₀ dia. |
| E2K-X8M□□ | 18.5 ^{+0.5} ₀ dia. |
| E2K-X15M□□ | 30.5 ^{+0.5} ₀ dia. |

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