Cylindrical Proximity Sensor

E2K-X

CSM_E2K-X_DS_E_5_1

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.

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**
			AC 2-wire	**E2K-X4MY1 2M**	**E2K-X4MY2 2M**
	M18	8 mm	DC 3-wire, NPN	**E2K-X8ME1 2M**	**E2K-X8ME2 2M**
			AC 2-wire	**E2K-X8MY1 2M**	**E2K-X8MY2 2M**
	M30	15 mm	DC 3-wire, NPN	**E2K-X15ME1 2M**	**E2K-X15ME2 2M**
			AC 2-wire	**E2K-X15MY1 2M**	**E2K-X15MY2 2M**

Accessories (Order Separately)

Mounting Brackets

Refer to *Y92□* for details.

Ratings and Specifications

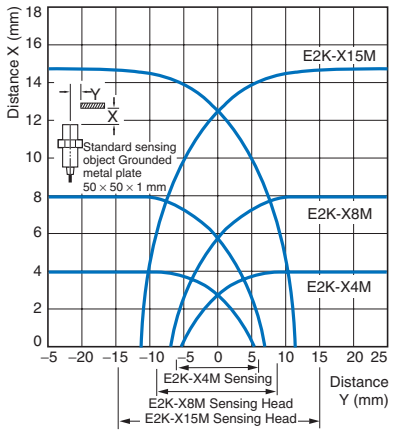
Item	Model	E2K-X4ME□, E2K-X4MY□	E2K-X8ME□, E2K-X8MY□	E2K-X15ME□, E2K-X15MY□
Sensing distance		4mm ±10%	8 mm ±10%	15 mm ±10%
Set distance *1		0 to 2.8 mm	0 to 5.6 mm	0 to 10 mm
Differential travel		4% to 20% of sensing distance		
Detectable object		Conductors and dielectrics		
Standard sensing object		Grounded metal plate: 50 × 50 × 1 mm		
Response frequency		E Models: 100 Hz, Y Models: 10 Hz		
Power supply voltage*2 (operating voltage range)		E Models: 12 to 24 VDC (10 to 30 VDC) Y Models: 100 to 220 VAC (90 to 250 VAC)		
Current consumption		E Models: 15 mA max.		
Leakage current		Y Models: 2.2 mA max. (Refer to page 4.)		
Control output	Load current	E Models: 200 mA max.*2, Y Models: 10 to 200 mA		
	Residual voltage	E Models: 1 V max. (Load current: 200 mA, Cable length: 2 m), Y Models: Refer to *Engineering Data* on page 4.		
Indicators		E Models: Detection indicator (red), Y Models: Operation indicator (red)		
Operation mode (with sensing object approaching)		E1/Y1 Models: NO E2/Y2 Models: NC Refer to the timing charts under *I/O Circuit Diagrams* on page 4 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)		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 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 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/s² 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 Models (DC switching models): A full-wave rectification power supply of 24 VDC ±20% (average value) can be used.

Engineering Data (Typical)

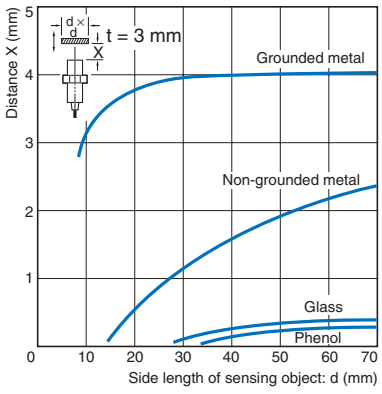
Sensing Area (Grounded Metal Plate)

E2K-X4M

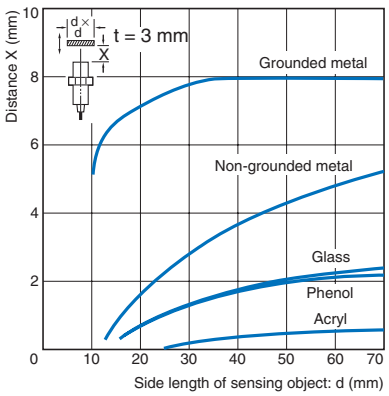


Influence of Sensing Object Size and Material

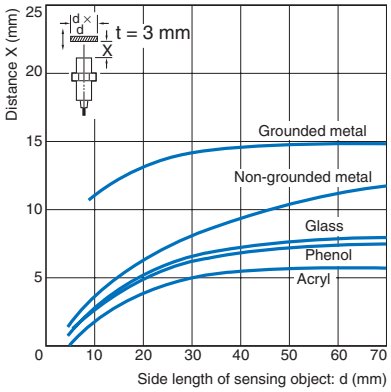
E2K-X4M



E2K-X8M

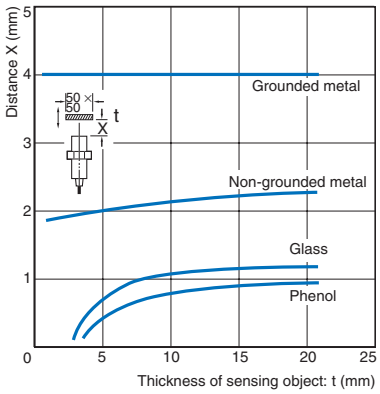


E2K-X15M

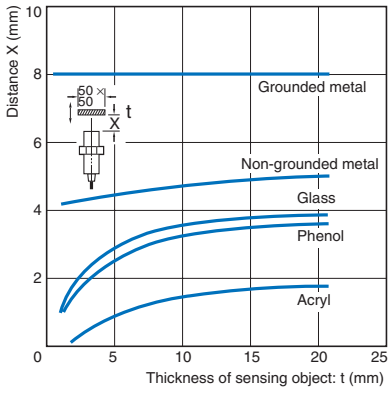


Sensing Object Thickness and Material vs. Sensing Distance

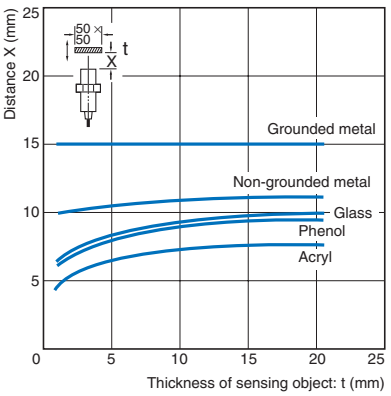
E2K-X4M



E2K-X8M

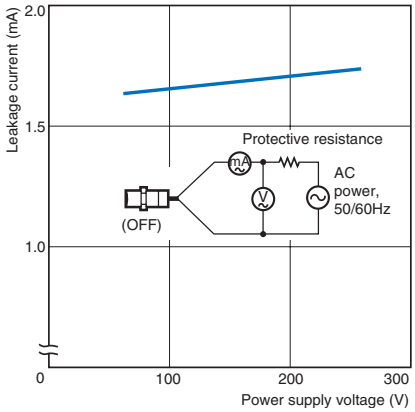


E2K-X15M



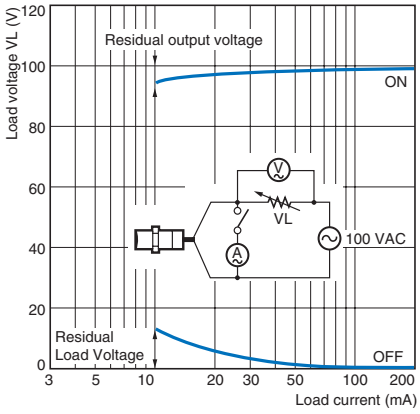
Leakage Current

E2K-X□MY

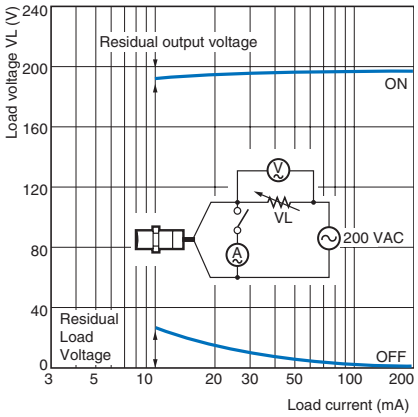


Residual Output Voltage

E2K-X□MY□ at 100 VAC

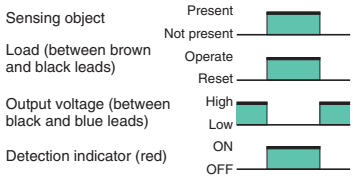
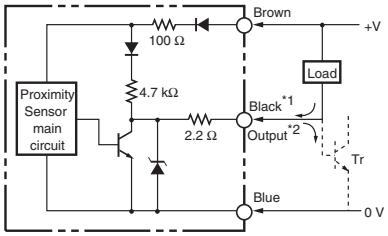
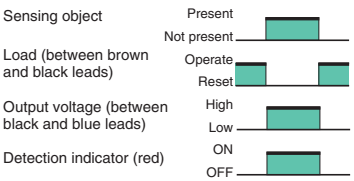


E2K-X□MY□ at 200 VAC



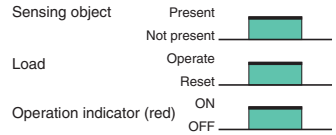
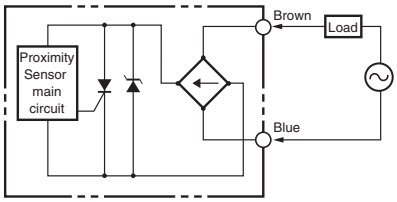
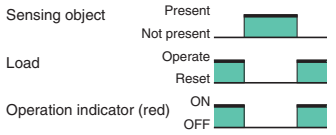
I/O Circuit Diagrams

DC 3-Wire Models

Operation mode	Model	Timing chart	Output circuit
NO	E2K-X4ME1 E2K-X8ME1 E2K-X15ME1		
NC	E2K-X4ME2 E2K-X8ME2 E2K-X15ME2		

*1. Load current: 200 mA max.
*2. When a transistor is connected.

AC 2-Wire Models

Operation mode	Model	Timing chart	Output circuit
NO	E2K-X4MY1 E2K-X8MY1 E2K-X15MY1		
NC	E2K-X4MY2 E2K-X8MY2 E2K-X15MY2		

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.

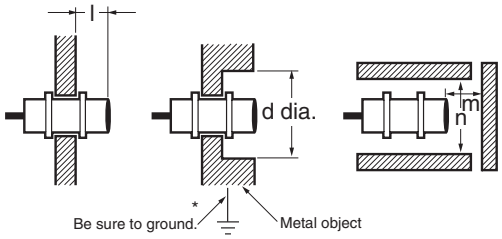
● Design

Ambient Environment

The Sensor may malfunction if subjected to water, oil, chemicals, or condensation by falsely detecting these as sensing objects.
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.

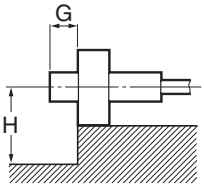
Influence of Surrounding Metal (Unit: mm)

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

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

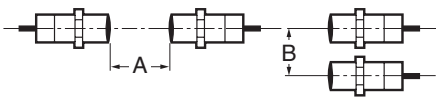
Influence of Surrounding Metal
(Unit: mm)

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.

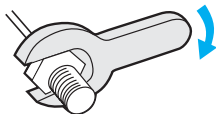
- Sensing Object Material
  The E2K-X can detect almost any type of object. The sensing distance of the E2K-X, however, will vary with the electrical characteristics of the object, such as the conductance and inductance of the object, and the water content and capacity of the object. The maximum sensing 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	2 N·m
E2K-X15M	

Note: A special tightening tool is provided with the E2K-X4M□□. Always use this tool to tighten the nuts.

● Miscellaneous

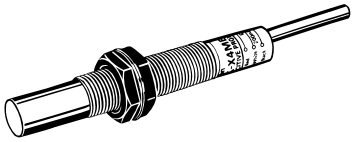
Organic Solvents

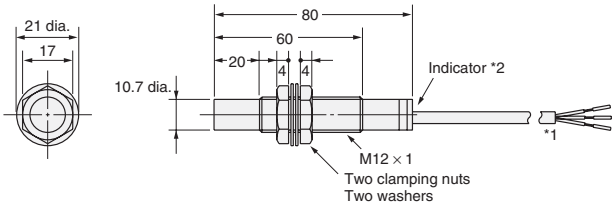
The Sensor has a case made of heat-resistant ABS resin. Be sure that the case is free from organic solvents or solutions containing organic solvents.

Dimensions

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

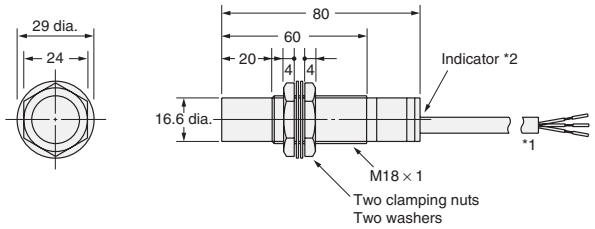
E2K-X4ME□
E2K-X4MY□





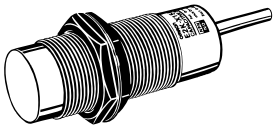
*1. E Models: 4-dia. vinyl-insulated round cable with 3 conductors
(Conductor cross section: 0.2 mm^2, Insulator diameter: 1.2 mm),
Standard length: 2 m
Y Models: 4-dia. vinyl-insulated round cable with 2 conductors
(Conductor cross section: 0.3 mm^2, Insulator diameter: 1.3 mm),
Standard length: 2 m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

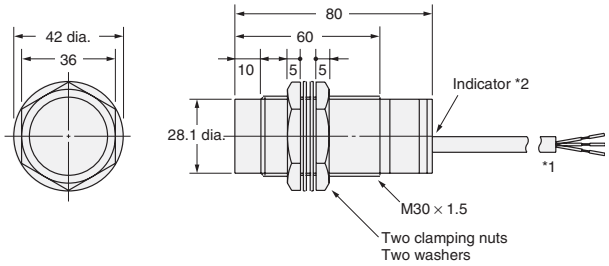
E2K-X8ME□
E2K-X8MY□



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

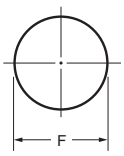
E2K-X15ME□
E2K-X15MY□





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

Mounting Hole Dimensions



Model	F (mm)
E2K-X4ME□ E2K-X4MY□	12.5 $^{+0.5}_{0}$ dia.
E2K-X8ME□ E2K-X8MY□	18.5 $^{+0.5}_{0}$ dia.
E2K-X15ME□ E2K-X15MY□	30.5 $^{+0.5}_{0}$ dia.