

### Low-profiled Capacitive Proximity Sensor with Mounting Flexibility

- Flat, built-in amplifier model offers excellent space efficiency, with 10-mm sensing distance.
- Detects almost any kind of object, be it metallic or non-metallic (water, oil, glass, plastic, etc.).
- Direct mounting onto a metallic surface is possible.
- LED operation indicator

### Ordering Information

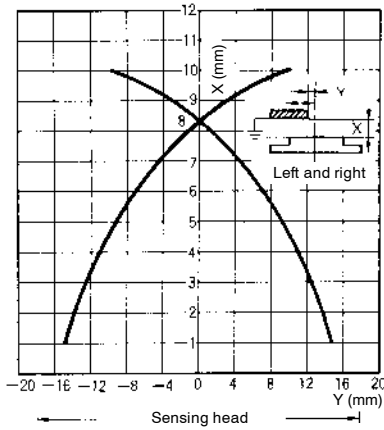
| Shield     | Sensing distance | DC 3-wire models |            | Response frequency |
|------------|------------------|------------------|------------|--------------------|
|            |                  | NPN              |            |                    |
|            |                  | NO               | NC         |                    |
| Unshielded | 10 mm            | E2K-F10MC1       | E2K-F10MC2 | 100 Hz             |

## Specifications

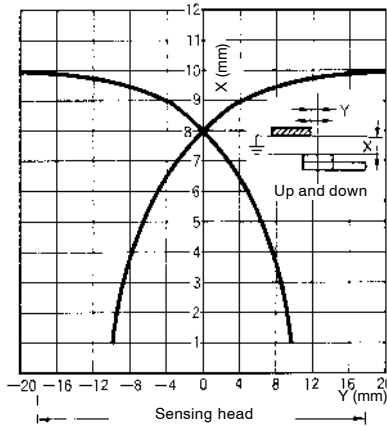
| Model  | E2K-F10MC1, E2K-F10MC2   |                          |
|--|--|--------------------------|
| Supply voltage<br>(operating voltage range)        | 12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.   |                          |
| Current consumption                                | 10 mA max. (at 24 VDC)   |                          |
| Sensing object                                     | Conductors and dielectrics   |                          |
| Sensing distance                                   | 0 to 7.5 mm (with grounded metal: 50 x 50 x 1 mm)  |                          |
| Differential travel                                | 15% max. of sensing distance   |                          |
| Indicator  | Operation indicator (red)  |                          |
| Circuit protection                                 | Reverse connection protection, surge absorber  |                          |
| Response frequency                                 | 100 Hz   |                          |
| Operating status (with sensing object approaching) | Load ON  |                          |
| Control output                                     | NPN open collector, 100 mA max. at 30 VDC  |                          |
| Ambient temperature                                | Operating: -10°C to 55°C (with no icing)   |                          |
| Ambient humidity                                   | Operating: 35% to 95%  |                          |
| Temperature influence                              | ±15% max. of sensing distance at 23°C in the temperature range of -10°C and 55°C                   |                          |
| Voltage influence                                  | ±2.5% max. of sensing distance at a voltage between 90% and 110% of the rated power supply voltage |                          |
| Residual voltage                                   | 1.5 V max. with a load current of 100 mA and a cord length of 2 m                                  |                          |
| Insulation resistance                              | 50 MΩ (at 500 VDC) between the case and current carry parts  |                          |
| Dielectric strength                                | 500 VAC (50/60 Hz) for 1 min between the case and current carry parts                              |                          |
| Vibration resistance                               | Malfunction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions       |                          |
| Shock resistance                                   | Malfunction: 500 m/s <sup>2</sup> (approx. 50G) 3 times each in X, Y, and Z directions.            |                          |
| Enclosure ratings                                  | IEC IP66   |                          |
| Weight (with 2-m cord)                             | Approx. 35 g   |                          |
| Material   | Case   | Heat-resistant ABS resin |
|  | Sensing surface  | Heat-resistant ABS resin |

# Engineering Data

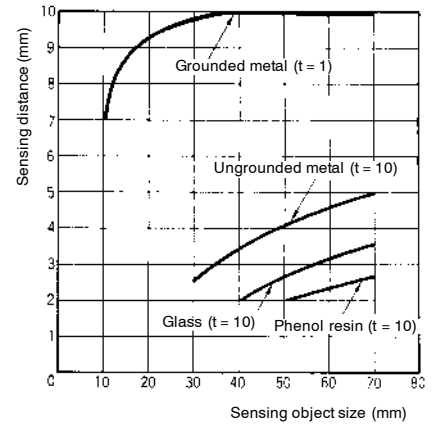
## Operating Range (Typical)



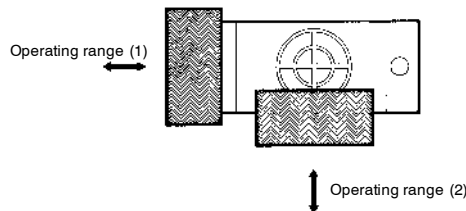
## Operating Range



## Sensing Object Size and Material vs. Sensing Distance (Typical)



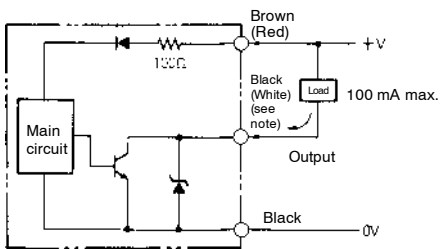
## Moving Direction of Object



# Operation

**Note:** The lead wire colors of the E2K-F have been changed in compliance with the latest Japanese Industrial Standards. Colors in parentheses are previous ones.

## Output Circuit



**Note:** A maximum load current is 100 mA.

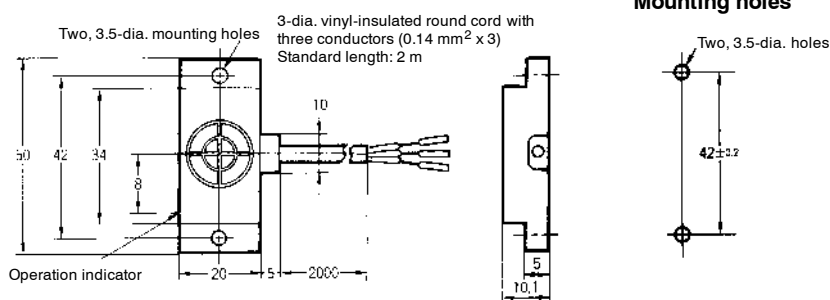
## Operating Chart

|                           | E2K-10MC1 (NO) | E2K-10MC2 (NC) |
|---------------------------|----------------|----------------|
| Sensing object            | Yes            | No             |
| Output transistor (Load)  | ON             | OFF            |
| Operation indicator (LED) | ON             | OFF            |

## Dimensions

### E2K-F

Weight: Approx. 35 g



## Precautions

### Sensing Object Material

The E2K-F can detect almost any type of object. The sensing distance of the E2K-F, 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-F will be available if the object is made of grounded metal. There are objects that cannot be detected indirectly. Therefore, be sure to test the E2K-F in a trial operation with the objects before using the E2K-F in actual applications.

### Wiring

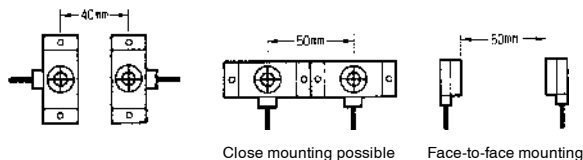
The characteristics of the E2K-F will not change when the cord is extended. While considering voltage drops that may be caused by the cord extended, be sure that the total cord length is no more than 200 m.

### Effects of a High-frequency Electromagnetic Field

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

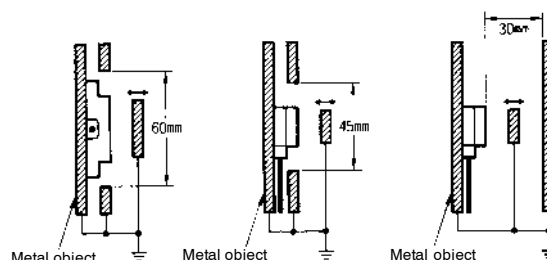
### Mutual Interference

When mounting more than one E2K-F face-to-face or side-by-side, separate them as shown below.



### Effects of Ambient Metal

Separate the E2K-F from ambient metals as shown below.



**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. D18-E1-2 In the interest of product improvement, specifications are subject to change without notice.

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Printed in Japan  
0897-1M (0697) a