

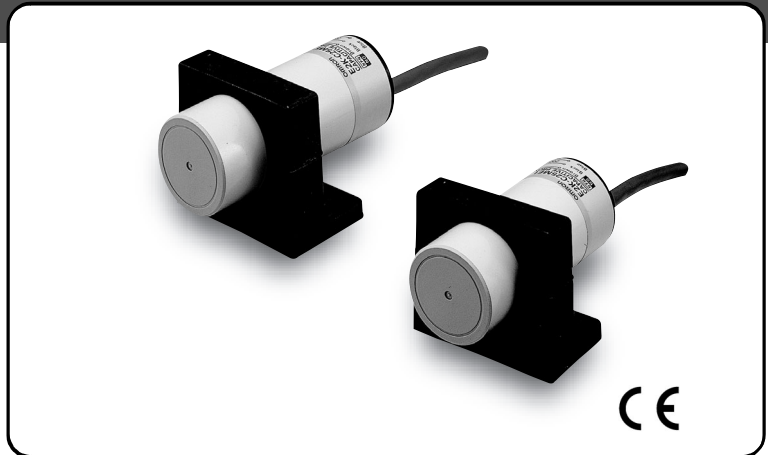
## Capacity Proximity Sensor E2K-C

### Capacitive Proximity Sensor with Adjustable Sensitivity

- Detects both metallic and nonmetallic objects (glass, lumber, water, oil, plastic, etc.) without direct contact.
- Indirectly detects objects buried in a nonmetallic wall or objects placed in a nonmetallic container.
- Loads up to 200 mA can be switched at 90 to 250 V (AC Switching Models) and at 10 to 40 V (DC Switching Models).
- Ideal for sorting out workpieces of various shapes.
- Noise-resistant models added to the lineup for application in a wide range of industrial environments.

**<READ AND UNDERSTAND THIS CATALOG>**

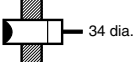


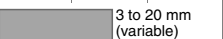
Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.



**Note:** CE marking is not applicable to E2K-C25MY1 and E2K-C25MY2.

## Ordering Information

### List of Models

Appearance		Sensing distance		Models		
				Output configuration	Operation mode	
					NO	NC
Standard models	Non-shielded  34 dia.	 3 to 25 mm (variable)	DC 3-wire Models, NPN	E2K-C25ME1	E2K-C25ME2	
			DC 3-wire Models, PNP	E2K-C25MF1	E2K-C25MF2	
			AC 2-wire Models	E2K-C25MY1	E2K-C25MY2	
Noise-resistant models	 34 dia.	 3 to 20 mm (variable)	DC 3-wire Models, NPN	E2K-C20MC1	E2K-C20MC2	
			AC/DC 2-wire Models	E2K-C20MT1	E2K-C20MT2	

**Note:** If a UL- or CSA-approved AC-switching model is required, add suffix “-US” to the model number as shown below.  
Example: E2K-C25MY□-US

# Specifications

## Standard Models

Model		E2K-C25ME1, E2K-C25MF1 E2K-C25ME2, E2K-C25MF2	E2K-C25MY1	E2K-C25MY2
Sensing distance (See note.)		25 mm		
Sensing range		3 to 25 mm		
Sensing object		Conductors and dielectrics		
Standard sensing object		Grounded metal object: 50 x 50 x 1 mm		
Differential travel		15% max. of sensing distance (when adjusted to 25 mm $\pm$ 10% with standard sensing object)		
Response speed		70 Hz	10 Hz	
Power supply voltage (operating voltage range)		12 to 24 VDC (10 to 40 VDC) ripple (p-p): 10% max.	100 to 220 VAC (90 to 250 VAC) 50/60 Hz	
Current consumption		10 mA max. at 12 VDC 16 mA max. at 24 VDC	---	
Leakage current		---	1 mA max. at 100 VAC (50/60 Hz) with output turned OFF, 2 mA max. at 200 VAC (50/60 Hz) with output turned OFF.	
Control output	Load current	200 mA max.		5 to 200 mA (resistive load)
	Residual voltage	2 V max. (Load current: 200 mA, Cable length: 2 m)		Refer to <i>Residual Load Voltage</i> .
Indicator		Detection indicator (red)		Operation indicator (red)
Operation mode (with sensing object approaching)		E1/F1/Y1 Models: NO E2/F2/Y2 Models: NC For details, refer to <i>Timing Charts</i> .		
Protection circuits		Reverse polarity protection, surge suppressor	Surge suppressor	
Ambient temperature		Operating/storage: -25°C to 70°C (with no icing or condensation)		
Ambient humidity		Operating/storage: 35% to 95% (with no condensation)		
Temperature influence		$\pm$ 15% max. of sensing distance at 23°C in the temperature range of -10°C and 55°C $\pm$ 25% max. of sensing distance at 23°C in the temperature range of -25°C and 70°C		
Voltage influence		$\pm$ 2% max. of sensing distance in the rated voltage range $\pm$ 15%	$\pm$ 2% max. of sensing distance in the rated voltage +20%, -10% at 100 VAC, $\pm$ 20% at 200 VAC	
Insulation resistance		50 M $\Omega$ min. (at 500 VDC) between the case and current-carrying parts		
Dielectric strength		1,000 VAC at 50/60 Hz for 1 min between the case and current-carrying parts	1,500 VAC at 50/60 Hz for 1 min between the case and current-carrying parts	
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance		500 m/s <sup>2</sup> 10 times each in X, Y, and Z directions		
Degree of protection		IEC 60529 IP66		
Approved standards		UL, CSA		
Weight (packed state)		Approx. 200 g		
Connection method		Pre-wired Models (Cable length: 2 m)		
Material	Case	Heat-resistant ABS		
	Sensing surface			
Accessories		Mounting Bracket, Instruction manual		

Note: The set distances are sensing distances applicable to standard sensing objects. Refer to *Engineering Data* for sensing distances applicable to other types of objects.

## Noise-resistant Models

Model		E2K-C20MC1	E2K-C20MC2	E2K-C20MT1	E2K-C20MT2
Sensing distance (See note 1.)		20 mm			
Sensing range		3 to 20 mm			
Sensing object		Conductors and dielectrics			
Standard sensing object		Grounded metal object: 50 x 50 x 1 mm			
Differential travel		15% max. of sensing distance (when adjusted to 20 mm $\pm$ 10% with standard sensing object)			
Response speed (See note 2.)		40 Hz		AC power: 25 Hz, DC power: 40 Hz	
Power supply voltage (operating voltage range)		12 to 24 VDC (10 to 36 VDC) ripple (p-p): 10% max.		24 to 240 VAC (50/60 Hz), 24 to 240 VDC (20 to 250 VAC 50/60 Hz, 20 to 250 VDC)	
Current consumption		13 mA max. at 24 VDC		---	
Leakage current		---		1.5 mA max. at 24 VDC, 1.7 mA max. at 110 VAC (50/60 Hz), 2.5 mA max. at 250 VAC (50/60 Hz) Refer to <i>Engineering Data</i> for details.	
Control output	Load current	250 mA max.		5 to 20 mA (resistive load)	
	Residual voltage	2.5 V max. (Load current: 250 mA, Cable length: 2 m)		AC power: 10 V max., DC power: 8 V max. Refer to <i>Residual Load Voltage</i> .	
Indicator		Operation indicator (yellow)			
Operation mode (with sensing object approaching)		C1/T1 Models: NO C2/T2 Models: NC For details, refer to <i>Timing Charts</i> .			
Protection circuits		Reverse polarity protection, load short-circuit protection		---	
Ambient temperature		Operating/storage: -25°C to 70°C (with no icing or condensation)			
Ambient humidity		Operating/storage: 35% to 95% (with no condensation)			

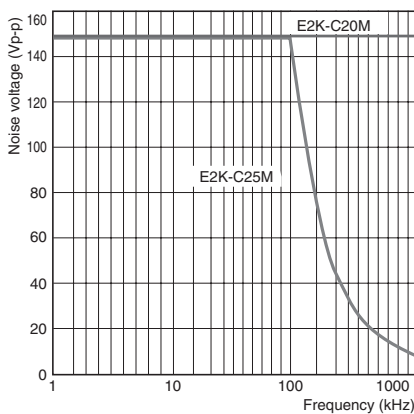
Model	E2K-C20MC1	E2K-C20MC2	E2K-C20MT1	E2K-C20MT2
Temperature influence	±15% max. of sensing distance at 23°C in the temperature range of -10°C and 55°C ±25% max. of sensing distance at 23°C in the temperature range of -25°C and 70°C			
Voltage influence	±2% max. of sensing distance in the rated voltage range ±15%			
Insulation resistance	50 MΩ min. (at 500 VDC) between the case and current-carrying parts			
Dielectric strength	1,000 VAC at 50/60 Hz for 1 min between the case and current-carrying parts		1,500 VAC at 50/60 Hz for 1 min between the case and current-carrying parts	
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance	500 m/s <sup>2</sup> 10 times each in X, Y, and Z directions			
Degree of protection	IEC 60529 IP65			
Connection method (See note 3.)	Pre-wired Models (Cable length: 2 m)			
Weight (packed state)	Approx. 240 g			
Material	Case	PBT		
	Sensing surface			
Accessories	Mounting Bracket, Instruction manual			

**Note** 1. The set distances are sensing distances applicable to standard sensing objects. Refer to *Engineering Data* for sensing distances applicable to other types of objects.  
 2. The response speed is an average value.  
 3. The cable is only 2 m long. Use a cable with a conductor cross section of 0.5 mm<sup>2</sup> or greater to extend the cable.

## Engineering Data

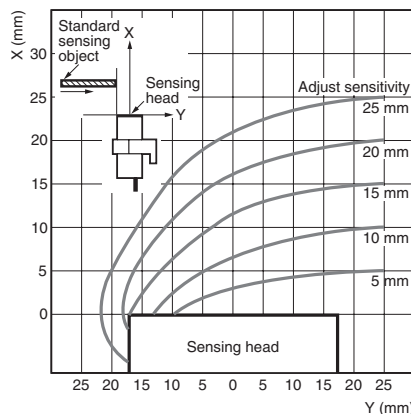
### Common Mode Continuous Noise

#### E2K-C20M



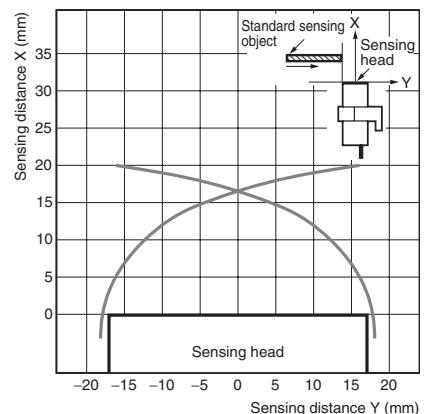
### Operating Range (Typical)

#### E2K-C25M□□



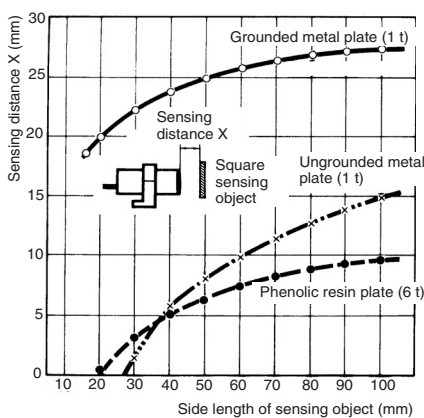
### Operating Range (Typical)

#### E2K-C20M□□



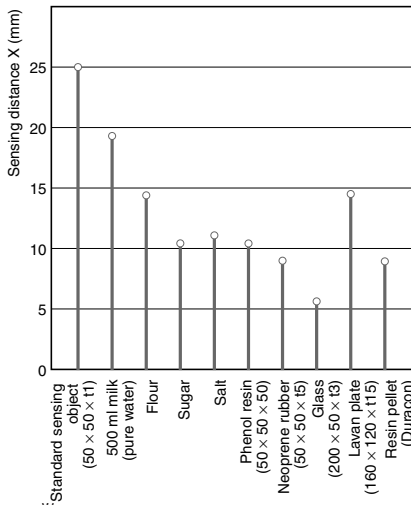
### Sensing Object vs. Sensing Distance (Typical)

#### E2K-C25M□□

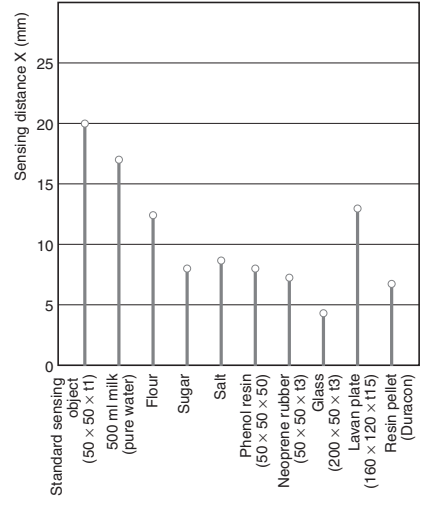


### Sensing Distance Change by Sensing Object (Typical)

#### E2K-C25M□□

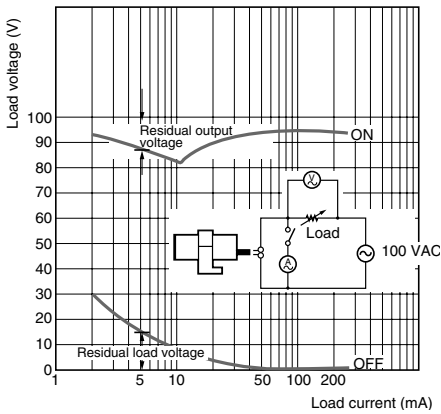


#### E2K-C20M□□

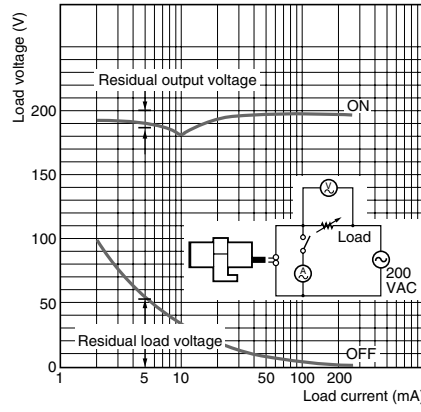


### Residual Load Voltage (Typical)

E2K-C25MY, 100 VAC

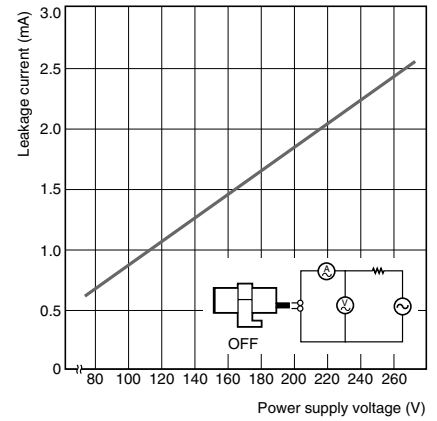


E2K-C25MY, 200 VAC



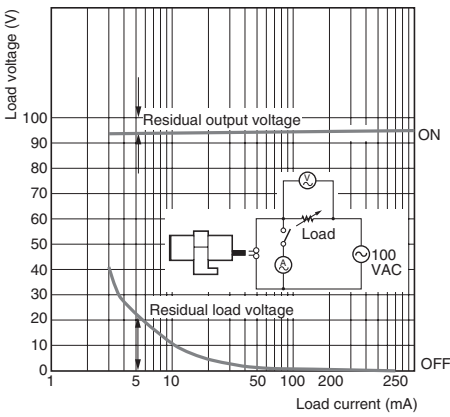
### Leakage Current (Typical)

E2K-C25MY

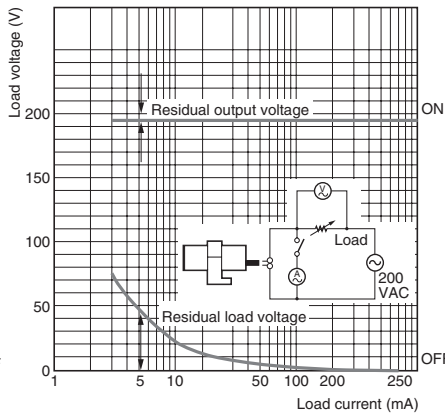


### Residual Load Voltage (Typical)

E2K-C20MT, 100 VAC

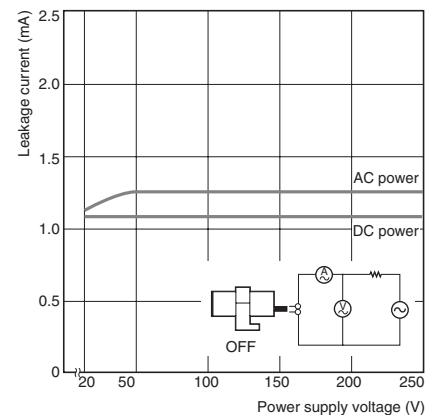


E2K-C20MT, 200 VAC



### Leakage Current (Typical)

E2K-C20MT

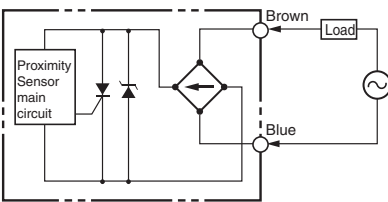


## Operation

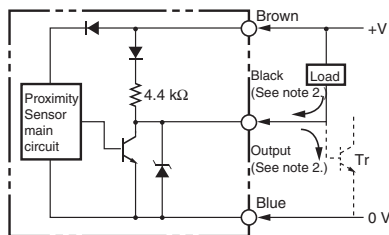
### Standard Models

#### Output Circuits

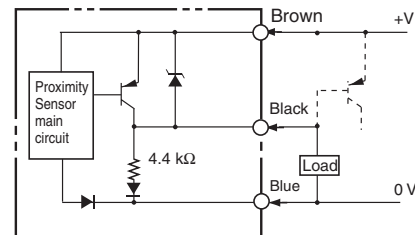
E2K-C25MY1 (NO)  
E2K-C25MY2 (NC)



E2K-C25ME1 (NO)  
E2K-C25ME2 (NC)



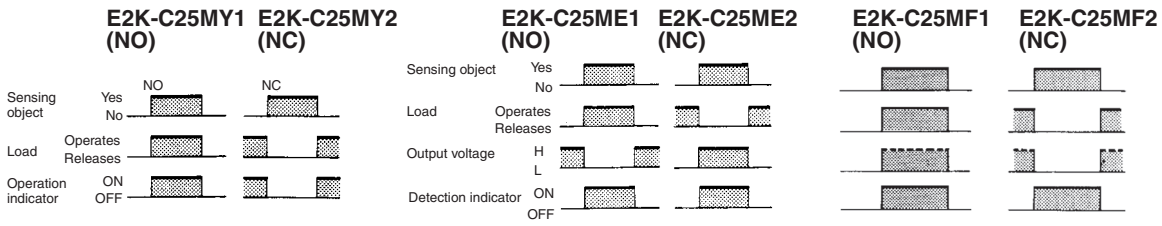
E2K-C25MF1 (NO)  
E2K-C25MF2 (NC)



Note 1. 200 mA max. (load current)

2. When a transistor is connected

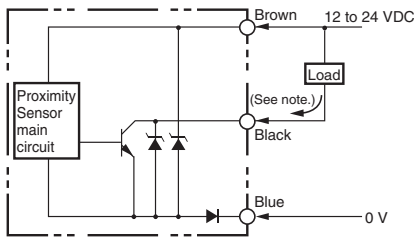
### Timing Charts



### Noise-resistant Models

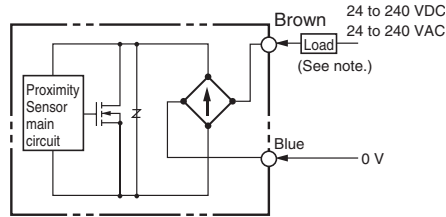
#### Output Circuits

**E2K-C20MC1 (NO)**  
**E2K-C20MC2 (NC)**



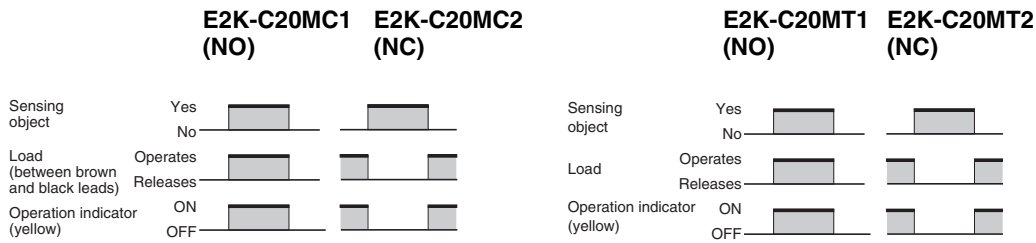
**Note:** 250 mA max. (load current)

**E2K-C20MT1 (NO)**  
**E2K-C20MT2 (NC)**



**Note:** 200 mA max. (load current)

### Timing Charts



# Precautions

## ⚠ WARNING

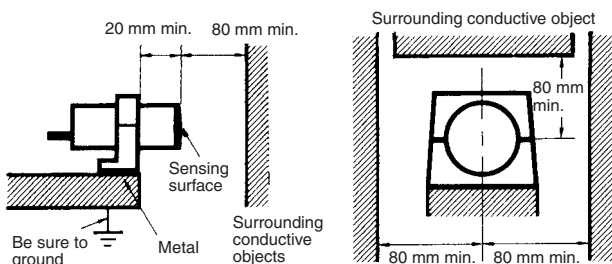
This product is not designed or rated for ensuring safety of persons. Do not use it for such purposes.

## Precautions for Correct Use

### Influence of Surrounding Metals

When mounting a Proximity Sensor, be sure to provide a distance of 80 mm min. from the surrounding metal objects, to prevent the Sensor from being affected by metal objects other than the sensing object.

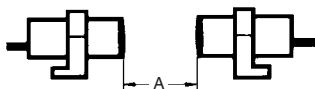
When mounting the Sensor with the L-shaped mounting bracket, be sure to provide a distance of 20 mm min. between the face of the sensing head and the Mounting Bracket.



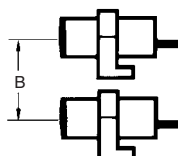
### Mutual Interference

Be sure to space the two Sensors at a distance greater than 100 mm to prevent mutual interference.

- Face-to-face Mounting



- Parallel Mounting



Mutual Interference (Unit: mm)

Dimension	A	B
Model		
E2K-C25M□□	100	100
E2K-C20M□□		105

### Influence of a High-frequency Electromagnetic Field

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

### Sensing Objects

- Sensing Object Material

The E2K-C can detect almost any type of object. The sensing distance of the E2K-C, 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-C will be available if the object is made of grounded metal.

- Indirect Detection

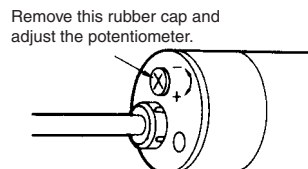
In the case of the detection of objects in metal containers, each metal container must have a nonmetallic window.

- Power ON Conditions

Design the system so that the power for the Sensor is turned ON before the power for the load. Sensing is enabled within 200 ms for the E2K-C20M□□ and within 100 ms for the E2K-C25M□□.

### Sensitivity Adjustment

- Remove the rear rubber cap of the E2K-C and turn the potentiometer in the hole to adjust the sensitivity of the E2K-C. (There is no rubber cap on the E2K-C20M□□.)



- The sensing distance increases by turning the potentiometer clockwise and decreases by turning the potentiometer counterclockwise. The potentiometer can make 15±3 valid turns and then make slip turns because the potentiometer does not have a stopper. The slip turns will not, however, damage the potentiometer.

1. Slowly turn the potentiometer clockwise until the E2K-C turns ON with no sensing object.

Potentiometer



Stop turning the potentiometer at the moment the E2K-C turns ON.

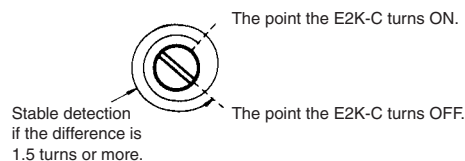
2. Turn the potentiometer counterclockwise until the E2K-C turns OFF with the sensing object located within the sensing distance.

Potentiometer

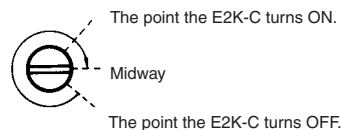


Stop turning the potentiometer at the moment the E2K-C turns OFF.

3. The E2K-C will be in stable operation if there is a difference of 1.5 turns or more between the points the E2K-C is turned ON and OFF, otherwise the E2K-C will not be in stable operation.



4. Set the potentiometer midway between the two points.



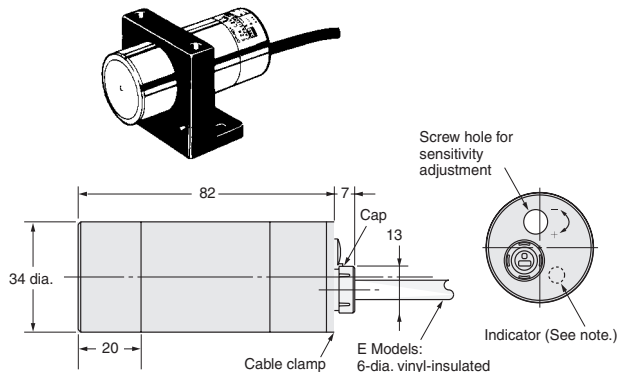
5. If the distance of each sensing object varies, take step 2 with the sensing object located at the farthest sensing distance to be applied.

### Organic Solvents

The E2K-C has a case made of heat-resistant ABS resin or PBT resin. Be sure that the case is free from organic solvents or solutions containing organic solvents.

# Dimensions

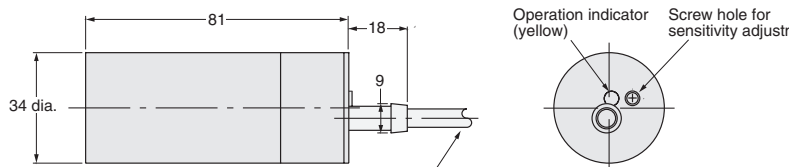
## E2K-C25M□□



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

E Models:  
6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm<sup>2</sup>, 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<sup>2</sup>, Insulator diameter: 1.9 mm), Standard length: 2 m

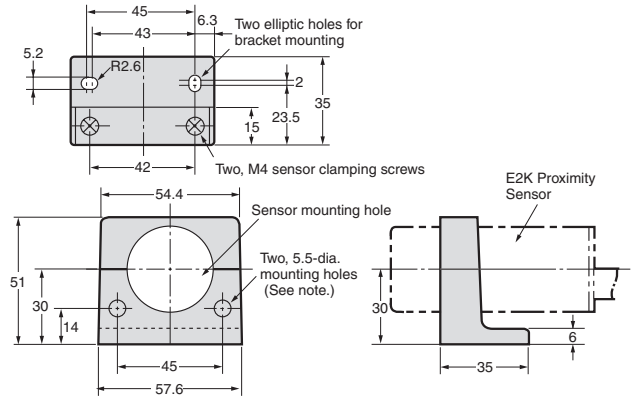
## E2K-C20M□□



C Models:  
5.5 dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm<sup>2</sup>, Insulator diameter 1.5 mm dia.), Standard length: 2 m  
T Models:  
5.5 dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm<sup>2</sup>, Insulator diameter 1.5 mm dia.), Standard length: 2 m

## L-shaped Mounting Bracket (Provided)

### Y92E-A34



**Note:** The holes are not drilled straight through. Drill through the holes before using them.

## Warranties and Limitations of Liability

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### ■ WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

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### ■ LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

## Application Considerations

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### ■ SUITABILITY FOR USE

THE PRODUCTS CONTAINED IN THIS CATALOG ARE NOT SAFETY RATED. THEY ARE NOT DESIGNED OR RATED FOR ENSURING SAFETY OF PERSONS, AND SHOULD NOT BE RELIED UPON AS A SAFETY COMPONENT OR PROTECTIVE DEVICE FOR SUCH PURPOSES. Please refer to separate catalogs for OMRON's safety rated products.

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the product.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

Know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

## Disclaimers

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### ■ CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your OMRON representative at any time to confirm actual specifications of purchased product.

### ■ DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

**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. D016-E1-04

**In the interest of product improvement, specifications are subject to change without notice.**

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