OMRON

# Adjustable Flat Capacitive Prox

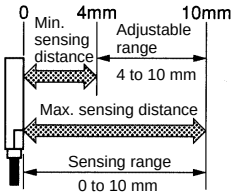
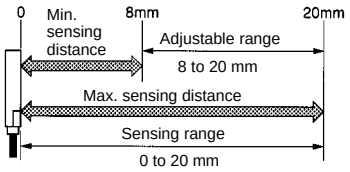
# E2J

Thin Sensor with Separate Amplifier
Ideal for Robotic Grippers, Wafers, LCD, and PDP Detection Applications

- Adjustable sensitivity on separate amplifier
- Flat sensing head is only 5.5 mm thick
- Robotic cable takes continuous flexing
- Dual LED indicator for power and output


## Ordering Information

### ■ SENSORS

| Type | | Sensing distance | Part number |
|---|---|---|---|
| Flat | Unshielded  |   | **E2J-W10MA** |
| | |   | **E2J-W20MA** |

### ■ AMPLIFIER UNIT

| Type | Output configuration | Part number |
|---|---|---|
| DC 3-wire | NPN open collector, switch selectable NO or NC operation | **E2J-JC4A** |

## ■ ACCESSORIES (SOLD SEPARATELY)

| Description | | | Part number |
|---|---|---|---|
| Extension robotic cables | M8-screw-mounting, vibration-proof, 4 conductors | 1 m (3.3 ft) length | **XS3W-M421-401-R** |
| | | 2 m (6.6 ft) length | **XS3W-M421-402-R** |
| Connector dust covers | Red PVC, does not seal to IP67 | For amplifier | **XS3Z-13** |
| | | For sensing head | **XS3Z-15** |

# Specifications

## ■ RATINGS/CHARACTERISTICS

**Sensors**

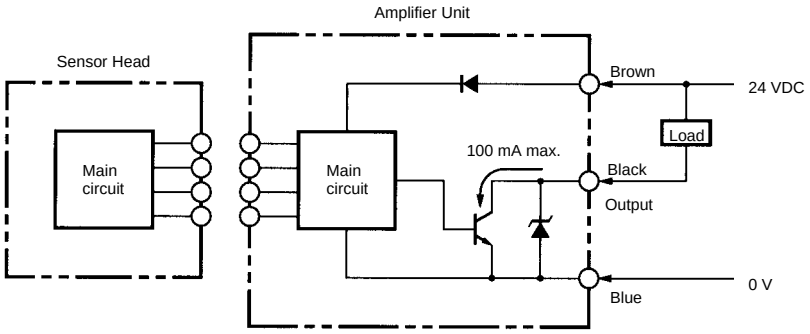
| Part number | | E2J-W10MA | E2J-W20MA |
|---|---|---|---|
| Sensing distance adjustable range | | 4 to 10 mm (0.16 to 0.39 in) | 8 to 20 mm (0.32 to 0.79 in) |
| Sensing range | | 0 to 10 mm (0 to 0.39 in) | 0 to 20 mm (0 to 0.79 in) |
| Standard sensing target | | 50 x 50 mm grounded metal (t = 1 mm) | |
| Sensing target | | Metallic and non–metallic objects | |
| Differential travel | | 15% max. of sensing distance | |
| Response frequency | | 70 kHz max. | |
| Ambient temperature | Operating | –10°C to 55°C (14°F to 131°F) | |
| Ambient humidity | Operating | 35% to 95% | |
| Enclosure rating | | IEC IP66 | |
| Vibration resistance | Malfunction | 10 to 500 Hz, 2.0-mm double amplitude or 150 $m/s^2$ (approx. 15G) for 2 hrs each in X, Y, and Z directions | |
| Shock resistance | Malfunction | 500 $m/s^2$ (approx. 50G) for 3 times each in X, Y, and Z directions | |
| Weight | | Approx. 30 g (1.05 oz) | Approx. 40 g (1.4 oz) |
| Case material | | ABS resin | |

**Amplifier Unit**

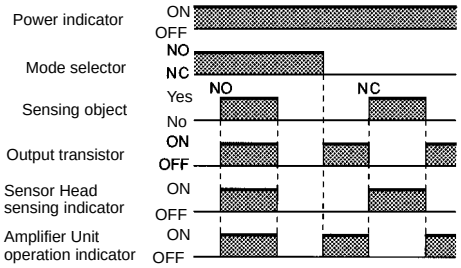
| Part number | | E2J-JC4A |
|---|---|---|
| Supply voltage | | 24 VDC±10%, ripple (p-p): 10% max. |
| Current consumption | | 30 mA max. |
| Control output | | 100 mA max., NPN open collector |
| Output residual voltage | | 1 V max. |
| Circuit protection | | Reverse connection, load short-circuit, and surge absorption |
| Ambient temperature | Operating | –10°C to 55°C (14°F to 131°F) |
| Ambient humidity | Operating | 35% to 85% |
| Temperature influence (Sensor Head and Amplifier Unit) | | ±25% max. of sensing distance at 23°C (73.4 °F) in temperature range of 0°C to 40°C (32°F to 104°F) |
| Voltage influence | | ±1% max. of sensing distance in rated voltage range of ±20% |
| Insulation resistance | | 50 MΩ (at 500 VDC) between current carry parts and case |
| Dielectric strength | | 1,000 VAC (50/60 Hz) for 1 min between current carry parts and case |
| Vibration resistance | Malfunction | 10 to 150 Hz, 1.5-mm double amplitude or 150 $m/s^2$ (approx. 15G) for 2 hrs each in X, Y, and Z directions |
| Shock resistance | Malfunction | 300 $m/s^2$ (approx. 30G) for 3 times each in X, Y, and Z directions |
| Enclosure rating | | IEC IP50 |
| Weight | | Approx. 60 g (21 oz) |
| Case material | | ABS |

# Operation

## ■ OUTPUT CIRCUIT




## ■ OPERATING CHARTS





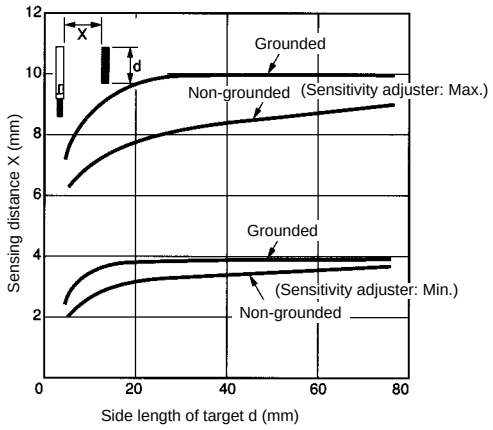
The output transistor is ON when the sensing object is detected.


The output transistor is ON when the sensing object is not detected.

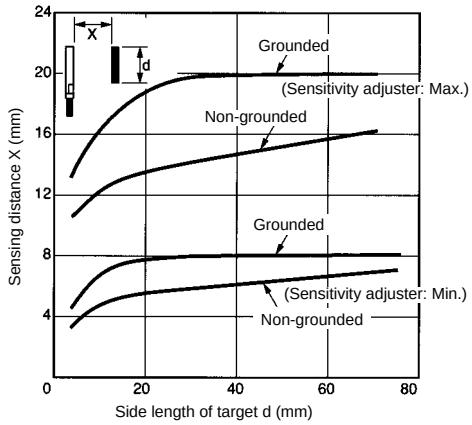
# Engineering Data

## ■ SENSING DISTANCE VS. SENSING OBJECT (IRON)

**E2J-W10MA**

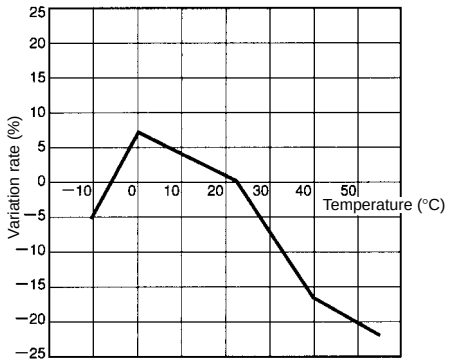



**E2J-W20MA**

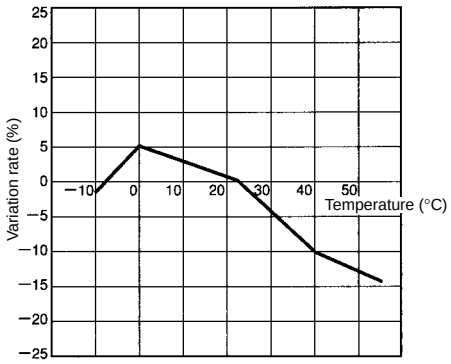



## ■ INFLUENCE OF AMBIENT TEMPERATURE

**E2J-W10MA**

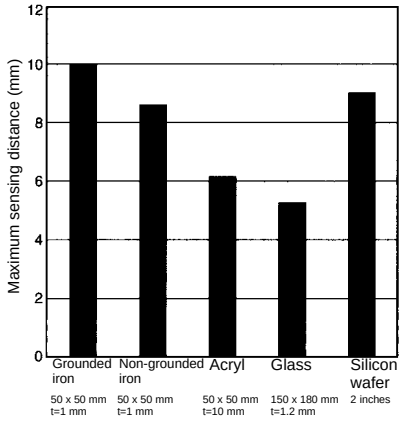



**E2J-W20MA**

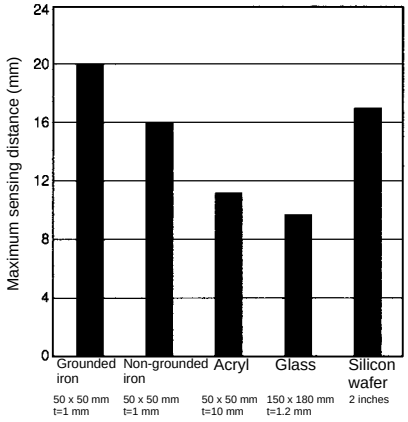


## ■ SENSING DISTANCE OF SENSING OBJECTS

**E2J-W10MA**

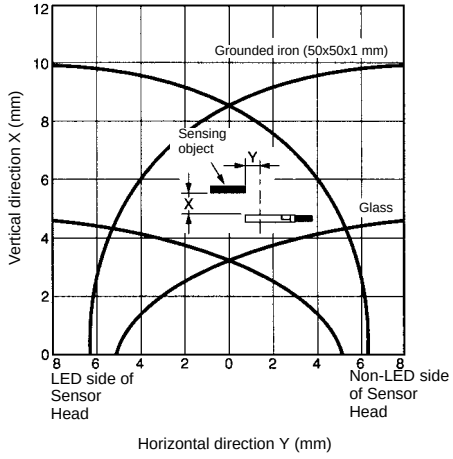



**E2J-W20MA**

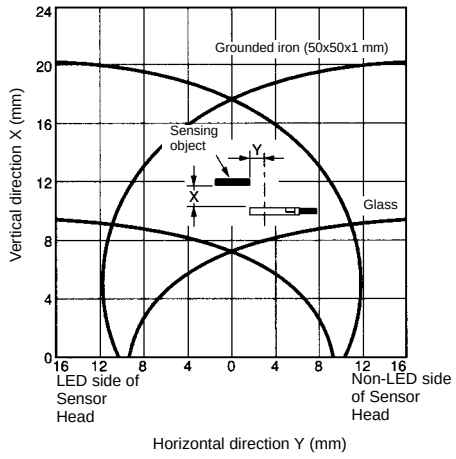



## ■ SENSING RANGES

**E2J-W10MA**




**E2J-W20MA**

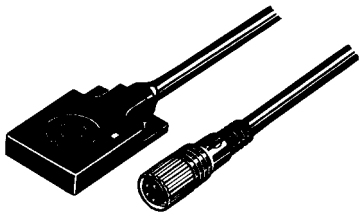


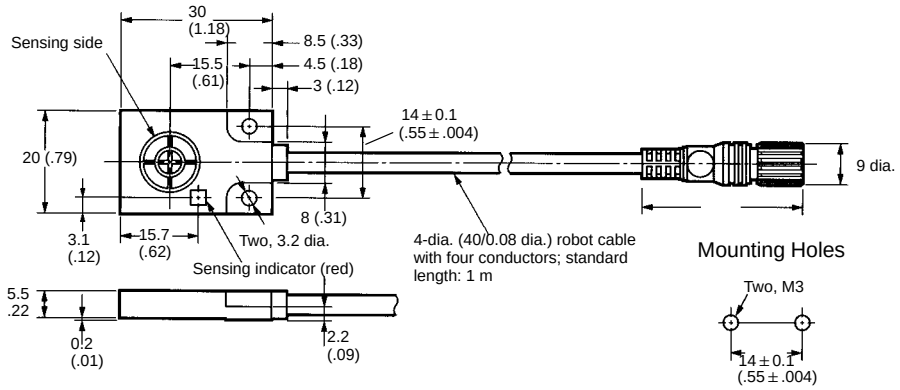

# Dimensions

Unit: mm (inch)

## ■ SENSORS

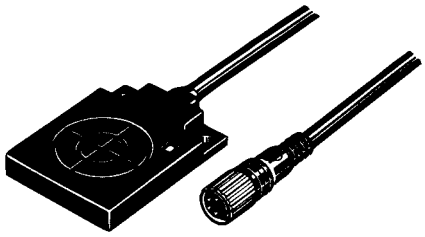
**E2J-W10MA**

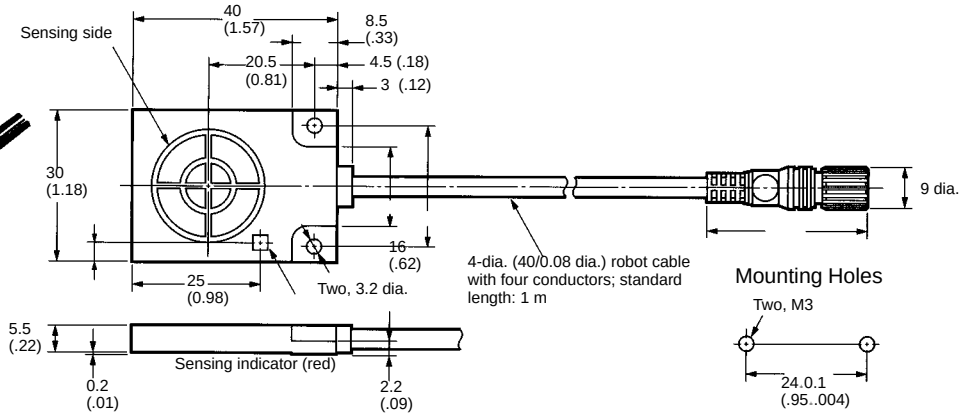




Unit: mm (inch)

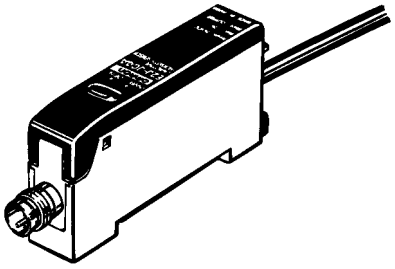
**E2J-W20MA**

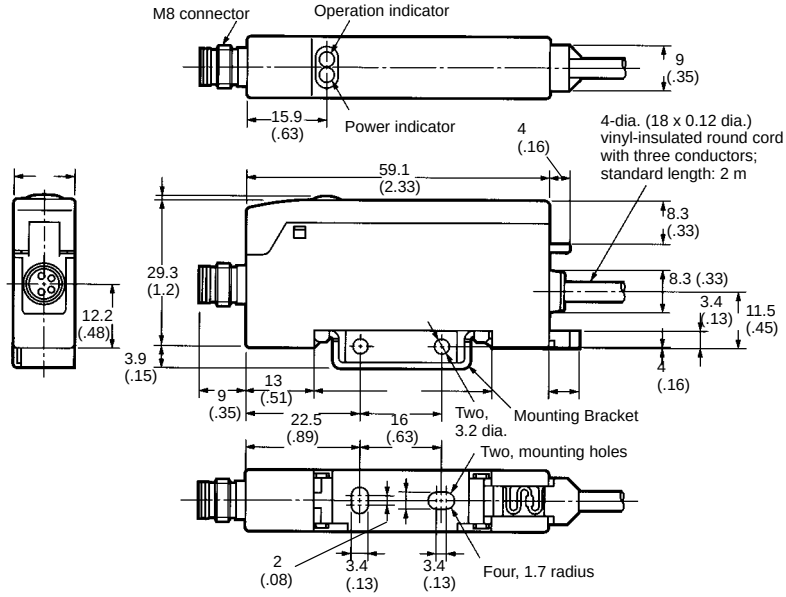





## ■ AMPLIFIER UNIT

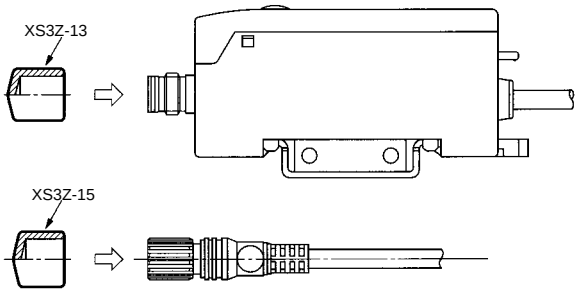
**E2J-JC4A**





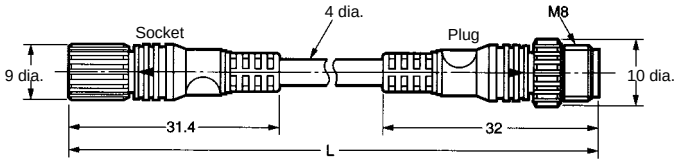

## ■ CONNECTOR DUST COVERS

**XS3Z-13**
**XS3Z-15**




Note: Although the XS3Z Dust Covers protect the E2J from dust, they do not satisfy IP67. When attaching the Dust Cover, be sure to fully insert the connector into the Dust Cover.

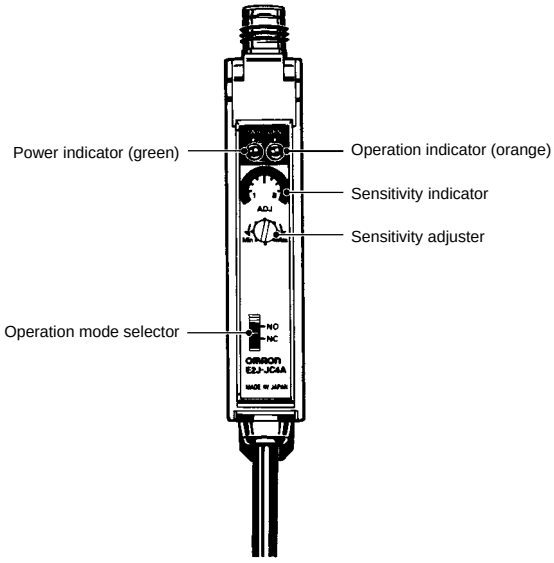
## ■ EXTENSION ROBOTIC CABLES




| Part number | L |
|---|---|
| XS3W-M421-401-R | 1 m |
| XS3W-M421-402-R | 2 m |

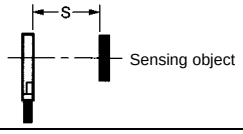
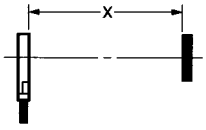
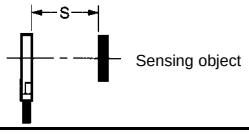
# Nomenclature

## ■ AMPLIFIER UNIT




# Installation

## ■ ADJUSTMENT PROCEDURE

| Step | Sensing | Sensitivity adjuster | Adjustment |
|---|---|---|---|
| 1 |   | --- | Obtain the sensing distance X from the set distance S divided by 0.75. (See note). Determine S so that X will be less than the maximum sensing distance. |
| 2 |   |   | Locate the Sensor so that the distance between the Sensor and sensing object is X. Turn the sensitivity adjuster clockwise until the red sensing indicator of the Sensor Head is lit. |
| 3 |   | --- | Return the Sensor to the previous position so that the distance between the Sensor and sensing object is S. |

Note: 1. If the ambient temperature is beyond 0°C to 40°C, divide by 0.7 to obtain sensing distance.
2. After completing sensitivity adjustment, mount the provided cover on the Amplifier Unit to prevent misoperation.
3. The maximum sensing distance will drop depending on the dimensions and material of the sensing object. Refer to *Engineering Data*.

# Precautions

## ■ SAFETY PRECAUTIONS

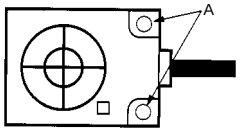
- Do not use the sensor in an environment where it will be exposed to inflammable or explosive gases.
- Do not attempt to disassemble, repair, or modify the Sensor.
- Be careful not to connect the power source with the polarities in reverse.
- Do not short-circuit the loads.
- Do not use the Sensor at voltages exceeding the rated voltage.

## ■ HANDLING

- Do not use the Sensor outdoors.
- Do not wire the Sensor alongside a high-tension or power line.
- Do not use portable telephones or transceivers near the Sensor. Be sure to ground the Mounting Brackets.
- Do not use the Sensor in an environment where it will be exposed to chemicals, particularly chemical solutions or oxidizing acids.

## ■ TIGHTENING TORQUE

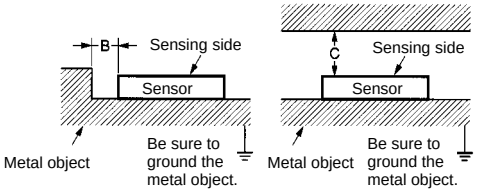
Be sure that the tightening torque does not exceed the following value.




| Location | Torque |
|---|---|
| A | 0.54N • m {5.5 kgf • cm} max. |

## ■ EFFECTS OF SURROUNDING METAL

Before mounting the sensor, be sure that the sensor will be separated from surrounding objects as shown in the following illustration.



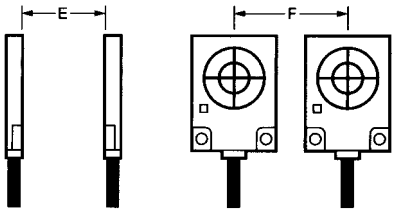

| Dimension | E2J-W10MA | E2J-W20MA |
|---|---|---|
| B | 10 mm (0.39 in) | 20 mm (0.79 in) |
| C | 20 mm (0.79 in) | 40 mm (1.57 in) |

## ■ EFFECTS OF STATIC ELECTRICITY

Be sure to discharge static electricity before detecting objects that are greatly affected by static electricity.

## ■ MUTUAL INTERFERENCE

When mounting more than two sensors face to face or side by side, ensure that the minimum distances given in the following table are maintained.




| Distance | E2J-W10MA | E2J-W20MA |
|---|---|---|
| E | 20 mm (0.79 in) | 70 mm (2.76 in) |
| F | 30 mm (1.18 in) | 50 mm (1.97 in) |

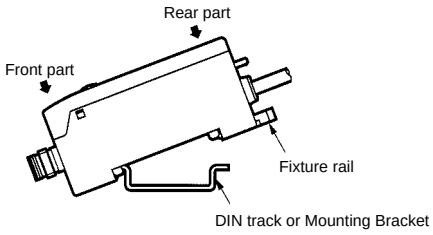
## ■ CABLING

- Be sure that the bending radius of the cable is more than 5 mm.
- Use the XS3W-M421-40□-R with connectors (M8-screw-mounting type) as the extension cable. The maximum cable length is 3 m (extension section: 2 m).

## ■ TRACK MOUNTING THE AMPLIFIER UNIT

### Mounting

1. Mount the front part of the amplifier to the mounting bracket provided with the amplifier or a DIN track.
2. Press the rear part of the amplifier onto the mounting bracket or DIN track.




### Removal

Pull the fixture rail with a flat-blade screwdriver for easy removal.

**NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.**

OMRON®

**OMRON ELECTRONICS, INC.**
One East Commerce Drive
Schaumburg, IL 60173
**1-800-55-OMRON**

**OMRON CANADA, INC.**
885 Milner Avenue
Scarborough, Ontario M1B 5V8
**416-286-6465**

Cat. No. CEDSAX3 10/99 Specifications subject to change without notice. Printed in U.S.A.

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Omron:

E2J-W10MA E2J-W20MA E2J-JC4A