High Precision Positioning Inductive Proximity Sensor
E2C-EDA

Proximity Sensor with Separate Amplifier Enables Easily Making High-precision Sensitivity Settings.

• Wide variety of Sensor Heads to select according to the application. Flexible cables are used between Preamplifiers and Amplifier Units of the Sensor Heads.
• High resistance to changes in ambient temperature. Temperature characteristics of 0.08%/°C (for 5.4-dia. models).
• Make simple and reliable detection settings with micron-level precision using the teaching function.
• Check the sensing excess gain level on the digital display.
• Support for high-precision positioning and screening with fine positioning to maximize variations.
• The E2C-EDA0 supports an EtherCAT Sensor Communications Unit or CompoNet Sensor Communications Unit.

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 12.]

<table>
<thead>
<tr>
<th>Sensor Heads</th>
<th>Appearance</th>
<th>Sensing distance</th>
<th>Repeat accuracy</th>
<th>Cable specification</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cylindrical</td>
<td>3 dia. × 18 mm</td>
<td>0.6 mm</td>
<td>Free cutting</td>
<td>E2C-EDR6-F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.4 dia. × 18 mm</td>
<td>1 mm</td>
<td>Standard</td>
<td>E2C-ED01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 dia. × 22 mm</td>
<td>2 mm</td>
<td>Free cutting</td>
<td>E2C-ED01-F</td>
</tr>
<tr>
<td></td>
<td>Shielded</td>
<td>5.4 dia. × 18 mm</td>
<td>1 mm</td>
<td>With Protective Spiral Tube</td>
<td>E2C-ED01-S</td>
</tr>
<tr>
<td></td>
<td>Screw</td>
<td>M10 × 22 mm</td>
<td>2 mm</td>
<td>Standard</td>
<td>E2C-EM02</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Free cutting</td>
<td>E2C-EM02-F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>With Protective Spiral Tube</td>
<td>E2C-EM02-S</td>
</tr>
<tr>
<td></td>
<td>Flat</td>
<td>30 × 14 × 4.8 mm</td>
<td>5 mm</td>
<td>Standard</td>
<td>E2C-EV05</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Free cutting</td>
<td>E2C-EV05-F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>With Protective Spiral Tube</td>
<td>E2C-EV05-S</td>
</tr>
<tr>
<td></td>
<td>Screw</td>
<td>M18 × 46.3 mm</td>
<td>7 mm</td>
<td>Standard</td>
<td>E2C-EM07M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Free cutting</td>
<td>E2C-EM07M-F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>With Protective Spiral Tube</td>
<td>E2C-EM07M-S</td>
</tr>
<tr>
<td></td>
<td>Unshielded</td>
<td>M12 × 22 mm</td>
<td>2 mm</td>
<td>Standard</td>
<td>E2C-EM02H</td>
</tr>
</tbody>
</table>

*1 Ask your OMRON representative for information on the Protective Spiral Tube.
*2 Overall length of free-cut cable: 3.5 m, Length from the Sensor Head to the Preamplifier: 0.5 m (Overall length of the standard cable with Protective Spiral Tube: 2.5 m, Length from the Sensor Head to the Preamplifier: 2 m)
# Amplifier Units

## Amplifier Units with Cables

<table>
<thead>
<tr>
<th>Item</th>
<th>Appearance</th>
<th>Functions</th>
<th>Model</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced models</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twin-output models</td>
<td></td>
<td>Area output, open circuit detection, differential operation</td>
<td>E2C-EDA11 2M</td>
<td>E2C-EDA41 2M</td>
</tr>
<tr>
<td>External-input models</td>
<td></td>
<td>Remote setting, differential operation</td>
<td>E2C-EDA21 2M</td>
<td>E2C-EDA51 2M</td>
</tr>
</tbody>
</table>

## Amplifier Units with Wire-saving Connectors (An Amplifier Unit Connector (sold separately) is required.)

<table>
<thead>
<tr>
<th>Item</th>
<th>Appearance</th>
<th>Functions</th>
<th>Model</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced models</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twin-output models</td>
<td></td>
<td>Area output, open circuit detection, differential operation</td>
<td>E2C-EDA6</td>
<td>E2C-EDA8</td>
</tr>
<tr>
<td>External-input models</td>
<td></td>
<td>Remote setting, differential operation</td>
<td>E2C-EDA7</td>
<td>E2C-EDA9</td>
</tr>
</tbody>
</table>

Note: These models allow you to use an E3X-DRT21-S VER.3 Sensor Communications Unit. When using the E3X-DRT21-S VER.3, use an E3X-CN02 Connector without a Cable for the Wire-saving Connector.

## Amplifier Unit with Connector for EtherCAT or CompoNet Sensor Communications Units [Refer to Dimensions page 16]

<table>
<thead>
<tr>
<th>Item</th>
<th>Appearance</th>
<th>Functions</th>
<th>Model</th>
<th>Applicable Sensor Communications Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced model</td>
<td></td>
<td></td>
<td></td>
<td>E3X-ECT</td>
</tr>
<tr>
<td>Twin-output model</td>
<td></td>
<td>Area output, open circuit detection, differential operation</td>
<td>E2C-EDA0</td>
<td>E3X-CRT</td>
</tr>
</tbody>
</table>

## Wire-saving Connectors (Order Separately)

Note: Protector seals provided. [Refer to E3X-DA-S/MDA.]

<table>
<thead>
<tr>
<th>Item</th>
<th>Appearance</th>
<th>Cable length</th>
<th>No. of conductors</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Connector</td>
<td></td>
<td>2 m</td>
<td>4</td>
<td>E3X-CN21</td>
</tr>
<tr>
<td>Slave Connector</td>
<td></td>
<td></td>
<td>2</td>
<td>E3X-CN22</td>
</tr>
</tbody>
</table>

### Ordering Precaution for Amplifier Units with Wire-saving Connectors

A Connector is not provided with the Amplifier Unit.

Refer to the following tables when ordering.

<table>
<thead>
<tr>
<th>Amplifier Unit</th>
<th>NPN output</th>
<th>PNP output</th>
<th>Applicable Connector (Order Separately)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td>Master Connector</td>
</tr>
<tr>
<td>Advanced models</td>
<td>E2C-EDA6</td>
<td>E2C-EDA8</td>
<td>E3X-CN21</td>
</tr>
<tr>
<td></td>
<td>E2C-EDA7</td>
<td>E2C-EDA9</td>
<td>+</td>
</tr>
</tbody>
</table>

### When Using 5 Amplifier Units

<table>
<thead>
<tr>
<th>Amplifier Units (5 Units)</th>
<th>+</th>
<th>1 Master Connector</th>
<th>4 Slave Connectors</th>
</tr>
</thead>
</table>
Mobile Console (Order Separately)  [Refer to E3X-DA-S/MDA.]

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E3X-MC11-SV2 (model number of set)</td>
<td>Mobile Console with Head, Cable, and AC adapter provided as accessories</td>
</tr>
<tr>
<td></td>
<td>E3X-MC11-C1-SV2</td>
<td>Mobile Console</td>
</tr>
<tr>
<td></td>
<td>E3X-MC11-H1</td>
<td>Head</td>
</tr>
<tr>
<td></td>
<td>E39-Z12-1</td>
<td>Cable (1.5 m)</td>
</tr>
</tbody>
</table>

**Note:** Use the E3X-MC11-SV2 Mobile Console with E2C-EDA-series Amplifier Units. If you use a Mobile Console like the E3X-MC11-S, some functions may not operate. For details, refer to Ratings and Specifications for E3X-DA-S/MDA.

**Accessories (Order Separately)**

**Mounting Bracket**
A Mounting Bracket is not provided with the Amplifier Unit. Order a Mounting Bracket separately if required.  

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E39-L143</td>
<td>1</td>
</tr>
</tbody>
</table>

**End Plate**
An End Plate is not provided with the Amplifier Unit. Order an End Plate separately if required.  
[Refer to PFP-M.]

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PFP-M</td>
<td>1</td>
</tr>
</tbody>
</table>

**Extension Cables for Sensor Head**
A Mounting Bracket is not provided with the Amplifier Unit. Order an Extension Cable separately if required.  
[Refer to Dimensions on page 13.]

<table>
<thead>
<tr>
<th>Cable length</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 m</td>
<td>E22-XC2R</td>
<td>1</td>
</tr>
<tr>
<td>7 m</td>
<td>E22-XC7R</td>
<td>1</td>
</tr>
</tbody>
</table>
## Rating and Specifications

### Sensor Heads

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
<th>E2C-EDR6-F</th>
<th>E2C-ED01(-)</th>
<th>E2C-ED02(-)</th>
<th>E2C-EM02(-)</th>
<th>E2C-EM07(-)</th>
<th>E2C-EV05(-)</th>
<th>E2C-EM02H</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3 dia. × 18 mm</td>
<td>5.4 dia. × 18 mm</td>
<td>8 dia. × 22 mm</td>
<td>M10 × 22 mm</td>
<td>M18 × 46.3 mm</td>
<td>30 × 14 × 4.8 mm</td>
<td>M12 × 22 mm</td>
</tr>
<tr>
<td>Sensing distance</td>
<td></td>
<td>0.6 mm</td>
<td>1 mm</td>
<td>2 mm</td>
<td>7 mm</td>
<td>5 mm</td>
<td>2 mm</td>
<td></td>
</tr>
<tr>
<td>Sensing object</td>
<td>Magnetic metal</td>
<td>(The sensing distance will decrease when sensing non-magnetic metal. Refer to Engineering Data (Reference Value) on page 6.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard sensing object</td>
<td></td>
<td>5 × 5 × 3 mm</td>
<td>10 × 10 × 3 mm</td>
<td>22 × 22 × 3 mm</td>
<td>15 × 15 × 3 mm</td>
<td>20 × 20 × 3 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material:</td>
<td>iron (S50C)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeat accuracy</td>
<td>*1</td>
<td>1 μm</td>
<td>2 μm</td>
<td>5 μm</td>
<td>2 μm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hysteresis distance</td>
<td></td>
<td>Variable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature characteristic</td>
<td>*1</td>
<td>0.3%/%C</td>
<td>0.08%/%C</td>
<td>0.04%/%C</td>
<td>0.2%/%C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor Head</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preamplifier and Amplifier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0.08%/%C</td>
<td>Operating</td>
<td>−10°C to 60°C (with no icing or condensation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td></td>
<td></td>
<td>−20°C to 70°C (with no icing or condensation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td></td>
<td>Operating/storage: 35% to 85% (with no condensation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation resistance</td>
<td></td>
<td>50 MΩ min. (at 500 VDC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dielectric strength</td>
<td></td>
<td>1,000 VAC at 50/60 Hz for 1 min between current carry parts and case</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td></td>
<td>Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock resistance</td>
<td></td>
<td>Destruction: 500 m/s² for 3 times each in X, Y, and Z directions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td></td>
<td>IEC60529 IP67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection method</td>
<td></td>
<td>Connector (standard cable length: 2.5 m (2 m between Head and Preamplifier))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (packed state)</td>
<td></td>
<td>Approx. 120 g (Models with protective spiral tube (&quot;-S&quot; models) are approx. 90 g heavier.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor Head</td>
<td></td>
<td>Case</td>
<td>Brass</td>
<td>Stainless steel</td>
<td>Brass</td>
<td>Zinc</td>
<td>Brass</td>
<td></td>
</tr>
<tr>
<td>Sensing surface</td>
<td></td>
<td>Heat-resistant ABS</td>
<td></td>
<td></td>
<td></td>
<td>PEEK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping nut</td>
<td></td>
<td>---</td>
<td>Nickel-plated brass</td>
<td>---</td>
<td>Nickel-plated brass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toothed washer</td>
<td></td>
<td>---</td>
<td>Zinc-plated iron</td>
<td>---</td>
<td>Zinc-plated iron</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preamplifier</td>
<td></td>
<td>PES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 The repeat accuracy and temperature characteristic are for a standard sensing object positioned midway through the rated sensing distance.
*2 A sudden temperature rise even within the rated temperature range may degrade characteristics.
*3 For the Sensor Head only without the preamplifier (−10 to 60°C). With no icing or condensation.
*4 Do not operate in areas exposed to water vapor because the enclosure is not waterproof.
## Amplifier Units

<table>
<thead>
<tr>
<th>Model Item</th>
<th>Type</th>
<th>Advanced Models with Twin Outputs</th>
<th>Advanced Models with External Inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-wired Model</td>
<td>Model with Wire-saved Connector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E2C-EDA11</td>
<td>E2C-EDA6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E2C-EDA41</td>
<td>E2C-EDA8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E2C-EDA7</td>
<td>E2C-ED51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E2C-EDA9</td>
<td>E2C-EDA11</td>
</tr>
</tbody>
</table>

### Functions

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply voltage</strong></td>
<td>12 to 24 VDC ±10%, ripple (p-p): 10% max.</td>
</tr>
<tr>
<td><strong>Power consumption</strong></td>
<td>1,080 mW max. (current consumption: 45 mA at power supply voltage of 24 VDC)</td>
</tr>
<tr>
<td><strong>Control output</strong></td>
<td>Load power supply voltage: 26.4 VDC max.; NPN/PNP open collector output; load current: 50 mA max. (residual voltage: 1 V max.)</td>
</tr>
</tbody>
</table>

### Response time

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Super-high-speed mode *2</td>
<td>150 μs for operation and reset respectively</td>
</tr>
<tr>
<td>High-speed mode</td>
<td>300 μs for operation and reset respectively</td>
</tr>
<tr>
<td>High-resolution mode</td>
<td>4 ms for operation and reset respectively</td>
</tr>
</tbody>
</table>

### Differential detection

Switchable between single edge and double edge detection mode
- Single edge: Can be set to 300 μs, 500 μs, 1 ms, 10 ms, or 100 ms
- Double edge: Can be set to 500 μs, 1 ms, 2 ms, 20 ms, or 200 ms.

### Timer function

- Select from OFF-delay, ON-delay, or one-shot timer.
- 1 ms to 5 s (1 to 20 ms set in 1-ms increments, 20 to 200 ms set in 10-ms increments, 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1-s increments).

### Zero-reset

Negative values can be displayed. (Threshold is not shifted.)

### Initial reset

Settings can be returned to defaults as required.

### Mutual interference prevention

Possible for up to 5 Units. *2
- Intermittent oscillation method (Response time = (number of Units connected + 1) ×15 ms)

### Hysteresis settings

Setting range: 10 to 4,000

### I/O settings

- Output setting (Select from channel 2 output, area output, self-diagnosis, or open circuit detection.)
- Input setting (Select from teaching, fine positioning, zero-reset, synchronous detection.)

### Digital display

Select from the following:
- Incident level + threshold, incident level percentage + threshold, incident light peak level + incident light bottom level (updated with output), long bar display, incident level + peak hold, incident level + channel

### Display orientation

Switching between normal/reversed display is possible.

### Ambient temperature *3

- Operating: When connecting 1 to 2 Units: –10°C to 55°C, When connecting 3 to 5 Units: –10°C to 50°C, When connecting 6 to 16 Units: –10°C to 45°C
- When used in combination with an EDR6-F: When connecting 3 to 4 Units: –10°C to 50°C, When connecting 5 to 8 Units: –10°C to 45°C, When connecting 9 to 16 Units: –10°C to 40°C
- Storage: –20°C to 70°C (with no icing)

### Ambient humidity

- Operating/storage: 35% to 85% (with no condensation)

### Insulation resistance

20 MΩ min. (at 500 VDC)

### Dielectric strength

1,000 VAC at 50/60 Hz for 1 min

### Vibration resistance (Destruction)

- 10 to 55 Hz with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions
- 10 to 150 Hz with a 0.7-mm double amplitude for 80 min each in X, Y, and Z directions
- 10 to 55 Hz with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions

### Shock resistance (Destruction)

- 500 m/s² for 3 times each in X, Y, and Z directions
- 150 m/s² for 3 times each in X, Y, and Z directions
- 500 m/s² for 3 times each in X, Y, and Z directions

### Degree of protection

IEC60529 IP50

### Connection method

- Pre-wired
- Wire-saving connector
- Connector for Sensor Communications Unit
- Pre-wired
- Wire-saving connector

### Weight (packed state)

- Approx. 100 g
- Approx. 55 g
- Approx. 55 g
- Approx. 100 g
- Approx. 55 g

### Material

- Case: PBT (polybutylene terephthalate)
- Cover: Polycarbonate

---

*1 This model allows you to use an E3X-ECT EtherCAT Sensor Communications Unit or E3X-CRT CompoNet Sensor Communications Unit.

*2 Communications functions, mutual interference prevention, and communications with the Mobile Console are all disabled if the detection mode is set to the super-high-speed mode.

*3 The following temperature ranges apply for operation when an E3X-ECT or E3X-CRT Sensor Communications Unit is used with the E2C-EDA0: Groups of 1 or 2 Amplifier Units: 0 to 55°C, Groups of 3 to 5 Amplifier Units: 0 to 50°C, Groups of 6 to 16 Amplifier Units: 0 to 45°C, Groups of 17 to 30 Amplifier Units (with the E3X-ECT): 0 to 40°C.

The following temperature ranges apply when an E3X-ECT or E3X-CRT Sensor Communications Unit is used with the E2C-EDR6-F: Groups of 3 or 4 Amplifier Units: 0 to 50°C, Groups of 5 to 8 Amplifier Units: 0 to 45°C, Groups of 9 to 16 Amplifier Units: 0 to 40°C, Groups of 17 to 30 Amplifier Units (with the E3X-ECT): 0 to 35°C.
**Engineering Data (Reference Value)**

### Sensing Distance vs. Display Values

**E2C-EDR6-F**

![Graph showing Display Value vs. Sensing Distance for E2C-EDR6-F](image1)

**E2C-ED01(-@)**

![Graph showing Display Value vs. Sensing Distance for E2C-ED01(-@)](image2)

**E2C-ED02(-@)/EM02(-@)**

![Graph showing Display Value vs. Sensing Distance for E2C-ED02(-@)/EM02(-@)](image3)

**E2C-EM07(-@)**

![Graph showing Display Value vs. Sensing Distance for E2C-EM07(-@)](image4)

**E2C-EV05(-@)**

![Graph showing Display Value vs. Sensing Distance for E2C-EV05(-@)](image5)

**E2C-EM02H**

![Graph showing Display Value vs. Sensing Distance for E2C-EM02H](image6)

### Influence of Sensing Object Size and Material

**E2C-EDR6-F**

![Graph showing Sensing Distance vs. Length of Sensed Object for E2C-EDR6-F](image7)

**E2C-ED01(-@)**

![Graph showing Sensing Distance vs. Length of Sensed Object for E2C-ED01(-@)](image8)

**E2C-ED02(-@)/EM02(-@)**

![Graph showing Sensing Distance vs. Length of Sensed Object for E2C-ED02(-@)/EM02(-@)](image9)
Influence of Sensor Head Temperature

**E2C-EDA**

**E2C-EM07(-□□)**

**E2C-EV05(-□□)**

**E2C-EM02H**
### NPN Output

<table>
<thead>
<tr>
<th>Model</th>
<th>Operation mode</th>
<th>Timing chart</th>
<th>Mode selector</th>
<th>Output circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>E2C-EDA11</td>
<td>NO (Normally open)</td>
<td></td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>E2C-EDA6</td>
<td>NC (Normally closed)</td>
<td></td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>E2C-EDA21</td>
<td>NO (Normally open)</td>
<td></td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>E2C-EDA7</td>
<td>NC (Normally closed)</td>
<td></td>
<td>NC</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
1. **Setting Areas for Twin-output Models**
   - Normally open: ...ON between the thresholds for Channel 1 and Channel 2
   - Normally closed: ...OFF between the thresholds for Channel 1 and Channel 2
2. **Timing Charts for Timer Settings (T: Set Time)**

### Timing Chart for ON Delay

<table>
<thead>
<tr>
<th>Sensing object</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Timing Chart for OFF Delay

<table>
<thead>
<tr>
<th>Sensing object</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Timing Chart for One Shot

<table>
<thead>
<tr>
<th>Sensing object</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

[Diagram of I/O Circuit Diagrams]
PNP Output

### Setting Areas for Twin-output Models
- **Normally open**: ON between the thresholds for Channel 1 and Channel 2
- **Normally closed**: OFF between the thresholds for Channel 1 and Channel 2

### Timing Charts for Timer Settings (T: Set Time)

#### Nomenclature

**Amplifier Units**
- Twin-output Models (E2C-EDA11/EDA41/EDA6/EDA8/EDA0)
- External-input Models (E2C-EDA21/EDA51/EDA7/EDA9)

**Operation Keys**
- **UP**
- **DOWN**
- **MODE**

**Main Display (Red)**
- Displays the incident light level or the function name.

**Sub-Display (Green)**
- Displays the threshold values and function settings.

**Operation Indicator (Orange)**
- For Channel 1: ON when output is ON, OFF when output is OFF.
- For Channel 2: ON when output is ON, OFF when output is OFF.

**Channel Selector**
- Used to select the channel to display or set.

**SET/RUN Mode Selector**
- Used to select SET or RUN mode.

**Fine Positioning Indicator (Orange)**
- Displays the incident light level or the function name.

**Sub-Display (Green)**
- Displays the threshold values and function settings.

**Operation Keys**
- **UP**
- **DOWN**
- **MODE**

**Main Display (Red)**
- Displays the incident light level or the function name.

**Sub-Display (Green)**
- Displays the threshold values and function settings.

**Operating Mode Selector**
- Used to select normally open or normally closed.

**Fine Positioning Indicator (Orange)**
- Displays the incident light level or the function name.

**Sub-Display (Green)**
- Displays the threshold values and function settings.

**Operation Keys**
- **UP**
- **DOWN**
- **MODE**

**Main Display (Red)**
- Displays the incident light level or the function name.

**Sub-Display (Green)**
- Displays the threshold values and function settings.

**Operating Mode Selector**
- Used to select SET or RUN mode.
Safety Precautions

Refer to Warranty and Limitations of Liability.

![WARNING]

Do not use this product in any safety device used for the protection of human lives.

Precautions for Correct Use

Do not use this product in operating atmospheres or environments outside the specified ratings.

Amplifier Units

Design

Power ON

The Sensor is ready to sense an object within 200 ms after turning the power ON. If the load and Sensor are connected to different power supplies, always turn ON the Sensor power first.

Cable

Use an external power cable of cross-section of 0.3 mm² or more for the Amplifier, and the total length of the cable must be 30 m or less.

Connecting Sensor Heads

Connecting and Disconnecting Sensor Heads

1. Open the protective cover.
2. Making sure that the lock button is up, insert the fibers all the way to the back of the Connector insertion opening.

To disconnect the Sensor Head, pull out the fibers while pressing on the lock button.

Connecting and Disconnecting Wire-saving Connectors

<Connecting Connectors>

1. Insert the Master or Slave Connector into the Amplifier Unit until it clicks into place.
2. Apply the supplied seal to the non-connection surface of the Master/Slave Connector.

Note: Apply the seal to the grooved side.

<Disconnecting Connectors>

1. Slide the Slave Amplifier Unit.
2. After the Amplifier Unit has been separated, press down on the lever on the Connector and remove it. (Do not attempt to remove Connectors without separating them from other Amplifier Units first.)

Installing and Removing Amplifier Units

<Installing Amplifier Units>

1. Install the Units one by one to the DIN rail.
2. Slide one Unit toward the other, match the clips at the front ends, and then bring them together until they “click.”

<Removing Amplifier Units>

Slide one Unit away from the other and remove them one by one. (Do not remove the connected Units together from the DIN rail.)

Note: 1. When the Amplifier Units are connected to each other, the operable ambient temperature changes depending on the number of connected Amplifier Units. Check page 5 in Rating and Specifications.
2. Before connecting or disconnecting the Units, always switch power OFF.
End Plate Mounting (PFP-M)
Mount End Plates on Amplifier Units to avoid movement due to vibration. When a Mobile Console is installed, mount the End Plate facing as shown in the following diagram.

Mounting a Communications Head for the Mobile Console
Leave a space of at least 20 mm on the left side of the Units for a Mobile Console Communications Head.

EEPROM Write Error
If the data is not written to the EEPROM correctly due to a power failure or static-electric noise, initialize the settings using the keys on the Amplifier Unit.

Optical Communications
When using more than one Amplifier Unit, mount the Units side-by-side. Do not slide or remove Units while they are in use.

Miscellaneous
Protective Cover
Be sure to put on the Protective Cover before use.

Mobile Console
Use the E3X-MC11-SV2 Mobile Console for E2C-EDA-series Amplifier Units. Other Mobile Consoles, such as the E3X-MC11, cannot be used.

Sensor Head and Amplifier Unit Connection
Be sure to use only specified Sensor Head and Amplifier Unit combinations. The E3C-LDA-series Photoelectric Sensor with Separate Digital Amplifier is not compatible, and the E2C-EDA must not be used with products from that series.

Warm-up
The digital display will slowly change until the circuits stabilize after the power is turned ON. It takes about 30 minutes after the power is turned ON before the E2C-EDA is ready to sense.

Maintenance Inspection
• Be sure to turn OFF the power before adjusting, connecting, or disconnecting the Sensor Head.
• Do not use thinner, benzene, acetone, or kerosene to clean the Sensor Head or Amplifier Unit.

Sensor Heads Mounting
Mounting Sensor Heads
• Use the dimensions from the following table to mount unthreaded cylindrical models (E2C-EDR6-F). Do not tighten screws with torque exceeding 0.2 N·m when mounting Sensor Heads.

<table>
<thead>
<tr>
<th>Model</th>
<th>Tightening range A</th>
</tr>
</thead>
<tbody>
<tr>
<td>E2C-EDR6-F</td>
<td>9 to 18 mm</td>
</tr>
<tr>
<td>E2C-ED01</td>
<td>9 to 18 mm</td>
</tr>
<tr>
<td>E2C-ED02</td>
<td>11 to 12 mm</td>
</tr>
</tbody>
</table>

• Use the torque given in the following table to tighten threaded cylindrical models (E2C-EM02H). Do not use torque exceeding 0.5 N·m to tighten screws when mounting flat models (E2C-EV05).

<table>
<thead>
<tr>
<th>Model</th>
<th>Tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>E2C-EM02</td>
<td>15 N·m max</td>
</tr>
<tr>
<td>E2C-EM07</td>
<td>15 N·m max</td>
</tr>
<tr>
<td>E2C-EM02H</td>
<td>5.9 N·m max</td>
</tr>
</tbody>
</table>

• Do not use torque exceeding 0.5 N·m to tighten screws when mounting flat models (E2C-EV05).
• Use a bending radius of at least 8 mm for the Sensor Head cable.
• Use only the special extension cable to extend the cable between the Sensor Head and the Amplifier Unit.

Effects of Surrounding Metal
• Provide a minimum distance between the Sensor and the surrounding metal as shown in the table below.

<table>
<thead>
<tr>
<th>Effects of Surrounding Metal (Units: mm)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Counterbore A</th>
<th>Protrusion B</th>
</tr>
</thead>
<tbody>
<tr>
<td>E2C-EDR6-F</td>
<td>3.1</td>
<td>0</td>
</tr>
<tr>
<td>E2C-ED01</td>
<td>5.4</td>
<td>0</td>
</tr>
<tr>
<td>E2C-ED02</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>E2C-EM02</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>E2C-EM07</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>E2C-EV05</td>
<td>14 x 30</td>
<td>4.8</td>
</tr>
<tr>
<td>E2C-EM02H</td>
<td>12</td>
<td>0</td>
</tr>
</tbody>
</table>

Mutual Interference
• If more than one Sensor Head is installed face to face or in parallel, make sure that the distances between two Units adjacent to each other are the same as or larger than the corresponding values shown in the following table.
• The distance between Sensor Heads may be narrower than specified with these Sensors because the Mutual Interference Prevention Function is used for optical communications between the Amplifier Units.

<table>
<thead>
<tr>
<th>Mutual Interference (Units: mm)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Face-to-face arrangement A</th>
<th>Parallel arrangement B</th>
<th>Face-to-face arrangement using the Mutual Interference Prevention Function A'</th>
<th>Parallel arrangement using the Mutual Interference Prevention Function B'</th>
</tr>
</thead>
<tbody>
<tr>
<td>E2C-EDR6-F</td>
<td>14</td>
<td>10</td>
<td>3.5</td>
<td>3.1</td>
</tr>
<tr>
<td>E2C-ED01</td>
<td>45</td>
<td>20</td>
<td>9</td>
<td>5.4</td>
</tr>
<tr>
<td>E2C-ED02</td>
<td>35</td>
<td>30</td>
<td>21</td>
<td>6</td>
</tr>
<tr>
<td>E2C-EM02</td>
<td>36</td>
<td>30</td>
<td>21</td>
<td>10</td>
</tr>
<tr>
<td>E2C-EM07</td>
<td>140</td>
<td>120</td>
<td>35</td>
<td>18</td>
</tr>
<tr>
<td>E2C-EV05</td>
<td>65</td>
<td>30</td>
<td>21</td>
<td>14</td>
</tr>
<tr>
<td>E2C-EM02H</td>
<td>45</td>
<td>30</td>
<td>21</td>
<td>12</td>
</tr>
</tbody>
</table>

* Mutual interference does not occur for close-proximity mounting when the Mutual Interference Prevention Function is effective.
Dimensions

Sensor Heads

**E2C-EDR6-F**

- 3 dia.
- Vinyl-insulated round coaxial cable 1.7 dia., 1 core
- Standard: 2 m/-F: 0.5 m

**E2C-EDO1(-F)**

- 5.4 dia.
- Vinyl-insulated round coaxial cable 2.5 dia., 1 core
- Standard: 2 m/-F: 0.5 m

**E2C-EDO2(-F)**

- 8 dia.
- Vinyl-insulated round coaxial cable 2.5 dia., 1 core
- Standard: 2 m/-F: 0.5 m

**E2C-EM02(-F)**

- 18 dia.
- Vinyl-insulated round coaxial cable 2.5 dia., 1 core
- Standard: 2 m/-F: 0.5 m

Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.
Extension Cables for Sensors Head

### E2C-EM07M(-F)
- **Vinyl-insulated round coaxial cable**
  - 2.5 dia., 1 core
  - Standard: 2 m / F: 0.5 m
- **Flexible Cable**
  - 5.2 dia.

### E2C-EV05(-F)
- **Vinyl-insulated round coaxial cable**
  - 2.5 dia., 1 core
  - Standard: 2 m / F: 0.5 m
- **Vinyl-insulated round cable**
  - 3.4 dia., 3 cores
  - Standard: 0.5 m / F: 3 m

### E2C-EM02H
- **Fluorescent-insulated round coaxial cable**
  - 2.5 dia., 1 core
  - Standard: 2 m
- **Vinyl-insulated round cable**
  - 3.4 dia., 3 cores
  - Standard: 0.5 m

### Extension Cables for Sensors Head

#### E22-XC2R
- Vinyl-insulated round cable 2.5 dia., 1 core
  - Standard: 2 m / F: 0.5 m

#### E22-XC7R
- Vinyl-insulated round cable 3.4 dia., 3 cores
  - Standard: 0.5 m / F: 3 m

<table>
<thead>
<tr>
<th>Specifications</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 m</td>
<td>2,000 ±20</td>
</tr>
<tr>
<td>7 m</td>
<td>7,000 ±20</td>
</tr>
</tbody>
</table>
Amplifier Units

Amplifier Units with Cables

E2C-EDA11
E2C-EDA21
E2C-EDA41
E2C-EDA51

Connector

Sub-display

Circle (ø): Fine positioning indicator

Ellipse (): Operation indicators (2 channels)

Vinyl-insulated round cable, 4 dia., 4 cores
(Conductor cross-sectional area: 0.2 mm²; insulation diameter: 1.1 dia.)
Standard length: 2 m

Main display

Operation indicator

With Mounting Bracket Attached

Mounting Bracket: Sold separately
Stainless steel (SUS304)

Two, M3

Mounting Holes

The Mounting Bracket can also be used on side A.
Amplifier Units with Wire-saving Connectors

E2C-EDA6
E2C-EDA7
E2C-EDA8
E2C-EDA9

With Mounting Bracket Attached

* The Mounting Bracket can also be used on side A.

- Hole for optical communications
- Mounting Bracket: Sold separately Stainless steel (SUS304)

Connector E3X-CN21  E3X-CN22

Mounting Holes

Two, M3

Connector

Circle (Φ): Fine positioning indicator
Ellipse (Ø): Operation indicators (2 channels)

Main display

Sub-display

Operation indicator
Amplifier Unit Connectors
Refer to E3X-DA-S/MDA for details.

Mobile Console
Refer to E3X-DA-S/MDA for details.

Accessories (Order Separately)
Mounting Brackets
Refer to E39-L for details.

End Plate
Refer to DIN rail for details.
## Warranty and Limitations of Liability

**WARRANTY**
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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 products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS 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 PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

**PROGRAMMABLE PRODUCTS**
OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

## Disclaimers

**CHANGE IN SPECIFICATIONS**
Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

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

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Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON’s test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

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