Distance-settable Photoelectric Sensor TOF Laser Sensor
E3AS-F Series

Achieving “innovations in distance” for reflective-type photoelectric sensors
Optimal sensing distance (50 to 1,500 mm) for use on conveyor lines

- Wide sensing distance of 50 to 1,500 mm *1, enabling use on any conveyor line width
- TOF-type sensors for use with any type of conveyed workpiece
- Compact-sized body can be mounted anywhere (Metal case type (SUS316L), Plastic case type)
- Teaching method allows anyone to set optimal threshold values
- Manufactured using OMRON’s proprietary laser sealing method (IP67/IP69K/IP67G *2)
- Antifouling coatings reduce the cleaning frequency on the sensing surface.
- IO-Link reduces the time required for startups and changeovers

*1. The sensing distance of the E3AS-F1500 series.
*2. Only for sensor units.

Ordering Information

Sensors [Refer to Dimensions on page 10.]

**Metal case type**

<table>
<thead>
<tr>
<th>Connection method</th>
<th>Sensing distance (white paper)</th>
<th>Output</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NPN output</td>
<td>PNP output</td>
</tr>
<tr>
<td></td>
<td>IO-Link baud rate</td>
<td>---</td>
<td>COM2 (38.4 kbps)</td>
</tr>
<tr>
<td>M8 Connector</td>
<td>50 mm to 1,500 mm</td>
<td>E3AS-F1500IMN M3</td>
<td>E3AS-F1500IMD M3</td>
</tr>
<tr>
<td></td>
<td>50 mm to 1,000 mm</td>
<td>E3AS-F1000IMN M3</td>
<td>E3AS-F1000IMD M3</td>
</tr>
</tbody>
</table>

**Plastic case type**

<table>
<thead>
<tr>
<th>Connection method</th>
<th>Sensing distance (white paper)</th>
<th>Output</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NPN output</td>
<td>PNP output</td>
</tr>
<tr>
<td></td>
<td>IO-Link baud rate</td>
<td>---</td>
<td>COM2 (38.4 kbps)</td>
</tr>
<tr>
<td>M8 Connector</td>
<td>50 mm to 1,500 mm</td>
<td>E3AS-F1500IPN M3</td>
<td>E3AS-F1500IPD M3</td>
</tr>
<tr>
<td></td>
<td>50 mm to 1,000 mm</td>
<td>E3AS-F1000IPN M3</td>
<td>E3AS-F1000IPD M3</td>
</tr>
</tbody>
</table>

* Coming soon
Pre-wired models and M8/M12 Pre-wired Connector models.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Refer to Safety Precautions on page 8.
E3AS-F Series

Accessories (Sold Separately)

Sensor I/O Connectors (Sockets on One Cable End)

(A Models for Connectors / Pre-wired Connectors)

A Sensor I/O Connector is not provided with the Sensor. It must be ordered separately as required.

Round Water-resistant Connectors XS3F-M8 series

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Cable specification</th>
<th>Cable diameter (mm)</th>
<th>Cable connection direction</th>
<th>Cable length (m)</th>
<th>Sensor I/O Connector model number</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8 Connector</td>
<td>PVC cable</td>
<td>5 dia.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Straight type</td>
<td></td>
<td></td>
<td>Straight</td>
<td>2</td>
<td>XS3F-M8PVC4S2M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>XS3F-M8PVC4S5M</td>
</tr>
<tr>
<td>Right-angle type</td>
<td></td>
<td></td>
<td>Right-angle</td>
<td>2</td>
<td>XS3F-M8PVC4A2M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>XS3F-M8PVC4A5M</td>
</tr>
</tbody>
</table>

Note: 1. The XS3W (Socket and Plug on Cable Ends) is also available. Refer to XS3W-M8/XS3F-M8 Series Datasheet (Cat. No. G140).
2. The connectors will not rotate after they are connected.
3. The cable is fixed at an angle of 180° from the sensor emitter/receiver surface.

Mounting Brackets [Refer to Dimensions on page 10.]

A Mounting Bracket is not enclosed with the Sensor. Order a Mounting Bracket separately if required.

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model (material)</th>
<th>Applicable Sensor E3AS-F series</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-shaped Mounting Bracket</td>
<td>E39-L211 (SUS304)</td>
<td></td>
</tr>
<tr>
<td>Horizontal Protective Cover Bracket</td>
<td>E39-L212 (SUS304)</td>
<td>M8 Connector</td>
</tr>
<tr>
<td>Robust Mounting Bracket</td>
<td>E39-L214 (SUS304)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Use an L-shaped Sensor I/O Connector. Straight types cannot be installed.
### Ratings and Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specified Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensing method</td>
<td>TOF (Time of flight)</td>
</tr>
<tr>
<td>Model</td>
<td>Type</td>
</tr>
<tr>
<td>NPN output</td>
<td>Metal case ([]: M), Plastic case ([]: P)</td>
</tr>
<tr>
<td>PNP output/ COM2</td>
<td>E3AS-F1500[]:N</td>
</tr>
<tr>
<td>PNP output/ COM3</td>
<td>E3AS-F1000[]:T</td>
</tr>
</tbody>
</table>

| Sensing distance                          | 50 mm to the set distance (White paper or black paper 200 × 200 mm)           |
| Setting range                             | 100 to 1,500 mm (White paper 200 × 200 mm), 100 to 1,000 mm (Black paper 200 × 200 mm) |
| Spot diameter (reference value)           | 95 mm dia. (at distance of 1,000 mm)                                          |

| Differential travel                       | 15% max. of set distance (Set distance 200 mm min.)                           |

| Reflectivity characteristic (black/white error) | 10% max. of set distance (Set distance 200 mm min.)                           |

| Light source (wavelength)                  | Infrared laser (940 nm) Class1 (IEC/EN60825-1:2014)                           |

| Power supply voltage                       | 10 to 30 VDC (including 10% ripple (p-p)), Class2                              |

| Current consumption                        | 30 mA max.                                                                     |

| Control output                            | Load power supply voltage: 30 VDC max., Class2, Load current: 100 mA max. (Residual voltage: Load current of less than 10 mA: 1 V max. Load current of 10 to 100 mA: 2 V max.) Open-collector output (NPN/PNP output depending on model) |
| NPN                                        | OUTPUT 1: NO (Normally open), OUTPUT 2: NC (Normally closed)                    |
| PNP/COM2                                   | OUTPUT 1: NO (Normally open)/COM\[\], OUTPUT 2: NC (Normally closed)             |

| Protection circuits                        | Power supply reverse polarity protection, Output short-circuit protection, and Output reverse polarity protection |

| Distance setting                           | Teaching method/IO-Link communications                                          |

| Ambient illumination (Receiver side)       | Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.                     |

| Ambient temperature range                  | Operating: -20 to 55°C, Storage: -40 to 70°C (with no icing or condensation)  |

| Ambient humidity range                     | Operating: 35% to 85%, Storage: 35% to 95% (with no condensation)             |

| Insulation resistance                      | 20 MΩ min. at 500 VDC                                                          |

| Dielectric strength                        | 1,000 VAC, 50/60 Hz for 1 min                                                  |

| Vibration resistance                       | 10 to 55 Hz with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions |

| Shock resistance                           | 500 m/s² for 3 times each in X, Y, and Z directions                             |

| Degree of protection                       | IP67 (IEC60529) and IP67G \[\] (JIS C 0920 Annex 1), IP69K (ISO20653)          |

| Indicators                                 | Operation indicator (orange), stability/communication indicator (green \[\] 2) |

| Connection method                          | M8 Connector                                                                   |

| Weight (packed state/Sensor only)           | Metal case type: Approx. 75 g/approx. 30 g                                     |
| Plastic case type                          | Approx. 60 g/approx. 15 g                                                      |

| Materials                                  | Case                                                                           |
|                                            | Metal case type: Main unit/mounting part/connector part Stainless steel (SUS316L) Plastic case type: Main unit Polybutylene terephthalate (PBT)/polycarbonate (PC), Mounting part/connector part Nickel-plated brass |

| Display                                    | Metal case type: Polymide 11 (PA11) Plastic case type: Polyethersulfone (PES) |

| Main IO-Link functions                     | Operation mode switching between NO and NC, execution of teaching (2-point teaching, teaching without workpiece), setup of the threshold, timer function of the control output and timer time selecting, monitor output (Detection level, Incident light level), Restore Factory Settings, Key Lock (Unlock, Lock, Lock (No Button)) |

| IO-Link Communication specifications       | Ver. 1.1                                                                       |
| Baud rate                                  | COM2 (38.4 kbps), COM3 (230.4 kbps)                                            |
| Data length                                | PD size: 4 bytes, OD size: 1 byte (M-sequence type: TYPE_2_V)                  |
| Minimum cycle time                         | COM2: 3.5 ms, COM3: 1.2 ms                                                      |

| Accessories                                | Instruction manual, compliance sheet, index list (attached for IO-Link type only) and FDA certification label, Note: Mounting Brackets must be ordered separately. |

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1. The IP67G is the degree of protection which is defined according to the JIS (Japanese Industrial Standards). The IP67 indicates the same level of protection as defined by the IEC, and the G indicates that a device has resistance to oil.
E3AS-F Series
Engineering Data (Reference Value)

Operating Range

**E3AS-F1500**

**Z directions**

- Set distance: 1,500 mm
- Sensing object: White paper, 200 x 200 mm

**Operating range Z (mm)**

- Distance X (mm)

**E3AS-F1000**

**Z directions**

- Set distance: 1,000 mm
- Sensing object: White paper, 200 x 200 mm

**Operating range Z (mm)**

- Distance X (mm)

**Set distance: 1,500 mm**

**Sensing object: White paper, 200 x 200 mm**

**Operating range Y (mm)**

- Distance X (mm)

**Set distance: 1,000 mm**

**Sensing object: White paper, 200 x 200 mm**

**Operating range Y (mm)**

- Distance X (mm)

**Spot Diameter vs. Sensing Distance**

**E3AS-F1500**

**E3AS-F1000**

**Spot diameter (mm)**

- Distance X (mm)
E3AS-F Series

Close-range Characteristics

E3AS-F1500

Differential distance for each sensing object Vs. Distance

E3AS-F1000

Sensing Object Angle Characteristics

E3AS-F1500

Vertical

Horizontal

Differential distance (%)

Reflectance of sensing object/
Reflectance of background
1. 10% (Black paper)/90% (White paper)
2. 18% (Gray paper)/90% (White paper)
3. 90% (White paper)/90% (White paper)

Reflectance of sensing object/
Reflectance of background
1. 10% (Black paper)/90% (White paper)
2. 18% (Gray paper)/90% (White paper)
3. 90% (White paper)/90% (White paper)

Change in sensing distance (%)
Sensing Distance vs. Sensing Object Material

**E3AS-F1500**
(Set Distance of 1,500 mm using White Paper)

**E3AS-F1000**
(Set Distance of 1,000 mm using White Paper)
## I/O Circuit Diagrams/ Timing Charts

### NPN Output

<table>
<thead>
<tr>
<th>Model</th>
<th>Timing chart</th>
<th>Output circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3AS-F1500I</td>
<td><img src="image1" alt="Timing chart" /></td>
<td><img src="image2" alt="Output circuit" /></td>
</tr>
<tr>
<td>E3AS-F1000I</td>
<td><img src="image3" alt="Timing chart" /></td>
<td><img src="image4" alt="Output circuit" /></td>
</tr>
</tbody>
</table>

- The initial value of control output 2 is reverse of control output 1.

### PNP Output

<table>
<thead>
<tr>
<th>Model</th>
<th>Output circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3AS-F1500I</td>
<td><img src="image5" alt="Output circuit" /></td>
</tr>
<tr>
<td>E3AS-F1000I</td>
<td><img src="image6" alt="Output circuit" /></td>
</tr>
</tbody>
</table>

- Standard I/O mode is used as PNP ON/OFF output.
- IO-Link Communication mode is used for communications with the IO-Link Master. C/Q performs IO-Link communications. Sensor output DO performs ON/OFF output.

*1. Standard I/O mode is used as PNP ON/OFF output.
*2. The timer function of the control output can be set up by the IO-Link communications. (It is able to select ON delay, OFF delay, or one-shot function and select a timer time of 1 to 9,999 ms (T).)

### Nomenclature

- **Teach button**
- **Operation indicator (orange)**

**Note:** The indicators work differently depending on sensor status.

---

**E3AS-F Series**

**I/O Circuit Diagrams/ Timing Charts**

**NPN Output**

<table>
<thead>
<tr>
<th>Model</th>
<th>Timing chart</th>
<th>Output circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3AS-F1500I</td>
<td><img src="image1" alt="Timing chart" /></td>
<td><img src="image2" alt="Output circuit" /></td>
</tr>
<tr>
<td>E3AS-F1000I</td>
<td><img src="image3" alt="Timing chart" /></td>
<td><img src="image4" alt="Output circuit" /></td>
</tr>
</tbody>
</table>

- The initial value of control output 2 is reverse of control output 1.

**PNP Output**

<table>
<thead>
<tr>
<th>Model</th>
<th>Output circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3AS-F1500I</td>
<td><img src="image5" alt="Output circuit" /></td>
</tr>
<tr>
<td>E3AS-F1000I</td>
<td><img src="image6" alt="Output circuit" /></td>
</tr>
</tbody>
</table>

- Standard I/O mode is used as PNP ON/OFF output.
- IO-Link Communication mode is used for communications with the IO-Link Master. C/Q performs IO-Link communications. Sensor output DO performs ON/OFF output.

*1. Standard I/O mode is used as PNP ON/OFF output.
*2. The timer function of the control output can be set up by the IO-Link communications. (It is able to select ON delay, OFF delay, or one-shot function and select a timer time of 1 to 9,999 ms (T).)

### Timing charts

**Output mode**

<table>
<thead>
<tr>
<th>Output mode</th>
<th>Timing chart</th>
<th>Distance threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard I/O mode (SIO mode)</td>
<td><img src="image7" alt="Timing chart" /></td>
<td>Stable NEAR → Unstable NEAR → Stable FAR</td>
</tr>
<tr>
<td>IO-Link Communication mode (COM mode)</td>
<td><img src="image8" alt="Timing chart" /></td>
<td>Stable NEAR → Unstable NEAR → Stable FAR</td>
</tr>
</tbody>
</table>

- **Stability&Communication indicator (green)**
- **Operation indicator (orange)**
- **Control output 1**
- **Control output 2**

**Note:** Shown above are the factory settings. Refer to the index list for the default settings at time of shipment from factory.

PNP/COM output logic can be reversed by IO-Link communication.

**Nomenclature**

- **Teach button**
- **Operation indicator (orange)**

**Note:** The indicators work differently depending on sensor status.
E3AS-F Series

Safety Precautions

Be sure to read the precautions for all models in the website at: http://www.ia.omron.com/.

Warning Indications

<table>
<thead>
<tr>
<th>WARNING</th>
<th>Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUTION</td>
<td>Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.</td>
</tr>
</tbody>
</table>

Precautions for Safe Use

Supplementary comments on what to do or avoid doing, to use the product safely.

Precautions for Correct Use

Supplementary comments on what to do or avoid doing, to prevent failure to operate, malfunction or undesirable effect on product performance.

Meaning of Product Safety Symbols

- **General prohibition**
  - Indicates the instructions of unspecified prohibited action

- **Caution, explosion**
  - Indicates the possibility of explosion under specific conditions

- **Laser Caution**
  - Indicates information related to laser safety

**WARNING**

This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purpose.

**CAUTION**

Never use the product with an AC power supply. Otherwise, explosion may result.

**To safely use laser products**

**WARNING**

Do not expose your eyes to the laser beam either directly or indirectly (i.e., after reflection from a mirror or shiny surface). The laser beam has a high power density and exposure may result in loss of sight.

Laser safety measures for laser equipment are stipulated in Japan and other countries. For usage in Japan and for export to other countries combined with other products, follow the instructions described below categorized in three cases respectively.

1. **Usage in Japan**
   
   The JIS C6802:2014 standard stipulates the safety precautions that users must take according to the class of the laser product. This product is classified into Class 1 defined by this standard.

2. **Usage in U.S.**
   
   When this product is installed in a device and exported to the U.S., it is subjected to the U.S. FDA (Food and Drug Administration) laser regulations. This product is classified into Class 1 by the IEC 60825-1:2007 standard according to the provisions of Laser Notice No. 50 of the FDA standard. This product is already reported to CDRH (Center for Devices and Radiological Health).

   Accession Number: 1920014-000

   Because the product is small, we can not attach an FDA certification label on the main body, so we enclose it in the packing box. When exporting a device equipped with the product to the U.S., attach an FDA certification label near the sensor mounting of customer equipment.

3. **Usage in China**

   This product is classified into Class 1 by the IEC60825-1:2007 standard.

4. **Usage in a country other than U.S. and China.**

   This product is classified into Class 1 by the IEC60825-1:2014 standard.
## Precautions for Safe Use

The following precautions must be observed to ensure safe operation.

1. Do not reverse the power supply connection or connect to an AC current.
2. Do not short the load.
3. Be sure that before making supply the supply voltage is less than the maximum rated supply voltage (30 VDC).
4. Do not use the product in environments subject to flammable or explosive gases.
5. Do not use the product under a chemical or an oil environment without prior evaluation.
6. Do not attempt to modify the product.

## Precautions for Correct Use

1. Do not hit the product using a hammer for installation.
2. The product must be installed with the specified torque or less. For M8 connector, the proper tightening torque is from 0.3 to 0.4 N m.
3. Do not use the product in any atmosphere or environment that exceeds the ratings.
4. Output pulses may occur when the power supply is turned OFF. We recommend that you turn OFF the power supply to the load or load line first.
5. Use an extension cable less than 100 m long for Standard I/O mode and less than 20 m for IO-Link Communication mode.
6. Do not pull on the cable with excessive strength.
7. Please wait for at least 500 ms after turning on the product's power until it is available for use.
8. Though this is type IP67, do not use in the water, rain or outdoors.
9. If the Sensor wiring is placed in the same conduits or ducts as high-voltage or high-power lines, inductive noise may cause malfunction or damage. Wire the cables separately or use a shielded cable.
10. Do not use the product in locations subject to direct sunlight.
11. Do not use the product where humidity is high and dew condensation may occur.
12. Do not use the product where corrosive gases may exist.
13. If high-pressure washing water and so on hits the teach button, it might lead to malfunctioning. So, consider use of the key lock function.
14. Do not use the product at a location subject to shock or vibration.
15. To use a commercially available switching regulator, FG (frame ground) must be grounded.
16. Do not use organic solvents (e.g. paint thinner and alcohol) for cleaning. Otherwise optical properties and protective structure may deteriorate.
17. Be sure to check the influence caused by surrounding environments such as background objects and LED lighting before using the product.
18. Please dispose in accordance with applicable regulations.
E3AS-F Series

Dimensions

Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Connectors Models:
E3AS-F1500@M3
E3AS-F1000@M3

Accessories (Sold Separately)

Mounting Brackets

E39-L211

Material: Stainless steel (SUS304)

* Accessories
2-M3-L12 Cross Recessed Pan Head Screws (Attached to SW+JIS W)
**E39-L212**

Material: Stainless steel (SUS304)

* Accessories
  2-M3-L12 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

**E39-L214**

Material: Stainless steel (SUS304)

* Accessories
  2-M3-L12 Cross Recessed Pan Head Screws (Attached to SW+JIS W)
Distance-settable Photoelectric Sensor
E3AS-L Series

Reflective sensor with a triangular method detects low-reflective workpieces more accurately

- Equipped with OMRON’s proprietary light emitting element for stable detection of low-reflective workpieces
- Teaching method allows anyone to set optimal threshold values
- Manufactured using OMRON’s proprietary laser sealing method (IP67/IP69K/IP67G *)
- IO-Link reduces the time required for startups and changeovers.
  * Only for sensor units.

Refer to Safety Precautions on page 19.

Ordering Information

Sensors [Refer to Dimensions on page 20.]

<table>
<thead>
<tr>
<th>Connection method</th>
<th>Sensing distance (white paper)</th>
<th>Output NPN output PNP output PNP output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IO-Link baud rate</td>
<td>--- COM2 (38.4 kbps) COM3 (230.4 kbps)</td>
</tr>
</tbody>
</table>

M8 Connector

<table>
<thead>
<tr>
<th>10 mm</th>
<th>200 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3AS-L200MN M3</td>
<td>E3AS-L200MD M3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10 mm</th>
<th>80 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3AS-L80MN M3</td>
<td>E3AS-L80MD M3</td>
</tr>
</tbody>
</table>

* Coming soon Pre-wired models and M8/M12 Pre-wired Connector models.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.
Accessories (Sold Separately)

Sensor I/O Connectors (Sockets on One Cable End)

(Model for Connectors / Pre-wired Connectors)

A Sensor I/O Connector is not provided with the Sensor. It must be ordered separately as required.

Round Water-resistant Connectors XS3F-M8 series

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Cable specification</th>
<th>Cable diameter (mm)</th>
<th>No. of cable cores (Poles)</th>
<th>Cable connection direction</th>
<th>Cable length (m)</th>
<th>Sensor I/O Connector model number</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8 Connector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Straight type</td>
<td>PVC cable</td>
<td>5 dia.</td>
<td>4</td>
<td>Straight</td>
<td>2</td>
<td>XS3F-M8PVC4S2M</td>
</tr>
<tr>
<td>Right-angle type</td>
<td></td>
<td></td>
<td></td>
<td>Right-angle</td>
<td>5</td>
<td>XS3F-M8PVC4S5M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: 1. The XS3W (Socket and Plug on Cable Ends) is also available. Refer to XS3W-M8/XS3F-M8 Series Datasheet (Cat. No. G140).
2. The connectors will not rotate after they are connected.
3. The cable is fixed at an angle of 180° from the sensor emitter/receiver surface.

Mounting Brackets [Refer to Dimensions on page 20.]

A Mounting Bracket is not enclosed with the Sensor. Order a Mounting Bracket separately if required.

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model (material)</th>
<th>Applicable Sensor E3AS-L series</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-shaped Mounting Bracket</td>
<td>E39-L211 (SUS304)</td>
<td></td>
</tr>
<tr>
<td>Horizontal Protective Cover Bracket</td>
<td>E39-L212 (SUS304)</td>
<td>M8 Connector</td>
</tr>
<tr>
<td>Robust Mounting Bracket</td>
<td>E39-L214 (SUS304)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Use an L-shaped Sensor I/O Connector. Straight types cannot be installed.
### Ratings and Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
<th>Distance-settable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensing method</td>
<td>NPN output</td>
<td>E3AS-L200MN</td>
</tr>
<tr>
<td></td>
<td>PNP output/ COM2</td>
<td>E3AS-L200MD</td>
</tr>
<tr>
<td></td>
<td>PNP output/ COM3</td>
<td>E3AS-L200MT</td>
</tr>
<tr>
<td>Sensing distance</td>
<td>10 mm to the set distance (White paper or black paper 100 × 100 mm)</td>
<td>100 × 100 mm</td>
</tr>
<tr>
<td>Setting range</td>
<td>40 to 200 mm</td>
<td>20 to 80 mm</td>
</tr>
<tr>
<td>(White paper or black paper 100 × 100 mm)</td>
<td>(White paper or black paper 100 × 100 mm)</td>
<td></td>
</tr>
<tr>
<td>Spot diameter (reference value)</td>
<td>25 × 25 mm at distance of 200 mm</td>
<td>4 mm dia. (at distance of 80 mm)</td>
</tr>
<tr>
<td>Differential travel</td>
<td>10% max. of set distance</td>
<td>White paper: 2% max. of set distance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Black paper: 5% max. of set distance</td>
</tr>
<tr>
<td>Reflectivity characteristic (black/white error)</td>
<td>10% max. of set distance</td>
<td>5% max. of set distance</td>
</tr>
<tr>
<td>Light source (wavelength)</td>
<td>Red LED (624 nm)</td>
<td>Red LED (650 nm)</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>10 to 30 VDC (including 10% ripple (p-p), Class2)</td>
<td>Current consumption 35 mA max.</td>
</tr>
<tr>
<td>Control output</td>
<td>Load power supply voltage: 30 VDC max., Class2, Load current: 100 mA max. (Residual voltage: Load current of less than 10 mA: 1 V max. Load current of 10 to 100 mA: 2 V max.) Open-collector output (NPN/PNP output depending on model)</td>
<td></td>
</tr>
<tr>
<td>NPN</td>
<td>OUTPUT 1: NO (Normally open), OUTPUT 2: NC ( Normally closed)</td>
<td></td>
</tr>
<tr>
<td>PNP/COM2</td>
<td>OUTPUT 1: NO (Normally open)/COM2, OUTPUT 2: NC (Normally closed)</td>
<td></td>
</tr>
<tr>
<td>Protection circuits</td>
<td>Power supply reverse polarity protection, Output short-circuit protection, and Output reverse polarity protection</td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td>Operate or reset: 1 ms max.</td>
<td></td>
</tr>
<tr>
<td>Distance setting</td>
<td>Teaching method/IO-Link communications</td>
<td></td>
</tr>
<tr>
<td>Ambient illumination (Receiver side)</td>
<td>Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature range</td>
<td>Operating: -25 to 55°C, Storage: -40 to 70°C (with no icing or condensation)</td>
<td></td>
</tr>
<tr>
<td>Ambient humidity range</td>
<td>Operating: 35% to 85%, Storage: 35% to 95% (with no condensation)</td>
<td></td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>20 MΩ min. at 500 VDC</td>
<td></td>
</tr>
<tr>
<td>Dielectric strength</td>
<td>1,000 VAC, 50/60 Hz for 1 min</td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>10 to 55 Hz with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions</td>
<td></td>
</tr>
<tr>
<td>Shock resistance</td>
<td>500 m/s² for 3 times each in X, Y, and Z directions</td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP67 (IEC60529) and IP67G *1 (JIS C 0920 Annex 1), IP69K (ISO20653)</td>
<td></td>
</tr>
<tr>
<td>Indicators</td>
<td>Operation indicator (orange), Stability &amp; Communication indicator (green * 2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*2. IO-Link Communication mode: blinking</td>
<td></td>
</tr>
<tr>
<td>Connection method</td>
<td>M8 Connector</td>
<td></td>
</tr>
<tr>
<td>Weight (packed state/Sensor only)</td>
<td>Approx. 75 g/approx. 30 g</td>
<td></td>
</tr>
<tr>
<td>Materials</td>
<td>Case</td>
<td>Stainless steel (SUS316L)</td>
</tr>
<tr>
<td></td>
<td>Lens</td>
<td>Methacrylate resin (PMMA)</td>
</tr>
<tr>
<td></td>
<td>Display</td>
<td>Polyamide 11 (PA11)</td>
</tr>
<tr>
<td>Main IO-Link functions</td>
<td>Operation mode switching between NO and NC, execution of teaching (2-point teaching, teaching without workpiece), setup of the threshold, timer function of the control output and timer time selecting, Restore Factory Settings, Key Lock (Unlock, Lock, Lock (No Button))</td>
<td></td>
</tr>
<tr>
<td>IO-Link Communication specifications</td>
<td>IO-Link specification</td>
<td>Ver. 1.1</td>
</tr>
<tr>
<td></td>
<td>Baud rate</td>
<td>COM2 (38.4 kbps), COM3 (230.4 kbps)</td>
</tr>
<tr>
<td></td>
<td>Data length</td>
<td>PD size: 1 byte, OD size: 1 byte (M-sequence type: TYPE_2_1)</td>
</tr>
<tr>
<td></td>
<td>Minimum cycle time</td>
<td>COM2: 3.5 ms, COM3: 1.2 ms</td>
</tr>
<tr>
<td>Accessories</td>
<td>Instruction manual, compliance sheet and index list (attached for IO-Link type only), Note: Mounting Brackets must be ordered separately.</td>
<td></td>
</tr>
</tbody>
</table>

*1. The IP67G is the degree of protection which is defined according to the JIS (Japanese Industrial Standards). The IP67 indicates the same level of protection as defined by the IEC, and the G indicates that a device has resistance to oil.
E3AS-L Series

Engineering Data (Reference Value)

Operating Range

**E3AS-L200**
- Operating Range: 200 mm
- Sensing object: White paper, 100 x 100 mm

**E3AS-L80**
- Operating Range: 80 mm
- Sensing object: White paper, 100 x 100 mm

Spot Diameter vs. Sensing Distance

**E3AS-L200**

**E3AS-L80**

Close-range Characteristics

**E3AS-L200**
- Set distance: 200 mm
- Sensing distance: 182 mm
- White paper: 35 mm
- Black paper: 35 mm

**E3AS-L80**
- Set distance: 100 mm
- Sensing distance: 71 mm
- White paper: 15.5 mm
- Black paper: 15.5 mm

Differential distance for each sensing object Vs. Distance

**E3AS-L200**
- Reflectance of sensing object/Reflectance of background:
  1. 10% (Black paper) / 90% (White paper)
  2. 18% (Gray paper) / 90% (White paper)
  3. 90% (White paper) / 90% (White paper)

**E3AS-L80**
- Reflectance of sensing object/Reflectance of background:
  1. 10% (Black paper) / 90% (White paper)
  2. 18% (Gray paper) / 90% (White paper)
  3. 90% (White paper) / 90% (White paper)
Sensing Object Angle Characteristics

**E3AS-L200**

**Vertical**

Set distance: 200 mm  
Sensing object: White paper/Black paper 100×100 mm

**Horizontal**

Set distance: 200 mm  
Sensing object: White paper/Black paper 100×100 mm

**E3AS-L80**

**Vertical**

Set distance: 80 mm  
Sensing object: White paper/Black paper 100×100 mm

**Horizontal**

Set distance: 80 mm  
Sensing object: White paper/Black paper 100×100 mm

Sensing Distance vs. Sensing Object Material

**E3AS-L200**  
(Set Distance of 200 mm using White Paper)

**E3AS-L80**  
(Set Distance of 80 mm using White Paper)
**E3AS-L Series**

**I/O Circuit Diagrams/ Timing Charts**

### NPN Output

<table>
<thead>
<tr>
<th>Model</th>
<th>Timing chart</th>
<th>Output circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3AS-L/N</td>
<td><img src="image1.png" alt="Timing chart" /></td>
<td><img src="image2.png" alt="Output circuit" /></td>
</tr>
</tbody>
</table>

*1. Turns off when there is insufficient margin for incident light. In that case, place the workpiece closer to ensure sufficient receiving light intensity.

*2. The initial value of control output 2 is reverse of control output 1.

### PNP Output

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard I/O mode (SIO mode)</th>
<th>Output circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3AS-L/D</td>
<td><img src="image3.png" alt="Timing chart" /></td>
<td><img src="image4.png" alt="Output circuit" /></td>
</tr>
<tr>
<td>E3AS-L/T</td>
<td><img src="image3.png" alt="Timing chart" /></td>
<td><img src="image4.png" alt="Output circuit" /></td>
</tr>
</tbody>
</table>

*1. Standard I/O mode is used as PNP ON/OFF output.

*2. IO-Link Communication mode is used for communications with the IO-Link Master. C/Q performs IO-Link communications. Sensor output DO performs ON/OFF output.

### Timing charts

- **Stability&Communication indicator (green)**
- **Operation indicator (orange)**
- **Control output 1**
- **Control output 2**

*1. Turns off when there is insufficient margin for incident light. In that case, place the workpiece closer to ensure sufficient receiving light intensity.

*2. The initial value of control output 2 is reverse of control output 1.

*3. The timer function of the control output 2 can be set up by the IO-Link communications. (It is able to select ON delay, OFF delay, or one-shot function and select a timer time of 1 to 9,999 ms (T).)

### Note:
- The indicators work differently depending on sensor status.
- The operation indicator (orange) lights up when control output 1 is ON or communication output is 1.

### Nomenclature

- **E3AS-L200**
- **E3AS-L80**

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**Please contact your OMRON sales representative regarding the IO-Link setup file (IODD file).**
Safety Precautions

Be sure to read the precautions for all models in the website at: http://www.ia.omron.com/.

Warning Indications

**WARNING**
Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.

**CAUTION**
Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

### Precautions for Safe Use
Supplementary comments on what to do or avoid doing, to use the product safely.

### Precautions for Correct Use
Supplementary comments on what to do or avoid doing, to prevent failure to operate, malfunction or undesirable effect on product performance.

### Meaning of Product Safety Symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>General prohibition</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Symbol]</td>
<td>Indicates the instructions of unspecified prohibited action</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Caution, fire</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Symbol]</td>
<td>Indicates the possibility of fires under specific conditions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>General Caution</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Symbol]</td>
<td>Indicates unspecified general alert</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Caution, explosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Symbol]</td>
<td>Indicates the possibility of explosion under specific conditions</td>
</tr>
</tbody>
</table>

### WARNING
This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purpose.

Do not use the product with voltage in excess of the rated voltage. Excess voltage may result in malfunction or fire.

### CAUTION
Its component may be damaged and/or degree of protection may be degraded. Please do not apply high pressure water intensively at one place during cleaning.

Never use the product with an AC power supply. Otherwise, explosion may result.

### Precautions for Safe Use

The following precautions must be observed to ensure safe operation.

1. Do not reverse the power supply connection or connect to an AC current.
2. Do not short the load.
3. Be sure that before making supply the supply voltage is less than the maximum rated supply voltage (30 VDC).
4. Do not use the product in environments subject to flammable or explosive gases.
5. Do not use the product under a chemical or an oil environment without prior evaluation.
6. Do not attempt to modify the product.

### Precautions for Correct Use

1. Do not hit the product using a hammer for installation.
2. The product must be installed with the specified torque or less. For M8 connector, the proper tightening torque is from 0.3 to 0.4 Nm.
3. Do not use the product in any atmosphere or environment that exceeds the ratings.
4. Output pulses may occur when the power supply is turned OFF. We recommend that you turn OFF the power supply to the load or load line first.
5. Use an extension cable less than 100 m long for Standard I/O mode and less than 20 m for IO-Link Communication mode.
6. Do not pull on the cable with excessive strength.
7. Please wait for at least 100 ms after turning on the product's power until it is available for use.
8. Though this is type IP67, do not use in the water, rain or outdoors.
9. If the Sensor wiring is placed in the same conduits or ducts as high-voltage or high-power lines, inductive noise may cause malfunction or damage. Wire the cables separately or use a shielded cable.
10. Do not use the product in locations subject to direct sunlight.
11. Do not use the product where humidity is high and dew condensation may occur.
12. Do not use the product where corrosive gases may exist.
13. If high-pressure washing water and so on hits the teach button, it might lead to malfunctioning. So, consider use of the key lock function.
14. Do not use the product at a location subject to shock or vibration.
15. To use a commercially available switching regulator, FG (frame ground) must be grounded.
16. Do not use organic solvents (e.g. paint thinner and alcohol) for cleaning. Otherwise optical properties and protective structure may deteriorate.
17. Be sure to check the influence caused by surrounding environments such as background objects and LED lighting before using the product.
18. Please dispose in accordance with applicable regulations.
E3AS-L Series

Dimensions

Sensors

<table>
<thead>
<tr>
<th>Connector Models</th>
<th>E3AS-L200 M3</th>
<th>E3AS-L80 M3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Accessories (Sold Separately)

Mounting Brackets

E39-L211

Material: Stainless steel (SUS304)

* Accessories
2-M3-L12 Cross Recessed Pan Head Screws (Attached to SW+JIS W)
E39-L212

Material: Stainless steel (SUS304)
* Accessories
2-M3-L12 Cross Recessed Pan Head Screws (Attached to SW+JIS W)

E39-L214

Material: Stainless steel (SUS304)
* Accessories
2-M3-L12 Cross Recessed Pan Head Screws (Attached to SW+JIS W)
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Read and understand this catalog.

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Kyoto, JAPAN
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