Smart Fiber Amplifier Units
E3NX-FA

Industry-leading Levels* of Performance
Highly Stable Detection

Easy Setup for Any Workpiece by Any Operator

* For performance (sensing distance and minimum sensing object) based on November 2013 OMRON investigation.
### Three Technologies That Support High Performance

<table>
<thead>
<tr>
<th>Technology</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical Coupling Efficiency of 40%</td>
<td>The lens and reflector eliminate lost light to emit powerful, uniform emission.</td>
</tr>
<tr>
<td>Low Noise to Accurately Capture Signals</td>
<td>The influences of noise are reduced to achieve stable incident light levels by increasing the number of samples taken. This increases the margin for threshold values to achieve stable detection.</td>
</tr>
<tr>
<td>Signal-to-Noise Ratio Improved 2.5 Times</td>
<td>The influences of noise are reduced to achieve stable incident light levels by increasing the number of samples taken. This increases the margin for threshold values to achieve stable detection.</td>
</tr>
</tbody>
</table>

### Point

You can adjust the light intensity to detect fast-moving workpieces more accurately *2.
Easily Handle a Wide Range of Applications with the Press of a Single Button

Consistent Settings for All Users  
**Smart Tuning Settings**

Conventional Models*1

1st Step
Adjust light intensity.

2nd Step
Set threshold.

*1. Fiber Amplifier Unit without Smart Tuning.

**E3NX-FA**
Press the **TUNE** button once with a workpiece and once without a workpiece

Automatically set the light intensity and threshold to optimum values in 1 Step.

Threshold Incident Level

Set to the intermediate value between the incident levels with and without a workpiece.

Incident level adjustment with and without a workpiece.

**Autoamic Adjustment to Optimum Incident Level**

Wide Light Intensity Adjustment Range from Transparent Objects to Black Workpieces

*1/2000 *20

Conventional Models*2 (×1/100)

(Light intensity adjustment range)

×1

Wider light intensity adjustment range of 40,000 times (Conventional models*2: 2,000 times)
You can automatically adjust the light intensity to an optimum value for stable detection even with saturated or insufficient incident light.

*2. E3X-HD
Two Decision Support Functions to Help You

Visual Displays of the Passing Time and Difference in Incident Levels.

Selecting Fiber Units
Just about anyone can make a quantitative decision without special skills.

Setting Optimum Thresholds and Modes
You can see the passing time and difference in incident levels to facilitate manual setup.

Visual Information for Fast Workpieces
You can confirm changes in displayed values for fast workpieces to accurately set the threshold.

Change Finder

Advanced DPC (Dynamic Power Control)
Predictive Maintenance to Reduce Downtime
An alarm output* has been added to the DPC that automatically compensates differences in the incident level. A maintenance signal is output when the incident level drops due to dirt or vibration for use in predictive maintenance. (We recommend DPC for through-beam or retro-reflective models.)

*An alarm output is supported only on models with two outputs.
Common Features and Models in the N-Smart Series

Common Buttons
Intuitive Operation and Easy Setup.

White Characters on a Black background
High-contrast displays for easy visibility from a distance.

Models with Wire-saving Connectors
No Master/Slave Distinctions in Amplifier Units

- Reduce model numbers in stock
  You do not need to stock both master and slave amplifier units.

- Greatly reduced wiring work
  Power is supplied from the Master Connector. Slave Connectors have only output lines.

- Expansion is easy and reliable
  Mutual interference prevention works even if you use a Master Connector instead of a Slave Connector or combine them with pre-wired models.

Model for Sensor Communications Unit
Data Management and Time Reduction with Network Communications

- Three communications methods are supported
- Use Distributed Sensor Units to reduce equipment production costs and commissioning time
### Ordering Information

#### Fiber Amplifier Units (Dimensions ➔ pages 10 and 11)

<table>
<thead>
<tr>
<th>Type</th>
<th>Connecting method</th>
<th>Appearance</th>
<th>Inputs/outputs</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NPN output</td>
</tr>
<tr>
<td>Standard models</td>
<td></td>
<td></td>
<td></td>
<td>E3NX-FA11 2M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E3NX-FA11-5 2M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 output</td>
<td>E3NX-FA6</td>
</tr>
<tr>
<td></td>
<td>Pre-wired (2 m)</td>
<td></td>
<td>2 outputs + 1 input</td>
<td>E3NX-FA21 2M</td>
</tr>
<tr>
<td>Advanced models</td>
<td></td>
<td></td>
<td></td>
<td>E3NX-FA7</td>
</tr>
<tr>
<td></td>
<td>Pre-wired (2 m)</td>
<td></td>
<td></td>
<td>E3NX-FA7TW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E3NX-FA24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Wire-saving Connector</td>
<td></td>
<td>1 output + 1 input</td>
<td>E3NX-FAH11 2M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E3NX-FAH6</td>
</tr>
<tr>
<td>Infrared models</td>
<td></td>
<td></td>
<td>2 outputs</td>
<td>E3NX-FA11AN 2M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E3NX-FA0</td>
</tr>
<tr>
<td>Analog output models</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-wired (2 m)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1. This type can prevent mutual interference for two units in the SHS2 mode.

*2. A Sensor Communications Unit is required if you want to use the Fiber Amplifier Unit on a network.
Accessories (Sold Separately)

Wire-saving Connectors (Required for models for Wire-saving Connectors.)
Connectors are not provided with the Fiber Amplifier Unit and must be ordered separately. Note: Protective stickers are provided.

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Cable length</th>
<th>No. of conductors</th>
<th>Model</th>
<th>Applicable Fiber Amplifier Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Connector</td>
<td>![Master Connector Image]</td>
<td>2 m</td>
<td>4</td>
<td>E3X-CN21</td>
<td>E3NX-FA7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E3NX-FA7TW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E3NX-FA9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E3NX-FA9TW</td>
</tr>
<tr>
<td>Slave Connector</td>
<td>![Slave Connector Image]</td>
<td></td>
<td>2</td>
<td>E3X-CN22</td>
<td></td>
</tr>
<tr>
<td>Master Connector</td>
<td>![Master Connector Image]</td>
<td></td>
<td>3</td>
<td>E3X-CN11</td>
<td>E3NX-FA6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E3NX-FA8</td>
</tr>
<tr>
<td>Slave Connector</td>
<td>![Slave Connector Image]</td>
<td></td>
<td>1</td>
<td>E3X-CN12</td>
<td></td>
</tr>
</tbody>
</table>

Sensor I/O Connectors (Required for models for M8 Connectors.)
Connectors are not provided with the Fiber Amplifier Unit and must be ordered separately.

<table>
<thead>
<tr>
<th>Size</th>
<th>Cable</th>
<th>Appearance</th>
<th>Cable type</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8</td>
<td>Standard cable</td>
<td>Straight</td>
<td>4-wire</td>
<td>XS3F-M421-402-A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L-shaped</td>
<td></td>
<td>XS3F-M421-405-A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2m</td>
<td>XS3F-M422-402-A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5m</td>
<td>XS3F-M422-405-A</td>
</tr>
</tbody>
</table>

Mounting Bracket
A Mounting Bracket is not provided with the Fiber Amplifier Unit. It must be ordered separately as required.

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Mounting Bracket Image]</td>
<td>E39-L143</td>
<td>1</td>
</tr>
</tbody>
</table>

DIN Track
A DIN Track is not provided with the Fiber Amplifier Unit. It must be ordered separately as required.

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Type</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>![DIN Track Image]</td>
<td>Shallow, total length: 1 m</td>
<td>PFP-100N</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Shallow, total length: 0.5 m</td>
<td>PFP-50N</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deep, total length: 1 m</td>
<td>PFP-100N2</td>
<td></td>
</tr>
</tbody>
</table>

End Plate
Two End Plates are provided with the Sensor Communications Unit. End Plates are not provided with the Fiber Amplifier Unit. They must be ordered separately as required.

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>![End Plate Image]</td>
<td>PFP-M</td>
<td>1</td>
</tr>
</tbody>
</table>

Cover
Attach these Covers to Amplifier Units. Order a Cover when required, e.g., if you lose the covers.

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Cover Image]</td>
<td>E39-G25 FOR E3NX-FA</td>
<td>1</td>
</tr>
</tbody>
</table>

Related Products

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor Communications Unit for EtherCAT</td>
<td>![Sensor Communications Unit for EtherCAT Image]</td>
<td>E3NW-ECT</td>
</tr>
<tr>
<td>Sensor Communications Unit for CompoNet</td>
<td>![Sensor Communications Unit for CompoNet Image]</td>
<td>E3NW-CRT #1</td>
</tr>
<tr>
<td>Sensor Communications Unit for CC-Link</td>
<td>![Sensor Communications Unit for CC-Link Image]</td>
<td>E3NW-CCL</td>
</tr>
<tr>
<td>Distributed Sensor Unit #2</td>
<td>![Distributed Sensor Unit Image]</td>
<td>E3NW-DS</td>
</tr>
</tbody>
</table>

Refer to your OMRON website for details.

#1. Only E3NX-FA0 can be connected to E3NW-CRT.
#2. The Distributed Sensor Unit can be connected to any of the Sensor Communications Units.

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Ratings and Specifications

### Standard models/ Advanced models/ Infrared models

**Type**

- **Standard models**
- **Advanced models**
- **Infrared models**

### Inputs/outputs

- **Type**: Standard models/ Advanced models/ Infrared models
- **Standard models**: Normal mode: 990 mW max. (Current consumption: 33 mA max. at 30 VDC, 65 mA max. at 10 VDC)
- **Advanced models**: Normal mode: 1,020 mW max. (Current consumption: 34 mA max. at 30 VDC, 67 mA max. at 10 VDC)
- **Infrared models**: Normal mode: 1,260 mW max. (Current consumption: 42 mA max. at 30 VDC, 80 mA max. at 10 VDC)

### Power consumption

- **Standard models**: Normal mode: 840 mW max. (Current consumption at 35 mA max.)
- **Advanced models**: Normal mode: 920 mW max. (Current consumption at 38 mA max.)
- **Infrared models**: Normal mode: 1,080 mW max. (Current consumption at 45 mA max.)

### Control output

- **Type**: Standard models/ Advanced models/ Infrared models
- **Standard models**: Normal mode: 650 mW max. (Current consumption at 27 mA max.)
- **Advanced models**: Normal mode: 680 mW max. (Current consumption at 28 mA max.)
- **Infrared models**: Normal mode: 800 mW max. (Current consumption at 33 mA max.)

### Power supply voltage

- **Standard models**: Normal mode: 10 to 30 VDC, including 10% ripple (p-p)
- **Advanced models**: Normal mode: 10 to 30 VDC, including 10% ripple (p-p)
- **Infrared models**: Normal mode: 10 to 30 VDC, including 10% ripple (p-p)

### Response time

- **Super-high-speed mode (SHS)**: Operate or reset: 30 μs (Super High Speed mode (SHS2) of E3NX-FA11-5 is 60 μs each), with 2 outputs: 32 μs
- **High-speed mode (HS)**: Operate or reset: 250 μs
- **Standard mode (Stnd)**: Operate or reset: 1 ms
- **Giga-power mode (GIGA)**: Operate or reset: 16 ms

### Maximum connectable Units

- **Standard models**: Maximum connectable Units: 30
- **Advanced models**: Maximum connectable Units: 30
- **Infrared models**: Maximum connectable Units: 30

### Functions

- **Standard models/ Advanced models/ Infrared models**: Auto power control (APC), dynamic power control (DPC), timer, zero reset, resetting settings, eco mode, bank switching, power tuning, and hysteresis width

---

1. This type can prevent mutual interference for two units in the SHS2 mode.
2. At Power supply voltage of 10 to 30 VDC
3. The tuning will not change the number of units. The last unit count among the mutual interference prevention units of E3NX and E3NC.

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* Refer to E3NX-FA/ Fiber Amplifier on your OMRON website for details.
Analog output models/ Model for Sensor Communications Unit

<table>
<thead>
<tr>
<th>Item</th>
<th>NPN output Model</th>
<th>PNP output Model</th>
<th>Connecting method</th>
<th>Model for Sensor Communications Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E3NX-FA11AN</td>
<td>E3NX-FA41AN</td>
<td>Pre-wired</td>
<td>E3NX-FA0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E3NX-FAH0</td>
</tr>
</tbody>
</table>

Inputs/Outputs
- Outputs: 2 outputs
- External inputs: ---

Light source (wavelength)
- Red, 4-element LED (625 nm)
- Infrared LED (870nm)

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

Power consumption
- At Power supply voltage of 10 to 30 VDC
  - Normal mode: 1,080 mW max. (Current consumption: 36 mA max. at 30 VDC, 75 mA max. at 10 VDC)
  - Eco function ON: 840 mW max. (Current consumption: 28 mA max. at 30 VDC, 55 mA max. at 10 VDC)
  - Eco function LO: 960 mW max. (Current consumption: 32 mA max. at 30 VDC, 65 mA max. at 10 VDC)

- At Power supply voltage of 24 VDC
  - Normal mode: 920 mW max. (Current consumption: 45 mA max. at 30 VDC, 75 mA max. at 10 VDC)
  - Eco function ON: 680 mW max. (Current consumption: 28 mA max. at 30 VDC, 55 mA max. at 10 VDC)
  - Eco function LO: 800 mW max. (Current consumption: 32 mA max. at 30 VDC, 65 mA max. at 10 VDC)

- Supplied from the connector through the communication units.

Control output
- Load power supply voltage: 30 VDC max., open-collector output (depends on the NPN/PNP output format)
- Load current: Groups of 1 to 3 Amplifier Units: 100 mA max., Groups of 4 to 30 Amplifier Units: 20 mA max.
  - Residual voltage: At load current of less than 10 mA; 1 V max. At load current of 10 to 100 mA; 2 V max. OFF current: 0.1 mA max.

Analog output
- Voltage output: 1-5 VDC (10 kΩ or more connected load), temperature characteristics: 0.3% F.S./°C

Control output Response time
- Super-high-speed mode (SHS): Operate or reset: 80 μs
- Operate or reset: 32 μs
- Operate or reset: 1 ms
- Operate or reset: 16 ms
- Operate or reset: 16 ms

Maximum connectable Units
- 30

No. of Units for mutual interference prevention
- Super-high-speed mode (SHS): 0 (The mutual interference prevention function is disabled if the detection mode is set to super-high-speed mode.)
- High-speed mode (HS): 10
- Standard mode (Stnd): 10
- Giga-power mode (GIGA): 10

Functions
- Auto power control (APC), dynamic power control (DPC), timer, zero reset, resetting settings, eco mode, bank switching, power tuning, and hysteresis width

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* Refer to E3NX-FA/ Fiber Amplifier on your OMRON website for details.

#1. Two sensor outputs are allocated in the programmable logic controller PLC I/O table.

#2. At Power supply voltage of 10 to 30 VDC
- Analog output models:
  - Normal mode: 1,080 mW max. (Current consumption: 36 mA max. at 30 VDC, 75 mA max. at 10 VDC)
  - Eco function ON: 840 mW max. (Current consumption: 28 mA max. at 30 VDC, 55 mA max. at 10 VDC)
  - Eco function LO: 960 mW max. (Current consumption: 32 mA max. at 30 VDC, 65 mA max. at 10 VDC)

#3. The tuning will not change the number of units. The least unit count among the mutual interference prevention units of E3NX and E3NC. Check the mutual interference prevention unit count and response speed of each model.
Dimensions

Fiber Amplifier Units

Pre-wired Amplifier Units
E3NX-FA11(-5)
E3NX-FAH1
E3NX-FAH8

Amplifier Units with Wire-saving Connectors
E3NX-FA6
E3NX-FA7(TW)
E3NX-FA8
E3NX-FA9(TW)
E3NX-FAH6
E3NX-FAH8

Cable Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Diameter</th>
<th>No. of Conductors</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3NX-FA11</td>
<td>4.0 dia</td>
<td>3</td>
<td>Cylindrical cross section 0.2 mm² Insulation dia. 0.8 mm Minimum bending radius 12 mm</td>
</tr>
<tr>
<td>E3NX-FAH1</td>
<td>4.0 dia</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>E3NX-FAH8</td>
<td>4.0 dia</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>E3NX-FA9(TW)</td>
<td>4.0 dia</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>E3NX-FAH6</td>
<td>4.0 dia</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>E3NX-FAH8</td>
<td>4.0 dia</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.
Amplifier Units with M8 Connectors
E3NX-FA24
E3NX-FA54
E3NX-FA54TW

Amplifier Unit with Connector for Sensor Communications Unit
E3NX-FA0/FAH0
Fiber Sensor Best Selection Catalog

Refer to the Fiber Sensor Best Selection Catalog for information on the above Fiber Units and detailed information on the E3NX-FA.

**NEW** Introduction to New Fiber Units

**A New Standard: Build-in Lens Series**

- **Hex Shape**
  - E32-LT11N
  - E32-LD11N
  - M4 Through-beam
  - M6 Reflective

- **Flat Models**
  - E32-LT35Z
  - Through-beam

- **Straight Type**
  - E32-LT11 (R)
  - E32-LD11 (R)

- **Oil-resistant**
  - E32-T11NF
  - Through-beam

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**Compliance with International Standards**

* Only the E3NX-FA0, E3NX-FA11, E3NX-FA21, E3NX-FA41, E3NX-FA51, E3NX-FA6, E3NX-FA7□□, E3NX-FA8, E3NX-FA9□□, E3NX-FA24 and E3NX-FA54□□ are certified for UL standards.

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

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