

# Digital Fiber Amplifier Unit

# E3X-DA-S/MDA

CSM\_E3X-DA-S\_MDA\_DS\_E\_15\_4



## Advanced Fiber Amplifier Units

- Features a Power Tuning function that optimizes light reception at the press of a button.
- APC circuits to suppress LED aging degradation used with 4-element LEDs.
- 2-channel models achieve the thinnest\* profile in the industry, at only 5 mm per channel.
- 2-channel models also offer AND/OR control output.
- The E3X-MDA0 with two channels supports an EtherCAT Sensor Communications Unit or CompoNet Sensor Communications Unit.

\* (Based on July 2012 OMRON investigation.)



Be sure to read *Safety Precautions* on page 15.

Note: Manufacture of the E3X-DA□SE-S/DA□-S/DA□AT-S/DA□IRM-S/DA□TW-S will be discontinued in March 2017.

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

## Features

### Models available for a wide variety of applications at manufacturing sites

#### Industry Leading Two Amplifiers Loaded in a Small Body . . . 2-channel models

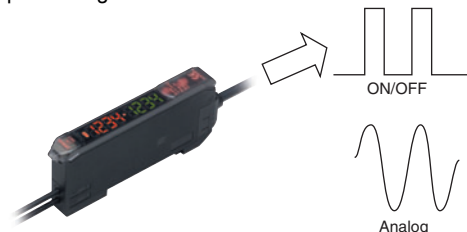
Two amplifiers are loaded in a 10 mm-wide body. Space usability can be approximately doubled. In addition, approximately 40% of the energy can be saved. (compared to the value per channel of the former model)



#### High-speed and High-resolution Analog Output Supports Wide Variety of Applications . . . Advanced Analog Output Models

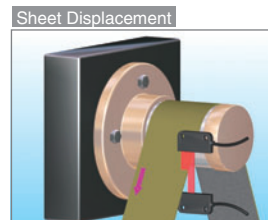
##### Analog Control Output

The voltage in the range of 1 to 5 V is output according to the incident level (digital display). Wide variety of applications is possible including positioning control or difference detection with multiple levels.



##### High-speed and High Resolution

Detection modes can be switched in accordance with applications. High-speed response of 80  $\mu$ s (super-high-speed mode) supports the positioning controls that require high-speed control.



## Ordering Information

### Fiber Amplifier Units

**Amplifier Units with Cables (2 m)** [Refer to *Dimensions* on page 17.]

| Item                                                    |                       | Appearance                                                                        | Functions                                           | Model             |                   |
|---------------------------------------------------------|-----------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------|-------------------|-------------------|
|                                                         |                       |                                                                                   |                                                     | NPN output        | PNP output        |
| Single-function models                                  |                       |  | ---                                                 | E3X-DA11SE-S 2M * | E3X-DA41SE-S 2M * |
| Standard models                                         |                       |                                                                                   | E3X-DA11-S 2M *                                     | E3X-DA41-S 2M *   |                   |
| Mark-detecting models<br>(multiple color light sources) | Green LED             |                                                                                   | E3X-DAG11-S 2M                                      | E3X-DAG41-S 2M    |                   |
|                                                         | Blue LED              |                                                                                   | E3X-DAB11-S 2M                                      | E3X-DAB41-S 2M    |                   |
|                                                         | Infrared LED          |                                                                                   | E3X-DAH11-S 2M                                      | E3X-DAH41-S 2M    |                   |
| Advanced models                                         | External-input models |                                                                                   | Remote setting, counter, differential operation     | E3X-DA11RM-S 2M * | E3X-DA41RM-S 2M * |
|                                                         | Twin-output models    |                                                                                   | Area output, self-diagnosis, differential operation | E3X-DA11TW-S 2M * | E3X-DA41TW-S 2M * |
|                                                         | ATC function models   |                                                                                   | ATC (Threshold value automatic correction)          | E3X-DA11AT-S 2M * | E3X-DA41AT-S 2M * |
|                                                         | Analog output models  |                                                                                   | Analog output models                                | E3X-DA11AN-S 2M   | E3X-DA41AN-S 2M   |
| 2-channel models                                        |                       |  | AND/OR output                                       | E3X-MDA11 2M      | E3X-MDA41 2M      |

\* Manufacture of the E3X-DA□SE-S/DA□-S/DA□AT-S/DA□RM-S/DA□TW-S will be discontinued in March 2017.

**Amplifier Units with Wire-saving Connectors** [Refer to *Dimensions* on page 18.]

| Item                                                    |                     | Appearance                                                                        | Functions                                                                          | Model                                           |                  |                  |
|---------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------|------------------|------------------|
|                                                         |                     |                                                                                   |                                                                                    | NPN output                                      | PNP output       |                  |
| Single-function models                                  |                     |  | ---                                                                                | E3X-DA6SE-S *1                                  | E3X-DA8SE-S *1   |                  |
| Standard models                                         |                     |                                                                                   |                                                                                    | E3X-DA6-S *1,2                                  | E3X-DA8-S *1,2   |                  |
| Mark-detecting models<br>(multiple color light sources) | Green LED           |                                                                                   | Timer, Response speed change                                                       | E3X-DAG6-S *2                                   | E3X-DAG8-S *2    |                  |
|                                                         | Blue LED            |                                                                                   |                                                                                    | E3X-DAB6-S *2                                   | E3X-DAB8-S *2    |                  |
|                                                         | Infrared LED        |                                                                                   |                                                                                    | E3X-DAH6-S *2                                   | E3X-DAH8-S *2    |                  |
| External-input models                                   |                     |                                                                                   |                                                                                    | Remote setting, counter, differential operation | E3X-DA6RM-S *1,2 | E3X-DA8RM-S *1,2 |
| Advanced models                                         | Twin-output models  |                                                                                   | Area output, self-diagnosis, differential operation                                | E3X-DA6TW-S *1,2                                | E3X-DA8TW-S *1,2 |                  |
|                                                         | ATC function models |                                                                                   | ATC (Threshold value automatic correction)                                         | E3X-DA6AT-S *1                                  | E3X-DA8AT-S *1   |                  |
| 2-channel models                                        |                     |                                                                                   |  | AND/OR output                                   | E3X-MDA6 *2      | E3X-MDA8 *2      |

\*1. Manufacture of the E3X-DA□SE-S/DA□-S/DA□AT-S/DA□RM-S/DA□TW-S will be discontinued in March 2017.

\*2. 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 Units with Connectors for EtherCAT or CompoNet Sensor Communications Units** [Refer to *Dimensions* on page 19.]

| Item            | Appearance                                                                          | Functions     | Model    | Applicable Sensor Communications Unit |
|-----------------|-------------------------------------------------------------------------------------|---------------|----------|---------------------------------------|
| 2-channel model |  | AND/OR output | E3X-MDA0 | E3X-ECT<br>E3X-CRT                    |

## Ratings and Specifications

| Type                   |                       | Light source | Response time  | Control output/input              |          |               | Functions    |       |                         |                        |         |     |
|------------------------|-----------------------|--------------|----------------|-----------------------------------|----------|---------------|--------------|-------|-------------------------|------------------------|---------|-----|
|                        |                       |              |                | ON/OFF output                     | Input    | Analog output | Power tuning | Timer | Interference prevention | Differential detection | counter | ATC |
| Single-function models |                       | Red LED      | 1 ms           | Only main                         | ---      | ---           | ---          | ---   | ○                       | ---                    | ---     | --- |
| Standard models        |                       |              | 50 μs to 4 ms  |                                   |          |               | ○            | ○     |                         |                        |         |     |
| Mark-detecting models  | E3X-DA□G-S            | Green LED    | 50 μs to 4 ms  | Only main                         | ---      | ○             | ○            | ○     | ---                     | ---                    | ---     |     |
|                        | 3X-DA□B-S             | Blue LED     |                |                                   |          |               |              |       |                         |                        |         |     |
|                        | E3X-DA□H-S            | Infrared LED |                |                                   |          |               |              |       |                         |                        |         |     |
| Ad-<br>vanced models   | Twin-output models    | Red LED      | 50 μs to 4 ms  | Only main                         | (1 line) | ○             | ○            | ○     | ○                       | ○                      | ---     |     |
|                        | External-input models |              | 80 μs to 4 ms  | Main + sub (2 lines)              |          |               |              |       |                         | ---                    |         |     |
|                        | ATC function models   |              | 130 μs to 4 ms | ---                               | (1 line) |               |              |       |                         |                        | ○       |     |
|                        | Analog output         |              | 80 μs to 4 ms  | Only main                         |          |               |              |       |                         | ---                    |         |     |
| 2-channel models       |                       | Red LED      | 130 μs to 4 ms | Main + main (2 independent lines) | ---      | ---           | ○            | ○     | ○                       | ---                    | ---     | --- |

## Accessories (Order Separately)

### Amplifier Unit Connectors (Required for models for Wire-saving Connectors.)

Note: Protector seals are provided as accessories. [Refer to *Dimensions* on page 19.]

| Item             | Appearance                                                                        | Cable length | No. of conductors | Model    |
|------------------|-----------------------------------------------------------------------------------|--------------|-------------------|----------|
| Master Connector |  | 2 m          | 3                 | E3X-CN11 |
|                  |                                                                                   |              | 4                 | E3X-CN21 |
| Slave Connector  |  |              | 1                 | E3X-CN12 |
|                  |                                                                                   |              | 2                 | E3X-CN22 |

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

Amplifier Units and Connectors are sold separately. Refer to the following tables when placing an order.

| Fiber Amplifier Unit                                    |             |             | Applicable Connector (Order Separately) |                 |
|---------------------------------------------------------|-------------|-------------|-----------------------------------------|-----------------|
| Model                                                   | NPN output  | PNP output  | Master Connector                        | Slave Connector |
| Single-function models                                  | E3X-DA6SE-S | E3X-DA8SE-S | E3X-CN11                                | E3X-CN12        |
| Standard models                                         | E3X-DA6-S   | E3X-DA8-S   |                                         |                 |
| Mark-detecting models<br>(multiple color light sources) | E3X-DAG6-S  | E3X-DAG8-S  |                                         |                 |
|                                                         | E3X-DAB6-S  | E3X-DAB8-S  |                                         |                 |
|                                                         | E3X-DAH6-S  | E3X-DAH8-S  | E3X-CN21                                | E3X-CN22        |
| Advanced models                                         | E3X-DA6TW-S | E3X-DA8TW-S |                                         |                 |
|                                                         | E3X-DA6RM-S | E3X-DA8RM-S |                                         |                 |
|                                                         | E3X-DA6AT-S | E3X-DA8AT-S |                                         |                 |
| 2-channel models                                        | E3X-MDA6    | E3X-MDA8    |                                         |                 |

### When Using 5 Amplifier Units

|                                 |   |                                         |
|---------------------------------|---|-----------------------------------------|
| Fiber Amplifier Units (5 Units) | + | 1 Master Connector + 4 Slave Connectors |
|---------------------------------|---|-----------------------------------------|

### Mobile Console [Refer to *Dimensions* on page 20.]

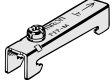
| Appearance                                                                          | Model                                 | Remarks                                                                 |
|-------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------|
|  | E3X-MC11-SV2<br>(model number of set) | Mobile Console with Head, Cable, and AC adapter provided as accessories |
|  | E3X-MC11-C1-SV2                       | Mobile Console                                                          |
|  | E3X-MC11-H1                           | Head                                                                    |
|  | E39-Z12-1                             | Cable (1.5 m)                                                           |

Note: Use the E3X-MC11-SV2 Mobile Console for the E3X-DA-S/MDA-series Fiber Amplifier Units.  
The E3X-MC11-SV2 is an upgraded version of the E3X-MC11-S that is fully interchangeable with the older model.

### Mounting Bracket [Refer to *E39-L/E39-S/E39-R*.]

| Appearance                                                                          | Model    | Quantity |
|-------------------------------------------------------------------------------------|----------|----------|
|  | E39-L143 | 1        |

### End Plate [Refer to *PFP-□*.]

| Appearance                                                                          | Model | Quantity |
|-------------------------------------------------------------------------------------|-------|----------|
|  | PFP-M | 1        |

## Ratings and Specifications

Refer to pages 17 to 20 for dimensions.

## Fiber Amplifier Units

## ● Single-function, Standard, and Mark-detecting Amplifier Units

| Type                                 |                                | Single-function models                                                                                                                                                                                         | Standard models                                                                                                                                                                                                          | Mark-detecting models (multiple color light sources) |                   |                      |
|--------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------|----------------------|
|                                      |                                |                                                                                                                                                                                                                |                                                                                                                                                                                                                          | Green LED                                            | Blue LED          | Infrared LED         |
| Item                                 | Model                          | E3X-DA□SE-S                                                                                                                                                                                                    | E3X-DA□-S                                                                                                                                                                                                                | E3X-DAG□-S                                           | E3X-DAB□-S        | E3X-DAH□-S           |
| Light source (wavelength)            |                                | Red LED (635 nm)                                                                                                                                                                                               |                                                                                                                                                                                                                          | Green LED (525 nm)                                   | Blue LED (470 nm) | Infrared LED (870nm) |
| Power supply voltage                 |                                | 12 to 24 VDC ±10%, ripple (p-p) 10% max.                                                                                                                                                                       |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Power consumption                    |                                | 960 mW max. (current consumption: 40 mA max. at power supply voltage of 24 VDC)                                                                                                                                |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Control output                       |                                | Load power supply voltage: 26.4 VDC; NPN/PNP open collector; load current: 50 mA max.; residual voltage: 1 V max.                                                                                              |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Remote control input                 |                                | No-voltage input (contact/non-contact)                                                                                                                                                                         | ---                                                                                                                                                                                                                      |                                                      |                   |                      |
| Protection circuits                  |                                | Reverse polarity for power supply connection, output short-circuit                                                                                                                                             |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Re-sponse time                       | Super-high-speed mode          | ---                                                                                                                                                                                                            | Operate: 48 μs, reset: 50 μs *1, *2                                                                                                                                                                                      |                                                      |                   |                      |
|                                      | High-speed mode                | ---                                                                                                                                                                                                            | Operate/reset: 250 μs                                                                                                                                                                                                    |                                                      |                   |                      |
|                                      | Standard mode                  | Operate or reset: 1 ms                                                                                                                                                                                         |                                                                                                                                                                                                                          |                                                      |                   |                      |
|                                      | High-resolution mode           | ---                                                                                                                                                                                                            | Operate or reset: 4 ms                                                                                                                                                                                                   |                                                      |                   |                      |
| Sensitivity setting                  |                                | Teaching or manual method                                                                                                                                                                                      |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Functions                            | Power tuning                   | ---                                                                                                                                                                                                            | Light emission power and reception gain, digital control method                                                                                                                                                          |                                                      |                   |                      |
|                                      | Timer function                 | ---                                                                                                                                                                                                            | Select from OFF-delay, ON-delay, or one-shot timer.<br>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) |                                                      |                   |                      |
|                                      | Automatic power control (APC)  | High-speed control method for emission current                                                                                                                                                                 |                                                                                                                                                                                                                          |                                                      |                   |                      |
|                                      | Zero-reset                     | ---                                                                                                                                                                                                            | Negative values can be displayed. (Threshold value is shifted.)                                                                                                                                                          |                                                      |                   |                      |
|                                      | Initial reset                  | Settings can be returned to defaults as required.                                                                                                                                                              |                                                                                                                                                                                                                          |                                                      |                   |                      |
|                                      | Mutual interference prevention | Possible for up to 10 Units *3                                                                                                                                                                                 |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Display                              |                                | Operation indicator (orange)                                                                                                                                                                                   | Operation indicator (orange), Power Tuning indicator (orange)                                                                                                                                                            |                                                      |                   |                      |
| Digital display                      |                                | incident level + threshold                                                                                                                                                                                     | Select from incident level + threshold or other 6 patterns                                                                                                                                                               |                                                      |                   |                      |
| Display orientation                  |                                | ---                                                                                                                                                                                                            | Switching between normal/reversed display is possible.                                                                                                                                                                   |                                                      |                   |                      |
| Ambient illumination (Receiver side) |                                | Incandescent lamp: 10,000 lux max.<br>Sunlight: 20,000 lux max.                                                                                                                                                |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Ambient temperature range            |                                | Operating: Groups of 1 to 2 Amplifiers: -25°C to 55°C<br>Groups of 3 to 10 Amplifiers: -25°C to 50°C<br>Groups of 11 to 16 Amplifiers: -25°C to 45°C<br>Storage: -30°C to 70°C (with no icing or condensation) |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Ambient humidity range               |                                | Operating and 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 minute                                                                                                                                                                             |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Vibration resistance                 |                                | Destruction: 10 to 55 Hz with a 1.5-mm double amplitude for 2 hrs each in X, Y and Z directions                                                                                                                |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Shock resistance                     |                                | Destruction: 500 m/s <sup>2</sup> , for 3 times each in X, Y and Z directions                                                                                                                                  |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Degree of protection                 |                                | IEC 60529 IP50 (with Protective Cover attached)                                                                                                                                                                |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Connection method                    |                                | Pre-wired or amplifier unit connector                                                                                                                                                                          |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Weight (packed state)                |                                | Pre-wired model: Approx. 100 g, Amplifier unit connector model: Approx. 55 g                                                                                                                                   |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Materials                            | Case                           | Polybutylene terephthalate (PBT)                                                                                                                                                                               |                                                                                                                                                                                                                          |                                                      |                   |                      |
|                                      | Cover                          | Polycarbonate (PC)                                                                                                                                                                                             |                                                                                                                                                                                                                          |                                                      |                   |                      |
| Accessories                          |                                | Instruction manual                                                                                                                                                                                             |                                                                                                                                                                                                                          |                                                      |                   |                      |

\*1. Communications are disabled if the detection mode is selected during super-high-speed mode, and the communications functions for mutual interference prevention and the Mobile Console will not function.

\*2. PNP output is as follows: Operate: 53  $\mu$ s, reset: 55  $\mu$ s.

\*3. Mutual interference prevention can be used for only up to 6 Units if power tuning is enabled.

### ● Advanced and 2-channel Amplifier Units

| Type<br><br>Model         |                                | Advanced models                                                                                                                                                                                                          |                                       |                     |                                                                                                                                                                                                                                                                                                                                   | 2-channel models                                       |                                                                    |
|---------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------------|
|                           |                                | External input models                                                                                                                                                                                                    | Twin output models                    | ATC function models | Analog output models                                                                                                                                                                                                                                                                                                              | Standard models                                        | Model for Sensor Communications Unit <sup>*1</sup>                 |
| Item                      |                                | E3X-DA□RM-S                                                                                                                                                                                                              | E3X-DA□TW-S                           | E3X-DA□AT-S         | E3X-DA□AN-S                                                                                                                                                                                                                                                                                                                       | E3X-MDA□<br>(□: 11/41/6/8)                             | E3X-MDA0                                                           |
| Light source (wavelength) |                                | Red LED (635 nm)                                                                                                                                                                                                         |                                       |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |
| Power supply voltage      |                                | 12 to 24 VDC ±10%, ripple (p-p) 10% max.                                                                                                                                                                                 |                                       |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |
| Power consumption         |                                | 1,080 mW max. (current consumption: 45 mA max. at power supply voltage of 24 VDC)                                                                                                                                        |                                       |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |
| Control output            | ON/OFF output                  | Load power supply voltage: 26.4 VDC; NPN/PNP open collector; load current: 50 mA max.; residual voltage: 1 V max.                                                                                                        |                                       |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        | Supplied from the connector through the Sensor Communications Unit |
|                           | Analog output                  | ---                                                                                                                                                                                                                      |                                       |                     | <b>Control output</b><br>Voltage output: 1 to 5 VDC (Connection load 10 kΩ min.)<br><b>Temperature characteristics</b><br>0.3%F.S./°C<br><b>Response speed/repeat accuracy</b><br>Super-high-speed mode: 80 μs/1.5%F.S.<br>High-speed mode: 250 μs/1.5%F.S.<br>Standard mode: 1 ms/1%F.S.<br>High-resolution mode: 4 ms/0.75%F.S. | ---                                                    |                                                                    |
| Remote control input      |                                | No-voltage input (contact/transistor) <sup>*2</sup>                                                                                                                                                                      | ---                                   |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |
| Protection circuits       |                                | Reverse polarity for power supply connection, output short-circuit                                                                                                                                                       |                                       |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |
| Response time             | Super-high-speed mode          | Operate: 48 μs, reset: 50 μs <sup>*3, *4, *5</sup>                                                                                                                                                                       | Operate or reset: 80 μs <sup>*3</sup> |                     |                                                                                                                                                                                                                                                                                                                                   | Operate or reset: 130 μs <sup>*3, *6</sup>             | ---                                                                |
|                           | High-speed mode                | Operate or reset: 250 μs                                                                                                                                                                                                 |                                       |                     |                                                                                                                                                                                                                                                                                                                                   | Operate or reset: 450 μs                               |                                                                    |
|                           | Standard mode                  | Operate or reset: 1ms                                                                                                                                                                                                    |                                       |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |
|                           | High-resolution mode           | Operate or reset: 4ms                                                                                                                                                                                                    |                                       |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |
| Sensitivity setting       |                                | Teaching or manual method                                                                                                                                                                                                |                                       |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |
| Functions                 | Power tuning                   | Light emission power and reception gain, digital control method                                                                                                                                                          |                                       |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |
|                           | Differential detection         | Switchable between single edge and double edge detection mode<br>Single edge: Can be set to 250 μs, 500 μs, 1 ms, 10 ms, or 100 ms.<br>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.<br>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) |                                       |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |
|                           | Automatic power control (APC)  | High-speed control method for emission current                                                                                                                                                                           |                                       |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |
|                           | Zero-reset                     | Negative values can be displayed. (Threshold value is shifted.)                                                                                                                                                          |                                       |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |
|                           | Initial reset                  | Settings can be returned to defaults as required.                                                                                                                                                                        |                                       |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |
|                           | Mutual interference prevention | Possible for up to 10 Units <sup>*7</sup>                                                                                                                                                                                |                                       |                     |                                                                                                                                                                                                                                                                                                                                   | Possible for up to 9 Units (18 channels) <sup>*8</sup> |                                                                    |
|                           | Counter                        | Switchable between up counter and down counter. Set count: 0 to 9,999,999                                                                                                                                                | ---                                   |                     |                                                                                                                                                                                                                                                                                                                                   |                                                        |                                                                    |

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

\*2. Input Specifications

|     | Contact input (relay or switch)                                                   | Non-contact input (transistor)                                                                          |
|-----|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| NPN | ON: Shorted to 0 V (sourcing current: 1 mA max.).<br>OFF: Open or shorted to Vcc. | ON: 1.5 V max. (sourcing current: 1 mA max.).<br>OFF: Vcc - 1.5 V to Vcc (leakage current: 0.1 mA max.) |
| PNP | ON: Shorted to Vcc (sinking current: 3 mA max.).<br>OFF: Open or shorted to 0 V.  | ON: Vcc - 1.5 V to Vcc (sinking current: 3 mA max.).<br>OFF: 1.5 V max. (leakage current: 0.1 mA max.)  |

\*3. Communications are disabled if the detection mode is selected during super-high-speed mode, and the communications functions for mutual interference prevention and the Mobile Console will not function.

\*4. PNP output is as follows: Operate: 53 μs, reset: 55 μs.

\*5. When counter is enabled: 80 μs for operate and reset respectively.

\*6. When differential output is selected for the output setting, the second channel output is 200 μs for operation and reset respectively.

\*7. Mutual interference prevention can be used for only up to 6 Units if power tuning is enabled.

\*8. Mutual interference prevention can be used for up to 5 Units (10 channels) if power tuning is enabled.

| Item                                 |             | Type                                                                                                                                                    | Advanced models                                                                        |                                                                                                        |                                                               |                                                                                                                      | 2-channel models                                                                      |                                      |
|--------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------|
|                                      |             |                                                                                                                                                         | External input models                                                                  | Twin-output models                                                                                     | ATC function models                                           | Analog output models                                                                                                 | Standard models                                                                       | Model for Sensor Communications Unit |
|                                      |             | Model                                                                                                                                                   | E3X-DA□RM-S                                                                            | E3X-DA□TW-S                                                                                            | E3X-DA□AT-S                                                   | E3X-DA□AN-S                                                                                                          | E3X-MDA□<br>(□: 11/41/6/8)                                                            | E3X-MDA0                             |
| Functions                            | I/O setting | External input setting (Select from teaching, power tuning, zero reset, light OFF, or counter reset.)                                                   | Output setting (Select from channel 2 output, area output, or self-diagnosis.)         | Output setting (Select from channel 2 output, area output, self-diagnosis output, or ATC error output) | Analog output setting (offset voltage adjustable)             | Output setting (Select from channel 2 output, AND, OR, leading edge sync, falling edge sync, or differential output) |                                                                                       |                                      |
| Display                              |             | Operation indicator (orange), Power Tuning indicator (orange)                                                                                           | Operation indicator for channel 1 (orange), Operation indicator for channel 2 (orange) |                                                                                                        | Operation indicator (orange), Power Tuning indicator (orange) | Operation indicator for channel 1 (orange), Operation indicator for channel 2 (orange)                               |                                                                                       |                                      |
| Digital display                      |             | Select from incident level + threshold or other 7 patterns                                                                                              | Select from incident level + threshold or other 6 patterns                             |                                                                                                        |                                                               | Select from incident level for channel 1 + incident level for channel 2 or other 7 patterns                          |                                                                                       |                                      |
| Display orientation                  |             | Switching between normal/reversed display is possible.                                                                                                  |                                                                                        |                                                                                                        |                                                               |                                                                                                                      |                                                                                       |                                      |
| Ambient illumination (Receiver side) |             | Incandescent lamp: 10,000 lux max.<br>Sunlight: 20,000 lux max.                                                                                         |                                                                                        |                                                                                                        |                                                               |                                                                                                                      |                                                                                       |                                      |
| Ambient temperature range            |             | Operating: Groups of 1 to 2 Amplifiers: -25°C to 55°C<br>Groups of 3 to 10 Amplifiers: -25°C to 50°C<br>Groups of 11 to 16 Amplifiers: -25°C to 45°C *9 |                                                                                        |                                                                                                        |                                                               |                                                                                                                      |                                                                                       |                                      |
|                                      |             | Storage: -30°C to 70°C (with no icing or condensation)                                                                                                  |                                                                                        |                                                                                                        |                                                               |                                                                                                                      |                                                                                       |                                      |
| Ambient humidity range               |             | Operating and 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 minute                                                                                                                      |                                                                                        |                                                                                                        |                                                               |                                                                                                                      |                                                                                       |                                      |
| Vibration resistance (Destruction)   |             | 10 to 55 Hz with a 1.5-mm double amplitude for 2 hrs 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 |                                      |
| Shock resistance (Destruction)       |             | 500 m/s <sup>2</sup> , for 3 times each in X, Y and Z directions                                                                                        |                                                                                        |                                                                                                        |                                                               |                                                                                                                      | 200 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions                       |                                      |
| Degree of protection                 |             | IEC 60529 IP50 (with Protective Cover attached)                                                                                                         |                                                                                        |                                                                                                        |                                                               |                                                                                                                      |                                                                                       |                                      |
| Connection method                    |             | Pre-wired or amplifier unit connector                                                                                                                   |                                                                                        |                                                                                                        |                                                               |                                                                                                                      | Connector for Sensor Communications Unit                                              |                                      |
| Weight (packed state)                |             | Pre-wired model: Approx. 100 g, Amplifier unit connector model: Approx. 55 g                                                                            |                                                                                        |                                                                                                        |                                                               |                                                                                                                      | Approx. 55 g                                                                          |                                      |
| Materials                            | Case        | Polybutylene terephthalate (PBT)                                                                                                                        |                                                                                        |                                                                                                        |                                                               |                                                                                                                      |                                                                                       |                                      |
|                                      | Cover       | Polycarbonate (PC)                                                                                                                                      |                                                                                        |                                                                                                        |                                                               |                                                                                                                      |                                                                                       |                                      |
| Accessories                          |             | Instruction manual                                                                                                                                      |                                                                                        |                                                                                                        |                                                               |                                                                                                                      |                                                                                       |                                      |

\*9. The following temperature ranges apply for operation when an E3X-ECT or E3X-CRT Sensor Communications Unit is used with the E3X-MDA0: Groups of 1 or 2 Amplifier Units: 0 to 55°C, Groups of 3 to 10 Amplifier Units: 0 to 50°C, Groups of 11 to 16 Amplifier Units: 0 to 45°C, Groups of 17 to 30 Amplifier Units (with the E3X-ECT): 0 to 40°C.

## Amplifier Unit Connectors

| Item                  | Model    | E3X-CN11/21/22                                                                                                                                                                              | E3X-CN12     |
|-----------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Rated current         |          | 2.5 A                                                                                                                                                                                       |              |
| Rated voltage         |          | 50 V                                                                                                                                                                                        |              |
| Contact resistance    |          | 20 mΩ max. (20 mVDC max., 100 mA max.)<br>(The figure is for connection to the Fiber Amplifier Unit and the adjacent Connector. It does not include the conductor resistance of the cable.) |              |
| No. of insertions     |          | Destruction: 50 times<br>(The figure for the number of insertions is for connection to the Fiber Amplifier Unit and the adjacent Connector.)                                                |              |
| Materials             | Housing  | Polybutylene terephthalate (PBT)                                                                                                                                                            |              |
|                       | Contacts | Phosphor bronze/gold-plated nickel                                                                                                                                                          |              |
| Weight (packed state) |          | Approx. 55 g                                                                                                                                                                                | Approx. 25 g |

## Mobile Console

| Item                             | Model | E3X-MC11-SV2                              |
|----------------------------------|-------|-------------------------------------------|
| Applicable Fiber Amplifier Units |       | E3X-DA-S<br>E3X-MDA<br>E3C-LDA<br>E2C-EDA |
| Power supply voltage             |       | Charged with AC adapter                   |
| Connection method                |       | Connected via adapter                     |
| Weight (packed state)            |       | Approx. 580 g (Console only: 120 g)       |

Refer to *Instruction Manual* provided with the Mobile Console for details.

## Sensing Distance

● Single-function, Standard, Advanced, and 2-channel Amplifier Units  
Threaded Models

(Unit: mm)

| Sensing method | Sensing direction | Size | Model        | E3X-DA□-S            |               |                 |                       | E3X-MDA□             |               |                 |                       |
|----------------|-------------------|------|--------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |                   |      |              | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | Right-angle       | M4   | E32-T11N 2M  | 700                  | 530           | 350             | 140                   | 450                  | 350           | 230             | 140                   |
|                | Straight          |      | E32-LT11N 2M | 2,300                | 1,750         | 1,150           | 460                   | 1,500                | 1,150         | 750             | 460                   |
|                |                   |      | E32-T11R 2M  | 700                  | 530           | 350             | 140                   | 450                  | 350           | 230             | 140                   |
|                |                   |      | E32-LT11 2M  | 2,700                | 2,050         | 1,350           | 540                   | 1,750                | 1,350         | 890             | 540                   |
|                |                   |      | E32-LT11R 2M | 2,300                | 1,750         | 1,150           | 460                   | 1,500                | 1,150         | 750             | 460                   |
| Reflective     | Right-angle       | M3   | E32-C31N 2M  | 40                   | 25            | 16              | 7                     | 24                   | 16            | 10              | 7                     |
|                |                   |      | E32-C21N 2M  | 75                   | 65            | 45              | 20                    | 50                   | 45            | 30              | 20                    |
|                |                   | M4   | E32-D21N 2M  | 300                  | 170           | 120             | 50                    | 170                  | 120           | 80              | 50                    |
|                |                   |      | E32-C11N 2M  | 280                  | 170           | 110             | 50                    | 160                  | 110           | 70              | 50                    |
|                |                   | M6   | E32-LD11N 2M | 300                  | 170           | 120             | 50                    | 170                  | 120           | 80              | 50                    |
|                |                   |      | E32-D21R 2M  | 50                   | 30            | 20              | 8                     | 30                   | 22            | 14              | 8                     |
|                | Straight          | M3   | E32-C31 2M   | 120                  | 75            | 50              | 22                    | 75                   | 50            | 30              | 22                    |
|                |                   |      | E32-C31M 1M  |                      |               |                 |                       |                      |               |                 |                       |
|                |                   |      | E32-D211R 2M |                      |               |                 |                       |                      |               |                 |                       |
|                |                   | M4   | E32-D11R 2M  | 50                   | 30            | 20              | 8                     | 30                   | 22            | 14              | 8                     |
|                |                   |      | E32-D11R 2M  | 300                  | 170           | 120             | 50                    | 170                  | 120           | 80              | 50                    |
|                |                   | M6   | E32-CC200 2M | 500                  | 300           | 200             | 90                    | 300                  | 210           | 140             | 90                    |
|                |                   |      | E32-LD11 2M  | 305                  | 180           | 125             | 55                    | 175                  | 125           | 85              | 55                    |
|                |                   |      | E32-LD11R 2M | 300                  | 170           | 120             | 50                    | 170                  | 120           | 80              | 50                    |

## Cylindrical Models

| Sensing method | Size                | Sensing direction | Model        | E3X-DA□-S            |               |                 |                       | E3X-MDA□             |               |                 |                       |
|----------------|---------------------|-------------------|--------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |                     |                   |              | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | 1 dia.              | Top-view          | E32-T223R 2M | 160                  | 130           | 75              | 30                    | 110                  | 85            | 55              | 30                    |
|                | 1.5 dia.            |                   | E32-T22B 2M  | 240                  | 200           | 110             | 45                    | 150                  | 110           | 70              | 45                    |
| Reflective     | 3 dia.              | Side-view         | E32-T12R 2M  | 700                  | 530           | 350             | 140                   | 450                  | 350           | 230             | 140                   |
|                |                     |                   | E32-T14LR 2M | 270                  | 210           | 130             | 50                    | 170                  | 130           | 85              | 50                    |
|                | 1.5 dia.            | Top-view          | E32-D22B 2M  | 50                   | 30            | 20              | 8                     | 30                   | 22            | 14              | 8                     |
|                | 1.5 dia. + 0.5 dia. |                   | E32-D43M 1M  | 10                   | 6             | 4               | 2                     | 6                    | 4             | 2.5             | 2                     |
|                |                     |                   | E32-D22R 2M  | 50                   | 30            | 20              | 8                     | 30                   | 22            | 14              | 8                     |
|                | 3 dia.              |                   | E32-D221B 2M | 110                  | 70            | 45              | 20                    | 70                   | 50            | 30              | 20                    |
|                |                     |                   | E32-D32L 2M  | 250                  | 150           | 100             | 45                    | 150                  | 100           | 65              | 45                    |
|                | 3 dia. + 0.8 dia.   |                   | E32-D33 2M   | 25                   | 16            | 10              | 4                     | 16                   | 10            | 6               | 4                     |
|                |                     |                   |              |                      |               |                 |                       |                      |               |                 |                       |
|                |                     |                   |              |                      |               |                 |                       |                      |               |                 |                       |
|                |                     |                   |              |                      |               |                 |                       |                      |               |                 |                       |
|                |                     |                   |              |                      |               |                 |                       |                      |               |                 |                       |

## Flat Models

| Sensing method | Sensing direction | Model        | E3X-DA□-S            |               |                 |                       | E3X-MDA□             |               |                 |                       |
|----------------|-------------------|--------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |                   |              | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | Top-view          | E32-T15XR 2M | 700                  | 530           | 350             | 140                   | 450                  | 350           | 230             | 140                   |
|                | Side-view         | E32-T15YR 2M | 270                  | 210           | 130             | 50                    | 170                  | 130           | 85              | 50                    |
|                | Flat-view         | E32-T15ZR 2M |                      |               |                 |                       |                      |               |                 |                       |
| Reflective     | Top-view          | E32-D15XR 2M | 300                  | 170           | 120             | 50                    | 170                  | 120           | 80              | 50                    |
|                | Side-view         | E32-D15YR 2M | 70                   | 40            | 26              | 12                    | 40                   | 29            | 19              | 12                    |
|                | Flat-view         | E32-D15ZR 2M |                      |               |                 |                       |                      |               |                 |                       |

Note: The super-high-speed mode cannot be used with the E3X-MDA0.

## Sleeve Models

| Sensing method | Sensing direction | Model           | E3X-DA□-S            |               |                 |                       | E3X-MDA□             |               |                 |                       |
|----------------|-------------------|-----------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |                   |                 | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | Side-view         | E32-T24R 2M     | 60                   | 50            | 25              | 10                    | 35                   | 27            | 18              | 10                    |
|                |                   | E32-T24E 2M     | 160                  | 130           | 75              | 30                    | 100                  | 70            | 45              | 30                    |
|                | Top-view          | E32-T21-S1 2M   | 180                  | 150           | 85              | 34                    | 120                  | 85            | 57              | 34                    |
|                |                   | E32-T33 1M      | 53                   | 44            | 25              | 10                    | 35                   | 28            | 18              | 10                    |
|                |                   | E32-TC200BR 2M  | 700                  | 530           | 350             | 140                   | 450                  | 350           | 230             | 140                   |
| Reflective     | Side-view         | E32-D24R 2M     | 26                   | 15            | 10              | 4                     | 15                   | 10            | 6               | 4                     |
|                |                   | E32-D24-S2 2M   | 40                   | 26            | 23              | 7                     | 26                   | 23            | 15              | 7                     |
|                | Top-view          | E32-D43M 1M     | 10                   | 6             | 4               | 2                     | 6                    | 4             | 2.5             | 2                     |
|                |                   | E32-D331 2M     | 5                    | 3             | 2               | 0.8                   | 3                    | 2             | 1.3             | 0.8                   |
|                |                   | E32-D33 2M      | 25                   | 16            | 10              | 4                     | 16                   | 10            | 6               | 4                     |
|                |                   | E32-D32-S1 0.5M | 21                   | 13            | 9               | 3                     | 14                   | 9             | 6               | 3                     |
|                |                   | E32-D31-S1 0.5M |                      |               |                 |                       |                      |               |                 |                       |
|                |                   | E32-DC200F4R 2M | 50                   | 30            | 20              | 8                     | 30                   | 22            | 14              | 8                     |
|                |                   | E32-D22-S1 2M   | 85                   | 55            | 36              | 15                    | 56                   | 36            | 24              | 15                    |
|                |                   | E32-D21-S3 2M   |                      |               |                 |                       |                      |               |                 |                       |
|                |                   | E32-DC200BR 2M  | 300                  | 170           | 120             | 50                    | 170                  | 120           | 80              | 50                    |
|                |                   | E32-D25-S3 2M   | 85                   | 55            | 36              | 15                    | 56                   | 36            | 24              | 15                    |

## Small-spot, Reflective

| Type            | spot diameter   | Center distance (mm) | Model                   | E3X-DA□-S                                      |               |                 |                       | E3X-MDA□                                       |               |                 |                       |
|-----------------|-----------------|----------------------|-------------------------|------------------------------------------------|---------------|-----------------|-----------------------|------------------------------------------------|---------------|-----------------|-----------------------|
|                 |                 |                      |                         | High-resolution mode                           | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode                           | Standard mode | High-speed mode | Super-high-speed mode |
| Variable spot   | 0.1 to 0.6 dia. | 6 to 5               | E32-C42 1M + E39-F3A    | Spot diameter of 0.1 to 0.6 mm at 6 to 15 mm.  |               |                 |                       | Spot diameter of 0.1 to 0.6 mm at 6 to 15 mm.  |               |                 |                       |
|                 | 0.3 to 1.6 dia. | 10 to 30             | E32-C42 1M + E39-F17    | Spot diameter of 0.3 to 1.6 mm at 10 to 30 mm. |               |                 |                       | Spot diameter of 0.3 to 1.6 mm at 10 to 30 mm. |               |                 |                       |
| Parallel light  | 4 dia.          | 0 to 20              | E32-C31 2M + E39-F3C    | Spot diameter of 4 mm max. at 0 to 20 mm.      |               |                 |                       | Spot diameter of 4 mm max. at 0 to 20 mm.      |               |                 |                       |
| Integrated lens |                 |                      | E32-C31N 2M + E39-F3C   |                                                |               |                 |                       |                                                |               |                 |                       |
|                 | 0.1 dia.        | 5                    | E32-C42S 1M             | Spot diameter of 0.1 mm at 5 mm.               |               |                 |                       | Spot diameter of 0.1 mm at 5 mm.               |               |                 |                       |
| Small-spot      | 0.1 dia.        | 7                    | E32-C41 1M + E39-F3A-5  | Spot diameter of 0.1 mm at 7 mm.               |               |                 |                       | Spot diameter of 0.1 mm at 7 mm.               |               |                 |                       |
|                 | 0.5 dia.        |                      | E32-C31 2M + E39-F3A-5  | Spot diameter of 0.5 mm at 7 mm.               |               |                 |                       | Spot diameter of 0.5 mm at 7 mm.               |               |                 |                       |
|                 |                 |                      | E32-C31N 2M + E39-F3A-5 |                                                |               |                 |                       |                                                |               |                 |                       |
|                 | 0.2 dia.        | 17                   | E32-C41 1M + E39-F3B    | Spot diameter of 0.2 mm at 17 mm.              |               |                 |                       | Spot diameter of 0.2 mm at 17 mm.              |               |                 |                       |
|                 | 0.5 dia.        |                      | E32-C31 2M + E39-F3B    | Spot diameter of 0.5 mm at 17 mm.              |               |                 |                       | Spot diameter of 0.5 mm at 17 mm.              |               |                 |                       |
|                 |                 |                      | E32-C31N 2M + E39-F3B   |                                                |               |                 |                       |                                                |               |                 |                       |
|                 | 3 dia.          | 50                   | E32-CC200 2M + E39-F18  | Spot diameter of 3 mm at 50 mm.                |               |                 |                       | Spot diameter of 3 mm at 50 mm.                |               |                 |                       |
|                 |                 |                      | E32-C11N 2M + E39-F18   |                                                |               |                 |                       |                                                |               |                 |                       |

Note: The super-high-speed mode cannot be used with the E3X-MDA0.

## High-power Beam

| Type                            | Sensing direction | Aperture angle | Model                   | E3X-DA□-S            |               |                 |                       | E3X-MDA□             |               |                 |                       |
|---------------------------------|-------------------|----------------|-------------------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                                 |                   |                |                         | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam Integrated lens    | Right-angle       | 15 °           | E32-LT11N 2M            | 2,300                | 1,750         | 1,150           | 460                   | 1,500                | 1,150         | 750             | 460                   |
|                                 | Top-view          | 10 °           | E32-T17L 10M            | 20,000 *1            | 20,000 *1     | 10,000          | 4,000                 | 13,000               | 10,000        | 6,500           | 4,000                 |
|                                 |                   | 15 °           | E32-LT11 2M             | 2,700                | 2,050         | 1,350           | 540                   | 1,750                | 1,350         | 890             | 540                   |
|                                 |                   |                | E32-LT11R 2M            | 2,300                | 1,750         | 1,150           | 460                   | 1,500                | 1,150         | 750             | 460                   |
| Through-beam models with lenses | Right-angle       | 30 °           | E32-T14 2M              | 4,000 *2             | 3,400         | 2,250           | 900                   | 2,900                | 2,200         | 1,450           | 900                   |
|                                 |                   | 12 °           | E32-T11N 2M + E39-F1    | 4,000 *2             | 3,700         | 2,400           | 970                   | 3,100                | 2,400         | 1,600           | 970                   |
|                                 |                   | 6 °            | E32-T11N 2M + E39-F16   | 4,000 *2             | 4,000 *2      | 4,000 *2        | 1,700                 | 4,000 *2             | 4,000 *2      | 2,900           | 1,700                 |
|                                 |                   | 12 °           | E32-T11R 2M + E39-F1    | 4,000 *2             | 3,700         | 2,400           | 970                   | 3,100                | 2,400         | 1,600           | 970                   |
|                                 | Top-view          | 6 °            | E32-T11R 2M + E39-F16   | 4,000 *2             | 4,000 *2      | 4,000 *2        | 1,700                 | 4,000 *2             | 4,000 *2      | 2,900           | 1,700                 |
|                                 |                   | 60 °           | E32-T11R 2M + E39-F2    | 520                  | 400           | 250             | 100                   | 330                  | 260           | 170             | 100                   |
|                                 | Side-view         | 12 °           | E32-T11 2M + E39-F1     | 4,000 *2             | 3,600         | 2,300           | 930                   | 3,000                | 2,300         | 1,500           | 930                   |
|                                 |                   | 6 °            | E32-T11 2M + E39-F16    | 4,000 *2             | 4,000 *2      | 4,000 *2        | 2,200                 | 4,000 *2             | 4,000 *2      | 3,700           | 2,200                 |
|                                 | Top-view          | 60 °           | E32-T11 2M + E39-F2     | 820                  | 660           | 430             | 160                   | 530                  | 430           | 280             | 160                   |
|                                 |                   | 12 °           | E32-T51R 2M + E39-F1    | 3,900                | 2,900         | 1,900           | 780                   | 2,500                | 1,900         | 1,300           | 780                   |
|                                 | Side-view         | 6 °            | E32-T51R 2M + E39-F16   | 4,000 *2             | 4,000 *2      | 3,500           | 1,400                 | 4,000 *2             | 3,500         | 2,300           | 1,400                 |
|                                 |                   | 60 °           | E32-T51R 2M + E39-F2    | 500                  | 380           | 250             | 100                   | 320                  | 250           | 160             | 100                   |
|                                 | Top-view          | 12 °           | E32-T81R-S 2M + E39-F1  | 4,000 *2             | 3,200         | 2,100           | 840                   | 2,700                | 2,100         | 1,380           | 840                   |
|                                 |                   | 6 °            | E32-T81R-S 2M + E39-F16 | 4,000 *2             | 4,000 *2      | 3,700           | 1,500                 | 4,000 *2             | 3,700         | 2,500           | 1,500                 |
|                                 | Side-view         | 60 °           | E32-T81R-S 2M + E39-F2  | 540                  | 410           | 270             | 100                   | 350                  | 270           | 170             | 100                   |
|                                 |                   | 12 °           | E32-T61-S 2M + E39-F1   | 4,000                | 3,400         | 2,200           | 900                   | 3,000                | 2,200         | 1,450           | 900                   |
|                                 | Top-view          | 6 °            | E32-T61-S 2M + E39-F16  | 4,000 *2             | 4,000 *2      | 3,700           | 1,500                 | 4,000 *2             | 3,700         | 2,500           | 1,500                 |
|                                 |                   | 60 °           | E32-T61-S 2M + E39-F2   | 600                  | 450           | 300             | 120                   | 390                  | 300           | 200             | 120                   |
|                                 | Side-view         | 12 °           | E32-T51 2M + E39-F1-33  | 4,000 *2             | 4,000 *2      | 3,500           | 1,400                 | 4,000 *2             | 3,500         | 2,300           | 1,400                 |
|                                 |                   | 6 °            | E32-T51 2M + E39-F16    | 4,000 *2             | 4,000 *2      | 4,000 *2        | 2,500                 | 4,000 *2             | 4,000 *2      | 4,000 *2        | 2,500                 |
| Reflective Integrated lens      | Top-view          | 4 °            | E32-D16 2M              | 40 to 1,000          | 40 to 700     | 40 to 450       | 40 to 240             | 40 to 600            | 40 to 490     | 40 to 300       | 40 to 240             |

\*1. The fiber length is 10 m on each side, so the sensing distance is given as 20,000 mm.

\*2. The fiber length is 2 m on each side, so the sensing distance is given as 4,000 mm.

## Narrow View

| Sensing method | Sensing direction | Aperture angle | Model        | E3X-DA□-S            |               |                 |                       | E3X-MDA□             |               |                 |                       |
|----------------|-------------------|----------------|--------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |                   |                |              | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | Side-view         | 1.5 °          | E32-A03 2M   | 1,150                | 890           | 600             | 250                   | 750                  | 580           | 380             | 250                   |
|                |                   |                | E32-A03-1 2M |                      |               |                 |                       |                      |               |                 |                       |
|                |                   | 3.4 °          | E32-A04 2M   | 460                  | 340           | 225             | 100                   | 300                  | 220           | 145             | 100                   |
|                |                   |                | E32-T24SR 2M |                      |               |                 |                       |                      |               |                 |                       |
|                |                   | 4 °            | E32-T24S 2M  | 1,750                | 1,300         | 870             | 350                   | 1,100                | 870           | 580             | 350                   |
|                |                   |                | E32-T22S 2M  |                      |               |                 |                       |                      |               |                 |                       |
|                |                   |                |              | 2,500                | 1,900         | 1,250           | 500                   | 1,600                | 1,250         | 830             | 500                   |

## Detection without Background Interference

| Sensing method     | Sensing direction | Model        | E3X-DA□-S             |               |                 |                       | E3X-MDA□              |               |                 |                       |
|--------------------|-------------------|--------------|-----------------------|---------------|-----------------|-----------------------|-----------------------|---------------|-----------------|-----------------------|
|                    |                   |              | High-resolution mode  | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode  | Standard mode | High-speed mode | Super-high-speed mode |
| Limited-reflective | Flat-view         | E32-L16-N 2M | 0 to 15               |               |                 |                       | 0 to 12               |               |                 |                       |
|                    |                   | E32-L24S 2M  | 0 to 4                |               |                 |                       | 0 to 4                |               |                 |                       |
|                    | Side-view         | E32-L25L 2M  | 5.4 to 9 (center 7.2) |               |                 |                       | 5.4 to 9 (center 7.2) |               |                 |                       |

## Transparent Object Detection (Retro-reflective)

| Sensing method   | Feature         | Size | Model                           | E3X-DA□-S            |               |                 |                       | E3X-MDA□             |               |                 |                       |
|------------------|-----------------|------|---------------------------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                  |                 |      |                                 | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Retro-reflective | Film detection  | M3   | E32-C31 2M + E39-F3R + E39-RP37 | 250                  | 150           | 100             | 45                    | 150                  | 100           | 65              | 45                    |
|                  | Square          | —    | E32-R16 2M                      | 150 to 1500          |               |                 |                       | 150 to 1500          |               |                 |                       |
|                  | Threaded models | M6   | E32-R21 2M                      | 10 to 250            |               |                 |                       | 10 to 250            |               |                 |                       |
|                  | Hex-shaped      | M6   | E32-LR11NP 2M + E39-RP1         | 630                  | 600           | 500             | 275                   | 600                  | 500           | 330             | 275                   |

Note: The super-high-speed mode cannot be used with the E3X-MDA0.

## Transparent Object Detection (Limited-reflective)

| Sensing method     | Feature                          | Sensing direction | Model        | E3X-DA□-S             |               |                 |                       | E3X-MDA□              |               |                 |                       |
|--------------------|----------------------------------|-------------------|--------------|-----------------------|---------------|-----------------|-----------------------|-----------------------|---------------|-----------------|-----------------------|
|                    |                                  |                   |              | High-resolution mode  | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode  | Standard mode | High-speed mode | Super-high-speed mode |
| Limited-reflective | Small size                       | Flat-view         | E32-L24S 2M  | 0 to 4                |               |                 |                       | 0 to 4                |               |                 |                       |
|                    | Standard                         |                   | E32-L16-N 2M | 0 to 15               |               |                 |                       | 0 to 15               |               |                 |                       |
|                    | Glass substrate alignment, 70 °C |                   | E32-A08 2M   | 10 to 20              |               |                 |                       | 10 to 20              |               |                 |                       |
|                    | Standard/long-distance           |                   | E32-A12 2M   | 12 to 30              |               |                 |                       | 12 to 30              |               |                 |                       |
|                    | Side view form                   | Side-view         | E32-L25L 2M  | 5.4 to 9 (center 7.2) |               |                 |                       | 5.4 to 9 (center 7.2) |               |                 |                       |
|                    | Glass substrate mapping, 70 °C   | Top-view          | E32-A09 2M   | 15 to 38              |               |                 |                       | 15 to 38              |               |                 |                       |

## Chemical-resistant, Oil-resistant

| Sensing method | Type                             | Sensing direction | Model        | E3X-DA□-S            |               |                 |                       | E3X-MDA□             |               |                 |                       |
|----------------|----------------------------------|-------------------|--------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |                                  |                   |              | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | Oil-resistant                    | Right-angle       | E32-T11NF 2M | 4,000 *              | 4,000 *       | 2,800           | 1,100                 | 3,600                | 2,800         | 1,800           | 1,100                 |
|                | Chemical/oil-resistant           | Top-view          | E32-T12F 2M  | 4,000 *              | 3,000         | 2,000           | 800                   | 2,600                | 2,000         | 1,300           | 800                   |
|                |                                  | Side-view         | E32-T11F 2M  | 2,500                | 2,000         | 1,300           | 520                   | 1,600                | 1,300         | 850             | 520                   |
|                |                                  | Side-view         | E32-T14F 2M  | 500                  | 400           | 250             | 100                   | 320                  | 250           | 160             | 100                   |
|                | Chemical/oil-resistant at 150 °C | Top-view          | E32-T51F 2M  | 1,800                | 1,400         | 900             | 350                   | 1,190                | 920           | 600             | 350                   |
| Reflective     | Chemical/oil-resistant           | Top-view          | E32-D12F 2M  | 160                  | 95            | 65              | 30                    | 95                   | 70            | 45              | 30                    |
|                | Chemical-resistant cable         |                   | E32-D11U 2M  | 300                  | 170           | 120             | 50                    | 170                  | 125           | 80              | 50                    |

\* The fiber length is 2 m on each side, so the sensing distance is given as 4,000 mm.

## Bending-resistant

| Sensing method | Size     | Model        | E3X-DA□-S            |               |                 |                       | E3X-MDA□             |               |                 |                       |
|----------------|----------|--------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |          |              | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | 1.5 dia. | E32-T22B 2M  | 240                  | 200           | 110             | 45                    | 150                  | 110           | 70              | 45                    |
|                | M3       | E32-T21 2M   |                      |               |                 |                       |                      |               |                 |                       |
|                | M4       | E32-T11 2M   |                      |               |                 |                       |                      |               |                 |                       |
|                | Square   | E32-T25XB 2M |                      |               |                 |                       |                      |               |                 |                       |
| Reflective     | 1.5 dia. | E32-D22B 2M  | 50                   | 30            | 20              | 8                     | 30                   | 22            | 14              | 8                     |
|                | M3       | E32-D21 2M   |                      |               |                 |                       |                      |               |                 |                       |
|                | 3 dia.   | E32-D221B 2M | 110                  | 70            | 45              | 20                    | 70                   | 50            | 30              | 20                    |
|                | M4       | E32-D21B 2M  |                      |               |                 |                       |                      |               |                 |                       |
|                | M6       | E32-D11 2M   | 300                  | 170           | 120             | 50                    | 170                  | 125           | 80              | 50                    |
|                | Square   | E32-D25XB 2M | 85                   | 50            | 30              | 15                    | 50                   | 35            | 23              | 15                    |

## Heat-resistant

| Sensing method | Heat-resistant temperature | Model         | E3X-DA□-S            |               |                 |                       | E3X-MDA□             |               |                 |                       |
|----------------|----------------------------|---------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |                            |               | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | 100 °C                     | E32-T51R 2M   | 560                  | 425           | 280             | 110                   | 360                  | 280           | 180             | 110                   |
|                | 150 °C                     | E32-T51 2M    | 1,000                | 760           | 500             | 200                   | 650                  | 500           | 330             | 200                   |
|                | 200 °C                     | E32-T81R-S 2M | 360                  | 280           | 180             | 70                    | 230                  | 180           | 120             | 70                    |
|                | 350 °C                     | E32-T61-S 2M  | 600                  | 450           | 300             | 120                   | 390                  | 300           | 200             | 120                   |
| Reflective     | 100 °C                     | E32-D51R 2M   | 240                  | 135           | 95              | 40                    | 130                  | 95            | 60              | 40                    |
|                | 150 °C                     | E32-D51 2M    | 400                  | 230           | 160             | 72                    | 230                  | 165           | 110             | 72                    |
|                | 200 °C                     | E32-D81R-S 2M | 150                  | 90            | 60              | 27                    | 90                   | 63            | 40              | 27                    |
|                | 300 °C                     | E32-A08H2 2M  | 10 to 20             |               |                 |                       | 10 to 20             |               |                 |                       |
|                |                            | E32-A09H2 2M  | 20 to 30             |               |                 |                       | 20 to 30             |               |                 |                       |
|                |                            | E32-D611-S 2M | 150                  | 90            | 60              | 27                    | 90                   | 63            | 40              | 27                    |
|                | 350 °C                     | E32-D61-S 2M  |                      |               |                 |                       |                      |               |                 |                       |
|                | 400 °C                     | E32-D73-S 2M  | 100                  | 60            | 40              | 18                    | 60                   | 40            | 25              | 18                    |
|                |                            |               |                      |               |                 |                       |                      |               |                 |                       |

Note: The super-high-speed mode cannot be used with the E3X-MDA0.

## Area Beam

| Sensing method | Type  | Sensing width | Model        | E3X-DA□-S            |               |                 |                       | E3X-MDA□             |               |                 |                       |
|----------------|-------|---------------|--------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |       |               |              | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | Area  | 11 mm         | E32-T16PR 2M | 1,100                | 840           | 560             | 220                   | 730                  | 560           | 370             | 220                   |
|                |       |               | E32-T16JR 2M | 980                  | 750           | 480             | 190                   | 600                  | 480           | 320             | 190                   |
|                |       | 30 mm         | E32-T16WR 2M | 1,700                | 1,300         | 850             | 340                   | 1,100                | 860           | 570             | 340                   |
| Reflective     | Array | 11 mm         | E32-D36P1 2M | 250                  | 150           | 100             | 45                    | 150                  | 100           | 65              | 45                    |

## Liquid-level Detection

| Sensing method                               | Tube diameter    | Feature                            | Model        | E3X-DA□-S                                                                                                  |               |                 |                       | E3X-MDA□                                                                                                   |               |                 |                       |
|----------------------------------------------|------------------|------------------------------------|--------------|------------------------------------------------------------------------------------------------------------|---------------|-----------------|-----------------------|------------------------------------------------------------------------------------------------------------|---------------|-----------------|-----------------------|
|                                              |                  |                                    |              | High-resolution mode                                                                                       | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode                                                                                       | Standard mode | High-speed mode | Super-high-speed mode |
| Tube-mounting                                | 3.2/6.4/9.5 dia. | Stable residual quantity detection | E32-A01 5M   | Applicable tube: Transparent tube with a diameter of 3.2, 6.4, or 9.5 mm, Recommended wall thickness: 1 mm |               |                 |                       | Applicable tube: Transparent tube with a diameter of 3.2, 6.4, or 9.5 mm, Recommended wall thickness: 1 mm |               |                 |                       |
|                                              | 8 to 10 dia.     | Mounting at multi levels           | E32-L25T 2M  | Applicable tube: Transparent tube with a diameter of 8 to 10 mm, Recommended wall thickness: 1 mm          |               |                 |                       | Applicable tube: Transparent tube with a diameter of 8 to 10 mm, Recommended wall thickness: 1 mm          |               |                 |                       |
|                                              | No restrictions  | Large tubes                        | E32-D36T 2M  | Applicable tube: Transparent tube (no restriction on diameter)                                             |               |                 |                       | Applicable tube: Transparent tube (no restriction on diameter)                                             |               |                 |                       |
| Liquid contact (heat-resistant up to 200 °C) | —                | —                                  | E32-D82F1 4M | Liquid-contact Type                                                                                        |               |                 |                       | Liquid-contact Type                                                                                        |               |                 |                       |

## Vacuum-resistant

| Sensing method | Heat-resistant temperature | Model                 | E3X-DA□-S            |               |                 |                       | E3X-MDA□             |               |                 |                       |
|----------------|----------------------------|-----------------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |                            |                       | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | 120 °C                     | E32-T51V 1M           | 260                  | 200           | 130             | 50                    | 170                  | 130           | 85              | 50                    |
|                |                            | E32-T51V 1M + E39-F1V | 1,350                | 1,000         | 680             | 260                   | 850                  | 650           | 430             | 260                   |
|                | 200 °C                     | E32-T84SV 1M          | 630                  | 480           | 320             | 130                   | 410                  | 310           | 200             | 130                   |

## FPD, Semiconductors, and Solar Cells

| Sensing method     | Application               | Operating temperature | Model        | E3X-DA□-S            |               |                 |                       | E3X-MDA□             |               |                 |                       |
|--------------------|---------------------------|-----------------------|--------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                    |                           |                       |              | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Limited-reflective | Glass presence detection  | 70 °C                 | E32-L16-N 2M | 0 to 15              |               |                 | 0 to 12               | 0 to 15              |               |                 | 0 to 12               |
|                    | E32-A08 2M                |                       | 10 to 20     |                      |               | —               | 10 to 20              |                      |               | —               |                       |
|                    | Glass substrate alignment | 300 °C                | E32-A08H2 2M | 12 to 30             |               |                 | —                     | 12 to 30             |               |                 | —                     |
|                    | Glass substrate mapping   | 70 °C                 | E32-A12 2M   | 15 to 38             |               |                 | —                     | 15 to 38             |               |                 | —                     |
|                    |                           |                       | E32-A09 2M   | 20 to 30             |               |                 | —                     | 20 to 30             |               |                 | —                     |
| Through-beam       | Wafer mapping             | 70 °C                 | E32-A03 2M   | 1,150                | 890           | 600             | 250                   | 750                  | 580           | 380             | 250                   |
|                    |                           |                       | E32-A03-1 2M |                      |               |                 |                       |                      |               |                 |                       |
|                    |                           |                       | E32-A04 2M   | 460                  | 340           | 225             | 100                   | 300                  | 220           | 145             | 100                   |
|                    |                           |                       | E32-T24SR 2M | 1,480                | 1,100         | 730             | 290                   | 920                  | 730           | 480             | 290                   |
|                    |                           |                       | E32-T24S 2M  | 1,750                | 1,300         | 870             | 350                   | 1,100                | 870           | 580             | 350                   |

Note: The super-high-speed mode cannot be used with the E3X-MDA0.

# ● Mark-detecting Amplifier Units (Different Colors of Light Sources)

## Threaded Models

| Sensing method | Sensing direction | Size | Model        | E3X-DAG□-S/DAB□-S    |               |                 |                       | E3X-DAH□-S           |               |                 |                       |
|----------------|-------------------|------|--------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |                   |      |              | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | Right-angle       | M4   | E32-T11N 2M  | 65                   | 50            | 35              | 30                    | 280                  | 190           | 130             | 55                    |
|                | Straight          |      | E32-T11R 2M  |                      |               |                 |                       |                      |               |                 |                       |
| Reflective     | Straight          | M3   | E32-C31 2M   | 7.5                  | 6             | 4               | 3.5                   | 50                   | 37            | 25              | 8.5                   |
|                |                   | M6   | E32-D11R 2M  | 17                   | 14            | 10              | 8                     | 120                  | 90            | 60              | 21                    |
|                |                   |      | E32-CC200 2M | 32                   | 25            | 16              | 16                    | 200                  | 150           | 100             | 35                    |

## Cylindrical Models

| Sensing method | Size   | Sensing direction | Model        | E3X-DAG□-S/DAB□-S    |               |                 |                       | E3X-DAH□-S           |               |                 |                       |
|----------------|--------|-------------------|--------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |        |                   |              | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | 3 dia. | Top-view          | E32-T12R 2M  | 65                   | 50            | 35              | 30                    | 280                  | 190           | 130             | 55                    |
|                |        | Side-view         | E32-T14LR 2M | 25                   | 20            | 22              | 12                    | 100                  | 75            | 80              | 21                    |
| Reflective     | 3 dia. | Top-view          | E32-D32L 2M  | 15                   | 12            | 8               | 7.5                   | 100                  | 75            | 50              | 17                    |

## Flat Models

| Sensing method | Sensing direction | Model        | E3X-DAG□-S/DAB□-S    |               |                 |                       | E3X-DAH□-S           |               |                 |                       |
|----------------|-------------------|--------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |                   |              | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | Top-view          | E32-T15XR 2M | 25                   | 20            | 22              | 12                    | 100                  | 75            | 80              | 21                    |
|                | Side-view         | E32-T15YR 2M |                      |               |                 |                       |                      |               |                 |                       |
|                | Flat-view         | E32-T15ZR 2M |                      |               |                 |                       |                      |               |                 |                       |
| Reflective     | Top-view          | E32-D15XR 2M | 4.2                  | 3.3           | 2.2             | 2.1                   | 28                   | 20            | 13              | 5                     |
|                | Side-view         | E32-D15YR 2M |                      |               |                 |                       |                      |               |                 |                       |
|                | Flat-view         | E32-D15ZR 2M |                      |               |                 |                       |                      |               |                 |                       |

## Sleeve Models

| Sensing method | Sensing direction | Model          | E3X-DAG□-S/DAB□-S    |               |                 |                       | E3X-DAH□-S           |               |                 |                       |
|----------------|-------------------|----------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                |                   |                | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam   | Top-view          | E32-TC200BR 2M | 65                   | 50            | 35              | 30                    | 280                  | 190           | 130             | 55                    |
| Reflective     | Top-view          | E32-DC200BR 2M | 17                   | 14            | 10              | 8                     | 120                  | 90            | 60              | 21                    |

## High-power Beam

| Type                         | Sensing direction | Aperture angle | Model      | E3X-DAG□-S/DAB□-S    |               |                 |                       | E3X-DAH□-S           |               |                 |                       |
|------------------------------|-------------------|----------------|------------|----------------------|---------------|-----------------|-----------------------|----------------------|---------------|-----------------|-----------------------|
|                              |                   |                |            | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode | High-resolution mode | Standard mode | High-speed mode | Super-high-speed mode |
| Through-beam Integrated lens | Side-view         | 30 °           | E32-T14 2M | 320                  | 260           | 220             | 160                   | 1800                 | 1200          | 820             | 360                   |

## Output Circuit Diagrams

## NPN Output

| Model                                                                                                                                         | Operation mode | Timing charts | Operation selector | Output circuit |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------|--------------------|----------------|
| E3X-DA11-S<br>E3X-DA6-S<br>E3X-DAG11-S<br>E3X-DAG6-S<br>E3X-DAB11-S<br>E3X-DAB6-S<br>E3X-DAH11-S<br>E3X-DAH6-S<br>E3X-DA11SE-S<br>E3X-DA6SE-S | Light-ON       |               | LIGHT ON (L-ON)    |                |
|                                                                                                                                               | Dark-ON        |               | DARK ON (D-ON)     |                |
| E3X-DA11TW-S<br>E3X-DA6TW-S<br>E3X-MDA11<br>E3X-MDA6<br>E3X-DA11AT-S<br>E3X-DA6AT-S                                                           | Light-ON       |               | LIGHT ON (L-ON)    |                |
|                                                                                                                                               | Dark-ON        |               | DARK ON (D-ON)     |                |
| E3X-DA11RM-S<br>E3X-DA6RM-S                                                                                                                   | Light-ON       |               | LIGHT ON (L-ON)    |                |
|                                                                                                                                               | Dark-ON        |               | DARK ON (D-ON)     |                |
| E3X-DA11AN-S                                                                                                                                  | Light-ON       |               | LIGHT ON (L-ON)    |                |
|                                                                                                                                               | Dark-ON        |               | DARK ON (D-ON)     |                |

Note: 1. The ON/OFF regions when areas settings are used with the E3X-DA□TW-S are as follows:  
 LIGHT ON: ON when the incident level is between the thresholds for channels 1 and 2.  
 DARK ON: OFF when the incident level is between the thresholds for channels 1 and 2.

2. Timing Charts for Timer Function Settings (T: Set Time)

| ON delay | OFF delay | One-shot |
|----------|-----------|----------|
|          |           |          |

3. Control Output (AND, OR, Sync) and Timing Chart for Timer Settings (T: Set Time)

|                |                |
|----------------|----------------|
| CH1 ON         | CH1 ON         |
| CH1 OFF        | CH1 OFF        |
| CH2 ON         | CH2 ON         |
| CH2 OFF        | CH2 OFF        |
| OUT (AND) ON   | OUT (AND) ON   |
| OUT (AND) OFF  | OUT (AND) OFF  |
| OUT (OR) ON    | OUT (OR) ON    |
| OUT (OR) OFF   | OUT (OR) OFF   |
| OUT (sync) ON  | OUT (sync) ON  |
| OUT (sync) OFF | OUT (sync) OFF |

## PNP Output

| Model                                                                                                                                         | Operation mode | Timing chart | Operation selector | Output circuit |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|--------------------|----------------|
| E3X-DA41-S<br>E3X-DA8-S<br>E3X-DAG41-S<br>E3X-DAG8-S<br>E3X-DAB41-S<br>E3X-DAB8-S<br>E3X-DAH41-S<br>E3X-DAH8-S<br>E3X-DA41SE-S<br>E3X-DA8SE-S | Light-ON       |              | LIGHT ON (L-ON)    |                |
|                                                                                                                                               | Dark-ON        |              | DARK ON (D-ON)     |                |
| E3X-DA41TW-S<br>E3X-DA8TW-S<br>E3X-MDA41<br>E3X-DA41AT-S<br>E3X-DA8AT-S                                                                       | Light-ON       |              | LIGHT ON (L-ON)    |                |
|                                                                                                                                               | Dark-ON        |              | DARK ON (D-ON)     |                |
| E3X-DA41RM-S<br>E3X-DA8RM-S                                                                                                                   | Light-ON       |              | LIGHT ON (L-ON)    |                |
|                                                                                                                                               | Dark-ON        |              | DARK ON (D-ON)     |                |
| E3X-DA41AN-S                                                                                                                                  | Light-ON       |              | LIGHT ON (L-ON)    |                |
|                                                                                                                                               | Dark-ON        |              | DARK ON (D-ON)     |                |

Note: The ON/OFF regions when areas settings are used with the E3X-DA□TW-S are as follows:  
 LIGHT ON: ON when the incident level is between the thresholds for channels 1 and 2.  
 DARK ON: OFF when the incident level is between the thresholds for channels 1 and 2.

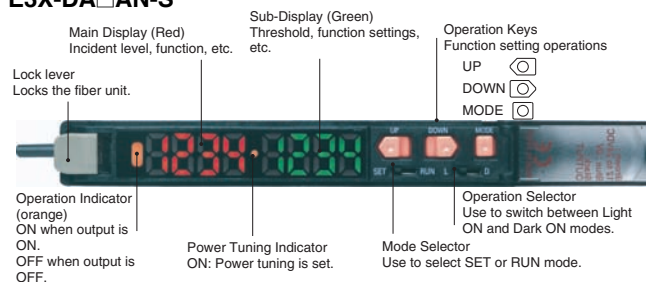
## Nomenclature

### Fiber Amplifier Units

E3X-DA□-S

E3X-DA□RM-S

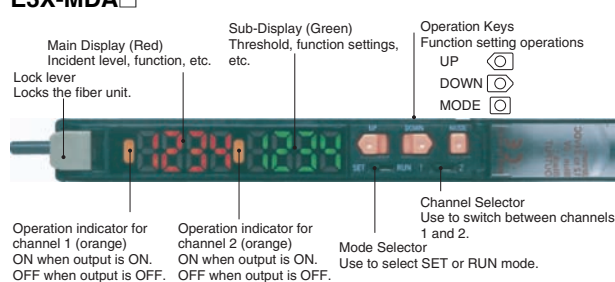
E3X-DA□AN-S



E3X-DA□TW-S

E3X-DA□AT-S

E3X-MDA□



## Safety Precautions

Refer to *Warranty and Limitations of Liability*.

### ⚠ WARNING

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



### Precautions for Correct Use

Do not use the product in atmospheres or environments that exceed product ratings.

### Fiber Amplifier Unit

#### ● Designing

#### Operation after Turning Power ON

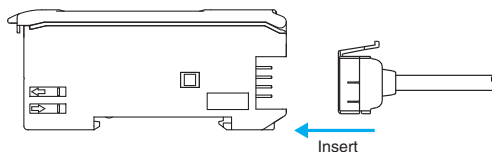
The Sensor is ready to detect 200 ms after the power supply is turned ON. If the Sensor and load are connected to separate power supplies, be sure to turn ON the Sensor first.

#### ● Mounting

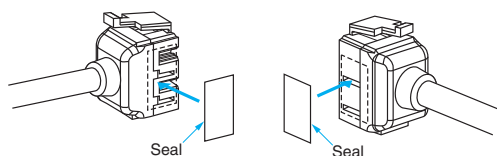
#### Connecting and Disconnecting Wire-saving Connectors

##### Mounting Connectors

1. Insert the Master or Slave Connector into the Amplifier Unit until it clicks into place.



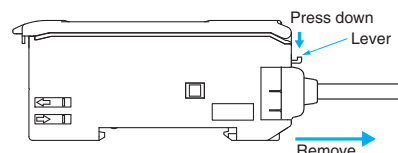
2. Attach the protector seals (provided as accessories) to the sides of master and slave connectors that are not connected.



Note: Attach the seals to the sides with grooves.

#### Removing Connectors

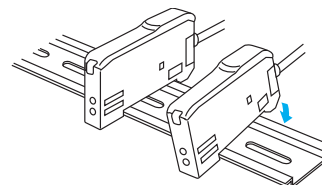
1. Slide the slave Amplifier Unit(s) for which the Connector is to be removed away from the rest of the group.
2. After the Amplifier Unit(s) has been separated, press down on the lever on the Connector and remove it. (Do not attempt to remove Connectors without separating them from other Amplifier Units first.)



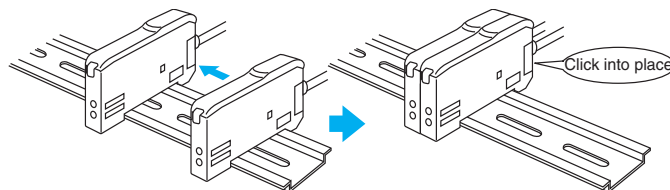
#### Adding and Removing Fiber Amplifier Units

##### Adding Fiber Amplifier Units

1. Mount the Amplifier Units one at a time onto the DIN track.



2. Slide the Amplifier Units together, line up the clips, and press the Amplifier Units together until they click into place.



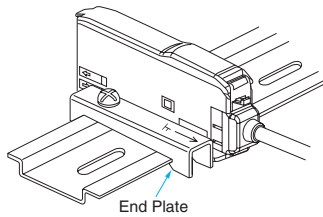
##### Removing Fiber Amplifier Units

Slide Amplifier Units away from each other, and remove from the DIN track one at a time. (Do not attempt to remove Amplifier Units from the DIN track without separating them first.)

- Note: 1. The specifications for ambient temperature will vary according to the number of Amplifier Units used together. For details, refer to *Ratings and Specifications*.
2. Always turn OFF the power supply before joining or separating Amplifier Units.

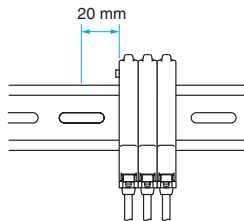
## Mounting the End Plate (PFP-M)

An End Plate should be used if there is a possibility of the Amplifier Unit moving, e.g., due to vibration. If a Mobile Console is going to be mounted, connect the End Plate in the direction shown in the following diagram.



## Mounting the Mobile Console Head

Leave a gap of at least 20 mm between the nearest Amplifier Unit and the Mobile Console head.

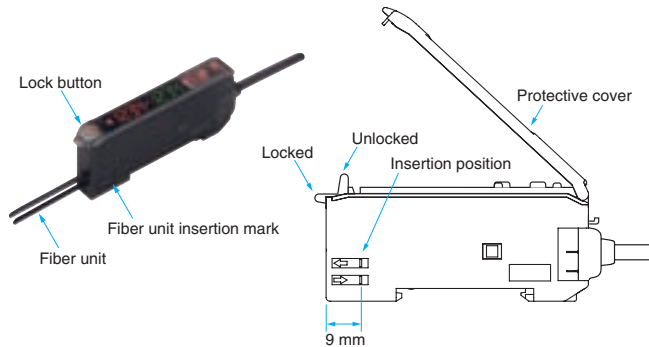


## Fiber Unit Connection

The E3X Amplifier Unit has a lock button for easy connection of the Fiber Unit. Connect or disconnect the fiber units using the following procedures:

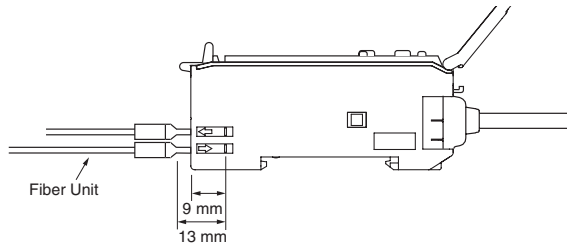
### 1. Connection

Open the protective cover, insert the fiber units according to the fiber unit insertion marks on the side of the Amplifier Unit, and lower the lock lever.

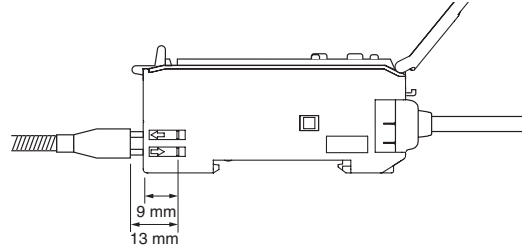


Note: If one of the fibers from the Fiber Unit is labeled as the Emitter fiber, such as with a Coaxial Sensor, insert that fiber into the Emitter section. Refer to *Dimensions for the Fiber Unit* to see if there is an Emitter fiber label.

## Fiber Units with E39-F9 Attachment

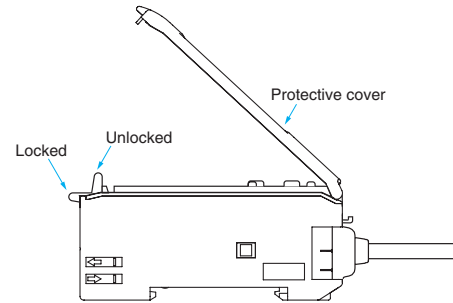


## Fiber Units That Cannot Be Free-Cut (with Sleeves)



### 2. Disconnecting Fiber Units

Remove the protective cover and raise the lock lever to pull out the fiber units.



Note: 1. To maintain the fiber unit properties, confirm that the lock is released before removing the fiber units.  
2. Be sure to lock or unlock the lock button within an ambient temperature range between  $-10^{\circ}\text{C}$  and  $40^{\circ}\text{C}$ .

## ● Adjusting

### Mutual Interference Protection Function

There may be some instability in the digital display values due to light from other sensors. If this occurs, decrease the sensitivity (i.e., decrease the power or increase the threshold) to perform stable detection.

### EEPROM Writing Error

If the data is not written to the EEPROM correctly due to a power failure or static-electric noise, initialize the settings with the keys on the Amplifier Unit. ERR/EEP will flash on the display when a writing error has occurred.

## Optical Communications

Several Amplifier Units can be slid together and used in groups. Do not, however, slide the Amplifier Units or attempt to remove any of the Amplifier Units during operation.

## ● Others

### Protective Cover

Always keep the protective cover in place when using the Amplifier Unit.

### Mobile Console

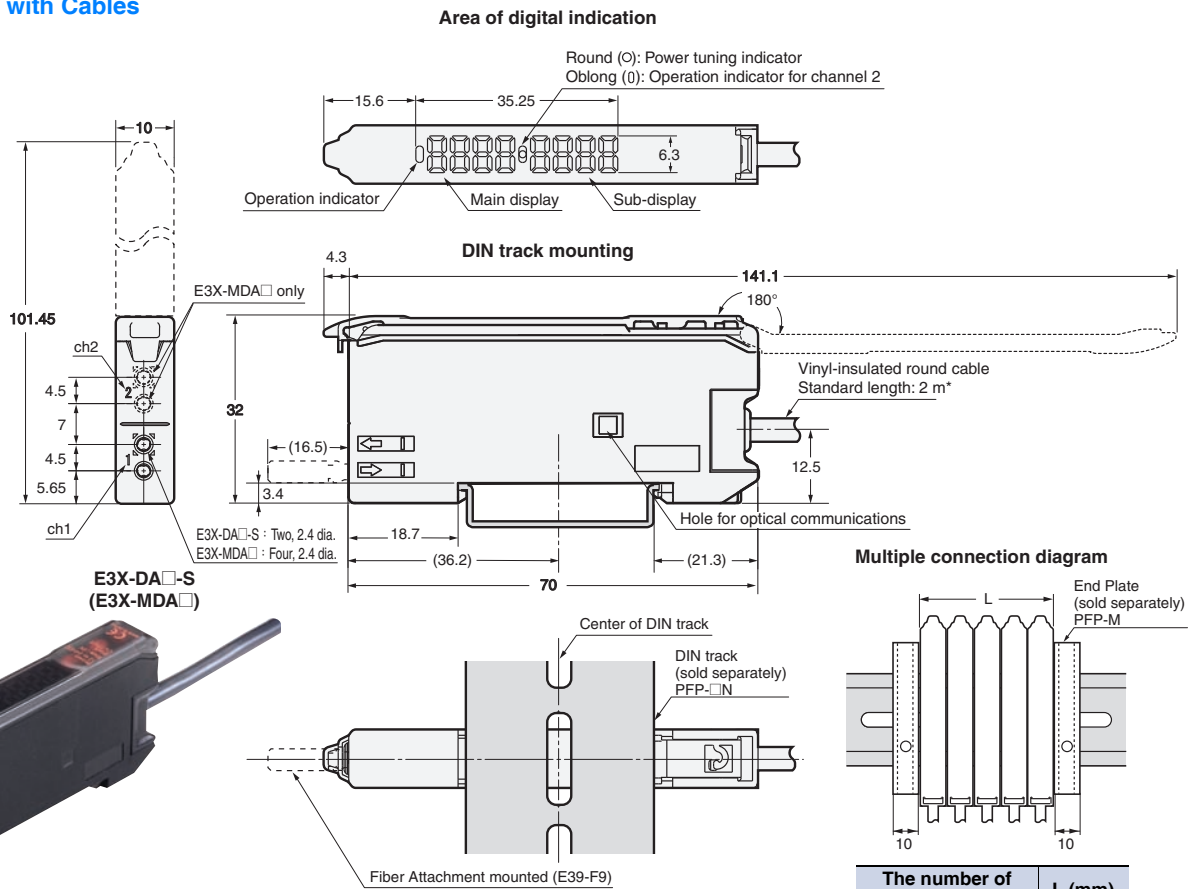
Use the E3X-MC11-SV2 Mobile Console for the E3X-DA-S-series Amplifier Units.

## Dimensions

### Fiber Amplifier Units

#### Amplifier Units with Cables

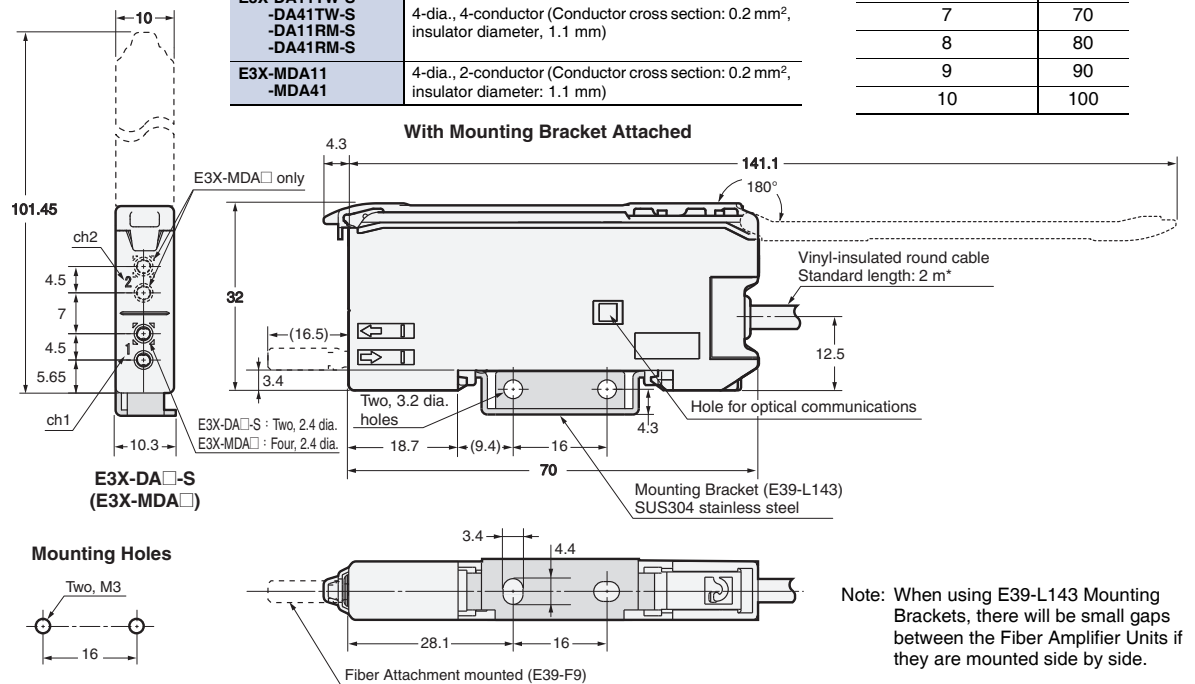
E3X-DA11-S  
E3X-DA41-S  
E3X-DAG11-S  
E3X-DAG41-S  
E3X-DAB11-S  
E3X-DAB41-S  
E3X-DAH11-S  
E3X-DAH41-S  
E3X-DA11RM-S  
E3X-DA41RM-S  
E3X-DA11TW-S  
E3X-DA41TW-S  
E3X-DA11SE-S  
E3X-DA41SE-S  
E3X-DA11AT-S  
E3X-DA41AT-S  
E3X-DA11AN-S  
E3X-DA41AN-S  
E3X-MDA11  
E3X-MDA41



#### \* Cable Specifications

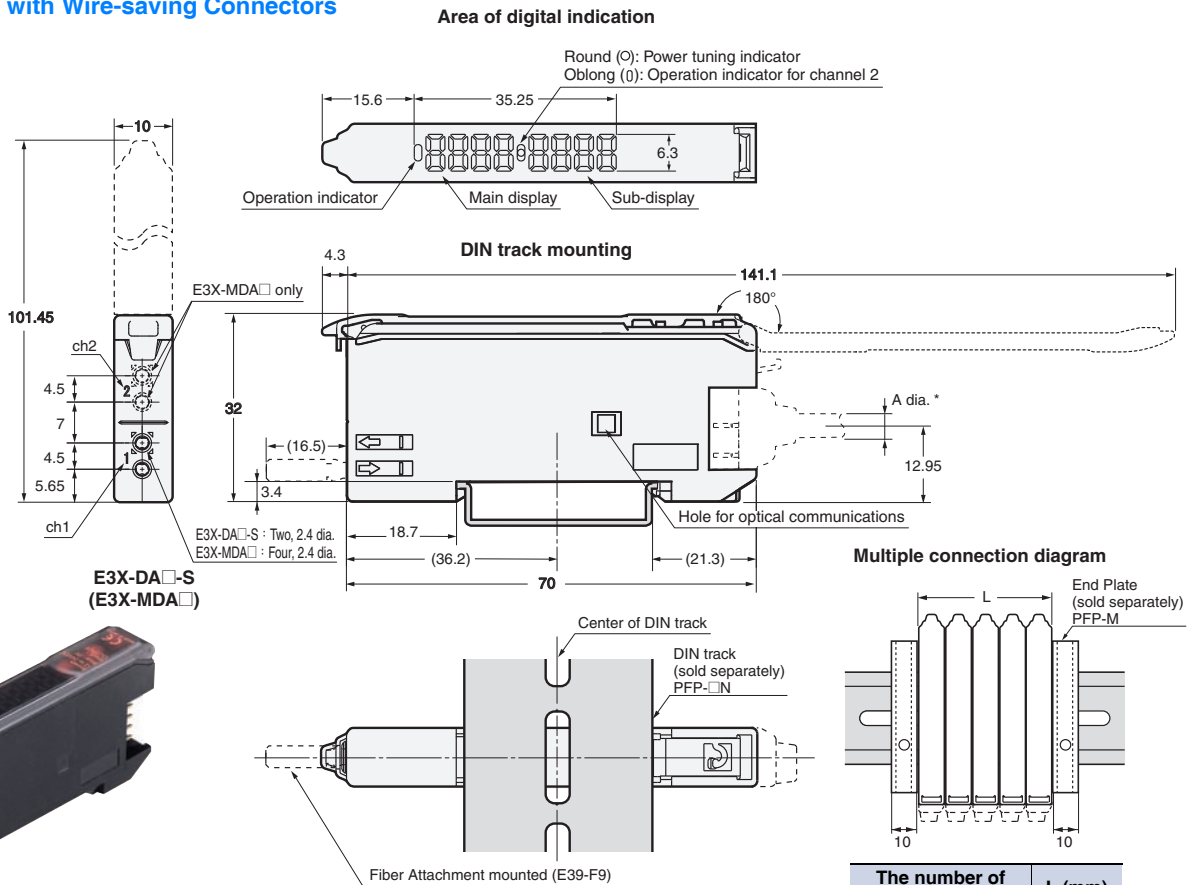
|                                                                                               |                                                                                                 |
|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| E3X-DA11-S<br>-DA41-S<br>-DAG11-S<br>-DAG41-S<br>-DAB11-S<br>-DAB41-S<br>-DAH11-S<br>-DAH41-S | 4-dia., 3-conductor (Conductor cross section: 0.2 mm <sup>2</sup> , insulator diameter: 1.1 mm) |
| E3X-DA11TW-S<br>-DA41TW-S<br>-DA11RM-S<br>-DA41RM-S                                           | 4-dia., 4-conductor (Conductor cross section: 0.2 mm <sup>2</sup> , insulator diameter: 1.1 mm) |
| E3X-MDA11<br>-MDA41                                                                           | 4-dia., 2-conductor (Conductor cross section: 0.2 mm <sup>2</sup> , insulator diameter: 1.1 mm) |

| The number of expansion | L (mm) |
|-------------------------|--------|
| 1                       | 10     |
| 2                       | 20     |
| 3                       | 30     |
| 4                       | 40     |
| 5                       | 50     |
| 6                       | 60     |
| 7                       | 70     |
| 8                       | 80     |
| 9                       | 90     |
| 10                      | 100    |



## Amplifier Units with Wire-saving Connectors

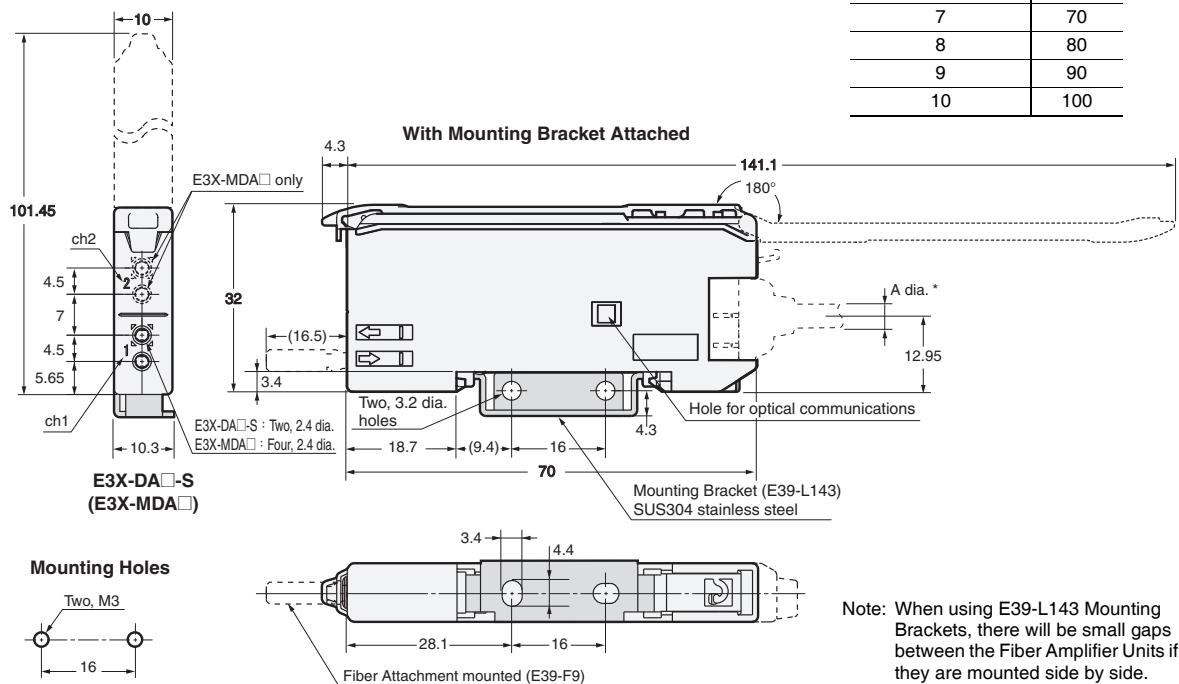
**E3X-DA6-S**  
**E3X-DA8-S**  
**E3X-DAG6-S**  
**E3X-DAG8-S**  
**E3X-DAB6-S**  
**E3X-DAB8-S**  
**E3X-DAH6-S**  
**E3X-DAH8-S**  
**E3X-DA6RM-S**  
**E3X-DA8RM-S**  
**E3X-DA6TW-S**  
**E3X-DA8TW-S**  
**E3X-DA6SE-S**  
**E3X-DA8SE-S**  
**E3X-DA6AT-S**  
**E3X-DA8AT-S**  
**E3X-MDA6**  
**E3X-MDA8**



\* Cable Diameters

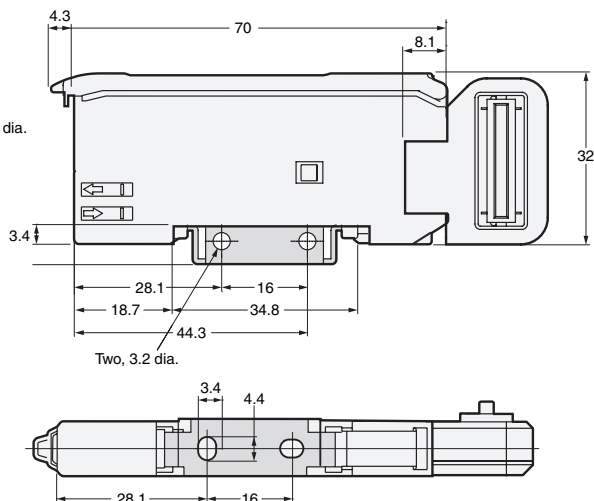
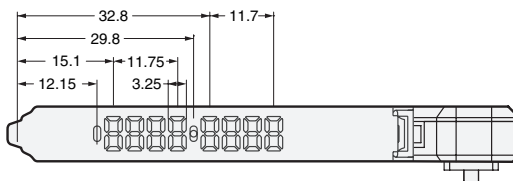
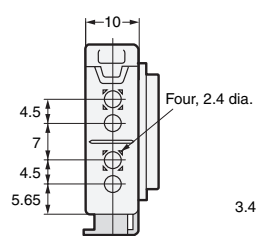
|                                |             |
|--------------------------------|-------------|
| <b>E3X-CN22 (2 conductors)</b> | 4.0-mm dia. |
| <b>E3X-CN21 (4 conductors)</b> |             |
| <b>E3X-CN11 (3 conductors)</b> |             |
| <b>E3X-CN12 (1 conductor)</b>  | 2.6-mm dia. |

| The number of expansion | L (mm) |
|-------------------------|--------|
| 1                       | 10     |
| 2                       | 20     |
| 3                       | 30     |
| 4                       | 40     |
| 5                       | 50     |
| 6                       | 60     |
| 7                       | 70     |
| 8                       | 80     |
| 9                       | 90     |
| 10                      | 100    |



Note: When using E39-L143 Mounting Brackets, there will be small gaps between the Fiber Amplifier Units if they are mounted side by side.

## Amplifier Unit with Connector for Sensor Communications Unit E3X-MDA0

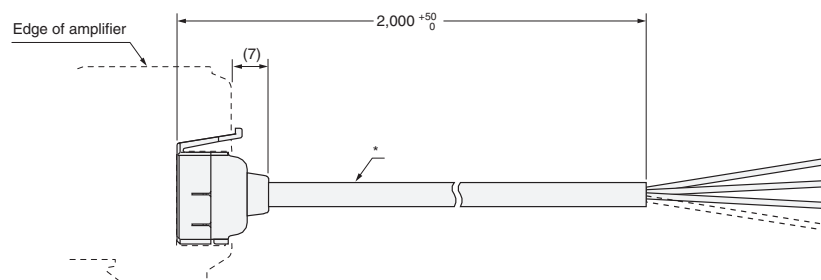


## Amplifier Unit Connectors

### Master Connectors

E3X-CN11

E3X-CN21



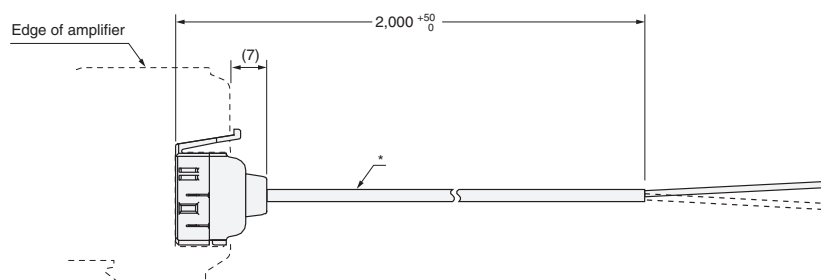
\* E3X-CN11: **4 dia. cable / 3 conductors** / Standard length: 2 m (Conductor cross section: 0.2 mm<sup>2</sup> (AWG24), Insulator diameter: 1.1 mm)

E3X-CN21: **4 dia. cable / 4 conductors** / Standard length: 2 m (Conductor cross section: 0.2 mm<sup>2</sup> (AWG24), Insulator diameter: 1.1 mm)

### Slave Connectors

E3X-CN12

E3X-CN22



\* E3X-CN12: **2.6 dia. cable / 1 conductor** / Standard length: 2 m (Conductor cross section: 0.2 mm<sup>2</sup> (AWG24), Insulator diameter: 1.1 mm)

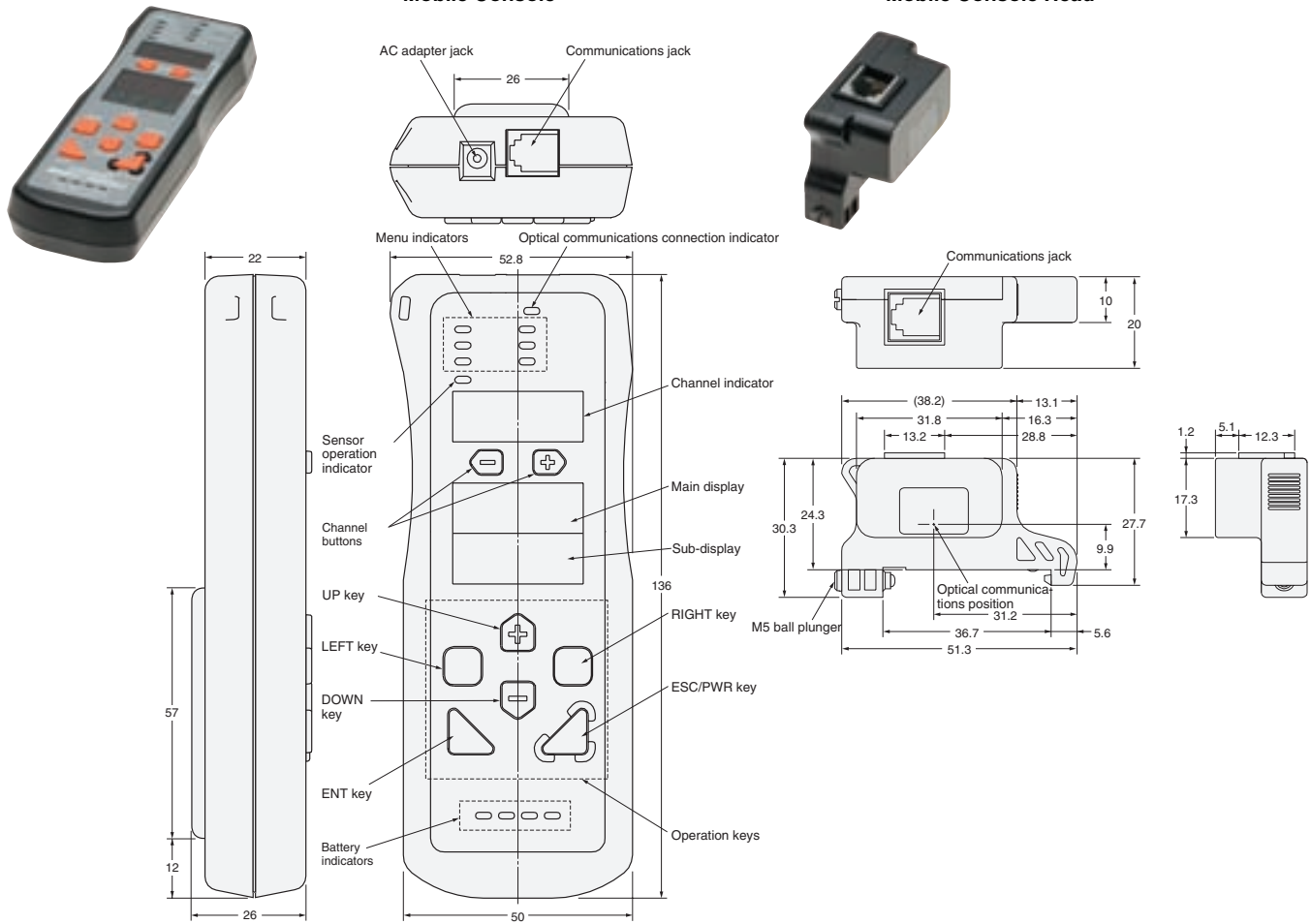
E3X-CN22: **4 dia. cable / 2 conductors** / Standard length: 2 m (Conductor cross section: 0.2 mm<sup>2</sup> (AWG24), Insulator diameter: 1.1 mm)

## Mobile Console

E3X-MC11-SV2

### Mobile Console

### Mobile Console Head



Refer to E32 Series for details on Fiber Units.

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