

Easy-teach digital fiber amplifier



E3X-SD

The E3X-SD easy-teach fiber amplifier is the ideal solution for all standard fiber applications. The one-button teaching and/or the simple threshold adjustment with up/down keys and the easy to read display allow an intuitive usage and fast set up.

- easy one-button teaching
- easy to read display and simple threshold adjustment with up/ down keys for intuitive usage
- GIGA RAY LED for high performance and precision





Ordering Information

| Shape | Item | Order code | |
|-------------------------------------------------------------------------------------|-----------------------------------------|-------------|-------------|
| | | NPN output | PNP output |
|  | Pre-wired | E3X-SD21 2M | E3X-SD51 2M |
|  | Fiber amplifier connector* ¹ | E3X-SD7 | E3X-SD9 |

*1: Order connector separately. For M8 connector models see E3X-DA-S.

Amplifier Unit Connectors (sold separately)

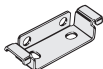
| Shape | Type | Comment | Order code |
|-------------------------------------------------------------------------------------|---------------------------|-------------------------------------------------|------------------------|
|  | Fiber amplifier connector | 2 m PVC cable | E3X-CN21* ¹ |
|  | | 30 cm PVC cable with M12 plug connector (4 pin) | E3X-CN21-M1J 0.3M |
| | | 30 cm PVC cable with M8 plug connector (4 pin) | E3X-CN21-M3J-2 0.3M |

*1: 4-wire version. For 3-wire version order E3X-CN11.

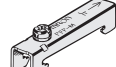
Note: Stickers for Connectors are included as accessories.

Accessories (sold separately)

Mounting Brackets

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

End Plate

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

Ratings and Specifications

Amplifier Units

| Item | E3X-SD□ | |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Light source (wavelength) | Red, 4-element LED (625 nm) | |
| Power supply voltage | 12 to 24 VDC ±10%, ripple (p-p): 10% max. | |
| Power consumption/ Current consumption | 960 mW max. (Power supply voltage: 24 V, Current consumption: 40 mA max.) (Power supply voltage: 12 V, Current consumption: 80 mA max.) | |
| Control output | Open-collector output (NPN or PNP) Load power supply: 26.4 V max., Load current: 50 mA max. (Residual voltage: 1.5 V max.) Light-ON/Dark-ON mode selector | |
| Response time | Operate or reset: 200 μs max. | |
| Sensitivity adjustment | UP/DOWN direct key setting, teaching with/without a workpiece, automatic teaching | |
| Protection circuits | Power supply reverse polarity protection, output short-circuit protection, output reverse polarity protection | |
| Mutual interference prevention | Up to 5 Amplifiers (optically synchronized) ^{*1} | |
| Ambient illumination | Receiver side Incandescent lamp: 10,000 lux max. Sunlight: 20,000 lux max. | |
| Number of gang-mounted Amplifiers | 16 max. (The ambient temperature specification depends on the number of gang-mounted Amplifiers.) | |
| Ambient temperature range | Operating: Groups of 1 to 3 Amplifiers: -25°C to 55°C Groups of 4 to 11 Amplifiers: -25°C to 50°C Groups of 12 to 16 Amplifiers: -25°C to 45°C 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 hours each in X, Y and Z directions | |
| Shock resistance | Destruction: 500 m/s ² , for 3 times each in X, Y and Z directions | |
| Degree of protection | IEC 60529 IP50 (with Protective Cover attached) | |
| Connection method | Pre-wired (standard cable length: 2 m), or connector | |
| Weight (packed state) | Pre-wired model: Approx. 100 g, Model with connector: Approx. 55 g | |
| Material | Case | Polybutylene terephthalate (PBT) |
| | Cover | Polycarbonate (PC) |
| Accessories | Instruction manual | |

*1. Mutual interference prevention is effective when E3X-SD-series Amplifiers are gang-mounted without other E3X-series Amplifiers.

Output Circuit Diagrams

| Output form | Model | Output transistor operation mode | Timing charts | Operation selector | Output circuit |
|-------------|---------------------|----------------------------------|---------------|--------------------|----------------|
| NPN Output | E3X-SD21 E3X-SD7 | Light-ON | | LIGHT ON (L-ON) | |
| | | Dark-ON | | DARK ON (D-ON) | |
| PNP Output | E3X-SD51 E3X-SD9 | Light-ON | | LIGHT ON (L-ON) | |
| | | Dark-ON | | DARK ON (D-ON) | |

Safety Precautions

Warning

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



Caution

Do not exceed the rated voltage. Excess voltage may result in malfunction or fire.



Do not use an AC power supply. Using an AC power supply may result in rupturing..



High-temperature environments may result in burn injury.



Precautions for Safe Use

The following precautions must be observed to ensure safety.

1. Do not use the product in locations where flammable or explosive gas is present.
2. Do not use the product in locations subject to splashing water, oil, or chemicals, or in locations subject to steam.
3. Do not attempt to disassemble, repair, or modify the product.
4. Do not apply voltage or current in excess of the rated ranges.
5. Do not use the product in atmospheres or environments that exceed product ratings.
6. Do not wire the product incorrectly, such as using incorrect power supply polarity.
7. Connect the load properly.
8. Do not short-circuit both ends of the load.
9. Do not use the product if the case is damaged.
10. When disposing of the product, dispose of it as industrial waste.
11. Do not use the product in locations subject to direct sunlight.
12. The surface temperature of the product may rise as a result of the ambient temperature, power supply, or other usage conditions. Use caution when performing maintenance and washing. Failure to do so may result in burn injury.

Precautions for Correct Use

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

Amplifier Units

Designing

Communications Hole

The hole on the side of the Amplifier Unit is a communications hole for preventing mutual interference when Amplifier Units are mounted side-by-side. The E3X-MC11 Mobile Console (sold separately) cannot be used.

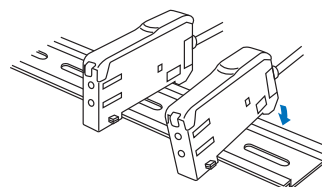
If an excessive amount of light is received via the Sensor, the mutual interference prevention function may not work. In this case, make the appropriate adjustments using the sensitivity adjuster. Mutual interference prevention is effective when E3X-SD-series Amplifiers are gang-mounted without other E3X-series Amplifiers.

Mounting

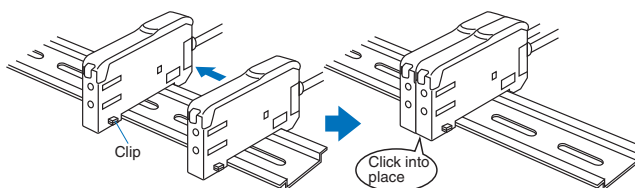
DIN Track Mounting/Removal

Mounting 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 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.)

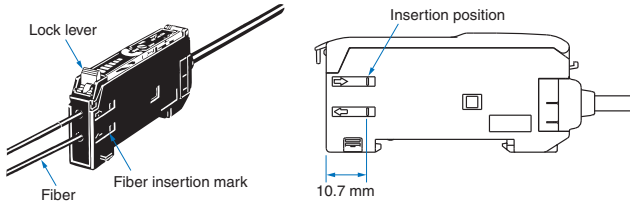
- Note**
1. The specifications for ambient temperature will vary according to the number of Amplifier Units used together. For details, refer to *Ratings and Specifications*.
 2. Always turn OFF the power supply before mounting or removing Amplifier Units.

Fiber Connection and Disconnection

The E3X Amplifier Unit has a lock lever. Connect or disconnect the fibers to or from the E3X Amplifier Unit using the following procedures:

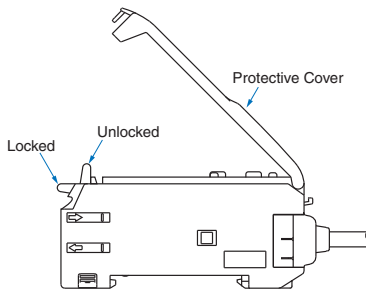
1. Connection

Open the Protective Cover, insert the fibers according to the fiber insertion marks on the side of the Amplifier Unit, and lower the lock lever.



2. Disconnection

Remove the Protective Cover and raise the lock lever to pull out the fiber.



Note: To maintain the fiber properties, confirm that the lock is released before removing the fiber.

3. Precautions for Fiber Connection/Disconnection

Be sure to lock or unlock the lock lever within an ambient temperature range between -10°C and 40°C.

Operating Environment

Ambient Conditions

If dust or dirt adhere to the hole for optical communications, it may prevent normal communications. Be sure to remove any dust or dirt before using the Units.

Other

Protective Cover

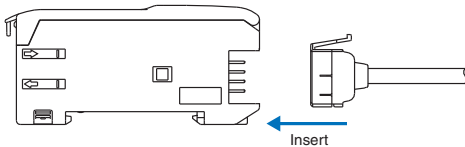
Be sure to mount the Protective Cover before use.

Amplifier Units with Connectors

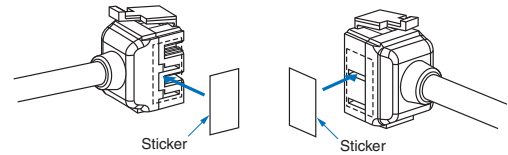
Mounting

Mounting Connectors

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



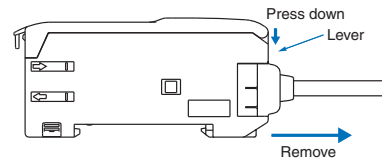
2. Join Amplifier Units together as required after all the Master and Slave Connectors have been inserted.
3. Attach the stickers (provided as accessories) to the sides of Master and Slave Connectors that are not connected to other Connectors.



Note: Attach the stickers to the sides with grooves.

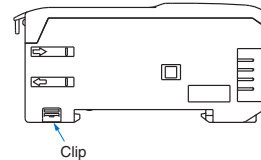
Removing Connectors

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



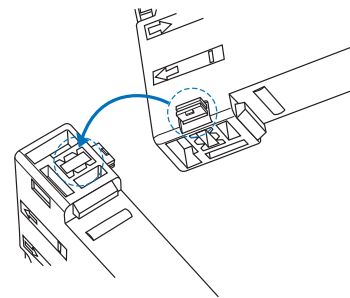
Mounting End Plate (PFP-M)

Depending on how it is mounted, an Amplifier Unit may move during operation. In this case, use an End Plate. Before mounting an End Plate, remove the clip from the master Amplifier Unit using a nipper or similar tool.

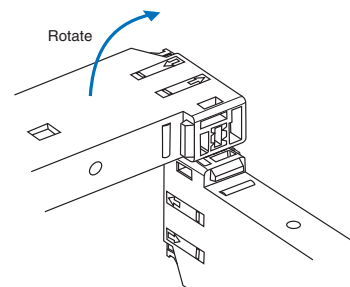


The clip can also be removed using the following mechanism, which is incorporated in the construction of the section underneath the clip.

1. Insert the clip to be removed into the slit underneath the clip on another Amplifier Unit.



2. Remove the clip by rotating the Amplifier Unit.



Pull Strengths for Connectors (Including Cables)

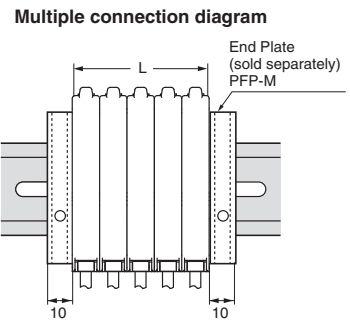
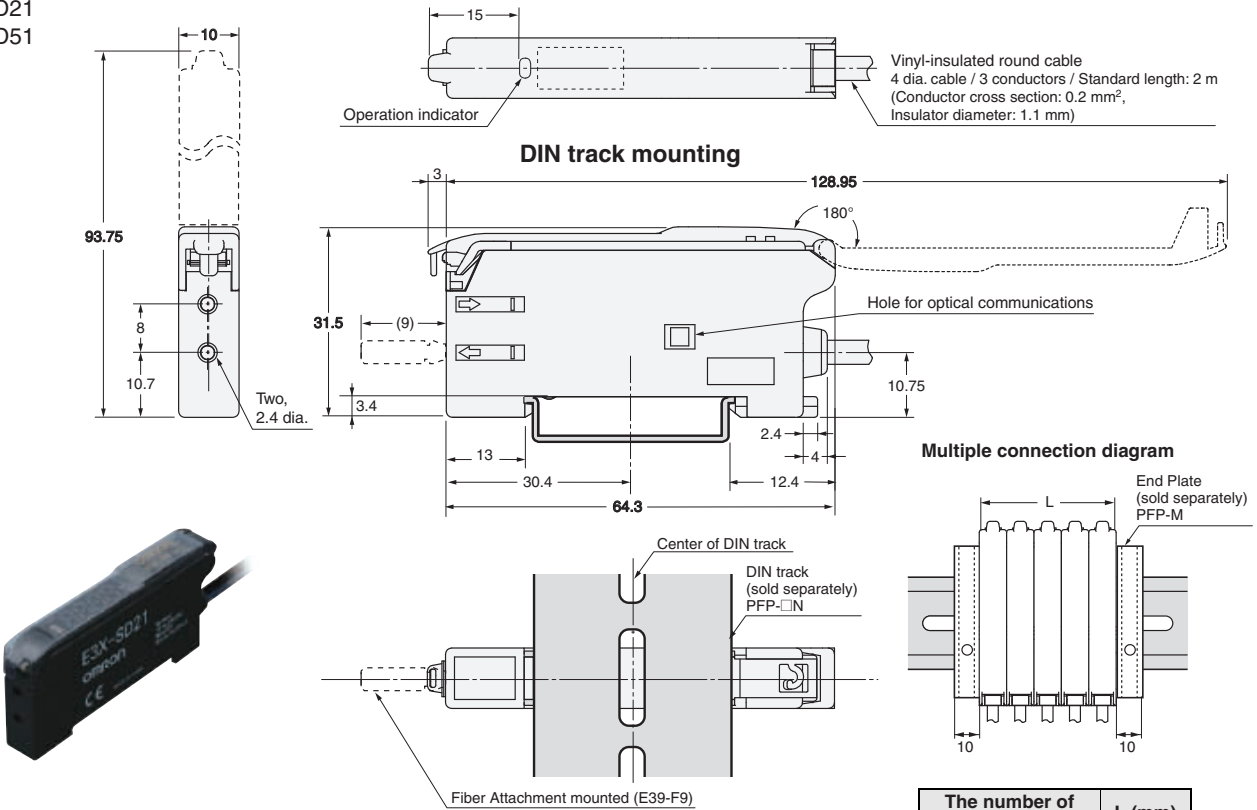
E3X-CN11: 30 N max.
E3X-CN12: 12 N max.

Dimensions

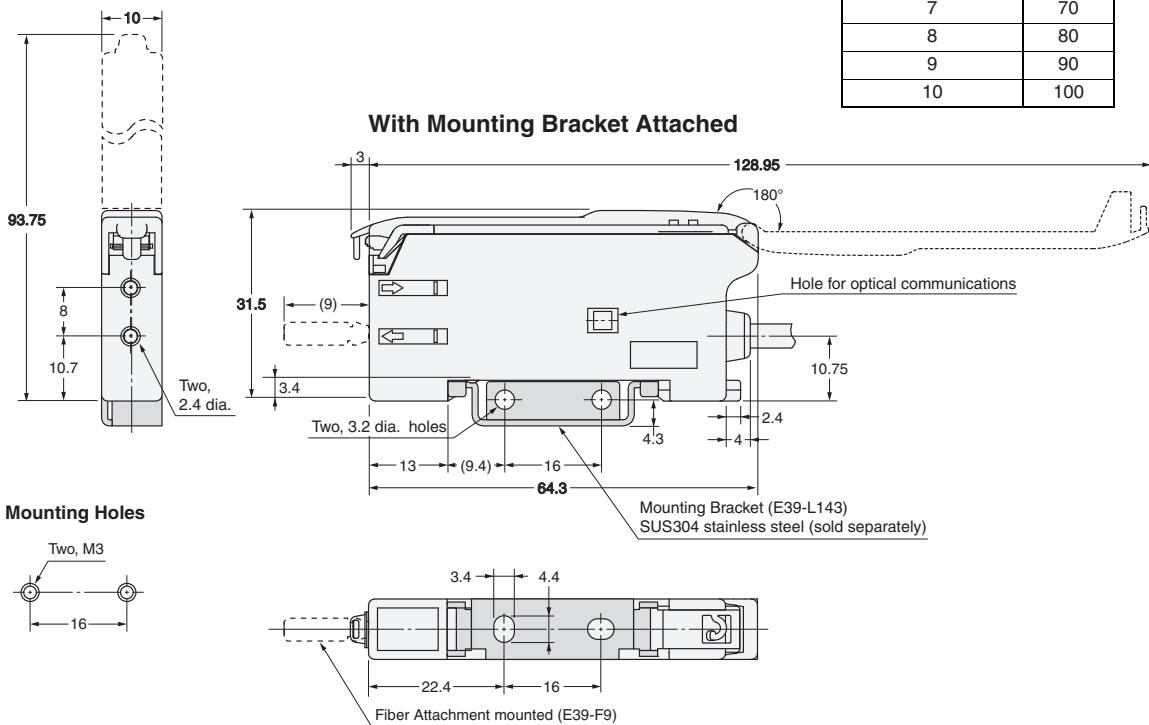
Amplifier Units

Amplifier Units with Cables

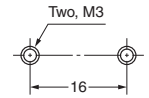
E3X-SD21
E3X-SD51



| 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 |



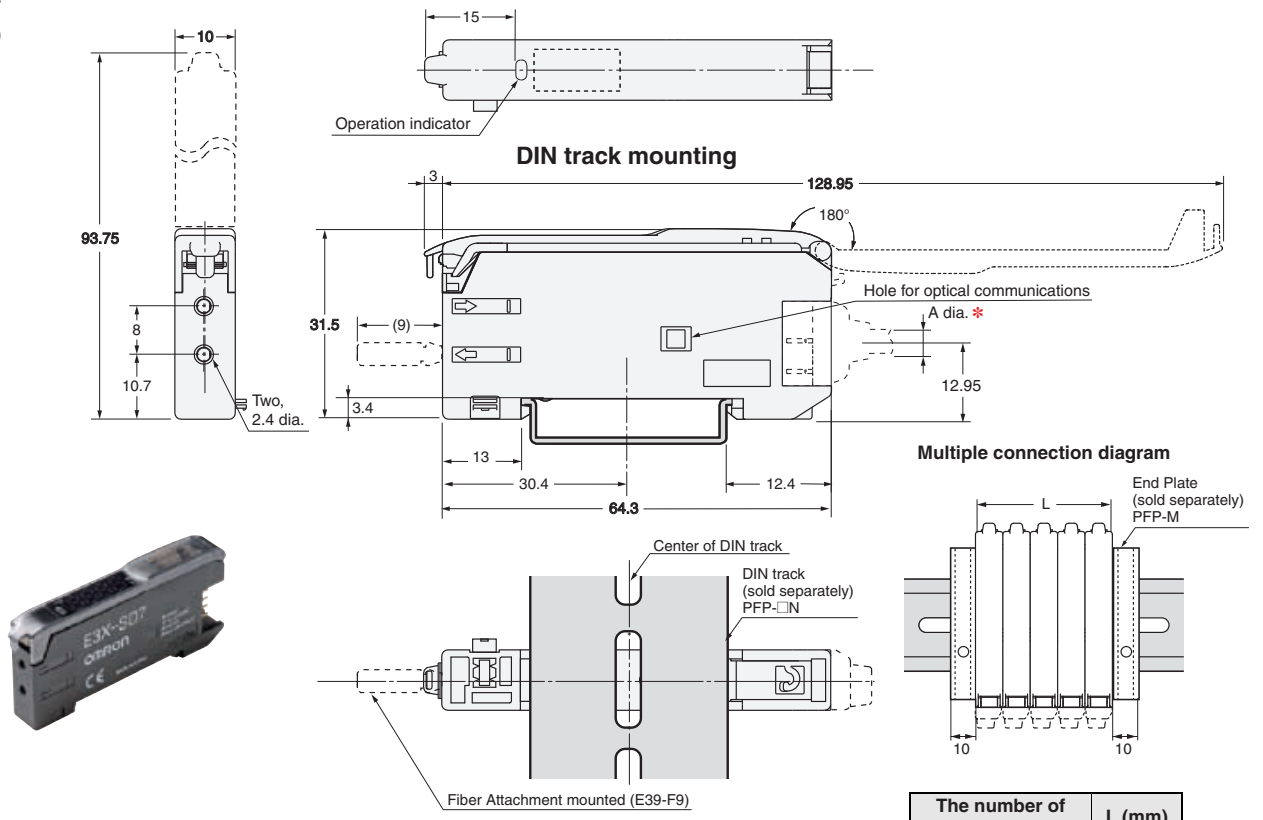
Mounting Holes



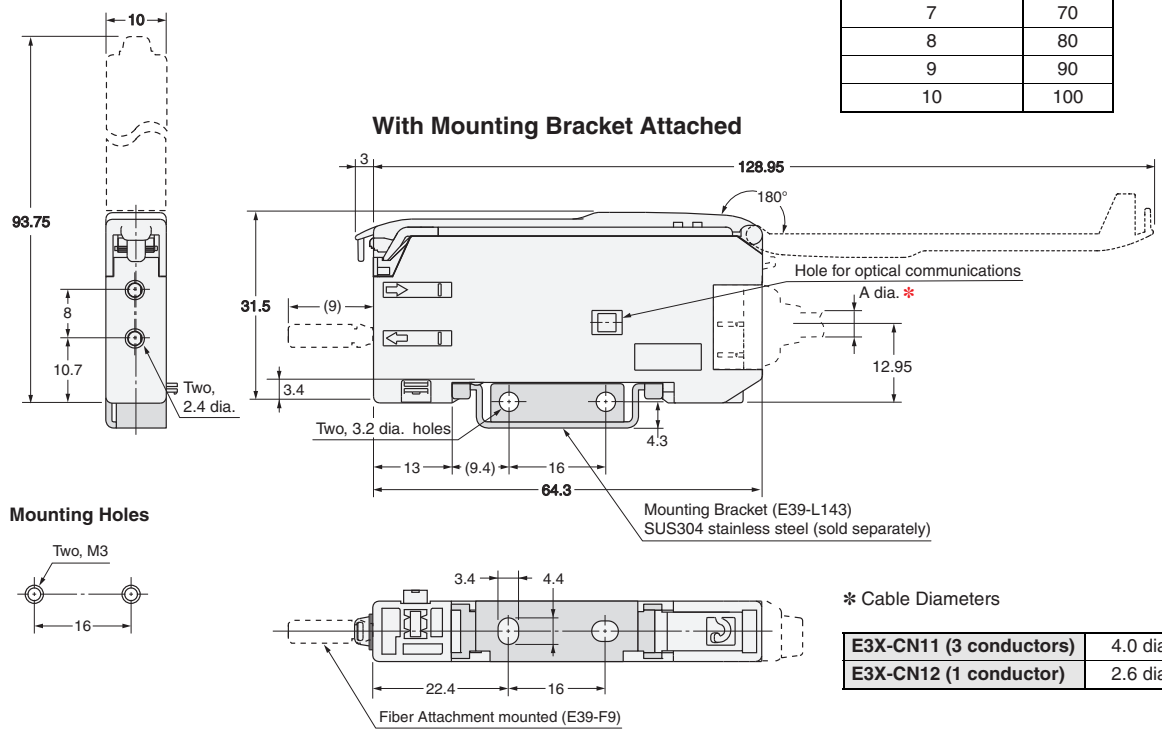
Note: When using E39-L143 Mounting Brackets, there will be small gaps between the Amplifier Units if they are mounted side by side.

Amplifier Units with Connectors

E3X-SD7
E3X-SD9



| 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 |



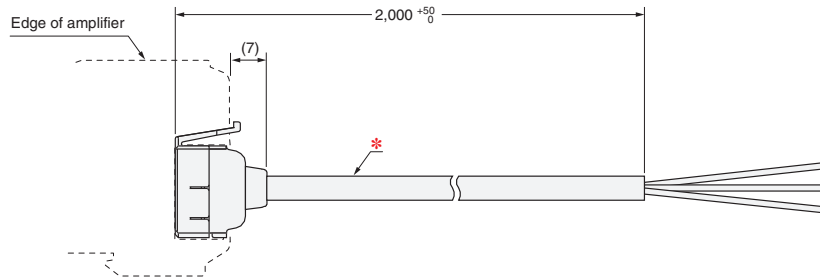
* Cable Diameters

| | |
|-------------------------|----------|
| E3X-CN11 (3 conductors) | 4.0 dia. |
| E3X-CN12 (1 conductor) | 2.6 dia. |

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

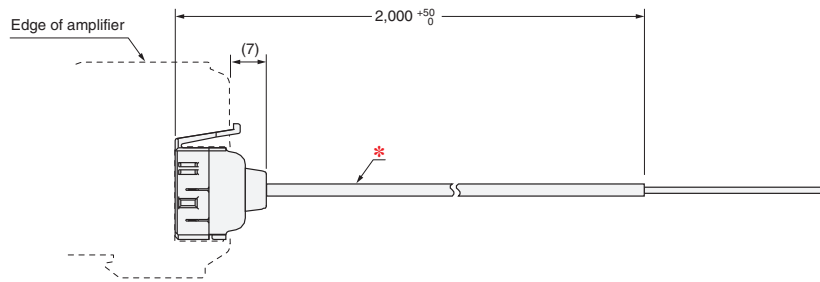
Amplifier Unit Connectors (Wire-saving Connectors)

Master Connector
E3X-CN11



* E3X-CN11: **4 dia. cable / 3 conductors** / Standard length: 2 m (Conductor cross section: 0.2 mm² (AWG24), Insulator diameter: 1.1 mm)

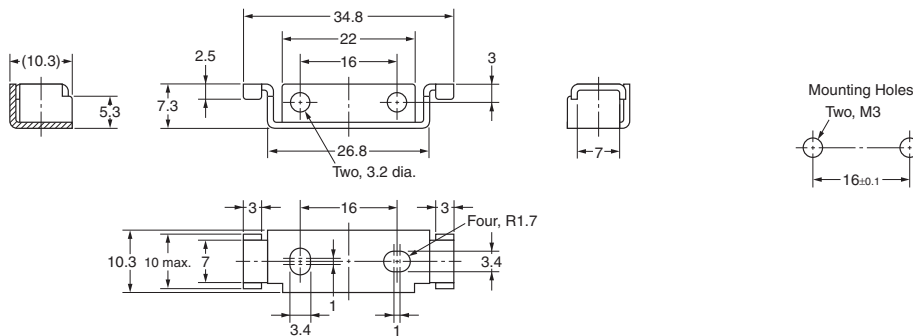
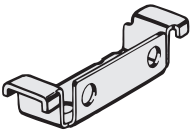
Slave Connector
E3X-CN12



* E3X-CN12: **2.6 dia. cable / 1 conductor** / Standard length: 2 m (Conductor cross section: 0.2 mm² (AWG24), Insulator diameter: 1.1 mm)

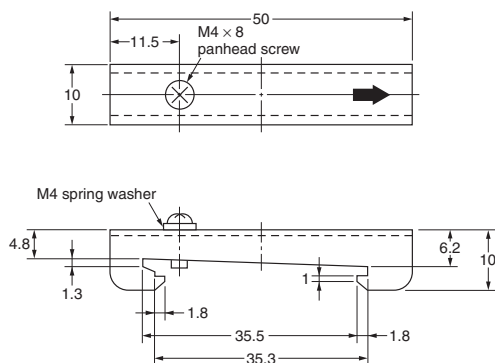
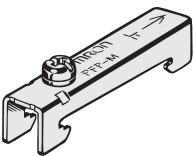
Accessories (sold separately)

Mounting Brackets
E39-L143



Material: Stainless steel (SUS304)

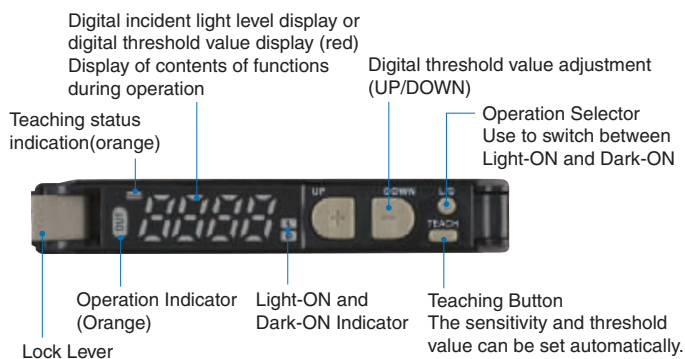
End Plates
PFP-M



Nomenclature

Amplifier Units

E3X-SD





Operating Procedure

Sensitivity Setting

The sensitivity can be set with the UP and DOWN Keys similar to using an adjuster knob. The sensitivity can also be easily set by using the following two teaching functions.


Teaching with/without a Workpiece

Two points (one with the workpiece and the other without) are detected, and the operating level is set to the midpoint. Light level is also automatically set to the optimal value.

| Operation description | Button/Key |
|-----------------------------------------------|----------------------------------------------------------------------------------------------|
| Press the TEACH button with the workpiece. | TEACH  |
| Press the TEACH button without the workpiece. | TEACH  |

Automatic Teaching

Changes within a time are detected, and the operating level is set to the midpoint between the maximum and the minimum values of the changes. This setting is optimal for when the workpieces cannot be stopped. Execute automatic teaching again if the incident light level is not automatically set to the optimal value.

| Operation description | Button/Key |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Press the TEACH button for 3 s min. Let the workpiece pass while the button is pressed. | TEACH  |

READ AND UNDERSTAND THIS DOCUMENT

Please read and understand this document before using the products. Please consult your OMRON representative if you have any questions or comments.

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

SUITABILITY FOR USE

THE PRODUCTS CONTAINED IN THIS DOCUMENT ARE NOT SAFETY RATED. THEY ARE NOT DESIGNED OR RATED FOR ENSURING SAFETY OF PERSONS, AND SHOULD NOT BE RELIED UPON AS A SAFETY COMPONENT OR PROTECTIVE DEVICE FOR SUCH PURPOSES. Please refer to separate catalogs for OMRON's safety rated products.

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the product.

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

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

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.

- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

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

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PERFORMANCE DATA

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

CHANGE IN SPECIFICATIONS

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

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

DIMENSIONS AND WEIGHTS

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

ERRORS AND OMISSIONS

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

PROGRAMMABLE PRODUCTS

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

COPYRIGHT AND COPY PERMISSION

This document shall not be copied for sales or promotions without permission.

This document is protected by copyright and is intended solely for use in conjunction with the product. Please notify us before copying or reproducing this document in any manner, for any other purpose. If copying or transmitting this document to another, please copy or transmit it in its entirety.

Cat. No. E67E-EN-01

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

OMRON EUROPE B.V.

Wegalaan 67-69,
NL-2132 JD, Hoofddorp,
The Netherlands
Phone: +31 23 568 13 00
Fax: +31 23 568 13 88
www.industrial.omron.eu