

Simple Fiber Amplifier Unit E3X-SD/-NA

Simple and Affordable Fiber Amplifier Units



- Reasonable price.
- Use the one-key one-function feature for quick, easy operation.



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

Ordering Information

Fiber Amplifier Units [Refer to *Dimensions* on page 11.] Digital Display and Direct Key Setting

Item	Appearance	Connection method	Ratings and Specifications	Model	
				NPN output	PNP output
Standard models		Pre-wired (2 m)	---	E3X-SD21 2M	E3X-SD51 2M
		Wire-saving connector *		E3X-SD7	E3X-SD9

*An Amplifier Unit Connector (sold separately) is required.

Bar Display and Adjuster Setting

Item	Appearance	Connection method	Ratings and Specifications	Model	
				NPN output	PNP output
Standard models		Pre-wired (2 m)	---	E3X-NA11 2M	E3X-NA41 2M
		Wire-saving connector *1		E3X-NA6	E3X-NA8
High-speed detection models		Pre-wired (2 m)	Response time: 20 μs	E3X-NA11F 2M	E3X-NA41F 2M
Water-resistant models		Pre-wired (2 m)	Degree of protection: IP66	E3X-NA11V 2M	E3X-NA41V 2M
		Connector (M8) *2		E3X-NA14V	E3X-NA44V

*1. An Amplifier Unit Connector (sold separately) is required.

*2. A Sensor I/O Connector (sold separately) is required.

E3X-SD/-NA

Accessories (sold separately)

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

Note: Protective seals provided. [Refer to Dimensions on page 15.]

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

Ordering Precautions for Amplifier Units Connectors A Connector is not provided with the Amplifier Unit. Refer to the tables at the right when placing an order.	Fiber Amplifier Units			Applicable Connectors (sold separately)	
	Type	NPN	PNP	Master Connector	Slave Connector
	Standard models	E3X-SD7 E3X-NA6	E3X-SD9 E3X-NA8	+	E3X-CN11 (3-wire)
When Using 5 Amplifier Units			+	1 Master Connector + 4 Slave Connectors	
5 Fiber Amplifier Units			+	1 Master Connector + 4 Slave Connectors	

Sensor I/O Connectors (Required for models with M8 Connectors.)

[Refer to Dimensions on XS3.]

Size	Cable specifications	Appearance	Cable type	Model	
M8	Standard cable	Straight connector 	2 m	Four-conductor cable	XS3F-M421-402-A
			5 m		XS3F-M421-405-A
		L-shaped connector 	2 m		XS3F-M422-402-A
			5 m		XS3F-M422-405-A

Mounting Brackets

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

[Refer to Dimensions on page 15.]

Appearance	Applicable models	Model	Quantity
	E3X-SD□ E3X-NA□ E3X-NA□F	E39-L143	1
	E3X-NA□V	E39-L148	

End Plate

End Plates are not provided with the Fiber Amplifier Unit. Order End Plates separately if required.

[Refer to Dimensions on page 15.]

Appearance	Model	Quantity
	PFP-M	1

Ratings and Specifications

Fiber Amplifier Units

Type	Digital display and direct key setting		Bar display and adjuster setting		
	Standard models		Standard models	High-speed detection models	Water-resistant models
Item	E3X-SD□		E3X-NA□	E3X-NA□F	E3X-NA□V
Light source (wavelength)	Red, 4-element LED (625 nm)		Red, 4-element LED (624 nm)	Red, 4-element LED (625 nm)	Red LED (680 nm)
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p): 10% max.				
Power consumption/ Current consumption	At Power Supply Voltage of 24 VDC 960 mW max./40 mA max. At Power Supply Voltage of 12 VDC 960 mW max./80 mA max.		At Power Supply Voltage of 24 VDC 840 mW max./35 mA max. At Power Supply Voltage of 12 VDC 420 mW max./35 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		Open-collector output (NPN or PNP) Load power supply: 26.4 V max., Load current: 50 mA max. (Residual voltage: 1 V max.) Light-ON/Dark-ON mode selector.		
Response time	Operate or reset: 200 μs max. (*1)			Operate: 20 μs max. Reset: 30 μs max.	Operate or reset: 200 μs max. (*1)
Sensitivity adjustment	UP/DOWN direct key setting, teaching with/without a workpiece, automatic teaching		8-turn sensitivity adjuster (with indicator)		
Protection circuits	Power supply reverse polarity protection, output short-circuit protection, output reverse polarity protection		Power supply reverse polarity protection, output short-circuit protection		
Timer function	---		No timer, OFF-delay timer; or Timer selector (timer time: 40 ms (fixed))		
Mutual interference prevention	Up to 5 Amplifiers (optically synchronized) (*2)			None	Up to 5 Amplifiers (optical- ly synchronized) (*2)
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)		Operating: 35% to 85% Storage: 35% to 95% (with no condensation)		
Insulation resistance	20 MΩ. min. (at 500 VDC)				
Dielectric strength	1,000 VAC at 50/60 Hz for 1 minute (*3)				
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)				IEC 60529 IP66 (with Protective Cover at- tached)
Connection method	Pre-wired (standard cable length: 2 m), or connector				
Weight (packed state) (*4)	Pre-wired model: Approx. 100 g, Model with connector: Approx. 55 g				
Material	Case	Polybutylene terephthalate (PBT)			
	Cover	Polycarbonate (PC)			Polyethersulfone (PES)
Accessories	Instruction manual				

*1. When there are 8 or more E3X-NA Amplifiers mounted side-by-side, the response time will be 350 μs max.

*2. Mutual interference prevention is effective when E3X-SD/-NA-series Fiber Amplifier Units are gang-mounted without other E3X-series Fiber Amplifier Units.

*3. Water-resistant models and models with connectors have a dielectric strength of 500 VAC.

*4. Add 10 g for water-resistant models.

Amplifier Unit Connectors (Wire-saving Connectors)

Item	Model	E3X-CN11	E3X-CN12
Rated current		2.5 A	
Rated voltage		50 V	
Contact resistance		20 mΩ max. (20 mVDC max., 100 mA max.) (The above figure is for connection to the Fiber Amplifier Unit and the adjacent Connector. It does not include the conductor resistance of the cable.)	
Number of insertions		Destruction: 50 times (for connection to the Fiber Amplifier Unit and the adjacent Connector)	
Material	Housing	Polybutylene terephthalate (PBT)	
	Contact	Phosphor bronze/gold-plated nickel	
Weight (packed state)		Approx. 55 g	Approx. 25 g

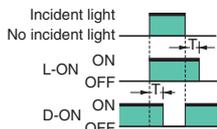
E3X-SD/-NA

I/O Circuit Diagrams

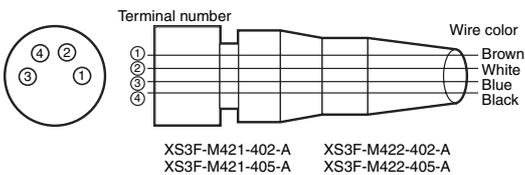
Output form	Model	Output transistor operation mode	Timing charts	Operation selector	Output circuit
NPN Output	E3X-SD21 E3X-SD7 E3X-NA11 E3X-NA6 E3X-NA11F E3X-NA14V	Light-ON		LIGHT ON (L-ON)	<p>• M8 Connector Pin Arrangement </p> <p>Note: Pin 2 is not used.</p> <p>* Not present on the E3X-NA.</p>
		Dark-ON		DARK ON (D-ON)	
PNP Output	E3X-SD51 E3X-SD9 E3X-NA41 E3X-NA8 E3X-NA41F E3X-NA41V E3X-NA44V	Light-ON		LIGHT ON (L-ON)	<p>• M8 Connector Pin Arrangement </p> <p>Note: Pin 2 is not used.</p> <p>* Not present on the E3X-NA.</p>
		Dark-ON		DARK ON (D-ON)	

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

OFF delay



Plug (Sensor I/O Connector)



Classification	Wire color	Connection pin	Application
DC	Brown	1	Power supply (+V)
	White	2	---
	Blue	3	Power supply (0 V)
	Black	4	Output

Note: Pin 2 is not used.

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.

Fiber 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.

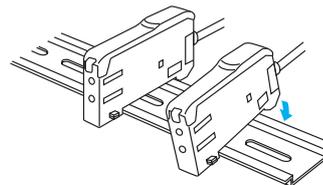
Mutual interference prevention is effective when E3X-SD/-NA-series Amplifier Units are gang-mounted without other E3X-series Amplifiers.

● Mounting

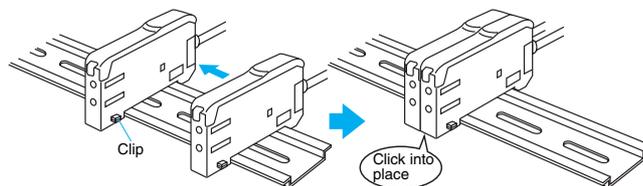
DIN Track Mounting/Removal

Mounting 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.)

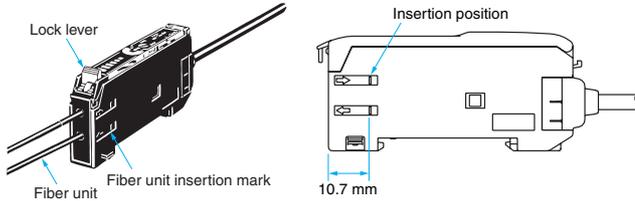
- Note 1.** The specifications for ambient temperature will vary according to the number of Amplifier Units used together. For details, refer to *Ratings and Specifications*.
- 2.** Always turn OFF the power supply before mounting or removing Amplifier Units.

Fiber Unit Connection and Disconnection

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

1. Connection

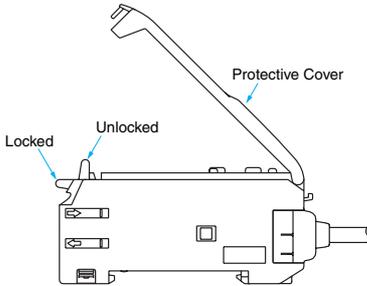
Open the Protective Cover, insert the fiber units according to the fiber unit insertion marks on the side of the Amplifier Unit, and lower the lock lever.



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.

2. Disconnection

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



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

3. Precautions for Fiber Unit 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

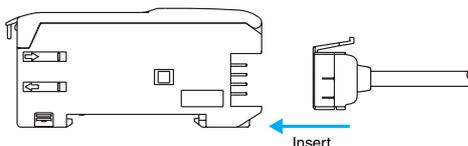
Be sure to mount the Protective Cover before use.

Fiber Amplifier Units with Connectors

● Mounting

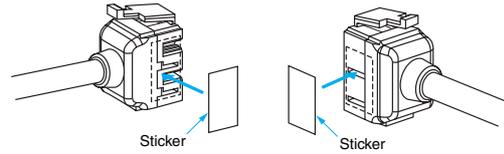
Mounting Connectors

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.

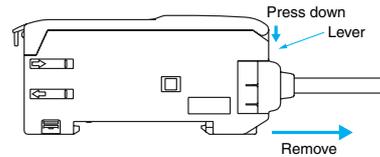
3. Attach the stickers (provided as accessories) to the sides of Master and Slave Connectors that are not connected to other Connectors.



Note: Attach the stickers to the sides with grooves.

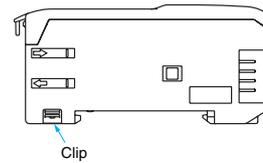
Removing Connectors

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.)



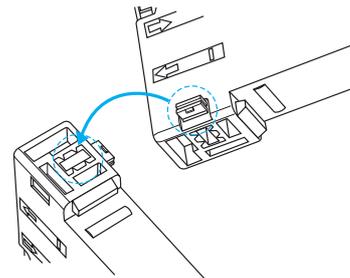
Mounting End Plate (PFP-M)

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.

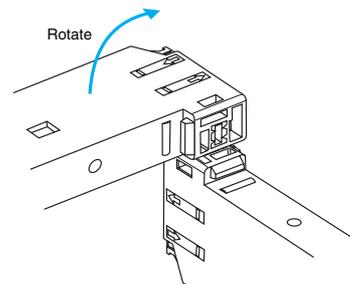


The clip can also be removed using the following mechanism, which is incorporated in the construction of the section underneath the clip.

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.

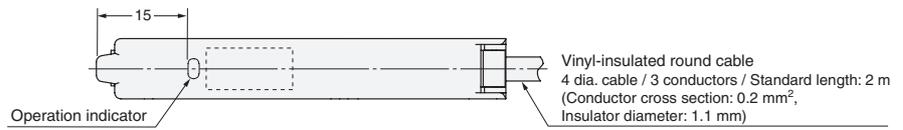
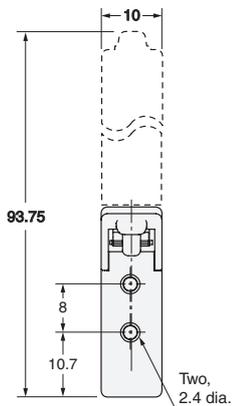
E3X-CN12: 12 N max.

Dimensions

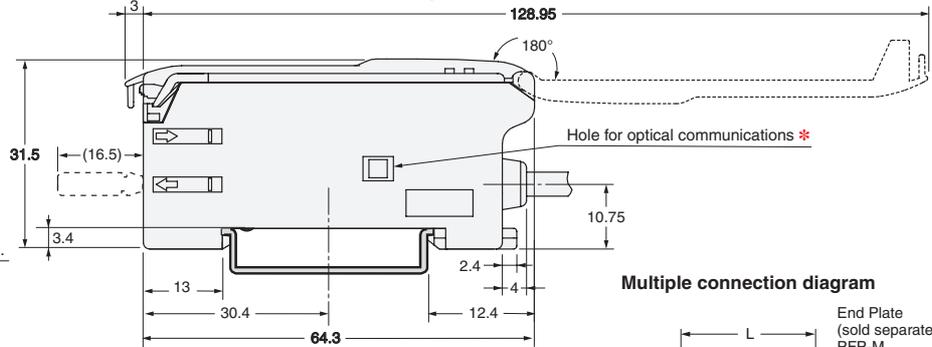
Fiber Amplifier Units

Amplifier Units with Cables

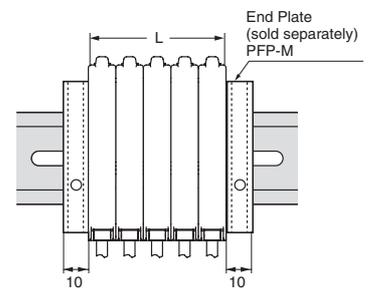
E3X-SD21
E3X-SD51
E3X-NA11
E3X-NA11F
E3X-NA41
E3X-NA41F



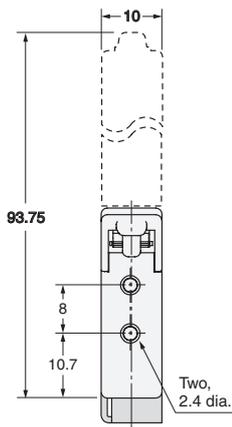
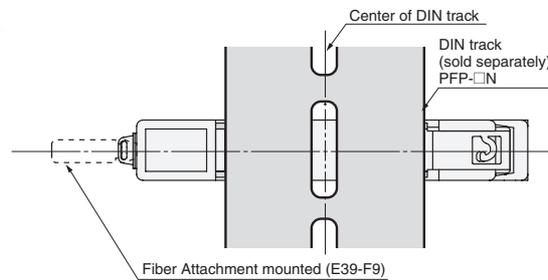
DIN track mounting



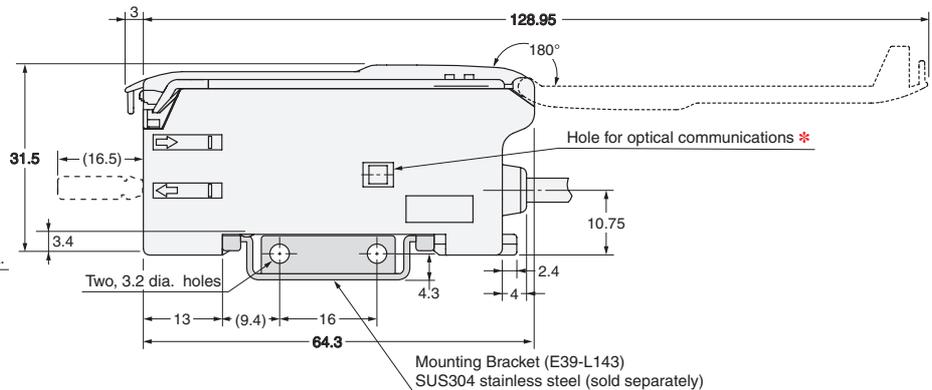
Multiple connection diagram



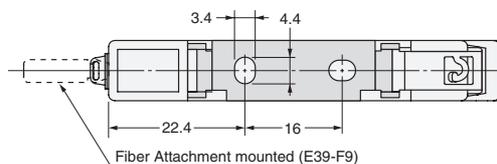
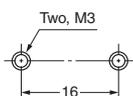
The number of expansion	L (mm)
1	10
2	20
3	30
4	40
5	50
6	60
7	70
8	80
9	90
10	100



With Mounting Bracket Attached



Mounting Holes



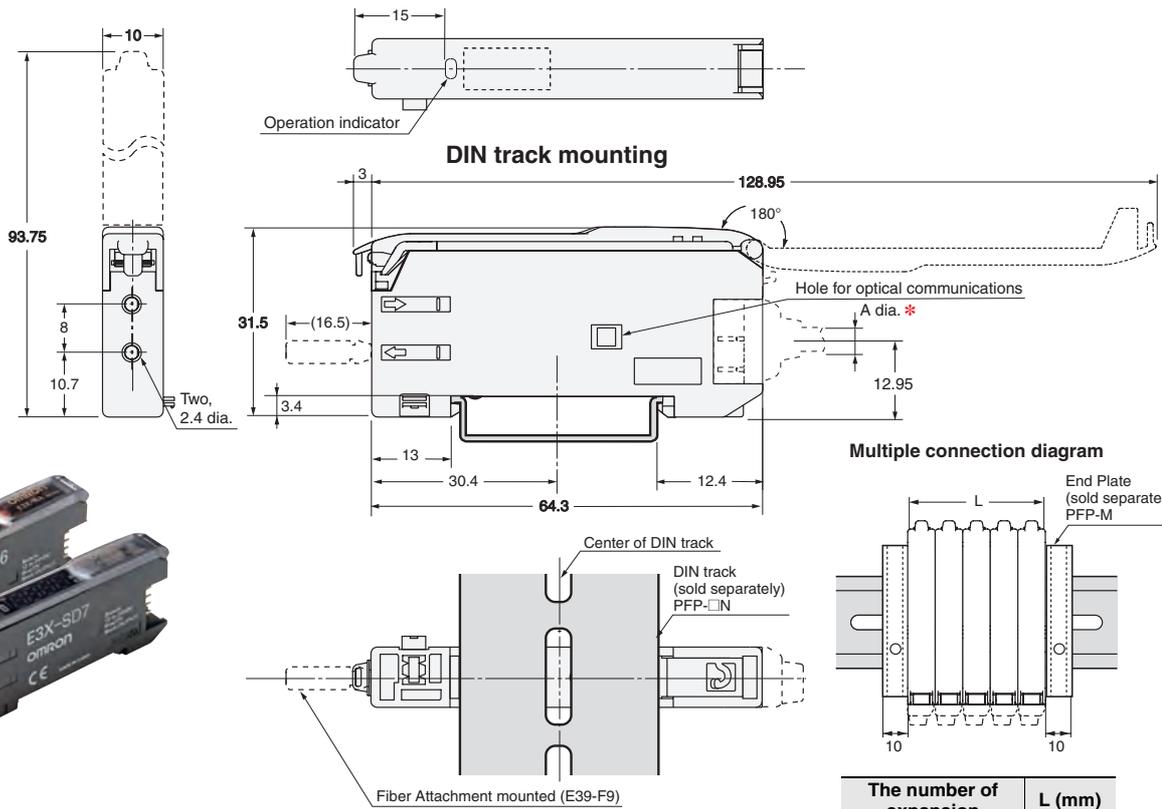
* There is no hole for E3X-NA□F models.

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

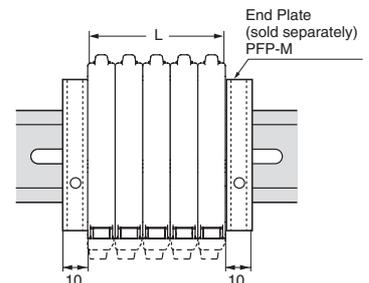
E3X-SD/-NA

Amplifier Units with Connectors

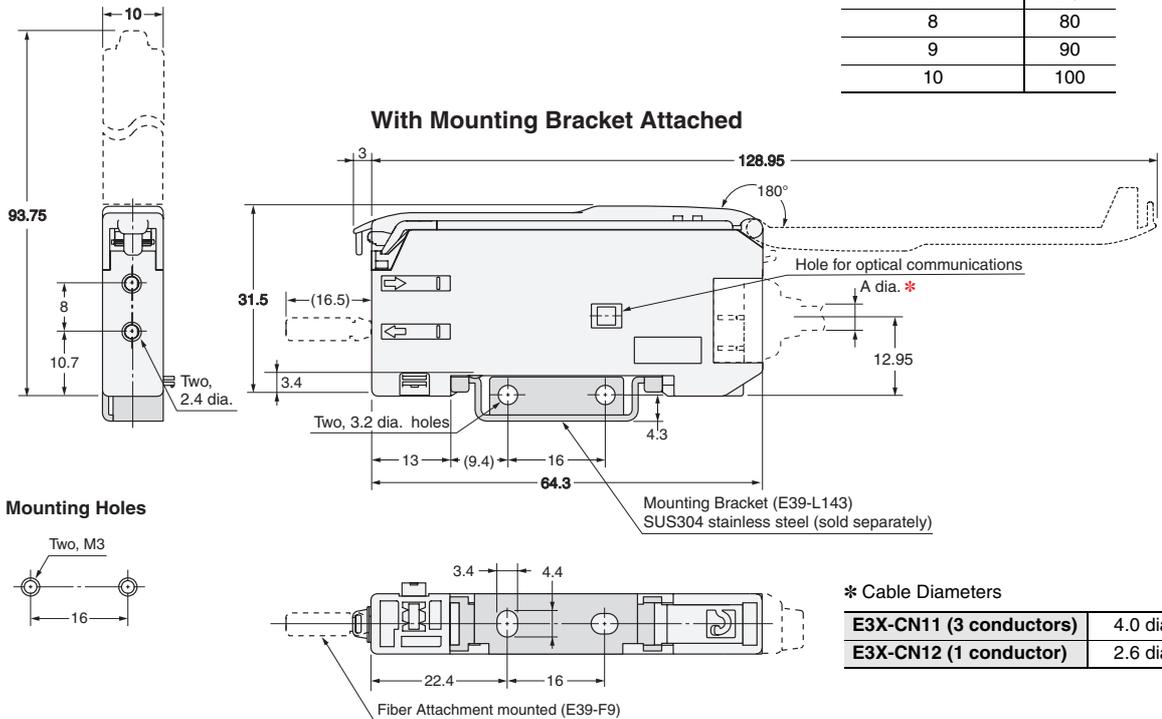
E3X-SD7
E3X-SD9
E3X-NA6
E3X-NA8



Multiple connection diagram



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



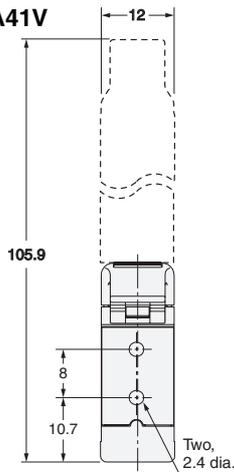
* Cable Diameters

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

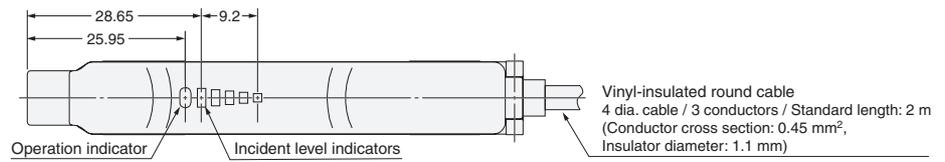
Note: When using E39-L143 Mounting Brackets, there will be small gaps between the Fiber Amplifier Units if they are mounted side by side.

Amplifier Units with Cables, Water-resistant Models

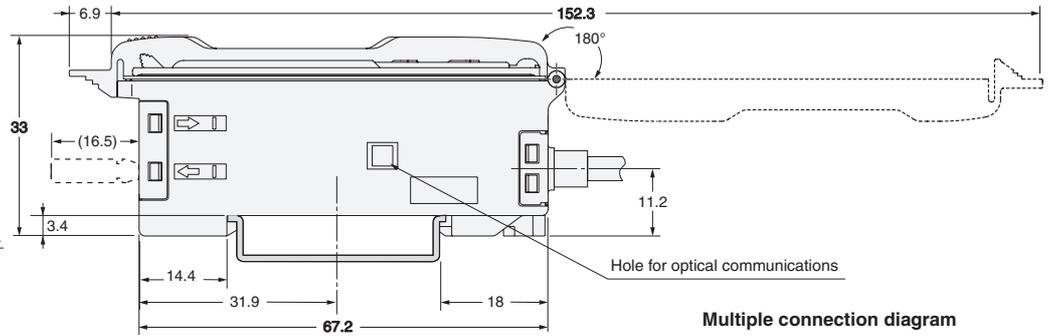
E3X-NA11V
E3X-NA41V



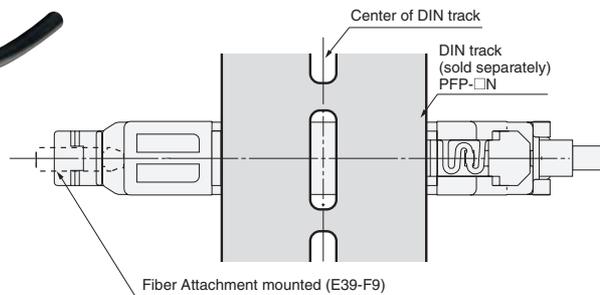
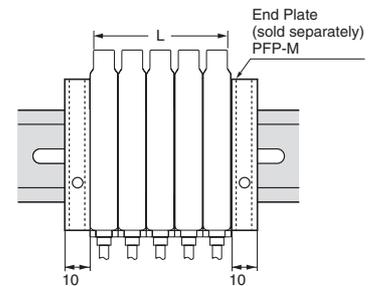
Area of digital indication



DIN track mounting

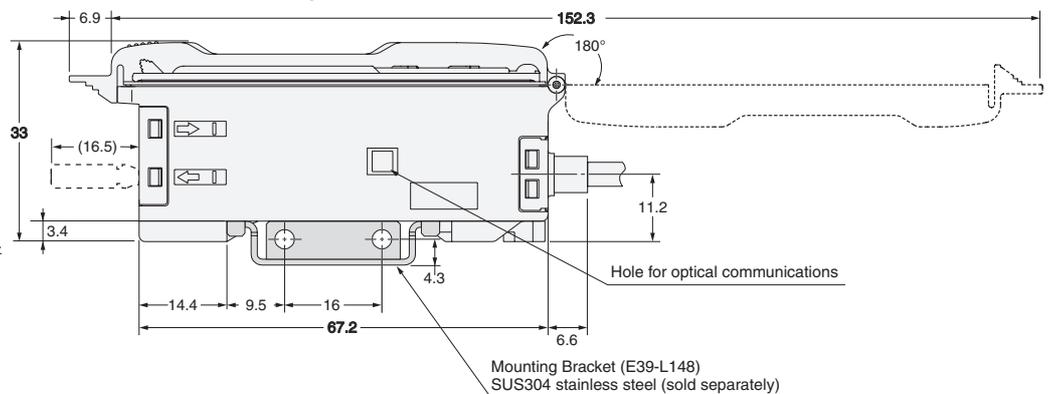
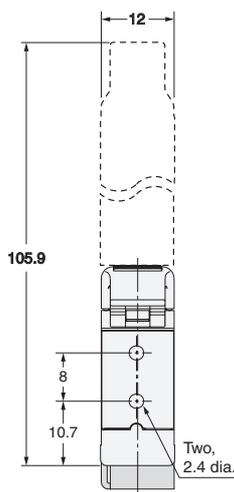


Multiple connection diagram

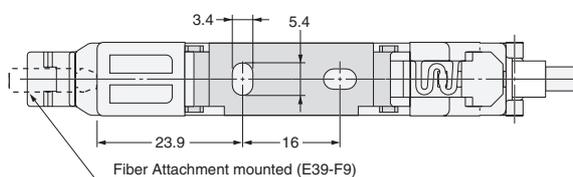
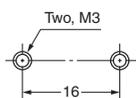


The number of expansion	L (mm)
1	12
2	24
3	36
4	48
5	60
6	72
7	84
8	96
9	108
10	120

With Mounting Bracket Attached



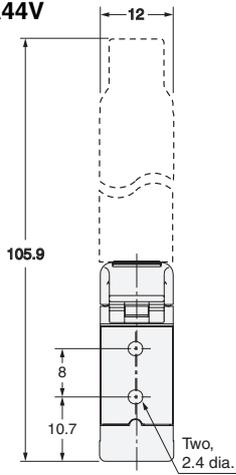
Mounting Holes



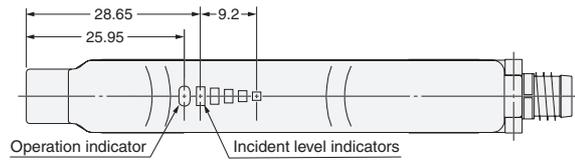
E3X-SD/-NA

Amplifier Units with Connectors, Water-resistant Models

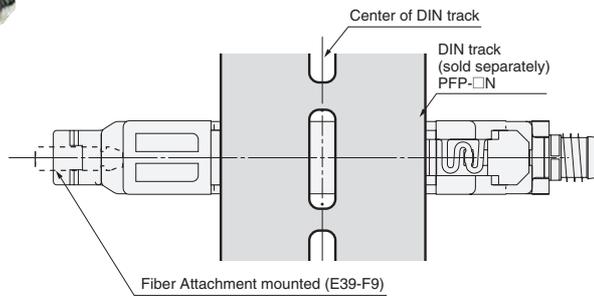
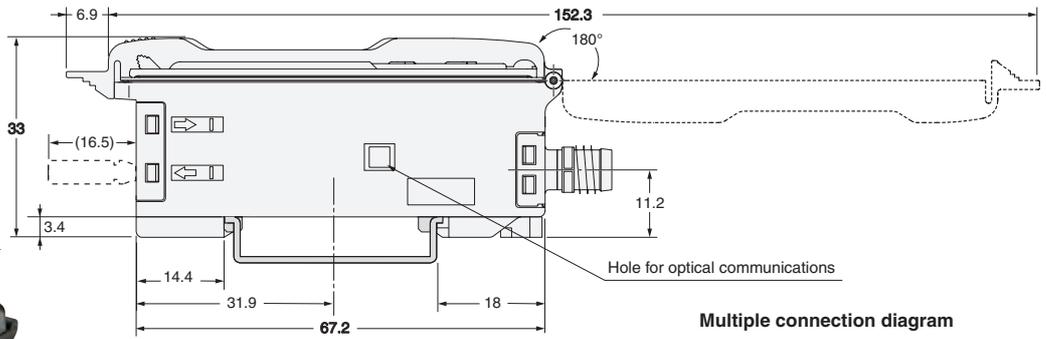
E3X-NA14V
E3X-NA44V



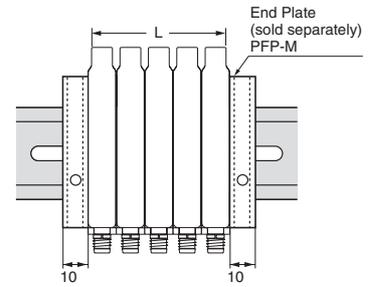
Area of digital indication



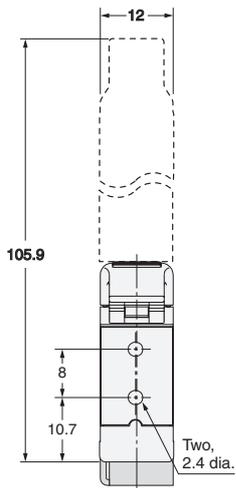
DIN track mounting



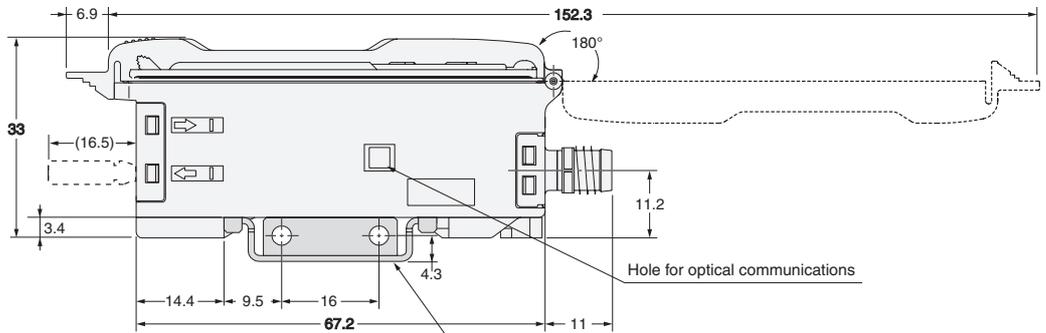
Multiple connection diagram



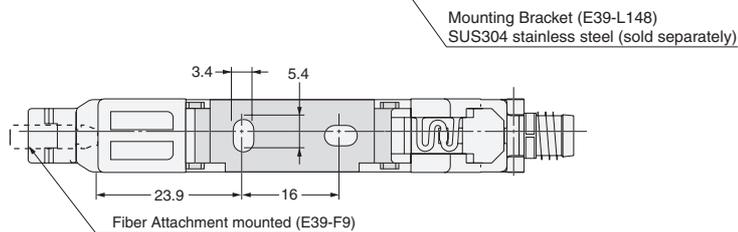
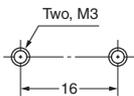
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With Mounting Bracket Attached

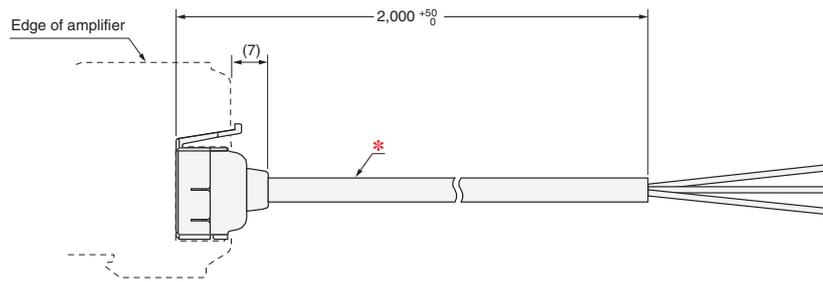


Mounting Holes



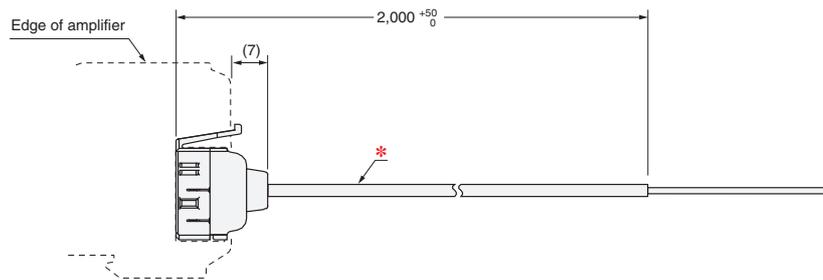
Amplifier Unit Connectors (Wire-saving Connectors)

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)

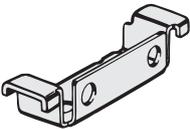
Slave Connector E3X-CN12



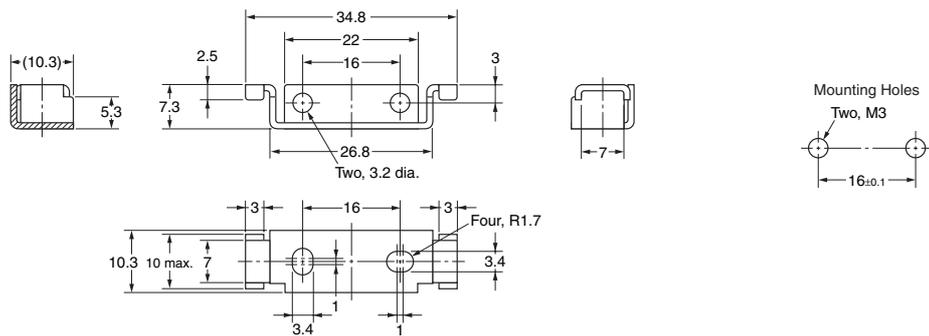
* E3X-CN12: **2.6 dia. cable / 1 conductor** / Standard length: 2 m (Conductor cross section: 0.2 mm² (AWG24), Insulator diameter: 1.1 mm)

Accessories (sold separately)

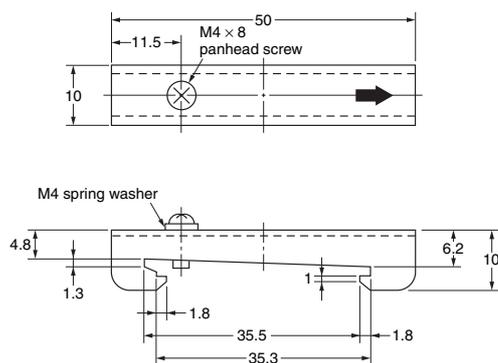
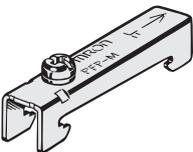
Mounting Brackets E39-L143



Material: Stainless steel (SUS304)



End Plates PFP-M

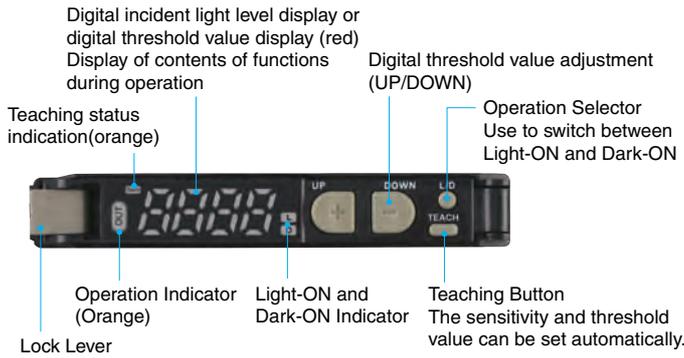


E3X-SD/-NA

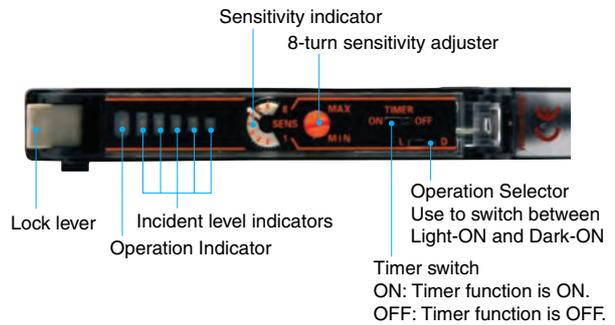
Nomenclature

Fiber Amplifier Units

E3X-SD



E3X-NA



Operating Procedure

E3X-SD

1 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.

2-1. 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

2-2. 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

E3X-NA

1 Displays

A bar display (with four green and one red) showing excess gain is provided in addition to the orange operation indicator. Use these when adjusting the light axis and setting the sensitivity at setup.

Display/indicator status (for L/ON)	Excess gain level	Description
<p>Operation indicator</p> <p>Excess gain level display</p>	Approx. 120% min.	Stable incident light
	Approx. 110% to 120%	
	Approx. 90% to 110%	Unstable incident light or Unstable interrupted light
	Approx. 80% to 90%	
	Approx. 80% max.	Stable interrupted light

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