Digital Fiber Amplifier Unit
E3X-DA-S

Stable Detection with Advanced Fiber Amplifier Units

- A wide range of added value with standard models with one input and two outputs, and ultra-long-term APC models with an APC life of approximately 20 years.
- Power turning to easily set the optimum light level.
- Automatic Power Control (APC) is always enabled to stabilize emitter power with high accuracy.
- GIGA RAY for stable detection with the highest level of power in this class even for low-reflective objects and large objects.
- The E3X-DA0-S supports an EtherCAT Sensor Communications Unit or CompoNet Sensor Communications Unit.

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

Ordering Information

Fiber Amplifier Units

Pre-wired Models and Wire-saving Connector Models [Dimensions→page 27]

Type	Appearance	Connecting method	Model		Applicable wire-saving connector (sold separately)	
			NPN output	PNP output	Type	Model
Standard models		Pre-wired (2 m)	**E3X-DA21-S 2M**	**E3X-DA51-S 2M**	---	---
		Wire-saving connector *1	**E3X-DA7-S** *2	**E3X-DA9-S** *2	Master connector	**E3X-CN21**
					Slave connector	**E3X-CN22**
Ultra-long-term APC models		Pre-wired (2 m)	**E3X-DA21R-S 2M**	**E3X-DA51R-S 2M**	---	---
		Wire-saving connector *1	**E3X-DA7R-S**	**E3X-DA9R-S**	Master connector	**E3X-CN21**
					Slave connector	**E3X-CN22**
High-speed response models		Pre-wired (2 m)	**E3X-DA21F-S 2M**	**E3X-DA51F-S 2M**	---	---
		Wire-saving connector *1	**E3X-DA7F-S**	**E3X-DA9F-S**	Master connector	**E3X-CN11**
					Slave connector	**E3X-CN12**

∗1. A Wire-saving connector sold separately is required.
∗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.

Sensor Communications Unit Connector Models (for EtherCAT and CompoNet) [Dimensions→page 29]

Type	Appearance	Connecting method	Model	Applicable Sensor Communications Unit
Standard model		Connector for Sensor Communications Unit	**E3X-DA0-S**	**E3X-ECT**
				E3X-CRT

Accessories (sold separately)

Wire-saving Connectors (Required for models for Wire-saving Connectors.)
Protection stickers attached [Dimensions➜page 29]

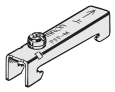
Type	Appearance	Cable length	No. of conductors	Model
Master connector		2 m	4	**E3X-CN21**
Slave connector			2	**E3X-CN22**
Master connector			3	**E3X-CN11**
Slave connector			1	**E3X-CN12**

Note: The E3X-CN11/12 can also be used to connect to the E3X-DA□-S (□: 7/9) or the E3X-DA□R-S (□: 7/9), but the output lines will support only 1 channel. Output function for channel 2 or APC alarm output function will be disabled.

Mounting Brackets [Dimensions➜page 30]

Appearance	Model	Quantity
	**E39-L143**	1

End Plate [Dimensions➜page 30]

Appearance	Model	Quantity
	**PFP-M**	1

Product Overview

●: Strong point of the model ○: Provided ---: Not provided

Item		Types	Standard models*1		Ultra-long-term APC models		High-speed response models	
		Connecting method	Pre-wired	Wire-saving connector	Pre-wired	Wire-saving connector	Pre-wired	Wire-saving connector
		Models	E3X-DA21-S E3X-DA51-S	E3X-DA7-S E3X-DA9-S	E3X-DA21R-S E3X-DA51R-S	E3X-DA7R-S E3X-DA9R-S	E3X-DA21F-S E3X-DA51F-S	E3X-DA7F-S E3X-DA9F-S
Input/output	**External input**		1 input	---	1 input	---	---	
	Output		2 outputs		1 output and 1 APC alarm output		1 output	
Performance	**Sensing distance with E32-T11R**		280 to 2,000 mm (Depends on response time)		140 to 1,000 mm (Depends on response time)		280 mm (Only Super-high-speed Mode)	
	Sensing distance with E32-D11R		100 to 840 mm (Depends on response time)		50 to 420 mm (Depends on response time)		100 mm (Only Super-high-speed Mode)	
	Giga Power (GIGA RAY)		● (Margin: × 160)		○		○	
	High-speed response*2 (fastest response time)		○ (80 μs)		○ (80 μs)		● (46 μs)	
Function	**Power tuning**		○		○		○	
	Automatic power control (APC)		○		● (Ultra-long-term APC)		○	
	Timer		○		○		○	
	ATC		○		○		○	
	Key lock		○		○		○	
	Easy key lock (switchable)		---		○		○	
	APC margin display		---		○		---	
	Slow-motion display		---		---		○	

✻1.2. Except for the response time, the Sensor Communications Unit Connector Models for EtherCAT and CompoNet have the same I/O, performance, and functions as the Standard, Wire-saving Connector Models.
(The fastest response time of the Sensor Communications Units Connector Models is 250 μs.)

Ratings and Specifications

Fiber Amplifier Units

Item \ Type		Standard models		Ultra-long-term APC models	High-speed response models
		Standard models	Model for Sensor Communications Unit		
Item	Model	E3X-DA□-S (□: 21/51/7/9)	E3X-DA0-S*1	E3X-DA□R-S (□: 21/51/7/9)	E3X-DA□F-S (□: 21/51/7/9)
Light source (wavelength)		Red,4-element LED (625 nm)			
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.	Supplied from the connector through the Sensor Communications Unit	12 to 24 VDC ±10%, ripple (p-p) 10% max.	
Power consumption		Normal mode : 960 mW max. (Current consumption: 40 mA max. at 24 VDC, 80 mA max. at 12 VDC) Power saving ECO1: 720 mW max. (Current consumption: 30 mA max. at 24 VDC, 60 mA max. at 12 VDC) Power saving ECO2: 600 mW max. (Current consumption: 25 mA max. at 24 VDC, 50 mA max. at 12 VDC)			
Control output / APC alarm output *1		Load power supply voltage: 26.4 VDC max.; NPN/PNP open collector; load current: 50 mA max.; residual voltage: 2 V max.			
External input *2		No-voltage input (contact/transistor)*3	---	No-voltage input (contact/transistor)*3	---
Protection circuits		Power supply reverse polarity protection, output short-circuit protection and output reverse polarity protection			
Response time	Super-high-speed Mode *4	Operate or reset: 80 μs	---	Operate or reset: 80 μs	NPN output: Operate: 46 μs, Reset: 48 μs PNP output: Operate: 51 μs, Reset: 53 μs
	High-speed Mode	Operate or reset: 250 μs			---
	Standard Mode	Operate or reset: 1 ms			
	High-resolution Mode	Operate or reset: 4 ms			
	Tough Mode	Operate or reset: 16 ms			
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 Modes. Single edge: Set to 250 μs, 500 μs, 1 ms, 10 ms, or 100 ms. Double edge: Set to 500 μs, 1 ms, 2 ms, 20 ms, or 200 ms			---
	Automatic power control (APC)	Always enabled. High-speed control of emission current Wide-range APC for the E3X-DA□R-S			
	Timer	Select from timer disabled, OFF-delay, ON-delay, One-shot, or ON-delay + OFF-delay timer			
		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)			
	ATC	Provided			
	APC margin display	---		Provided	---
	Slow-motion display	---			Provided
	Zero reset	Negative values can be displayed. (Threshold value is shifted.)			
	Resetting settings	Select from initial reset (factory defaults) or user reset (saved settings).			
	Mutual interference prevention	Possible for up to 10 units *5			---
	ECO Mode *6	Select from OFF (digital display lit), ECO1 (digital display dimmed), and ECO2 (digital display OFF).			
	External input setting *2	Select from teaching operations, power tuning, zero reset, emitter OFF, or ATC start.			---
	Output setting	Select from output for each channel, area output, or self-diagnosis.		---	
Indicator		Operation indicator for channel 1(orange) Operation indicator for channel 2(orange)		Operation indicator for channel 1(orange) APC alarm output indicator (orange)	Operation indicator for channel 1(orange) Power tuning indicator (orange)

*1. The E3X-DA0-S Amplifier Unit allows you to use an E3X-ECT EtherCAT Sensor Communications Unit or E3X-CRT CompoNet Sensor Communications Unit.
*2. Only for Pre-wired models.
*3. The following details apply to inputs.

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

*4. The communications function and mutual interference prevention function are disabled if the detection mode is set to Super-high-speed mode.
*5. Mutual interference prevention is enabled if Fiber Amplifier Units are connected together. It is also enabled in the same way if E3X-DA-S-series Units and E3C-LDA-series Units are used together. If power tuning is enabled, mutual interference prevention can be used for up to six units.
*6. For the standard models E3X-DA□-S (□: 21/51/7/9/0), the rated sensing distance is approximately 1/2 and the incident level is approximately 1/3 of the normal levels when ECO mode is enabled.

Item	Model	E3X-DA□-S (□: 21/51/7/9)	E3X-DA0-S	E3X-DA□R-S (□: 21/51/7/9)	E3X-DA□F-S (□: 21/51/7/9)
Digital display		Select from incident level + threshold or other 6 patterns (Refer to 6. *Display switch* on page 21.)			
Display orientation		Switching between normal / reversed display is possible.			
Key lock		Key lock		Key lock / Easy key lock.	
Ambient illumination (Receiver side)		Incandescent lamp: 10,000 lx max. Sunlight: 20,000 lx max.			
Maximum connectable Units		16 (The ambient temperature specification depends on the number of connected units.)*7			
Ambient temperature range		Operating: Groups of 1 to 2 Amplifiers: −25 to 55°C Groups of 3 to 10 Amplifiers: −25 to 50°C Groups of 11 to 16 Amplifiers: −25 to 45°C*8			
		Storage: −30 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	10 to 150 Hz with a 0.7-mm double amplitude for 80 min each in X, Y, and Z directions	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	200 m/s^2 for 3 times each in X, Y, and Z directions	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 wire-saving connector	Connector for Sensor Communications Unit	Pre-wired (standard cable length: 2 m) or wire-saving connector	
Weight (packed state)		Pre-wired Models: Approx. 100 g, Wire-saving Connector Models: Approx. 55 g	Approx. 55 g	Pre-wired Models: Approx. 100 g, Wire-saving Connector Models: Approx. 55 g	
Materials	Case	Polybutylene terephthalate (PBT)			
	Cover	Polycarbonate (PC)			
Accessories		Instruction Manual			

***7.** The maximum number of connectable Units is 30 when the E3X-ECT is used with the E3X-DA0-S.
***8.** The following temperature ranges apply for operation when an E3X-ECT or E3X-CRT Sensor Communications Unit is used with the E3X-DA0-S: 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.

Wire-saving Connectors

Item	Model	E3X-CN21/22/11	E3X-CN12
Rated current		2.5 A	
Rated voltage		50 V	
Contact resistance		20 mΩ max. (20 mVDC max., 100 mA max.) (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 (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