

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.
- GIGA RAY for the highest level of power in this class for stable detection even with sensing objects with low reflection or large sensing objects. *

*Excluding E3X-NA□□V Amplifiers.



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		
Type	NPN	PNP
Standard models	E3X-SD7	E3X-SD9
	E3X-NA6	E3X-NA8

When Using 5 Amplifier Units

5 Fiber Amplifier Units

Applicable Connectors (sold separately)

Master Connector	Slave Connector
E3X-CN11 (3-wire)	E3X-CN12 (1-wire)

1 Master Connector + 4 Slave Connectors

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

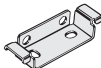
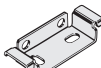
[Refer to Dimensions on XS3.]

Size	Cable specifications	Appearance	Cable type	Model
M8	Standard cable	Straight connector 	2 m	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.

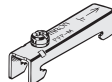
[Refer to Dimensions on page 15.]

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	Model	E3X-SD□	E3X-NA□	E3X-NA□F	E3X-NA□V
Light source (wavelength)		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/s², 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 μ s 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 m Ω 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

Sensing distance Threaded Models

Detection method	Sensing direction	Size	Model	Sensing distance (mm)		
				E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Through-beam	Right-angle	M4	E32-T11N 2M	530	160	280
	Straight		E32-LT11N 2M	1,800	600	900
			E32-T11R 2M	560	160	280
			E32-LT11 2M	2,100	700	1,050
			E32-LT11R 2M	1,800	600	900
Reflective	Right-angle	M3	E32-C31N 2M	25	7.5	13
			E32-C21N 2M	65	21	32
		M4	E32-D21N 2M	170	56	85
			E32-C11N 2M	170	50	85
		M6	E32-LD11N 2M	170	56	85
			Straight	M3	E32-D21R 2M	30
	E32-C31 2M	80			26	40
	E32-C31M 1M					
	M4	E32-D211R 2M		30	10	15
	M6	E32-D11R 2M		180	60	90
		E32-CC200 2M		300	100	150
		E32-LD11 2M		180	60	90
		E32-LD11R 2M	170	56	85	

Cylindrical Models

Detection method	Size	Sensing direction	Model	Sensing distance (mm)		
				E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Through-beam	1 dia.	Top-view	E32-T223R 2M	120	36	60
	1.5 dia.		E32-T22B 2M	200	60	100
	3 dia.		E32-T12R 2M	560	160	280
		Side-view	E32-T14LR 2M	220	66	110
Reflective	1.5 dia.	Top-view	E32-D22B 2M	30	10	15
	1.5 dia. + 0.5 dia.		E32-D43M 1M	6	2	3
			3 dia.	E32-D22R 2M	30	10
	E32-D221B 2M			70	20	35
	E32-D32L 2M			160	50	80
	3 dia. + 0.8 dia.		E32-D33 2M	16	4	10

Flat Models

Detection method	Sensing direction	Model	Sensing distance (mm)		
			E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Through-beam	Top-view	E32-T15XR 2M	560	160	280
	Side-view	E32-T15YR 2M	220	66	110
	Flat-view	E32-T15ZR 2M			
Reflective	Top-view	E32-D15XR 2M	180	60	90
	Side-view	E32-D15YR 2M	40	10	20
	Flat-view	E32-D15ZR 2M			

Sleeve Models

Detection method	Sensing direction	Model	Sensing distance (mm)		
			E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Through-beam	Side-view	E32-T24R 2M	60	18	30
		E32-T24E 2M	180	36	60
	Top-view	E32-T21-S1 2M	130	43	65
		E32-T33 1M	40	13.5	20
		E32-TC200BR 2M	560	160	280
Reflective	Side-view	E32-D24R 2M	14	4.6	7
		E32-D24-S2 2M	26	8	13
	Top-view	E32-D43M 1M	6	2	3
		E32-D331 2M	3	1	1.5
		E32-D33 2M	16	4	10
		E32-D32-S1 0.5M	14	4	7
		E32-D31-S1 0.5M			
		E32-DC200F4R 2M	30	10	15
		E32-D22-S1 2M	57	19	28
		E32-D21-S3 2M			
		E32-DC200BR 2M	180	60	90
		E32-D25-S3 2M	57	19	28

Small-spot, Reflective

Small Spot, Nonselect						
Type	Spot diameter	Center distance (mm)	Model	Sensing distance (mm)		
				E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Variable spot	0.1 to 0.6 dia.	6 to 15	E32-C42 1M + E39-F3A	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.		
Parallel light	4 dia.	0 to 20	E32-C31 2M + E39-F3C E32-C31N 2M + E39-F3C	Spot diameter of 4 mm max. at 0 to 20 mm.		
Integrated lens	0.1 dia.	5	E32-C42S 1M	Spot diameter of 0.1 mm at 5 mm.		
	6 dia.	50	E32-L15 2M	Spot diameter of 6 mm at 50 mm.		
Small-spot	0.1 dia.	7	E32-C41 1M + E39-F3A-5	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 5 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.		
	0.5 dia.		E32-C31 2M + E39-F3B	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.		
			E32-C11N 2M + E39-F18			

High-power Beam

Type	Sensing direction	Aperture angle	Model	Sensing distance (mm)		
				E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Through-beam Integrated lens	Right-angle	15°	E32-LT11N 2M	1,800	600	900
	Top-view	10°	E32-T17L 10M	20,000 *1	8,400	14,000
		15°	E32-LT11 2M	2,100	700	1,050
		15°	E32-LT11R 2M	1,800	600	900
	Side-view	30°	E32-T14 2M	3,600	1,080	1,800
Through-beam models with lenses	Right-angle	12°	E32-T11N 2M + E39-F1	3,700	1,110	2,100
		6°	E32-T11N 2M + E39-F16	4,000 *2	2,000	3,600
	Top-view	12°	E32-T11R 2M + E39-F1	4,000 *2	1,260	2,100
		6°	E32-T11R 2M + E39-F16	4,000 *2	2,000	3,600
	Side-view	60°	E32-T11R 2M + E39-F2	440	130	220
	Top-view	12°	E32-T11 2M + E39-F1	4,000 *2	1,200	2,000
		6°	E32-T11 2M + E39-F16	4,000 *2	2,600	4,000 *2
	Side-view	60°	E32-T11 2M + E39-F2	720	200	360
	Top-view	12°	E32-T51R 2M + E39-F1	2,000	720	1,650
		6°	E32-T51R 2M + E39-F16	4,000 *2	1,560	2,900
	Side-view	60°	E32-T51R 2M + E39-F2	360	120	200
	Top-view	12°	E32-T81R-S 2M + E39-F1	1,800	630	1,100
		6°	E32-T81R-S 2M + E39-F16	4,000 *2	1,300	2,300
	Side-view	60°	E32-T81R-S 2M + E39-F2	280	84	140
	Top-view	12°	E32-T61-S 2M + E39-F1	4,000 *2	1,800	3,000
		6°	E32-T61-S 2M + E39-F16	4,000 *2	2,340	3,900
	Side-view	60°	E32-T61-S 2M + E39-F2	780	260	390
	Top-view	12°	E32-T51 2M + E39-F1-33	2,400	720	1,400
		6°	E32-T51 2M + E39-F16	4,000 *2	3,120	4,000 *2
Reflective Integrated lens	Top-view	4°	E32-D16 2M	800	140	40 to 400

* 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

Detection method	Sensing direction	Aperture angle	Model	Sensing distance (mm)		
				E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Through-beam	Side-view	1.5°	E32-A03 2M	890	267	445
			E32-A03-1 2M			
		3.4°	E32-A04 2M	340	102	170
		4°	E32-T24SR 2M	1,170	360	600
			E32-T24S 2M	1,400	420	700
			E32-T22S 2M	2,000	600	1,000

Detection without Background Interference

Detection method	Sensing direction	Model	Sensing distance (mm)		
			E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Limited-reflective	Flat-view	E32-L16-N 2M	0 to 15	0 to 12	0 to 15
		E32-L24S 2M	0 to 4		
	Side-view	E32-L25L 2M	5.4 to 9 (center 7.2)	5.4 to 8 (center 7.2)	5.4 to 9 (center 7.2)

E3X-SD/-NA

Transparent Object Detection (Retro-reflective)

Detection method	Feature	Size	Model	Sensing distance (mm)		
				E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Retroreflective Sensors	Film detection	M3	E32-C31 2M + E39-F3R + E39-RP37	220	50	75
	Square	—	E32-R16 2M	1,500	1,000	150 to 1,500
	Threaded Models	M6	E32-R21 2M	10 to 250	250	10 to 250
	Hex-shaped		E32-LR11NP 2M + E39-RP1	600	200	300

Transparent Object Detection (Limited-reflective)

Detection method	Feature	Sensing direction	Model	Sensing distance (mm)		
				E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Retro-reflective	Small size	Flat-view	E32- L24S 2M	0 to 4		
	Standard		E32-L16-N 2M	0 to 15	0 to 12	0 to 15
	Glass substrate alignment, 70°C		E32-A08 2M	10 to 20		
	Standard/long-distance		E32-A12 2M	12 to 30	—	—
	Side view form	Side-view	E32-L25L 2M	5.4 to 9 (center 7.2)	5.4 to 8 (center 7.2)	5.4 to 9 (center 7.2)
	Glass substrate mapping, 70°C	Top-view	E32-A09 2M	15 to 38 (center 25)		

Chemical-resistant, Oil-resistant

Detection method	Type	Sensing direction	Model	Sensing distance (mm)		
				E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Through-beam	Oil-resistant	Right-angle	E32-T11NF 2M	4,000 *	1,400	2,400
	Chemical/oil-resistant	Top-view	E32-T12F 2M	3,200	960	1,600
		Side-view	E32-T11F 2M	2,100	760	1,050
			E32-T14F 2M	400	120	200
	Chemical/oil-resistant at 150°C	Top-view	E32-T51F 2M	1,400	400	700
Reflective	Semiconductors: Cleaning, developing, and etching; 60°C	Top-view	E32-L11FP 2M	8 to 20 mm from tip of lens (Recommended sensing distance: 11 mm), 19 to 31 mm from center of mounting hole A (Recommended sensing distance: 22 mm)		
	Semiconductors: Resist stripping; 85°C		E32-L11FS 2M	8 to 20 mm from tip of lens (Recommended sensing distance: 11 mm), 32 to 44 mm from center of mounting hole A (Recommended sensing distance: 35 mm)		
	Chemical/oil-resistant		E32-D12F 2M	100	32	50
	Chemical-resistant cable		E32-D11U 2M	180	60	90

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

Bending-resistant

Detection method	Size	Model	Sensing distance (mm)		
			E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Through-beam	1.5 dia.	E32-T22B 2M	200	60	100
	M3	E32-T21 2M			
	M4	E32-T11 2M	720	200	360
	Square	E32-T25XB 2M	150	40	75
Reflective	1.5 dia.	E32-D22B 2M	30	10	15
	M3	E32-D21 2M			
	3 dia.	E32-D221B 2M	70	20	35
	M4	E32-D21B 2M			
	M6	E32-D11 2M	180	60	90
	Square	E32-D25XB 2M	50	16	25

Heat-resistant

Detection method	Heat-resistant temperature	Model	Sensing distance (mm)		
			E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Through-beam	100°C	E32-T51R 2M	400	120	225
	150°C	E32-T51 2M	800	240	400
	200°C	E32-T81R-S 2M	360	100	180
	350°C	E32-T61-S 2M	600	180	300
Reflective	100°C	E32-D51R 2M	140	42	70
	150°C	E32-D51 2M	240	80	120
	200°C	E32-D81R 2M	90	27	45
	300°C	E32-A08H2 2M	10 to 20		
		E32-A09H2 2M	20 to 30 (center 25)		
	350°C	E32-D61 2M	90	27	45
	400°C	E32-D73 2M	60	18	30

Area Beam

Detection method	Type	Sensing width	Model	Sensing distance (mm)		
				E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Through-beam	Area	11 mm	E32-T16PR 2M	800	260	450
			E32-T16JR 2M	700	220	390
		30 mm	E32-T16WR 2M	1,380	400	690
Reflective	Array	11 mm	E32-D36P1 2M	150	50	75

Liquid-level Detection

Detection method	Pipe diameter	Feature	Model	Sensing distance (mm)		
				E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
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		
	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		
	No restrictions	Large tubes	E32-D36T 2M	Applicable tube: Transparent tube (no restrictions on diameter)		
Liquid contact (heat-resistant up to 200°C)	—	—	E32-D82F1 4M	Liquid-contact model		

Vacuum-resistant

Detection method	Heat-resistant temperature	Model	Sensing distance (mm)		
			E3X-SD□ E3X-NA□	E3X-NA□F	E3X-NA□V
Through-beam	120°C	E32-T51V 1M	200	—	100
		E32-T51V 1M + E39-F1V	1,200	—	600
	200°C	E32-T84SV 1M	500	—	250

FPD, Semiconductors, and Solar Cells

E3X-SD□, E3X-NA□, E3X-NA□F, E3X-NA□V, E3X-NA□SR, E3X-NA□SRF, E3X-NA□SRV, E3X-NA□SRVF, E3X-NA						
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