

Smart Fiber Amplifier Units

E3NX-FA

CSM_E3NX-FA_DS_E_7_1

The Advanced Fiber Amplifier Units That Handles On-site Needs



- Improved basic performance with 1.5 times the sensing distance and approx. 1/10th the minimum sensing object.*
- Ultra-easy setup with Smart Tuning with a dynamic range expanded 20 times to 40,000:1. Optimum stable detection achieved with light level adjustment even for saturated incident light.
- White on black display characters for high visibility.
- Solution Viewer that shows the passing time and difference in incident levels and Change Finder that shows even high-speed workpieces to achieve simple settings and reliable detection.



* Compared to the E3X-HD.

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



Refer to the *Safety Precautions* on page 12.

Ordering Information

Fiber Amplifier Units (Dimensions → pages 13 and 15)





Type	Connecting method	Appearance	Inputs/outputs	Model	
				NPN output	PNP output
Standard models	Pre-wired (2 m)		1 output	E3NX-FA11 2M	E3NX-FA41 2M
	Wire-saving Connector		1 output	E3NX-FA6	E3NX-FA8
Advanced models	Pre-wired (2 m)		2 outputs + 1 input	E3NX-FA21 2M	E3NX-FA51 2M
	Wire-saving Connector		1 output + 1 input	E3NX-FA7	E3NX-FA9
			2 outputs	E3NX-FA7TW	E3NX-FA9TW
	M8 Connector		1 output + 1 input	E3NX-FA24	E3NX-FA54
			2 outputs	---	E3NX-FA54TW
Model for Sensor Communications Unit *	Connector for Sensor Communications Unit		---	E3NX-FA0	

* A Sensor Communications Unit is required if you want to use the Amplifier Unit on a network.

Accessories (Sold Separately)



Wire-saving Connectors (Required for models for Wire-saving Connectors.) (Dimensions → page 15)

Connectors are not provided with the Fiber Amplifier Unit and must be ordered separately. *Protective stickers are provided.

Type	Appearance	Cable length	No. of conductors	Model	Applicable Fiber Amplifier Units
Master Connector		2 m	4	E3X-CN21	E3NX-FA7 E3NX-FA7TW E3NX-FA9 E3NX-FA9TW
Slave Connector			2	E3X-CN22	
Master Connector			3	E3X-CN11	E3NX-FA6 E3NX-FA8
Slave Connector			1	E3X-CN12	

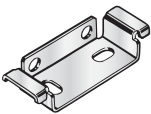
Sensor I/O Connectors (Required for models for M8 Connectors.) (Dimensions → page 15)

Connectors are not provided with the Fiber Amplifier Unit and must be ordered separately.

Size	Cable	Appearance	Cable type	Model	
M8	Standard cable	Straight 	2m	4-wire	XS3F-M421-402-A
			5m		XS3F-M421-405-A
		L-shaped 	2m		XS3F-M422-402-A
			5m		XS3F-M422-405-A

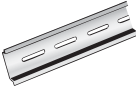
Mounting Bracket (Dimensions → page 16)

A Mounting Bracket is not provided with the Fiber Amplifier Unit. It must be ordered separately as required.

Appearance	Model	Quantity
	E39-L143	1


DIN Track (Dimensions → page 16)

A DIN Track is not provided with the Fiber Amplifier Unit. It must be ordered separately as required.

Appearance	Type	Model	Quantity
	Shallow type, total length: 1 m	PFP-100N	1
	Shallow type, total length: 0.5 m	PFP-50N	
	Deep type, total length: 1 m	PFP-100N2	





End Plate (Dimensions → page 16)

Two End Plates are provided with the Sensor Communications Unit. End Plates are not provided with the Fiber Amplifier Unit. They must be ordered separately as required.

Appearance	Model	Quantity
	PFP-M	1

Related Products

Sensor Communications Units

Type	Appearance	Model
Sensor Communications Unit for EtherCAT		E3NW-ECT
Sensor Communications Unit for CompoNet *1		E3NW-CRT
Sensor Communications Unit for CC-Link *1		E3NW-CCL
Distributed Sensor Unit *2		E3NW-DS

*1. Refer to your OMRON website for details.

*2. The Distributed Sensor Unit can be connected to any of the Sensor Communications Units.

EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

CompoNet is a registered trademark of the ODVA. CC-Link is a registered trademark of Mitsubishi Electric Corporation. The trademark is managed by the CC-Link Partner Association.

Ratings and Specifications

		Type	Standard models		Advanced models				Model for Sensor Communications Unit	
			E3NX-FA11	E3NX-FA6	E3NX-FA21	E3NX-FA7	E3NX-FA7TW	E3NX-FA24	---	E3NX-FA0
Item	Connecting method	NPN output	E3NX-FA41	E3NX-FA8	E3NX-FA51	E3NX-FA9	E3NX-FA9TW	E3NX-FA54	E3NX-FA54TW	Connector for Sensor Communications Unit
		PNP output	Pre-wired	Wire-saving Connector	Pre-wired	Wire-saving Connector	M8 Connector			
Inputs/outputs	Outputs	1 output		2 outputs	1 output	2 outputs	1 output	2 outputs	--- *1	
	External inputs	---		1 input	1 input	---	1 input	---		
Light source (wavelength)		Red, 4-element LED 25 nm								
Power supply voltage		10 to 30 VDC, including 10% ripple p-p								
Power consumption 2		At Power Supply Voltage of 24 VDC Standard Models or Model for Sensor Communications Unit: Normal mode: 0 mA. Current consumption: 40 mA. Power saving eco mode: 40 mA. Current consumption: 35 mA. Advanced Models: Normal mode: 1.0 mA. Current consumption: 45 mA. Power saving eco mode: 30 mA. Current consumption: 40 mA.								
Control output		Load power supply voltage: 30 VDC, open-collector output Load current: Groups of 1 to 3 Amplifier Units: 100 mA, Groups of 4 to 30 Amplifier Units: 20 mA. (Residual voltage: At load current of less than 10 mA: 1 V. At load current of 10 to 100 mA: 2 V.) Output current: 0.1 mA.							---	
External inputs		---	Refer to *3.			---	Refer to *3.		---	
Indicators		7-segment displays Sub digital display: green, Main digital display: white Display direction: Switchable between normal and reversed. OUT indicator orange, LD indicator orange, ST indicator blue, DPC indicator green, and OUT selection indicator orange, only on models with 2 outputs								
Protection circuits		Power supply reverse polarity protection, output short-circuit protection, and output reverse polarity protection							Power supply reverse polarity protection and output short-circuit protection	
Response time	Super-high-speed mode (S _S) 4	Operate or reset for model with 1 output: 30 μs, with 2 outputs: 32 μs								
	High-speed mode (S)	Operate or reset: 250 μs								
	Standard mode (Std)	Operate or reset: 1 ms								
	High-power mode (I A)	Operate or reset: 1 ms								
Sensitivity adjustment		Smart Tuning 2-point tuning, full auto tuning, position tuning, maximum sensitivity tuning, power tuning, or percentage tuning – to or manual adjustment								
No. of Units for mutual interference prevention	Super-high-speed mode (S _S) 4	0								
	High-speed mode (S)	10								
	Standard mode (Std)	10								
	High-power mode (I A)	10								
Functions	Automatic power control (APC)	Always enabled.								
	Dynamic power control (DPC)	Provided								
	Timer	Select from timer disabled, ON-delay, ON-delay, one-shot, or ON-delay ON-delay timer: 1 to 999 ms								
	Zero reset	Negative values can be displayed. Threshold value is shifted.								
	Resetting settings *5	Select from initial reset factory defaults or user reset saved settings.								

*1. Two sensor outputs are allocated in the programmable logic controller PLC Output table.

PLC operation via Communications Unit enables reading detected values and changing settings.

*2. At Power Supply Voltage of 10 to 30 VDC.

Standard Models or Model for Sensor Communications Unit:

Normal mode: 1.0 mA. Current consumption: 3 mA. at 30 VDC, 10 mA. at 10 VDC

Power saving eco mode: 30 mA. Current consumption: 31 mA. at 30 VDC, 3 mA. at 10 VDC

Advanced Models:

Normal mode: 1.230 mA. Current consumption: 41 mA. at 30 VDC, 123 mA. at 10 VDC

Power saving eco mode: 1.050 mA. Current consumption: 35 mA. at 30 VDC, 105 mA. at 10 VDC

*3. The following details apply to the input.

	Contact input (relay or switch)	Non-contact input (transistor)	Input time
NPN	ON: Shorted to 0 V Sourcing current: 1 mA. OFF: Open or shorted to Vcc.	ON: 1.5 V. Sourcing current: 1 mA. OFF: Vcc – 1.5 V to Vcc Leakage current: 0.1 mA.	ON: ms min. OFF: ms min.
PNP	ON: Shorted to Vcc Sinking current: 3 mA. OFF: Open or shorted to 0 V.	ON: Vcc – 1.5 V to Vcc Sinking current: 3 mA. OFF: 1.5 V. Leakage current: 0.1 mA.	

*4. The mutual interference prevention function is disabled if the detection mode is set to super-high-speed mode.

*5. The bank is not reset by the user reset function or saved by the user save function.

Item	Type	Standard models		Advanced models					Model for Sensor Communications Unit	
		NPN output	E3NX-FA11	E3NX-FA6	E3NX-FA21	E3NX-FA7	E3NX-FA7TW	E3NX-FA24	---	E3NX-FA0
		PNP output	E3NX-FA41	E3NX-FA8	E3NX-FA51	E3NX-FA9	E3NX-FA9TW	E3NX-FA54	E3NX-FA54TW	
Connecting method	Pre-wired	Wire-saving Connector	Pre-wired	Wire-saving Connector		M8 Connector		Connector for Sensor Communications Unit		
Functions	Eco mode	Select from O digital displays lit or ECO digital displays not lit .								
	Bank switching	Select from banks 1 to 4.								
	Power tuning	Select from ON or O .								
	Output 1	Select from normal detection mode or area detection mode.								
	Output 2	---		Select from normal detection mode, alarm output mode, or error output mode.	---	Select from normal detection mode, alarm output mode, or error output mode.	---	Select from normal detection mode, alarm output mode, or error output mode.		
	External input	---		Select from input O , tuning, power tuning, emission O , error reset, or bank switching.	---	Select from input O , tuning, power tuning, emission O , error reset, or bank switching.	---			
	hysteresis width	Select from standard setting or user setting. or a user setting, the hysteresis width can be set from 0 to , .								
Ambient illumination		Incandescent lamp: 20,000 l ma ., Sunlight: 30,000 l ma .								
Maximum connectable Units		30								
Ambient temperature range		Operating: Groups of 1 or 2 Amplifier Units: -25 to 55°C, Groups of 3 to 10 Amplifier Units: -25 to 50°C, Groups of 11 to 1 Amplifier Units: -25 to 45°C, Groups of 1 to 30 Amplifier Units: -25 to 40°C Storage: -30 to 0°C with no icing or condensation						Operating: 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 1 Amplifier Units: 0 to 45°C, Groups of 1 to 30 Amplifier Units: 0 to 40°C Storage: -30 to 0°C with no icing or condensation		
Ambient humidity range		Operating and storage: 35 to 5 with no condensation								
Insulation resistance		20 MΩ min. at 500 VDC								
Dielectric strength		1,000 VAC at 50 0 H for 1 min								
Vibration resistance (destruction)		10 to 55 H with a 1.5-mm double amplitude for 2 hours each in , , and directions								
Shock resistance (destruction)		500 m s ² for 3 times each in , , and directions						150 m s ² for 3 times each in , , and directions		
Weight (packed state/Sensor only)		Approx. 115 g approx. 5 g	Approx. 0 g approx. 20 g	Approx. 115 g approx. 5 g	Approx. 0 g approx. 20 g		Approx. 5 g approx. 25 g			
Materials	Case	Polycarbonate PC								
	Cover	Polycarbonate PC								
	Cable	PVC								
Accessories		Instruction Manual								

Sensing Distances

Threaded Models

Sensing method	Sensing direction	Size	Model	Sensing distance (mm)			
				iga mode	Standard mode	igh-speed mode	Super-high-speed mode
Through-beam	Right-angle	M4	E32-T11N 2M	3,000	1,500	1,050	2 0
	Straight		E32-T11R 2M				
			E32-LT11 2M	4,000*1	4,000*1	4,000*1	1,0 0
			E32-LT11R 2M	4,000*1	4,000*1	3,450	20
Reflective	Right-angle	M3	E32-C31N 2M	1 0	5		14
	Straight	M	E32-C11N 2M	1,1 0	520	4 0	100
		M3	E32-D21R 2M	210	0	0	1
			E32-C31 2M	4 0	220	150	44
			E32-C31M 1M				
		M4	E32-D211R 2M	210	0	0	1
		M	E32-D11R 2M	1,2 0	520	3 0	100
			E32-CC200 2M	2,100	00	00	1 0
			E32-LD11 2M	1,2 0	540	3 0	110
			E32-LD11R 2M	1,2 0	520	3 0	100

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

Cylindrical Models

Sensing method	Size	Sensing direction	Model	Sensing distance (mm)				
				iga mode	Standard mode	igh-speed mode	Super-high-speed mode	
Through-beam	1 dia.	Top-view	E32-T223R 2M	0	3 0	220	0	
	1.5 dia.		E32-T22B 2M	1,020	00	330	0	
	3 dia.		E32-T12R 2M	3,000	1,500	1,050	2 0	
Reflective	1.5 dia.	Top-view	Side-view	E32-T14LR 2M	1,120	0	3 0	100
			E32-D22B 2M	210	0	0	1	
	1.5 dia. 0.5 dia.		E32-D43M 1M	42	1	12	4	
	3 dia.		E32-D22R 2M	210	0	0	1	
			E32-D221B 2M	450	210	130	40	
			E32-D32L 2M	1,050	450	300	0	
	3 dia. 0. dia.		E32-D33 2M	100	45	30		

Flat Models

Sensing method	Sensing direction	Model	Sensing distance (mm)			
			iga mode	Standard mode	igh-speed mode	Super-high-speed mode
Through-beam	Top-view	E32-T15 R 2M	3,000	1,500	1,050	2 0
	Side-view	E32-T15 R 2M	1,120	0	3 0	100
	lat-view	E32-T15 R 2M				
Reflective	Top-view	E32-D15 R 2M	1,2 0	520	3 0	100
	Side-view	E32-D15 R 2M	300	150		24
	lat-view	E32-D15 R 2M				

Sleeve Models

Sensing method	Sensing direction	Model	Sensing distance (mm)			
			iga mode	Standard mode	igh-speed mode	Super-high-speed mode
Through-beam	Side-view	E32-T24R 2M	250	150	5	20
		E32-T24E 2M	0	3 0	220	0
	Top-view	E32-T33 1M	220	130	5	20
		E32-T21-S1 2M	0	450	250	
		E32-TC200BR 2M	3,000	1,500	1,050	2 0
Reflective	Side-view	E32-D24R 2M	100	45	30	
		E32-D24-S2 2M	1 0			14
	Top-view	E32-D43M 1M	42	1	12	4
		E32-D331 2M	21			2
		E32-D33 2M	100	45	30	
		E32-D32-S1 0.5M	4	40	2	
		E32-D31-S1 0.5M				
		E32-DC200 4R 2M	210	0	0	1
		E32-D22-S1 2M	3 0	1 0	100	30
		E32-D21-S3 2M				
		E32-DC200BR 2M	1,2 0	520	3 0	100
E32-D25-S3 2M	3 0	1 0	100	30		

Small-spot Reflective Models

Type	Spot diameter	Center distance (mm)	Models	Sensing distance (mm)			
				iga mode	Standard mode	igh-speed mode	Super-high-speed mode
Variable spot	0.1 to 0. dia.	to 15	E32-C42 1M E3 - 3A	Spot diameter of 0.1 to 0. mm at to 15 mm.			
	0.3 to 1. dia.	10 to 30	E32-C42 1M E3 - 1	Spot diameter of 0.3 to 1. mm at 10 to 30 mm.			
Parallel light	4 dia.	0 to 20	E32-C31 2M E3 - 3C	Spot diameter of 4 mm ma . at 0 to 20 mm.			
			E32-C31N 2M E3 - 3C				
Integrated lens	0.1 dia.	5	E32-C42S 1M	Spot diameter of 0.1 mm at 5 mm.			
	dia.	50	E32-L15 2M	Spot diameter of mm at 50 mm.			
Small-spot	0.1 dia.		E32-C41 1M E3 - 3A-5	Spot diameter of 0.1 mm at mm.			
			E32-C31 2M E3 - 3A-5	Spot diameter of 0.5 mm at mm.			
	E32-C31N 2M E3 - 3A-5						
	0.2 dia.	1	E32-C41 1M E3 - 3B	Spot diameter of 0.2 mm at 1 mm.			
			E32-C31 2M E3 - 3B	Spot diameter of 0.5 mm at 1 mm.			
	E32-C31N 2M E3 - 3B						
3 dia.	50	E32-CC200 2M E3 - 1	Spot diameter of 3 mm at 50 mm.				
		E32-C11N 2M E3 - 1					

High-power Beam Models

Type	Sensing direction	Aperture angle	Models	Sensing distance (mm)			
				iga mode	Standard mode	igh-speed mode	Super-high-speed mode
Through-beam models with integrated lens	Top-view	10°	E32-T1 10M	20,000*1	20,000*1	20,000*1	,000
		15°	E32-LT11 2M	4,000*2	4,000*2	4,000*2	1,0 0
	Side-view	30°	E32-LT11R 2M	4,000*2	4,000*2	3,450	20
Through-beam models with lenses	Right-angle	12°	E32-T14 2M	4,000*2	4,000*2	4,000*2	1, 00
		°	E32-T11N 2M E3 - 1	4,000*2	4,000*2	4,000*2	2,000
	Top-view	12°	E32-T11N 2M E3 - 1	4,000*2	4,000*2	4,000*2	3, 00
		°	E32-T11R 2M E3 - 1	4,000*2	4,000*2	4,000*2	2,000
	Side-view	0°	E32-T11R 2M E3 - 1	4,000*2	4,000*2	4,000*2	3, 00
		0°	E32-T11R 2M E3 - 2	2,1 0	1,200	50	200
	Top-view	12°	E32-T11 2M E3 - 1	4,000*2	4,000*2	4,000*2	1, 0
		°	E32-T11 2M E3 - 1	4,000*2	4,000*2	4,000*2	4,000*2
	Side-view	0°	E32-T11 2M E3 - 2	3,450	1, 0	1,2 0	320
		12°	E32-T51R 2M E3 - 1	4,000*2	4,000*2	4,000*2	1,500
	Top-view	°	E32-T51R 2M E3 - 1	4,000*2	4,000*2	4,000*2	4,000*2
		0°	E32-T51R 2M E3 - 2	2,100	1,0 0	50	200
	Top-view	12°	E32-T 1R-S 2M E3 - 1	4,000*2	4,000*2	4,000*2	1,000
		°	E32-T 1R-S 2M E3 - 1	4,000*2	4,000*2	4,000*2	1, 00
	Side-view	0°	E32-T 1R-S 2M E3 - 2	1,500	20	540	140
		12°	E32-T 1-S 2M E3 - 1	4,000*2	4,000*2	4,000*2	1, 00
	Top-view	°	E32-T 1-S 2M E3 - 1	4,000*2	4,000*2	4,000*2	3,100
		0°	E32-T 1-S 2M E3 - 2	2,520	1,350	00	240
Top-view	12°	E32-T51 2M E3 - 1-33	4,000*2	4,000*2	3,450	1,400	
	°	E32-T51 2M E3 - 1	4,000*2	4,000*2	4,000*2	4,000*2	
Reflective models with integrated lens	Top-view	4°	E32-D1 2M	40 to 4,000 *2	40 to 2,100	40 to 1,350	40 to 4 0

*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 Models

Sensing method	Sensing direction	Aperture angle	Models	Sensing distance (mm)				
				iga mode	Standard mode	igh-speed mode	Super-high-speed mode	
Through-beam	Side-view	1.5°	E32-A03 2M	4,000*1	2, 0	1, 00	500	
			E32-A03-1 2M					
		3.4°	E32-A04 2M	1, 20	1,020	0	200	
			4°	E32-T24SR 2M	4,000*1	3,300	2,1 0	5 0
				E32-T24S 2M	4,000*1	3, 00	2, 10	00
E32-T22S 2M	4,000*1	4,000*1	3, 50	1,000				

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

Models for Detection without Background Interference

Sensing method	Sensing direction	Model	Sensing distance (mm)			
			iga mode	Standard mode	igh-speed mode	Super-high-speed mode
Limited-reflective	lat-view	E32-L1 -N 2M	0 to 15			0 to 12
		E32-L24S 2M	0 to 4			
	Side-view	E32-L25L 2M	5.4 to center .2			

Transparent Object Detection (Retro-reflective Models)

Sensing method	Feature	Size	Models	Sensing distance (mm)			
				iga mode	Standard mode	igh-speed mode	Super-high-speed mode
Retro-reflective	ilm detection	M3	E32-C31 2M E3 - 3R E3 -RP3	3 0		300	---
	S uare	---	E32-R1 5M	150 to 2,250			150 to 1,500
	Threaded	M	E32-R21 2M	10 to 3 0			10 to 250

Transparent Object Detection (Limited-reflective Models)

Sensing method	Feature	Sensing direction	Model	Sensing distance (mm)			
				iga mode	Standard mode	igh-speed mode	Super-high-speed mode
Limited-reflective	Small si e	lat-view	E32-L24S 2M	0 to 4			
	Standard		E32-L1 -N 2M	0 to 15			0 to 12
	Glass substrate alignment, 0°C		E32-A0 2M	10 to 20			---
	Standard long-distance		E32-A12 2M	12 to 30			---
	Side-view form	Side-view	E32-L25L 2M	5.4 to center .2			
	Glass substrate mapping, 0°C	Top-view	E32-A0 2M	15 to 3			---

Chemical-resistant Oil-resistant Models

Sensing method	Type	Sensing direction	Model	Sensing distance (mm)			
				iga mode	Standard mode	igh-speed mode	Super-high-speed mode
Through-beam	Oil-resistant	Right-angle	E32-T11N 2M	4,000*1	4,000*1	4,000*1	2,200
	Chemical oil-resistant	Top-view	E32-T12 2M	4,000*1	4,000*1	4,000*1	1, 00
			E32-T11 2M	4,000*1	4,000*1	3, 00	1,000
		Side-view	E32-T14 2M	2,100	1,200	50	200
	Chemical oil-resistant at 150°C	Top-view	E32-T51 2M	4,000*1	4,000*1	2, 00	00
Reflective	Semiconductors: Cleaning, developing, and etching 0°C	Top-view	E32-L11 P 5M	to 20 mm from tip of lens Recommended sensing distance: 11 mm , 1 to 31 mm from center of mounting hole A Recommended sensing distance: 22 mm			
	Semiconductors: Resist stripping 5°C		E32-L11 S 5M	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-D12 2M	---*2	2 0	1 0	0
	Chemical-resistant cable		E32-D11U 2M	1,2 0	520	3 0	100

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

*2. Even if there is no sensing object, the Sensor will detect light that is reflected by the fluorescein.

Bending-resistant Models

Sensing method	Size	Model	Sensing distance (mm)			
			iga mode	Standard mode	igh-speed mode	Super-high-speed mode
Through-beam	1.5 dia.	E32-T22B 2M	1,020	00	330	0
	M3	E32-T21 2M				
	M4	E32-T11 2M	3, 50	2,020	1,350	3 0
	S uare	32-T25 B 2M	50	450	250	0
Reflective	1.5 dia.	E32-D22B 2M	210	0	0	1
	M3	E32-D21 2M				
	3 dia.	E32-D221B 2M	450	210	130	40
	M4	E32-D21B 2M				
	M	E32-D11 2M	1,2 0	520	3 0	100
	S uare	E32-D25 B 2M	3 0	150	0	30

Heat-resistant Models

Sensing method	Heat-resistant temperature	Model	Sensing distance (mm)				
			Giga mode	Standard mode	High-speed mode	Super-high-speed mode	
Through-beam	100°C	E32-T51R 2M	2,400	1,200	840	225	
	150°C	E32-T51 2M	4,000*1	2,250	1,500	400	
	200°C	E32-T81R-S 2M	1,500	820	540	140	
	350°C	E32-T61-S 2M	2,520	1,350	900	240	
Reflective	100°C	E32-D51R 2M	1,000	420	280	80	
	150°C	E32-D51 2M	1,680	670	480	144	
	200°C	E32-D81R-S 2M	630	270	180	54	
	300°C	E32-A08H2 2M	10 to 20				---
		E32-A09H2 2M	20 to 30 (center 25)				---
	350°C	E32-D611-S 2M	630	270	180	54	
		E32-D61-S 2M					
	400°C	E32-D73-S 2M	420	180	120	36	

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

Area Detection Models

Sensing method	Type	Sensing width	Model	Sensing distance (mm)			
				Giga mode	Standard mode	High-speed mode	Super-high-speed mode
Through-beam	Area	11 mm	E32-T16PR 2M	4,000*1	2,550	1,680	440
			E32-T16JR 2M	4,000*1	2,250	1,440	380
		30 mm	E32-T16WR 2M	4,000*1	3,900	2,550	680
Reflective	Array	11 mm	E32-D36P1 2M	1,050	450	300	90

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

Liquid-level Detection Models

Sensing method	Tube diameter	Feature	Model	Sensing distance (mm)			
				Giga mode	Standard mode	High-speed mode	Super-high-speed mode
Tube-mounting	3.2, 6.4, or 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 multiple 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 5M	Applicable tube: Transparent tube (no restrictions on diameter)			
Liquid contact (heat-resistant up to 200°C)	---	---	E32-D82F1 4M	Liquid-contact type			

Vacuum-resistant Models

Sensing method	Heat-resistant temperature	Model	Sensing distance (mm)			
			Giga mode	Standard mode	High-speed mode	Super-high-speed mode
Through-beam	120°C	E32-T51V 1M	1,080	600	390	100
		E32-T51V 1M + E39-F1V	2,000*1	2,000*1	2,000*1	520
	200°C	E32-T84SV 1M	2,000*1	1,420	960	260

*1. The fiber length is 1 m on each side, so the sensing distance is given as 2,000 mm.

Models for FPD, Semiconductors, and Solar Cells

Sensing method	Application	Operating temperature	Model	Sensing distance (mm)			
				Giga 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
			E32-A08 2M	10 to 20			---
	Glass substrate alignment	300°C	E32-A08H2 3M	12 to 30			---
			E32-A12 2M	15 to 38			---
	Glass substrate mapping	70°C	E32-A09 2M	20 to 30 (center 25)			---
			E32-A09H2 2M				---
Wet processes: Cleaning, Resist developing and etching	60°C	E32-L11FP 5M	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)				
		E32-L11FS 5M	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)				
Through-beam	Wafer mapping	70°C	E32-A03 2M	4,000*1	2,670	1,800	500
			E32-A03-1 2M				
			E32-A04 2M	1,920	1,020	670	200
			E32-T24SR 2M	4,000*1	3,300	2,190	580
			E32-T24S 2M	4,000*1	3,900	2,610	700

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

I/O Circuit Diagrams

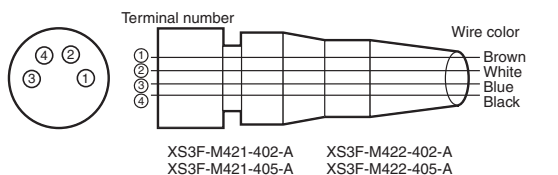
NPN Output

Model	Operation mode	Timing chart	L/D indicator	Output circuit
E3NX-FA11 E3NX-FA6	Light-ON	Incident light: [Bar chart showing light pulse] No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor: ON [Bar chart showing pulse] OFF [Bar chart showing no pulse] Load Operate (e.g., relay): [Bar chart showing pulse] Reset (Between brown and black leads): [Bar chart showing pulse]	L lit.	
	Dark-ON	Incident light: [Bar chart showing light pulse] No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor: ON [Bar chart showing pulse] OFF [Bar chart showing no pulse] Load Operate (e.g., relay): [Bar chart showing pulse] Reset (Between brown and black leads): [Bar chart showing pulse]	D lit.	
E3NX-FA21	Light-ON	ch1/ Incident light: [Bar chart showing light pulse] ch2 No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor: ON [Bar chart showing pulse] OFF [Bar chart showing no pulse] Load Operate (e.g., relay): [Bar chart showing pulse] Reset (Between brown and black (orange) leads): [Bar chart showing pulse]	L lit.	
	Dark-ON	ch1/ Incident light: [Bar chart showing light pulse] ch2 No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor: ON [Bar chart showing pulse] OFF [Bar chart showing no pulse] Load Operate (e.g., relay): [Bar chart showing pulse] Reset (Between brown and black (orange) leads): [Bar chart showing pulse]	D lit.	
E3NX-FA7 E3NX-FA24	Light-ON	Incident light: [Bar chart showing light pulse] No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor: ON [Bar chart showing pulse] OFF [Bar chart showing no pulse] Load Operate (e.g., relay): [Bar chart showing pulse] Reset (Between brown and black leads): [Bar chart showing pulse]	L lit.	
	Dark-ON	Incident light: [Bar chart showing light pulse] No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor: ON [Bar chart showing pulse] OFF [Bar chart showing no pulse] Load Operate (e.g., relay): [Bar chart showing pulse] Reset (Between brown and black leads): [Bar chart showing pulse]	D lit.	<p>• M8 Connector Pin Arrangement</p>
E3NX-FA7TW	Light-ON	ch1/ Incident light: [Bar chart showing light pulse] ch2 No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor: ON [Bar chart showing pulse] OFF [Bar chart showing no pulse] Load Operate (e.g., relay): [Bar chart showing pulse] Reset (Between brown and black (orange) leads): [Bar chart showing pulse]	L lit.	
	Dark-ON	ch1/ Incident light: [Bar chart showing light pulse] ch2 No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor: ON [Bar chart showing pulse] OFF [Bar chart showing no pulse] Load Operate (e.g., relay): [Bar chart showing pulse] Reset (Between brown and black (orange) leads): [Bar chart showing pulse]	D lit.	

PNP Output

Model	Operation mode	Timing chart	L/D indicator	Output circuit
E3NX-FA41 E3NX-FA8	Light-ON	Incident light: [Bar chart showing light pulse] No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor ON: [Bar chart showing pulse] OFF: [Bar chart showing no pulse] Load Operate (e.g., relay) Reset: [Bar chart showing pulse] (Between blue and black leads)	L lit.	
	Dark-ON	Incident light: [Bar chart showing light pulse] No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor ON: [Bar chart showing pulse] OFF: [Bar chart showing no pulse] Load Operate (e.g., relay) Reset: [Bar chart showing pulse] (Between blue and black leads)	D lit.	
E3NX-FA51	Light-ON	ch1/ Incident light: [Bar chart showing light pulse] ch2 No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor ON: [Bar chart showing pulse] OFF: [Bar chart showing no pulse] Load Operate (e.g., relay) Reset: [Bar chart showing pulse] (Between blue and black (orange) leads)	L lit.	
	Dark-ON	ch1/ Incident light: [Bar chart showing light pulse] ch2 No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Outputs transistor ON: [Bar chart showing pulse] OFF: [Bar chart showing no pulse] Load Operate (e.g., relay) Reset: [Bar chart showing pulse] (Between blue and black (orange) leads)	D lit.	
E3NX-FA9 E3NX-FA54	Light-ON	Incident light: [Bar chart showing light pulse] No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor ON: [Bar chart showing pulse] OFF: [Bar chart showing no pulse] Load Operate (e.g., relay) Reset: [Bar chart showing pulse] (Between blue and black leads)	L lit.	
	Dark-ON	Incident light: [Bar chart showing light pulse] No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor ON: [Bar chart showing pulse] OFF: [Bar chart showing no pulse] Load Operate (e.g., relay) Reset: [Bar chart showing pulse] (Between blue and black leads)	D lit.	<p>• M8 Connector Pin Arrangement</p>
E3NX-FA9TW E3NX-FA54TW	Light-ON	ch1/ Incident light: [Bar chart showing light pulse] ch2 No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Output transistor ON: [Bar chart showing pulse] OFF: [Bar chart showing no pulse] Load Operate (e.g., relay) Reset: [Bar chart showing pulse] (Between blue and black (orange) leads)	L lit.	
	Dark-ON	ch1/ Incident light: [Bar chart showing light pulse] ch2 No incident light: [Bar chart showing no light] OUT indicator Lit (orange): [Bar chart showing pulse] Not lit (orange): [Bar chart showing no pulse] Outputs transistor ON: [Bar chart showing pulse] OFF: [Bar chart showing no pulse] Load Operate (e.g., relay) Reset: [Bar chart showing pulse] (Between blue and black (orange) leads)	D lit.	<p>• M8 Connector Pin Arrangement</p>

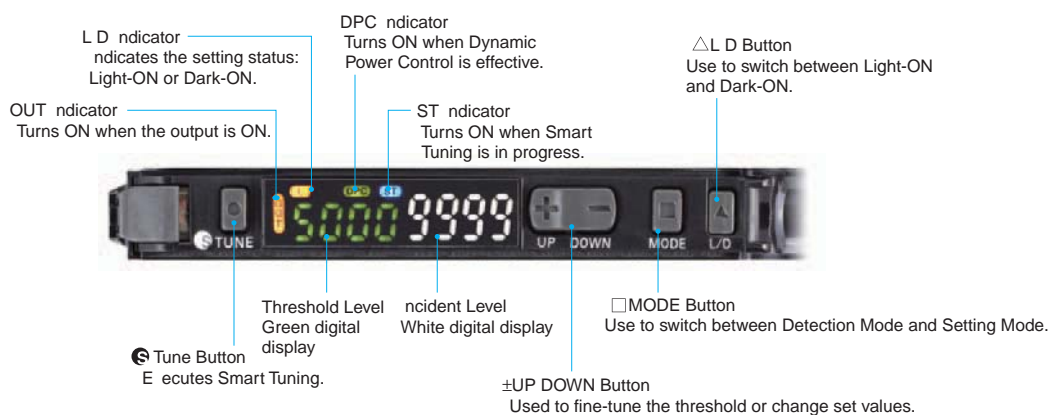
Plug (Sensor I/O Connector)



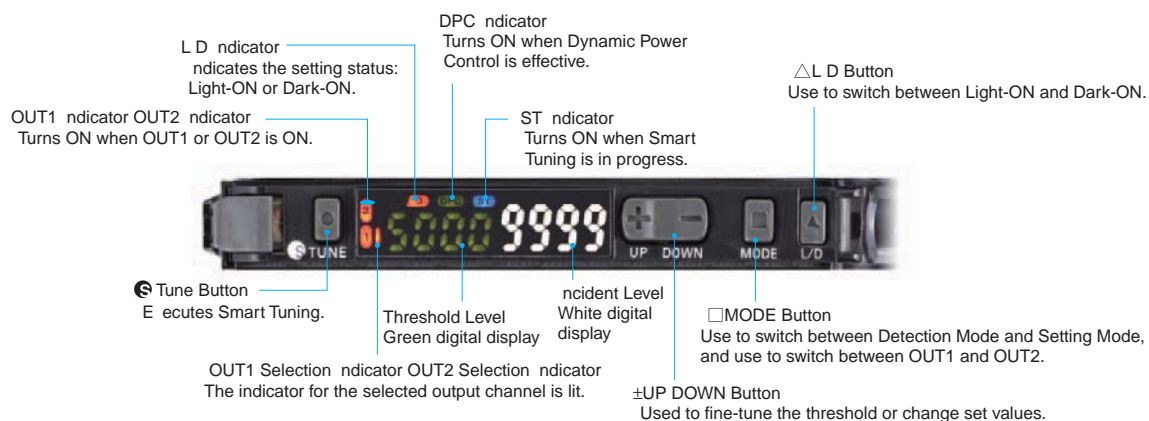
Wire color	Connection pin	Application
Brown	1	Power supply (+V)
White	2	External input / Output
Blue	3	Power supply (0 V)
Black	4	Output

Nomenclature

E3NX-FA11/FA41/FA6/FA8/FA7/FA9/FA24/FA54



E3NX-FA21/FA51/FA7TW/FA9TW/FA54TW/FA0



Safety Precautions

To ensure safe operation be sure to read and follow the Instruction Manual provided with the Sensor.

⚠️ WARNIN

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



Do not use the product with voltage in excess of the rated voltage. Excess voltage may result in malfunction or fire.



Never use the product with an AC power supply. Otherwise explosion may result.



Precautions for Safe Use

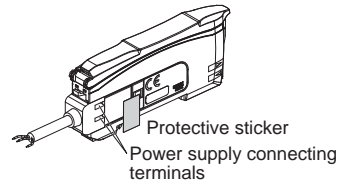
The following precautions must be observed to ensure safe operation of the Amplifier Unit. Doing so may cause damage or fire.

- Do not install the product in the following locations.
 - Locations subject to direct sunlight
 - Locations subject to condensation due to high humidity
 - Locations subject to corrosive gas
 - Locations subject to vibration or mechanical shocks exceeding the rated values
 - Locations subject to exposure to water, oil, chemicals
 - Locations subject to stream
 - Locations subjected to strong magnetic field or electric field
- Do not use the product in environments subject to flammable or explosive gases.
- Do not use the product in any atmosphere or environment that exceeds the ratings.
- To secure the safety of operation and maintenance, do not install the product close to high-voltage devices and power devices.
- High-voltage lines and power lines must be wired separately from the product. Wiring them together or placing them in the same duct may cause induction, resulting in malfunction or damage.
- Do not apply any load exceeding the ratings. Otherwise, damage or fire may result.
- Do not short the load. Otherwise, damage or fire may result.
- Do not use the product if the case is damaged.
- Burn injury may occur. The product surface temperature rises depending on application conditions, such as the ambient temperature and the power supply voltage. Use caution when operating or cleaning the product.
- When setting the sensor, be sure to check safety such as by stopping the equipment.
- Be sure to turn off the power supply before connecting or disconnecting wires.
- Do not attempt to disassemble, repair, or modify the product in any way.
- When disposing of the product, treat it as industrial waste.

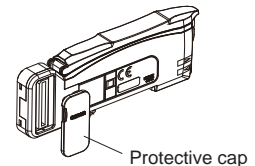
Precautions for Correct Use

- Connect the load correctly.
- Do not miswire such as the polarity of the power supply.
- Be sure to mount the unit to the DIN track until it clicks.
- When using the Amplifier Units with Wire-saving Connectors, attach the protective stickers provided with E3-CN-series Connectors on the unused power pins to prevent electrical shock and short circuiting. When using Amplifier Units with Connectors for Communications Units, attach the protective caps.

Amplifier Unit with Wire-saving Connector



Amplifier Unit with Connector for Communications Unit



- Use an extension cable with a minimum thickness of 0.3 mm² and less than 100 m long.
- Do not apply the forces on the cord exceeding the following limits: Pull: 40N torque: 0.1Nm pressure: 20N bending: 2.4N
- Do not apply excessive force such as tension, compression or torsion to the Amplifier Unit with the fiber Unit fitted to the Amplifier Unit.
- Always keep the protective cover in place when using the Amplifier Unit. Not doing so may cause malfunction.
- It may take time until the received light intensity and measured value become stable immediately after the power is turned on depending on use environment.
- The product is ready to operate 200 ms after the power supply is turned ON.
- The Mobile Console E3-MC11, E3-MC11-SV2 and E3-MC11-S cannot be connected.
- The mutual interference prevention function does not work when in combination with E3C-E2C-E3.
- If the unit receives excessive sensor light, the mutual interference prevention function may not work properly, resulting in malfunction of the unit. In such case, increase the threshold.
- Standard models and Advanced models
The Sensor Communication Unit E3-DRT21-S, E3-CRT, E3-ECT and E3N cannot be connected.
Model for Sensor Communication Unit E3NC-A0
The Sensor Communication Unit E3N can be connected.
E3-DRT21-S, E3-CRT, E3-ECT cannot be connected.
- If you notice an abnormal condition such as a strange odor, extreme heating of the unit, or smoke immediately stop using the product, turn off the power, and consult your dealer.
- Do not use thinner, benzene, acetone, and lamp oil for cleaning.

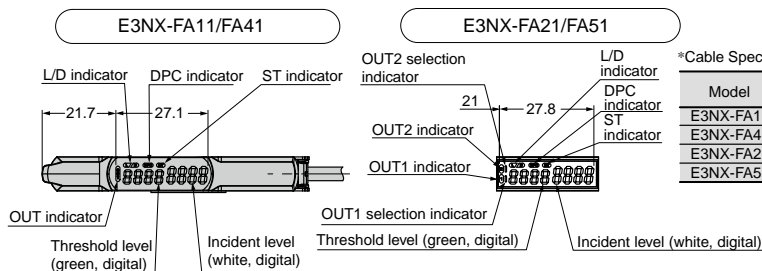
Dimensions

Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Fiber Amplifier Units

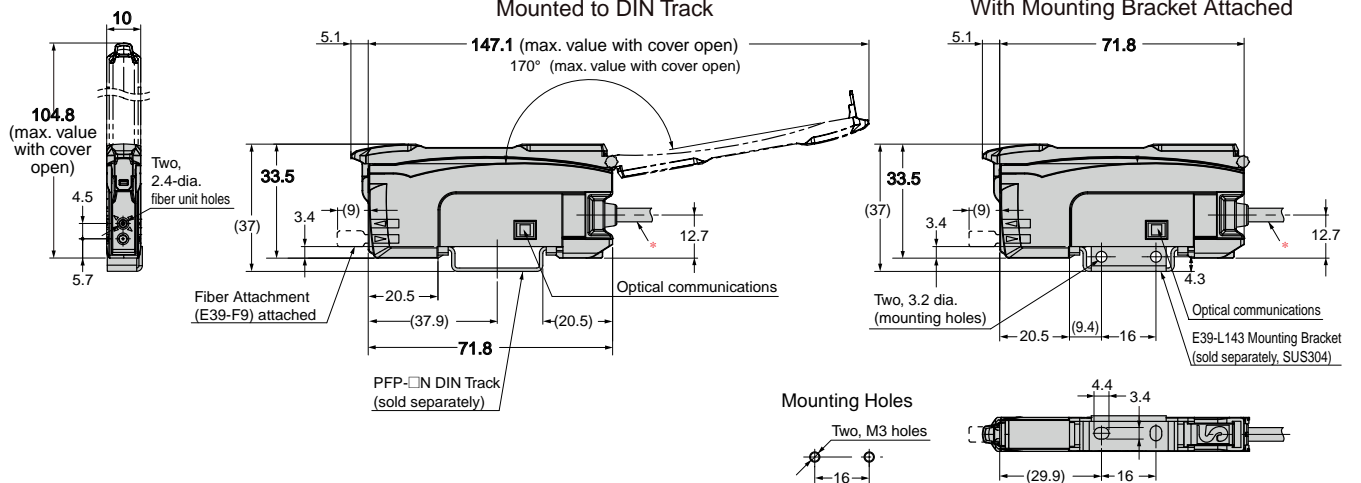
Pre-wired Amplifier Units

- E3NX-FA11
- E3NX-FA21
- E3NX-FA41
- E3NX-FA51



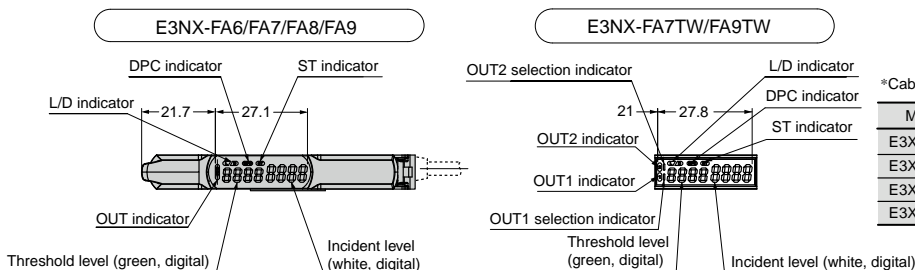
*Cable Specifications

Model	Outer diameter	No. of conductors	Others
E3NX-FA11	4.0 dia.	3	Conductor cross-section: 0.2 mm ² Insulator dia.: 0.9 mm Standard cable length: 2 m Minimum bending radius: 12 mm
E3NX-FA41			
E3NX-FA21	4.0 dia.	5	
E3NX-FA51			



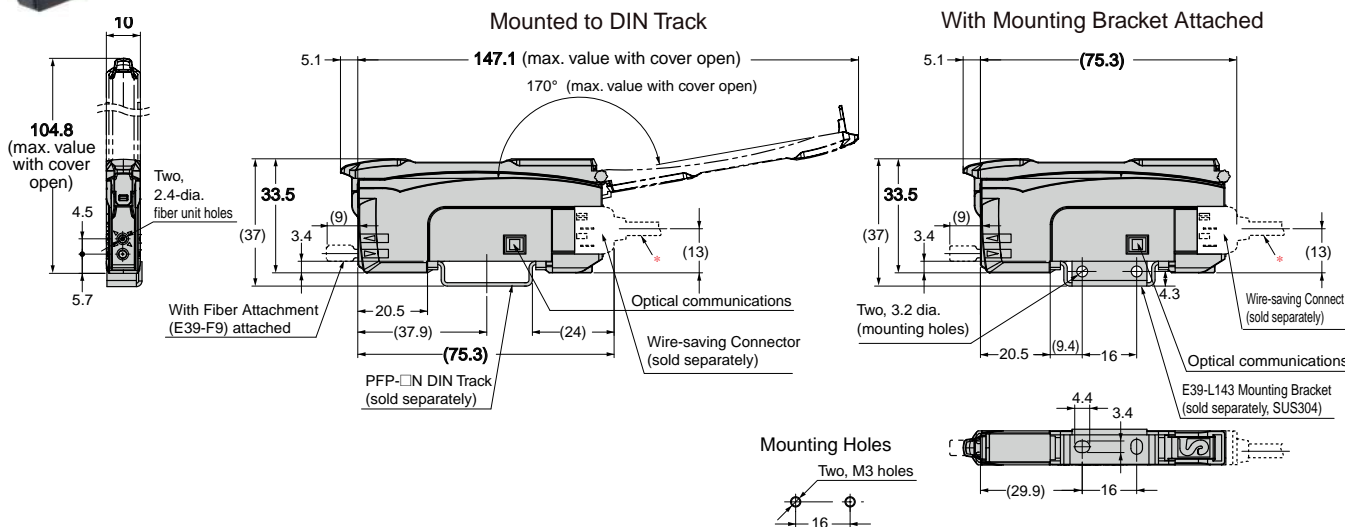
Amplifier Units with Wire-saving Connectors

- E3NX-FA6
- E3NX-FA7
- E3NX-FA7TW
- E3NX-FA8
- E3NX-FA9
- E3NX-FA9TW



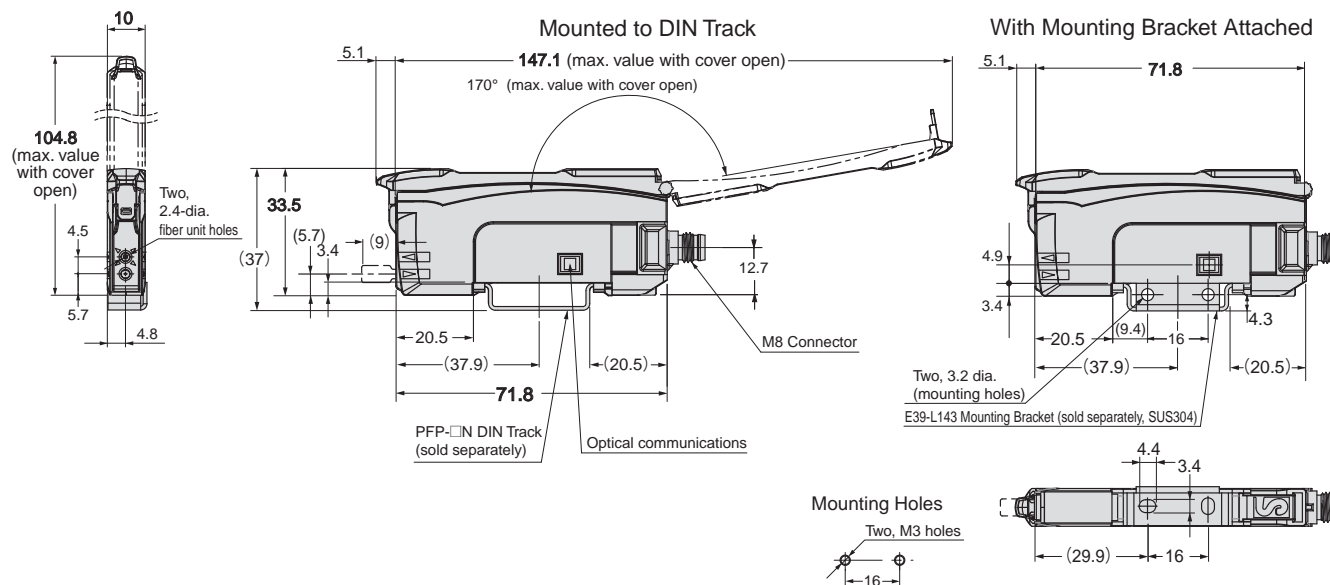
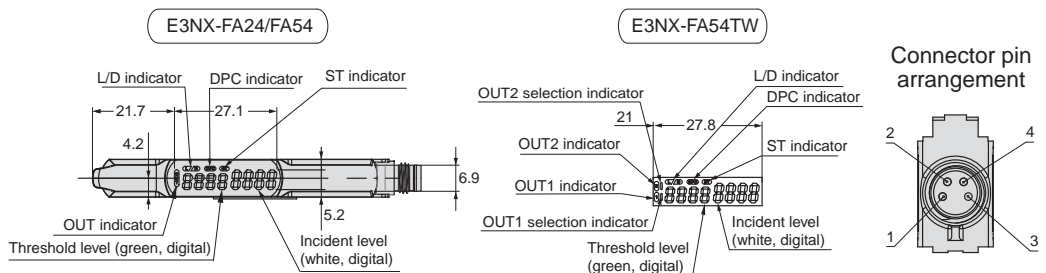
*Cable Specifications

Model	Outer diameter	No. of conductors
E3X-CN12	2.6 dia.	1
E3X-CN22		2
E3X-CN11	4.0 dia.	3
E3X-CN21		4



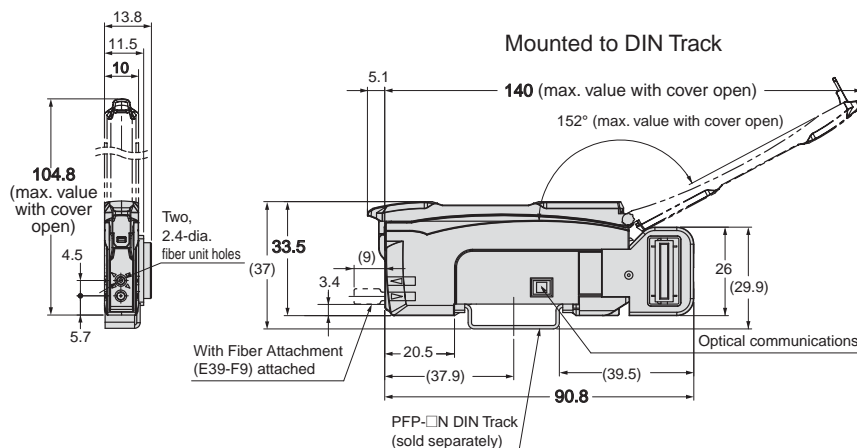
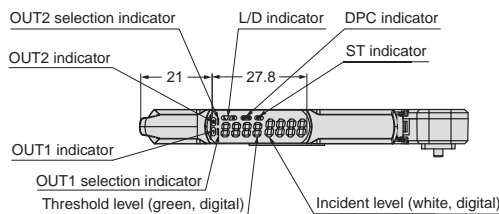
Amplifier Units with M8 Connectors

E3NX-FA24
E3NX-FA54
E3NX-FA54TW



Amplifier Unit with Connector for Sensor Communications Unit

E3NX-FA0

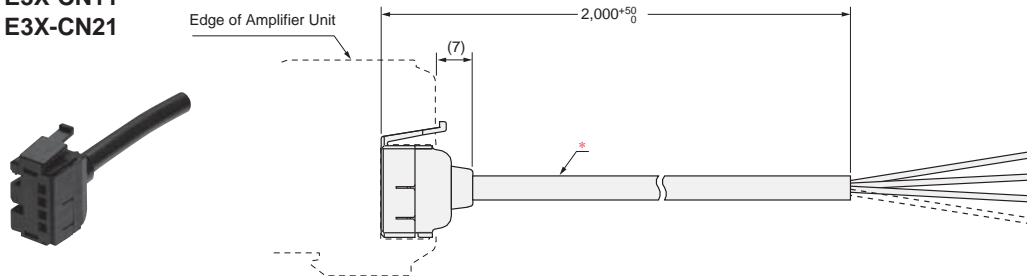


Accessories (Sold Separately)

Wire-saving Connectors

Master Connector

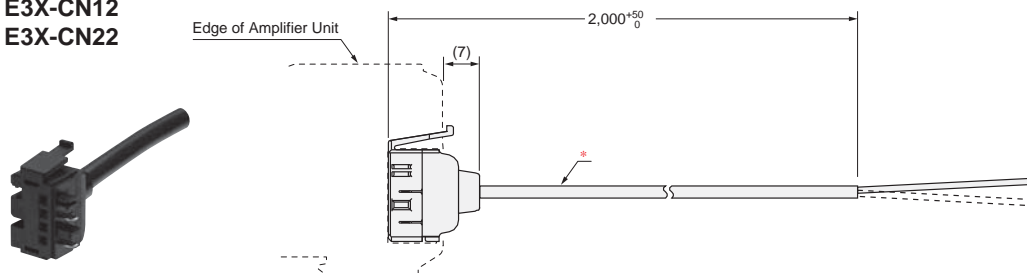
E3X-CN11
E3X-CN21



* E3X-CN11: 4-dia. cable with 3 conductors, Standard cable length: 2 m (Conductor cross-section: 0.2 mm^2 (AWG24), Insulator diameter: 1.1 mm)
E3X-CN21: 4-dia. cable with 4 conductors, Standard cable length: 2 m (Conductor cross-section: 0.2 mm^2 (AWG24), Insulator diameter: 1.1 mm)

Slave Connector

E3X-CN12
E3X-CN22

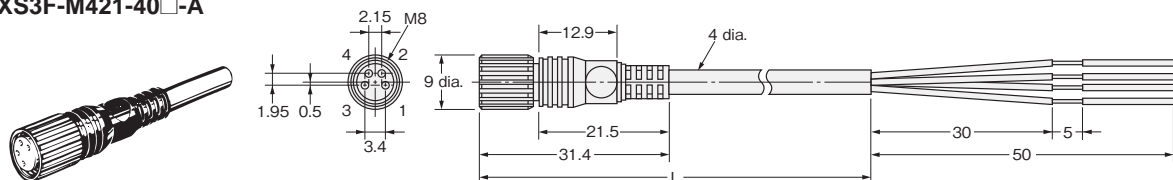


* E3X-CN12: 2.6-dia. cable with 1 conductor, Standard cable length: 2 m (Conductor cross-section: 0.2 mm^2 (AWG24), Insulator diameter: 1.1 mm)
E3X-CN22: 4-dia. cable with 2 conductors, Standard cable length: 2 m (Conductor cross-section: 0.2 mm^2 (AWG24), Insulator diameter: 1.1 mm)

Sensor I/O Connectors

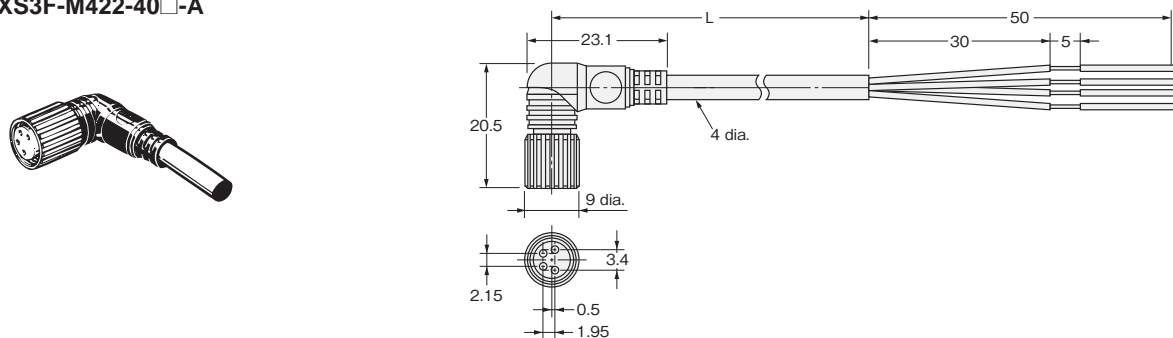
Straight

XS3F-M421-40□-A



L-shaped

XS3F-M422-40□-A



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