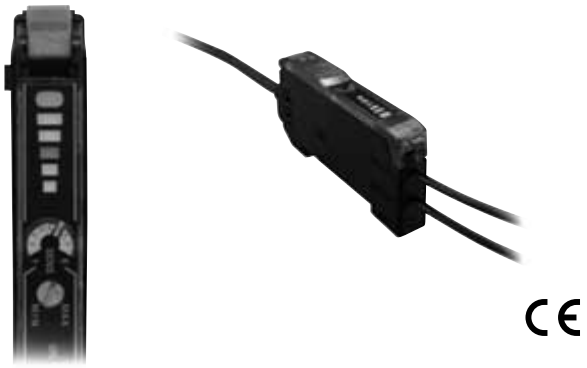
OMRON

User-Friendly Fiber-Optic Amplifier

E3X-NA

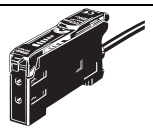
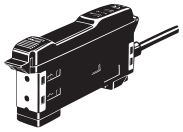
Solve Your Basic Sensing Challenges Easily with the E3X-NA Series



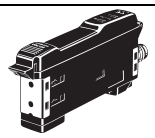
- Streamlined features provide basic sensing immediately after plug-in
- *Wire-saving* amplifiers reduce installation time and minimize space requirements
- Master/slave connector design affords connectivity for up to 16 wire-saving amplifiers
- Use the LED bar display to quickly confirm sensor performance
- Optical communication design prevents mutual interference for up to 5 amplifiers
- Green LED models address *mark-detecting* applications
- High-speed models have a response time of 50 μs
- Select a *water-resistant* model (IP66 rating) using an M8 connector
- Prewired water-resistant models are available

Ordering Information: Amplifier Units, Connectors, Accessories and Fiber-Optics

■ Amplifier Units with Cables

Type	Part number		Control output	Appearance
	NPN output	PNP output		
Standard	**E3X-NA11**	**E3X-NA41**	ON/OFF	
High-speed	**E3X-NA11F**	**E3X-NA41F**		
Mark-detection	**E3X-NAG11**	**E3X-NAG41**		
Water-resistant	**E3X-NA11V**	**E3X-NA41V**		

■ Connector-Ready Amplifiers (Order Connector Separately)

Item	Part number		Applicable connector (order separately)		Control output	Appearance
	NPN output	PNP output				
Wire-saving	**E3X-NA6**	**E3X-NA8**	Master	E3X-CN11	ON/OFF output	
			Slave	E3X-CN12		
Water-resistant (M8 connectors)	**E3X-NA14V**	**E3X-NA44V**	XS3F-M421-40□-A XS3F-M422-40□-A			

■ Amplifier Unit Connectors (Order Separately)

Note: Stickers for Connectors are included as accessories.

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

■ Combining Amplifier Units and Connectors (Each Sold Separately)

Refer to the following tables when placing an order. Amplifier Units and Connectors are sold separately.

Amplifier Units		
Type	NPN	PNP
Wire-saving models	E3X-NA6	E3X-NA8

+

Applicable Connectors (Order Separately)	
Master Connector	Slave Connector
E3X-CN11 (3-wire)	E3X-CN12 (1-wire)

Example: **When Using 5 Amplifier Units**

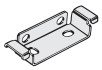
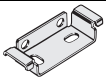
Amplifier Units (5 Units) + 1 Master Connector + 4 Slave Connectors

■ Sensor I/O Connectors (Order Separately)

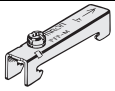
Size	Cable specifications	Appearance	Cable type		Part number
M8	Standard cable	Straight connector 	2 m	Four-core cable	**XS3F-M421-402-A**
			5 m		**XS3F-M421-405-A**
		L-shaped connector 	2 m		**XS3F-M422-402-A**
			5 m		**XS3F-M422-405-A**

■ Accessories (Order Separately)

Mounting Brackets

Appearance	Applicable models	Quantity	Part number
	E3X-NA□ E3X-NA□F E3X-NAG□	1	**E39-L143**
	E3X-NA□V		**E39-L148**

End Plate

Appearance	Quantity	Part number
	1	**PFP-M**

■ Fiber-Optic Cables

The E3X-NA amplifiers use Omron's E32-series fiber-optic cables. With a choice of over 80 sensing heads, you are sure to find one that matches your application requirements. Refer to the selection of E32 cables (listed with their respective sensing distances) in the fiber section at the end of this data sheet. Order fiber-optic cables separately.

Specifications

■ Amplifier Units

Ratings/Characteristics

Item		Amplifier Units with Cables				Connector-ready amplifier units	
		Standard models	High-speed detection models	Mark-detecting models	Water-resistant models	Wire-saving models	Water-resistant models (use M8 connectors)
Output type	NPN output	E3X-NA11	E3X-NA11F	E3X-NAG11	E3X-NA11V	E3X-NA6	E3X-NA14V
	PNP output	E3X-NA41	E3X-NA41F	E3X-NAG41	E3X-NA41V	E3X-NA8	E3X-NA44V
Light source (wavelength)		Red LED (680 nm)		Green LED (520 nm)	Red LED (680 nm)		
Supply voltage		12 to 24 VDC ±10%, ripple (p-p): 10% max.					
Current consumption		35 mA max.	35 mA max. (for 24-VDC power supply)	35 mA max.			
Control output		NPN/PNP (depends on model) open collector; load current: 50 mA max.; residual voltage: 1 V max.					
Operation mode	Switch-selectable	Light-ON/Dark-ON operation					
Response time		200 μs max. for operation and reset respectively (See note.)	Operation: 20 μs max. Reset: 30 μs max.	200 μs max. for operation and reset respectively (See Note.)			
Sensitivity adjustment		8-turn sensitivity adjuster (with indicator)					
Circuit protection		Reverse polarity, output short-circuit, mutual interference prevention (optically synchronized)	Reverse polarity, output short-circuit	Reverse polarity, output short-circuit, mutual interference prevention (optically synchronized)			
Timer function		OFF-delay timer: 40 ms (fixed)					
Ambient illumination (receiver side)		Incandescent lamp:10,000 lux max. Sunlight:20,000 lux max.					
Ambient temperature		Operating: Groups of 1 to 3 Amplifiers: –25°C to 55°C (-13°F to 131°F) Groups of 4 to11 Amplifiers: –25°C to 50°C (-13°F to 122°F) Groups of 12 to16 Amplifiers: –25°C to 45°C (-13°F t0 113°F) with no icing or condensation Storage: –30°C to 70°C (-22 °F to 158°F) with no icing or condensation					
Ambient humidity		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					500 VAC at 50/ 60 Hz for 1 minute
Vibration resistance		10 to 55 Hz with a 1.5-mm double amplitude for 2 hrs each in X, Y and Z directions					
Shock resistance		500 m/s^2, for 3 times each in X, Y and Z directions					
Enclosure rating		IEC60529 IP50 (with Protective Cover attached)			IEC60529 IP66 (with Protective Cover attached)	IEC60529 IP50 (with Protective Cover attached)	IEC60529 IP66 (with Protective Cover attached)
Connection method		Prewired (standard cable length: 2 m)				Connector	M8 connector
Weight (packed)		Approx. 100 g			Approx. 110 g	Approx. 55 g	Approx. 65 g
Material	Case	Polybutylene terephthalate (PBT)					
	Cover	Polycarbonate			Polyethersulfone (PES)	Polycarbonate	Polyethersulfone (PES)
Accessories		Instruction Sheet					

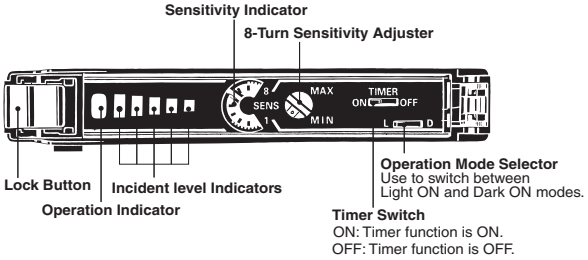
Note: When there are 8 or more Amplifier Units mounted side-by-side, the response time will be 350 μs max.

■ Amplifier Unit Connectors

Item		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 Amplifier Unit and the adjacent Connector. It does not include the conductor resistance of the cable.)	
Number of insertions		50 times (for connection to the Amplifier Unit and the adjacent Connector)	
Material	Housing	Polybutylene terephthalate (PBT)	
	Contact	Phosphor bronze/gold-plated nickel	
Weight (packed)		Approx. 55 g	Approx. 25 g

Nomenclature

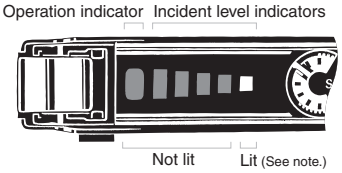
■ Amplifier Units



■ LED Bar Display

Indicators

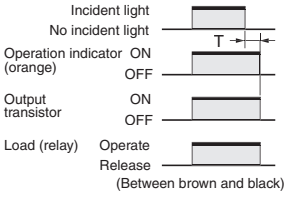
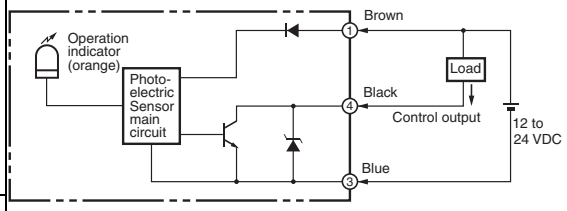
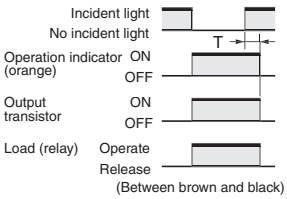
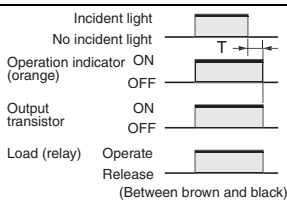
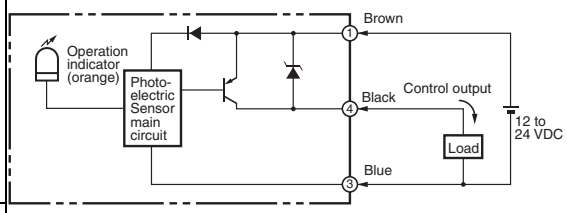
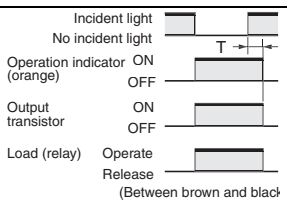
In addition to an operation indicator (orange), the E3X-NA also has incident level indicators (4 green and 1 red). Use these indicators for optical axis adjustments and maintenance.

Status of indicators (in L/ON mode)	Operation indicator (in L/ON mode)	Incident level
	Not lit	Approx. 80% max. of operating level
	Not lit	Approx. 80% to 90% of operating level
	Not lit or lit	Approx. 90% to 110% of operating level
	Lit	Approx. 110% to 120% of operating level
	Lit	Approx. 120% min. of operating level

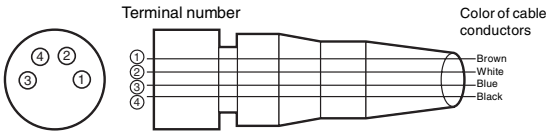
Note: The indicator farthest to the right will be lit even if the incident level is 0.

Operation

■ Output Circuits

Output	Model	Mode selector	Timing chart	State of output transistor	Output circuit
NPN	E3X-NA11 E3X-NA6 E3X-NAG11 E3X-NA11F E3X-NA11V E3X-NA14V	LIGHT ON (L/ON)		Light ON	
		DARK ON (D/ON)		Dark ON	**M8 Connector Pin Arrangement**  **Note:** Pin 2 is not used.
PNP	E3X-NA41 E3X-NA8 E3X-NAG41 E3X-NA41F E3X-NA41V E3X-NA44V	LIGHT ON (L/ON)		Light ON	
		DARK ON (D/ON)		Dark ON	**M8 Connector Pin Arrangement**  **Note:** Pin 2 is not used.

■ Connectors (Sensor I/O Connectors)



XS3F-M421-402-A, XS3F-M422-402-A
XS3F-M421-405-A, XS3F-M422-405-A

Classification	Color of cable conductors	Connection pin number	Application
DC	Brown	1	Power supply (+V)
	White	2	---
	Blue	3	Power supply (0 V)
	Black	4	Output

Note: Pin 2 is not used.