OMRON

Advanced Dual Fiber Sensors
E3X-MDA

Two Amplifiers Squeezed into a Single Sensor Provide Significant Cost, Space and Labor Savings

- Two channels accept two sets of fiber cables.
- AND/OR control output eliminates the need for a PLC or sensor controller.
- 4 element LED and Auto Power Control ensure stable, long term performance.
- Improved remote programmer.
- Same ease-of-use as the E3X-DA-N amplifiers.

Ordering Information

■ Amplifier Units

Stock Note: Shaded items are normally stocked.

Amplifier Units with Cables

Item	Appearance	Functions	Model	
			NPN output	PNP output
2-channel models		AND/OR output	**E3X-MDA11**	**E3X-MDA41**

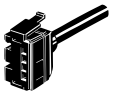
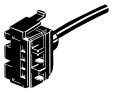
Amplifier Units with Connectors

Stock Note: Shaded items are normally stocked.

Item	Appearance	Functions	Model	
			NPN output	PNP output
2-channel models		AND/OR output	**E3X-MDA6**	**E3X-MDA8**

■ Amplifier Unit Connectors (Order Separately)

Stock Note: Shaded items are normally stocked.

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

Combining Amplifier Units and Connectors

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

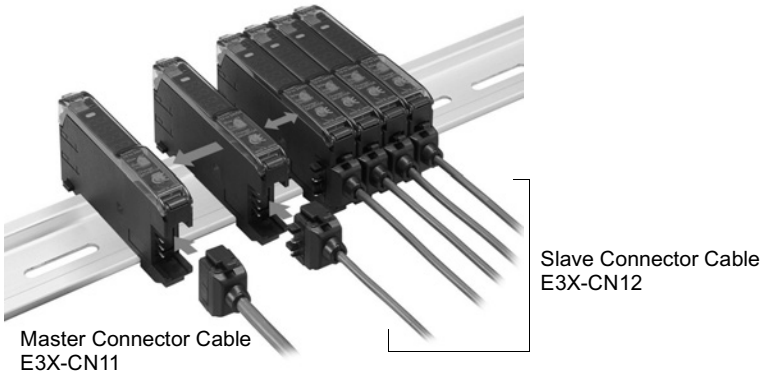
Amplifier Unit				Applicable Connector (Order Separately)	
Model	NPN output	PNP output		Master Connector	Slave Connector
2-channel models	E3X-MDA6	E3X-MDA8	+	E3X-CN21 (4-wire)	E3X-CN22 (2-wire)

Combining Multiple Wire-Saving Amplifiers and Connector Cables

When combining wire-saving amplifiers, the amplifiers that are connected together must all have the same part number. Only one master connector is required. The master connector cable distributes power to all the “ganged” wire-saving amplifiers. The rest of the wire-saving amplifiers require slave connector cables; slave connector cables handle output signal transmission only.

Example: Requirements for combining 5 E3X-MDA6 amplifiers:

- 1 master connector cable
- 5 slave connector cables
- 6 E3X-MDA6 amplifiers



■ Mobile Console (Order Separately)

Stock Note: Shaded items are normally stocked.

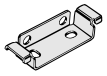
Appearance	Model	Remarks
	E3X-MC11-S (model number of set)	Mobile Console with Head, Cable, and AC adapter provided as accessories
	E3X-MC11-C1-S	Mobile Console
	E3X-MC11-H1	Head
	E39-Z12-1	Cable (1.5 m)

Note: Use the E3X-MC11-S Mobile Console for the E3X-DA-S/MDA-series Amplifier Units. Other Mobile Consoles cannot be used.

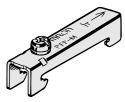
■ Accessories (Order Separately)

Stock Note: Shaded items are normally stocked.

Mounting Bracket

Appearance	Model	Quantity
	E39-L143	1

End Plate

Appearance	Model	Quantity
	PFP-M	1

Specifications

■ Ratings/Characteristics

Amplifier Units

Type			2-channel models	
Model		NPN output	E3X-MDA11	E3X-MDA6
Item		PNP output	E3X-MDA41	E3X-MDA8
Light source (wavelength)			Red LED (650 nm)	
Supply voltage			12 to 24 VDC ±10%, ripple (p-p) 10% max.	
Power consumption			1,080 mW max. (current consumption: 45 mA max. at power supply voltage of 24 VDC)	
Control output			Load power supply voltage: 26.4 VDC; open collector; load current: 50 mA max.; residual voltage: 1 V max.	
Circuit protection			Reverse polarity for power supply connection, output short-circuit	
Response time	High-speed mode	NPN	130 μs[*1] for operation and reset respectively	
		PNP		
	Standard mode		1 ms for operation and reset respectively	
	High-resolution mode		4 ms for operation and reset respectively	
Sensitivity setting			Teaching or manual method	
Functions	Power tuning		Light emission power and reception gain, digital control method	
	Timer function		Select from OFF-delay, ON-delay, or one-shot 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)	
	Automatic power control (APC)		High-speed control method for emission current	
	Zero-reset		Display can be reset to zero when required (negative values can be displayed).	
	Initial reset		Settings can be returned to defaults as required.	
	Mutual interference prevention		Possible for up to 9 Units (18 channels)[*2, *3]	
	I/O settings		Output setting (Select from channel 2 output, AND, OR, leading edge sync, falling edge sync, or differential output)	
Display			Operation indicator for channel 1 (orange), Operation indicator for channel 2 (orange)	
Digital display			Select from the following: Incident level for channel 1 + incident level for channel 2, Incident level + threshold, incident level percentage + threshold, incident light peak level + no incident light bottom level, minimum incident light peak level + maximum no incident light bottom level, long bar display, incident level + peak hold, incident level + channel	
Display orientation			Normal/reverse program selectable	
Ambient illumination (receiver side)			Incandescent lamp:10,000 lux max. Sunlight:20,000 lux max.	
Ambient temperature			Operating:Groups of 1 to 2 Amplifiers: −25°C to 55°C Groups of 3 to 10 Amplifiers: −25°C to 50°C Groups of 11 to 16 Amplifiers: −25°C to 45°C (with no icing or condensation) Storage: −30°C to 70°C (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	
Vibration resistance (destruction)			10 to 55 Hz with a 1.5-mm double amplitude for 2 hrs each in X, Y and Z directions	
Shock resistance (destruction)			500 m/s^2, for 3 times each in X, Y and Z directions	
Enclosure rating			IEC 60529 IP50 (with Protective Cover attached)	
Connection method			Prewired cable	Standard connector
Weight (packed state)			Approx. 100 g	Approx. 55 g
Materials	Case		Polybutylene terephthalate (PBT)	
	Cover		Polycarbonate (PC)	
Accessories			Instruction sheet	

Note: ***1.** When differential output is selected for the output setting, the second channel output is 200 μs for operation and reset respectively.

***2.** Communications are disabled if the detection mode is selected during high-speed mode, and the communications functions for mutual interference prevention and the Mobile Console will not function.

***3.** Mutual interference prevention can be used for up to 5 Units (10 channels) if power tuning is enabled.

Amplifier Unit Connectors

Item		E3X-CN11/21/22	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 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 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

Mobile Console

Item	E3X-MC11-S
Supply voltage	Charged with AC adapter
Connection method	Connected via adapter
Weight (packed state)	Approx. 580 g (Console only: 120 g)

Note: Refer to *Operation Manual* provided with the Mobile Console for details.

Ordering Information: Fiber Units

■ Through-beam Fiber Units

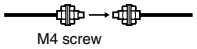
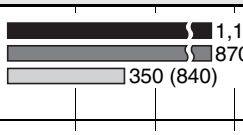
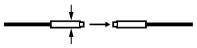
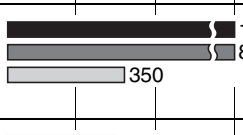
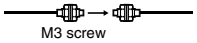
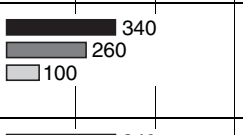
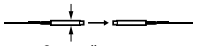
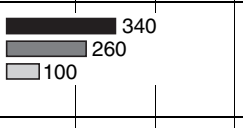
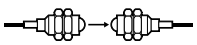
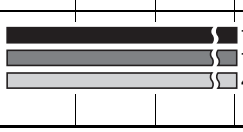
Note: 1. Free-cut Indicates models that allow free cutting. Models without this mark do not allow free cutting.

2. The size of standard sensing object is the same as the fiber core diameter (lens diameter for models with lens).

3. The values for the minimum sensing object are representative values that indicate values obtained in standard mode with the sensing distance and sensitivity set to optimum values.

Long-distance Fiber Units

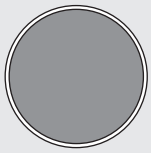
■ : High-resolution mode ■ : Standard mode ■ : Super-high-speed mode

Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm) (Parentheses: With E39-F1 Lens Unit)	Standard object (min. object) (Parentheses: Opaque object)	Model	Permissible bending radius
M4 Free-cut		E3X-MDA		1.4-mm dia. (0.01-mm dia.)	E32-T11L	25 mm
3-mm dia. Free-cut		E3X-MDA			E32-T12L	
M3 Free-cut		E3X-MDA		0.9-mm dia. (0.005-mm dia.)	E32-T21L	10 mm
2-mm dia.; small diameter Free-cut		E3X-MDA			E32-T22L	
M14; with lens; ideal for explosion-proof applications Free-cut		E3X-MDA		10-mm dia.	E32-T17L	25 mm

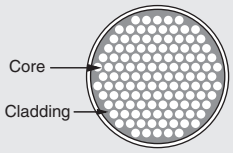
A Wide Range of Multicore Fibers for Easy Installation without Loss of Light Intensity

Multicore fiber models are indicated by an "R" at the end of the model number.
Multicore fiber contains multiple cores. These cores are all surrounded by cladding, giving a minimum bending radius of 1 mm.

The fiber can be bent at right angles without affecting the light intensity. Handle it just like any other cable.
Note: Do not use this fiber in applications that have repetitive bending.

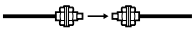
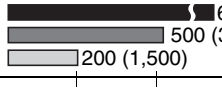
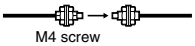
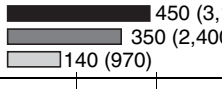
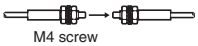
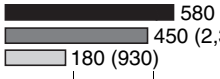
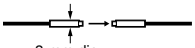
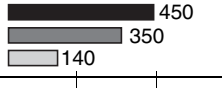
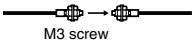
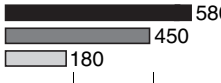
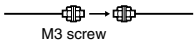
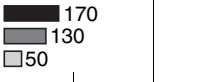
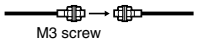
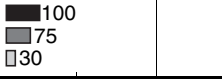


Conventional Fiber
Conventional fiber uses just one core and one cladding section. Bending the fiber may break it or reduce the light intensity.



Multicore Fiber
Multicore fiber contains multiple independent cores all surrounded by cladding. The fiber can be bent without breaking or reducing the light intensity.

General-purpose Fiber Units

Features	Appearance	Applicable Amplifier Unit	Sensing distance (mm) (Parentheses: With E39-F1 Lens Unit)	Standard object (min. object) (Parentheses: Opaque object)	Model	Permissible bending radius
M4 (Free-cut)	 M4 screw	E3X-MDA	 650 (4,000)* 500 (3,700) 200 (1,500)	1.0-mm dia. (0.005-mm dia.)	E32-TC200	25 mm
M4 Multicore (Free-cut)	 M4 screw	E3X-MDA	 450 (3,100) 350 (2,400) 140 (970)		E32-T11R	1 mm
M4 (Free-cut) Fiber-sheath material: fluororesin	 M4 screw	E3X-MDA	 580 (3,000)* 450 (2,300) 180 (930)		E32-T11U *NEW*	4 mm
3-mm dia. Multicore (Free-cut)	 3-mm dia.	E3X-MDA	 450 350 140		E32-T12R	1 mm
M3 (Free-cut) Possible to mount the E39-F5 Reflective Side-view Conversion Attachment	 M3 screw	E3X-MDA	 580 450 180		E32-TC200A	25 mm
M3; for detecting minute objects (Free-cut)	 M3 screw	E3X-MDA	 170 130 50	0.5-mm dia. (0.005-mm dia.)	E32-TC200E	10 mm
M3 Multicore (Free-cut)	 M3 screw	E3X-MDA	 100 75 30		E32-T21R	1 mm

Note: *The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm.