E3X-DA-S/MDA

CSM_E3X-DA-S_MDA_DS_E_10_1

OMRON's Next-generation Platform for a Wide Range of Detection

- Features a Power Tuning function that optimizes light reception at the press of a button.
- Combines newly developed 4-element LEDs with an APC circuit to ensure stable, long-term LED performance.
- Utilizes OMRON's innovative wire-saving connector.
- 2-channel models achieve the thinnest profile in the industry, at only 5 mm per channel.
- 2-channel models also offer AND/OR control output.



Be sure to read *Safety Precautions* on page 15.

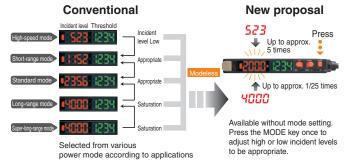
Features

Equipped with an Industry's First Power Tuning (Optimum Light Setting) Function

The E3X-DA-S/MDA features a Power Tuning function that optimizes power at the press of a button.

This function easily but securely resolves saturation due to short sensing distances or insufficient incident light due to long sensing distances.

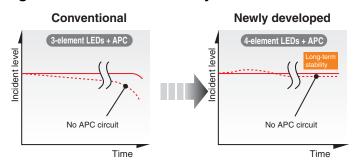
In addition, the response speed does not change as mode selection has tuned the power.



Adoption of Newly Developed 4-Element LEDs and an APC (Auto Power Control) Circuit Achieves Long-term Reliable Detection at the Highest Level in the Industry

The long-term reliable detection at the highest level in the industry is achieved with the innovative APC circuit whose performance is proved by E3X-DA-N series and the newly developed high-power LEDs (4-element type) to ensure super stable, long-term LED performance.

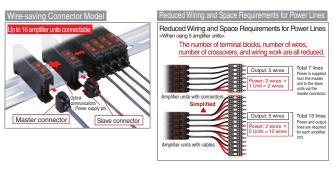
Stable performance is always available without the ON/OFF setting of an APC circuit.



OMRON's Innovative Wire-saving Connector Inherited from the E3X-DA-N

The amplifier units with connectors supply the power to slave connectors via a master connector. This offers three following advantages.

- I 1. Greatly reduced wiring work
- Improved space usability due to the unnecessity of relay connectors
- 3. Simple stock management due to the unnecessity of distinction between master and slave for amplifiers



OMRON 1

Models available for a wide variety of applications at manufacturing sites

Industry Leading Two Amplifiers Loaded in a Small Body 2-channel models

Two amplifiers are loaded in a 10 mm-wide body. Space usability can be approximately doubled. In addition, approximately 40% of the energy can be saved.

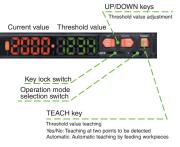
(compared to the value per channel of the former model)





Simpler Digital Fiber Sensors Simple & Easy Single-function Models

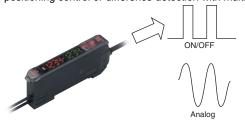
Required performance and functions have been reviewed from basic points to improve high-performance but hard-to-use digital models. Digital fiber sensors, used in the sense as if using volume type sensors, are added to the basic functions such as an APC function and digital display.



High-speed and High-resolution Analog Output Supports Wide Variety of Applications ····Advanced Analog Output Models

Analog Control Output

The voltage in the range of 1 to 5 V is output according to the incident level (digital display). Wide variety of applications is possible including positioning control or difference detection with multiple levels.



Area Output Function Area Judgment Is PossibleAdvanced, Twin-output Models

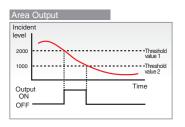
Only one sensor is enough for area judgment for height or others that has required multiple sensors.

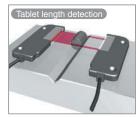
Setting two threshold values allows easy output inside and outside range.

High-speed and High Resolution

Detection modes can be switched in accordance with applications. High-speed response of 80 μ s (super-high-speed mode) supports the positioning controls that require high-speed control.







Sticker detection

Remote Input Function Sensors Controlled from Outside · · · · Advanced, Externalinput Models

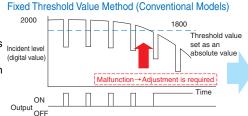
Remote settings for teaching/power tuning/light OFF are possible with input signals.

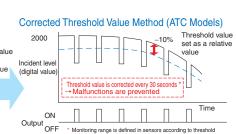
The remote input function meets the diversifying demands such as remote settings made for frequent teaching due to level change corresponding to workpiece change or remote operation check of sensors before operation.

n.

Equipped with an Industry's First ATC Function that Resolves Problems at Manufacturing Sites ····Advanced ATC Models

OMRON's unique algorithm is equipped to distinguish dust or dirt and the change of workpieces. Automatic correction of threshold values by sensors in accordance with changes prevents malfunctions and improves the operating rates of machines. The ATC function is especially effective for the applications that require high-resolution detection.





Ordering Information

Amplifier Units

Amplifier Units with Cables (2 m) [Refer to Dimensions on page 17.]

Item		Annogranco	Functions	Mo	odel
item		Appearance	Functions	NPN output	PNP output
Single-function models				E3X-DA11SE-S 2M	E3X-DA41SE-S 2M
Standard models				E3X-DA11-S 2M	E3X-DA41-S 2M
	Green LED		Timer Beenenge anded change	E3X-DAG11-S 2M	E3X-DAG41-S 2M
Mark-detecting models (multiple color light sources)	Blue LED		Timer, Response speed change	E3X-DAB11-S 2M	E3X-DAB41-S 2M
(maniple color light sources)	Infrared LED		e	E3X-DAH11-S 2M	E3X-DAH41-S 2M
	External-input models	Remote setting, counter, differential operation		E3X-DA11RM-S 2M	E3X-DA41RM-S 2M
Advanced medale	Twin-output models		Area output, self-diagnosis, differential operation	E3X-DA11TW-S 2M	E3X-DA41TW-S 2M
Advanced models	ATC function models		ATC (Threshold value automatic correction)	E3X-DA11AT-S 2M	E3X-DA41AT-S 2M
	Analog output models		Analog output models	E3X-DA11AN-S 2M	E3X-DA41AN-S 2M
2-channel models			AND/OR output	E3X-MDA11 2M	E3X-MDA41 2M

Amplifier Units with Connectors

Item		Annogranas	Functions	N	Model
iteiii		Appearance Functions –		NPN output	PNP output
Single-function models				E3X-DA6SE-S	E3X-DA8SE-S
Standard models				E3X-DA6-S	E3X-DA8-S
	Green LED		Timer Decrease speed shapes	E3X-DAG6-S	E3X-DAG8-S
Mark-detecting models (multiple color light sources)	Blue LED		Timer, Response speed change	E3X-DAB6-S	E3X-DAB8-S
inditiple color light sources)	Infrared LED			E3X-DAH6-S	E3X-DAH8-S
	External-input models		Remote setting, counter, differential operation	E3X-DA6RM-S	E3X-DA8RM-S
Advanced models	Twin-output models		Area output, self-diagnosis, differential operation	E3X-DA6TW-S	E3X-DA8TW-S
	ATC function models		ATC (Threshold value automatic correction)	E3X-DA6AT-S	E3X-DA8AT-S
2-channel models			AND/OR output	E3X-MDA6	E3X-MDA8

Ratings and Specifications

				Contro	ol output/	input			Functi	ions		
		Light source	Response time	ON/OFF output	Input	Analog output	Power tuning	Timer	Interfer- ence pre- vention	Differen- tial detec- tion	counter	ATC
Single-fund	ction models		1 ms	Only								
Standard n	nodels	Red LED	50 μs to 4 ms	main			0	0	0			
Mark-	E3X-DA□G-S	Green LED	50 1-	0-1-								
detecting	3X-DA□B-S	Blue LED	50 μs to 4 ms	Only main			0	0	0			
models	E3X-DA□H-S	Infrared LED										
	Twin-output models		50 μs to 4 ms 80 μs to 4 ms 130 μs to 4 ms Main + sub (2 lines)		(1 line)					0	0	
Ad-	External-input models	Red LED										
vanced models	ATC function models	- Red LED				0	0	0			0	
	Analog output		80 μs to 4 ms	Only main		(1 line)						
2-channel	models	Red LED	130 μs to 4 ms	Main + main (2 inde- pendent lines)			0	0	0			

Amplifier Unit Connectors (Order Separately)

Note: Protector seals are provided as accessories. [Refer to Dimensions on page 19.]

Item	Appearance	Cable length	No. of con- ductors	Model
Master Connector			3	E3X-CN11
Master Connector		2 m	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	
Model	NPN output	PNP output
Single-function models	E3X-DA6SE-S	E3X-DA8SE-S
Standard models	E3X-DA6-S	E3X-DA8-S
Mark-detecting models	E3X-DAG6-S	E3X-DAG8-S
(multiple color light	E3X-DAB6-S	E3X-DAB8-S
sources)	E3X-DAH6-S	E3X-DAH8-S
	E3X-DA6TW-S	E3X-DA8TW-S
Advanced models	E3X-DA6RM-S	E3X-DA8RM-S
	E3X-DA6AT-S	E3X-DA8AT-S
2-channel models	E3X-MDA6	E3X-MDA8

	Applicable Connector (Order Separately)						
	Master Connector	Slave Connector					
+	E3X-CN11	E3X-CN12					
	E3X-CN21	E3X-CN22					

When Using 5 Amplifier Units

Amplifier Units (5 Units)

+ 1 Master Connector + 4 Slave Connectors

Mobile Console (Order Separately) [Refer to Dimensions on page 20.]

Appearance	Model	Remarks
	E3X-MC11-SV2 (model number of set)	Mobile Console with Head, Cable, and AC adapter pro- vided as accessories
	E3X-MC11-C1-SV2	Mobile Console
	E3X-MC11-H1	Head
	E39-Z12-1	Cable (1.5 m)

Note: Use the E3X-MC11-SV2 Mobile Console for the E3X-DA-S/MDA-series Amplifier Units.

The E3X-MC11-SV2 is an upgraded version of the E3X-MC11-S that is fully interchangeable with the older model.

Accessories (Order Separately)

Mounting Bracket [Refer to E39-L/F39-L/E39-S/E39-R.]

Appearance	Model	Quantity
	E39-L143	1

End Plate [Refer to PFP-...]

Appearance	Model	Quantity
	PFP-M	1

Amplifier Units

	Tyme	Single-function	Standard	Mark-detecting	models (multiple col	or light sources)	
	Туре	models	models	Green LED	Blue LED	Infrared LED	
ltem	Model	E3X-DA□SE-S	E3X-DA□-S	E3X-DAG□-S	E3X-DAB□-S	E3X-DAH□-S	
Light sour	ce (wavelength)	Red LED (635 nm)		Green LED (525 nm)	Blue LED (470 nm)	Infrared LED (870nm)	
	ply voltage	12 to 24 VDC ±10%, ripple (p-p) 10% max.					
Power con	sumption	960 mW max. (current consumption: 40 mA max. at power supply voltage of 24 VDC)					
Control ou	tput		oltage: 26.4 VDC; NPN nax.; residual voltage:				
Remote co	ntrol input	No-voltage input (contact/non-contact)					
Protection	circuits	Reverse polarity for p	ower supply connectio	n, output short-circuit			
	Super-high- speed mode		Operate: 48 μs, reset	: 50 μs * 1, * 2			
Re- sponse	High-speed mode		Operate/reset: 250 μs	5			
time	Standard mode	Operate or reset: 1 m	s				
	High-resolution mode		Operate or reset: 4 m	ıs			
Sensitivity	setting	Teaching or manual n	nethod				
	Power tuning			and reception gain, dig			
	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 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1 s-increments				
Func- tions	Automatic power control (APC)	High-speed control method for emission current					
	Zero-reset	Negative values can be displayed. (Threshold value is shifted.)					
	Initial reset	Settings can be returned to defaults as required.					
	Mutual interference prevention	Possible for up to 10	Units *3				
Display		Operation indicator (orange)	Operation indicator (c	orange), Power Tuning	indicator (orange)		
Digital disp	olay	incident level + threshold	Select from incident level + threshold or other 6 patterns				
Display ori	ientation		Switching between normal/reversed display is possible.				
Ambient illumination Incandescent lamp: 10,000 lux max			Switching between no	ormal/reversed display	is possible.		
	lumination			ormal/reversed display	is possible.		
(Receiver s	lumination	Sunlight: 20 Operating: Groups of Groups of Groups of	0,000 lux max.	C to 55°C °C to 50°C :5°C to 45°C	is possible.		
Receiver s	lumination side)	Sunlight: 20 Operating: Groups of Groups of Groups of Storage: -30°C to 7	0,000 lux max. ,000 lux max. 1 to 2 Amplifiers: -25° 3 to 10 Amplifiers: -25 11 to 16 Amplifiers: -2	C to 55°C °C to 50°C :5°C to 45°C ondensation)	is possible.		
Ambient te Ambient hungsplants	umination side) emperature range umidity range resistance	Sunlight: 20 Operating: Groups of Groups of Groups of Storage: -30°C to 7 Operating and storage 20 MΩ min. (at 500 V	0,000 lux max. 1,000 lux max. 1 to 2 Amplifiers: -25°(3 to 10 Amplifiers: -25 11 to 16 Amplifiers: -2 0°C (with no icing or company of the company of	C to 55°C °C to 50°C :5°C to 45°C ondensation)	is possible.		
Ambient te Ambient hungled Ambient hungled Ambient hungled Dielectric s	umination side) emperature range umidity range resistance strength	Sunlight: 20 Operating: Groups of Groups of Groups of Groups of Storage: -30°C to 7 Operating and storage 20 MΩ min. (at 500 V 1,000 VAC at 50/60 F	0,000 lux max. 1,000 lux max. 1 to 2 Amplifiers: -25°(3 to 10 Amplifiers: -25 11 to 16 Amplifiers: -2 0°C (with no icing or compared to 10	C to 55°C °C to 50°C 5°C to 45°C ondensation) c condensation)			
Ambient te Ambient hungled his properties of the properties of th	umination side) emperature range umidity range resistance strength esistance	Sunlight: 20 Operating: Groups of Groups of Groups of Storage: -30°C to 7 Operating and storage 20 MΩ min. (at 500 V 1,000 VAC at 50/60 F Destruction: 10 to 55	0,000 lux max. 1,000 lux max. 1 to 2 Amplifiers: -25°4 3 to 10 Amplifiers: -25 11 to 16 Amplifiers: -2 0°C (with no icing or compared to the state of the state o	C to 55°C °C to 50°C 5°C to 45°C ondensation) c condensation)		ections	
Ambient te Ambient hungled to the control of the c	emperature range umidity range resistance strength esistance stance	Sunlight: 20 Operating: Groups of Groups of Groups of Storage: -30°C to 7 Operating and storage 20 MΩ min. (at 500 V 1,000 VAC at 50/60 F Destruction: 10 to 55 Destruction: 500 m/s²	0,000 lux max. 1,000 lux max. 1 to 2 Amplifiers: -25°4 3 to 10 Amplifiers: -25 11 to 16 Amplifiers: -2 0°C (with no icing or compared to the second to the s	C to 55°C °C to 50°C '5°C to 45°C ondensation) c condensation) ble amplitude for 2 hrs		ections	
Ambient te Ambient hunsulation Dielectric s Vibration re Shock resi Degree of p	emperature range umidity range resistance strength esistance stance stance protection	Sunlight: 20 Operating: Groups of Groups of Groups of Storage: -30°C to 7 Operating and storage 20 MΩ min. (at 500 V 1,000 VAC at 50/60 F Destruction: 10 to 55 Destruction: 500 m/s² IEC 60529 IP50 (with	0,000 lux max. ,000 lux max. 1 to 2 Amplifiers: -25°(3 to 10 Amplifiers: -25 11 to 16 Amplifiers: -2 0°C (with no icing or compared to the second sec	C to 55°C °C to 50°C '5°C to 45°C ondensation) c condensation) ble amplitude for 2 hrs		ections	
Ambient te Ambient hu Insulation in Dielectric s Vibration re Shock resi Degree of p	emperature range umidity range resistance strength esistance stance protection n method	Sunlight: 20 Operating: Groups of Groups of Groups of Storage: -30°C to 7 Operating and storage 20 MΩ min. (at 500 V 1,000 VAC at 50/60 F Destruction: 10 to 55 Destruction: 500 m/s² IEC 60529 IP50 (with Pre-wired or amplifier	0,000 lux max. 1,000 lux max. 1 to 2 Amplifiers: -25°(3 to 10 Amplifiers: -25 11 to 16 Amplifiers: -2 0°C (with no icing or coes: 35% to 85% (with no DC) Iz for 1 minute Hz with a 1.5-mm doul, for 3 times each in X, Protective Cover attact	C to 55°C °C to 50°C 'S°C to 45°C ondensation) c condensation) ble amplitude for 2 hrs y and Z directions	each in X, Y and Z dir	ections	
Ambient te Ambient hi Insulation Dielectric s Vibration r Shock resi Degree of p	emperature range umidity range resistance strength esistance stance protection n method icked state)	Sunlight: 20 Operating: Groups of Groups of Groups of Storage: -30°C to 7 Operating and storage 20 MΩ min. (at 500 V 1,000 VAC at 50/60 F Destruction: 10 to 55 Destruction: 500 m/s² IEC 60529 IP50 (with Pre-wired or amplifier Pre-wired model: App	0,000 lux max. 1,000 lux max. 1 to 2 Amplifiers: -25°(3 to 10 Amplifiers: -25 11 to 16 Amplifiers: -2 0°C (with no icing or coe: 35% to 85% (with no DC) Iz for 1 minute Hz with a 1.5-mm doul, for 3 times each in X, Protective Cover attact unit connector 100 g, Amplifier u	C to 55°C °C to 50°C '5°C to 45°C ondensation) c condensation) ble amplitude for 2 hrs	each in X, Y and Z dir	ections	
Ambient te Ambient hu Insulation Dielectric s Vibration re Shock resi Degree of p	emperature range umidity range resistance strength esistance stance protection n method	Sunlight: 20 Operating: Groups of Groups of Groups of Storage: -30°C to 7 Operating and storage 20 MΩ min. (at 500 V 1,000 VAC at 50/60 F Destruction: 10 to 55 Destruction: 500 m/s² IEC 60529 IP50 (with Pre-wired or amplifier	0,000 lux max. 1,000 lux max. 1 to 2 Amplifiers: -25°(3 to 10 Amplifiers: -25 11 to 16 Amplifiers: -2 0°C (with no icing or coe: 35% to 85% (with no DC) Iz for 1 minute Hz with a 1.5-mm doul, for 3 times each in X, Protective Cover attact unit connector 100 g, Amplifier u	C to 55°C °C to 50°C 'S°C to 45°C ondensation) c condensation) ble amplitude for 2 hrs y and Z directions	each in X, Y and Z dir	ections	

^{*1.} Communications are disabled if the detection mode is selected during super-high-speed mode, and the communications functions for mutual interference prevention and the Mobile Console will not function.

*2. PNP output is as follows: Operate: 53 µs, reset: 55 µs.

*3. Mutual interference prevention can be used for only up to 6 Units if power tuning is enabled.

			Advanc	ed models		
	Туре	External input mod- els	Twin output mod- els	ATC function mod- els	Analog output mod- els	2-channel models
Item	Model	E3X-DA□RM-S	E3X-DA□TW-S	E3X-DA□AT-S	E3X-DA□AN-S	E3X-MDA□
Light so	urce (wavelength)	Red LED (635 nm)				
Power s	upply voltage	12 to 24 VDC ±10%, ri	pple (p-p) 10% max.			
Power c	onsumption	1,080 mW max. (curre	nt consumption: 45 m	A max. at power supply	voltage of 24 VDC)	
	ON/OFF output	Load power supply volload current: 50 mA ma				
Con- trol output	Analog output	Control output Voltage output: 1 to 5 VDC (Connection load 10 kΩ min.) Temperature characteristics 0.3%F.S./°C Response speed/repeat accuracy Super-high-speed mode: 80 μs/1.5%F.S. High-speed mode: 250 μs/1.5%F.S. Standard mode: 1 ms/1%F.S. High-resolution mode: 4 ms/0.75%F.S.				
Remote	control input	No-voltage input (contact/non-contact) *1				
Protection	on circuits	Reverse polarity for po	wer supply connection	n, output short-circuit		
	Super-high- speed mode	Operate: 48 μs, reset: 50 μs *2, *3, *4	Operate or reset: 80 μs *2	Operate or reset: 130 μs *2	Operate or reset: 80 μs *2	Operate or reset: 130 μs *2, *5
Re- sponse	High-speed mode	Operate or reset: 250 μ	ıs	1		Operate or reset: 450 μs
time	Standard mode	Operate or reset: 1ms				
	High-resolution mode	Operate or reset: 4ms				
Sensitiv	ity setting	Teaching or manual me	ethod			
	Power tuning	Light emission power a		gital control method		
	Differential de- tection	Switchable between sin Single edge: Can be se Double edge: Can be se	et to 250 μs, 500 μs, 1	ms, 10 ms, or 100 ms.		-
	Timer function	Select from OFF-delay	, ON-delay, or one-sh set in 1-ms incremen	ot timer. ts, 20 to 200 ms set in 1	10-ms increments, 200 m	ns to 1 s set in 100-ms
Func-	Automatic pow- er control (APC)	High-speed control me	thod for emission cur	rent		
tions	Zero-reset /	Negative values can be	e displayed. (Thresho	ld value is shifted.)		
	Initial reset	Settings can be returned				
	Mutual interference prevention	Possible for up to 10 U				Possible for up to 9 Units (18 channels) *
	Counter	Switchable between up counter and down counter. Set count: 0 to 9,999,999				

^{*1.} Input Specifications

	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.)

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

*3. PNP output is as follows: Operate: 53 μs, reset: 55 μs.

*4. When counter is enabled: 80 μs for operate and reset respectively.

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

*6. Mutual interference prevention can be used for only up to 6 Units if power tuning is enabled.

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

			Advance	d models						
	Туре	External input models	Twin-output mod- els	ATC function mod- els	Analog output models	2-channel models				
Item	Model	E3X-DA□RM-S	E3X-DA□TW-S	E3X-DA□AT-S	E3X-DA□AN-S	E3X-MDA				
Func- tions	I/O setting	External input set- ting (Select from teaching, power tun- ing, zero reset, light OFF, or counter re- set.)	Output setting (Select from channel 2 output, area out- put, or self-diagno- sis.)	Output setting (Select from channel 2 output, area output, self-diagnosis output, or ATC error output)	Analog output set- ting (offset voltage adjustable)	Output setting (Select from channel 2 output, AND, OR, leading edge sync, falling edge sync, or differential output)				
Display		Operation indicator (orange), Power Tuning indicator (or- ange)	Operation indicator for Operation indicator for		Operation indicator (orange), Power Tuning indi- cator (orange)	Operation indicator for channel 1 (or- ange), Operation in- dicator for channel 2 (orange)				
Digital disp	play	Select from incident level + threshold or other 7 patterns	Select from incident level + threshold or other 6 patterns Select from incident level + threshold or other 6 patterns incident level for channel 2 or ot patterns							
Display or	ientation	Switching between normal/reversed display is possible.								
Ambient ill (Receiver	lumination side)	Incandescent lamp: 10,000 lux max. Sunlight: 20,000 lux max.								
Ambient te	emperature range	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								
		Storage: –30°C to 70°C (with no icing or condensation) Operating and storage: 35% to 85% (with no condensation)								
	umidity range resistance			condensation)						
		20 MΩ min. (at 500 V	,							
Dielectric s		1,000 VAC at 50/60 Hz for 1 minute Destruction: 10 to 55 Hz with a 1.5-mm double amplitude for 2 hrs each in X, Y and Z directions								
Shock resi				•	each III A, T and Z un	ECHOHS				
Degree of		Destruction: 500 m/s², for 3 times each in X, Y and Z directions IEC 60529 IP50 (with Protective Cover attached)								
Connectio	•	Pre-wired or amplifier unit connector								
	icked state)	Pre-wired model: Approx. 100 g, Amplifier unit connector model: Approx. 55 g								
	Case	Polybutylene terephthalate (PBT)								
Materials	Cover	Polycarbonate (PC)								
Accessories		Instruction manual								

Amplifier Unit Connectors

Item	Model	E3X-CN11/21/22	E3X-CN12					
Rated	current	2.5 A						
Rated	voltage	50 V						
Contac	ct resistance	$20~\text{m}\Omega$ 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.)						
Mate-	Housing	Polybutylene terephthalate (PBT)						
rials	Contacts	Phosphor bronze/gold-plated nickel						
Weigh (packe	t d state)	Approx. 55 g Approx. 25 g						

Mobile Console

Item Model	E3X-MC11-SV2
Applicable Sensors	E3X-DA-S E3X-MDA E3C-LDA E2C-EDA
Power supply voltage	Charged with AC adapter
Connection method	Connected via adapter
Weight (packed state)	Approx. 580 g (Console only: 120 g)

Refer to *Instruction Manual* provided with the Mobile Console for details.

Sensing Distance Through-beam Models

(Unit: mm)

				E3X-D	A□-S			E3X-MDA		
Туре			High- reso- lution mode	Stan- dard mode	High- speed mode	Super- high- speed mode	High- reso- lution mode	Stan- dard mode	High- speed mode	Super- high- speed mode
		E32-T11R/E32-T12R/E32-T15XR/ E32-TC200BR(B4R)	700	530	350	140	450	350	230	140
	Flexible	E32-T14LR/E32-T15YR/E32-T15ZR	270	210	130	50	170	130	85	50
	(new standard)	E32-T21R/E32-T22R/E32-T222R/ E32-T25XR/E32-TC200FR(F4R)	160	130	75	30	100	75	50	30
		E32-T24R/E32-T25YR/E32-T25ZR	60	50	25	10	35	27	18	10
		E32-TC200/E32-T12/E32-T15X/ E32-TC200B(B4)	1,000	760	500	200	650	500	330	200
Standard		E32-T14L/E32-T15Y/E32-T15Z	600	460	300	120	390	300	200	120
models	Standard	E32-TC200A	900	680	450	180	580	450	300	180
		E32-TC200E/E32-T22/E32-T222/ E32-T25X/E32-TC200F(F4)	270	220	125	50	170	130	85	50
		E32-T24/E32-T25Y/E32-T25Z	160	130	75	30	100	70	45	30
	Break-	E32-T11/E32-T12B/E32-T15XB	900	680	450	180	580	450	300	180
	resistant	E32-T21/E32-T221B/E32-T22B	240	200	110	45	150	110	70	45
	F1	E32-T25XB	180	150	85	35	125	95	60	35
	Fluorine coating	E32-T11U	900	680	450	180	580	450	300	180
		E32-T17L	20,000*1	20,000*1	10,000	4,000	13,000	10,000	6,500	4,000
		E32-TC200 + E39-F1	4,000*2	4,000*2	2,600	1,500	4,000	3,700	2,400	1,500
	Long- distance, high power	E32-T11R + E39-F1	4,000*2	3,700	2,400	970	3,100	2,400	1,600	970
		E32-T11 + E39-F1 E32-T14	4,000*2 4,000*2	3,600 3,400	2,300 2,250	930	3,000 2,900	2,300	1,500 1,450	930
		E32-T11L/E32-T12L	1,700	1,330	870	350	1,100	870	580	350
		E32-T11L + E39-F2	910	800	500	180	600	520	340	180
		E32-T11R + E39-F2	520	400	250	100	330	260	170	100
		E32-T11 + E39-F2	820	660	430	160	530	430	280	160
		E32-T21L/E32-T22L	540	440	250	100	340	260	170	100
	Ultracom-	E32-T223R	160	130	75	30	110	85	55	30
Special-	pact,	E32-T33-S5	53	44	25	10	35	28	18	10
beam	ultrafine	E32-T333-S5	12	10	6	4	8	6	5	4
models	sleeve	E32-T334-S5	6	5	3	2	4	3	2	2
	Fine beam	E32-T22S	2,500	1,900	1,250	500	1,600	1,250	830	500
	-ine Deani	E32-T24S	1,750	1,300	870	350	1,100	870	580	350
		E32-T16PR	1,100	840	560	220	730	560	370	220
		E32-T16P	1,500	1,100	750	300	970	750	500	300
		E32-T16JR	980	750	480	190	600	480	320	190
	Area sensing	E32-T16J	1,300	1,000	650	260	800	650	430	260
		E32-T16WR E32-T16W	1,700	1,300	850	340	1,100	1 100	570	340
		E32-116W	2,300 3,700	1,800 2,800	1,150 1,850	450 740	1,400 2,400	1,100	730 1,200	450 740
		E32-N21	750	610	350	140	470	360	240	140
		LVL IIIL I	750	010	330	140	470	300	240	140

^{*1.} The optical fiber for the E32-T17L is 10 m long on each side, so the value is 20,000 mm *2. The optical fiber is 2 m long on each side, so the sensing distance is 4,000 mm.

	E32-T51 E32-T54 E32-T81R-S Heat- resistant E32-T61-S + E39-F2			E3X-D	A□-S			E3X-N	/IDA□	
Туре			High- reso- lution mode	Stan- dard mode	High- speed mode	Super- high- speed mode	High- reso- lution mode	Stan- dard mode	High- speed mode	Super- high- speed mode
		E32-T51	1,000	760	500	200	650	500	330	200
		E32-T54	300	230	150	60	190	150	100	60
	114	E32-T81R-S	360	280	180	70	230	180	120	70
		E32-T61-S + E39-F2	600	450	300	120	390	300	200	120
		E32-T61-S + E39-F1	4,000	3,400	2,200	900	3,000	2,200	1,450	900
		E32-T84S-S	1,750	1,300	870	350	1,100	870	570	350
		E32-T61-S	600	450	300	120	390	300	200	120
Environ-		E32-T11F	2,500	2,000	1,300	520	1,600	1,300	850	520
ment resistant		E32-T12F	4,000*	3,000	2,000	800	2,600	2,000	1,300	800
models	Chemical resistant	E32-T14F	500	400	250	100	320	250	160	100
	rooiotant	E32-T51F	1,800	1,400	900	350	1,190	920	600	350
		E32-T81F-S	920	700	460	190	600	460	300	190
		E32-T51V	260	200	130	50	170	130	85	50
	V	E32-T51V + E39-F1V	1,350	1,000	680	260	850	650	430	260
	Vacuum resistant	E32-T54V	210	130	100	35	110	85	55	35
	Todiotant	E32-T54V + E39-F1V	660	500	330	180	420	320	210	180
		E32-T84SV	630	480	320	130	410	310	200	130

^{*} The optical fiber for the E32-T12F is 2 m long on each side, so the sensing distance is 4,000 mm.

Reflective Models (Unit: mm)

		Model		E3X-D	A□-S			E3X-N	/IDA□	
Туре			High- reso- lution mode	Stan- dard mode	High- speed mode	Super- high- speed mode	High- reso- lution mode	Stan- dard mode	High- speed mode	Super- high- speed mode
		E32-D11R/E32-D12R/E32-D15XR/ E32-DC200BR(B4R)	300	170	120	50	170	120	80	50
		E32-D14LR	80	45	30	14	45	33	22	14
	Flexible (new stan-	E32-D15YR/E32-D15ZR	70	40	26	12	40	29	19	12
	dard)	E32-D211R/E32-D21R/E32-D22R/ E32-D25XR/E32-DC200FR(F4R)	50	30	20	8	30	22	14	8
		E32-D24R	26	15	10	4	15	10	6	4
		E32-D25YR/E32-D25ZR	14	8	5	2	8	5	3.3	2
		E32-DC200/E32-D15X/ E32-DC200B(B4)	500	300	200	90	300	210	130	90
		E32-D12	400	230	160	70	230	160	100	70
Standard models		E32-D14L	200	110	80	36	110	80	50	36
illoueis	Standard	E32-D15Y/E32-D15Z	170	100	65	30	100	70	45	30
		E32-D211/E32-DC200E/E32-D22/ E32-D25X/E32-DC200F(F4)	130	80	50	22	80	55	35	22
		E32-D24	50	30	20	8	30	22	14	8
		E32-D25Y/E32-D25Z	35	20	12	6	20	14	9	6
		E32-D11/E32-D15XB	300	170	120	50	170	125	80	50
	Break-	E32-D21B/E32-D221B	110	70	45	20	70	50	30	20
	resistant	E32-D21/E32-D22B	50	30	20	8	30	22	14	8
		E32-D25XB	85	50	30	15	50	35	23	15
	Fluorine coating	E32-D11U	300	170	120	50	170	125	80	50

E3X-DA-S/MDA

		Model		E3X-E	DA□-S			E3X-N	/IDA□		
Туре	,		High- reso- lution mode	Stan- dard mode	High- speed mode	Super- high- speed mode	High- reso- lution mode	Stan- dard mode	High- speed mode	Super- high- speed mode	
		E32-D16	40 to 1,000	40 to 700	40 to 450	40 to 240	40 to 600	40 to 490	40 to 300	40 to 240	
	Long distance, high power	E32-D11L	650	400	260	110	400	270	180	110	
		E32-D21L/E32-D22L	210	130	80	35	130	85	High-speed mode	35	
	Ultracom- pact, ultrafine	E32-D33	25	16	10	4	16	10	6	4	
	sleeve	E32-D331	5	3	2	0.8	3	2	1.3	0.8	
		E32-CC200R	250	150	100	45	150	105	65	45	
		E32-CC200	500	300	200	90	300	210	_	90	
		E32-D32L	250	150	100	45	150	100		45	
Special-		E32-C31/E32-D32	120	75	50	22	75			22	
beam models	Coaxial/small spot	E32-C42 + E39-F3A	Spot diameter variable in the range 0.1 to 0.6 mm at distances in the range 6 to 15 mm.								
		E32-D32 + E39-F3A	Spot diameter variable in the range 0.5 to 1mm at distances in the range 6 to 15 mm.								
		E32-C41 + E39-F3A-5	0.1-mm dia. spot at a distance of 7 mm.								
		E32-C31 + E39-F3A-5	0.5-mm dia. spot at a distance of 7 mm.								
		E32-C41 + E39-F3B	0.2-mm dia. spot at a distance of 17 mm.								
		E32-C31 + E39-F3B	0.5-mm dia. spot at a distance of 17 mm. Spot diameter of 4 mm max. at distances in the range 0 to 20 mm.								
	A	E32-C31 + E39-F3C									
	Area sensing Retroireflec-	E32-D36P1 E32-R21 + E39-R3 (provided)	250	150	100	45 10 to	150 250	100	65	45	
	tive	E32-R16 + E39-R1 (provided)				150 to	1,500				
		E32-L25/E32-L25A				3.	.3				
	Comment	E32-L24S				0 t	0 4				
	Convergent- reflective	E32-L24L				2 to 6 (c	enter 4)				
		E32-L25L			5	5.4 to 9 (c		2)			
		E32-L86		Т	1		10	Т			
		E32-D51	400	230	160	72	230	165	110	72	
Environ-	Heat- resistant	E32-D81R-S E32-D61-S	150	90	60	27	90			27	
resistant		E32-D73-S	100	60	40	18	60	40	25	18	
ment-	Chemical-	E32-D12F	160	95	65	30	95		45	30	
	resistant	E32-D14F	70	40	30	10	40	28	18	10	
							_		_		

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Application-specific Models

(Unit: mm)

		Model		E3X-D	A□-S		E3X-MDA				
Туре			High- reso- lution mode	Stan- dard mode	High- speed mode	Super- high- speed mode	High- reso- lution mode	Stan- dard mode	High- speed mode	Super- high- speed mode	
	Label	E32-G14	10								
	detection	E32-T14	4,000*	3,400	2,250	900	2,900	2,200	1,450	900	
		E32-L25T					vith a dia ness of 1		the range	8 to 10	
	Liquid-level detection	E32-D36T	Applicat	ole tube:	Transpar	ent tube (no restric	tion on d	liameter)		
		E32-A01					ith a dian of 1 mm		.2, 6.4, or	9.5 mm	
		E32-A02	Applicable tube: Transparent tube with a diameter in the range mm and a recommended wall thickness of 1 mm								
		E32-D82F1(F2)	Liquid-contact model								
	Glass- substrate	E32-L16-N	0 to 15 0 to 12			0 to 12	0 to 15			0 to 12	
tion-		E32-A08	10 to 20								
Applica- tion- specific models	alignment	E32-A07E1(E2)	15 to 25				15 to 25				
		E32-L66	5 to	18	5 to 16	-	5 to 18		5 to 14		
	Glass- substrate	E32-A09/E32-A09H		15 to 38			15 to 38				
	Mapping	E32-A09H2		20 to 30		_		20 to 30			
		E32-A03/E32-A03-1	1,150	890	600	250	750	580	380	250	
	Wafer mapping	E32-T24S	1,750	1,300	870	350	1,100	870	580	350	
		E32-A04/E32-A04-1	460	340	225	100	300	220	145	100	
	Soda glass with reflection	E32-L64		1 to 5	ı			1 to 5	2 to 4		
	factor If 7%	E32-A10	0 t	0 8	0 to 6	0 to 4	0 to 8	0 to 6	0 t	o 4	

^{*} The optical fiber for the E32-T14 is 2 m long on each side, so the sensing distance is 4,000 mm.

Green, Blue, and Infrared Light Sources

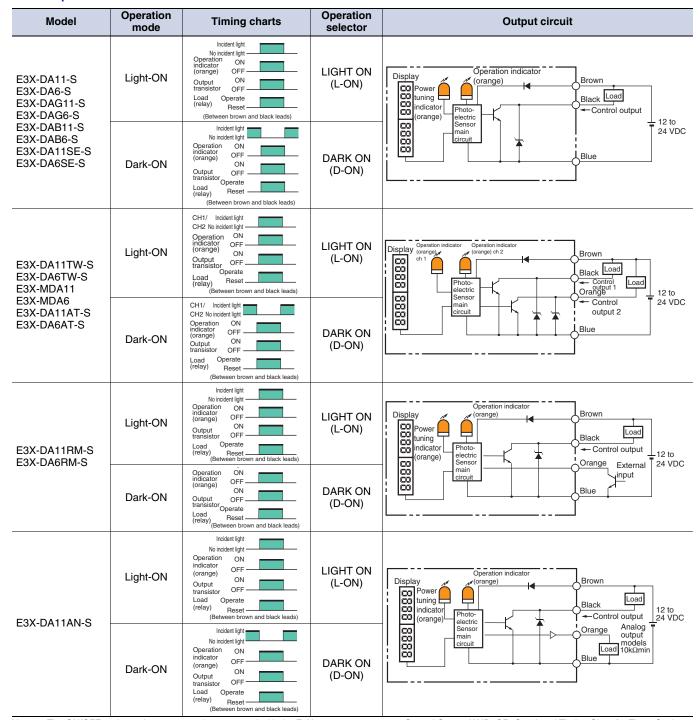
(Unit: mm)

		Model	E3	X-DAG□	-S/DAB□] -S		E3X-D	AH□-S	
Туре			High- reso- lution mode	Stan- dard mode	High- speed mode	Super- high- speed mode	High- reso- lution mode	Stan- dard mode	High- speed mode	Super- high- speed mode
		E32-T11R/E32-T12R/E32-T15XR/ E32-TC200BR(B4R)	65	50	35	30	280	190	130	55
Through-	Standard	E32-T14LR/E32-T15YR/E32-T15ZR	25	20	22	12	100	75	80	21
beam models	Standard	E32-TC200/E32-T12/E32-T15X/ E32-TC200B(B4)	100	75	50	45	400	280	180	80
		E32-T14L/E32-T15Y/E32-T15Z	50	40	30	25	240	160	110	45
	Special beam	E32-T11L/E32-T12L	150	120	85	75	700	490	320	140
	Standard	E32-D11R/E32-D12R/E32-D15XR/ E32-DC200BR(B4R)	17	14	10	8	120	90	60	21
		E32-D14LR	4.4	3.5	2.5	2.2	32	24	16	5.5
		E32-D15YR/E32-D15ZR	4.2	3.3	2.2	2.1	28	20	13	5
		E32-DC200/E32-D15X/ E32-DC200B(B4)	32	25	16	16	200	150	100	35
Reflective models		E32-D14L	11	9	6	5.5	80	60	40	14
models		E32-D15Y/E32-D15Z	10	8	5.5	5	65	50	33	11
		E32-D11L	44	35	22	22	260	190	130	45
		E32-CC200R	15	12	8	7.5	100	75	50	17
	Special beam	E32-CC200	32	25	16	16	200	150	100	35
		E32-D32L	15	12	8	7.5	100	75	50	17
		E32-C31/E32-D32	7.5	6	4	3.5	50	37	25	8.5
Applica- tion-	Label	E32-T14	320	260	220	160	1,800	1,200	820	360
specific models	detection	E32-G14		1	0			1	0	

Refer to E32 Series for details on Fiber Units.

Output Circuit Diagrams

NPN Output

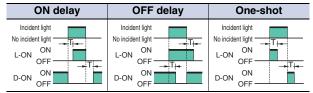


Note: 1. The ON/OFF regions when areas settings are used with the E3X-DA \square TW-S are as follows:

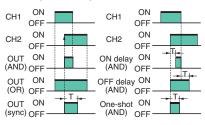
LIGHT ON: ON when the incident level is between the thresholds for channels 1 and 2.

DARK ON: OFF when the incident level is between the thresholds for channels 1 and 2.

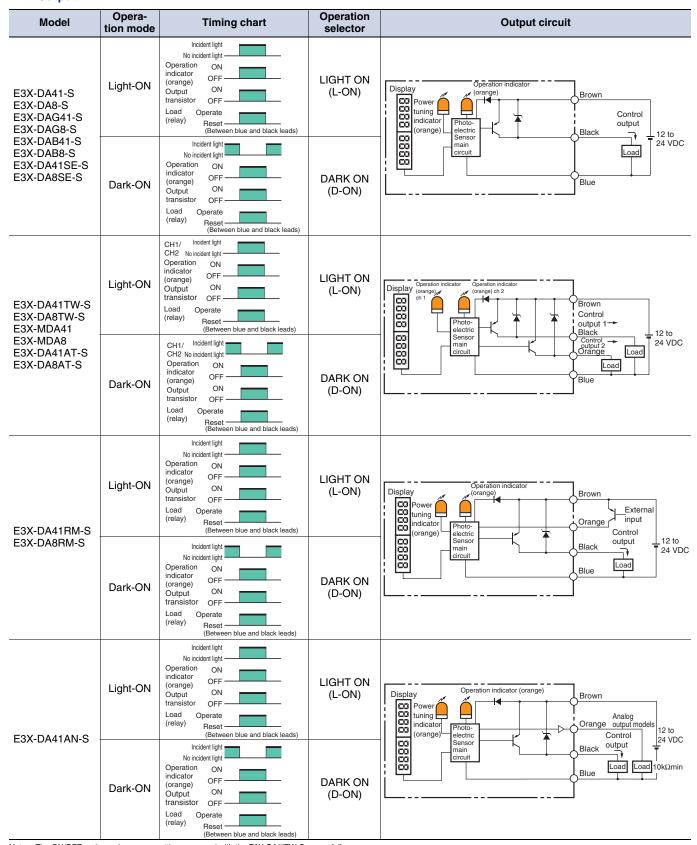
2. Timing Charts for Timer Function Settings (T: Set Time)



3. Control Output (AND, OR, Sync) and Timing Chart for Timer Settings (T: Set Time)



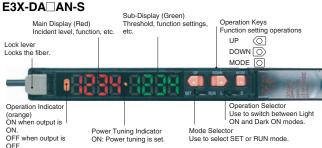
PNP Output



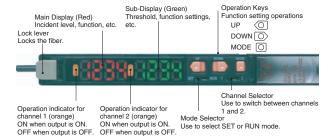
Note: The ON/OFF regions when areas settings are used with the E3X-DA□TW-S are as follows: LIGHT ON: ON when the incident level is between the thresholds for channels 1 and 2. DARK ON: OFF when the incident level is between the thresholds for channels 1 and 2.

Nomenclature

Amplifier Units E3X-DA□-S E3X-DA□RM-S



E3X-DA□TW-S E3X-DA□AT-S E3X-MDA□



Safety Precautions

Refer to Warranty and Limitations of Liability.



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



Precautions for Correct Use

Do not use the product in atmospheres or environments that exceed product ratings.

Amplifier Unit

Designing

Operation after Turning Power ON

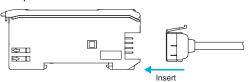
The Sensor is ready to detect within 200 ms after the power supply is turned ON. If the Sensor and load are connected to separate power supplies, be sure to turn ON the Sensor first.

Mounting

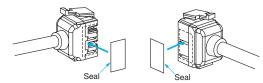
Connecting and Disconnecting Connectors

Mounting Connectors

 Insert the Master or Slave Connector into the Amplifier Unit until it clicks into place.



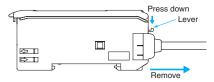
Attach the protector seals (provided as accessories) to the sides of master and slave connectors that are not connected.



Note: Attach the seals to the sides with grooves.

Removing Connectors

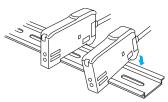
- Slide the slave Amplifier Unit(s) for which the Connector is to be removed away from the rest of the group.
- After the Amplifier Unit(s) has been separated, press down on the lever on the Connector and remove it. (Do not attempt to remove Connectors without separating them from other Amplifier Units first.)



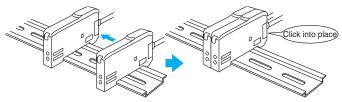
Adding and Removing Amplifier Units

Adding Amplifier Units

1. Mount the Amplifier Units one at a time onto the DIN track.



Slide the Amplifier Units together, line up the clips, and press the Amplifier Units together until they click into place.



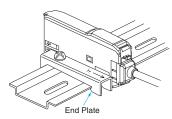
Removing Amplifier Units

Slide Amplifier Units away from each other, and remove from the DIN track one at a time. (Do not attempt to remove Amplifier Units from the DIN track without separating them first.)

- Note: 1. The specifications for ambient temperature will vary according to the number of Amplifier Units used together. For details, refer to *Ratings* and Specifications
 - Always turn OFF the power supply before joining or separating Amplifier Units.

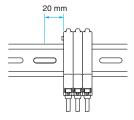
Mounting the End Plate (PFP-M)

An End Plate should be used if there is a possibility of the Amplifier Unit moving, e.g., due to vibration. If a Mobile Console is going to be mounted, connect the End Plate in the direction shown in the following diagram.



Mounting the Mobile Console Head

Leave a gap of at least 20 mm between the nearest Amplifier Unit and the Mobile Console head.

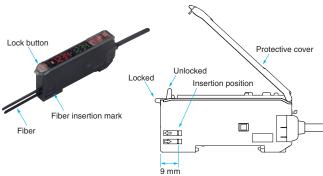


Fiber Connection

The E3X Amplifier Unit has a lock button for easy connection of the Fiber Unit. Connect or disconnect the fibers using the following procedures:

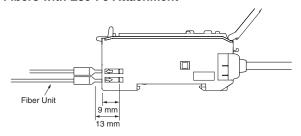
1. Connection

Open the protective cover, insert the fibers according to the fiber insertion marks on the side of the Amplifier Unit, and lower the lock lever.

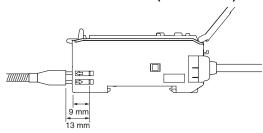


Note: If one of the fibers from the Fiber Unit has a white line, such as with a Coaxial Sensor, that fiber is for the Emitter. Insert it into the Emitter section. Refer to Dimensions for the Fiber Unit to see if there is an Emitter fiber.

Fibers with E39-F9 Attachment

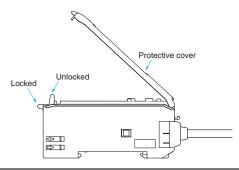


Fibers That Cannot Be Free-Cut (with Sleeves)



2. Disconnecting Fibers

Remove the protective cover and raise the lock lever to pull out the fibers



- Note: 1. To maintain the fiber properties, confirm that the lock is released before removing the fibers.
 - Be sure to lock or unlock the lock button within an ambient temperature range between -10°C and 40°C.

Adjusting

Mutual Interference Protection Function

There may be some instability in the digital display values due to light from other sensors. If this occurs, decrease the sensitivity (i.e., decrease the power or increase the threshold) to perform stable detection.

EEPROM Writing Error

If the data is not written to the EEPROM correctly due to a power failure or static-electric noise, initialize the settings with the keys on the Amplifier Unit. ERR/EEP will flash on the display when a writing error has occurred.

Optical Communications

Several Amplifier Units can be slid together and used in groups. Do not, however, slide the Amplifier Units or attempt to remove any of the Amplifier Units during operation.

Others

Protective Cover

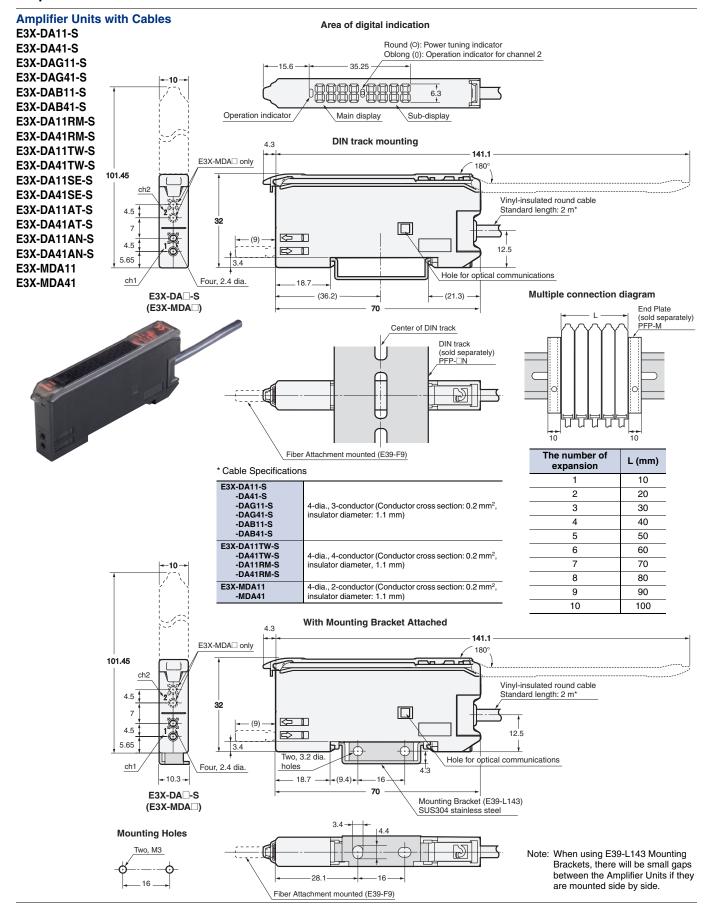
Always keep the protective cover in place when using the Amplifier Unit.

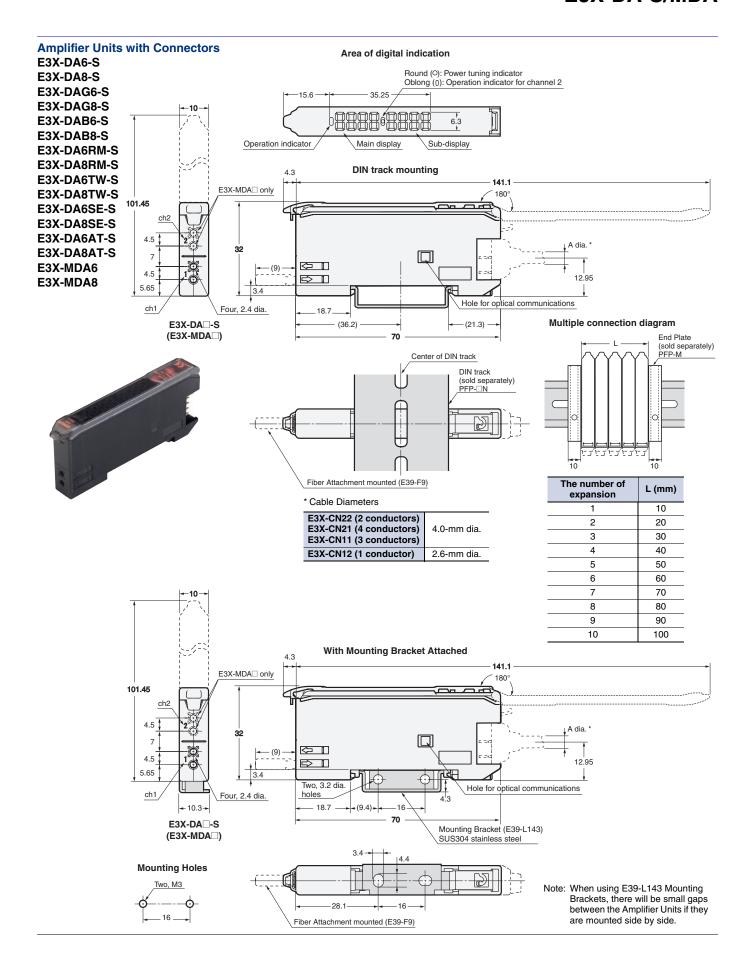
Mobile Console

Use the E3X-MC11-SV2 Mobile Console for the E3X-DA-S-series Amplifier Units.

(Unit: mm)

Amplifier Units



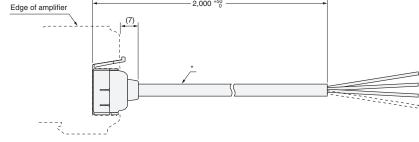


Amplifier Unit Connectors

Master Connectors

E3X-CN11 E3X-CN21

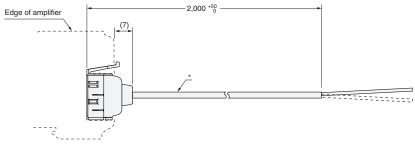




* E3X-CN11: 4 dla. cable / 3 conductors / Standard length: 2 m (Conductor cross section: 0.2 mm² (AWG24), Insulator diameter: 1.1 mm) E3X-CN21: 4 dla. cable / 4 conductors / Standard length: 2 m (Conductor cross section: 0.2 mm² (AWG24), Insulator diameter: 1.1 mm)

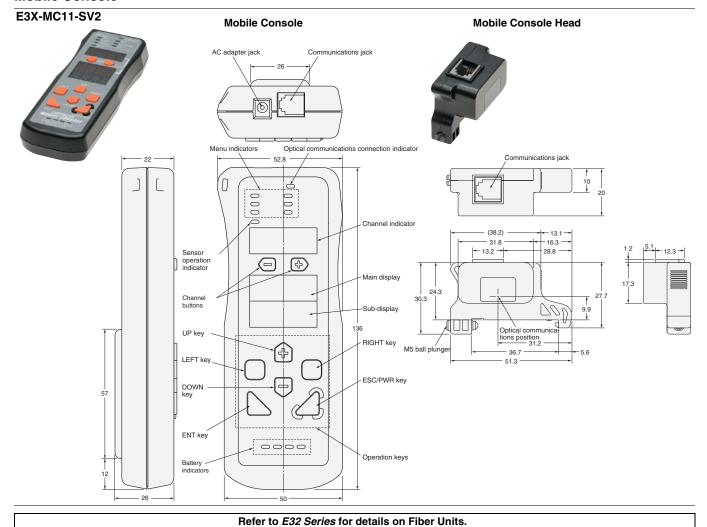
Slave Connectors E3X-CN12





* E3X-CN12: 2.6 dia. cable / 1 conductor / Standard length: 2 m (Conductor cross section: 0.2 mm² (AWG24), Insulator diameter: 1.1 mm) E3X-CN22: 4 dia. cable / 2 conductors / Standard length: 2 m (Conductor cross section: 0.2 mm² (AWG24), Insulator diameter: 1.1 mm)

Mobile Console



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