

1)Do not use the Amplifier Unit in environments subject to flammable or explosive gases. 2)Do not use the Amplifier Unit in environments subject to exposure to water, oil, chemicals, etc. 3)Do not attempt to disassemble, repair, or modify the Amplifier Unit in any way.

4)Do not apply voltages or currents that exceed the rated ranges.
 5)Do not use the Amplifier Unit in atmospheres or environments that exceedproduct ratings

6)Wire the Amplifier Unit correctly, e.g., do not reverse the polarity of the power supply.

7)Connect the load correctly. 8)Do not short both ends of the load.

9)Do not use the Amplifier Unit if the case is damaged.

10)When disposing of the Amplifier Unit, treat it as industrial waste. 11)Do not use the sensor in the place exposed to the direct sunlight.

Precautions for Correct Use 1)Do not use the Amplifier Unit under the following cond ①In the place exposed to the direct sunlight. 2 In the place where humidity is high and condensation may occur 3)In the place where corrosive gas exists.

(3) In the place where corrosive gas exists.
(4) In the place where vibration or shock is directly transmitted to the product.
(2) Wire the Amplifier Unit separately from power supply or high-voltage lines. If the Amplifier Unit wiring is wired together with or placed in the same duct as high-power lines, inductive noise may cause operating errors or damage the Amplifier Unit.

3)For extending wires, use a cable 0.3mm min., and 100m max. in length. When using the cable as a Korea's S-mark certified product, use the cable of less than 10m in length

4)Do not extend the following force values applied the cable. Tensile: 40 N max., torque: 0.1 Nm max., pressure:20 N max., flexure:3 kg max. 5)The Amplifier Unit is ready to operate 200 ms after the power supply is turned ON. If the

Amplifier Unit and load are connected to power supplies separately, turn ON the power supply to the Amplifier Unit first.

to the Amplifier Unit first.
6)Depending on the application environment, time may be required for the light level to stabilize after the power supply is turned ON.
7)Output pulses may occur when the power is interrupted, so turn OFF the ower to the load or load line before turning OFF the power to the Sensor.

8)When you use the Amplifier Units with Connectors, to prevent electric shock or short-circuits, attach the protector seals provided with E3X-CN-series Connectors to the sides of power supply

9)Always turn OFF the power supply before connecting,

9) Always turn Ore the power supply before connecting, separating, or adding Amplifier Units.
10) Do not pull or apply excessive pressure or force (exceeding 9.8 N·m) on the Fiber Unit when it is mounted to the Amplifier Unit.
11) Mobile console E3X-MC11-SV2 doesn't correspond to the new feature such as tough mode and ON delay OFF delay timer now. E3X-MC11-S cannot be used.
12) Ortical communication era to tooscible with the E3X DA N.

12)Optical communication are not possible with the E3X-DA-N. Optical communication are possible with the E3X-DA-S or the E3X-MDA.

13)Always keep the protective cover in place when using the Amplifier Unit.
 14)Do not use thinners, benzine, acetone, or kerosene for cleaning the Amplifier Unit.

Confirming the Package Contents

Amplif	fier Unit: 1	• Instruction Sheet (this sheet): 1		
1 Ra	tinge and	Specifications		
1. I ia	lings and	opecilications		
Model	NPN PNP	E3X- DA21-S E3X- DA51 S	E3X-DA7-S	
Control or	itput quantity	2 ESA- DA51-5	2 2	
External in	nput quantity	1		
Connectio	n method	Pre-wired	Wire-saving connector *1	
Light sour	ce	Red LED(625nm)		
Power sur	wavelength)	12 to 24 VDC +10% ripple (p-p) 10% max		
Power cor	sumption	Normal: 960 mW max (current consumption: 40 mA max	x at nower supply voltage of 24 VDC	
1 0 1 0 1 0 0 1	sumption	80 mA max, at power supply voltage of 12 VDC)		
		ECO1:720 mW max. (current consumption: 30 mA max. at power supply voltage of 24 VDC,		
		60 mA max. at power supply voltage of 12 VDC)		
		EC02-600 mW max. (current consumption: 25 mA max. 50 mA max at power supply voltage of 12 VDC)	at power supply voltage of 24 VDC,	
Control or	itput	Load power supply voltage: 26.4 VDC max.	: NPN/PNP open collector:	
control output		load current: 50 mA max.; residual voltage: 2	2 V max. off-stage current: 0.5 mA max.	
External in	nput	No-voltage input	-	
Protection	circuits	Power supply reverse polarity protection, Ou	tput short-circuit protection and Output	
Deenenee	Cupas high	reverse polarity protection.		
time	speed mode *2	Operate of reset: ou us		
	High-speed	Operate or reset: 250 us		
	mode			
	Standard mode	Operate or reset: 1 ms		
	High-resolution	Operate or reset: 4 ms		
	Tough mode	Operate or reset: 16ms		
Sensitivity	setting	Teaching (2-point teaching, teaching for though-beam sensor heads,		
	e	teaching for reflective sensor heads, setting the threshold at the maximum sensitivity,		
		positioning teaching or automatic-teaching) or munual adjustment		
Functions	Power tuning	Light emission power and reception gain, dig	ital control method	
	detection	Single edge: 250us 500us 1ms 10ms or 100	lms	
	detection	Double edge: 500µs, 1ms, 2ms, 20ms or 2001	ms	
	Timer	No effect, OFF delay, ON delay, one-shot or ON delay OFF delay		
	Auto norrion control	Timer time: 1ms to 5s (variable)		
	Auto power control	High-speed control method for emission current		
	Zero reset	Negative values can be displayed (Threshold	value is shifted, too)	
	Setting reset	Initial reset or user reset	, ,	
	Mutual interference	Possible for up to 10 Units *3		
	prevention East mode	Off Factor Fac2 *4		
	Output setting	Output for each channel Area output or Self-	-diagnosis output	
	External input	Various teachings, automatic teaching, power tuning, zero reset,		
	settings	light emission OFF or ATC start		
Indicator		Operation indicator for channel 1 (orange), Operation indicator for channel 2 (orange)		
Digital sw	itch	Peak light level+Bottom light level		
		Incident peak light level+No incident bottom light level. Analog bar display.		
		Light level+Peak light level, Light level+Channel number		
Digital dis	splay	7-segment displays (Main display: Red, Sub-d	isplay: Green),	
		display direction can be reversed.		
Ambient illumination		Incandescent lamp: 10,000 lux max., Sunligh	it: 20,000 lux max.	
(Receiver side) 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		
Ambient humidity		Groups of 11 to 16 Amplifiers: -25°C to 45°C		
		Storage: -30°C to 70°C (with no icing or condensation)		
Ambient humidity		Operating and storage: 35% to 85% (with no 20 MO min (at 500 VDC)	condensation)	
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute		
Vibration resistance		Destruction: 10 to 55 Hz with a 1.5-mm doub	ble amplitude for 2 hours	
		each in X, Y and Z directions	-	
Shock resi	istance	Destruction: 500 m/s ² , for 3 times each in X,	Y and Z directions	
Weight (m	protection	Approx 100 g	Approx 55 g	
Materials	Case	Polybutylene terephthalate (PBT)	приол. 55 g	
	Cover	Polycarbonate (PC)		

*1: Both the E3X-CN21 Master Connector (4-conductor) and the E3X-CN22 Slave Connector (2-conductor) can be used *2: Communications and mutual interference prevention does not function if super-high-speed mode is selected for the detection mode.

3: Mutual interference prevention can be used for only up to 6 Units if power tuning is enabled.
*4: Sensing distance is about 1/2 and light level is about 1/3 when the eco-mode is effective.

2. I/O Circuits



* Only E3X-DA21-S and E3X-DA51-S

① Operation indicator

(8) Lock button

Æ

for channel 1 (orange)



③ Operation indicator for channel 2 (orange)

(5) SET/RUN switch

FEFEURE

④ Sub-display (green)

6 Channel selector

⑦ Operation keys

 Lit when the output for channel 1 is ON.
 Displays the incident light level, the function name or the change in the incident light lerel.
 Lit when the output for channel 2 is ON.
 Display the threshold, the setting of the function displayed on the main disply or threshold ratio. Display the threshold, the
 Used to switch the mode. Mode Descriptio

SET Select for various settings or teaching. RUN Select for operating, threshold value adjust ting or various exec Used to select the channel to display or set. Used to change the display or set functions. Key RUN mode SET mode UP key Increases the threshold or threshol Depends on the setting. Executes teaching. · Changes the setting forward. DOWN key Decreases the threshold or threshold Depends on the settir · Executes teaching · Changes the setting in reverse.

Switches the function to be set on the

key setting. display. 8 Used to connect and disconnect the Fiber Unit 5. Installing the Amplifier Unit Mounting Units Mounting Units Catch the hook on the Fiber Unit connector end of the Unit on the DIN Track and then press down on the other end of the Unit until it locks into place. Always attach the Fiber Unit connector end first. If the incorrect end is attached first, the mounting strength will be reduced. Removing Units Press the Unit in the direction indicated by "1" and then lift up on the Fiber Unit connector end of the Unit in the direction indicated by "2." Joining Amplifier Units (for Units with Connectors) Up to 16 Units can be joined.

Execute variously depends on the MODE

Mount the Amplifier Units one at a time onto the DIN Track.
 Slide the Amplifier Units together and press the Amplifier Units together until they click into place

Secure the Units with an End Plate (PFP-M) if there is a possibility of the Amplifier Units moving, e.g., due to vibration.

Remove the Units in the reverse order.

6. Connecting the Fiber Unit

MODE key

- Open the protective cover
 Press up the lock button.
 Insert the fiber unit all the way to the back of the
- connector insertion opening. 4. Return the lock button to its original position to secure the fiber unit

7. Basic Settings

1. Setting the Operation Mode

Select either light-ON or dark-ON operation. Set as the operation mode in SET mode. Refer to 8. Detailed Settings.

	Selection	Description
LON (light-ON)		The output will turn ON when the incident light level is above the threshold. If DIFF (differential operation) is set for the detection method, the output will turn ON when an edge is detected.
	DON (dark-ON)	The output will turn ON when the incident light level is below the threshold. If DIFF (differential operation) is set for the detection method, the output will turn OFF when an edge is detected.

2. Adjusting the Power (as Required)

Power tuning can be used to adjust the incident light level that is currently being received to the power tuning target value (default: 2,000). Before tuning ON the power, always secure the detection object and Head and be sure that the incident light level is stable.



PEUN: OFF\$ The sub-display will flash twice and power tuning will be cleared. PTUN OF





If DIFF (differential operation) is set for the detection method, the threshold value will be set to half of the difference between the two measured values.

⁽²⁾Teaching for Through-beam Sensor Heads It is performed without a workpiece. The threshold will be set to lower with ratio in the teaching level setting for the light level of no workpiece. Refer to 8. DetailedSetings.



If DIFF (differential operation) is set for the detection method, the threshold value will be set to the minimum value that can be detected with stability for the light level of the without worlpiece. CHECKI

③ Teaching for Reflective Sensor Heads It is performed without a workpiece (i.e., for the background). The threshold will be set to upper with ratio in the teaching level setting for the light level of no workpiece. Refer to 8. DetailedSetings



If DIFF (differential operation) is set for the detection method, the threshold value will be set to the minimum value that can be detected with stability for the light level of the without worlpiece.







Execute it by the without workpiece. The value that is set will depend on the detection method and power tuning settings.

This method cannot be used to set the threshold when the detection method has been set to DIFF (differential operation).



 Initial Reset, User Restinitial reset: Initialize all outputs of the ser save is not of the series of the s	et of settings to return to aved states. executed(Initial reset itch to SET mode.	o the default states. only)
+ Pres	s the UP key and the DO	WN key for 5 seconds or more.
]	NO? Not initialized YES? Initialized
46257	. Initialization has has	
GOOD	completed.	Light level Threshold
2) When user save is executed Setting Method	d(Select initial reset of	or user reset)
Switch to	SET mode.	
+ Press the U	IP key and the DOWN ke	ey for 5 seconds or more.
	∕⊳	USER USER Initial reset
USEr		Refer to 1) When user save is not executed.
		Not execute user reset YESP Execute user reset
9852		500
GOOD Us	ser reset has been mpleted.	2:30 1000 Light level Threshold
10. Error display		
If the error occurs, the error r In these case Execute followi	nessages are blinking ng procedures to rest	as below.
ouEr cür	Overcurrent of cont	rol output
OVER CUR	Check an output load a Check whether the load	nd keep current in rating. 1 to be short-circuited.
Err 888	EEPROM error	
ERR EEP	Execute initial reset op	eration.

Suitability for Use

THE PRODUCTS CONTAINED IN THIS SHEET ARE NOT SAFETY RATED. THEY ARE NOT DESIGNED OR RATED FOR ENSURING SAFETY OF PERSONS, AND SHOULD NOT BE RELIED UPON AS A SAFETY COMPONENT OR PROTECTIVE DEVICE FOR SUCH PURPOSES. Please refer to separate catalogs for OMRON's safety rated products.

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the product.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used. Know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM. See also Product catalog for Warranty and Limitation of Liability.

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