

Ratings and Specifications

Fiber Amplifier Units

Type		Standard models	Advanced models with simultaneous 2-color determination	Advanced models with 4-color determination
Item	Model	E3X-DAC□-S□ (□: 11/41/6/8)	E3X-DAC□-S (□: 21/51)	E3X-DAC□B-S (□: 21/51)
Sensing distance		Depends on the Fiber Unit. Refer to page 5 to 7 for details.		
	Sensing object	Reflective models: Standard 11 color cards *1, Through-beam models: Opaque or translucent object		
Light source (wavelength)		White LED (420 to 700 nm)		
Sensing method		C Mode: RGB ratio determination (or I Mode: Light intensity determination for red, green, or blue; Black Mode: Determination of total light intensity for red, green, and blue) *2		
	Number of registered colors	1	2 (simultaneous determination)	4 (2-color simultaneous determination × 2 banks)
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.		
Power consumption		960 mW max. (current consumption: 40 mA max. at power supply voltage of 24 VDC)		
Control outputs		NPN or PNP open collector Load power supply voltage: 26.4 VDC max. Load current: 50 mA max. (residual voltage: 2 V max.)		
Number of control outputs		1	2	
External input *3 (page 4)		---	Remote control	Bank switching
Protection circuits		Reverse polarity for power supply connection, Output short-circuit, Reversed output polarity protection		
Response time	Super-high-speed mode *4 High-speed mode Standard mode High-resolution mode	Operate or reset: 60 μs Operate or reset: 300 μs Operate or reset: 1 ms Operate or reset: 4 ms	Operate or reset: 120 μs Operate or reset: 600 μs Operate or reset: 2 ms Operate or reset: 8 ms	
Sensitivity setting (color registration, allowable range)		Teaching (one-point teaching or teaching with/without workpiece) or manual adjustment		
Functions	Operation mode	ON for match (ON for same color as registered color) or ON for mismatch (ON for different color from registered color)		
	Timer function	Timer type: OFF delay, ON delay, or one-short, Timer time: 1 ms to 5 s (variable)		
	Control outputs	---	Output for each channel, AND output, and OR output	
	Remote control	---	One-point teaching, teaching with/without workpiece, zero reset, and light emission OFF	Bank switching (switching between banks A and B and banks C and D)
	Display switch *5	Seven patterns total: Match + Threshold, Margin + Threshold, Analog bar display, Peak + Bottom, etc.		
	Initialization	Initial reset (factory defaults) or user reset (saved settings)		Initial reset (factory defaults)
	Zero reset	Supported		Not supported
Indicators		Operation indicator (orange)/I mode display indicator (orange)	Operation indicator for each channel (orange)	
Digital display		7-segment displays (Main display: Red, Sub-display: Green)		
Display direction		Switchable between normal and reversed.		
Ambient illumination (Receiver side)		Incandescent lamp: 3,000 lux Sunlight: 10,000 lux		
Ambient temperature range *6		Operating: -25°C to 55°C, Storage: -30°C to 70°C (with no icing or condensation)		
Ambient humidity range		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 50 Hz with a 1.5-mm double amplitude for 2 h each in X, Y and Z directions		
Shock resistance		Destruction: 500 m/s ² , for 3 times each in X, Y and Z directions		
Degree of protection		IEC IP50 (with Protective Cover attached)		
Connection method		Pre-wired (standard cable length: 2 m) or reduced-wiring connector (Units connected: 16 max.)	Pre-wired (standard cable length: 2 m)	
Weight (packed state)		Pre-wired model: Approx. 100 g, Amplifier unit connector model: Approx. 55 g		
Materials	Case	Polybutylene terephthalate (PBT)		
	Cover	Polycarbonate (PC)		
Accessories		Instruction manual		

Note: Refer to page 4 for *1 to *6.

*1. Sensing Object: Standard Color Card (230 Colors) from Japan Color Enterprise Co., Ltd.)

Color (11 standard colors)	Munsell color notation
White	N9.5
Red	4R 4.5/12.0
Yellow/red	4YR 6.0/11.5
Yellow	5Y 8.5/11.0
Yellow/green	3GY 6.5/10.0
Green	3G 6.5/9.0
Blue/green	5BG 4.5/10.0
Blue	3PB 5.0/10.0
Blue/purple	9PB 5.0/10.0
Purple	7P 5.0/10.0
Red/purple	6RP 4.5/12.5
(Black)	(N2.0)

*2. When teaching with/without a workpiece, the best sensing method will be automatically selected (RGB ratio (C Mode) or light intensity determination (I Mode)). If color differences are not strong enough and RGB ratios would result in unstable detection, then light intensity determination (I Mode) will be selected. The detection mode can be set to C, I, or Black Mode.

*3. 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.).

Refer to the Instruction Manual for the external input pulse width. A pulse width of 300 ms or longer is required to switch banks for the E3X-DAC□B-S.

*4. Mutual interference prevention cannot be used in super-high-speed mode, and light intensity determination (I Mode) must be used. The response time will be 150 μs if an AND or OR is set for the control outputs.

*5. With light intensity determination (I Mode and Black Mode), the correlation is not displayed, but rather the light intensity is displayed.

*6. The allowable ambient operating temperature changes according to the number of Units that are linked.

2 Units: -25 to 55°C, 3 to 10 Units: -25 to 50°C, and 11 to 16 Units: -25 to 45°C

Amplifier Unit Connectors

Item	Model	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 figure is for connection to the Fiber 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 Fiber 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

Operating Procedures (Typical)

Detecting Marks



Because it distinguishes RGB ratios, detection is highly resistant to workpiece movement.



Through-beam heads are capable of detecting color differences in semi-transparent objects.

Detecting Black Marks



In Black Mode, blank seam tape and other black marks can be detected regardless of film color or patterns

Distinguishing Trays



Four-color determination greatly reduces the work required for line switchovers.

Detecting Wafers



Workpieces that absorb a specific wavelength can be detected with a wide range of wavelengths.

Detecting Products on Conveyors



If you teach the conveyor (i.e., the background), you can detect workpieces even if they have different colors, shapes, or gloss.