# **Ratings and Specifications**

## **Fiber Amplifier Units**

	Туре	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. Refe	er to page 5 to 7 for details.		
	Sensing object	Reflective models: Standard 11 color cards *1, Through-beam models: Opaque or translucent object			
Light sou	irce (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 su	ipply 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 o	of control outputs	1	2		
External	input *3 (page 4)		Remote control	Bank switching	
Protectio	n circuits	Reverse polarity for power supply	connection, Output short-circuit, Re	eversed output polarity protectio	
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		
	ty setting (color regis- llowable range)	etting (color regis-			
	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 dela	y, or one-short, Timer time: 1 ms	to 5 s (variable)	
	Control outputs	Output for each channel, AND output, and OR output			
Functions	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 + Three	eshold, Margin + Threshold, Analog	bar display, Peak + Bottom, etc	
	Initialization	Initial reset (factory defaults) or i	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 di	splay	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)			
Insulatio	n 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/s², 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.)			
Weight (p	packed state)	Pre-wired model: Approx. 100 g	, Amplifier unit connector model:	Approx. 55 g	
	Case	Polybutylene terephthalate (PBT	Γ)		
		D. I I (DO)			
Materials	Cover	Polycarbonate (PC)			

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

  \*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 m $\Omega$ 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)**

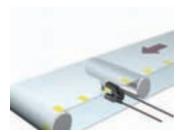


Because it distinguishes RGB ratios, detection is highly resistant to workpiece movement.





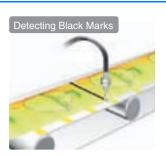
Four-color determination greatly reduces the work required for line switchovers.



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

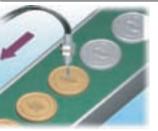


Workpieces that absorb a specific wavelength can be detected with a wide range of wavelengths.



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





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