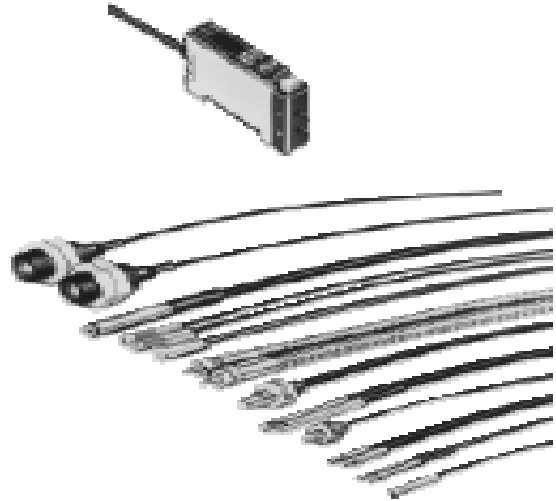


High Performance Amplifier Has Fast Response Time, Longer Sensing Distance and Self-Diagnostic Functions

- Ultra fast 20 μsec. response time (E3X-F)
- Extended sensing distance (E3X-H)
- User friendly features:
  - 8-turn sensitivity with position indicator
  - IP66 enclosure rating
  - Slim body mounts on DIN rail
- Set-mode blinking light source aids alignment



## Ordering Information

### ■ AMPLIFIERS

Part number	NPN output	E3X-A11	E3X-A21	E3X-F21	E3X-VG11	E3X-VG21
	PNP output	E3X-A41	E3X-A51	E3X-F51	—	—
Type	General-purpose			High-speed	Mark sensing	
Self-diagnostic function	None	Provided	Provided	Provided	None	Provided
Off-delay timer	None	Provided	Provided	Provided	None	Provided
Light source	Red LED				Green LED	

### ■ HIGH GAIN AMPLIFIERS

Part number	NPN output	E3X-H11
Type	High sensitivity	
Self diagnostic function	None	
Off-delay timer	Provided	
Light source	Red LED	

### ■ FIBER-OPTIC CABLES

Use E32-series fiber-optic cables. Refer to E32 data sheet in this catalog for specifications.

### ■ ACCESSORIES

Description		Part number
Cover with adjustment knob	Clear cover with gray knob allows sensitivity adjustment without removing cover. Enclosure rating is reduced to IP50.	E39-G3
Replacement cover	Smoked gray plastic like original cover	E39-G4

Note: Neither cover has any printing, such as part number, voltage or wiring information.

## Specifications

Part number		NPN	E3X-A11	E3X-A21	E3X-F21	E3X-VG11	E3X-VG21
		PNP	E3X-A41	E3X-A51	E3X-F51	—	—
Supply voltage		10-30 VDC 10% ripple max.			12-24 VDC±10% 10% ripple max.	10-30 VDC 10% ripple max.	
Current consumption		35 mA max.			40 mA max.		
Required fiber optic cables		All E32-series					
Light source		Pulse-modulated red LED (660 nm)				Pulse-modulated green LED (565 nm)	
Operation mode		Light-ON, Dark-ON or SET modes (switch selectable)					
Sensitivity		8-turn potentiometer with clutch and indicator					
Mutual interference protection		Not provided					
Control output	DC solid-state	Type	NPN — open collector PNP — open collector				
		Max. load	100 mA, 30 VDC max.				100 mA, 40 VDC max.
		Max. ON-state voltage drop	1 VDC max. at 100 mA				
Response time		200 µs max.			ON: 20 µs max. OFF: 30 µs max.	200 µs max.	
Timing functions		—	OFF-delay, 0.01 to 0.1 sec, adjustable; switch selectable			—	OFF-delay, 0.01 to 0.1 sec, adjustable; switch selectable
Alarm output		—	50 mA, 30 VDC max.			—	50 mA, 40 VDC max.
Check input	Input voltage	—	Light OFF: 1.5 V max.			—	Light OFF: 1.5 V max.
Circuit protection		Output short circuit protection, DC power reverse polarity protection					
Indicators		Light received (red LED) and output stability (green LED)					
Materials	Case	Heat-resistant ABS					
	Cover	Polycarbonate					
Mounting		DIN rail track, or on flat surface through holes in bracket (provided)					
Connections	Prewired	3 conductor cable, 2 m (6.5 ft)	5 conductor cable, 2 m (6.5 ft)			3 conductor cable, 2 m (6.5 ft)	5 conductor cable, 2 m (6.5 ft)
Weight		100 g (3.5 oz.) with 2 m cable					
Enclosure rating	IEC	IP66 (with cover on)					
Ambient temperature	Operating	-25° to 55°C with no ice buildup (-13° to 131°F)					
	Storage	-40° to 70°C (-40° to 158°F)					

## ■ HIGH GAIN AMPLIFIER

Part number		E3X-H11	
Supply voltage		10 - 30 VDC 10% ripple max.	
Current consumption		35 mA max.	
Required fiber optic cables		All E32 series	
Light source		Pulse modulated Red LED (660 nm)	
Operation mode		Light ON, Dark ON	
Sensitivity		8 turn potentiometer	
Control output	DC solid-state	Type	NPN - Open collector
		Max. load	100 mA, 30 VDC
		Max. ON-state voltage drop	1 VDC max. at 100 mA
Response time		1 m sec max.	
Timing functions		OFF DELAY 40 ms Fixed Switch selectable	
Circuit protection		Output short-circuit protection, DC power reverse polarity protection	
Indicators		Light received (Red LED) and output stability (Green LED)	
Materials	Case	Heat resistant ABS	
	Cover	Polycarbonate	
Mounting		DIN rail track, or on flat surface through holes in bracket (provided)	
Connections	Prewired	3 conductor cable 2 m (6.5 ft)	
Weight		100g (3.5 oz) with 2 m cable	
Enclosure ratings	IEC	IP66 (with cover on)	
Ambient temperature	Operating	-25° to -55°C with no icing build-up (-13° to 131°F)	
	Storage	-40° to 70°C (-40° to 158°F)	

# Nomenclature

## E3X-H11

**Stable Operation Indicator** (Green Indicator)

**Sensitivity Indicator**  
The position of the indicator can be checked.

**8-turn Sensitivity Adjuster**

**Mode Selector**

SET: The light source flashes. Set to this mode to adjust the light axis.

L-ON: Output transistor is ON when light is received.

D-ON: Output transistor is ON when light is not received.



**Light Reception Indicator** (Red Indicator)

**Hysteresis Adjuster**

**Timer Switch**

ON: Timer function is ON.

OFF: Timer function is OFF.

**Light Reception Monitoring Terminal**  
Monitoring is used with the E39-VX Beam Checker

## E3X-A11/A41 E3X-VG11

**Stable Operation Indicator** (Green Indicator)

**8-turn Sensitivity Adjuster**

**Mode Selector**

SET: The light source flashes. Set to this mode to adjust the light axis.

L-ON: Output transistor is ON when light is received.

D-ON: Output transistor is ON when light is not received.



**Light Reception Indicator** (Red Indicator)

**Sensitivity Indicator**  
Sensitivity adjustment can be checked visually.

**Light Reception Monitoring Terminal**  
Monitoring is used with the E39-VX Beam Checker

Note: Set the mode selector to L-ON or D-ON after the light axis is adjusted.

## E3X-A21/A51 E3X-F21/F51 E3X-VG21

**Stable Operation Indicator** (Green Indicator)

**Sensitivity Indicator**

**Timer Sensitivity Adjuster**

**Mode Selector**

SET: The light source flashes. Set to this mode to adjust the light axis.

L-ON: Output transistor is ON when light is received.

D-ON: Output transistor is ON when light is not received.



**Light Reception Indicator** (Red Indicator)

**Timer Switch**

ON: Timer function is ON.

OFF: Timer function is OFF.

**Light Reception Monitoring Terminal**  
Monitoring is used with the E39-VX Beam Checker

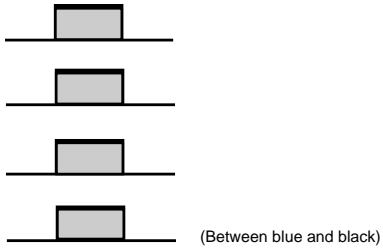
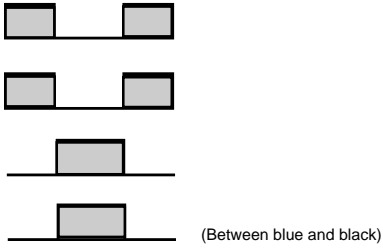
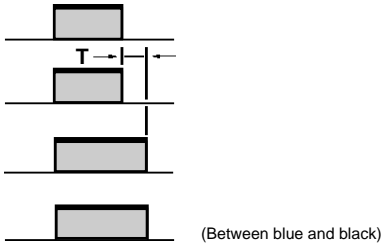
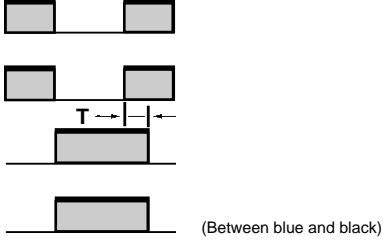
# Operation

## OUTPUT CIRCUITS

Type	Model	Mode switch	Output transistor	Output circuit
NPN	E3X-H11 E3X-A11 E3X-VG11	Light ON	ON when light is received.	<p><math>Z_D: V_Z = 39\text{ V}</math></p>
		Dark ON	ON when light is not received.	
	E3X-A21 E3X-VG21 E3X-F21	Light ON	ON when light is received.	<p><math>Z_D</math> (Zener diode): <math>V_Z = 39\text{ V}</math></p>
		Dark ON	ON when light is not received.	
PNP	E3X-A41	Light ON	ON when light is received.	<p><math>Z_D: V_Z = 39\text{ V}</math></p>
		Dark ON	ON when light is not received.	
	E3X-A51 E3X-F51	Light ON	ON when light is received.	<p><math>Z_D</math> (Zener diode): <math>V_Z = 39\text{ V}</math></p>
		Dark ON	ON when light is not received.	

■ TIMING CHARTS

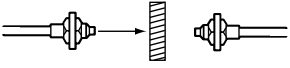

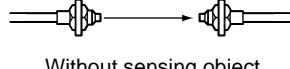

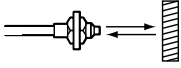



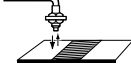

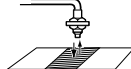

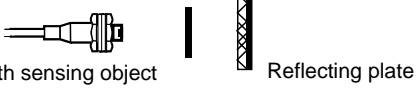

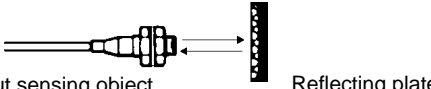

Type	Model	Mode switch	Output transistor	Timing circuit
NPN	E3X-H11 E3X-A11 E3X-VG11	Light ON	ON when light is received.	<p>Light received Light not received</p> <p>Light indicator (Red) ON OFF</p> <p>Output transistor ON OFF</p> <p>Load (relay) Operate release (Between brown and black)</p>
		Dark ON	ON when light is not received.	<p>Light received Light not received</p> <p>Light indicator (Red) ON OFF</p> <p>Output transistor ON OFF</p> <p>Load (relay) Operate release (Between brown and black)</p>
	E3X-A21 E3X-VG21 E3X-F21	Light ON	ON when light is received.	<p>Light received Light not received</p> <p>Light indicator (Red) ON OFF</p> <p>Output transistor ON OFF</p> <p>Load (relay) Operate release (Between brown and black)</p>
		Dark ON	ON when light is not received.	<p>Light received Light not received</p> <p>Light indicator (Red) ON OFF</p> <p>Output transistor ON OFF</p> <p>Load (relay) Operate release (Between brown and black)</p>

Type	Model	Mode switch	Output transistor	Timing chart
PNP	E3X-A41	Light ON	ON when light is received.	<p>Light received Light not received</p> 
		Dark ON	ON when light is not received.	<p>Light received Light not received</p> 
	E3X-A51 E3X-F51	Light ON	ON when light is received.	<p>Light received Light not received</p> 
		Dark ON	ON when light is not received.	<p>Light received Light not received</p> 

## ■ ADJUSTING SENSITIVITY

### E3X-H11/-A□□/-F□□/-VG□□

Using a sensing object, set the Sensitivity Adjust so that the indicators operate as described in the following table:

Sensing method		Detection	Light	Indicators
Through-beam		 <p>With sensing object</p>	OFF	 <p>Green: light ON Red: light OFF</p>
		 <p>Without sensing object</p>	ON	 <p>Green: light ON Red: light ON</p>
Reflective	Detection	 <p>With sensing object</p>	ON	 <p>Green: light ON Red: light ON</p>
		 <p>Without sensing object</p>	OFF	 <p>Green: light ON Red: light OFF</p>
	Detection of the difference in color or shade	 <p>Color that has a high reflective ratio</p>	ON	 <p>Green: light ON Red: light ON</p>
		 <p>Color that has a low reflective ratio</p>	OFF	 <p>Green: light ON Red: light OFF</p>
Retroreflective		 <p>With sensing object      Reflecting plate</p>	OFF	 <p>Green: light ON Red: light OFF</p>
		 <p>Without sensing object      Reflecting plate</p>	ON	 <p>Green: light ON Red: light ON</p>

Note: 1. If the indicators operate as described in the table, the E3X can operate in stable condition within the rated temperature range.

2. Even when the green indicator is OFF, the E3X will operate stably if the operating temperature change since the initial settings is within  $\pm 10^{\circ}\text{C}$ .