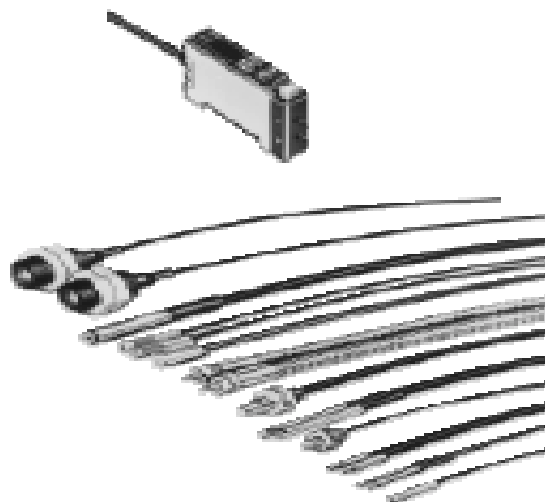


Fiber-Optic Photoelectric Sensor

E3X

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

- Ultra fast 20 μ sec. 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 | None | Provided |
| Off-delay timer | None | | 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

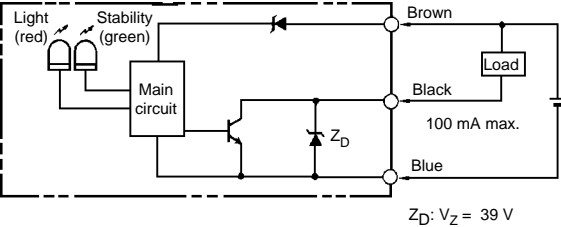
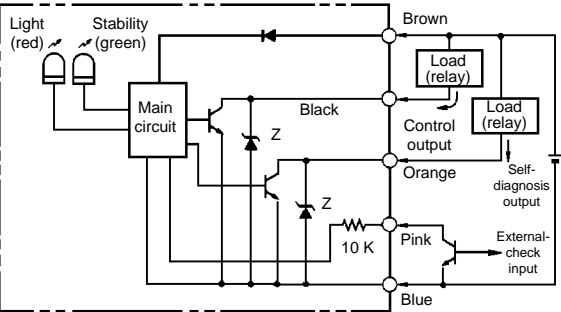
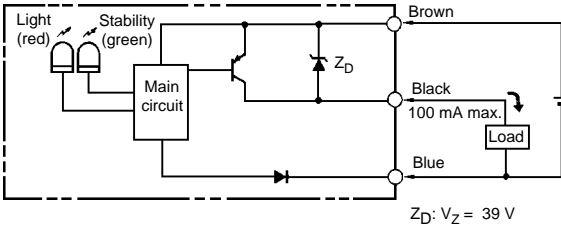
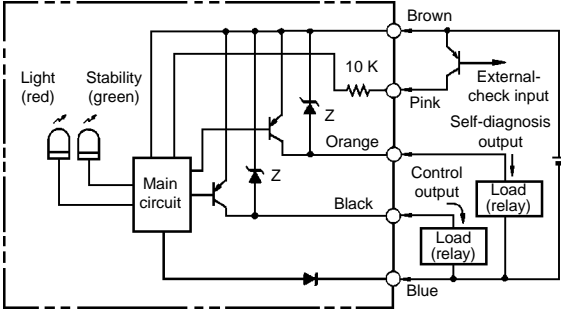
ON: Timer function is ON.

OFF: Timer function is OFF.















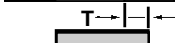

Light Reception Monitoring Terminal
Monitoring is used with the E39-VX Beam Checker

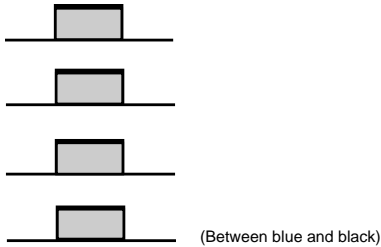
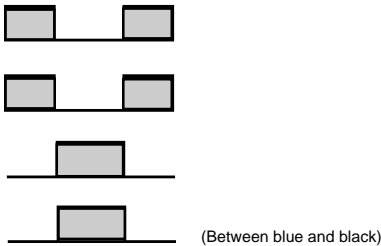
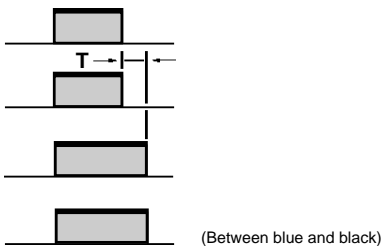
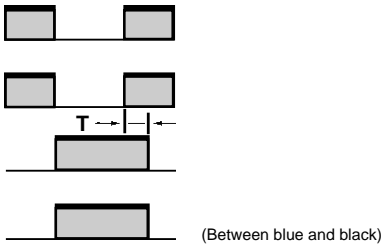
Operation

■ 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>$Z_D: V_Z = 39\text{ V}$</p> |
| | | Dark ON | ON when light is not received. | |
| | E3X-A21 E3X-VG21 E3X-F21 | Light ON | ON when light is received. |  <p>Z_D (Zener diode): $V_Z = 39\text{ V}$</p> |
| | | Dark ON | ON when light is not received. | |
| PNP | E3X-A41 | Light ON | ON when light is received. |  <p>$Z_D: V_Z = 39\text{ V}$</p> |
| | | Dark ON | ON when light is not received. | |
| | E3X-A51 E3X-F51 | Light ON | ON when light is received. |  <p>Z_D (Zener diode): $V_Z = 39\text{ V}$</p> |
| | | Dark ON | ON when light is not received. | |

■ TIMING CHARTS

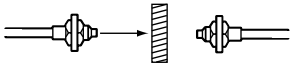



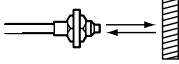



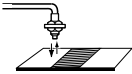

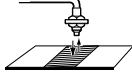

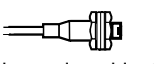



| Type | Model | Mode switch | Output transistor | Timing circuit |
|------|--------------------------------|-------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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</p>  <p>(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</p>  <p>(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</p>  <p>(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</p>  <p>(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 | |  With sensing object | OFF |  Green: light ON Red: light OFF |
| | |  Without sensing object | ON |  Green: light ON Red: light ON |
| Reflective | Detection |  With sensing object | ON |  Green: light ON Red: light ON |
| | |  Without sensing object | OFF |  Green: light ON Red: light OFF |
| | Detection of the difference in color or shade |  Color that has a high reflective ratio | ON |  Green: light ON Red: light ON |
| | |  Color that has a low reflective ratio | OFF |  Green: light ON Red: light OFF |
| Retroreflective | |  With sensing object | OFF |  Green: light ON Red: light OFF |
| | |  Without sensing object | ON |  Green: light ON Red: light ON |

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 $\pm 10^{\circ}\text{C}$.

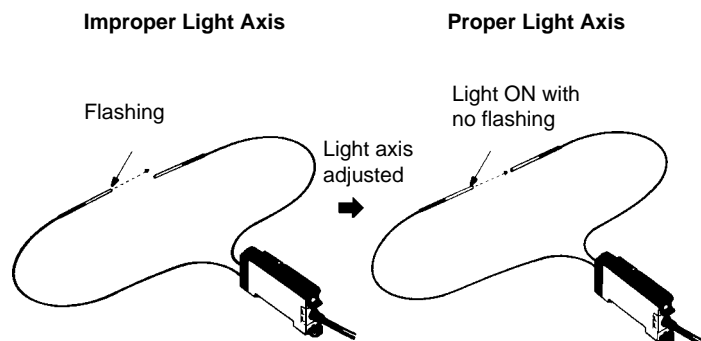
■ LIGHT AXIS ADJUSTMENT WITH FLASHING FUNCTION

E3X-A□□/F□□/VG□□

1. Set the mode selector to SET.



2. Adjust the light axis by moving the fiber with the light flashing.



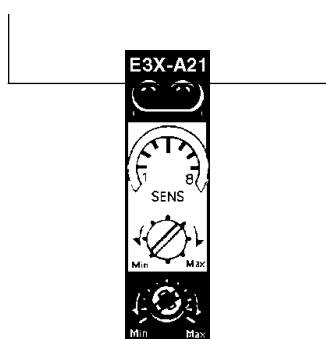
3. Set the mode selector to L-ON or D-ON after the light axis is adjusted.

■ SELF-DIAGNOSTIC FUNCTION

With this function, the E3X checks changes in environment conditions (especially a change in the ambient temperature) and self-diagnoses the resistance against the changes. The result is shown by the indicators or an output signal.

**Stable Operation Indicator
(Green Indicator)**

**Light Reception Indicator
(Red Indicator)**

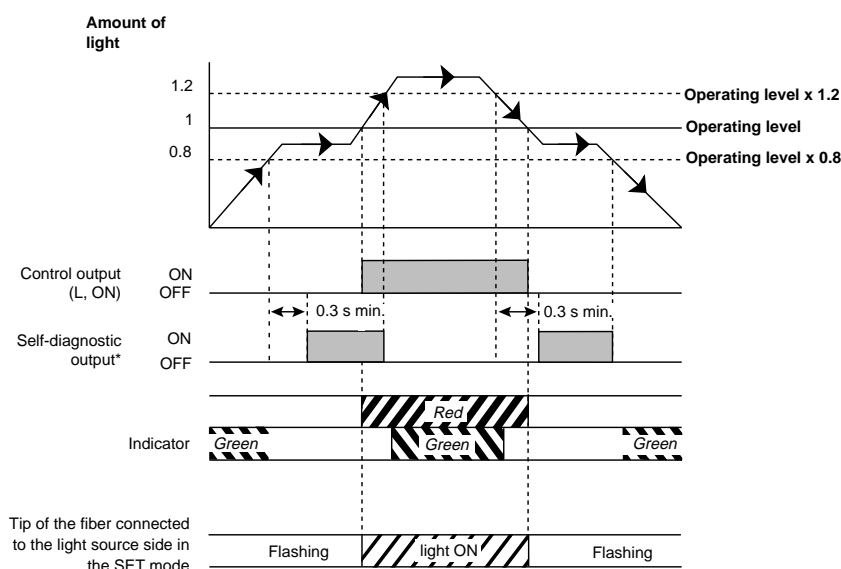


Displays

- **Stable Operation Indicator:** Changes in environmental conditions (changes in the ambient temperature, the operating voltage, or the volume of dust) are checked and the resistance against them are self-diagnosed. The result is shown via the indicator.
- **Light Reception Indicator:** The amount of light received is shown by this indicator.

Output:

- The resistance against changes in environmental conditions is shown by the indicator and the result is output.



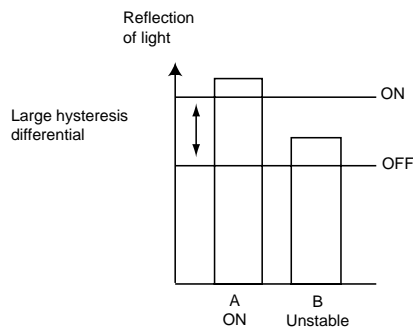
*If the self-diagnostic output is ON when the sensing object is moving at low speed, use the E3X with an ON-delay timer circuit.

■ VARIABLE HYSTERESIS FUNCTION (E3X-H11)

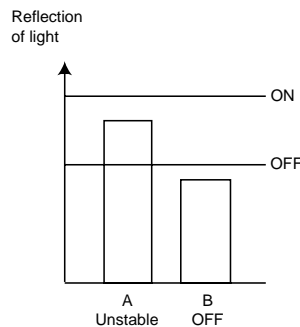
Detection of Plate Level Differences

(If detection is impossible with the hysteresis value set to maximum)

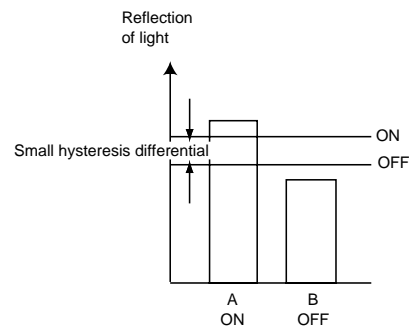
Refer to the following when using the hysteresis adjuster.



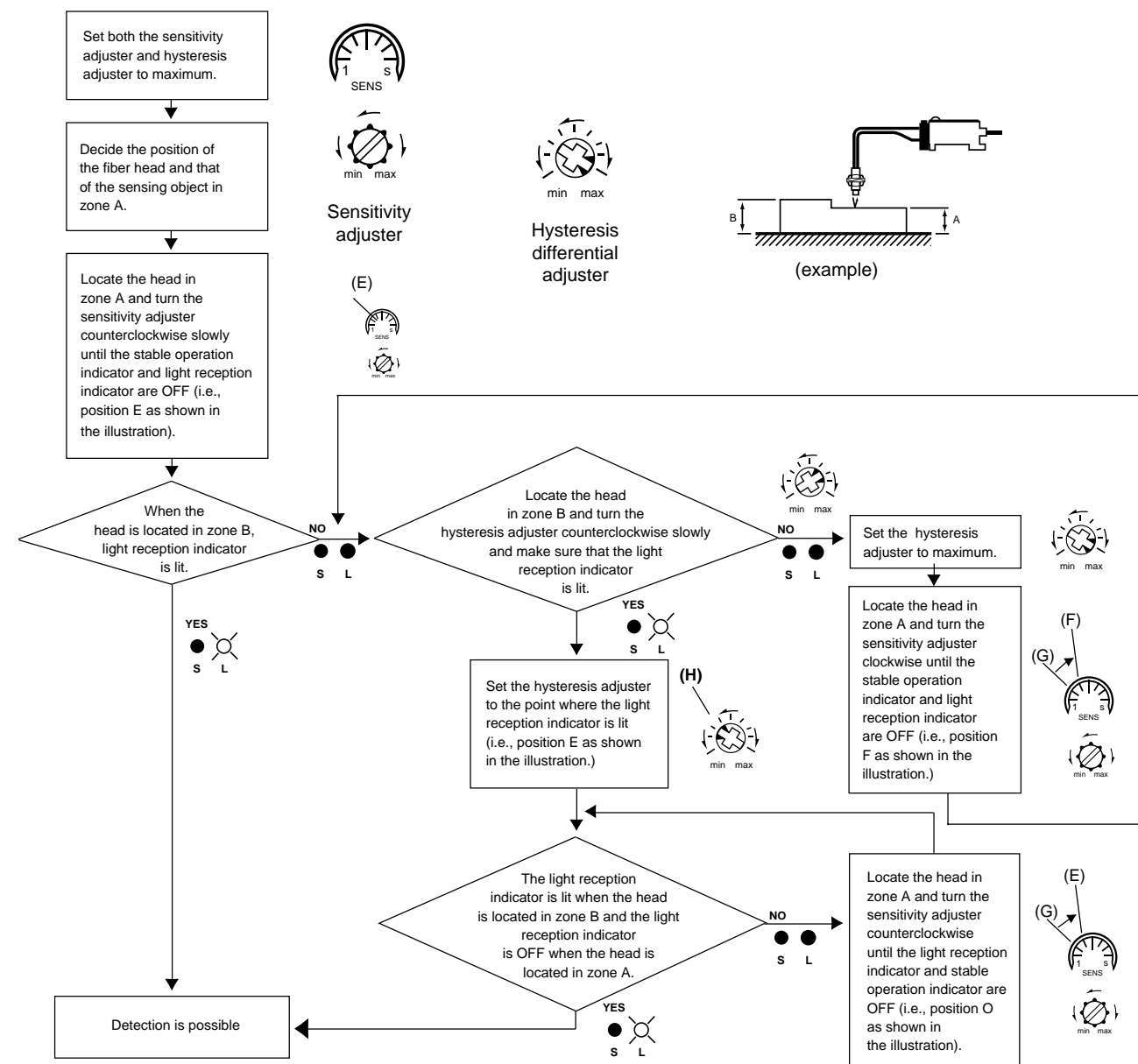
Detecting operation is not stable because zone B is within the hysteresis differential range.



Reduce the sensitivity of the E3X with the sensitivity adjuster and turn off zone B.



Reduce the hysteresis value with the hysteresis adjuster so that zone A will be ON.



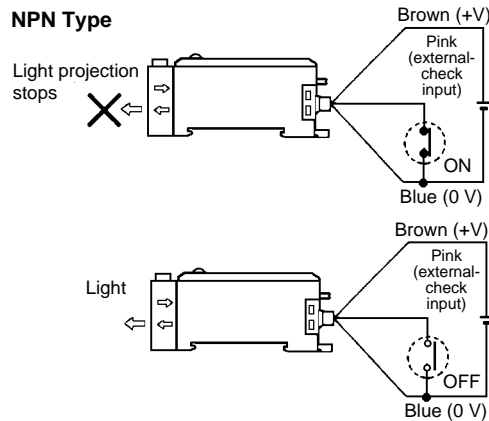
EXTERNAL DIAGNOSTIC INPUT FUNCTION

With this function, light projection can be stopped when desired. The operation of the sensor can be checked with this function before the E3X is placed into actual operation.

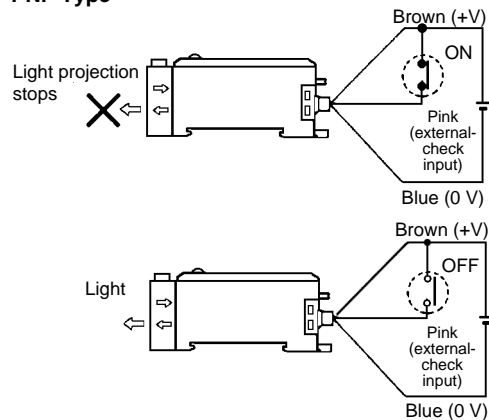
E3X-A□□

Light is emitted from the projection fiber head when the self-diagnostic input is ON. The sensor, however, will not operate.

NPN Type



PNP Type



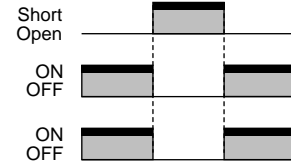
E3X-F□□/-VG□□

No light is emitted from the projection fiber head when self-diagnostic input is ON.

External-diagnostic input
(between blue and pink)

LED for light projection

Indicator

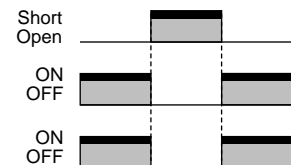


By short-circuiting the pink and blue cords, light projection can be stopped (with a short-circuit current of 0.2 mA max.).

External-diagnostic input
(between blue and pink)

LED for light projection

Indicator



By short-circuiting the brown and pink cords, light projection can be stopped (with a short-circuit current of 0.2 mA max.).

SPECIAL FIBER UNITS

The following special accessories are available (order separately). Contact your OMRON representative for the details.

Fiber Units with Special Length of Stainless Steel Tube

Fiber with different lengths of stainless steel tubes are available.

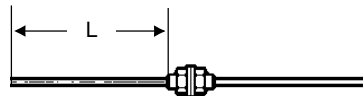
Applicable Models

E32-TC200F (tube with 0.9 dia.)

E32-TC200B/DC200F (tube with 1.2 dia.)

E32-DC200B (tube with 2.5 dia.)

Appearance



The length can be ordered in increments of 10 mm between 10 mm min. and 120 mm max.

Tolerance: ± 1.0 mm if L is 40 mm or less and ± 2.0 if L is more than 40 mm. (Note that standard Fiber Units have a 90-mm or 40-mm long stainless steel tube.)

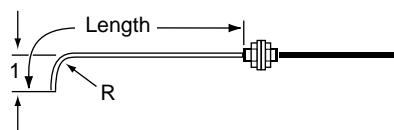
Fiber Units with 90° Bend in Stainless Steel Tube

Applicable Models

E32-TC200B/TC200F/DC200F

Appearance

Stainless Steel Tube with a 90° Bend at the Tip

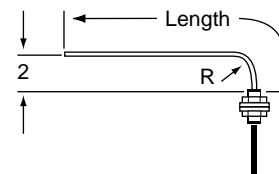


| Bending radius | $l\ 1\ (\pm 1)$ | |
|----------------|-----------------|---------|
| R 5.0 | 10.0 mm | 15.0 mm |
| R 7.5 | 12.5 mm | 17.5 mm |
| R 10.0 | 15.0 mm | 20.0 mm |
| R 12.5 | 17.5 mm | 22.5 mm |

The length overall is 120 mm max.

Note: If larger $l\ 1$ is required, use the E39-F11 Sleeve Bender.

Stainless Steel Tube with a 90° Bend at the Base



| Bending radius | $l\ 2\ (\pm 1)$ | |
|----------------|-----------------|---------|
| R 5.0 | 5.0 mm | 10.0 mm |
| R 7.5 | 7.5 mm | 17.5 mm |
| R 10.0 | 10.0 mm | 20.0 mm |
| R 12.5 | 12.5 mm | 22.5 mm |

The length overall is 120 mm max.

Note: If larger $l\ 2$ is required, use the E39-F11 Sleeve Bender.

Sensing Distance for Tubes with 90° Bends

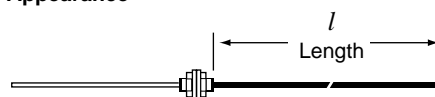
| Model | Amplifier | Bending radius | | | | |
|------------|-----------|----------------|--------|--------|--------|--------|
| | | Standard | R 5.0 | R 7.5 | R 10.0 | R 12.5 |
| E32-TC200B | E3X-H11 | 400 mm | 260 mm | 330 mm | 360 mm | 400 mm |
| | E3X-A□□ | 180 mm | 110 mm | 140 mm | 160 mm | 180 mm |
| E32-TC200F | E3X-H11 | 100 mm | 55 mm | 100 mm | 100 mm | 100 mm |
| | E3X-A□□ | 50 mm | 30 mm | 50 mm | 50 mm | 50 mm |
| E32-DC200F | E3X-H11 | 36 mm | 30 mm | 36 mm | 36 mm | 36 mm |
| | E3X-A□□ | 18 mm | 10 mm | 18 mm | 18 mm | 18 mm |

Fiber Unit with Longer Fiber

Applicable Models

E32-TC200/-DC200
E32-TC200B/-DC200B
E32-TC200E/-DC200E
E32-TC200F/-DC200F
E32-TC200A

Appearance

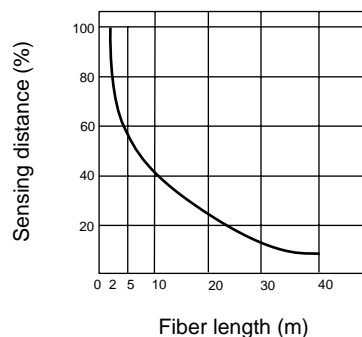


The length can be ordered in increments of 1 m between 6 m min. and 20 m max. (2 m and 5 m fiber length types are standard for E32-TC200, E32-DC200.)

Fiber Length vs. Sensing Distance

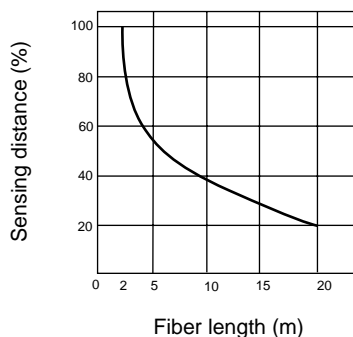
Through-beam Fiber Unit

(Based on the sensing distance using a fiber length of 2 m as 100%)

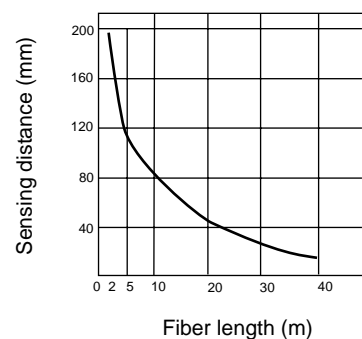


Reflective Fiber Unit

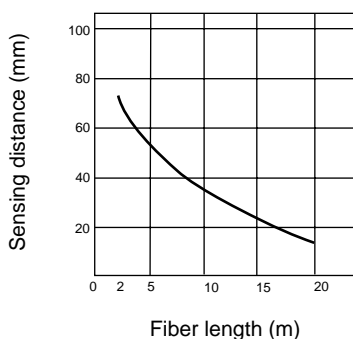
(Based on the sensing distance using a fiber length of 2 m as 100%)



E3X-A□□, E32-TC200 (Typical)



E3X-A□□, E32-DC200 (Typical)



Dimensions

Unit: mm (inch)

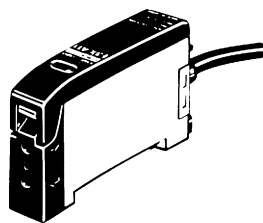
AMPLIFIER

E3X-H11

E3X-A□□

E3X-F□□

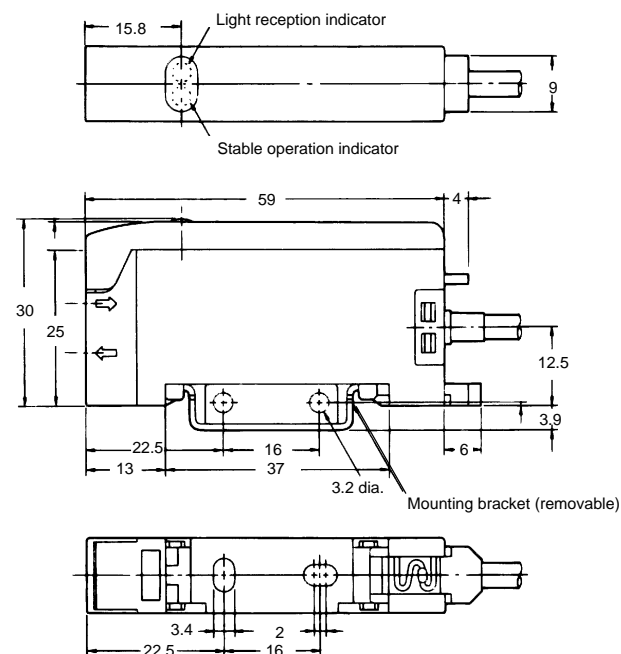
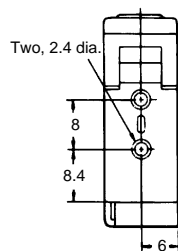
E3X-VG□□



Cable: 2-m polyvinyl chloride-covered cable (4-mm dia., 5 cores*)

Weight: Approx. 100 g

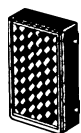
*The cables for the E3X-A11, E3X-A41, and E3X-VG11 models have 3 cores.



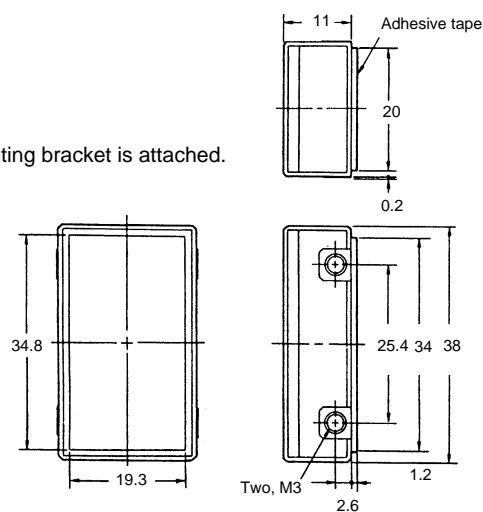
Unit: mm (inch)

REFLECTOR

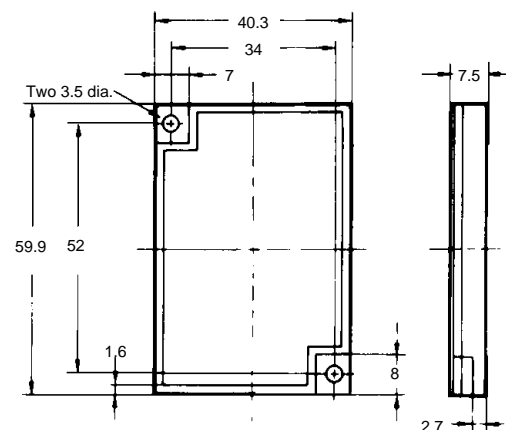
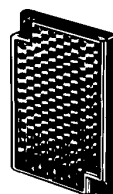
Reflector (Small) E39-R3



Note: Mounting bracket is attached.



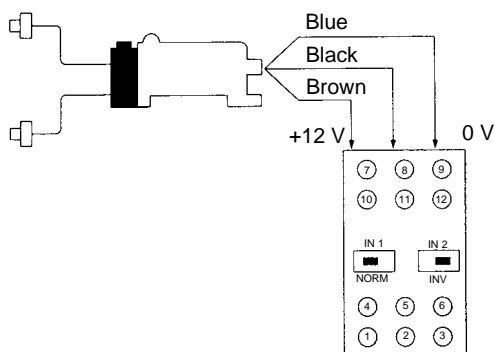
Reflector E39-R1



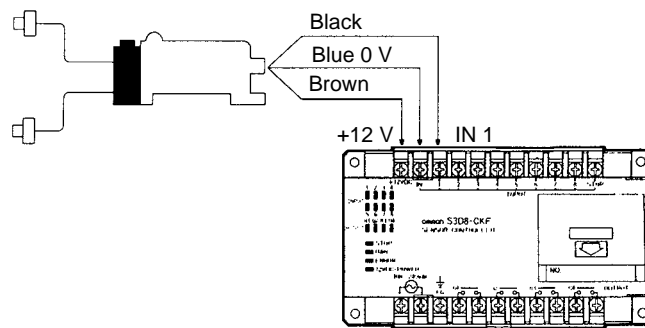
Installation

CONNECTIONS

Connection with S3D2 Sensor Controller



Connection with S3D8 Sensor Controller



Note: A maximum of two E3X Optical Fiber Photoelectric Sensors can be connected.

Note: A maximum of eight E3X Optical Fiber Photoelectric Sensors can be connected.

| Power supply voltage | Output | Functions | NPN input | PNP input |
|----------------------|------------|--------------------|------------|-------------|
| 100 to 240 VAC | Relay | AND, OR | S3D2-AK-US | S3D2-AKB-US |
| | | AND, OR, and timer | S3D2-CK-US | S3D2-CKB-US |
| | | Flip-flop | S3D2-BK-US | --- |
| | Transistor | AND, OR, and timer | S3D2-CC-US | S3D2-CCB-US |

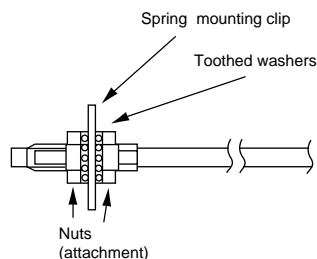
Precautions

■ FIBER UNITS

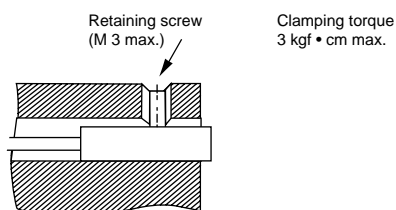
Tightening Force

The tightening force applied to the Fiber Unit should be as follows:

Screw-mounting Model



Column Model



| Fiber units | Clamping torque |
|------------------|--------------------------------------------------------------------------------------------------------------|
| M3/M4 screw | 8 kgf • cm max. (0.78 N • m) |
| M6 screw | 10 kgf • cm max. (0.98 N • m) |
| 2-mm dia. column | 3 kgf • cm max. (0.29 N • m) |
| 3-mm dia. column | 3 kgf • cm max. (0.29 N • m) |
| E32-D14L | 10 kgf • cm max. (0.98 N • m) |
| E32-T12F | 8 kgf • cm max. (0.78 N • m) |
| E32-D12F | 8 kgf • cm max. (0.78 N • m) |
| E32-T16 | 5 kgf • cm max. (0.49 N • m) |
| E32-R21 | 6 kgf • cm max. (0.59 N • m) |
| E32-M21 | Up to 5 mm to the tip: 5 kgf • cm max. (0.49 N • m) Up to 5 mm from the tip: 8 kgf • cm max. (0.78 N • m) |
| E32-L25A | 8 kgf • cm max. (0.78 N • m) |

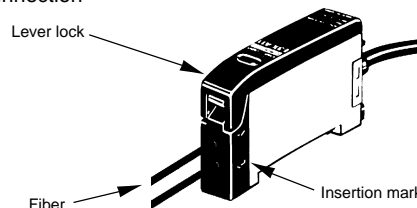
Use a proper-sized spanner.



Fiber Connection and Disconnection

The E3X amplifier has a lever lock. Connect or disconnect the fibers to or from the E3X amplifier using the following procedures:

1. Connection



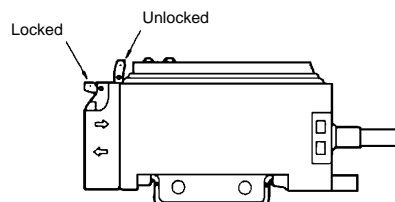
Insert the fibers into the E3X amplifier and press the lever lock until the amplifier clicks to lock the fibers. The fibers will have insertion marks when they are cut with the E39-F4 (Fiber Cutter). The portion from the tips to the insertion mark should be inserted to the E3X.

2. Disconnection

Raise the lock lever to unlock the fibers before pulling them out.

Fiber Insertion

If the portion from the tip to the insertion mark of the fibers are not inserted into the amplifier unit, the sensing distance will be reduced.

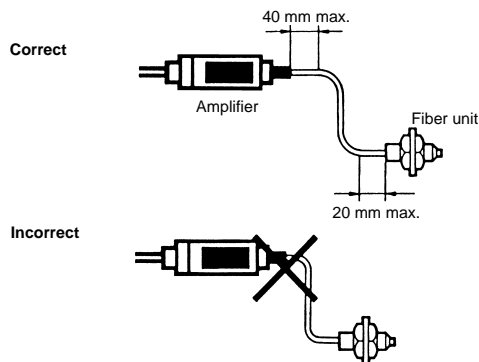


Connection

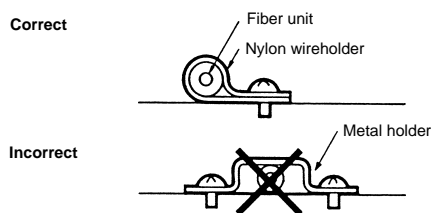
Do not pull or press the Fiber Units. The Fiber Units have a withstand force of 1 kg or 3 kg (pay utmost attention because the fibers are thin).

Do not bend the Fiber Units beyond the permissible bending radius.

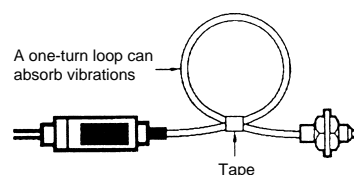
Do not bend the edge of the Fiber Units.



Do not apply excess force on the Fiber Units.



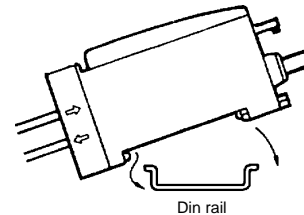
The Fiber Head could be broken by excessive vibration. To prevent this, the following is effective:



AMPLIFIER UNITS

Mounting

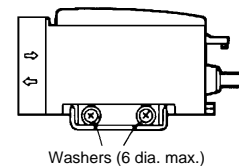
1. Mount the front part on the mounting bracket (sold together) or a DIN rail.
2. Press the back part onto the mounting bracket or the DIN rail.



Removal

By pulling back the lock (yellow) on the bottom with a flat blade screwdriver, the amplifier can be removed with ease.

In the case of side mounting, attach the mounting bracket on the amplifier first, and secure the amplifier with M3 screws and washers. The diameter of the washers should be 6 mm max.



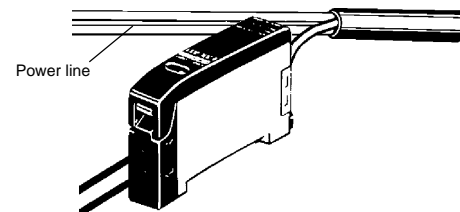
Others

When power is off:

The moment power is turned off, the E3X could output a pulse signal which could affect the operation of the devices connected to it. This will happen more often if power is supplied to the E3X from an external power supply, thus affecting the connected timer and counter. Use a built-in power supply as much as possible to avoid this.

If power is supplied to a photoelectric sensor through a cord that is wired together with other power lines in the same duct, the cord will be influenced by the power lines and malfunctioning of the photoelectric sensor or damage could result. Wire the cord separately or use a sealed cord to supply power to the photoelectric sensor.

If the case of the cord is extended, use a wire with 0.3 mm² max.. The total length of the cord should be 100 m max.



Power supply:

If a standard switching regulator is used as a power supply, the frame ground (FG) terminal and the ground (G) terminal must be grounded, or otherwise the E3X can malfunction, influenced by the switching noise of the power supply.

The supplied voltage must be within the rated voltage range. Unregulated full- or half-wave rectifiers must not be used as power supplies.

Do not use a hammer to hit the amplifier when mounting or the amplifier will lose watertightness.

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Cat. No. CEDSAX4

11/01

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