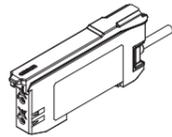


Smart Fiber Amplifier E3X-MZV Series

INSTRUCTION SHEET

Thank you for selecting an OMRON product. This sheet primarily describes precautions required in installing and operating the product.

- A specialist who has the knowledge of electricity must treat the product.
- Please read this manual carefully, and use it correctly after thoroughly understanding the product.
- Please keep this manual properly for future reference whenever it is necessary.



© OMRON Corporation 2023 All Rights Reserved.

WARNING Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.

Warning Indications

WARNING

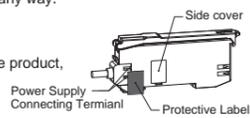
This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purpose.

Do not use the product with voltage in excess of the rated voltage. Excess voltage may result in malfunction or fire.

Never use the product with an AC power supply. Otherwise, explosion may result.

PRECAUTIONS FOR SAFE USE

- The following precautions must be observed to ensure safe operation of the product. Doing so may cause damage or fire.
- Do not install the product in the following locations.
 - (1) Locations subject to direct sunlight
 - (2) Locations subject to condensation due to high humidity
 - (3) Locations to corrosive, flammable or explosive gases
 - (4) Locations to vibration or shocks exceeding the spec
 - (5) Locations subject to exposure to water, oil, chemicals
 - (6) Locations subject to steam
 - (7) Locations subjected to strong magnetic field or electric field
 - (8) In water, rainfall or outdoors
 - (9) Any atmosphere or environment that exceeds the ratings
- To secure the safety of operation and maintenance, do not install the product close to high-voltage devices and power devices.
- High-Voltage lines and power lines must be wired separately from this product. Wiring them together or placing them in the same duct may cause induction, resulting in malfunction or damage.
- Please apply the load under rating and connect the load correctly. Do not short the load.
- Do not use the product if the case is damaged.
- Burn injury may occur. The product surface temperature rises depending on application conditions, such as the ambient temperature and the power supply voltage. Attention must be paid during operation or cleaning.
- When setting the sensor, be sure to check safety such as by stopping the equipment.
- Be sure to turn off the power supply before connecting or disconnecting wires.
- Do not attempt to disassemble, repair, or modify the product in any way.
- When disposing of the product, treat it as industrial waste.
- Do not remove the cover on the side of the case. Otherwise, electric shock or malfunction may result.
- If you notice any abnormal condition, immediately stop using the product, turn off the power and consult your dealer without doing any operation such as initialization.
- When using a connector type product, place a protective label (provided with the E3X-CN series) on the power supply connecting terminals that are not used, to prevent electric shock or short circuit.



PRECAUTIONS FOR CORRECT USE

- Be sure to mount the unit to the DIN track and the connector until it clicks.
- The length for the cable extension must be 30 m or less. Be sure to use a cable of at least 0.3 mm² for extension.
- The power voltage must be 24V when connecting amplifier units with extension cable and wire-saving connector.
- Do not apply the forces on the cord exceeding the limits. Do not use the cord while it is pinched or pressed.
- Pull: 40N; torque: 0.1N·m; bending: 29.4N
- Do not apply excessive force such as tension, compression or torsion to the amplifier unit with the fiber unit fixed to the amplifier unit.
- Please be aware of the polarity of the power supply to avoid miswiring. If there are input/output lines that are not used, insulate them.
- The product is ready to operate 250 ms after the power supply is turned ON.
- It may take time until the received light intensity becomes stable immediately after the power on.
- If the unit receives excessive sensor light, the mutual interference prevention function may not work properly, resulting in malfunction of the unit. In such case, increase the threshold.
- Do not use the unit when EEPROM (non-volatile memory) exceeds its writing life (100,000 times).
- When you perform setting change, threshold change, tuning, zero reset and so on, the setting information is written.
- Use End Plates (PFP-M: separately sold) at the both ends of the grouped Amplifier Units to prevent them from separating due to vibration or other cause.
- Do not use alcohol, thinner, benzene, acetone, and lamp oil for cleaning.

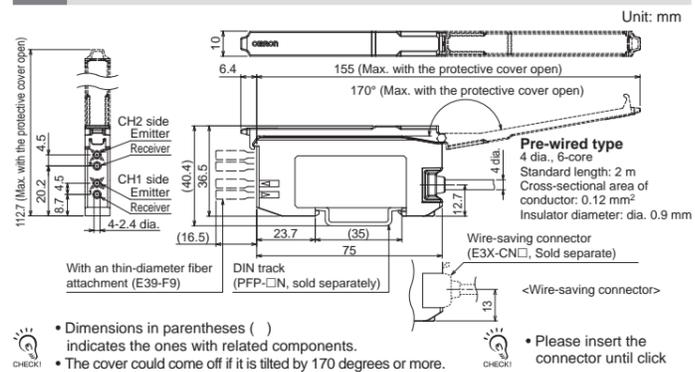
- Please dispose the product with ♻️ on the case in accordance with relevant regulations (laws and regulations)
- The mutual interference prevention function does not work when in combination with series other than E3X-ZV/E3X-MZV series.
- The Communication Unit E3X-DRT21-S, E3X-CRT, E3X-ECT and E3NW cannot be connected.
- This product is not equipped with the Auto Power Control (APC) function.
- When being installed with amplifier tightly, connecting up to 16 wire-saving connector is allowed.
- The following notice applies only to products that carry the CE mark.
- NOTICE : In a residential environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Checking the Package Content

- Amplifier Unit: 1
- Instruction Sheet, Compliance sheet

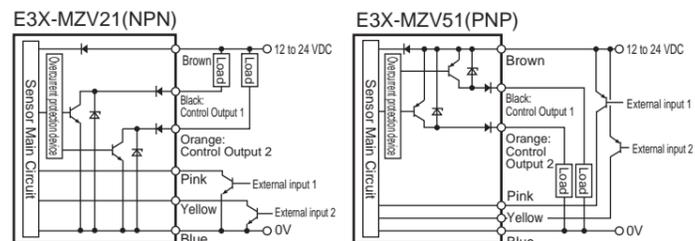
1 Installation

1-1 Dimensions



- Dimensions in parentheses () indicates the ones with related components.
- The cover could come off if it is tilted by 170 degrees or more.
- Please insert the connector until click

1-2 Input / Output Circuit Diagram

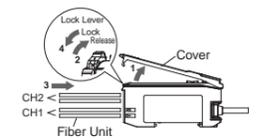
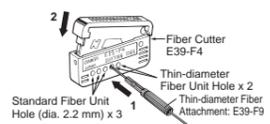


1-3 Mounting the Amplifier Unit

- **Mounting on DIN Track**
 1. Let the hook on the Amplifier Unit's Fiber Unit connection side catch the track.
 2. Push the unit until the hook clicks into place.
- DIN track (PFP-□) is sold separately.
- If there is vibration or when connecting, please use an end plate (PFP-M)
- **Removing from DIN Track**
 1. Push the unit in the direction 1.
 2. Lift the unit in the direction of arrow 2 while performing step 1.

1-4 Mounting Fiber Unit

- **Use Fiber Cutter**
 1. Insert a Fiber Unit (which can be freely cut) into a fiber cutter hole as necessary. (Do not use a hole which has been used once.)
 2. Press down the blade at a single stroke to cut the Fiber Unit.
- **Mount Fiber Unit**
 1. Open the cover.
 2. Raise the lock lever. (Release)
 3. Insert the Fiber Unit in the fiber unit hole until the Fiber Unit stops at the bottom.
 4. Return the lock lever to the original position and fix the Fiber Unit. (Lock)
- To mount the thin-diameter Fiber Unit, an attachment (E39-F9) is required. (The attachment is included with the applicable Fiber Unit.)
- In the case of a coaxial reflective Fiber Unit, insert the single-core Fiber Unit (⊙) with a white line into the upper hole (Emitter side) and the multi-core Fiber Unit (⊕) into the lower hole (Receiver side).



1-5 Ratings and Specifications

	E3X-MZV21	E3X-MZV51
Model	E3X-MZV21	E3X-MZV51
Control Input/Output	2 outputs (NPN) + 2 input *1	2 output (PNP) + 2 input *1
Connection Method	Pre-wired Type	
Light Source (Wavelength)	Red 4-element LED (625 nm)	
Power Supply Voltage	12 to 24 VDC ±10%, ripple (p-p) 10% max.	
Power Consumption	Normal mode: 820 mW max. (Power supply voltage 24 V; Current consumption 35 mA max. / Power supply voltage 12 V; Current consumption 69 mA max.) Eco function ON: 600 mW max. (Power supply voltage 24 V; Current consumption 25 mA max. / Power supply voltage 12 V; Current consumption 50 mA max.) Eco function Standby: 480 mW max. (Power supply voltage 24 V; Current consumption 20 mA max. / Power supply voltage 12 V; Current consumption 40 mA max.)	
Control Output	Load power supply voltage: 26.4 VDC, open collector output type (NPN or PNP output differs depending on the type.) Load current: 100 mA max. (Residual voltage: Load current less than 10 mA: 1 V max., load current 10 to 100 mA: 2 V max.) Off-state current: 0.1 mA max.	
Protection Circuit	Power supply reverse polarity protection, output short-circuit protection and output reverse polarity protection	
Response Time (Operation / Recovery)	Super High-speed Mode (SHS): 100 μs High-speed Mode (HS): 250 μs *2 Standard Mode (STND): 1 ms *3 Giga Power Mode (GIGA): 16 ms	
Mutual Interference Prevention Function	Emission cycle setting switching type *4	
Ambient Illumination	Illumination intensity Incandescent lamp: 20,000 lx max. / Sunlight: 30,000 lx max.	
Ambient Temperature Range	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 icing or condensation)	
Vibration Resistance	10 to 55 Hz with a 1.5 mm double amplitude for 2 hrs each in X, Y and Z directions	
Shock Resistance	500 m/s ² for 3 times each in X, Y and Z directions	
Weight (Packed State / Sensor)	Approx. 100 g / Approx. 75 g	Approx. 45g/Approx.20g
Materials	Case and cover: Polycarbonate (PC), Cable: PVC	

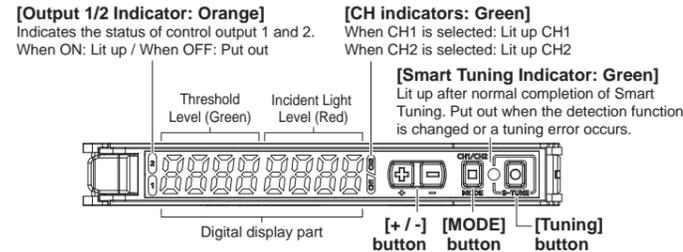
- *1. The details regarding input are as follows.

	Contact input (Relay, Switch)	Contactless input (Transistor)	Input time
NPN	ON: Short-circuited to 0 V (Outflow current: 1 mA or less) OFF: Opened or short-circuited to Vcc	ON: 1.5 V or less (Outflow current: 1 mA or less) OFF: Vcc -1.5V to Vcc (Leakage current: 0.1 mA or less)	ON: 100 ms or more OFF: 100 ms or more
PNP	ON: Short-circuited to Vcc (Sink current: 3 mA or less) OFF: Opened or short-circuited to 0 V	ON: Vcc -1.5V to Vcc (Sink current: 3 mA or less) OFF: 1.5 V or less (Leakage current: 0.1 mA or less)	
- *2. When using Mutual interference prevention function: 700 μs *3. When using Mutual interference prevention function: 1.6 ms
- *4. Up to 2 units for E3X-MZV. Or, up to 2 units for E3X-ZV (the Unit Number Priority Mode), and 1 unit for E3X-MZV.

2 Basic Settings

CH1/2 individual setting Setting/operation/tuning is possible for CH1/CH2 individually. Select which CH to be targeted first. CH common setting It is a common setting/operation for CH1/CH2.

2-1 Names of Each Part



2-2 Basic Settings

Select which fiber unit to set (selection of CH1 or CH2)

- **CH switching**
 1. Press the [CH] button for shorter than 1 second to select CH1/CH2.



Selection of Light ON (L-ON) or Dark ON (D-ON).

- **Output switching** (CH1/2 individual setting)
 1. Hold the [L/D] button for 3 seconds or longer to enter the SET Mode.
 2. Press the [L/D] button to select the following item.
 - In the case of diffuse reflection type or limited reflection type: State with incident light (Default) L-on (Turn ON when a workpiece is present)
 - In the case of through-beam type or regressive reflection type: State with no incident light d-on (Turn ON when a workpiece is present)
 3. Press the [L/D] button for 3 seconds or longer to return to the Detection Mode.

Adjustment of Threshold Level

- **Minute Adjustment of Threshold Level** (CH1/2 individual setting)

Set the threshold level in the Detection Mode. Press the [L/D] button to adjust the threshold level.

Hold the key for high-speed level adjustment.

The threshold level becomes higher. The threshold level becomes lower.

2-3 Initialization

- #### Initializing Settings
- **Setting Reset** (CH common setting)

Initialize all settings to the factory-set defaults.

 1. Hold the [MODE] button for 3 seconds or longer to enter the SET Mode.
 2. Press the [MODE] button twice. rSt no
 3. Press the [MODE] button once. rSt YES Initialization selected
 4. Press the [MODE] button once. rSt OK Initialization completed
- Settings can also be initialized by pressing the MODE button for 7 seconds or longer in the Detection Mode. Contents saved by User Save Function are not cleared by the setting initialization.

2-4 Basic Smart Tuning Method

Adjust the received light intensity and the threshold to appropriate values through Smart Tuning.

Most Basic Setting Method

- **2-point Tuning** (CH1/2 individual setting)
 1. Press the [Tuning] button with a workpiece in the detection area.
 2. Press the [Tuning] button again without a workpiece in the detection area.

Incident light level setting: The larger incident level of the Step 1 and 2 values is adjusted to the power tuning level.
Threshold setting: Set to the middle between the Step 1 and 2 incident light levels.
Step 1 and Step 2 can be reversed.

Making Received Light Intensity Uniform

- **Power Tuning** (CH1/2 individual setting)
 1. Hold the [Tuning] and [MODE] buttons for 1 second or longer and release the button when [PtUn] appears.

Incident light level setting: The Step 1 incident level is adjusted to the power tuning level.
Threshold setting: Not changed. If the value is low, it will be set to the minimum value in which an output is turned ON / OFF correctly.

- Perform the procedure with a workpiece in the area for reflective model setting. If the setting is made after position tuning, set both the through-beam model and reflective model with a workpiece. When power tuning ON / OFF setting is OFF, power tuning cannot be performed.

Setting a Threshold with Received Light Intensity Ratio

- **Percentage Tuning** (CH1/2 individual setting)
 1. Turn ON Percentage Tuning in SET mode. Refer to "Ⓞ Detailed Settings".
 2. Hold the [Tuning] button for 1 second or longer without a workpiece in the area.

Incident light level setting: The Step 2 incident light level is adjusted to the power tuning level.
Threshold setting: Set to [Set received light intensity x Percentage tuning level].

- No Smart Tuning other than Power Tuning can be used if Percentage Tuning is set. Set the Percentage tuning level to be below 0 in the case of a through-beam type (Dark ON: D-ON), or to be above 0 in the case of a reflective type (Light ON: L-ON).

