

# Digital Fiber Sensor E3X-DA□□-S M8 Connector models



## Instruction Sheet

Thank you for selecting OMRON product. This sheet primarily describes precautions required in installing and operating the product. Before operating the product, read the sheet thoroughly to acquire sufficient knowledge of the product. For your convenience, keep the sheet at your disposal.

### TRACEABILITY INFORMATION:

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**NOTICE:**  
This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to adequate measures.



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## PRECAUTIONS FOR SAFE USE

Please observe the following precautions for safe use of the product.

- Do not use the Amplifier Unit in environments subject to flammable or explosive gases.
- Do not use the Amplifier Unit in environments subject to exposure to water, oil, chemicals, etc.
- Do not attempt to disassemble, repair, or modify the Amplifier Unit in any way.
- Do not apply voltages or currents that exceed the rated ranges.
- Wire the Amplifier Unit correctly, e.g., do not reverse the polarity of the power supply.
- Connect the load correctly.
- Do not short both ends of the load.
- Do not use the Amplifier Unit if the case is damaged.
- When disposing of the Amplifier Unit, treat it as industrial waste.

## PRECAUTIONS FOR CORRECT USE

Please observe the following precautions to prevent failure to operate, malfunction, or undesirable effects on product performance.

- Wire the Amplifier Unit separately from power supply or high-voltage lines. If the Amplifier Unit wiring is wired together with or placed in the same duct as high-power lines, inductive noise may cause operating errors or damage the Amplifier Unit.
- Do not extend the cable to more than 100 m, and use a wire size of 0.3 mm<sup>2</sup> or larger for the extension cable.
- The Amplifier Unit is ready to operate 200 ms after the power supply is turned ON. If the Amplifier Unit and load are connected to power supplies separately, turn ON the power supply to the Amplifier Unit first.
- Always keep the protective cover in place when using the Amplifier Unit.
- Always turn OFF the power supply before joining or separating Amplifier Units, or adding Amplifier Units.
- If the data is not written to the EEPROM correctly due to a power failure or static-electric noise, initialize the settings using the keys on the Amplifier Unit.
- Using a Mobile Console  
Use the E3X-MC11-SV2 Mobile Console for the E3X-DA??-S-series Amplifier Units. Other Mobile Consoles, such as the E3X-MC11 cannot be used.
- Optical communications are not possible with an E3X-DA-N Amplifier Unit.
- Depending on the application environment, time may be required for the incident level to stabilize after the power supply is turned ON.
- Output pulses may occur when the power is interrupted and so turn OFF the power to the load or load line before turning OFF the power to the Sensor.
- Do not use thinners, benzene, acetone, or kerosene for cleaning the Amplifier Unit.
- Do not pull or press the Fiber Units. The Fiber Units have a withstand force of 9.8N max.
- Output pulses may occur when the power is interrupted and so turn OFF the power to the load or load line before turning OFF the power to the Sensor.

### Confirming the Package Contents

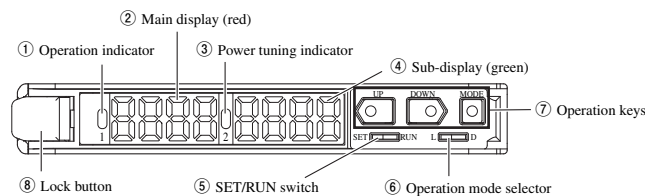
- Amplifier Unit: 1
- Instruction Sheet (this sheet): 1

## 1. Ratings and Specifications

Connection method	M8 Connector models	
	4pin	3pin
Model number	E3X-DA14-S E3X-DA44-S	E3X-DA13-S E3X-DA43-S
Light emitting element	Red LED	
Supply voltage	12 to 24 VDC ±10%, ripple (p-p) 10% max.	
Power consumption	960 mW max. (40 mA max. at 24 V)	
Control output	Open collector (26.4 VDC max.); load current: 50 mA max.; residual voltage: 1 V max.	
Timer	OFF, OFF-delay, ON-delay, or one-shot	
Timer time	1 ms to 5 s	
Power tuning	Supported	
Mutual interference prevention	Supported (optical communications sync method)*1 10 *2	

- \*1: Communications are disabled if SHS is selected for the detection mode, and the communications functions for mutual interference prevention and the Mobile Console will not function.  
\*2: Mutual interference prevention can be used for only up to 6 Units if power tuning is enabled.

## 2. Nomenclature



- Lit when the output is ON.
- Displays the incident light level or the function name.
- Lit when power tuning is set.
- Displays supplemental detection information, the setting of a function, etc.
- Used to switch the mode.
- Used to select dark-ON or light-ON operation.
- Used to change the display, set functions, etc.
- Used to connect and disconnect the Fiber Unit.

## 3. Basic Operating Information

### Setting the Mode

The mode is set using the SET/RUN switch. Set this switch according to the operation to be performed.

Mode	Description
SET	Select to set detection conditions, to teach the threshold value, etc.
RUN	Select for actual detection operation or to set the following: Manual adjustment of threshold value, teaching power adjustment, zero reset, or key lock.

### Key Operations

The operation keys are used to switch the displays and set detection conditions. The functions of the keys depend on the current mode.

Key	Function	
	RUN mode	SET mode
UP key	Increases the threshold value.	Depends on the setting. • Executes teaching. • Changes the setting forward.
DOWN key	Decreases the threshold value.	Depends on the setting. • Executes teaching. • Changes the setting in reverse.
MODE key	Depends on the MODE key setting. • Teaching • Executes power tuning. • Executes a zero reset.	Switches the function to be set on the display.



Time to Press Keys  
If a specific time for pressing a key is not given in a procedure, press the key for approximately 1 second. For example, if the procedure says press the UP key, then press the UP key for approximately 1 second and then release it.

### Reading Displays

The information displayed on the main display and sub-display depends on the current mode. For the default settings, the RUN mode displays will appear when the power supply is turned ON for the first time.

Mode	Main display (red)	Sub-display (green)
SET	Displays the incident light level, function name, or other information depending on the key operation.	Displays threshold value or the setting of the function displayed on the main display depending on the key operation.
RUN (See note.)	The current incident light level will be displayed.	The current threshold value will be displayed.

Note: The information that appears on the displays can be set using the display switch function. Refer to 5. Detailed Settings.

## 4. Basic Settings

### 1. Setting the Operation Mode

Select either light-ON or dark-ON operation. Set as the operation mode in SET mode. Refer to 5. Detailed Settings.

Selection	Description
LON (light-ON) (default)	The output will turn ON when the incident light level is above the threshold.
DON (dark-ON)	The output will turn ON when the incident light level is below the threshold.

### 2. Adjusting the Power (as Required)

Power tuning can be used to adjust the incident light level that is currently being received to the power tuning target value (default: 2,000). Before tuning ON the power, always secure the detection object and Head and be sure that the incident light level is stable.

### Setting Method

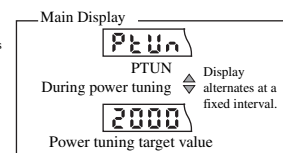
Confirm that the MODE key setting is PTUN (power tuning) in advance. PTUN is the default setting. Refer to 5. Detailed Settings.



Switch to RUN mode.  
Press the MODE key for at least 3 seconds.



A progress bar will appear on the sub-display one digit at a time. (Release the MODE key when the progress bar appears.)



Tuning completed and previous display returns.



The power tuning target value can be changed. Refer to 5. Detailed Settings.



If power is tuned when SHS is selected for the detection method, the power will be set to the minimum value.



Power tuning will be cleared whenever the detection method is changed from STND, HRES, or SHS.

### Power tuning Errors

An error has occurred if one of the following displays appears after the progress bar is displayed.

	<b>Over Error</b> The incident light level is too low for the power tuning target value. The power can be increased up to approximately 5 times the incident light level without power tuning.
	<b>Bottom Error</b> The incident light level is too high for the power tuning target value. The power can be decreased down to approximately 1/25th the incident light level without power tuning.

### Clearing Method



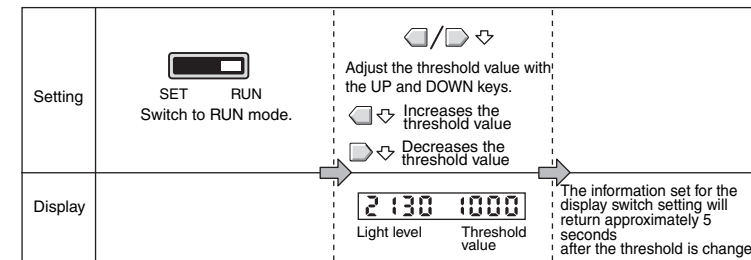
Switch to RUN mode.  
Hold down the MODE key and press the DOWN key for at least 3 seconds. Note: Press the DOWN key right after pressing the MODE key.



The sub-display will flash twice and power tuning will be cleared.

## 3. Setting Thresholds

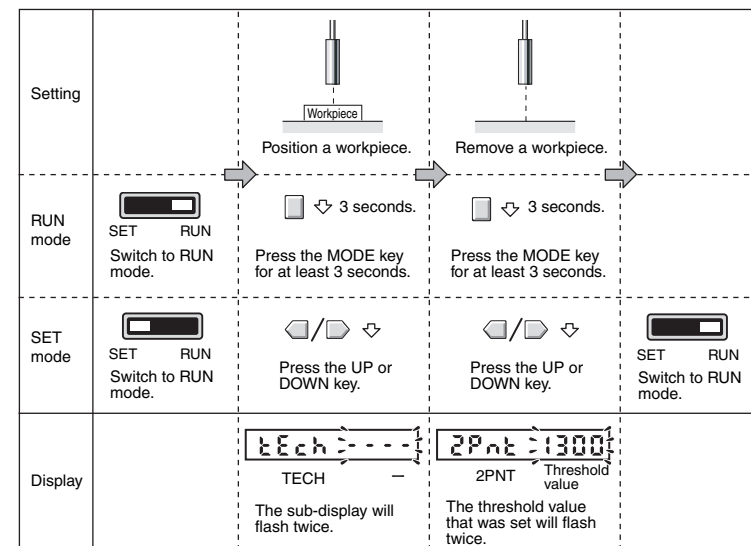
### 1) Manually Setting



### 2) Teaching

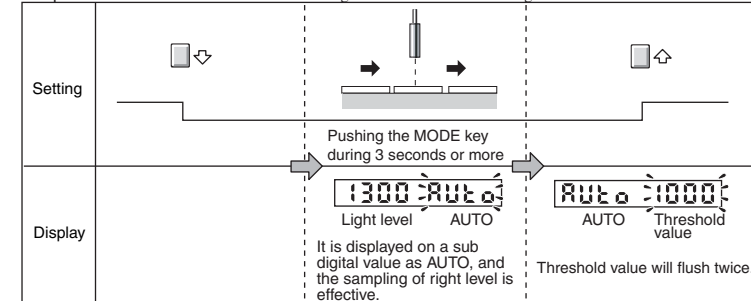
#### Teaching With and Without a Workpiece

Teaching can be performed twice, once with and once without a workpiece, and the value between the two measured values is set as the threshold. RUN mode and SET mode – each mode can be set up. PTUN is the default setting. Refer to 5. Detailed Settings.



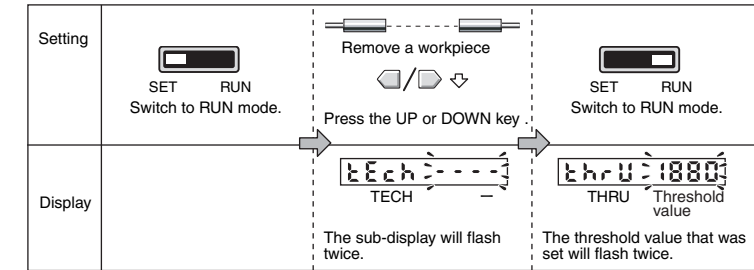
#### Automatic-teaching (It sets up at move work.)

While continuing pushing a key, the middle of the detected maximum and the minimum value can be set up as a threshold. PTUN is the default setting. Refer to 5. Detailed Settings.



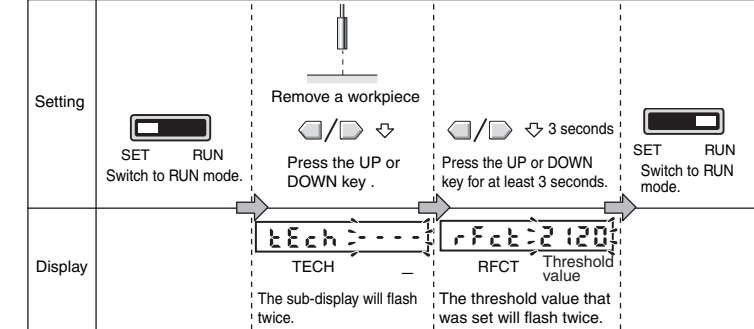
#### Teaching for Through-beam Sensor Heads

Teaching for a Through-beam Sensor Head is performed without a workpiece. A value about 6% less than the incident light level with no workpiece is set as the threshold value. This method is ideal to stably detect very small differences in light level.



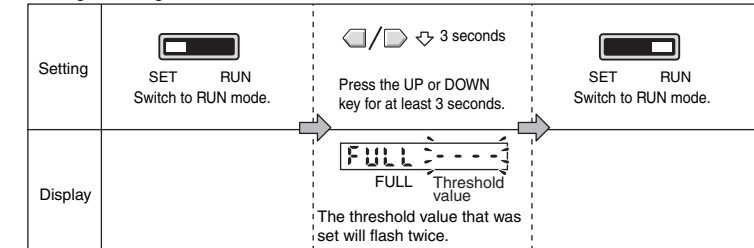
#### Teaching for Reflective Sensor Heads

Teaching for a Reflective Sensor Head is performed without a workpiece (i.e., for the background). A value about 6% greater than the incident light level is set as the threshold value. This method is ideal to stably detect very small differences in light level.



#### Setting the Threshold at the Maximum Sensitivity

The threshold can be set at the maximum sensitivity. This is convenient when using the longest sensing distance.



It does not matter whether or not there is a workpiece. The value that is set will depend on the detection method and power adjustment settings.

### Teaching Error

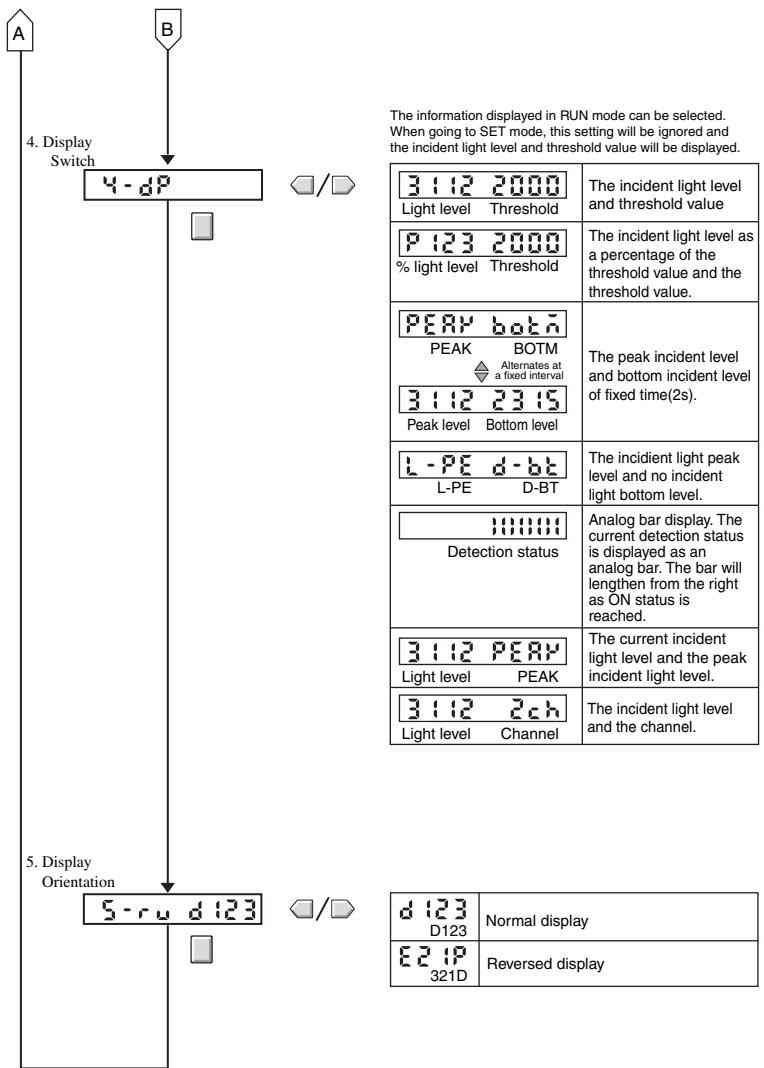
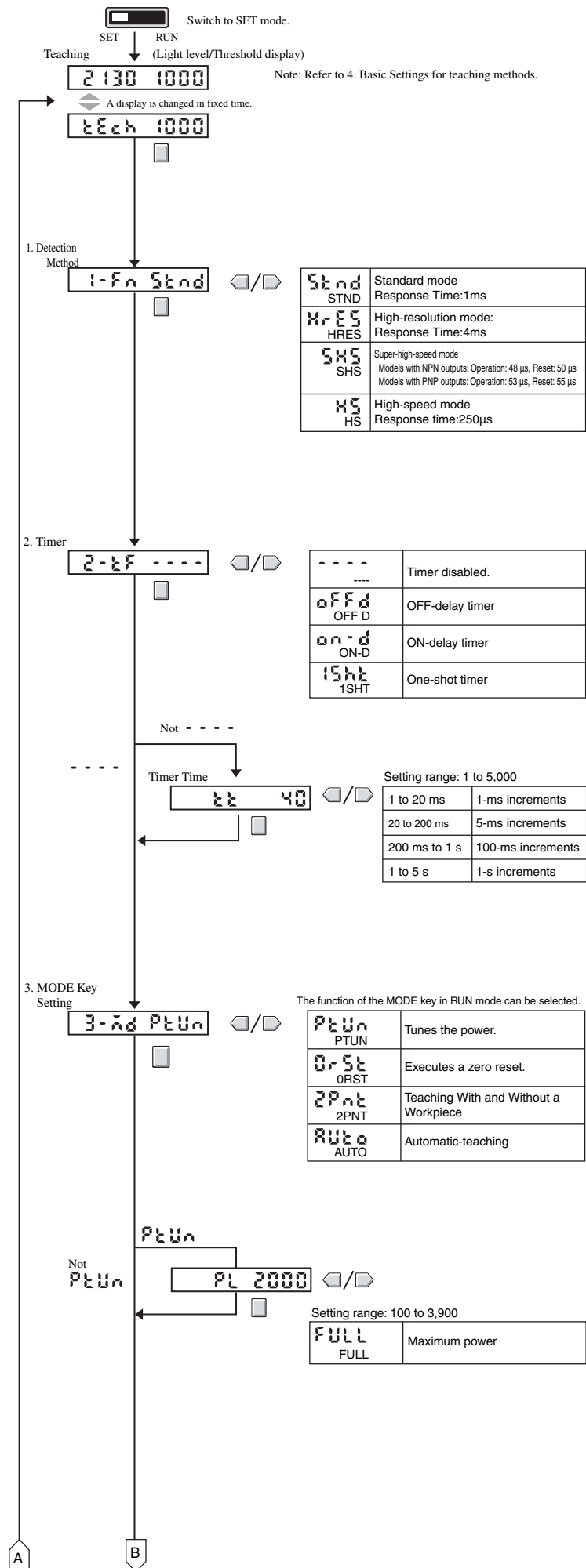
After performing teaching, when the following is displayed on sub digital display, the error has occurred. However, the threshold might not be able to be detected correctly though is set within the possible range.

	<b>Over error</b>	Light level is too large. Do one of the following and then repeat the operation. • Adjust the Head to decrease the incident light level. • Execute power tuning.
	<b>Low error</b>	Light level is too small. Do one of the following and then repeat the operation. • Adjust the Head to increase the incident light level. • Execute power tuning.
	<b>Near error</b>	The difference of incident light level is too small. Do one of the following and then repeat the operation. • Adjust the Head to increase the difference between the two incident light levels.

## 5. Detailed Settings

The following functions can be set in SET mode. The default settings are shown in the transition boxes between functions. All settings except for the operation mode and timer settings are the same for both channels.

\*: The values shown for thresholds, incident light levels, percentages, etc., are examples only. Actual displays may vary.

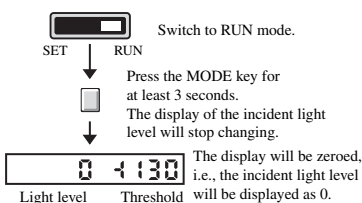


## 6. Convenient Functions

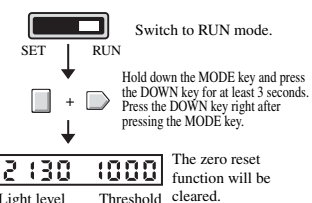
### Zeroing the Main Display

The incident light level displayed on the main display can be zeroed. The threshold displayed in the sub-display is shifted by an amount corresponding to the amount the incident light level was changed. Confirm that the MODE key setting is ORST (zero reset) in advance. PTUN (power tuning) is the default setting. Refer to 5. Detailed Settings.

#### Setting Method



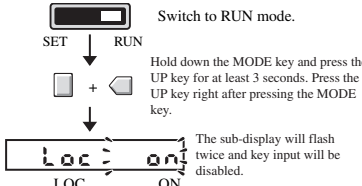
#### Clearing Method



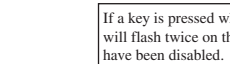
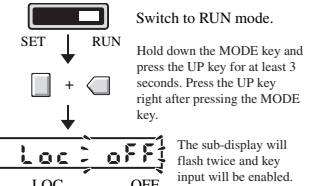
### Key Lock

All key operations can be disabled to help prevent key operating errors. Only the operation keys are disabled. The switches and selectors will still function.

#### Setting Method



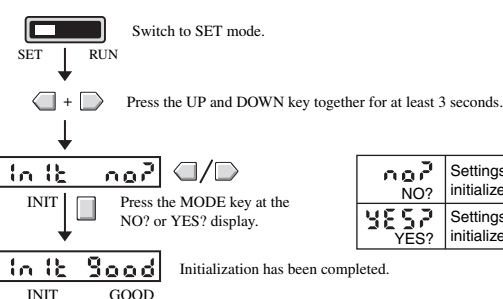
#### Clearing Method



### Initializing Settings

This procedure can be used to return all the settings to the original default values.

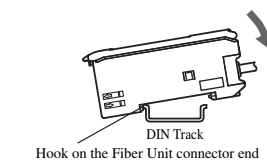
#### Setting Method



## 7. Installing the Amplifier Unit

### Mounting Units

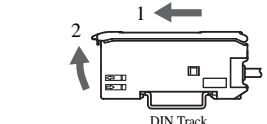
Catch the hook on the Fiber Unit connector end of the Unit on the DIN Track and then press down on the other end of the Unit until it locks into place.



Always attach the Fiber Unit connector end first. If the incorrect end is attached first, the mount strength will be reduced.

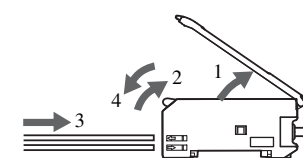
### Removing Units

Press the Unit in the direction indicated by "1" and then lift up on the Fiber Unit connector end of the Unit in the direction indicated by "2."



## 8. Connecting the Fiber Unit

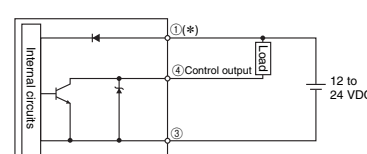
- Open the protective cover
- Press up the lock button.
- Insert the fibers all the way to the back of the connector insertion opening.
- Return the lock button to its original position to secure the fibers.



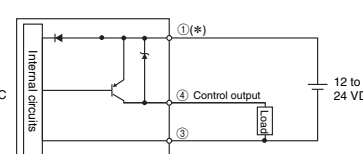
Reverse the above procedure to disconnect the Fiber Unit.

## 9. I/O Circuits

### NPN Models

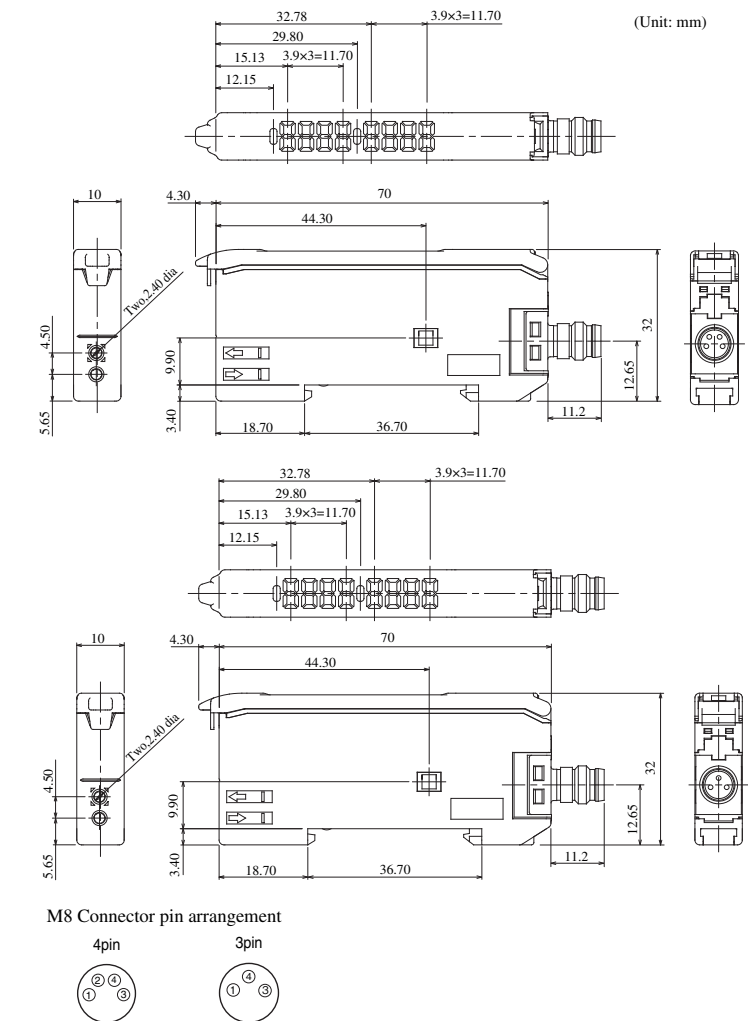


### PNP Models



\*①②③ is terminal pin No. of E3X-DA□4-S and E3X-DA□3-S.

## 10. Dimensions



## Suitability for Use

THE PRODUCTS CONTAINED IN THIS SHEET ARE NOT SAFETY RATED. THEY ARE NOT DESIGNED OR RATED FOR ENSURING SAFETY OF PERSONS, AND SHOULD NOT BE RELIED UPON AS A SAFETY COMPONENT OR PROTECTIVE DEVICE FOR SUCH PURPOSES. Please refer to separate catalogs for OMRON's safety rated products.

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the product.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used. Know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

See also Product catalog for Warranty and Limitation of Liability.

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