

数字式光纤传感器

型E3X-DA S

M8 连接器型

使用说明书

感谢您选择欧姆龙产品。使用时,请务必遵守以下内容。

- •由具备一定电气知识的人员使用
- •使用本品前,请仔细阅读本说明书,在充分了解产品后,正确使用。
- ·为了您的方便,请妥善保管好本说明书,以便随时查用。

欧姆龙公司

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2114730-8B (1/2)

安全上的要点

- 为了确保您的安全,请务必遵守以下内容:
- 请勿在有易燃、易爆气体的环境下使用
- 2) 请勿在有水、油、化学药品飞沫的环境、及接触到蒸汽的环境下使用。
- 3) 请勿擅自拆卸、修理、改造本产品。
- 4) 使用时请勿超出额定电压、电流的范围。
- 5) 请注意工作电源的极性,勿接错线。
- 6) 请正确连接负载。
- 7) 请勿让负载短路
- 8) 请不要在外壳破损的状态下使用。
- 9) 废弃时,请作为工业废弃物处理。

使用上的注意

- 1) 传感器导线和动力线或电力线装在同一配管中使用时,会受到干扰,有误动作甚至被破坏。
- 2) 延长导线必须使用截面积0.3mm²以上、长度100m以下的导线。
- 3)接通电源后,200ms以内本产品处于可以检测的状态
- 所以如果负载和产品连接在不同的电源上时,必须先接通产品的电源
- 4) 导线引出型产品连结使用时,请同时投入电源。
- 连结的传感器之间、电源投入的时间差在30ms以上的时候,相互干涉防止功能将无法正常动作。 另外,也会出现不能使用遥控器的情况。
- 5) 请务必在安装保护盖的状态下使用。
- 6) 拆除或者增加传感器时,请务必先切断电源
- 7)由于电源遮断或者静电等干扰发生写入错误时(ERR/EEP闪烁),请通过本体上的设定键进
- 8) 用手持式控制器操作时
- EXX-DACHORIAN IF 9) EXX-DACHORIAN IF 9) TREST-MC11-SV2手持式控制器。不能使用E3X-MC11. 9)不能与E3X-DA-N系列进行光通信。
- 10) 有时在接通电源后,需要花费一定的时间,使传感器通过适应使用环境来使受光量达到
- 11) 切断电源时,可能会发生输出脉冲,所以请先切断负载或者是负载线的电源。
- 12)请勿使用稀释剂、汽油、丙酮、及煤油类来清扫本产品。
- 13)请勿强行对光纤单元施加拉伸、压缩的力。光纤单元只能承受9.8N•m以内的力。

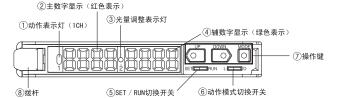
包装内容确认

·使用说明书(本说明书) 1份 ·放大器单元 1台

\+ 1÷ -1.		M8连接器型	
连接方式		4pin	3pin
ш. п	NPN	E3X-DA14-S	E3X-DA13-S
<u></u> 型号	PNP	E3X-DA44-S	E3X-DA43-S
投光元件		红色	LED
电源电压		DC12~24V±10%	波动10%以下
消费功率		消费功率 960mW以下(24V时40mA)	
控制输出		集电极开路(DO 负载电流:50mA以下、	
定时功能		无效/OFF 延时/ON 延时/单触发	
定时时间		1ms~5s	
光量调整功能		有	
防相互干扰功能		有<光通信际 10台	

- *1:当「检测功能」设定为高速模式「SHS」时,通信功能无效,防相互干扰功能以及手 持式控制器的诵信功能不能使用
- *2:光量调整功能有效时,防相互干扰功能最多可连接6台

2.各部分的名称及其功能



- ①1CH的输出为0N时灯亮。
- ②显示受光量和功能的名称。
- ③设定为光量调整时灯亮
- ④显示检测时的辅助性情报和功能的设定值。
- ⑤讲行模式的切换。
- ⑥选择入光时0N还是遮光时0N。
- ⑦进行显示的切换和功能的设定操作。
- ⑧插拔光纤时使用。

3. 操作的基础知识

■模式的切换

用「SET/RUN切换开关」进行模式切换。

请切换为目标模式进行操作。

模式	内容
SET	设定检测条件以及设定示教阈值时选择。
RUN	实际进行检测时或者进行以下设定时选择。 手动调整阈值、示教、光量调整、归零、按键锁定

按键操作

切换显示和检测条件的设定操作,用操作按键进行。 按键的作用,根据当前正在选择的模式不同而变化。

14 65 44 74 34	按键的作用		
按键的种类	RUN模式	SET模式	
UP键	调高阈值	设定以下功能 •实行示教 •顺方向变更设定值	
DOWN键	调低阈值	设定以下功能 •实行示教 •逆方向变更设定值	
MODE键	通过MODE按键设定以下功能。 • 示教 • 实行光量调整 • 实行归零	切换成需要设定的功能	

■ 显示内容的阅读方法

在主数字显示和辅数字显示上显示的内容,根据当前选择的模式不同而不同。出厂后初次接入 电源时,默认显示为RUN模式的内容。

模式	主数字显示板 (红色显示)	辅数字显示板(绿色显示)
SET	通过按键操作,依次显示受光量和功能名 称。	通过按键操作,会依次显示阈值以及主数字显示 上显示的功能的设定值。
RUN*	显示当前的受光量。	显示当前的阈值。

※显示内容可以通过「显示切换」功能进行变更。请参照「5. 详细设定」

4.基本设定

1. 动作模式的设定

选择入光时ON还是遮光时ON。

使用动作模式开关进行切换。请参照下图:

动作模式	LON(入光时ON)	DON(遮光时ON)
设定	L D	L D

需要将当前检测中的受光量调整到光量调整的目标值(出厂时设定: 2000) 左右时进行的 操作。光量调整一定要在检测物体与头部固定、受光量安定的状态下实行。

请事先确认「MODE键设定」功能的设定为「PTUN」(光量调整)。 出厂时设定为「PTUN」。请参照「5. 详细设定









当检测功能选择为「SHS」下实行光量调整时,一定要设在最小光量上。 (这时「光量调整目标值」无效。



切换检测功能后,受光量会发生变化,这时请再度实行光量调整。

●光量调整错误 当光量条显示以下内容时,表示光量调整发生错误。



■解除方法



3. 设定阈值

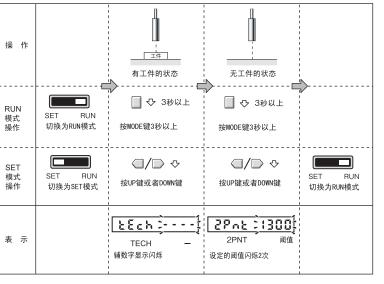
1) 手动设定



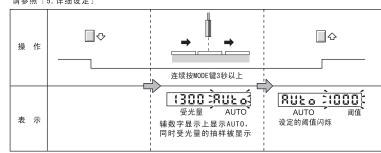
2) 示教设定

①工件有无示教 分别检测有工件和无工件时的光量值,将两者光量值的中间值设定为阈值

RUN模式、SET模式的任何一个都可以设定。 RUN模式下设定时,请预先确认「MODE键设定」功能的设定为「2PNT」。出厂时,设定为「PTUN」。

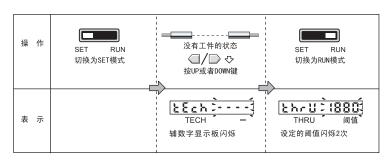


②自动示教 (通过移动工件设定) 在连续按键的过程中检测微受光量,可以设定其最大值和最小值的中间值为阈值。 请预先确认「MODE键设定」功能的设定为「AUTO」。出厂时,设定为「PTUN」 请参照「5. 详细设定」

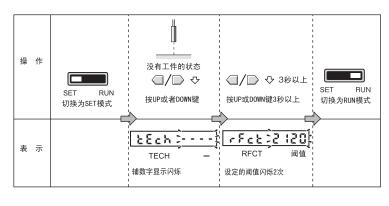


③对射型无丁件示数

使用对射型光纤时,以无工件的状态进行设定的方法。 (没有工件状态)将受光量的约-6%的值作为阈值设定,能够检测微小的光量差。



使用反射型光纤时,以无工件的状态进行设定的方法。 (没有工件状态)将受光量的约+6%的值作为阈值设定,能够检测微小的光量差。



⑤最大感度设定

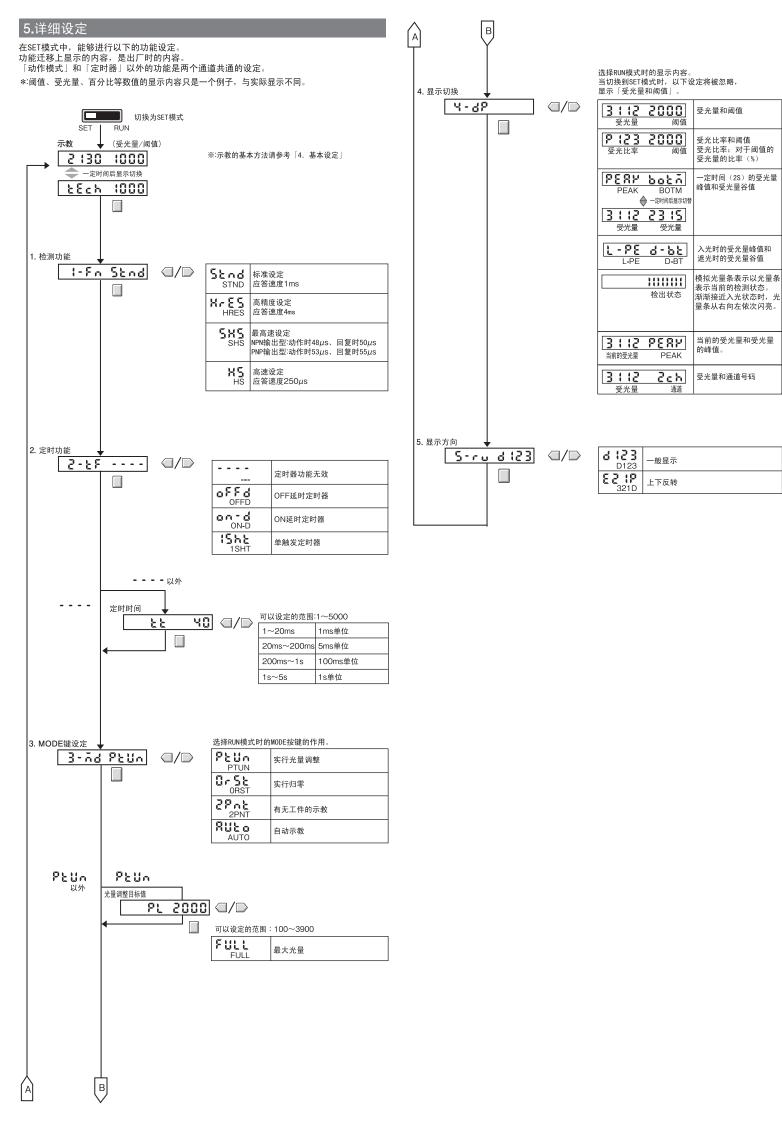
用最大感度设定阈值。这是想将检测距离设定到最长时非常便利的方法。



有/无工件与设定无关。设定的值,根据「检测功能」和「光量调整」而变化。

实行示教后,辅数字显示上显示下列内容是表示发生错误。只是,虽然会设定在阈值可能的范围,

内烁2次 OVER	OVER ERROR 受光量过大。 请在进行以下任意一个内容之后,再实行示教。 •调整头部,使受光量变小 •实行光量调整
闪烁2次 L Q I	LOW ERROR 受光量过小。 请在进行以下任意一个内容之后,再实行示教。 •调整头部,使受光量变大 •实行光量调整
闪烁2次 CERCI NEAR	NEAR ERROR 受光量的变化过小。 请调整头部,使受光量的变化变大后,再度实行示教



6.方便的功能

■ 将数字显示设为零 (归零)

将主数字显示上显示的受光量表示为「0」 辅数字显示上显示的阈值也会因受光量变为「0」而转换。

请预先将「MODE键设定」功能的设定变更为「ORST」(归零)。 出厂时设定为「PTUN」。请参照「5.详细设定」



■ 按键锁定

使按键操作全部无效,起到防止按键误操作的作用。 无效的仅是操作按键,无法使各切换开关无效。

■设定方法 ■解除方法 切换为RUN模式 切换为RUN模式 一边按MODE键, 一边按UP键3秒以上。 请在按下MODE键后, 一边按UP键3秒以上 一边按UP键3秒以上 请在按下MODE键后,



马上按UP键。 马上按UP键 辅数字显示闪烁2次。 **辅数字显示** ● □ 1 按键输入变为无效。 OFF 输入变为有效。 LOC

设定数据初始化(设定初始化处理)

设定内容全部初始化,回到出厂时的状态。

■设定方法







7.放大器单元的设置

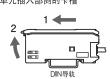
将光纤单元插入部侧的卡槽卡在导轨上, 一直按到卡槽扣住为止。

请务必将光纤单元插入部侧搭在导轨上安装。 如果反装的话,会降低安装强度,

■拆卸

朝方向1按住,光纤单元朝方向2提起。





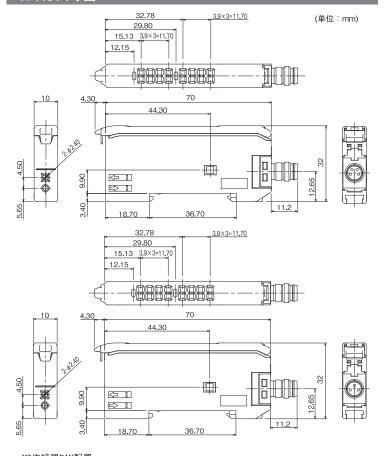
8.光纤单元的安装

- 1. 打开保护盖。
- 2. 提起Lock拨杆。
- 3. 将光纤牢牢插入光纤单元插入口。
- 4. 将Lock拨杆拉回原来的方向,固定光纤。



9.输出段回路图 ■NPN型 ■PNP型 控制输出 *①③④是E3X-DA□4-S、E3X-DA□3-S的端子号.

10.外形尺寸图



M8连接器PIN配置





使用时的承诺事项

- ①为了确保安全,直接或间接用于人体检测时,请勿使用本产品。需使用该用 途时,请选用本公司传感器综合样本中刊登的安全传感器。
- ②使用于下列用途时,与本公司营业担当者商谈之后,根据规格书等确认的同 时,对额定值性能方面请想出有余裕度的使用方法及采取即使万一出故障也 能使危险降低到最小的安全回路等的安全对策。
- a)屋外的用途、潜在化学污染或者受到电气的妨害的用途或者在商品目录、 使用说明书等中没有记载的条件及环境下使用。
- b) 原子力控制设备、焚烧设备、铁道·航空·车辆设备、医用设备、娱乐机械、 安全装置及行政机关及根据个别业界的规定制造的设备。
- c) 可能危及生命、财产的系统•机械•装置
- d) 煤气、水道、电气的供给系统记24小时连续运转系统等需要高信赖的设备。
- e) 其他,以上述的 a) ~ d) 为基准,需要高度安全性的用途。
- *上述内容是适用条件的一部分。仔细阅读本公司的综合商品目录、数据表 等最新版商品目录、手册中记载的保证免责事项的内容后再使用。

联络处所在地

■技术支持

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2114730-8B(2/2)

Digital Fiber Sensor

E3X-DA

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:

Representative in EU
Omron Europe B.V.
Carl-Benz-Str.4
71154 Nufringen Germany

Omron Corporation, Shiokoji Horikawa, Shimogyo-ku, Kyoto 600-8530 JAPAN

Shanghai Factory No.789 Jinji Road, Jinqiao Export Processing District,

Pudong New Area, Shanghai, 201206 CHINA 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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Please observe the following precautions for safe use of the product

- 1)Do not use the Amplifier Unit in environments subject to flammable or explosive gases. 2)Do not use the Amplifier Unit in environments subject to exposure to water, oil, chemicals, etc.
- 3)Do not attempt to disassemble, repair, or modify the Amplifier Unit in any way. 4)Do not apply voltages or currents that exceed the rated ranges.

PRECAUTIONS FOR SAFE USE

- 5) Wire the Amplifier Unit correctly, e.g., do not reverse the polarity of the power supply.
- Connect the load correctly.
- 7)Do not short both ends of the load. 8)Do not use the Amplifier Unit if the case is damaged.
- 9) 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 undesiable effects on product performance.

1)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.

 2)Do not extend the cable to more than 100 m, and use a wire size of 0.3 mm2 or larger for the
- 3)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.
- 4)Please turn on the power supply at the same time when you connecting use the amplifier units Mutual interference prevention might not operate normally or mobile console might not be
- able to be used when the difference between connected amplifiers at the power supply turning on time is 30ms or more. 5) Always keep the protective cover in place when using the Amplifier Unit.
- Amplifier Units, or adding Amplifier Units, or adding Amplifier Units and the data is not written to the EEPROM correctly due to a power failure or static-electric
- 7)If the data is not written to the EEPROM correctly due to a power failure of static-electric noise, initialize the settings using the keys on the Amplifier Unit.

 8)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.

 9)Optical communications are not possible with an E3X-DA-N Amplifier Unit.

 10)Depending on the application environment, time may be required for the incident level to stabilize after the power sumply is turned ON

- 10)Depending on the application environment, time may be required for the incident level to stabilize after the power supply is turned ON.

 11)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.

 12)Do not use thinners, benzine, acetone, or kerosene for cleaning the Amplifier Unit.

 13)Do not pull or press the Fiber Units. The Fiber Units have a withstand force of 9.8N max.

 14)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.

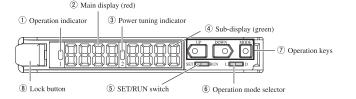
Confirming the Package Contents

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

1. Ratings and Specifications

Connection method		M8 Connector models	
Connection in	Sillou	4pin	3pin
Model number	NPN	E3X-DA14-S	E3X-DA13-S
wodel number	PNP	E3X-DA44-S	E3X-DA43-S
Light emitting el	ement	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.; res	idual 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		Supported (optical communications sync method)*1	
prevention		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.



- 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. 8 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			
Rey	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 ipress the UP key,î then press the UP key for approximately 1 second and then

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

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 with the operation mode selector, as shown below

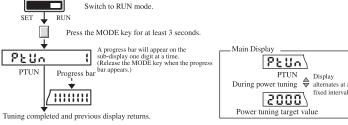
Operation mode	LON(light-ON)	DON(daik-ON)
Cotting		

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





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

<u>`</u>~ If power is tuned when SHS is selected for the detection method, the power will be set to the minimum value. <u>`</u>~

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

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

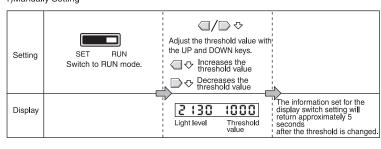
Flashes twice	Over Error The incident light level is too low for the power tuning target value. The power can be increased up to approximately 5 times the incident
	light level without power tuning.
PtUn-botn{	Bottom Error The incident light level is too high for the power tuning target value. The power can be decreased down to approximately 1/25th the incident light
PTUN BOTM	level without power tuning.

Clearing Method



3. Setting Thresholds

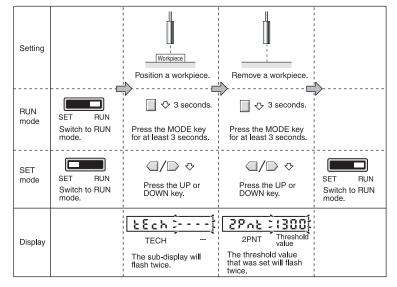
1)Manually Setting



2) Teaching

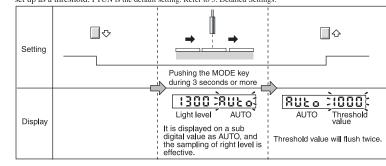
1 Teaching With and Without a Workpiece

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.



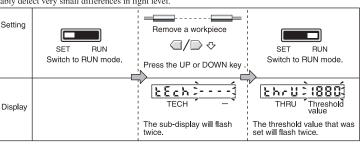
②Automatic-teaching(It sets up at move work.)

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



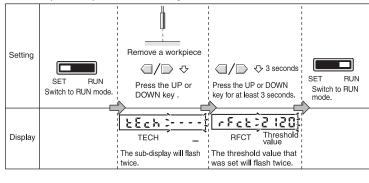
③Teaching for Through-beam Sensor Heads

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



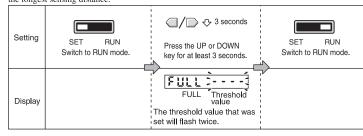
(4) Teaching for Reflective Sensor Heads

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.



(5) 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.

flash twice.	Over error	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.
flash twice.	Low error	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.
flash twice.	Near error	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 incidentlight levels.

5. Detailed Settings

The following functions can be set in SET mode. The default settings are shown in the transition boxes between

. Display

Display

4-68

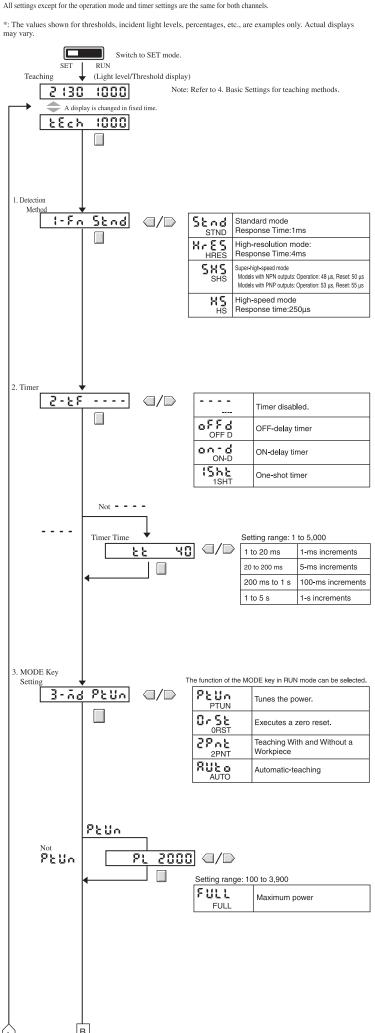
<u>5-ru d:23</u> □/□

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Normal display

Reversed display

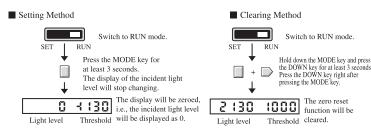


Bill 2000 Light level Threshold	The incident light level and threshold value
P 123 2000 % light level Threshold	The incident light level as a percentage of the threshold value and the threshold value.
PEAK BOTM Alternates at a fixed interval 3 1 1 2 2 3 15 Peak level Bottom level	The peak incident level and bottom incident level of fixed time(2s).
L-PE d-bb L-PE D-BT	The incidient light peak level and no incident light bottom level.
Detection status	Analog bar display. The current detection status is displayed as an analog bar. The bar will lengthen from the right as ON status is reached.
BIIZ PERY Light level PEAK	The current incident light level and the peak incident light level.
Bill 2ch	The incident light level and the channel.

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.

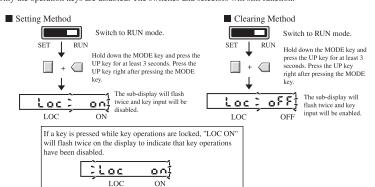


Key Lock

6. Convenient Functions

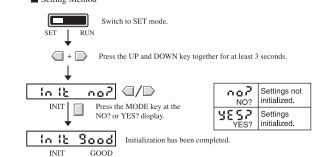
All key operations can be disabled to help prevent key operating errors.

Only the operation keys are disabled. The switches and selectors will still function



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

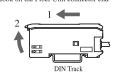
Catch the hook on the Fiber Unit connector end of the Unit on the DIN Track and then press down on the other end of the Unit until it locks into place.

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

■ Removing Units

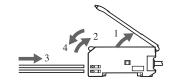
Press the Unit in the direction indicated by "1" and then lift up on the Fiber Unit connector end of the Unit in the direction indicated by "2."





8. Connecting the Fiber Unit

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

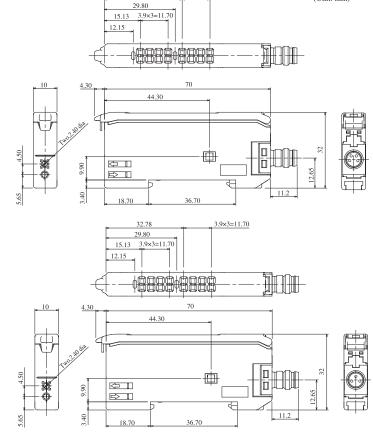


Reverse the above procedure to disconnect the Fiber Unit

9. I/O Circuits

■ NPN Models ■ PNP Models

*①③④ is terminal pin No. of E3X-DA□4-S and E3X-DA□3-S.



(Unit: mm)

M8 Connector pin arrangement



Suitability for Use

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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.

