型E3ZS-T81A

单光束安全传感器

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, 充分了解产品

• 为了您的方便,请妥善保管好本说明书。



● 保证内容

本产品的保证期限为购买后或在指定地点交货后一年

但故障由以下原因引起时,则不属于保证对象范围:

b) 非本公司原因引起故障

c) 非本公司进行的改造和修理引起故障 d) 进行了本公司记述使用方法以外的使用

e) 货品出厂时, 当时的科学技术水平无法预见可能引起

同时,上述保证仅指本公司产品本身,由于本公司产品 故障所引起的损害排除在保证对象之外。

● 责任限定

因本产品引起的特别损失、间接损失、派生损失、逸失利 益及事业损失等情况,不论其要求是基于合约责任、保证 责任、过失责任或者过失责任中的任何一个, 本公司一概 不承担责任。

规格•导则或者规则等

此外,将本产品用于客户的系统、设备、装置时、客户 应自己确认其适用性 关于本产品对于客户用途的适用性,本公司不承担责任

商品目录中记载的应用实例仅作参考之用,应在确认机器、 装置的机能和安全性之后,再进行使用 2. 用于下述场合时,请与本公司销售人员商谈,确认产品

规格书,并应选择额定•性能有一定余地的产品,同时应 当考虑各种安全对策,即使发生故障,也能将危险降低到 最小程度的安全回路等。

a) 屋外的用途、潜在化学污染或受到电气妨害的用途、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、安全装置以及必须符合行政机关和个别 业界特殊规定的设备。

c) 可能危及生命、财产的系统•机械•装置

d) 煤气、水道、电气的供给系统及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。 3. 当用户将本产品用于与人身财产安全密切相关的场合时, 应做到事前明确系统整体的危害性,为确保安全性应采用 特殊的冗余设计,同时按照本公司产品在该系统中的适用 目的,做到配套的配电•设置等。

4. 请务必遵守各项使用注意事项和使用禁止事项,避免发生 不正确使用以及由第三者造成的损害。

● 规格的变更

商品目录•使用说明书等中记载的商品规格以及附属品,可能因 改善或者其他事由,需要进行变更。请在与本公司营业担当商谈 之后,确认本产品的实际规格。

● 适用范围

上述内容仅限于日本国内的交易。

日本国外的交易及使用注意事项请与本公司营业担当接洽。

●警告表示的意思

D果不正确处理,则有可能对人身造成轻度或中度伤 严重情况下、其至会导致重伤或死亡。

安全上的注意

●图记号的意思

表示一般禁止。

●警告表示

⚠ 警告

将单光束安全传感器 E3ZS作为确保人体安全的安全机器, 特単元末交主に窓師 ことら「アブラットへ ドラスエッシュ・リップ する作为安全系统的一部分使用时,请务必连接安全控制器 COOV系列に信仰

·将E3ZS连接在F3SX上使用时,满足安全种类2 (EN954-1) 的必要条件

·E3ZS不连接在F3SX上使用时,是安全种类1(EN954-1)。 ·关于F3SX的额定和规格,请确认F3SX的用户手册

DC24V上、入光时ON(Light ON)的状态下使用。

200mm以上的不透明物体。透明物体不能检测。

受光器的模式选择输入线连接在0V时, 遮光时会变为0N (Dark

ON),不能构筑安全系统。所以必须将模式选择输入线连接在

请一直保持本产品与机械危险领域的安全距离。请按照相关的

对于确认机器检知能力的测试物体,请使用直径18mm、有效长

请不要使用反射型的构成。可能会导致不能检测、甚至可能受

请设置成不受光泽面影响的状态。否则可能会导致不能检测、

多台使用时, 请务必设置成不会发生相互干涉的状态。否则可

本产品不能对从危险领域飞来的物体进行人体保护。请另行设

进行接线时,请务必切断电源。若在通电中进行接线的话,可

请不要连接交流电源或额定以上的直流电源。可能会造成传感

供给电源请务必依据如EMC或电气机器安全规格等那样的、使用

E3ZS的国家的规定及基准进行。例如、请确认是否有依据

安全上的要点

1. 请在充分阅读本使用说明书后,正确使用本产品

2. 与安全控制器 F3SX组合使用时,请正确连接在B1模块

EN60742的二重绝缘必要条件、EU的EMC指令或低电压指令。

(SCHG-705)

反射板

甚至可能受重伤。

置遮蔽物或围墙。

能会触电。

能会导致不能检测、甚至可能受重伤。

器破裂、燃烧、或者触电事故等危险。

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使用时的承诺事项

1. 保证期限

2. 保证范围

在上述保证期限内由于本公司的责任造成所购商品故障 的情况下,本公司负责免费对故障产品进行维修或更换。 a) 在本公司产品说明书所述条件•环境•使用方法以外的

情况下使用而引起故障

f) 其他由于天灾、灾害等非本公司负责的因素

● 适合用途、条件

1. 当本产品与其他产品组合使用时,客户应事先确认适用

3. 不能使负载短路。请务必不要通过超过额定的电流。 请不要供给逆极性电压。E3ZS导线的接线路径中请隔离

> 4. 请不要撕去传感器上贴着的标签(黄色)。会发生不 能满足规格的情况。

高压线、动力线。或者请将单独配管使用作为原则。

5. 请确认连接导线以不紧绷、有一定的余裕、并且不妨 碍作业员或物体移动的状态接线。

6. 请不要分解、修理、改造E3ZS。 7. 请作为产业废弃物进行废弃处理。

使用上的注意

1. 请不要在以下环境中使用。

·日光直射、强光照射的场所 ·湿度高或易结露的场所

·含腐蚀性气体、引火性气体、爆炸性气体的场所 ·有烟雾或微粒子等可能引发品质低下的场所

·超过规格规定的振动或冲击能传送到传咸器的场际 ·使用水、油、药品的场所

2. 请不要在水中使用E3ZS。

3. 延长导线必须使用截面积0.3mm2以上、长度30m以内的 电线。

4. 请注意安装部的紧固强度不要超过0.5N·m。此外, 如果不充分紧固,在有振动的情况下容易松动。

5. 清洁时请不要使用稀释剂、汽油、及丙酮类。 6. 电源规格

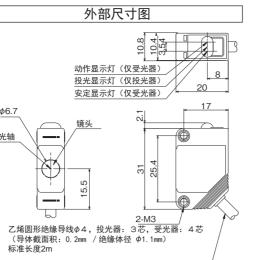
组合的直流电源请使用以下UL认证品。

(1) 符合UL508的限制电压电流回路 满足以下条件、用绝缘变压器的2次侧卷线做电源的回路 ·最大电压(无负载时): 30Vrms(42.4V峰值)以下并且 ·最大电流 : ①8A以下(包括短路时) 或者

②利用保持	下表额定值的回路	保护机器
(保险丝	等)限制的场合	
	无负载电压	最大额定电流
	(V峰值)	(A)
	0~20	5.0

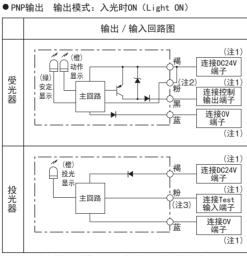
超过20、但30以下 峰值电压值 (2) 符合UL1310的Class2电源单元

(3)符合UL1585的Class2变压器做电源的最大电压30Vrms (42.4V峰值)以下的回路(Class2回路)



检出方式		对射型
连接控制器		F3SX系列
电源电压		DC12~24V±10%、波动(p-p)10%以下作为安全种类2(EN954-1)的安全机器或者安全系统的一部分使用时,请连接F3SX
有效开口	角	±5° (3m的条件下)
消费电流		投光器: 15mA以下 受光器: 20mA以下
检出距离		0. 2~3m
标准检出	物体	φ18mm以上的不透明体
响应时间		1.0ms (但是、E3ZS单体) (连接F3SX使用时,根据F3SX的不同型号, 响应时间不同。具体请参照F3SX的用户手册。)
控制输出		PNP晶体管输出负载电流: 100mA以下 输出残留电压1V以下(负载电流未满10mA时) 输出残留电压2V以下(负载电流10~100mA以下时) (因导线延长的电压下降除外) /作为安全种类2(EN954-1)的安全机器或者安全 系统的一部分使用时,请连接F3SX。
开闭元件	的类别	DC-13(电磁负载的控制)
Test输入 (投光器)		DC22. 5V~DC24V: 投光OFF (源电流: 3mA以下) 开放或者0~2. 5V: 投光OFF (漏电流: 0. 1mA以下) (作为安全种类2(EN954-1)的安全机器或者安全 系统的一部分使用时,请连接F3SX。
电源复位	 时间	100ms
使用周围	照度	受光面光照度 白炽灯: 3,0001x以下 太阳光: 10,0001x以下
周围温度		动作时: -10~55°C、保存时: -10~70°C (但是, 没有结冰、结露)
周围湿度		动作时: 35~85%RH、保存时: 35~95%RH (但是, 没有结冰、结露)
绝缘电阻		20MΩ以上 (DC 500V)
耐电压		AC 1,000V, 50/60Hz, 1min.
	耐久	10~55Hz 复振幅1.5mm X, Y, Z各方向2h
耐振动	动作极限	5~150Hz 复振幅7mm 加速度1G X,Y,Z各方向10回(IEC TR 60721-4-3 Class 3M4)
耐冲击	耐久	500m/s²(约50G) X, Y, Z各方向3回
	动作极限	加速度15G 脉冲时间6ms X,Y,Z各方向100回 3个相互垂直的轴(共600回) (IEC TR 60721-4-3 Class 3M4)
保护构造		IEC规格 IP67
光源		红色发光二极管
显示		投光器:橙/投光显示 受光器:绿/安定显示、橙/动作显示
保护回路		电源·输出逆接保护、负载短路保护
重量(包装状态)		约120g(1套)
		E3ZS单体使用时 EN954-1(种类1) IEC60947-5-3 (PDF-D)

■回路图



E3ZS连接在F3SX上使用时 IEC61496-1 Type2 ESPE IEC61496-2 Type2 AOPD EN954-1 (种类2)

UL61496-1 Type2 ESPE

UL61496-2 Type2 AOP[

(注1)·在安全种类2下使用时,请正确连接F3SX的B1模块各端子。 请不要连接其它模块。

·详细请参照F3SX的用户手册。 (注2)·请务必将受光器的粉色线连接在DC24V上使用。 (注3)·如果E3ZS不连接F3SX、并且不使用TEST输入时,请连接在OV上。

■时序图

● 输出模式和时序图

·F3SX每20ms会进行自我诊断

入光时ON (Light ON)	时序图
入光 連光 动作显示(橙)亮灯 灭灯 控制输出 ON OFF	

时序图 Test输入 投光 显示 (橙)

为了避免单光束安全传感器之间的互相干涉,设置时请考虑以下项 ·投光器和受光器相互交换位置设置(请参照下图) · 使用遮光板分开。 空出充分的间隔进行设置。 ※使用多个单光束安全传感器时,请务必确认不会发生相互 干涉。 ■附件(另售 ● 金属安装配件

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地址:中国上海市浦东新区银城中路200号中银大厦2211室

平行移动特性

相互干涉范围

受光输出余裕度一距离特性

如果有金属制的墙壁或地板、天花板、工件等光泽面(反射率

设置容许距离D

0.27m 以上

高的面),就需要保证充分的距离,使其免受反射光的影响。

请离开光泽面D以上距离,按照以下所示进行设置。

投光器与受光器间的距离(检测距离L)

■相互干涉的影响

■光泽面的影响

OMRON

Model E3ZS-T81A

SINGLE BEAM SAFETY SENSOR

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.

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

Pudong New Area, Shanghai, 201206 CHINA The following notice applies only to products that carry the CE mark n a residential environment, this product may cause radio interferer in which case the user may be required to take adequate me

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SUITABILITY FOR USE WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

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LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

SUITABILITY FOR USE

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

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this instruction sheet.

Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.

Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the

NEVER USE THE PRODUCT 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 PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE

PERFORMANCE DATA

OVERALL EQUIPMENT OR SYSTEM

products.

Performance data given in this manual is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your OMRON representative at any time to confirm actual specifications of purchased product.

DIMENSIONS AND WEIGHTS Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

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Precautions on Safety

Meanings of Alert Symbols

Alert Statements

Category 1 (EN954-1).

∴ WARNING

y device or a part of safety systems for ensuring safety of onnel, be sure to use it with the safety controller model F3SX safety device or a part of safety systems for ensuring safety of

·When the E3ZS is used with the F3SX, the requirements of the Category 2 (EN954-1) are satisfied. When the E3ZS is used without the F3SX, it corresponds to the

Read the F3SX users manual (SCHG-705) about the rating or other specifications of the F3SX.

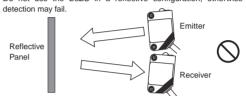
⚠ WARNING

If the mode selection input line of the receiver is connected to 0V the output turns ON when light is interrupted (Dark ON), which no longer configures the safety system. Be sure to connect the mode selection input line to 24V DC to make the sensor output ON when light is incident (Light ON).

Always maintain a safe distance between the E3ZS and a nazardous part of a machine. Be sure to refer to the related standards (EN999) for the calculation of safety distance.

Use an opaque test rod with 18mm in diameter and 200mm or eater in effective length to check the detection capability. The E3ZS cannot detect transparent materials.

Do not use the E3ZS in a reflective configuration, otherwise



Do not install the E3ZS in a location where it can be affected by wall reflections to avoid detection failure, which may result i serious injury.

When using multiple sets of E3ZS, arrange them to prevent mutua interference. Failure to do so may cause the sensor not to detect resulting in serious injury.

ojectiles existing the hazardous area. Proper means of nechanical guarding must be provided to ensure protection from Viring must be done while the power is turned OFF. Doing it with

The E3ZS does not offer protection to the operator's body from

the power ON may cause an electric shock. Do not connect the E3ZS to an AC or DC power supply with higher voltage than nominal DC24V. Otherwise the sensor may explode, burn, or cause electric shock. The power supply must conform to regulatory requirements and standards, regarding EMC and electrical equipment safety, of the country where the E3ZS is installed. For example, the power supply must fulfill EN60742 equirements for double insulation and must conform to EMC

Precautions for Safe Use

Directive and Low Voltage Directive in EU.

line or through an exclusive conduit.

1. Read this instruction sheet thoroughly to understand before using the 2. When used in combination with the F3SX safety controller, make

sure that the B1 module is properly connected. 3. A load must not be shorted. A load must not be used with current higher than the rating. Do not apply the reversed supplied voltage. Be sure to route the E3ZS cable separated from high-potential power

4. Do not remove the label (yellow) from the sensor. Doing so may violate the specifications. 5. Wire the cable so that it has some slack and does not prevent

personnel or object passage.

Allow some leeway for the wires and do not tight the wires when connection cable to F3SX, and confirm that any cable may not block the movements of workers or objects.

6. Do not disassemble, repair or modify the E3ZS.

7. Be sure to dispose of the E3ZS as industrial waste.

Precautions for Correct Use 1. Do not install the E3ZS in the following environments Areas exposed to intense interference light, such as direct sunlight; ·Areas with high-humidity where condensation is likely to occur;

·Areas exposed to corrosive, flammable or explosive gases; ·Areas in the presence of substances, such as heavy smoke or particulate matter, that may deteriorate product quality; ·Areas exposed to vibration or shock levels higher than specification

·Areas where the product may come in direct contact with water, oil,

2. Do not install the E3ZS in water.

3. To extend the cable, use a wire of cross-sectional area 0.3mm² or more. However do not extend it more than 30m.

not tight enough, vibration may cause it to come loose.

4. Be careful not to exceed a tightening torque of 0.5 Nm. Also, if it is

When cleaning, avoid using thinner, benzene or acetone.

6. Power supply specifications For combined DC power supply, use the following UL certified (1) Limited voltage current circuit that conforms to UL508

Circuit with a power supply that consists of a secondary coil of an insulated transformer that satisfies the following conditions -Maximum voltage (with no load): 30Vrms (42.4V peak) or less, and (2) When limited by a circuit protector (fuse, etc.) with the ratings shown in the table below No-load voltage Maximum current ratio

0 to 20

More than 20,

up to 30

5.0

100

Peak voltage value (2) Class 2 power supply unit that conforms to UL1310 (3) Circuit (class 2 circuit) with 30Vrms (42.4V peak) or less of maximum voltage, and which uses a class 2 transformer that conforms to UL1585 as its power supply

DIMENSIONS Operation indicator(Receiver only 6.7dia 2-M3 4dia, Emitter:3core, Receiver:4core length 2m

■ RATINGS / PERFORMANCE

Detection method

est Inpu

Power reset time

Ambient temperature

Ambient humidity

Enclosure ratings

Durability

■ CIRCUIT DIAGRAM

Output mode: ON when incident (Light ON)

E3ZS

Power supply voltage	12 to 24V DC±10% (ripple p-p 10% max) When the E3ZS is used as a part of safe apparatus or safe systems Category2(EN954-1), use it with F3SX.	
Operating angle	±5°(at 3m)	
Current consumption	Emitter : 15mA max. Receiver : 20mA max.	
Sensing distance	0.2~3m	
Standard object	Opaque object of Φ18mm or more.	
Response time	1.0ms (E3ZS only) Response time depends on the F3SX. For the details, see the users manual of the F3SX.	
Control output	Transistor output PNP, load current 100mA mai Output residual voltage of 1V or less (when load current is less than 10mA) Output residual voltage of 2V or less (when load current is from 10 to 100mA) (except for voltage drop due to cable extension) When the E3ZS is used as a part of safe apparatus or safe systems Category2(EN954-1) use it with F3SX.	
Utilization categories or switching elements DC-13 (Control of electromagnets)		
i		

Source current : 3mA max

Sunlight

Open or 0 to 2.5 V DC : Emitting ON

When the E3ZS is used as a part of safe

paratus or safe systems Category2(EN954-

Illumination intensity

Incandescent lamp: 3000 lx max

Operating: $-10\sim55^{\circ}$ C, Storage: $-10\sim70^{\circ}$ C

Operating: 35~85% RH, Storage: 35~95% RH

 $20 M\Omega$ or more (by 500V DC megger)

1000V AC, 50/60Hz for 1 min

10~55 Hz, 1.5mm double amplitude

2 hours for each direction of X, Y, Z

3 mutually perpendicular axes. (600 in total). (IEC TR 60721-4-3 Class 3M4

Red LED

Emitter : Orange / Light emission Receiver : Green / Stability, Orange / Operation

Approx. 120g (1set

Circuit protection Output short-circuit and power supply reverse polarity

When using E3ZS by itself:

IEC61496-2 Type2 AOPD

EN954-1 (Category 2)

UL61496-1 Type2 ESPE

UL61496-2 Type2 AOPI

Output / Input circuit

24V DC termina

input terminal

(Note

When E3ZS is connected to E3SX:

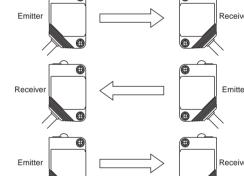
EN954-1 (Category 1) IEC60947-5-3 (PDF-D)

5 to 150Hz, 7mm double amplitude / 1G acceleration, 10 sw

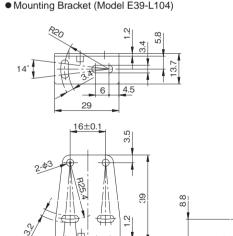
Through beam type

Model F3SX series

■ INFLUENCE OF MUTUAL INTERFERENCE

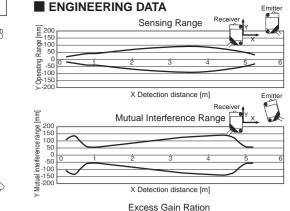


Install a light interrupting wall in between sensors.

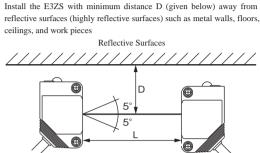


■ EUROPE OMRON EUROPE B.V. Sensor Business Unit Carl-Benz Str.4, D-71154 Nufringen Germany Phone:49-7032-811-0 Fax: 49-7032-811-199 NORTH AMERICA OMRON ELECTRONICS LLC One Commerce Drive Schaumburg,IL 60173-5302 U.S.A. Phone:1-847-843-7900 Fax: 1-847-843-7787 Alexandra Technopark, Singapore 119967 Phone: 65-6835-3011 Fax: 65-6835-2711 OMRON(CHINA) CO., LTD. Room 2211, Bank of China Tower, 200 Yin Cheng Zhong Road, PuDong New Area, Shanghai, 200120, China Phone: 86-21-5037-2222 Fax: 86-21-5037-2200

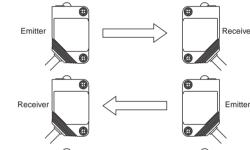
The F3SX executes a periodic self-diagnosis every 20 ms



■ INFLUENCE OF REFLECTIVE SURFACES



When installing two or more E3ZSs to each other, considerations mu



Install the E3ZSs facing away from the one another to

eliminate mutual interference Note: When using multiple sets of E3ZSs, be sure to

■ ACCESSORY (OPTIONAL)

(Note 1) •When the E3ZS is used as a part of safe apparatus or safe systems Category2(EN954-1), connect to the B1 module of the F3SX. Do not connect to the other modules. ·For the details, see the users manual of the F3SX. (Note 2) *Be sure to connect the "Mode selection input" to 24V DC terminal.

(Note 3) •When the E3ZS is used without being connected to F3SX, test input should be connected to 0V. ■ TIMING CHART Output mode and timing chart

On when incident (Light ON) Timing chart Light incident Light interrupted Indicator Green Red Control ON output OFF Emitting timing chart

Timing chart Test input Light emission Indicator (Orange) ON OFF

OMRON Corporation O OCT, 2009

CHINA

ASIA-PACIFIC
OMRON ASIA PACIFIC PTE. LTD.
No. 438A Alexandra Road #05-05-08(Lobby 2),

Distance between emitter and Minimum installation receiver(Operating range L) distance D 0.2 to 3 m 0.27 m or more

be made to prevent mutual interference ·Install so that any E3ZSs emit in the opposite directions (See below