

使用说明书

感谢您选择欧姆龙产品。
以下主要记载在安装和使用本产品过程中需注意事项。
使用本产品前，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。

2116438-5B

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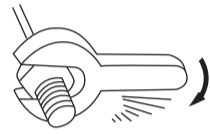
规格

| | | | | | |
|-------------------|------|---|------------------------|----------------------------|--------------------------|
| 项目 | 型号 | 型E2F-X1R5E□ 型E2F-X1R5Y□ | 型E2F-X2E□ 型E2F-X2Y□ | 型E2F-X5E□ 型E2F-X5Y□ | 型E2F-X10E□ 型E2F-X10Y□ |
| 检出距离 | | 1.5mm±10% | 2mm±10% | 5mm±10% | 10mm±10% |
| 设定距离 | | 0~1.2mm | 0~1.6mm | 0~4mm | 0~8mm |
| 应差距离 | | 检出距离的10%以下 | | | |
| 检出物体 | | 磁性金属 | | | |
| 标准检出物体 | | 铁8×8×1mm | 铁12×12×1mm | 铁18×18×1mm | 铁30×30×1mm |
| 响应频率 | | E型: 2kHz Y型: 25Hz | E型: 1.5kHz Y型: 25Hz | E型: 600Hz Y型: 25Hz | E型: 400Hz Y型: 25Hz |
| 电源电压 (使用电压范围) | | E型: DC12~24 波动(p-p) 10%以下 (DC10~30V) Y型: AC24~240V (AC20~264V) | | | |
| 消费电流 | | E型: 17mA以下 | | | |
| 漏电流 | | Y型: 1.7mA以下 (AC200V时) | | | |
| 控制输出 | 开关容量 | E型: 200mA以下 Y型: 5~100mA | | E型: 200mA以下 Y型: 5~300mA | |
| | 残留电压 | E型: 2V以下 (负载电流200mA、导线长2m时) Y型: 参照样本 | | | |
| 显示灯 | | E型: 动作表示 (红) Y型: 动作表示 (红) | | | |
| 动作状态 (检测物体接近时) | | E1型、Y1型: NO E2型、Y2型: NC | | | |
| 保护回路 | | E型: 逆向连接保护、负荷短路保护、浪涌吸收 Y型: 无 | | | |

安全上的要点

以下项目在安全确保方面非常重要，请务必遵守。

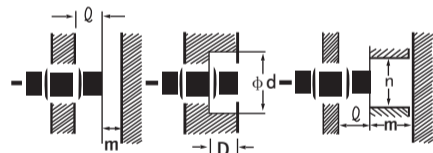
- 请不要在具有可燃性、爆炸性气体的环境下使用。
- 请勿拆卸、修理、改造本产品。
- 关于电源电压
请在额定电压范围以内使用。施加超过额定电压以上的电压或者将直流型传感器连接交流电源 (AC100V)，可能导致产品烧毁、破裂。
- 关于负载短路
请不要将负载短路，否则可能导致产品破裂或烧毁。
- 关于误接线
请不要颠倒电源的极性接线。否则可能导致产品破裂、烧毁。
- 关于无负载接线
请使用负载后再接线，如果没有负载不要直接接电源，否则可能导致产品内部元件破裂、烧毁。



- 固定:
不要用过大的力紧固螺丝。
紧固允许强度请参照下表。

| 型号 | 强度 (转矩) |
|-----------|---------|
| E2F-X1R5□ | 0.78N·m |
| E2F-X2□ | 0.78N·m |
| E2F-X5□ | 2.0N·m |
| E2F-X10□ | 2.0N·m |
| E2F-X5M□ | 0.78N·m |
| E2F-X10M□ | 2.0N·m |
| E2F-X18M□ | 2.0N·m |

- 周围金属的影响:
当周围有金属时，会受其影响，产生复归不良等；即使不产生复归不良，也会因周围有金属、随温度变化等影响导致检出距离的变化。故请注意下表所示之最小距离，实际距离必须大于此最小距离。



(单位: mm)

| 型号 | E2F-X1R5□ | E2F-X2□ | E2F-X5□ | E2F-X10□ | E2F-X5M□ | E2F-X10M□ | E2F-X18M□ |
|----|-----------|---------|---------|----------|----------|-----------|-----------|
| Q | 0 | 0 | 0 | 0 | 15 | 22 | 30 |
| d | 8 | 12 | 18 | 30 | 40 | 55 | 90 |
| D | 0 | 0 | 0 | 0 | 15 | 22 | 30 |
| m | 4.5 | 8 | 20 | 40 | 20 | 40 | 70 |
| n | 12 | 18 | 27 | 45 | 36 | 54 | 90 |

- 相互干涉
当有多个接近开关共同使用时，由于相互干涉的原因，会有导致误动作的可能，请对照下表，在大于下表所示距离以上范围使用。



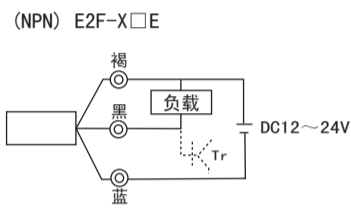
(单位: mm)

| 型号 | E2F-X1R5□ | E2F-X2□ | E2F-X5□ | E2F-X10□ | E2F-X5M□ | E2F-X10M□ | E2F-X18M□ |
|----|-----------|---------|---------|----------|----------|-----------|-----------|
| A | 20 | 30 (20) | 50 (30) | 100 (50) | 120 | 200 | 300 |
| B | 15 | 20 (12) | 35 (18) | 70 (35) | 100 | 110 | 200 |

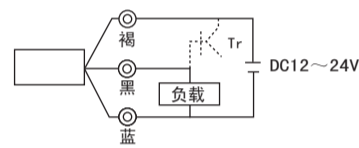
注: () 内的数值适用于使用异频率型号的机种。

输出段回路图和接线

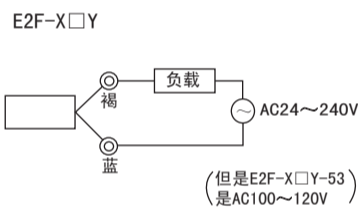
直流开关型



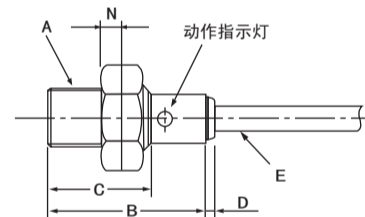
(PNP) E2F-X□F



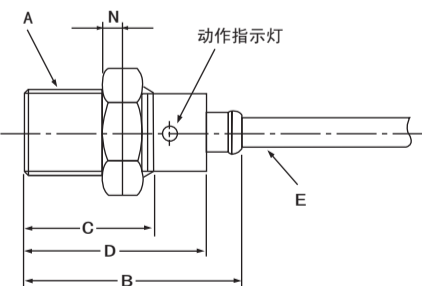
交流开关型



外形尺寸图 (mm)



| | A | B | C | D | N |
|-----------------|-----------|----|----|---|---|
| E2F-X1R5E (F) □ | M8 P=1.0 | 30 | 20 | - | 4 |
| E2F-X1R5Y □ | M8 P=1.0 | 40 | 29 | - | 4 |
| E2F-X2E (F) □ | M12 P=1.0 | 35 | 24 | 3 | 4 |
| E2F-X2Y □ | M12 P=1.0 | 40 | 29 | 3 | 4 |
| E2F-X5ME (F) □ | M12 P=1.0 | 35 | 24 | 3 | 4 |



| | A | B | C | D | N |
|-----------------|-----------|----|----|----|---|
| E2F-X5E (F) □ | M18 P=1.0 | 47 | 29 | 40 | 4 |
| E2F-X5Y □ | M18 P=1.0 | 47 | 29 | 40 | 4 |
| E2F-X5Y□-53 | M18 P=1.0 | 57 | 39 | 50 | 4 |
| E2F-X10E (F) □ | M30 P=1.5 | 57 | 38 | 50 | 5 |
| E2F-X10Y □ | M30 P=1.5 | 57 | 38 | 50 | 5 |
| E2F-X10Y□-53 | M30 P=1.5 | 57 | 39 | 50 | 5 |
| E2F-X10ME (F) □ | M18 P=1.0 | 47 | 29 | 40 | 4 |
| E2F-X18ME (F) □ | M30 P=1.5 | 57 | 38 | 50 | 5 |

E. 聚乙烯绝缘圆形导线 (耐油·耐热型)

| | |
|--|--------------------------------------|
| E2F-X1R5□ | 3-0.14mm ² φ3.5 标准: 2m |
| E2F-X2E (F) □ E2F-X5ME (F) □ E2F-X5E (F) □ E2F-X10E (F) □ E2F-X10ME (F) □ E2F-X18ME (F) □ | 3-0.5mm ² φ6 标准: 2m |
| E2F-X1R5Y□ | 2-0.14mm ² φ3.5 标准: 2m |
| E2F-X2Y□ E2F-X5Y□ E2F-X5Y□-53 E2F-X10Y□ E2F-X10Y□-53 | 2-0.5mm ² φ6 标准: 2m |

●导线延长、最大200m(单独金属配线管)

承诺事项

“本公司产品”是作为工业通用品而设计制造的。因此，不适用于以下用途，当“本公司”产品被使用于下列用途时，“本公司”不做任何保证。

- 需要高度安全性的用途(例: 用于原子能控制设备、焚烧设备、航空·宇宙设备、铁道设备、升降设备、娱乐设备、医用机器、安全装置、或其他可能危及到生命·人身安全的用途)
- 需要高可靠性的用途(例: 煤气·水道·电气等的供给系统、24小时连续运转系统、裁决系统、或其他牵涉到权利·财产的用途)
- 苛刻条件或环境下的用途(例: 室外设备、易受化学污染的设备、易受电磁干扰的设备、易受震动·冲击的设备等)
- “产品手册”里未记载的条件或环境下的用途

*除上述a)~d)的记载事项，“产品手册等记载的商品”中不包含车辆。请勿搭载于车辆上使用。车辆搭载用商品请咨询本公司销售人员。
*以上是适用条件的一部分。详情请参阅记载在本公司最新版的综合目录、产品手册上的保证·免责事项后再使用。

技术咨询

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技术咨询热线: 400-820-4535
网址: <http://www.fa.omron.com.cn>

Model E2F

PROXIMITY SWITCH

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., Wegalaan 67-69, 2132 JD Hooftdorp, The Netherlands
 Manufacturer: OMRON CORPORATION, Shikokji Horikawa, Shimogyo-ku, Kyoto 600-8530 JAPAN
 Shanghai Factory: No.789 Jinji Road, Jinqiao Export Processing District, Pudong New Area, Shanghai, 201206 CHINA

The following notice applies only to products that carry the CE mark:
 Notice: This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.

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PRECAUTIONS FOR SAFE USE

Keep following items to secure from danger.

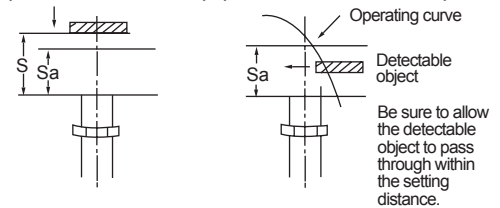
- Do not use in ambience of flammable, volatile gas.
- Do not decompose, repair, and modify.
- The product may explode or be burned with following misusages.
 - To apply excess voltage, or to apply AC source as the power source.
 - To short-circuit the load.
 - To reverse polarity, or to miss-wire.
 - To connect power source without loads.

PRECAUTIONS FOR CORRECT USE

- Do not use in the following ambience.
 - Direct sunlight, rain, snow, and water drop.
 - Chemicals, especially solvents and acids.
 - Corrosive gas, erosive gas.
- Proximity switch may have a malfunction with using cellular phones or transceivers near by.
- Plumbing into the same pipe or duct with high-voltage line or power line may cause a malfunction, or destruction because of induction.
- Do not use thinner may dissolve the surface of products.
- Be sure to connect the proximity switch by processing its connection cable end with a solderless terminal. (The solderless terminal is not supplied as an accessory.)
- Preventive maintenance

Do not use the AC two-wire type if the detecting surface could be damaged by an approaching detectable object and then get splashed with water or if the unit could go under water. An electric shock may result.
- How to determine setting distance (for stable operation)
 - The detecting distance and setting distance of the proximity switch will vary depending on the shape size and material of a object to be detected. Therefore confirm the proper detecting and setting distance beforehand.
 - When a detectable object is smaller than the standard detectable object (iron), the detecting distance will become shorter. However the detecting distance will not become longer even if an object larger than the standard detectable object is used.

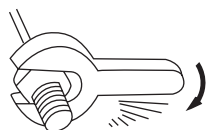
(Vertical movement) (Horizontal movement)



(8) Mounting

Do not tighten the switch mounting nuts with excessive force. Secure the mounting nuts to the corresponding torque values in table 1.

Failure to observe these values may cause damage to the sensor.



RATING AVAILABLE TYPES

| Item | Model | E2F-X1R5E□ E2F-X1R5Y□ | E2F-X2E□ E2F-X2Y□ | E2F-X5E□ E2F-X5Y□-US E2F-X5Y□-53-US | E2F-X10E□ E2F-X10Y□-US E2F-X10Y□-53-US |
|---|----------------------|--|--|---|--|
| Supply voltage | | E type : 10 to 30V DC Y type : 20 to 264V AC, 50/60Hz | | 20 to 264V AC, 50/60Hz (E2F-X□Y□-US) 90 to 140V AC, 50/60Hz (E2F-X□Y□-53-US) | |
| Current consumption | | E type : 17mA max. Y type : 5mA max. | | | |
| Detectable object type | | Metallic objects | | | |
| Effective maximum detecting distance (with standard target) | | 1.5mm (0.06 in) ± 15% | 2mm (0.08 in) ± 10% | 5mm (0.20 in) ± 10% | 10mm (0.39 in) ± 10% |
| Usable detecting range (with standard target) | | 0 to 1.2mm (0 to 0.05 in) | 0 to 1.6mm (0 to 0.06 in) | 0 to 4mm (0 to 0.16 in) | 0 to 8mm (0 to 0.31 in) |
| Standard target size (mild steel, L x W x H) | | 8X8X1mm (0.31X0.31X0.04 in) | 12X12X1mm (0.47X0.47X0.04 in) | 18X18X1mm (0.71X0.71X0.04 in) | 30X30X1mm (1.18X1.18X0.04 in) |
| Differential travel | | 10% max. of effective max. detecting distance | | | |
| Control output | AC solid-state | Type | SCR-NO (E2F-X□Y□-□□□□) SCR-NO (E2F-X□Y□-□□□□) | | NPN-NO open collector with pull-up (E2F-X□Y□-□□E1) NPN-NC open collector with pull-up (E2F-X□Y□-□□E2) PNP-NO open collector with pull-down (E2F-X□Y□-□□F1) PNP-NC open collector with pull-down (E2F-X□Y□-□□F2) |
| | | Max. load | E type : 200mA Y type : 100mA | | 300mA for E2F-X□Y□-□□-US and E2F-X□Y□-53-US at -25° to 70° C (-13° to 158° F) 500mA for E2F-X□Y□-□□-US at -25° to 55° C (-13° to 131° F) |
| | | Min. load | E type : 200mA Y type : 5mA | | |
| | | Max. off-state leakage current | 1.7mA at 200V AC | | 1.7mA at 200V AC (E2F-X□Y□-□□-US) 1.5mA at 200V AC (E2F-X□Y□-□□-53-US) |
| | | Max. on-state voltage drop | E type : 2V DC Y type : See "Residual Load Voltage Characteristics" graph in Engineering Data | | |
| Response frequency | | E type : 2kHz Y type : 25Hz | E type : 1.5kHz | E type : 600Hz | E type : 400Hz |
| Circuit protection | Output short-circuit | E type : Provided; automatic resetting type Y type : Not provided | | Provided on E2F-X□Y□-53-US types only; manual resetting type | |
| Indicators | | E type : Output Operation (red LED) Y type : Output Operation (red LED) | | | |

Table 1

| Model | Tightening torque |
|-----------|-------------------|
| E2F-X1R5□ | 0.78N • m |
| E2F-X2□ | 0.78N • m |
| E2F-X5□ | 2.0N • m |
| E2F-X10□ | 2.0N • m |
| E2F-X5M□ | 0.78N • m |
| E2F-X10M□ | 2.0N • m |
| E2F-X18M□ | 2.0N • m |

(9) Effects of surrounding metals

When a metallic object other than the object to be detected exists in the area surrounding the detecting head, the proximity switch may be affected by the surrounding metal and may not release properly. Even if the proximity switch release properly, a change in the detecting distance may occur by temperature, etc. Therefore be sure to provide a minimum distance from the surrounding metallic object as specified in Table 2.

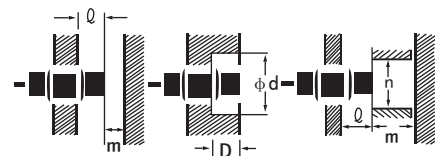


Table 2 Effects of surrounding metals [Unit : mm]

| Model | E2F-X1R5□ | E2F-X2□ | E2F-X5□ | E2F-X10□ | E2F-X5M□ | E2F-X10M□ | E2F-X18M□ |
|-------|-----------|---------|---------|----------|----------|-----------|-----------|
| Q | 0 | 0 | 0 | 0 | 15 | 22 | 30 |
| d | 8 | 12 | 18 | 30 | 40 | 55 | 90 |
| D | 0 | 0 | 0 | 0 | 15 | 22 | 30 |
| m | 4.5 | 8 | 20 | 40 | 20 | 40 | 70 |
| n | 12 | 18 | 27 | 45 | 36 | 54 | 90 |

(10) Mutual interference

When plural proximity switches are used, the juxtaposed switches may malfunction due to mutual interference. Therefore be sure to provide a minimum distance between two switches, as specified in Table 3.



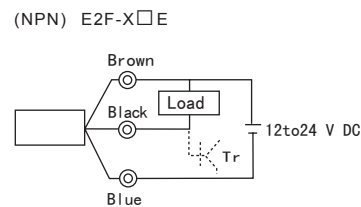
Table 3 Mutual interference [Unit : mm]

| Model | E2F-X1R5□ | E2F-X2□ | E2F-X5□ | E2F-X10□ | E2F-X5M□ | E2F-X10M□ | E2F-X18M□ |
|-------|-----------|---------|---------|----------|----------|-----------|-----------|
| A | 20 | 30 (20) | 50 (30) | 100 (50) | 120 | 200 | 300 |
| B | 15 | 20 (12) | 35 (18) | 70 (35) | 100 | 110 | 200 |

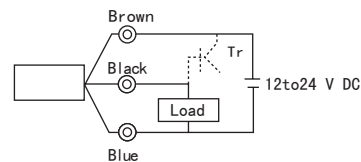
NOTE : The values in parentheses apply to the alternated frequency ("5" suffix) type. Refer to "AVAILABLE TYPES".

OUTPUT CIRCUIT DIAGRAMS AND CONNECTIONS

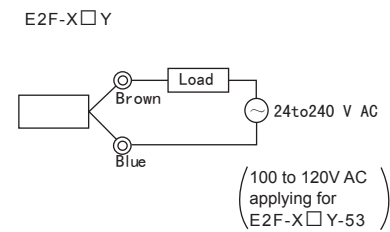
DC Switching



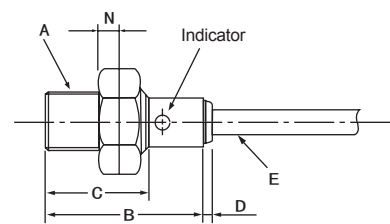
(PNP) E2F-X□F



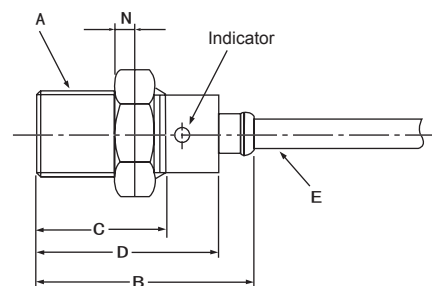
AC Switching



DIMENSIONS (mm)



| | A | B | C | D | N |
|-----------------|-----------|----|----|---|---|
| E2F-X1R5E (F) □ | M8 P=1.0 | 30 | 20 | - | 4 |
| E2F-X1R5Y□ | M8 P=1.0 | 40 | 29 | - | 4 |
| E2F-X2E (F) □ | M12 P=1.0 | 35 | 24 | 3 | 4 |
| E2F-X2Y□ | M12 P=1.0 | 40 | 29 | 3 | 4 |
| E2F-X5ME (F) □ | M12 P=1.0 | 35 | 24 | 3 | 4 |



| | A | B | C | D | N |
|-----------------|-----------|----|----|----|---|
| E2F-X5E (F) □ | M18 P=1.0 | 47 | 29 | 40 | 4 |
| E2F-X5Y□ | M18 P=1.0 | 47 | 29 | 40 | 4 |
| E2F-X5Y□-53 | M18 P=1.0 | 57 | 39 | 50 | 4 |
| E2F-X10E (F) □ | M30 P=1.5 | 57 | 38 | 50 | 5 |
| E2F-X10Y□ | M30 P=1.5 | 57 | 38 | 50 | 5 |
| E2F-X10Y□-53 | M30 P=1.5 | 57 | 39 | 50 | 5 |
| E2F-X10ME (F) □ | M18 P=1.0 | 47 | 29 | 40 | 4 |
| E2F-X18ME (F) □ | M30 P=1.5 | 57 | 38 | 50 | 5 |

E : Polyvinyl chloride insulated cable

| | |
|--|---|
| E2F-X1R5□ | 3-0. 14mm ² φ 3.5 Standard length: 2m |
| E2F-X2E (F) □ E2F-X5ME (F) □ E2F-X5E (F) □ E2F-X10E (F) □ E2F-X10ME (F) □ E2F-X18ME (F) □ | 3-0. 5mm ² φ 6 Standard length: 2m |
| E2F-X1R5Y□ | 2-0. 14mm ² φ 3.5 Standard length: 2m |
| E2F-X2Y□ E2F-X5Y□ E2F-X5Y□-53 E2F-X10Y□ E2F-X10Y□-53 | 2-0. 5mm ² φ 6 Standard length: 2m |

• Extendable cable length is 200m max (independently through metallic conduit)

Suitability for use

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

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

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