Slot-type Photomicrosensor (Non-modulated) *1

# EE-SX47/67

CSM_EE-SX47/67_DS_E_12_2

## Global Standard Slot-type photomicrosensors with 50- to 100-mA direct switching capacity.

- Series includes models that enable switching between dark-ON and light-ON operation.
- Response frequency as high as 1 kHz.
- Easy operation monitoring with bright light indicator.
- Wide operating voltage range: 5 to 24 VDC
- Models in which the light indicator turns ON for dark-ON operation are also available.
- A wide range of variations in eight different shapes.
- Flexible robot cable is provided as a standard feature. *2

Be sure to read *Safety Precautions* on page 5.

*1. Pre-wired Models are available only in the EE-SX67 Series.
*2. Only for Pre-wired Models.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

## Ordering Information

### Connector

Infrared light

| Appearance | Sensing method | Connecting method | Sensing distance | Output configuration | Indicator mode | Model | |
|---|---|---|---|---|---|---|---|
| | | | | | | NPN output | PNP output |
| Standard  | Through-beam type (with slot) | Connector (4 poles) | 5 mm (slot width) | Dark-ON/Light-ON (selectable) *3 *4 | Incident light | EE-SX670 | EE-SX670P |
| | | | | | No incident light | EE-SX670A | EE-SX670R |
| | | | | Light-ON | Incident light | EE-SX470 | --- |
| L-shaped  | | | | Dark-ON/Light-ON (selectable) *3 *4 | Incident light | EE-SX671 | EE-SX671P |
| | | | | | No incident light | EE-SX671A | EE-SX671R |
| | | | | Light-ON | Incident light | EE-SX471 | --- |
| T-shaped, slot center 7 mm  | | | | Dark-ON/Light-ON (selectable) *3 *4 | Incident light | EE-SX672 | EE-SX672P |
| | | | | | No incident light | EE-SX672A | EE-SX672R |
| | | | | Light-ON | Incident light | EE-SX472 | --- |
| Close-mounting  | | | | Dark-ON/Light-ON (selectable) *3 *4 | Incident light | EE-SX673 | EE-SX673P |
| | | | | | No incident light | EE-SX673A | EE-SX673R |
| | | | | Light-ON | Incident light | EE-SX473 | --- |
| Close-mounting  | | | | Dark-ON/Light-ON (selectable) *3 *4 | Incident light | EE-SX674 | EE-SX674P |
| | | | | | No incident light | EE-SX674A | EE-SX674R |
| | | | | Light-ON | Incident light | EE-SX474 | --- |
| T-shaped, slot center 10 mm  | | | | Dark-ON/Light-ON (selectable) *3 *4 | Incident light | EE-SX675 | EE-SX675P |
| F-shaped  | | | | Dark-ON/Light-ON (selectable) *3 *4 | Incident light | EE-SX676 | EE-SX676P |
| R-shaped  | | | | Dark-ON/Light-ON (selectable) *3 *4 | Incident light | EE-SX677 | EE-SX677P |

*3. Dark-ON when the L terminal of the connector is opened, and light-ON when the L terminal and positive (+) terminal are connected. Do not connect the L terminal to 0 V when using dark-ON operation. When using light-ON, it is useful to select the connector EE-1001-1. The L terminal and positive (+) terminal of this connector are connected in advance.
*4. If you do not use the L terminal wire ((2) pink) when you use a Connector with Cable for an EE-1006 or EE-1010-series Photomicrosensor, noise may affect the Photomicrosensor. To prevent the effects of noise, cut the unused L terminal wire at the base of the connector and wrap it with insulating tape to prevent it from coming in contact with other terminals.

## Pre-wired Models

Infrared light

| Appearance | Sensing method | Sensing distance | | Output configuration | Indicator mode | Connecting method | Model | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | NPN output | PNP output |
| Standard  | Through-beam type (with slot) | | 5 mm (slot width) | Dark-ON/ Light-ON (selectable) *1 *2 | Incident light | Pre-wired Models (1m) | **EE-SX670-WR 1M** | **EE-SX670P-WR 1M** |
| L-shaped  | | | | | | | **EE-SX671-WR 1M** | **EE-SX671P-WR 1M** |
| T-shaped, slot center 7 mm  | | | | | | | **EE-SX672-WR 1M** | **EE-SX672P-WR 1M** |
| Close-mounting  | | | | | | | **EE-SX673-WR 1M** | **EE-SX673P-WR 1M** |
| Close-mounting  | | | | | | | **EE-SX674-WR 1M** | **EE-SX674P-WR 1M** |
| T-shaped, slot center 10 mm  | | | | | | | **EE-SX675-WR 1M** | **EE-SX675P-WR 1M** |
| F-shaped  | | | | | | | **EE-SX676-WR 1M** | **EE-SX676P-WR 1M** |
| R-shaped  | | | | | | | **EE-SX677-WR 1M** | **EE-SX677P-WR 1M** |

*1. Dark-ON operation can be used when the L terminal is left unconnected or Light-ON operation can be used when the L terminal and positive (+) terminal are connected to each other. Do not connect the L terminal to 0 V when using dark-ON operation.

*2. If you do not use the L terminal wire ((2) pink) when you use a Connector with Cable for an EE-1006 or EE-1010-series Photomicrosensor, noise may affect the Photomicrosensor. To prevent the effects of noise, cut the unused L terminal wire at the base of the connector and wrap it with insulating tape to prevent it from coming in contact with other terminals.

## Accessories (Order Separately) Connector Models

| Type | | Cable length | Model | Remarks |
|---|---|---|---|---|
| Connector | | | **EE-1001** | |
| | | | **EE-1001-1** | L terminal and positive (+) terminal are already short-circuited. |
| | | | **EE-1009** * | |
| | Connector with Cable | 1 m | **EE-1006 1M** | |
| | | | **EE-1010 1M** * | |
| | | 2 m | **EE-1006 2M** | |
| | | | **EE-1010 2M** * | |
| | Connector with Robot Cable | 1 m | **EE-1010-R 1M** * | |
| | | 2 m | **EE-1010-R 2M** * | |
| Connector Hold-down Clip | | | **EE-1006A** | Applicable Photomicrosensors<br>For EE-SX670□ and 470□ only.<br>(Can be used only with EE-1006 Connectors for the Photomicrosensors listed above.) |

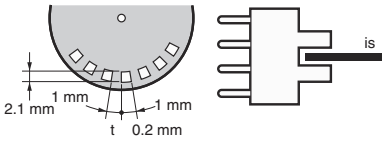
Note: For details, refer to the Photomicro Sensors Accessories on EE-□ which can be accessed from your OMRON website.

* EE-1009- or EE-1010-series Connectors have a builtin locking mechanism to prevent cable disconnection when only the cable is pulled. To remove the Connector from the Sensor, grip the top and bottom of the Connector firmly and push into the Sensor once before pulling out. The locking mechanism prevents the Connector from being removed by pulling on the cable only and enables removal only when the Connector (housing) is pulled.

## Ratings and Specifications

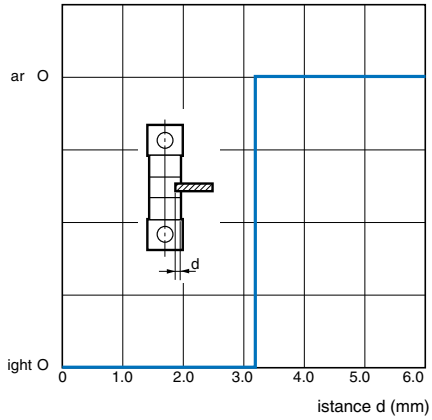
| Item | | | Type | Standard | L-shaped | T-shaped, slot center 7 mm | Close-mounting | | T-shaped, slot center 10 mm | F-shaped | R-shaped |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | NPN models | | Connector models | EE-SX670<br>EE-SX670A<br>EE-SX470 | EE-SX671<br>EE-SX671A<br>EE-SX471 | EE-SX672<br>EE-SX672A<br>EE-SX472 | EE-SX673<br>EE-SX673A<br>EE-SX473 | EE-SX674<br>EE-SX674A<br>EE-SX474 | EE-SX675 | EE-SX676 | EE-SX677 |
| | | | Pre-wired models | EE-SX670-WR | EE-SX671-WR | EE-SX672-WR | EE-SX673-WR | EE-SX674-WR | EE-SX675-WR | EE-SX676-WR | EE-SX677-WR |
| | PNP models | | Connector models | EE-SX670P<br>EE-SX670R | EE-SX671P<br>EE-SX671R | EE-SX672P<br>EE-SX672R | EE-SX673P<br>EE-SX673R | EE-SX674P<br>EE-SX674R | EE-SX675P | EE-SX676P | EE-SX677P |
| | | | Pre-wired models | EE-SX670P-WR | EE-SX671P-WR | EE-SX672P-WR | EE-SX673P-WR | EE-SX674P-WR | EE-SX675P-WR | EE-SX676P-WR | EE-SX677P-WR |
| **Sensing distance** | | | | 5 mm (slot width) | | | | | | | |
| **Sensing object** | | | | Opa ue: 2 × 0.8 mm min. | | | | | | | |
| **Differential distance** | | | | 0.025 mm | | | | | | | |
| **Light source** | | | | Infrared with a pea wa elength of 940 nm | | | | | | | |
| **Indicator 1** | | | | ight indicator (red) (turns O when light is interrupted for models with or R suffix) | | | | | | | |
| **Supply voltage** | | | | 5 to 24 10 , ripple (p p): 10 max. | | | | | | | |
| **Current consumption** | | | | 12 m max. ( onnector models, terminal open), 35 m max. ( pre wired models), 30 m max. ( pre wired models) | | | | | | | |
| **Control output** | | | | open collector: 5 to 24 , 100 m max.<br>100 m load current with a residual oltage of 0.8 max.<br>40 m load current with a residual oltage of 0.4 max.<br>OFF current (lea age current): 0.5 m max.<br>open collector: 5 to 24 , 50 m max.<br>50 m load current with a residual oltage of 1.3 max.<br>OFF current (lea age current): 0.5 m max. | | | | | | | |
| **Protection circuits** | | | | oad short circuit protection ( onnector models), o circuit protection ( re wired models) | | | | | | | |
| **Response frequency 2** | | | | 1 min. (3 a erage) | | | | | | | |
| **Ambient illumination** | | | | 1,000 lx max. with fluorescent light on the surface of the recei er. | | | | | | | |
| **Ambient temperature range** | | | | Operating: –25 to 55° , Storage: –30 to 80° (with no icing or condensation) | | | | | | | |
| **Ambient humidity range** | | | | Operating: 5 to 85 , Storage: 5 to 95 (with no icing or condensation) | | | | | | | |
| **Vibration resistance** | | | | estruction: 20 to 2,000 (pea acceleration: 100 m s$^2$)<br>1.5 mm double amplitude for 2 h (4 min periods) each in , , and directions | | | | | | | |
| **Shock resistance** | | | | estruction: 500 m s$^2$ for 3 times each in , , and directions | | | | | | | |
| **Degree of protection** | | | | I 60529 I 50 | | | | | | | |
| **Connecting method** | | | | onnector odels (direct soldering possible), re wired odels (Standard cable length: 1 m),<br>odels with onnectors (Standard cable length: 0.1 m) | | | | | | | |
| **Weight** | **Connector models** | | | pprox. 3.1 g | pprox. 3 g | pprox. 2.4 g | pprox. 2.3 g | pprox. 3 g | pprox. 2.7 g | pprox. 2.2 g | pprox. 2.2 g |
| | **Pre-wired models** | | | pprox. 18.9 g | pprox. 17.3 g | pprox. 17.8 g | pprox. 16.8 g | pprox. 17.1 g | pprox. 18.3 g | pprox. 16.9 g | pprox. 16.9 g |
| **Material** | **Case** | | | ol but lene phthalate ( T) | | | | | | | |
| | **Cover** | | | ol carbonate | | | | | | | |
| | **Emitter/receiver** | | | | | | | | | | |

1. The indicator is a a red (pea wa elength: 690 nm).
2. The response fre uenc was measured b detecting the rotating dis shown at the right.

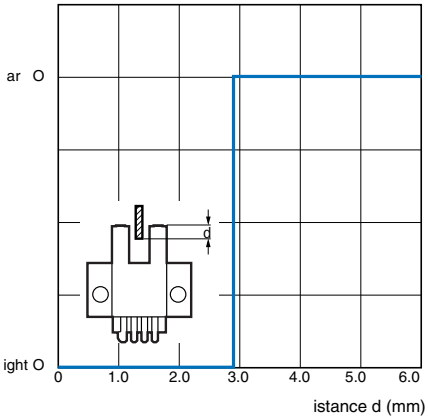


## Engineering Data (Reference Value)

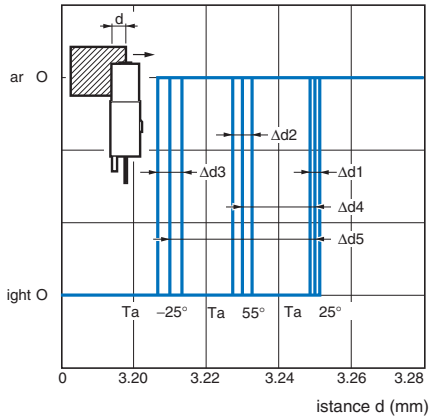
### Sensing Position Characteristics




### Sensing Position Characteristics




### Repeated Sensing Position Characteristics

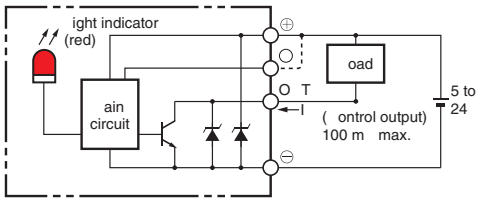
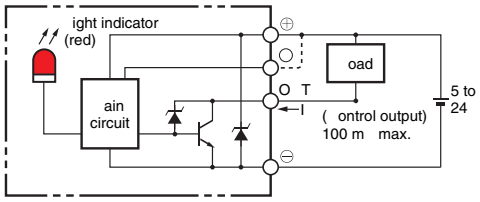
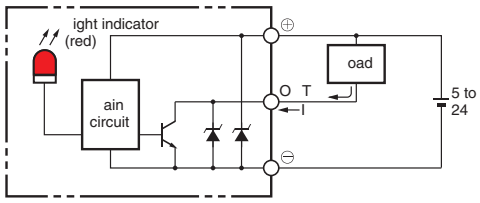



Vcc =12 V, No. of repetitions: 20, Δd1 = 0.002 mm, Δd2 = 0.004 mm, Δd3 = 0.005 mm, Δd4 = 0.02 mm, Δd5 = 0.04 mm

Note: The data applies to dark status. Operation may be affected by external light interference or light coming through the sensing object.

## I/O Circuit Diagrams

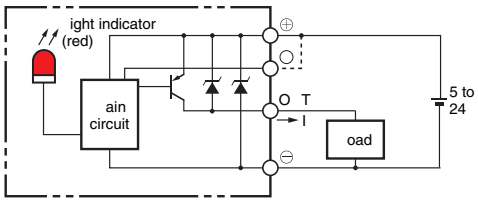
### NPN Output

| Model | Output configuration | Timing charts | Terminal connections | Output circuit |
|---|---|---|---|---|
| EE-SX67□<br>EE-SX67□-WR | Light-ON | Incident<br>Interrupted<br>ight indicator (red) O / OFF<br>Output transistor O / OFF<br>oad (e.g., rela ) Operates / Releases | Short-circuited between ◯ terminal and positive ⊕ terminal | **EE-SX67□**<br>**EE-SX67□A**<br>  <br><br>The terminal arrangement depends on the model. hec the dimensional diagrams. |
| | Dark-ON | Incident<br>Interrupted<br>ight indicator (red) O / OFF<br>Output transistor O / OFF<br>oad (e.g., rela ) Operates / Releases | Open between ◯ terminal and positive ⊕ terminal *1 *2 | |
| EE-SX670A<br>EE-SX671A<br>EE-SX672A<br>EE-SX673A<br>EE-SX674A | Light-ON | Incident<br>Interrupted<br>ight indicator (red) O / OFF<br>Output transistor O / OFF<br>oad (e.g., rela ) Operates / Releases | Short-circuited between ◯ terminal and positive ⊕ terminal | **EE-SX67□-WR**<br>  <br><br>The terminal arrangement depends on the model. hec the dimensional diagrams. |
| | Dark-ON | Incident<br>Interrupted<br>ight indicator (red) O / OFF<br>Output transistor O / OFF<br>oad (e.g., rela ) Operates / Releases | Open between ◯ terminal and positive ⊕ terminal *1 *2 | |
| EE-SX470<br>EE-SX471<br>EE-SX472<br>EE-SX473<br>EE-SX474 | Light-ON | Incident<br>Interrupted<br>ight indicator (red) O / OFF<br>Output transistor O / OFF<br>oad (rela ) Operates / Releases | --- |  <br> |

*1. Do not connect the L terminal to 0 V when using dark-ON operation.

*2. If you do not use the L terminal wire ((2) pink) when you use a Connector with Cable for an EE-1006 or EE-1010-series Photomicrosensor, noise may affect the Photomicrosensor. To prevent the effects of noise, cut the unused L terminal wire at the base of the connector and wrap it with insulating tape to prevent it from coming in contact with other terminals.

### PNP Output

| Model | Output configuration | Timing charts | Terminal connections | Output circuit |
|---|---|---|---|---|
| S 67□<br>S 67□ R | ight O | Incident<br>Interrupted<br>ight indicator (red) O OFF<br>Output transistor O OFF<br>oad (rela ) Operates Releases | Short circuited between ◯ terminal and positi e ⊕ terminal |  The terminal arrangement depends on the model. hec the dimensional diagrams. |
| | ar O | Incident<br>Interrupted<br>ight indicator (red) O OFF<br>Output transistor O OFF<br>oad (rela ) Operates Releases | Open between ◯ terminal and positi e ⊕ terminal 1 2 | |
| S 670R<br>S 671R<br>S 672R<br>S 673R<br>S 674R | ight O | Incident<br>Interrupted<br>ight indicator (red) O OFF<br>Output transistor O OFF<br>oad (e.g., rela ) Operates Releases | Short circuited between ◯ terminal and positi e ⊕ terminal | |
| | ar O | Incident<br>Interrupted<br>ight indicator (red) O OFF<br>Output transistor O OFF<br>oad (e.g., rela ) Operates Releases | Open between ◯ terminal and positi e ⊕ terminal 1 2 | |

1. o not connect the terminal to 0 when using dar O operation.
2. If ou do not use the terminal wire ((2) pin ) when ou use a onnector with able for an 1006 or 1010 series hotomicrosensor, noise ma affect the hotomicrosensor. To pre ent the effects of noise, cut the unused terminal wire at the base of the connector and wrap it with insulating tape to pre ent it from coming in contact with other terminals.

## Safety Precautions

**Refer to *Warranty and Limitations of Liability*.**

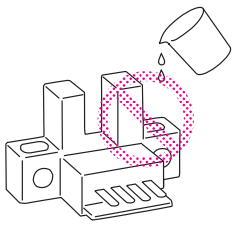
### ⚠ WARNING

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

### Precautions for Safe Use

#### ● Operating Environment

These hotomicrosensors ha e an I 50 (conforms to I ) enclosure and do not ha e a water proof or dust proof structure. Therefore, do not use them in applications in which the sensor will be sub ected to splashes from water, oil, or an other li uid. i uid entering the Sensor ma result in malfunction.



### Precautions for Correct Use

a e sure that this product is used within the rated ambient en ironment conditions.

#### ● Installation

- hen direct soldering to the terminals, use the following guidelines.

Soldering onditions

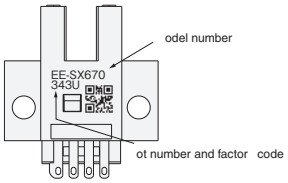
| Item | Temper-ature | Permissible time | Remarks |
|---|---|---|---|
| Soldering iron | 350 max. | 3 s max. | The portion between the base of the terminals and the position 1.5 mm from the terminal base must not be soldered. |

- The terminal base uses a pol carbonate resin, which could be deformed b excessi e soldering heat, resulting in damage to the product s functionalit .

#### ● Lot Number and Model Number Legend

In the following diagrams, 343 indicates the lot number and factor where the product was manufactured. o not include this code with the model number when ordering.
The R code on connector models is used b O RO onl .

**EE-SX□70□**



(Unit: mm)

## Dimensions

Tolerance class IT16 applies to dimensions in this datasheet unless otherwise specified.

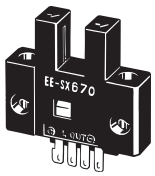
### Sensors

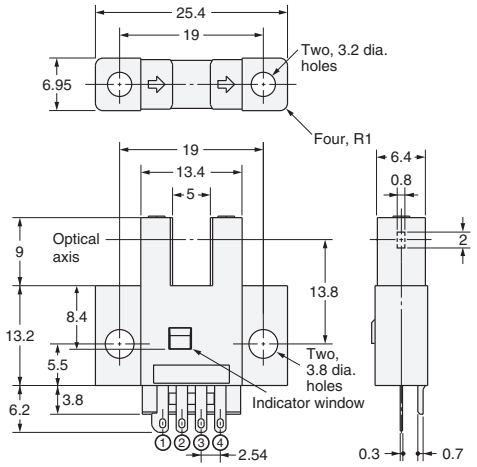
**EE-SX670/670P**
**EE-SX670A/670R**
**EE-SX470**

**Terminal Arrangement**

| | | |
|---|---|---|
| (1) | ⊕ | Vcc |
| (2) | L | L* |
| (3) | OUT | OUTPUT |
| (4) | ⊖ | GND (0 V) |

* Pin 2 is not used for the EE-SX470.



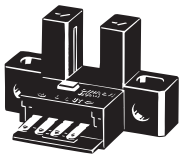



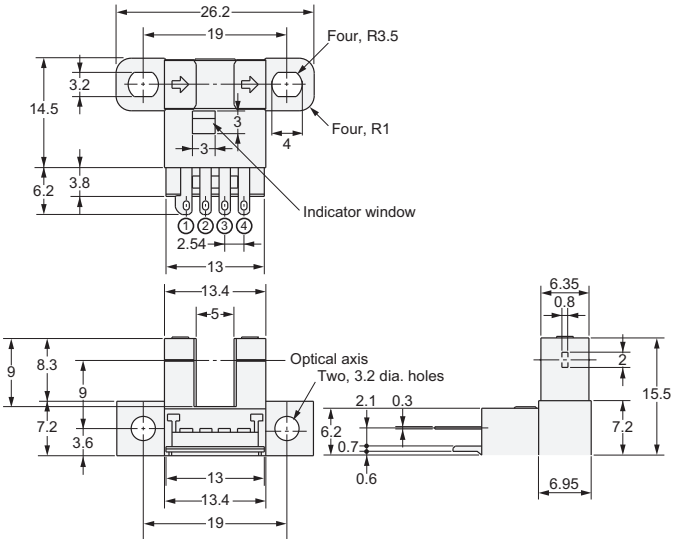

**EE-SX671/671P**
**EE-SX671A/671R**
**EE-SX471**

**Terminal Arrangement**

| | | |
|---|---|---|
| (1) | ⊕ | Vcc |
| (2) | L | L* |
| (3) | OUT | OUTPUT |
| (4) | ⊖ | GND (0 V) |

* Pin 2 is not used for the EE-SX471.



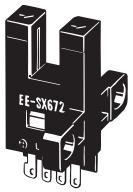


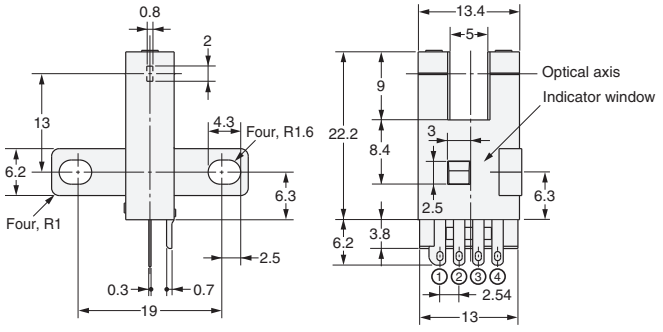

**EE-SX672/672P**
**EE-SX672A/672R**
**EE-SX472**

**Terminal Arrangement**

| | | |
|---|---|---|
| (1) | ⊕ | Vcc |
| (2) | L | L* |
| (3) | OUT | OUTPUT |
| (4) | ⊖ | GND (0 V) |

* Pin 2 is not used for the EE-SX472.



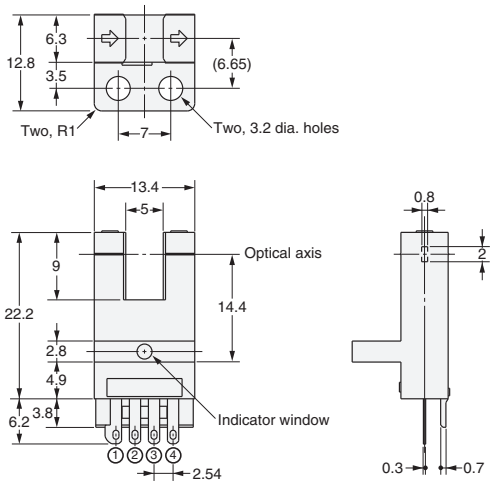




**EE-SX673/673P**
**EE-SX673A/673R**
**EE-SX473**

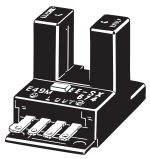
**Terminal Arrangement**

| | | |
|---|---|---|
| (1) | ⊕ | Vcc |
| (2) | L | L* |
| (3) | OUT | OUTPUT |
| (4) | ⊖ | GND (0 V) |

* Pin 2 is not used for the EE-SX473.

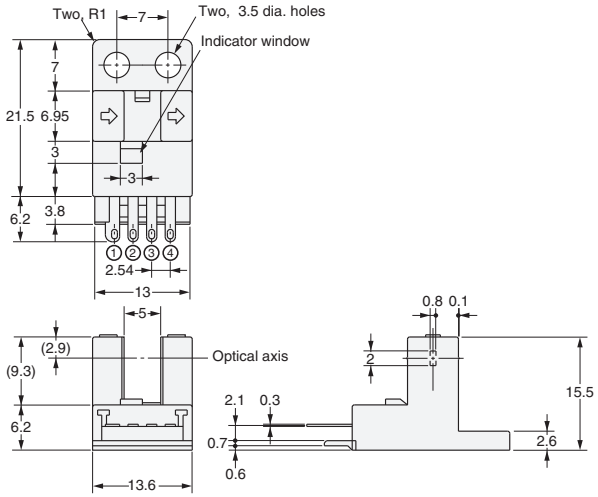
## EE-SX674/674P
## EE-SX674A/674R
## EE-SX474



**Terminal Arrangement**

| | | |
|---|---|---|
| (1) | ⊕ | Vcc |
| (2) | L | L* |
| (3) | OUT | OUTPUT |
| (4) | ⊖ | GND (0 V) |

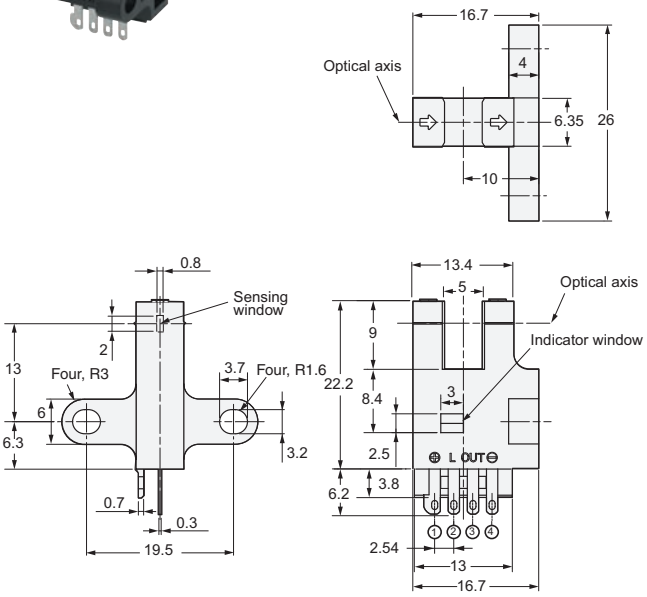
* Pin 2 is not used for the EE-SX474.




## EE-SX675/675P

**Terminal Arrangement**

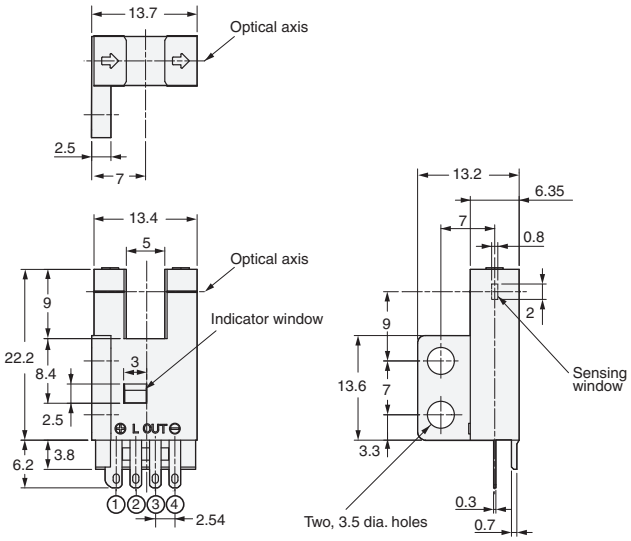
| | | |
|---|---|---|
| (1) | ⊕ | Vcc |
| (2) | L | L |
| (3) | OUT | OUTPUT |
| (4) | ⊖ | GND (0 V) |




## EE-SX676/676P

**Terminal Arrangement**

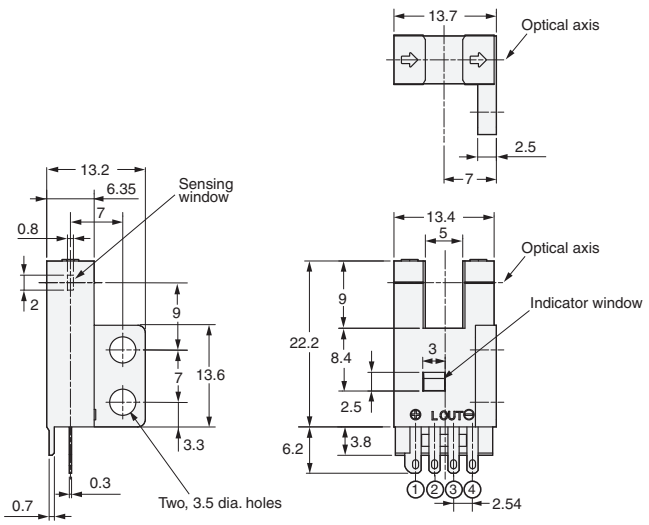
| | | |
|---|---|---|
| (1) | ⊕ | Vcc |
| (2) | L | L |
| (3) | OUT | OUTPUT |
| (4) | ⊖ | GND (0 V) |




## EE-SX677/677P

**Terminal Arrangement**

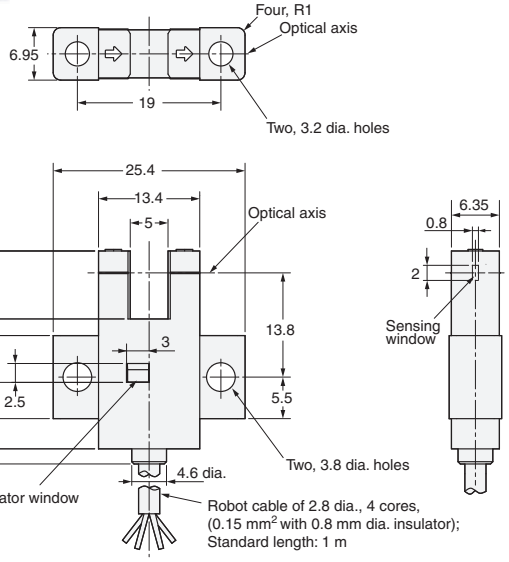
| | | |
|---|---|---|
| (1) | ⊕ | Vcc |
| (2) | L | L |
| (3) | OUT | OUTPUT |
| (4) | ⊖ | GND (0 V) |



## EE-SX670-WR/670P-WR

**Terminal Arrangement**

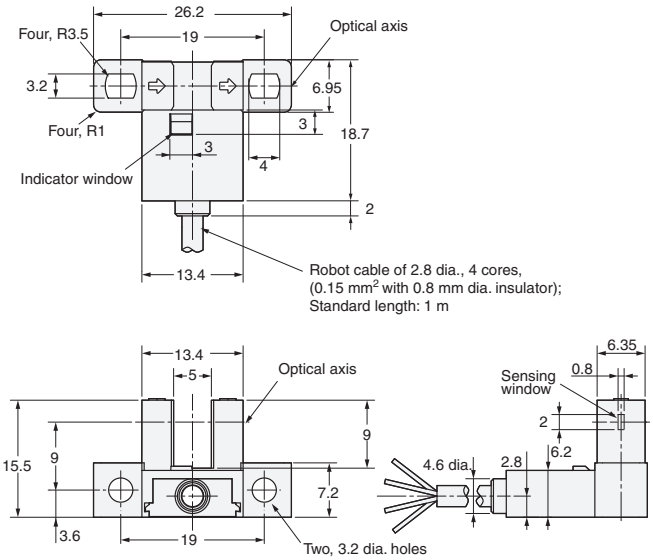
| | |
|---|---|
| **Brown** | Vcc |
| **Pink** | L |
| **Blue** | GND (0 V) |
| **Black** | OUTPUT |




## EE-SX671-WR/671P-WR

**Terminal Arrangement**

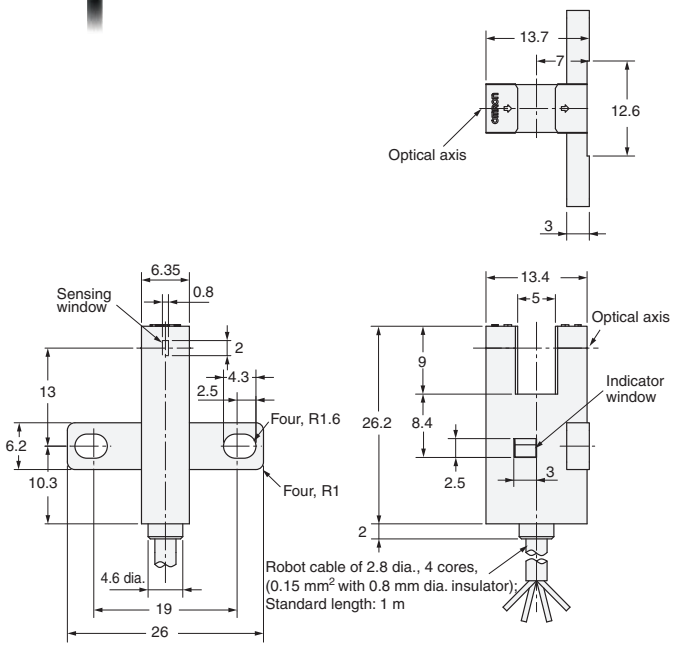
| | |
|---|---|
| **Brown** | Vcc |
| **Pink** | L |
| **Blue** | GND (0 V) |
| **Black** | OUTPUT |




## EE-SX672-WR/672P-WR

**Terminal Arrangement**

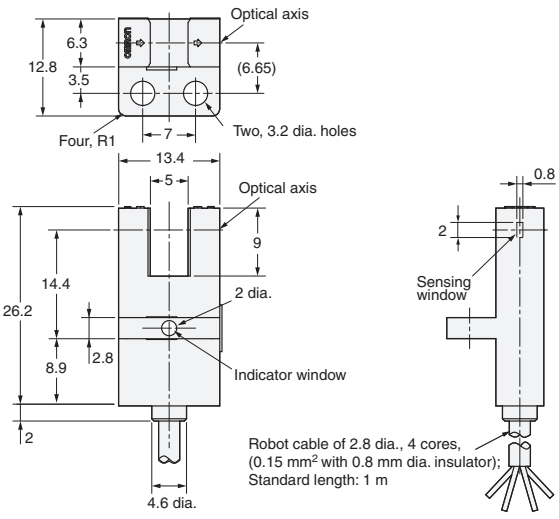
| | |
|---|---|
| **Brown** | Vcc |
| **Pink** | L |
| **Blue** | GND (0 V) |
| **Black** | OUTPUT |




## EE-SX673-WR/673P-WR

**Terminal Arrangement**

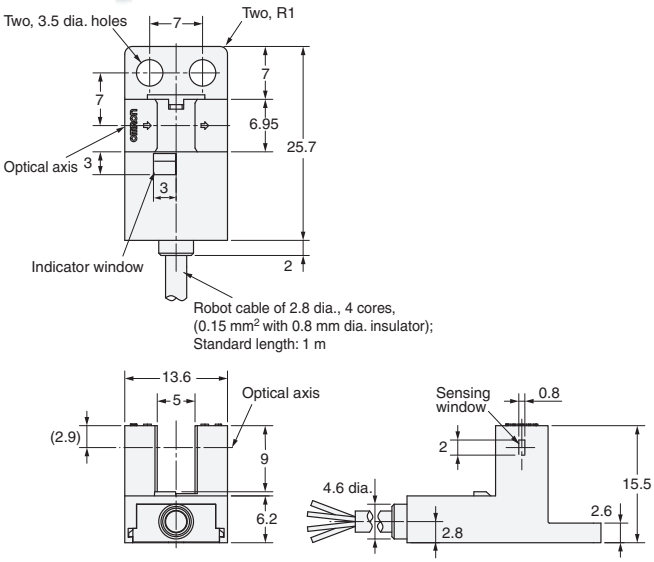
| | |
|---|---|
| **Brown** | Vcc |
| **Pink** | L |
| **Blue** | GND (0 V) |
| **Black** | OUTPUT |



## EE-SX674-WR/674P-WR

**Terminal Arrangement**

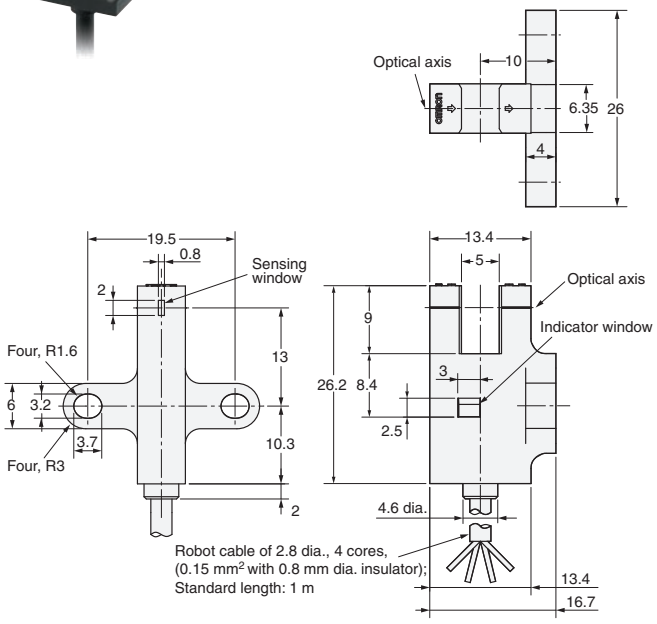
| | |
|---|---|
| **Brown** | Vcc |
| **Pink** | L |
| **Blue** | GND(0V) |
| **Black** | OUTPUT |




## EE-SX675-WR/675P-WR

**Terminal Arrangement**

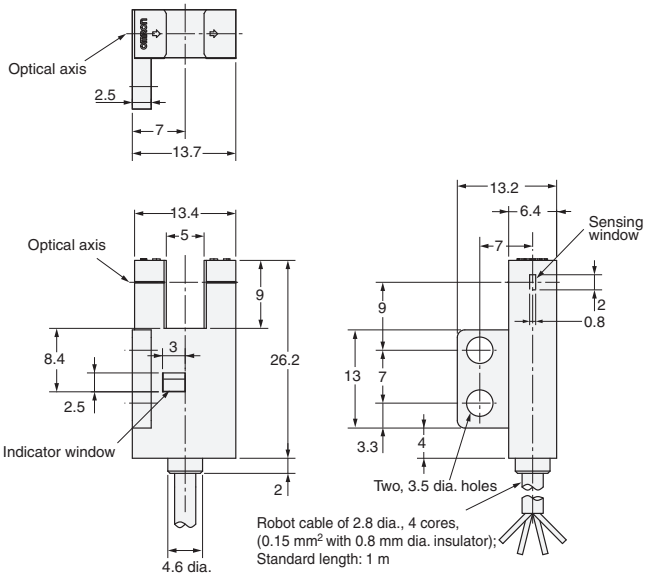
| | |
|---|---|
| **Brown** | Vcc |
| **Pink** | L |
| **Blue** | GND(0V) |
| **Black** | OUTPUT |




## EE-SX676-WR/676P-WR

**Terminal Arrangement**

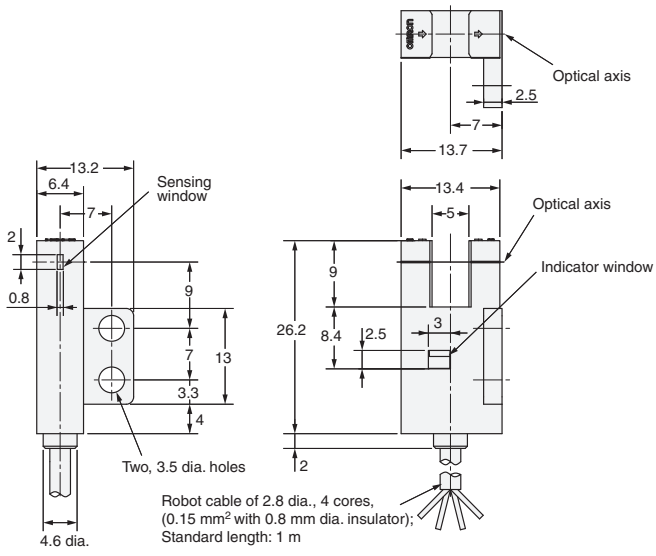
| | |
|---|---|
| **Brown** | Vcc |
| **Pink** | L |
| **Blue** | GND(0V) |
| **Black** | OUTPUT |




## EE-SX677-WR/677P-WR

**Terminal Arrangement**

| | |
|---|---|
| **Brown** | Vcc |
| **Pink** | L |
| **Blue** | GND(0V) |
| **Black** | OUTPUT |



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