

EE-SX47/67

Global Standard Slot-type photomicrosensors with 50- to 100-mA direct switching capacity for built-in application.

- 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 8.

*1. Only the EE-SX67 Series has pre-wired models.
*2. Only for Pre-wired Models.

Ordering Information

Connector models










Infrared light

| Appearance | Sensing method | Connect-ing 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 | Incident light | EE-SX670 | EE-SX670P |
| | | | | | No incident light | EE-SX670A | EE-SX670R |
| | | | | | Light-ON | EE-SX470 | EE-SX470P |
| L-shaped | | | | Dark-ON/Light-ON (selectable) *3 | Incident light | EE-SX671 | EE-SX671P |
| | | | | | No incident light | EE-SX671A | EE-SX671R |
| | | | | | Light-ON | EE-SX471 | EE-SX471P |
| T-shaped | | | | Dark-ON/Light-ON (selectable) *3 | Incident light | EE-SX672 | EE-SX672P |
| | | | | | No incident light | EE-SX672A | EE-SX672R |
| | | | | | Light-ON | EE-SX472 | EE-SX472P |
| Close-mounting | Dark-ON/Light-ON (selectable) *3 | Incident light | EE-SX673 | EE-SX673P | | | |
| | | No incident light | EE-SX673A | EE-SX673R | | | |
| | | Light-ON | EE-SX473 | EE-SX473P | | | |
| Close-mounting | Dark-ON/Light-ON (selectable) *3 | Incident light | EE-SX674 | EE-SX674P | | | |
| | | No incident light | EE-SX674A | EE-SX674R | | | |
| | | Light-ON | EE-SX474 | EE-SX474P | | | |
| T-shaped, slot center: 10 mm | Dark-ON/Light-ON (selectable) *3 | Incident light | EE-SX675 | EE-SX675P | | | |
| F-shaped | Dark-ON/Light-ON (selectable) *3 | Incident light | EE-SX676 | EE-SX676P | | | |
| R-shaped | Dark-ON/Light-ON (selectable) *3 | Incident light | EE-SX677 | EE-SX677P | | | |

*3. These models can be used as Light-ON when the L terminal and positive (+) terminal are connected to each other. To use them as Dark-ON, do not connect these terminals to each other. When used at light-ON, it is useful to select the connector EE-1001-1. The L terminal and positive (+) terminal of this connector are short-circuited in advance.

Pre-wired Models and 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) * | Incident light | Pre-wired models (1 m) | EE-SX670-WR | EE-SX670P-WR |
| L-shaped  | | | | | | | EE-SX671-WR | EE-SX671P-WR |
| T-shaped, slot center: 7 mm  | | | | | | | EE-SX672-WR | EE-SX672P-WR |
| Close-mounting  | | | | | | | EE-SX673-WR | EE-SX673P-WR |
| Close-mounting  | | | | | | | EE-SX674-WR | EE-SX674P-WR |
| T-shaped, slot center: 10 mm  | | | | | | | EE-SX675-WR | EE-SX675P-WR |
| F-shaped  | | | | | | | EE-SX676-WR | EE-SX676P-WR |
| R-shaped  | | | | | | | EE-SX677-WR | EE-SX677P-WR |

* These models can be used as Light-ON when the L line and positive (+) line are connected to each other. To use them as Dark-ON, do not connect these lines to each other.

Accessories for Models with Connectors (Order Separately)

| 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 | |
| | 2 m | EE-1006 | |
| | | EE-1010 | |
| Connector with Robot Cable | 1 m | EE-1010-R | |
| | 2 m | EE-1010-R | |
| Connector Hold-down Clip | | EE-1006A | For EE-1006 only. |

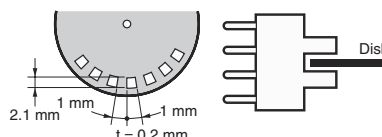
EE-SX47/67

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 | EE-SX670 EE-SX670A EE-SX470 | EE-SX671 EE-SX671A EE-SX471 | EE-SX672 EE-SX672A EE-SX472 | EE-SX673 EE-SX673A EE-SX473 | EE-SX674 EE-SX674A EE-SX474 | EE-SX675 | EE-SX676 | EE-SX677 |
| Pre-wired models | | EE-SX670-WR EE-SX470P | EE-SX671-WR EE-SX471P | EE-SX672-WR EE-SX472P | EE-SX673-WR EE-SX473P | EE-SX674-WR EE-SX474P | EE-SX675-WR | EE-SX676-WR | EE-SX677-WR | |
| PNP models | Connector | EE-SX670P EE-SX670R EE-SX470P | EE-SX671P EE-SX671R EE-SX471P | EE-SX672P EE-SX672R EE-SX472P | EE-SX673P EE-SX673R EE-SX473P | EE-SX674P EE-SX674R EE-SX474P | EE-SX675P | EE-SX676P | EE-SX677P | |
| | Pre-wired models | EE-SX670P-WR EE-SX471P | EE-SX671P-WR EE-SX471P | EE-SX672P-WR EE-SX472P | EE-SX673P-WR EE-SX473P | EE-SX674P-WR EE-SX474P | EE-SX675P-WR | EE-SX676P-WR | EE-SX677P-WR | |
| Sensing distance | | | 5 mm (slot width) | | | | | | | |
| Sensing object | | | Opaque: 2 × 0.8 mm min. | | | | | | | |
| Differential distance | | | 0.025 mm | | | | | | | |
| Light source | | | GaAs infrared LED with a peak wavelength of 940 nm | | | | | | | |
| Indicator *1 | | | Light indicator (red) (turns ON when light is interrupted for models with A or R suffix) | | | | | | | |
| Supply voltage | | | 5 to 24 VDC ±10%, ripple (p-p): 10% max. | | | | | | | |
| Current consumption | | | 35 mA max. (NPN models), 30 mA max. (PNP models) | | | | | | | |
| Control output | | | NPN open collector: 5 to 24 VDC, 100 mA max. 100 mA load current with a residual voltage of 0.8 V max. 40 mA load current with a residual voltage of 0.4 V max. PNP open collector: 5 to 24 VDC, 50 mA max. 50 mA load current with a residual voltage of 1.3 V max. | | | | | | | |
| Response frequency *2 | | | 1 kHz min. (3 kHz average) | | | | | | | |
| Ambient illumination | | | 1,000 lx max. with fluorescent light on the surface of the receiver. | | | | | | | |
| Ambient temperature range | | | Operating: -25 to +55°C, Storage: -30 to +80°C | | | | | | | |
| Ambient humidity range | | | Operating: 5% to 85%, Storage: 5% to 95% | | | | | | | |
| Vibration resistance | | | Destruction: 20 to 2,000 Hz (peak acceleration: 100 m/s ²) 1.5-mm double amplitude for 2 h (4-min periods) each in X, Y, and Z directions | | | | | | | |
| Shock resistance | | | Destruction: 500 m/s ² for 3 times each in X, Y, and Z directions | | | | | | | |
| Enclosure rating | | | IEC60529 IP50 | | | | | | | |
| Connecting method | | | Special connectors (direct soldering possible), Pre-wired models (Standard cable length: 1 m) | | | | | | | |
| Weight (packaged) | Connector | Approx. 3.1 g | Approx. 3 g | Approx. 2.4 g | Approx. 2.3 g | Approx. 3 g | Approx. 2.7 g | Approx. 2.2 g | Approx. 2.2 g | |
| | Pre-wired models | Approx. 18.9 g | Approx. 17.3 g | Approx. 17.8 g | Approx. 16.8 g | Approx. 17.1 g | Approx. 18.3 g | Approx. 16.9 g | Approx. 16.9 g | |
| Material | Case | Polybutylene phthalate (PBT) | | | | | | | | |
| | Cover emitter/receiver | Polycarbonate | | | | | | | | |

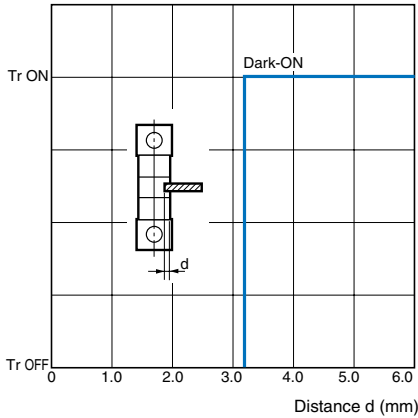
*1. The indicator is a GaP red LED (peak wavelength: 690 nm).

*2. The response frequency was measured by detecting the rotating disk shown at the right.

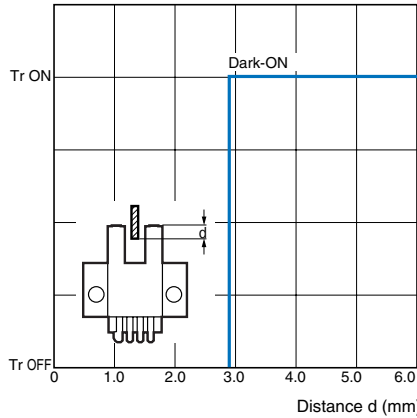


Engineering Data (Typical)

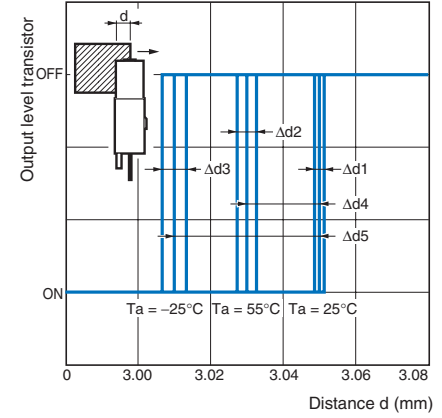
Sensing Position Characteristics



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

I/O Circuit Diagrams

NPN Output

| Model | Output configuration | Timing chart | Terminal connection | Output circuit |
|---|----------------------|--|--|----------------|
| EE-SX67□ EE-SX67□-WR | Light-ON | Incident Interrupted Light indicator (red) ON OFF Output transistor ON OFF Load Operates Releases | Short-circuited between ① terminal and positive ⊕ terminal | |
| | Dark-ON | Incident Interrupted Light indicator (red) ON OFF Output transistor ON OFF Load Operates Releases | Open between ① terminal and positive ⊕ terminal | |
| EE-SX670A EE-SX671A EE-SX672A EE-SX673A EE-SX674A | Light-ON | Incident Interrupted Light indicator (red) ON OFF Output transistor ON OFF Load Operates Releases | Short-circuited between ① terminal and positive ⊕ terminal | |
| | Dark-ON | Incident Interrupted Light indicator (red) ON OFF Output transistor ON OFF Load Operates Releases | Open between ① terminal and positive ⊕ terminal | |
| EE-SX470 EE-SX471 EE-SX472 EE-SX473 EE-SX474 | Light-ON | Incident Interrupted Light indicator (red) ON OFF Output transistor ON OFF Load Operates Releases | --- | |

EE-SX47/67

PNP Output

| Model | Output configuration | Timing chart | Terminal connection | Output circuit |
|---|----------------------|--------------|--|----------------|
| EE-SX67□P EE-SX67□P-WR | Light-ON | | Short-circuited between terminal and positive ⊕ terminal | |
| | Dark-ON | | Open between terminal and positive ⊕ terminal | |
| EE-SX670R EE-SX671R EE-SX672R EE-SX673R EE-SX674R | Light-ON | | Short-circuited between terminal and positive ⊕ terminal | |
| | Dark-ON | | Open between terminal and positive ⊕ terminal | |
| EE-SX470P EE-SX471P EE-SX472P EE-SX473P EE-SX474P | Light-ON | | — | |

Safety Precautions

Refer to *Warranty and Limitations of Liability*.

⚠ WARNING

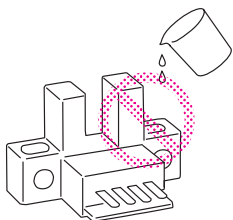
This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.



Precautions for Safe Use

● Operating Environment

These Photomicrosensors have an IP50 (conforms to IEC60529) enclosure and do not have a water-proof or dust-proof structure. Therefore, do not use them in applications in which the sensor will be subjected to splashes from water, oil, or any other liquid. Liquid entering the Sensor may result in malfunction.



Precautions for Correct Use

Make sure that this product is used within the rated ambient environment conditions.

● Installation

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

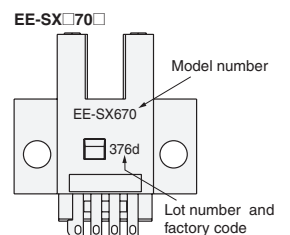
Soldering Conditions

| Item | Temperature | Permissible time | Remarks |
|----------------|-------------|------------------|--|
| Soldering iron | 350°C 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 polycarbonate resin, which could be deformed by excessive soldering heat, resulting in damage to the product's functionality.

● Lot Numbers and Models

In the right illustration, 376d indicates the lot number and factory where the product was manufactured. Do not include this code with the model number when ordering.



Dimensions

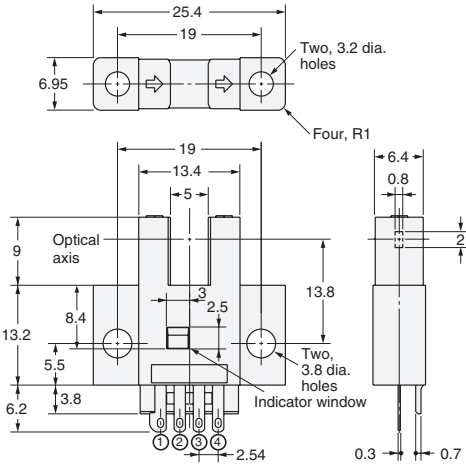
Sensors

EE-SX670/670P
EE-SX670A/670R
EE-SX470/470P

Terminal Arrangement

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

* L Terminal needs no connection for all EE-SX47□ series sensors.

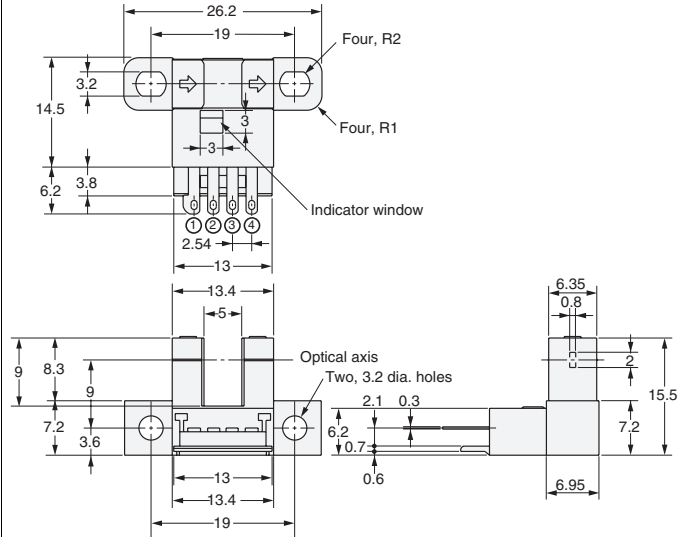


EE-SX671/671P
EE-SX671A/671R
EE-SX471/471P

Terminal Arrangement

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

* L Terminal needs no connection for all EE-SX47□ series sensors.

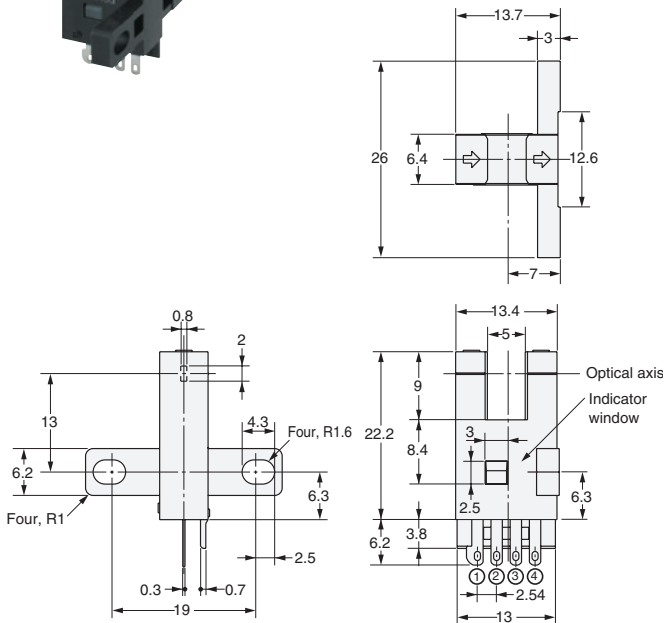


EE-SX672/672P
EE-SX672A/672R
EE-SX472/472P

Terminal Arrangement

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

* L Terminal needs no connection for all EE-SX47□ series sensors.

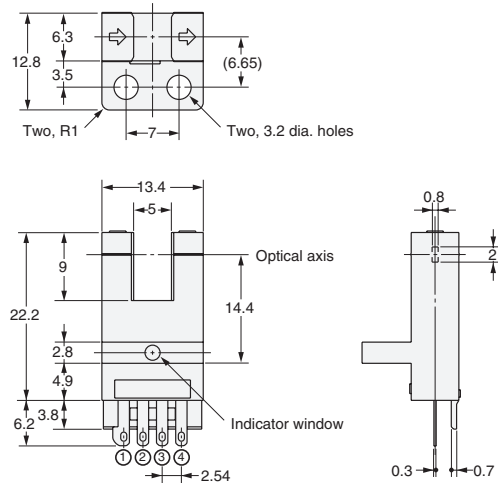


EE-SX673/673P
EE-SX673A/673R
EE-SX473/473P

Terminal Arrangement

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

* L Terminal needs no connection for all EE-SX47□ series sensors.



EE-SX47/67

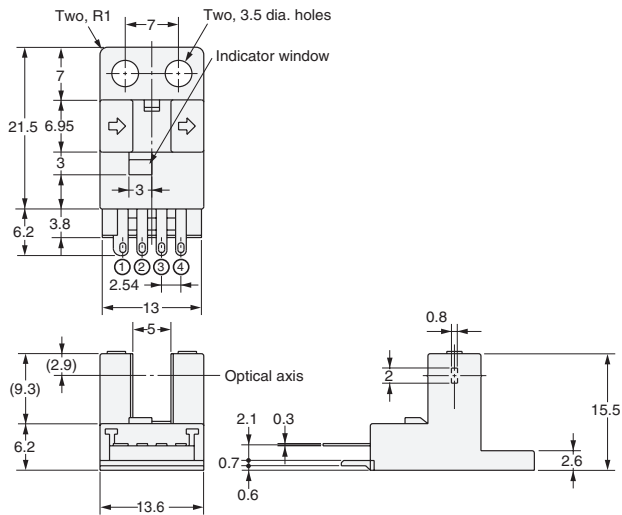
EE-SX674/674P EE-SX674A/674R EE-SX474/474P



Terminal Arrangement

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

* L Terminal needs no connection for all EE-SX47□ series sensors.

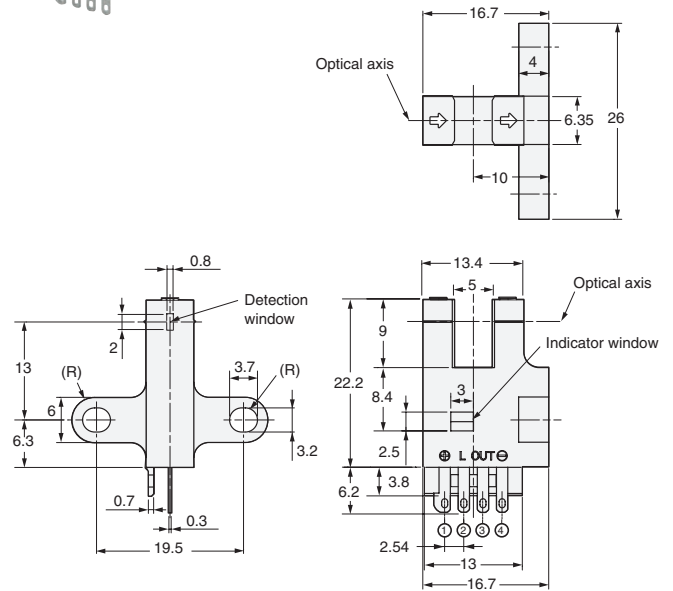


EE-SX675/675P



Terminal Arrangement

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

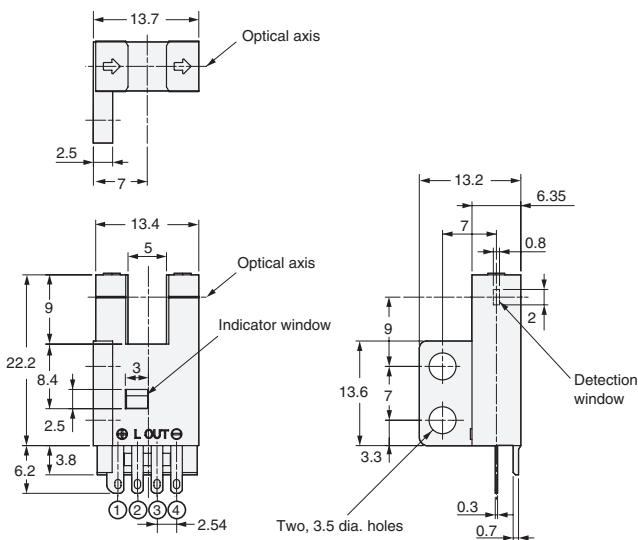


EE-SX676/676P



Terminal Arrangement

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

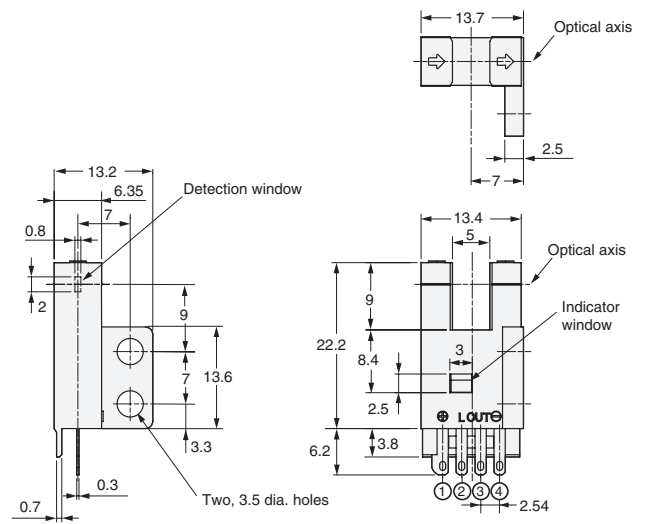


EE-SX677/677P



Terminal Arrangement

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

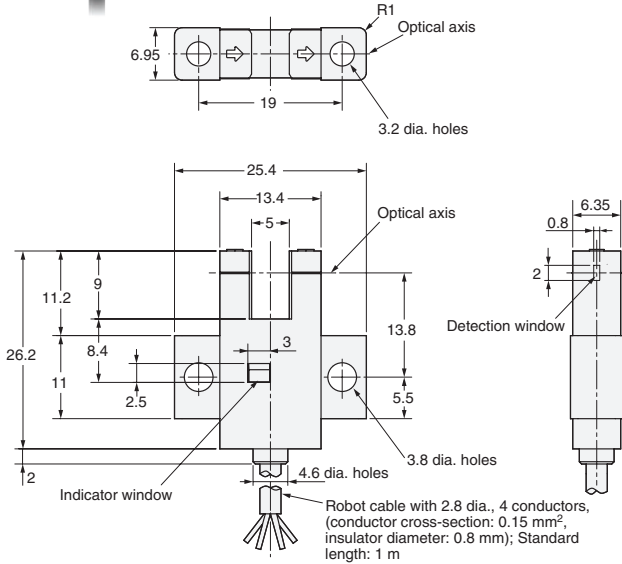


EE-SX670-WR/670P-WR



Terminal Arrangement

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

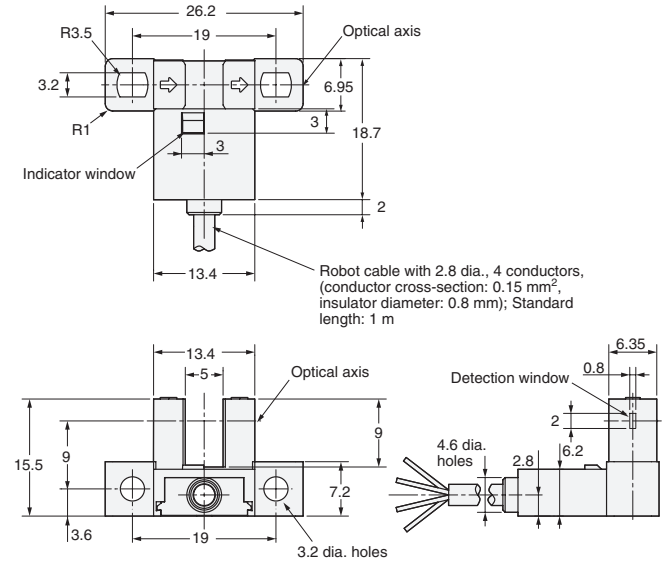


EE-SX671-WR/671P-WR



Terminal Arrangement

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

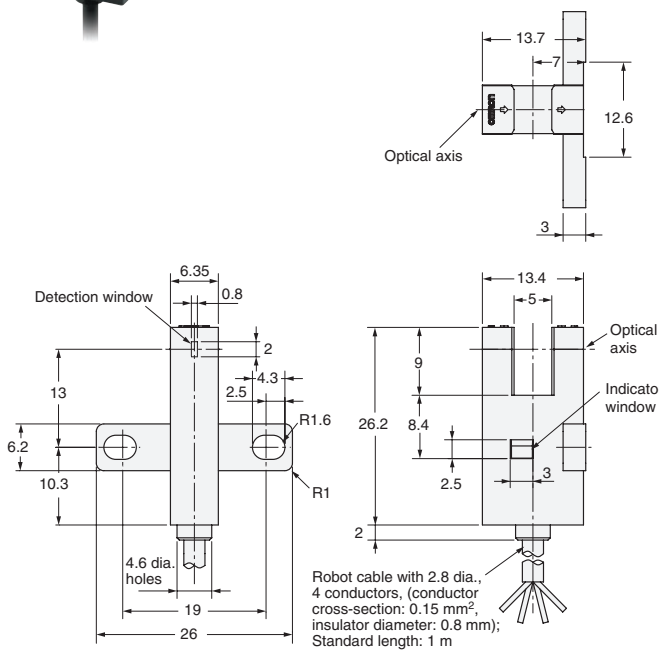


EE-SX672-WR/672P-WR



Terminal Arrangement

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

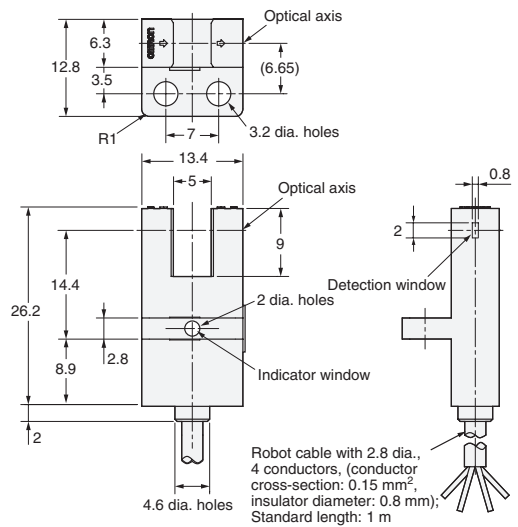


EE-SX673-WR/673P-WR



Terminal Arrangement

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

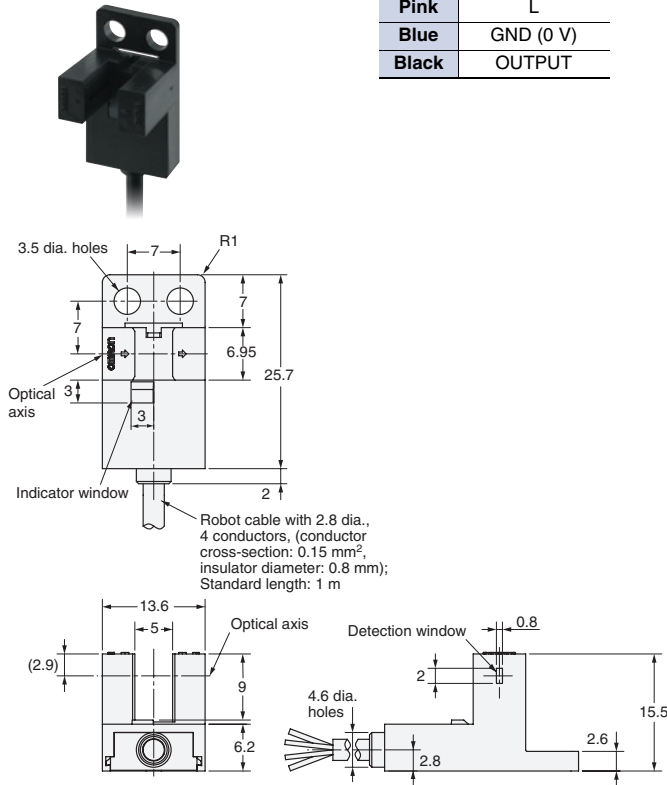


EE-SX47/67

EE-SX674-WR/674P-WR

Terminal Arrangement

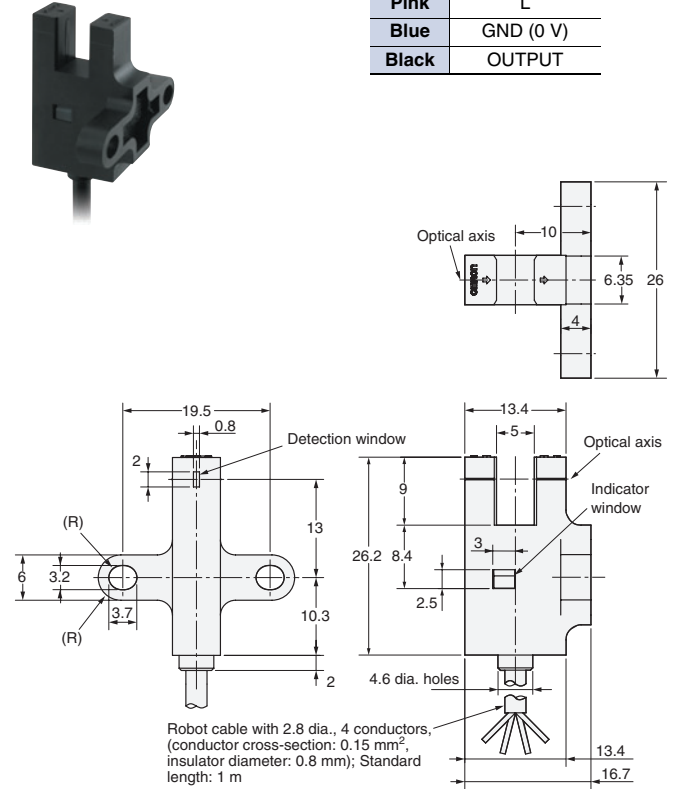
| | |
|--------------|-----------|
| Brown | Vcc |
| Pink | L |
| Blue | GND (0 V) |
| Black | OUTPUT |



EE-SX675-WR/675P-WR

Terminal Arrangement

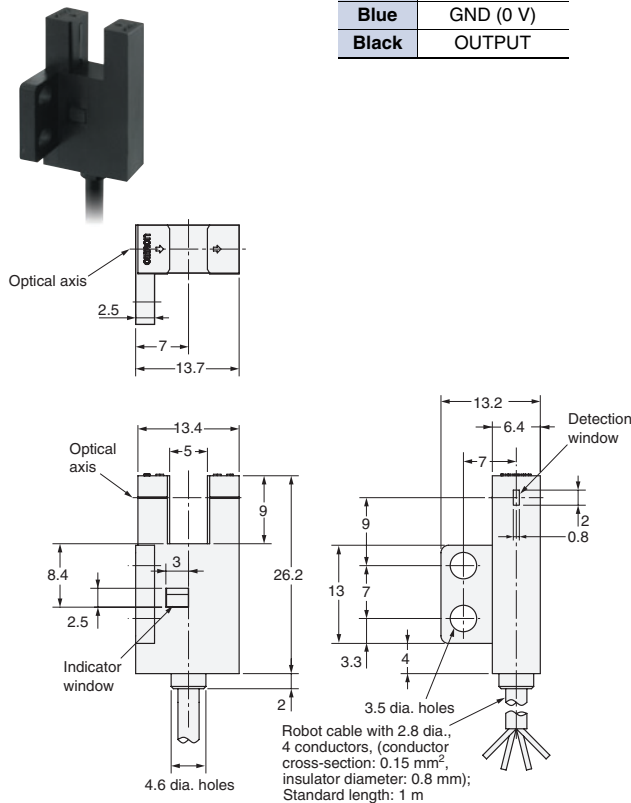
| | |
|--------------|-----------|
| Brown | Vcc |
| Pink | L |
| Blue | GND (0 V) |
| Black | OUTPUT |



EE-SX676-WR/676P-WR

Terminal Arrangement

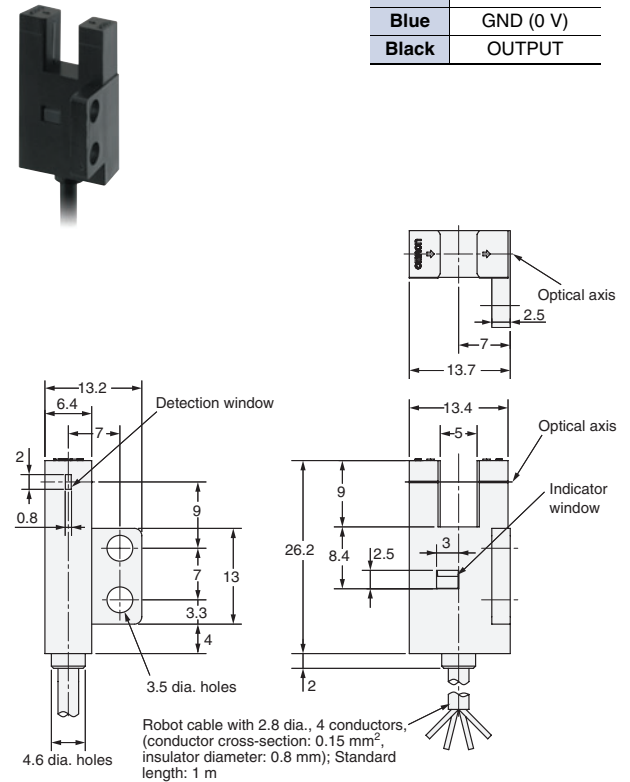
| | |
|--------------|-----------|
| Brown | Vcc |
| Pink | L |
| Blue | GND (0 V) |
| Black | OUTPUT |



EE-SX677-WR/677P-WR

Terminal Arrangement

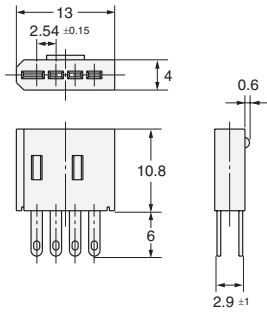
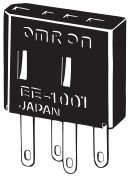
| | |
|--------------|-----------|
| Brown | Vcc |
| Pink | L |
| Blue | GND (0 V) |
| Black | OUTPUT |



EE-SX47/67 Connector Hold-down Clips

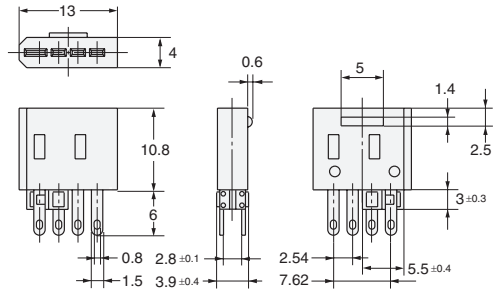
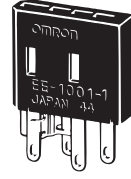
Connector

EE-1001



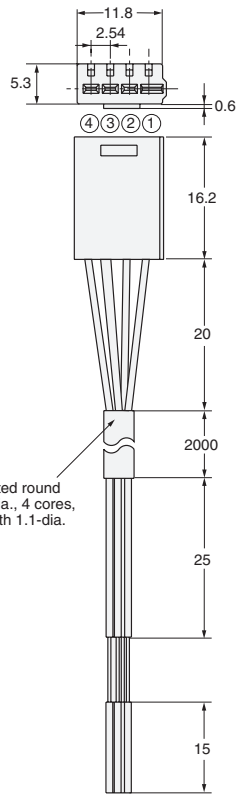
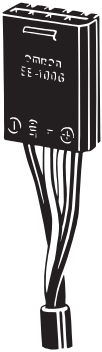
Connector (short-circuited between positive (+) and L terminals)

EE-1001-1



Connector with Cable

EE-1006



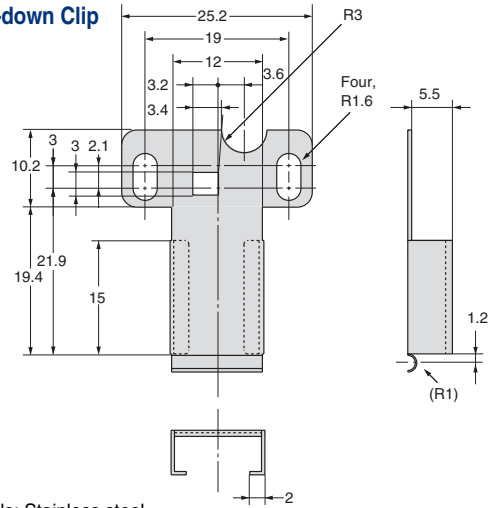
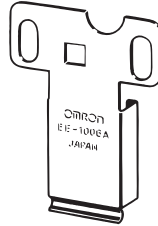
Cable:
Vinyl-insulated round
cable of 4 dia., 4 cores,
(0.2 mm² with 1.1-dia.
insulator)

Terminal Arrangement

| | | |
|-----|-----|-------|
| (1) | ⊕ | Brown |
| (2) | L | Pink |
| (3) | OUT | Black |
| (4) | ⊖ | Blue |

Connector Hold-down Clip

EE-1006A



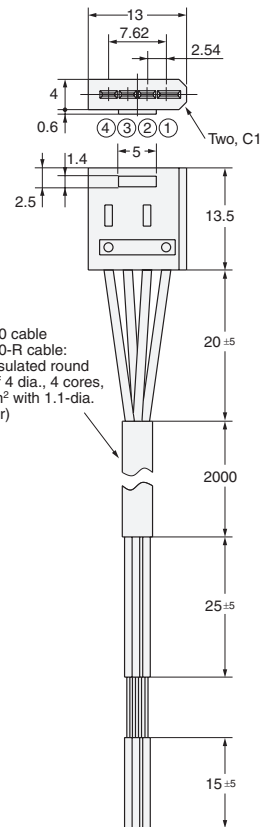
Materials: Stainless steel

Connector with Cable

EE-1010

Connector with Robot Cable

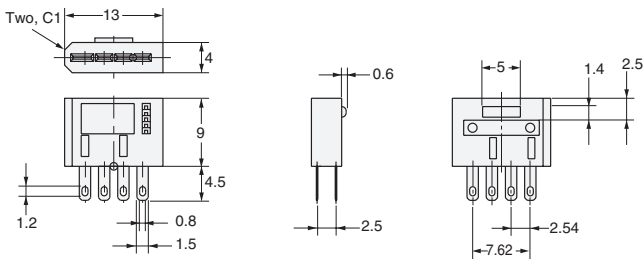
EE-1010-R



EE-1010 cable
EE-1010-R cable:
Vinyl-insulated round
cable of 4 dia., 4 cores,
(0.2 mm² with 1.1-dia.
insulator)

Connector

EE-1009



Terminal Arrangement

| | | |
|-----|-----|-------|
| (1) | ⊕ | Brown |
| (2) | L | Pink |
| (3) | OUT | Black |
| (4) | ⊖ | Blue |

In the interest of product improvement, specifications are subject to change without notice.

This document provides information mainly for selecting suitable models. Please read the Instruction sheet carefully for information that the user must understand and accept before purchase, including information on warranty, limitations of liability, and precautions.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Terms and Conditions of Sale

1. **Offer; Acceptance.** These terms and conditions (these "Terms") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
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 - d. Delivery and shipping dates are estimates only; and
 - e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
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17. **Export Controls.** Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (ii) sale of products to "forbidden" or other proscribed persons; and (iii) disclosure to non-citizens of regulated technology or information.
18. **Miscellaneous.** (a) **Waiver.** No failure or delay by Omron in exercising any right and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) **Assignment.** Buyer may not assign its rights hereunder without Omron's written consent. (c) **Law.** These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law principles). (d) **Amendment.** These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) **Severability.** If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) **Setoff.** Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (g) **Definitions.** As used herein, "including" means "including without limitation"; and "Omron Companies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

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 - (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
 - (ii) Use in consumer products or any use in significant quantities.
 - (iii) 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.
 - (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this Product.

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'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
2. **Programmable Products.** Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
3. **Performance Data.** Data presented in Omron Company websites, catalogs and other materials 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 user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.
4. **Change in Specifications.** Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.
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