

# EE-SX47/67



## 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	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	Incident light	EE-SX470	---
L-shaped 				Dark-ON/Light-ON (selectable) *3	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	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	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	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	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. 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.

## 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) *	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

\* 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.

## 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.
Connector with Cable	1 m	EE-1009	
		EE-1006 1M	
	2 m	EE-1010 1M	
		EE-1006 2M	
Connector with Robot Cable	1 m	EE-1010-R 1M	
	2 m	EE-1010-R 2M	
Connector Hold-down Clip		EE-1006A	For EE-1006 only.

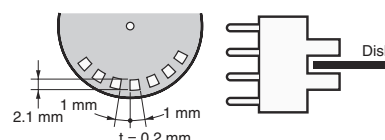
\* Refer to *Accessories* for details.

## 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 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					
Item	Type		Standard	L-shaped	T-shaped, slot center 7 mm	Close-mounting		T-shaped, slot center 10 mm	F-shaped	R-shaped					
	PNP models	Connector models	EE-SX670P EE-SX670R	EE-SX671P EE-SX671R	EE-SX672P EE-SX672R	EE-SX673P EE-SX673R	EE-SX674P EE-SX674R	EE-SX675P	EE-SX676P	EE-SX677P					
Item	Type		Standard	L-shaped	T-shaped, slot center 7 mm	Close-mounting		T-shaped, slot center 10 mm	F-shaped	R-shaped					
Item	Type		Standard	L-shaped	T-shaped, slot center 7 mm	Close-mounting		T-shaped, slot center 10 mm	F-shaped	R-shaped					
<b>Sensing distance</b>			5 mm (slot width)												
<b>Sensing object</b>			Opaque: 2 × 0.8 mm min.												
<b>Differential distance</b>			0.025 mm												
<b>Light source</b>			Infrared LED with a peak wavelength of 940 nm												
<b>Indicator *1</b>			Light indicator (red) (turns ON when light is interrupted for models with A or R suffix)												
<b>Supply voltage</b>			5 to 24 VDC ±10%, ripple (p-p): 10% max.												
<b>Current consumption</b>			12 mA max. (Connector models), 35 mA max. (NPN pre-wired models), 30 mA max. (PNP pre-wired models)												
<b>Control output</b>			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. OFF current (leakage current): 0.5 mA max. PNP open collector: 5 to 24 VDC, 50 mA max. 50 mA load current with a residual voltage of 1.3 V max. OFF current (leakage current): 0.5 mA max.												
<b>Protection circuits</b>			Load short circuit protection (Connector models), No circuit protection (Pre-wired models)												
<b>Response frequency *2</b>			1 kHz min. (3 kHz average)												
<b>Ambient illumination</b>			1,000 lx max. with fluorescent light on the surface of the receiver.												
<b>Ambient temperature range</b>			Operating: -25 to +55°C, Storage: -30 to +80°C (with no icing or condensation)												
<b>Ambient humidity range</b>			Operating: 5% to 85%, Storage: 5% to 95% (with no icing or condensation)												
<b>Vibration resistance</b>			Destruction: 20 to 2,000 Hz (peak acceleration: 100 m/s <sup>2</sup> ) 1.5-mm double amplitude for 2 h (4-min periods) each in X, Y, and Z directions												
<b>Shock resistance</b>			Destruction: 500 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions												
<b>Degree of protection</b>			IEC60529 IP50												
<b>Connecting method</b>			Connector Models (direct soldering possible), Pre-wired Models (Standard cable length: 1 m), Models with Connectors (Standard cable length: 0.1 m)												
<b>Wei- ght</b>	<b>Connector models</b>		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					
	<b>Pre-wired models</b>		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					
<b>Ma- ter- ial</b>	<b>Case</b>		Polybutylene phthalate (PBT)												
	<b>Cover</b>		Polycarbonate												
	<b>Emitter/receiver</b>		Polycarbonate												

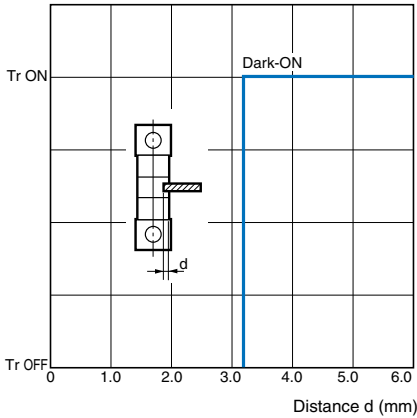
\*1. The indicator is a GaP red LED (peak wavelength: 690 nm).

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

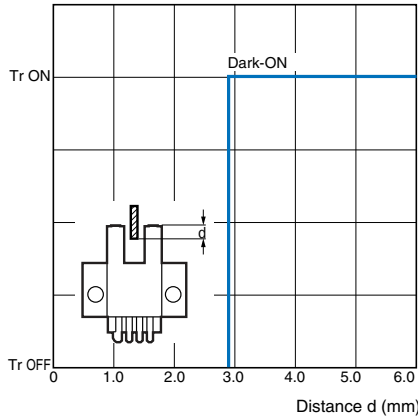


Engineering Data (Reference Value)

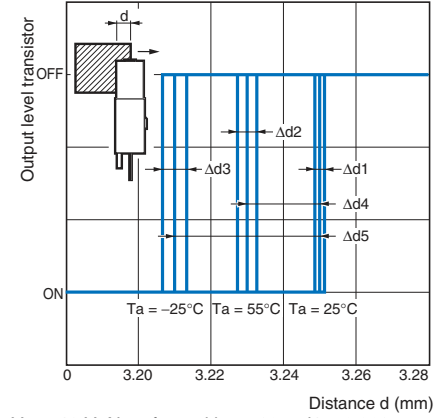
Sensing Position Characteristics



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□ EE-SX67□-WR	Light-ON	Incident Interrupted Light indicator (red) ON OFF Output transistor ON OFF Load Operates (e.g., relay) Releases	Short-circuited between ⊖ terminal and positive ⊕ terminal	<b>EE-SX67□ EE-SX67□A</b> 
	Dark-ON	Incident Interrupted Light indicator (red) ON OFF Output transistor ON OFF Load Operates (e.g., relay) Releases	Open between ⊖ terminal and positive ⊕ terminal *1	
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 (e.g., relay) Releases	Short-circuited between ⊖ terminal and positive ⊕ terminal	<b>EE-SX67□-WR</b> 
	Dark-ON	Incident Interrupted Light indicator (red) ON OFF Output transistor ON OFF Load Operates (e.g., relay) Releases	Open between ⊖ terminal and positive ⊕ terminal *1	
EE-SX470 EE-SX471 EE-SX472 EE-SX473 EE-SX474	Light-ON	Incident Interrupted Light indicator (red) ON OFF Output transistor ON OFF Load (relay) Operates Releases	---	

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

## PNP Output

Model	Output configuration	Timing charts	Terminal connections	Output circuit
EE-SX67□P EE-SX67□P-WR	Light-ON		Short-circuited between Ⓛ terminal and positive ⊕ terminal	<p>*The terminal arrangement depends on the model. Check the dimensional diagrams.</p>
	Dark-ON		Open between Ⓛ terminal and positive ⊕ terminal *1	
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 *1	

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

## Safety Precautions

Refer to *Warranty and Limitations of Liability*.

### ⚠ WARNING

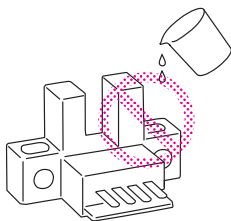
This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.



### Precautions for Safe Use

#### ● Operating Environment

These Photomicrosensors have an IP50 (conforms to IEC) 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.

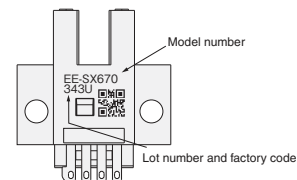
- The terminal base uses a polycarbonate resin, which could be deformed by excessive soldering heat, resulting in damage to the product's functionality.

#### ● Lot Number and Model Number Legend

In the following diagrams, 343U indicates the lot number and factory where the product was manufactured. Do not include this code with the model number when ordering.

The QR code on connector models is used by OMRON only.

#### EE-SX□70□



## Dimensions

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

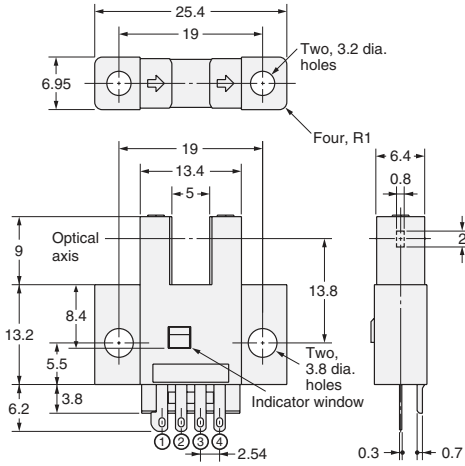
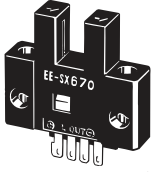
### Sensors

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.

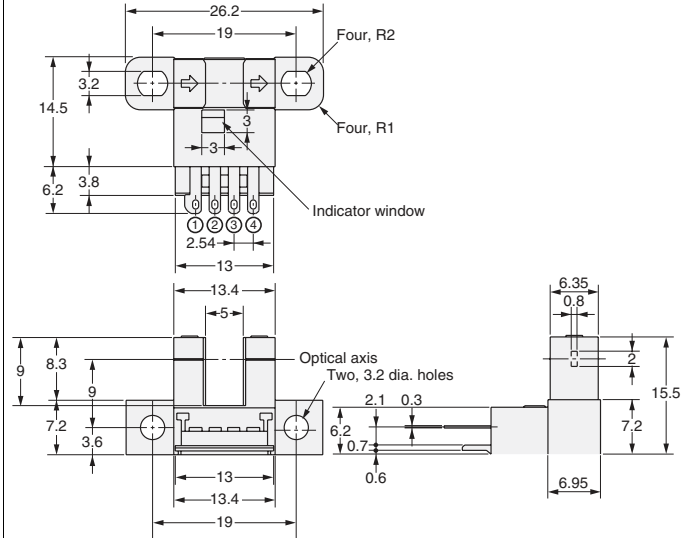
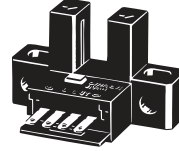


EE-SX671/671P  
EE-SX671A/671R  
EE-SX471

#### Terminal Arrangement

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

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

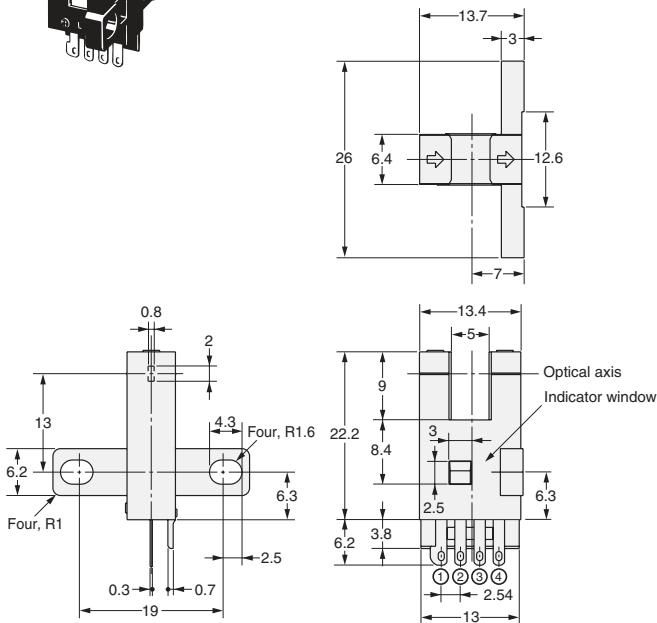
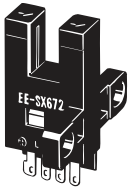


EE-SX672/672P  
EE-SX672A/672R  
EE-SX472

#### Terminal Arrangement

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

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

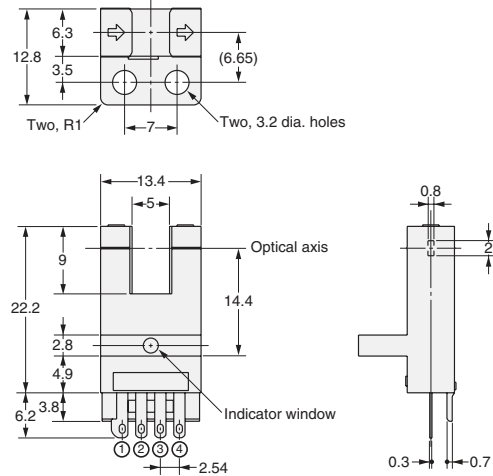


EE-SX673/673P  
EE-SX673A/673R  
EE-SX473

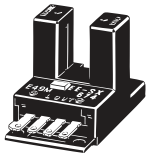
#### Terminal Arrangement

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

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



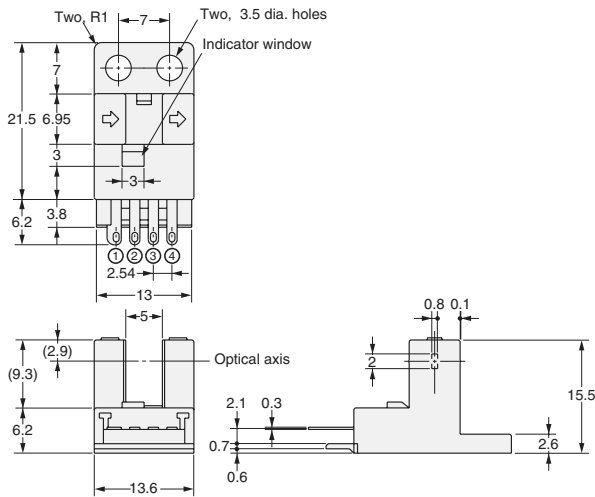
EE-SX674/674P  
EE-SX674A/674R  
EE-SX474



Terminal Arrangement

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

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

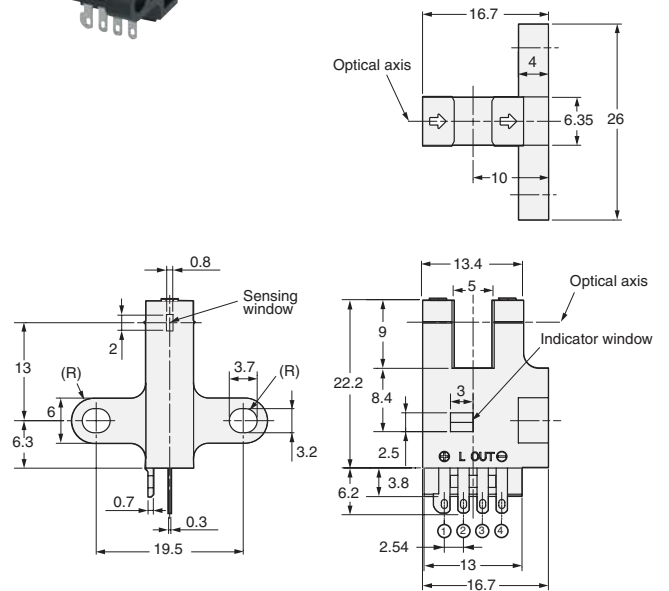


EE-SX675/675P



Terminal Arrangement

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

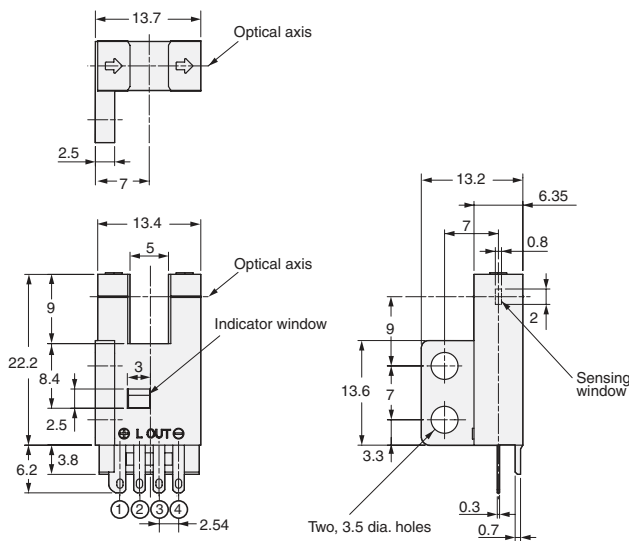


EE-SX676/676P



Terminal Arrangement

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

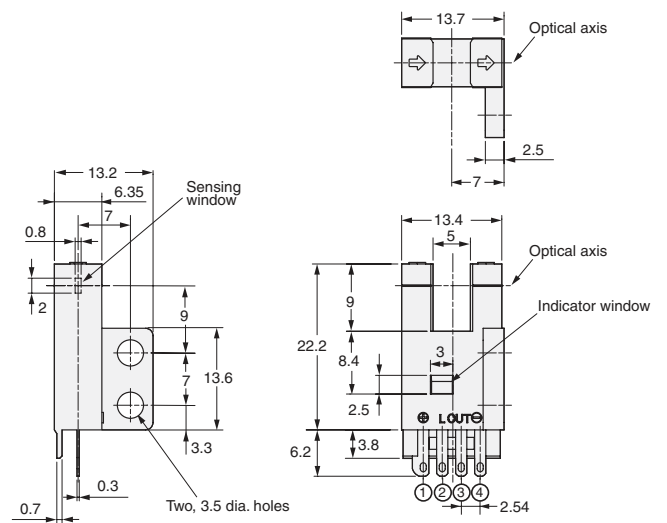


EE-SX677/677P



Terminal Arrangement

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

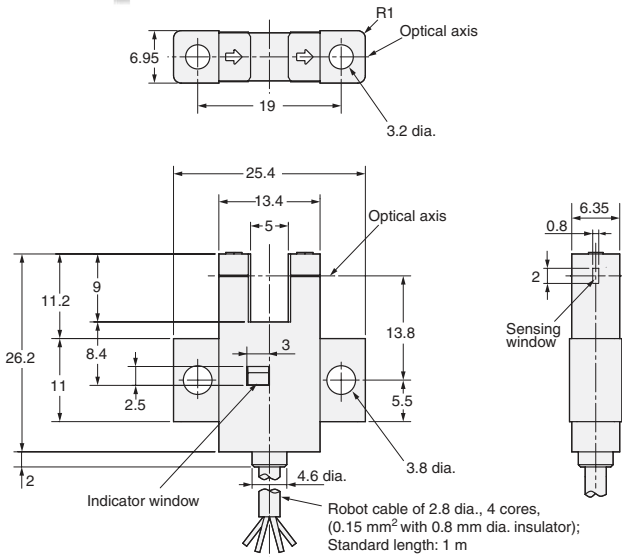


## EE-SX670-WR/670P-WR



### Terminal Arrangement

<b>Brown</b>	Vcc
<b>Pink</b>	L
<b>Blue</b>	GND (0 V)
<b>Black</b>	OUTPUT

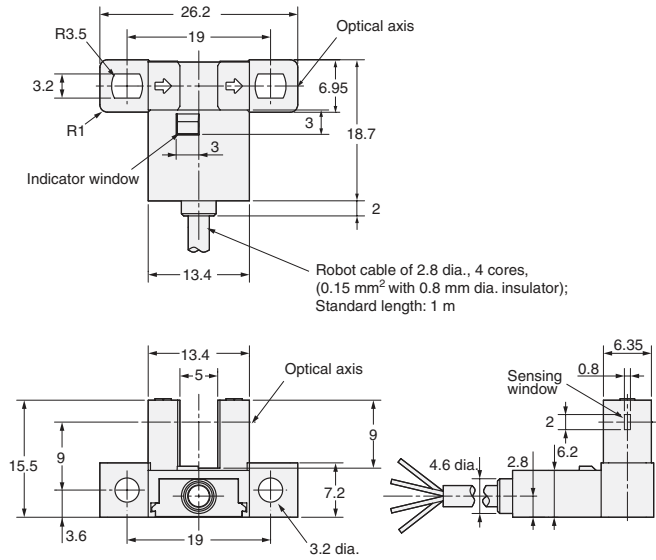


## EE-SX671-WR/671P-WR



### Terminal Arrangement

<b>Brown</b>	Vcc
<b>Pink</b>	L
<b>Blue</b>	GND (0 V)
<b>Black</b>	OUTPUT

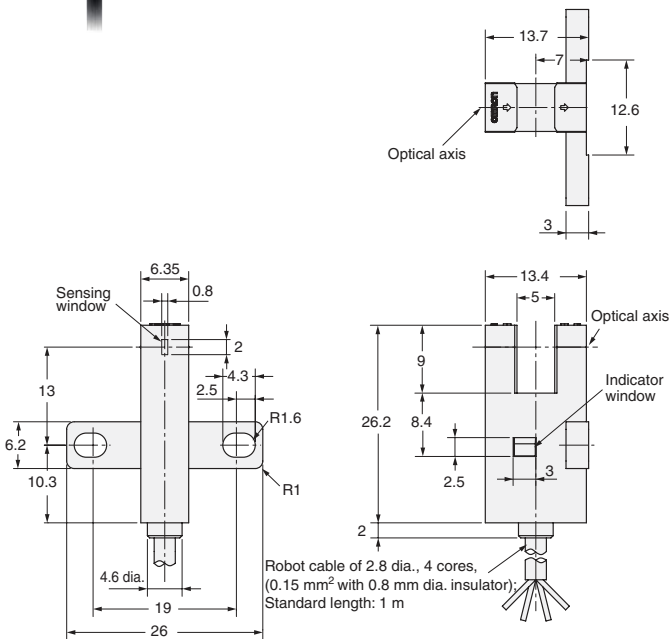


## EE-SX672-WR/672P-WR



### Terminal Arrangement

<b>Brown</b>	Vcc
<b>Pink</b>	L
<b>Blue</b>	GND (0 V)
<b>Black</b>	OUTPUT

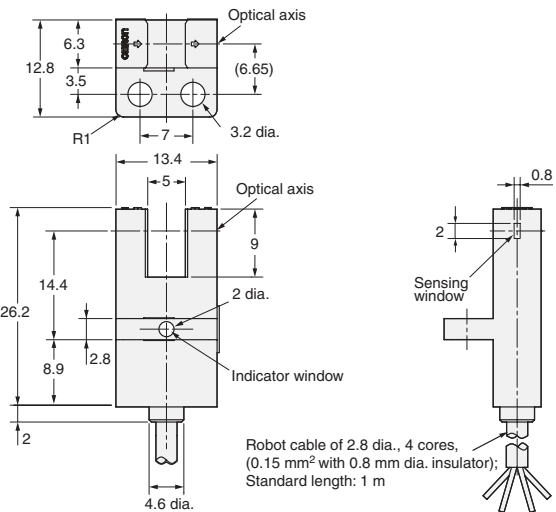


## EE-SX673-WR/673P-WR



### Terminal Arrangement

<b>Brown</b>	Vcc
<b>Pink</b>	L
<b>Blue</b>	GND (0 V)
<b>Black</b>	OUTPUT



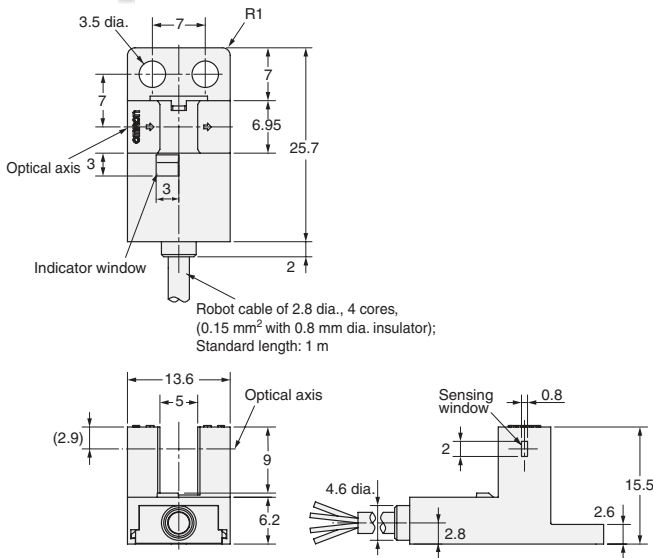


EE-SX674-WR/674P-WR



Terminal Arrangement

<b>Brown</b>	Vcc
<b>Pink</b>	L
<b>Blue</b>	GND(0V)
<b>Black</b>	OUTPUT

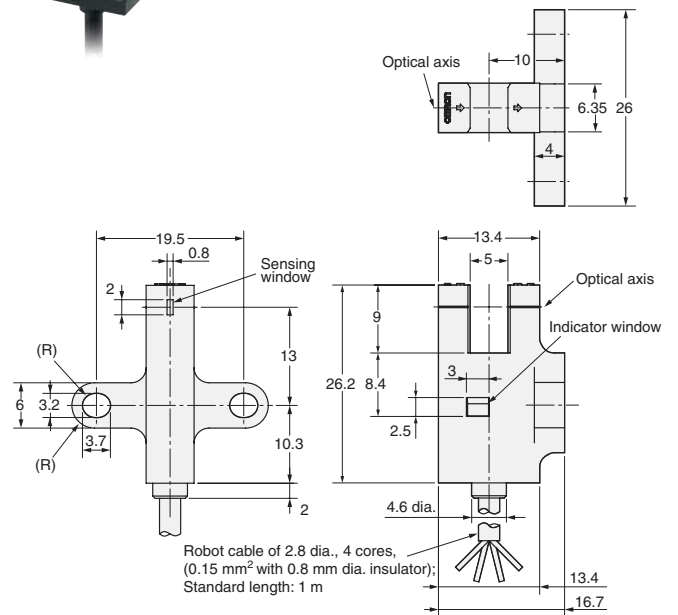


EE-SX675-WR/675P-WR



Terminal Arrangement

<b>Brown</b>	Vcc
<b>Pink</b>	L
<b>Blue</b>	GND(0V)
<b>Black</b>	OUTPUT

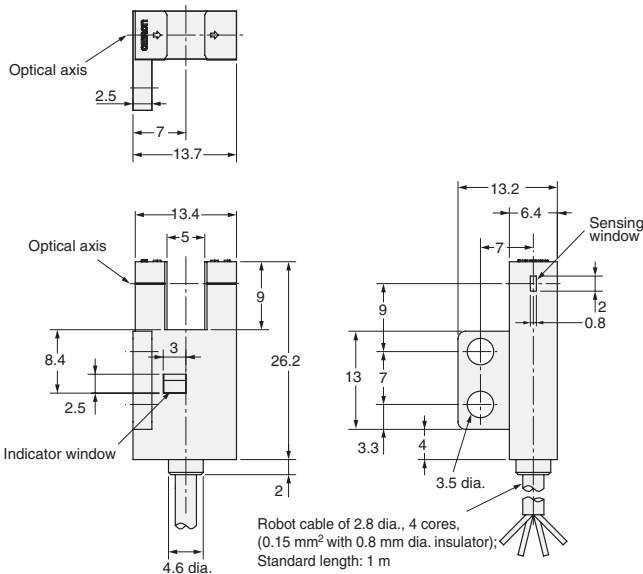


EE-SX676-WR/676P-WR



Terminal Arrangement

<b>Brown</b>	Vcc
<b>Pink</b>	L
<b>Blue</b>	GND(0V)
<b>Black</b>	OUTPUT

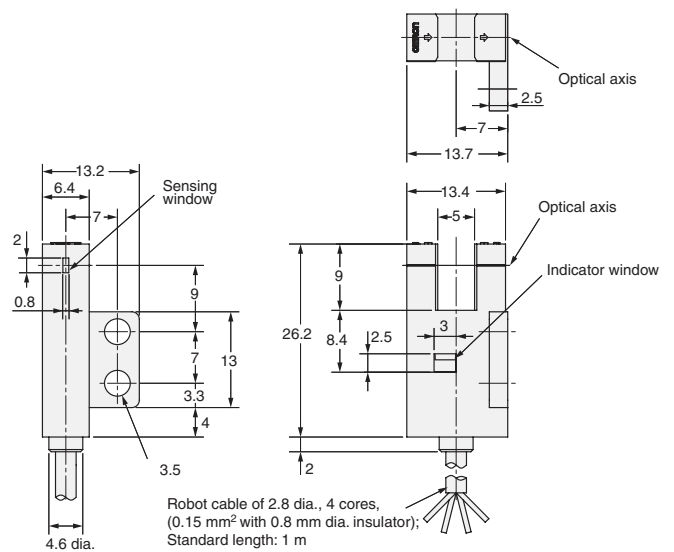


EE-SX677-WR/677P-WR



Terminal Arrangement

<b>Brown</b>	Vcc
<b>Pink</b>	L
<b>Blue</b>	GND(0V)
<b>Black</b>	OUTPUT



**MEMO**

A large grid of dashed blue lines, intended for writing notes. The grid consists of 15 columns and 25 rows of squares.

# 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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3. **Discounts.** Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (i) the invoice is paid according to Omron's payment terms and (ii) Buyer has no past due amounts.
4. **Interest.** Omron, at its option, may charge Buyer 1-1/2% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
5. **Orders.** Omron will accept no order less than \$200 net billing.
6. **Governmental Approvals.** Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Products.
7. **Taxes.** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Omron.
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10. **Force Majeure.** Omron shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
11. **Shipping; Delivery.** Unless otherwise expressly agreed in writing by Omron:
  - a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
  - b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
  - c. All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid;
  - 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.
12. **Claims.** Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
13. **Warranties.** (a) **Exclusive Warranty.** Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied. (b) **Limitations.** OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) **Buyer Remedy.** Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses 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. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty. See <http://www.omron247.com> or contact your Omron representative for published information.
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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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1. **Suitability of 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 but the following is a non-exhaustive list of applications for which particular attention must be given: (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.
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