Slot-type Photomicrosensor (Non-modulated) *1

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 59.

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

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	Incident light	EE-SX670	EE-SX670P
					No incident light	EE-SX670A	EE-SX670R
				Light-ON	Incident light	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	Incident light	EE-SX471	EE-SX471P
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	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	Incident light	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	Incident light	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. 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

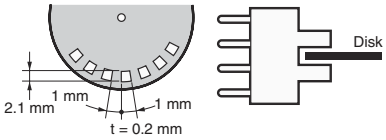
Type		Cable length	Model	Remarks
Connector			**EE-1001**	
			EE-1001-1	L terminal and positive (+) terminal are already short-circuited.
			EE-1009	
	Connector with Cable	1 m	**EE-1006**	
			EE-1010	
		2 m	**EE-1006**	
			EE-1010	
	Connector with Robot Cable	1 m	**EE-1010-R**	
		2 m	**EE-1010-R**	
Connector Hold-down Clip			**EE-1006A**	For EE-1006 only.

* 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
		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 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-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			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. 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.							
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 (with no icing or condensation)							
Ambient humidity range			Operating: 5% to 85%, Storage: 5% to 95% (with no icing or condensation)							
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							
Degree of protection			IEC60529 IP50							
Connecting method			Connector Models (direct soldering possible), Pre-wired Models (Standard cable length: 1 m), Models with Connectors (Standard cable length: 0.1 m)							
Weight	Connector models		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		Polycarbonate							
	Emitter/receiver									

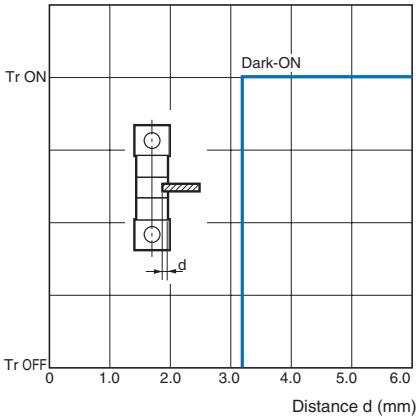
*1. The indicator is a GaP red LED (peak wavelength: 690 nm).
*2. The response frequency was measured by detecting the rotating disk shown at the right.



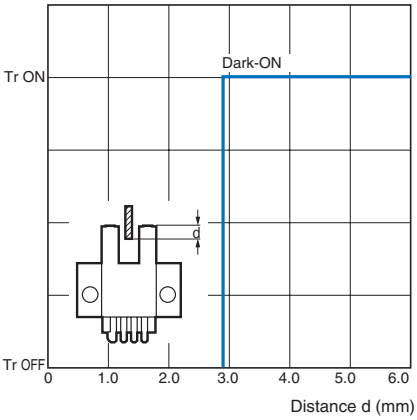
EE-SX47/67

Engineering Data (Typical)

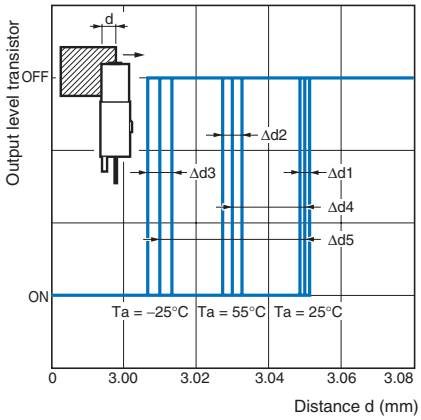
Sensing Position Characteristics



Sensing Position Characteristics



Repeated Sensing Position Characteristics

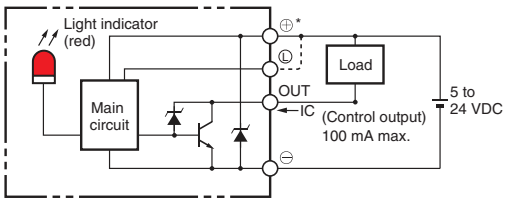
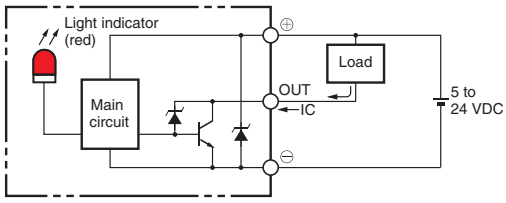


Vcc =12 V, No. of repetitions: 20, Δd1 = 0.002 mm, Δd2 = 0.004 mm, Δd3 = 0.005 mm, Δd4 = 0.02 mm, Δd5 = 0.04 mm

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

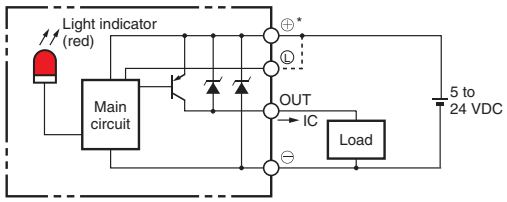
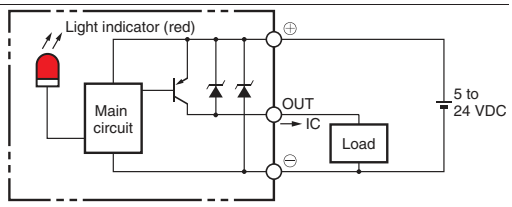
NPN Output

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 (e.g., relay): Operates / Releases	Short-circuited between Ⓛ terminal and positive ⊕ terminal	
	Dark-ON	Incident / Interrupted Light indicator (red): ON / OFF Output transistor: ON / OFF Load (e.g., relay): Operates / 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 (e.g., relay): Operates / Releases	Short-circuited between Ⓛ terminal and positive ⊕ terminal	
	Dark-ON	Incident / Interrupted Light indicator (red): ON / OFF Output transistor: ON / OFF Load (e.g., relay): Operates / 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	---	

*The terminal arrangement depends on the model. Check the dimensional diagrams.

*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	Incident / Interrupted Light indicator (red): ON / OFF Output transistor: ON / OFF Load (relay): Operates / Releases	Short-circuited between Ⓛ terminal and positive ⊕ terminal	 *The terminal arrangement depends on the model. Check the dimensional diagrams.
	Dark-ON	Incident / Interrupted Light indicator (red): ON / OFF Output transistor: ON / OFF Load (relay): Operates / Releases	Open between Ⓛ terminal and positive ⊕ terminal *1	
EE-SX670R EE-SX671R EE-SX672R EE-SX673R EE-SX674R	Light-ON	Incident / Interrupted Light indicator (red): ON / OFF Output transistor: ON / OFF Load (e.g., relay): Operates / Releases	Short-circuited between Ⓛ terminal and positive ⊕ terminal	
	Dark-ON	Incident / Interrupted Light indicator (red): ON / OFF Output transistor: ON / OFF Load (e.g., relay): Operates / Releases	Open between Ⓛ terminal and positive ⊕ terminal *1	
EE-SX470P EE-SX471P EE-SX472P EE-SX473P EE-SX474P	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.

Safety Precautions

Refer to *Warranty and Limitations of Liability*.

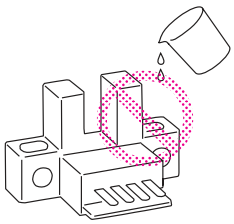
⚠ WARNING

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

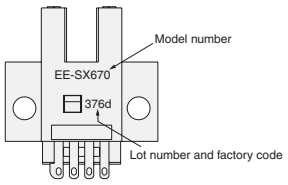
Item	Temperature	Permissible time	Remarks
Soldering iron	350°C max.	3 s max.	The portion between the base of the terminals and the position 1.5 mm from the terminal base must not be soldered.

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

EE-SX□70□



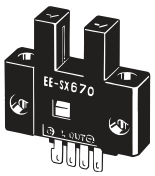
(Unit: mm)

Dimensions

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

Sensors

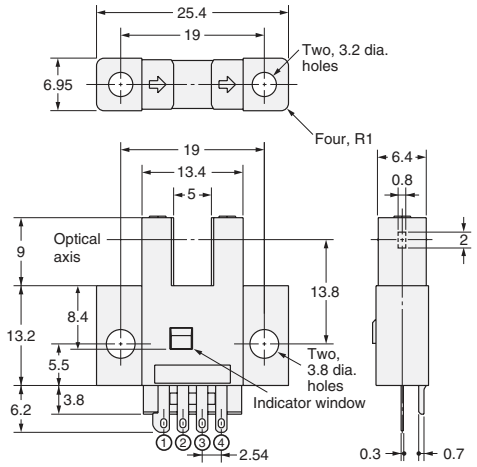
EE-SX670/670P
EE-SX670A/670R
EE-SX470/470P



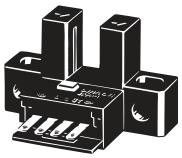
Terminal Arrangement

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

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



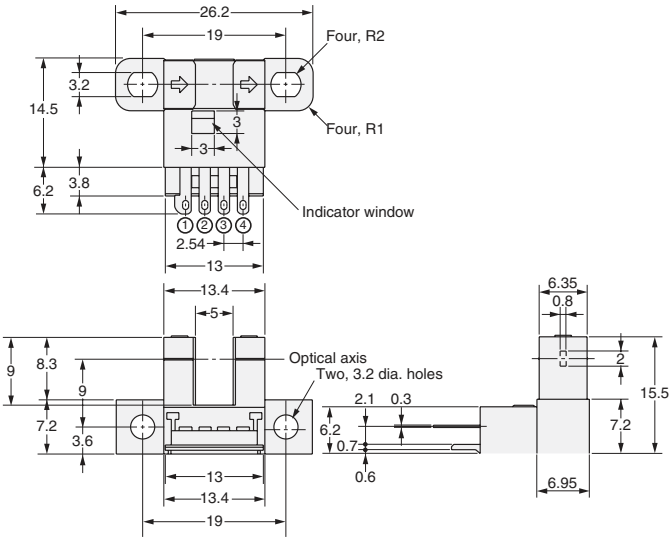
EE-SX671/671P
EE-SX671A/671R
EE-SX471/471P



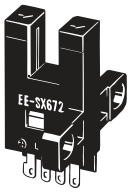
Terminal Arrangement

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

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



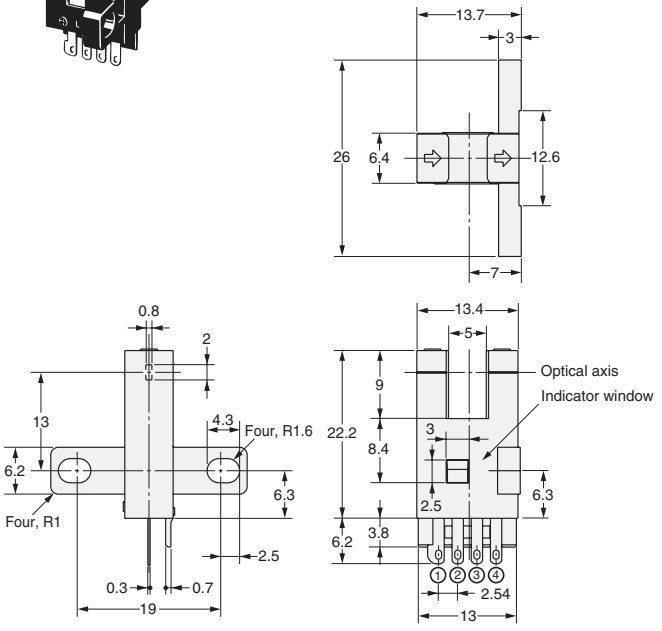
EE-SX672/672P
EE-SX672A/672R
EE-SX472/472P



Terminal Arrangement

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

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

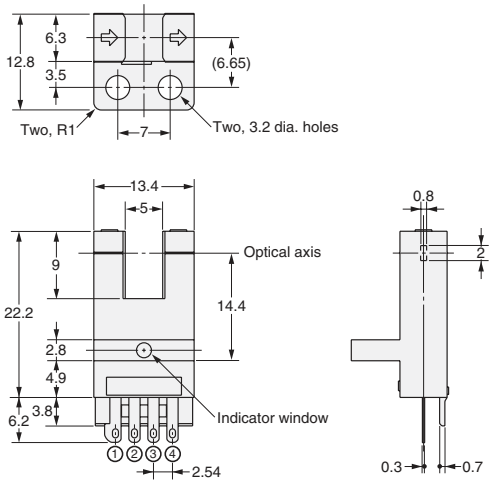


EE-SX673/673P
EE-SX673A/673R
EE-SX473/473P

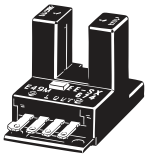
Terminal Arrangement

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

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



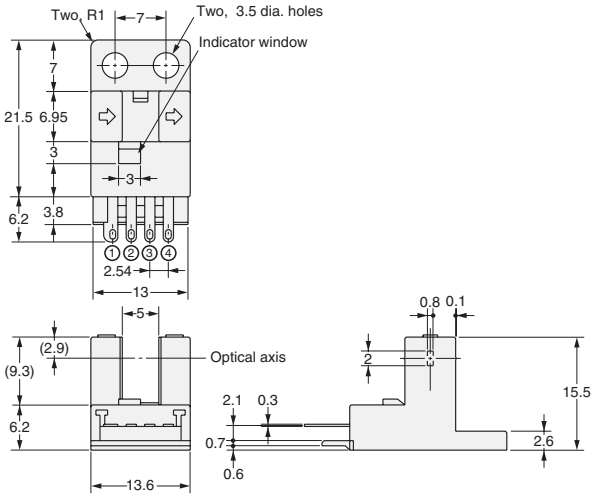
EE-SX674/674P
EE-SX674A/674R
EE-SX474/474P



Terminal Arrangement

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

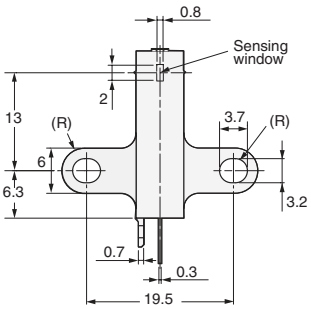
* Pin 2 is not used for the EE-SX474.

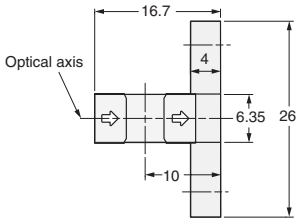


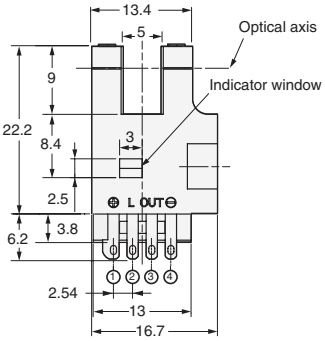
EE-SX675/675P

Terminal Arrangement

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



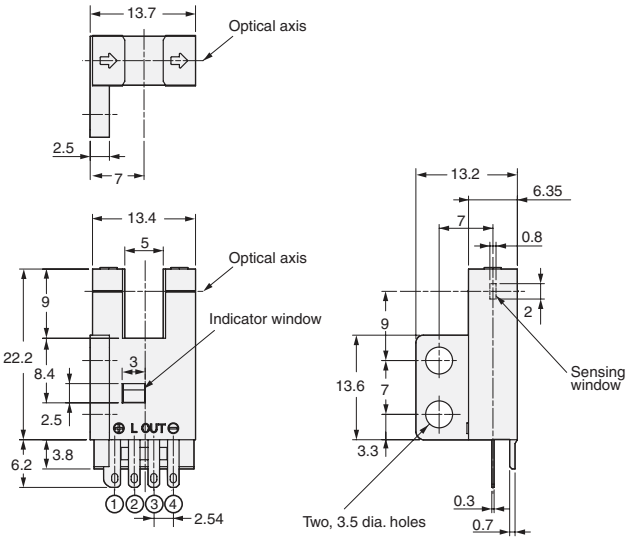




EE-SX676/676P

Terminal Arrangement

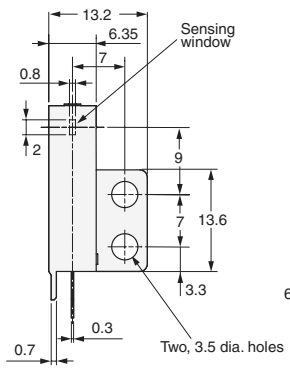
(1)	⊕	Vcc
(2)	L	L
(3)	OUT	OUTPUT
(4)	⊖	GND (0 V)

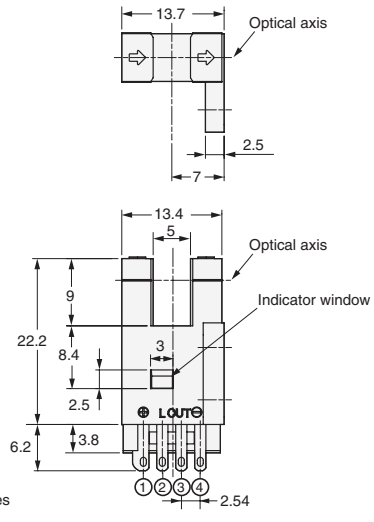


EE-SX677/677P

Terminal Arrangement

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

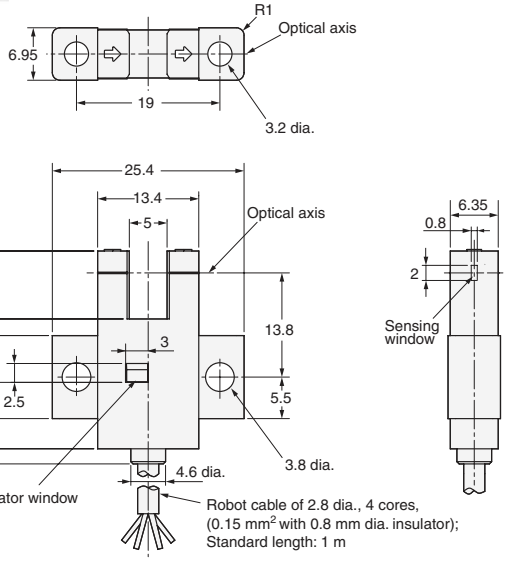




EE-SX670-WR/670P-WR

Terminal Arrangement

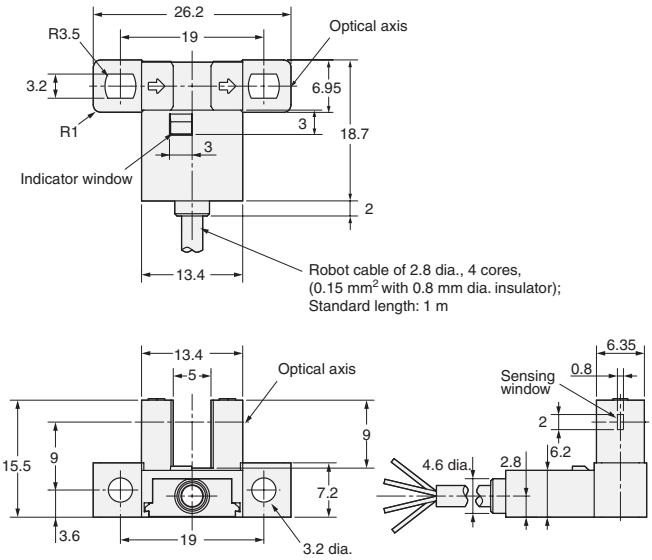
Brown	Vcc
Pink	L
Blue	GND (0 V)
Black	OUTPUT



EE-SX671-WR/671P-WR

Terminal Arrangement

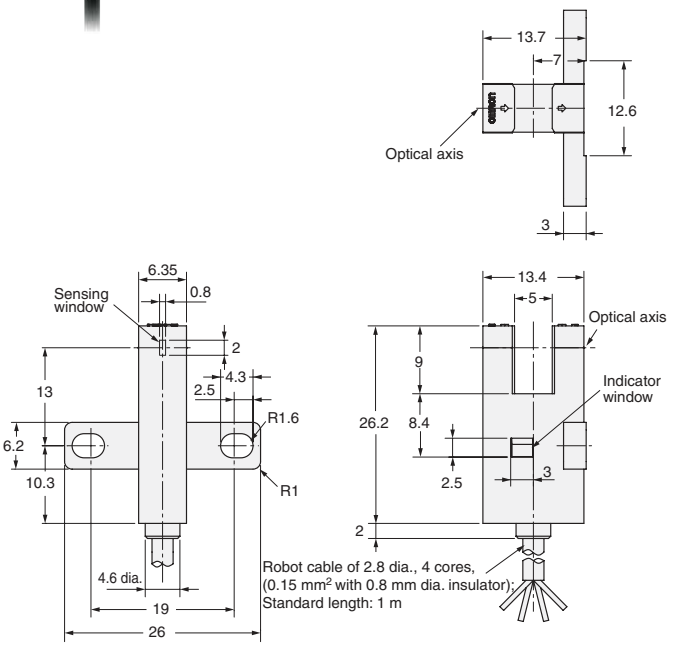
Brown	Vcc
Pink	L
Blue	GND (0 V)
Black	OUTPUT



EE-SX672-WR/672P-WR

Terminal Arrangement

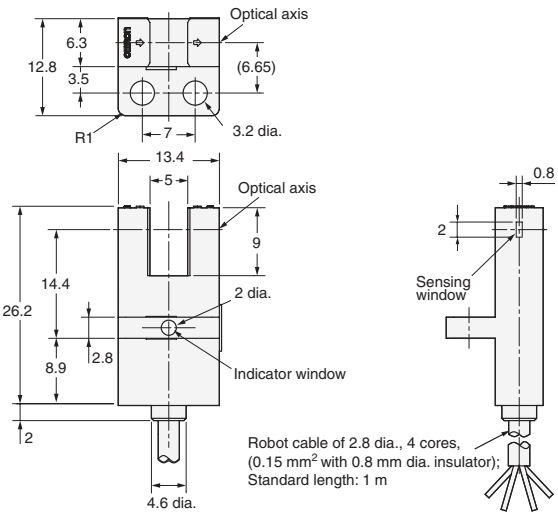
Brown	Vcc
Pink	L
Blue	GND (0 V)
Black	OUTPUT



EE-SX673-WR/673P-WR

Terminal Arrangement

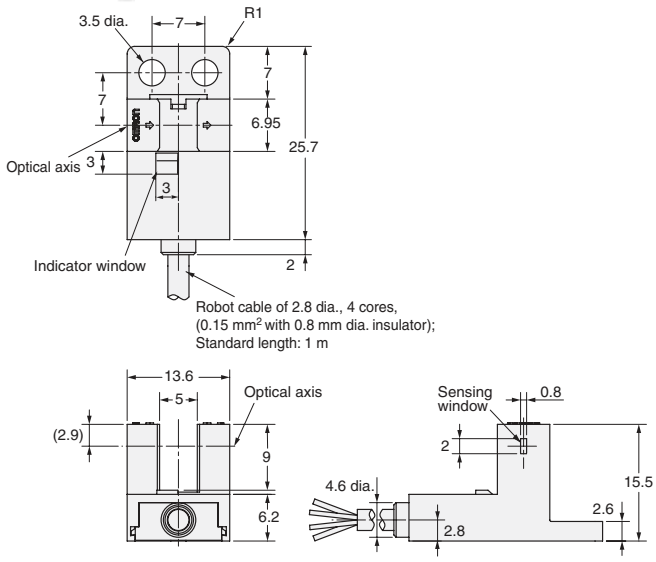
Brown	Vcc
Pink	L
Blue	GND (0 V)
Black	OUTPUT



EE-SX674-WR/674P-WR

Terminal Arrangement

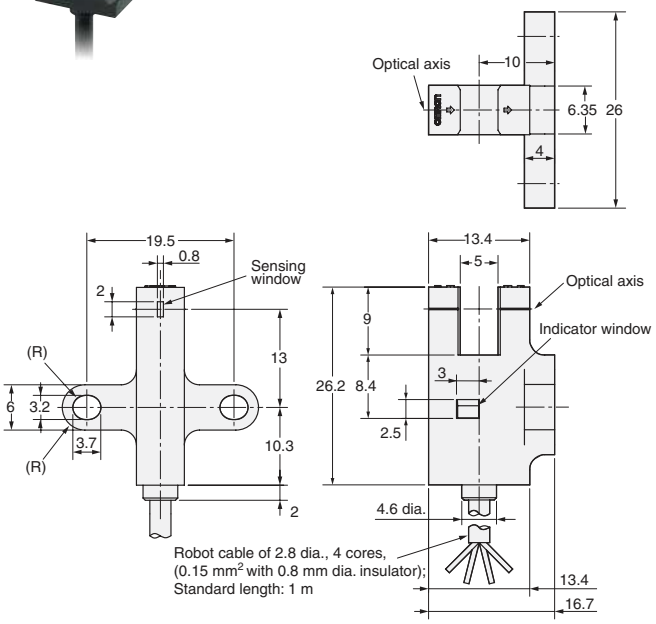
Brown	Vcc
Pink	L
Blue	GND(0V)
Black	OUTPUT



EE-SX675-WR/675P-WR

Terminal Arrangement

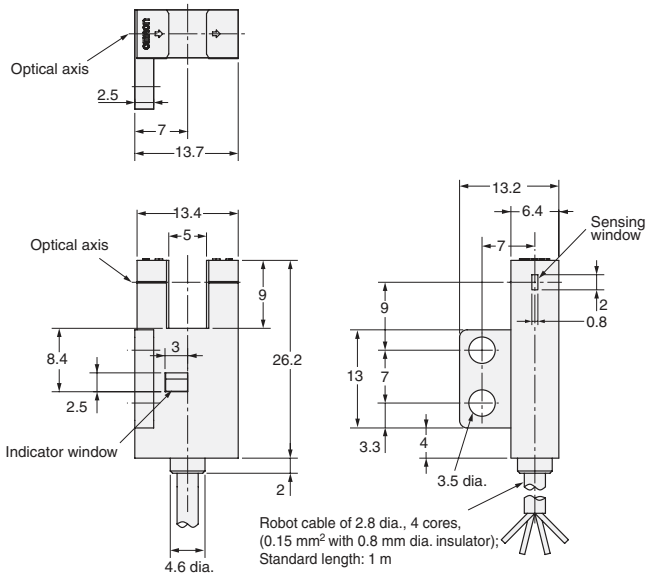
Brown	Vcc
Pink	L
Blue	GND(0V)
Black	OUTPUT



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