

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	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 				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			
Close-mounting 	Dark-ON/Light-ON (selectable) *3	Incident light	EE-SX473	EE-SX473P			
		No incident light	EE-SX674	EE-SX674P			
	Light-ON	Incident light	EE-SX674A	EE-SX674R			
Light-ON	Incident light	EE-SX474	EE-SX474P				
		EE-SX675	EE-SX675P				
T-shaped, slot center: 10 mm 	Dark-ON/Light-ON (selectable) *3	Incident light	EE-SX676	EE-SX676P			
		No incident light	EE-SX677	EE-SX677P			
F-shaped 	Dark-ON/Light-ON (selectable) *3	Incident light	EE-SX676	EE-SX676P			
		No incident light	EE-SX677	EE-SX677P			
R-shaped 	Dark-ON/Light-ON (selectable) *3	Incident light	EE-SX676	EE-SX676P			
		No 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-1010	
		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.

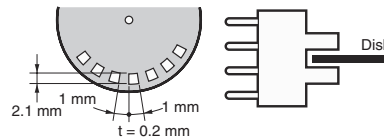
EE-SX47/67

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								

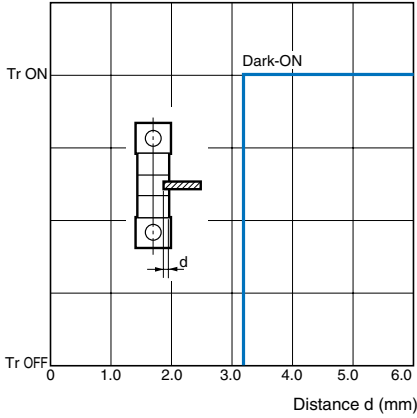
*1. The indicator is a GaP red LED (peak wavelength: 690 nm).

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

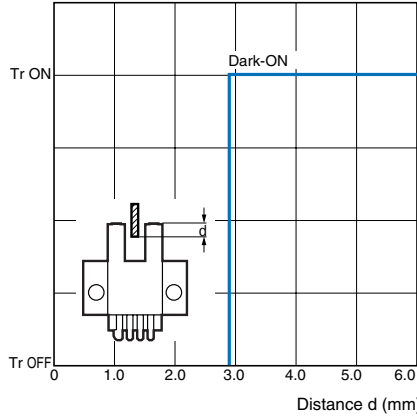


Engineering Data (Typical)

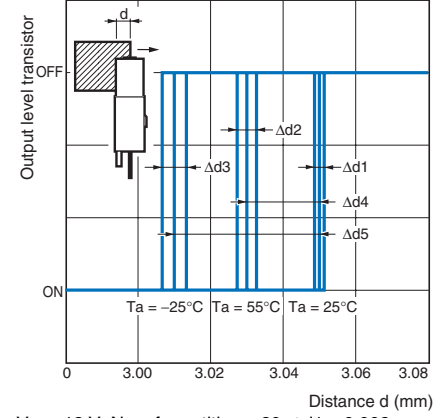
Sensing Position Characteristics



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

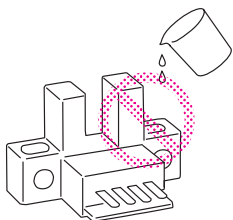
This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.



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.

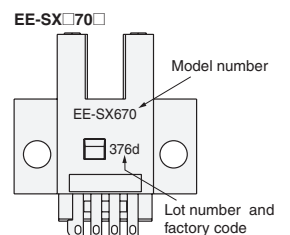
Soldering Conditions

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

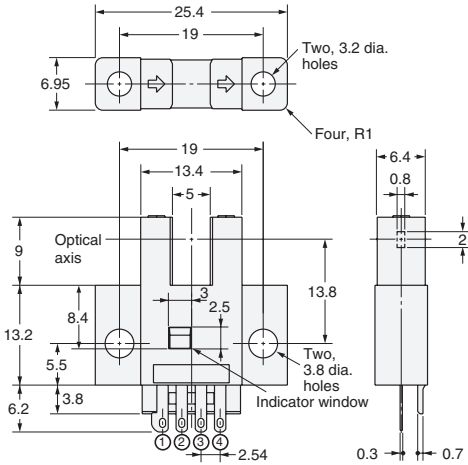
Sensors

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.

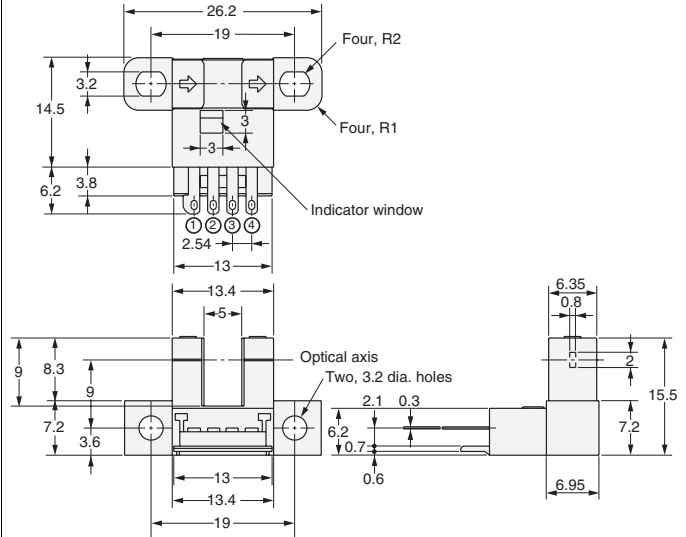


EE-SX671/671P
EE-SX671A/671R
EE-SX471/471P

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.

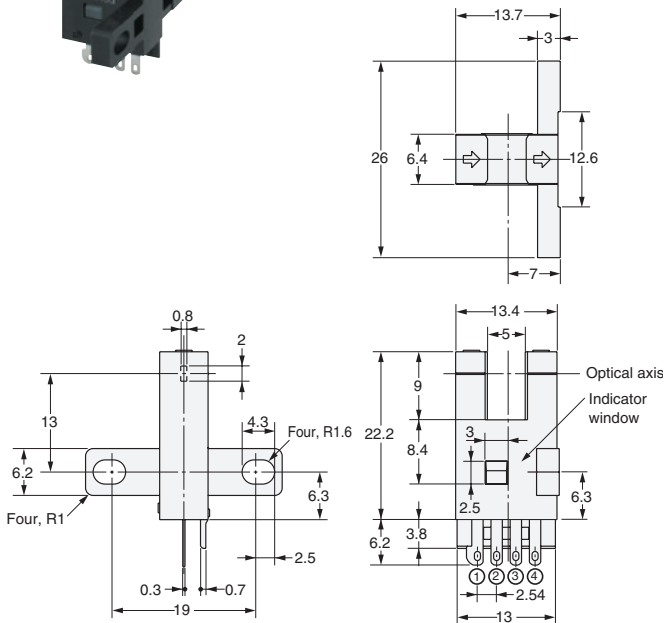


EE-SX672/672P
EE-SX672A/672R
EE-SX472/472P

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.

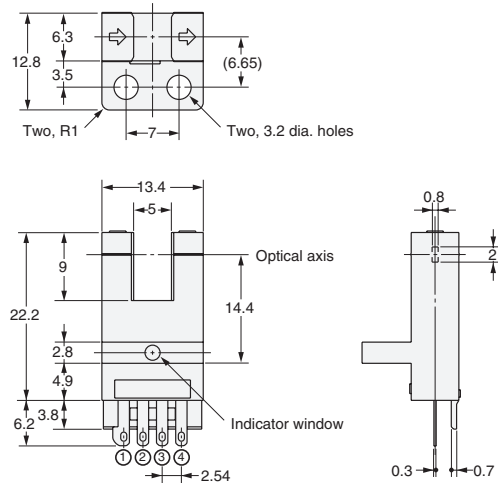


EE-SX673/673P
EE-SX673A/673R
EE-SX473/473P

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

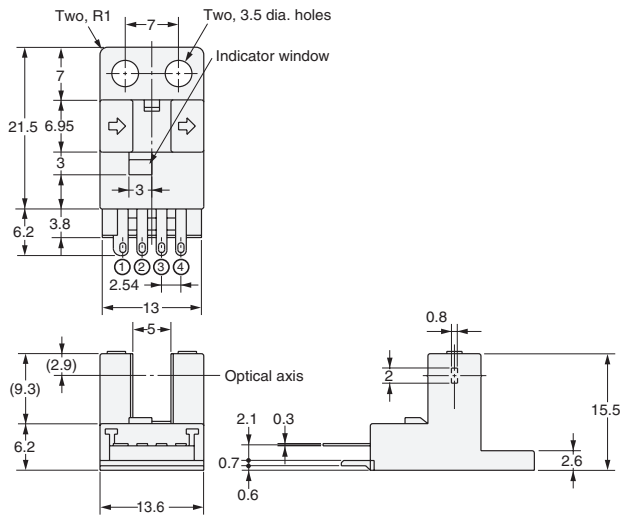
EE-SX674/674P EE-SX674A/674R EE-SX474/474P



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.

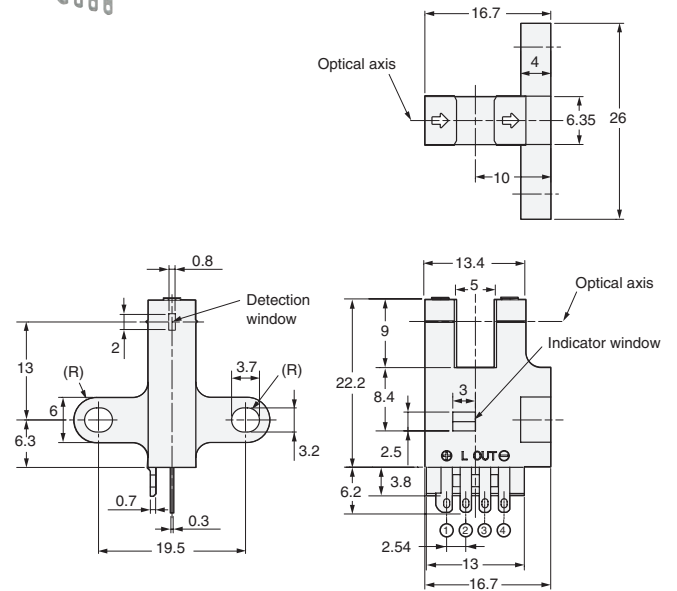


EE-SX675/675P



Terminal Arrangement

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

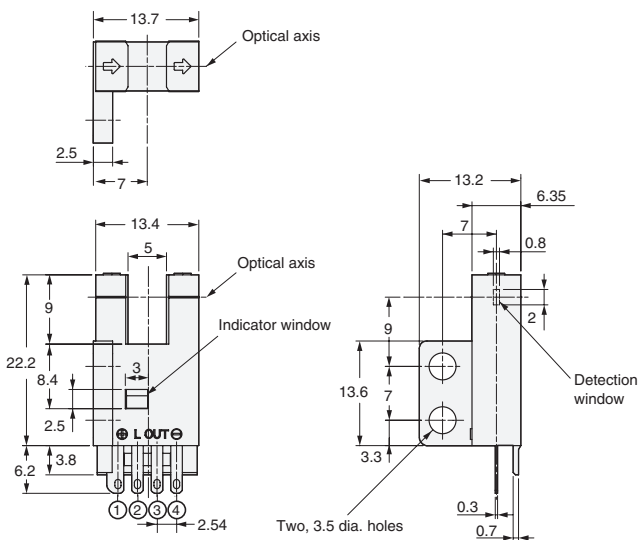


EE-SX676/676P



Terminal Arrangement

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

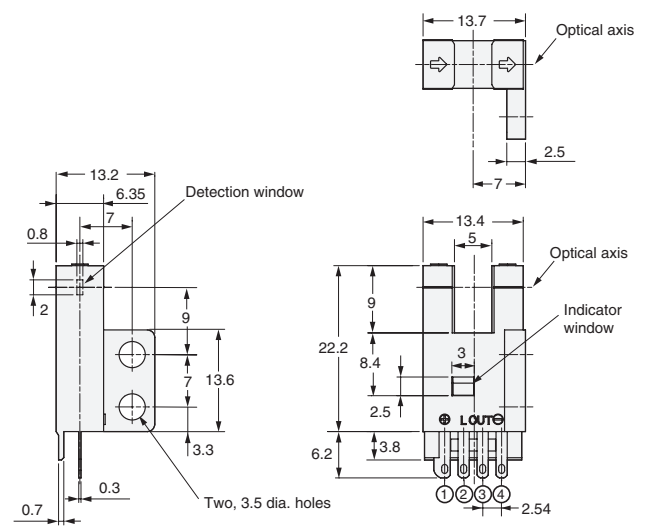


EE-SX677/677P



Terminal Arrangement

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

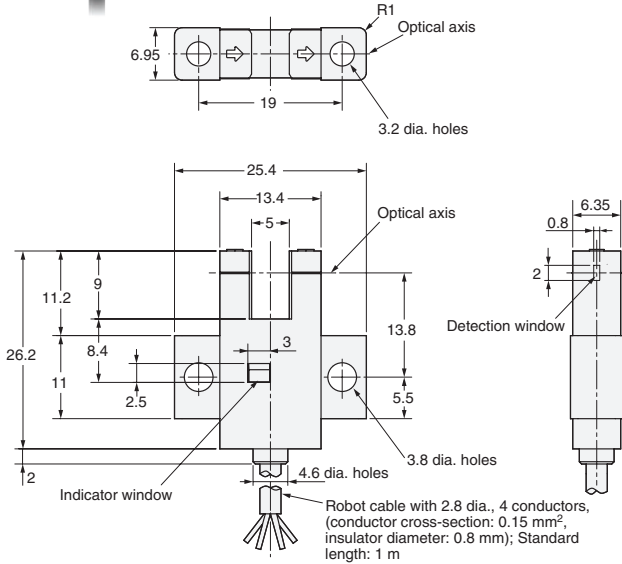


EE-SX670-WR/670P-WR



Terminal Arrangement

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

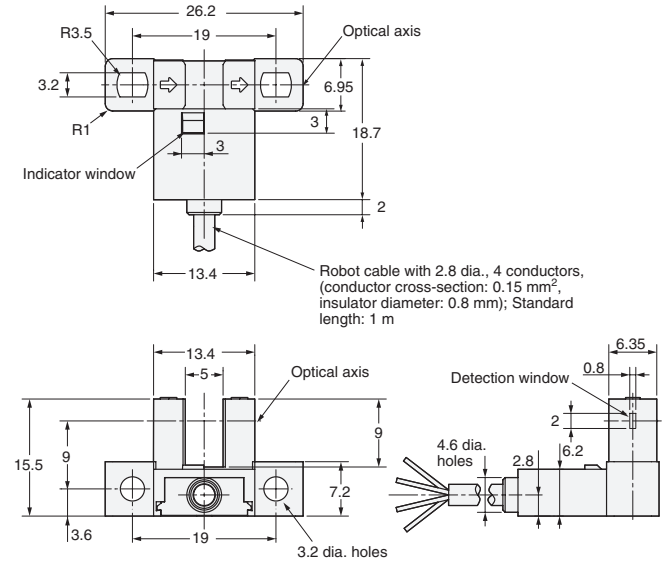


EE-SX671-WR/671P-WR



Terminal Arrangement

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

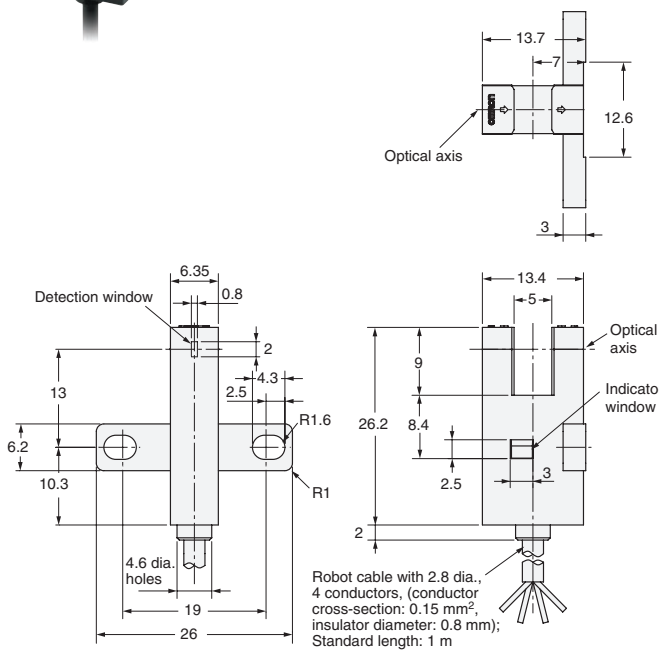


EE-SX672-WR/672P-WR



Terminal Arrangement

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

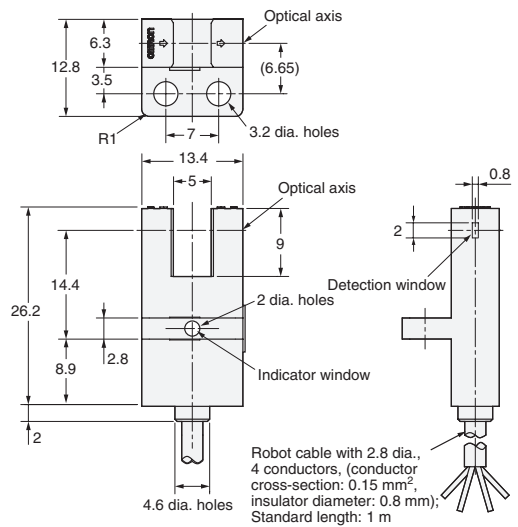


EE-SX673-WR/673P-WR



Terminal Arrangement

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

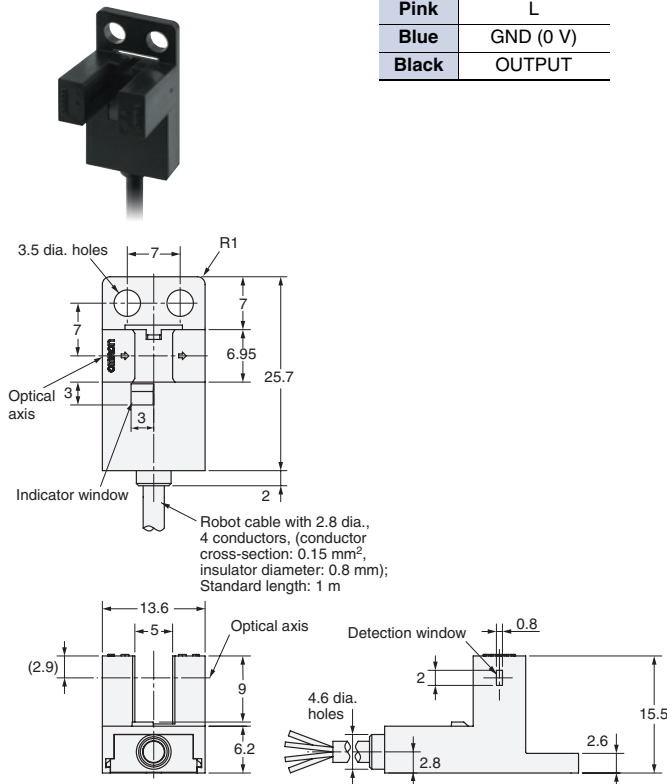


EE-SX47/67

EE-SX674-WR/674P-WR

Terminal Arrangement

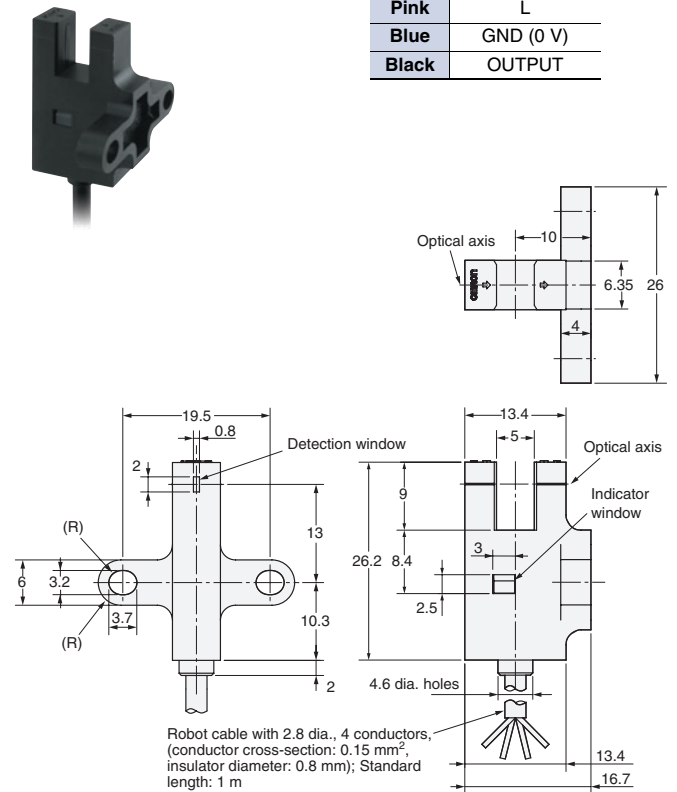
Brown	Vcc
Pink	L
Blue	GND (0 V)
Black	OUTPUT



EE-SX675-WR/675P-WR

Terminal Arrangement

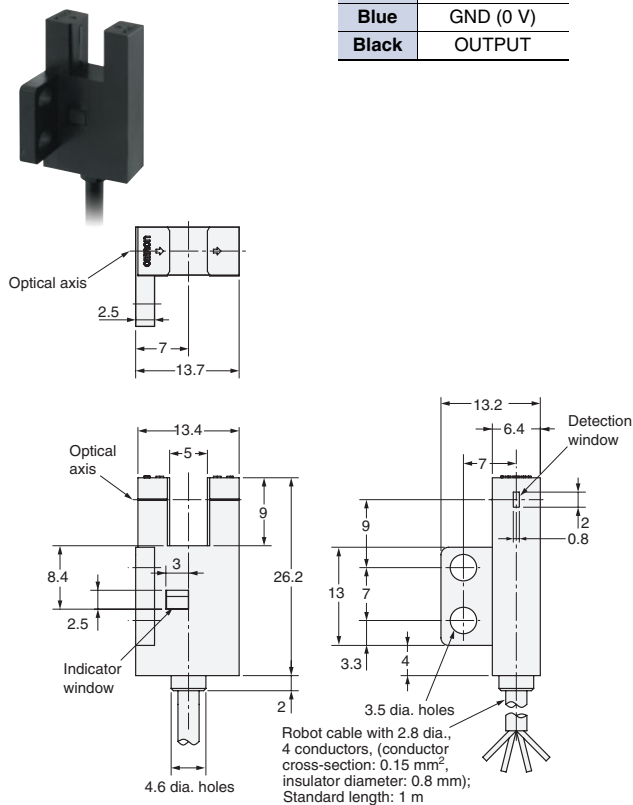
Brown	Vcc
Pink	L
Blue	GND (0 V)
Black	OUTPUT



EE-SX676-WR/676P-WR

Terminal Arrangement

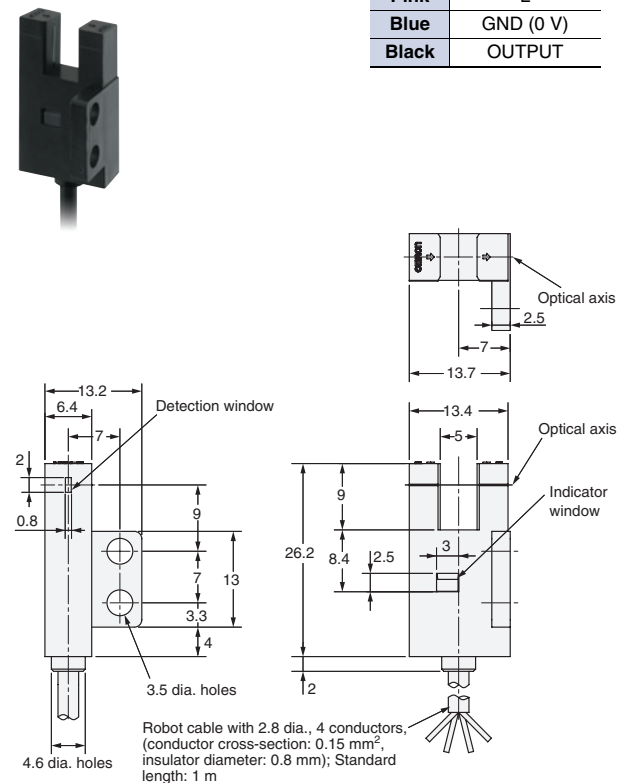
Brown	Vcc
Pink	L
Blue	GND (0 V)
Black	OUTPUT



EE-SX677-WR/677P-WR

Terminal Arrangement

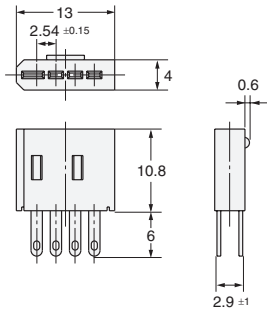
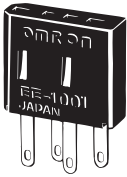
Brown	Vcc
Pink	L
Blue	GND (0 V)
Black	OUTPUT



EE-SX47/67 Connector Hold-down Clips

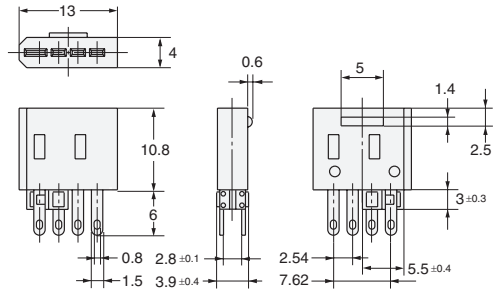
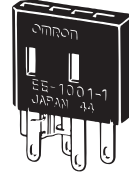
Connector

EE-1001



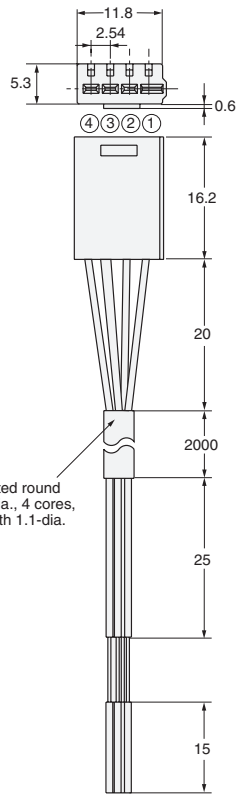
Connector (short-circuited between positive (+) and L terminals)

EE-1001-1



Connector with Cable

EE-1006



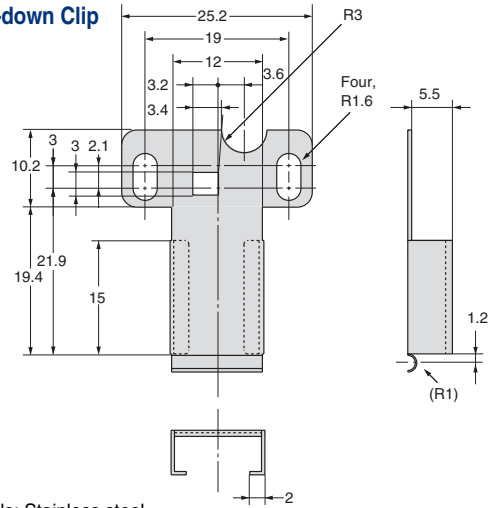
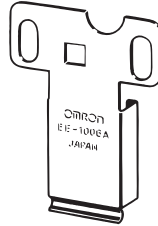
Cable:
Vinyl-insulated round
cable of 4 dia., 4 cores,
(0.2 mm² with 1.1-dia.
insulator)

Terminal Arrangement

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

Connector Hold-down Clip

EE-1006A



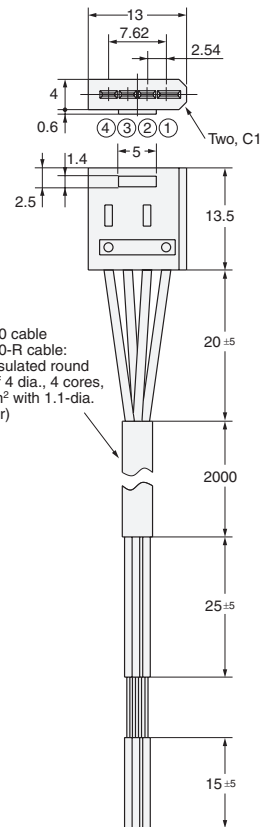
Materials: Stainless steel

Connector with Cable

EE-1010

Connector with Robot Cable

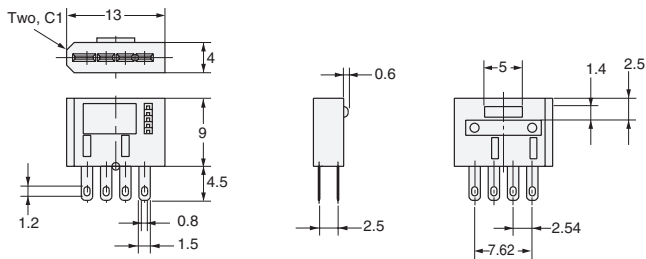
EE-1010-R



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

- 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.
- Prices; Payment Terms.** All prices stated are current, subject to change without notice by Omron. Omron reserves the right to increase or decrease prices on any unshipped portions of outstanding orders. Payments for Products are due net 30 days unless otherwise stated in the invoice.
- 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.
- 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.
- Orders.** Omron will accept no order less than \$200 net billing.
- 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.
- 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.
- Financial.** If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
- Cancellation; Etc.** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
- 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.
- Shipping; Delivery.** Unless otherwise expressly agreed in writing by Omron:
 - Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
 - Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
 - 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;
 - Delivery and shipping dates are estimates only; and
 - Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
- 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.
- 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.
- Limitation on Liability; Etc.** OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.
- Indemnities.** Buyer shall indemnify and hold harmless Omron Companies and their employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Omron is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Omron and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
- Property; Confidentiality.** Any intellectual property in the Products is the exclusive property of Omron Companies and Buyer shall not attempt to duplicate it in any way without the written permission of Omron. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Omron. All information and materials supplied by Omron to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
- 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.
- 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.

Certain Precautions on Specifications and Use

- 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:
 - Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
 - Use in consumer products or any use in significant quantities.
 - 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.
 - 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.
- Programmable Products.** Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
- 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.
- 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.
- Errors and Omissions.** Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.