Pre-wired Models and Models

_	Sensing		Output	Indicator mode	Connecting method	Ν	Model	
Appearance	method	Sensing distance	configura- tion			NPN output	PNP output	
itandard						EE-SX670-WR	EE-SX670P-WF	
-shaped]	5 mm Ligh	Dark-ON/ Light-ON n) (selectable) *	Incident light	Pre-wired models (1 m)	EE-SX671-WR	EE-SX671P-W	
-shaped, lot center: mm						EE-SX672-WR	EE-SX672P-WI	
close- nounting	Through- beam					EE-SX673-WR	EE-SX673P-WI	
close- nounting	type (with slot)					EE-SX674-WR	EE-SX674P-WI	
-shaped, lot center: 0 mm						EE-SX675-WR	EE-SX675P-WI	
-shaped						EE-SX676-WR	EE-SX676P-WI	
R-shaped						EE-SX677-WR E	EE-SX677P-WI	

* 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.

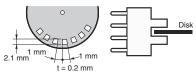
Accessories for Models with Connectors (Order Separately)

Type Cable length		Model	Remarks	
Connector			EE-1001	
			EE-1001-1	L terminal and positive (+) terminal are already short-circuited.
		1 m	EE-1006	
	Connector with Cable		EE-1010	
	Connector with Cable		EE-1006	
		2 111	EE-1010	
	Connector with Robot	1 m	EE-1010-R	
	Cable	2 m	EE-1010-R	
Connector	Connector Hold-down Clip			For EE-1006 only.

Ratings and Specifications

		Туре	Standard	L-shaped	T-shaped, slot center: 7 mm	Close-m	ounting	T-shaped, slot center: 10 mm	F-shaped	R-shaped	
	NPN mod-	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	
	1	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 mod-	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	
Item	els	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	
Sensi	ng dis	tance	5 mm (slot wi	dth)							
Sensi	ng obj	ect	Opaque: 2 × 0.8 mm min.								
Differe	ential o	distance	0.025 mm								
Light source			GaAs infrared LED with a peak wavelength of 940 nm								
Indica	tor *1		Light indicator (red) (turns ON when light is interrupted for models with A or R suffix)								
Suppl	Supply voltage 5 to 24 VDC ±10%, ripple (p-p): 10% max.										
Curre	nt con	sumption		NPN 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)								
Ambie	ent illu	mination	1,000 lx max. with fluorescent light on the surface of the receiver.								
Ambie	ent tem	perature range	Operating: -25 to +55°C, Storage: -30 to +80°C								
Ambie	ent hui	midity 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				Destruction: 500 m/s ² for 3 times each in X, Y, and Z directions							
Enclo		<u> </u>	IEC60529 IP50								
	<u> </u>	method	Special connectors (direct soldering possible), Pre-wired models (Standard cable length: 1 m)								
Weigh		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	
(pack- aged)		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	
Ma- Case			Polybutylene phthalate (PBT)								
terial		emitter/receiver	Polycarbonat								

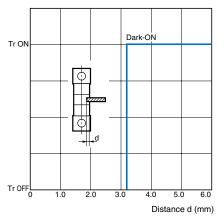
*1. The indicator is a GaP red LED (peak wavelength: 690 nm).
*2. The response frequency was measured by detecting the rotating disk shown at the right.

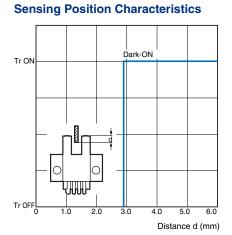


6

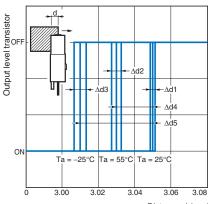
Engineering Data (Typical)

Sensing Position Characteristics





Repeated Sensing Position Characteristics



Distance d (mm)

Vcc =12 V, No. of repetitions: 20, $\Delta d1 = 0.002$ mm, $\Delta d2 = 0.004$ mm, $\Delta d3 = 0.005$ mm, $\Delta d4 = 0.02$ mm, $\Delta d5 = 0.04$ mm

I/O Circuit Diagrams

NPN Output

Model	Output configuration	Timing chart	Terminal connection	Output circuit
EE-SX67□	Light-ON	Incident Interrupted Light indicator ON (red) OFF Output ON transistor OFF Load Operates (e.g., relay) Releases	Short-circuited between ① terminal and positive ⊕ terminal	
EE-SX67□-WR	Dark-ON	Incident Interrupted Light indicator ON (red) OFF Output ON transistor OFF Load Operates	Open between () terminal and positive ⊕ terminal	Light indicator
EE-SX670A EE-SX671A EE-SX672A	Light-ON	Incident Interrupted Light indicator ON (red) OFF Output ON transistor OFF Load Operates (e.g., relay) Releases	Short-circuited between ① terminal and positive ⊕ terminal	Main circuit 100 mA max. 3
EE-SX673A EE-SX674A	Dark-ON	Light indicator ON (red) OFF Output ON transistor OFF (e.g., relay) Releases	Open between () terminal and positive ⊕ terminal	
EE-SX470 EE-SX471 EE-SX472 EE-SX473 EE-SX474	Light-ON	Incident Interrupted Light indicator ON (red) OFF Output ON transistor OFF Load Operates (e.g., relay) Releases		Light indicator (red) Main circuit Circuit

PNP Output				
Model	Output configuration	Timing chart	Terminal connection	Output circuit
EE-SX67□P	Light-ON	Incident Interrupted Light indicator ON (red) OFF Output ON transistor OFF Load Operates (e.g., relay) Releases	Short-circuited between ① terminal and positive ⊕ terminal	
EE-SX67□P-WR	Dark-ON	Incident Interrupted Light indicator ON (red) OFF Output ON transistor OFF Load Operates (e.g., relay) Releases	Open between () terminal and positive ⊕ terminal	Light indicator (red)
EE-SX670R EE-SX671R EE-SX672R	Light-ON	Light indicator ON (red) OFF Output ON transistor OFF Load Operates (e.g., relay) Releases	Short-circuited between ① terminal and positive ⊕ terminal	Main circuit Gro
EE-SX673R EE-SX674R	Dark-ON	Incident Interrupted Light indicator ON (red) OFF Output ON transistor OFF Load Operates (e.g., relay) Releases	Open between ℂ terminal and positive ⊕ terminal	
EE-SX470P EE-SX471P EE-SX472P EE-SX473P EE-SX474P	Light-ON	Incident Interrupted Light indicator ON (red) OFF Output ON transistor OFF Load Operates (e.g., relay) Releases		Light indicator (red) Main circuit Curt

Safety Precautions

Refer to Warranty and Limitations of Liability.

WARNING

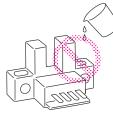
This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.

\bigcirc

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

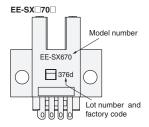
• When direct soldering to the terminals, use the following guidelines. Soldering Conditions

Item	Temper- ature	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.

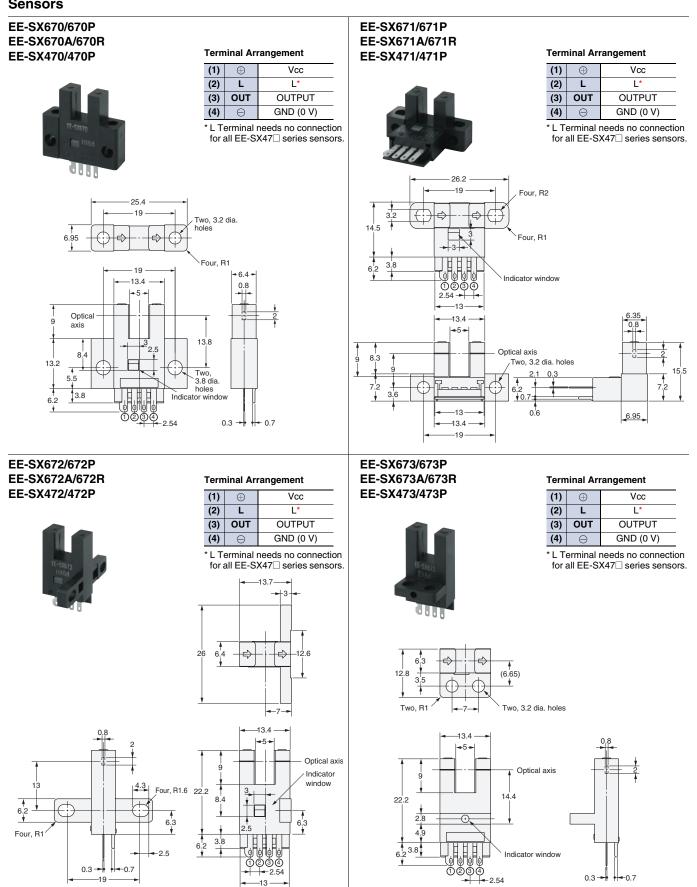


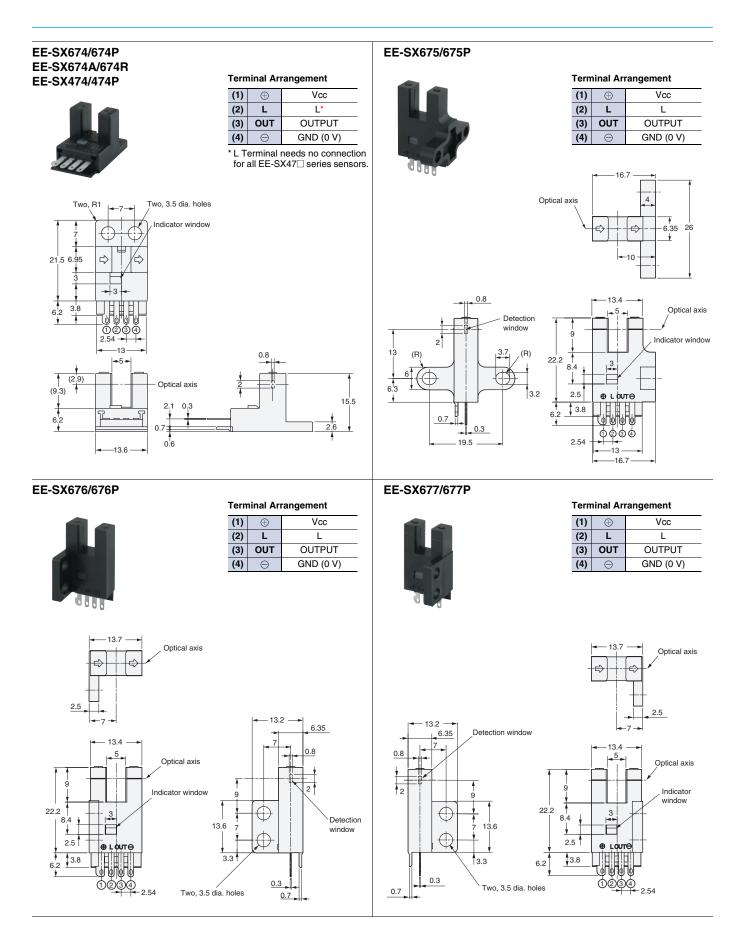
Downloaded from Arrow.com.

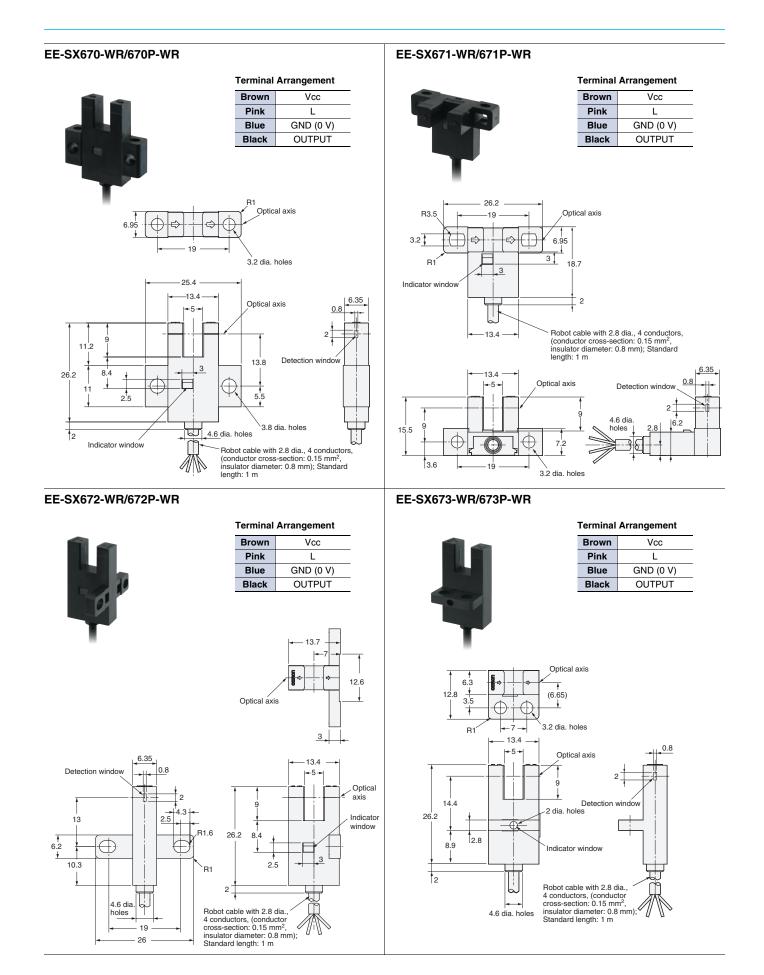
(Unit: mm)

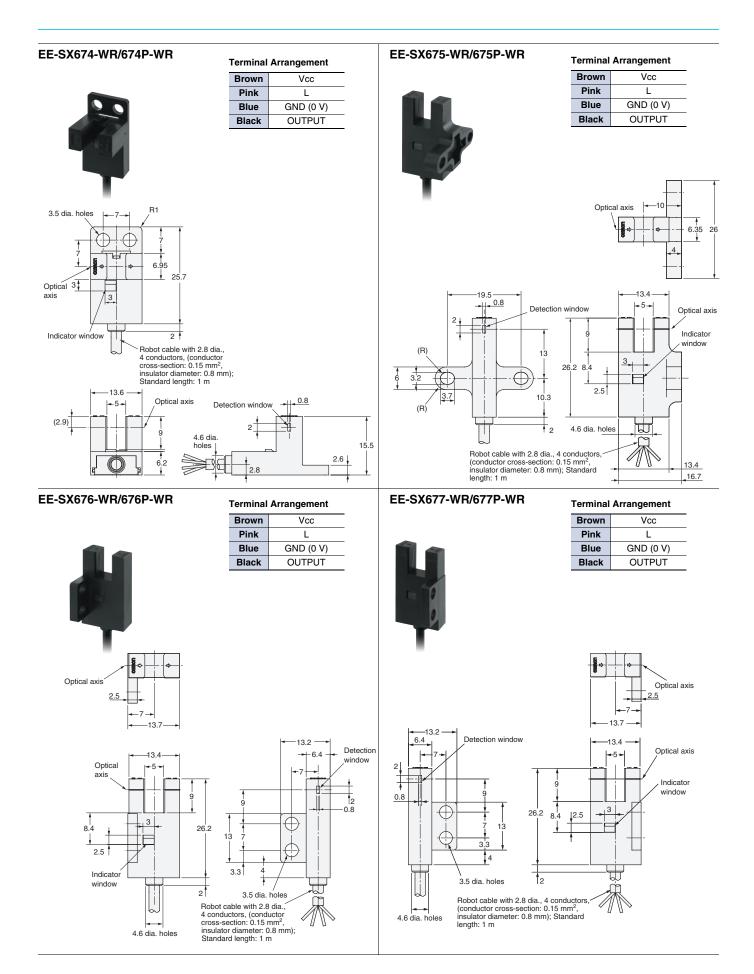
Dimensions

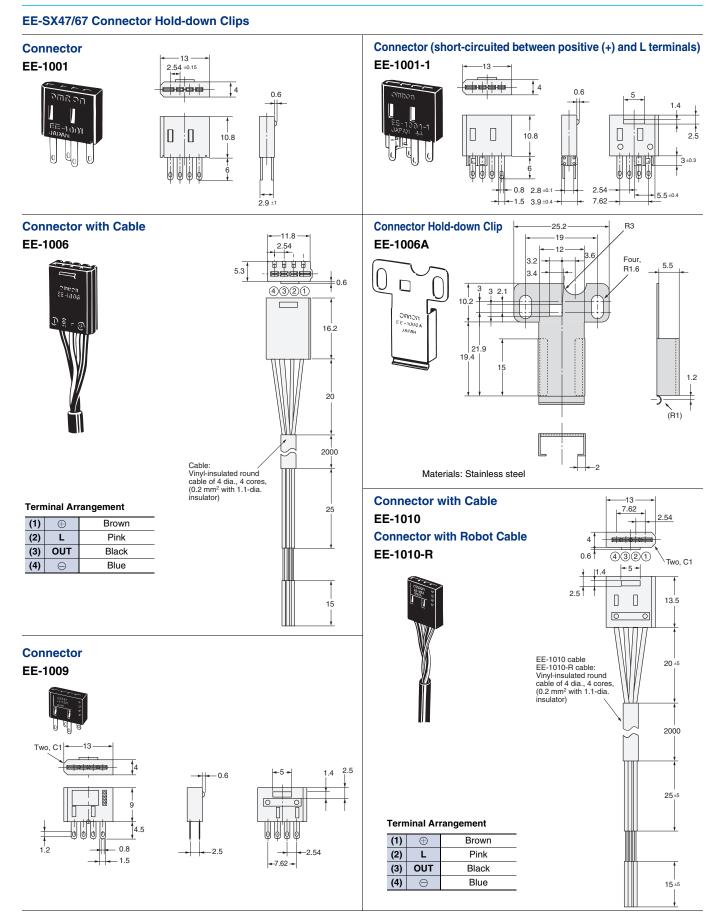
Sensors











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.

OMRON

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 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.
- З.
- 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.
- 5
- <u>Orders</u>. Omron will accept no order less than \$200 net billing. <u>Governmental Approvals</u>. Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the impor-6 tation 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, importa-tion, 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.
- and remitted by Buyer to Omron. <u>Financial.</u> 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 liabil-ity and in addition to other remedies) cancel any unshipped portion of Prod-ucts 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. 8. unpaid accounts.
- unpaid accounts.
 <u>Cancellation</u>; <u>Etc.</u> Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
 <u>Force Majeure</u>. 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.
 <u>Shippents shall be by a carrier selected by Omron</u>; Omron will not drop ship except in "break down" situations.
 <u>b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer</u>;
- 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 concurring before delivery to the carrier must be presented in writing.
- b) 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, MERCHANTABIL-13

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 Rumer shell be celebulated for determining appropriate particular to the complete the product. 1 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.

 (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 uct

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

ITY 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 oth-erwise of any intellectual property right. (c) <u>Buyer Remedy</u>. Omron's sole obli-gation 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 responsi-ble for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were prop-erly handled, stored, installed and maintained and not subject to contamina-tion, abuse, misuse or inappropriate modification. Return of any Products by tion, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Compa-nies 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 environ-ments. 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 pub-lished information.

- See http://www.onion.exp. to in or contact your originative to put lished 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 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 15
- the 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. <u>Property: Confidentiality.</u> 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. 16.
- and buyer shall limit distribution intereor to its trusted employees and strictly prevent disclosure to any third party. <u>Export Controls.</u> Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (iii) sale of products to "forbidden" or other proscribed persons; and (ii) disclosure to non-citizens of regulated technology or information. <u>Miscellaneous</u>. (a) <u>Waiver</u>. No failure or delay by Omron in exercising any right and no curves of dealing between Buwer and Omron shall operate as a waiver.
- 18. Miscentarieous. (a) <u>water</u>, No failule of delay by offinitin the electroning any figure and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) <u>Assignment</u>. Buyer may not assign its rights hereunder without Omron's written consent. (c) <u>Law</u>. 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 princibuyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) <u>Severability</u>. If any provi-sion 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) <u>Definitions</u>. As used herein, "<u>including</u>" means "including without limitation"; and "<u>Omron Compa-</u> nies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

ADDRESS THE RISKS, AND THAT THE OMRON'S PRODUCT IS PROP-ERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

- 2. 3.
- Programmable Products. Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof. <u>Performance Data</u>. Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitabil-ity 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 require-ments. Actual performance is ubject to the Omron's Warranty and Limitations. ments. Actual performance is subject to the Omron's Warranty and Limitations
- Ments. Actual performance is subject to the Omron's warranty and Limitations of Liability. <u>Change in Specifications</u>. Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our prac-tice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifica-tions of the Product may be changed without any notice. When in doubt, spe-cial part numbers may be acciented to fix or article in the upper pro-4 cial 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. <u>Errors and Omissions</u>. 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.

OMRON

OMRON ELECTRONICS LLC • THE AMERICAS HEADQUARTERS • Schaumburg, IL USA • 847.843.7900 • 800.556.6766 • www.omron247.com

OMRON CANADA, INC. • HEAD OFFICE Toronto, ON, Canada • 416.286.6465 • 866.986.6766 www.omron247.com

OMRON ELETRÔNICA DO BRASIL LTDA • HEAD OFFICE São Paulo, SP, Brasil • 55.11.2101.6300 • www.omron.com.br

OMRON ELECTRONICS MEXICO SA DE CV • HEAD OFFICE Apodaca, N.L. • 52.811.156.99.10 • 001.800.556.6766 • mela@omron.com OMRON ARGENTINA • SALES OFFICE Cono Sur • 54.11.4783.5300

OMRON CHILE • SALES OFFICE Santiago • 56.9.9917.3920

OTHER OMRON LATIN AMERICA SALES 54.11.4783.5300

OMRON EUROPE B.V. Wegalaan 67-69, NL-2132 JD, Hoofddorp, The Netherlands. Tel: +31 (0) 23 568 13 00 Fax: +31 (0) 23 568 13 88 www.industrial.omron.eu

Cat. No. E382-E1-EESX4767