

Advanced Performance and Wide Range of Selections in a Super-compact Size

- Only 5.5 × 5.5 mm with a built-in Amplifier.
- Maximum sensing distance: 2.5 mm. Stable detection even with workpiece fluctuations.
- Response frequency: 1 kHz.
- Low current consumption.



Be sure to read *Safety Precautions* on page 6.

Ordering Information

Sensors [Refer to *Dimensions* on page 7.]

DC 2-Wire Models

Appearance	Sensing surface	Sensing distance	Model	
			Operation mode	
			NO	NC
Unshielded 	Top	1.6 mm	E2S-W11 1M *	E2S-W12 1M
	Front		E2S-Q11 1M *	E2S-Q12 1M
	Top	2.5 mm	E2S-W21 1M *	E2S-W22 1M
	Front		E2S-Q21 1M *	E2S-Q22 1M

* Models with a different frequency are also available to prevent mutual interference. The model numbers are E2S-□□□B (e.g., E2S-W11B).

DC 3-Wire Models





Appearance	Sensing surface	Sensing distance	Output configuration	Model	
				Operation mode	
				NO	NC
Unshielded 	Top	1.6 mm	NPN	E2S-W13 1M *	E2S-W14 1M
	Front			E2S-Q13 1M *	E2S-Q14 1M
	Top	2.5 mm		E2S-W23 1M *	E2S-W24 1M
	Front			E2S-Q23 1M *	E2S-Q24 1M
	Top	1.6 mm	PNP	E2S-W15 1M *	E2S-W16 1M
	Front			E2S-Q15 1M *	E2S-Q16 1M
	Top	2.5 mm		E2S-W25 1M *	E2S-W26 1M
	Front			E2S-Q25 1M *	E2S-Q26 1M

* Models with a different frequency are also available to prevent mutual interference. The model numbers are E2S-□□□B (e.g., E2S-W13B).

Accessories (Order Separately)

Mounting Brackets Some Mounting Brackets are provided with the Sensor. Order other Mounting Brackets separately if required.

[Refer to *Dimensions* on page 7.]

Appearance	Model	Quantity	Remarks
	Y92E-C1R6	1	Provided with E2S-□1□□. (fixed with one screw)
	Y92E-C2R5		Provided with E2S-□2□□. (fixed with one screw)
	Y92E-D1R6		For E2S-□1□□ (fixed with two screws)
	Y92E-D2R5		For E2S-□2□□ (fixed with two screws)

Model Number Legend

E2S- □ □ □ □

(1) (2) (3) (4) (5)

(1) Compact
Square
Series

(2) Sensing Direction
W: Top surface detection
Q: Front surface detection

(3) Size and Sensing Distance
(Standard Sensing Object)
1: 5.5 × 5.5 mm, 1.6 mm (iron)
2: 8 × 8 mm, 2.5 mm (iron)

(4) Output
1: DC 2-wire NO
2: DC 2-wire NC
3: DC 3-wire NPN NO
4: DC 3-wire NPN NC
5: DC 3-wire PNP NO
6: DC 3-wire PNP NC

(5) Different Frequency
Blank: Standard
B: Different frequency

Ratings and Specifications

DC 2-Wire Models

Model		E2S-W11 E2S-W12	E2S-Q11 E2S-Q12	E2S-W21 E2S-W22	E2S-Q21 E2S-Q22
Item					
Sensing surface		Top	Front	Top	Front
Sensing distance		1.6 mm ±15%		2.5 mm ±15%	
Set distance		0 to 1.2 mm		0 to 1.9 mm	
Differential travel		10% max. of sensing distance			
Detectable object		Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to <i>Engineering Data</i> on page 4.)			
Standard sensing object		Iron, 12 × 12 × 1 mm		Iron, 15 × 15 × 1 mm	
Response frequency *		1 kHz min.			
Power supply voltage (operating voltage range)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			
Leakage current		0.8 mA max.			
Control output	Load current	3 to 50 mA max.			
	Residual voltage	3 V max. (under load current of 50 mA with cable length of 1 m)			
Indicators		<input type="checkbox"/> <input type="checkbox"/> 1 Models: Operation indicator (red), Setting indicator (green) <input type="checkbox"/> <input type="checkbox"/> 2 Models: Operation indicator (red)			
Operation mode (with sensing object approaching)		<input type="checkbox"/> <input type="checkbox"/> 1 Models: NO <input type="checkbox"/> <input type="checkbox"/> 2 Models: NC Refer to the timing charts under <i>I/O Circuit Diagrams</i> on page 5 for details.			

* The response frequency is an average value.

Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.

DC 3-Wire Models

Model		E2S-W13 E2S-W14	E2S-Q13 E2S-Q14	E2S-W23 E2S-W24	E2S-Q23 E2S-Q24	E2S-W15 E2S-W16	E2S-Q15 E2S-Q16	E2S-W25 E2S-W26	E2S-Q25 E2S-Q26
Item									
Sensing surface		Top	Front	Top	Front	Top	Front	Top	Front
Sensing distance		1.6 mm ±15%		2.5 mm ±15%		1.6 mm ±15%		2.5 mm ±15%	
Set distance		0 to 1.2 mm		0 to 1.9 mm		0 to 1.2 mm		0 to 1.9 mm	
Differential travel		10% max. of sensing distance							
Detectable object		Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to <i>Engineering Data</i> on page 4.)							
Standard sensing object		Iron, 12 × 12 × 1 mm		Iron, 15 × 15 × 1 mm		Iron, 12 × 12 × 1 mm		Iron, 15 × 15 × 1 mm	
Response frequency *		1 kHz min.							
Power supply voltage (operating voltage range)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.							
Current consumption		13 mA max. at 24 VDC (no-load)							
Control output	Load current	NPN open-collector output, 50 mA max. (30 VDC max.)				PNP open-collector output, 50 mA max. (30 VDC max.)			
	Residual voltage	1.0 V max. (under load current of 50 mA with cable length of 1 m)							
Indicators		Operation indicator (orange)							
Operation mode (with sensing object approaching)		<input type="checkbox"/> <input type="checkbox"/> 3 Models: NO <input type="checkbox"/> <input type="checkbox"/> 4 Models: NC Refer to the timing charts under <i>I/O Circuit Diagrams</i> on page 5 for details.				<input type="checkbox"/> <input type="checkbox"/> 5 Models: NO <input type="checkbox"/> <input type="checkbox"/> 6 Models: NC Refer to the timing charts under <i>I/O Circuit Diagrams</i> on page 5 for details.			

* The response frequency is an average value.

Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.

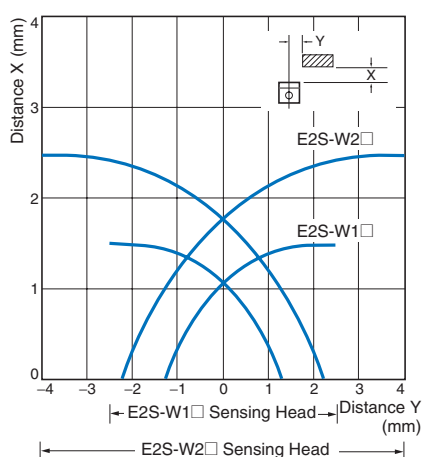
Specifications

Item	Model	E2S-□□□
Protection circuits		Reverse polarity protection, Surge suppressor
Ambient temperature range		Operating: -25 to 70°C (with no icing or condensation), Storage: -40 to 85°C (with no icing or condensation)
Ambient humidity range		Operating: 35% to 90% (with no condensation), Storage: 35% to 95% (with no condensation)
Temperature influence		±15% max. of sensing distance at 23°C in the temperature range of -25 to 70°C
Voltage influence		±2.5% max. of sensing distance at rated voltage in rated voltage ±10% range
Insulation resistance		50 MΩ min. (at 500 VDC) between current-carrying parts and case
Dielectric strength		1,000 VAC for 1 min between current-carrying parts and case
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions
Shock resistance		Destruction: 500 m/s ² 3 times each in X, Y, and Z directions
Degree of protection		IEC 60529 IP67
Connection method		Pre-wired Models (Standard cable length: 1 m)
Weight (packed state)		Approx. 10 g
Materials	Case	Polyarylate resin
Accessories		Mounting Brackets

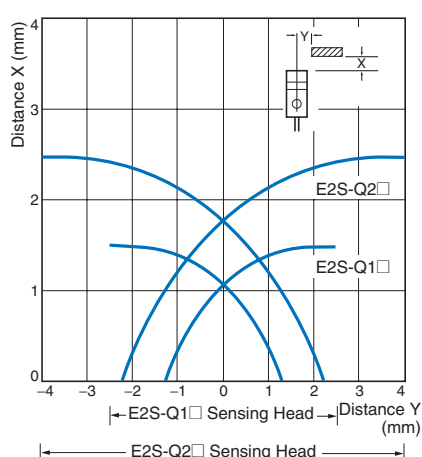
Engineering Data (Typical)

Sensing Area

E2S-W1□/-W2□

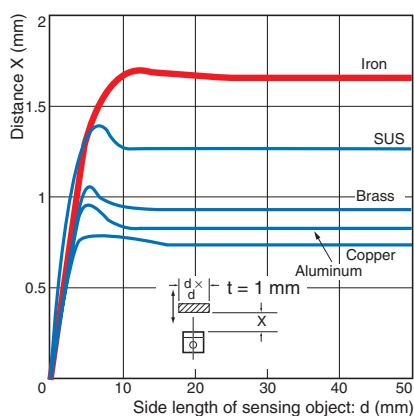


E2S-Q1□/-Q2□

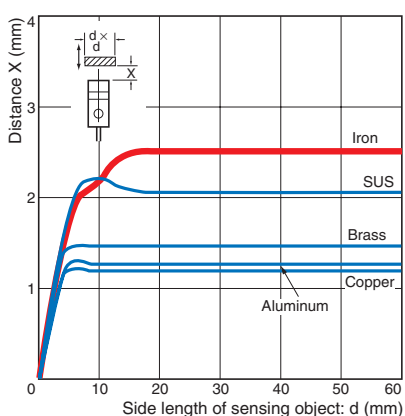


Influence of Sensing Object Size and Material

E2S-W1□/-Q1□



E2S-W2□/-Q2□



I/O Circuit Diagrams

DC 2-Wire Models

Operation mode	Model	Timing chart	Output circuit
NO	E2S-W11 E2S-W21 E2S-Q11 E2S-Q21		<p>Note: The load can be connected to either the +V or 0 V side.</p>
NC	E2S-W12 E2S-W22 E2S-Q12 E2S-Q22		<p>Note: The load can be connected to either the +V or 0 V side.</p>

DC 3-Wire Models

Operation mode	Output configuration	Model	Timing chart	Output circuit
NO	NPN	E2S-W13 E2S-W23 E2S-Q13 E2S-Q23		<p>* Load current: 50 mA max.</p>
NC		E2S-W14 E2S-W24 E2S-Q14 E2S-Q24		
NO	PNP	E2S-W15 E2S-W25 E2S-Q15 E2S-Q25		<p>* Load current: 50 mA max.</p>
NC		E2S-W16 E2S-W26 E2S-Q16 E2S-Q26		

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 Correct Use

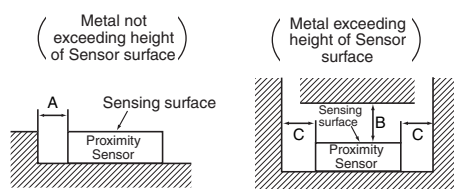
Do not use this product under ambient conditions that exceed the ratings.

● Design

Influence of Surrounding Metal

- When mounting the Sensor within a metal panel, ensure that the clearances given in the following table are maintained. Failure to maintain these distances may cause deterioration in the performance of the Sensor.

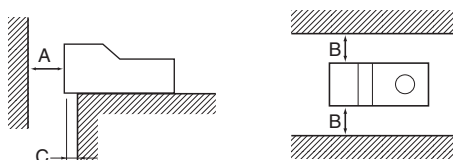
● Models with Top Sensing Surface



(Unit: mm)

Model	Distance	A	B	C
E2S-W1□		0	8	2
E2S-W2□			15	10

● Models with Front Sensing Surface



(Unit: mm)

Model	Distance	A	B	C
E2S-Q1□		8	3	2
E2S-Q2□		15	10	3

Applicable e-CON Connector Models and Manufacturers

The companies and model number of e-CON connections that can be used with Sensor cables are listed in the following table. Confirm applicability when purchasing e-CON connectors for connection to Pre-wired Sensors.

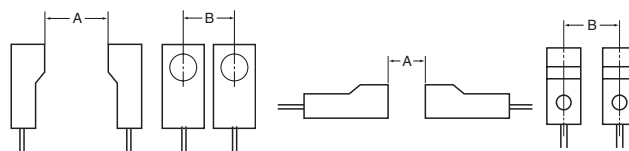
Model	Tyco Electronics AMP K.K.
E2S-W□3/4	1-1473562-4 (red)
E2S-Q□3/4	

Mutual Interference

When installing Sensors face-to-face or side-by-side, ensure that the minimum distances given in the following table are maintained.

● Models with Top Sensing Surface

● Models with Front Sensing Surface



(Unit: mm)

Model	Distance	A	B
E2S-W(Q)1□		50 (40)	20 (5.5)
E2S-W(Q)2□		75 (50)	25 (8)

Note: Values in parentheses apply to Sensors operating at different frequencies.

● Mounting

Tightening Torque

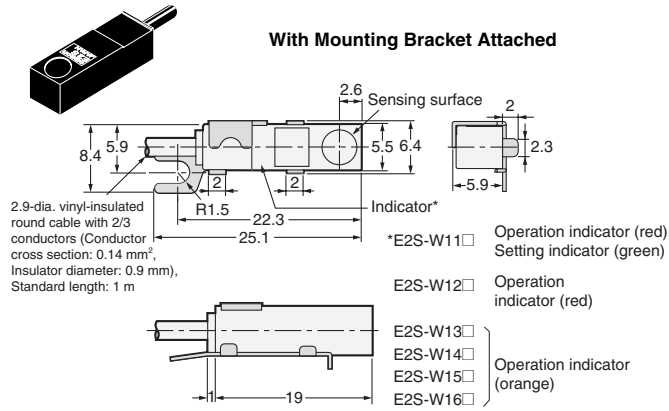
For the E2S-W(Q)2□, the maximum tightening torque that should be applied to the mounting screws is 0.7 N·m.

Dimensions

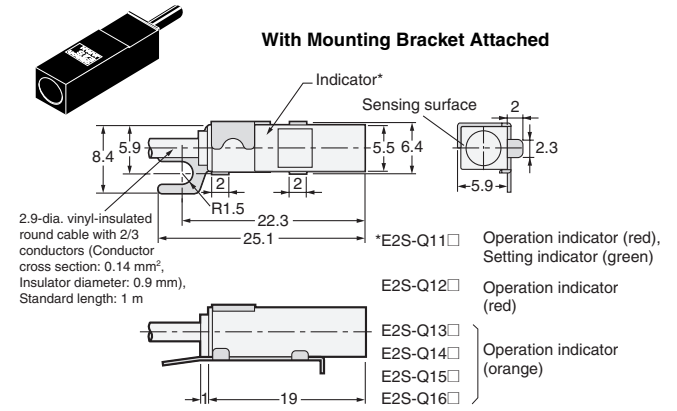
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Sensors

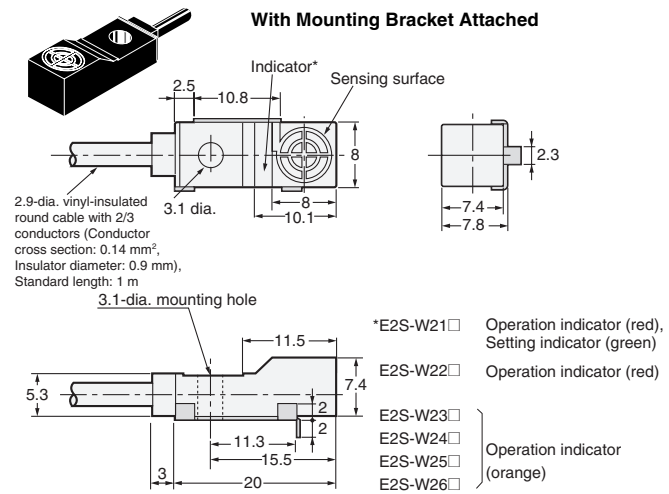
E2S-W1 □



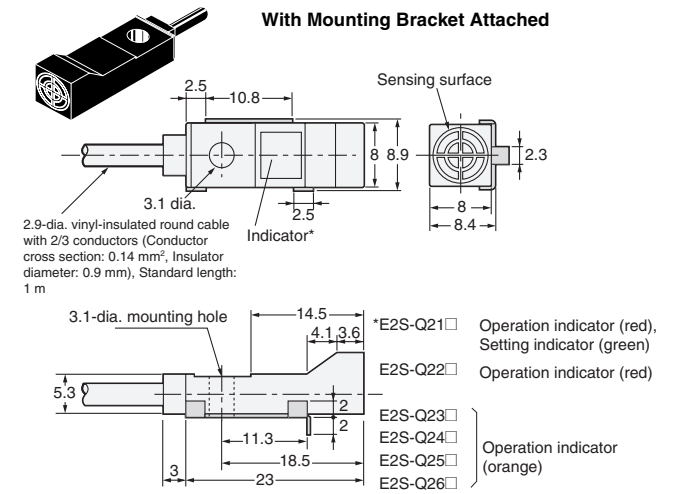
E2S-Q1 □



E2S-W2 □



E2S-Q2 □

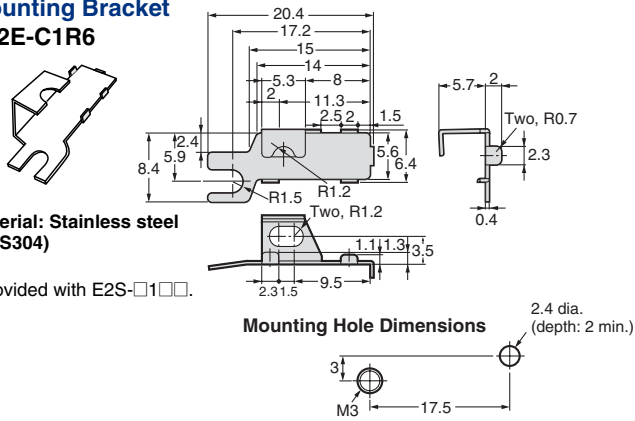


Accessories (Order Separately)

**Mounting Bracket
Y92E-C1R6**

Material: Stainless steel (SUS304)

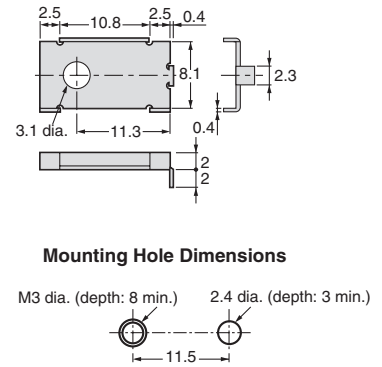
* Provided with E2S-□1□□.



**Mounting Bracket
Y92E-C2R5**

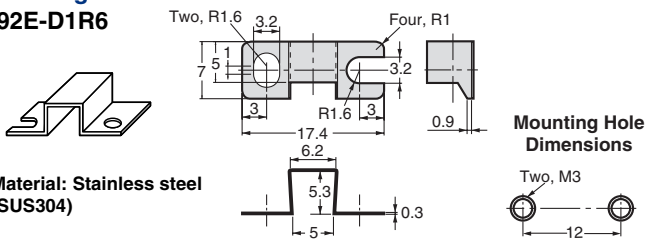
Material: Stainless steel (SUS304)

* Provided with E2S-□2□□.



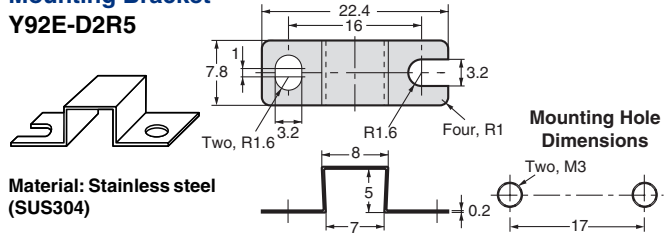
**Mounting Bracket
Y92E-D1R6**

Material: Stainless steel (SUS304)



**Mounting Bracket
Y92E-D2R5**

Material: Stainless steel (SUS304)



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.
2. **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.
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.
8. **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.
9. **Cancellation; Etc.** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
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.
14. **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.
15. **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.
16. **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.
17. **Export Controls.** Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (ii) sale of products to "forbidden" or other proscribed persons; and (iii) disclosure to non-citizens of regulated technology or information.
18. **Miscellaneous.** (a) **Waiver.** No failure or delay by Omron in exercising any right and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) **Assignment.** Buyer may not assign its rights hereunder without Omron's written consent. (c) **Law.** These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law principles). (d) **Amendment.** These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) **Severability.** If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) **Setoff.** Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (g) **Definitions.** As used herein, "including" means "including without limitation"; and "Omron Companies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

Certain Precautions on Specifications and Use

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.
2. **Programmable Products.** Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
3. **Performance Data.** Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.
4. **Change in Specifications.** Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.
5. **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.