ZX1

A CMOS Laser Sensor That's Optimum for Simple Measurements

- A resolution of 0.002 mm that's suitable for simple measurements.
- Stable measurements for any type of workpiece.
- Models available with four different distance specifications.
- Long-distance model for up to 1,000 mm.



This datasheet contains information only for selecting the appropriate model. Be sure to read the instruction sheet for usage precautions prior to using the product.



Ordering Information

Sensors (Refer to Dimensions on page 5.)

Appearance	Connection method	Cable length	Consing distance	Model	
			Sensing distance	NPN output	PNP output
SCOOL FOR	Pre-wired	2 m	50 ± 10 mm 40 60	ZX1-LD50A61 2M	ZX1-LD50A81 2M
		5 m		ZX1-LD50A61 5M	ZX1-LD50A81 5M
	Pre-wired connector	0.5 m		ZX1-LD50A66 0.5M	ZX1-LD50A86 0.5M
	Pre-wired	2 m	100 ± 35 mm 65 135	ZX1-LD100A61 2M	ZX1-LD100A81 2M
		5 m		ZX1-LD100A61 5M	ZX1-LD100A81 5M
1	Pre-wired connector	0.5 m		ZX1-LD100A66 0.5M	ZX1-LD100A86 0.5M
	Pre-wired	2 m	300 ± 150 mm 150 450	ZX1-LD300A61 2M	ZX1-LD300A81 2M
The state of the s		5 m		ZX1-LD300A61 5M	ZX1-LD300A81 5M
	Pre-wired connector	0.5 m		ZX1-LD300A66 0.5M	ZX1-LD300A86 0.5M
	Pre-wired	2 m	600 ± 400 mm 200 1,000	ZX1-LD600A61 2M	ZX1-LD600A81 2M
		5 m		ZX1-LD600A61 5M	ZX1-LD600A81 5M
	Pre-wired connector	0.5 m		ZX1-LD600A66 0.5M	ZX1-LD600A86 0.5M

Accessories (sold separately)

Extension Cables for Pre-wired Connector Models An Extension Cable is not provided with the Sensor. Order an Extension Cable separately. (Refer to Dimensions on page 6.)

Cable length	Model	
10 m	ZX0-XC10R	
20 m	ZX0-XC20R	

Mounting Brackets A Mounting Bracket is not provided with the Sensor. Order a Mounting Bracket separately if required. (Refer to Dimensions on page 6.)

Applicable sensors	Appearance	Model	Remarks	
ZX1-LD50□ ZX1-LD100□	E39-L18		Mounting Bracket: 1 Nut plate: 1 Phillips screws (M3×30): 2	
ZX1-LD300□ ZX1-LD600□		E39-L181	Mounting Bracket: 1 Nut plate: 1 Phillips screws (M4×35): 2	

Ratings and Specifications

Mo	odel NPN output	ZX1-LD50A61 ZX1-LD50A66	ZX1-LD100A61 ZX1-LD100A66	ZX1-LD300A61 ZX1-LD300A66	ZX1-LD600A61 ZX1-LD600A66		
Item	PNP output	ZX1-LD50A81 ZX1-LD50A86	ZX1-LD100A81 ZX1-LD100A86	ZX1-LD300A81 ZX1-LD300A86	ZX1-LD600A81 ZX1-LD600A86		
Measurement range		50 ± 10 mm	100 ± 35 mm	300 ± 150 mm	600 ± 400 mm		
Light source (wave length)		Visible-light semiconductor laser (wavelength: 660 nm, 1 mW max., IEC/EN Class 2, FDA Class II *1)					
Spot diameter (typical) (Defined at the measurement center distance) 2		0.17 mm dia.	0.33 mm dia.	0.52 mm dia.	0.56 mm dia.		
Power supply voltage	9	10 to 30 VDC, including 10% ripple (p-p)					
Current consumption		250 mA max. (at power supply voltage 10 VDC)					
Control output		Load power supply voltage: 30 VDC max., Load current: 100 mA max. (Residual voltage: 1 V max. (load current 10 mA or less), 2 V max. (load current of 10 mA))					
Analog output		Current output: 4 to 20 mA, maximum load resistance: 300 Ω					
Indicators		Digital display (red), output indicator (OUT1, OUT2) (orange), zero reset indicator (orange), menu indicator (orange), laser ON indicator (green), and smart tuning indicator (blue)					
Response time	Judgment output	Super-high-speed (SHS) Mode: 1 ms High-speed (HS) Mode: 10 ms Standard (Stnd) Mode : 100 ms					
	Laser OFF input	200 ms max.					
	Zero reset input	200 ms max.					
Temperature charact	eristic *3	0.03% F.S./°C 0.04% F.S./°C					
Linearity ⁴		±0.15% F.S.		±0.25% F.S.	±0.25% F.S. (200 to 600 mm) ±0.5% F.S. (entire range)		
Resolution *5		2 μm 7 μm		30 μm	80 μm		
Ambient illumination		Illumination on receiv 7,500 lx or less (incar		Illumination on received light surface: 5,000 lx or less (incandescent light)			
Ambient temperature	•	Operating: -10 to +55°C, Storage: -15 to +70°C (with no icing or condensation)					
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)					
Dielectric strength		1,000 VAC, 50/60 Hz	1,000 VAC, 50/60 Hz, 1 minute				
Vibration resistance	(destruction)	10 to 55 Hz, 1.5-mm double amplitude, 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 6		IEC 60529, IP67					
Connection method		Pre-wired model (Standard cable length: 2 m, 5 m) Pre-wired connector model (Standard cable length: 0.5 m)					
	Pre-wired models (2 m)	Approx. 240 g / Appro	ox. 180 g	Approx. 270 g / Approx. 210 g			
Inacked state/	Pre-wired models (5 m)	Approx. 450 g / Appro	ox. 330 g	Approx. 480 g / Approx. 360 g			
• /	Pre-wired connector models (0.5 m)	Approx. 170 g / Approx. 110 g		Approx. 200 g / Approx. 140 g			
Materials		Case and cover: PBT (polybutylene terephthalate), Optical window: Glass, Cable: PVC Mounting hole part: SUS303					

- Note: False detection outside the measurement range can occur in the case of an object with high reflectance.
 1. Classified as Class 2 by EN60825-1 criteria in accordance with the FDA standard previsions of Laser Notice No. 50. Notification to CDRH planned. (Center for Devices and Radiological Health)
 2. Spot diameter: Defined as 1/e² (13.5%) of the central intensity at the measurement center distance.
- - False detections can occur in the case there is light leakage outside the defined region and the surroundings of the target object have a high reflectance in com-
- Accurate measurements may not be possible for workpieces that are smaller than the spot diameter.

 3. Temperature characteristic: Value for the case the space between the sensor and Omron's standard target object is secured by an aluminum jig. (Measured at the
- measurement center distance)

 4. Linearity: Indicates the error with respect to the ideal straight line of the displacement output in the case of measuring Omron's standard target object (white ceramic) at a temperature of 25 °C.
 - Linearity and measured value may vary depending on target object.
- Resolution: Defined in Standard Mode for Omron's standard target object (white ceramic) after executing Smart Tuning. The resolution indicates the repetition accuracy for a still workpiece. Not an indication of the distance accuracy.
- Resolution performance may not be satisfied in a strong electromagnetic field.

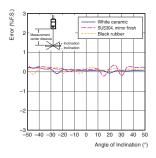
 6. IP67 protection applies to the connector on pre-wired connector models if an extension cable is connected.

Engineering Data (Typical)

Angle Characteristic

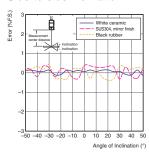
ZX1-LD50

Side-to-side Inclination



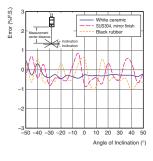
ZX1-LD100

Side-to-side Inclination



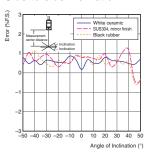
ZX1-LD300□

Side-to-side Inclination



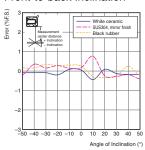
ZX1-LD600

Side-to-side Inclination



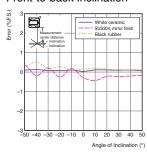
ZX1-LD50□

Front-to-back Inclination



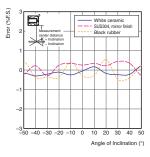
ZX1-LD100□

Front-to-back Inclination



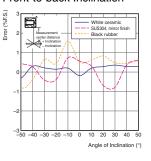
ZX1-LD300□

Front-to-back Inclination



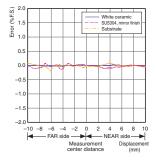
ZX1-LD600□

Front-to-back Inclination

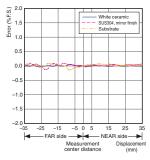


Linearity Characteristic for Different Materials

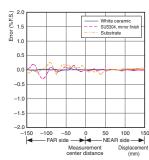
ZX1-LD50□



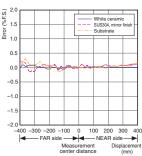
ZX1-LD100

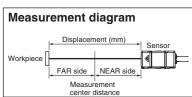


ZX1-LD300□



ZX1-LD600□





- Note: 1. Measurement conditions: Standard Mode at a temperature of 25 °C when executing Smart Tuning.
 2. The X-axis displacement indicates the measurement distance displayed on a digital display.

 The measurement distance displayed on a digital display takes the measurement center distance as 0 and displays the near side of the Sensor as positive and the far side as negative.

I/O Circuit Diagrams

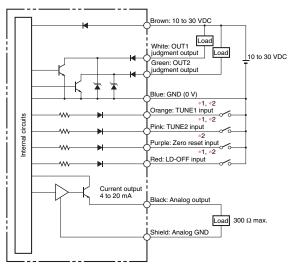
NPN Output Model (Negative Common)

ZX1-LD50A61/ZX1-LD50A66

ZX1-LD100A61/ZX1-LD100A66

ZX1-LD300A61/ZX1-LD300A66

ZX1-LD600A61/ZX1-LD600A66



- * 1. TUNE1 input: tuning external input for channel 1 TUNE2 input: tuning external input for channel 2 LD-OFF input: Laser OFF input
- * 2. The input specification is as follows:

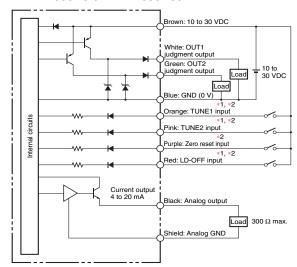
PNP Output Model (Positive Common)

ZX1-LD50A81/ZX1-LD50A86

ZX1-LD100A81/ZX1-LD100A86

ZX1-LD300A81/ZX1-LD300A86

ZX1-LD600A81/ZX1-LD600A86

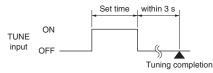


NPN Output Model ON Short-circuited with 0-V terminal or 1.5 V max. OFF Open (leakage current: 0.1 mA max.) PNP Output Model Supply voltage short-circuited or supply voltage within -1.5 V Open (leakage current: 0.1 mA max.)

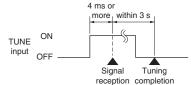
Timing Charts

TUNE1 Input / TUNE2 Input

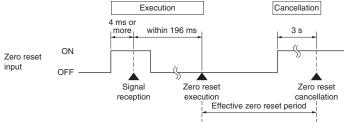
(1) Time identification tuning type



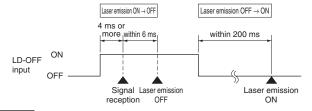
(2) Tuning type other than time identification



Zero Reset Input



LD-OFF Input



Safety Precautions

This datasheet contains information only for selecting the appropriate model.

Be sure to read the Instruction Sheet for usage precautions prior to using the product.



ZX1-LD : Class 2

Do not expose your eyes to the laser radiation either directly or indirectly (i.e., after reflection from a mirror or shiny surface).



The laser radiation has a high power density and exposure may result in loss of sight.

Do not disassemble the product.

Doing so may cause the laser beam to leak, resulting in the danger of visual impairment.



Note: For Precautions for safe use and Precautions for correct use, refer to the Instruction Sheet supplied with the product.

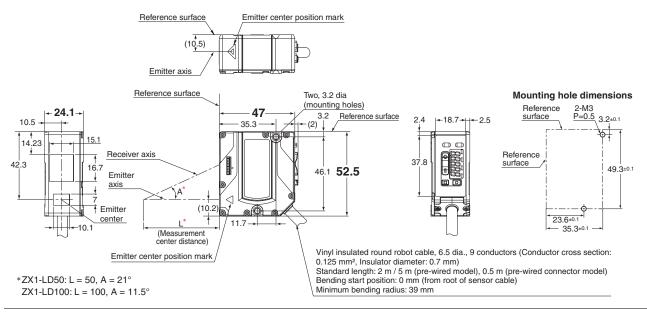
Sensors

Pre-wired Models

ZX1-LD50A□1 ZX1-LD100A□1

Pre-wired Connector Models

ZX1-LD50A□6 ZX1-LD100A□6

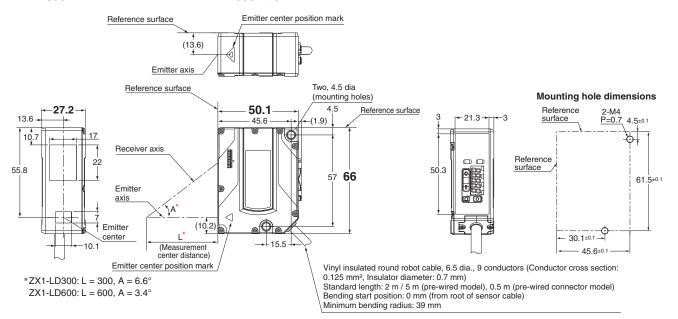


Pre-wired Models

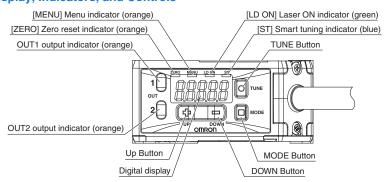
ZX1-LD300A□1 ZX1-LD600A□1

Pre-wired Connector Models

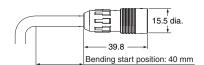
ZX1-LD300A□6 ZX1-LD600A□6



Display, Indicators, and Controls



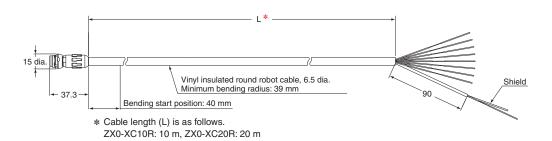
Pre-wired connector



Accessories (sold separately)

Extension Cables for Pre-wired Connector Models

ZX0-XC10R (10 m) ZX0-XC20R (20 m)



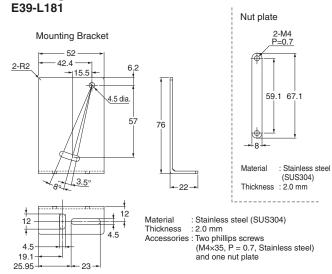
Mounting Bracket for ZX1-LD50□/ZX1-LD100□

E39-L180 Nut plate Mounting Bracket 2-M3 P=0.5 41.3 2-R2 32.1 .. i -|11.7 3.5 dia. 47.6 53.6 _4° Stainless steel (SUS304) Material : Stainless steel (SUS304) Thickness : 2.0 mm

Two phillips screws (M3×30, P = 0.5, Stainless steel)

and one nut plate

Mounting Bracket for ZX1-LD300□/ZX1-LD600□

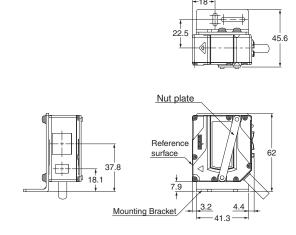


Installation Method (ZX1-LD50□/ZX1-LD100□)

Using E39-L180 Mounting Bracket

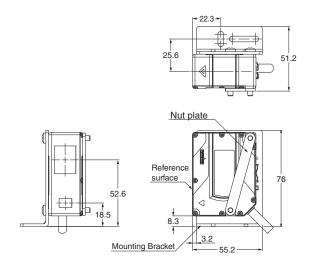
18.5

19.75



Installation Method (ZX1-LD300□/ZX1-LD600□)

Using E39-L181 Mounting Bracket



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.

- 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
- 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
- <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 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. unpaid accounts
- 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 oth-
- 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. portation 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) <u>Limitations</u>. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABIL-

- 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 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 tion, 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.
- lished information.

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- 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.
- 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.
- 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
- "forbidden" or other proscribed persons; and (ii) 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 provior waived unless in writing signed by the parties. (e) <u>Severability</u> 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) <u>Definitions</u>. As used herein, "<u>including</u>" means "including without limitation"; and "<u>Omron Companies</u>" (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 application of use of the Product. At Buyer's lequest, 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. 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 and industrial consumers and consumers are severed to expect and consumers.
 - ment, and installations subject to separate industry or government regulations. (iv) Systems, machines and equipment that could present a risk to life or prop erty. Please know and observe all prohibitions of use applicable to this Prod-
 - 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 PROP-ERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
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