

# OMRON

## Model ZS-HLDC□□-N

### Smart Sensor Sensor Controller

## INSTRUCTION SHEET

Thank you for selecting OMRON product. This sheet primarily describes precautions required in installing and operating the product.

Before operating the product, read the sheet thoroughly to acquire sufficient knowledge of the product. For your convenience, keep the sheet at your disposal.

#### TRACEABILITY INFORMATION:

Importer in EU: OMRON Europe B.V. Wegalaan 67-69, 2132 JD Hoofddorp, The Netherlands  
 Manufacturer: OMRON Corporation, Shiokoji Horikawa, Shimogyo-ku, Kyoto 600-8530 JAPAN

The following notice applies only to products that carry the CE mark:  
 Notice: This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.



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### Precautions for Safe Use

Please observe the following precautions for safe use of the product:

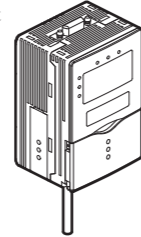
- Do not use the product in environments where it can be exposed to inflammable/explosive gas.
- Do not disassemble, repair or modify this product.
- Be sure to make sure that locking mechanisms are locked before use.
- The supply voltage must be within the rated range.
- Use the power supply within the rated load.
- Dispose of this product as industrial waste.

### Precautions for Correct Use

- Do not install the product in locations subjected to the following conditions:
  - Direct sunlight or near heaters
  - Condensation caused by high humidity
  - Sudden changes in humidity
  - Cold conditions that may cause freezing
  - Presence of corrosive or flammable gases
  - Direct vibration or shock
  - Build-up of dust or metal chips
  - Spraying by organic solvents, water, oil or other liquids
  - Strong magnetic or electric field
  - Reflection of intense light (such as other laser beams or electric arc-welding machines)
- Power Supply and Wiring
  - Reverse connection of power supply is not allowed. Connection to AC power supply is also not allowed.
  - Open-collector outputs should not be short-circuited.
  - Use the Extension Cable for extending the cable between the Sensor Head and Sensor Controller. The total length differs according to the Extension cable.
    - Extension Cable ZS-XC □A : max. total length 10 m (including Sensors)
    - Extension Cable ZS-XC □B(R) : max. total length 22 m (including Sensors)
    - Extension Cable ZS-XC □CR : max. total length 27 m (including Sensors)
  - High-voltage lines and power lines must be wired separately from this product. Wiring them together or placing them in the same duct may cause induction, resulting in malfunction or damage.
  - When using a commercially available switching regulator, make sure that the FG (Frame Ground) terminal is grounded.
  - If surge currents are present in the power lines, connect surge absorbers that suit the operating environment.
  - Before connecting/disconnecting the Sensor Head, make sure that the Sensor Controller is turned OFF. The Sensor Controller may break down if it is connected or disconnected while the power is ON.
  - Use only the specified combinations of Sensor Head and Sensor Controller.

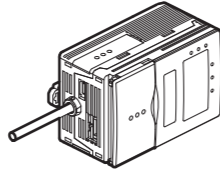
- Orientation when Installing the Sensor Controller  
 To improve heat radiation, install the Sensor Controller only in the orientation show below.

Correct

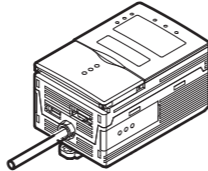


Do not install the Sensor Controller in the following orientations.

Incorrect



Incorrect

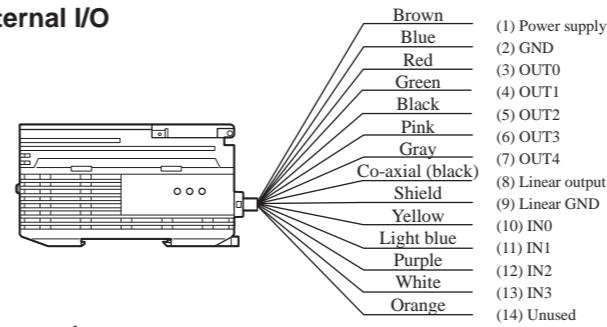


- Cleaning
  - Do not use paint thinner, benzene, acetone or kerosene to clean the Sensor Controller. Doing so will melt the surface of the Sensor Controller.
  - Use commercially available alcohol.

#### ●Notice for Korea Radio Law

A 급 기기 (업무용 방송통신기자재)  
 이 기기는 업무용(A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

### External I/O



- Power supply  
 This connects the 24 V DC (±10%) power supply. When using a Sensor Controller with a PNP output, the power supply terminal is also the common I/O terminal for all I/O except for the linear output.
  - Supply power from a DC power supply unit that has a countermeasure (safety ultra-low voltage circuit) built-in for preventing high voltages from occurring.
  - Wiring the power supply separately from other devices. Wiring them together or placing them in the same duct may cause induction, resulting in malfunction or damage.
- GND  
 The GND terminal is the 0V power supply terminal. When using a Sensor Controller with an NPN output, the GND terminal is also the common I/O terminal for all I/O except for the linear output.
- OUT0 (HIGH output)  
 This outputs judgment results (HIGH).
- OUT1 (PASS output)  
 This outputs judgment results (PASS).
- OUT2 (LOW output)  
 This outputs judgment results (LOW).
- OUT3 (ENABLE output)  
 This turns ON when the sensor is ready for measurement. This output is interlocked with the ENABLE indicator.
- OUT4 (BUSY output)  
 This turns ON during sampling with the hold function enabled. It allows you to check whether or not the self-trigger is functioning correctly. It also turns ON during bank switching.
- Linear output  
 The linear output outputs a current or voltage in accordance with the measured value.

### Specifications

Item	Model	ZS-HLDC11A-N	ZS-HLDC11-N	ZS-HLDC41A-N	ZS-HLDC41-N	
No. of samples to average		1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, or 4096				
Number of mounted Sensors		1 per Sensor Controller				
External I/F	Connection method	Serial I/O: connector, Other: pre-wired (standard cable length: 2 m)				
		Serial I/O	USB2.0 RS-232C 1 port, FULL SPEED [max.12 Mbps], MINI-B 1 port, max. 115200 bps			
	Output	Judgment output	3 outputs: HIGH/PASS/LOW NPN open-collector, 30 V DC, 50 mA max., residual voltage: 1.2 V max.		3 outputs: HIGH/PASS/LOW PNP open-collector, 50 mA max., residual voltage: 1.2 V max.	
		Linear output	Selectable from 2 types voltage/current output (selected by slide switch on base) · At voltage output: -10 to +10 V, output impedance: 40Ω · At current output: 4 to 20 mA, max. load resistance: 300Ω			
Input	Laser OFF/ZERO Reset/timing/RESET	ON: Short-circuited with 0V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or within supply voltage -1.5 V max. OFF: Open (leakage current: 0.1 mA max.)			
Functions		Display: Measurement value display, threshold value/voltage or current value/light intensity value/accuracy display Sensing: Mode/gain/measurement object/head installation Filter: Smooth/average/differentiation Output: Scaling/various hold/zero reset I/O setting: Linear (focus/adjust)/judgment (hysteresis, timer)/non-measurement/bank (switching, clear) System: Save/initialization/measurement information display/communications setting/keylock/language/data load HIGH (orange), PASS (green), LOW (orange), LDON (green), ZERO (green), ENABLE (green)				
Status indicators						
Segment display	Main display	8-segment red display, 6 digits				
	Sub-display	8-segment green display, 6 digits				
LCD		16 digits × 2 rows, color of characters: green, resolution per character: 5 × 8 pixel matrix				
Setting input	Setting keys	Direction keys (UP/DOWN/LEFT/RIGHT), SET key, ESC key, MENU key, function keys (1 to 4)				
	Slide switch	Threshold switch (2 states H/L), mode switch (3 states FUN/TEACH/RUN)				
Power supply voltage		21.6 V DC to 26.4 V DC (including ripple)				
Current consumption		0.5 A max. (when Sensor Head is connected)				
Insulation resistance		Across all lead wires and controller case: 20 MΩ (by 250 V megger)				
Dialectic strength		Across all lead wires and controller case, 1000 VAC, 50/60 Hz, 1 min				
Noise resistance		1500 V peak-to-peak, pulse width 0.1 μs/1 μs, rising edge: 1 ns pulse				
Vibration resistance (destructive)		10 to 150 Hz, 0.7-mm double amplitude, 80 min each in X, Y, and Z directions				
Shock resistance (destructive)		300 m/s <sup>2</sup> 3 times each in six directions (up/down, left/right, forward/backward)				
Ambient temperature		Operating: 0 to 50°C, Storage: -15 to +60°C (with no icing or condensation)				
Ambient humidity		Operating and storage: 35% to 85% RH (with no condensation)				
Materials		Case: Polycarbonate (PC)				
Weight		Approx. 280 g (excluding packing materials and accessories)				
Accessories		Setup software, 3 ferrite cores, Instruction Sheet	1 ferrite cores, Instruction Sheet	Setup software, 3 ferrite cores, Instruction Sheet	1 ferrite cores, Instruction Sheet	

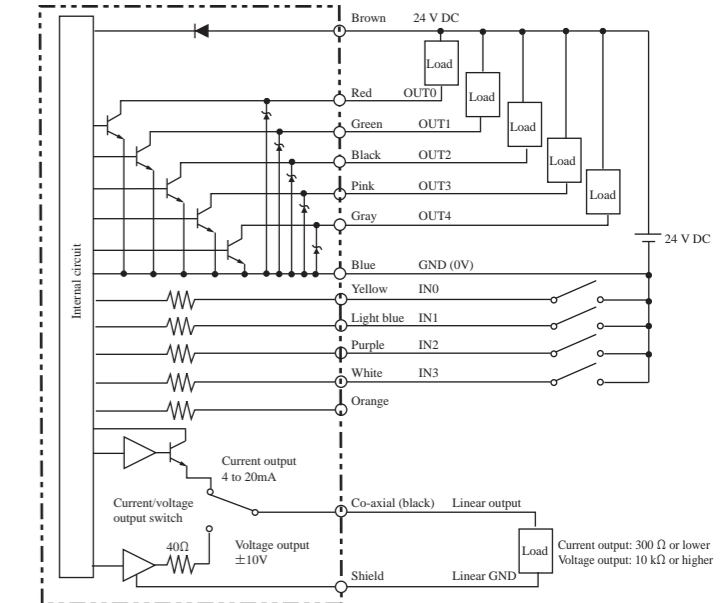
- Linear GND  
 The linear GND terminal is the 0V terminal for the linear output.
  - This ground wire must be grounded separately from the other ground wires.
  - Always ground the linear output terminal even when linear output is not used.
- to (13) IN0 to IN3  
 The following input signal assignments can be selected.
  - Signal assignments

Signal	When [Standard] is selected (default)	When [Bank] is selected
IN0	External trigger (timing) input	Bank input A
IN1	Reset input	Bank input B
IN2	LD-OFF input	LD-OFF input
IN3	Zero reset input	Zero reset input

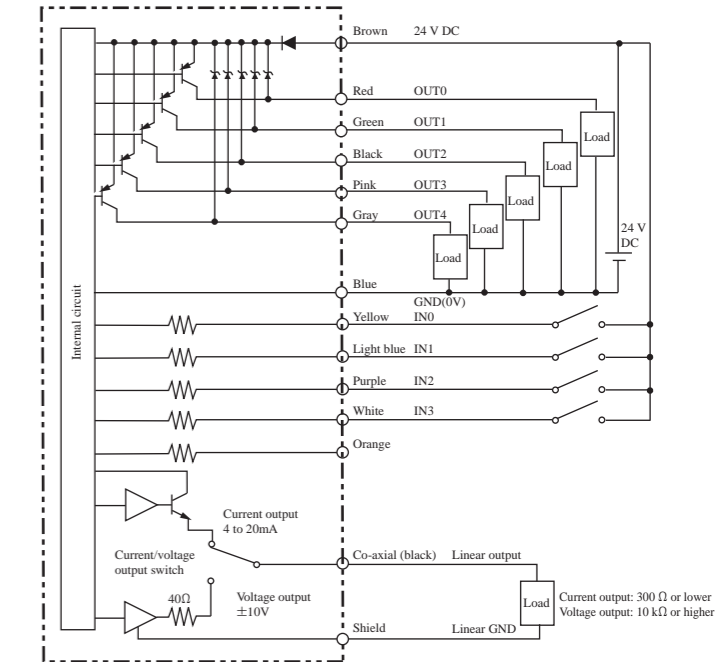
Signal Name	Description
External trigger (timing) input	This timing input is for signal input from external devices. Use it for hold function timing.
Reset input	This resets all executing measurements and outputs. While a reset is being input, judgment output conforms to the non-measurement setting. If this reset input switches ON while the hold function is used, the state in effect before the hold function was set will be restored.
LD-OFF input	If this LD-OFF signal is set to ON, the laser will stop emission, causing a light amount error. While LD-OFF is being input, judgment output conforms to the non-measurement setting.
Zero reset input	This is used to execute and clear a zero reset.
Bank input A, B	This is used for switching banks. Specify the bank No. in combinations of A and B.

### I/O circuit diagrams

· NPN type (ZS-HLDC11-N/HLDC11A-N)

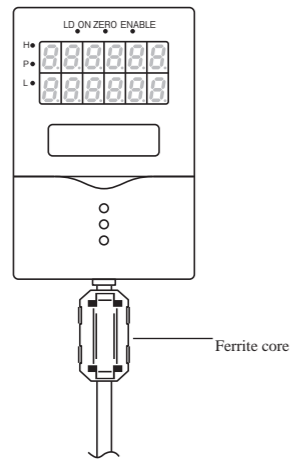


· PNP type (ZS-HLDC41-N/HLDC41A-N)



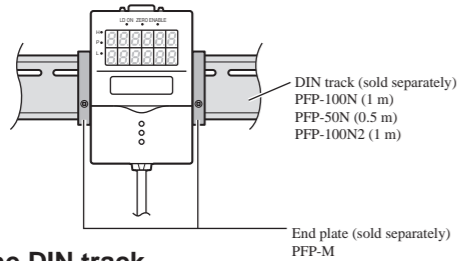
## Attaching the ferrite core

Attach the ferrite core (provided with the Sensor Controller) to the I/O cable of the Sensor Controller.



Ferrite core

## Mounting



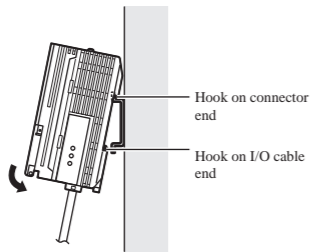
DIN track (sold separately)  
PFP-100N (1 m)  
PFP-50N (0.5 m)  
PFP-100N2 (1 m)

End plate (sold separately)  
PFP-M

## Installing the DIN track

The following describes how to attach the 35 mm wide DIN track by quick, easy operation.

- Hook the hook on the connector end onto the DIN track.



- Push the Sensor Controller down onto the DIN track until the hook on the I/O cable side is locked. Push down until you hear it snap into place.

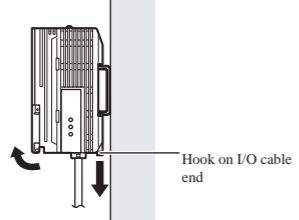


When Sensor Controllers are used gang-mounted, attach the End Plate (sold separately PFP-M) on the DIN track beforehand. Always hook the hook on the connector end on the DIN track first. Hooking the I/O cable end on the DIN track first may impair the mounting strength of the DIN track attachment.

## Removing the DIN track

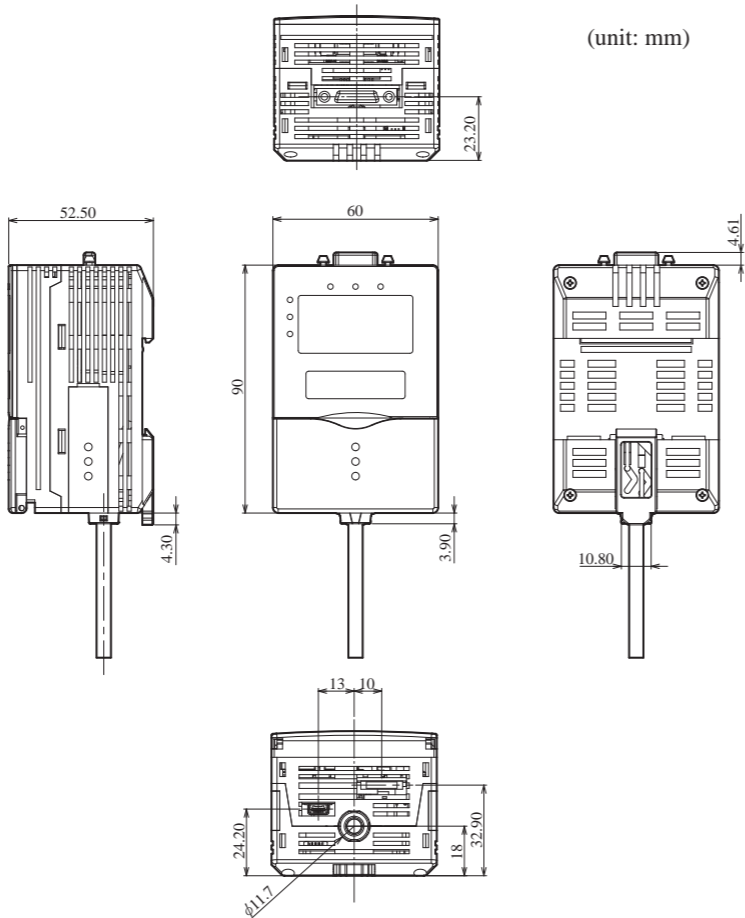
The following describes how to remove the Sensor Controller from the DIN track.

- Pull the hook on the I/O cable end of the Sensor Controller downwards.



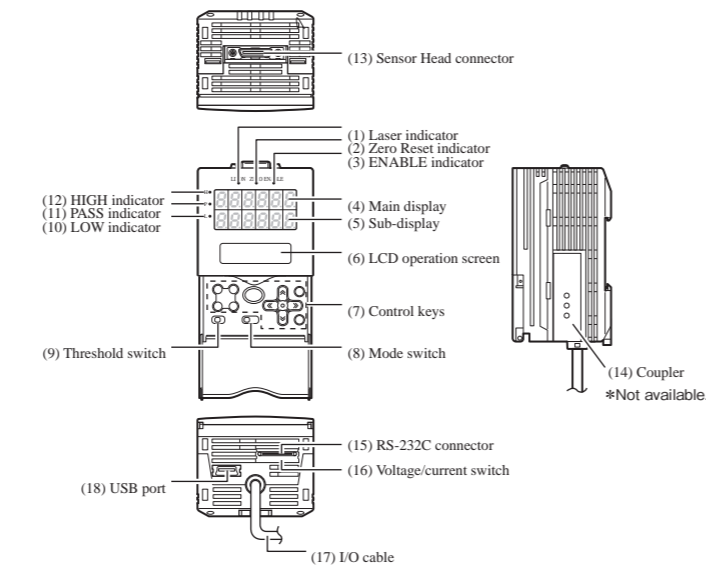
- Lift up the Sensor Controller from the I/O cable, and remove it from the DIN track.

## Dimensions



(unit: mm)

## Part Names and Functions



- Laser indicator**  
The Laser indicator lights while the Sensor Head is emitting a laser beam.
- Zero Reset indicator**  
The Zero Reset indicator lights when the zero reset function is enabled.
- ENABLE indicator**  
The ENABLE indicator lights when the Sensor is ready for measurement. It goes off when measurement is not possible (e.g. when the received light amount is excessive or insufficient, when the measuring range is exceeded, when the Sensor Head is not connected, or when measurement is not being performed in the FUN mode).
- Main display**  
The Main Display shows measured values.

- Sub-display**  
The sub-display shows thresholds and additional information during measurement.
- LCD operation screen**  
RUN mode : Displays the content of the main display and the setup menu for display related information.  
TEACH mode : Displays the menu for setting up the thresholds.  
FUN mode : Displays the various settings.
- Control keys**  
The Control Keys are for setting measurement conditions and other information. The functions assigned to the Control Keys change according to the operating mode.
- Mode switch**  
The Mode switch selects the operating mode.  
RUN mode : Select this mode when performing regular measurement.  
TEACH mode : Select this mode when setting the judgment thresholds.  
FUN mode : Select this mode when setting various functions.
- Threshold switch**  
The Threshold switch selects whether to set (or display) the HIGH or LOW threshold.
- LOW indicator**  
The LOW indicator lights when the condition "measured value < LOW threshold" is satisfied.
- PASS indicator**  
The PASS indicator lights when the condition "LOW threshold ≤ measured value ≤ HIGH threshold" is satisfied.
- HIGH indicator**  
The HIGH indicator lights when the condition "HIGH threshold < measured value" is satisfied.
- Sensor Head connector**  
This connector connects the Sensor Head.
- Coupler**  
Not available.
- RS-232C connector**  
Connect the connector of model ZG-RPD□□-N when connecting it with real-time parallel output unit (model ZG-RPD□□-N)  
When using it without connecting model ZG-RPD□□-N, connect the RS-232C cable when you are connecting the Sensor Controller to a PLC or a personal computer.  
The RS-232C cable must use the following special goods.  
When cables other than special goods are used, it causes the malfunction and the breakdown.  
CHECK!  
[For PLC connection]model ZS-XPT3  
[For Personal computer connection]model ZS-XRS3
- Voltage/current switch**  
The Voltage/Current switch selects between voltage output and current output.  
Before operating this switch, make sure that the Sensor Controller is turned OFF. Also, make sure that the load connected to "linear output wire (co-axial) - linear GND wire" satisfies the rating (see I/O circuit diagram) of the set state (voltage or current output) before turning the Sensor Controller ON. Otherwise, the Sensor Controller may be damaged.  
CHECK!
- I/O cable**  
The I/O cable connects the Sensor Controller to the power supply and external devices, such as sync sensors or programmable controllers.
- USB port**  
Connect the USB cable to the USB port to connect to a personal computer.

## Alphabet display

Alphabet characters are displayed as follows on the main display:

A	b	c	d	E	F	G	h	I	J
K	L	m	n	o	P	q	r	S	t
U	v	w	X	Y	Z				

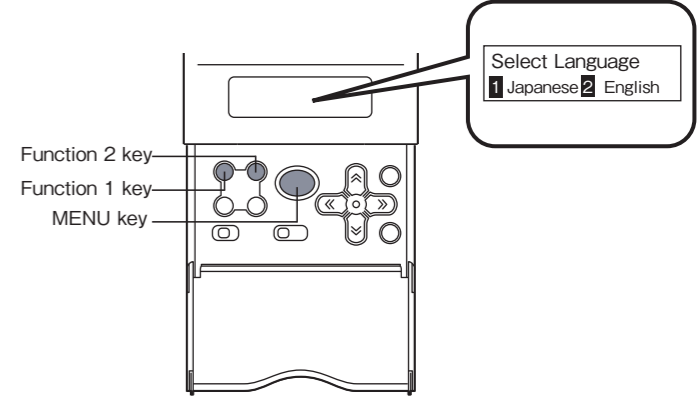
## How to switch the language on the display

The message switch screen is automatically displayed only at time that turned on power for the first time.

**Select [Japanese] : Push Function 1 key.**  
**Select [English] : Push Function 2 key.**

After it reactivates, the selected content is reflected.

Please turn on power while pushing the MENU key to start the language selection menu when the power supply is turned on since the second times.



For detailed functions and operations of the ZS-HLDC-N series Sensor Controller, refer to the separate User's Manual (Cat. No. Z470-E1). The User's Manual can be downloaded from the following website. (Free)  
<https://www.fa.omron.co.jp/>

## Suitability for 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.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

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