Smart Laser Sensors
E3NC-L/E3NC-S

Smart Laser Sensor
Ideal for Long Range or Pinpoint Presence/Absence Sensing
A Wide Variety of Laser Sensor Heads That Solve

Fiber Sensor Challenges

- The sensing distance is relatively short.
- The beam spreads out at a 60-degree angle.
- The spot is not visible at longer ranges.

E3NC Laser Sensor Solutions

The laser beam provides sufficient distance and a visible beam spot for stable detection.

The use of triangulation and CMOS provides stable detection for workpieces with different colors or with an inclination of the Sensor.

Varying colors influence detection.

Incline changes influence detection.

The distance is displayed instead of the incident level.

“2500” is an approximation for 250 mm.
**Applications Beyond the Realm of Fiber Sensors**

### Detection Requirement

- **Stable presence detection**
- **Long-distance detection with installation on only one side**
- **High-precision positioning**

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#### E3NC-L series of Compact Laser Sensors

<table>
<thead>
<tr>
<th>Model</th>
<th>Sensing distance</th>
<th>Spot diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>8 m</td>
</tr>
<tr>
<td>Retro-reflective Model E3NC-LH03</td>
<td>50, 100, 1200</td>
<td>2 mm dia. (at 1 m)</td>
</tr>
<tr>
<td>Diffuse-reflective Model E3NC-LH02</td>
<td>8000 mm</td>
<td>0.8 mm dia. (at 300 mm)</td>
</tr>
<tr>
<td>Limited-reflective Model E3NC-LH01</td>
<td></td>
<td>0.1 mm dia. (at 70 mm)</td>
</tr>
</tbody>
</table>

---

#### E3NC-S series of Ultra-compact CMOS Laser Sensors

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement range</th>
<th>Spot diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>35 to 250 mm</td>
</tr>
<tr>
<td>CMOS Reflective Model E3NC-SH250H</td>
<td>50, 100, 150, 200, 250, 300</td>
<td>1 mm dia. (at 250 mm)</td>
</tr>
<tr>
<td>CMOS Reflective Model E3NC-SH100</td>
<td>35 to 100 mm</td>
<td>0.5 mm dia. (at 100 mm)</td>
</tr>
</tbody>
</table>

---

- **Stable detection even with workpieces of different colors**
- **Stable detection even with the Sensor installed at an angle**
Stable Detection of a Wide Range of Workpieces, Including Transparent Targets

Visible spot even at long distances.

**Maximum sensing distance of 8 m**

**Application**

<table>
<thead>
<tr>
<th>Detection of Remaining Sheet Metal in a Press</th>
<th>Detection of Two PCBs</th>
<th>Detection of Overlapping Lids</th>
</tr>
</thead>
<tbody>
<tr>
<td>The small, long-distance spot can stably detect large pieces of sheet metal that remain on a press.</td>
<td>The small beam spot can detect two PCBs accidentally stacked together.</td>
<td>The small beam spot stably detects overlapping lids on cups.</td>
</tr>
</tbody>
</table>
Detects Film That’s 95% Transparent

High-frequency Modulation for Stable Detection of Even Minor Variations in the Thickness or Position of Transparent Objects

High-frequency Modulation

Conventional emitted laser beams have a single wavelength. With high-frequency Modulation, the emitted laser beam is controlled so that it contains multiple wavelengths.

Wavelength Distribution of Conventional Emission

- A single wavelength of light is emitted.

Emitted wavelength

Wavelength Distribution of High-frequency Modulation

- Multiple wavelengths of light are emitted.

Emitted wavelength

Application

Detecting Glass Wafer Protrusion

Detecting the Height of Shrink Packaging Film

Detecting Two Sheets of Transparent Film

The high ability to detect transparent objects enables stable detection of highly transparent glass wafers.

The large difference in light levels even for transparent films enables stable detection of thin packaging films.

Even small differences in incident light level are captured to enable detection of two sheets of transparent film.
E3NC-L series of Compact Laser Sensors

Diffuse-reflective Model
E3NC-LH02

Long-distance and Variable Beam Spot for Application Versatility

Visible spot even at long distances.
**Maximum Sensing Distance:**

1.2 m

Application

**Thread Presence Detection**

The spot is made wider so that the presence of threading in nuts can be detected.

**Glass Substrate Mark Detection**

With a maximum sensing distance of 1.2 m, long-distance mark detection is stable.

**Workpiece Presence Detection through Narrow Gaps**

Even detailed locations that are recessed in machines can be stably detected from a distance.

Adjust the Spot to the Target or Application for Stable Detection.

**Variable Spot**

You can adjust the spot size to the target size or sensing surface conditions for improved detection stability. The use of a crown lock eliminates the need for tools to lock the spot adjuster. Just press the adjuster to lock it and prevent the settings from changing.

0.8 mm dia. or larger

Spot adjuster

Make the spot smaller to detect smaller targets.

Make the spot larger for stable detection on rough surfaces.
Limited-reflective Model
E3NC-LH01

Minute Beam Spot for High-precision Detection

High-precision Positioning
Minute spot with 0.1 mm dia.
Pin-point precision positioning to ±10 μm.*

No Detection Outside of Detection Window
Limited detection with a sensing distance of 70±15 mm
Limited reflection means that objects are detected only within a sensing distance of 70 mm ±15 mm even if there are workpieces or reflective objects closer or farther away. This helps prevent false detection.

Application

Detecting the Presence of Needle Caps
The minute 0.1-mm spot is targeted only at the end of the cap for stable detection.

PCB Arrival Confirmation
The laser beam forms a minute spot to detect arrival with high precision.

Ring Joint Location Detection
The minute, sharp laser beam stably detects 0.1 mm seams.

* With Smart Tuning. Depends on the workpiece.
With the CMOS Sensor, stable detection is possible even if the workpiece’s color or surface conditions are not consistent.

OMRON’s Unique HSDR-CMOS (High Speed and Dynamic Range)
Dynamic Range of Up to 500,000 Times

The shutter time of the CMOS is adjusted to the workpiece. The emission power is then adjusted to optimize the amount of dispersed light that is received.

Stable Detection Regardless of Workpiece Color, Material, or Surface Condition
Even for Glossy or Cast Metals

OMRON’s Unique HSDR-CMOS
High Speed and Dynamic Range
Dynamic Range of Up to 500,000 Times

E3NC-SH250H/SH250
E3NC-SH100

Application
Detecting the Presence of Exterior Wall Material

Stable Detection with Triangulation

Targets located at different distances from the sensor will reflect light onto a different spot of the Position Sensitive Device. The PSD is therefore only concerned with location of light received rather than how much light is received. This reduces effects of changing color or surface finish.

O-ring Presence Detection

With the CMOS Sensor, stable detection is possible even with low-reflectance workpieces.
Increased Mounting Flexibility

Even if the Sensor is mounted at an angle, the workpiece can still be detected due to the reduced mounting restrictions.

Inclined mounting at up to 60°

<Application>

**Detecting Holes Made in Metal Parts**

The Sensors are influenced very little by the surface conditions of the workpiece, allowing level differences on metal surfaces to be stably detected.

**Detection of Cut Position on Rubber Hose**

Even if the Sensor is mounted at an angle, stable detection is possible for workpieces with low reflection.
Lens Attachments

E39-P51 (For E3NC-LH03 Retro-reflective Models)

E39-P52 (For E3NC-LH02 Diffuse-reflective Models)

Solve Even More Applications with a Line Beam

Selective Line Beam Shape
You can mount a Lens Attachment to the E3NC-LH02 and adjust the spot to create various shapes of line beams. Adjusting the beam shape to your specific workpiece enables even more-stable detection.

Rubber Sealing
The Lens Attachments have internal rubber packings to reduce the entry of dirt between the Sensor Head and Lens Attachment.

Application

Presence Detection of Powders or Liquids

Detection of Faulty Cap Assembly

Presence Detection of Rubber Sheets

With a wider beam, you can stably detect powders and liquids because they are less likely to fall outside of the beam.

Using a line beam allows you to detect caps that are not attached correctly with a single Sensor.

The wide sensing area helps eliminate the influences of color differences in the rubber sheet to enable stable detection.
Stable Detection of Everything But the Background
Tuning without a Workpiece

Calibrate with the background as your reference surface. This enables stable detection of any target that passes, regardless of shape, color, or surface condition.

Long-term Stable Detection with Essentially No Maintenance Even When the Sensor Is Dirty

Even if dirt or machine vibration reduces the amount of light received, OMRON’s unique DPC automatically compensates the displayed incident level to achieve stable, high-precision detection.

Stable Detection of Everything But the Background
Tuning without a Workpiece

With Workpiece
Background
With Workpiece

CMOS light-receiving elements
ON
OFF
ON

Easy Adjustment after Head Installation
Easy-to-understand Distance Display

You can see the distance at a glance, which simplifies adjustment. After head installation, you can reduce adjustment time after line switchovers and reduce line stoppage time.

Digital value of 10 = Approx. 1 mm

With Workpiece
Background
With Workpiece

CMOS light-receiving elements
ON
OFF
ON
Simple and Dependable

The N-Smart Lineup of Next-generation Fiber Sensors and Laser Sensors will quickly solve your problems and therefore increase equipment operation rates and minimize downtime with optimum cost performance.

Common Features and Models in the N-Smart Series

Common Buttons

Intuitive Operation and Easy Setup.

White Characters on a Black Background

High-contrast displays for easy visibility from a distance.

Models with Wire-saving Connectors

- Reduce model numbers in stock
  - You do not need to stock master and slave amplifier units.
- Greatly reduced wiring work
  - Power is supplied from the Master Connector. Slave Connectors have only output lines.
- Expansion is easy and reliable
  - Mutual interference prevention works even if you use a Master Connector instead of a Slave Connector or combine them with pre-wired models.

Model for Sensor Communications Unit

Data Management and Time Reduction with Network Communications

- Three communications methods are supported
- Use Distributed Sensor Units to reduce equipment production costs and commissioning time
Ordering Information

Sensor Heads: E3NC-L Compact Laser Sensor Series

<table>
<thead>
<tr>
<th>Sensing method</th>
<th>Appearance</th>
<th>Beam shape</th>
<th>Sensing distance</th>
<th>Laser class</th>
<th>Cable length</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coaxial Retro-reflective with MSR function</td>
<td>![Image]</td>
<td>Spot</td>
<td>8 m *</td>
<td>Class 1</td>
<td>2 m</td>
<td>E3NC-LH03 2M NEW</td>
</tr>
<tr>
<td>Diffuse-reflective</td>
<td>![Image]</td>
<td>Variable spot</td>
<td>1.2 m</td>
<td>Class 1</td>
<td>2 m</td>
<td>E3NC-LH02 2M</td>
</tr>
<tr>
<td>Limited-reflective</td>
<td>![Image]</td>
<td>Spot</td>
<td>70±15 mm</td>
<td>Class 1</td>
<td>2 m</td>
<td>E3NC-LH01 2M</td>
</tr>
</tbody>
</table>

* These values apply when an E39-R21, E39-R22, E39-RS10, or E39-RS11 Reflector is used. A Reflector is not included. Purchase a Reflector separately to match the intended use of the Sensor.

Note: Only an E3NC-LA Amplifier Unit can be connected.

Amplifier Units: E3NC-L Compact Laser Sensor Series

<table>
<thead>
<tr>
<th>Connecting method</th>
<th>Appearance</th>
<th>Inputs/outputs</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-wired (2 m)</td>
<td>![Image]</td>
<td>2 outputs + 1 input</td>
<td>E3NC-LA21 2M E3NC-LA51 2M</td>
</tr>
<tr>
<td>Wire-saving Connector</td>
<td>![Image]</td>
<td>1 output + 1 input</td>
<td>E3NC-LA7 E3NC-LA9</td>
</tr>
<tr>
<td>M8 Connector</td>
<td>![Image]</td>
<td>1 output + 1 input</td>
<td>E3NC-LA24 E3NC-LA54</td>
</tr>
<tr>
<td>Amplifier for Sensor Communications Unit *</td>
<td>![Image]</td>
<td>2 outputs</td>
<td>E3NC-LA0</td>
</tr>
</tbody>
</table>

* A Sensor Communications Unit is required if you want to use the Amplifier Unit on a network.

Note: Only an E3NC-LH Amplifier Unit can be connected.

Sensor Heads: E3NC-S Ultra-compact CMOS Laser Sensor Series

<table>
<thead>
<tr>
<th>Sensing method</th>
<th>Appearance</th>
<th>Beam shape</th>
<th>Measurement range</th>
<th>Laser class</th>
<th>Cable length</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance-settable</td>
<td>![Image]</td>
<td>Spot</td>
<td>35 to 250 mm</td>
<td>Class 2</td>
<td>2 m</td>
<td>E3NC-SH250H 2M</td>
</tr>
<tr>
<td></td>
<td>![Image]</td>
<td></td>
<td>35 to 100 mm</td>
<td>Class 1</td>
<td>2 m</td>
<td>E3NC-SH100 2M</td>
</tr>
</tbody>
</table>

Note: Only an E3NC-SA Amplifier Unit can be connected.
Amplifier Units: E3NC-S Ultra-compact CMOS Laser Sensor Series

<table>
<thead>
<tr>
<th>Connecting method</th>
<th>Appearance</th>
<th>Inputs/outputs</th>
<th>Model</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-wired (2 m)</td>
<td>![Image]</td>
<td>2 outputs + 1 input</td>
<td>E3NC-SA21 2M</td>
<td>E3NC-SA51 2M</td>
</tr>
<tr>
<td>Wire-saving Connector</td>
<td>![Image]</td>
<td>1 output + 1 input</td>
<td>E3NC-SA7</td>
<td>E3NC-SA9</td>
</tr>
<tr>
<td>M8 Connector</td>
<td>![Image]</td>
<td>1 output + 1 input</td>
<td>E3NC-SA24</td>
<td>E3NC-SA54</td>
</tr>
<tr>
<td>Amplifier for Sensor Communications Unit *</td>
<td>![Image]</td>
<td>2 outputs</td>
<td>E3NC-SA0</td>
<td></td>
</tr>
</tbody>
</table>

* A Sensor Communications Unit is required if you want to use the Amplifier Unit on a network.

Note: Only an E3NC-SH or E3NC-SH Sensor Head can be connected.

Accessories (Sold Separately)

Sensor Head Accessories

Reflector for Retro-reflective Sensors NEW
A Reflector is not provided with the Sensor Head. It must be ordered separately as required.

<table>
<thead>
<tr>
<th>Applicable Sensor Head</th>
<th>Appearance</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3NC-LH03</td>
<td>![Image]</td>
<td>E39-R21</td>
<td>1</td>
</tr>
<tr>
<td>E3NC-LH03</td>
<td>![Image]</td>
<td>E39-R22</td>
<td>1</td>
</tr>
<tr>
<td>E3NC-LH03</td>
<td>![Image]</td>
<td>E39-RS10</td>
<td>1</td>
</tr>
<tr>
<td>E3NC-LH03</td>
<td>![Image]</td>
<td>E39-RS11</td>
<td>1</td>
</tr>
</tbody>
</table>

Lens Attachments for Sensor Heads NEW
A Lens Attachment is not provided with the Sensor Head. It must be ordered separately as required.

<table>
<thead>
<tr>
<th>Applicable Sensor Head</th>
<th>Appearance</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3NC-LH03</td>
<td>![Image]</td>
<td>E39-P51</td>
<td>1</td>
</tr>
<tr>
<td>E3NC-LH02</td>
<td>![Image]</td>
<td>E39-P52</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: You can combine the Lens Attachment with an applicable Sensor Head to create a line beam.

Sensor Head Mounting Brackets

A Mounting Bracket is not provided with the Sensor Head. It must be ordered separately as required.

<table>
<thead>
<tr>
<th>Applicable Sensor Head</th>
<th>Appearance</th>
<th>Model</th>
<th>Quantity</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3NC-LH03</td>
<td>![Image]</td>
<td>E39-L190 NEW</td>
<td>1</td>
<td>Mounting Bracket: 1</td>
</tr>
<tr>
<td>E3NC-LH02</td>
<td>![Image]</td>
<td>E39-L185</td>
<td>1</td>
<td>Nut plate: 1</td>
</tr>
<tr>
<td>E3NC-LH01</td>
<td>![Image]</td>
<td>E39-L186</td>
<td>1</td>
<td>Phillips screws (M3×18): 2</td>
</tr>
<tr>
<td>E3NC-SH250H E3NC-SH250 E3NC-SH100</td>
<td>![Image]</td>
<td>E39-L187</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>E3NC-SH250H E3NC-SH250 E3NC-SH100</td>
<td>![Image]</td>
<td>E39-L188</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Amplifier Unit Accessories

Wire-saving Connectors (Required for models for Wire-saving Connectors.)
Connectors are not provided with the Amplifier Unit and must be ordered separately. *Protective stickers are provided.

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Cable length</th>
<th>No. of conductors</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Connector</td>
<td></td>
<td>2 m</td>
<td>4</td>
<td>E3X-CN21</td>
</tr>
<tr>
<td>Slave Connector</td>
<td></td>
<td>2 m</td>
<td>2</td>
<td>E3X-CN22</td>
</tr>
</tbody>
</table>

Sensor I/O Connectors (Required for models for M8 Connectors.)
Connectors are not provided with the Amplifier Unit and must be ordered separately.

<table>
<thead>
<tr>
<th>Size</th>
<th>Cable</th>
<th>Appearance</th>
<th>Cable type</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8</td>
<td>Standard cable</td>
<td>Straight</td>
<td>2 m</td>
<td>XS3F-M8PVC4S2M</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L-shaped</td>
<td>5 m</td>
<td>XS3F-M8PVC4S5M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 m</td>
<td>XS3F-M8PVC4A2M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 m</td>
<td>XS3F-M8PVC4A5M</td>
</tr>
</tbody>
</table>

Amplifier Unit Mounting Bracket
A Mounting Bracket is not provided with the Amplifier Unit. It must be ordered separately as required.

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>E39-L143</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

DIN Track
A DIN Track is not provided with the Amplifier Unit. It must be ordered separately as required.

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Type</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shallow type, total length: 1 m</td>
<td>PFP-100N</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Shallow type, total length: 0.5 m</td>
<td>PFP-50N</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deep type, total length: 1 m</td>
<td>PFP-100N2</td>
<td></td>
</tr>
</tbody>
</table>

End Plate
Two End Plates are provided with the Sensor Communications Unit. End Plates are not provided with the Amplifier Unit. They must be ordered separately as required.

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PFP-M</td>
<td>1</td>
</tr>
</tbody>
</table>

Related Products

Sensor Communications Units

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor Communications Unit for EtherCAT</td>
<td></td>
<td>E3NW-ECT</td>
</tr>
<tr>
<td>Sensor Communications Unit for CompoNet *1</td>
<td></td>
<td>E3NW-CRT</td>
</tr>
<tr>
<td>Sensor Communications Unit for CC-Link *1</td>
<td></td>
<td>E3NW-CCL</td>
</tr>
<tr>
<td>Distributed Sensor Unit *2</td>
<td></td>
<td>E3NW-DS</td>
</tr>
</tbody>
</table>

*1: Refer to your OMRON website for details.
*2: The Distributed Sensor Unit can be connected to any of the Sensor Communications Units.

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OMRON’s CMOS Laser Sensor Lineup

Select the best match to your application from our wide lineup.

<table>
<thead>
<tr>
<th>Installation distance</th>
<th>Detectable level difference</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ZX2</strong></td>
<td></td>
<td>5 μm</td>
</tr>
<tr>
<td>100 mm*1</td>
<td></td>
<td>5 μm</td>
</tr>
<tr>
<td>300 mm*1</td>
<td></td>
<td>30 μm</td>
</tr>
<tr>
<td>100 mm*1</td>
<td></td>
<td>7 μm</td>
</tr>
<tr>
<td>300 mm*1</td>
<td>3.0 mm*2</td>
<td>350 μm</td>
</tr>
<tr>
<td>100 mm*1</td>
<td>0.7 mm*2</td>
<td>80 μm</td>
</tr>
<tr>
<td>250 mm</td>
<td>9.0 mm*2</td>
<td></td>
</tr>
<tr>
<td>100 mm</td>
<td>1.5 mm*2</td>
<td></td>
</tr>
</tbody>
</table>

Ideal for simple measurements.

**ZX1**

Stable detection of level differences in the order of 0.1 mm.

**ZX0**

Dependable presence/absence detection in a compact body.

**E3NC-S**

*1. Sensors are also available for other installation distances.

*2. The value depends on conditions. Refer to product datasheets or refer to product information on your OMRON website.

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Terms and Conditions of Sale

1. Offer, Acceptance. These terms and conditions (these "Terms") are deemed part of any Order placed by Buyer ("Buyer") with Omron Corporation ("Omron") for the sale of Omron products ("Products"). Buyer is expected to, and does, understand that Omron Corporation makes no representation that the Products will suit any particular purpose or needs of Buyer or any actual or expected第三人. Buyer acknowledges that he has read these Terms, understands them, and agrees to be bound by them. Buyer acknowledges Omron Corporation's representation that Buyer is required to use ordinary diligence to determine whether the Products are suitable for Buyer's purpose. Buyer acknowledges that Buyer is not relying on any information, services, or representations, other than the above, and that these Terms are integral to the Agreement. Buyer acknowledges that, in the absence of any express agreement to the contrary, Buyer is not relying on Omron Corporation's representations and is assuming the risk that the Products will not meet Buyer's requirements. Buyer agrees to indemnify and hold Omron and its suppliers harmless from any claim, loss, or expense arising from Buyer's use or misuse of the Products.

2. Prices; Payment Terms. All prices stated are current, subject to change without notice, and do not include costs for transportation, insurance, or other expenses. Payment terms of net thirty days apply to Omron products. 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, duties, and other governmental charges (other than general sales taxes) imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, or export of the Products shall be charged at the time of sale to Buyer. All taxes and duties shall be the responsibility of Buyer. Buyer shall comply with all applicable laws, regulations, and requirements of any government authority. Omron shall not be liable for any delay or failure in delivery caused by delays or interruptions in transportation, weather conditions, strikes, road blocks, or other causes beyond Omron's control. Data presented in Omron Company websites, catalogs, system assemblies or any other materials or substances or environments. Any advice, recommendation or other information furnished orally or in writing, relating to the sale of products or services (collectively, the "Products") are not to be construed as an amendment or addition to the above warranty. See http://www.omron.com or contact your Omron representative for published information.

3. Shipping; Delivery. Unless otherwise expressly agreed in writing by Omron, (a) shipment will be by a carrier selected by Omron; (b) such carrier shall act as the agent of Buyer and to deliver 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. Omron will order and ship only such Products as are available. Buyer will be responsible for losses or delays in transit. Buyer is responsible for loss, damage or destruction suffered in transit. Omron reserves the right to make substitutions as may become available in order to meet the date of shipment. Omron shall not be liable for any delay or failure in delivery caused by delays or interruptions in transportation, weather conditions, strikes, road blocks, or other causes beyond Omron's control. Only if Buyer agrees to take delivery of Products prior to the completion of manufacture, and the Buyer agrees to pay for such Products in advance, will an estimated delivery date be furnished. Buyer will be responsible for all costs involved in obtaining any government approvals required for the importation or sale of the Products. Buyer’s representatives, including customers duties and sales, excise, use, turnover and license taxes shall be charged to and remitted by Buyer to Omron. If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron reserves the right to stop shipments or require satisfactory security. If Buyer fails to make payment in full in accord with these Terms or any other agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Product. Omron shall notify Buyer of the cancellation of any or all Products in transit. Buyer pays all amounts, including amounts payable hereunder, whether or not then due, when due or when suitably notified by Buyer. Buyer shall in any event remain liable for all unpaid accounts.

4. Cancellation; Etc. Orders are subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses. Force Majeure. Omron shall not be liable for any delay or failure in delivery resulting from any cause beyond its control, including but not limited to acts of God, fire, 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 transportation carrier’s disrepair, suspension of government or other authority.

5. 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. All taxes, duties and other governmental charges (other than general sales taxes), imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, or export of the Products shall be charged at the time of sale to Buyer. All taxes and duties shall be the responsibility of Buyer. Buyer shall comply with all applicable laws, regulations, and requirements of any government authority. Omron shall not be liable for any delay or failure in delivery caused by delays or interruptions in transportation, weather conditions, strikes, road blocks, or other causes beyond Omron's control. Data presented in Omron Company websites, catalogs, system assemblies or any other materials or substances or environments. Any advice, recommendation or other information furnished orally or in writing, relating to the sale of products or services (collectively, the "Products") are not to be construed as an amendment or addition to the above warranty. See http://www.omron.com or contact your Omron representative for published information.

6. Government. These Terms shall be governed by and construed under the laws of the State of Illinois. The United Nations Convention on Contracts for the International Sale of Goods shall be excluded. Any disputes arising out of or relating to these Terms or the Products shall be resolved by arbitration administered by the American Arbitration Association under its Commercial Arbitration Rules, and judgment may be entered on the award in any court having jurisdiction. Neither the fact that Omron has shipped products to Buyer nor any prior course of dealing shall create an agency or a representative relationship between Omron and Buyer. Omron reserves the right to stop shipments or require satisfactory security. Buyer shall be responsible for all costs involved in obtaining any government approvals required for the importation or sale of the Products. Buyer’s representatives, including customers duties and sales, excise, use, turnover and license taxes shall be charged to and remitted by Buyer to Omron. If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron reserves the right to stop shipments or require satisfactory security. If Buyer fails to make payment in full in accord with these Terms or any other agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Product. Omron shall notify Buyer of the cancellation of any or all Products in transit. Buyer pays all amounts, including amounts payable hereunder, whether or not then due, when due or when suitably notified by Buyer. Buyer shall in any event remain liable for all unpaid accounts.

7. Cancellation; Etc. Orders are subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses. Force Majeure. Omron shall not be liable for any delay or failure in delivery resulting from any cause beyond its control, including but not limited to acts of God, fire, 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 transportation carrier’s disrepair, suspension of government or other authority.

8. Export/Import. Buyers are required to obtain all necessary export and import licenses and permits prior to receipt of the Products. Buyers are responsible for all duties, taxes, and other governmental charges arising in connection with importation or exportation of the Products. Buyers shall comply with all applicable laws, regulations, and requirements of any government authority. Buyers must determine the suitability of the Products for the intended use and confirm the proper use of the Products. Buyers are not to be construed as an amendment or addition to the above warranty. See http://www.omron.com or contact your Omron representative for published information.

Certain Precautions on Specifications and Use

1. Suitability of Use. Omron Corporation 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 recognized limits and limitations. Any application for which the Product is not suitable is itself not sufficient for a complete determination of the suitability of the Product. Buyer's design of combinations of the Product with other components, or other applications or use, Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product, or system. Buyer's application responsibility is in all cases the following. (i) A non-exhaustive list of applications for which particular attention must be given: (a) outdoor use (including potential exposure to rain, weather, electrical interference, or conditions or uses not described in this document). (ii) Use in consumer products or any use in significant quantities. (iii) Use in applications where contamination could be a risk, including potential chemical contamination or electrical interference, or conditions or uses not described in this document. (iv) Use in outdoor applications. (v) Use in alloys, glues or 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. (vi) Suitability for use in an overall equipment or system. (vii) Use in applications where there is a real possibility of injury to life or property. Buyer agrees to indemnify and hold Omron and its suppliers harmless from any claim, loss, or expense arising from Buyer's use or misuse of the Products.

2. Programmed Products. Omron Corporation shall not be responsible for the performance or programming of the Products by Buyer. This includes the software, any additions, inserts, modifications or adaptations to the software, any programs developed or installed by Buyer, or any documents, files, or data created or modified by Buyer. Buyer is responsible for determining appropriateness of the particular Product with respect to Buyer's application, product, or system. Buyer's application responsibility is in all cases the following. (i) A non-exhaustive list of applications for which particular attention must be given: (a) outdoor use (including potential exposure to rain, weather, electrical interference, or conditions or uses not described in this document). (ii) Use in consumer products or any use in significant quantities. (iii) Use in applications where contamination could be a risk, including potential chemical contamination or electrical interference, or conditions or uses not described in this document. (iv) Use in outdoor applications. (v) Use in alloys, glues or 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. (vi) Suitability for use in an overall equipment or system. (vii) Use in applications where there is a real possibility of injury to life or property. Buyer agrees to indemnify and hold Omron and its suppliers harmless from any claim, loss, or expense arising from Buyer's use or misuse of the Products.

3. Performance Data. Data presented in Omron Corporation websites, catalogs, system assemblies or any other materials or substances or environments. Any advice, recommendation or other information furnished orally or in writing, relating to the sale of products or services (collectively, the "Products") are not to be construed as an amendment or addition to the above warranty. See http://www.omron.com or contact your Omron representative for published information.

4. Changes 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 contact Omron to confirm actual specifications of purchased Product.

5. Errors and Omissions. Information in this document has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.
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