

OMRON

Smart Laser Head(CMOS)

Model **E3NC-SH**Series

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. Refer to the user's manual for details.

TRACEABILITY INFORMATION:

Representative in EU:
Omron Europe B.V.
Wegalaan 67-69
2132 JD Hookdorp,
The Netherlands

Manufacturer:
Omron Corporation,
Shiokoji Horkawa, Shimogyo-ku,
Kyoto 600-8530 JAPAN
Ayabe Factory
3-2 Narutani, Nakayama-cho,
Ayabe-shi, Kyoto 623-0105 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 ON SAFETY

●Keys to Warning Symbols

<div><div>⚠</div><div>WARNING</div></div>	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury,or may result in serious injury or death. Additionally there may be significant property damage.
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●Explanation of signs

<div><div>⚠</div><div>Laser beam</div></div>	<div><div>Cautions to indicate potential Laser beam hazard</div></div>
<div><div>🚫</div><div>Resolution prohibition</div></div>	<div><div>Indicates prohibition when there is a risk of minor injury from electrical shock or other source if the product is disassembled.</div></div>

SAFETY PRECAUTIONS FOR USING LASER EQUIPMENT

The E3NC-LH use a laser as the light source. Lasers are classified based on EN standard (EN 60825-1)

●Alert Statements

· E3NC-SH Sensor Head: Class 1

<div><div>⚠</div><div>WARNING</div></div>	<div><div>Do not expose your eyes to the laser radiation either directly (i.e., after reflection from a mirror or shiny surface). Loss of sight may possibly occur in case of the exposure to laser high power density.</div><div>Do not disassemble the product. Doing so may cause the laser beam to leak,resulting in the danger of visual impairment.</div></div>	<div><div>⚠</div><div>🚫</div></div>
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The E3NC-SH has the WARNING label regarding laser on the side of the Sensor Head as shown on the right figure.

When using devices in which E3NC-SH is installed in the U.S., the devices are subjected to the U.S. FDA (Food and Drug Administration) laser regulations. E3NC-SH series is classified into Class1 by the standard of IEC/EN60825-1 according to deviations of Laser Notice NO.50 of this standard, and is scheduled to report to CDRH (Center for Devices and Radiological Health).

Using in Europe
The E3NC-SH is categorized as a Class 1 device as stipulated in EN60825-1.

PRECAUTIONS FOR SAFE USE

Please observe the following precautions for safe use of the products.

(1)Installation Environment

- Do not use the product in environments where it can be exposed to inflammable/explosive gas.
- To secure the safety of operation and maintenance, do not install the product close to high-voltage devices and power devices.

(2)Power Supply and Wiring

- Be sure to use a dedicated amplifier unit (E3NC-SA/E3NC-SA0). Connecting the sensor to other amplifier unit may cause damage or fire.
- When short circuiting the cable, be sure to connect wires correctly according to the specification. Improper connection may cause damage or fire.
- 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.
- Always turn off the power of the unit before connecting or disconnecting cables.

(3)Installation

- Use screws for mounting and be sure to tighten screws with a specified torque. (tightening torque: M3, 0.5N·m)

(4)Other Rules

- Do not attempt to disassemble, deform by pressure, incinerate, repair, or modify this product.
- When disposing of the product, treat as industrial waste.
- If you notice an abnormal condition such as a strange odor, extreme heating of the unit, or smoke, immediately stop using the product, turn off the power, and consult your dealer.

PRECAUTIONS FOR CORRECT USE

Please observe the following precautions to prevent failure to operate, malfunctions, or undesirable effects on product performance.

(1)Do not install the product in locations subjected to the following conditions:

- Surrounding air temperature outside the rating
- Rapid temperature fluctuations (causing condensation)
- Relative humidity outside the range of 35 to 85%
- Presence of corrosive or flammable gases
- Presence of dust, salt, or iron particles
- Direct vibration or shock
- Reflection of intense light (such as other laser beams, electric arc-welding machines, or ultra-violet light)
- Direct sunlight or near heaters
- Water, oil, or chemical fumes or spray, or mist atmospheres
- Strong magnetic or electric field

(2)Warming Up

- The circuitry is not stable immediately after turning the power ON, and the values gradually change until the Sensor Head is completely warmed up.

(3)Maintenance and inspection

- Always turn off the power of the unit before connecting or disconnecting cables.
- Do not use thinner, alcohol, benzene, acetone, or kerosene to clean the sensor.
- If considerable foreign matter or dust collects on the front of sensor, use a blower brush (for camera lenses) to blow off the foreign matter. Avoid blowing it off with your breath. For a small amount of foreign matter or dust, gently wipe with a soft cloth. Do not wipe hard. If the surface is damaged, false detection may result.

(4)Sensing Object For Reflective Type Sensor Head

- The product cannot accurately measure the following types of objects:Transparent objects, objects with an extremely low reflective sensor ratio, objects smaller than the spot diameter, objects with a large curvature, excessively inclined objects,etc.

Checking the package contents

·Sensor head ×1 ·Manual (this paper) ×1

■ Shortening the connection cable for use

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Push the operation lever at the operation slot with the slotted screwdriver and pull out the wire to adjust the cable length. The tip of the screwdriver must be 2 mm or less. The type of screwdriver whose tip width becomes broaden toward its root cannot be used.

■ Procedure to connect the connector

(1) According to "STRIP GAUGE" shown on the side of the product, strip the coating of the shield for 20 mm or less, strip the coating of the core wire for 7 to 8 mm, and twist the wire for several times.

(2) Insert the wire all the way to the wire insertion slot. Make sure that the wire coating is located inside the wire inserting slot and the tip of the conductor passes through the connection part. Connect wires as follows. Terminal No.1: Shield (Red, White sides), No.2: White, No.3: Red, No.4: Brown, No.5: Blue, No.6: Shield (Brown, Blue side).

(3) Push the slotted screwdriver all the way to the releasing slot and pry the slotted screwdriver up and down lightly. When you feel a click on the slotted screwdriver, pry it to the reverse direction of the wire insertion direction. The operation lever will recover with a click sound.

(4) Check that the operation lever recovers and the wire coating enters into the wire insertion slot. The shield wire cover must not be shorted circuited. (The wires are connected when you pull the wire and feel a resistance.)

1.Dimensions

2.Sensor Head Display

3.Installing Sensor Heads

Fix the Reflective type sensor head with screws (M3). (tightening torque: M3, 0.3 N·m)

Mounting dimensional drawing (Unit: mm)

CHECK!
When mounting a Sensor Head, take care not to touch the emitter and receiver. Adhesion of finger marks may hinder correct measurements. If you have touched them, wipe them with a clean soft cloth.
·Secure the connector to avoid vibration or shocks.
⚠ Caution on Mounting Direction

4.Mounting the sensor head

1. Open the protection cover.
2. Insert the sensor head, with the lock lever on its connector area facing upward, all the way into the connector port. To remove it, press and hold the lock lever then pull the sensor head out.

The connector cover of E3NC-SH is white. Connect the cable correctly.

Lock lever
Connector cover: White

5.Specifications

Item	Detection method Model	Distance configuration model E3NC-SH100	E3NC-SH250
Light source (wavelength)*1		Visible-light semiconductor laser (660nm) 100 μW max. (JIS standard Class 1, IEC/EN Class1, FDA Class1)	
Measurement range		35 to 100 mm	35 to 250 mm
Standard measurement gap *2		35 to 50 mm: 1.5 mm 50 to 100mm: 3 mm	35 to 180 mm: 9 mm 180 to 250 mm: 25 mm
Spot size *3		Approx. 0.5 mm (distance at 100 mm)	Approx. 1 mm (distance at 250 mm)
Indicator		OUT indicator (Orange), STABILITY indicator (Green), ST indicator (Blue)	
Ambient illumination		Illuminance on receiving optical side 4,000 lx max. (incandescent light) Sunlight: 8,000lx max.	Illuminance on receiving optical side 2,000 lx max. (incandescent light) Sunlight: 4,000lx max.
Ambient temperature		Operating: -10 to 55°C, storage: -25 to 70°C (with no icing or condensation)	
Ambient humidity		Operating and storage: 35% to 85% (with no condensation)	
Insulation resistance		20 MΩ min. (500 VDC)	
Dielectric strength		1000 VAC 50/60 Hz 1min	
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude 2 hours each in X, Y, and Z directions	
Shock resistance		500m/s ² 3 times each in X, Y, and Z directions	
Degree of protection		IEC standard, IP65	
Connection method		Connector joint model (standard cable length: 2 m)	
Material	Case	Polybutylene terephthalate	
	Lens	Methacrylate resin	
	Cable	PVC	
Weight (packed state/main unit only)		Approx. 125 g/ approx. 75 g	
Accessories		Instruchthn Sheet	

*1. The E3NC-SH is classified into Class 1 by the standard of EN60825-1 according to deviations of Laser Notice No.50 of FDA standard, and will be reported to CDRH (Center for Devices and Radiological Health).
*2. Measured using Omron's reference sensing object (white paper).
*3. Defined at the 1/e² (13.5%) of the central intensity at the measurement distance. Measurement may be influenced if there is light leakage outside the defined region and the surroundings of the target object have a high reflectance in comparison to the target object. Also, when detecting a workpiece that is smaller than the spot size, a correct value may not be obtained.

Suitability for Use

THE PRODUCTS CONTAINED IN THIS SHEET ARE NOT SAFETY RATED. THEY ARE NOT DESIGNED OR RATED FOR ENSURING SAFETY OF PERSONS, AND SHOULD NOT BE RELIED UPON AS A SAFETY COMPONENT OR PROTECTIVE DEVICE FOR SUCH PURPOSES. Please refer to separate catalogs for OMRON's safety rated products.

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the product.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used. Know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCTS 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 IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM. See also Product catalog for Warranty and Limitation of Liability.

■ EUROPE
OMRON EUROPE B.V. Sensor Business Unit
Carl-Benz Str.4, D-71154 Nufringen Germany
Phone:49-7032-811-0 Fax: 49-7032-811-199

■ NORTH AMERICA
OMRON ELECTRONICS LLC
One Commerce Drive Schaumburg,IL 60173-5302 U.S.A.
Phone:1-847-843-7900 Fax : 1-847-843-7787

■ ASIA-PACIFIC
OMRON ASIA PACIFIC PTE. LTD.
No. 438A Alexandra Road #05-05-08(Lobby 2),
Alexandra Technopark, Singapore 119967
Phone : 65-6835-3011 Fax :65-6835-2711

■ CHINA
OMRON(CHINA) CO., LTD.
Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Phone : 86-21-5037-2222 Fax :86-21-5037-2200

OMRON Corporation

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E3NC-SHSeries