


Reliable Detection Unaffected by PCB Holes or Notches



- High-limit E3S-LS3□ is suitable for incorporation in devices.
- Wide-range E3S-LS3□W is ideal for detecting tall components mounted on boards.
- Timer function models available.






 Be sure to read *Safety Precautions* on page 4.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Ordering Information

Sensors [Refer to *Dimensions* on page 4.]

 Red light

| Sensing method | Appearance | Connection method | Sensing distance | Timer function | Model | |
|-----------------------|--|-------------------|--|----------------------|----------------------|---------------------|
| | | | | | NPN output | PNP output |
| Convergent-reflective |  | Pre-wired (2 m) |  20 to 35 mm *1*2 | Without | E3S-LS3N 2M | E3S-LS3P 2M |
| | | | | With | E3S-LS3NT 2M | E3S-LS3PT 2M |
| | | |  10 to 60 mm *1*3 | Without | E3S-LS3NW 2M | E3S-LS3PW 2M |
| | | | With | E3S-LS3NWT 2M | E3S-LS3PWT 2M | |

*1. For white paper: 80 × 80 mm.

*2. Install the Sensor at least 60 mm away from the background.

*3. Install the Sensor at least 120 mm away from the background.

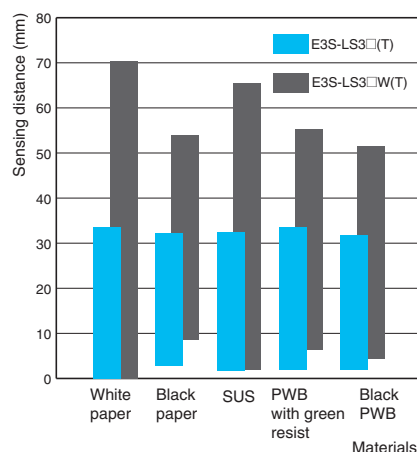
Ratings and Specifications

| Item | Sensing method Model | Convergent-reflective | |
|---|-------------------------|--|---|
| | | E3S-LS3N(T)/-LS3P(T) | E3S-LS3NW(T)/-LS3PW(T) |
| Sensing distance | White paper * | 20 to 35 mm (installation distance from background: 60 mm min.) | 10 to 60 mm (installation distance from background: 120 mm min.) |
| | Black paper * | 20 to 30 mm (installation distance from background: 60 mm min.) | 15 to 50 mm (installation distance from background: 120 mm min.) |
| Light source (wavelength) | | Red LED (660 nm) | |
| Power supply voltage | | 12 to 24 VDC±10%, ripple (p-p) 10% max. | |
| Current consumption | | 25 mA max. | |
| Control output | | Load power supply voltage: 24 VDC max., Load current: 100 mA max., (Residual voltage: 1 V max. for NPN output or 2 V max. for PNP output) Open collector output configuration: NPN or PNP output depending on the model, Operating mode: Light-ON | |
| Protection circuits | | Power supply reverse polarity protection, Output short-circuit protection, Mutual interference prevention | |
| Response time | | Operate or reset: 1 ms max. | |
| Timer function (only models with timer function) | | OFF-delay range: 0.1 to 1.0 s (adjustable) | |
| Ambient illumination (Receiver side) | | Incandescent lamp: 5,000 lux max. | |
| Ambient temperature range | | Operating: -10 to 55°C (with no icing or condensation) Storage: -25 to 70°C (with no icing or condensation) | |
| Ambient humidity range | | Operating: 35% to 85% (with no condensation) Storage: 35% to 95% (with no condensation) | |
| Insulation resistance | | 20 MΩ min. (at 500 VDC) | |
| Dielectric strength | | 1,000 VAC at 50/60 Hz for 1 minute | |
| Vibration resistance | | Destruction: 10 to 55 Hz with a 1.5-mm double amplitude for 2 hrs each in X, Y and Z directions | |
| Shock resistance | | Destruction: 500 m/s ² , 3 times each in X, Y and Z directions | |
| Degree of protection | | IEC 60529 IP40 | |
| Connection method | | Pre-wired (standard length: 2 m) | |
| Weight (packed state) | | Approx. 80 g | |
| Material | Case | ABS (Acrylonitril Butadiene Styrene) | |
| | Lens | Methacrylic resin | |
| Accessories | | Instruction manual, M3 screws, Adjustment screwdriver (only models with timer function) | |

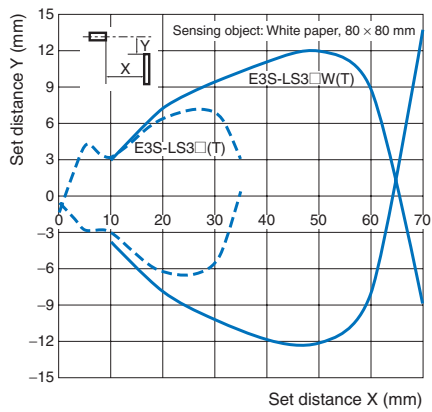
* For 80 × 80 mm.

Engineering Data (Reference Value)

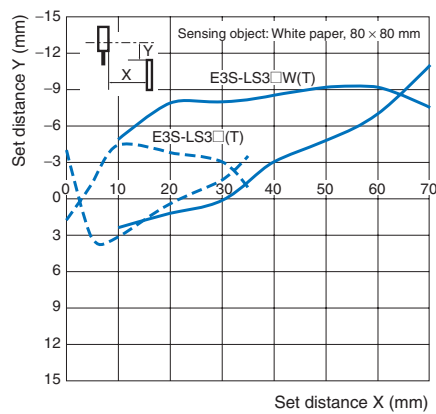
Sensing Distance vs. Materials



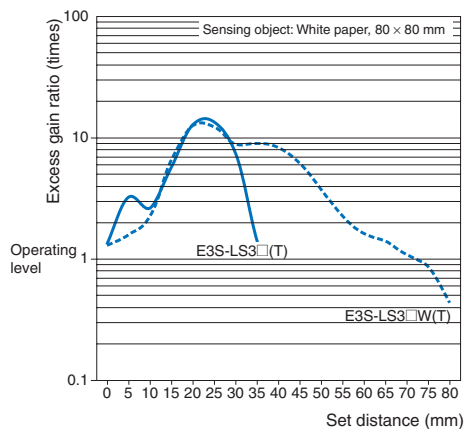
Operating Range (Left and Right)



Operating Range (Up and Down)

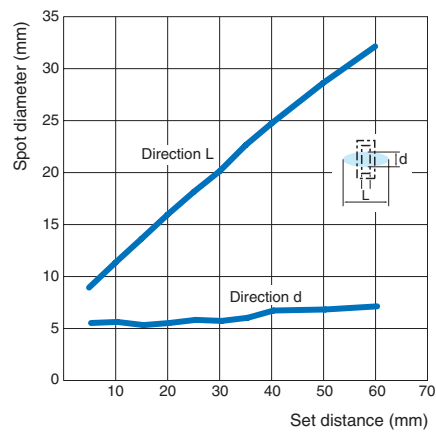


Excess Gain vs. Set Distance



Spot Diameter vs. Sensing Distance

(E3S-LS3□(T), E3S-LS3□W(T) (Common))









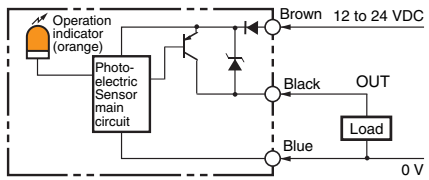






I/O Circuit Diagrams

NPN Output

| Model | Operation mode | Timing charts | Output circuit |
|-------------------------|----------------|---|----------------|
| E3S-LS3N E3S-LS3NW | Light-ON | Incident light: ON (green bar) No incident light: OFF (white bar) Operation indicator (orange): ON (green bar) OFF (white bar) Output transistor: ON (green bar) OFF (white bar) | |
| E3S-LS3NT E3S-LS3NWT | | Incident light: ON (green bar) No incident light: OFF (white bar) Operation indicator (orange): ON (green bar) with a delay timer 'T' indicated by a horizontal arrow. OFF (white bar) Output transistor: ON (green bar) OFF (white bar) | |

T: OFF-delay timer (0.1 to 1.0 s)

PNP Output

| Model | Operation mode | Timing charts | Output circuit |
|-------------------------|----------------|---|--|
| E3S-LS3P E3S-LS3PW | Light-ON | Incident light  No incident light  Operation indicator (orange) ON  OFF  Output transistor ON  OFF  |  |
| E3S-LS3PT E3S-LS3PWT | | Incident light  No incident light  Operation indicator (orange) ON  OFF  Output transistor ON  OFF  T: OFF-delay timer (0.1 to 1.0 s) | |

Safety Precautions

Refer to *Warranty and Limitations of Liability*.

WARNING

This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.



Precautions for Correct Use

Do not use the product in atmospheres or environments that exceed product ratings

Dimensions

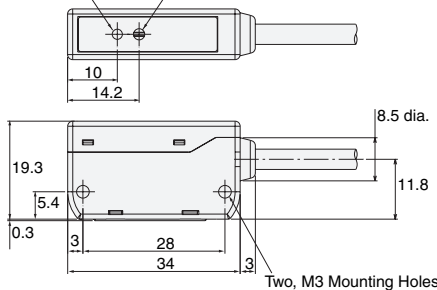
(Unit: mm)

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

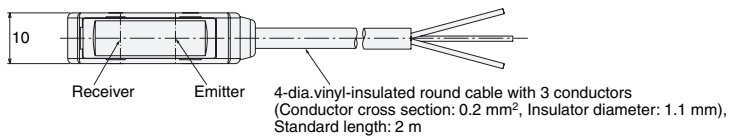
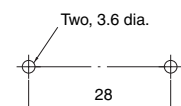
E3S-LS3N(T)/E3S-LS3P(T)
E3S-LS3NW(T)/E3S-LS3PW(T)



Operation Indicator (orange) Timer adjuster *



Mounting Holes



* The timer adjuster is only for models with the timer function.

Read and Understand This Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

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The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

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 PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

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Disclaimers

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It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

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Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

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Performance data given in this catalog 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 users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

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