

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.

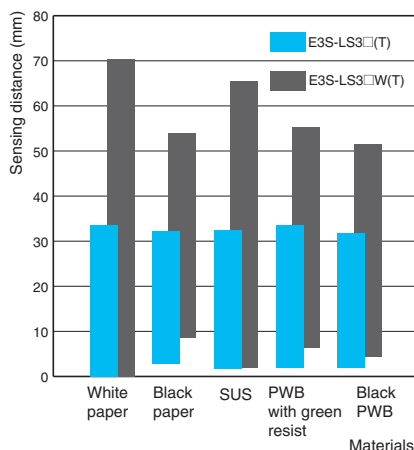
Ratings and Specifications

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)	

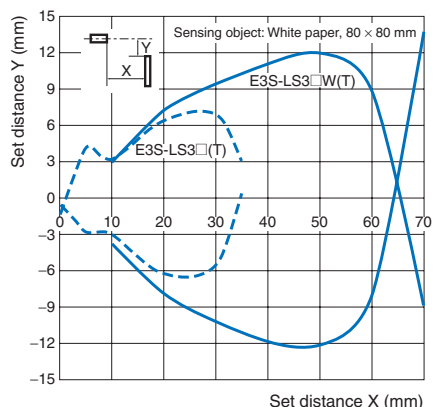
* For 80 × 80 mm.

Engineering Data (Reference Value)

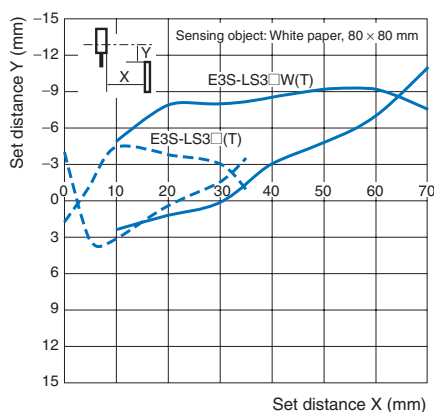
Sensing Distance vs. Materials



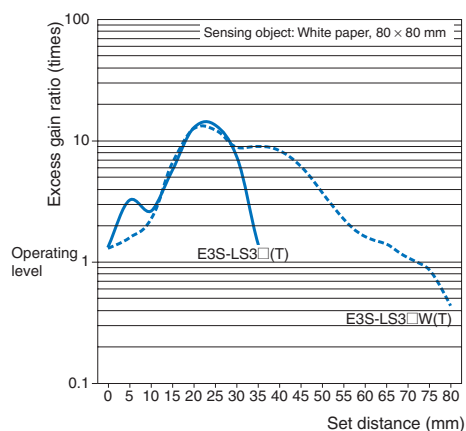
Operating Range (Left and Right)



Operating Range (Up and Down)

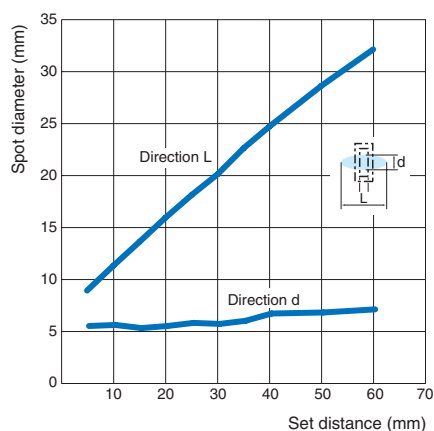


Excess Gain vs. Set Distance



Spot Diameter vs. Sensing Distance

(E3S-LS3□(T), E3S-LS3□W(T) (Common))







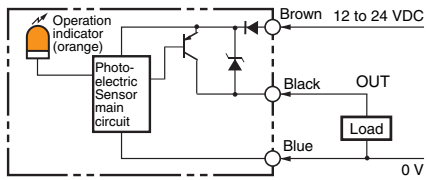








I/O Circuit Diagrams

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 after incident light ends OFF (white bar) Output transistor: ON (green bar) OFF (white bar)	

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

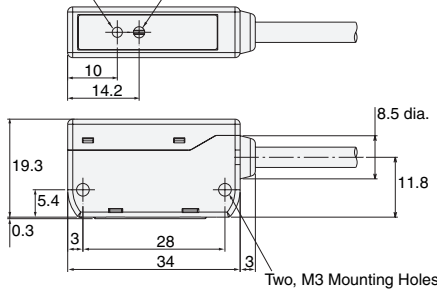
(Unit: mm)

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

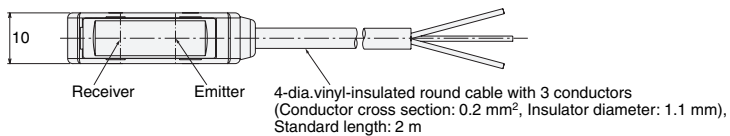
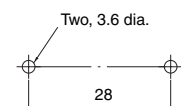
E3S-LS3N(T)/E3S-LS3P(T)
E3S-LS3NW(T)/E3S-LS3PW(T)



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.

Warranty and Limitations of Liability

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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.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

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.

DIMENSIONS AND WEIGHTS

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

PERFORMANCE DATA

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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