E3S-LS3□

CSM_E3S-LS3__DS_E_5_3

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.

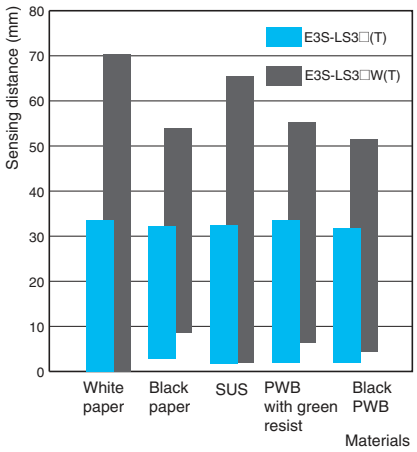
Ratings and Specifications

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)	

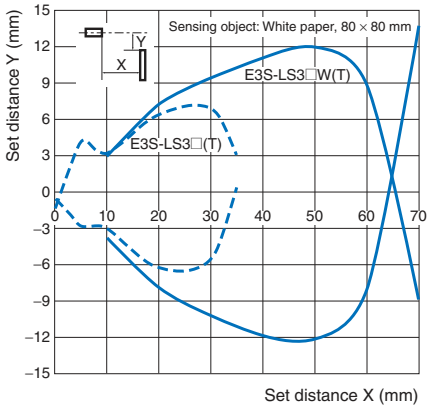
* For 80 × 80 mm.

Engineering Data (Reference Value)

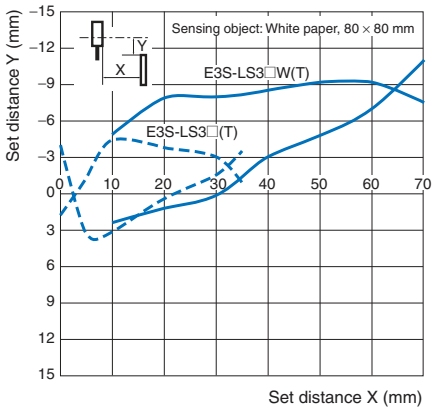
Sensing Distance vs. Materials



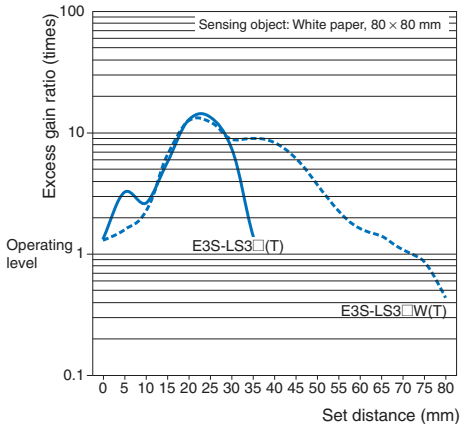
Operating Range (Left and Right)



Operating Range (Up and Down)

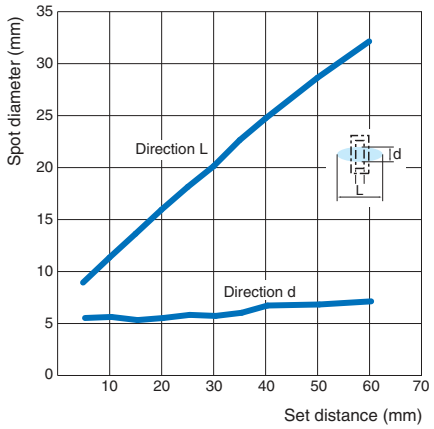


Excess Gain vs. Set Distance



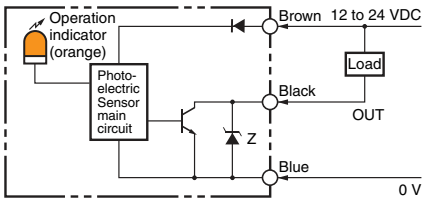
Spot Diameter vs. Sensing Distance

(E3S-LS3□(T), E3S-LS3□W(T) (Common)

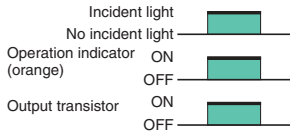
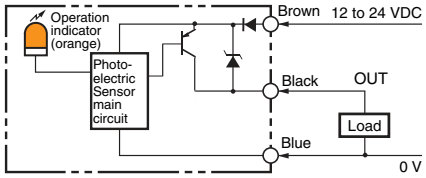
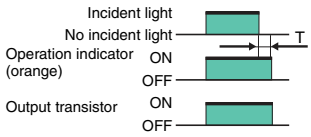


I/O Circuit Diagrams

NPN Output

Model	Operation mode	Timing charts	Output circuit
E3S-LS3N E3S-LS3NW	Light-ON	Incident light No incident light Operation indicator (orange) ON / OFF Output transistor ON / OFF	
E3S-LS3NT E3S-LS3NWT		Incident light No incident light Operation indicator (orange) ON / OFF Output transistor ON / OFF 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		
E3S-LS3PT E3S-LS3PWT		 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

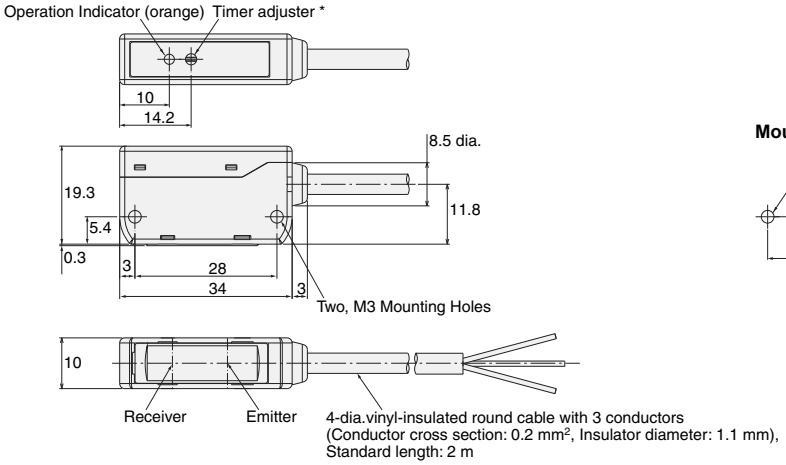
Do not use the product in atmospheres or environments that exceed product ratings

Dimensions

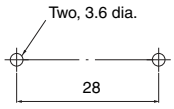
(Unit: mm)

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

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



Mounting Holes



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

Terms and Conditions Agreement

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.

Warranties.
(a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.
(b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE
PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE.
Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.
See http://www.omron.com/global/ or contact your Omron representative for published information.

Limitation on Liability; Etc.
OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.
Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

Suitability of 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 OR IN LARGE QUANTITIES 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.

Programmable Products.
Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

Performance Data.
Data presented in Omron Company websites, catalogs and 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. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

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 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 consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

Errors and Omissions.
Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

2023.2

In the interest of product improvement, specifications are subject to change without notice.

OMRON Corporation
Industrial Automation Company

http://www.ia.omron.com/