


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.

Ordering Information

Sensors

 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 *	Without	E3S-LS3N 2M	E3S-LS3P 2M
				With	E3S-LS3NT 2M	E3S-LS3PT 2M
			 10 to 60 mm *	Without	E3S-LS3NW 2M	E3S-LS3PW 2M
			With	E3S-LS3NWT 2M	E3S-LS3PWT 2M	

* For white paper: 80 × 80 mm.

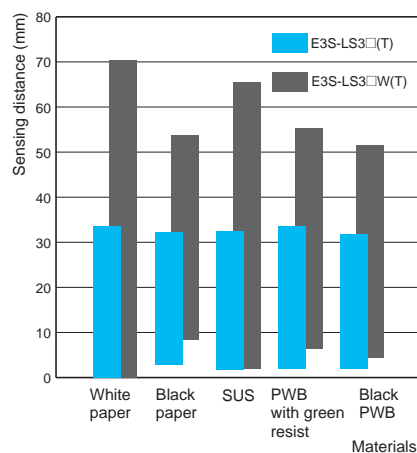
Ratings and Specifications

Item	Sensing method Model	Convergent-reflective	
		E3S-LS3N(T)/-LS3P(T)	E3S-LS3NW(T)/-LS3PW(T)
Sensing distance	White paper *	20 to 35 mm	10 to 60 mm
	Black paper *	20 to 30 mm	15 to 50 mm
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		
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)		

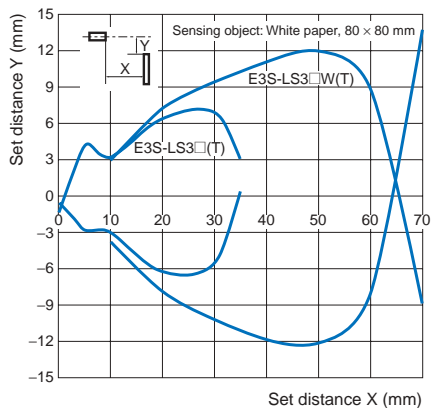
* For 80 × 80 mm.

Engineering Data (Typical)

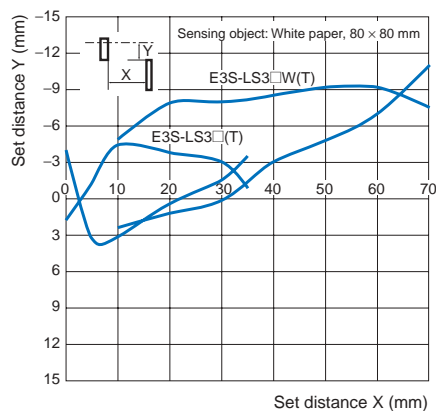
Sensing Distance vs. Materials



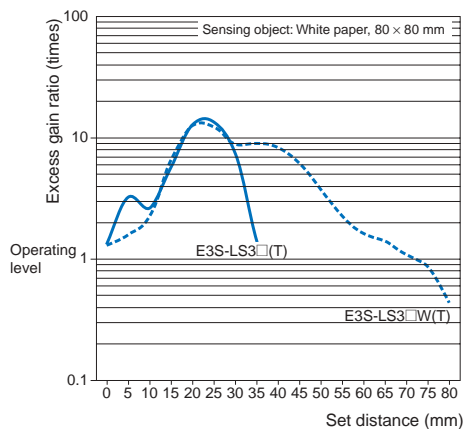
Operating Range (Left and Right)



Operating Range (Up and Down)

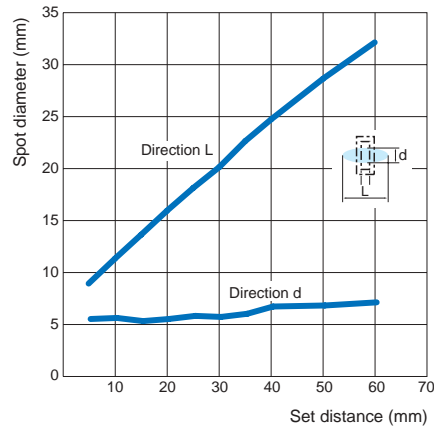


Excess Gain vs. Set Distance



Spot Diameter vs. Sensing Distance

(E3S-LS3□(T), E3S-LS3□W(T) (Common))









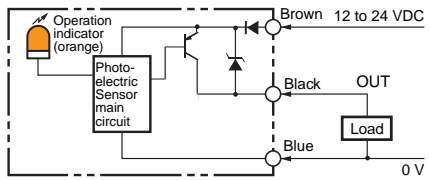






I/O Circuit Diagrams

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' shown after the light turns off. 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

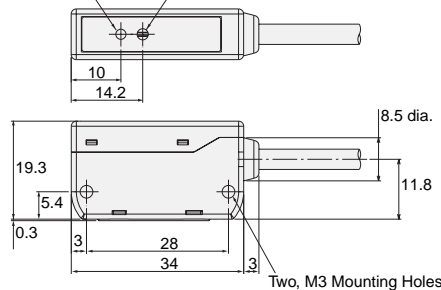
(Unit: mm)

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

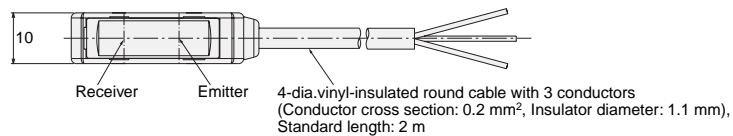
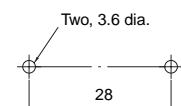
E3S-LS3N(T)/E3S-LS3P(T)
E3S-LS3NW(T)/E3S-LS3PW(T)



Operation Indicator (orange) Timer adjuster *



Mounting Holes



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

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- 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.

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2008.11

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