

Transparent Object Sensor

E3S-DB



- Stable recognition of all transparent objects
- Detects product gaps to 3mm
- Optimum set-up in a few seconds



Sensing performance redefined

Omron's E3S-DB retro-reflective sensor is the first in a new generation of high-performance sensors designed for packaging machines. Developed in close consultation with Omron's leading customers in the Food & Beverage industry, it is designed for the stable detection of all transparent objects, independent of shape, colour, or thickness.

Features



361° - the perfect match

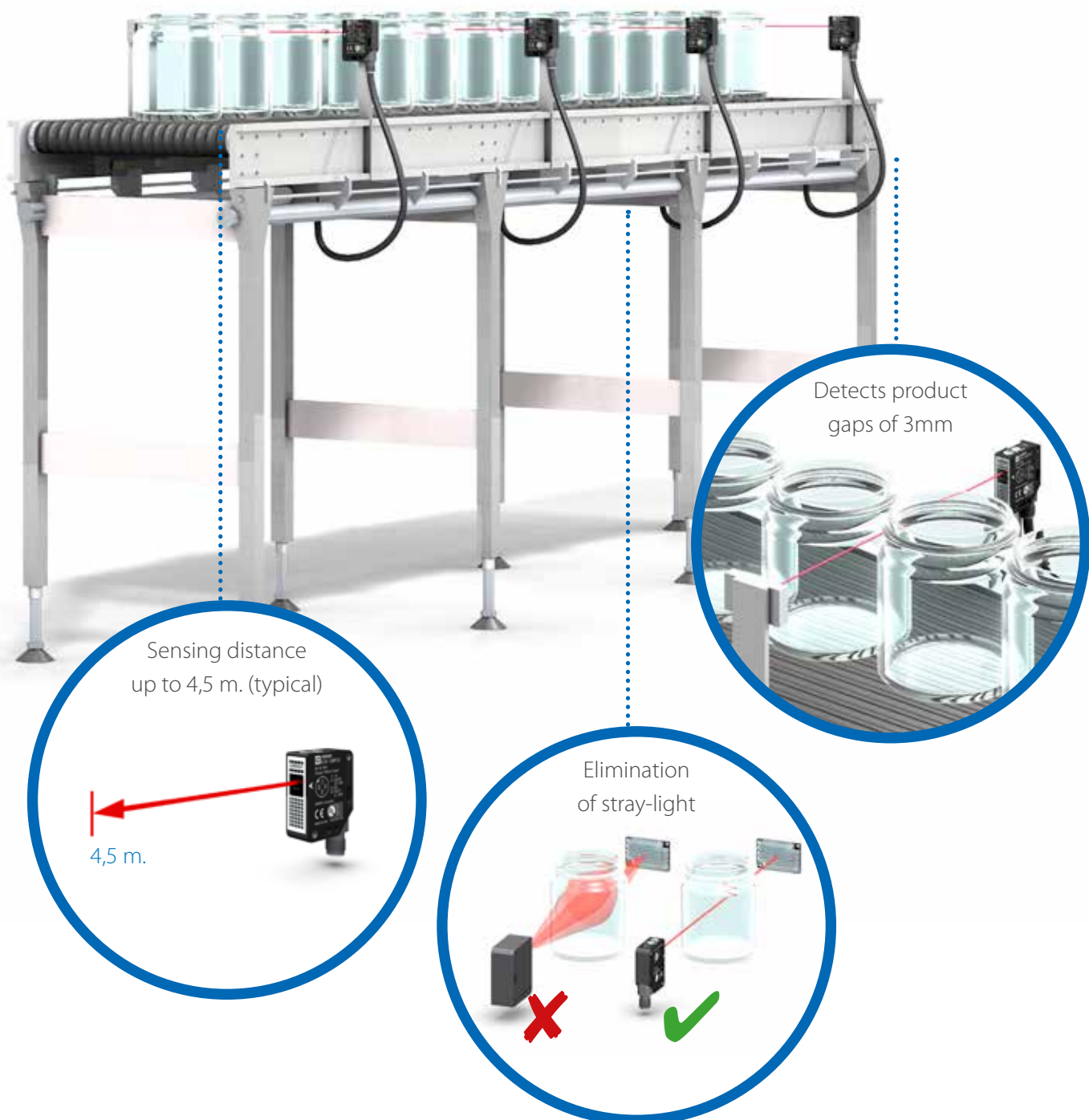


The E3S-DB follows the Omron 361° approach where you select what you really need: not more – not less. E3S-DB is part of the PRO-Plus line, providing tailored performance for specific applications in industry.

For more information, visit www.industrial.eu.com/products/technologies/361.

Stable operation

The E3S-DB detects all types of transparent objects such as glass bottles, PET bottles, transparent trays and packaging films. The sensor provides stable operation under all ambient conditions resulting in fewer sensor failures, thus less downtime of your machine.



Smart Teach

The E3S-DB features models with multi-turn trimmer pots and models with “Smart Teach ”- an enhanced teaching method combining a seamless threshold setting using a one-turn trimmer and One-push-teach. The teach button automatically adjusts light emission power and sensitivity based on the sensing distance and selected threshold. This provides clear information about the sensor’s settings and allows easy and fast copying of sensor settings.



Benefits of Smart Teach:

- Pre-selection of optimized threshold for maximum operating stability
- Adjustment of optimum light emission power and sensitivity within 3 seconds
- Clearly visible information about operational threshold setting
- Fast copying of settings
- Reduction of setting time from 60s to 3s per sensor

Monitoring tool

Using a PC-interface, the monitoring tool optimised control over all sensor parameters using remote devices. Furthermore, in conjunction with SmartTeach, it enables analysis of the minimum attenuation of an object.

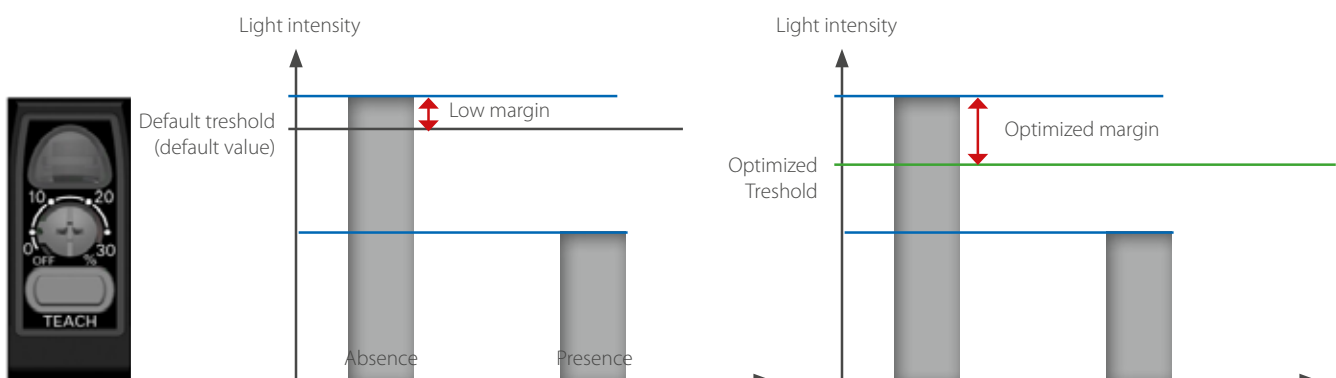


Threshold optimisation

To achieve the most reliable long-term operation, the threshold for transparent-object detection should be exactly between the light intensity levels for object absence and object presence. This optimum or 'middle' position can be quickly determined and clearly indicated using the monitoring tool, as shown.

From: Default threshold setting

To: Smart Teach = Optimum settings



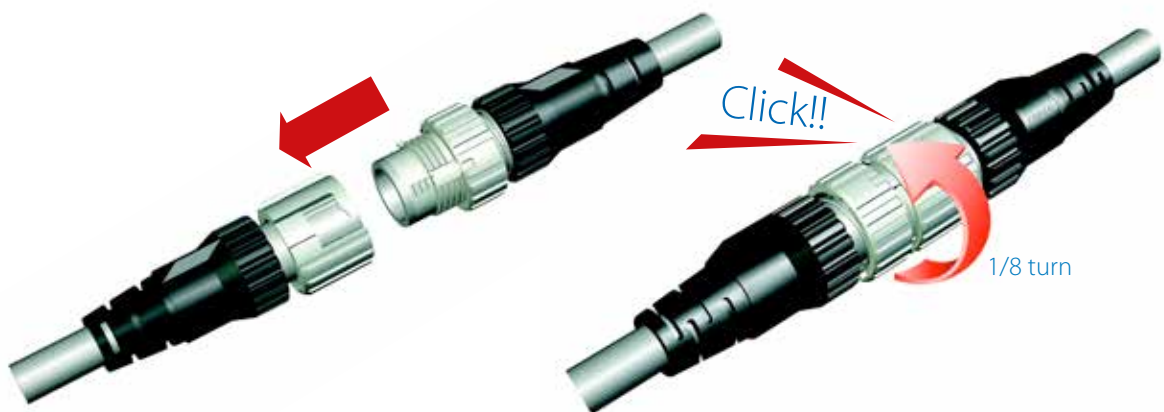
Technologies

Unique optical system

The unique optical system of E3S-DB features a collimated beam with a special aperture that eliminates the smallest amounts of stray light, which is a potential risk for so called "bottle-lens-effect". This effect can occur when stray light is magnified in reflections by a filled bottle. E3S-DB is immune against these effects and can detect all transparent objects reliably. By using the latest pin-point LED technology, the E3S-DB provides high resolution and low hysteresis for short range and long distance up to 4,5 m.

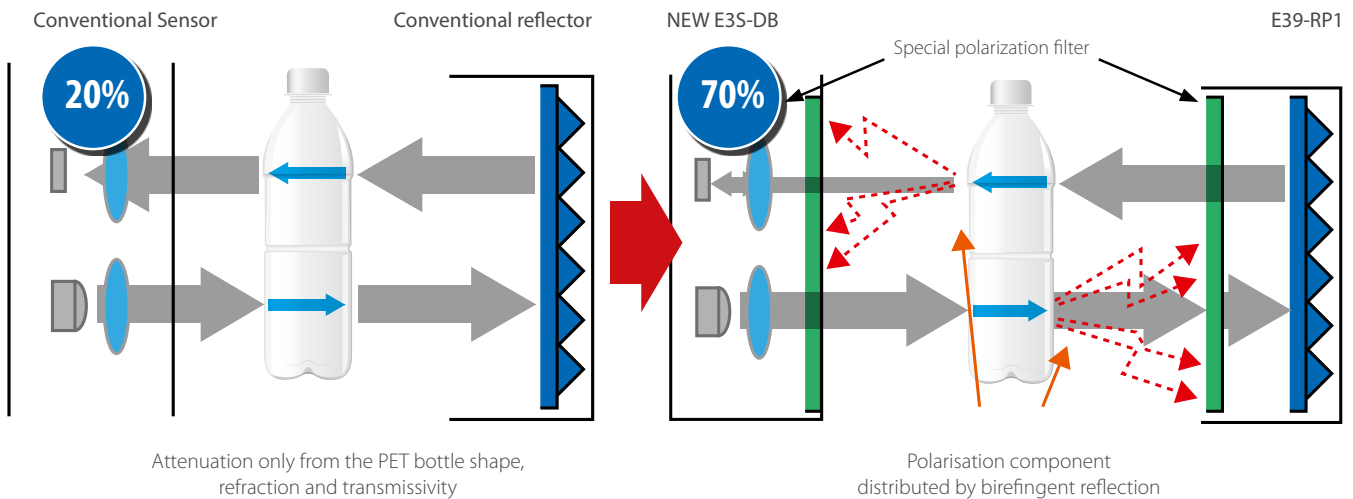
Smart Click

Omron's Smart Click cable connector is a fast and secure way to join I/O cables. Compatible with conventional M12 screw connectors, the Smart Click only requires a short (1/8th) turn to make perfectly sealed (IP67/IP69K) connections, removing the problems of under or over tightening. The bayonet mechanism stays locked under all conditions.



P-Opaquing

E3S-DB features special polarising filters. In combination with p-opaquing reflectors (e.g. E39-RP1) PET bottles cause very high attenuation of light levels when breaking the beam and appear to the sensor like a non-transparent (opaque) object. As a result the user has very high sensing stability even in dusty or humid environments.



*Note: The above picture is simplified to explain principle of P-Opaquing. It does not reflect optics of E3S-DB"

Auto-compensation (AC³)

Auto Compensation Control for Contamination compensates for decreasing light levels due to dust or temperature changes and therefore highly reduces the need for sensor re-teaching.

AC³ can be activated by pressing the teach button for more than 10s.



Transparent Sensing Portfolio - Food & Beverage Industry

The E3S-DB sensor is the latest addition to Omron's extensive range of transparent-object sensing solutions for applications in the food & beverage industry.

E3S-DB

The sensor for all transparent objects



E3Z-B

Compact Transparent sensor ideal for secondary packaging



E3ZM-B

Sensor with co-axial optics / p-opaqing for frequently washed-down machines (e.g. PET blowers).



E3FA-B/ E3FB-B

M18 format sensor with co-axial optics for detection independent of sensor orientation



E3X

Advanced fiber sensors with remote amplifiers for use in limited spaces are demanding environments.



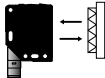
E3NC

"High resolution Laser sensor with separate amplifier for high precision detection"






Ordering information



Sensors

Sensing method	Appearance	Sensitivity adjustment	Connection method	Sensing distance, typ.	Model		
					NPN output	PNP output	
Retro-reflective with MSR function		SmartTeach	Pre-wired (2 m)	4.5 m with E39-R8	E3S-DBN11 2M	E3S-DBP11 2M	
			Connector (M12, 4 pins)		E3S-DBN21	E3S-DBP21	
			Pigtail Connector (M12, 4 pins)		E3S-DBN31	E3S-DBP31	
			Pre-wired (2 m)		Narrow beam	E3S-DBN12 2M	E3S-DBP12 2M
			Connector (M12, 4 pins)			E3S-DBN22	E3S-DBP22
			Pigtail Connector (M12, 4 pins)			E3S-DBN32	E3S-DBP32
		Trimmer	Pre-wired (2 m)	4.5 m with E39-R8	E3S-DBN11T 2M	E3S-DBP11T 2M	
			Connector (M12, 4 pins)		E3S-DBN21T	E3S-DBP21T	
			Pigtail Connector (M12, 4 pins)		E3S-DBN31T	E3S-DBP31T	
			Pre-wired (2 m)		Narrow beam	E3S-DBN12T 2M	E3S-DBP12T 2M
			Connector (M12, 4 pins)			E3S-DBN22T	E3S-DBP22T
			Pigtail Connector (M12, 4 pins)			E3S-DBN32T	E3S-DBP32T




Reflectors

Sensor	Sensing distance, typ.	Appearance	Dimensions [mm]	Remarks	Model
E3S-DB__1(T)	0 to 4.5 m		100 × 100	A Reflector is not provided with the Sensor.	E39-R8
	0 to 3.5 m		60 × 40	A Reflector is not provided with the Sensor.	E39-R15
E3S-DB__2(T)	0 to 700 mm		35 × 30	A Reflector is not provided with the Sensor. For narrow gap detection	E39-R21

Mounting brackets

Appearance	Material	Remarks	Model
	SUS304	A Mounting bracket is not provided with the Sensor.	E39-L192
	SUS304	A Mounting bracket is not provided with the Sensor.	E39-L193

Sensor I/O connectors

Size	Specifications	Appearance	Cable		Model
M12 (4 pins)	Standard PVC	Straight 	2 m	4-wire	XS2F-M12PVC4S2M-EU
			5 m		XS2F-M12PVC4S5M-EU
		Angled 	2 m		XS2F-M12PVC4A2M-EU
			5 m		XS2F-M12PVC4A5M-EU
	Smartclick Polyurethane	Straight 	2 m		XS5F-D421-D80-P
			5 m		XS5F-D421-G80-P

Specifications

Sensing method		Retro-reflective with MSR function			
Item	Model	E3S-DBN_1	E3S-DBN_1T	E3S-DBN_2	E3S-DBN_2T
		E3S-DBP_1	E3S-DBP_1T	E3S-DBP_2	E3S-DBP_2T
Sensing distance, typ. ^{*1}		0 to 4.5 m (with E39-R8)		0 to 700 mm (with E39-R21)	
Sensing distance, recommended ^{*2}		0 to 3.5 m (with E39-R8)		0 to 500 mm (with E39-R21)	
Light source (wavelength)		Red LED (624 nm)			
Power supply voltage		10 to 30 VDC, including 10% ripple (p-p)			
Current consumption		720 mW max. (24 VDC, 30 mA)			
Control output		Load power supply voltage: 30 VDC max., Load current: 100 mA max. (Residual voltage: 2 V max.) NPN/PNP transistor output (depending on model)			
Operating modes		OUT1: L-ON/OUT2: D-ON (antivalent output)			
Protection circuits		Reversed power supply polarity protection, Output short-circuit protection, Reversed output polarity protection, Missconnection protection, Mutual interference suppression			
Response time		0.5 ms			
Sensitivity adjustment		SmartTeach	11-turn trimmer	SmartTeach	11-turn trimmer
Ambient illumination		Incandescent lamp: 3,000 lx max./Sunlight: 10,000 lx max.			
Ambient temperature range		Operating: -25 to 60°C/Storage: -40 to 70°C (with no icing or condensation)			
Ambient humidity range		Operating: 35 to 85% RH/Storage: 35 to 95% RH (with no condensation)			
Insulation resistance		20 MΩ min. at 500 VDC			
Dielectric strength		1,000 VAC at 50/60Hz for 1 min. Between current-carrying parts and case			
Vibration resistance		Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X,Y,Z directions			
Shock resistance		Destruction: 500 m/s ² , 3 times each in X,Y,Z directions			
Degree of protection		IEC: IP67, DIN 40050-9: IP69K			
Connection method		Pre-wired cable (standard length: 2 m) or M12 4-pin connector or Pigtail (0.3 m/M12 4-pin)			
Indicators		Light indicator (orange), Stability indicator (green)			
Weight (packed state)		Approx. 40 g			
Materials	Housing	PBT/ABS			
	Lens	PMMA (Polymethylmethacrylate)			
	Indication	PMMA (Polymethylmethacrylate)			
	Buttons	Elastomer			
	Cable	PVC			
Accessories		Instruction manual			

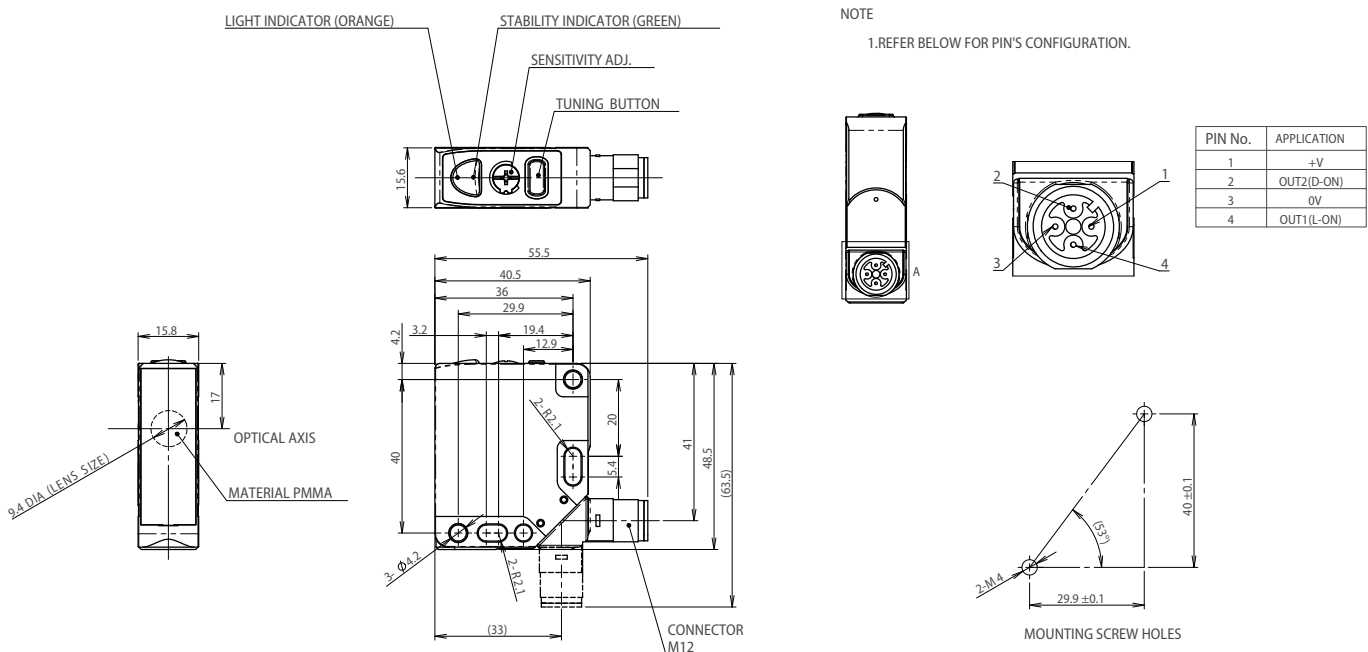
*1 Maximum sensing distance for typical reflector and sensor

*2 Operating sensing distance recommended for factory environments

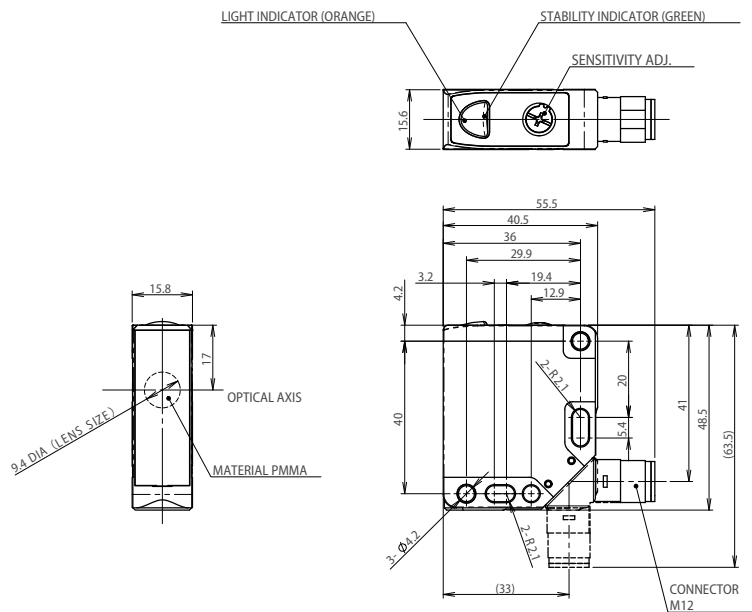
Dimensions

Sensor

E3S-DB_

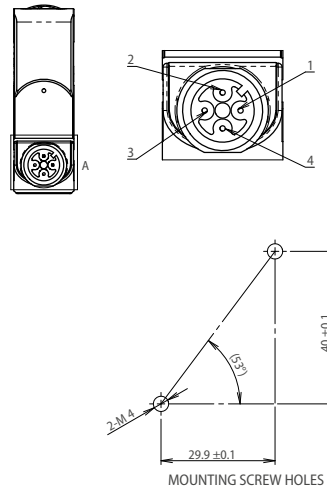


E3S-DB___(T)



NOTE

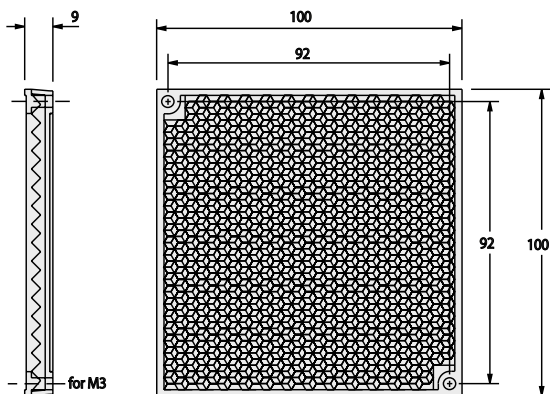
1.REFER BELOW FOR PIN'S CONFIGURATION.



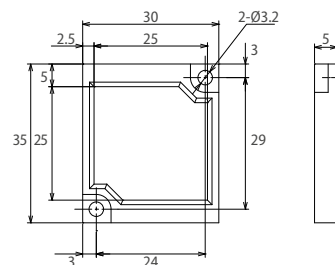
PIN No.	APPLICATION
1	+V
2	OUT2(D-ON)
3	0V
4	OUT1(L-ON)

Reflector

E39-R8

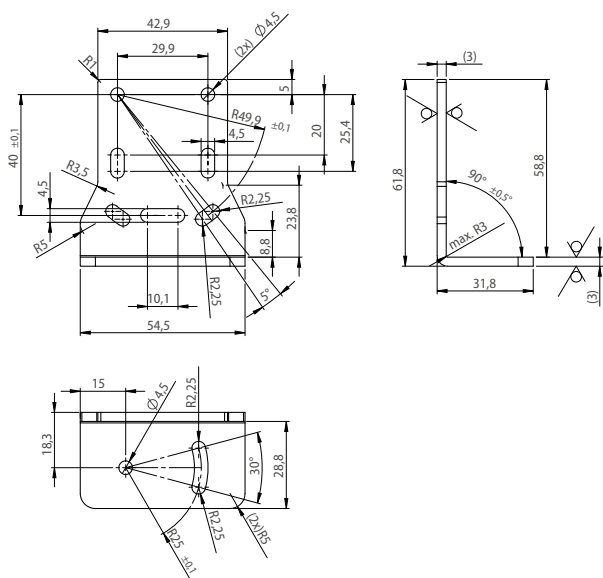


E39-R21

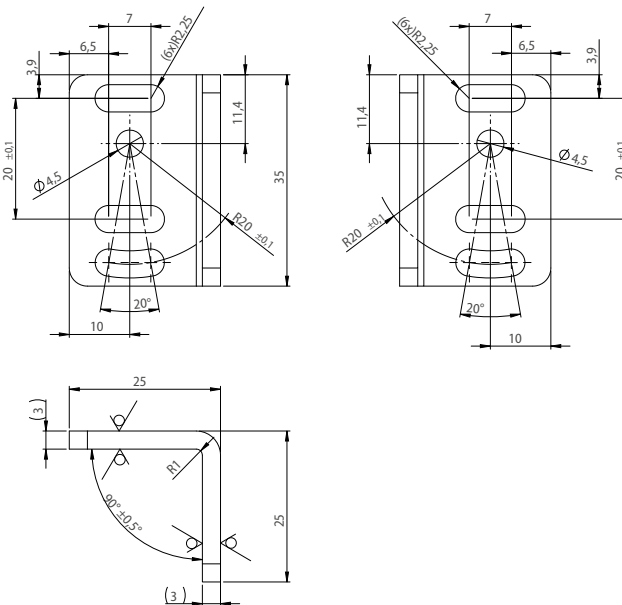


Mounting bracket

E39-L192



E39-L193



Would you like to know more?

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