

Transparent Object Detection  
Photoelectric Sensor  
E3S-DB

## Reliable Detection of Transparent Objects

These Photoelectric Sensors Contribute to the Food and Packaging Industries  
by Detecting the Objects Regardless of Changes in Materials, Shapes, and Types.





# Stably Detect Various Types of Transparent Workpieces Easier to Set Up and Use

Transparent Object Detection Photoelectric Sensor

## E3S-DB

High detection capabilities for stable detection of a wide range of transparent workpieces in the food and packaging industries, including glass bottles, PET bottles, films, and trays. You can increase equipment operating rates and reduce commissioning and maintenance work.



Improved Equipment Operating Rates

## Prevent Intermittent Line Stoppage and Shorten Cycle Time with High Detection Capabilities

### Increase Operating Efficiency for Transparent Bottle Detection

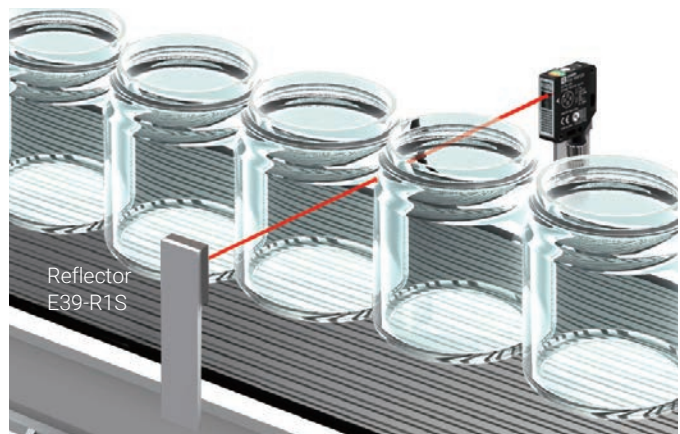
Typical Problems

Detection of transparent bottles with photoelectric sensors is not stable, which prevents increasing equipment operating rates. Sensors have to be selected on a case-by-case basis or expensive laser sensors have to be used.



With the E3S-DB

These Photoelectric Sensors can stably detect transparent glass bottles so that you can increase equipment operating rates.

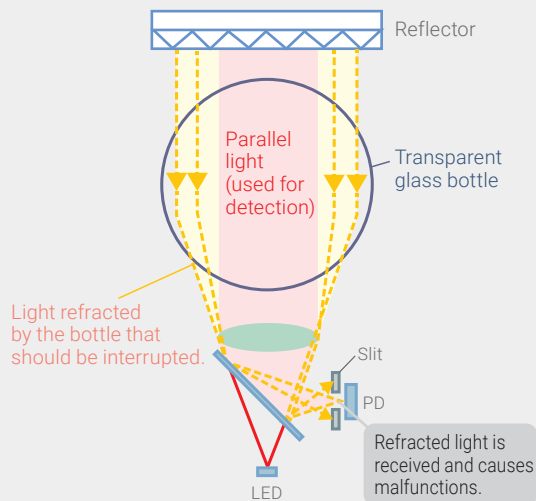


New technology

### This Is How Double-slit Optical Design

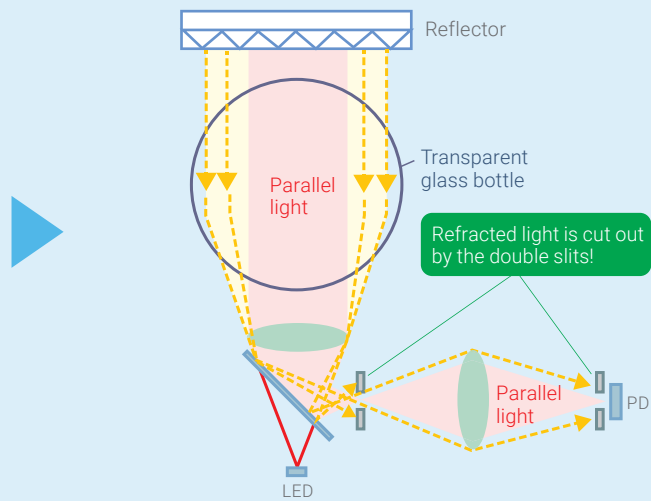
Model with a slit

Light refracted from the bottles increases the incident light, making detection unstable.



E3S-DB

New technology ensures reception of only parallel light to stabilize detection.



## Three Benefits for Transparent Object Detection



**Improved Equipment Operating Rates**

High detection capabilities for stable detection.



**Reduced Commissioning and Maintenance Work**

Easy setup and operation.



**High Usability**

Reliable Resistance to Water and Detergents, and Ease of Use.

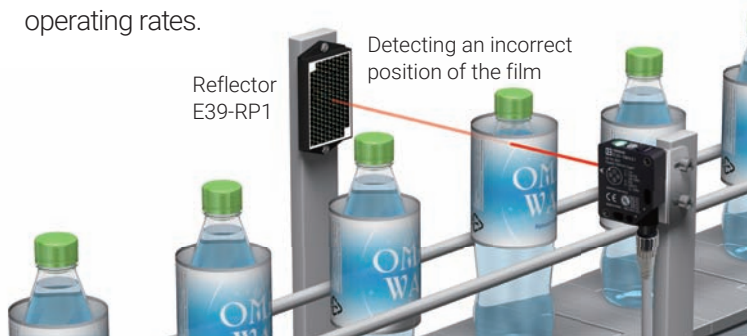
## Increase Operating Efficiency to Detect Loose Shrinkwrapping

Typical Problems

Detection of transparent film is not stable, which prevents increasing equipment operating rates.

With the E3S-DB

P-opaquing function ensures attenuation of 70%\* even with films with little difference in light levels. Stable detection lets you increase equipment operating rates.

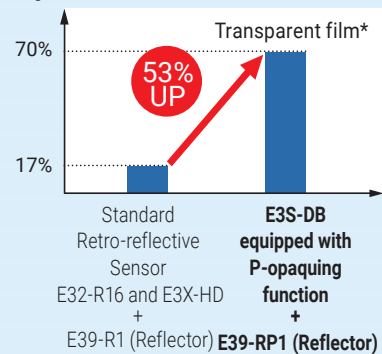


This Is How

### P-opaquing function

This uses double refraction to cut out polarized components with OMRON's unique polarization filter.

Light attenuation



\*The data are obtained by OMRON from measurement of cigarette pack film.

## Shorten Cycle Time for Transparent Bottle Detection

Typical Problems

When the pitch between glass or PET bottles on conveyor belts is too tight, sensors do not have enough time to turn ON and OFF, which prevents shortening the cycle time.

With the E3S-DB

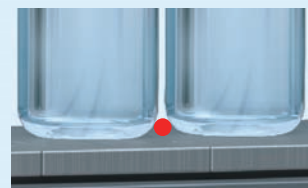
The narrow beam enables incident light with gaps as narrow as 3 mm.\* You can reduce the pitch between workpieces to maximize conveyance.

\*When using the E39-R21 Reflector, adjusting the threshold to 25% or less and using stationary workpieces.



This Is How

### Narrow beam diameter of minimum 2.5 mm



The E3S-DB has a response time of 0.5 ms for a pitch of 5 mm, so detection is possible at a conveyor speed of up to 4 m/s. (With the E3S-DB□□□(T) and a sensing distance of 200 mm.)



Reduced Work

# Easy Setup and Operation; Reduced Commissioning and Maintenance Work

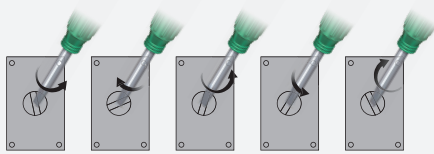
## Large Reductions in Adjustment Time for Sensitivity and Threshold

### Standard Sensor with Multi-turn Adjuster

You have to adjust the sensitivity adjuster on each Sensor individually to achieve the optimum sensitivity for each.

### Examples for Setting Five Sensors

With 11 turns, you end up turning the adjuster left and right. Sensitivity depends on the installation location, so all Sensors have to be adjusted individually.

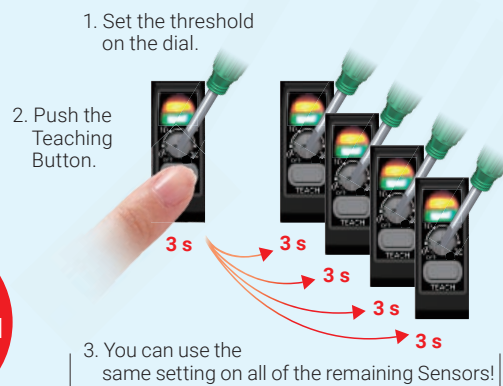


60 s   60 s   60 s   60 s   60 s

**60 s × 5 Sensors = 300 s**

### E3S-DB Smart Teaching Type

Set the optimum threshold and sensitivity by adjusting the setting to the same scale (2 s) and pushing a button (1 to 5 s).



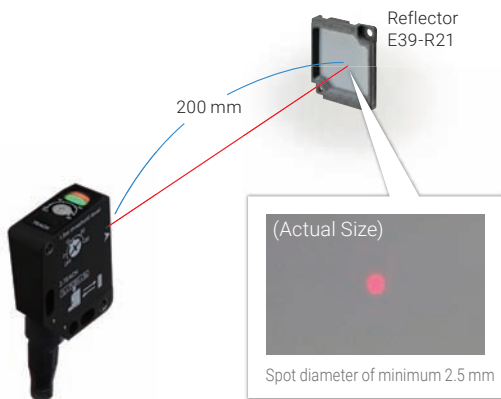
**3 s × 5 Sensors = 15 s**

**Adjustment work reduced by 95%.**

## Visualization Reduces Work in Changeovers and Installation

### ● Visible Spot

The visible spot in the Reflector lets you easily adjust the height of the optical axis for detecting different height of workpieces and reduces time required for adjustment.



### ● Indicators That Are Easy to See from Any Angle

Large, easy-to-see light and stability indicators let you easily check operation from any angle.





High Usability

# Reliable Resistance to Water and Detergents, and Ease of Use

## Reliable Structure That Resists Water and Detergents

### ● IP69K Water Resistance

Withstands harsh environments with high temperatures and high water pressures.



IP69K Degree of Protection  
IP69K is defined in DIN 40050 Part 9 of the German standards for protection against high temperatures and high water pressures.

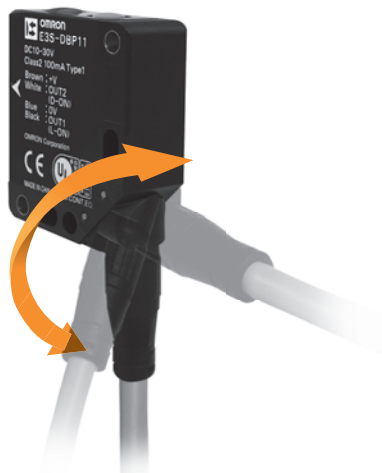
### ● Resistance to Detergents Certified by Ecolab

Third-party certification has been received from the Ecolab company in Europe for applications in water-washed environments.



## Simple Wiring with Movable Connectors and Cables

Connectors and cables can be rotated and run vertically or horizontally for well organized wiring.



## Information Printed on Sensor Eliminates the Need for Manuals Onsite

Smart Teaching and wiring information is printed on the Sensor to eliminate the need for manuals onsite.



Smart Teaching Information

Wiring Information

# Total Solutions to Increase Equipment Operating Rates

## Example in Beverage Line

### Benefit Icons



#### Improved Equipment Operating Rates

Devices that ensure rapid recovery or stable operation.



#### Reduced Work

Devices that reduce the work required for setup, adjustment, or changeovers.

Transparent Object Detection  
Photoelectric Sensors



### E3S-DB



#### Reduced Work with Easy Threshold Setting for Each Transparent Object

Smart Teaching

#### Reduced Work in Changeovers and Adjustment

Small spot.

[E3S-DB Datasheet \(E439\)](#)

Digital  
Temperature  
Controllers



### E5□C Series



#### Reduced Work in Creating Communications Programs

Programless communications.

#### Reduced Time in Adjusting PID Values

Control simulator.

[E5□C Pamphlet \(H220\)](#)  
[E5□C/E5□C-T Datasheet \(H177\)](#)

Machine Automation  
Controllers



### NJ/NX Series

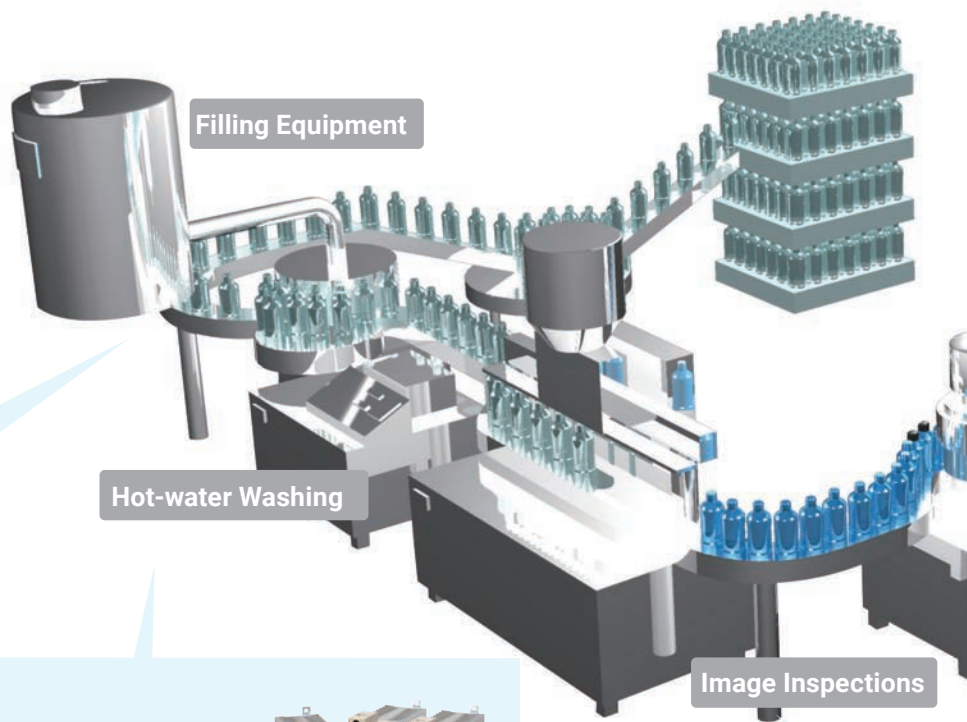


#### Rapid Recovery with Error Detection for Various Devices



- Records device status when errors occur.
- High-speed execution of user programs.
- Function blocks to monitor safety device operation time for preventive maintenance.

[NJ/NX Series Catalog \(P089\)](#)



AC Servomotors and Servo Drives

### R88M-K and R88D-KN□-ECT G5 Series



#### Rapid Recovery with Servomotor Torque Error Monitoring

Torque error monitoring.



#### Reduced Work in Changeovers and Adjustment

Parameter setting and switching.

[G5 Series Catalog \(I815\)](#)

Multi-function Compact  
Inverters



### MX2 Series V1 Type



#### Reduced Work in Changeovers and Adjustment

Parameter setting and switching.

[MX2 Series Type V1 Catalog \(I920\)](#)

Solid-state Relays  
with Built-in CTs



### G3PF



#### Rapid Recovery by Identifying Faulty Locations

- SSR short-circuit failure detection.
- Heater burnout detection.

Smart Fiber Amplifier Units

### E3NX-FA



#### Alarm Output for Reduced Light Level for Preventive Maintenance

Sensor Incident level monitoring.



#### Reduced Work in Changeovers and Adjustment

Threshold setting.

[E3NX-FA Pamphlet \(E426\)](#)

# and Reduce Work in Setup and Maintenance

Programmable  
Terminals

## NA Series



### Reduced Work in Setting and Adjusting Various Devices

Set and change parameters on a touch panel.



### Preventive Maintenance for Various Devices

Monitors device status to quickly identify error locations.

### Reduced Work in Changeovers

Records device parameters for each product to quickly and accurately make changeovers.

[NA Series Catalog \(V457\)](#)

Transparent Object Detection  
Photoelectric Sensors

## E3S-DB



### Detect All Sorts of Transparent Objects with High Sensitivity for Stable Operation

- P-opaqing function.
- Optimum optical design.

[E3S-DB Datasheet \(E439\)](#)

Digital  
Temperature  
Controllers

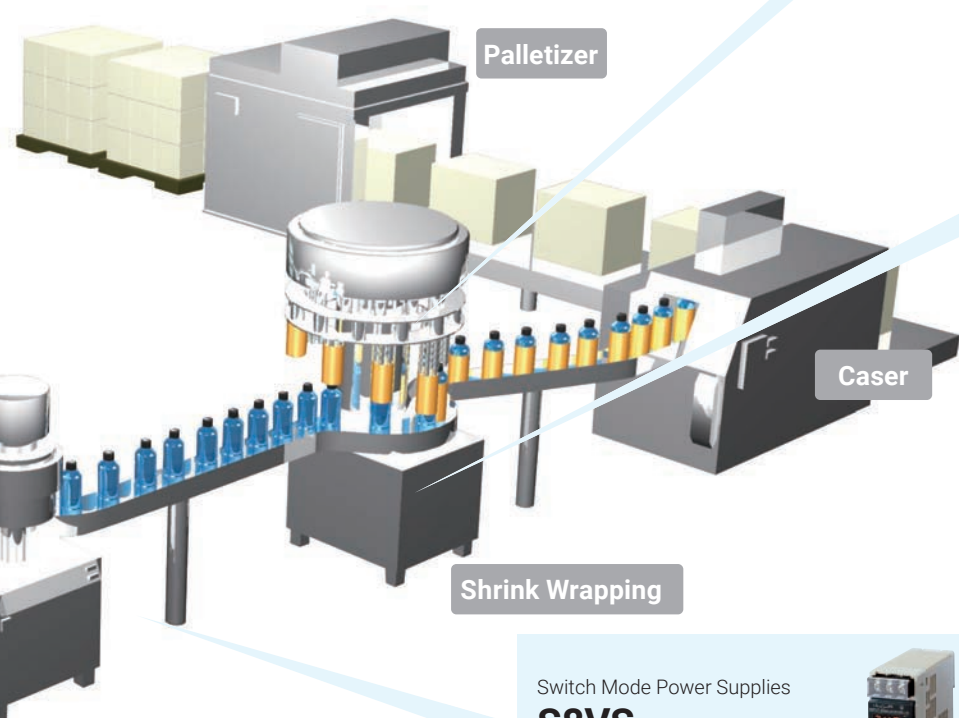
## E5□C Series



### Rapid Recovery by Identifying Faulty Locations with Temperature Control

- Heater burnout detection.
- Temperature sensor burnout detection.

[E5□C Pamphlet \(H220\)](#)  
[E5□C/E5□C-T Datasheet \(H177\)](#)



Inspection for Tilted Caps

Switch Mode Power Supplies

## S8VS



### Long-life Power Supplies for Preventive Maintenance against Stoppage

Maintenance forecast monitor.

[S8VS Datasheet \(T026\)](#)

Buffer Blocks

## S8T-DCBU



### Stable Operation because Power Is Supplied during Momentary and Long-term Power Interruptions

[S8T-DCBU](#)

Vision Systems

## FH Series



### Stable Operation by Preventing Excessive Filtering Out

High-accuracy OCRs.



### Reduced Work in Dictionary Registration

Built-in dictionary.

[FH Series Catalog \(Q197\)](#)

OMRON helps you increase equipment operating rates while reducing work. We also provide a wide range of safety components for machine and equipment safety measures.

Safety Light Curtains

## F3SG-R Series F3SJ Series

Finger, Arm, and Body Protection

[F3SG-R Series Catalog \(F094\)](#)

[F3SJ Series Catalog \(F074\)](#)

Safety Door Switches

## D4SL-N Series D41D Series

Open/Close Detection of Mechanical Guards and Covers

[D4SL-N Catalog \(C146\)](#)

[D41D Catalog \(F115\)](#)

Emergency Stop Switches

## A165E Series A22E Series

Emergency Stopping of Machines

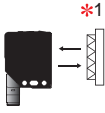
[A165E](#)  [A22E](#)

\*Catalog numbers are shown in the brackets "( )".

# Ordering Information

## Sensors

Red light

Sensing method	Appearance	Sensitivity adjustment	Connection method	Sensing distance *2	Model		
					NPN output	PNP output	
Retro-reflective (with MSR function)		Smart Teaching	Pre-wired (2 m)	3.5 m	E3S-DBN11 2M	E3S-DBP11 2M	
			Connector (M12)		E3S-DBN21	E3S-DBP21	
			M12 Smartclick pre-wired connector (0.3 m)		(with E39-R8)	E3S-DBN31 0.3M	E3S-DBP31 0.3M
			Pre-wired (2 m)		Narrow beam 0.5 m (with E39-R21)	E3S-DBN12 2M	E3S-DBP12 2M
			Connector (M12)			E3S-DBN22	E3S-DBP22
			M12 Smartclick pre-wired connector (0.3 m)			E3S-DBN32 0.3M	E3S-DBP32 0.3M
		Eleven-turn adjuster	Pre-wired (2 m)	3.5 m	E3S-DBN11T 2M	E3S-DBP11T 2M	
			Connector (M12)		E3S-DBN21T	E3S-DBP21T	
			M12 Smartclick pre-wired connector (0.3 m)		(with E39-R8)	E3S-DBN31T 0.3M	E3S-DBP31T 0.3M
			Pre-wired (2 m)		Narrow beam 0.5 m (with E39-R21)	E3S-DBN12T 2M	E3S-DBP12T 2M
			Connector (M12)			E3S-DBN22T	E3S-DBP22T
			M12 Smartclick pre-wired connector (0.3 m)			E3S-DBN32T 0.3M	E3S-DBP32T 0.3M

\*1. A Reflector is not included with the Sensor. Select a Reflector (sold separately) according to the application.

\*2. There is no close-range dead zone between the Sensor and Reflector.

## Ratings and Specifications

Item	Model	Sensing method	Retro-reflective (with MSR function)			
			NPN output	E3S-DBN□1T	E3S-DBN□2	E3S-DBN□2T
			E3S-DBP□1	E3S-DBP□1T	E3S-DBP□2	E3S-DBP□2T
Sensing distance			0 to 3.5 m (with E39-R8)		0 to 0.5 m (with E39-R21)	
Power consumption			720 mW max. (current consumption: 30 mA max. at power supply voltage of 24 VDC)			
Control output			Load power supply voltage: 30 VDC max., Load current: 100 mA max. (Residual voltage: 2 V max.) Open-collector output (NPN/PNP output depending on model.)			
Response time			Operate or reset: 0.5 ms max.			
Smart Teaching lock function			Provided.	---	Provided.	---
Automatic compensation (AC <sup>3</sup> )			Provided (OFF by default).	---	Provided (OFF by default).	---
Ambient illumination			(Receiver side) Incandescent lamp: 3,000 lx max., Sunlight: 10,000 lx max.			
Materials	Case		Polybutylene terephthalate (PBT)/ABS			
	Lens		Methacrylic resin (PMMA)			
	Indicators		Methacrylic resin (PMMA)			
	Sensitivity adjuster and Threshold adjuster		Polyester elastomer			
	Cable		Polyvinyl chloride (PVC)			

(Unit: mm)

## Dimensions

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

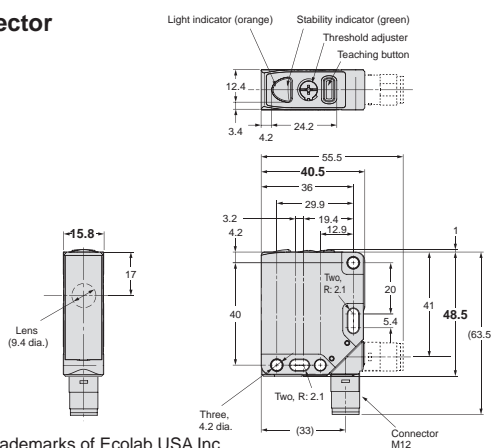
### Models with M12 Connector

E3S-DBN2□(T)

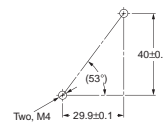
E3S-DBP2□(T)

### Smart Teaching Type

Compliance with International Standards



### Mounting Holes



### Connector Pin Arrangement



Pin No.	Application
①	Power supply (+V)
②	Output 2 (Dark ON)
③	Power supply (0 V)
④	Output 1 (Light ON)

Note: Refer to the E3S-DB Datasheet (Cat. No. E439) for details.

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**Note: Do not use this document to operate the Unit.**

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