

# Reliable Detection of Transparent Objects

The E3S-DB photoelectric sensor contributes to the food and packaging industry by detecting transparent objects regardless of changes in materials, shapes, and types.



- » Consistently accurate clear object detection
- » Detergent washdown resistant to IP69K
- » Prevents intermittent line stoppages



# Reliably detect various types of transparent workpieces

Transparent Object Detection Photoelectric Sensor

## E3S-DB

High detection capabilities for reliable detection of a wide range of transparent objects in the food and packaging industries, including glass bottles, PET bottles, films, and trays. You can increase equipment operating rates while reducing set-up and maintenance work.



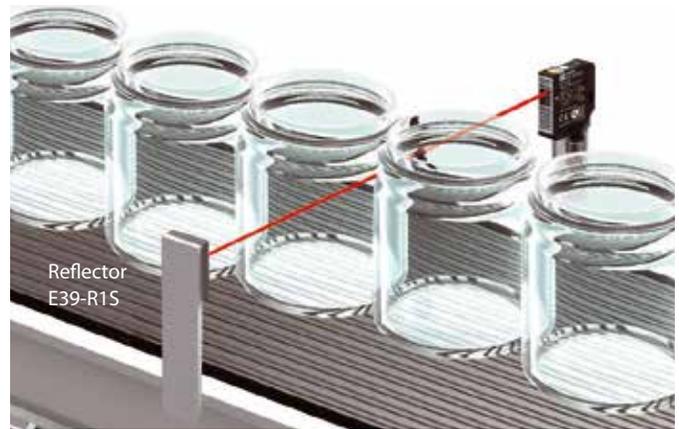
Improved Equipment Operating Rates

## Prevent intermittent line stoppage and shorten cycle time with reliable 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.

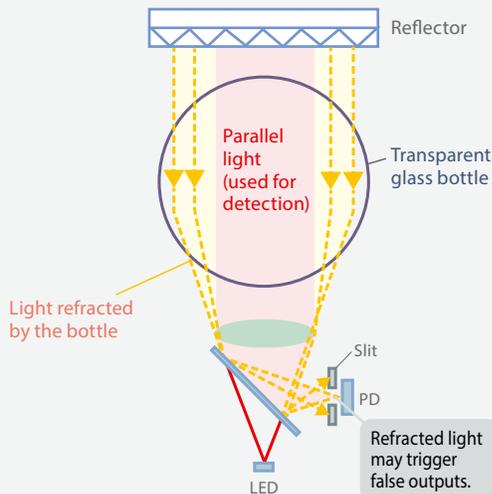
**With the E3S-DB** These photoelectric sensors can **reliably detect** transparent glass bottles allowing increased equipment operating rates.



### Double-slit Optical Design

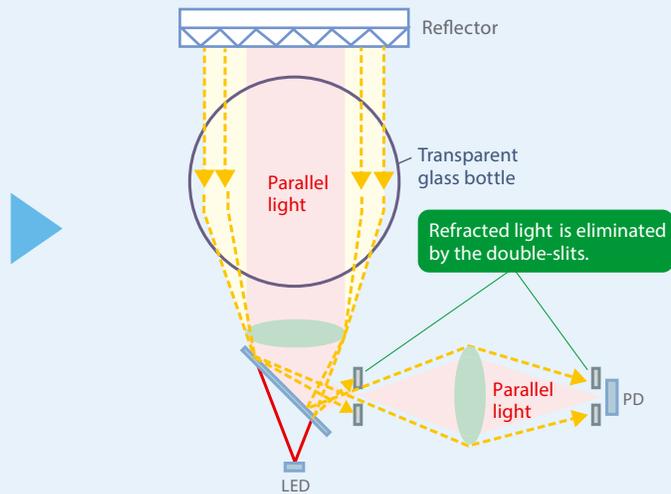
**Model with a slit**

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



**E3S-DB**

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



## Three benefits of transparent object detection



**Improved  
Equipment  
Operating Rates**

**Reliable part detection.**



**Reduced  
Commissioning and  
Maintenance**

**Easy setup and operation.**



**High  
Usability**

**IP69K rated, Ecolab certified  
for washdown resistance.**

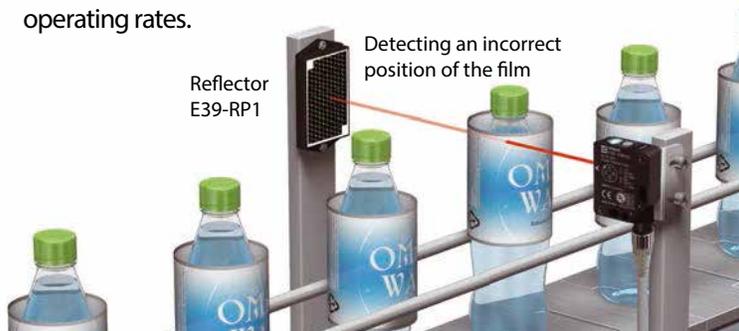
## Increase operating efficiency to detect loose shrinkwrapping

Typical  
Problems

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

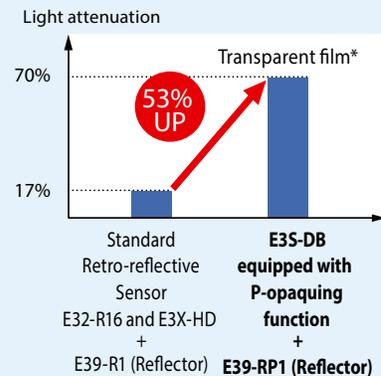
With the  
E3S-DB

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



### P-opaquiring function

The E3S-DB utilizes the birefringent (double refraction) property of PET bottles to dramatically increase the level of excess gain. The polarization component that is disturbed by the PET bottles as they pass along the line is cut by a special and unique OMRON polarization filter. This greatly lowers the intensity of the light received to provide stable detection with a simple sensitivity adjustment.



\*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

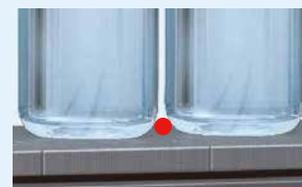
The narrow beam **enables incident light with gaps as narrow as 3 mm.\***

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.



### 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

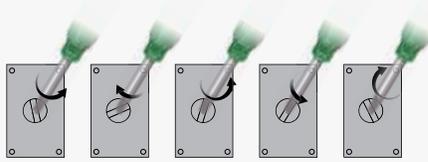
### Large reductions in adjustment time for sensitivity and threshold

#### 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.

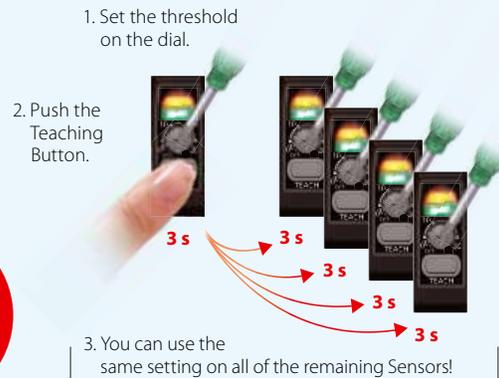


60 s   60 s   60 s   60 s   60 s

**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).



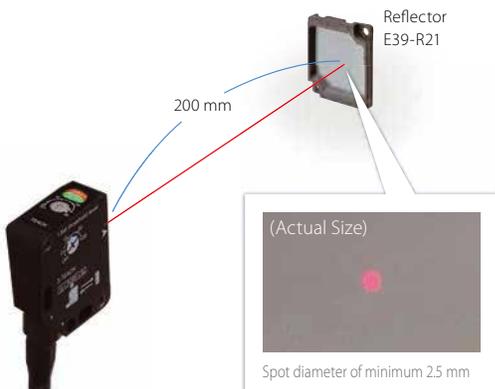
**Adjustment work reduced by 95%.**

**3 s × 5 Sensors = 15 s**

### 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 and reduces time required for adjustment.



#### ● Easy to see indicators

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





High Usability

# Resistance to water and detergents

## Reliable structure that resists water and detergents

### ● IP69K water resistance

Withstands harsh environments with high temperatures and high water pressures.



IP69K Degree 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 washdown environments.



## Rotating connector/cable



Connectors and cables can be rotated for ease of wiring.

## Information printed on sensor

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



Smart Teaching Information

Wiring Information

## PC Monitoring Software helps you visualize detection status (to be released soon).

You can easily monitor Sensor status.

- **Testing** ..... Check detection stability for new workpieces or when using a new Reflector.
- **Setup** ..... Check the optimum threshold.
- **Maintenance** ..... Check Sensor detection status data.



# 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



#### Easy threshold setting for each transparent object

Smart teaching.



#### Reduced work in changeovers and adjustment

Small spot.

Digital  
Temperature  
Controllers



### E5C Series



#### Reduced work in creating communications programs

Programless communications.

#### Reduced time in adjusting pid values

Control simulator.

Machine Automation  
Controllers



### NJ/NX Series

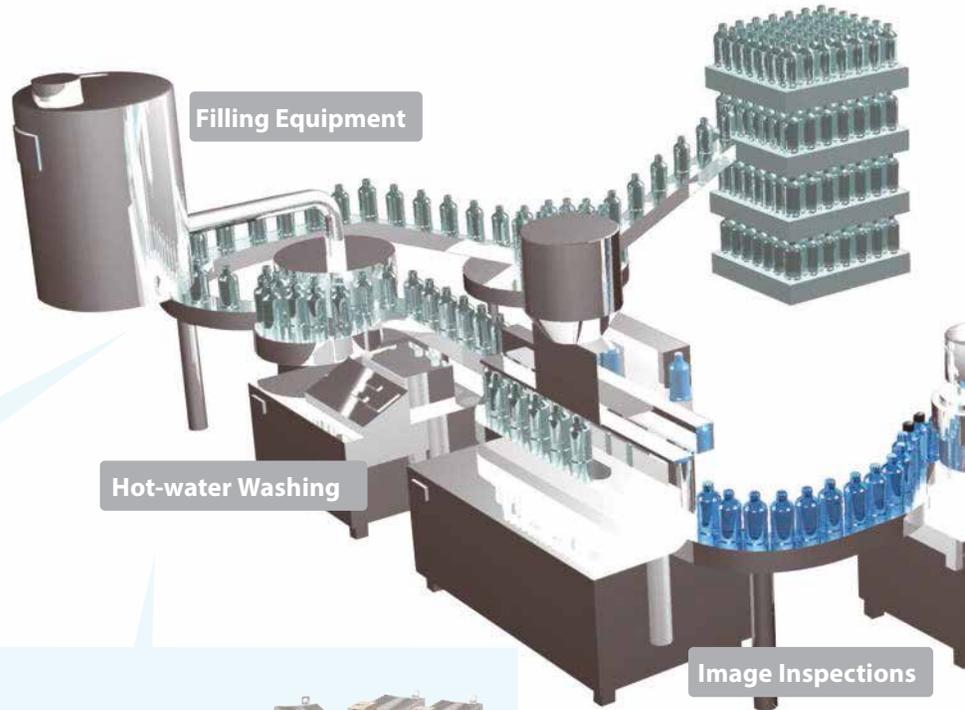


#### Rapid recovery with error detection for various devices

· Records device status when errors occur.

· High-speed execution of user programs.

· Function blocks to monitor safety device operation time for preventive maintenance.



Filling Equipment

Hot-water Washing

Image Inspections

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.

Multi-function Compact  
Inverters

### MX2 Series V1 Type



#### Reduced work in changeovers and adjustment

Parameter setting and switching.

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.

# 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.

Transparent Object Detection  
Photoelectric Sensors

## E3S-DB



### Detect all sorts of transparent objects with high sensitivity for reliable operation

- P-opaquiring function.
- Optimum double-slit optical design.

Digital  
Temperature  
Controllers

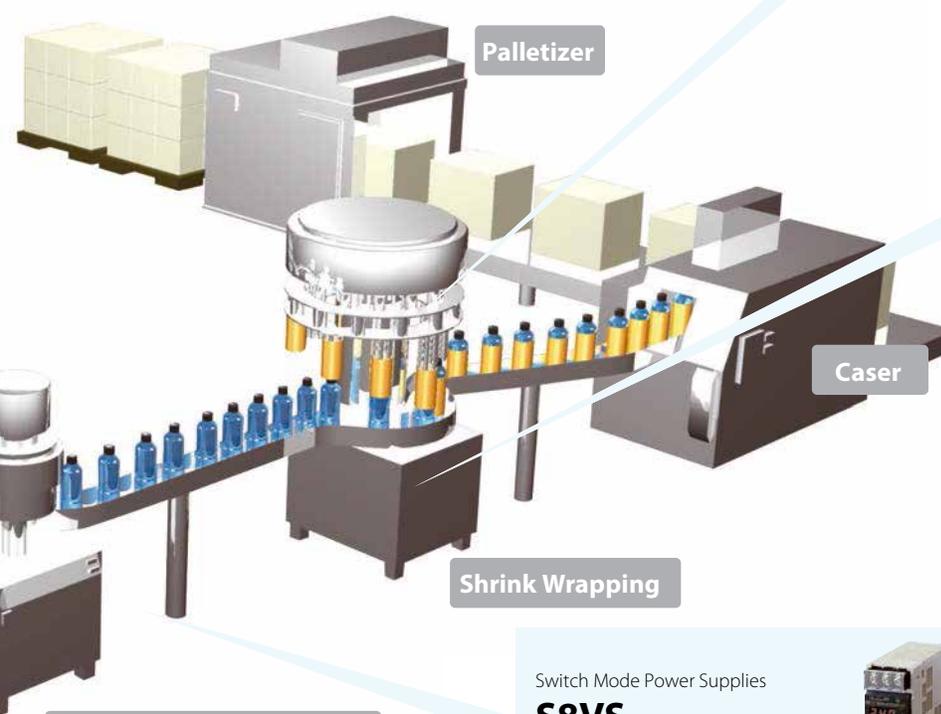


## E5□C Series



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

- Heater burnout detection.
- Temperature sensor burnout detection.



Inspection for Tilted Caps

Switch Mode Power Supplies

## S8VS



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

Maintenance forecast monitor.



Buffer Blocks

## S8T-DCBU



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



Vision Systems

## FH Series



### Stable Operation by Preventing Excessive Filtering Out

High-accuracy OCRs.



### Reduced Work in Dictionary Registration

Built-in dictionary.

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



Safety Door Switches

## D4SL-N Series D40Z Series

Open/Close Detection of Mechanical Guards and Covers



Emergency Stop Switches

## A165E Series A22E Series

Emergency Stopping of Machines



\*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)				(with E39-R8)							
			M12 Smartclick pre-wired connector (0.3 m)					Narrow beam 0.5 m (with E39-R21)						
			Pre-wired (2 m)						3.5 m	E3S-DBN12 2M	E3S-DBP12 2M			
			Connector (M12)									E3S-DBN22	E3S-DBP22	
			M12 Smartclick pre-wired connector (0.3 m)											E3S-DBN32 0.3M
		Eleven-turn adjuster	Pre-wired (2 m)	3.5 m	E3S-DBN11T 2M	E3S-DBP11T 2M								
			Connector (M12)				(with E39-R8)							
			M12 Smartclick pre-wired connector (0.3 m)					Narrow beam 0.5 m (with E39-R21)						
			Pre-wired (2 m)						3.5 m	E3S-DBN21T	E3S-DBP21T			
			Connector (M12)									E3S-DBN31T 0.3M	E3S-DBP31T 0.3M	
			M12 Smartclick pre-wired connector (0.3 m)											E3S-DBN12T 2M
Pre-wired (2 m)	3.5 m	E3S-DBN22T	E3S-DBP22T											
Connector (M12)				E3S-DBN32T 0.3M	E3S-DBP32T 0.3M									
M12 Smartclick pre-wired connector (0.3 m)														

\*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 operation selector		Polyester elastomer			
	Cable		Polyvinyl chloride (PVC)			

(Unit: mm)

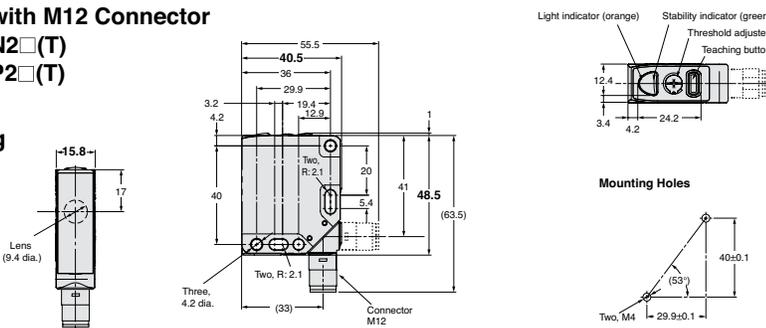
## Dimensions

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



### 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.

Compliance with International Standards



Ecolab and its logo are registered trademarks of Ecolab USA Inc.

OMRON AUTOMATION AND SAFETY • THE AMERICAS HEADQUARTERS • Chicago, IL USA • 847.843.7900 • 800.556.6766 • www.omron247.com

### OMRON CANADA, INC. • HEAD OFFICE

Toronto, ON, Canada • 416.286.6465 • 866.986.6766 • www.omron247.com

### OMRON ELECTRONICS DE MEXICO • HEAD OFFICE

México DF • 52.55.59.01.43.00 • 01-800-226-6766 • mela@omron.com

### OMRON ELECTRONICS DE MEXICO • SALES OFFICE

Apodaca, N.L. • 52.81.11.56.99.20 • 01-800-226-6766 • mela@omron.com

### OMRON ELETRÔNICA DO BRASIL LTDA • HEAD OFFICE

São Paulo, SP, Brasil • 55.11.2101.6300 • www.omron.com.br

### OMRON ARGENTINA • SALES OFFICE

Cono Sur • 54.11.4783.5300

### OMRON CHILE • SALES OFFICE

Santiago • 56.9.9917.3920

### OTHER OMRON LATIN AMERICA SALES

54.11.4783.5300

OMRON EUROPE B.V. • Wegalaan 67-69, NL-2132 JD, Hoofddorp, The Netherlands. • +31 (0) 23 568 13 00 • www.industrial.omron.eu