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.

realizing

IP69K
ECOLAB

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

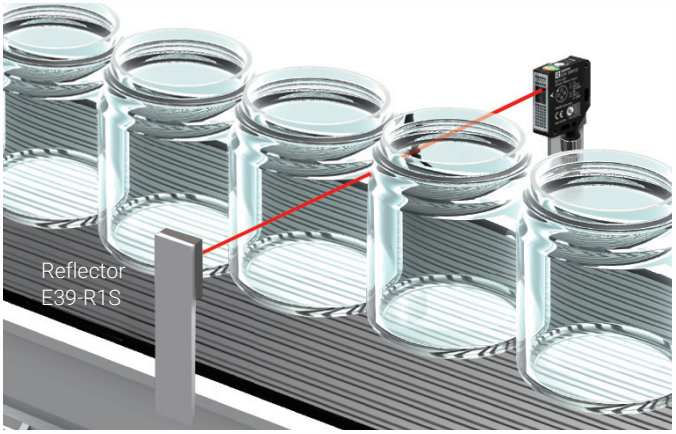
Increase Operating Efficiency for Transparent Bottle Detection

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.



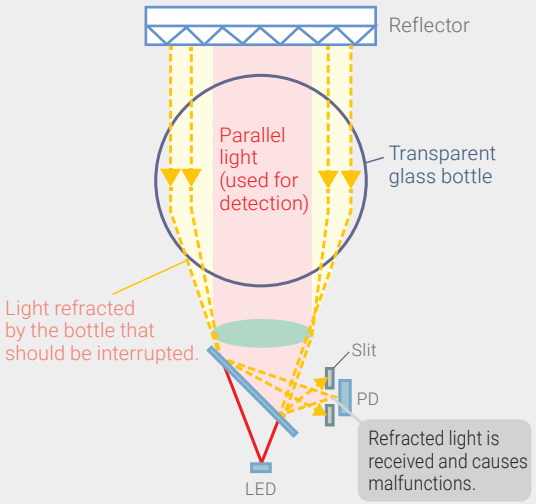
New technology

This Is How

Double-slit Optical Design

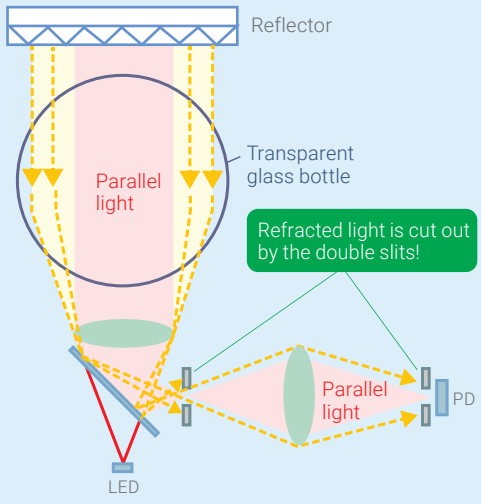
Model with a slit

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.

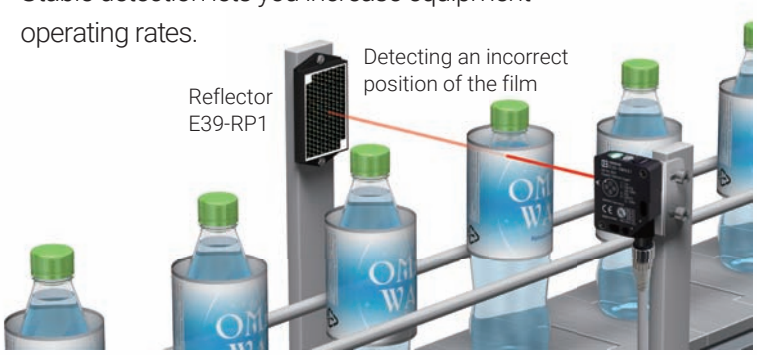
Increase Operating Efficiency to Detect Loose Shrinkwrapping

Typical Problems

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

With the **E3S-DB**

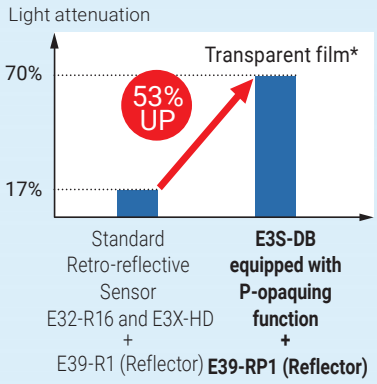
P-opaquing function ensures attenuation of 70%* even with films with little difference in light levels. Stable detection lets you increase equipment operating rates.



This Is How

P-opaquing function

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



*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□□2(T) and a sensing distance of 200 mm.)

Reduced Work

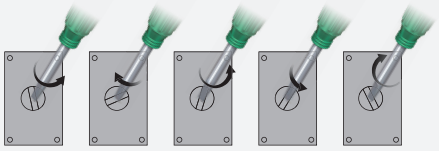
Easy Setup and Operation; Reduced Commissioning and Maintenance Work

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.

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

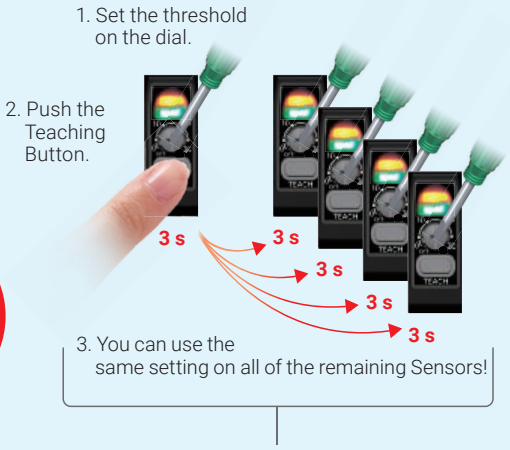
60 s × 5 Sensors = 300 s

Adjustment work reduced by 95%.

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).

Examples for Setting Five Sensors

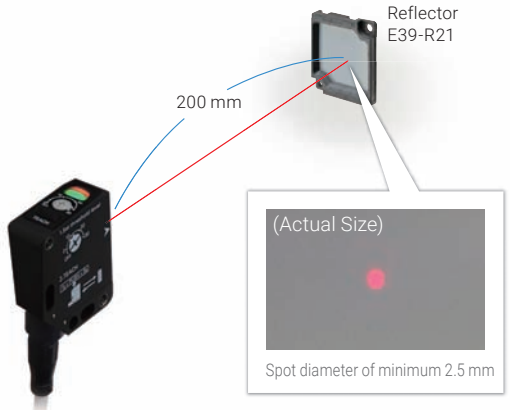


3 s × 5 Sensors = 15 s

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 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.

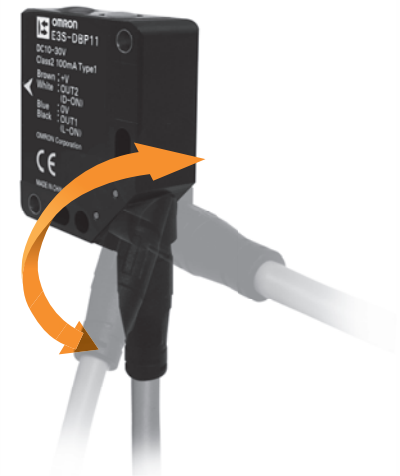
IP69K Degree of Protection
IP69K is defined in DIN 40050 Part 9 of the German standards for protection against high temperatures and high water pressures.

●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.

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)

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.

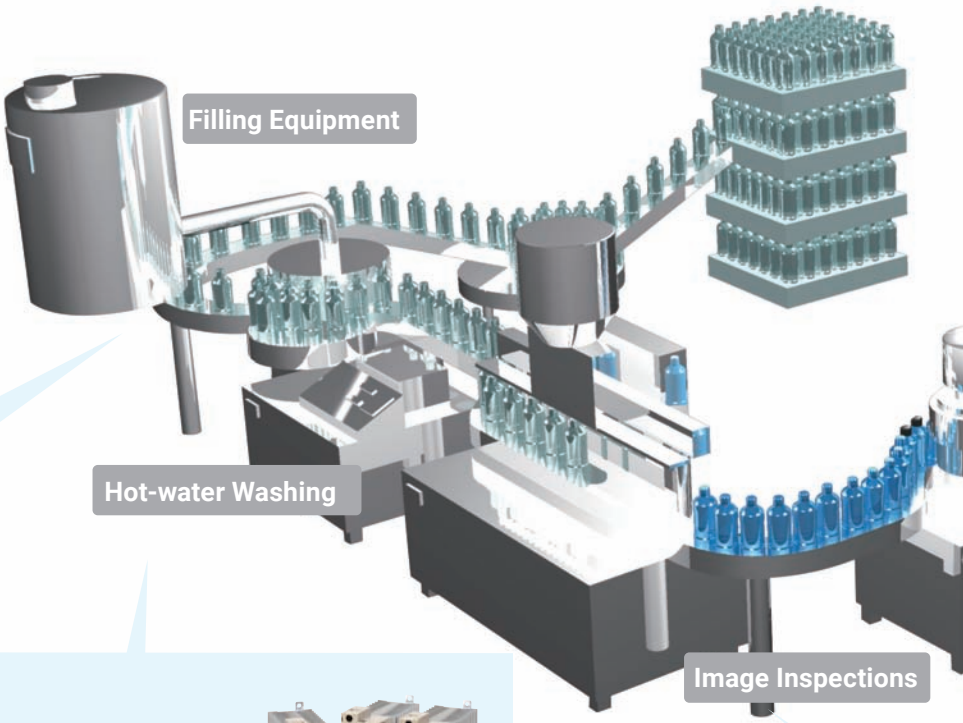
E3S-DB Datasheet (E439)

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)



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.

G3PF Search

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

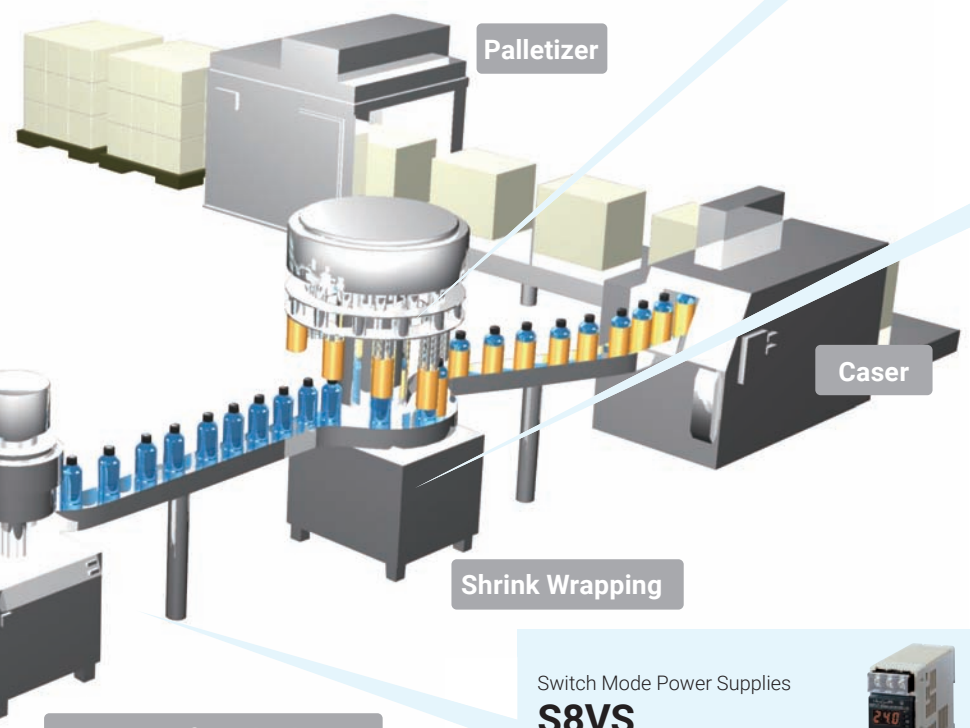
NA Series

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-opaquing 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)

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-SR/PG Series
F3SJ Series

Finger, Arm, and Body Protection

F3SG-SR/PG Series Catalog (F118)
F3SJ Series Catalog (F074)

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 Search

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)

Safety Door Switches

D4SL-N Series
D41D Series
D40A-2 Series

Open/Close Detection of Mechanical Guards and Covers

D4SL-N Catalog (C146)
D41D Catalog (F115)
D40A-2 Catalog (F134)

Emergency Stop Switches

A165E Series
A22E Series

Emergency Stopping of Machines

A165E Search A22E Search

*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)	✻1	Smart Teaching	Pre-wired (2 m)	3.5 m (with E39-R8)	E3S-DBN11 2M	E3S-DBP11 2M
			Connector (M12)		E3S-DBN21	E3S-DBP21
			M12 Smartclick pre-wired connector (0.3 m)		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 (with E39-R8)	E3S-DBN11T 2M	E3S-DBP11T 2M
			Connector (M12)		E3S-DBN21T	E3S-DBP21T
			M12 Smartclick pre-wired connector (0.3 m)		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

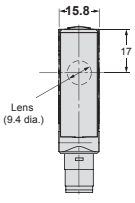
Item \ Model	Sensing method / NPN output / PNP output	Retro-reflective (with MSR function)			
		E3S-DBN□1 / E3S-DBP□1	E3S-DBN□1T / E3S-DBP□1T	E3S-DBN□2 / E3S-DBP□2	E3S-DBN□2T / E3S-DBP□2T
Sensing distance		0 to 3.5 m (with E39-R8)		0 to 0.5 m (with E39-R21)	
Power consumption		720 mW max. (current consumption: 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[3])		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)			

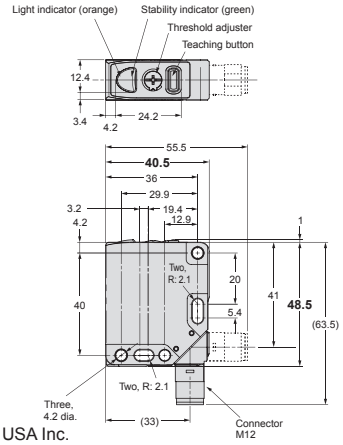
Dimensions

(Unit: mm)
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

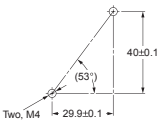
Models with M12 Connector
E3S-DBN2□(T)
E3S-DBP2□(T)

Smart Teaching Type





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.

Compliance with International Standards

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

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