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**

Typical Problems: Detection of transparent bottles using 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.

**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.
With the E3S-DB

Typical Problems

Detection of transparent film is not consistent, 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.

P-opaquing 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.

Light attenuation

Detecting an incorrect position of the film

Reflectors E39-RP1

Detecting an incorrect position of the film

Reflectors E39-RP1

E3S-DB equipped with P-opaquing function

E39-RP1 (Reflector)

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

Three benefits of transparent object detection

Improved Equipment Operating Rates

Reduced Commissioning and Maintenance

High Usability

Reliable part detection.

Easy setup and operation.

IP69K rated, Ecolab certified for washdown resistance.

Increase operating efficiency to detect loose shrinkwrapping

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.

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 ＆ P27) and a sensing distance of 200 mm.)

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

E3S-DB

Standard Retro-reflective Sensor

E32-R16 and E3X-HD

E39-R1 (Reflector)

Three benefits of transparent object detection

Increased Equipment Operating Rates

Easy setup and operation.

IP69K rated, Ecolab certified for washdown resistance.

With the E3S-DB

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Three benefits of transparent object detection

Improved Equipment Operating Rates

Reduced Commissioning and Maintenance

High Usability

Reliable part detection.

Easy setup and operation.

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

1. Set the threshold on the dial.
2. Push the Teaching Button.
3. You can use the same setting on all of the remaining 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 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.

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**

**E5-C Series**
- Reduced work in creating communications programs
- Programless communications.
- Reduced time in adjusting pid values
- Control simulator.

**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.

**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**

SHOP ONLINE at www.airlinehyd.com 800-999-7378
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.

**Switch Mode Power Supplies**

**S8VS**

- **Long-life Power Supplies for Preventive Maintenance against Stoppage**
- Maintenance forecast monitor.

**Vision Systems**

**FH Series**

- **Stable Operation by Preventing Excessive Filtering Out**
  - High-accuracy OCRs.
- **Reduced Work in Dictionary Registration**
  - Built-in dictionary.

**Buffer Blocks**

**S8T-DCBU**

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

**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-opaquing 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.

**Switch Mode Power Supplies**

- **S8T-DCBU**

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

**Emergency Stop Switches**

**A165E Series**

- **Emergency Stopping of Machines**

**A22E Series**

**Safety Door Switches**

**D4SL-N Series**

**D40Z Series**

**Open/Close Detection of Mechanical Guards and Covers**

**Safety Light Curtains**

**F3SG-R Series**

**F3SJ Series**

**Finger, Arm, and Body Protection**

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

SHOP ONLINE at www.airlinehyd.com

800-999-7378

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### Ordering Information

#### Sensors

<table>
<thead>
<tr>
<th>Sensing method</th>
<th>Appearance</th>
<th>Sensitivity adjustment</th>
<th>Connection method</th>
<th>Sensing distance*2</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retro-reflective (with MSR function)</td>
<td>Smart Teaching</td>
<td>Eleven-turn adjuster</td>
<td>Pre-wired (2 m)</td>
<td>Narrow beam 0.5 m (with E39-R21)</td>
<td>3.5 m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Connector (M12)</td>
<td></td>
<td>E3S-DBN1 2M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>M12 Smartclick pre-wired connector (0.3 m)</td>
<td>(with E39-R8)</td>
<td>E3S-DBN2T</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pre-wired (2 m)</td>
<td></td>
<td>E3S-DBN3T 0.3M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>M12 Smartclick pre-wired connector (0.3 m)</td>
<td>(with E39-R21)</td>
<td>E3S-DBP1T</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pre-wired (2 m)</td>
<td></td>
<td>E3S-DBP2T</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Connector (M12)</td>
<td></td>
<td>E3S-DBP3T 0.3M</td>
</tr>
</tbody>
</table>

*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

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
<th>Sensing method NPN output</th>
<th>Sensing method PNP output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensing distance</td>
<td>E3S-DBN1 2M</td>
<td>E3S-DBN2T</td>
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</tr>
<tr>
<td>Power consumption</td>
<td>E3S-DBN1T 2M</td>
<td>E3S-DBN3T 0.3M</td>
<td></td>
</tr>
<tr>
<td>Load power supply voltage</td>
<td>E3S-DBP1T 2M</td>
<td>E3S-DBP2T</td>
<td></td>
</tr>
<tr>
<td>Load current</td>
<td>E3S-DBP1T 2M</td>
<td>E3S-DBP3T 0.3M</td>
<td></td>
</tr>
<tr>
<td>Residual voltage</td>
<td>E3S-DBP1 2T</td>
<td>E3S-DBP2T</td>
<td></td>
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</table>

#### Materials

<table>
<thead>
<tr>
<th>Item</th>
<th>Case</th>
<th>Lens</th>
<th>Sensitivity adjuster and operation selector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Polybutylene terephthalate (PBT)/ABS</td>
<td>Methacrylic resin (PMMA)</td>
<td>Polyester elastomer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Polyvinyl chloride (PVC)</td>
</tr>
</tbody>
</table>

#### Dimensions

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

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