Special-purpose Optical Fiber Unit

Additional Series of Fiber Optics

Ideal Wafer Sensor for Semiconductor and Electronic Parts Industries

- Stable Detection of Minute Objects in Any Position (E32-T16P)
- Ensures Stable Detection of Wafers and Glass-coated PCBs Without Being Influenced by Color and Brightness, and with a Detection Distance Three Times Greater than that of Conventional Fibers (E32-L24L/L25L)
- Detects Silicone Wafers and Glass Wafers as Accurately as Laser Fibers, with a LED Light Source (E32-T22S/T24S)
Application Examples

**E32-T16P**

**Discriminates Between Capacitors**
Discriminates between capacitors according to diameter.

**Detects Diameters of Tapes to be Rolled**
In the following application, a signal is output when the diameter of the tape reaches a certain value.

**Detection of Chips**
Metal or non-metal objects in a 11-mm zone can be detected.
The objects need not pass through the zone in a straight line.

**Wafer Positioning**
In the following application, highly precise wafer positioning is possible because the sensor uses belt-like light beams.

- The area width is as large as 2 x 11 mm.
- The diameter of the most minute detectable object is 1.3 mm when the beam is in the vertical direction.
- In the center of the optical axis, the diameter of the most minute detectable object is 0.4 mm when a 0.5-mm-wide slit is used.

**E32-T22S/T24S**

- The minute object detection capability of the E32-T16P is four to five times greater than that of OMRON’s conventional E32-T16.
- The E32-T16P ensures highly precise object detection regardless of object positioning in the sensing area because the beam emitted by the E32-T16P is uniform.
Ensures the stable detection of minute objects, including silicone wafers and glass wafers in cassettes, without being influenced by other wafers.

The Side-view Model (E32-T24S) is ideal for mounting in narrow spaces.

The highly sensitive E3X-H11 Fiber Unit with a diameter of 3 mm, in combination with the E32-T22S or E32-T24S, can ensure a detection distance as large as 1 m.

Has a flexible fiber with a bending radius of 10 mm.

E32-L24L/L25L

Definite reflective wafer sensors ensure the stable detection of wafers and glass-coated PCBs without being influenced by color and brightness, as well as other wafers.

Detects wafers and glass-coated PCBs without touching them and has a detection distance three times greater than that of OMRON’s conventional fibers.

The most heat-resistive convergent reflective wafer sensors with an ambient operating temperature range of –40°C to 105°C, thus detecting heat-treated wafers.

The thin Side-view Model (E32-L24L) has a width of only 4 mm and does not require a large mounting space.
# Specifications

## Ratings/Characteristics

### Fiber Unit

#### Through-beam Sensors

<table>
<thead>
<tr>
<th>Item</th>
<th>E32-T16P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image" alt="Image" /></td>
</tr>
<tr>
<td>Slit width</td>
<td></td>
</tr>
<tr>
<td>With E3X-NT □ □</td>
<td>Detection distance</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Image" /></td>
</tr>
<tr>
<td>Min. sensing object (see note)</td>
<td><img src="image" alt="Image" /></td>
</tr>
<tr>
<td>Horizontal beam</td>
<td><img src="image" alt="Image" /></td>
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<td></td>
<td><img src="image" alt="Image" /></td>
</tr>
<tr>
<td>With E3X-NM □ □</td>
<td>Detection distance</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Image" /></td>
</tr>
<tr>
<td>Min. sensing object (see note)</td>
<td><img src="image" alt="Image" /></td>
</tr>
<tr>
<td>Horizontal beam</td>
<td><img src="image" alt="Image" /></td>
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<td><img src="image" alt="Image" /></td>
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<tr>
<td></td>
<td><img src="image" alt="Image" /></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operating: –40°C to 70°C</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operating: 35% to 85%</td>
</tr>
<tr>
<td>Permissible bending radius</td>
<td>R10 mm min.</td>
</tr>
<tr>
<td>Material</td>
<td>Sensing head: Heat-resistive ABS</td>
</tr>
<tr>
<td></td>
<td>Fiber sheath: Vinyl chloride</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IEC IP50</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 12 g</td>
</tr>
<tr>
<td>Applicable amplifier unit</td>
<td>E3X-NT/-NM, E3X-T/-H/-A, E3XA-CC4A</td>
</tr>
<tr>
<td>Attachments</td>
<td>Two slits each (0.5 mm and 1.0 mm wide)</td>
</tr>
</tbody>
</table>

**Note:** Values not in parentheses represent detectable objects within the 11-mm-wide sensing area and values in parentheses represent detectable objects in the center of the E32-T16P sensing area. The diameters of sensing objects in the above table represent detectable object sizes, on condition that the objects are not moving.

**Sensing Method**

![Diagram](image)
Reflective Sensors

<table>
<thead>
<tr>
<th>Item</th>
<th>Difinite reflective</th>
<th>Difinite reflective (side-view)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Detects wafers and small difference in height</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E32-L25L</td>
<td>E32-L24L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>With E3X-NT □□ □</th>
<th>Detection distance (standard object)</th>
<th>White paper</th>
<th>Black paper</th>
<th>7.2±1.8 mm (2.5 x 2.5 cm)</th>
<th>4±2 mm (2.5 x 2.5 cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. sensing object (copper wire)</td>
<td>White paper</td>
<td>Black paper</td>
<td>---</td>
<td>0.012-mm dia.</td>
<td>---</td>
</tr>
<tr>
<td>Min. sensing object (copper wire)</td>
<td>White paper</td>
<td>Black paper</td>
<td>---</td>
<td>0.015-mm dia.</td>
<td>---</td>
</tr>
</tbody>
</table>

Differential travel 5% of detection distance
Beam size 2 mm dia.
Ambient temperature Operating: –40°C to 105°C
Ambient humidity Operating: 35% to 85%
Permissible bending radius (mean value when the detection distance is reduced by 10%) R10 mm min.
Material Reinforced polyethylene
Enclosure rating IEC IP50

Fine Through-beam Sensors

<table>
<thead>
<tr>
<th>Item</th>
<th>Separate</th>
<th>Separate (side-view)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Detects wafers and small difference in height</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E32-T22S</td>
<td>E32-T24S</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>With E3X-NT □□ □</th>
<th>Detection distance (standard object)</th>
<th>650 mm (1.7-mm dia. min.)</th>
<th>480 mm (1.7-mm dia. min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. sensing object (opaque objects)</td>
<td>0.2-mm dia.</td>
<td>0.1-mm dia.</td>
<td></td>
</tr>
<tr>
<td>Min. sensing object (opaque objects)</td>
<td>0.4-mm dia.</td>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>

Differential travel ---
Beam size 13-mm dia. (at a distance of 200 mm)
Ambient temperature Operating: –40°C to 70°C (with no icing)
Ambient humidity Operating: 35% to 85%
Permissible bending radius (mean value when the detection distance is reduced by 10%) 10 mm min.
Material Reinforced laminated vinyl chloride
Enclosure rating IEC IP67
Engineering Data

■ Excess Gain Ratio

E32-T16P

Detection distance (cm)

Excess gain ratio

Detection distance (mm)

E32-T22S

Detection distance (mm)

E32-T24S

Detection distance (mm)

■ Parallel Operating Range

E32-T22S

Parallel operating range Y (mm)

Set distance X (mm)

E32-T24S

Parallel operating range Y (mm)

Set distance X (mm)

■ Operating Range (Limited Reflector)

Sensing Object: Standard Object (White Paper)
Dimensions

Note: All units are in millimeters unless otherwise indicated.

**E32-T16P**

- **0.5-mm-wide Seal Slit**
  - (Two slits are provided)
  - Sensing head (heat-resistive ABS)
  - Two, 3.2 dia., 6 dia counter sinking
  - 2.2-dia. optical fiber
  - Two, M3

- **1-mm-wide Seal Slit**
  - (Two slits are provided)

**E32-T16P + E39-L94 Mounting**

- E39-L94 Mounting Bracket (sold separately soon)
- Two fiber attachment (E39-F9)

**E32-L25L**

- Sensing head (PC)
- Two, 3.2 dia, 6 dia counter sinking
- Two, 1 dia. optical fibers

**E32-L24L**

- Sensing head (PC)
- Two, 3.2 dia, 6 dia counter sinking
- Two fiber attachment (E39-F9)
- Side view prism (PC)
**Precautions**

**Mounting (E32-T16P)**
The emitter and receiver of the Fiber Unit must be on the same level and face each other.

**E32-16P Attachment Slit**
When using a slit provided with the E32-16P, remove the paper from the back of the slit and paste the slit so that each corner of the slit matches that of the sensing face.

Tighten each Fiber Unit to a torque of 0.3N • m (3 kgf • cm).

**Sensitivity Adjustment (E32-T16P)**
To detect minute objects in the sensing area using an amplifier with a built-in teaching function, teaching must be performed by placing one of the minute objects on the edge of the sensing area. If teaching is performed by placing the minute object in the center of the optical axis, minute objects on the edge may not be detected.