New industry standard sensor

- Longest sensing distance in class at 25 m*
- Significantly reduced dead zone
- Indicators visible from any angle

*Red LED type, with through-beam type

Selection table

<table>
<thead>
<tr>
<th>Type</th>
<th>Shape</th>
<th>Sensing distance</th>
<th>Model (Models in parentheses are connector types)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through-beam</td>
<td></td>
<td>25 m</td>
<td>Z3T-2500N (Z3T-2500CN4)</td>
</tr>
<tr>
<td>Retro-reflective</td>
<td></td>
<td>0.01 to 4 m</td>
<td>Z3R-400N (Z3R-400CN4)</td>
</tr>
<tr>
<td>Diffuse-reflective</td>
<td></td>
<td>0 to 1 m</td>
<td>Z3D-100N (Z3D-100CN4)</td>
</tr>
<tr>
<td>Limited diffuse reflective</td>
<td></td>
<td>10 to 90 mm</td>
<td>Z3D-L09N (Z3D-L09CN4)</td>
</tr>
<tr>
<td>Wide angle diffuse reflective</td>
<td></td>
<td>1 to 200 mm</td>
<td>Z3D-W20N (Z3D-W20CN4)</td>
</tr>
<tr>
<td>Transparent object detection</td>
<td></td>
<td>0.01 to 2 m</td>
<td>Z3R-Q200N (Z3R-Q200CN4)</td>
</tr>
</tbody>
</table>

- A mounting bracket is not included. If necessary, please purchase separately.
- A reflector is not included with the retro-reflective type. Please purchase an optional reflector separately.
- For the connector type, please purchase an optional connector cable separately.
- For the sensor head for amplifier separate type, please refer to P.404.

Options/Accessories

**Reflector**

- Standard V-61
  - Size: 60.9 x 50.9 mm
  - Sensing distance: 0.01 to 4 m
- Small type V-42
  - Size: 42 x 35 mm
  - Sensing distance: 0.01 to 2.4 m
- Vertical type P45A
  - Size: 54 x 12.4 mm
  - Sensing distance: 0.01 to 1.4 m
- Ultra-small V-30
  - Size: 43 x 23 mm
  - Sensing distance: 0.01 to 2.2 m

**Reflective sheet**

- Diamond grade sheet
  - Size: 100 x 100 mm (adhesive type)

**Connector cables**

- Straight
  - JCN-S: Cable length: 2 m
  - JCN-5S: Cable length: 5 m
  - JCN-10S: Cable length: 10 m
- L-shaped
  - JCN-L: Cable length: 2 m
  - JCN-5L: Cable length: 5 m
  - JCN-10L: Cable length: 10 m
World-renowned Z series basic photoelectric sensors continue to evolve.

Total volume of Z series photoelectric sensors sold around the world exceeds 3 million units. The FASTUS Z3 series built-in amplifier photoelectric sensors with improved detection performance is the successor of the easy-to-use Z series. This series takes the functionality, practicality and cost performance required of general purpose photoelectric sensors to the next level.

Sensing distance
Longest in class **25 m**

*Red LED type, with through-beam type*

- Features an industry standard mounting pitch of 25.4 mm
- Indicators visible from any angle

---

**Mounting bracket**
For cable type Floor-mounted
**BEF-W100-B**

For connector type Back-mounted
**BEF-W100-A**
Cannot be used with connector cable JCN-□□□L.

**Protective mounting bracket**
**LK series**

**LK-501**
Ultra-durable 2 mm thick type
Sensor is firmly secured using M3 hex socket head cap screws
The bracket is also firmly secured using M6 screws

**LK-502**

**Slit mask**
Slit mask for through-beam type (adhesive type)
**BL-W100**
Shipped with two of each slit width (0.5 mm, 1 mm, 2 mm).

**Stainless steel slit mask**
Stainless steel slit mask for through-beam type
**BL-100-M1-10pcs**
BL-100-M05
10 pieces of slit masks are shipped for M1 with a slit width of 1 mm, and 1 piece of slit mask is shipped for M05 with a slit width of 0.5 mm.

**Anti-interference filter**
For through-beam type (4 pieces)
**BL-100-POLF**
Low cost/Small type Z3 series

Features

High power LED provides stable detection
The Z3 series through-beam type sensor has a 25 m sensing distance, the longest in its class. The margin for the receiving light quantity has been increased significantly, helping the sensor overcome interference from dust or other fine particles.

![Sensing distance 25 m](image)

Significantly reduced dead zone
The diffuse-reflective type features an optimized optical receiver structure that successfully minimizes the dead zone in front of the lens. This makes it easier to detect workpieces with a low reflectivity that pass close to the sensor, even on lines that convey workpieces of varying heights.

Close-range dead zone (typical value)

<table>
<thead>
<tr>
<th>Paper Type</th>
<th>Conventional model</th>
<th>Z3D-100</th>
<th>Gray paper (18%)</th>
<th>Black paper (6%)</th>
<th>Sensing distance</th>
<th>Sensing distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 mm</td>
<td>2 mm</td>
<td>to 2 mm</td>
<td>No dead zone</td>
<td>1 mm</td>
<td>to 2 mm</td>
<td>to 13 mm</td>
</tr>
<tr>
<td>5 mm</td>
<td></td>
<td></td>
<td></td>
<td>2 mm</td>
<td>to 13 mm</td>
<td>to 13 mm</td>
</tr>
<tr>
<td>10 mm</td>
<td></td>
<td></td>
<td></td>
<td>2 mm</td>
<td>to 13 mm</td>
<td>to 13 mm</td>
</tr>
<tr>
<td>15 mm</td>
<td></td>
<td></td>
<td></td>
<td>2 mm</td>
<td>to 13 mm</td>
<td>to 13 mm</td>
</tr>
<tr>
<td>20 mm</td>
<td></td>
<td></td>
<td></td>
<td>2 mm</td>
<td>to 13 mm</td>
<td>to 13 mm</td>
</tr>
<tr>
<td>30 mm</td>
<td></td>
<td></td>
<td></td>
<td>2 mm</td>
<td>to 13 mm</td>
<td>to 13 mm</td>
</tr>
<tr>
<td>40 mm</td>
<td></td>
<td></td>
<td></td>
<td>2 mm</td>
<td>to 13 mm</td>
<td>to 13 mm</td>
</tr>
</tbody>
</table>

Plus

- Easy optical axis adjustment thanks to a large spot size with good visibility
- 4 element LED helps reduce emitting power degradation during long-term use
### Photoelectric Sensors

#### Low cost/Small type Z3 series

<table>
<thead>
<tr>
<th>Type</th>
<th>Through-beam type</th>
<th>Retro-reflective type</th>
<th>Diffuse-reflective type</th>
<th>Limited diffuse reflective type</th>
<th>Wide angle diffuse reflective type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model NPN</td>
<td>Z3T-2500N</td>
<td>Z3R-400N</td>
<td>Z3D-100N</td>
<td>Z3D-L09N</td>
<td>Z3D-W20N</td>
</tr>
<tr>
<td>Connector type</td>
<td>Z3T-2500CN4</td>
<td>Z3R-400CN4</td>
<td>Z3D-100CN4</td>
<td>Z3D-L09CN4</td>
<td>Z3D-W20CN4</td>
</tr>
<tr>
<td>Model PNP</td>
<td>Z3T-2500P</td>
<td>Z3R-400P</td>
<td>Z3D-100P</td>
<td>Z3D-L09P</td>
<td>Z3D-W20P</td>
</tr>
<tr>
<td>Connector type</td>
<td>Z3T-2500CP4</td>
<td>Z3R-400CP4</td>
<td>Z3D-100CP4</td>
<td>Z3D-L09CP4</td>
<td>Z3D-W20CP4</td>
</tr>
</tbody>
</table>

- **Sensing distance**: 25 m  
  -0.01 to 4 m
  -0 to 1 m
  -10 to 90 mm
  -1 to 200 mm

- **Light source**: 4 element red LED, wavelength 632 nm

- **Spot size**:  
  -Approx. ø1800 mm (at distance of 25 m)
  -Approx. ø280 mm (at distance of 4 m)
  -Approx. ø75 mm (at distance of 1 m)
  -Approx. ø8 mm (at distance of 90 mm)
  -Approx. ø45 mm (at distance of 50 mm)

- **Response time**: 500 μs or less

- **Hysteresis**:  
  -20% Max.
  -10% Max.
  -20% Max.

- **Distance adjustment**: 1-turn potentiometer

- **Indicators**:  
  -Output indicator: orange LED
  -Stability indicator: green LED
  -No indicator equipped on through-beam type emitter

- **Control output**: NPN/PNP type
  -Open collector
  -Max. 100 mA/30 VDC

- **Output mode**:  
  -Light ON / Dark ON selection switch

- **Connection type**:  
  -Cable type: Cable length: 2 m ø3.8 mm
  -Connector type: M8, 4-pin

<table>
<thead>
<tr>
<th>Rating</th>
<th>Supply voltage</th>
<th>Current consumption</th>
</tr>
</thead>
</table>
|        | 10 to 30 VDC, including 10% ripple (p-p) | Emitter: 20 mA or less
|        |                   | Receiver: 15 mA or less |
|        |                   | 20 mA or less
|        |                   | 25 mA or less
|        |                   | 20 mA or less
|        |                   | 20 mA or less

- **Applicable regulations**: EMC directive (2004/108/EC)
- **Applicable standards**: EN 60947-5-2
- **Company standards**: Noise resistance: Feilen Level 3 cleared

- **Environmental resistance**:  
  -Ambient temperature/humidity: -25 to +55°C (no freezing) / 35 to 85% RH (no condensation)
  -Ambient illuminance: Sunlight: 10,000 lx
  -Incandescent lamp: 3,000 lx
  -Vibration resistance: 10 to 55 Hz; double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions
  -Shock resistance: Approx. 100 G (1000 m/s²); 3 times in each of the X, Y, and Z directions
  -Degree of protection: IP67
- **Material**: Housing: ABS, Front cover: PMMA
- **Weight without cable**: Approx. 10 g
- **Included accessories**: Instruction manual

---

1. With the V-61 reflector
2. Using a 200 x 200 mm white sheet of paper.
3. Using a 100 x 100 mm white sheet of paper.
4. Using a 300 x 300 mm white sheet of paper.

*Specifications are subject to change without prior notice for product improvement purposes.*
Low cost/Small type Z3 series

Output circuit diagram

- **NPN output type**
  - Brown: ① 10 to 30 VDC
  - Black: ④
  - Blue: ③ 0 V

- **PNP output type**
  - Brown: ① 10 to 30 VDC
  - Black: ④
  - Blue: ③ 0 V

- **Through-beam type emitter**
  - Brown: ① 10 to 30 VDC
  - Blue: ③ 0 V

- **Connector type**
  - (Pin configuration) Sensor side: ① ② ③ ④
  - Connector cable side: ① ② ③ ④
  - 10 to 30 VDC
  - —
  - 0 V
  - Control output

Connecting:
- ① to ④ are connector pin No.

Notes:
- When using a switching regulator for the power supply, be sure to ground the frame ground terminal.
- Because wiring sensor wires with high-voltage wires or power supply wires can result in malfunctions due to noise, which can cause damage, make sure to wire separately.
- Avoid using the transient state while the power is on (approx. 100 ms).
- The connector direction is fixed as the drawing below when you use L-shaped connector cable. Be aware that rotation is not possible.
**Dimensions**

**Sensor**

- **Cable type**
  - Through-beam type emitter
  - Output indicator (orange)
  - Stability indicator (green)
  - Distance adjustment

- **Connector type**

**Mounting bracket**

- **BEF-W100-B**
- **BEF-W100-A**

**Detection type**

<table>
<thead>
<tr>
<th>Detection type</th>
<th>A: optical axis of emitter</th>
<th>B: optical axis of receiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through-beam type</td>
<td>-</td>
<td>19 (optical axis of emitter/receiver)</td>
</tr>
<tr>
<td>Diffuse-reflective type</td>
<td>11.9</td>
<td>19</td>
</tr>
<tr>
<td>Retro-reflective type</td>
<td></td>
<td>18.8</td>
</tr>
<tr>
<td>Wide angle diffuse reflective type</td>
<td></td>
<td>18.8</td>
</tr>
<tr>
<td>Limited diffuse reflective type</td>
<td></td>
<td>18.8</td>
</tr>
</tbody>
</table>

*Note: (Unit: mm)*
Low cost/Small type Z3 series

Dimensions

Reflectors

- V-61: Standard type reflector
- V-42: Small reflector
- P45A: Vertical type reflector

Protective mounting bracket

- LK-S01
- LK-S02

*Limited diffuse reflective type is 18.7
Through-beam type emitter
Low cost/Small type Z3 series

Connector cable
- JCN-S, JCN-5S, JCN-10S
- JCN-L, JCN-5L, JCN-10L

Slit mask
- BL-W100
- BL-100-M1, BL-100-M05

<table>
<thead>
<tr>
<th>Slit width X</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>Sensing distance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.5</td>
<td>1</td>
<td>2</td>
<td>2 m</td>
</tr>
<tr>
<td></td>
<td>2 m</td>
<td>4 m</td>
<td>10 m</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Slit width C</th>
<th>Slit length D</th>
<th>Sensing distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL-100-M1</td>
<td>1.0</td>
<td>8</td>
</tr>
<tr>
<td>BL-100-M05</td>
<td>0.5</td>
<td>6</td>
</tr>
</tbody>
</table>
Typical characteristic data

**Z3T-2500**

<table>
<thead>
<tr>
<th>Excess gain</th>
<th>Sensing area</th>
<th>Angular deviation</th>
<th>Interference area</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Excess gain" /></td>
<td><img src="image2" alt="Sensing area" /></td>
<td><img src="image3" alt="Angular deviation" /></td>
<td><img src="image4" alt="Interference area" /></td>
</tr>
</tbody>
</table>

When slit mask is attached **Z3T-2500**

<table>
<thead>
<tr>
<th>Excess gain</th>
<th>Sensing area</th>
<th>Angular deviation</th>
<th>Interference area</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Excess gain" /></td>
<td><img src="image2" alt="Sensing area" /></td>
<td><img src="image3" alt="Angular deviation" /></td>
<td><img src="image4" alt="Interference area" /></td>
</tr>
</tbody>
</table>

**Z3R-400**

<table>
<thead>
<tr>
<th>Excess gain</th>
<th>Sensing area</th>
<th>Angular deviation</th>
<th>Interference area</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Excess gain" /></td>
<td><img src="image2" alt="Sensing area" /></td>
<td><img src="image3" alt="Angular deviation" /></td>
<td><img src="image4" alt="Interference area" /></td>
</tr>
</tbody>
</table>

Low cost/Small type Z3 series

Photoelectric Sensors

Specialized Photoelectric Sensors

Laser Displacement Sensors

Sensors with Built-in Amplifier

Z3

Z-M

Z2

E

J

K

S

S2

C-R

C2

PLN