Diffuse laser sensors
Series 16

**Diffuse contrast sensor**

- Accurate laser contrast sensor
- Digital switching and analog current output
- Adjustable sensitivity
- Visible red light for alignment aid

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**Technical Data**

- Optimum operating range: 40...80 mm
- Beam focal point: 80 mm
- Repeatability: < 0.1 mm at focal point
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- Diffuse reflection factor:
  - < 8% diffuse reflection
  - up to mirror reflection
- Temperature range: -10...+50 °C
- Laser class: IEC 825-1/1996 for Europe
- Voltage supply range: 12...30 VDC
- Max. switching current: 200 mA
- Max. supply current: 12...30 VDC
- Voltage drop: ≤ 1.1 VDC
- Response time: ≤ 0.05 ms
- Sensitivity adjustment: 14 turn pot
- Short circuit protection: Yes
- Reverse polarity protection: Yes
- Housing material: Die-cast zinc
- Protection class: IP 67

**Technical Data Complementary**

- Analog output:
  - 4...20 mA
  - ±0.1 mA
- Linear range:
  - 0...100% corresponds to 4.5...14.5 mA
  - ±3% F.S. (Linear range)
- Repeatability: ±0.1% at constant temperature
- Temperature drift: ±0.05% per °C

**Connectors**

- PNP: OZDM 16P1001
  - Light operate
  - OZDM 16P1001/S14
  - Dark operate
- NPN: OZDM 16N1001
  - Light operate
  - OZDM 16N1001/S14
  - Dark operate

**Connection Diagram**

- Output state:
  - Object present:
    - LED: PNP = HIGH, NPN = LOW
  - Object not present:
    - LED: PNP = LOW, NPN = HIGH

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**Analog Output**

- 4...20 mA
- ±0.1 mA

**Beam Diameter Chart**

- Object distance:
  - 300 mm
  - 250 mm
  - 200 mm
  - 150 mm
  - 100 mm
  - 50 mm
  - 0 mm

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**Objects not Present**

- Sensor:
  - Diffuse reflection: ≤ 8% diffuse reflection
  - Mirror reflection

**Objects Present**

- Sensor:
  - Diffuse reflection: ≤ 8% diffuse reflection
  - Mirror reflection

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**Notes**

- *: within linear range and at 40 mm sensing distance
- **: within optimum operating range
- ***: when detecting shiny objects it is recommended to tilt the sensor 5° to 20° from perpendicular to the sensing plane.
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### Tw 250 mm

#### Diffuse contrast sensor

- Accurate laser contrast sensor
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### Technical data

<table>
<thead>
<tr>
<th>PNP</th>
<th>NPN</th>
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<tbody>
<tr>
<td>light operate</td>
<td>light operate</td>
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<tr>
<td>dark operate</td>
<td>dark operate</td>
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<tr>
<td>PNP + PNP = HIGH</td>
<td>NPN + NPN = HIGH</td>
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<tr>
<td>PNP + NPN = LOW</td>
<td>NPN + PNP = HIGH</td>
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<tr>
<td>yellow LED</td>
<td>green LED</td>
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<tr>
<td>40...80 mm</td>
<td>40...80 mm</td>
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<tr>
<td>&lt;0,1 mm at focal point</td>
<td>&lt;0,1 mm at focal point</td>
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<tr>
<td>± ≤ 4% FS (linear range)</td>
<td>± ≤ 4% FS (linear range)</td>
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<td>Tw adjustable up to 250 mm</td>
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### Analog data

**PNP**

- Analog output: 4...20 mA
- Reaction time (10 to 90% of signal change): ≤ 0,1 ms
- Analog signal versus diffuse reflection factor:
  - Linear range: ± ≤ 3% FS linear range within full temp. range
- Repeatability at constant temperature:
  - Temperature drift reference room temperature: ± ≤ 0,1% FS linear range

**NPN**

- Analog output: 4...20 mA
- Reaction time (10 to 90% of signal change): ≤ 0,1 ms
- Analog signal versus diffuse reflection factor:
  - Linear range: ± ≤ 3% FS linear range within full temp. range
- Repeatability at constant temperature:
  - Temperature drift reference room temperature: ± ≤ 0,1% FS linear range

### Connectors

- OZDM 16P1001
- OZDM 16P1001/S14
- OZDM 16P3001
- OZDM 16P3001/S14
- OZDM 16N1001
- OZDM 16N1001/S14

### Connection diagram

- Output state
  - Object present
  - Object not present
- Beam diameter chart
- Signal chart
- Connectors:
  - Mounting bracket: 113917
- Accessory

### Technical information

- Class 1 LASER Product
- 21CFR 1040.10
- EIC 825-1/1996
- IEC 825-1/1996
- Class 2 LASER Product
- Max. Output: < 1 mW
- Wavelength: 630 - 680 nm
- Laser radiation:
  - Green LED: 1,8 VDC
  - Yellow LED: ≤ 120 mA
  - Red laser diode: ≤ 200 mA
  - Power indicator
  - Green LED for light operate
  - Yellow LED for dark operate

**Additional notes**

- ESW 33AH0200 4 pin 2 m PUR halogen-free
- ESG 34AH0200 4 pin 2 m PUR halogen-free
- Mounting bracket 113917