More Precision

**optoNCDT** // Laser displacement sensors (triangulation)
Analog laser triangulation sensors of the optoNCDT 1610 and 1630 series are designed for extremely fast measurement processes. Equipped with a PSD array, the sensors automatically adapt to the reflection factor of the measurement object enabling measurements even on changing surfaces.

The LD 1610 series achieves a frequency response of 10 kHz (-3dB) while the LD 1630 series is suitable for measurements up to 100 kHz (-3dB).

Equipped with analog interfaces (current, voltage) and an optional Ethernet interface, the controller can be easily integrated into diverse systems.
### Sensors

<table>
<thead>
<tr>
<th>Sensors</th>
<th>LD1610-4</th>
<th>LD1610-10</th>
<th>LD1610-20</th>
<th>LD1610-50</th>
<th>LD1610-100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>4 mm</td>
<td>10 mm</td>
<td>20 mm</td>
<td>50 mm</td>
<td>100 mm</td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>22 mm</td>
<td>40 mm</td>
<td>55 mm</td>
<td>115 mm</td>
<td>170 mm</td>
</tr>
<tr>
<td>Linearity</td>
<td>≤± 8 µm</td>
<td>≤± 20 µm</td>
<td>≤± 40 µm</td>
<td>≤± 100 µm</td>
<td>≤± 200 µm</td>
</tr>
<tr>
<td>Linearity</td>
<td>≤± 0.2 % FSO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution (noise, dynamic 1)</td>
<td>2.6 µm</td>
<td>6.5 µm</td>
<td>13.0 µm</td>
<td>32.5 µm</td>
<td>65 µm</td>
</tr>
<tr>
<td>Resolution (noise, dynamic 2)</td>
<td>0.2 µm</td>
<td>0.5 µm</td>
<td>1 µm</td>
<td>2.5 µm</td>
<td>6 µm</td>
</tr>
<tr>
<td>Spot diameter</td>
<td>0.3 mm</td>
<td>0.6 mm</td>
<td>0.9 mm</td>
<td>1.5 mm</td>
<td>1.5 mm</td>
</tr>
<tr>
<td>Frequency response</td>
<td>10 kHz (-3dB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light source</td>
<td>Laser, wavelength 670 nm, red (visible)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser safety class</td>
<td>Class 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Vibration</td>
<td>10 g to 1 kHz (sensor head, 20 g optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0 ... +50 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20 ... +70 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Other measuring ranges on request

<table>
<thead>
<tr>
<th>Sensors</th>
<th>LD1630-4</th>
<th>LD1630-10</th>
<th>LD1630-20</th>
<th>LD1630-50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>4 mm</td>
<td>10 mm</td>
<td>20 mm</td>
<td>50 mm</td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>22 mm</td>
<td>40 mm</td>
<td>55 mm</td>
<td>115 mm</td>
</tr>
<tr>
<td>Linearity</td>
<td>≤± 12 µm</td>
<td>≤± 30 µm</td>
<td>≤± 60 µm</td>
<td>≤± 150 µm</td>
</tr>
<tr>
<td>Resolution (noise, dynamic 1)</td>
<td>7 µm</td>
<td>17.5 µm</td>
<td>35 µm</td>
<td>50 µm</td>
</tr>
<tr>
<td>Resolution (noise, dynamic 2)</td>
<td>0.4 µm</td>
<td>1 µm</td>
<td>2 µm</td>
<td>7.5 µm</td>
</tr>
<tr>
<td>Spot diameter</td>
<td>0.3 mm</td>
<td>0.6 mm</td>
<td>0.9 mm</td>
<td>1.5 mm</td>
</tr>
</tbody>
</table>
| Frequency response | 100 kHz (-3dB)
| Light source | Laser, wavelength 670 nm, red (visible) |
| Laser safety class | Class 2 |
| Max. Vibration | 5 g to 1 kHz (sensor head, 20 g optional) |
| Operating temperature | 0 ... +40 °C |
| Storage temperature | -30 ... +75 °C |

#### Other measuring ranges on request

- Measurement on white target - Frequency response 10 kHz
- Measurement on white target - Frequency response 20 Hz

### Controller

#### Analog output

- Distance: ±10V (optional 0 ... 10 V / 0 ... 5 V ; 4 ... 20 mA)
- Output impedance: approx. 0 Ohm (10 mA max.)
- Tilt angle: with 30° object inclination (axis A): approx. 0.5% (white target)
- Frequency response: DC ... 10 kHz / 100 kHz
- Thermal drift: 0.02 % °C FSO
- Light intensity: 0 ... 10 V

#### Digital output

- Ethernet (optional)
- TCP/IP factory set IP 192.168.122.245 (sampling frequency 1 - 30 kHz)

#### Switching outputs with display

- MIN: +24 V when distance < MIN, LED yellow
- OK: +24 V when distance > MIN and < MAX, LED green
- MAX: +24 V when distance > MAX, LED orange
- Error: +24 V, LED red

#### Switching hysteresis

approx. 0.5 % FSO

#### Permissible ambient light

20,000 lux

#### Operating time

50,000h (laser diode)

#### Insulation voltage

200 VDC, 0 V against housing

#### Humidity

up to 90% RH, non-condensing

#### Protection class

Sensor: IP64, controller: IP40

#### Supply voltage

10 ... 30 VDC

#### Max. current consumption

200 mA (24 V)

#### Connector

25-in D-sub

#### Sensor cable length, standard

2 m
**Accessories for all optoNCDT Series**

- **Power supply**
  - PS 2020 (power supply 24 V / 2.5 A, input 100 - 240 VAC, output 24 VDC / 2.5 A, mounting onto symmetrical standard rail 35 mm x 7.5 mm, DIN 50022)

- **Controller unit for evaluation and signal conversion**
  - C-Box/2A (controller for conversion and evaluation of up to 2 sensor signals)

- **Interface card**
  - IF2008PCI / IF2008PCIe (interface card for multiple signal processing; analog and digital interfaces)

- **USB converter**
  - IF2001/USB RS422/USB converter (converter for digital signals in USB)
  - IF2004/USB 4-channel RS422/USB converter (converter for up to 4 digital signals in USB)

**Accessories for optoNCDT 1320 / 1420 / 1402CL1**

- **Supply and output cable (drag-chain suitable)**
  - PCF1420-1/I (1 m, output 4 ... 20 mA)
  - PCF1420-3/I (3 m, output 4 ... 20 mA)
  - PCF1420-6/I (6 m, output 4 ... 20 mA)
  - PCF1420-10/I (10 m, output 4 ... 20 mA)
  - PCF1420-15/I (15 m, output 4 ... 20 mA)
  - PCF1420-3/U (3 m, with integrated resistor, output 1 ... 5 VDC)*
  - PCF1420-6/U (6 m, with integrated resistor, output 1 ... 5 VDC)*
  - PCF1420-10/U (10 m, with integrated resistor, output 1 ... 5 VDC)*
  - PCF1420-15/U (15 m, with integrated resistor, output 1 ... 5 VDC)*
  - PCF1420-3/IF2008 (3 m, interface and supply cable)
  - PCF1420-6/IF2008 (6 m, interface and supply cable)
  - PCF1420-10/IF2008 (10 m, interface and supply cable)
  - PCF1420-3/C-Box (3 m)
  - on request with output 2 ... 10 VDC

**Supply and output cable, suitable for use with robots**

- PCR 1402-3/1 (3 m)
- PCR 1402-6/1 (6 m)
- PCR 1402-8/1 (8 m)

**Accessories for optoNCDT 1750 / 1750LL / 1750BL / 1750DR / 1710 / 1710BL**

- **Supply and output cable (drag-chain suitable)**
  - PC1700-3 (3 m)
  - PC1700-10 (10 m)
  - PC1700-10/IF2008 (10 m, for use with interface card IF2008)
  - PC1750-3/C-Box (3 m)
  - PC1750-6/C-Box (6 m)
  - PC1750-9/C-Box (9 m)

- **Supply and output cable (suitable for use with robots)**
  - PCR1700-5 (5 m)
  - PCR1700-10 (10 m)

- **Supply and output cables for temperatures up to 200 °C**
  - PC1700-3/OE/HT (3 m)
  - PC1700-6/OE/HT (6 m)
  - PC1700-15/OE/HT (15 m)

- **Protection housing**
  - SGH model (sizes S and M)
  - SGHF model (sizes S and M)
  - SGHF-HT model

**Accessories for optoNCDT 2300 / 2300LL / 2300BL / 2300-2DR**

- **Supply and output cable**
  - PC2300-0,5Y (connection cable to PC or PLC; for operation a PC2300-3/SUB-D will be required)
  - PC2300-3/SUB-D (3 m; for operation a PC2300-0,5Y will be required)
  - PC2300-3/IF2008 (interface and supply cable)
  - PC2300-3/OE (3 m)
  - PC2300-3/OE (6 m)
  - PC2300-9/OE (9 m)
  - PC2300-15/OE (15 m)
  - PC2300-3/C-Box/RJ45 (3 m)
  - * other cable lengths on request

**Supply and output cables for temperatures up to 200 °C**

- PC2300-3/OE/HT (3 m)
- PC2300-6/OE/HT (6 m)
- PC2300-9/OE/HT (9 m)
- PC2300-15/OE/HT (15 m)

- **Protection housing**
  - SGH model (sizes S and M)
  - SGHF model (sizes S and M)
  - SGHF-HT model

**Accessories for optoNCDT 1610/1630**

- **Supply and output cable**
  - PC1605-3 (3 m)
  - PC1605-6 (6 m)
  - PC1607-5/BNC (5 m, BNC connector)

- **Protection housing**
  - SGH model (sizes S and M)
  - SGHF model (sizes S and M)
  - SGHF-HT model

- **Supply and output cables for temperatures up to 200 °C**
  - PC2300-3/OE/HT (3 m)
  - PC2300-6/OE/HT (6 m)
  - PC2300-9/OE/HT (9 m)
  - PC2300-15/OE/HT (15 m)
Sensors and Systems from Micro-Epsilon

Sensors and systems for displacement, distance and position

Sensors and measurement devices for non-contact temperature measurement

Measuring and inspection systems for metal strips, plastics and rubber

Optical micrometers and fiber optics, measuring and test amplifiers

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