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>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 1) Measurement on white target - Frequency response 10 kHz 2) Measurement on white target - Frequency response 20 Hz

## Sensors

<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>
<tr>
<td>Frequency response</td>
<td>100 kHz (-3dB)</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>
</tr>
<tr>
<td>Laser safety class</td>
<td>Class 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Vibration</td>
<td>5 g to 1 kHz (sensor head, 20 g optional)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0 ... +40 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-30 ... +75 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other measuring ranges on request 1) Measurement on white target - Frequency response 100 kHz 2) Measurement on white target - Frequency response 230 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 optoNCDT

Accessories for 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)

Supply and output cable (drag-chain suitable)
- PCF1420-1/I (1 m, output 4 ... 20 mA)
- PCF1420-1/I/01 (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)
- PCF1420-6/C-Box (6 m)
- PCF1420-9/C-Box (9 m)

Supply and output cable, suitable for use with robots (available in 90° version)
- PCR 1402-3/I (3 m)
- PCR 1402-6/I (6 m)
- PCR 1402-8/I (8 m)

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
- PCF1420-3/OE/HT (3 m)
- PCF1420-6/OE/HT (6 m)
- PCF1420-9/OE/HT (9 m)
- PCF1420-15/OE/HT (15 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

Supply and output cables for temperatures up to 200 °C
- PC1700-3/OE/HT (3 m)
- PC1700-6/OE/HT (6 m)
- PC1700-9/OE/HT (9 m)
- PC1700-15/OE/HT (15 m)

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)
- PC2300-6/OE (6 m)
- PC2300-9/OE (9 m)
- PC2300-15/OE (15 m)
- PC2300-3/C-Box/RJ45 (3 m)
- PC2300-6/C-Box/RJ45 (6 m)
- PC2300-9/C-Box/RJ45 (9 m)

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)

Accessories for optoNCDT 2310 / 2310LL / 2310BL / 2310-2DR

Supply and output cable
- PC2310-0,5Y (connection cable to PC or PLC; for operation a PC2310-3/SUB-D will be required)
- PC2310-3/SUB-D (3 m; for operation a PC2310-0,5Y will be required)
- PC2310-3/IF2008 (interface and supply cable)
- PC2310-3/OE (3 m)
- PC2310-6/OE (6 m)
- PC2310-9/OE (9 m)
- PC2310-15/OE (15 m)
- PC2310-3/C-Box/RJ45 (3 m)
- PC2310-6/C-Box/RJ45 (6 m)
- PC2310-9/C-Box/RJ45 (9 m)

Protection housing
- SGH model (sizes S and M)
- SGHF model (sizes S and M)
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Supply and output cables for temperatures up to 200 °C
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- PC2310-6/OE/HT (6 m)
- PC2310-9/OE/HT (9 m)
- PC2310-15/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
- Color recognition sensors, LED analyzers and inline color spectrometers
- 3D measurement technology for dimensional testing and surface inspection

MICRO-EPSILON USA
8120 Brownleigh Dr. · Raleigh, NC 27617 / USA
Phone +1/919/787-9707 · Fax +1/919/787-9706
me-usa@micro-epsilon.com · www.micro-epsilon.com