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.
<table>
<thead>
<tr>
<th>Model</th>
<th>LD1610-4</th>
<th>LD1610-10</th>
<th>LD1610-20</th>
<th>LD1610-50</th>
<th>LD1610-100</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>
<td>100 mm</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>
<td>170 mm</td>
<td>22 mm</td>
<td>40 mm</td>
<td>55 mm</td>
<td>115 mm</td>
</tr>
<tr>
<td>Mid of measuring range</td>
<td>24 mm</td>
<td>45 mm</td>
<td>65 mm</td>
<td>140 mm</td>
<td>220 mm</td>
<td>24 mm</td>
<td>45 mm</td>
<td>65 mm</td>
<td>140 mm</td>
</tr>
<tr>
<td>End of measuring range</td>
<td>26 mm</td>
<td>50 mm</td>
<td>75 mm</td>
<td>165 mm</td>
<td>270 mm</td>
<td>26 mm</td>
<td>50 mm</td>
<td>75 mm</td>
<td>165 mm</td>
</tr>
<tr>
<td>Frequency response (-3dB)</td>
<td>10 kHz</td>
<td>10 kHz</td>
<td></td>
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<tr>
<td>Linearity</td>
<td>&lt; ± 8 µm</td>
<td>&lt; ± 20 µm</td>
<td>&lt; ± 40 µm</td>
<td>&lt; ± 100 µm</td>
<td>&lt; ± 200 µm</td>
<td>&lt; ± 12 µm</td>
<td>&lt; ± 30 µm</td>
<td>&lt; ± 60 µm</td>
<td>&lt; ± 150 µm</td>
</tr>
<tr>
<td>Resolution</td>
<td>static (20 Hz)</td>
<td>0.2 µm</td>
<td>0.5 µm</td>
<td>1 µm</td>
<td>2.5 µm</td>
<td>6 µm</td>
<td>0.4 µm</td>
<td>1 µm</td>
<td>2 µm</td>
</tr>
<tr>
<td></td>
<td>dynamic (10 / 100 kHz)</td>
<td>2.6 µm</td>
<td>6.5 µm</td>
<td>13 µm</td>
<td>32.5 µm</td>
<td>65 µm</td>
<td>7 µm (1)</td>
<td>17.5 µm (1)</td>
<td>35 µm (1)</td>
</tr>
<tr>
<td>Temperature stability</td>
<td>± 0.02 % FSO / K</td>
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<tr>
<td>Light spot diameter (± 10 %)</td>
<td>SMR</td>
<td>MMR</td>
<td>EMR</td>
<td>300 µm</td>
<td>600 µm</td>
<td>900 µm</td>
<td>1500 µm</td>
<td>1500 µm</td>
<td>300 µm</td>
</tr>
<tr>
<td>Light source</td>
<td>Semiconductor laser &lt; 1 mW, 670 nm (red)</td>
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<tr>
<td>Laser safety class</td>
<td>Class 2</td>
<td></td>
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<tr>
<td>Permissible ambient light 2)</td>
<td>20,000 lx</td>
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<tr>
<td>Supply voltage</td>
<td>10 … 30 VDC</td>
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<tr>
<td>Max. current consumption</td>
<td>200 mA (24 V)</td>
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<td></td>
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<tr>
<td>Digital interface</td>
<td>Ethernet (optional)</td>
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<tr>
<td>Analog output</td>
<td>± 10 V (optional 0 … 10 V / 0 … 5 V) / 4 … 20 mA</td>
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<tr>
<td>Switching output</td>
<td>3 x switching outputs: MIN, OK, MAX (+24V) / 1 x error output (+24 V)</td>
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<tr>
<td>Connection</td>
<td>Sensor: integrated cable 2 m, min. bending radius 80 mm (fixed installation); Supply/signal: 25-pin D-plug (see accessories for suitable connection cable)</td>
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<tr>
<td>Installation</td>
<td>Sensor: screw connection via two mounting holes; Controller: screw connection via four mounting holes</td>
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<tr>
<td>Temperature range</td>
<td>Storage -20 … +70 °C (non-condensing)</td>
<td>-30 … +75 °C (non-condensing)</td>
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<tr>
<td></td>
<td>Operation 0 … +50 °C (non-condensing)</td>
<td>0 … +40 °C (non-condensing)</td>
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<tr>
<td>Shock (DIN-EN 60068-2-29)</td>
<td>15 g / 6 ms in 3 axes</td>
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<tr>
<td>Vibration (DIN EN 60068-2-6)</td>
<td>10 g / 0 … 1000 Hz (optional 20 g)</td>
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<tr>
<td>Protection class (DIN-EN 60529)</td>
<td>Sensor: IP64</td>
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<td></td>
<td>Controller: IP40</td>
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<tr>
<td>Material</td>
<td>Aluminum housing (sensor &amp; controller)</td>
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<tr>
<td>Weight 3)</td>
<td>approx. 250 g</td>
<td>approx. 480 g</td>
<td>approx. 250 g</td>
<td>approx. 480 g</td>
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<tr>
<td>Control and display elements</td>
<td>5 x color LEDs for power / status</td>
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</table>

FSO = Full Scale Output,
SMR = Start of measuring range, MMR = Mid of measuring range, EMR = End of measuring range.
The specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)
1) Resolution dynamic with 100 kHz.
2) Illuminant: light bulb
3) The specified weight refers only to the sensor head.
Accessories for all optoNCDT series (except for LD16x0)

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)

Interface module for Industrial Ethernet connection
- IF2030/PNET
- IF2030/ENETIP

Accessories for optoNCDT 1420 / 1402CL1

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)
- PCF1420-10/C-Box (9 m)
- PCF1420-3/C-Box (3 m)
- PCF1420-6/C-Box (6 m)
- PCF1420-10/C-Box (10 m)

Supplementary supply and output cable, suitable for use with robots (available in 90° version)
- PCR1402-3/I (3 m)
- PCR1402-6/I (6 m)
- PCR1402-8/I (8 m)

Accessories for optoNCDT 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)
- PC2300-6/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)
- PC2300-15/C-Box/RJ45 (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
- 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

Color recognition sensors, LED analyzers and inline color spectrometers

3D measurement technology for dimensional testing and surface inspection