More Precision

*optoNCDT* // Laser displacement sensors (triangulation)
The optoNCDT 1710BL sensors are equipped with the patented Blue Laser Technology and used for measurement tasks where large measuring ranges or distances from the measurement object are required. These large distances enable measurements on hot objects and red-hot glowing steel and silicon.

These sensors are equipped with high-performance lenses, new intelligent laser control and innovative evaluation algorithms. This is how they achieve high accuracy and signal stability.
**Patented Blue Laser Technology**

Measurement tasks involving Blue Laser sensors on red-hot glowing metals exceeding 700 °C and transparent objects such as plastics, adhesives and glass are patented by Micro-Epsilon. On these surfaces, the optoNCDT Blue Laser models achieve excellent signal stability and high precision measurement results.

<table>
<thead>
<tr>
<th>Model</th>
<th>ILD1710-50BL</th>
<th>ILD1710-1000BL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>50 mm</td>
<td>1000 mm</td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>550 mm</td>
<td>1000 mm</td>
</tr>
<tr>
<td>Mid of measuring range</td>
<td>575 mm</td>
<td>1500 mm</td>
</tr>
<tr>
<td>End of measuring range</td>
<td>600 mm</td>
<td>2000 mm</td>
</tr>
<tr>
<td>Measuring rate</td>
<td>4 adjustable stages: 2.5 kHz / 1.25 kHz / 625 Hz / 312.5 Hz</td>
<td></td>
</tr>
<tr>
<td>Linearity</td>
<td>&lt; ± 50 µm</td>
<td>&lt; ± 1000 µm</td>
</tr>
<tr>
<td>Resolution</td>
<td>&lt; ± 0.1 % FSO</td>
<td></td>
</tr>
<tr>
<td>Light spot diameter (± 10 %)</td>
<td>7.5 µm</td>
<td>100 µm</td>
</tr>
<tr>
<td>Light source</td>
<td>Semiconductor laser &lt;1 mW, 405 nm (blue violet)</td>
<td></td>
</tr>
<tr>
<td>Laser safety class</td>
<td>Class 2 in accordance with DIN EN 60825-1 : 2015-07</td>
<td></td>
</tr>
<tr>
<td>Permissible ambient light</td>
<td>10,000 lx</td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td>11 ... 30 VDC</td>
<td></td>
</tr>
<tr>
<td>Max. current consumption</td>
<td>150 mA (24 V)</td>
<td></td>
</tr>
<tr>
<td>Signal input</td>
<td>Zero, laser on/off</td>
<td></td>
</tr>
<tr>
<td>Digital interface</td>
<td>RS422 (14 bit) / USB</td>
<td></td>
</tr>
<tr>
<td>Analog output</td>
<td>4 ... 20 mA / 0 ... 10 V</td>
<td></td>
</tr>
<tr>
<td>Switching output</td>
<td>1 x error / 2 x limit values (configurable)</td>
<td></td>
</tr>
<tr>
<td>Synchronization</td>
<td>possible for simultaneous or alternating measurements</td>
<td></td>
</tr>
<tr>
<td>Connection</td>
<td>integrated pigtail 0.25 m with 14-pin ODU plug, min. bending radius 30 mm (see accessories for suitable connection cable)</td>
<td></td>
</tr>
<tr>
<td>Installation</td>
<td>Screw connection via three mounting holes</td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>Storage: -20 ... +70 °C (non-condensing)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operation: 0 ... +50 °C (non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Shock (DIN EN 60068-2-29)</td>
<td>15 g / 6 ms in 3 axes</td>
<td></td>
</tr>
<tr>
<td>Vibration (DIN EN 60068-2-6)</td>
<td>2 g / 20 ... 500 Hz</td>
<td></td>
</tr>
<tr>
<td>Protection class (DIN-EN 60529)</td>
<td>IP65</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Aluminum housing</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 800 g (incl. pigtail)</td>
<td></td>
</tr>
<tr>
<td>Control and display elements</td>
<td>Select &amp; function keys: output type, measuring rate, type of averaging, averaging number, error analog, synchronization, operation mode, trigger mode, baud rate, data format; measurement chart via PC using the ILD1700 Tool; 5 x color LEDs for status display</td>
<td></td>
</tr>
</tbody>
</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) Measuring rate of 2.5 kHz, without averaging
2) USB optional via cable PC 1700-3/USB (see accessories)
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-Box2A (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 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)
* on request with output 2 ... 10 VDC

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 1610/1630

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

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)
* other cable lengths on request

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)
Protection housing for demanding environments
To protect the optoNCDT laser sensors in harsh environments, protective housings are available in different designs.

**SGH model**
Completely enclosed housing with an integrated front window, where the sensor measures through the window. The water-resistant housing provides protection against solvents and detergents.

**SGHF model**
With window and compressed-air connection ideal for high ambient temperatures. The integrated air cooling of the housing offers optimum protection for the sensor.

**SGHF-HT model**
This water-cooled protection housing with window and compressed-air connection is designed for measurement tasks in ambient temperatures up to 200 °C. Suitable for all long-range sensors
optoNCDT 1710
optoNCDT 1750-500 and optoNCDT 1750-750
optoNCDT 2310
optoNCDT 2300 - 200

Maximum ambient temperature 200 °C
Maximum temperature of cooling water $T_{(max)} = 10$ °C
Minimum water flow rate $Q_{(min)} = 3$ liters/min

**optoNCDT Demo Tool**
The scope of supply includes a software for easy sensor configuration. The settings can be implemented conveniently via a Windows user interface on the PC. The sensor parameters are transmitted to the sensor via the serial port and can also be saved if required. The software is available as single and multi-channel version. The sensor is connected to the PC via the sensor cable using a USB converter.

**Free download**
Download free of charge from www.micro-epsilon.com/download: software, driver and well-documented driver DLL for easy sensor integration in existing or customer software.
**IF2008PCI/IF2008PCIe - PCI Interface card for synchronous data acquisition**

The absolutely synchronous data acquisition is a decisive factor for the planarity or thickness measurement using several laser sensors. The IF2008PCI interface card is designed for installation in PCs and enables the synchronous capture of four digital sensor signals and two encoders. The data are stored in a FIFO memory in order to enable resource-saving processing in blocks in the PC. The IF2008E expansion board enables to detect in addition two digital sensor signals, two analog sensor signals and eight I/O signals.

**Special features**
- IF2008 basic printed circuit board: 4 digital signals and 2 encoders
- IF2008E - Expansion board: 2x digital signals, 2x analog signals and 8x I/O signals

**IF2004/USB: 4-channel converter from RS422 to USB**

The RS422/USB converter is used for transforming digital signals from up to four optical sensors into USB data signals. The converter has four trigger inputs and a trigger output for connecting additional converters. Data is output via an USB interface. The connected sensors and the converter can be programmed through software.

**Special features**
- 4x digital signals via RS422
- 4x trigger inputs, 1x trigger output
- Synchronous data acquisition
- Data output via USB
**IF2030 Interface module for Industrial Ethernet connection**

The IF2030 interface modules are designed for easy connection of Micro-Epsilon sensors to Ethernet-based fieldbuses, e.g., plant control systems. The PROFINET and Ethernet/IP modules are compatible with sensors that output data via an RS422 or RS485 interface. These modules operate on the sensor side with up to 4 MBd and have two network connections for different network topologies. Installation in switching cabinets is via a DIN rail.

**C-Box/2A Controller for D/A conversion and evaluation**

C-Box/2A is used for fast D/A conversion of two digital input signals or for evaluating two digital sensor signals. The controller is compatible with the optoNCDT 1420, 1750 und 2300 models. Handling of the C-Box/2A and of the connected sensors are performed via web interface. Averaging functions, thickness, diameter, step and inclinations can be calculated. The D/A conversion is executed at 16 bit and max. 70 kHz.

**Special features**

- Trigger input
- Multi-function output
- Measurement value output via Ethernet, USB, analog output
  - 4 ... 20 mA / 0 ... 5 V / 0 ... 10 V / ±5 V / ±10 V
  - (scalable via web interface)
- 2x switching outputs for sensors or C-Box/2A status
- Parallel data output via 3 output interfaces
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