More Precision

**optoNCDT** // Laser displacement sensors (triangulation)
The optoNCDT 1420 offers a unique combination of speed, size, performance and application versatility in the range of compact triangulation sensors. The sensor with integrated controller is used in restricted installation space or dynamic applications. The selectable connector type, i.e. cable or pigtail, together with compact size reduce the sensor installation effort to a minimum.

The Auto Target Compensation (ATC) provides stable distance signal control. The high-performance optical system projects the small light spot sharply onto the measurement object which enables to even detect smallest components and every little detail reliably.

**Highest precision in a minimum of space**
Compact size combined with low weight opens up new fields of application. Analog and digital output signals enable to integrate the sensor into plant or machine control systems.

The triangulation sensor achieves a high measurement accuracy with measuring rates of up to 4 kHz.

**Unique ease of use, individual results**
All optoNCDT 1420 models are operated using an extended web interface. The settings for the measurement task can be quickly selected using predefined presets. The quality slider enables the sensor to be adapted to static and dynamic processes.

Up to eight user-specific sensor settings can be stored and exported in the setup management.

The video signal display, the signal peak selection and a freely adjustable signal averaging enable to optimize the measurement task.

The ROI function (region of interest) allows e.g. for interfering signals in the background to be filtered out. The remaining signal peak is optimally corrected.
<table>
<thead>
<tr>
<th>Model</th>
<th>ILD1420-10</th>
<th>ILD1420-25</th>
<th>ILD1420-50</th>
<th>ILD1420-100</th>
<th>ILD1420-200</th>
<th>ILD1420-500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>10 mm</td>
<td>25 mm</td>
<td>50 mm</td>
<td>100 mm</td>
<td>200 mm</td>
<td>500 mm</td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>SMR</td>
<td>20 mm</td>
<td>25 mm</td>
<td>35 mm</td>
<td>50 mm</td>
<td>60 mm</td>
</tr>
<tr>
<td>Mid of measuring range</td>
<td>MMR</td>
<td>25 mm</td>
<td>37.5 mm</td>
<td>60 mm</td>
<td>100 mm</td>
<td>160 mm</td>
</tr>
<tr>
<td>End of measuring range</td>
<td>EMR</td>
<td>30 mm</td>
<td>50 mm</td>
<td>85 mm</td>
<td>150 mm</td>
<td>260 mm</td>
</tr>
<tr>
<td>Linearity</td>
<td>≤ ± 8 µm</td>
<td>≤ ± 20 µm</td>
<td>≤ ± 40 µm</td>
<td>≤ ± 80 µm</td>
<td>≤ ± 160 µm</td>
<td>≤ ± 500 µm</td>
</tr>
<tr>
<td>Repeatability</td>
<td>0.5 µm</td>
<td>1 µm</td>
<td>2 µm</td>
<td>4 µm</td>
<td>8 µm</td>
<td>20 ... 40 µm</td>
</tr>
<tr>
<td>Measuring rate</td>
<td>0.25 kHz / 0.5 kHz / 1 kHz / 2 kHz / 4 kHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Light source</td>
<td>Semiconductor laser &lt; 1 mW, 670 nm (red)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Permissible ambient light</td>
<td>50,000 lx</td>
<td>30,000 lx</td>
<td>10,000 lx</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spot diameter</td>
<td>SMR</td>
<td>90 x 120 µm</td>
<td>100 x 140 µm</td>
<td>90 x 120 µm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MMR</td>
<td>45 x 40 µm</td>
<td>120 x 130 µm</td>
<td>230 x 240 µm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EMR</td>
<td>140 x 160 µm</td>
<td>390 x 500 µm</td>
<td>630 x 820 µm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>smallest diameter</td>
<td>45 x 40 µm with 24 mm</td>
<td>55 x 50 µm with 31 mm</td>
<td>70 x 65 µm with 42 mm</td>
<td></td>
<td></td>
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<tr>
<td>Protection class</td>
<td>IP65</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Laser safety class</td>
<td>Class 2 in accordance with DIN EN 60825-1 : 2008-05</td>
<td></td>
<td></td>
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<tr>
<td>Temperature stability</td>
<td>± 0.03 % FSO/°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0 ... +50 °C (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Storage temperature</td>
<td>-20 ... +70 °C (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control inputs/outputs</td>
<td>1x HTL Multifunction input Trigger in / zero setting / mastering / teach (1x error output npn, pnp, push pull)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Measurement value output</td>
<td>analog 4 ... 20 mA (1 ... 5 V with cable PCF1420-3/U); 12 bit; freely scalable within the measuring range ³</td>
<td></td>
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<tr>
<td></td>
<td>digital RS422 / 16 bit</td>
<td></td>
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<tr>
<td>Vibration</td>
<td>20 g / 20 ... 500 Hz (in accordance with IEC 60068-2-6)</td>
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<tr>
<td>Shock</td>
<td>15 g / 6 ms / 3 axes (in accordance with IEC 60068-2-29)</td>
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<td></td>
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<tr>
<td>Weight</td>
<td>with 3 m cable approx. 145 g</td>
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<tr>
<td></td>
<td>with pigtail approx. 60 g</td>
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<tr>
<td>Display</td>
<td>2 x 3 color LEDs for power and status</td>
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<td></td>
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<tr>
<td>Operation</td>
<td>Key Select button for zero / teach / factory settings</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Web interface application-specific presets; peak selection, video signal; freely selectable averaging possibilities; data reduction; setup management ⁴</td>
<td></td>
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<tr>
<td>Supply voltage</td>
<td>11 ... 30 VDC</td>
<td></td>
<td></td>
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<tr>
<td>Power consumption</td>
<td>&lt; 2 W (24 V)</td>
<td></td>
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<tr>
<td>Sensor cable</td>
<td>3 m integrated, open ends</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Control</td>
<td>integrated signal processor</td>
<td></td>
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<tr>
<td>Electromagnetic compatibility (EMC)</td>
<td>EN 61 000-6-3 / DIN EN 61326-1 (Class B)</td>
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<tr>
<td></td>
<td>EN 61 000-6-2 / DIN EN 61326-1</td>
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</tbody>
</table>

FSO = Full Scale Output; The specified data apply to a white, diffuse reflecting surface (reference: ceramics); SMR = start of measuring range; MMR = midrange; EMR = end of measuring range

² Measuring rate 2 kHz, median 9
³ Factory setting 2 kHz; modifying the factory settings requires the IF2001/USB converter (optionally available)
⁴ The D/A conversion is executed with 12 bit
⁵ Connection to PC via IF2001/USB (optionally available)
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 (1 m, output 4 ... 20 mA)
- PCF1420-1/01 (1 m, output 4...20 mA)
- PCF1420-3 (3 m, output 4 ... 20 mA)
- PCF1420-6/1 (6 m, output 4 ... 20 mA)
- PCF1420-10/1 (10 m, output 4 ... 20 mA)
- PCF1420-15/1 (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)
- 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)
- PC2300-6/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)
To protect the laser sensors in extreme environments, individual protective housings are available for all sensor models. There are three different models:

**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. [for any ILD sensor]

**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.

**Protection housing for harsh environments**
To protect the laser sensors in extreme environments, individual protective housings are available for all sensor models. There are three different models:

**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
IF2008PCI/IF2008 PCIe - PCI Interface card
The IF2008 interface card is designed for installation in PCs and enables the synchronous capture of four digital sensor signals and two encoders. The IF2008E expansion board enables the acquisition of two digital sensor signals, two analog sensor signals and eight I/O signals. The absolutely synchronous data acquisition plays an important role particularly for planarity or thickness measurement tasks. The data are stored in a FIFO memory in order to enable resource-saving processing in blocks in the PC.

Special features
- 4x digital signals and 2x encoders with IF2008 basic PCB
- 2x digital signals, 2x analog signals and 8x I/O signals with IF2008E expansion board
- 6x digital signals, 2x encoders, 2x analog signals and 8x I/O signals together with IF2008E
- FIFO data memory
- Synchronous data acquisition

IF2001/USB converter RS422 to USB
The RS422/USB converter transforms digital signals from a laser-optical sensor into a USB data packet. The sensor and the converter are connected via the RS422 interface of the converter. Data output is done via USB interface. The converter loops through further signals and functions such as laser on/off, switch signals and function output. The connected sensors and the converter can be programmed through software.
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

C-Box/2A Controller for conversion and evaluation of up to two sensor signals
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 2300 laser triangulation sensors. Output of the sensor signals is possible via two configurable analog outputs, Ethernet or USB. 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.
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