



# More Precision

**optoNCDT** // Laser displacement sensors (triangulation)





- Precise laser sensor with oval-shaped light spot (laser line)**
- For shiny metallic, rough and structured surfaces**
- Unique combination of compact size, high speed and accuracy**
- Ideal for dynamic and high resolution measurements**
- Highest immunity to ambient light**
- Reproducible sensor alignment**
- Advanced Surface Compensation**

**Laser sensors with oval-shaped light spot (laser line)**

The optoNCDT 1900LL is the latest Micro-Epsilon laser sensor. This innovative sensor projects an oval-shaped light spot which resembles a short laser line (LL). The laser sensor impresses with precise distance measurements on shiny metallic and structured surfaces, as well as materials where the laser beam penetrates. The integrated high performance controller enables fast and highly precise processing and output of measurement values.

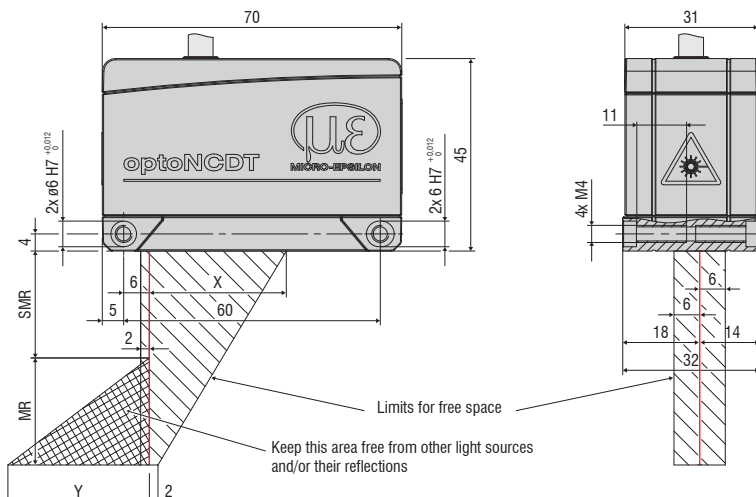
The innovative optoNCDT 1900LL laser triangulation sensor is used wherever high precision and reliability are required, e.g., in challenging automation tasks, automotive production, 3D printing and in measuring machines.

**Advanced Surface Compensation  
The intelligent exposure control for demanding surfaces**

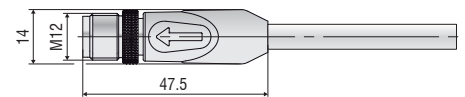
The optoNCDT 1900LL is equipped with an intelligent surface control feature. New algorithms generate stable measurement

results even on demanding surfaces where changing reflections occur. In addition, the sensor has the highest resistance to ambient light in its class and can be used in strongly illuminated environments up to 50,000 lux.

optoNCDT 1900LL (10/25 mm)



Connector (sensor side)



MR	SMR	X	Y
2	15	23	3
10	20	33	14
25	25	33	33

Model		ILD1900-2LL	ILD1900-10LL	ILD1900-25LL
Measuring range		2 mm	10 mm	25 mm
Start of measuring range		15 mm	20 mm	25 mm
Mid of measuring range		16 mm	25 mm	37.5 mm
End of measuring range		17 mm	30 mm	50 mm
Measuring rate <sup>1)</sup>		continuously adjustable between 0.25 ... 10 kHz 7 adjustable stages: 10 kHz / 8 kHz / 4 kHz / 2 kHz / 1.0 kHz / 500 Hz / 250 Hz		
Linearity <sup>2)</sup>		< ±1 µm < ±0.05 % FSO	< ±2 µm < ±0.02 % FSO	< ±5 µm < ±0.02 % FSO
Repeatability <sup>3)</sup>		< 0.1 µm	< 0.4 µm	< 0.8 µm
Temperature stability <sup>4)</sup>		±0.005 % FSO / K		
Light spot diameter (±10 %) <sup>5)</sup>	SMR	55 x 480 µm	125 x 730 µm	210 x 950 µm
	MMR	40 x 460 µm	55 x 690 µm	80 x 970 µm
	EMR	55 x 440 µm	125 x 660 µm	220 x 1000 µm
	smallest diameter	40 x 460 µm with 16 mm	55 x 690 µm with 25 mm	80 x 970 µm with 37.5 mm
Light source		Semiconductor laser < 1 mW, 670 nm (red)		
Laser safety class		Class 2 in accordance with DIN EN 60825-1: 2015-07		
Permissible ambient light		50,000 lx		
Supply voltage		11 ... 30 VDC		
Power consumption		< 3 W (24 V)		
Signal input		1 x HTL/TTL laser on/off; 1 x HTL/TTL multi-function input: trigger in, slave in, zero setting, mastering, teach-in; 1 x RS422 synchronization input: trigger in, sync in, master/slave, master/slave alternating		
Digital interface		RS422 (18 bit) / PROFINET <sup>6)</sup> / EtherNet/IP <sup>6)</sup>		
Analog output		4 ... 20 mA / 0 ... 5 V / 0 ... 10 V (16 bit, freely scalable within the measuring range)		
Switching output		2x switching outputs (error & limit value): npn, pnp, push pull		
Synchronization		possible for simultaneous or alternating measurements		
Connection		integrated cable 3 m, open ends, min. bending radius 30 mm (fixed installation); or integrated pigtail 0.3 m with 17-pin M12 plug; optional extension to 3 m / 6 m / 9 m / 15 m possible (suitable connection cable see Accessories)		
Temperature range	Storage	-20 ... +70 °C (non-condensing)		
	Operation	0 ... +50 °C (non-condensing)		
Shock (DIN EN 60068-2-27)		15 g / 6 ms in 3 axes		
Vibration (DIN EN 60068-2-6)		20 g / 20 ... 500 Hz		
Protection class (DIN EN 60529)		IP67		
Material		Aluminum housing		
Weight		approx. 185 g (incl. pigtail), approx. 300 g (incl. cable)		
Control and display elements		Select & function keys: interface selections, mastering (zero), teach, presets, quality slider, frequency selection, factory settings; web interface for setup <sup>7)</sup> : application-specific presets, peak selection, video signal, freely selectable averaging possibilities, data reduction, setup management; 2 x color LEDs for power / status		

FSO = Full Scale Output

SMR = Start of measuring range, MMR = Mid of measuring range, EMR = End of measuring range

The specified data apply to a white, diffuse reflecting surface (Micro-Epsilon reference ceramic for ILD sensors)

<sup>1)</sup> Factory setting: measuring rate 4 kHz, median 9; modifying the factory setting requires the IF2001/USB converter (see accessories)

<sup>2)</sup> Relates to digital output

<sup>3)</sup> Typical value with measurements at 4 kHz and median 9

<sup>4)</sup> Relates to digital output in mid of measuring range

<sup>5)</sup> Light spot diameter with line-shaped laser determined based on the emulated 90/10 knife-edge method

<sup>6)</sup> Connection via interface module (see accessories)

<sup>7)</sup> Connection to PC via IF2001/USB (see accessories)

**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)

**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 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)

**Protective housing**

- SGH model (sizes S and M)
- SGHF model (sizes S and M)
- SGHF-HT model

**Accessories optoNCDT 1900****Supply and output cable (drag-chain suitable)**

- PC1900-3/IF2008 Supply/output cable 3 m
- PC1900-6/IF2008 Supply/output cable 6 m
- PC1900-9/IF2008 Supply/output cable 9 m
- PC1900-15/IF2008 Supply/output cable 15 m
- PC1900-3/C-Box Power/output cable 3 m
- PC1900-6/C-Box Power/output cable 6 m
- PC1900-9/C-Box Power/output cable 9 m
- PC1900-15/C-Box Power/output cable 15 m
- PC1900-3/OE Supply/output cable 3 m
- PC1900-6/OE Supply/output cable 6 m
- PC1900-9/OE Supply/output cable 9 m
- PC1900-15/OE Supply/output cable 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)

\* other cable lengths on request

**Protective 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)



### optoNCDT Demo Tool

The scope of supply includes 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 versions. 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](http://www.micro-epsilon.com/download): software, driver and well-documented driver DLL for easy sensor integration in existing or customer software.

### Protective housing for demanding environments

To protect 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 protective 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  $T(\max) = 10\text{ °C}$

Minimum water flow rate  $Q(\min) = 3\text{ liters/min}$



SGHx ILD size S (140x140x71 mm)  
for optoNCDT 1750 / 2300 dimensions 97x75 mm



SGHx ILD size M (140x180x71 mm)  
for optoNCDT 1750 / 2300 dimensions 150x80 mm

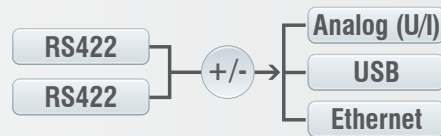
Board	optoNCDT 1220	optoNCDT 1320	optoNCDT 1420	optoNCDT 1710	optoNCDT 1750	optoNCDT 1900	optoNCDT 2300	optoNCDT 2310
<b>C-Box/2A</b> Controller unit for evaluation and signal conversion of up to 2 sensor signals	⊘	⊘	✓	⊘	✓	✓	✓	✓
<b>IF2001/USB</b> RS422/USB converter to transform a digital signal to USB	✓	✓	✓	✓	✓	✓	✓	✓
<b>IF2004/USB</b> RS422/USB converter to transform from up to 4 digital signals to USB	⊘	⊘	✓	✓	✓	✓	✓	✓
<b>IF2008/ETH</b> Interface module for Ethernet connection for up to 8 sensors	⊘	⊘	✓	⊘	✓	✓	✓	✓
<b>IF2008PCIE</b> Interface card for multiple sensor signals; analog and digital interfaces	⊘	⊘	✓	✓	✓	✓	✓	✓
<b>IF2030/PNET</b> Interface module for Industrial Ethernet connection (PROFINET)	✓	✓	✓	⊘	✓	✓	✓	✓
<b>IF2030/ENETIP</b> Interface module for Industrial Ethernet connection (EtherNet/IP)	✓	✓	✓	⊘	✓	✓	✓	✓

**C-Box/2A Controller for D/A conversion and evaluation of up to 2 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 1420, 1750 and 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



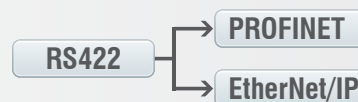
**IF2030 Interface module for Industrial Ethernet connection**

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 control cabinets is via a DIN rail.



EtherNet/IP<sup>®</sup>

PROFI<sup>®</sup>NET



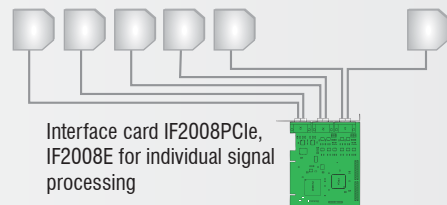
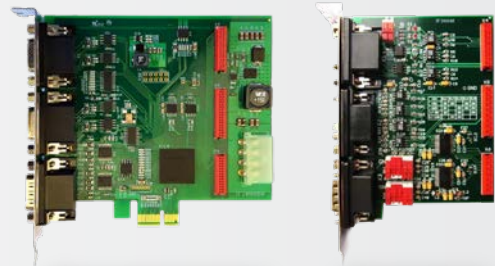
### IF2008PCIe / IF2008E:

#### Interface card for synchronous data acquisition

Absolute synchronous data acquisition is a decisive factor for the planarity or thickness measurement using several laser sensors. The IF2008PCIe interface card is designed for installation in PCs and enables the synchronous capture of four digital sensor signals and two encoders. The data is 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.

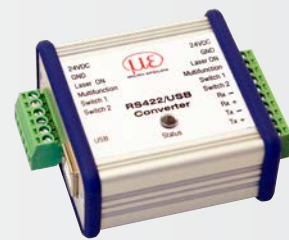
#### Special features

- IF2008PCIe - basic printed circuit board: 4 digital signals and 2 encoders
- IF2008E - expansion board: 2x digital signals, 2x analog signals and 8x I/O signals



### 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.



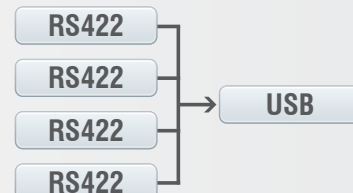
RS422 → USB

### 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



## Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, distance and position



Sensors and measurement devices for non-contact temperature measurement



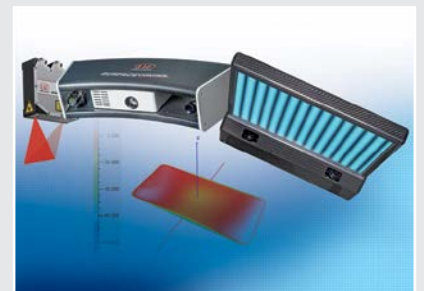
Measuring and inspection systems for metal strips, plastics and rubber



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