MICRO-EPSILON

More Precision

optoNCDT // Laser displacement sensors (triangulation)

- Unique combination of compact size, high speed and accuracy
- Ideal for dynamic and high resolution measurements
- Highest immunity to ambient light
- Reproducible sensor alignment
- ASC Advanced Surface Compensation

Next-generation laser sensors

The optoNCDT 1900 is the latest laser sensor model from Micro-Epsilon. This innovative sensor is used for dynamic displacement, distance and position measurements offering a unique combination of high speed, compact design and accuracy. The integrated high-performance controller enables fast and highly precise processing and output of measurement values.

The innovative optoNCDT 1900 laser triangulation sensor is used whenever maximum precision is combined with the latest technology, e.g., in sophisticated automation, automotive production, 3D printing and coordinate measuring machines.

Simple installation and initial operation

Mounting the sensor using fitting sleeves automatically aligns the sensor in the correct position. This enables both easy sensor replacement and increased measurement accuracy.

Highest stability based on intelligent signal optimization

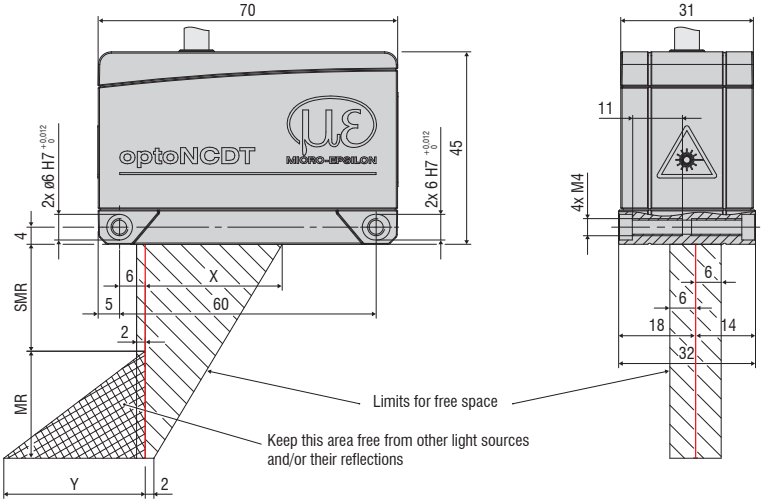
For the first time, a two-step measurement value averaging feature is available to optimize the signal. This enables a smooth signal at edges and steps. Especially for high speed measurements of moving parts, measurement averaging enables a precise signal course.

Advanced Surface Compensation
The intelligent exposure control for demanding surfaces

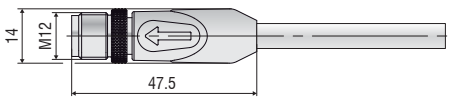
The optoNCDT 1900 is equipped with an intelligent surface control feature. New algorithms generate stable measurement results even on demanding surfaces where changing reflections occur.

Furthermore, these new algorithms compensate for ambient light up to 50,000 lux. Therefore, this is the sensor with the highest resistance to ambient light in its class which can even be used in strongly illuminated environments.

optoNCDT 1900 (2/10/25/50/100/200/500 mm)



Connector (sensor side)



MR	SMR	X	Y
2	15	23	3
10	20	33	14
25	25	33	33
50	40	36	45
100	50	37	75
200	60	39	130
500	100	43	215

Model		ILD1900-2	ILD1900-10	ILD1900-25	ILD1900-50	ILD1900-100	ILD1900-200	ILD1900-500
Measuring range		2 mm	10 mm	25 mm	50 mm	100 mm	200 mm	500 mm
Start of measuring range		15 mm	20 mm	25 mm	40 mm	50 mm	60 mm	100 mm
Mid of measuring range		16 mm	25 mm	37.5 mm	65 mm	100 mm	160 mm	350 mm
End of measuring range		17 mm	30 mm	50 mm	90 mm	150 mm	260 mm	600 mm
Measuring rate [1]		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 [2]		< ±1µm	< ±2 µm	< ±5 µm	< ±10 µm	< ±30 µm	< ±100 µm	< ±400 µm
		< ±0.05 % FSO	< ±0.02 % FSO			< ±0.03 % FSO	< ±0.05 % FSO	< ±0.08 % FSO
Repeatability [3]		< 0.1 µm	< 0.4 µm	< 0.8 µm	< 1.6 µm	< 4 µm	< 8 µm	< 20 … 40 µm
Temperature stability [4]		±0.005 % FSO / K						
Light spot diameter (±10 %) [5]	SMR	60 x 75 µm	115 x 150 µm	200 x 265 µm	220 x 300 µm	310 x 460 µm	950 x 1200 µm	950 x 1200 µm
	MMR	55 x 65 µm	60 x 65 µm	70 x 75 µm	95 x 110 µm	140 x 170 µm		
	EMR	65 x 75 µm	120 x 140 µm	220 x 260 µm	260 x 300 µm	380 x 410 µm		
	smallest diameter	55 x 65 µm with 16 mm	60 x 65 µm with 25 mm	65 x 70 µm with 35 mm	85 x 90 µm with 55 mm	120 x 125 µm with 75 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				30.000 lx	10.000 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 [6] / EtherNet/IP [6]						
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 [7]: 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)
[1] Factory setting: measuring rate 4 kHz, median 9; modifying the factory setting requires the IF2001/USB converter (see accessories)
[2] Relates to digital output
[3] Typical value with measurements at 4 kHz and median 9
[4] Relates to digital output in mid of measuring range
[5] Light spot diameter determined using a point-shaped laser with Gaussian fit (full $1/e^2$ width); for ILD1900-2: determined using the emulated 90/10 knife-edge method
[6] Connection via interface module (see accessories)
[7] 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)

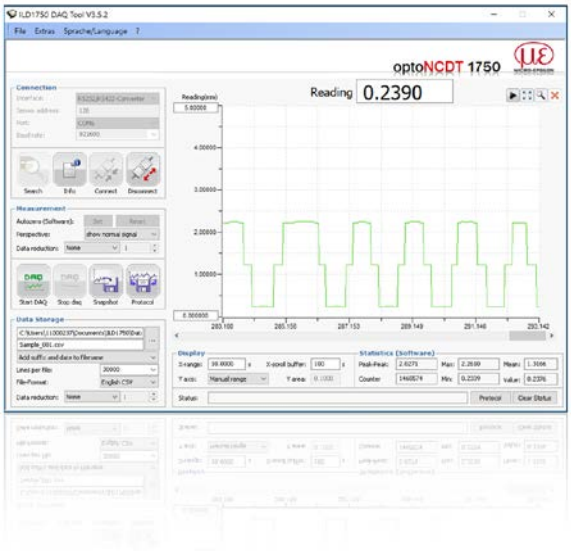
* other cable lengths on request

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: 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.

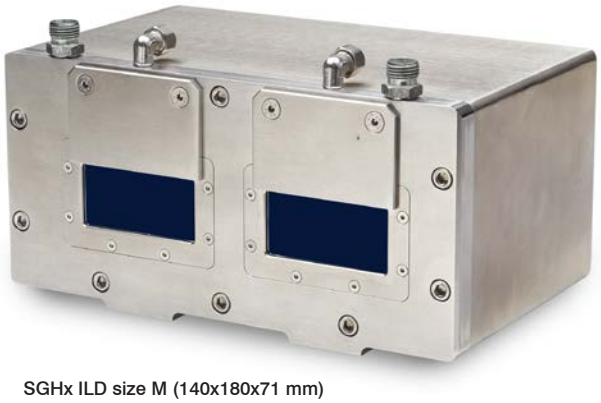
SGHF model

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 °C
Minimum water flow rate Q(min) = 3 liters/min

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

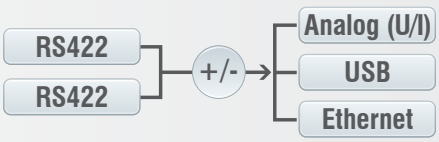


SGHx ILD size M (140x180x71 mm)
for optoNCDT 1750 / 2300 dimensions 150x80 mm

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

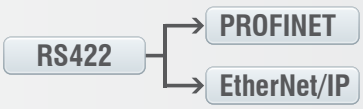
- Trigger input
- Multi-function output
- Measurement value output via Ethernet, USB, analog output 4 ... 20 mA / 0 ... 5 V / 0 ... 10 V / ±5 V / ±10 V (scalable via web interface)
- 2x switching outputs for sensors or C-Box/2A status
- Parallel data output via 3 output interfaces

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.

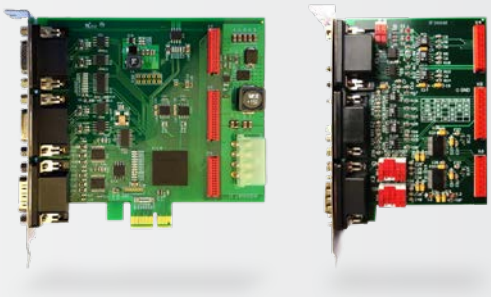
EtherNet/IP

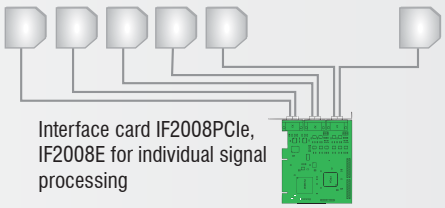
PROFINET



IF2008PCIe / IF2008E:
Interface cardfor 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.



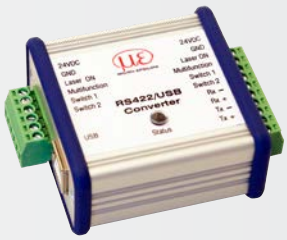


Special features

- 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.

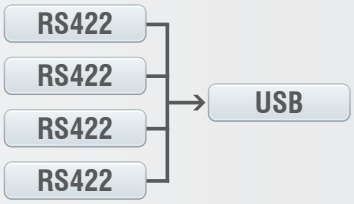


IF2004/USB: 4-channel converter from RS422 to USB

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

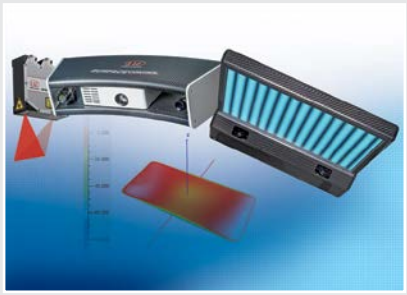
Sensors and systems for displacement, distance and position

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

Modifications reserved / Y9761188-M022051GKE

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