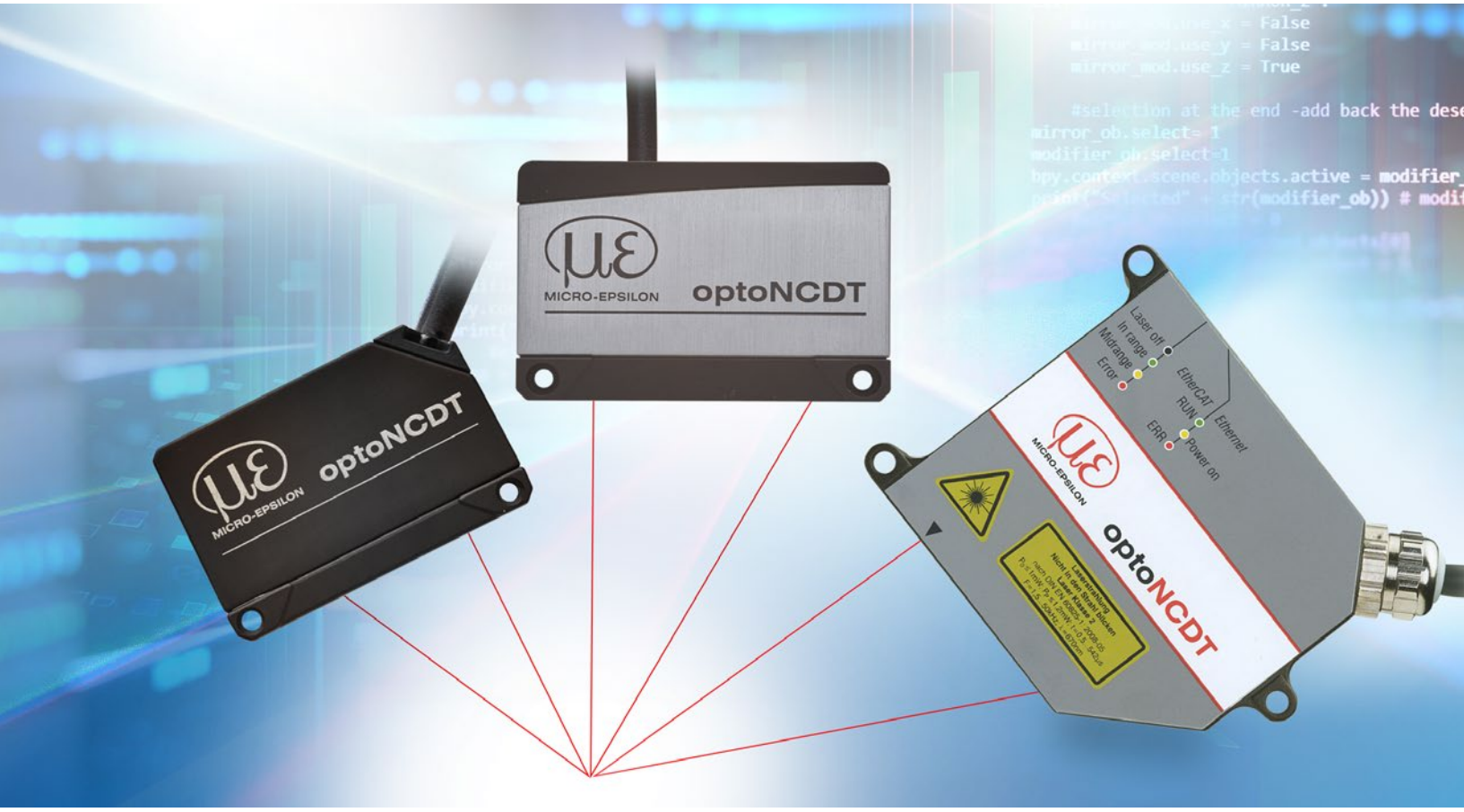
MICRO-EPSILON

More Precision

optoNCDT // Laser displacement sensors (triangulation)



Smart laser sensors for precise measurements
optoNCDT 1900

designed for advanced
AUTOMATION

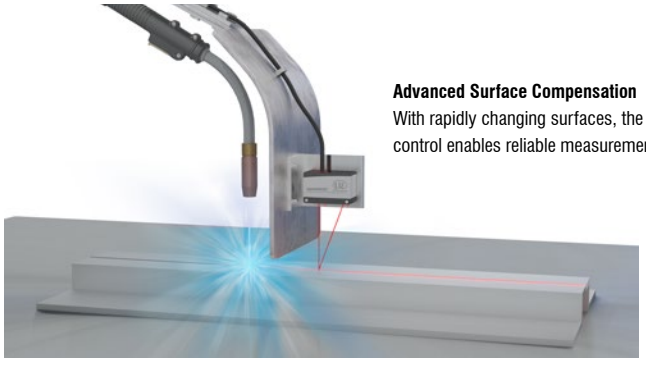
- For common surfaces
- Measuring rate up to 10 kHz
- Analog (U/I) / RS422 / PROFINET / EtherNet/IP / EtherCAT
- Advanced Surface Compensation
- Repeatability <0.1 µm
- Ideal for series and OEM applications
- Highest immunity to ambient light
- High resistance to shocks and vibrations

Next-generation laser sensors

The optoNCDT 1900 laser sensors are used for dynamic displacement, distance and position measurements and offer a unique combination of performance, design and integration capability. The integrated high-performance controller enables fast and highly precise processing and output of measurement values. These innovative sensors are used whenever maximum precision is combined with the latest technology, e.g., in sophisticated automation, automotive production, 3D printing and coordinate measuring machines.

Advanced Surface Compensation –
The intelligent exposure control for demanding surfaces

The optoNCDT 1900 laser sensors are equipped with an intelligent surface control feature. Innovative algorithms enable 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, these are the sensors with the highest resistance to ambient light in their class and can even be used in strongly illuminated environments.



Advanced Surface Compensation
With rapidly changing surfaces, the exposure control enables reliable measurement results.

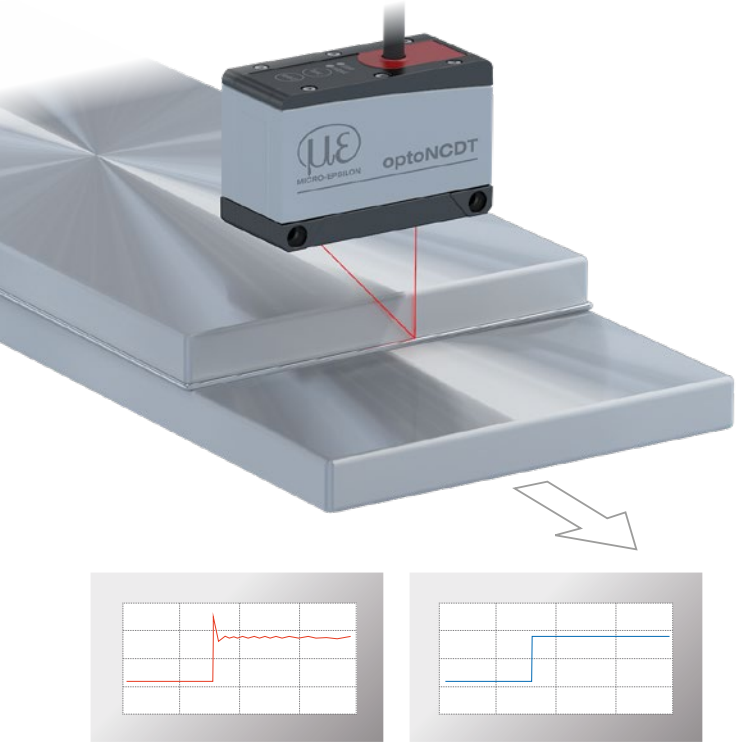
Industrial Ethernet for easy integration

The latest optoNCDT 1900 laser triangulation sensors are also available with integrated Industrial Ethernet interface. Depending on the model, you can integrate the full sensor performance into your PLC directly via EtherCAT, EtherNet/IP or PROFINET without any additional interface module. You benefit from real-time data without time delay as well as reduced installation and wiring effort.

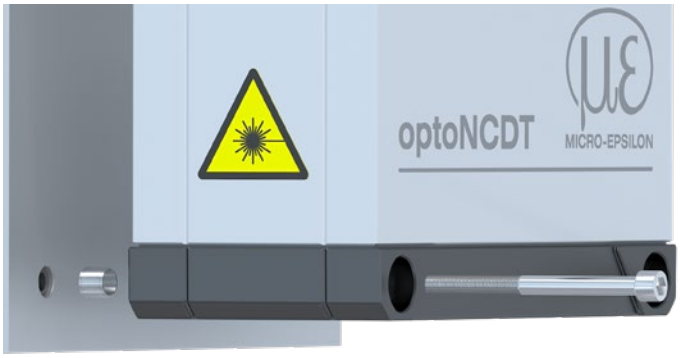
The sensor parameters can be set directly via Industrial Ethernet or still via web interface. For high speed measurements, the sensor offers an Oversampling feature which allows, depending on the fieldbus, measurement data to be detected or transmitted eight times faster than the bus cycles.

EtherCAT® EtherNet/IP® PROFINET®

Model	Technology	Measuring range	Repeatability	Linearity
optoNCDT 1900		2 - 500 mm	0.1 µm	from 0.02 %
optoNCDT 1900LL		2 - 50 mm	0.1 µm	from 0.02 %



The two-step measurement value averaging enables smooth signal courses when measuring edges (right). Otherwise, interfering signals occur (left).



Patented installation
Easy mounting and high repeatability when replacing the sensor

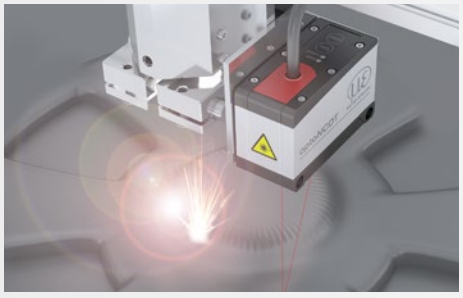
Highest stability based on intelligent signal optimization

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.

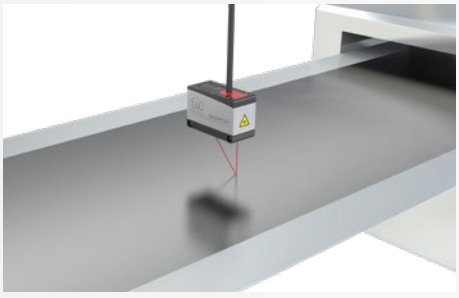
Simple mounting and initial operation

Mounting the sensor using fitting sleeves automatically aligns the sensor in the correct position. This enables both easy sensor replacement and even higher precision in solving measurement tasks. Thanks to its small dimensions, the laser sensor can also be integrated in confined spaces.

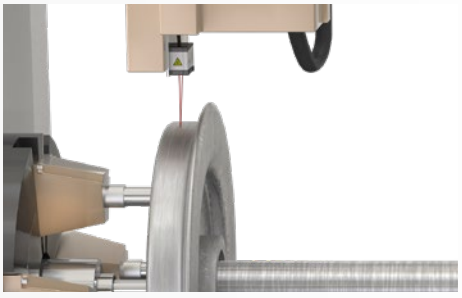
Application examples



Distance measurement of print heads



Thickness measurement of electrode film



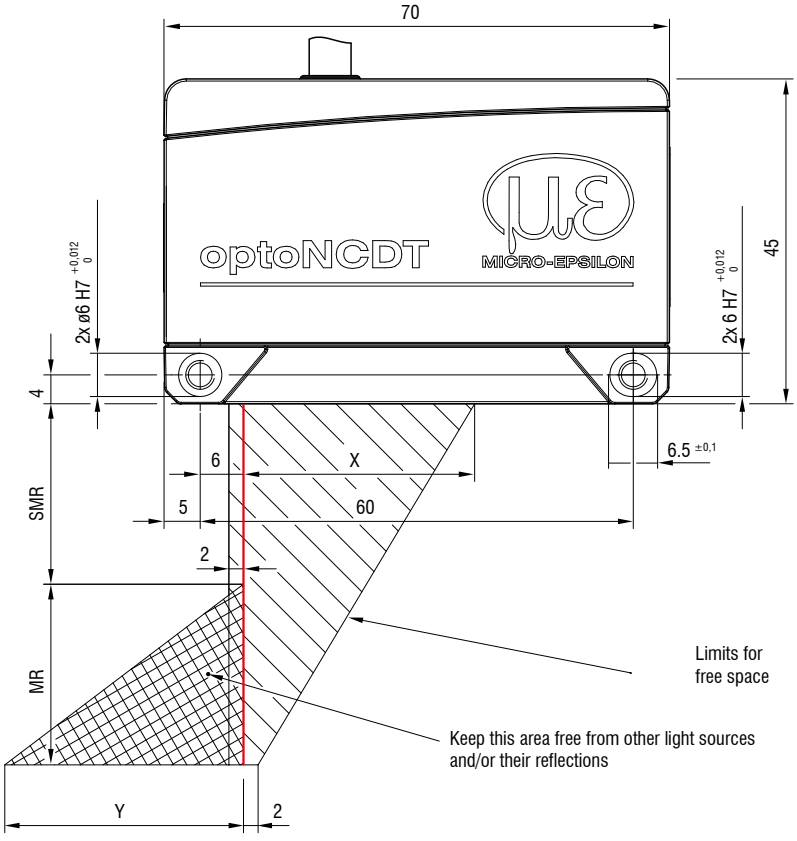
Wear inspection of wheel tires

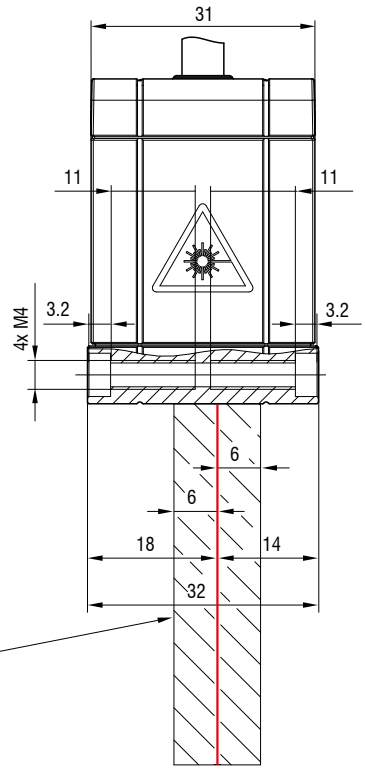
Laser-Line - optoNCDT 1900LL

Model		ILD1900-2LL	ILD1900-6LL	ILD1900-10LL	ILD1900-25LL	ILD1900-50LL
Measuring rangee		2 mm	6 mm	10 mm	25 mm	50 mm
Start of measuring range		15 mm	17 mm	20 mm	25 mm	40 mm
Mid of measuring range		16 mm	20 mm	25 mm	37.5 mm	65 mm
End of measuring range		17 mm	23 mm	30 mm	50 mm	90 mm
Linearity [1]		< ±1 µm	< ±1.2 µm	< ±2 µm	< ±5 µm	< ±10 µm
		< ±0.05 % FSO	< ±0.02 % FSO	< ±0.02 % FSO	< ±0.02 % FSO	< ±0.02 % FSO
Repeatability [2]		< 0.1 µm	< 0.25 µm	< 0.4 µm	< 0.8 µm	< 1.6 µm
Light spot diameter [3]	SMR	55 x 480 µm	100 x 600 µm	125 x 730 µm	210 x 950 µm	235 µm x 1280 µm
	MMR	40 x 460 µm	50 x 565 µm	55 x 690 µm	80 x 970 µm	125 µm x 1500 µm
	EMR	55 x 440 µm	100 x 525 µm	125 x 660 µm	220 x 1000 µm	325 µm x 1740 µm
	smallest Ø	40 x 460 µm with 16 mm	50 x 565 µm with 20 mm	55 x 690 µm with 25 mm	80 x 970 µm with 37.5 mm	115 x 1450 µm with 59 mm
Permissible ambient light		50,000 lx				

[1] Related to digital output; FSO = Full Scale Output
The specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)
[2] Typical value with measurements at 4 kHz and median 9
[3] ±10 %; SMR = Start of measuring range; MMR = Mid of measuring range; EMR = End of measuring range
Light spot diameter with line-shaped laser determined based on the emulated 90/10 knife-edge method

Dimensions
optoNCDT 1900

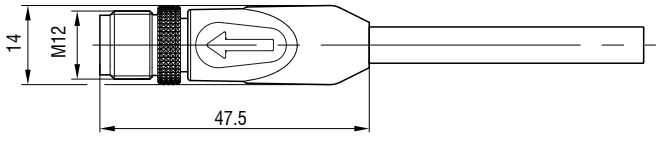




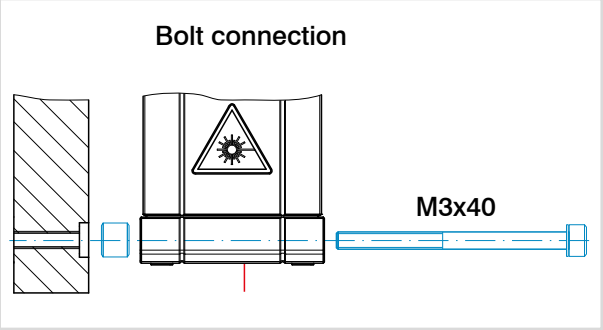
MR	SMR	X	Y
2	15	23	3
6	17	27	9
10	20	33	14
25	25	33	33
50	40	36	45
100	50	37	75
200	60	39	130
500	100	43	215

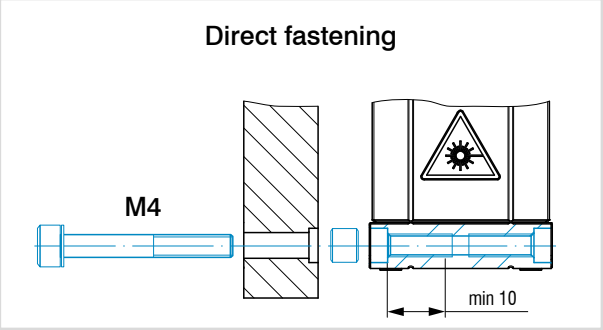
(Dimensions in mm, not to scale)
MR = measuring range; SMR = start of measuring range
MMR = mid of measuring range; EMR = end of measuring range

Connector (sensor side)



Installation options





Accessories for optoNCDT 1900/1910

Power supply unit
PS2020 (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)

Protective film
Transparent protective film 52 x 15 mm for ILD1900

Protective housings
with air purge and cooling, see page 62

Scope of supply

- 1 Sensor ILD1900/1910
- 1 Assembly instructions
- 1 Calibration protocol
- Accessories (2 pc. centering sleeves, 2 pc. M3 x 40)

Article designation

ILD1900-	6	LL	CL3B	EtherCAT

Interface
No indication: RS422, current, voltage (standard)
integrated fieldbus: EtherCAT, EtherNet/IP, PROFINET

Laser class
No indication: class 2 (standard)
3B: on request
3R: on request

Laser type
No indication: Red laser point (standard)
LL: Laser Line

Measuring range in mm

Series
ILD1900: Laser displacement sensor for Advanced Automation

Connection possibilities
optoNCDT 1900

Connection possibilities for sensors with integrated cables

Cable diameter: 5.80 ±0.2 mm
Drag chain: yes
Robot: no
Temperature range: -25 … 80 °C (moving)
-40 … 80 °C (not moving)
Bending radius: > 30 mm (fixed installation)
> 75 mm (dynamic)

Sensor	Cables	Type	Connection possibilities and accessories	
LD1900-xx ILD1900-xxLL ILD1910-xx	**Integrated cable length 3 m**	Open ends	**Supply voltage connection** Power supply unit PS2020	
			Interface module of RS422 to USB IF2001/USB IC2001/USB	
			Interface module for Industrial Ethernet connection IF2035-PROFINET IF2035-EIP IF2035-EtherCAT	

Drag-chain suitable connection cables for sensors with pigtail

Cable diameter: 6.7 ±0.2 mm
Drag chain: yes
Robot: no
Temperature range: -25 … 80 °C (moving) (up to +105 °C for max. 3000 hrs)
-40 … 80 °C (not moving)
Bending radius: > 34 mm (fixed installation)
> 67 mm (dynamic)
> 81 mm (drag chain)

Sensor	Cables	Type	Connection possibilities and accessories	
ILD1900-xx ILD1900-xxLL ILD1910-xx	**Extension cable pigtail** Length 3 m / 6 m / 9 m / 15 m *Art. no.* *Designation* 29011218 PC1900-3/OE 29011219 PC1900-6/OE 29011220 PC1900-9/OE 29011221 PC1900-15/OE	Open ends	**Connection supply voltage** PS2020	
			Interface module of RS422 to USB IF2001/USB IC2001/USB	
			Interface module for Industrial Ethernet connection IF2035-PROFINET IF2035-EIP IF2035-EtherCAT	
	Adapter cable for PC interface card Length 3 m / 6 m / 9 m / 15 m *Art. no.* *Designation* 29011316 PC1900-3/IF2008 PCIE 29011317 PC1900-6/IF2008 PCIE 29011318 PC1900-9/IF2008 PCIE 29011319 PC1900-15/IF2008 PCIE	Sub-D	**Interface card for synchronous data acquisition** IF2008PCIe / IF2008E	
			4-fold interface module from RS422 to USB IF2004/USB	
	Adapter cable for sensor calculation Length 3 m / 6 m / 9 m / 15 m *Art. no.* *Designation* 29011320 PC1900-3/C-Box 29011321 PC1900-6/C-Box 29011322 PC1900-9/C-Box 29011323 PC1900-15/C-Box	Sub-D	**Controller for D/A conversion and evaluation of up to 2 sensor signals** Dual Processing Unit	
	Adapter cable for sensor calculation Length 2 m *Art. no.* *Designation* 29011326 PCE1900-3/M12	M12	**Interface module for Ethernet connection of up to 8 sensors** IF2008/ETH	

Robot-suitable connection cables

Cable diameter: approx. 7.3 mm
Drag chain: no
Robot: yes
Temperature range: -40 … 90 °C (moving)
-50 … 90 °C (not moving)
Bending radius: > 37 mm (fixed installation)
> 73 mm (dynamic)

Sensor	Cables	Type	Connection possibilities and accessories	
LD1900-xx ILD1900-xxLL ILD1910-xx	**Extension cable pigtail** Length 3 m / 6 m / 9 m / 15 m *Art. no.* — *Designation* 29011404 — PC1900R-3/OE 29011405 — PC1900R-6/OE 29011406 — PC1900R-9/OE 29011407 — PC1900R-15/OE	Open ends	**Connection supply voltage** PS2020	
			Interface module of RS422 to USB IF2001/USB IC2001/USB	
			Interface module for Industrial Ethernet connection IF2035-PROFINET IF2035-EIP IF2035-EtherCAT	

Connection cables for sensors with integrated Industrial Ethernet interface

Cable diameter: 7.5 ±0.2 mm
Drag chain: yes
Robot: no
Temperature range: -40 … 90 °C (moving)
-50 … 90 °C (not moving)
Bending radius: > 38 mm (fixed installation)
> 75 mm (dynamic)

Sensor	Cables	Type	Connection possibilities and accessories	
ILD1900-xx-PROFINET* ILD1900-xxLL-PROFINET* ILD1900-xx-EtherCAT ILD1900-xxLL-EtherCAT ILD1900-xx-EtherNet/IP ILD1900-xxLL-EtherNet/IP	**Connection cables PoE, laser On/Off hardware** Length 3 m / 6 m / 9 m / 15 m *Art. no.* — *Designation* 29011332 — PC1900-IE-3/OE-RJ45 29011333 — PC1900-IE-6/OE-RJ45 29011334 — PC1900-IE-9/OE-RJ45 29011444 — PC1900-IE-15/OE-RJ45	Open ends & RJ45	**Signal / Supply PoE** optional: PoE Switch	
ILD1900-xx-EtherCAT ILD1900-xxLL-EtherCAT ILD1900-xx-EtherNet/IP ILD1900-xxLL-EtherNet/IP	**Connection cables PoE, laser On/Off Software** Length 3 m / 6 m / 9 m / 15 m *Art. no.* — *Designation* 29011338 — PC1900-IE-3/RJ45 29011355 — PC1900-IE-6/RJ45 29011356 — PC1900-IE-9/RJ45 29011445 — PC1900-IE-15/RJ45	RJ45		

*PoE not possible with PROFINET

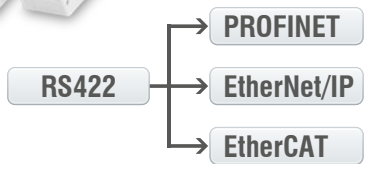
Other cables

Cable diameter: 6.7 mm
Drag chain: yes
Robot: no
Temperature range: -40 … 80 °C
Bending radius: > 27 mm (fixed installation)
> 51 mm (dynamic)

Input	Cables	Type	Connection possibilities and accessories	
2 x Sub-D (PC1900-x/ IF2008 PCIE)	**Adapter cable for the connection of two sensors per Sub-D connector** Length 0.1 m *Art. no.* — *Designation* 2901528 — IF2008-Y-adapter cable 	Sub-D	**Interface card for synchronous data acquisition** IF2008PCIe / IF2008E	
			4-fold USB converter & parameter setting IF2004/USB	

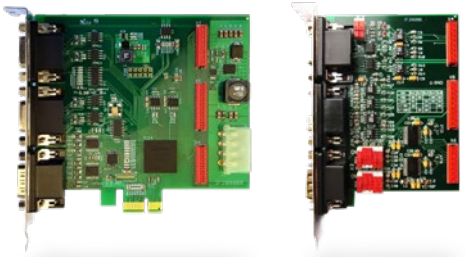
IF2035: Interface module for Industrial Ethernet connection

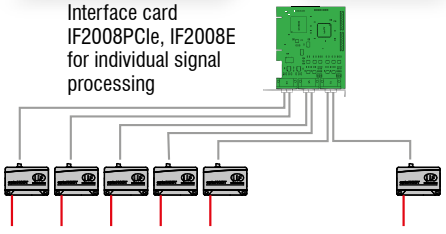
- Connection of RS422 or RS485 interfaces to PROFINET / Ethernet/IP / EtherCAT
- Synchronization output for RS422 sensors
- 2 network connections for different network topologies
- Data rate up to 4 MBaud
- 4-fold oversampling (with EtherCAT)
- Ideal for confined spaces due to a compact housing and DIN rail mounting



IF2008PCIe / IF2008E: Interface card for synchronous data acquisition

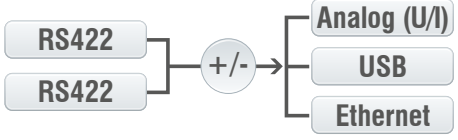
- IF2008PCIe - Basic PCB: 4 digital signals and 2 encoders
- IF2008E - Expansion board: 2x digital signals, 2x analog signals and 8x I/O signals
- Absolutely synchronous data acquisition for multi-channel applications (e.g. for planarity or thickness measurement)





Dual Processing Unit: Controller for D/A conversion and evaluation of up to 2 sensor signals

- Fast D/A conversion (16 bit, with a maximum of 100 kHz) of 2 digital input signals or calculation of 2 digital sensor signals
- Averaging functions and calculation of thickness, step, diameter, ovality and radial run out
- 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 sensor or Dual Processing Unit status
- Parallel data output via three output interfaces
- Two filter possibilities
- Post-linearization of measured values or calculated values
- Easy parameter setting via web interface (controller and sensors)



IF2008/ETH: Interface module for Ethernet connection of up to 8 sensors

- Integration of eight sensors or encoders with RS422 interface in Ethernet network
- Four programmable switching in-/outputs (TTL and HTL logic)
- Fast data acquisition and output up to 200 kHz
- Simple parameter set up via web interface

RS422 → Ethernet

IC2001/USB Single-channel converter cable RS422/USB

- Conversion from RS422 to USB
- 5-core interface cable without outer shield
- Easy sensor connection via USB
- Supports baud rates from 9.6 kBaud to 1 MBaud
- Ideal for integration into plant and machinery

RS422 → USB

IF2001/USB: Interface module from RS422 to USB

- Conversion from RS422 to USB
- Signals and functions such as laser on/off, switch signals and function output
- Supports baud rates from 9.6 kBaud to 12 MBaud
- Robust aluminum housing
- Easy sensor connection via screw terminals (plug and play)
- Parameter setting (converter and sensors) via software

RS422 → USB

IF2004/USB: 4-fold interface module from RS422 to USB

- Conversion of 4 digital signals (RS422) to USB
- 4x trigger inputs, 1x trigger output
- Synchronous data acquisition
- Parameter setting (converter and sensors) via software

RS422
RS422
RS422
RS422 → USB

Connection of 4 sensors via IF2008-Y-adapter cable

Protective housings for demanding environments
optoNCDT

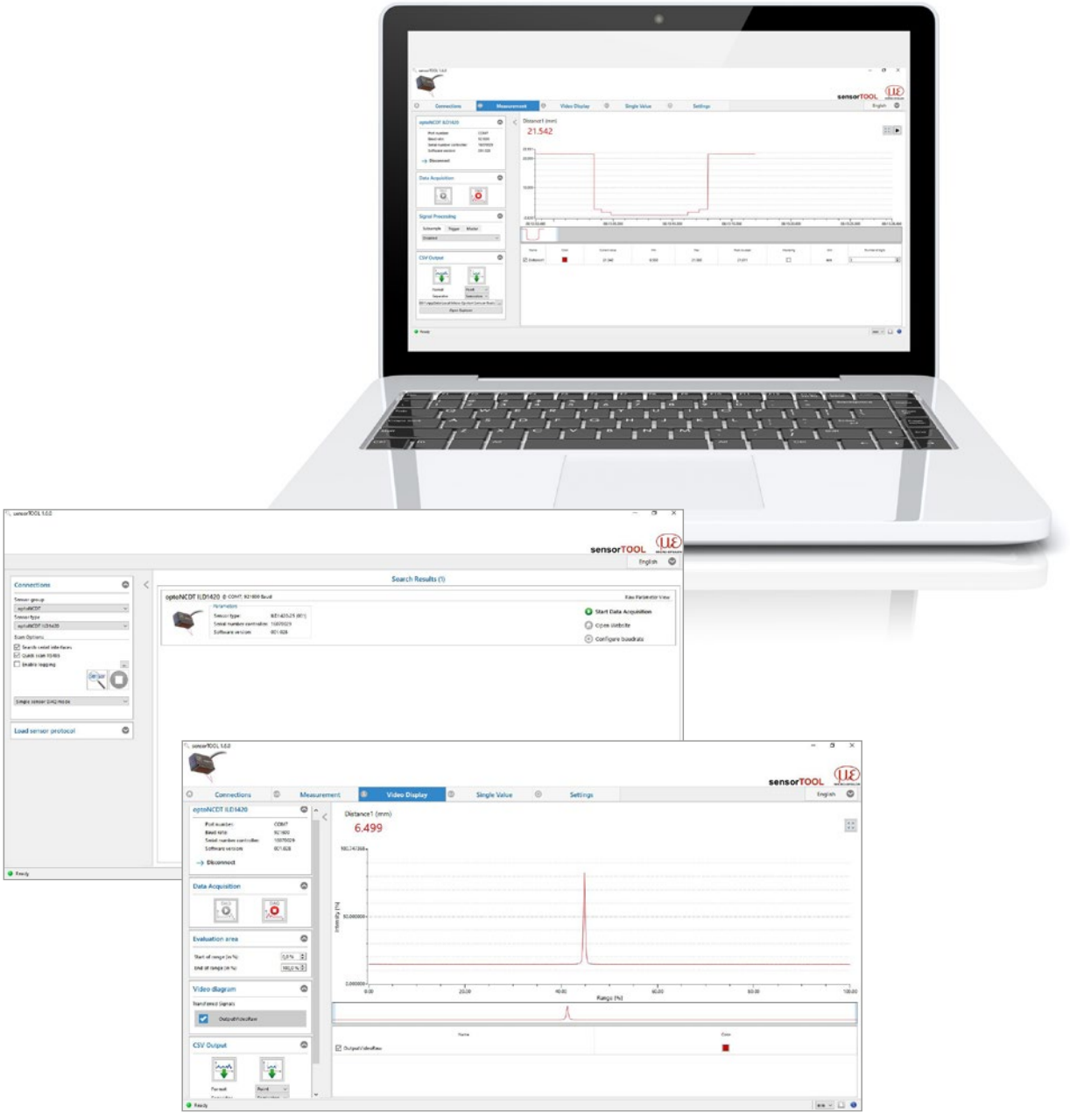
SGH & SGHF models				SGHF-HT model
Protective housing Size S		Protective housing Size M		
SGH	SGHF	SGH	SGHF	
				
(140 x 140 x 71 mm)		(180 x 140 x 71 mm)		(260 x 180 x 154 mm)
Water-resistant housing protects the sensor from solvents and detergents.	Ideal with high ambient temperatures. The integrated air cooling of the housing offers optimum protection for the sensor.	Water-resistant housing protects the sensor from solvents and detergents.	Ideal with high ambient temperatures. The integrated air cooling of the housing offers optimum protection for the sensor.	Water-cooled protective housing with window and compressed-air connection for measurement tasks in ambient temperatures up to 200 °C. Maximum temperature of cooling water T(max) = 10 °C Minimum water flow rate Q(min) = 3 liters/min
Size S suitable for ILD1750-20BL ILD1750-200BL ILD2300-2 / -2LL / -2BL ILD2300-5 / -5BL ILD2300-10 / -10LL / -10BL ILD2300-20 / -20LL ILD2300-50 / -50LL ILD2300-100		Size M suitable for ILD1750-500BL ILD1750-750BL ILD2300-200 ILD2300-300 ILD2310-10 ILD2310-20 ILD2310-40		Suitable for ILD1710-50 / -50BL ILD1710-1000 / -1000BL ILD1750-500BL ILD1750-750BL ILD2300-200 ILD2300-300 ILD2310-10 ILD2310-20 ILD2310-40 ILD2310-50BL

Protective housing SGHF ILD1900

Compact protective housing which is simply attached to the sensor. The protective housing has an air purge for cleaning the protective windows. It also cools the sensor.
Suitable for ILD1900-6 / -6LL ILD1900-10 / -10LL ILD1900-25 / -25LL ILD1900-50 / -50LL ILD1900-100 ILD1900-200 ILD1900-500

sensorTOOL

The Micro-Epsilon sensorTOOL is a powerful software that is used to operate one or more optoNCDT sensors. The sensorTOOL can be used to access the sensor connected to the PC, display its complete data stream and save it in a file (in Excel-compatible CSV format). The sensor is configured via its web interface.



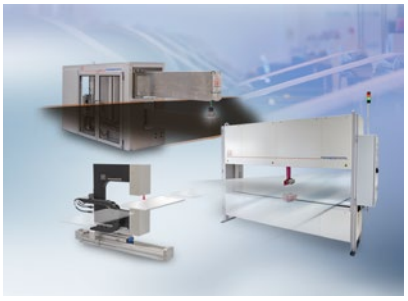
Free download

All software tools, drivers and documented driver DLL for easy integration of the sensors into existing or internally-generated software are available free of charge under www.micro-epsilon.de/download

Sensors and Systems from Micro-Epsilon

Sensors and systems for displacement, distance and position

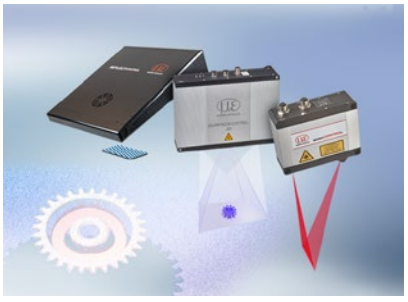
Sensors and measurement devices for non-contact temperature measurement



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

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