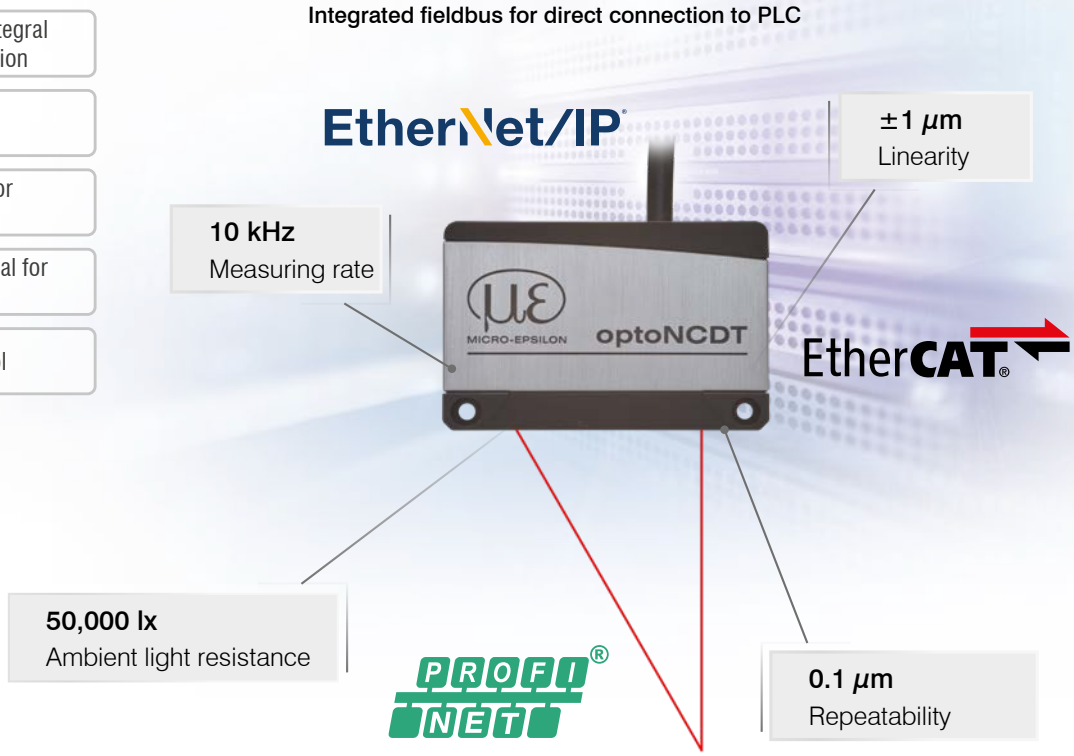
MICRO-EPSILON

More Precision.

optoNCDT 1900 // Laser sensor with integrated Industrial Ethernet interface

Laser sensor with integrated Industrial Ethernet interface
optoNCDT 1900

- Compact, lightweight & integral controller for easy integration
- Sensors available with laser point or laser line
- 30g-vibration resistance for integration into machines
- Fast, precise & stable signal for automation tasks
- Intelligent exposure control



Highest performance in ultra-compact design with integrated Industrial Ethernet

This innovative optoNCDT 1900 laser sensor is used for dynamic displacement, distance and position measurements and impresses with its high speed, compact design and accuracy. The latest sensor generation is now even smarter - thanks to the integrated Industrial Ethernet interface, you integrate the full sensor performance directly into your PLC. You benefit from real-time data without time delay and with reduced installation effort.

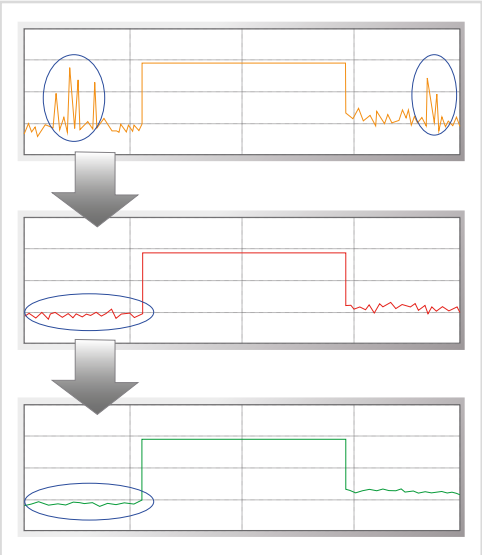
Intelligent technology meets high performance and ease of use

You can operate the optoNCDT 1900 as usual in Ethernet mode and make the settings via the intuitive web interface. Depending on the fieldbus, settings are automatically applied to the PLC environment. Time-consuming setting directly in the programming environment is no longer necessary.

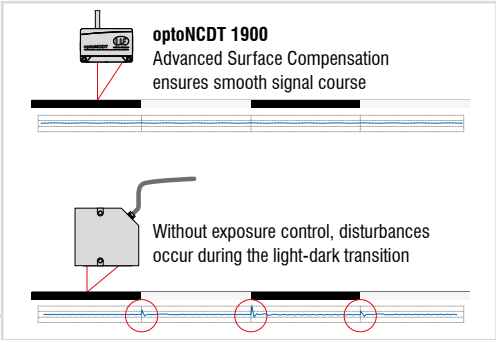
Fast, precise and stable

The high-performance controller integrated in the optoNCDT 1900 sensor enables fast and highly precise processing of measurement values. The intelligent exposure control and powerful signal processing ensure a stable measurement signal and maximum process reliability. 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.

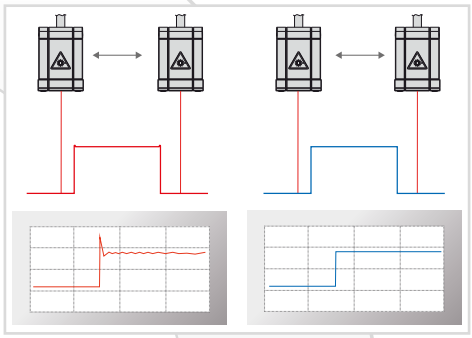
A unique combination of speed, size and performance make the sensor best in class and make it ideally suitable for inline applications in precision automation, automotive, 3D printing and coordinate measuring machines.



2-step measurement averaging
Corrects signal peaks and smooths the signal.

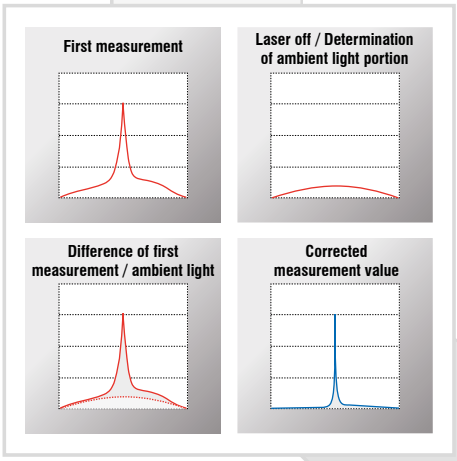


Advanced Surface Compensation
Avoids fluctuations of the measurement signal caused by changing properties of surface or material

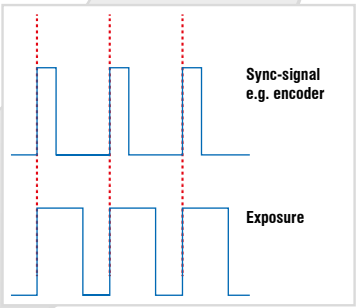


Limitation of exposure time
Avoids over-/underexposure and ensures proper edge transitions.

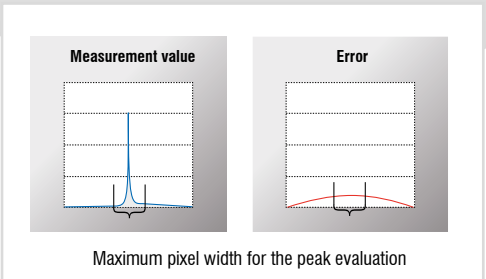
Easy handling:
Parameter set up via web interface



Ambient light correction
Hides constant sources of ambient light.



Real-time synchronization
Optimizes synchronization of several sensors by, e.g., starting the exposure time with an external encoder signal.



Peak width evaluation
Outputs a detected error instead of a wrong measurement value

Product innovation with unique advantages

No external controller unit required

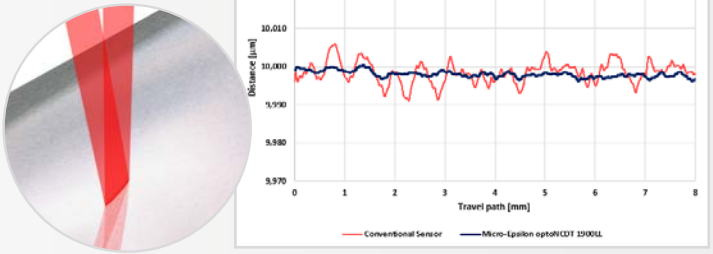
- Reduced wiring effort and low space requirements
- Unique combination of size and performance
- Directly to the signal even in real time due to integrated Industrial Ethernet

Compact and lightweight sensor

- Space-saving installation with up to 50 % more compact design than comparable sensors
- Easy to mount and integrate via two mounting holes and alignment concept with fitting sleeves

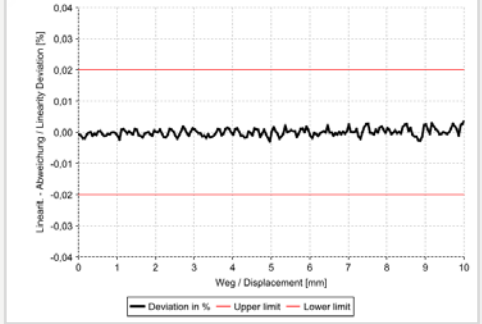
ILD1900-LL models with laser line for metals and structured surfaces

- Reliable measurement values on static metal surfaces (movement in Z direction only) thanks to optical averaging via light spot
- Detection of details and structures also possible with small laser line



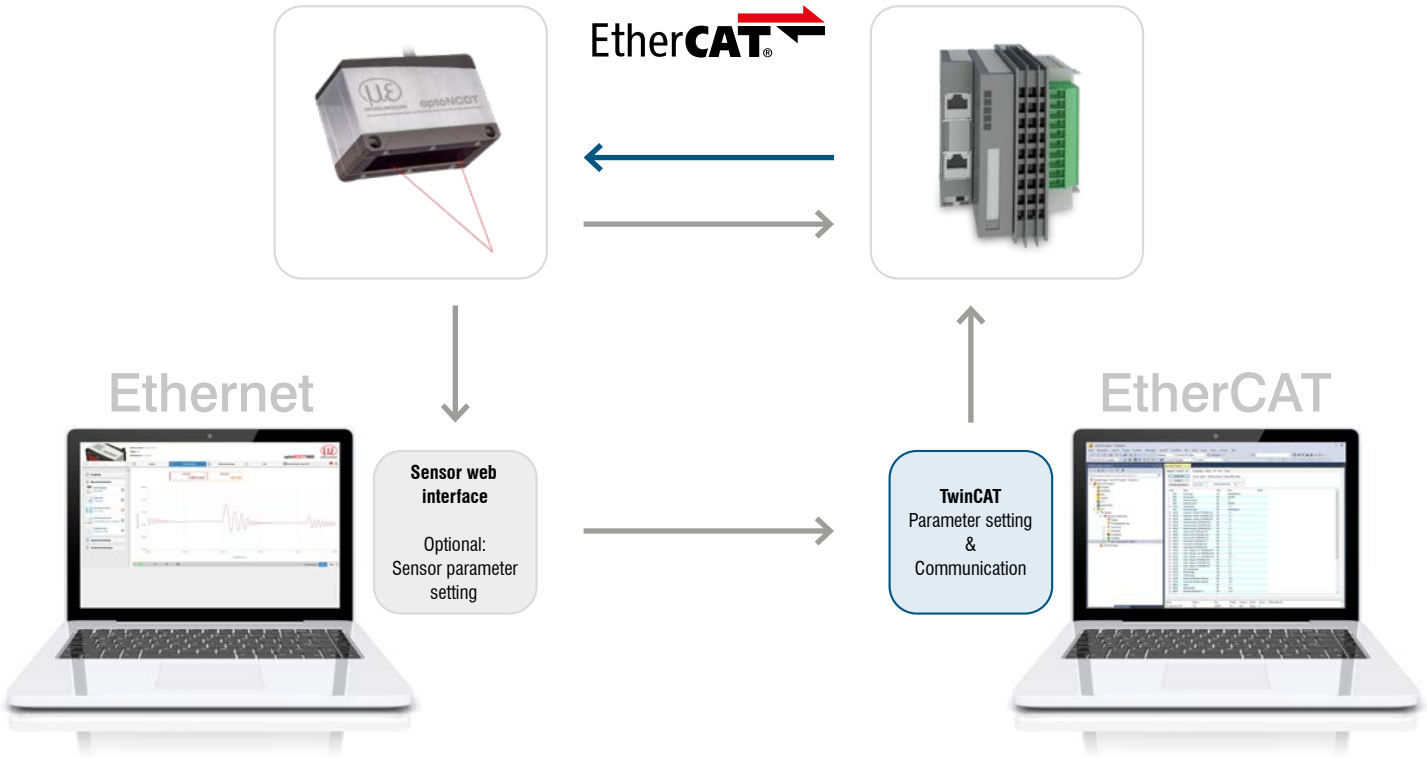
Calibrated accuracy

- Measured values reproducible down to 0.1 μm over several measurement series
- Linearity up to ±0.02 % over the entire Z measuring range
- Small light spot for high lateral resolution at the best price-performance ratio



Integrated Industrial Ethernet: EtherCAT

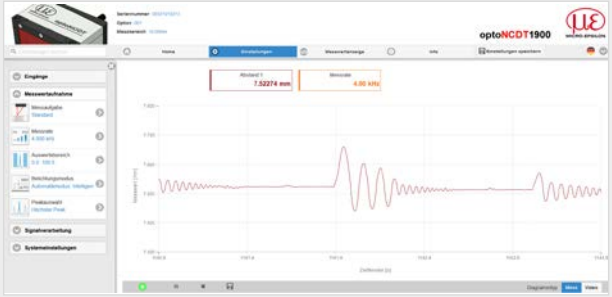
With the ILD1900 EtherCAT, the connection is established via a user-friendly boot mode.
The sensors start with the last stored operating mode. Standard is EtherCAT. The sensor can also be booted in the usual Ethernet mode via a function key on the sensor, thus opening the web interface.



Ethernet setup mode:
Simple parameter set up via integrated web interface

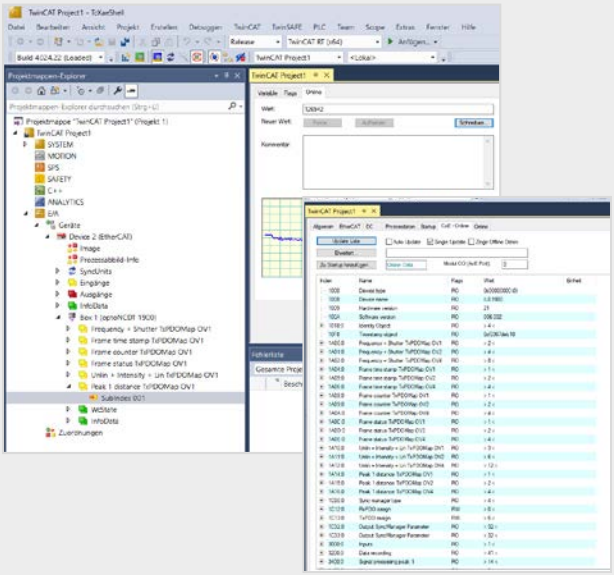
In Ethernet setup mode, you have access to the intuitive web interface. This allows the sensor to be parameterized very quickly and extremely easily. Settings made are stored and applied directly to the EtherCAT mode with the next boot process. It is therefore not necessary to know all the commands in TwinCAT in order to make the optimum sensor settings. In particular, less experienced TwinCAT users can thus quickly integrate the sensor into the EtherCAT control unit.

Alternatively, Ethernet data traffic can also be tunneled via EtherCAT (EoE).



Industrial Ethernet operation:
Sensor integration into EtherCAT control units

In Industrial Ethernet operation, the sensor communicates via EtherCAT. Sensor parameters are displayed in EtherCAT as objects and are adjustable. For very fast measurements, an oversampling function can be activated in the sensor. This allows measurement data to be transferred four times faster than the cycle time of the PLC (up to max. 10 kHz).



Laser sensor with integrated Industrial Ethernet interface
optoNCDT 1900

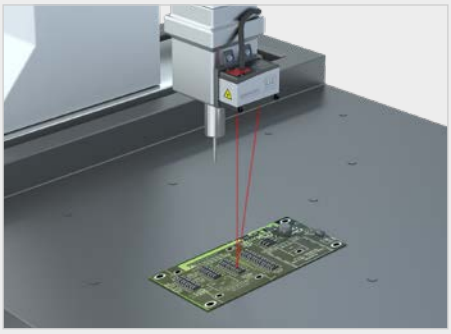
- Direct PLC connection without additional module
- High speed data transmission due to oversampling
- Easy handling: Parameter set up via web interface
- Supply possible via PoE

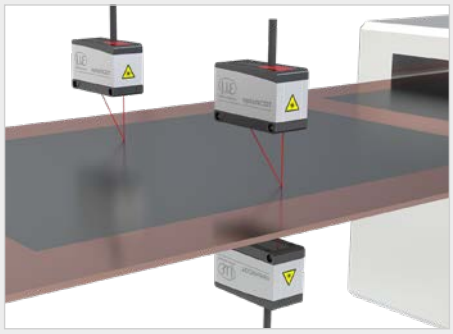
PROFINET®
EtherCAT®
EtherNet/IP

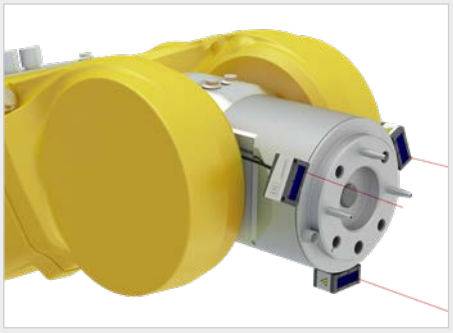
The sensor for precise automation tasks

The optoNCDT 1900 solves numerous measurement tasks on a wide variety of materials. This innovative sensor is used for dynamic displacement, distance and position measurements and impresses with its high speed, design and accuracy. Thanks to the small light spot, the sensor also detects small details. The integrated Industrial Ethernet interface enables direct integration into the machine or production environment.

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


Presence monitoring of electronic components


Thickness measurement of electrode coatings


Measurement tasks in industry & automation

Model		ILD1900-2	ILD1900-6	ILD1900-10	ILD1900-25	ILD1900-50	ILD1900-100	ILD1900-200	ILD1900-500
Measuring range		2 mm	6 mm	10 mm	25 mm	50 mm	100 mm	200 mm	500 mm
Start of measuring range		15 mm	17 mm	20 mm	25 mm	40 mm	50 mm	60 mm	100 mm
Mid of measuring range		16 mm	20 mm	25 mm	37.5 mm	65 mm	100 mm	160 mm	350 mm
End of measuring range		17 mm	23 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		< ±1µm	< ±1.8 µm	< ±2 µm	< ±5 µm	< ±10 µm	< ±30 µm	< ±100 µm	< ±400 µm
		< ±0.05 % FSO	< ±0.03 % FSO	< ±0.02 % FSO			< ±0.03 % FSO	< ±0.05 % FSO	< ±0.08 % FSO
Repeatability [2]		< 0.1 µm	< 0.25 µm	< 0.4 µm	< 0.8 µm	< 1.6 µm	< 4 µm	< 8 µm	< 20 … 40 µm
Temperature stability [3]		±0,005 % FSO / K							
Light spot diameter (±10 %) [4]	SMR	60 x 75 µm	85 x 105 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	57 x 60 µm	60 x 65 µm	70 x 75 µm	95 x 110 µm	140 x 170 µm		
	EMR	65 x 75 µm	105 x 120 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	57 x 60 µm with 20 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) with laser class 2							
Laser class		Class 2 according to DIN EN 60825-1: 2015-07 Class 3 available on request							
Permissible ambient light		50,000 lx					30,000 lx	10,000 lx	
Supply voltage		11 … 30 VDC or PoE							
Power consumption		< 3 W (24 V)							
Signal input		Laser on/off							
Digital interface		EtherCAT / EtherNet/IP / PROFINET							
Synchronization		possible via fieldbus							
Connection		integrated pigtail 0.3 m with 12-pin M12 plug; optional extension to 3 m / 6 m / 9 m (see accessories for suitable connection cable)							
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)		30 g / 20 … 500 Hz							
Protection class (DIN EN 60529)		IP67							
Material		Aluminum housing							
Weight		approx. 185 g (incl. pigtail)							
Control and indicator elements		Select key: factory settings, switching the operating mode; web interface for setup [5]: application-specific presets, peak selection, video signal, freely selectable averaging possibilities, data reduction, setup management; 1 x color LED for power / status 2 x color LEDs for fieldbus 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] Max. measuring rate depending on fieldbus and bus cycle; Factory setting: measuring rate 4 kHz, median 9
[2] Typical value with measurements at 4 kHz and median 9
[3] Related to digital output in the mid of the measuring range; the specified value is only achieved by mounting on a metallic sensor holder.
Good heat dissipation from the sensor to the holder must be ensured.
[4] Light spot diameter determined using a point-shaped laser with Gaussian fit (full $1/e^2$ width); for ILD1900-2: determined with emulated 90/10 knife-edge method
[5] Connection to PC via network cable (with EtherCAT: sensor in Ethernet setup mode)

Laser sensor with integrated Industrial Ethernet interface
optoNCDT 1900LL

- Direct PLC connection without additional module
- High speed data transmission due to oversampling
- Easy handling: Parameter set up via web interface
- Supply possible via PoE
- For shiny metallic, rough and structured surfaces

PROFINET®
EtherCAT®
EtherNet/IP

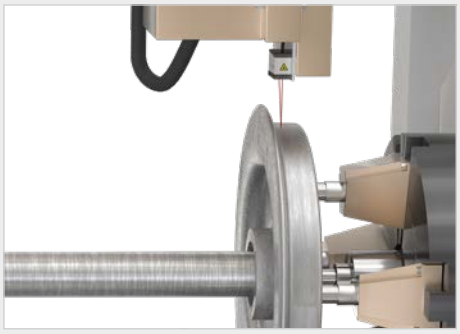
High-performance laser sensors with small laser line

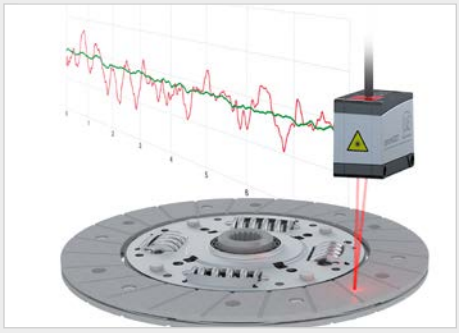
The optoNCDT 1900LL projects a small laser line onto the measuring object. This compact laser sensor particularly impresses in distance measurements where the sensor or measuring object is moved in the Z-axis direction, such as robot positioning. optoNCDT 1900LL sensors are designed for shiny metallic and structured surfaces, as well as for measurements of materials where the laser beam penetrates.

For these surfaces, the small laser line offers significant advantages, as it optically averages and compensates for irregularities such as structure and roughness. In addition to optical averaging, special software algorithms filter out interferences caused by surface roughness, defects, depressions or the smallest of holes. Especially on metals, they achieve more stable and reliable measurement results than point sensors.

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


Measuring tool holders in the magazine

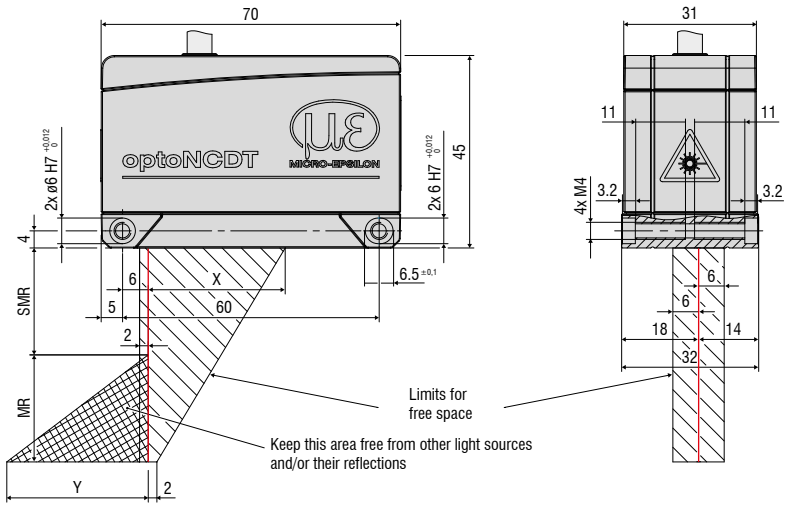

Optical measurement of drive shaft, brake disc and wheel tires


Reliable measurement on metal surfaces

Modell		ILD1900-2LL	ILD1900-6LL	ILD1900-10LL	ILD1900-25LL	ILD1900-50LL
Measuring range		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
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		< ±1µm	< ±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
Temperature stability [3]		±0,005 % d.M. / K				
Light spot diameter (±10 %) [4]	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 diameter	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
Light source		Semiconductor laser ≤ 1 mW, 670 nm (red) with laser class 2				
Laser class		Class 2 according to DIN EN 60825-1: 2015-07 Class 3 available on request				
Permissible ambient light		50,000 lx				
Supply voltage		11 … 30 VDC or PoE				
Power consumption		< 3 W (24 V)				
Signal input		1 x HTL/TTL Laser on/off				
Digital interface		EtherCAT / EtherNet/IP / PROFINET				
Synchronization		possible via fieldbus				
Connection		integrated pigtail 0.3 m with 12-pin M12 plug; optional extension to 3 m / 6 m / 9 m (see accessories for suitable connection cable)				
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)		30 g / 20 … 500 Hz				
Protection class (DIN EN 60529)		IP67				
Material		Aluminum housing				
Weight		approx. 185 g (incl. pigtail)				
Control and indicator elements		Select key: factory setting, switching the operating mode; web interface for setup [5]: application-specific presets, peak selection, video signal, freely selectable averaging possibilities, data reduction, setup management; 1 x color LED for power / status 2 x color LEDs for fieldbus 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] Max. measuring rate depending on fieldbus and bus cycle; Factory setting: measuring rate 4 kHz, median 9
[2] Typical value with measurements at 4 kHz and median 9
[3] Related to digital output in the mid of the measuring range; the specified value is only achieved by mounting on a metallic sensor holder.
Good heat dissipation from the sensor to the holder must be ensured.
[4] Light spot diameter with line-shaped laser determined based on the emulated 90/10 knife-edge method
[5] Connection to PC via network cable (with EtherCAT: sensor in Ethernet setup mode)

Dimensional drawing of sensor

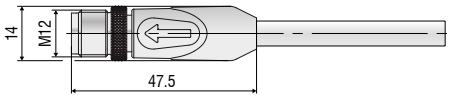


(dimensions in mm, not to scale)

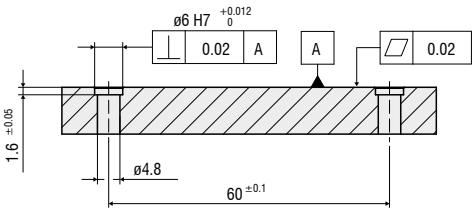
MR	SMR	X	Y
2 / 2LL	15	23	3
6 / 6LL	17	27	9
10 / 10LL	20	33	14
25 / 25LL	25	33	33
50 / 50LL	40	36	45
100	50	37	75
200	60	39	130
500	100	43	215

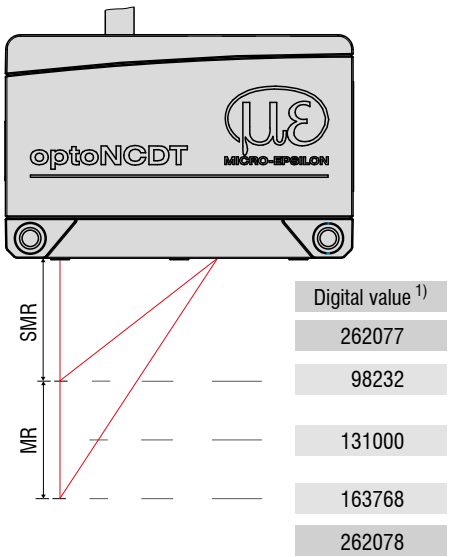
MR = Measuring range
SMR = Start of measuring range

Connector (sensor side)



Dimensional drawing of sensor holder with fitting sleeves





[1] For displacement values without zero setting or mastering.

Connection cables

- Ethernet cable PC1900-IE-3/OE-RJ45
- Ethernet cable PC1900-IE-6/OE-RJ45
- Ethernet cable PC1900-IE-9/OE-RJ45
- Ethernet cable PC1900-IE-3/RJ45
- Ethernet cable PC1900-IE-6/RJ45
- Ethernet cable PC1900-IE-9/RJ45

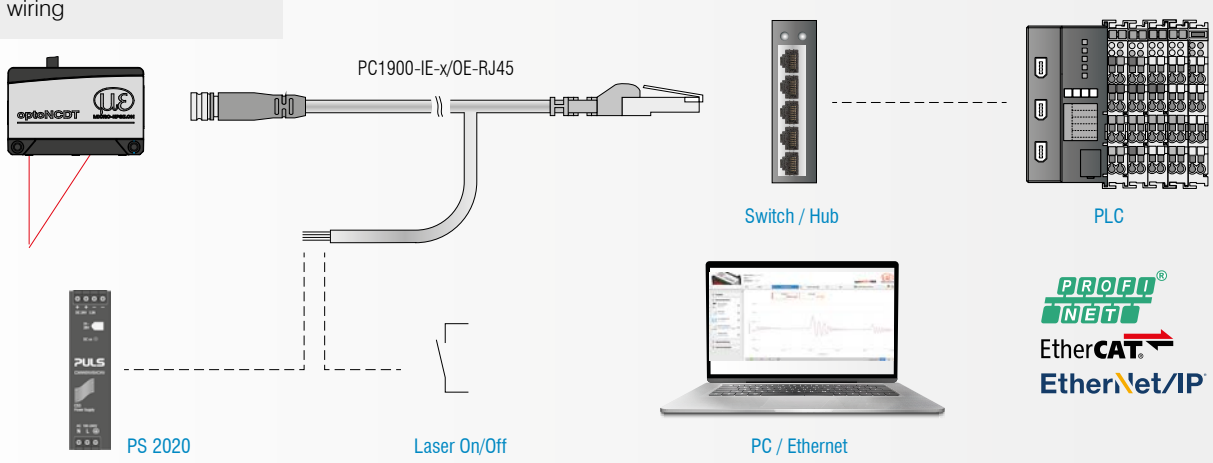
Accessories
optoNCDT

Cable concepts for every application

The connection options are diverse and can be adapted to your plant or machine concept.

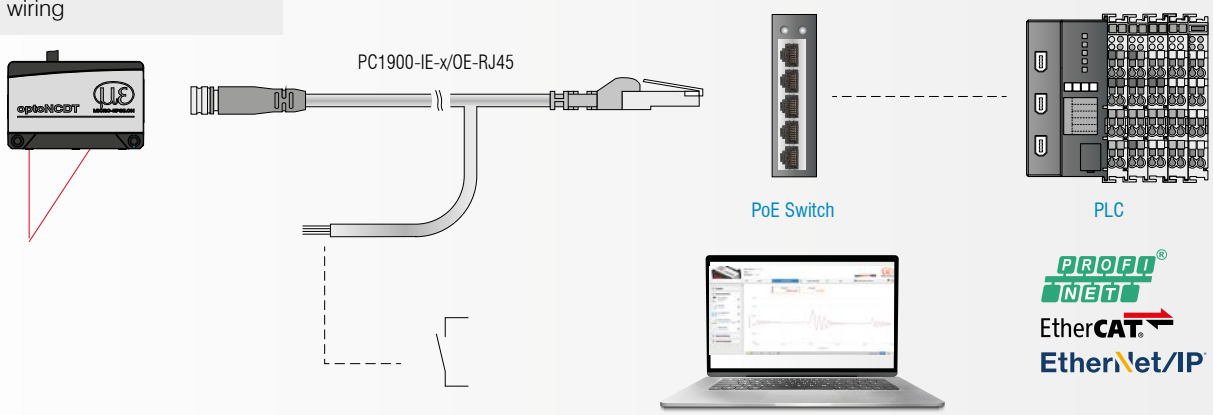
Control unit in the control cabinet

- External supply
- Laser ON/OFF via hardware
- Central wiring



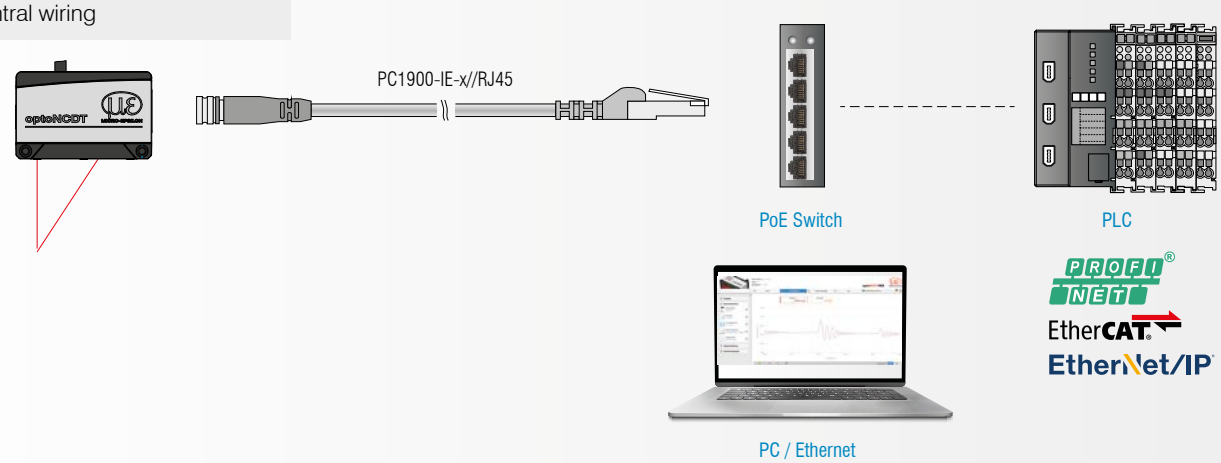
Control unit in the control cabinet

- Supply via PoE
- Laser On/Off via hardware
- Central wiring



Control unit in the field

- Supply via PoE
- Laser On/Off via software
- Decentral wiring



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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