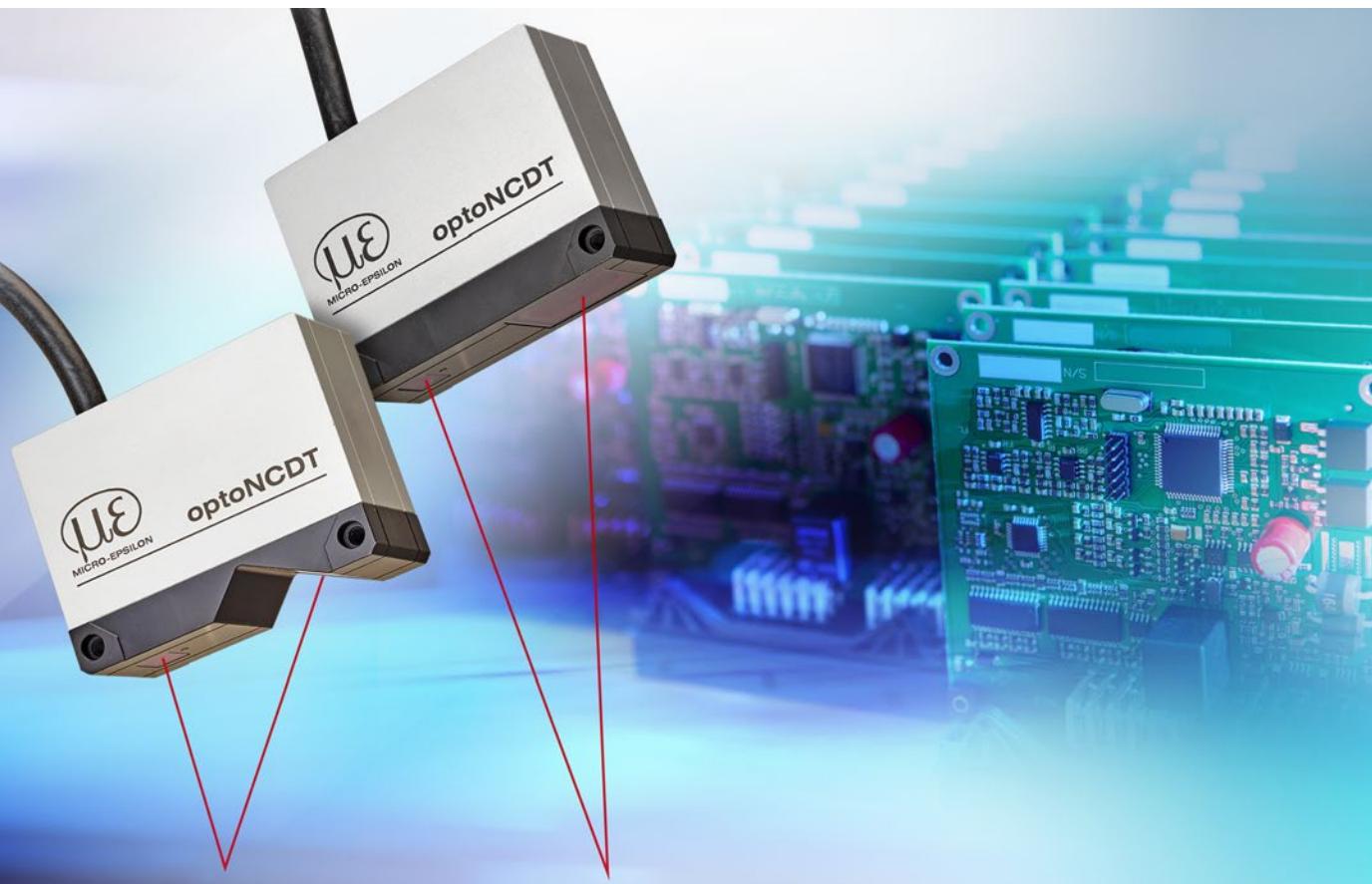




# More Precision

**optoNCDT 5500** // The new high-performance laser sensors



# The new class of high-performance laser sensors optoNCDT 5500

-  Measuring rate up to 75 kHz
-  Analog, Ethernet and RS422
-  Advanced Surface Compensation
-  Increased linearity of 0.015 % due to improved lens design
-  Repeatability  $< 0.04 \mu\text{m}$
-  Highest immunity to ambient light
-  High resistance to shocks and vibrations



## Highest performance:

### A new class of laser triangulation sensors

The optoNCDT 5500 from Micro-Epsilon represents the latest performance class among laser triangulation sensors. With its increased measuring rate up to 75 kHz, the sensor is ideal for highly dynamic measurement tasks.

The sensor delivers extremely precise measurement results, even on rapidly changing and poorly reflective surfaces. Its high repeatability enables measurements with submicron precision.

## Versatile use

The optoNCDT 5500 sensors are available with different measuring ranges. In addition to the standard measuring range, an extended measuring range can be used, which significantly expands the fields of use. With IP67 protection and high resistance to ambient light, the laser sensors can also be used in challenging environmental conditions.

## Advanced Surface Compensation -

### The intelligent exposure control for all surfaces

The optoNCDT 5500 is equipped with an intelligent surface control feature. New algorithms enable fast exposure control and therefore stable measurement results on surfaces where changing reflections occur. In addition, the sensor is extremely resistant to ambient light and can also be used in strongly illuminated environments. The new algorithms compensate for ambient light up to 50,000 lux.

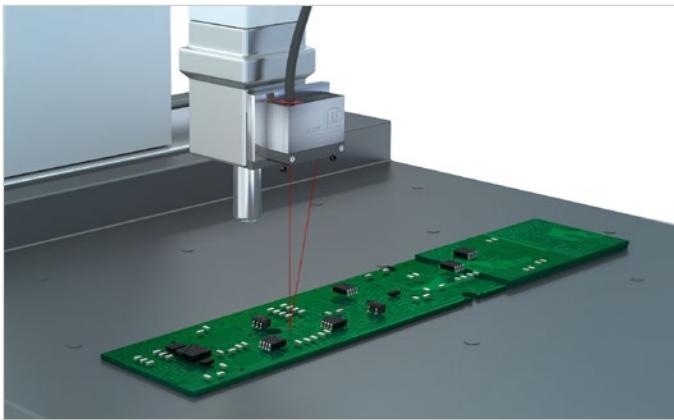
## New features:

- Activation of both encoder inputs
- 2-point scaling for the digital and analog interfaces
- 32-bit data transmission for RS422 (previously 16-bit)
- Automatic definition of the measuring range when switching the measuring rate



Field linearization enables measurements even when the sensor is not ideally mounted. For example, sensor tilt or measurements taken through protective glass can be compensated for by calculating the tilt angle or refractive index of the glass.

# Application examples



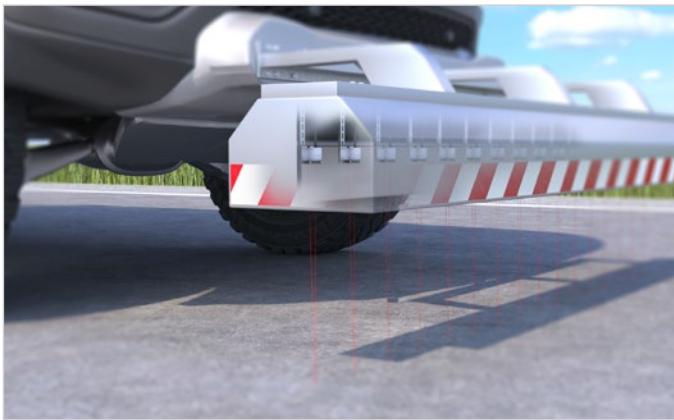
## Coordinate measuring machines

optoNCDT 5500 laser triangulation sensors support the fast positioning of the measuring heads. Due to their advanced sensor technology, these laser sensors enable exact distance control of the sensor head.



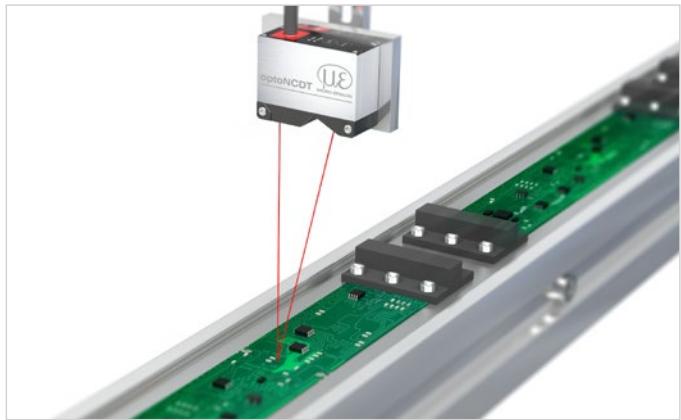
## Tire inspection

optoNCDT 5500 sensors are used to detect the tire thickness. They measure fast and precisely on black surfaces.



## Road surface testing

A total of up to 48 sensors (40 at the front, 8 at the sides) regularly check the road surface. The condition of various roads (e.g. highway, cycle paths, footpaths) can be measured.



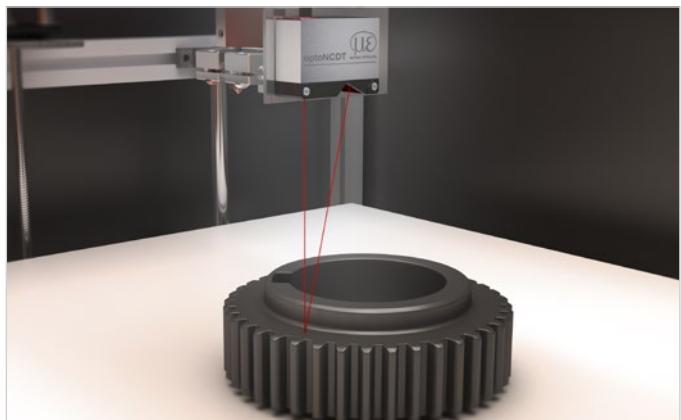
## PCB assembly

When assembling printed circuit boards, the presence and position of the components is inspected using optoNCDT 5500 laser sensors. Regardless of the surface reflection and due to their small light spot, these sensors deliver precise measurement results and reliably detect even the smallest parts.



## Wear test on rails

High-speed lines are maintained by special grinding trains. These are equipped with optoNCDT 5500 laser displacement sensors, which detect the distance from the track at a high measuring rate, and thus also the slippage. Changing reflections and ambient light hardly affect these robust sensors.



## 3D printing

The unique combination of high performance, compact size and ease of integration makes the optoNCDT 5500 sensors ideal for use in 3D printing. They reliably detect the positioning of the print head in a 3D printer and ensure precise production of the components.

# Technical data

General technical data		ILD5500-x
Measuring rate <sup>[1]</sup>		0,25 kHz ... 75 kHz
Temperature stability <sup>[2]</sup>		± 0,008 % FSO / K
Light source		Laser 670 nm
Laser class		Class 2 in accordance with IEC 60825-1: 2022-07
Supply voltage		12 ... 30 VDC
Power consumption		max. 5 W
Signal input		Laser on/off, sync in, trigger/MFI in
Digital interface <sup>[3]</sup>		Ethernet (32 bit), RS422 (32 or 18)
Analog output		4 ... 20 mA / 0 ... 5 V / 0 ... 10 V
Switching output		1 or 2 switching outputs (error & limit value): npn, pnp, push pull
Connection		Sensor with 3 m integrated cable with open ends and RJ45 connector; or integrated pigtail 0.3 m with 24-pin M16 plug
Mounting		Support points with locating holes for centering sleeves for reproducible clamping of the sensor 2 x M4 direct or M3 bolt connection
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)		50 g / 20 ... 500 Hz / max. displacement 3.6 mm
Protection class (DIN EN 60529)		IP67
Material		Aluminum housing
Weight		approx. 310 g (incl. pigtail); < 600 g (sensor with 3 m OE)
Control and indicator elements <sup>[4]</sup>		Select & Function buttons: interface selection, mastering (zero), teaching, presets, quality slider, frequency selection, factory setting; web interface for setup: application-specific presets, peak selection, video signal, freely selectable averaging, data reduction, setup management, expert mode; 2 x color LEDs for power / status
Permissible ambient light <sup>[5]</sup>		≥ 200,000 lx

[1] Factory setting: 20 kHz; at 75 kHz the measuring range is reduced to 45 % of the standard measuring range

[2] 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.

[3] EtherNet/IP require connection via interface module IF2035 (see accessories)

[4] Access to web interface requires connection to PC

[5] ≥ 200,000 lx with background suppression | Default settings with 20 kHz measurement frequency: 50,000 lx

Model	ILD5500-10	ILD5500-25	ILD5500-100	ILD5500-200
Measuring range	10 mm	25 mm	100 mm	200 mm
Start of measuring range	30 mm	40 mm	70 mm	100 mm
Mid of measuring range	35 mm	52.5 mm	120 mm	200 mm
End of measuring range	40 mm	65 mm	170 mm	300 mm
Linearity <sup>[1]</sup>	1.5 µm	5 µm	30 µm	80 µm
	0.015% FSO	0,015% FSO	0.03% FSO	0.04% FSO
Repeatability <sup>[2]</sup>	< 0,04 µm	< 0,09 µm	< 1,5 µm	< 4,5 µm
Light spot diameter <sup>[3]</sup>	SMR	85 x 200 µm	140 x 310 µm	200 x 500 µm
	MMR	60 x 75 µm	60 x 90 µm	200 x 500 µm
	EMR	130 x 250 µm	230 x 380 µm	640 x 1100 µm
	smallest Ø	30 x 47 µm with 34,5 mm	46 x 66 µm with 51,1 mm	82 x 117 µm with 99 mm

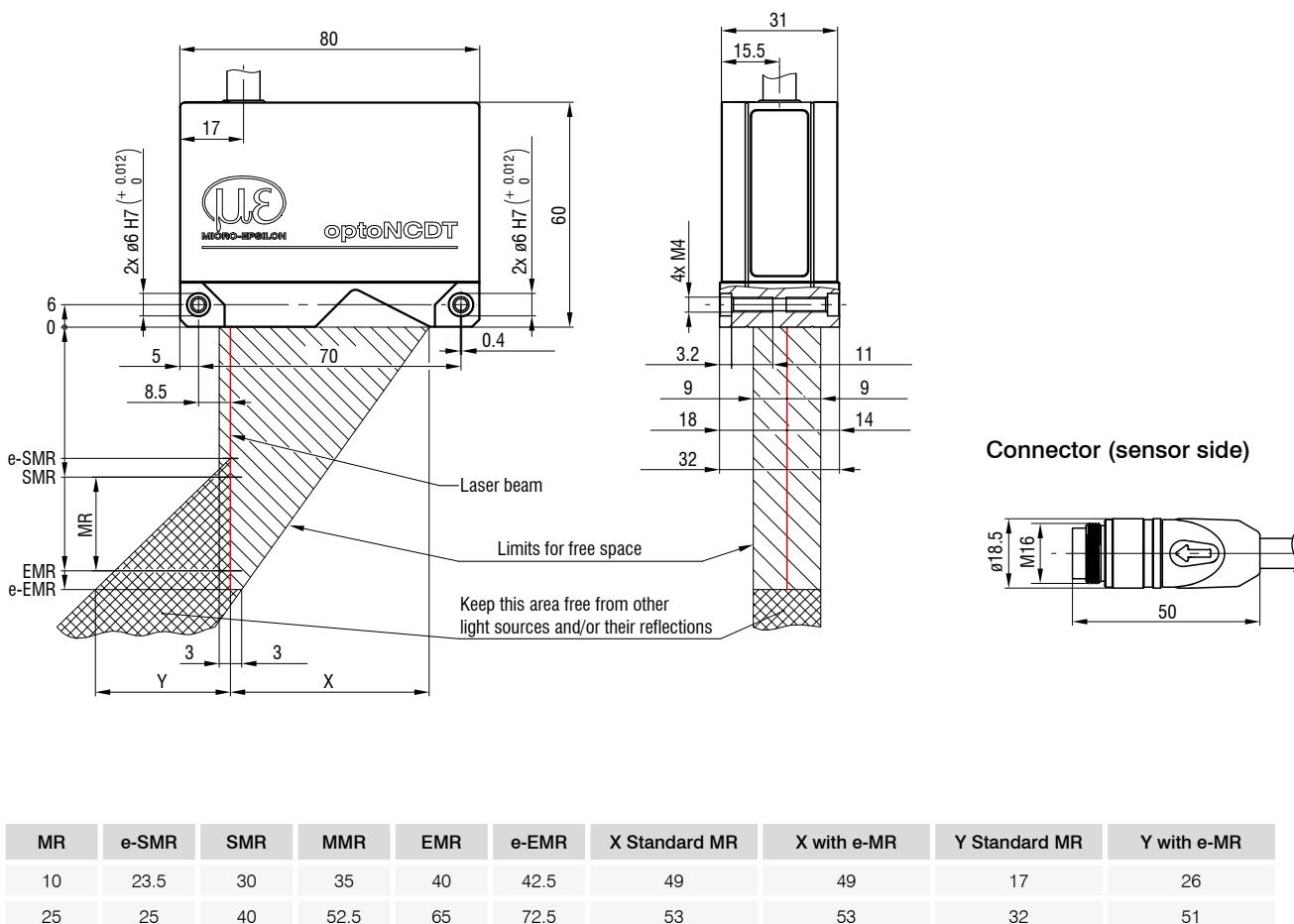
[1] Value applies only to the standard measuring range; FSO = Full Scale Output; measurement according to DIN 32877 with 10 or 1024 measurements per position, Ethernet, 20 kHz, on a white, diffusely reflecting surface (Micro-Epsilon reference ceramic for optoNCDT sensors)

[2] Value applies only to the standard measuring range; value for median 9 + moving average 4096; Ethernet, 20 kHz, in the mid of the measuring range, on white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for optoNCDT sensors)

[3] ±20 %; SMR = start of measuring range; MMR = mid of measuring range; EMR = end of measuring range; light spot diameter determined with point-shaped laser with Gaussian fit (full 1/e<sup>2</sup> width)

# Dimensions

optoNCDT 5500 / Measuring ranges 10/25



(Dimensions in mm, not to scale)

MR = measuring range

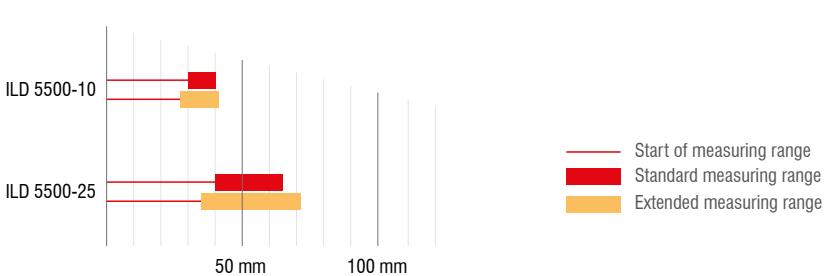
SMR = Start of measuring range

MMR = Mid of measuring range

EMR = End of measuring range

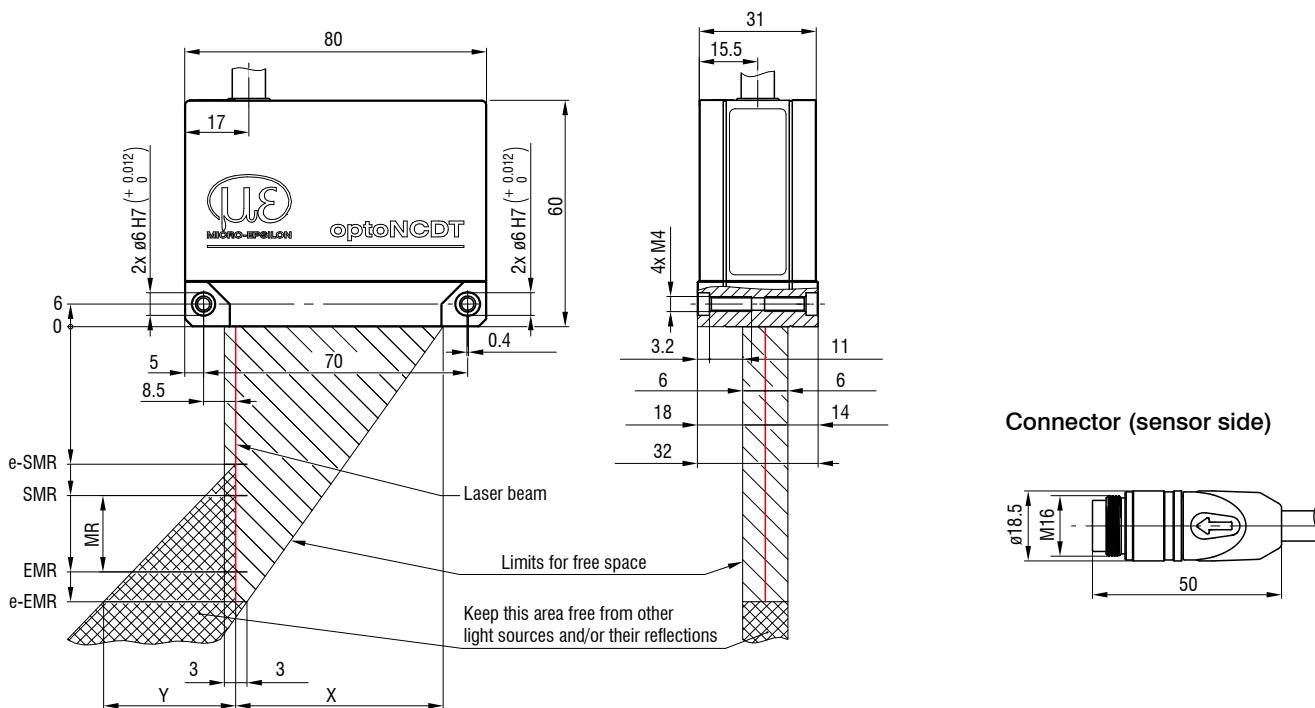
e-SMR = Start of extended measuring range

e-EMR = End of extended measuring range

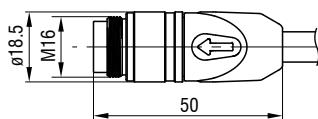


# Dimensions

optoNCDT 5500 / Measuring ranges 100/200



Connector (sensor side)



MR	e-SMR	SMR	MMR	EMR	e-EMR	X Standard MR	X with e-MR	Y Standard MR	Y with e-MR
100	55	70	120	170	205	58	59	64	106
200	70	100	200	300	370	59	60	92	167

(Dimensions in mm, not to scale)

MR = measuring range

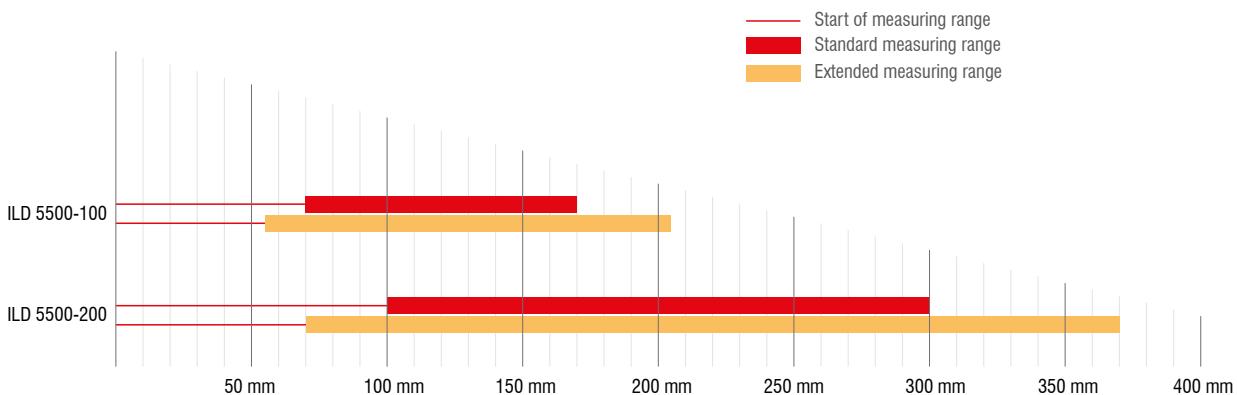
SMR = Start of measuring range

MMR = Mid of measuring range

EMR = End of measuring range

e-SMR = Start of extended measuring range

e-EMR = End of extended measuring range



# Connection possibilities

## Connection possibilities for sensors with integrated cables

Cable diameter:	8.1 ... 8.9 mm
Drag chain:	yes
Robot:	no
Temperature range:	-40 ... 90 °C (movable) -50 ... 90 °C (not movable)
Bending radius:	> 45 mm (fixed installation) > 108 mm (dynamic)

Sensor	Cables	Type	Connection possibilities and accessories
ILD5500-xx	Integrated cable Length 3 m	Open ends	<p>Supply voltage connection Power supply unit PS2020</p> <p>Interface module of RS422 to USB IF2001/USB</p> <p>Interface module for Industrial Ethernet connection IF2035-PROFINET IF2035-EIP IF2035-EtherCAT</p>

## Drag-chain suitable extension and adapter cables for sensors with pigtail

Cable diameter:	8.1 ... 8.9 mm
Drag chain:	yes
Robot:	no
Temperature range:	-40 ... 90 °C (movable) -50 ... 90 °C (not movable)
Bending radius:	> 45 mm (fixed installation) > 108 mm (dynamic)

Sensor	Cables	Type	Connection possibilities and accessories
ILD5500-xx	<p>Supply/output cable with RJ45 and encoder cables Length 3 m / 6 m / 9 m / 15 m</p> <p>Art. no. Designation 29011422 PC5500-3/OE-RJ45 29011423 PC5500-6/OE-RJ45 29011424 PC5500-9/OE-RJ45 29011425 PC5500-15/OE-RJ45</p> <p>Supply/output cable Length 3 m / 6 m / 9 m / 15 m</p> <p>29011638 PC5500-3/OE 29011639 PC5500-6/OE 29011640 PC5500-9/OE 29011641 PC5500-15/OE</p>	Open ends	<p>Supply voltage connection Power supply unit PS2020</p> <p>Interface module of RS422 to USB IF2001/USB</p> <p>Interface module for Industrial Ethernet connection IF2035-PROFINET IF2035-EIP IF2035-EtherCAT</p>
	<p>Adapter cable for PC interface card Length 3 m / 6 m / 9 m / 15 m</p> <p>Art. no. Designation 29011654 PC5500-3/IF2008 29011655 PC5500-6/IF2008 29011656 PC5500-9/IF2008 29011657 PC5500-15/IF2008</p>	Sub-D	<p>Interface card for synchronous data acquisition IF2008PCIe / IF2008E</p> <p>4-fold interface module from RS422 to USB IF2004/USB</p>
	<p>Adapter cable for sensor calculation Length 3 m / 6 m / 9 m / 15 m</p> <p>Art. no. Designation 29011658 PC5500-3/DPU 29011659 PC5500-6/DPU 29011660 PC5500-9/DPU 29011661 PC5500-15/DPU</p>	Sub-D	<p>Controller for D/A conversion and evaluation of up to 2 sensor signals Dual Processing Unit</p>
	<p>Adapter cable for IF2008/ETH Length 3 m / 6 m / 9 m / 15 m</p> <p>Art. no. Designation 29011662 PCE5500-3/M12 29011663 PCE5500-6/M12 29011664 PCE5500-9/M12 29011665 PCE5500-15/M12</p>	M12	<p>Interface module for Ethernet connection of up to 8 sensors IF2008/ETH</p>

# Accessories

## IF2035: Interface module for Industrial Ethernet connection

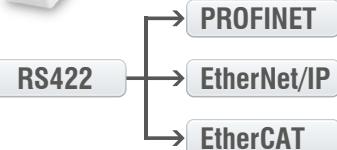
- Connection of RS422 or RS485 interfaces to PROFINET / Ethernet/IP / EtherCAT
- Synchronization output for RS422 sensors
- 2 network connections for different network topologies
- Data rate up to 4 MBaud
- 4-fold oversampling (with EtherCAT)
- Ideal for confined spaces due to a compact housing and DIN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



EtherCAT®

EtherNet/IP®

PROFINET®



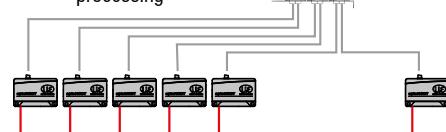
## IF2008PCIe/IF2008E:

### 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)

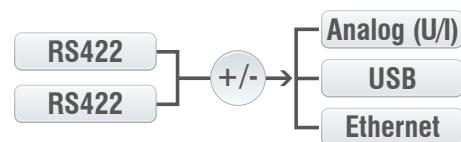


Interface card  
IF2008PCIe, IF2008E  
for individual signal  
processing



## 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 150 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
- Sensor connections 1 and 2 switchable to encoder
- 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

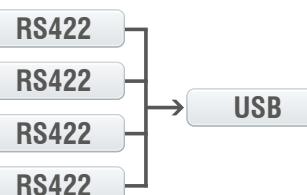
- Conversion from RS422 to USB
- Signals and functions such as laser on/off, switch signals and function output
- Supports baud rates from 9.6 kBaud to 12 MBaud
- Robust aluminum housing
- Easy sensor connection via screw terminals (plug and play)
- Parameter setting (converter and sensors) via software



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

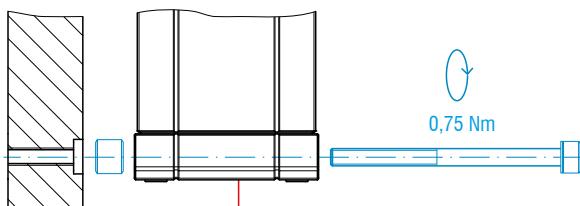


Connection of 4 sensors via  
IF2008-Y-adapter cable

# Installation options and Accessories

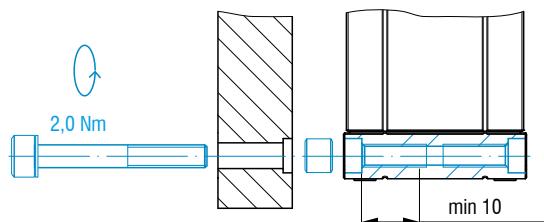
## Installation options

**Bolt connection**



M3 x 40; ISO 4762, A2-70

**Direct fastening**



M4; ISO 4762, A2-70  
Screwing depth at least 10 mm

## Accessories for optoNCDT 5500

### **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)

### Scope of supply

- 1 ILD5500 sensor
- 1 Assembly instructions
- 2 laser warning signs German, 2 laser warning signs English, 2 laser warning sign French
- Accessories (2 pc. centering sleeves, 2 pc. M3 x 40)

# Software

## 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.com/download](http://www.micro-epsilon.com/download)

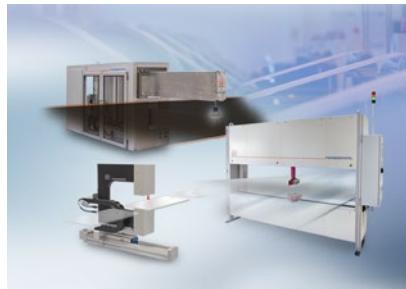
## Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, distance and position



Sensors and measurement devices for non-contact temperature measurement



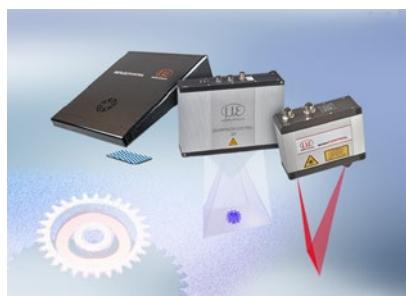
Measuring and inspection systems for metal strips, plastics and rubber



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