MICRO-EPSILON

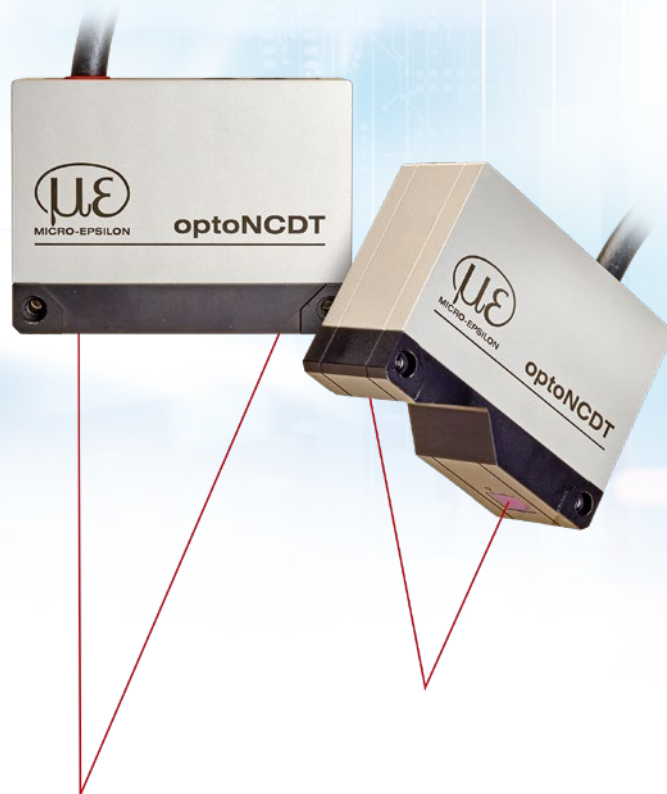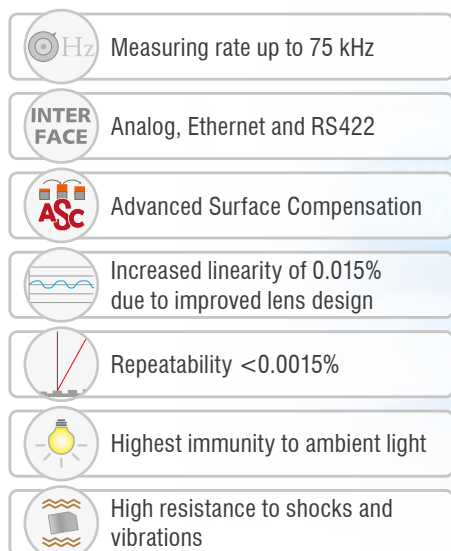# More Precision

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 <0.0015%

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.
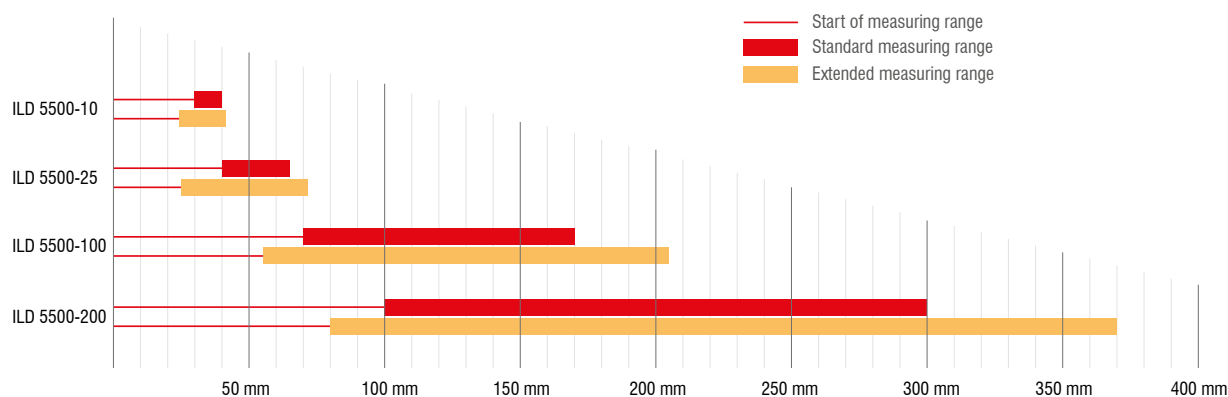
Advanced Surface Compensation -
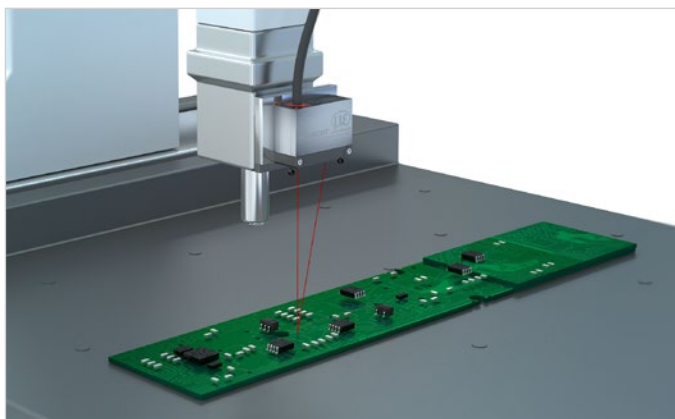### The intelligent exposure control for all surfaces

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.

Simple mounting and initial operation

The repeatable sensor alignment is facilitated by a patented mounting concept with centering sleeves. This enables both simple sensor replacement and precise mounting of multiple sensors. Due to its small sensor housing with integrated controller, the laser sensor can also be installed in confined spaces. A web interface with ready-made presets makes the sensor immediately ready for use.

─── Start of measuring range
■ Standard measuring range
■ Extended measuring range

ILD 5500-10
ILD 5500-25
ILD 5500-100
ILD 5500-200

50 mm   100 mm   150 mm   200 mm   250 mm   300 mm   350 mm   400 mm

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.
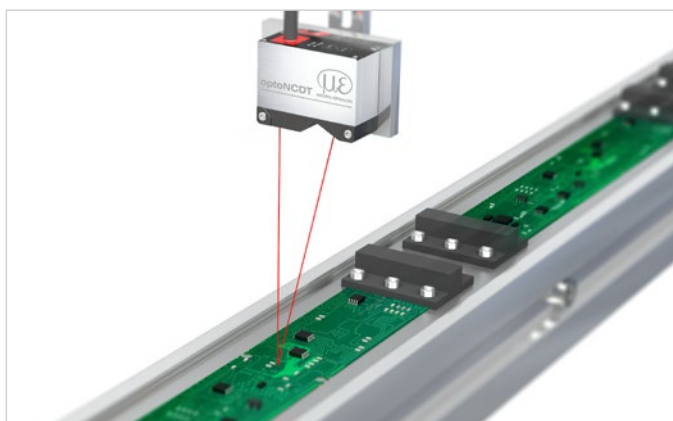

Tire inspection
optoNCDT 5500 sensors are used to detect the tire thickness.
They measure fast and precisely on black surfaces.
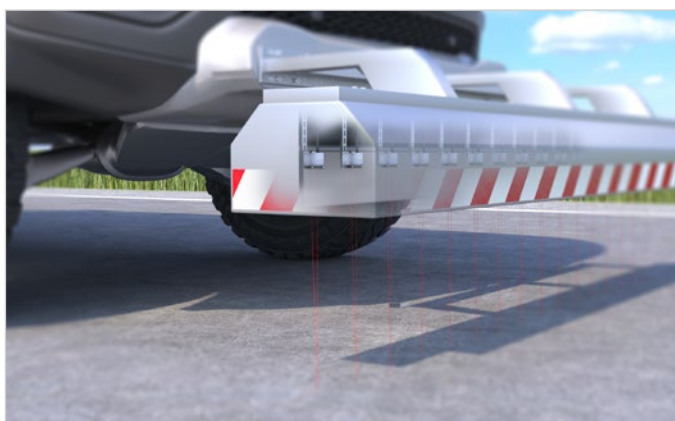
Road surface testing
A total of up to 48 sensors (40 at the front, 8 at the sides) regularly check the road surface. The condition of various roads (e.g. highway, cycle paths, footpaths) can be measured.


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.
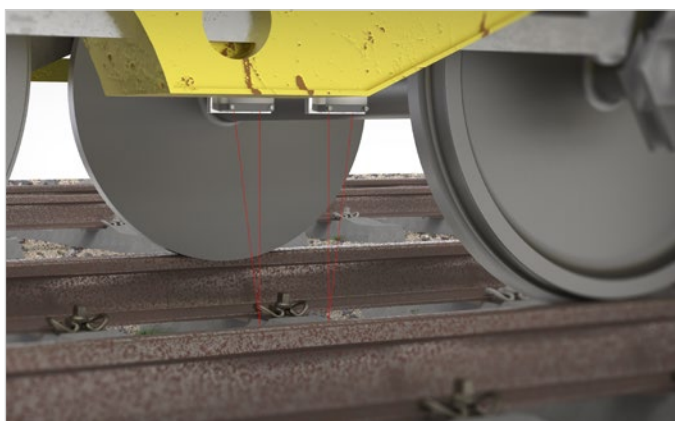
Wear test on rails
High-speed lines are maintained by special grinding trains. These are equipped with optoNCDT 5500 laser displacement sensors, which detect the distance from the track at a high measuring rate, and thus also the slippage. Changing reflections and ambient light hardly affect these robust sensors.
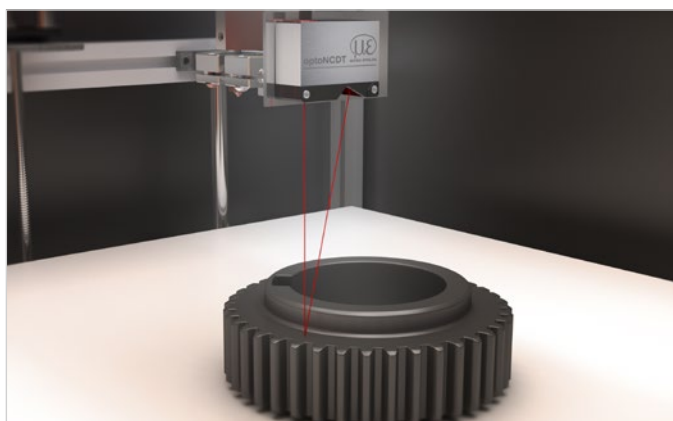
3D printing
The unique combination of high performance, compact size and ease of integration makes the optoNCDT 5500 sensors ideal for use in 3D printing. They reliably detect the positioning of the print head in a 3D printer and ensure precise production of the components.

Technical data
optoNCDT 5500

General technical data	ILD5500-x
Measuring rate[1]	0,25 kHz ... 75 kHz
Temperature stability[2]	±0.015 % 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[3]	RS422 (16 bit in the standard measuring range, 18 bit in the extended measuring range), Ethernet (32 bit)
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; or integrated pigtail 0.3 m with 17-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)
Temperature range — 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)	15 g / 20 … 500 Hz
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[4]	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	50,000 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] PROFINET and EtherNet/IP require connection via interface module IF2035 (see accessories)
[4] Access to web interface requires connection to PC

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 [1]	1.5 μm	5 μm	30 μm	100 μm
	0.015% FSO	0.02% FSO	0.03% FSO	0.05% FSO
Repeatability [2]	< 0,15 μm	< 0,375 μm	< 1,5 μm	< 3 μm
Light spot diameter [3] — SMR	85 x 200 μm	140 x 310 μm	200 x 260 μm	780 x 1800 μm
Light spot diameter [3] — MMR	60 x 75 μm	60 x 90 μm	200 x 260 μm	780 x 1800 μm
Light spot diameter [3] — EMR	130 x 250 μm	230 x 380 μm	640 x 1100 μm	780 x 1800 μm
Light spot diameter [3] — smallest Ø	50 x 75 μm with 34.5 mm	60 x 80 μm with 51 mm	82 x 117 μm with 99 mm	-

[1] Value applies only to the standard measuring range; FSO = Full Scale Output; the specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)
[2] Measuring rate 20 kHz, moving average 128
[3] ±10 %; 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/e² width)

Dimensions
optoNCDT 5500

optoNCDT 5500 / Measuring ranges 10/25

(Dimensions in mm, not to scale)
MR = measuring range
SMR = Start of measuring range
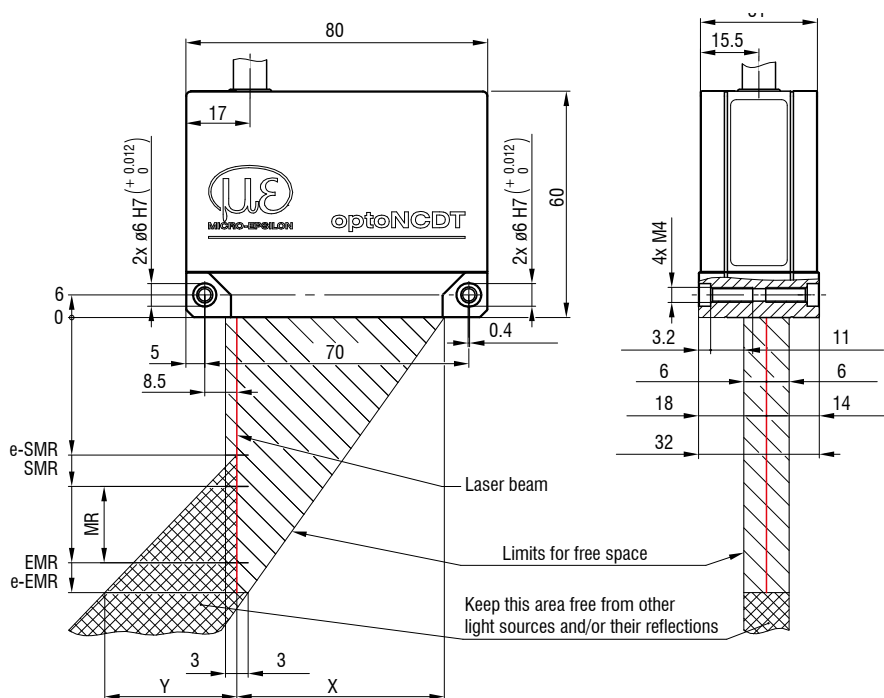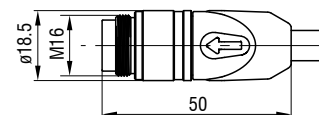MMR = Mid of measuring range
EMR = End of measuring range
e-SMR = Start of extended measuring range
e-EMR = End of extended measuring range
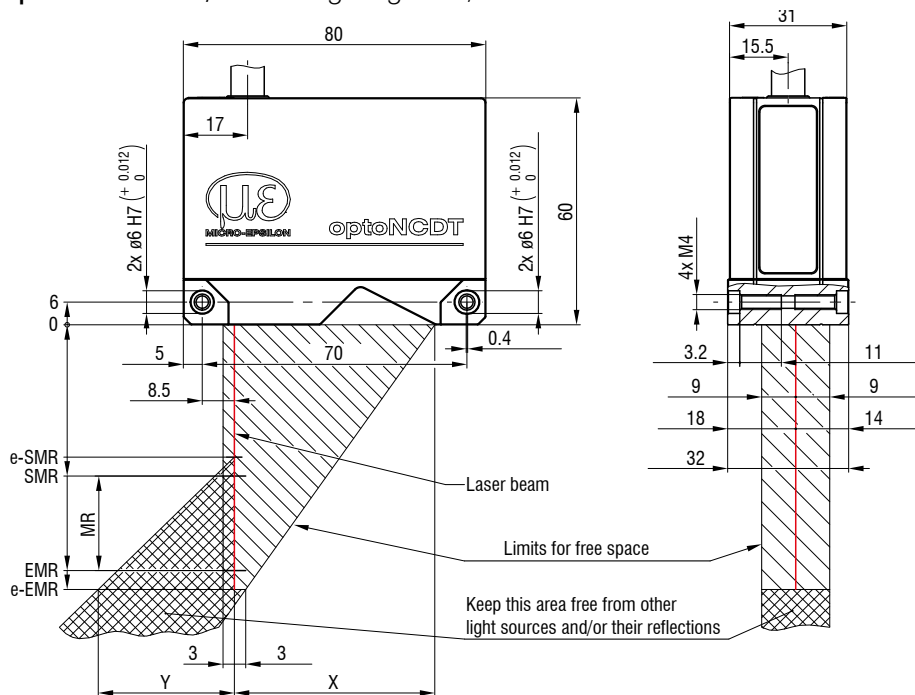
MR	e-SMR	SMR	MMR	EMR	e-EMR	X Standard MR
10	23.5	30	35	40	42.5	49
25	25	40	52.5	65	72.5	52

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

Connection possibilities
optoNCDT 5500

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	
ILD5500-xx	Integrated cable Length 3 m	Open ends	**Supply voltage connection** Power supply unit PS2020	
			Interface module of RS422 to USB IF2001/USB	
			Interface module for Industrial Ethernet connection IF2035-PROFINET IF2035-EIP IF2035-EtherCAT	

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:	-25 … 80 °C (moving)
	-40 … 80 °C (not moving)
Bending radius:	> 40 mm (fixed installation)
	> 90 mm (dynamic)

Sensor	Cables	Type	Connection possibilities and accessories	
ILD5500-xx	Extension cable pigtail Length 3 m / 6 m / 9 m / 15 m *Art. no.* *Designation* 29011422 PC5500-3/OE-RJ45 29011423 PC5500-6/OE-RJ45 29011424 PC5500-9/OE-RJ45 29011425 PC5500-15/OE-RJ45	Open ends	**Supply voltage connection** Power supply unit PS2020	
			Interface module of RS422 to USB IF2001/USB	
			Interface module for Industrial Ethernet connection IF2035-PROFINET IF2035-EIP IF2035-EtherCAT	

## 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®

RS422 →
- PROFINET
- EtherNet/IP
- EtherCAT
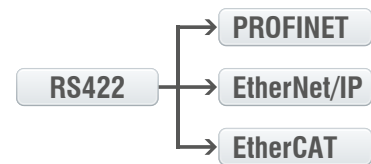
IC2001/USB Single-channel converter cable RS422/USB

- 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)
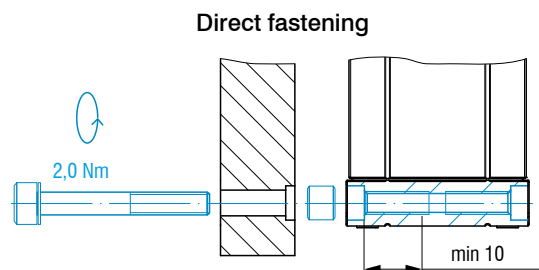- Parameter setting (converter and sensors) via software

RS422 → USB

Installation options and Accessories

Installation options

Bolt connection

0,75 Nm

M3 x 40; ISO 4762, A2-70

Direct fastening

2,0 Nm
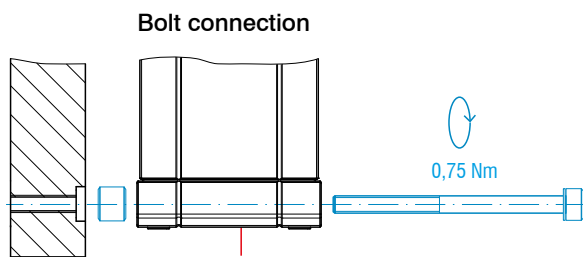
min 10

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.
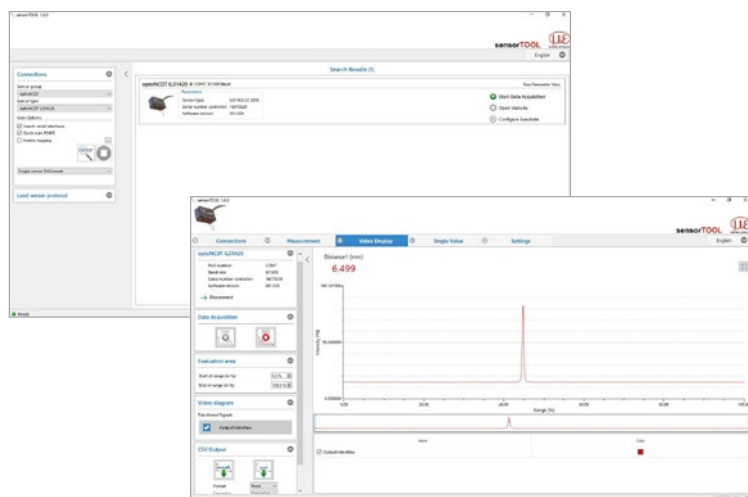
Free download

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