Sensor Mounting

The optoNCDT 5500 sensor is an optical system for measurements with micrometer accuracy. Pay attention to careful handling during mounting and operation.

☞ Mount the sensor only to the existing through-holes (mounting holes) on a flat surface. Clamps of any kind are not permitted.

☞ Mount the sensor by means of 2 screws type M4 or by means of through bores for M3 with the screws from the accessories.

Measuring Range, Start of Measuring Range
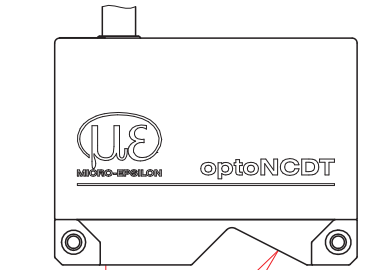
	Analog value		Digital value	
	Current	Voltage	RS422	Ethernet
	3 mA	5.2 V / 10.2 V	262077	0x7FFFFF05
			depends on measuring range	
	4 mA (MBA)	0 V	98232	Nanometer
	12 mA (MBM)	2.5 V / 5 V	131000	Nanometer
	20 mA (MBE)	5 V / 10 V	163768	Nanometer
			depends on measuring range	
	3 mA	5.2 V / 10.2 V	262078	0x7FFFFF06

e-SMR Start of extended measuring range
SMR Start of measuring range
MMR Mid of measuring range
EMR End of measuring range
e-EMR End of extended measuring range
e-MR Extended measuring range

The digital values apply to distance values without zeroing or mastering.

Mounting

Bolt connection

0.75 Nm

M3 x 40; ISO 4762, A2-70

Direct fastening

2.0 Nm

min 10 (.04)

M4; ISO 4762, A2-70
screw depth min. 10 mm

Drawings, Free Space

Dimensional drawing ILD5500-10/25/50, dimensions in mm (inches)

Dimensional drawing ILD5500-100/200, dimensions in mm (inches)

MB	10	25	50	100	200
e-SMR	27.5	35	40	55	70
SMR	30	40	45	70	100
MMR	35	52.5	70	120	200
EMR	40	65	95	170	300
e-EMR	42.5	72.5	115	205	370
X standard MR	49	52	51	58	59
X with e-MR	49	53	52	59	60
Y standard MR	17	32	51	64	92
Y with e-MR	26	51	81	106	167

Dimensions in mm

Pin Assignment

Signal	Pin	Cable color PC5500-x	Description
V+	24	Red	Supply voltage (12 ... 30 VDC), typically 24 VDC
GND	17	Blue	Reference ground for Power, Sync, RS422, Ethernet
Analog output	12	Coaxial	Current 4 ... 20 mA Voltage 0 ... 5 VDC | 0 ... 10 VDC
AGND	21	Coaxial screen	Reference ground for analog output
Sync+	5	Grey-pink	Synchronization or Triggering; symmetrical RS422 level, terminating resistor (120 Ohm), direction can be switched using software, not electrically separated Alternative: reference pulse encoder input
Sync -	2	Red-blue	
Laser on/off	3	Black	Switching output, Laser is active when pin 3 is connected to GND
Multi_in	4	Violet	Switching output for triggering, zeroing/mastering or teaching
Out 1	16	Brown	Switching outputs, programmable switching behavior: (NPN, PNP or push-pull)
Out 2	8	White	
A_ENC 1+	23	White-grey	Encoder input Incremental signals A, B
A_ENC 1 -	18	Grey-brown	
B_ENC 1+	22	White-pink	
B_ENC 1 -	19	Pink-brown	
Ethernet screen	13	Eth-Screen	Industrial Ethernet
RX-Ethernet+	14	White-green	
RX-Ethernet -	10	Green	
TX-Ethernet+	20	White-orange	
TX-Ethernet -	11	Orange	
Tx +	9	Grey-black	Interface RS422 (32 Bit), symmetrical Rx internally terminated with 100 Ohm max. 4 MBaud, full duplex not electrically separated
Tx -	7	Pink-black	
Rx +	6	Green-black	
Rx -	1	Yellow-black	
Screen		SHLD	

24-pol. Sensor connector, M16, pin side view

Laser Safety

The optoNCDT 5500 operates with a semiconductor laser with a wavelength of 670 nm (visible/red). The sensors fall within laser class 2. The laser is operated on a pulsed mode, the maximum optical power is ≤ 1 mW. The pulse frequency depends on the adjusted measuring rate (0.25 ... 75 kHz). The pulse duration of the peaks is regulated depending on the measuring rate and reflectivity of the target and can be 0.5 up to 3994.5 μs.

ℹ Observe the national laser protection regulations.

Although the laser output is low, directly looking into the laser beam must be avoided. Close your eyes or immediately turn away if the laser beam hits the eye.

Lasers of Class 2 are not subject to notification and a laser protection officer is not required.
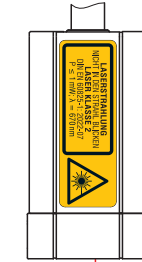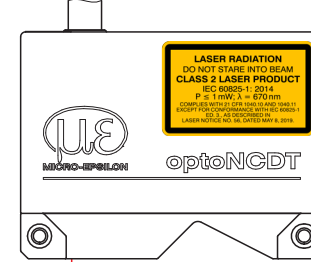
The following warning labels must be attached to the cover (front and/or rear side) of the sensor housing. The laser warning labels for Germany have already been attached. For other non German speaking countries, an IEC standard label is included in delivery and the versions valid for the user's country must be attached before the device is put into operation for the first time.

⚠ CAUTION

Laser radiation. Irritation or injury of the eyes possible. Close your eyes or immediately turn away if the laser beam hits the eye.

Laser warning sign at the sensor housing

During operation of the sensor, the pertinent regulations according to IEC 60825-1 on „Safety of laser products" must be fully observed at all times. The sensor complies with all applicable laws for the manufacturer of laser devices.

True reproduction of the sensors with its actual location of the warning labels, class 2

ℹ If both warning labels are covered over when the unit is installed, the user must ensure that supplementary labels are applied.
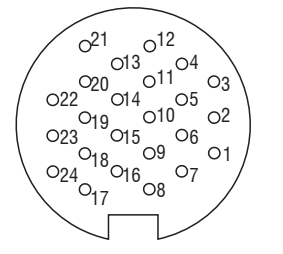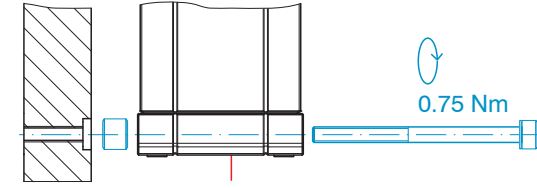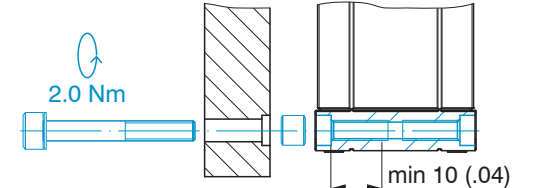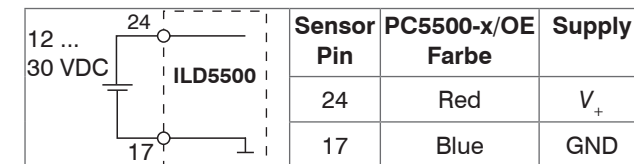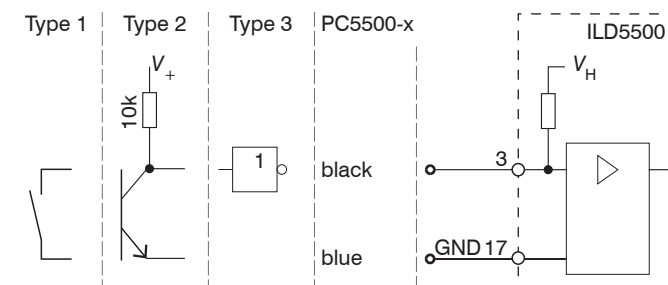
Operation of the laser is indicated visually by the LED State on the sensor.

The housing of the optical sensors may only be opened by the manufacturer.

For repair and service purposes, the sensors must always be sent to the manufacturer.

Please observe national regulations, e. g., Laser Notice No. 56 for the USA.

Intended Use

The optoNCDT 5500 system is designed for use in industrial and laboratory areas. It is used for measuring displacement, distance and position as well as in in-process quality control and dimensional testing.

The sensor must only be operated within the limits specified in the technical data, see operating instructions. The sensor must be used in such a way that no persons are endangered or machines and other material goods are damaged in the event of malfunction or total failure of the sensor. Take additional precautions for safety and damage prevention for safety-related applications.

Warnings

Avoid unnecessary laser radiation to be exposed to the human body.

☞ Switch off the sensor for cleaning and maintenance.

☞ Switch off the sensor for system maintenance and repair if the sensor is integrated into a system.

Caution - use of controls or adjustments or performance of procedures other than those specified may cause harm.

Connect the power supply according to the safety regulations for electrical equipment. The supply voltage must not exceed the specified limits.
> Risk of injury, damage to or destruction of the sensor.

Avoid constant exposure of the sensor to splashes of water. Avoid exposure of sensor to aggressive media (detergents, cooling emulsions).
> Damage to or destruction of the sensor

Avoid shock and vibration to the sensor. Protect the sensor cable against damage.
> Damage to or destruction of the sensor, failure of the measuring device.

Proper Environment

- Protection class: IP67 (applies only when the sensor cable is plugged in)

Optical inputs are excluded from protection class. Contamination leads to impairment or failure of the function.

- Temperature range
  - Operation: 0 ... +50 °C (+32 ... +122 °F)
  - Storage: -20 ... +70 °C (-4 ... +158 °F)
- Humidity: 5 ... 95 % (non-condensing)

Supply voltage, Nominal value: 24 V DC (12 ... 30 V, P < 5 W)

Sensor Pin	PC5500-x/OE Farbe	Supply
24	Red	V_+
17	Blue	GND

Use supply voltage for measurement instruments only. Micro-Epsilon recommends using an optional available power supply unit PS2020 for the sensor.
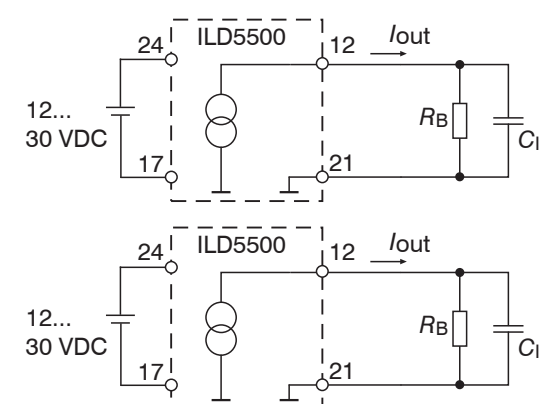
Switch on the Laser

i The laser remains off as long as pin 3 is not electrically connected with pin 17.

Analog Output

Current output 4 ... 20 mA or
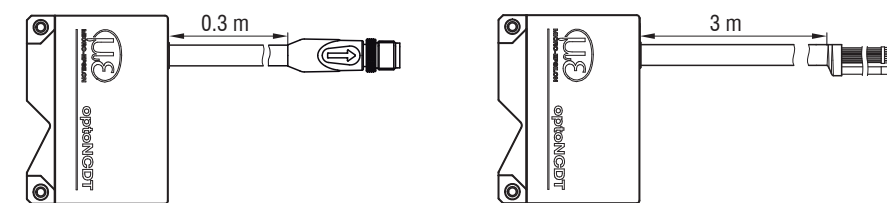
Voltage output 0 ... 5 V or 0 ... 10 V

i The current output may not be continuously operated in short-circuit operation without load resistor. This would lead to thermal overload and thus to the automatic overload cut-off of the output.

Current output

$R_a < (V_+ -6 V) / 20 mA;$
$R_a max. = 250 Ohm$
at $V_+ = 12 V$
$C_l \leq 33 nF$

Voltage output

$R_l = 50 Ohm, I_{max} = 5 mA,$
Short circuit protection 7 mA
$R_L > 20 MOhm$
$C_V \leq 100 nF$

Analog output

Pin 12,
coaxial inner conductor, white

AGND Pin 21,
screening

Connector and Sensor cable

ILD5500 with pigtail

ILD5500 with open ends

Unused open cable ends must be insulated to protect against short circuits or malfunction of the sensor.

Multi-Function Input

The multi-function input enables triggering, zero setting/mastering and teaching. The function depends on the programming of the input and on the timing of the input signal.

The inputs are not electrically isolated. The maximum switching frequency is 10 kHz. (with symmetrical signals).
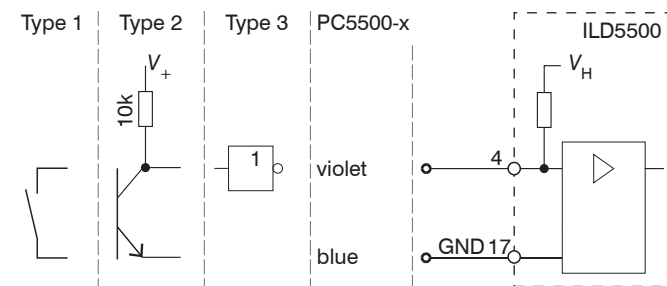
24V-Logik (HTL):
Low ≤ 3 V; High ≥ 8 V
(max 30 V),

5 V logic (TTL):
Low ≤ 0,8 V; High ≥ 2 V

internal pull-up resistor, an open input is detected as High.

Connect the input to GND to trigger the function.

RS422 Connection with USB Converter IF2001/USB

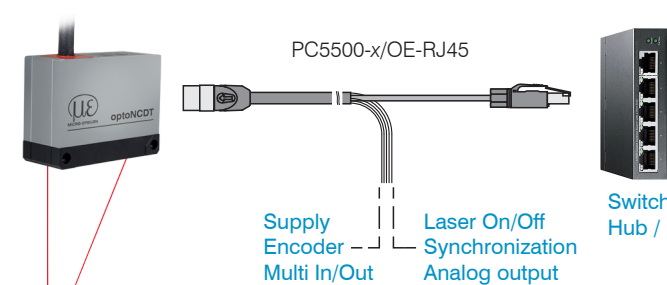E. g. for the connection between Sensor with integral cable and PC. Cross the lines for connections.

i Disconnect or connect the sensor and USB converter when the sensor is disconnected from power supply only.

	Sensor	End device (converter) Type IF2001/USB from Micro-Epsilon
24-pol. cable connector	Sensor cable	
V + (Pin 24)	Red	24VDC
Tx + (Pin 9)	Grey-black	Rx +
Tx - (Pin 7)	Pink-black	Rx -
Rx + (Pin 6)	Green-black	Tx +
Rx - (Pin 1)	Yellow-black	Tx -
GND (Pin 17)	Blue	GND
Laser On (Pin 3)	Black	Laser ON
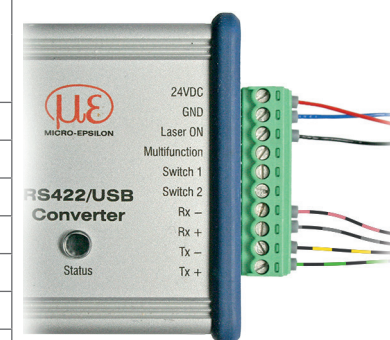
Symmetric differential signals acc. to EIA-422, not electrically isolated from supply voltage. Use a shielded cable with twisted cores e.g. PC5500-3/OE-RJ45.
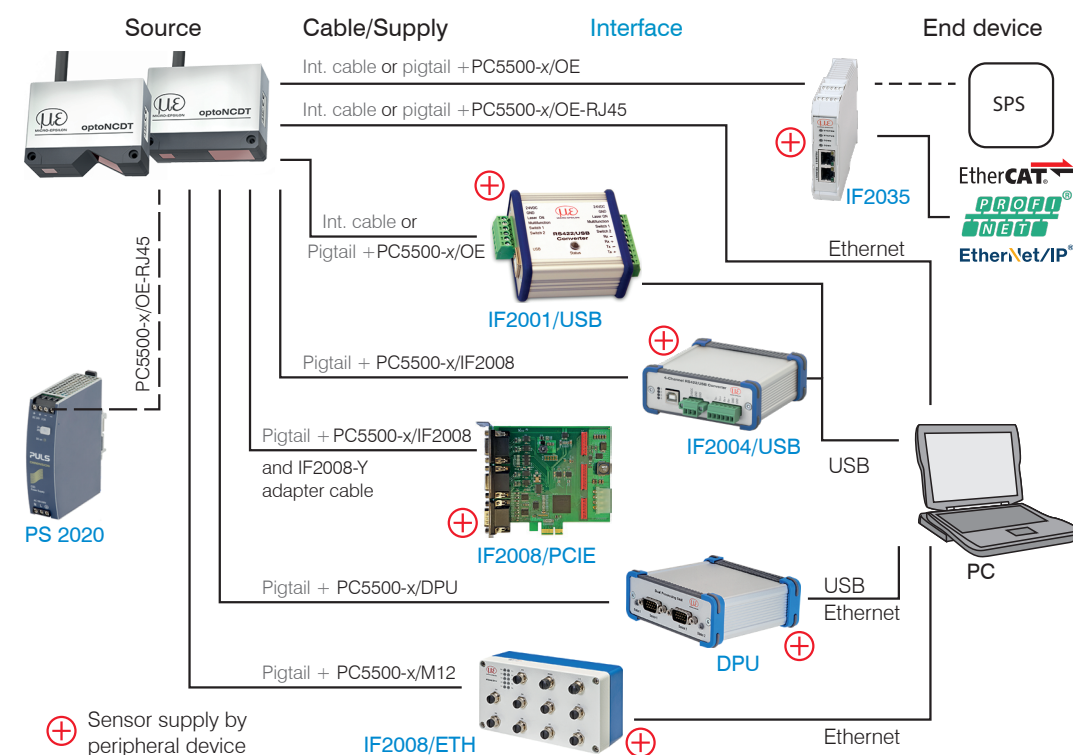
Ethernet Connection

E. g. for the connection between Sensor with pigtail and PC.

Micro-Epsilon recommends to use the PC5500-3/OE-RJ45 cable of the optional accessories.

Components

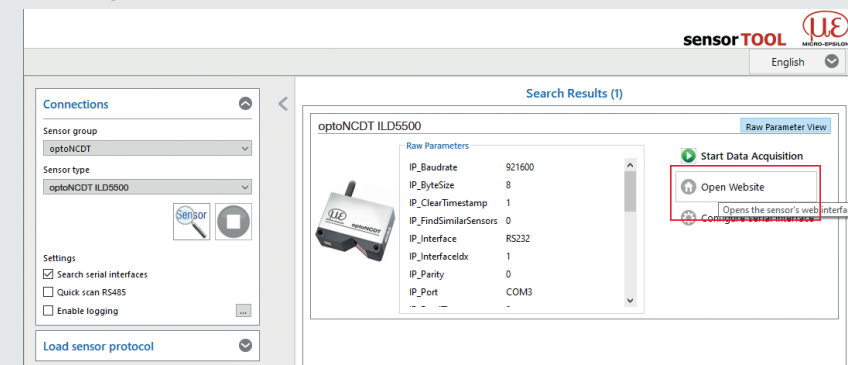Mount the sensor and connect the components.

⊕ Sensor supply by peripheral device

Quick Guide

Initial Operation

Connect the sensor to a PC/notebook via Ethernet or a RS422 connector. Connect the supply voltage.

Start the program `sensorTOOL`.

Click the `Sensor` button.

The program searches for connected ILD5500 sensors on available interfaces.

The `sensorTOOL` program is available at https://www.micro-epsilon.com/fileadmin/download/software/sensor-Tool.exe.

You need a web browser compatible with HTML5 on a PC/notebook.

Select the desired sensor. Click on the button `Open Website`.

Access via Web Interface

Interactive web pages for programming the sensor now appear in the web browser. The sensor is active and supplies measurement values. The ongoing measurement can be operated by means of function buttons in the area `Measurement chart`.
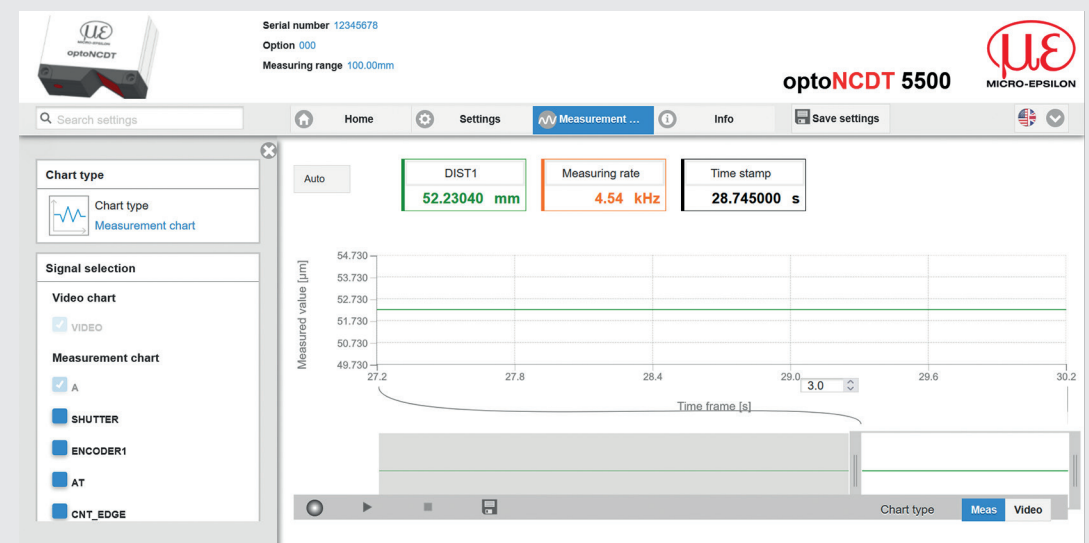
In the top navigation bar other functions (settings, measurement chart etc.) are available. The appearance of the websites can change dependent on the functions. Each page contains descriptions of parameters and tips for filling the website.

Place Target

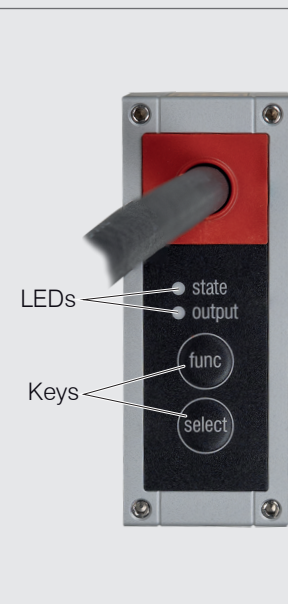Position the target (measuring object) as much as possible in the midrange.
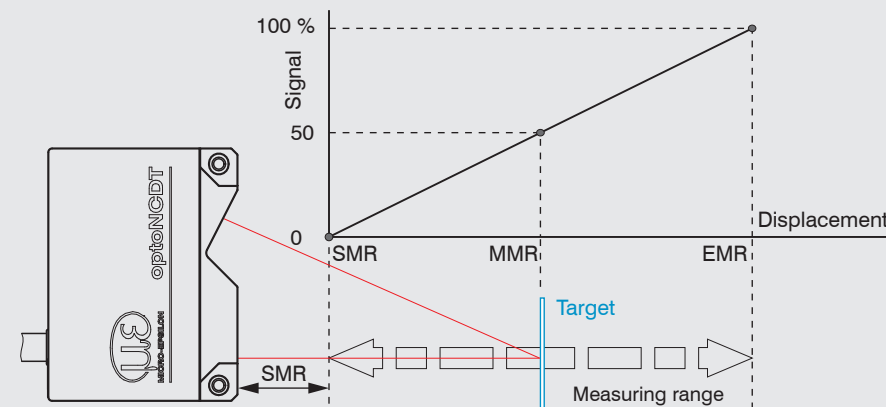
The State LED on the sensor indicates the position of the target to the sensor.

Select a Measuring Rate

Go to the menu `Settings > Data recording > Measuring rate`.

Start with a medium measuring rate. Confirm with `Apply`.

Control and Indicator Elements

LED	Color	Meaning
State	○ Off	Laser beam is switched off
	Green	Target within measuring range
	Yellow	Target within the midrange
	Red	No distance value available, e.g. target outside the measuring range, too low reflection
Output	Green	Measurement value output RS422 or Ethernet are active, analog output off
	Yellow	Switching outputs are active RS422, Ethernet or analog output can be switched on. The web interface can be switched on.
	Red	Measured value output current 4 ... 20 mA or Voltage 0 ... 5 V or 0 ... 10 V active
	○ Off	Sensor off, no supply
Taste Function		Sensor parameterization during initialization Sensor: selection of interface and key function (mastering or teaching) in in measurement mode: selection of the presets, averaging and measurement frequency functions
Taste Select		Sensor parameterization Teaching or mastering

Select an Interface

Go to the menu `Settings > Outputs > Output interface`.

Defines which interface is used for output of measured values. Parallel output of measured values via multiple channels is not possible. RS422, Ethernet and analog output cannot be operated simultaneously. While using the web interface, the output is switched off via RS422/Ethernet.

Store the Settings

Go to the menu `Settings > System settings > Load & Stores` or click the `Save settings` button.

Read the detailed operating instructions before using the sensor. The manual is available online on:
https://www.micro-epsilon.com/download-file/man--optoNCDT-5500--en.pdf