



Proper Use

The optoNCDT 1910 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 may only be operated within the limits specified in the technical data, see instruction manual, Chap. 3.3. The sensor must be used in such a way that no persons are endangered or machines are damaged in case of malfunctions or total failure of the sensor. Take additional precautions for safety and damage prevention for safety-related applications.

Warnings

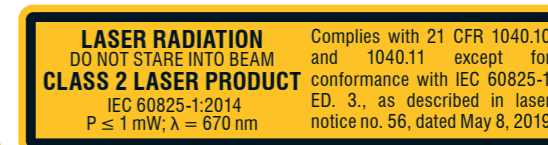
Avoid unnecessary laser radiation to be exposed to the human body. Switch off the sensor for cleaning and maintenance, for system maintenance and repair if the sensor is integrated into a system. Caution - use of controls or adjustments or performance of procedures other than those specified may cause harm. Connect the power supply and the display/output device in accordance with the safety regulations for electrical equipment. The power supply may not exceed the specified limits. > Risk of injury. Damage to or destruction of the sensor.

Avoid continuous exposure to splashing water on the sensor and the controller. Avoid exposure to aggressive materials (washing agent, cooling emulsions) on the sensor. > 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.

Laser Class

The ILD1910-x operates with a semiconductor laser with a wavelength of 670 nm (visible/red). The sensors fall within laser class 2. The following warning labels are attached to the cover (front and rear side) of the sensor housing:



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

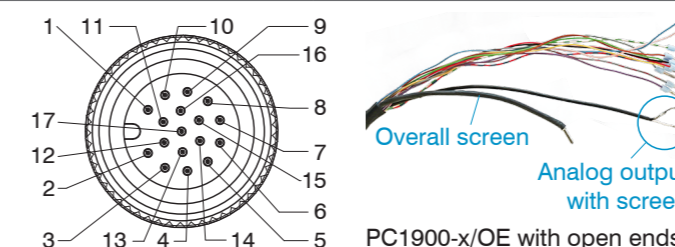
Pin Assignment

Signal	Pin	Color sensor cable PC1900-x/OE, Description	Specification, Wiring
V ₊	5	Red	Supply voltage (11 ... 30 VDC)
GND	14	Blue	System ground for power supply, switch signals (Laser on/off, Zero, Limits)
Analog output	1	Coaxial inner conductor, white	Current 4 ... 20 mA Voltage 0 ... 5 VDC Voltage 0 ... 10 VDC $R_B < (V_+ - 6 V) / 20 \text{ mA}$ $R_I = 50 \text{ Ohm}, I_{\text{max}} = 5 \text{ mA}$
AGND	2	Coaxial screening, black	Reference potential for analog output
Laser on/off	3	Black	Switching input Laser is active, if Pin 3 is connected with GND
Multifunction input	13	Violet	Switching input TrigIn, Zero/Master, TeachIn, SlaveIn
Error/Limit 1	10	Brown	Switching output 1
Limit 2	11	White	Switching output 2
Sync +	17	Grey-pink	Symmetrical synchron output (Master) or input (Slave) ¹
Sync -	12	Red-blue	RS422 level, terminating resistor 120 Ohm switchable, input or output selected depending on the synchronization mode
Tx +	8	Grey	RS422 - Output (symmetric)
Tx -	15	Pink	RS422 - Output (symmetric)
Rx +	9	Green	RS422 - Input (symmetric)
Rx -	16	Yellow	RS422 - Input (symmetric)

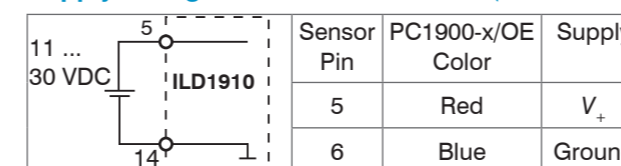
The sensor cable PC1900-x/OE is cable carriers suitable. One end has a molded female cable connector, the other end has free leads with ferrules.

17-pin connector, M12, pin side male cable connector pigtail

1) Used as trigger inputs in mode „Triggering“.



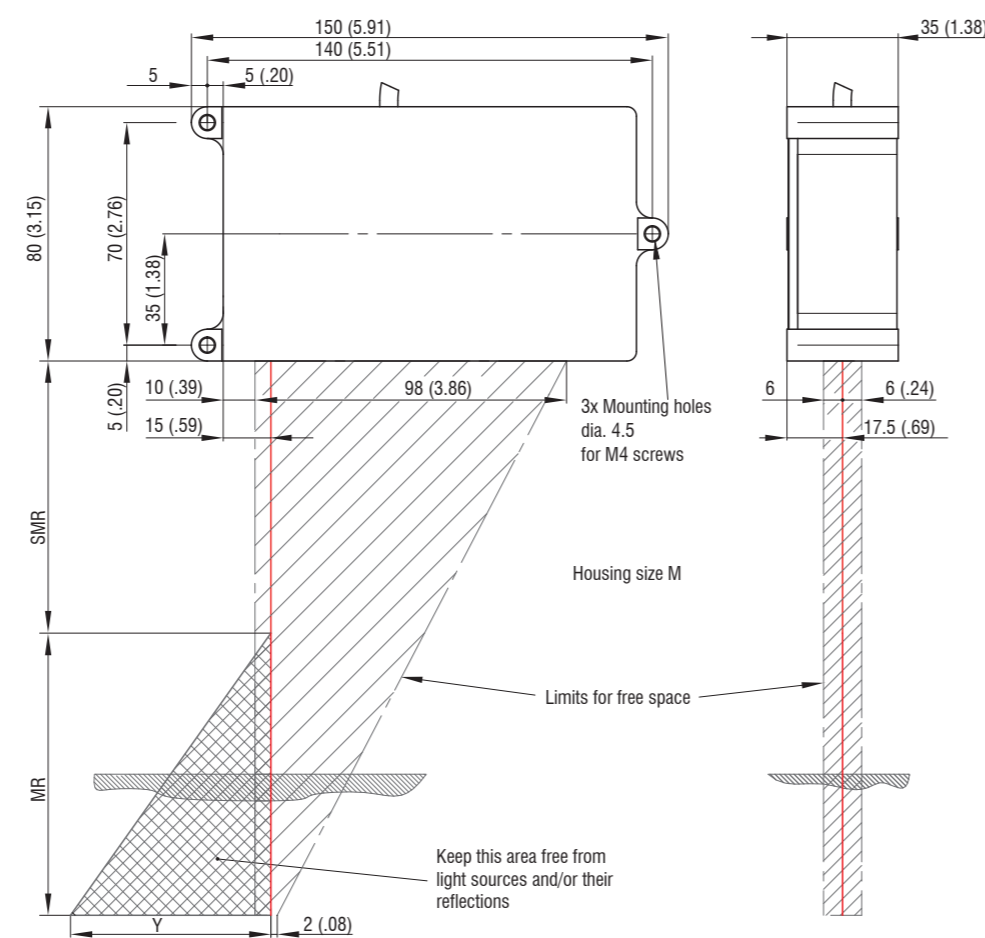
Supply Voltage, Nominal value: 24 V DC (11 ... 30 V, P < 3 W)



Sensor Pin	PC1900-x/OE Color	Supply
5	Red	V ₊
6	Blue	Ground

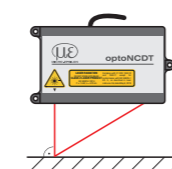
Use supply voltage for measurement instruments only. MICRO-EPSILON recommends using an optional available power supply unit PS2020 for the sensor.

Drawings, Free Space



MR	500	750
SMR	200	200
Y	180	270

Dimensions in mm (inches, rounded off)

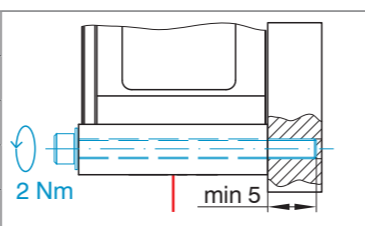


Sensor mounting with diffuse reflection

The laser beam must be directed perpendicularly onto the surface of the target. In case of misalignment it is possible that the measurement results will not always be accurate.

Mounting

Bolt connection		
Through length	35 mm	
Screw	ISO 4762-A2	M4
Washer	ISO 7089-A2	A4,3
Torque	$\mu = 0,12$	2 Nm



Proper Environment

- Protection class: IP65 (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.
- Operating temperature: 0 °C ... +50 °C (+32 up to +122 °F)
- Storage temperature: -20 °C ... +70 °C (-4 up to +158 °F)
- Humidity: 5 - 95 % (non-condensing)
- Ambient pressure: Atmospheric pressure

Sensor Mounting

The optoNCDT 1910 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 holes on a flat surface. Clamps of any kind are not permitted.
- Use three M4 screws to mount the sensors. The bearing surfaces surrounding the fastening holes (through-holes) are slightly raised.

Measuring range, Start of Measuring range

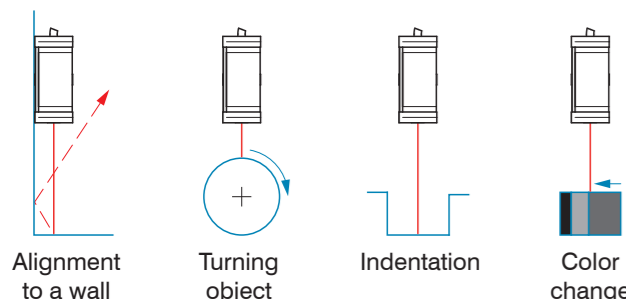


Current	Voltage	Digital value ¹
3 mA	5.2 V / 10.2 V	262077
4 mA (SMR)	0 V	98232
12 mA (MMR)	2.5 V / 5 V	131000
20 mA (EMR)	5 V / 10 V	163768
3 mA	5.2 V / 10.2 V	262078

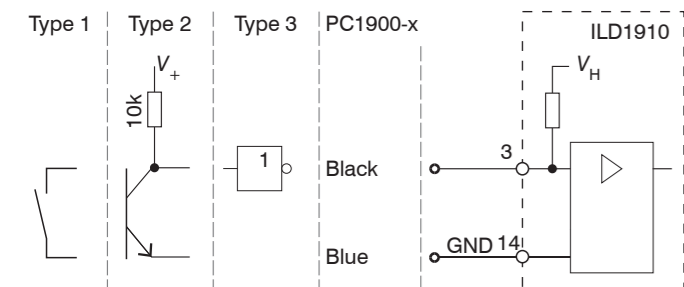
MR = Measuring range
SMR = Start of measuring range
MMR = Midrange
EMR = End of measuring range

1) For displacement values without zero setting or mastering.

Optimizing the Measuring Accuracy



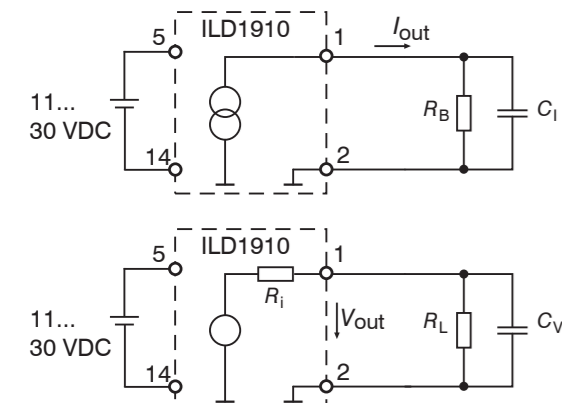
Laser On



i If pin 3 is not connected with pin 14, the laser is off.

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

$$R_B < (V_+ - 6 \text{ V}) / 20 \text{ mA};$$

$$R_B \text{ max.} = 250 \text{ Ohm at } V_+ = 11 \text{ V}$$

$$C_1 \leq 33 \text{ nF}$$

Voltage output

$$R_i = 50 \text{ Ohm, } I_{\text{max}} = 5 \text{ mA,}$$

short circuit protection at 7 mA

$$R_L > 20 \text{ MOhm}$$

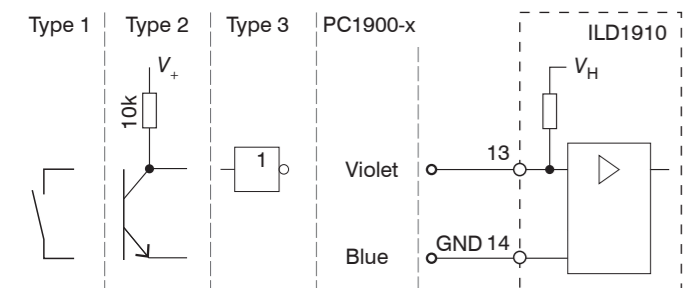
$$C_V \leq 100 \text{ nF}$$

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.

➡ Connect the input to **GND** to trigger the function.



24 V logic (HTL):
Low level $\leq 3 \text{ V}$;
High level $\geq 8 \text{ V}$ (max 30 V)

5 V logic (TTL):
Low level $\leq 0.8 \text{ V}$;
High level $\geq 2 \text{ V}$

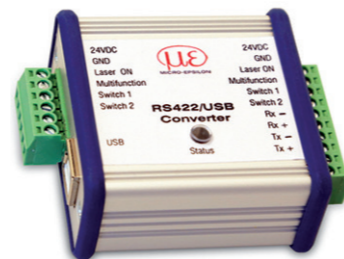
internal pull-up resistor, an open input is detected as High.

RS422 Connection with USB Converter IF2001/USB

Cross the lines for connections between sensor and PC.

i Disconnect or connect the D-sub connection between RS422 and USB converter when the sensor is disconnected from power supply only.

Sensor		End device (converter)
17-pin female cable connector	Sensor cable	Type IF2001/USB from MICRO-EPSILON
Tx + (Pin 8)	Grey	Rx + (Pin 3)
Tx - (Pin 15)	Pink	Rx - (Pin 4)
Rx + (Pin 9)	Green	Tx + (Pin 1)
Rx - (Pin 16)	Yellow	Tx - (Pin 2)
GND (Pin 14)	Blue	GND (Pin 9)

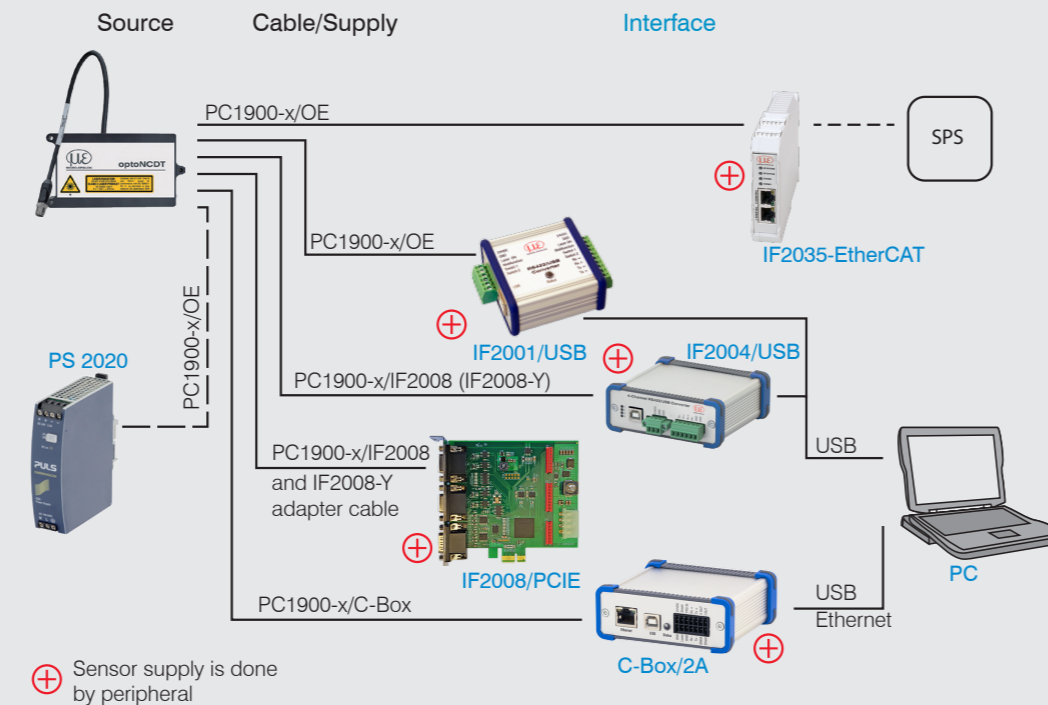


Symmetric differential signals acc. to EIA-422, not electrically isolated from supply voltage. Use a shielded cable with twisted cores e.g. PC1900-x/OE.

Quick Guide

Components

➡ Mount the sensor and connect the components.

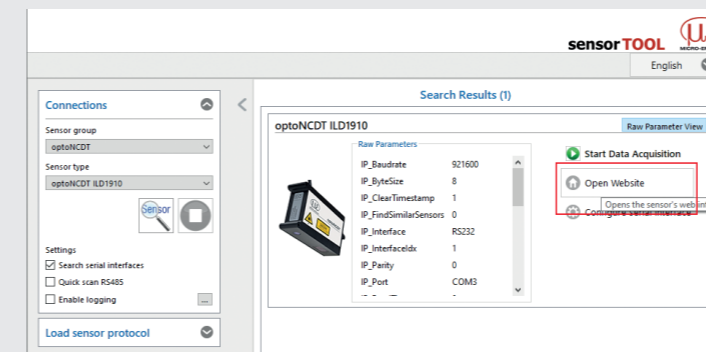


⊕ Sensor supply is done by peripheral

Commissioning

- ➡ Connect the sensor to a PC/notebook via a RS422 connector. Connect the supply voltage.
- ➡ Start the program `sensorTOOL`
- ➡ Click the `Sensor` button

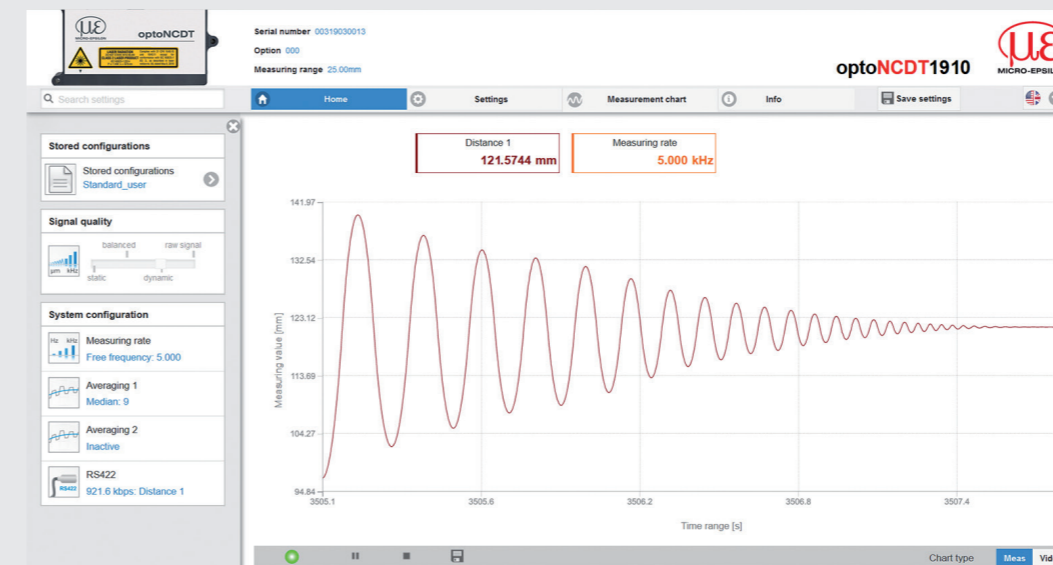
The program searches for connected ILD1910 sensors on available interfaces.



➡ 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 `Chart` type.



In the top navigation bar other auxiliary functions (settings, measurement chart etc.) are available. The appearance of the websites can change dependent of the functions. Each page contains descriptions of parameters and so tips for filling the website.

Select a Measuring Rate

- ➡ Go to the menu `Settings > Data recording > Measuring rate`.
- Start with a medium measuring rate. Select a measuring rate from the list.

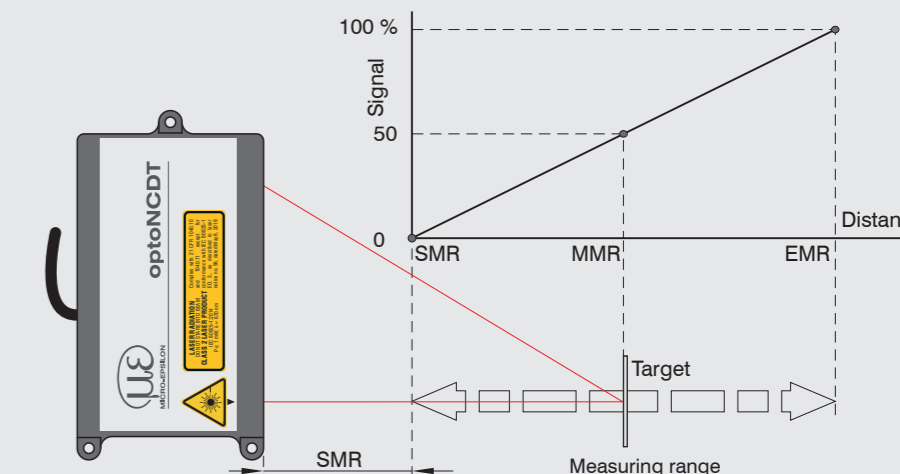
Select an Interface

- ➡ Go to the menu `Settings > Output > Output interface`.

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

Place target

- ➡ Position the target (measurement object) as much as possible in the midrange.



The State LED on the sensor indicates the position of the target to the sensor.

LED	Color	Labeling	Meaning
	○	off	Laser off Laser beam is switched off
State	●	green	In range Target within measuring range
	●	yellow	Midrange Target within the midrange
	●	red	Error Target outside the measuring range, too low reflection

Store the Settings

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

Read the detailed instruction manual before using the sensor. The manual is available online on www.micro-epsilon.com/download/manuals/man--optoNCDT-1900--en.pdf