

## 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.

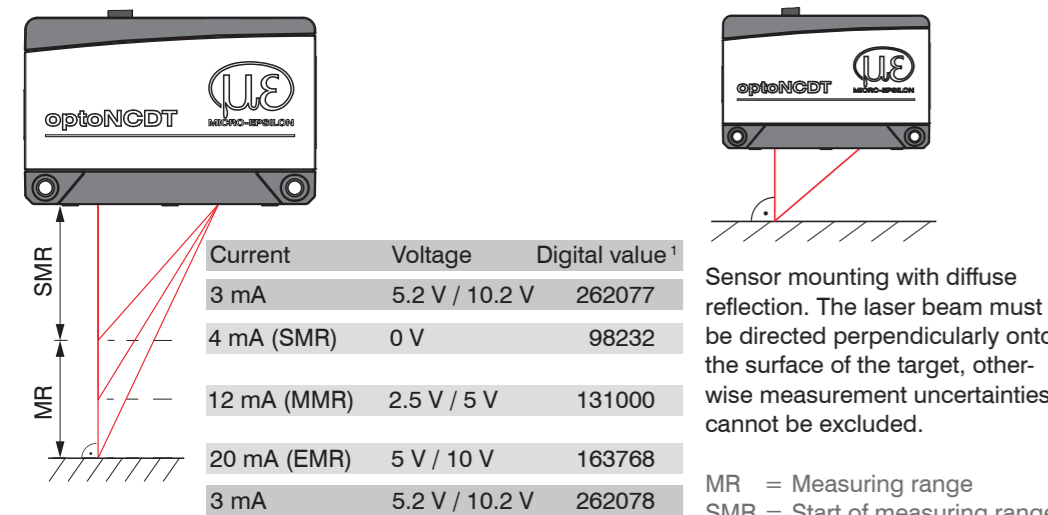
- Temperature range
  - Operation: 0 ... +50 °C (+32 ... +122 °F)
  - Storage: -20 ... +70 °C (-4 ... +158 °F)
- Humidity: 5 - 95 % (non-condensing)
- Ambient pressure: Atmospheric pressure

## Sensor Mounting, Dimensions

The optoNCDT 1900LL 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.
- ➡ 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



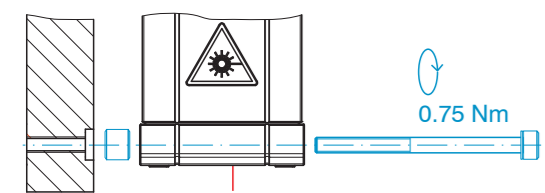
Sensor mounting with diffuse reflection. The laser beam must be directed perpendicularly onto the surface of the target, otherwise measurement uncertainties cannot be excluded.

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

1) For displacement values without zero setting or mastering.

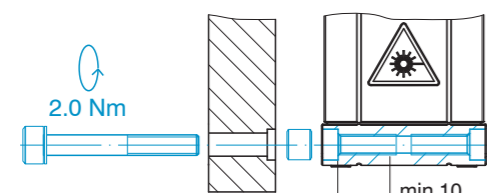
## Mounting

### Bolt connection



M3 x 40; ISO 4762, A2-70

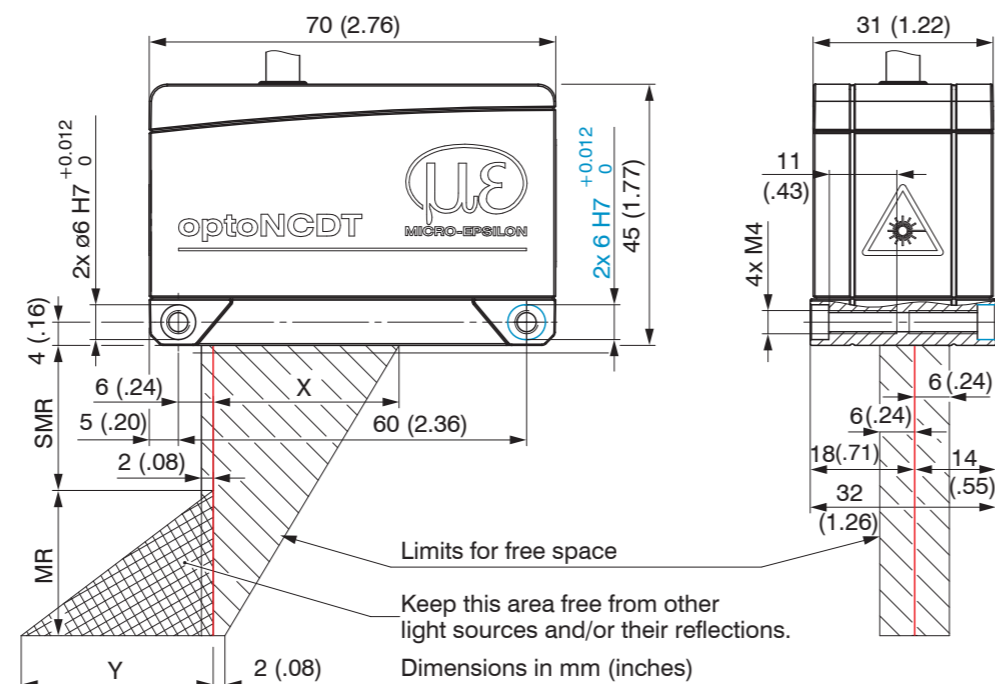
### Direct fastening



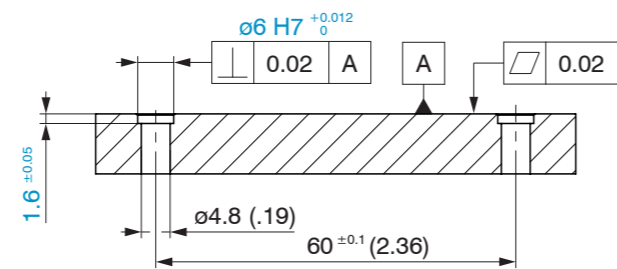
M4; ISO 4762, A2-70  
screw depth min. 10 mm

## Drawings, Free Space

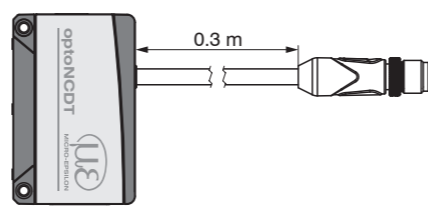
Mount the sensor only to the existing holes on a flat surface or screw it directly. Do not exceed torques.



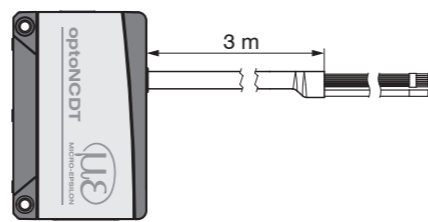
MR	10	25
SMR	20	25
X	33	33
Y	14	33



Dimensional drawing, drilling pattern, mounting plate  
Alignment via centering elements (optional)



ILD1900LL with pigtail



ILD1900LL with open ends

## Pin Assignment

Signal	Pin	Cable color PC1900-x	Description
+U <sub>B</sub>	5	Red	Supply voltage (11 ... 30 VDC)
GND	14	Blue	System ground supply, switch signals (Laser on/off, Zero, Limits) Current 4 ... 20 mA ( $R_B < (U_B - 6 V) / 20 \text{ mA}$ )
Analog output	1	Coaxial inner conductor, white	Voltage 0 ... 5 VDC Voltage 0 ... 10 VDC ( $R_i = 50 \text{ Ohm}$ , $I_{\text{max}} = 5 \text{ mA}$ )
AGND	2	Screening, black	Reference potential for analog output
Laser on/off	3	Black	Switching input, Laser operates when pin 3 is connected to GND
Multifunction input	13	Violet	Switching input, TrigIn, Zero/Master, TeachIn, Slaveln
Error/Limit 1	10	Brown	Switching output 1
Limit 2	11	White	Switching output 2 Programmable switching behavior: (NPN, PNP, push-pull)
Sync +	17	Gray-pink	Symmetrical synchronous output (Master) or input (Slave). RS422 level, 120 Ohm switchable for terminating, selectable input or output depending on synchronization mode
Sync -	12	Red-blue	
Tx +	8	Gray	RS422 - Output (symmetric) terminate receiver with 120 Ohm
Tx -	15	Pink	
Rx +	9	Green	RS422 - Input (symmetric) internally terminated with 120 Ohm
Rx -	16	Yellow	

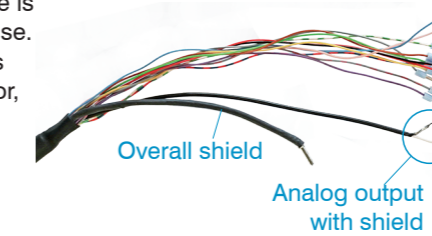
The PC1900 sensor cable is qualified for drag chain use. One end of the cable has a molded cable connector, the other end has braids with ferrules.

17-pin plug-in connector, M12, pin side of pigtail cable connector

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

11 ... 30 VDC	Sensor Pin	PC1900-x/Y Color	Supply
	5	red	+U <sub>B</sub>
	14	blue	Ground

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



PC1900-x with open ends



## Intended Use

The optoNCDT 1900LL 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, Chap. 3.3. 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, 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 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 sensor and controller. Avoid exposure of sensor and controller to aggressive media (detergents, cooling emulsions).  
> Damage to or destruction of the sensor.

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

## Laser Safety

The ILD1900LL sensors operate 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  $\leq 1 \text{ mW}$ . Operation of the laser is indicated visually by LED state.



Laser warning sign on the sensor housing

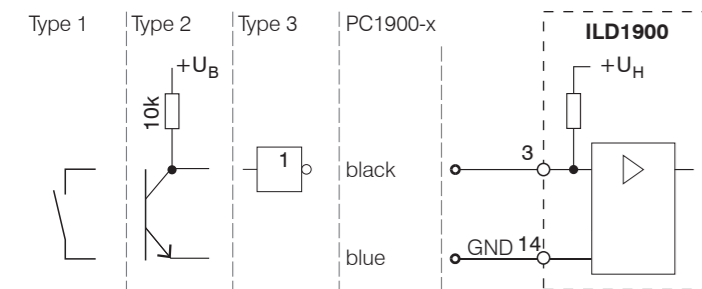


Laser label on the sensor cable

## CAUTION

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

## Switch on the Laser

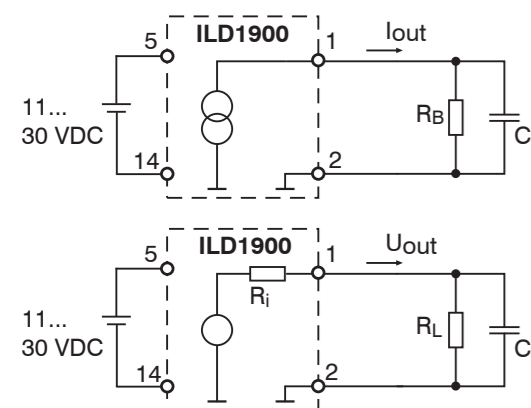


The laser remains off as long as pin 3 is not electrically connected with pin 14.

## Analog Output

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

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  
 $R_B < (U_B - 6 V) / 20 \text{ mA}$ ;  
 $R_B \text{ max.} = 250 \text{ Ohm}$   
at  $U_B = 11 \text{ V}$   
 $C_1 \leq 33 \text{ nF}$

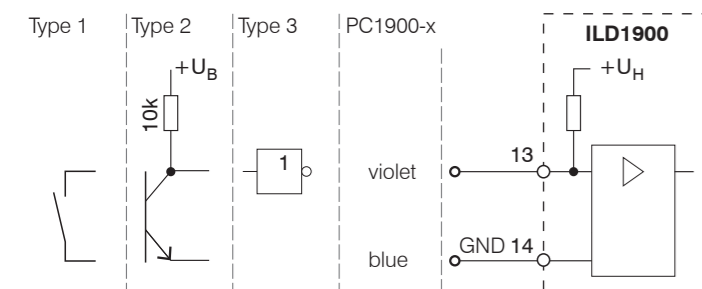
Analog output  
Pin 1,  
coaxial inner conductor, white  
  
AGND Pin 2,  
screening

Voltage output  
 $R_i = 50 \text{ Ohm}$ ,  $I_{\text{max}} = 5 \text{ mA}$ ,  
Short circuit protection 7 mA  
 $R_L > 20 \text{ MOhm}$   
 $C_U \leq 100 \text{ nF}$

## 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.



24 V logic (HTL):  
Low  $\leq 3 \text{ V}$ ; High  $\geq 8 \text{ V}$   
(max 30 V)  
5 V logic (TTL):  
Low  $\leq 0.8 \text{ V}$ ; High  $\geq 2 \text{ V}$   
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

Cross the lines for connections between sensor and PC.

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 cable connector	Sensor cable	Type IF2001/USB from MICRO-EPSILON
Tx + (Pin 8)	Gray	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)	Black	GND (Pin 9)

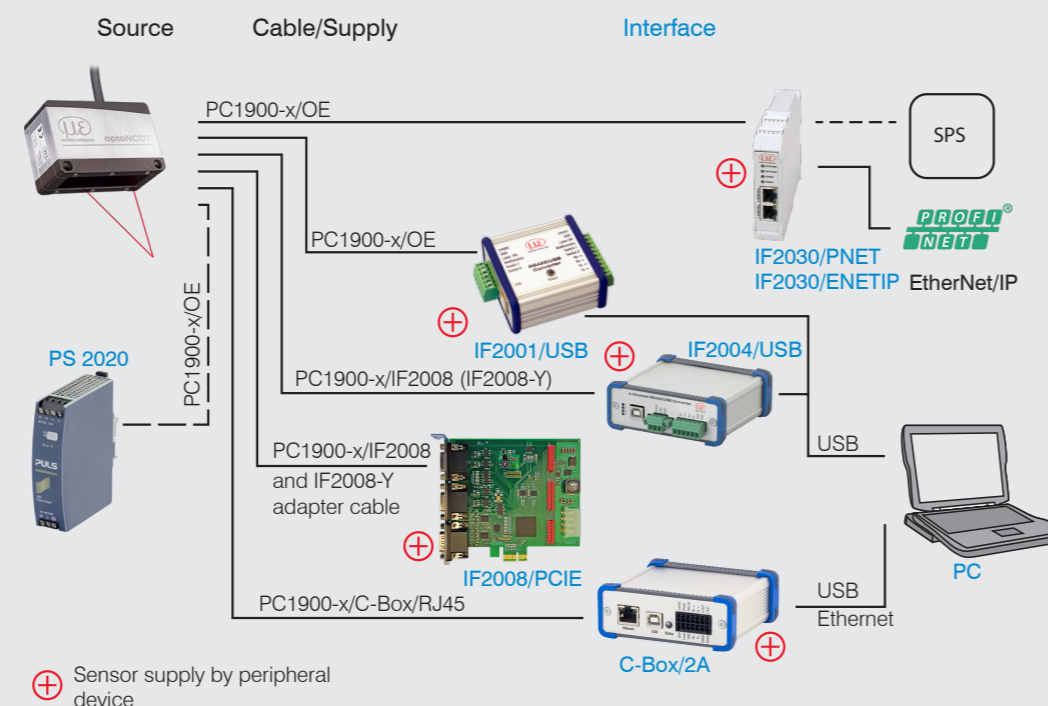


Symmetric differential signals acc. to EIA-422, not electrically isolated from supply voltage. Use a shielded cable with twisted cores e.g. PC1900-x.

## Quick Guide

### Components

➡ Mount the sensor and connect the components.

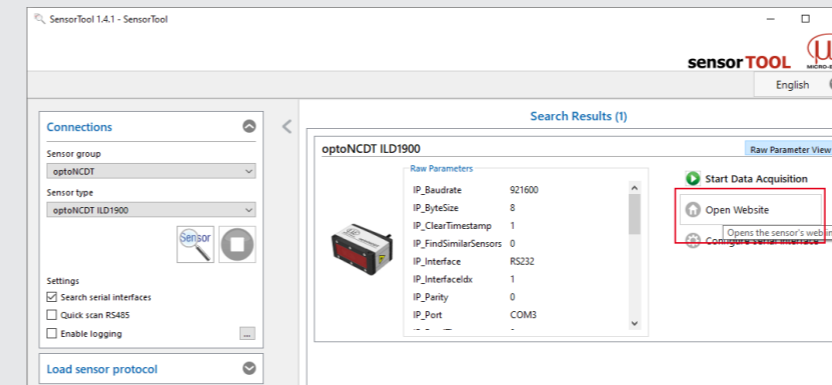


⊕ Sensor supply by peripheral device

## Initial Operation

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

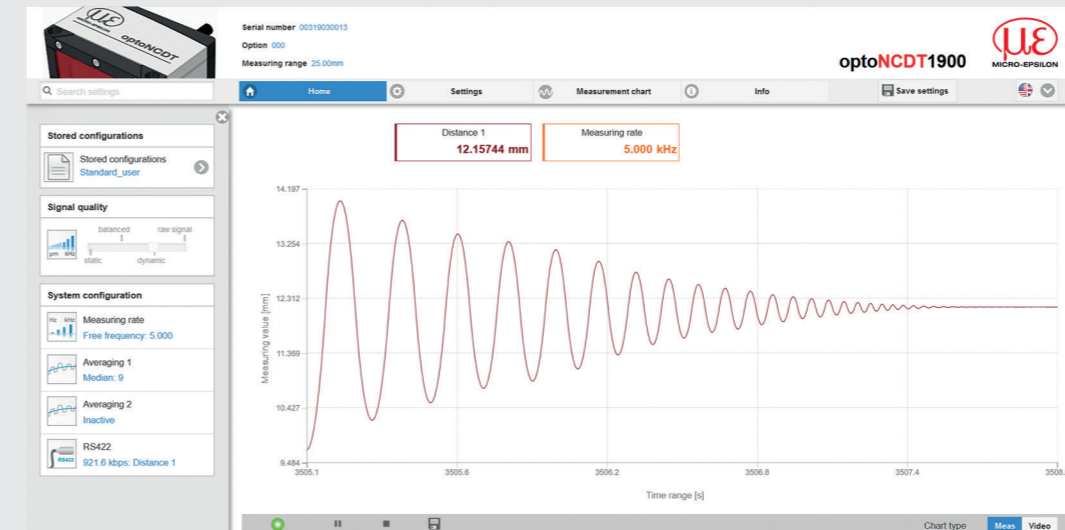
The program searches for connected ILD1900LL sensors on available interfaces.



➡ 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 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 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. Confirm with Apply.

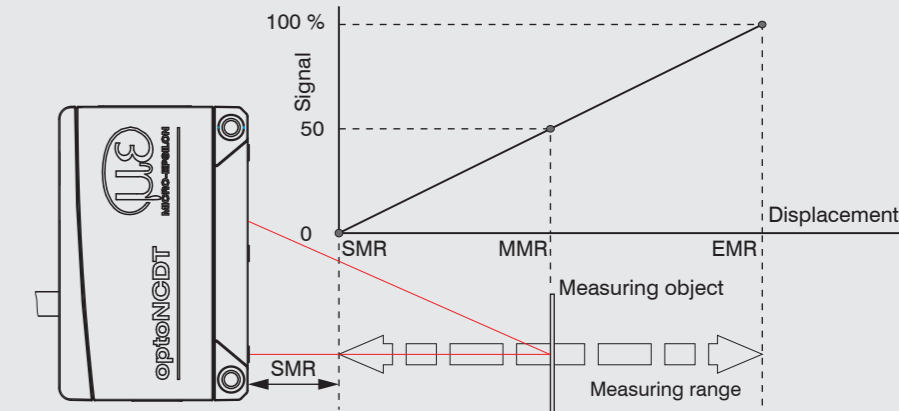
## Select an Interface

➡ 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 and analog output cannot be operated simultaneously. While using the web interface, the output is switched off via RS422.

## 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.

LED	Color	Labeling	Meaning
State	off	Laser off	Laser beam is switched off
	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 operating instructions before using the sensor. The manual is available online on [www.micro-epsilon.de/download/manuals/man--optoNCDT-1900--en.pdf](http://www.micro-epsilon.de/download/manuals/man--optoNCDT-1900--en.pdf).