

Proper Environment

- Protection class: IP65 (applies only when sensor cable is plugged in)

Lenses are excluded from the protection class. Contamination of the lenses causes impairment or failure of the function.

- Temperature range
- Humidity: 5 - 95 % (non-condensing)
- Operation: -10 ... +50 °C
- Ambient pressure: Atmospheric pressure
- Storage: -20 ... +70 °C

Sensor Fastening, Dimensional Drawings

The optoNCDT ILR2250 sensors are optical sensors that operate with millimeter accuracy.

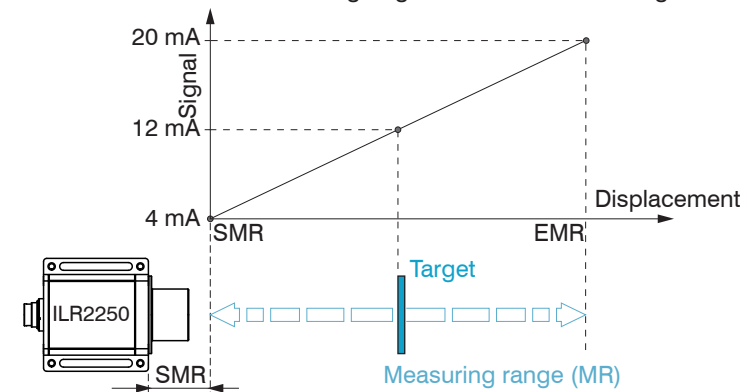
i Ensure careful handling during installation and operation

➡ Only attach the sensor on a flat surface using the holes provided. Any type of clamping is not permitted.

➡ Mount the sensor on the sensor base plate using four M4 screws.

Term Definitions, Analog Output Displacement

For ILR2250 sensors, the start of the measuring range is placed in front of the sensor. The point of reference is the front housing edge on the sensor housing.



i Position the sensor so that the connections and display elements are not concealed. We recommend maintaining a clearance of 2 - 3 cm at the cooling ribs on the left and right sides.

- SMR Start of measuring range, minimum distance between sensor and target
- EMR End of measuring range (start of measuring range + measuring range), maximum distance between sensor and target
- MR Measuring range

Fastening

Bolt length	Screwing depth	Screw	Torque
5 mm	min 10 mm	M4 ISO 4762-A2, 4 pc.	1.7 Nm for strength class 70 2.3 Nm for strength class 80

Conditions for a bolt connection ¹

¹) Recommendation: Test under use conditions!

Sensor Installation

i Only attach the sensor on a flat surface using the holes provided. Any type of clamping is not permitted.

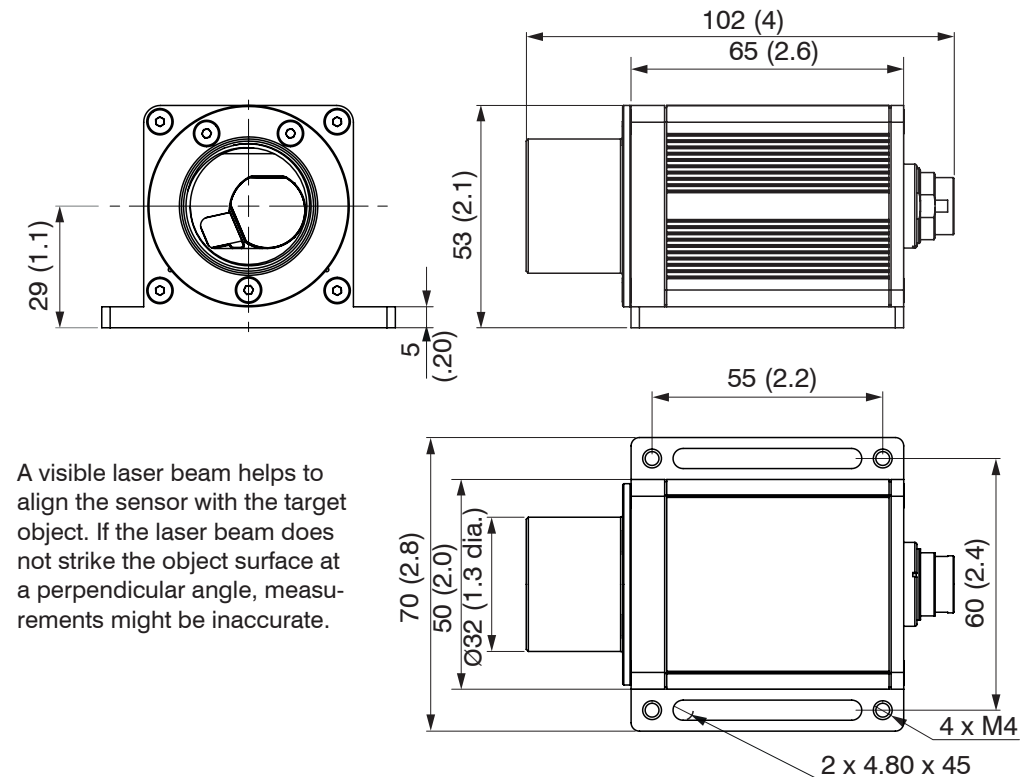


Fig. 2 Dimensional drawing optoNCDT ILR2250-100, dimensions in mm

Additionally, 4 grub screws can be used to adjust the sensor.

Reflector Installation

The sensor measures the distance to moving and stationary objects:

- In the range of 0.05 m ... 100 m for diffuse reflecting surfaces
- Between 35 and 150 m onto reflectors (e.g. ILR-RF210, Scotchlight by 3M etc.)

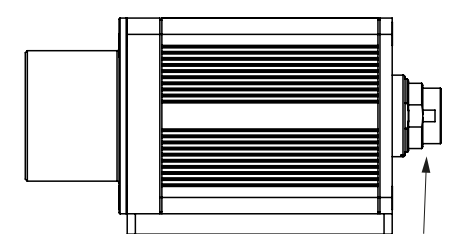
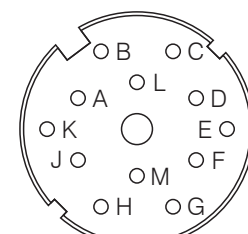
The measurement laser can be used for alignment. When aligning the sensor, proceed as follows:

- ➡** Position the sensor at the furthest possible point from the reflector (for example < 1 m).
- The visible point of light of the measurement laser should be in the center of the reflector.
- ➡** Position the sensor at the furthest possible point from the reflector.
- ➡** Check that the measurement laser is pointing at the center of the reflector and adjust if necessary.

The center of the spot must be in the center of the reflector over the entire measuring range. Target (reflector) and sensor can only be tilted by at most 5° relative to one another.

Pin Assignment

Signal	Pin	PC1100-x cable color	Explanation	Comments, circuitry
RX+	A	White	RS422 input (symmetrical)	Internally terminated with 120 Ohm
RX-	B	Brown		
TRIG	C	Green	Switching input	Trigger input, $t_{\downarrow} > 2$ ms
I_{OUT}	D	Yellow	Analog output	4 ... 20 mA
TX -	E	Gray	RS422 output (symmetrical)	Receiver terminated with 120 Ohm
TX+	F	Pink		
$+U_B$	G	Red	Supply voltage	10 ... 30 VDC, typ. 24 VDC
OUT1	H	Black	Switching output 1	Switching behavior programmable: NPN, PNP, push-pull, push-pull negated $I_{max} = 50$ mA Protected against polarity, overload and excessive temperature
OUT2	K	Gray/pink	Switching output 2	
OUT3	M	Blue	Switching output 3	
GND	L	Red/blue	Supply ground	Reference potential for switching outputs as well
GND	J	Purple	Signal ground	Reference potential for analog output



The ground lines are connected internally and are the reference potential for all voltage values given below. All outputs are designed to be permanently resistant to short circuits.

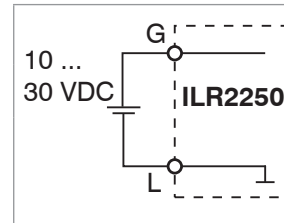
Solder side 12-pin cable socket Power supply and signal socket M16x0,75; 12-pin.

The optionally available PC11xx and PC1100/90-x supply/output cables can be used with drag chains and have the following bend radii: 47 mm (once) 116 mm (permanent)

NOTICE

Make sure that cable ends are not exposed. This could cause short circuits. Connecting input signals to outputs can damage the sensor!

Supply Voltage, Nominal value: 24 V DC (10 ... 30 V, P < 5.5 W)



Sensor Pin	PC1100-x cable color	Comments
G	Red	U_B
L	Red/blue	Supply ground

➡ Only turn on the power supply after wiring has been completed.

MICRO-EPSILON recommends using the optionally available PS2020 power supply.



Assembly Instructions optoNCDT ILR2250

Intended Use

The optoNCDT ILR2250 is designed for use in industrial and laboratory applications. It is used for distance, displacement and position measurement, monitoring quality and checking dimensions. The system must only be operated within the limits specified in the technical data, see operating Instructions, Chap. 3.4.

The system 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 system. Take additional precautions for safety and damage prevention in case of safety-related applications.

Warnings

Connect the power supply according to the safety regulations for electrical equipment.
> Risk of injury, damage to or destruction of the sensor

The supply voltage must not exceed the specified limits. Install the sensor on a flat surface using the mounting holes/threaded holes provided, any type of clamping is permitted.

Avoid shocks and impacts to the sensor, protect the sensor cable against damage. Do not touch the lenses or protective windows. Remove any fingerprints immediately using pure alcohol and a clean cotton cloth without leaving any streaks. Do not operate the sensor if optical components are steamed up or dirty.

> Damage to or destruction of the sensor, failure of the measuring device

Laser Safety

The optoNCDT ILR2250 works with a semiconductor laser with a wavelength of 655 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. Operation of the laser is indicated visually by the State LED on the sensor.



Fig. 1 Laser warning sign and laser label, optoNCDT ILR2250-100, IEC



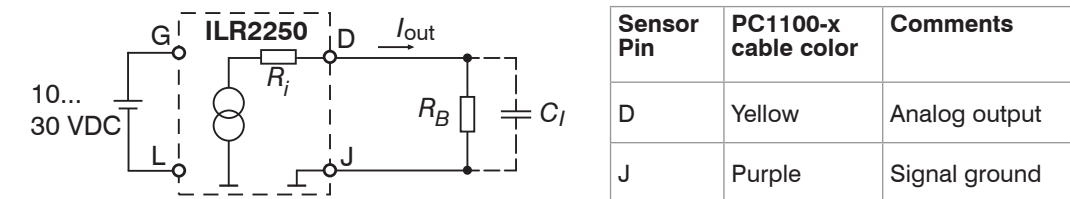
Laser radiation. Close your eyes or immediately turn away if the laser beam hits the eye. Irritation or injury of the eyes possible.

Analog Output

The sensor produces a current output of 4 ... 20 mA.

The output may not be used continuously in short-circuit operation without a load resistor. Continuous short-circuit operation leads to thermal overloading and thus causes the output to switch off automatically.

The current impressed in the line is proportional to the measured distance.

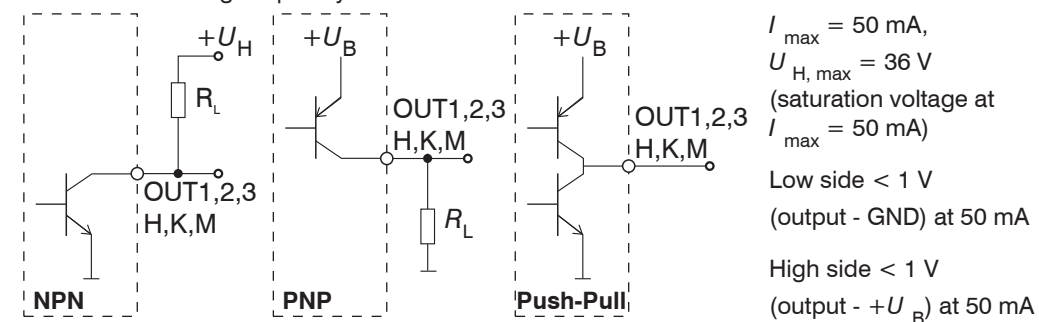


Analog output properties

- 4 ... 20 mA	Load $R_B < U_B - 1\text{ V} / 20\text{ mA}$
- Behavior when error reported: 3 mA	@10 V: $R_B < 450\text{ Ohm}$
- Resistant to short circuits	@24 V: $R_B < 1150\text{ Ohm}$
- Distance range limits adjustable	@30 V: $R_B < 1450\text{ Ohm}$
- Resolution: 16 bit DA converter	- R_i 30 Ohm

Switching Output, HT Logic

The switching behavior (NPN, PNP, push-pull, push-pull negated) of the switching output depends on the programming. The outputs are resistant to short circuits, are not electrically separated, the maximum switching frequency is 10 kHz.



Switching behavior	Output active (error)	Output passive (no error)
NPN (Low side)	GND	Approx. $+U_H$
PNP (High side)	$+U_B$	Approx. GND
Push-pull	$+U_B$	GND
Push-pull, negated	GND	$+U_B$

RS422 Connection with USB Converter IF2001/USB

For the connection between sensor and PC, the lines must be crossed.

Only disconnect or connect the sub-D connection between the RS422 and USB converter when no voltage is flowing.

Sensor		Terminal, PLC, IF2001/USB converter from MICRO-EPSILON	
Pin	Cable color (cable: PC1100-x)	Function	Function
A	White	Rx+	Tx+
B	Brown	Rx-	Tx-
E	Gray	Tx-	Rx-
F	Pink	Tx+	Rx+
J	Purple	GND	GND

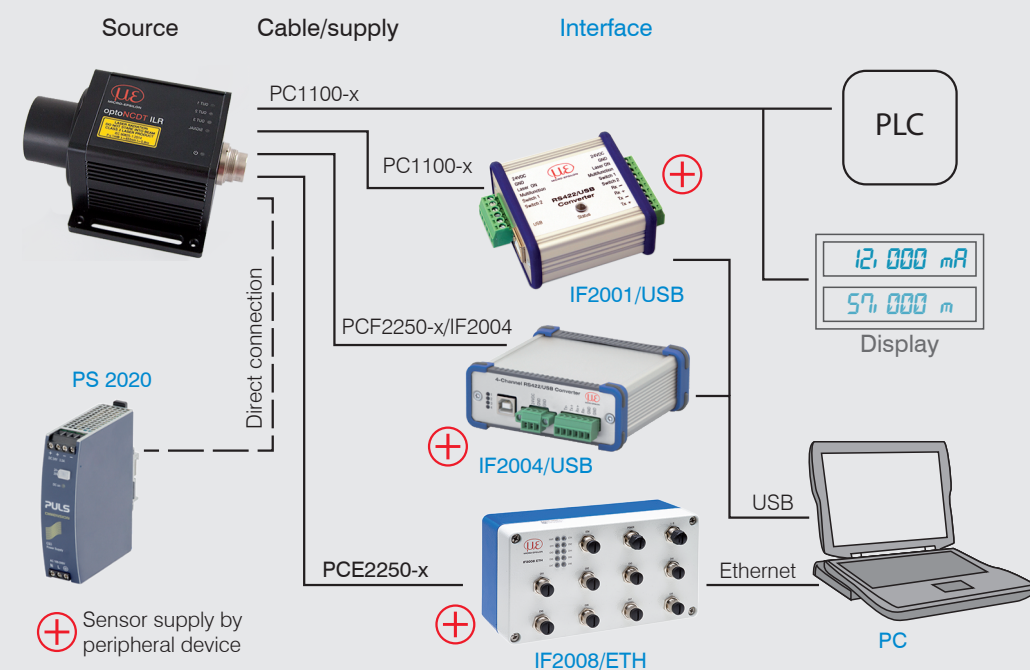


Symmetrical differential signals according to EIA-422, not electrically separated from the voltage supply. Use a shielded cable with twisted wires, e. g. PC1100-x. The RS422 interface can be used for configuration as well as for permanent data transmission, even over longer distances.

Quick Guide

Structure of the Components

Mount the sensor and connect the components.



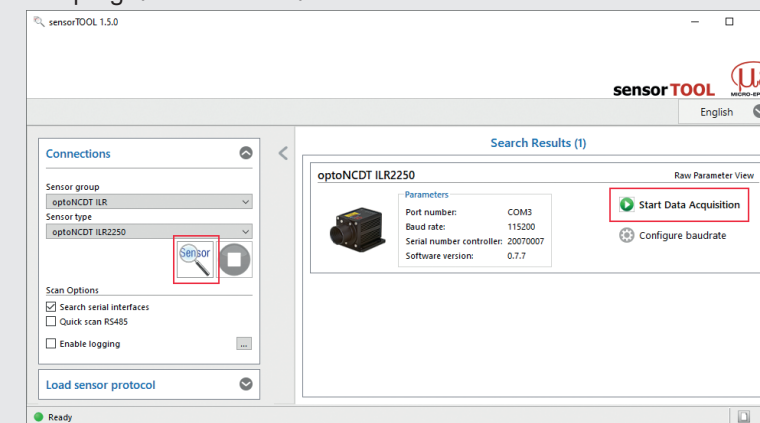
Initial Operation

The measurement laser starts when the supply voltage is applied if an active measurement (see LASER MEASURE ON) has previously been saved in the sensor.

The sensor is ready to use after approx. 2 s, digital accuracy is immediate. The sensor typically requires a warm-up time of 5 min for reproducible measurements via the analog output.

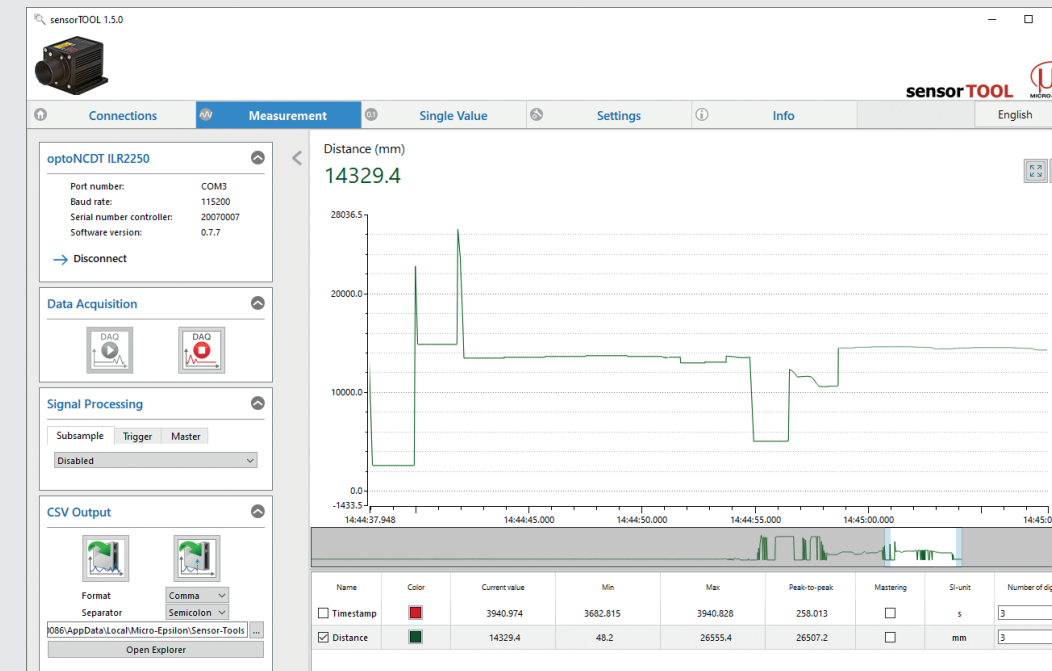
- Connect the sensor to a PC/notebook via an RS422 converter and connect the power supply.
- Launch the sensorTOOL program.
- Click on the Sensor button.

The program will now search for connected ILR2250 sensors on the available interfaces.



The sensorTOOL program also finds connected sensors via a network. You can find this program online at <https://www.micro-epsilon.de/download/software/sensorTOOL.exe>.

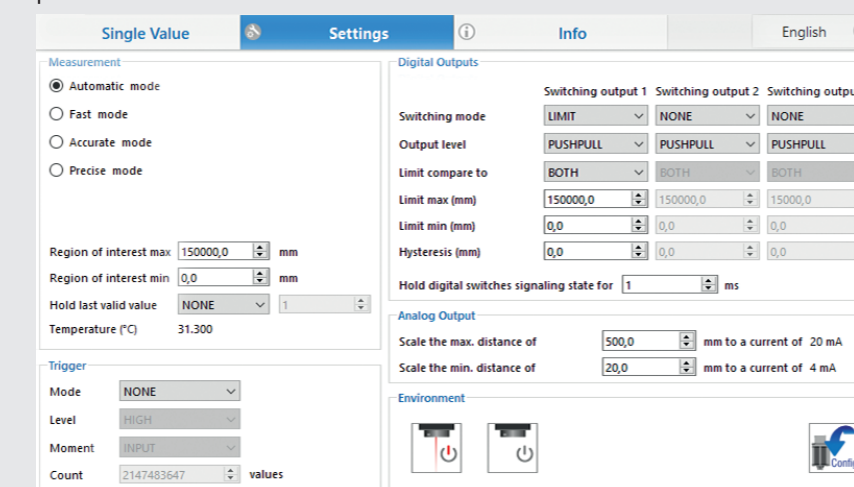
Select a desired sensor. Click the Start Data Acquisition button.



Presets, Analog Output, Switching Outputs

Switch to the Settings menu.

By selecting a measurement mode in the Data Acquisition section, you can switch between the saved configurations (presets) for various target surfaces and target movement speeds. This will produce the best results for the material selected.



Display Elements, LED

LED	Function	Display	Status
Out 1	Switching output 1	Off	Switching output inactive
Out 2	...		
Out 3	Switching output 3	White	Switching output active
Signal	Reflection strength	Green	Signal very good
		Yellow	Signal satisfactory
		Red	Weak signal/error
Power	Operational readiness	Off	No supply voltage
		Green	Ready to use
		Yellow	Warm-up phase ¹

LEDs Out 1 - 3



1) For sensors with optional heating.

Save the Settings

Go to the Settings > Environment menu and click on the Config button.



After programming, save all settings permanently so that they will be available again the next time you switch on the sensor.

Read the detailed operating instructions before using the sensor. The manual is available online on: www.micro-epsilon.de/download/manuals/man--optoNCDT-ILR-2250--en.pdf