

## Sensor Fastening

The optoNCDT ILR2250-100-IO sensors are optical sensors that operate with millimeter accuracy.

- Ensure careful handling during installation and operation.

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

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

## Term Definitions, Switching Output

For optoNCDT ILR2250-100-IO 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.

The switching outputs

- can be used independently of one another to monitor limit values.
- are activated depending on the output level set (switching behavior) and the range check.
- are activated if the target is outside the range limits (upper/lower limit).

A lower and an upper limit value (in mm) need to be entered in order for the range limits to be monitored.

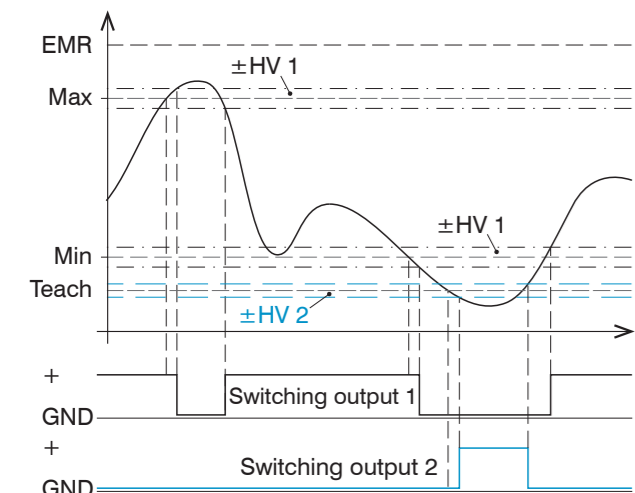


Fig. 4 Switching output 1 with range limits (NPN), switching output 2 with measuring range error (PNP)

If you want to monitor whether the target leaves the region of interest (min and max), you can do this using the Limit function. You will need to set the values for the upper and lower limit to the min and max values; the hysteresis value is not taken into account.

## Sensor Installation

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

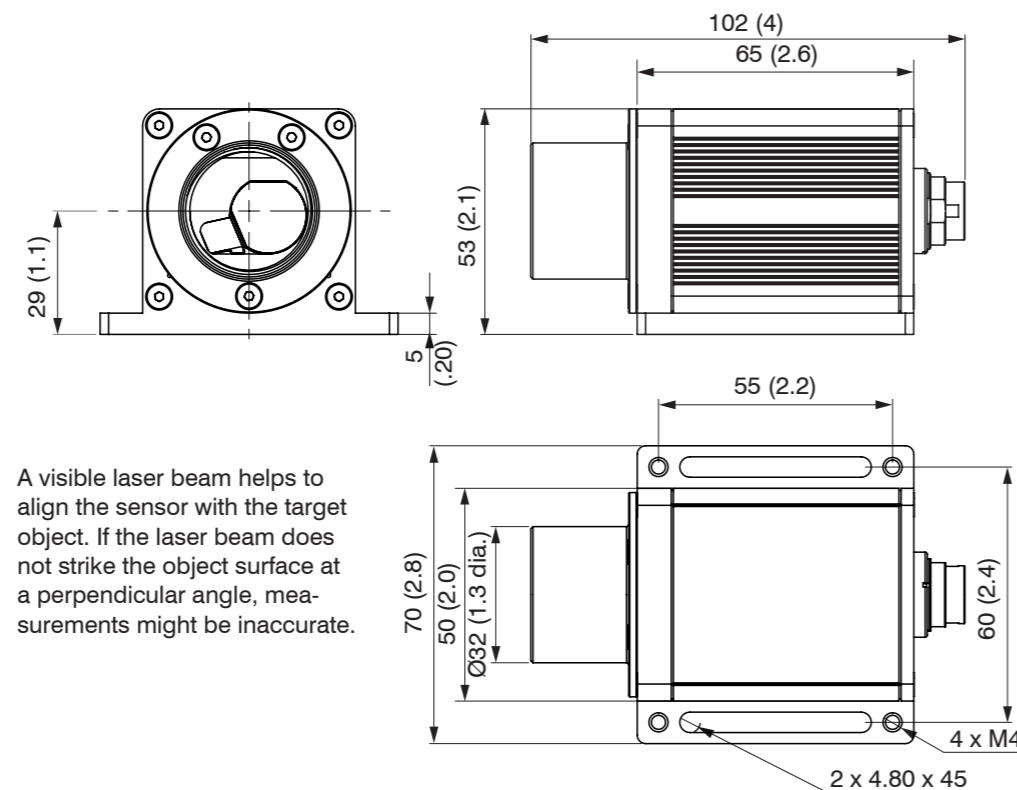


Fig. 5 Dimensional drawing optoNCDT ILR2250-100-IO, dimensions in mm

Additionally, 4 set 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 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.

## Fastening

Bolt connection <sup>1</sup>				
Bolt length	Screwing depth	Number	Screw	Torque
5 mm	min 10 mm	4	M4 ISO 4762-A2,	1.7 Nm for strength class 70 2.3 Nm for strength class 80

1) Recommendation: Test under use conditions!

## Laser Spot Diameter, Min. Target Size

The laser spot diameter increases with increasing distance (displacement). Keep this in mind for the selection/size of the measuring object.

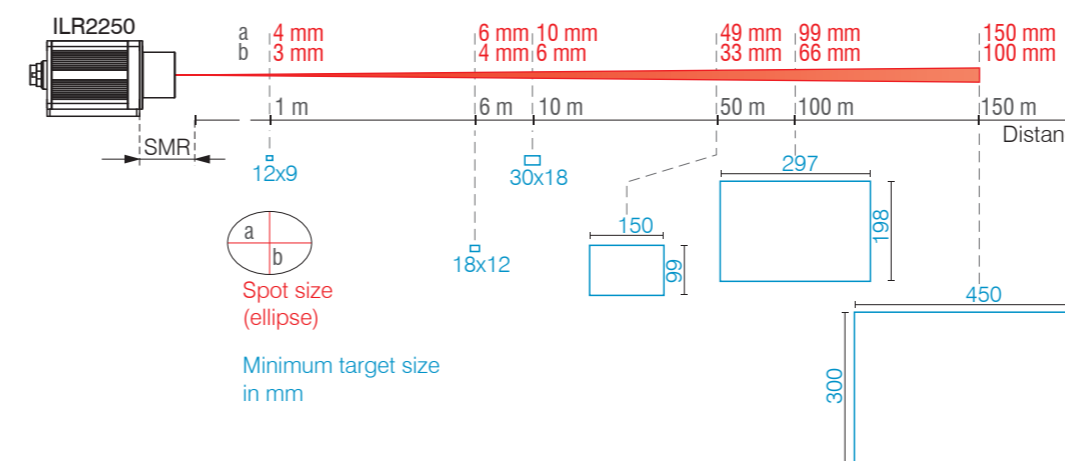


Fig. 3 Laser spot dimensions and size of measuring object depending on the distance

The measuring object must have at least three times the size of the laser spot.

## 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:
  - Operation: -10 ... +50 °C (+14 ... +122 °F)
  - Storage: -20 ... +70 °C (-4 ... +158 °F)
- Humidity: 5 ... 95 % RH (non-condensing)
- Ambient pressure: Atmospheric pressure

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X9771422.01-A032014HDR



## Assembly Instructions optoNCDT ILR2250-100-IO

## Intended Use

The optoNCDT ILR2250-100-IO 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 ILR2250-100-IO 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 Signal LED on the sensor. The warning sign below, see Fig. 1, is attached to the sensor housing (front side):



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




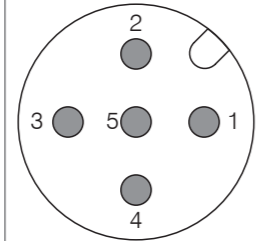
Fig. 2 Laser warning sign and laser label, optoNCDT ILR2250-100-IO, for Germany

The German laser information sign, see Fig. 2, is enclosed, along with an additional international laser information sign.



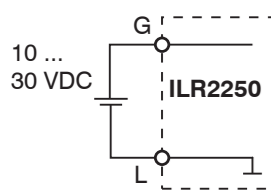
Laser radiation. Irritation or injury of the eyes possible. Close your eyes or immediately turn away if the laser beam hits the eye.

## Pin Assignment

Signal Sensor	PC2250-0,3 IO-Link Adapter		Explanation	PC2250-x IO-Link	
	Pin	Wire color		Pin	Wire color
NC	A				
NC	B				
NC	C				
NC	D				
NC	E				
NC	F				
+U <sub>B</sub>	G	Brown	Supply voltage 10 ... 30 VDC, typ. 24 VDC	1	Brown
C/Q	H	Black	Standard input/output	4	Black
NC	K				
NC	M				
GND	L	Blue	Supply ground	3	Blue
NC	J				
	 View: Solder side 12-pin M16 cable socket			 View: Solder side 5-pin M12 cable socket	

**Supply Voltage**, Nominal value: 24 V DC (10 ... 30 V,  $P < 4 \text{ W}$ )

The ILR2250-100-IO sensor is supplied by the IO-Link master.

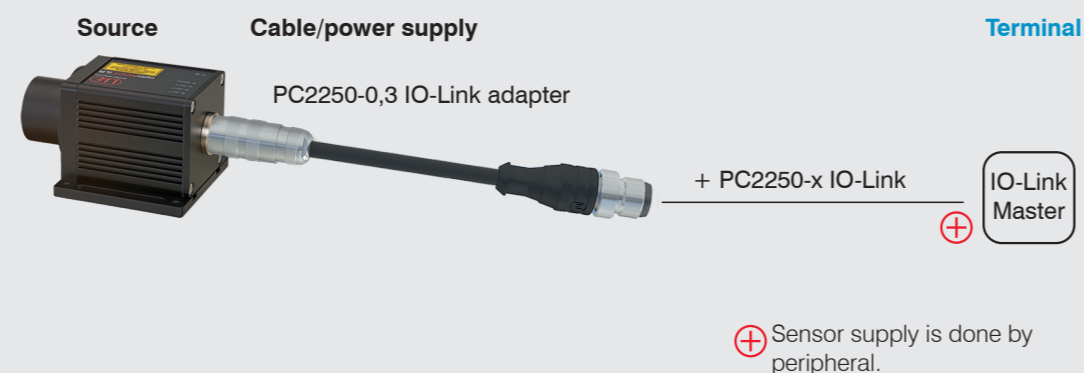
 10 ... 30 VDC	Sensor	PC2250-0,3 IO-Link adapter		PC2250-x IO-Link		Description
	Pin	Pin, 12-poles	Pin, 5-poles	Pin	Wire color	
	G	G	1	1	Brown	U <sub>B</sub>
	L	L	3	3	Blue	Supply ground

**i** Use the power only for measuring devices; do not use it at the same time for drives or similar sources of impulse interference.

## Quick Guide

### Structure of the Components

➤ Mount the sensor and connect the sensor to the IO-Link master.



The IO-Link master also supplies the supply voltage (24 V DC) for the sensor.

### 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.

**i** The sensor can be put in an autostart state. To do this, all desired parameters must be set and saved on the sensor. If the sensor is then switched off during an active measurement, it immediately resumes the saved measurement task once the power supply is connected again.

If the POWER LED is off, no power is being supplied.

### Operation using IO-Link

The sensor exchanges process data and parameters via IO-Link.

➤ For this purpose, connect the sensor with a suitable IO-Link master.

IO-Link specification	V 1.1
Minimum cycle time	4.0 ms (COM2)
Transmission speed	COM2 (38.4 kBaud)
Process data width	32 bit output (from device to master)
Process data type	Mixed (27 bit Integer + 3 Boolean)
Parameterization server function (data storage)	Yes

Fig. 6 IO-Link interface properties

## Process Data

The factory settings ensure that the process data telegram of the sensor receives the measured distance value. The distance value is output in tenths of a millimeter (27 bit signed integer). In addition, the logical state of the three switching outputs is transmitted by the last three bits.

Bit 0 – Bit 26	Measurement value
Bit 29	ErrorOut3 (switching output 3)
Bit 30	ErrorOut2 (switching output 2)
Bit 31	ErrorOut1 (switching output 1)

Fig. 7 Factory-set process data format

### Device Data

The device data include

- parameters,
- identification data and
- diagnosis data

This information can be transmitted to or from the sensor in parallel with the process data. For this purpose, the IO-Link master requires a sensor-specific device description file (IODD).

The current device description file is available at:

[www.micro-epsilon.com/displacement-position-sensors/laser-distance-sensor/optoNCDT-ILR-2250/](http://www.micro-epsilon.com/displacement-position-sensors/laser-distance-sensor/optoNCDT-ILR-2250/).

## Display Elements, LED

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



The Signal LED indicates the reflection strength of a measurement. This LED generally lights up when a measurement is started.

### Unpacking, Included in Delivery

- 1 Sensor ILR2250-100-IO
- 1 PC2250-0,3 IO-Link adapter cable<sup>3</sup>
- 1 Assembly Instructions
- 1 German laser information sign)
- 1 IEC laser information sign)
- 1 Mounting set consisting of:
  - 2x Cylinder head bolt, hexagon socket M4 x 12
  - 2x Spring washer M4
  - 4x Hexagon socket set screw M4 x 6

- 1) Reduced measurement accuracy and measurement frequency possible.
- 2) For sensors with optional heating function.
- 3) The optional PC2250-x-IO-Link supply/connection cable can be found in the Optional Accessories appendix of the operating instructions.

You can find more information about the sensor in the operating instructions. They are available online at: [www.micro-epsilon.de/download/manuals/man--optoNCDT-ILT-22xx--en.pdf](http://www.micro-epsilon.de/download/manuals/man--optoNCDT-ILT-22xx--en.pdf)