









# More Precision

**optoNCDT** // Laser displacement sensors (triangulation)



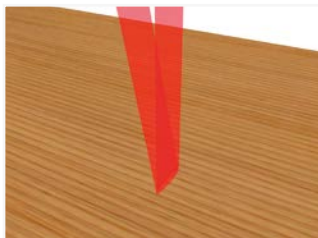
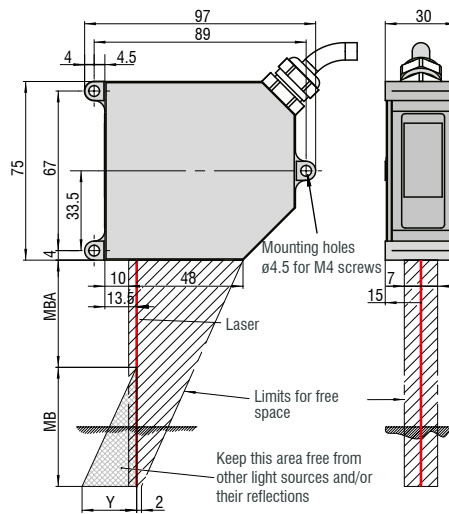


-  **Laser Line averages across shiny metallic or structured surfaces**
-  **Four models with measuring ranges from 2 mm to 50 mm**
-  **Adjustable measuring rate up to 49.14 kHz**  
312Hz, 375Hz, 1000Hz
- INTER FACE** **Ethernet / EtherCAT / RS422**  
**Analog output via C-Box**
-  **Advanced Real-Time-Surface-Compensation**
-  **Calibration certificate included**
-  **Configuration via web interface**

The optoNCDT 2300LL is ideally suitable for measurements against shiny and structured surfaces. The point-shaped laser beam is widened using a lens to form an oval point. Therefore, physically induced interferences can be easily filtered enabling measurements on shiny surfaces. Due to its extremely compact size, the sensor can easily be integrated into restricted installation space.

The "Advanced Real Time Surface Compensation" (A-RTSC), with its improved dynamic range, enables a more precise real time surface compensation during the measurement process. Data output is via Ethernet, RS422 or EtherCAT. All sensor configurations are carried out using a user-friendly web interface.

optoNCDT 2300LL



MR	SMR	Y
2	24	1.5
10	30	6.5
20	40	10.0
50	45	23.0

Model		ILD2300-2LL	ILD2300-10LL	ILD2300-20LL	ILD2300-50LL
Measuring range <sup>1)</sup>		2 (2) mm	10 (5) mm	20 (10) mm	50 (25) mm
Start of measuring range	SMR	24 (24) mm	30 (35) mm	40 (50) mm	45 (70) mm
Midrange	MMR	25 (25) mm	35 (37.5) mm	50 (55) mm	70 (82.5) mm
End of measuring range	EMR	26 (26) mm	40 (40) mm	60 (60) mm	95 (95) mm
Linearity		$\leq \pm 0.6 \mu\text{m}$	$\leq \pm 2 \mu\text{m}$	$\leq \pm 4 \mu\text{m}$	$\leq \pm 10 \mu\text{m}$
		$\leq \pm 0.03 \% \text{ FSO}$	$\leq \pm 0.02 \% \text{ FSO}$		
Resolution (with 20 kHz)		0.03 $\mu\text{m}$	0.15 $\mu\text{m}$	0.3 $\mu\text{m}$	0.8 $\mu\text{m}$
		0.0015 % FSO			
Measuring rate		switchable (software) 49.14 / 30 / 20 / 10 / 5 / 2.5 / 1.5 kHz (49.14 kHz with reduced measuring range)			
Permissible ambient light		10,000 ... 40,000 lx			
Spot diameter	SMR	85 x 240 $\mu\text{m}$	120 x 405 $\mu\text{m}$	185 x 485 $\mu\text{m}$	350 x 320 $\mu\text{m}$
	MMR	24 x 280 $\mu\text{m}$	35 x 585 $\mu\text{m}$	55 x 700 $\mu\text{m}$	70 x 960 $\mu\text{m}$
	EMR	64 x 400 $\mu\text{m}$	125 x 835 $\mu\text{m}$	195 x 1200 $\mu\text{m}$	300 x 1940 $\mu\text{m}$
Light source		laser diode (670nm) class 2			
Protection class		IP65			
Operating temperature		0 ... +50 °C			
Storage temperature		-20 ... +70 °C			
Inputs/Outputs		Ethernet/EtherCAT RS422 analog output via C-Box			
Inputs		Laser on/off Sync/Trigger input			
Supply voltage		11 ... 30 VDC			
Power consumption		< 3 W (24 V)			
LED		status / power / Ethernet / EtherCAT			
Sensor cable	standard	0.25 m (with connector)			
	option	3 / 6 / 9 m with 15-pole sub-D connector			
Synchronization		possible for simultaneous or alternating measurements			
Electromagnetic compatibility (EMC)		EN 61326-1: 2006-10 DIN EN 55011: 2007-11 (group 1, class B) EN 61 000-6-2: 2006-03			
Vibration		2 g / 20 ... 500 Hz			
Shock		15 g / 6 ms / 3 axes			

FSO = Full Scale Output; The specified data apply to a white, diffuse reflecting surface (reference: ceramics)

SMR = start of measuring range; MMR = midrange; EMR = end of measuring range

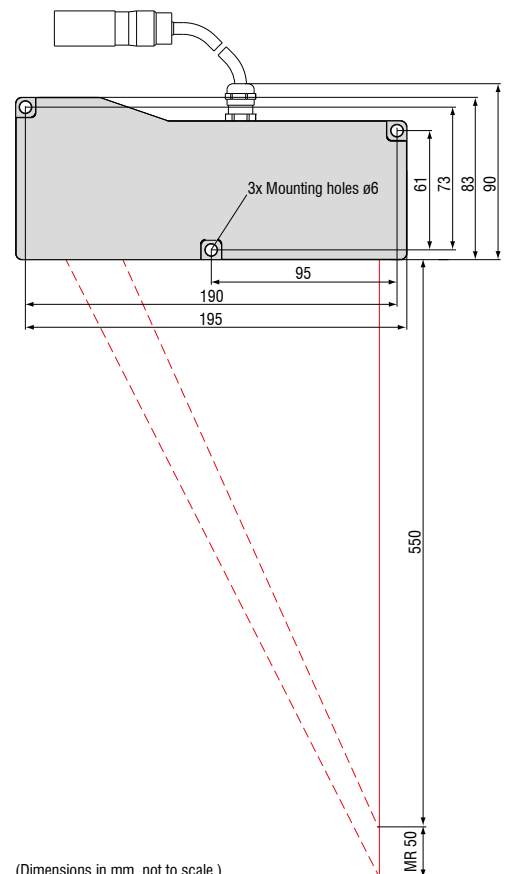
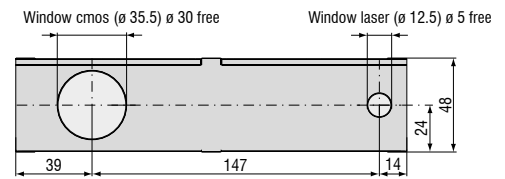
<sup>1)</sup> Range specifications: value in brackets is valid for a measuring rate of 49.14 kHz



-  **Three models with measuring ranges from 2 mm to 50 mm**
-  **Blue Laser Technology (Blue violet laser diode 405 nm)**
-  **Adjustable measuring rate up to 49.14 kHz**
- INTER FACE** **Ethernet / Ethercat / RS422**  
**Analog output via C-Box**
-  **Advanced Real-Time-Surface-Compensation**
-  **Calibration certificate included**
-  **Measurement of diffuse and specular surfaces**
-  **Configuration via web interface**

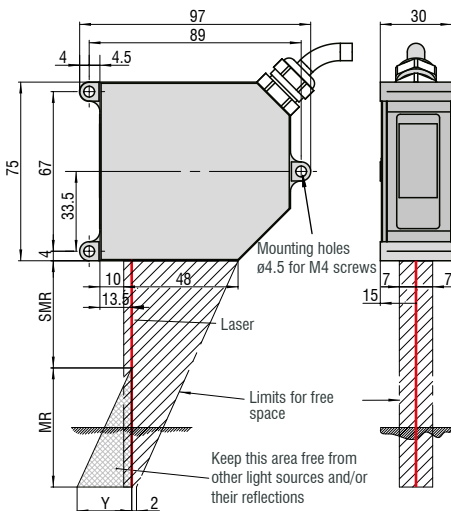
Blue Laser sensors in the optoNCDT 2300BL series are designed for high speed displacement, distance and position measurements on red-hot glowing metals and organic materials. In numerous applications, Blue Laser sensors are superior to standard sensors that use a red laser diode. In contrast to a red laser, the blue-violet laser light does not penetrate materials such as wood, skin and foods. The blue laser generates a minimal laser point on the surface and therefore offers more stable, precise measurements.

**optoNCDT 2310-50BL**



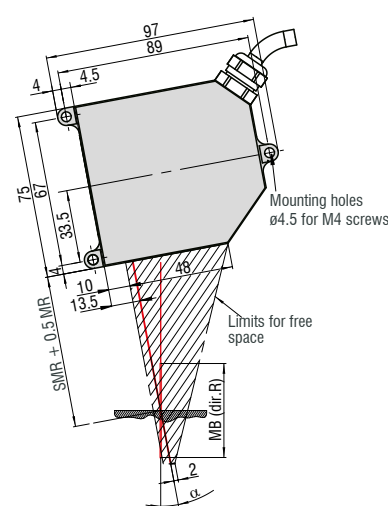
(Dimensions in mm, not to scale.)

**optoNCDT 2300-2BL / 2300-5BL**  
Diffuse reflection



MR	SMR	Y
2	24	1.5
5	24	3.5

**optoNCDT 2300-2BL / 2300-5BL**  
Direct reflection



MR	SMR + 0.5 MR	α
2	25	20.5°
5	26.5	20°

Model		ILD2300-2 BL	ILD2300-5 BL	ILD2310-50 BL
Measuring range <sup>1)</sup>		2 (2) mm	5 (2) mm	50 (25) mm
Start of measuring range	SMR	24 (24) mm	24 (24) mm	550 (575) mm
Midrange	MMR	25 (25) mm	26.5 (25) mm	575 (587.5) mm
End of measuring range	EMR	26 (26) mm	29 (26) mm	600 (600) mm
Linearity		$\leq \pm 0.6 \mu\text{m}$	$\leq \pm 1.5 \mu\text{m}$	$\leq \pm 40 \mu\text{m}$
		$\leq \pm 0.03 \% \text{ FSO}$		$\leq \pm 0.08 \% \text{ FSO}$
Resolution (with 20 kHz)		$0.03 \mu\text{m}$	$0.08 \mu\text{m}$	$7.5 \mu\text{m}$
		$0.0015 \% \text{ FSO}$		$0.015 \% \text{ FSO}$
Measuring rate		switchable (software) 49.14 / 30 / 20 / 10 / 5 / 2.5 / 1.5 kHz (49.14 kHz with reduced measuring range)		
Light source		semiconductor laser <1 mW, 405 nm (blue violet), laser class 2		
Permissible ambient light		10,000 lx		
Spot diameter	SMR	70 x 80 $\mu\text{m}$	200 x 200 $\mu\text{m}$	400 ... 500 $\mu\text{m}$
	MMR	20 x 20 $\mu\text{m}$	20 x 20 $\mu\text{m}$	400 ... 500 $\mu\text{m}$
	EMR	80 x 100 $\mu\text{m}$	200 x 400 $\mu\text{m}$	400 ... 500 $\mu\text{m}$
Protection class		IP65		
Operating temperature		0 ... +50 °C		
Storage temperature		-20 ... +70 °C		
Inputs/Outputs		Ethernet/EtherCAT RS422 analog output via C-Box		
Inputs		Laser on/off Sync/Trigger input		
Supply voltage		11 ... 30 VDC		
Power consumption		< 3 W (24 V)		
LED		status / power / Ethernet / EtherCAT		
Sensor cable	standard	0.25 m (with connector)		
	option	3 / 6 / 9 m with 15-pole sub-D connector		
Synchronization		possible for simultaneous or alternating measurements		
Electromagnetic compatibility (EMC)		EN 61326-1: 2006-10 DIN EN 55011: 2007-11 (group 1, class B) EN 61 000-6-2: 2006-03		
Vibration		2 g / 20 ... 500 Hz		
Shock		15 g / 6 ms / 3 axes		
Weight (with 25 cm cable)		550 g	550 g	approx. 800 g

FSO = Full Scale Output; The specified data apply to a white, diffuse reflecting surface (reference: ceramics)

SMR = start of measuring range; MMR = midrange; EMR = end of measuring range

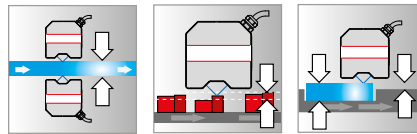
<sup>1)</sup> Range specifications: value in brackets is valid for a measuring rate of 49.14 kHz



	<b>Blue Laser Technology</b> (Blue violet laser diode 405 nm)
	<b>Adjustable measuring rate</b> up to 49.14 kHz
<b>INTER FACE</b>	<b>Ethernet / EtherCAT / RS422</b> Analog output via C-Box/2A
	<b>Advanced</b> <b>Real-Time-Surface-Compensation</b>
	<b>Calibration certificate included</b>
	<b>Configuration via web interface</b>

#### Blue Laser Sensor for direct reflection

The optoNCDT 2300-2DR high precision laser triangulation sensor is designed for highly dynamic measurements on reflective and shiny targets. The sensor can be fixed parallel to the measurement object, which greatly simplifies the installation process. Unlike conventional laser triangulation sensors, the optoNCDT 2300-2DR uses the directly reflected light of the laser. During measurements, the blue laser light is directly reflected by the measurement object onto the receiving optics. Due to the blue laser light, the signal on the receiver element is extremely stable, which means the sensor is able to measure to nanometer resolution. An extremely small laser spot size enables the detection of very small objects.



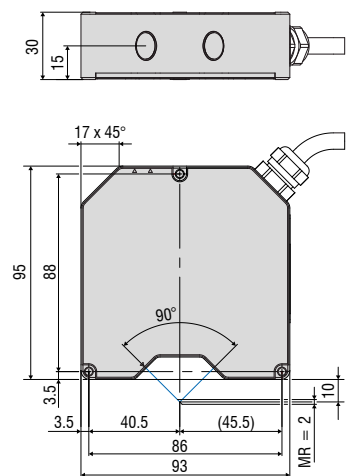
The sensor is used for production control purposes such as thickness measurement of flat glass, assembly monitoring of extremely small parts and for distance measurements on annealed glass.

#### Compact and easy to integrate

The entire electronics is integrated in a compact sensor housing which is a worldwide unique feature of this sensor class. Data output is via Ethernet, RS422 or EtherCAT. If the sensor is operated with the C-Box/2A signal processing unit (optional), an analog output is also available. All sensor configurations are carried out using a user-friendly web interface.

#### High speed and precision on reflective, shiny surfaces

The optoNCDT 2300-2DR offers an adjustable measuring rate up to 49 kHz and so is suitable for dynamic high speed process monitoring. The new A-RTSC (Advanced Real Time Surface Compensation) feature is a development of the proven RTSC technology and enables more precise real time surface compensation when measuring onto different surface types.



Model	ILD 2300-2DR	
Measuring range <sup>1)</sup>	2 mm (1 mm)	
Start of measuring range	9 mm (9 mm)	
Midrange	10 mm (9.5 mm)	
End of measuring range	11 mm (10 mm)	
Linearity	≤ ± 0.6 μm	
	≤ ± 0.03 % FSO	
Resolution (with 20 kHz)	30 nm	
	0.0015 % FSO	
Measuring rate	switchable (software) 49.14 / 30 / 20 / 10 / 5 / 2.5 / 1.5 kHz (49.14 kHz with reduced measuring range)	
Permissible ambient light	10,000 ... 40,000 lx	
Light spot diameter	SMR	21.6 x 25 μm
	MMR	8.5 x 11 μm
	EMR	22.4 x 23.7 μm
Light source	semiconductor laser <1 mW, 405 nm (blue violet), laser class 2	
Protection class	IP65	
Operating temperature	0 ... +50 °C	
Storage temperature	-20 ... +70 °C	
Inputs/Outputs	RS422 / Ethernet / EtherCAT	
Inputs	Laser on/off Synch / Trigger	
Supply voltage	11 ... 30 VDC	
Power consumption	< 2 W (24 V)	
Displays	status LED	off = Laser OFF red = poor target; out of range yellow = MMR green = ok
	power LED	off = Power OFF green = Ethernet / RS422
Sensor cable	standard	0.25m (with connector)
	option	3/10 m with 15-pole sub-D connector
Electromagnetic compatibility (EMC)	according to EN 55011/12.1998 and EN 50082-2/ 02.1996	
Vibration	2 g / 20 ... 500 Hz	
Shock	15 g / 6 ms / 3 axes	

FSO = Full Scale Output

SMR = start of measuring range; MMR = midrange; EMR = end of measuring range

<sup>1)</sup> Range specifications: value in brackets is valid for a measuring rate of 49.14 kHz

## High performance sensors made by Micro-Epsilon



Sensors and systems for displacement and position



Sensors and measurement devices for non-contact temperature measurement



2D/3D profile sensors (laser scanner)



Optical micrometers, fiber optic sensors and fiber optics



Color recognition sensors, LED analyzers and color inline spectrometer



Measurement and inspection systems