










More Precision

optoNCDT // Laser displacement sensors (triangulation)





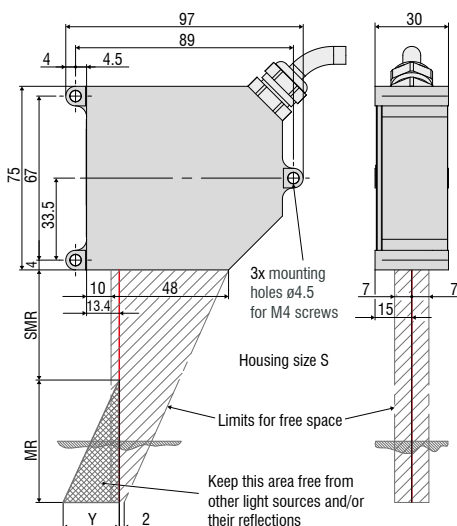
-  **Compact design with integrated controller**
-  **Measuring rate up to 7.5 kHz**
312Hz
375Hz
1000Hz
-  **Analog and digital output**
-  **Trigger input/teach-in/zero-setting/mastering/synchronization**
-  **Configuration via web interface or Plug & Play**
-  **Application-specific presets and individual sensor settings**
-  **Real Time Surface Compensation**

The optoNCDT 1750 is a powerful laser triangulation sensor which is used in high speed, precise measurements in industrial applications. New evaluation algorithms and enhanced components provide highest accuracy and dynamics. The high-performance optical system generates a small light spot onto the target which enables to even detect smallest components reliably. Due to its extremely compact size, the sensor can also be integrated into restricted installation spaces.

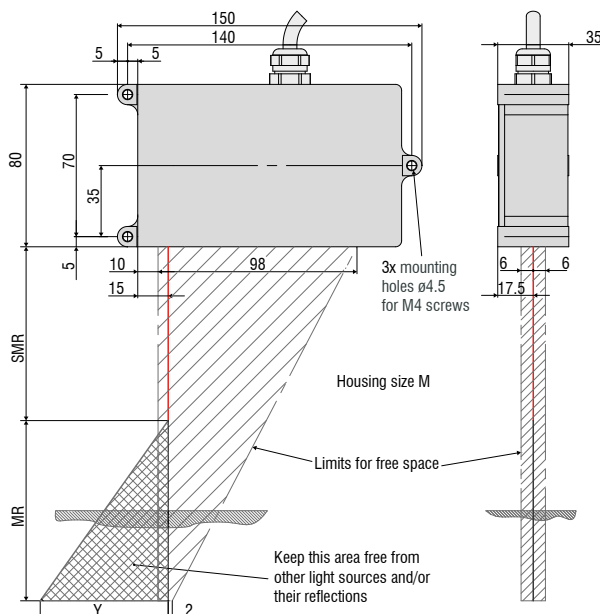
The optoNCDT 1750 laser stands out due to its real-time surface compensation feature. The real-time surface compensation feature (RTSC) determines the amount of reflection from the target surface during continuous exposure and in real-time. The exposure time or the amount of light produced by the laser is optimally matched to the reflection characteristics of the target surface. This enables extremely reliable measurements even on reflecting surfaces.

Different output signals enable to integrate the sensor into plant or machine control systems. As well as analog voltage and current outputs, a digital RS422 interface provides distance information from the sensor. All optoNCDT 1750 models are operated using an intuitive web interface. Due to the selectable setting and evaluation possibilities, the optoNCDT 1750 meets the requirements for use in industrial applications with high dynamics.

optoNCDT 1750 (2/10/20/50/100/200 mm)

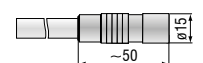


optoNCDT 1750 (500/750 mm)

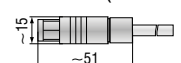


MR	SMR	Y
2	24	2
10	30	7
20	40	12
50	45	25
100	70	35
200	70	70
500	200	180
750	200	270

Connector (sensor side)



Connector (sensor cable)



Model	ILD1750-2	ILD1750-10	ILD1750-20	ILD1750-50	ILD1750-100	ILD1750-200	ILD1750-500	ILD1750-750	
Measuring range	2 mm	10 mm	20 mm	50 mm	100 mm	200 mm	500 mm	750 mm	
Start of measuring range	24 mm	30 mm	40 mm	45 mm	70 mm	70 mm	200 mm	200 mm	
Midrange	25 mm	35 mm	50 mm	70 mm	120 mm	170 mm	450 mm	575 mm	
End of measuring range	26 mm	40 mm	60 mm	95 mm	170 mm	270 mm	700 mm	950 mm	
Linearity	$\leq \pm 1.6 \mu\text{m}$	$\leq \pm 6 \mu\text{m}$	$\leq \pm 12 \mu\text{m}$	$\leq \pm 30 \mu\text{m}$	$\leq \pm 60 \mu\text{m}$	$\leq \pm 160 \mu\text{m}$	$\leq \pm 350 \mu\text{m}$	$\leq \pm 670 \mu\text{m}$	
	$\leq \pm 0.08 \%$ FSO	$\leq \pm 0.06 \%$ FSO				$\leq \pm 0.08 \%$ FSO			$\leq \pm 0.07 \%$ FSO
Repeatability ²⁾	0.1 μm	0.4 μm	0.8 μm	2 μm	4 μm	8 μm	20 μm	30 μm	
Measuring rate	continuously adjustable 0.3 ... 7.5 kHz								
	6 adjustable stages: 7.5 kHz / 5 kHz / 2.5 kHz / 1.25 kHz / 625 Hz / 300 Hz								
Light source	semiconductor laser <1 mW, 670 nm (red)								
Permissible ambient light (with 2.5 kHz)	10,000 lx								
Laser safety class	Class 2 in accordance with DIN EN 60825-1 : 2015-07								
Spot diameter	SMR	80 μm	110 μm	320 μm	570 μm	740 μm	1300 μm	1500 μm	
	MMR	35 μm	50 μm	45 μm	55 μm	60 μm	1300 μm	1500 μm	
	EMR	80 μm	110 μm	320 μm	570 μm	700 μm	1300 μm	1500 μm	
Temperature stability ¹⁾	0.025 % FSO/°C	0.01 % FSO/°C							
Operating temperature	0 ... +50 °C								
Storage temperature	-20 ... +70 °C								
Control inputs/outputs	1x HTL/TTL Laser on/off; 1x HTL/TTL multifunction input Trigger in / slave in / zero setting / mastering / teach 2x error outputs (error & limit value): npn, pnp, push pull) 1x RS422 synchronization input (trigger in, sync in, master/slave, master/slave alternating)								
Measurement value output	analog	4 ... 20 mA; 0 ... 5 V / 0 ... 10 V; 16 bit; freely scalable within the measuring range							
	digital	RS422 / 18 bit							
Operation	button	select & function buttons for interface selections, mastering (zero), teach, presets, quality slider, frequency selection, factory settings							
	web interface	application-specific presets; peak selection, video signal; freely selectable averaging possibilities; data reduction; setup management ²⁾							
Supply voltage	11 ... 30 VDC								
Power consumption	< 3 W (24 V)								
Sensor cable	standard	0.25 m pigtail with 14-pole ODU connector							
	option	Extension: 3 / 10 m							
Synchronization	possible for simultaneous or alternating measurements								
Protection class	IP65								
Vibration	2g / 20 ... 500 Hz								
Shock	15 g / 6 ms								
Weight (with 25 cm cable)	approx. 550 g						600 g		


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

¹⁾ based on digital output

²⁾ Connection to PC via IF2001/USB (optionally available)

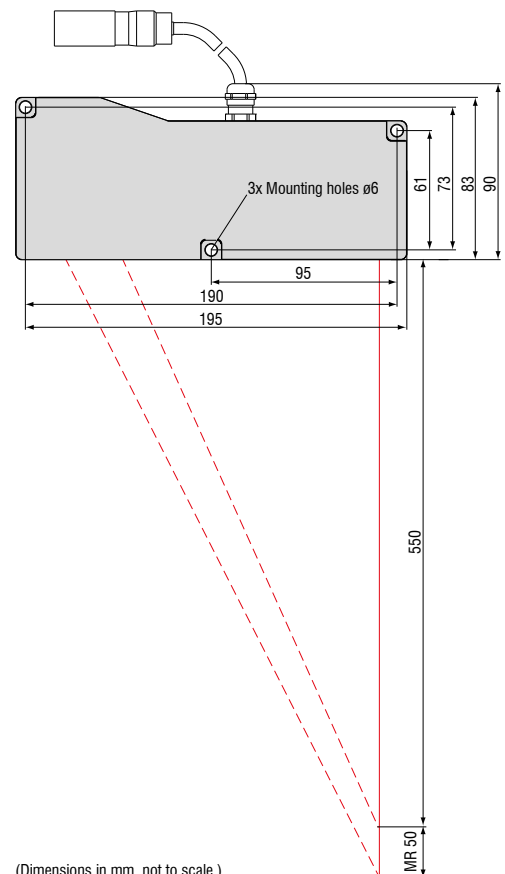
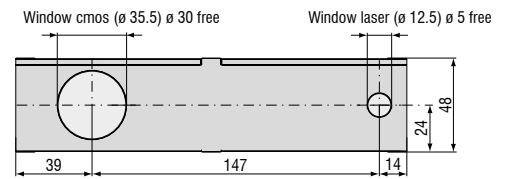
SMR = start of measuring range; MMR = midrange; EMR = end of measuring range



-  **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**

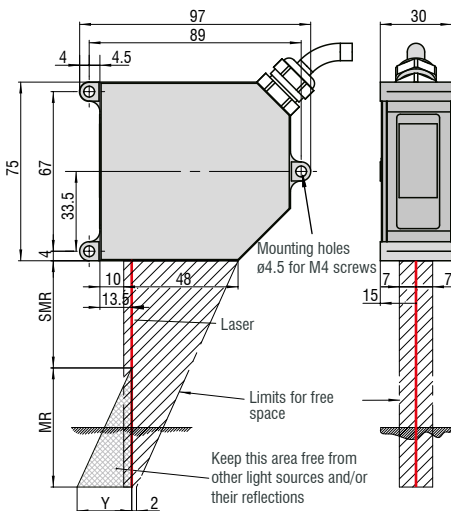
Blue Laser sensors in the optoNCDT 2300BL series are designed for high speed displacement, distance and position measurements on red-hot glowing metals and organic materials. In numerous applications, Blue Laser sensors are superior to standard sensors that use a red laser diode. In contrast to a red 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



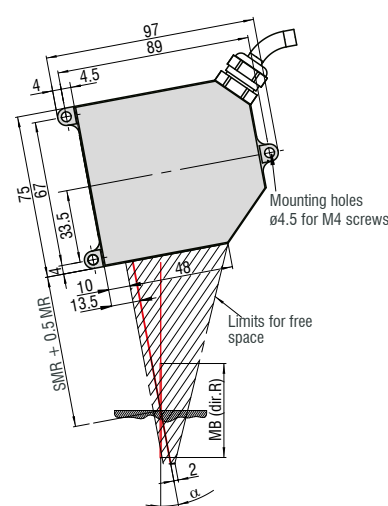
(Dimensions in mm, not to scale.)

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 ¹⁾		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 μm	200 x 200 μm	400 ... 500 μm
	MMR	20 x 20 μm	20 x 20 μm	400 ... 500 μm
	EMR	80 x 100 μm	200 x 400 μm	400 ... 500 μm
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

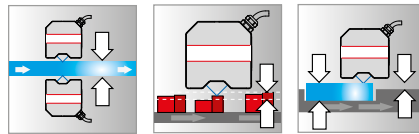
¹⁾ Range specifications: value in brackets is valid for a measuring rate of 49.14 kHz



	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/2A
	Advanced Real-Time-Surface-Compensation
	Calibration certificate included
	Configuration via web interface

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.



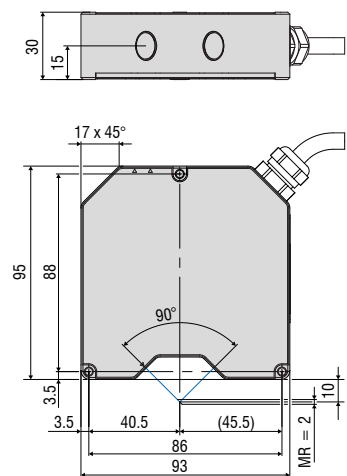
The sensor is used for production control purposes such as thickness measurement of flat glass, assembly monitoring of extremely small parts and for distance measurements on annealed glass.

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 ¹⁾	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

¹⁾ 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