



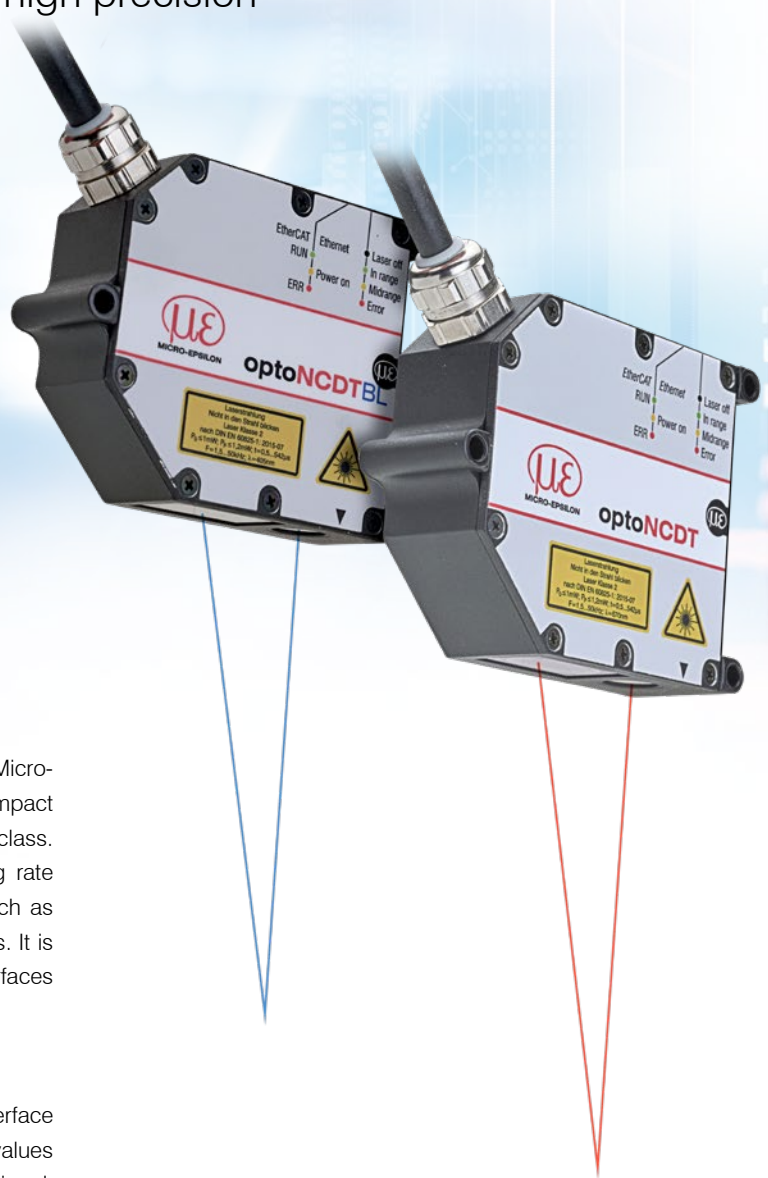
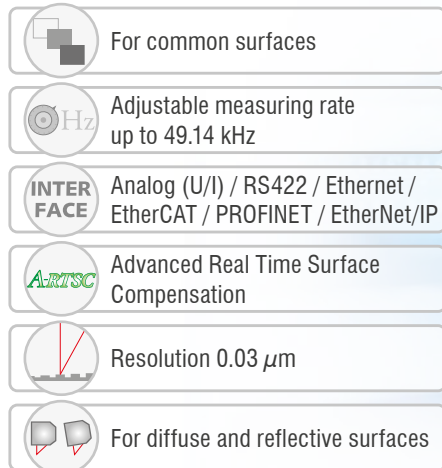
More Precision

optoNCDT // Laser displacement sensors (triangulation)



Highly dynamic laser sensors with high precision

optoNCDT 2300



The optoNCDT 2300 sensors form the high-end segment of Micro-Epsilon laser sensors. The entire electronics is integrated in a compact sensor housing which is a worldwide unique feature of this sensor class. The high-precision laser sensor has an adjustable measuring rate of 49.14 kHz and is used for particularly fast applications, such as monitoring vibrations or measurements on challenging surfaces. It is used on diffuse reflective surfaces and for directly reflecting surfaces when equipped with the special alignment feature.

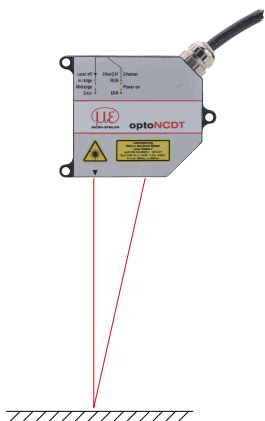
User-friendly web interface for easy operation

The optoNCDT 2300 laser sensors can be operated via a web interface which offers multiple possibilities in order to process measured values and signals, e.g., peak selection, filter and masking of the video signal.

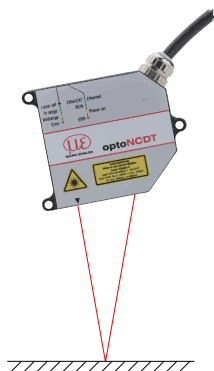
Fast exposure control for demanding surfaces

The new A-RTSC (Advanced Real Time Surface Compensation) feature is a development based on the proven RTSC technology and, with its improved dynamic range, enables more precise real time surface compensation during the measurement process. This means the sensor is not influenced by rapidly changing surface reflections and provides stable measurement results.

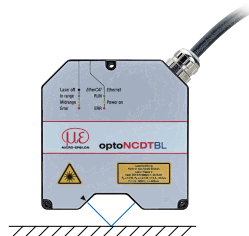
Model	Technology	Measuring range	Repeatability	Linearity
optoNCDT 2300		2 - 300 mm	0.03 μm	from 0.02 %
optoNCDT 2300BL		2 - 50 mm	0.03 μm	from 0.02 %
optoNCDT 2300LL		2 - 50 mm	0.1 μm	from 0.02 %
optoNCDT 2300-2DR		2 mm	0.03 μm	from 0.03 %
optoNCDT 2310		10 - 50 mm	0.5 μm	from 0.03 %



Distance measurement on diffuse reflecting surfaces



Distance measurement on directly reflecting surfaces

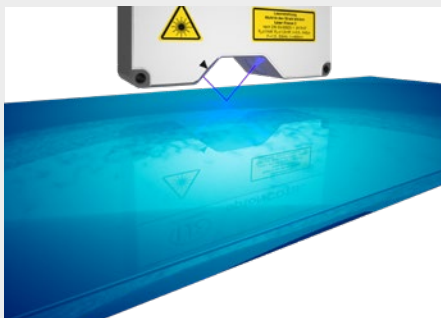


High precision distance measurement on directly reflecting surfaces

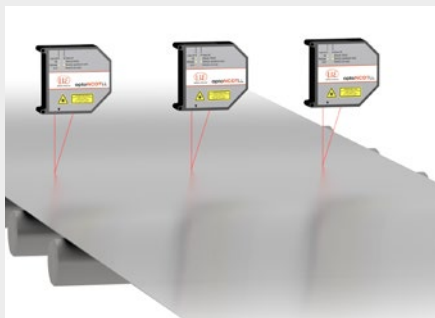
Versatile use

The optoNCDT 2300 sensors can be operated in several measurement modes: in standard mode for distance measurement on diffusely reflecting materials. In addition, the sensors can be used for distance measurement on reflective and shiny surfaces (direct reflection).

Application examples



Distance measurement of coated glass



Planarity testing of metal strips



Testing the radial run out of rollers

Technical data

optoNCDT 2300

optoNCDT 2300 (General technical data)

Model		ILD23x0-xx
Measuring rate ^[1]		7 adjustable stages: 49.14 kHz / 30 kHz / 20 kHz / 10 kHz / 5 kHz / 2.5 kHz / 1.5 kHz
Light source		Semiconductor laser < 1 mW, 670 nm (red)
Laser class		Class 2 in accordance with DIN EN 60825-1 : 2022-07 / (optional class 3R)
Permissible ambient light		10,000...40,000 lx
Supply voltage		11 ... 30 VDC
Power consumption		< 3 W (24 V)
Signal input		Laser on/off, sync in, trigger in
Digital interface ^[2]		RS422 (16 bit) / Ethernet / EtherCAT / PROFINET / EtherNet/IP
Analog output ^[3]		4 ... 20 mA / 0 ... 5 V / 0 ... 10 V / ± 5 V / ± 10 V
Synchronization		possible for simultaneous or alternating measurements
Connection		integrated pigtail 0.25 m with 14-pin cable connector, min. bending radius 30 mm when firmly installed; optional extension to 3 m / 6 m / 9 m possible (see accessories for suitable connection cables)
Installation		Screw connection via three mounting holes
Temperature range	Storage	-20 ... +70 °C (non-condensing)
	Operation	0 ... +50 °C (non-condensing)
Shock (DIN EN 60068-2-27)		15 g / 6 ms in 3 axes
Vibration (DIN EN 60068-2-6)		2 g / 20 ... 500 Hz
Protection class (DIN EN 60529)		IP65
Weight		approx. 550 g (incl. pigtail)
Control and indicator elements ^[4]		Web interface for setup: user management, measurement settings, data output, measurement control, parameters and extras; 2x color LEDs for status / Ethernet and EtherCAT

^[1] Measuring rate 49.14 kHz with reduced measuring range (in brackets)

^[2] PROFINET and EtherNet/IP require connection via interface module (see accessories)

^[3] Requires connection via interface module (see accessories)

^[4] Access to web interface requires connection to PC via IF2001/USB (see accessories)



Laser-Point - optoNCDT 2300 / Measuring ranges 2 - 20

Model		ILD2300-2	ILD2300-5	ILD2300-10	ILD2300-20
Measuring range ^[1]		2 (2) mm	5 (2) mm	10 (5) mm	20 (10) mm
Start of measuring range ^[1]		24 (24) mm	24 (24) mm	30 (35) mm	40 (50) mm
Mid of measuring range ^[1]		25 (25) mm	26.5 (25) mm	35 (37.5) mm	50 (55) mm
End of measuring range ^[1]		26 (26) mm	29 (26) mm	40 (40) mm	60 (60) mm
Linearity ^[2]		< $\pm 0.6 \mu\text{m}$	< $\pm 1.5 \mu\text{m}$	< $\pm 2 \mu\text{m}$	< $\pm 4 \mu\text{m}$
		< ± 0.03 % FSO	< ± 0.03 % FSO	< ± 0.02 % FSO	< ± 0.02 % FSO
Resolution ^[3]		0.03 μm	0.08 μm	0.15 μm	0.3 μm
Light spot diameter ^[4]	SMR	55 x 85 μm	70 x 80 μm	75 x 85 μm	140 x 200 μm
	MMR	23 x 23 μm	30 x 30 μm	32 x 45 μm	46 x 45 μm
	EMR	35 x 85 μm	70 x 80 μm	110 x 160 μm	140 x 200 μm
Material		Die-cast zinc housing			

^[1] Value in brackets applies for measuring rate 49.14 kHz

^[2] FSO = Full Scale Output

The specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)

^[3] Measuring rate 20 kHz

^[4] ± 10 %; SMR = Start of measuring range; MMR = Mid of measuring range; EMR = End of measuring range



Laser point - optoNCDT 2300 / Measuring ranges 50 - 300

Model		ILD2300-50	ILD2300-100	ILD2300-200	ILD2300-300
Measuring range ^[1]		50 (25) mm	100 (50) mm	200 (100) mm	300 (150) mm
Start of measuring range ^[1]		45 (70) mm	70 (120) mm	130 (230) mm	200 (350) mm
Mid of measuring range ^[1]		70 (82.5) mm	120 (145) mm	230 (280) mm	350 (425) mm
End of measuring range ^[1]		95 (95) mm	170 (170) mm	330 (330) mm	500 (500) mm
Linearity ^[2]		< ±10 µm	< ±20 µm	< ±60 µm	< ±90 µm
		< ±0.02 % FSO	< ±0.02 % FSO	< ±0.03 % FSO	< ±0.03 % FSO
Resolution ^[3]		0.8 µm	1.5 µm	3 µm	4.5 µm
Light spot diameter ^[4]	SMR	255 x 350 µm	350 µm	1300 µm	580 x 860 µm
	MMR	70 x 70 µm	130 µm	1300 µm	380 x 380 µm
	EMR	255 x 350 µm	350 µm	1300 µm	470 x 530 µm
Material		Die-cast zinc housing		Aluminum housing	

^[1] Value in brackets applies for measuring rate 49.14 kHz

^[2] FSO = Full Scale Output

The specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)

^[3] Measuring rate 20 kHz

^[4] ±10 %; SMR = Start of measuring range; MMR = Mid of measuring range; EMR = End of measuring range



Blue laser - optoNCDT 2300BL

Model		ILD2300-2BL	ILD2300-5BL	ILD2300-10BL	ILD2310-50BL
Measuring range ^[1]		2 (2) mm	5 (2)	10 (5) mm	50 (25) mm
Start of measuring range ^[1]		24 (24) mm	24 (24) mm	30 (35) mm	550 (575) mm
Mid of measuring range ^[1]		25 (25) mm	26.5 (25) mm	35 (37.5) mm	575 (587.5) mm
End of measuring range ^[1]		26 (26) mm	29 (26) mm	40 (40) mm	600 (600) mm
Linearity		< ±0.6 µm	< ±1.5 µm	< ±2 µm	< ±40 µm
		< ±0.03 % FSO	< ±0.03 % FSO	< ±0.02 % FSO	< ±0.08 % FSO
Resolution ^[2]		0.03 µm	0.08 µm	0.15 µm	7.5 µm
Light spot diameter ^[3]	SMR	70 x 80 µm	200 x 200 µm	75 x 85 µm	400 ... 500 µm
	MMR	20 x 20 µm	20 x 20 µm	32 x 45 µm	
	EMR	80 x 100 µm	200 x 400 µm	110 x 160 µm	
Light source		Semiconductor laser <1 mW, 405 nm (blue violet)			
Permissible ambient light		10,000 lx			

^[1] Value in brackets applies for measuring rate 49.14 kHz

^[2] Measuring rate 20 kHz

^[3] ±10 %; SMR = Start of measuring range; MMR = Mid of measuring range; EMR = End of measuring range

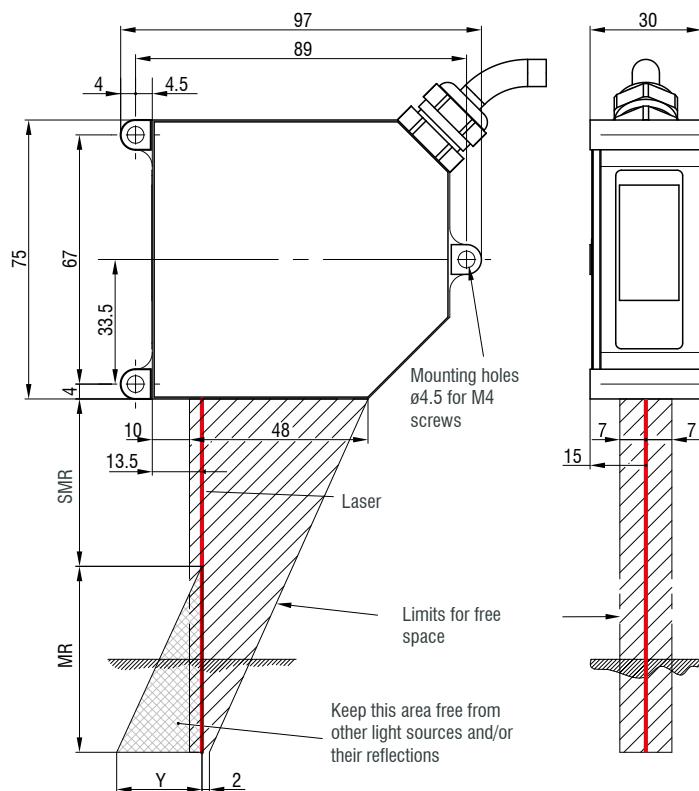
Dimensions

optoNCDT 2300

optoNCDT 2300 / Measuring range 2 - 100

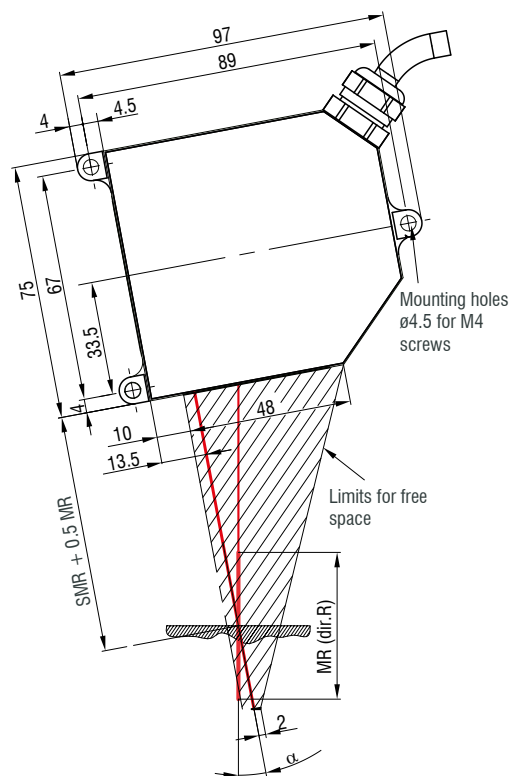
optoNCDT 2300-2 ... 2300-100

Diffuse reflection



optoNCDT 2300-2 ... 2300-20

Direct reflection



optoNCDT 2300 (Diffuse reflection)

optoNCDT 2300LL

optoNCDT 2300BL (Diffuse reflection)

MR	SMR	Y
2	24	1.5
5	24	3.5
10	30	6.5
20	40	10.0
50	45	23.0
100	70	33.5

optoNCDT 2300 (Direct reflection)

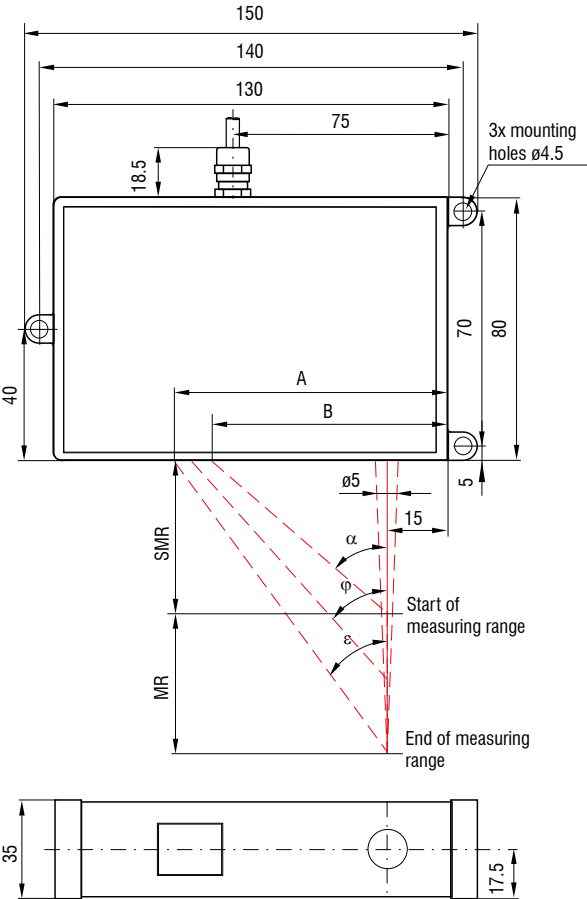
optoNCDT 2300BL (Direct reflection)

MR	SMR + 0.5 MR	α
2	25	20.5 °
5	26.5	20 °
10	35	17.5 °
20	50	13.8 °

Connector (sensor side)

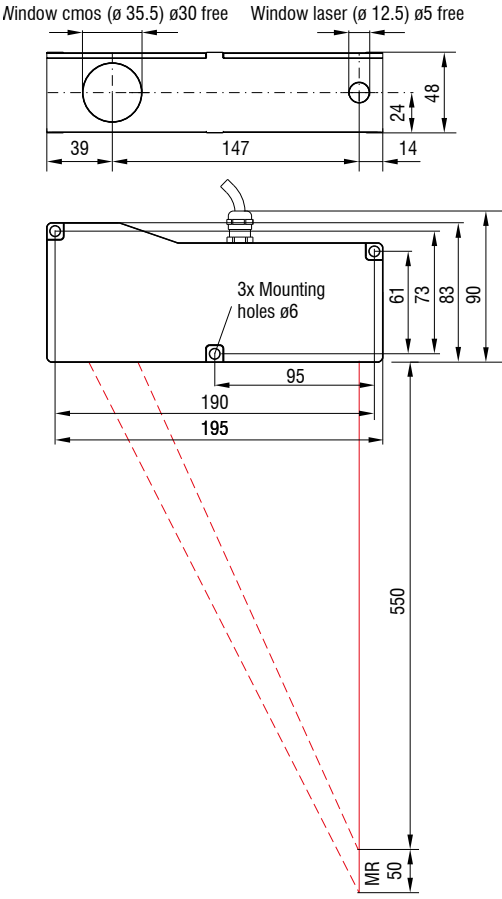


optoNCDT 2300 / Measuring ranges 200/300



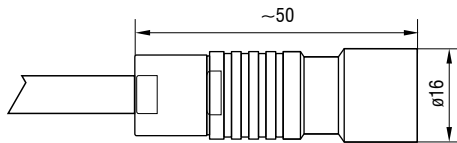
MR	α	φ	ε	A	B
200	25.1 °	16.7 °	13.1 °	91.6	76
300	18.3 °	12.2 °	9.6 °	99.4	81

optoNCDT 2300BL / Measuring range 50
optoNCDT 2310 / Measuring range 50



(Dimensions in mm, not to scale)
MR = measuring range; SMR = start of measuring range
MMR = mid of measuring range; EMR = end of measuring range

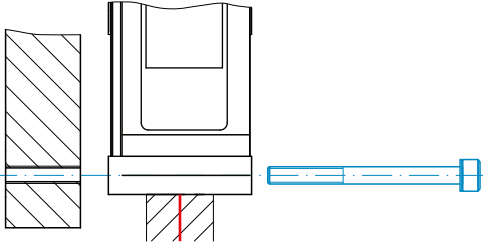
Connector (sensor side)



Installation options

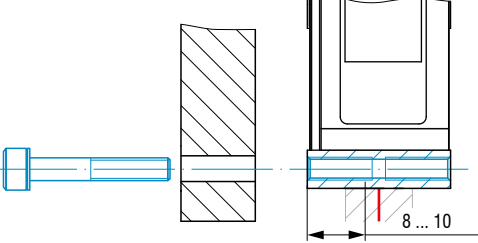
Housings M and L

Bolt connection



ILD2300-2 ... ILD2300-100 ILD2300BL / ILD2300LL	M4
ILD2300-200 / -300 ILD2310-10 / -20 / -40	M4
ILD2310-50 ILD2310-50BL	M5
ILD2300-2DR	M3

Direct fastening



ILD2300-2 ... ILD2300-100 ILD2300BL / ILD2300LL	-
ILD2300-200 / -300 ILD2310-10 / -20 / -40	M5
ILD2310-50 ILD2310-50BL	M6
ILD2300-2DR	M4

Accessories for optoNCDT 2300/2310

Power supply unit

PS2020 (power supply 24 V / 2.5 A, input 100 - 240 VAC, output 24 VDC / 2.5 A, mounting onto symmetrical standard rail 35 mm x 7.5 mm, DIN 50022)

Mounting plate

for easy alignment of the DR models

Protective housings

see page 60

Scope of supply

- 1 sensor ILD23x0 with 0.25 m connection cable and cable socket
- 2 laser warning signs according to IEC standard
- RJ45 short-circuit plug

Article designation

ILD2300-	6	LL	3R
Laser class No indication: class 2 (standard) 3R: class 3R (on request)			
Laser type No indication: Red laser point (standard) LL: Laser Line BL: Blue Laser DR: Direct Reflection			
Measuring range in mm			
Series ILD2300: Highly dynamic laser sensor in the 50 kHz class ILD2310: Laser sensors with small measuring range and large offset distance			

Connection possibilities

optoNCDT 2300

Drag-chain suitable extension and adapter cables

Cable diameter:	max. 7.5 mm
Drag chain:	ja
Robot:	no
Temperature range:	-40 ... 70 °C (moving / not moving)
Bending radius:	> 90 mm (fixed installation / dynamic / drag chain)

Sensor	Cables	Type	Connection possibilities and accessories
ILD2300-xx ILD2300-xxLL ILD2300-xxBL ILD2300-2DR ILD2310-xx	Extension cable pigtail Length 3 m / 6 m / 9 m / 15 m <i>Art. no.</i> <i>Designation</i> 2901717 PC2300-3/OE 2901760 PC2300-6/OE 2901761 PC2300-9/OE 2901762 PC2300-15/OE	Open ends	Supply voltage connection Power supply unit PS2020 
			Interface module of RS422 to USB IF2001/USB 
			Interface module for Industrial Ethernet connection IF2035-PROFINET IF2035-EIP IF2035-EtherCAT 
	Adapter cable for PC interface card Length 3 m / 6 m <i>Art. no.</i> <i>Designation</i> 2901728 PC2300-3/IF2008 2901729 PC2300-6/IF2008	Sub-D	Interface card for synchronous data acquisition IF2008PCle / IF2008E 
			4-fold interface module from RS422 to USB IF2004/USB 
	Adapter cable for sensor calculation Length 3 m / 6 m / 9 m <i>Art. no.</i> <i>Designation</i> 29011031 PC2300-3/C-Box/RJ45 29011044 PC2300-6/C-Box/RJ45 29011045 PC2300-9/C-Box/RJ45	Sub-D	Controller for D/A conversion and evaluation of up to 2 sensor signals Dual Processing Unit 
	Adapter cable for sensor calculation Length 2 m <i>Art. no.</i> <i>Designation</i> 29011279 PCE2300-3/M12	M12	Interface module for Ethernet connection of up to 8 sensors IF2008/ETH 
	Adapter cable Sub-D for EtherCAT Length 3 m / 6 m <i>Art. no.</i> <i>Designation</i> 2901661 PC2300-3/SUB-D 2901976 PC2300-6/SUB-D	Sub-D	Signal output Ethernet, EtherCAT, RS422 to PC or PLC PC2300-0,5Y Connection cable ILD2300 

Connection cable for high temperature

Cable diameter:	max. 7.5 mm
Drag chain:	no
Robot:	no
Temperature range:	-55 ... 250 °C (moving) -90 ... 250 °C (not moving)
Bending radius:	> 40 mm (fixed installation) > 75 mm (dynamic)

Sensor	Cables	Type	Connection possibilities and accessories	
ILD2300-xx ILD2300-xxLL ILD2300-xxBL ILD2300-2DR ILD2310-xx	Connection cable high temperatures Length 3 m / 6 m / 9 m / 15 m <i>Art. no.</i> <i>Designation</i> 29011118 PC2300-3/OE/HT 29011119 PC2300-6/OE/HT 29011095 PC2300-9/OE/HT 29011120 PC2300-15/OE/HT	Open ends	Connection supply voltage PS2020	
	Interface module of RS422 to USB IF2001/USB			
	Interface module for Industrial Ethernet connection IF2035-PROFINET IF2035-EIP IF2035-EtherCAT			

Connection cable for EtherCAT operation

Cable diameter:	max. 7.5 mm
Drag chain:	yes
Robot:	no
Temperature range:	-40 ... 70 °C (moving / not moving)
Bending radius:	> 90 mm (fixed installation / dynamic / drag chain)

Input	Cables	Type	Connection possibilities and accessories					
Sub-D (PC2300-x/ Sub-D)	Adapter cable for EtherCAT Length 0.5 m <table><tr><td>Art. no.</td><td>Designation</td></tr><tr><td>2901693</td><td>PC2300-0,5Y Connection cable ILD2300</td></tr></table> 	Art. no.	Designation	2901693	PC2300-0,5Y Connection cable ILD2300	Open ends & RJ45	Signal output EtherCAT & Ethernet	EtherCAT 
	Art. no.	Designation						
	2901693	PC2300-0,5Y Connection cable ILD2300						
Supply voltage connection Power supply unit PS2020								
Interface module of RS422 to USB IF2001/USB								

Protective housings for demanding environments

optoNCDT

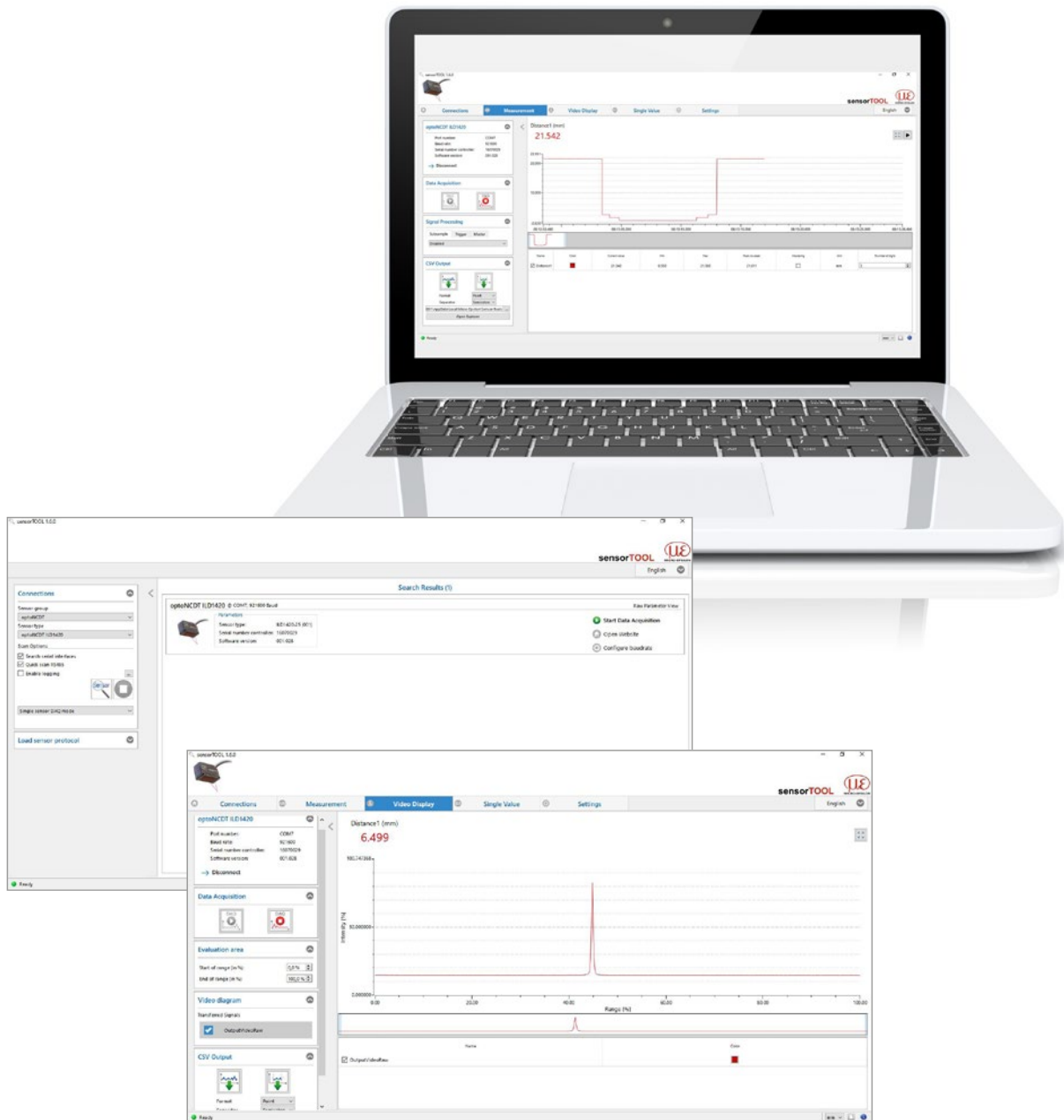
SGH & SGHF models				SGHF-HT model
Protective housing Size S		Protective housing Size M		
SGH	SGHF	SGH	SGHF	
				
(140 x 140 x 71 mm)		(180 x 140 x 71 mm)		(260 x 180 x 154 mm)
Water-resistant housing protects the sensor from solvents and detergents.	Ideal with high ambient temperatures. The integrated air cooling of the housing offers optimum protection for the sensor.	Water-resistant housing protects the sensor from solvents and detergents.	Ideal with high ambient temperatures. The integrated air cooling of the housing offers optimum protection for the sensor.	Water-cooled protective housing with window and compressed-air connection for measurement tasks in ambient temperatures up to 200 °C. Maximum temperature of cooling water T(max) = 10 °C Minimum water flow rate Q(min) = 3 liters/min
Size S suitable for ILD1750-20BL ILD1750-200BL ILD2300-2 / -2LL / -2BL ILD2300-5 / -5BL ILD2300-10 / -10LL / -10BL ILD2300-20 / -20LL ILD2300-50 / -50LL ILD2300-100		Size M suitable for ILD1750-500BL ILD1750-750BL ILD2300-200 ILD2300-300 ILD2310-10 ILD2310-20 ILD2310-40		Suitable for ILD1750-500BL ILD1750-750BL ILD2300-200 ILD2300-300 ILD2310-10 ILD2310-20 ILD2310-40 ILD2310-50BL

Protective housing SGHF ILD1900

Compact protective housing which is simply attached to the sensor. The protective housing has an air purge for cleaning the protective windows. It also cools the sensor.
Suitable for ILD1900-6 / -6LL ILD1900-10 / -10LL ILD1900-25 / -25LL ILD1900-50 / -50LL ILD1900-100 ILD1900-200 ILD1900-500

sensorTOOL

The Micro-Epsilon sensorTOOL is a powerful software that is used to operate one or more optoNCDT sensors. The sensorTOOL can be used to access the sensor connected to the PC, display its complete data stream and save it in a file (in Excel-compatible CSV format). The sensor is configured via its web interface.



Free download

All software tools, drivers and documented driver DLL for easy integration of the sensors into existing or internally-generated software are available free of charge under www.micro-epsilon.de/download

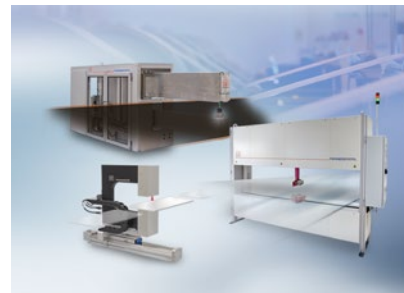
Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, distance and position



Sensors and measurement devices for non-contact temperature measurement



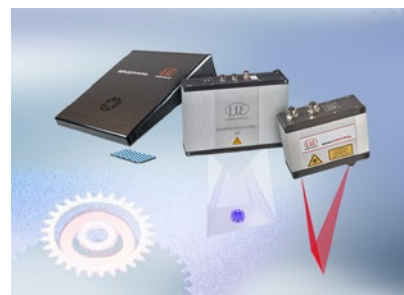
Measuring and inspection systems for metal strips, plastics and rubber



Optical micrometers and fiber optics, measuring and test amplifiers



Color recognition sensors, LED analyzers and inline color spectrometers



3D measurement technology for dimensional testing and surface inspection