



More Precision

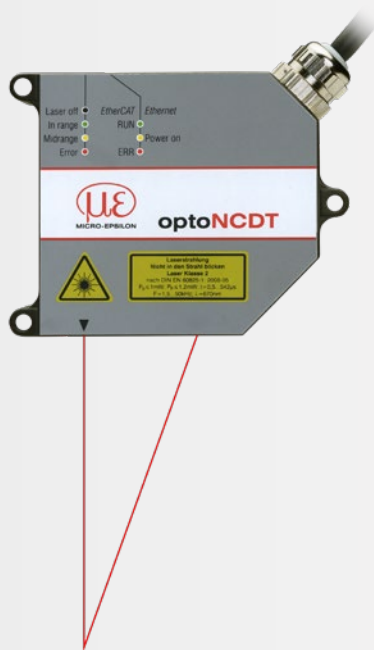
optoNCDT // Laser displacement sensors (triangulation)



optoNCDT 23x0

High precision laser sensors

from page 34



| 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 % |

optoNCDT 17x0

Laser sensors for special measurement tasks

optoNCDT 1910

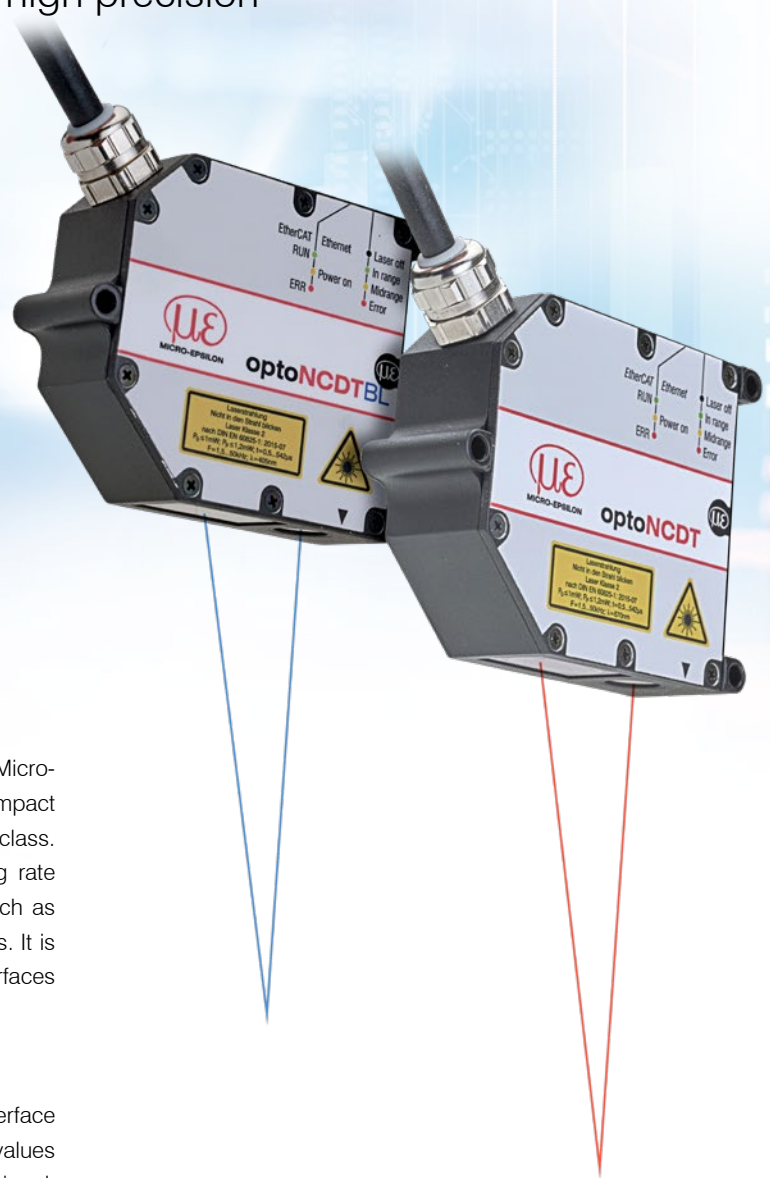
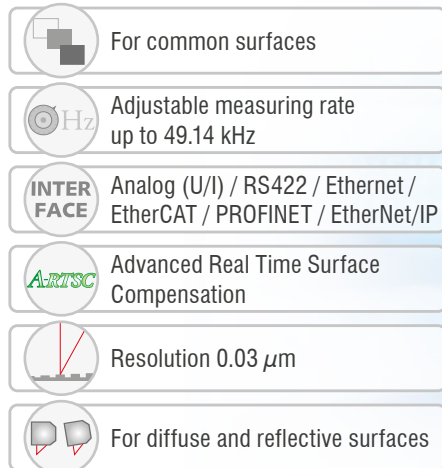
from page 46



| Model | Technology | Measuring range | Repeatability | Linearity |
|------------------|------------|-----------------|------------------------|-------------|
| optoNCDT 1750BL | | 2 - 750 mm | 0.8 μm | from 0.06 % |
| optoNCDT 1750-DR | | 2 - 20 mm | 0.1 μm | 0.08 % |
| optoNCDT 1710 | | 50 mm | from 7.5 μm | 0.10 % |
| optoNCDT 1710BL | | 50 / 1000 mm | 7.5 μm | from 0.10 % |
| optoNCDT 1760 | | 1000 mm | from 7.5 μm | 0.10 % |
| optoNCDT 1910 | | 500 / 750 mm | from 20 μm | 0.07 % |

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.

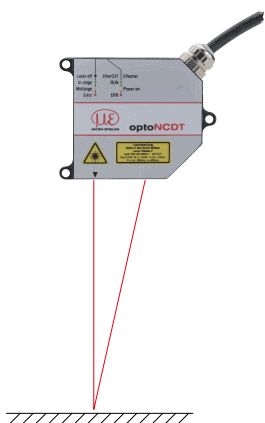
User-friendly web interface for easy operation

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.

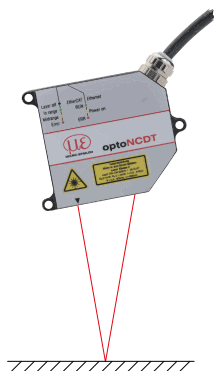
Fast exposure control for demanding surfaces

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.

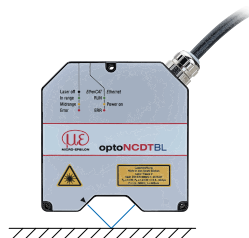
| Model | Technology | Measuring range | Repeatability | Linearity |
|-------------------|---|-----------------|--------------------|-------------|
| optoNCDT 2300 |  | 2 - 300 mm | 0.03 μm | from 0.02 % |
| optoNCDT 2300BL |  | 2 - 50 mm | 0.03 μm | from 0.02 % |
| optoNCDT 2300LL |  | 2 - 50 mm | 0.1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

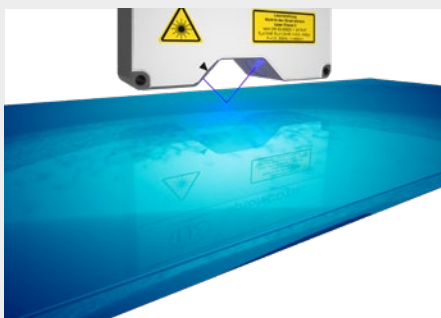


High precision distance measurement on directly reflecting surfaces

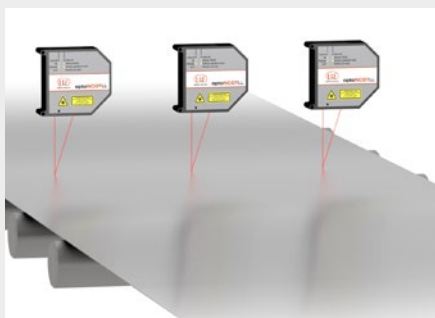
Versatile use

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



Laser-Line - optoNCDT 2300LL

| Model | | ILD2300-2LL | ILD2300-10LL | ILD2300-20LL | ILD2300-50LL |
|---|-----|-----------------------|---------------|---------------|---------------|
| Measuring range ^[1] | | 2 (2) mm | 10 (5) mm | 20 (10) mm | 50 (25) mm |
| Start of measuring range ^[1] | | 24 (24) mm | 30 (35) mm | 40 (50) mm | 45 (70) mm |
| Mid of measuring range ^[1] | | 25 (25) mm | 35 (37.5) mm | 50 (55) mm | 70 (82.5) mm |
| End of measuring range ^[1] | | 26 (26) mm | 40 (40) mm | 60 (60) mm | 95 (95) mm |
| Linearity ^[2] | | < ±0.6 μm | < ±2 μm | < ±4 μm | < ±10 μm |
| | | < ±0.03 % FSO | < ±0.02 % FSO | < ±0.02 % FSO | < ±0.02 % FSO |
| Resolution ^[3] | | 0.03 μm | 0.15 μm | 0.3 μm | 0.8 μm |
| Light spot diameter ^[4] | SMR | 85 x 240 μm | 120 x 405 μm | 185 x 485 μm | 350 x 320 μm |
| | MMR | 24 x 280 μm | 35 x 585 μm | 55 x 700 μm | 70 x 960 μm |
| | EMR | 64 x 400 μm | 125 x 835 μm | 195 x 1200 μm | 300 x 1940 μm |
| Material | | Die-cast zinc housing | | | |

^[1] Value in brackets applies for a measuring rate of 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



Direct reflection - optoNCDT 2300-2DR

| Model | | ILD2300-2DR/BL |
|---|-----|---|
| Measuring range ^[1] | | 2 (1) mm |
| Start of measuring range ^[1] | | 9 (9) mm |
| Mid of measuring range ^[1] | | 10 (9.5) mm |
| End of measuring range ^[1] | | 11 (10) mm |
| Linearity ^[2] | | < ±0.6 μm |
| | | < ±0.03 % FSO |
| Resolution ^[3] | | 0.03 μm |
| Temperature stability ^[4] | | ±0.01 % FSO / K |
| Light spot diameter ^[5] | 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) |
| Power consumption | | < 2 W (24 V) |
| Connection | | integrated pigtail 0.25 m with 14-pin cable connector, min. bending radius 30 mm when firmly installed; optional extension to 3 m / 10 m possible (see accessories for suitable connection cables) |
| Material | | Aluminum housing |
| Weight | | approx. 400 g (incl. pigtail) |

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

^[2] The specified data apply to directly reflecting surfaces; FSO = Full Scale Output

^[3] Measuring rate 20 kHz

^[4] Relates to digital output in mid of measuring range

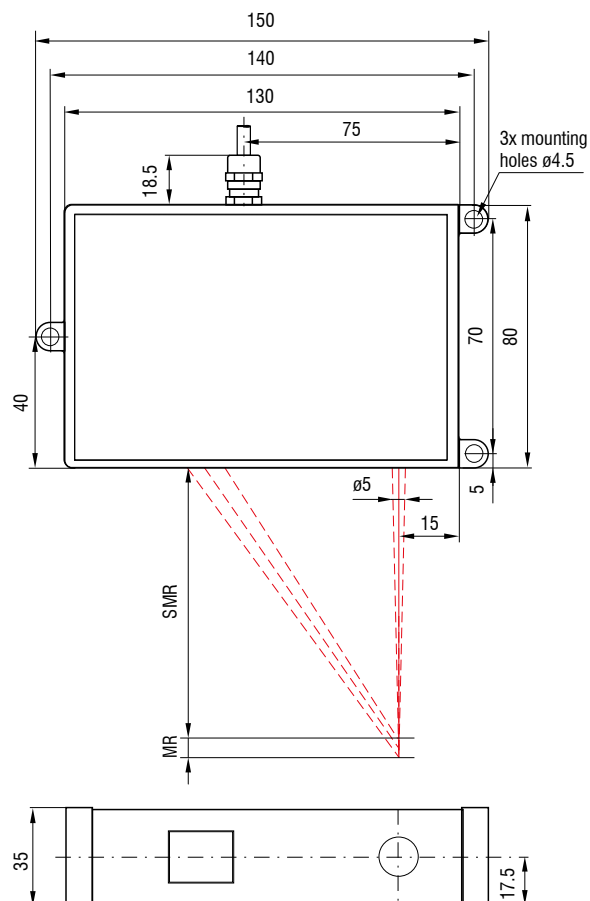
^[5] ±10 %; SMR = Start of measuring range; MMR = Mid of measuring range; EMR = End of measuring range

Light spot diameter determined with point-shaped laser with Gaussian fit (full 1/e² width)

Dimensions

optoNCDT 2300

optoNCDT 2310 / Measuring ranges 10/20/40



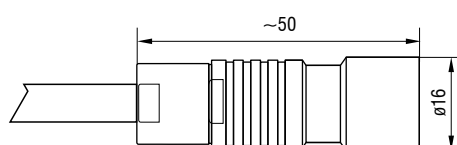
| MR | SMR | MMR | EMR |
|----|-----|-----|-----|
| 10 | 95 | 100 | 105 |
| 20 | 90 | 100 | 110 |
| 40 | 175 | 195 | 215 |

(Dimensions in mm, not to scale)

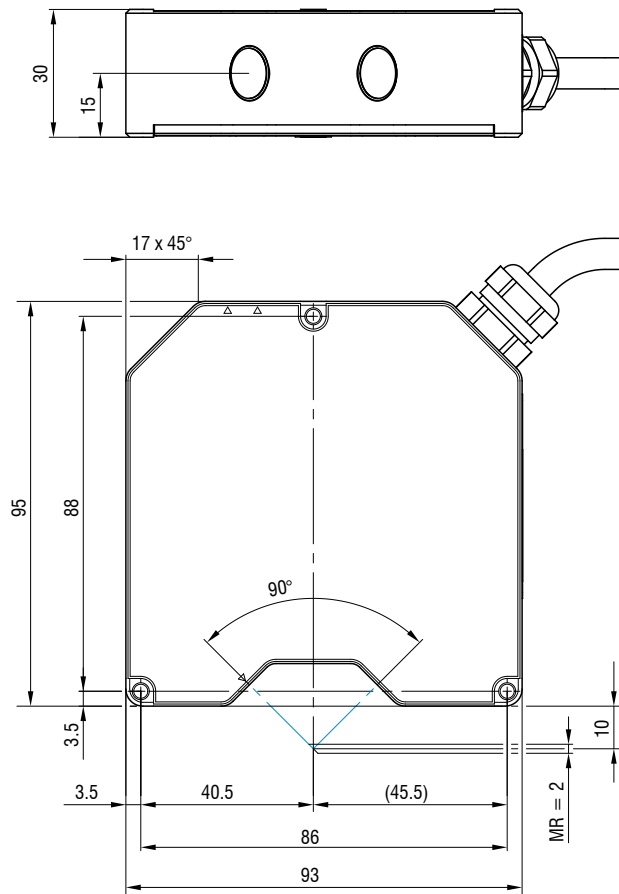
MR = measuring range; SMR = start of measuring range

MMR = mid of measuring range; EMR = end of measuring range

Connector (sensor side)



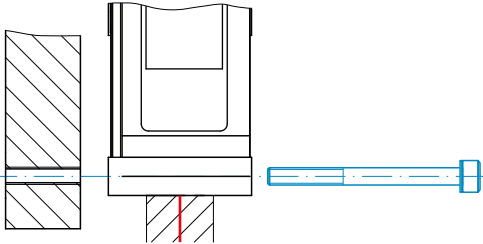
optoNCDT 2300-2DR



Installation options

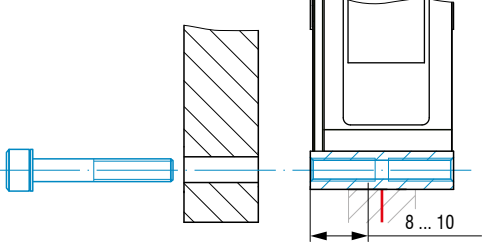
Housings M and L

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 62

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 | Extension cable pigtail Length 3 m / 6 m / 9 m / 15 m <i>Art. no. 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 |  |
| | | | Interface card for synchronous data acquisition IF2008PCle / IF2008E |  |
| ILD2310-xx | Adapter cable for PC interface card Length 3 m / 6 m <i>Art. no. Designation</i> 2901728 PC2300-3/IF2008 2901729 PC2300-6/IF2008 | Sub-D | 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. 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. 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. 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 | |  | |
| | | | | |
| | | | | |

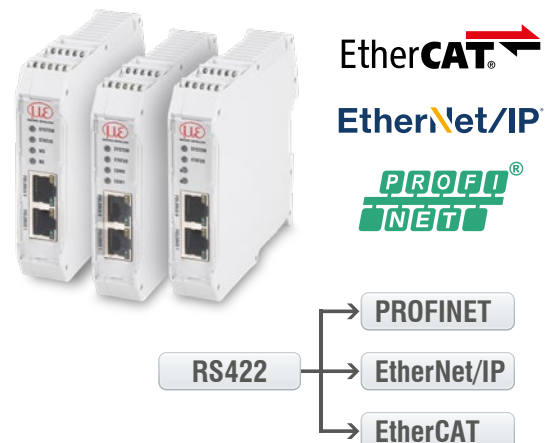
Connection cable for EtherCAT operation

| | |
|--------------------|---|
| 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 <div><div>Art. no.</div><div>2901693</div></div> <div><div>Designation</div><div>PC2300-0,5Y</div><div>Connection cable</div><div>ILD2300</div></div> <div></div> | Open ends & RJ45 | Signal output EtherCAT & Ethernet | <div>EtherCAT</div> <div></div> |
| | Supply voltage connection Power supply unit PS2020 | | <div></div> | |
| | Interface module of RS422 to USB IF2001/USB | | <div></div> | |

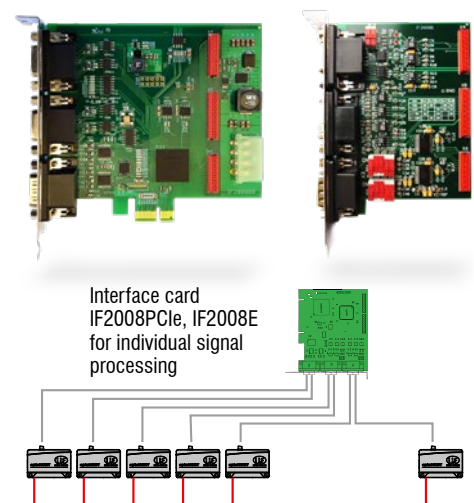
IF2035: Interface module for Industrial Ethernet connection

- Connection of RS422 or RS485 interfaces to PROFINET / Ethernet/ IP / EtherCAT
- Synchronization output for RS422 sensors
- 2 network connections for different network topologies
- Data rate up to 4 MBaud
- 4-fold oversampling (with EtherCAT)
- Ideal for confined spaces due to a compact housing and DIN rail mounting



IF2008PCIe/IF2008E: Interface card for synchronous data acquisition

- IF2008PCIe - Basic PCB: 4 digital signals and 2 encoders
- IF2008E - Expansion board: 2x digital signals, 2x analog signals and 8x I/O signals
- Absolutely synchronous data acquisition for multi-channel applications (e.g. for planarity or thickness measurement)



Dual Processing Unit: Controller for D/A conversion and evaluation of up to 2 sensor signals

- Fast D/A conversion (16 bit, with a maximum of 100 kHz) of 2 digital input signals or calculation of 2 digital sensor signals
- Averaging functions and calculation of thickness, step, diameter, ovality and radial run out
- Trigger input
- Multi-function output
- Measurement value output via Ethernet, USB, analog output 4 ... 20 mA/0 ... 5 V / 0 ... 10 V / ± 5 V / ± 10 V (scalable via web interface)
- 2x switching outputs for sensor or Dual Processing Unit status
- Parallel data output via three output interfaces
- Two filter possibilities
- Post-linearization of measured values or calculated values
- Easy parameter setting via web interface (controller and sensors)



IF2008/ETH: Interface module for Ethernet connection of up to 8 sensors

- Integration of eight sensors or encoders with RS422 interface in Ethernet network
- Four programmable switching in-/outputs (TTL and HTL logic)
- Fast data acquisition and output up to 200 kHz
- Simple parameter set up via web interface



IC2001/USB Single-channel converter cable RS422/USB

- Conversion from RS422 to USB
- 5-core interface cable without outer shield
- Easy sensor connection via USB
- Supports baud rates from 9.6 kBaud to 1 MBaud
- Ideal for integration into plant and machinery



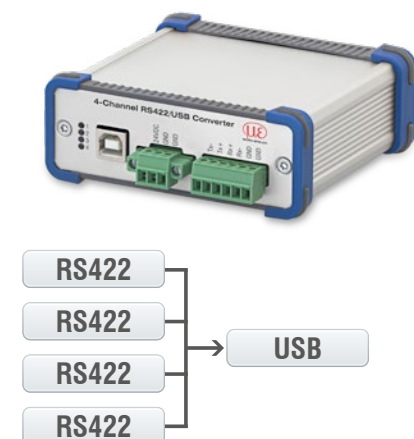
IF2001/USB: Interface module from RS422 to USB

- Conversion from RS422 to USB
- Signals and functions such as laser on/off, switch signals and function output
- Supports baud rates from 9.6 kBaud to 12 MBaud
- Robust aluminum housing
- Easy sensor connection via screw terminals (plug and play)
- Parameter setting (converter and sensors) via software



IF2004/USB: 4-fold interface module from RS422 to USB






- Conversion of 4 digital signals (RS422) to USB
- 4x trigger inputs, 1x trigger output
- Synchronous data acquisition
- Parameter setting (converter and sensors) via software



Connection of 4 sensors via IF2008-Y-adaptor cable

Protective housings for demanding environments

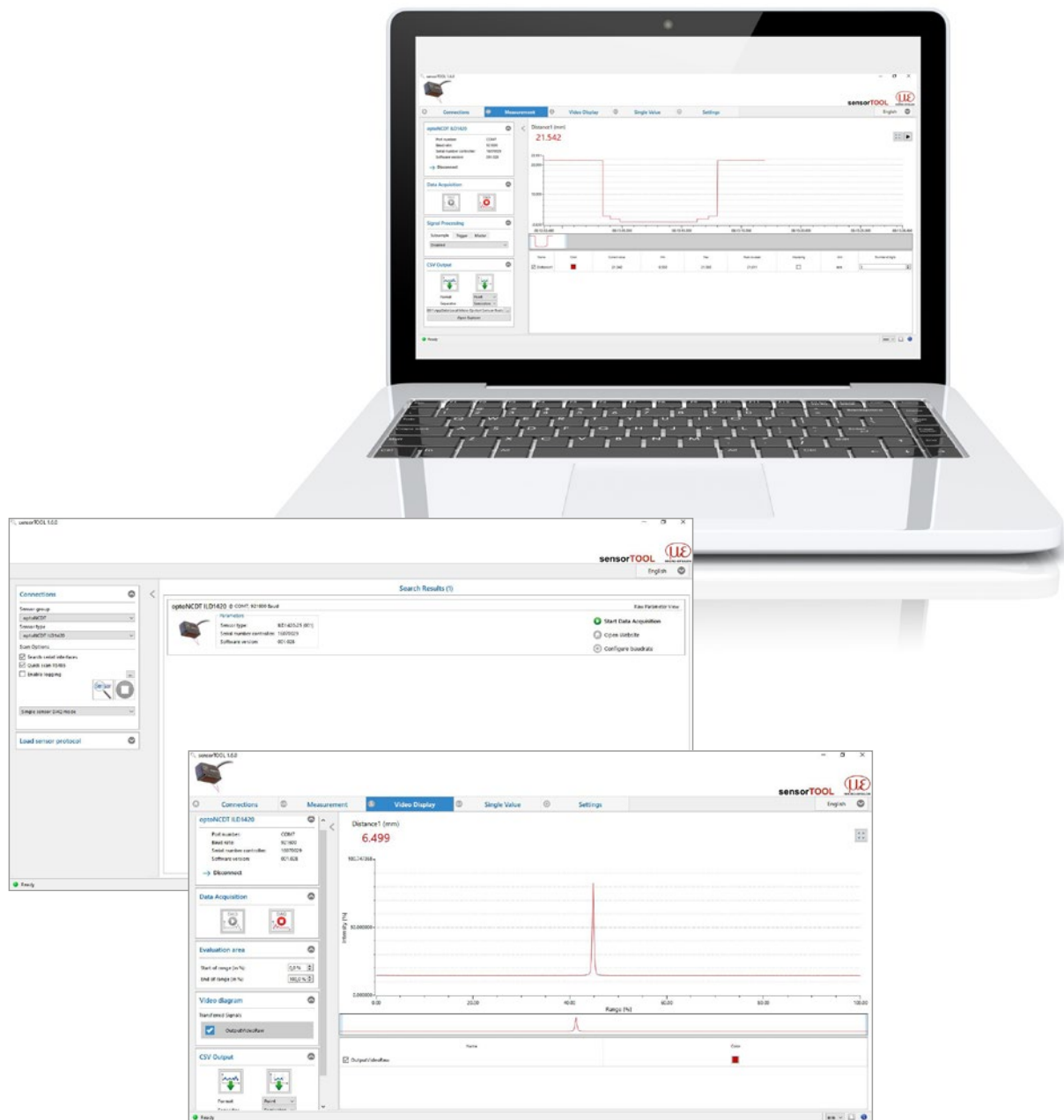
optoNCDT

| 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 ILD1710-50 / -50BL ILD1710-1000 / -1000BL 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