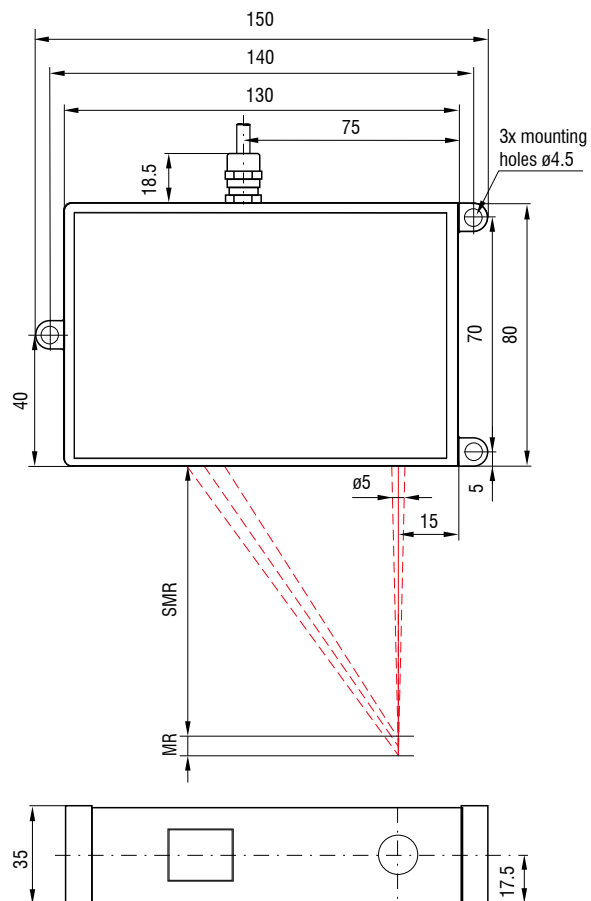




# Dimensions

## optoNCDT 2300

optoNCDT 2310 / Measuring ranges 10/20/40



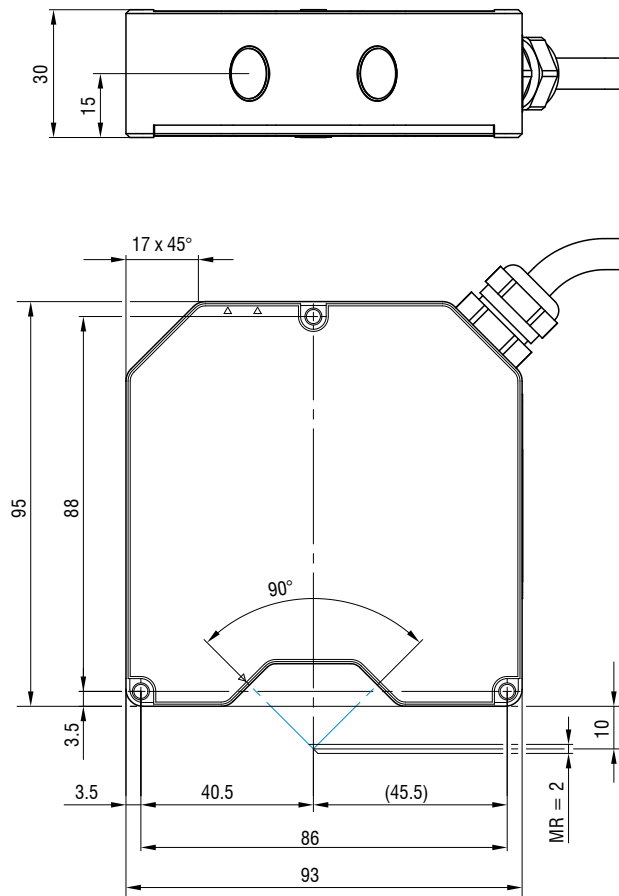
| MR | SMR | MMR | EMR |
|----|-----|-----|-----|
| 10 | 95  | 100 | 105 |
| 20 | 90  | 100 | 110 |
| 40 | 175 | 195 | 215 |

(Dimensions in mm, not to scale)

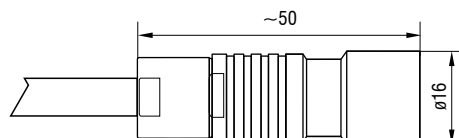
MR = measuring range; SMR = start of measuring range

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

optoNCDT 2300-2DR



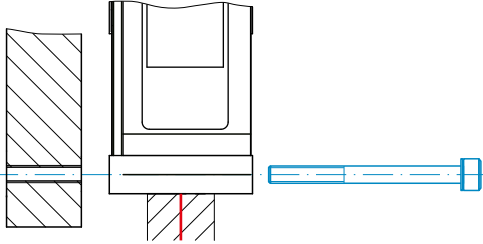
### Connector (sensor side)



Installation options

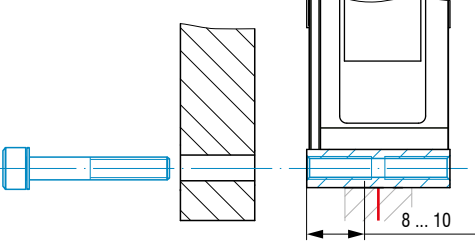
Housings M and L

**Bolt connection**



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

**Direct fastening**



|                                                    |    |
|----------------------------------------------------|----|
| ILD2300-2 ... ILD2300-100<br>ILD2300BL / ILD2300LL | -  |
| ILD2300-200 / -300<br>ILD2310-10 / -20 /-40        | M5 |
| ILD2310-50<br>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

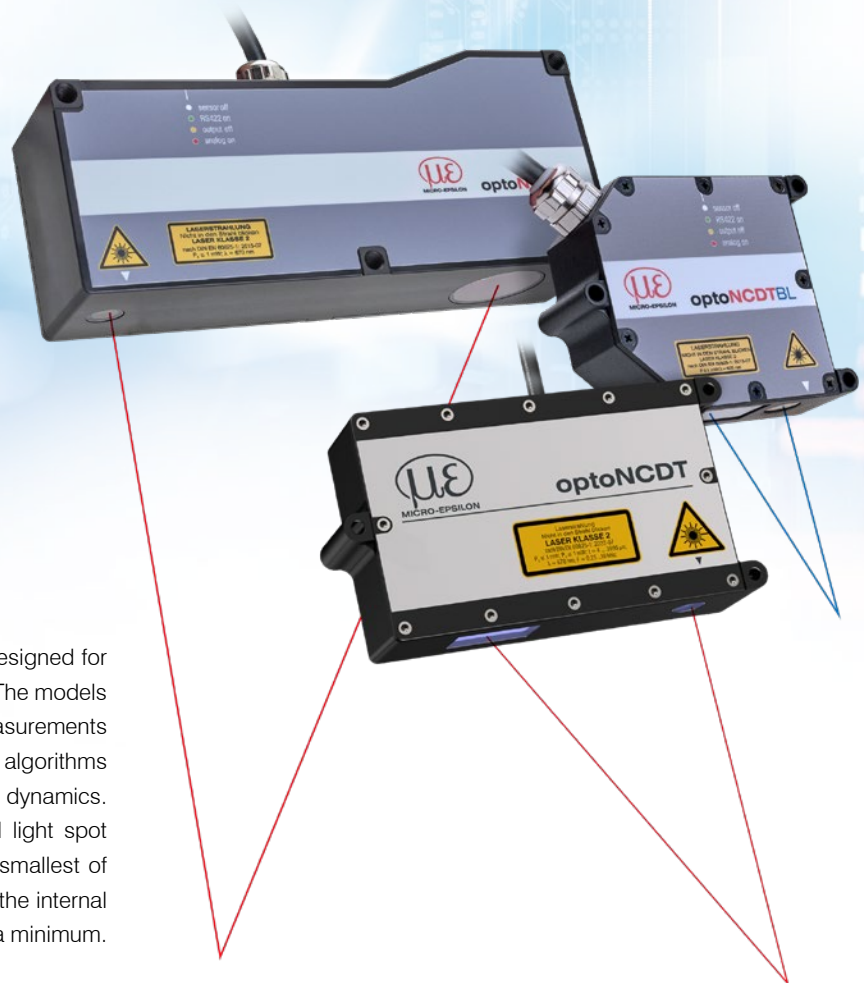
Article designation

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

# Powerful laser sensors for special applications

## optoNCDT 17x0 / optoNCDT 1910

-  Adjustable measuring rate up to 10 kHz
-  Analog (U/I) / RS422 / PROFINET / EtherNet/IP
-  Fast surface compensation
-  High repeatability
-  Ideal for large measurement distances



The optoNCDT 1910 and 1750 series laser sensors are designed for fast and precise measurements in industrial applications. The models are used for demanding surfaces and impress in measurements where large distances are required. Innovative evaluation algorithms and improved components enable high accuracy and dynamics. The high-performance optical system generates a small light spot onto the target which enables the detection of even the smallest of components reliably. The pigtail cable in conjunction with the internal controller reduces the installation effort for the sensors to a minimum.

### The intelligent exposure control for demanding surfaces

The optoNCDT 1750 sensors feature real-time surface compensation. 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. The optoNCDT 1910 sensors use Advanced Surface Compensation and are also highly resistant to ambient light.

### Ideal for industrial applications

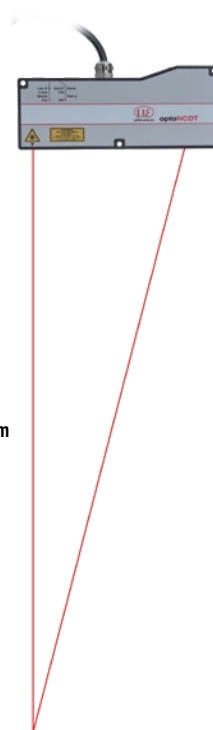
Different output signals enable the integration of the sensor into plant and machine control systems. As well as analog voltage and current outputs, a digital interface provides distance information from the sensor. Due to the universal setting and evaluation possibilities, the sensors meet all the requirements for use in industrial applications.

| Model            | Technology                                                                        | Measuring range | Repeatability          | Linearity   |
|------------------|-----------------------------------------------------------------------------------|-----------------|------------------------|-------------|
| optoNCDT 1750BL  |  | 2 - 750 mm      | 0.8 $\mu\text{m}$      | from 0.06 % |
| optoNCDT 1750-DR |  | 2 - 20 mm       | 0.1 $\mu\text{m}$      | 0.08 %      |
| optoNCDT 1760    |  | 1000 mm         | from 7.5 $\mu\text{m}$ | 0.10 %      |
| optoNCDT 1910    |  | 500 / 750 mm    | from 20 $\mu\text{m}$  | 0.07 %      |

### Large distance and large measuring range

The optoNCDT long-range models are used to cover a large measuring range or to measure from a large distance to the target. The long-range laser sensors combine high accuracy and large measuring distances.

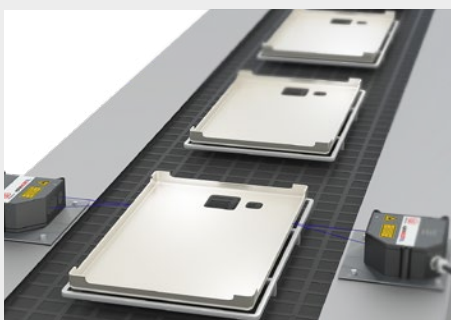
Measurement distances up to 2 m



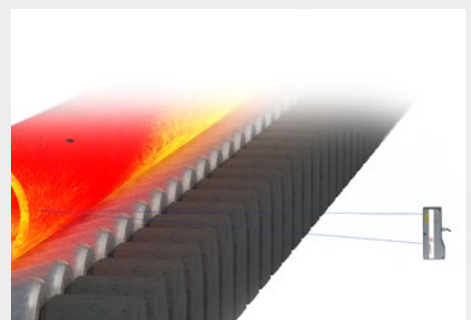
### Application examples



Geometry testing of reflective glass parts



Position check of plastic components



Position measurement of red-hot glowing pipes

# Technical data

## optoNCDT 17x0 Laser sensors for demanding objects

### optoNCDT 1750 (General technical data)

| Model                                         |           | ILD1750-xx                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measuring rate <sup>[1]</sup>                 |           | 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)                                                                                                                                                                                                                                                                                                  |
| Laser class                                   |           | Class 2 in accordance with DIN EN 60825-1: 2022-07                                                                                                                                                                                                                                                                                        |
| Permissible ambient light                     |           | 10,000 lx                                                                                                                                                                                                                                                                                                                                 |
| Supply voltage                                |           | 11 ... 30 VDC                                                                                                                                                                                                                                                                                                                             |
| Power consumption                             |           | < 3 W (24 V)                                                                                                                                                                                                                                                                                                                              |
| Signal input                                  |           | 1 x HTL/TTL laser on/off; 1 x HTL/TTL multi-function input: trigger in, slave in, zero setting, mastering, teach-in;<br>1 x RS422 synchronization input: trigger in, sync in, master/slave, master/slave alternating                                                                                                                      |
| Digital interface <sup>[2]</sup>              |           | RS422 (16 bit) / EtherCAT / PROFINET / EtherNet/IP                                                                                                                                                                                                                                                                                        |
| Analog output                                 |           | 4 ... 20 mA / 0 ... 5 V / 0 ... 10 V (16 bit, freely scalable within the measuring range)                                                                                                                                                                                                                                                 |
| Switching output                              |           | 2x switching outputs (error & limit value): npn, pnp, push pull                                                                                                                                                                                                                                                                           |
| Connection                                    |           | integrated pigtail 0.25 m with 14-pin ODU connector, min. bending radius 30 mm when firmly installed;<br>optional extension to 3 m / 10 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                                                                                                                                                                                                                                                                                                                                      |
| Material                                      |           | Zinc die-cast housing                                                                                                                                                                                                                                                                                                                     |
| Weight                                        |           | approx. 550 g (incl. pigtail)                                                                                                                                                                                                                                                                                                             |
| Control and indicator elements <sup>[3]</sup> |           | Select & function keys: interface selections, mastering (zero), teach, presets, quality slider, frequency selection, factory settings; web interface for setup: application-specific presets, peak selection, video signal, freely selectable averaging possibilities, data reduction, setup management 2 x color LEDs for power / status |

<sup>[1]</sup> Factory setting: measuring rate 4 kHz, modifying the factory setting requires the IF2001/USB converter (see accessories)

<sup>[2]</sup> EtherCAT, PROFINET and EtherNet/IP require connection via interface module (see accessories)

<sup>[3]</sup> Access to web interface requires connection to PC via IF2001/USB (see accessories)



## Blue laser - optoNCDT 1750BL

| Model                              |     | ILD1750-20BL                                    | ILD1750-200BL | ILD1750-500BL    | ILD1750-750BL |
|------------------------------------|-----|-------------------------------------------------|---------------|------------------|---------------|
| Measuring range                    |     | 20 mm                                           | 200 mm        | 500 mm           | 750 mm        |
| Start of measuring range           |     | 40 mm                                           | 100 mm        | 200 mm           | 200 mm        |
| Mid of measuring range             |     | 50 mm                                           | 200 mm        | 450 mm           | 575 mm        |
| End of measuring range             |     | 60 mm                                           | 300 mm        | 700 mm           | 950 mm        |
| Linearity <sup>[1]</sup>           |     | < ±12 μm                                        | < ±160 μm     | < ±350 μm        | < ±670 μm     |
|                                    |     | < ±0.06 % FSO                                   | < ±0.08 % FSO | < ±0.07 % FSO    | < ±0.09 % FSO |
| Repeatability <sup>[2]</sup>       |     | 0.8 μm                                          | 15 μm         | 20 μm            | 45 μm         |
| Light spot diameter <sup>[3]</sup> | SMR | 320 μm                                          | 1300 μm       | 1500 μm          | 1500 μm       |
|                                    | MMR | 45 μm                                           |               |                  |               |
|                                    | EMR | 320 μm                                          |               |                  |               |
| Light source                       |     | Semiconductor laser <1 mW, 405 nm (blue violet) |               |                  |               |
| Material                           |     | Die-cast zinc housing                           |               | Aluminum housing |               |

<sup>[1]</sup> FSO = Full Scale Output; the specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)

<sup>[2]</sup> Measuring rate 5 kHz, median 9

<sup>[3]</sup> ±10 %; SMR = Start of measuring range; MMR = Mid of measuring range; EMR = End of measuring range



## Direct reflection - optoNCDT 1750DR

| Model                              |     | ILD1750-2DR   | ILD1750-10DR | ILD1750-20DR |
|------------------------------------|-----|---------------|--------------|--------------|
| Measuring range                    |     | 2 mm          | 10 mm        | 20 mm        |
| Start of measuring range           |     | 24 mm         | 30.5 mm      | 53.5 mm      |
| Mid of measuring range             |     | 25 mm         | 35.5 mm      | 63.5 mm      |
| End of measuring range             |     | 26 mm         | 40.5 mm      | 73.5 mm      |
| Linearity <sup>[1]</sup>           |     | < ±1.6 µm     | < ±6 µm      | < ±12 µm     |
|                                    |     | < ±0.08 % FSO |              |              |
| Repeatability <sup>[2]</sup>       |     | 0.1 µm        | 0.4 µm       | 0.8 µm       |
| Measuring angle                    |     | 20°           | 17.6°        | 11.5°        |
| Light spot diameter <sup>[3]</sup> | SMR | 80 µm         | 110 µm       | 320 µm       |
|                                    | MMR | 35 µm         | 50 µm        | 45 µm        |
|                                    | EMR | 80 µm         | 110 µm       | 320 µm       |

<sup>[1]</sup> FSO = Full Scale Output; the specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)

<sup>[2]</sup> Measuring rate 5 kHz, median 9

<sup>[3]</sup> ±10 %; SMR = Start of measuring range; MMR = Mid of measuring range; EMR = End of measuring range

# Technical data

## optoNCDT 17x0 Laser sensors for large measuring ranges



### Long-Range - optoNCDT 1760

| Model                                         |           | ILD1760-1000                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measuring range                               |           | 1 000 mm                                                                                                                                                                                                                                                                                                                                  |
| Start of measuring range                      |           | 1 000 mm                                                                                                                                                                                                                                                                                                                                  |
| Mid of measuring range                        |           | 1 500 mm                                                                                                                                                                                                                                                                                                                                  |
| End of measuring range                        |           | 2 000 mm                                                                                                                                                                                                                                                                                                                                  |
| Measuring rate <sup>[1]</sup>                 |           | 6 adjustable stages: 7.5 kHz / 5 kHz / 2.5 kHz / 1.25 kHz / 625 Hz / 300 Hz                                                                                                                                                                                                                                                               |
| Linearity <sup>[2]</sup>                      |           | < ±1000 µm                                                                                                                                                                                                                                                                                                                                |
|                                               |           | < ±0.1 % FSO                                                                                                                                                                                                                                                                                                                              |
| Repeatability <sup>[3]</sup>                  |           | 100 µm                                                                                                                                                                                                                                                                                                                                    |
| Light spot diameter <sup>[4]</sup>            | SMR       | 2500 ... 5000 µm                                                                                                                                                                                                                                                                                                                          |
|                                               | MMR       |                                                                                                                                                                                                                                                                                                                                           |
|                                               | EMR       |                                                                                                                                                                                                                                                                                                                                           |
| Light source                                  |           | Semiconductor laser < 1 mW, 670 nm (red)                                                                                                                                                                                                                                                                                                  |
| Laser class                                   |           | Class 2 in accordance with DIN EN 60825-1: 2022-07                                                                                                                                                                                                                                                                                        |
| Permissible ambient light                     |           | 10,000 lx                                                                                                                                                                                                                                                                                                                                 |
| Supply voltage                                |           | 11 ... 30 VDC                                                                                                                                                                                                                                                                                                                             |
| Max. current consumption                      |           | 150 mA (24 V)                                                                                                                                                                                                                                                                                                                             |
| Signal input                                  |           | 1 x HTL/TTL laser on/off; 1 x HTL/TTL multi-function input: trigger in, slave in, zero setting, mastering, teach-in;<br>1 x RS422 synchronization input: trigger in, sync in, master/slave, master/slave alternating                                                                                                                      |
| Digital interface <sup>[5]</sup>              |           | RS422 (16 bit) / EtherCAT / PROFINET / EtherNet/IP                                                                                                                                                                                                                                                                                        |
| Analog output                                 |           | 4 ... 20 mA / 0 ... 5 V / 0 ... 10 V (16 bit, freely scalable within the measuring range)                                                                                                                                                                                                                                                 |
| Switching output                              |           | 2x switching outputs (error & limit value): npn, pnp, push pull                                                                                                                                                                                                                                                                           |
| Connection                                    |           | integrated pigtail 0.25 m with 14-pin ODU connector, min. bending radius 30 mm when firmly installed;<br>optional extension to 3 m / 10 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                                                                                                                                                                                                                                                                                                                                      |
| Material                                      |           | Aluminum housing                                                                                                                                                                                                                                                                                                                          |
| Weight                                        |           | approx. 800 g (incl. pigtail)                                                                                                                                                                                                                                                                                                             |
| Control and indicator elements <sup>[6]</sup> |           | Select & function keys: interface selections, mastering (zero), teach, presets, quality slider, frequency selection, factory settings; web interface for setup: application-specific presets, peak selection, video signal, freely selectable averaging possibilities, data reduction, setup management 2 x color LEDs for power / status |

<sup>[1]</sup> Factory setting 5 kHz, modifying the factory setting requires the IF2001/USB converter (see accessories)

<sup>[2]</sup> FSO = Full Scale Output; the specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)

<sup>[3]</sup> Measuring rate 5 kHz, median 9

<sup>[4]</sup> ±10 %; SMR = Start of measuring range; MMR = Mid of measuring range; EMR = End of measuring range

<sup>[5]</sup> EtherCAT, PROFINET and EtherNet/IP require connection via interface module (see accessories)

<sup>[6]</sup> Access to web interface requires connection to PC via IF2001/USB (see accessories)





optoNCDT 1910

| Model                                         |           | ILD1910-500                                                                                                                                                                                                                                                                                                                                | ILD1910-750    |
|-----------------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Measuring range                               |           | 500 mm                                                                                                                                                                                                                                                                                                                                     | 750 mm         |
| Start of measuring range                      |           | 200 mm                                                                                                                                                                                                                                                                                                                                     | 200 mm         |
| Mid of measuring range                        |           | 450 mm                                                                                                                                                                                                                                                                                                                                     | 575 mm         |
| End of measuring range                        |           | 700 mm                                                                                                                                                                                                                                                                                                                                     | 950 mm         |
| Measuring rate <sup>[1]</sup>                 |           | continuously adjustable between 0.25 ... 9.5 kHz<br>or 7 adjustable stages: 9.5 kHz / 8 kHz / 4 kHz / 2 kHz / 1.0 kHz / 500 Hz / 250 Hz                                                                                                                                                                                                    |                |
| Linearity <sup>[2]</sup>                      |           | < ±0.07 % FSO                                                                                                                                                                                                                                                                                                                              | ±0.08 % FSO    |
|                                               |           | ±350 µm                                                                                                                                                                                                                                                                                                                                    | ±600 µm        |
| Repeatability <sup>[3]</sup>                  |           | 20 µm                                                                                                                                                                                                                                                                                                                                      | 30 µm          |
| Light spot diameter <sup>[4]</sup>            |           | 800 x 800 µm                                                                                                                                                                                                                                                                                                                               | 1100 x 1100 µm |
| Light source                                  |           | Semiconductor laser ≤ 1 mW, 670 nm (red) with laser class 2                                                                                                                                                                                                                                                                                |                |
| Laser class                                   |           | Class 2 in accordance with IEC 60825-1: 2014 (Class 3 available on request)                                                                                                                                                                                                                                                                |                |
| Permissible ambient light <sup>[5]</sup>      |           | 10,000 lx                                                                                                                                                                                                                                                                                                                                  |                |
| Supply voltage                                |           | 11 ... 30 VDC                                                                                                                                                                                                                                                                                                                              |                |
| Power consumption                             |           | < 3 W (24 V)                                                                                                                                                                                                                                                                                                                               |                |
| Signal input                                  |           | 1 x HTL/TTL laser on/off;<br>1 x HTL/TTL multi-function input: trigger in, slave in, zero setting, mastering, teach-in;<br>1 x RS422 synchronization input: trigger in, sync in, master/slave, master/slave alternating                                                                                                                    |                |
| Digital interface <sup>[6]</sup>              |           | RS422 (18 bit) / EtherCAT / PROFINET / EtherNet/IP                                                                                                                                                                                                                                                                                         |                |
| Analog output                                 |           | 4 ... 20 mA / 0 ... 5 V / 0 ... 10 V (16 bit, freely scalable within the measuring range)                                                                                                                                                                                                                                                  |                |
| Switching output                              |           | 2x switching outputs (error & limit value): npn, pnp, push pull                                                                                                                                                                                                                                                                            |                |
| Connection                                    |           | integrated pigtail 0.3 m with 17-pin M12 plug;<br>optional extension to 3 m / 6 m / 9 m / 15 m possible (suitable connection cable see Accessories)                                                                                                                                                                                        |                |
| 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                                                                                                                                                                                                                                                                                                                                       |                |
| Material                                      |           | Aluminum housing                                                                                                                                                                                                                                                                                                                           |                |
| Weight                                        |           | approx. 600 g (incl. pigtail)                                                                                                                                                                                                                                                                                                              |                |
| Control and indicator elements <sup>[7]</sup> |           | Select & function keys: interface selections, mastering (zero), teach, presets, quality slider, frequency selection, factory settings; web interface for setup: application-specific presets, peak selection, video signal, freely selectable averaging possibilities, data reduction, setup management; 2 x color LEDs for power / status |                |

<sup>[1]</sup> Factory setting 4 kHz, median 9, modifying the factory setting requires the IF2001/USB converter (see accessories)

<sup>[2]</sup> FSO = Full Scale Output; data related to the digital output and valid for white, diffusely reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)

<sup>[3]</sup> Typical value with measurements at 4 kHz and median 9

<sup>[4]</sup> ±15 %; light spot diameter determined with point-shaped laser with Gaussian fit (full 1/e<sup>2</sup> width)

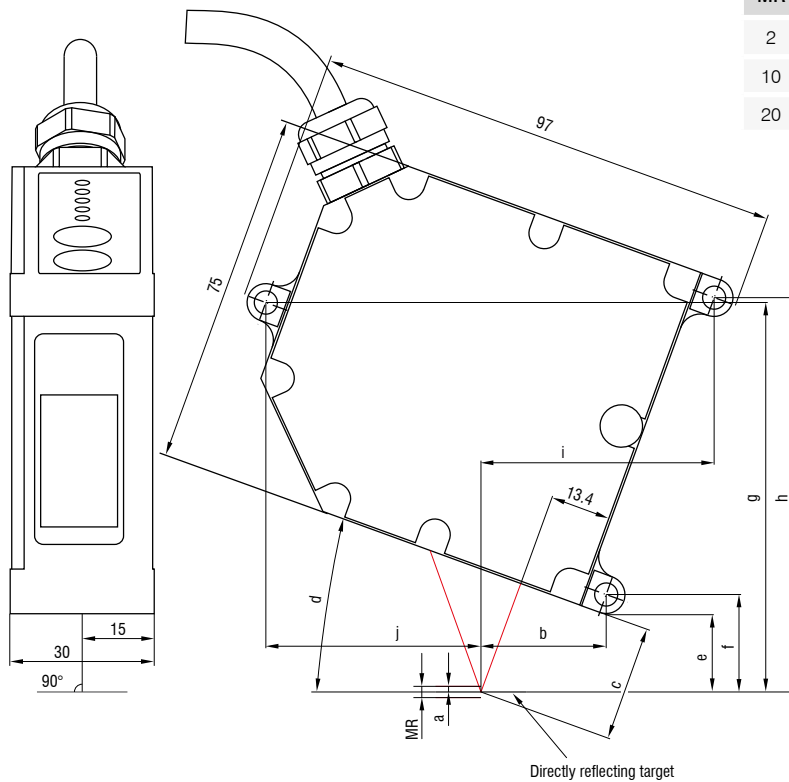
<sup>[5]</sup> Illuminant: light bulb

<sup>[6]</sup> For EtherCAT, PROFINET and EtherNet/IP, connection via interface module is required (see accessories)

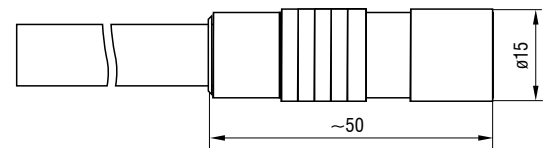
<sup>[7]</sup> Access to web interface requires connection to PC via IF2001/USB (see accessories)

optoNCDT 1750DR

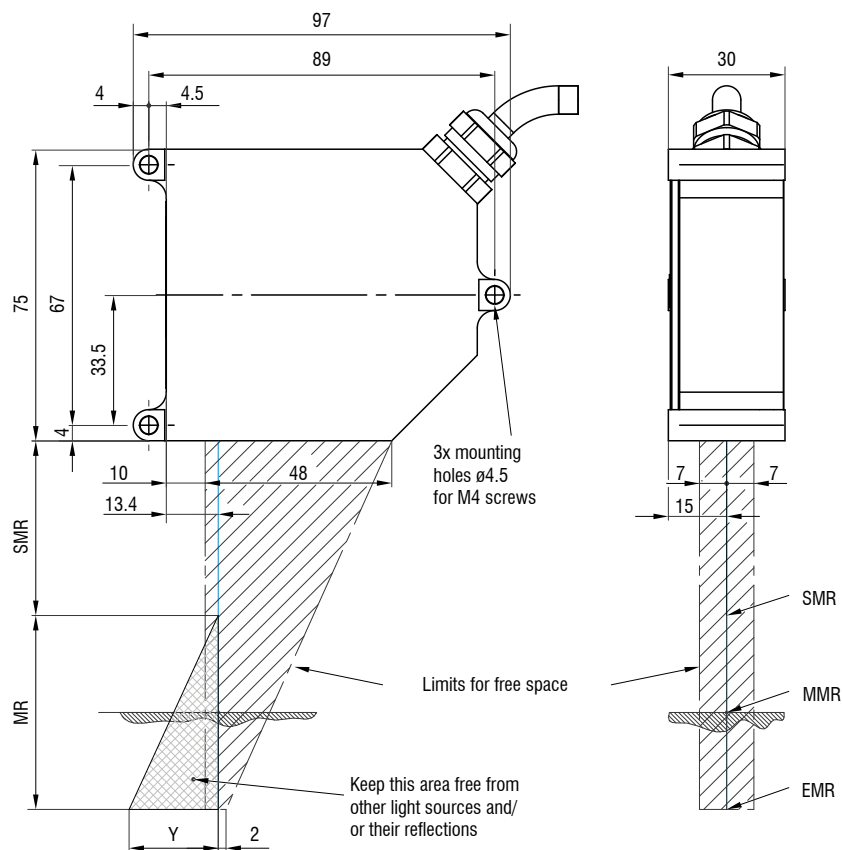
| MR | a  | b    | c    | d      | e    | f    | g     | h     | i    | j    |
|----|----|------|------|--------|------|------|-------|-------|------|------|
| 2  | 1  | 26.5 | 25   | 20 °   | 16.7 | 20.7 | 82.6  | 83.7  | 49.5 | 45.6 |
| 10 | 5  | 29   | 35.5 | 17.6 ° | 28.3 | 32.3 | 91.1  | 96.2  | 49.2 | 45.7 |
| 20 | 10 | 30.9 | 63.5 | 11.5 ° | 58.6 | 62.6 | 113.2 | 128.2 | 44.3 | 49.6 |



Connector (sensor side)



**optoNCDT 1750BL** / Measuring ranges 20 / 200



| MR  | SMR | Y  |
|-----|-----|----|
| 20  | 40  | 12 |
| 200 | 100 | 70 |

Connector (sensor side)

