# More Precision

**opto**NCDT // Laser displacement sensors (triangulation)

# Powerful laser sensors for special applications
## optoNCDT 17x0 / optoNCDT 1910

| | |
|---|---|
| Hz | Adjustable measuring rate up to 10 kHz |
| INTER FACE | Analog (U/I) / RS422 / PROFINET / EtherNet/IP |
| RTSC | Fast surface compensation |
| | High repeatability |
| | Ideal for large measurement distances |
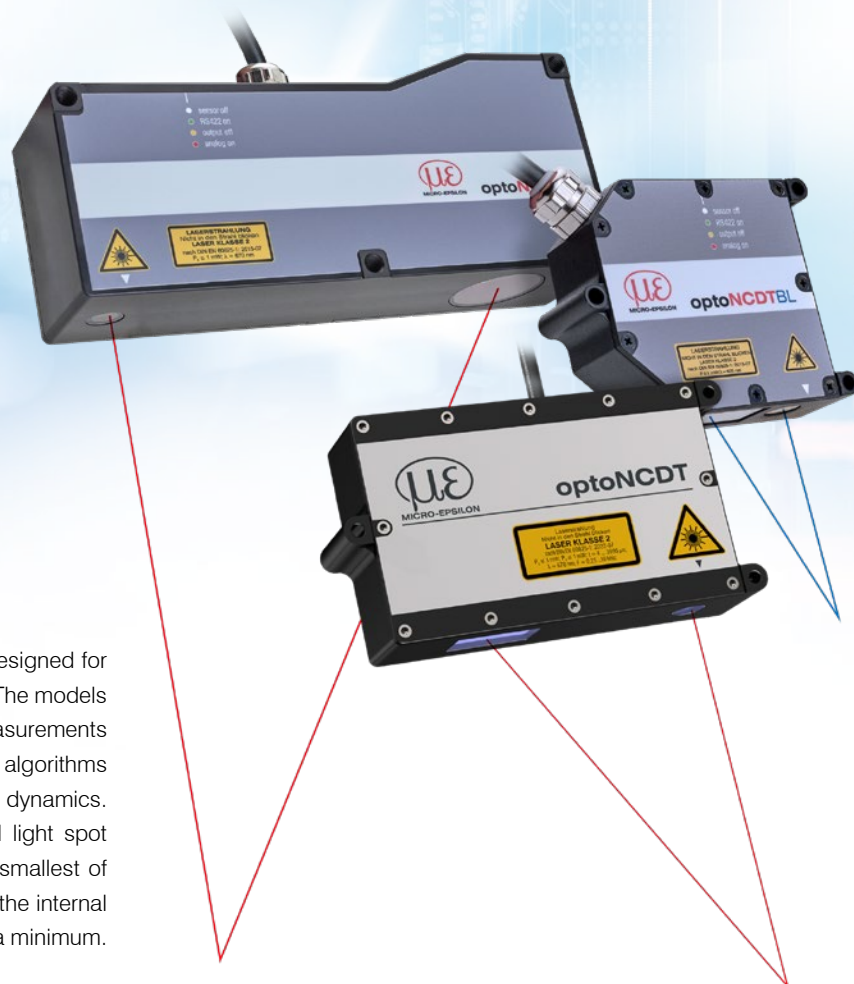
The optoNCDT 1910 and 1750 series laser sensors are designed for fast and precise measurements in industrial applications. The models are used for demanding surfaces and impress in measurements where large distances are required. Innovative evaluation algorithms and improved components enable high accuracy 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 $\mu m$ | from 0.06 % |
| optoNCDT 1750-DR | | 2 - 20 mm | 0.1 $\mu m$ | 0.08 % |
| optoNCDT 1760 | | 1000 mm | from 7.5 $\mu m$ | 0.10 % |
| optoNCDT 1910 | | 500 / 750 mm | from 20 $\mu m$ | 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.
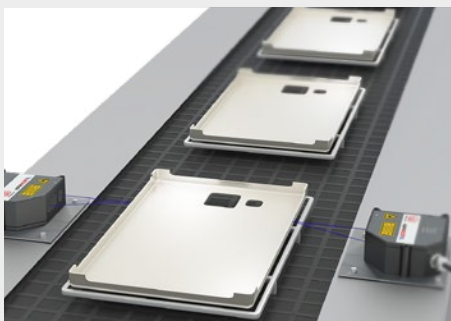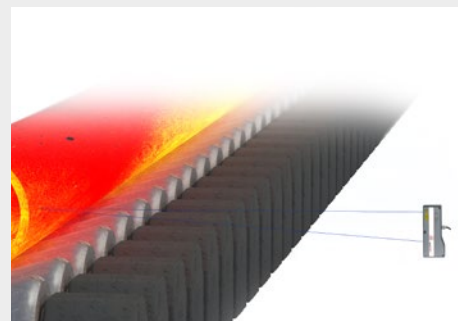
**Measurement distances up to 2 m**
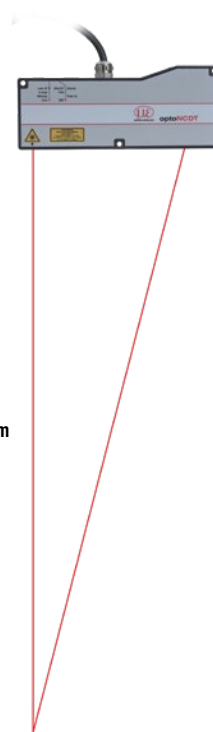
## Application examples

Geometry testing of reflective glass parts

Position check of plastic components

Position measurement of red-hot glowing pipes

## Blue laser - optoNCDT 1750BL

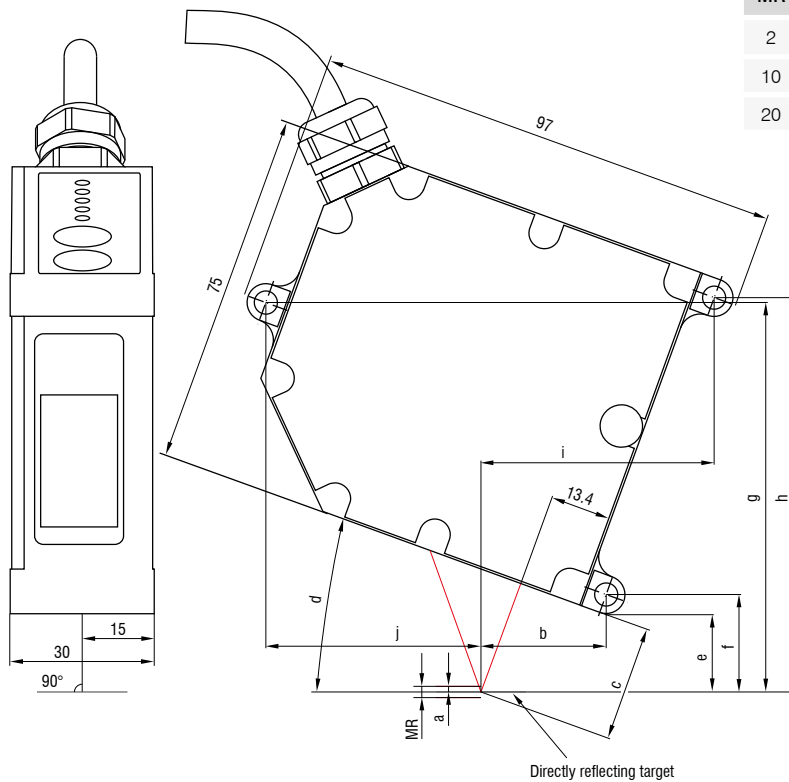| Model | ILD1750-20BL | ILD1750-200BL | ILD1750-500BL | ILD1750-750BL |
|---|---|---|---|---|
| Measuring range | 20 mm | 200 mm | 500 mm | 750 mm |
| Start of measuring range | 40 mm | 100 mm | 200 mm | 200 mm |
| Mid of measuring range | 50 mm | 200 mm | 450 mm | 575 mm |
| End of measuring range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

[1] FSO = Full Scale Output; the specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)
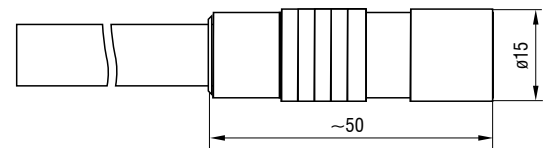[2] Measuring rate 5 kHz, median 9
[3] ±10 %; SMR = Start of measuring range; MMR = Mid of measuring range; EMR = End of measuring range

## 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 [1] | < ±1.6 $\mu$m | < ±6 $\mu$m | < ±12 $\mu$m |
| | < ±0.08 % FSO | | |
| Repeatability [2] | 0.1 $\mu$m | 0.4 $\mu$m | 0.8 $\mu$m |
| Measuring angle | 20° | 17.6° | 11.5° |
| Light spot diameter [3] — SMR | 80 $\mu$m | 110 $\mu$m | 320 $\mu$m |
| Light spot diameter [3] — MMR | 35 $\mu$m | 50 $\mu$m | 45 $\mu$m |
| Light spot diameter [3] — EMR | 80 $\mu$m | 110 $\mu$m | 320 $\mu$m |

[1] FSO = Full Scale Output; the specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)
[2] Measuring rate 5 kHz, median 9
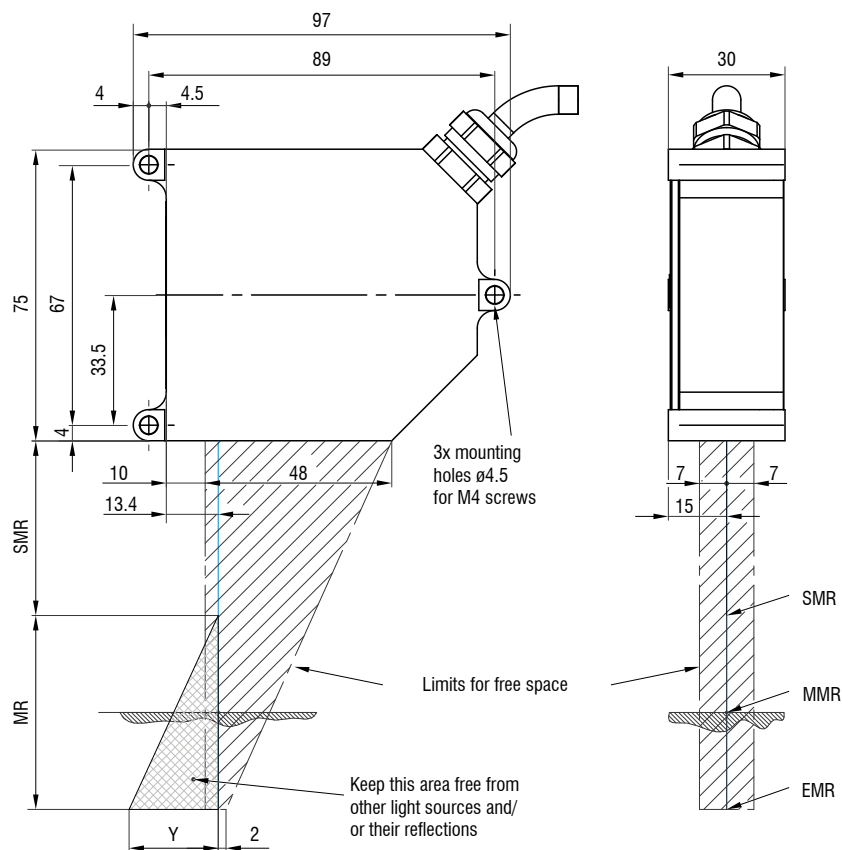[3] ±10 %; SMR = Start of measuring range; MMR = Mid of measuring range; EMR = End of measuring range

# Dimensions
## optoNCDT 17x0

### 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 |

Directly reflecting target

**Connector (sensor side)**



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



3x mounting
holes ø4.5
for M4 screws

Limits for free space

Keep this area free from
other light sources and/
or their reflections

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

**Connector (sensor side)**
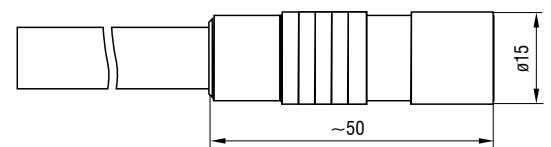
# Connection possibilities
## optoNCDT 17x0 / 1910

## optoNCDT 1750 / 1760

### Drag-chain suitable extension and adapter cables

| | |
|---|---|
| Cable diameter: | 6.8 ±0.2 mm |
| Drag chain: | yes |
| Robot: | no |
| Temperature range: | -40 … 90 °C (moving /not moving) |
| Bending radius: | > 55 mm (fixed installation / dynamic / drag chain) |

| Sensor | Cables | Type | | Connection possibilities and accessories | |
|---|---|---|---|---|---|
| ILD1750-xxBL ILD1750-xxDR ILD1760-1000 | **Extension cable pigtail** Length 3 m / 6 m / 9 m / 15 m <br><br> *Art. no.*  *Designation* <br> 2901189  PC1700-3 <br> 2901357  PC1700-6 <br> 2901191  PC1700-10 <br> 2901266  PC1700-15 | Open ends | | **Supply voltage connection** Power supply unit PS2020 | |
| | | | | **Interface module of RS422 to USB** IF2001/USB <br> IC2001/USB | |
| | | | | **Interface module for Industrial Ethernet connection** IF2035-PROFINET <br> IF2035-EIP <br> IF2035-EtherCAT | |
| | **Adapter cable for PC interface card** Length 3 m / 6 m <br><br> *Art. no.*  *Designation* <br> 2901555  PC1700-3/IF2008 <br> 2901556  PC1700-6/IF2008 <br> 2901557  PC1700-8/IF2008 | Sub-D | | **Interface card for synchronous data acquisition** IF2008PCIe / IF2008E | |
| | | | | **4-fold USB converter** IF2004/USB | |
| | **Adapter cable for sensor calculation** Length 3 m / 6 m / 9 m <br><br> *Art. no.*  *Designation* <br> 29011173  PC1750-3/C-Box <br> 29011180  PC1750-6/C-Box <br> 29011181  PC1750-9/C-Box | Sub-D | | **Controller for D/A conversion and evaluation of up to 2 sensor signals** Dual Processing Unit | |

### Robot-suitable extension cables

| | |
|---|---|
| Cable diameter: | max. 9 mm |
| Drag chain: | no |
| Robot: | yes |
| Temperature range: | -40 … 70 °C (moving / not moving) |
| Bending radius: | 110 mm (dynamic) |

| Sensor | Cables | Type | | Connection possibilities and accessories | |
|---|---|---|---|---|---|
| ILD1750-xxBL ILD1750-xxDR ILD1760-1000 | **Extension cable pigtail:** Length 3 m / 6 m / 9 m / 15 m <br><br> *Art. no.*  *Designation* <br> 2901494  PCR1700-5 <br> 2901299  PCR1700-10 | Open ends | | **Connection supply voltage** PS2020 | |
| | | | | **Interface module from RS422 to USB** IF2001/USB <br> IC2001/USB | |
| | | | | **Interface module for Industrial Ethernet connection** IF2035-PROFINET <br> IF2035-EIP <br> IF2035-EtherCAT | |

## Extension cables for high temperatures

| | |
|---|---|
| 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 | |
|---|---|---|---|---|
| ILD1750-xxBL<br>ILD1750-xxDR<br><br>ILD1760-1000 | **Extension cables high temperatures**<br>Length 3 m / 6 m / 9 m / 15 m<br><br>*Art. no.*     *Designation*<br>29011091    PC1700-3/OE/HT<br>29011092    PC1700-6/OE/HT<br>29011094    PC1700-15/OE/HT | Open ends | **Supply voltage connection**<br>Power supply unit PS2020 | |
| | | | **Interface module of RS422 to USB**<br>IF2001/USB | |
| | | | **Interface module for Industrial Ethernet connection**<br>IF2035-PROFINET<br>IF2035-EIP<br>IF2035-EtherCAT | |

## Other cables

| | |
|---|---|
| Cable diameter: | 6.7 mm |
| Drag chain: | yes |
| Robot: | no |
| Temperature range: | -40 … 80 °C |
| Bending radius: | > 27 mm (fixed installation) |
| | > 51 mm (dynamic) |

| Input | Cables | Type | Connection possibilities and accessories | |
|---|---|---|---|---|
| 2 x Sub-D<br><br>(PC1700-x/<br>IF2008) | **Adapter cables for 4-fold sensor connection**<br>Length 0.1 m<br><br>*Art. no.*     *Designation*<br>2901528     IF2008-Y-adapter cable | Sub-D | **Interface card for synchronous data acquisition**<br>IF2008PCIe / IF2008E | |
| | | | **4-fold USB converter & parameter setting**<br>IF2004/USB | |

## optoNCDT 1910

**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.
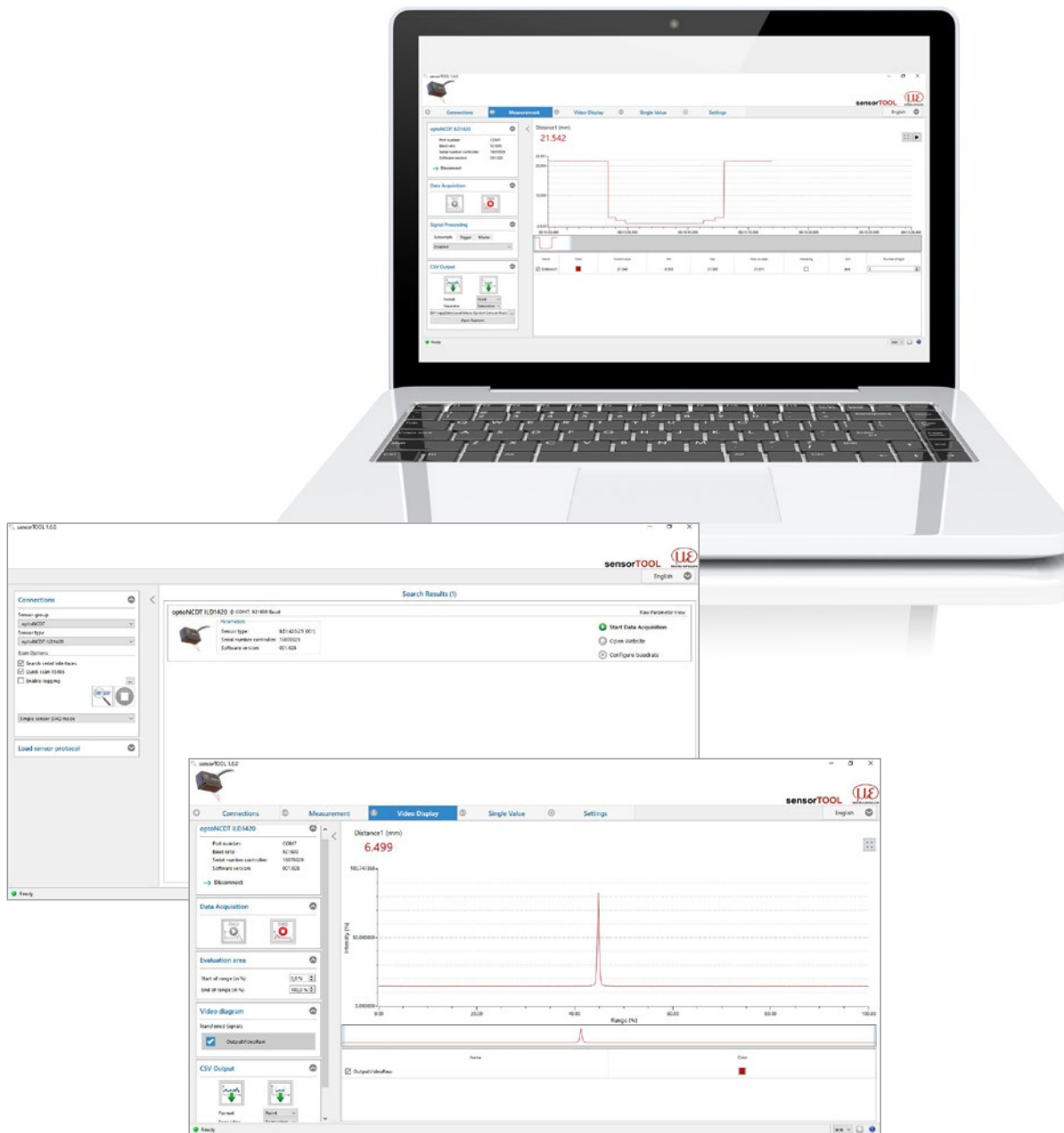


**Free download**

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
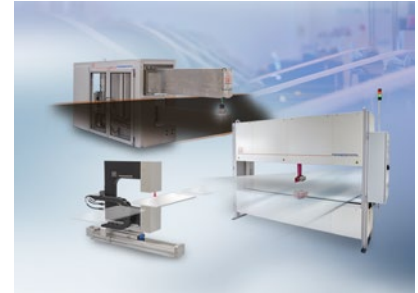www.micro-epsilon.de/download

# Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, distance and position



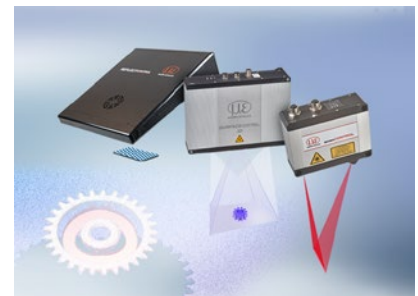Sensors and measurement devices for non-contact temperature measurement



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