**MICRO-EPSILON**

# Laser Triangulation Displacement Sensors

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|---|---|
| | **High accuracy and long standoff distances** |
| | **Model with measuring range up to 1000mm** |
| | **Compact design with integrated controller** |
| 312Hz 375Hz 1000Hz | **Adjustable measuring rate up to 2.5kHz** |
| *RTSC* | **Real Time Surface Compensation** |
| *A*nalog *D*igital | **Analogue (U/I) and digital output** |
| *F*ilter inside | **Adjustable filter functions (firmware)** |
| Certified | **Calibration certificate included** |
| //www. | **Configuration via software www.micro-epsilon.com/download** |

The optoNCDT 1710-1000 laser sensors are unrivalled in measurement performance worldwide. The sensor can measure over a working range of 1,000mm. The start of measurement is 1,000mm from the sensor body which means that objects upto 2m in distance can be measured. The controller is integrated into the housing of the sensor which means that external electronic processing is not required. The sensor operates with automatic, real time surface compensation, RTSC which auto adapts the laser intensity to the surface being measured. Additionally built in, programmable limit switch give the sensor further integration flexibility.

operator panel

field of view - keep free

M 1:2

connector cable 0.25m

SMR =1000      MR= 1000
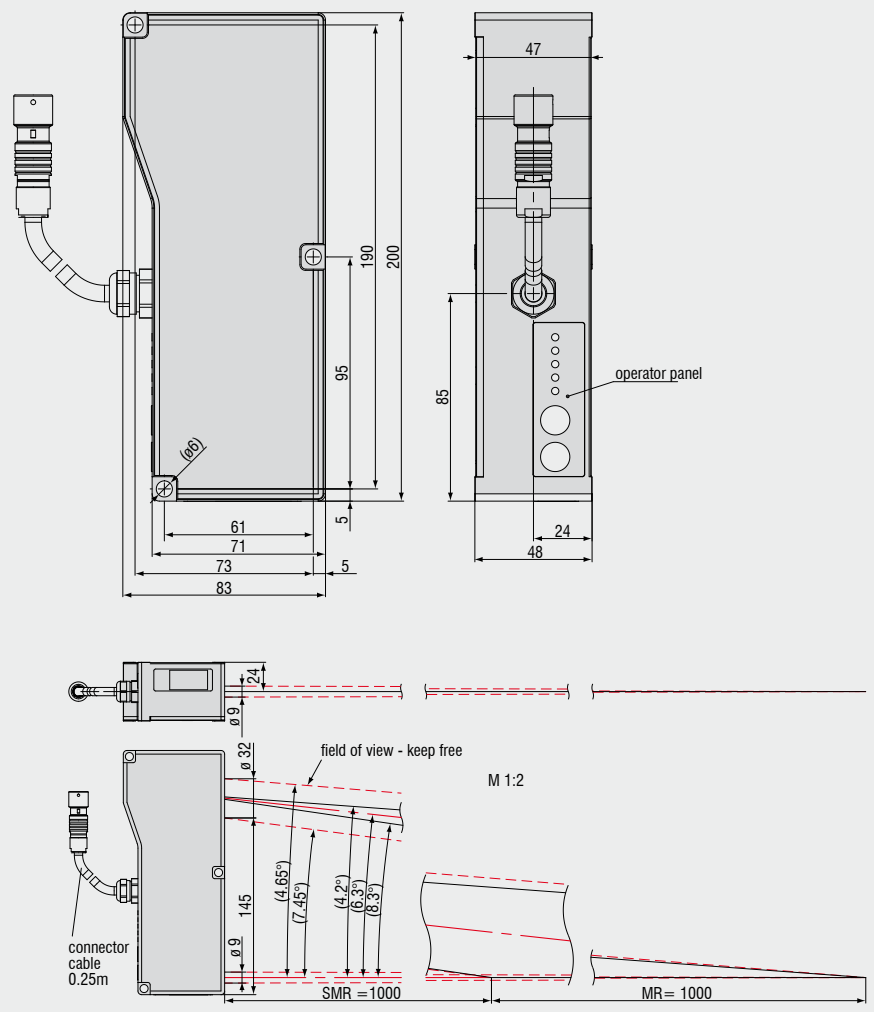
| Model | ILD1710-1000 |
|---|---|
| Measuring range | 1000mm |
| Start of measuring range | 1000mm |
| Midrange | 1500mm |
| End of measuring range | 2000mm |
| Linearity ≤ ±0.1% FSO | ±1mm |
| Resolution (at 2.5kHz without averaging) | 100$\mu$m |
| Measuring rate | 2.5kHz / 1.25kHz / 625Hz / 312.5Hz (adjustable) |
| Light source | semiconductor laser <1mW, 670nm (red) |
| Permissable ambient light at 2.5kHz | 10,000lx |
| Laser safety class | class 2 IEC 60825-1 : 2008-05 |
| Spot diameter SMR | 2.5…5mm |
| Spot diameter MMR | 2.5…5mm |
| Spot diameter EMR | 2.5…5mm |
| Temperature stability | 0.01 % FSO/℃ |
| Operation temperature | 0 … 50℃ |
| Storage temperature | -20 ... +70℃ |
| Output measurements | switchable: 4 ... 20 mA / 0 ... 10 V / RS 422 / USB (optional via cable PC1700-3/USB) |
| Output switching outputs | 1 x error or 2x limit values (configurable) |
| Switching input | Laser ON-OFF / Zero |
| Operation | via keypad directly on the sensor and/or via PC with ILD1700 Tool |
| Power supply | 24VDC (11 … 30 VDC), max. 150mA |
| Electromagnetic compatibility (EMC) | EN 61000-6-3 and EN 61000-6-2 |
| Sensor cable | standard 0.25m integrated |
| Synchronisation | possible for simultaneous or alternating measurements |
| Protection class | IP 65 |
| Vibration | 2g / 20 … 500Hz |
| Shock | 15g / 6ms |
| Weight | ~ 0.8kg |

FSO = Full Scale Output   All specifications apply for a diffusely reflecting matt white ceramic target
SMR = Start of measuring range; MMR = Midrange; EMR = End of measuring range;

**Accessories for all optoNCDT Series**

Power supply

_PS 2020_ (Power Supply 24 V / 2,5 A, Input 100 - 240 VAC, output 24 VDC / 2.5 A, for snap in mounting on DIN 50022 rail)

Controller

_CSP 2008_ (controller for processing of multiple sensor signals; analogue and digital interfaces)

Interface card

_IF2008_ (Interface card for individual signal processing; analogue and digital interfaces)

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**Accessories optoNCDT 1302 / 1402**

Supply and output cable, rated for moving cable tracks (also available in 90° version)

_PC 1402-3/I_ (3m, output 4 ... 20mA)

_PC 1402-6/I_ (6m, output 4 ... 20mA)

_PC 1402-3/U_ (3m, with integral resistance, output 1 ... 5VDC)

_PC 1402-6/U_ (6m, with integral resistance, output 1 ... 5VDC)

_PC1402-3/IF2008_ (3m, supply and output cable)

_PC 1402-3/USB_ (3m, supply and output cable)

_PC1401/1402-0.2_ (0.2m, adapter cable 12-pin to 7-pin)

_PC 1402-3/CSP_ (3m, required for CSP 2008, optoNCDT 1402 only)

Supply and output cable, robot rated (available in 90° version)

PCR 1402-3/l (3m)

PCR 1402-6/l (6m)

PCR 1402-8/l (8m)

Protective housing

_SGH 1800_

_SGHF 1800_

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**Accessories optoNCDT 1607 / 1627**

Supply and output cable

_PC 1605-3_ (3m)

_PC 1605-6_ (6m)

_PC 1607-3/RS232_ (3m, with 9-pin Sub-D connector for RS232)

Protective housing

_SGF 1605-20_ (for LD1607-2/4/10/20)

_SGF 1605-200_ (for LD1607-50/100/200)

_SGL_ with connection for compressed air

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**Accessories optoNCDT 1700/1700LL**

Supply and output cable (drag chain rated)

_PC 1700-3_ (3m)

_PC 1700-10_ (10m)

_PC 1700-10/3/IF2008_ (10m, for use with interface card IF2008)

_PC 1700-3/T_ (3m, for use with trigger box)

_PC 1700-10/T_ (10m, for use with trigger box)

_PC 1700-3/USB_ (3m, with USB-RS422-converter, power supply 90 ... 230 VAC)

Supply and output cable (robot rated)

PCR 1700-5 (5m)

PCR 1700-10 (10m)

Protective housing

_SGH 1800_ (for ILD 1700-2/10/20/50/100/200/250VT and ILD 1700-2LL/10LL/20LL/50LL)

_SGH 2200-200_ (for ILD 1700-40/500/750)

_SGxF 1800_ (option with compressed air clean setup)

_SGxF 2200-200_ (option with compressed air clean setup)

External trigger

_Triggerbox 1700_ (Electronics for triggering optoNCDT 1700 sensors. Acceptable trigger levels from +2.4VDC to +24VDC, L/W/H 98x64x34mm)

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**Accessories optoNCDT 2200(LL) / 2220(LL) / 1710-50 / 2210**

Supply and output cable (drag chain rated)

_PC 1800-3_ (3m)

_PC 1800-8_ (8m)

_PC2200-3/10/RS485_ (3m, RS 485 for use with interface card IF2008)

_PC 2200-3/3/RS422_ (3m, for IF2008/RS422/USB-converter)

Sensor cable extension (drag chain rated)

_CE 1800-3_ (3m)

_CE 1800-8_ (8m)

Protective housing (only for series 2200, 2200LL, 2220, 2220LL)

_SGx 1800_ (for ILD 2200-2/10/20/50/100, ILD 2200-2LL/10LL/20LL/50LL, ILD 2220-2/10/20/50/100, ILD 2220-2LL/10LL/20LL/50LL)

_SGH 2200-200_ (for ILD 2200-40/200, ILD 2220-200)

SGxF 1800 (option with compressed air clean setup)

SGxF 2200-200 (option with compressed air clean setup)

**Accessories optoNCDT 2300**

Supply and output cable

_PC2300-0,5Y_ (Connecting cable to PC or SPS; for operation a PC2300-3/SUB-D will be required)

_PC2300-3/SUB-D_ (3m; for operation a PC2300-0,5Y will be required)

_PC2300-3/CSP_ (3m, connecting cable ILD2300 and CSP2008)

_PC2300-10/CSP_ (10m, connecting cable ILD2300 and CSP2008)

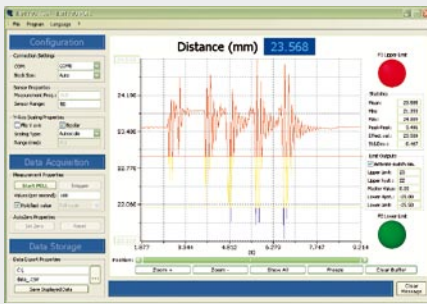_PC2300-15/CSP_ (15m, connecting cable ILD2300 and CSP2008)

_PC2300-3/IF2008_ (3m, interface and supply cable)

_PC2300-3/OE_ (3m)

_PC2300-6/OE_ (6m)

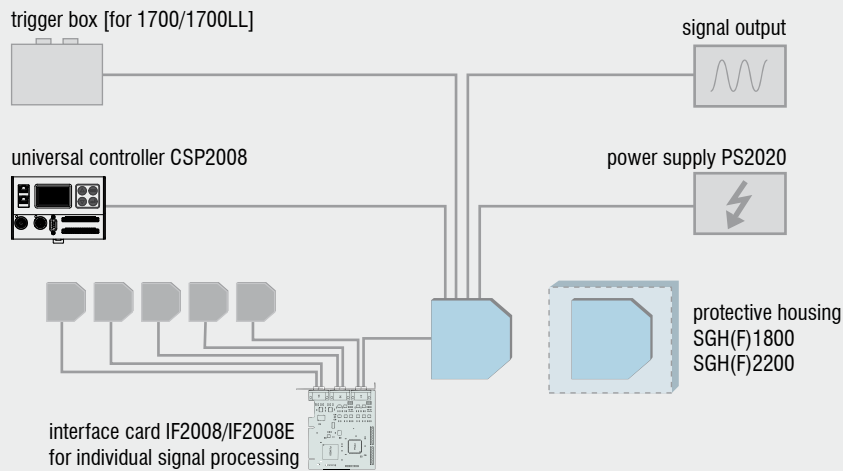_PC2300-9/OE_ (9m)

_PC2300-15/OE_ (15m)

## Setup and configuration software

ILD Tools is the software included for easy sensor configuration. All the settings can be implemented conveniently via a Windows user interface on the PC. The sensor parameters are sent to the sensor via the serial port and can also be saved if required. ILD Tools also includes a module which can display and save measurement results. The link to the PC is made via the sensor cable with a USB converter. [available for all series except 1302 and 1607]

## Driver support for customer software

For the optoNCDT sensors documented DLL drivers are available free of charge, which enables easy integration of the sensors into existing software.

**Software download free of charge from**
**www.micro-epsilon.com/download**



trigger box [for 1700/1700LL]

signal output

universal controller CSP2008

power supply PS2020

interface card IF2008/IF2008E
for individual signal processing

protective housing
SGH(F)1800
SGH(F)2200

## Protective housing for harsh environment

To protect the laser sensors in extreme environments individual protective housings are available for all sensor models. Three options for the protective housing are offered.

## Option SGH:

Completely enclosed housing with an integrated front window, where the sensor measures through the window. The water resistant housing (IP68) provides protection against aggressive solvents and detergents.

## Option SGHF:

The SGHF version offers optimum protection for the sensor with integrated compressed air cooling and provides protection against fluids.

## Option SGL:

Protective housing with open slot for air purging of the measurement gap and cooling purpose.

**Dimensions**
**SGx 16x7/20:** 74x80x58mm for
ILD 16x7-2/4/10/20

**SGx 16x7/200:** 125x80x58mm for
ILD16x7-50/100/200

**SGx 1800:** 140x140x71 mm for
ILD 1302 and ILD 1402
ILD 1700-2/10/20/50/100/200/250VT,
ILD 1700-2LL/10LL/20LL/50LL,
ILD 2200-2/10/20/50/100,
ILD 2200-2LL/10LL/20LL/50LL,
ILD 2220-2/10/20/50/100,
ILD 2220-2LL/10LL/20LL/50LL

**SGx 2200:** 140x180x71 mm for
ILD 1700-40/500/750,
ILD 2200-40/200,
ILD 2220-200

## IF2008 - PCI interface card

The IF 2008 interface card is designed for installation in PCs and enables the synchronous capture of 4 digital sensor signals and 2 encoders. The absolutely synchronous data acquisition plays an important role particularly for planarity or thickness measurement tasks. The data are stored in a FIFO memory in order to enable resource-saving processing in the PC in blocks.

### Particular Benefits

- 4x digital signals and two encoders with basic printed circuit board
- Additional expansion board for a total of 6x digital signals, 2x encoder and 2x analogue signals and 8x I/O Signals
- FIFO data memory
- Synchronous data acquisition

Interface card IF2008, IF2008E for individual signal processing
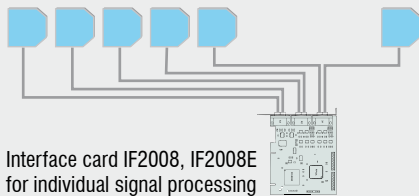
## IF2008E - Expansion board

The IF 2008E expansion board is designed for installation in PCs and enables the synchronous capture of 2 digital sensor signals and 2 encoders as well as 8 I/O-Signals. The expansion board is connected to the basis board IF2008. The absolutely synchronous data acquisition plays an important role particularly for planarity or thickness measurement tasks.

### Particular Benefits

- Two digital signals, two analogue signals and 8 I/O signals
- Overall with IF2008: 6 digital signals, 2 encoders and 2 analogue signals and 8 I/O Signals
- FIFO data memory
- Synchronous data acquisition

## CSP2008 - Universal controller

The CSP2008 controller can be used to process two digital or analogue input signals of almost all Micro-Epsilon displacement sensors (2x internal plus 4x external via Ethercat modules from Beckhoff). Ethercat can also be used as an external interface (master) for connecting further sensors and I/O modules. The controller has a high luminance display so that measured values can be easily read, even from a long distance.

### Features

- Real-time processing of input and output signals at upto 100kHz (user selectable)
- Unique user interface for the configuration of the controller via Ethernet on a PC or laptop. All user selectable functions of the controller and the measured values can be viewed, displayed and stored in real time via your own web browser without installing any 3rd part software
- Simple sensor connection with automatic sensor recognition, configuration of the sensor using buttons and display on controller or via laptop
- Modular system upgradable with additional I/O modules for customer-specific requirements. The internal communication between I/O components using Ethercat connection (CSP 2008 acts as master)
- Simple mounting using DIN rail TS 35
- Extremely flexible and powerful functionality; function modules can be combined in many ways. Application example:
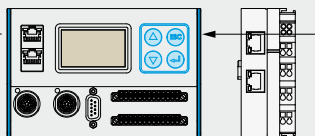


Universal controller with DIN rail TS 35
(dimensions not to scale)
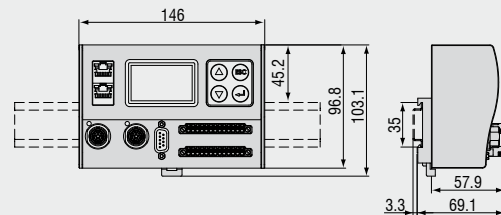


### System setup



**Sensors via RS422**

optoNCDT 1402

optoNCDT 1700

optoNCDT 2200/2220

optoNCDT 2300

optoCONTROL 2500

optoCONTROL 2600

confocalDT

**Beckhoff modules for extended inputs / outputs**

EK1100 (EtherCat bus coupler)

EL2004 (4 channel digital output terminal 24VDC)

EL4132 (2 channel analogue output terminal for -10...10V, 16Bit)

EL1012/EL1014/EL1018 (2 / 4 / 8 channel digital output terminal for 24V DC)

EL3161/EL3162 (1 / 2 channel analogue output terminal for 0...10V, 16Bit)

EL3141/EL3142 (1 / 2 channel analogue output terminal for 0...20mA, 16Bit)

EL4112 (2 channel analogue output terminal for 0...20mA,16Bit)

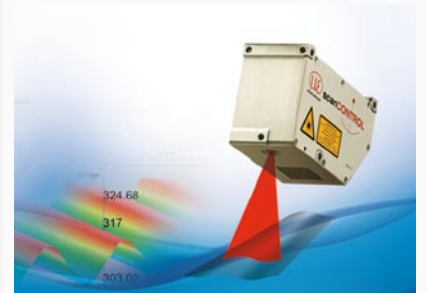RS422 Extension terminal for CSP2008

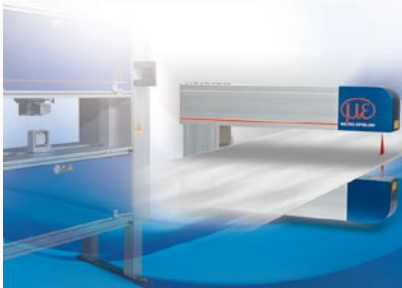# High performance sensors made by Micro-Epsilon



Sensors and systems for displacement and position



Sensors and measurement devices for non-contact temperature measurement



2D/3D profile sensors (laser scanner)



Measurement and inspection systems for quality assurance



Optical micrometers, fiber optic sensors and optical fibers



Color recognition sensors, LED analyzers and color online spectrometer

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