











## Laser Triangulation Displacement Sensors





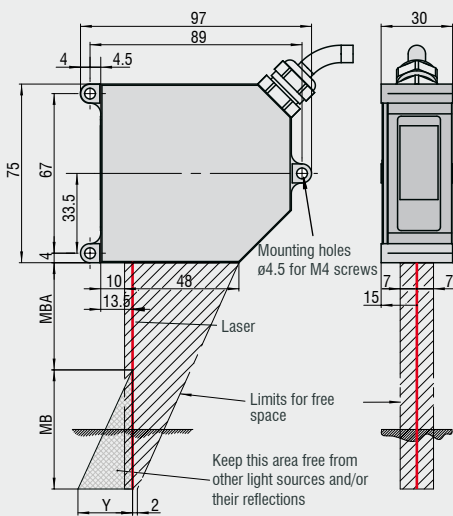
-  **Six models with measuring ranges from 2 to 200mm**
-  **Compact design with integrated controller**
-  **Adjustable measuring rate up to 49.02kHz**
- INTERFACE** Ethernet / Ethercat / RS422
-  **Advanced Real Time Surface Compensation**
-  **Calibration certificate included**
-  **Measurement of diffuse and specular surfaces**
-  **Thickness measurement of transparent materials**
-  **Configuration via Web-Interface**

The optoNCDT 2300 is the latest high-end model of laser triangulation sensors from Micro-Epsilon. The new series offers an adjustable measuring rate up to 49.02 kHz. An impressive and worldwide unique fact regarding this sensor class is that the complete electronics has already been integrated in the compact sensor..

The new A-RTSC (Advanced Real-Time-Surface-Compensation) is a further development of the proven RTSC. Therefore, a more precise real-time surface compensation during the measuring process is ensured due to an increased dynamic range. By means of the software, the threshold of the areas for compensation can be set easily.

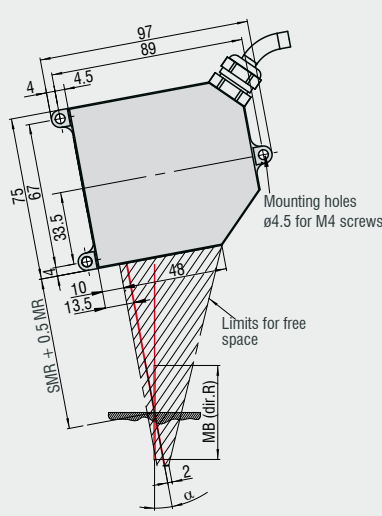
The data are output via Ethernet, Ethercat or RS422. The complete sensor configuration is effected via a comfortably designed web interface. The optoNCDT 2300 is especially used in the case of fast measurements such as vibration monitoring or measurements against challenging surfaces.

**optoNCDT 2300-2 ... 2300-100**  
Diffuse reflection



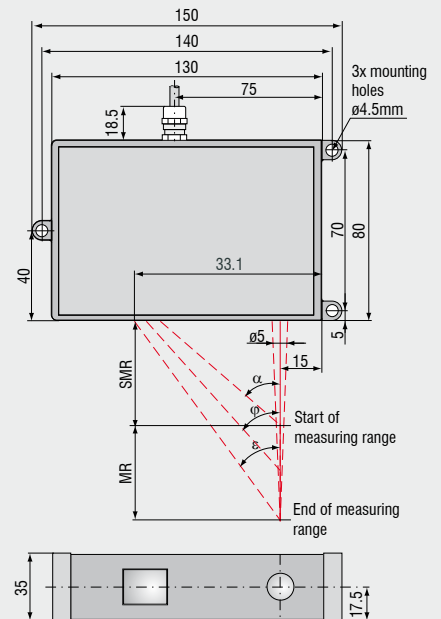
MR	SMR	Y
2	24	1.5
10	30	6.5
20	40	10.0
50	45	23.0
100	70	33.5

**optoNCDT 2300-2 ... 2300-20**  
Direct reflection



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

**optoNCDT 2300-200**



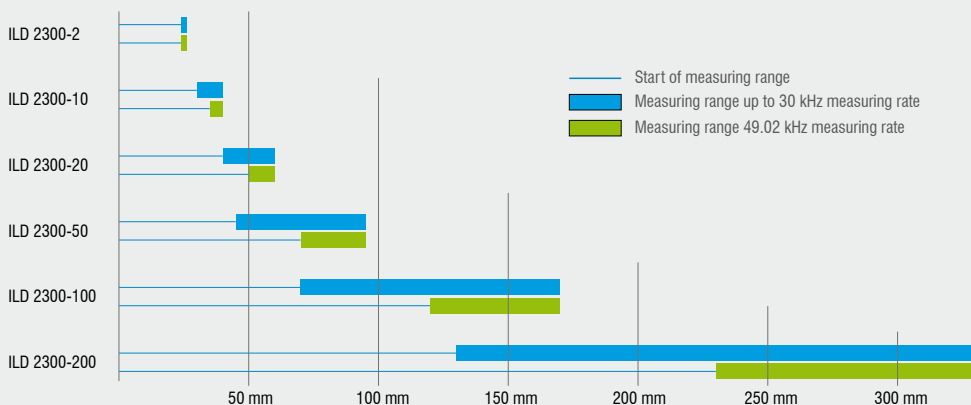
α	φ	ε
19,0°	9,78°	6,97°

Model		ILD 2300-2	ILD 2300-10	ILD 2300-20	ILD 2300-50	ILD 2300-100	ILD 2300-200
Measuring range <sup>1)</sup>		2 (2) mm	10 (5) mm	20 (10) mm	50 (25) mm	100 (50) mm	200 (100) mm
Start of measuring range	SMR	24 (24) mm	30 (35) mm	40 (50) mm	45 (70) mm	70 (120) mm	130 (230) mm
Midrange	MMR	25 (25) mm	35 (37.5) mm	50 (55) mm	70 (82.5) mm	120 (145) mm	230 (280) mm
End of measuring range	EMR	26 (26) mm	40 (40) mm	60 (60) mm	95 (95) mm	170 (170) mm	330 (330) mm
Linearity		0.6µm ≤ ±0.03% FSO	2µm	4µm	10µm	20µm	60µm ≤ ±0.03% FSO
Resolution (20kHz)		0.03 µm	0.15µm	0.3µm	0.8µm	1.5µm	3µm
Measuring rate		adjustable via software 49.02 / 30 / 20 / 10 / 5 / 2.5 / 1.5kHz (49.02kHz with reduced measuring range)					
Permissible ambient light		10,000...40,000lx					
Spot diameter	SMR	80µm	110µm	160µm	215µm	350µm	1300µm
	MMR	23 x 23µm	32 x 45µm	46 x 45µm	70 x 70µm	130µm	1300µm
	EMR	35 x 85µm	110 x 160µm	140 x 200µm	255 x 350µm	350µm	1300µm
Light source		semiconductor laser < 1mW / 670nm (red)					
Protection class		IP 65					
Operation temperature		0 ... +50°C					
Storage temperature		-20 ... +70°C					
Inputs / Outputs		Ethernet / Ethercat RS422 Analog output via CSP2008					
Inputs		Laser on/off; synchronization/trigger input					
Power supply		24 Vdc (11...30V); PV < 3W					
LED		Status / Power / Ethernet / Ethercat					
Sensor cable	Standard	0.25m (with cable connector)					
	Option	3 / 6 / 9m with Sub D 15 pin connector					
Electromagnetic compatibility (EMC)		EN 61326-1: 2006-10 DIN EN 55011: 2007-11 (group 1. class B) EN 61 000-6-2: 2006-03					
Vibration		2g / 20 ... 500Hz					
Shock		15g / 6ms / 3 axes					

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

<sup>1)</sup> Numbers in brackets refer to full measurement rate 49.02 kHz



**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)

**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/I (3m)

PCR 1402-6/I (6m)

PCR 1402-8/I (8m)

Protective housing

SGH 1800

SGHF 1800

**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

**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)

**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)

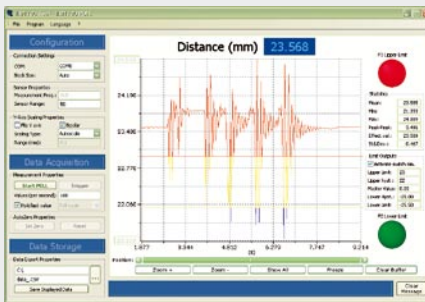
PC2300-3/IF2008 (3m, interface and supply cable)

PC2300-3/OE (3m)

PC2300-6/OE (6m)

PC2300-9/OE (9m)

PC2300-15/OE (15m)



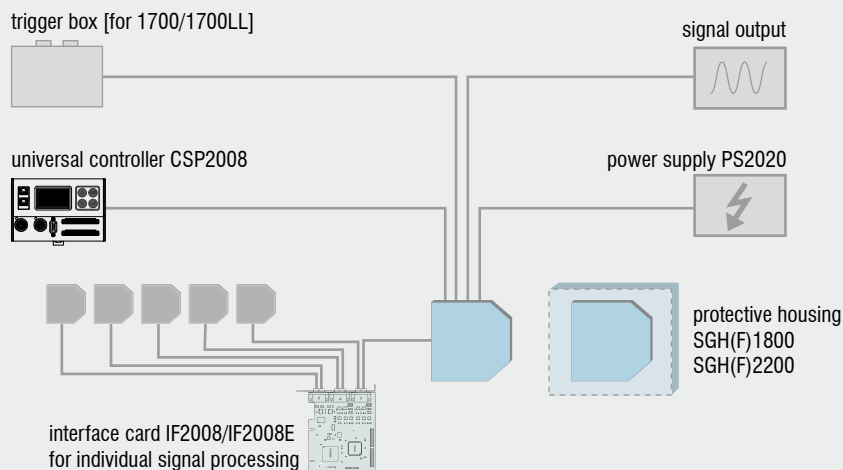
### Setup and configuration software

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 optNCDT 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](http://www.micro-epsilon.com/download)



### 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

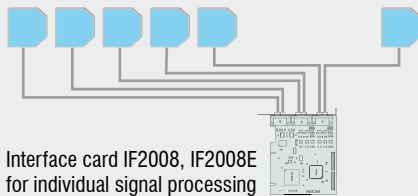
**SGx 2200:** 140x180x71 mm for  
ILD 1700-40/500/750,  
ILD 2200-40/200,  
ILD 2220-200

### 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

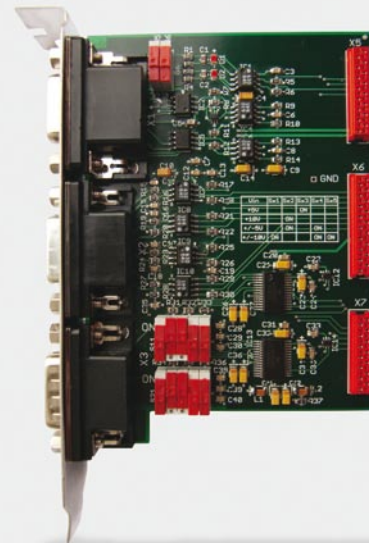


### IF2008E - Expansion board

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

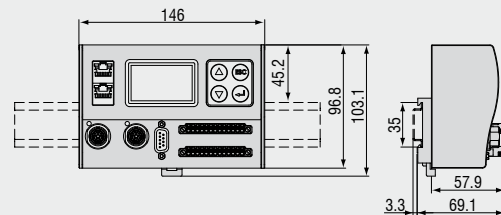
The CSP2008 controller can be used to process two digital or analogue input signals of almost all Micro-Epsilon displacement sensors (2x internal plus 4x external via Ethercat modules from Beckhoff). Ethercat can also be used as an external interface (master) for connecting further sensors and I/O modules. 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:



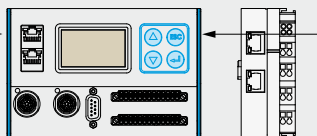
Universal controller with DIN rail TS 35  
(dimensions not to scale)



#### 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

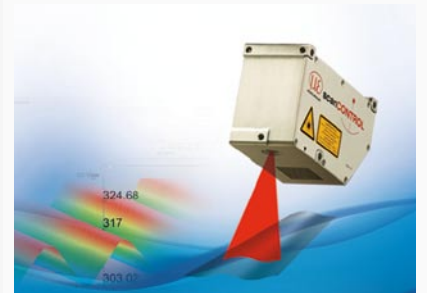
## High performance sensors made by Micro-Epsilon



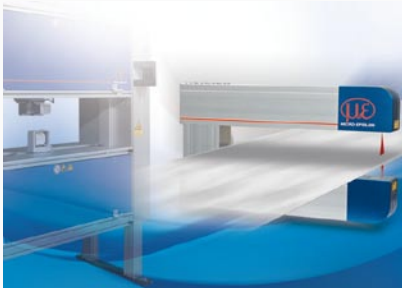
Sensors and systems for displacement and position



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