MICRO-EPSILON

Laser Triangulation Displacement Sensors

Laser off • • Power off
OK • • Ethernet, RS422
Midrange • • EtherCat, operational mo
Error • • EtherCat, init mode

laser off
error
o.k.
midrange

normal
zero

1
4   1/2   4 - 20 mA
32   1/4   0 - 10 V
128   1/8   RS 422

optoNCDTBL

LASER RADIATION
Do not stare into the beam
CLASS 2 LASER PRODUCT
IEC 60825-1: 2008-05
P≤1mW; λ=670nm

Intelligent sensor with integrated controller for industrial applications

optoNCDT 1700

Eleven models with measuring ranges from 2mm to 1000mm

Compact design with integrated controller

RTSC **Real Time Surface Compensation**

312Hz 375Hz 1000Hz **Adjustable measuring rate up to 2.5kHz**

Analog *Digital* **Analogue (U/I) and digital output**

*F*ilter inside **Adjustable filter functions (firmware)**

High flex cables for dragchain or robot use

Certified **Calibration certificate included**

//www. **Configuration via software www.micro-epsilon.com/download**

The benchmark
in laser triangulation sensors

The optoNCDT 1700 series is truly a world leading laser displacement sensor. Featuring Real Time Surface Compensation (RTSC), remote software programming and excellent linearity & resolution the optoNCDT 1700 is difficult to match at this price level. Integrated conditioning electronics allows the sensor to have a very unique and compact design.

Adjustable limit switches

As well as for precise measurement, the optoNCDT 1700 sensors are also used for tolerance or limit monitoring. Two switching points are available which can be configured and adjusted via the remote software (USB connection). The switching hysteresis can also be individually adjusted for each limit point.
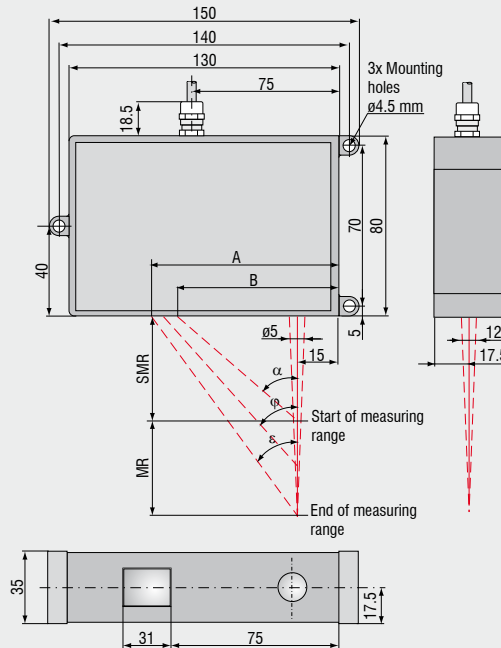
Adjustable exposure time/measuring rate

For poor reflecting targets, the measuring rate can be reduced to enable a longer exposure time. The set measurement rate always remains constant so that with closed-loop control the system response time is always the same.

optoNCDT 1700 (2/10/20/50/100/200/250VTmm)
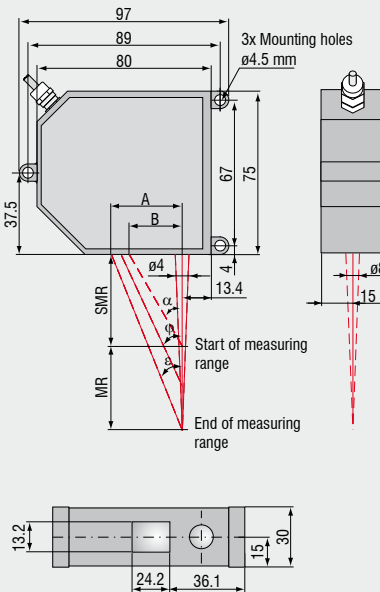
optoNCDT 1700 (40/500/750mm)

MR	SMR	α	φ	ε	A	B
2	24	35°	40°	44.8°	25.8	16.8
10	30	34.3°	35.2°	35.6°	28.7	20.5
20	40	28.8°	27.5°	26.7°	30.1	22.0
50	45	26.5°	23.0°	18.3°	31.5	22.5
100	70	19.0°	15.4°	10.9°	32.6	24.1
200	70	19.0°	9.78°	6.97°	33.1	24.1
250VT	70	19.0°	8.4°	6.0°	33.5	24.1
40	175	22.1°	21.9°	21.8°	101	86
500	200	19.3°	9.8°	7.0°	101	85
750	200	19.3°	7.7°	5.0°	101	85

Connector (sensor side)
Article Number: 0323243
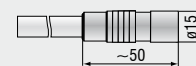
Connector (sensor cable)
Article Number: 0323272
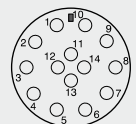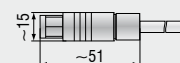
14-pin-connector
(Pin side female cable connector or solder-pin side male cable connector)

(Dimensions in mm, not to scale. All CAD files are available online.)

Model	ILD 1700-2	ILD 1700-10	ILD 1700-20	ILD 1700-40	ILD 1700-50	ILD 1700-100	ILD 1700-200	ILD 1700-250VT	ILD 1700-500	ILD 1700-750
Measuring range	2mm	10mm	20mm	40mm	50mm	100mm	200mm	250mm	500mm	750mm
Start of measuring range	24mm	30mm	40mm	175mm	45mm	70mm	70mm	70mm	200mm	200mm
Midrange	25mm	35mm	50mm	195mm	70mm	120mm	170mm	195mm	450mm	575mm
End of measuring range	26mm	40mm	60mm	215mm	95mm	170mm	270mm	320mm	700mm	950mm
Linearity	2µm	8µm	16µm	32µm	40µm	80µm	200µm	630µm	400µm	750µm
Linearity FSO	≤0.1%	≤0.08%					≤0.1%	≤0.25%	≤0.08%	≤0.1%
Resolution (at 2.5kHz without averaging)	0.1µm	0.5µm	1.5µm	4µm	3µm	6µm	12µm	50µm	30µm	50µm
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							15,000lx	10,000lx	
Laser safety class	class 2 acc. DIN EN 60825-1 : 2008-05									
Spot diameter SMR	80µm	110µm	320µm	230µm	570µm	740µm	1300µm	1500µm	1500µm	1500µm
Spot diameter MMR	35µm	50µm	45µm	210µm	55µm	60µm	1300µm	1500µm	1500µm	1500µm
Spot diameter EMR	80µm	110µm	320µm	230µm	570µm	700µm	1300µm	1500µm	1500µm	1500µm
Temperature stability*	0.025% FSO/°C	0.01 % FSO/°C						0.025% FSO/°C	0.01 % FSO/°C	
Operation temperature	0 ...+50°C							0 ...+55°C	0 ...+50°C	
Storage temperature	-20 ... +70°C									
Output — measurements	selectable: 4 ... 20mA / 0 ... 10V / RS 422 / USB (optional with cable PC1700-3/USB)									
Output — switching outputs	1 x error or 2 x limit (each pogrammable)									
Switch Input	laser ON-OFF / zero									
Operation	via touch screen on sensor or via PC with ILD 1700 tool									
Power supply	24VDC (11 ... 30VDC), max. 150mA									
Electromagnetic compatibility (EMC)	EN 61000-6-3 EN 61000-6-2									
Sensor cable length (with connector)	0.25m (integrated cable with connector) option: 3m or 10m									
Synchronisation	possible for simultaneous or alternating measurements									
Protection class	IP 65									
Vibration	2g / 20 ... 500Hz									
Shock	15g / 6ms									
Weight (with 0.25m cable)	~ 550g			~ 600g		~ 550g			~ 600g	

FSO = Full Scale Output   All specifications apply for a diffusely reflecting white ceramic target
* based on digital output
SMR = Start of measuring range   MMR = Midrange   EMR = End of measuring range

Custom Sensor Modifications

For applications where the above standard sensors do not meet your requirements, it may be possible to supply a sensor with modified specification. Please contact us for further information.

Options

- Non standard measuring range and stand off
- Custom housing or mounting geometry
- Non standard signal interfaces
- Special cable length of electrical connector
- 90° beam deflection
- Vacuum suitability
- Reduced mass
- Increased shock and vibration resistance

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/l (3m)

PCR 1402-6/l (6m)

PCR 1402-8/l (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)

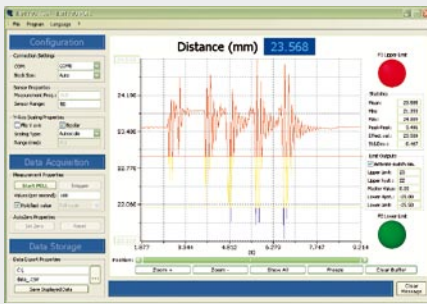*PC2300-15/CSP* (15m, connecting cable ILD2300 and CSP2008)

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

PC2300-3/OE (3m)

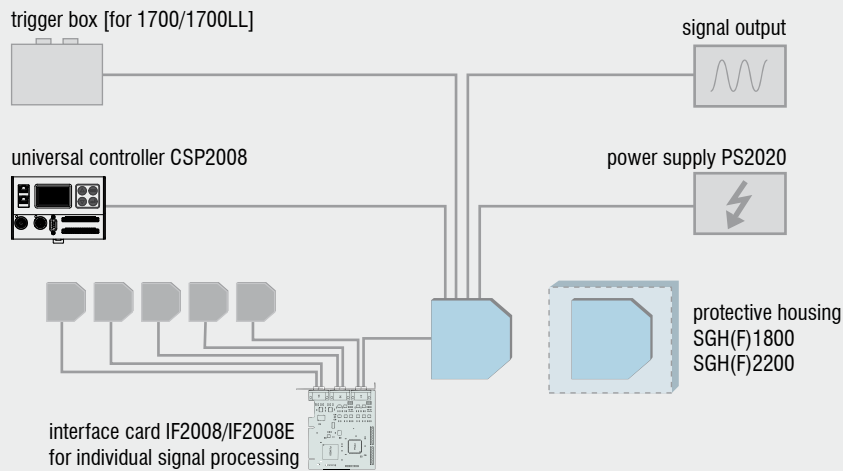*PC2300-6/OE* (6m)

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 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

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

interface card IF2008/IF2008E
for individual signal processing

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
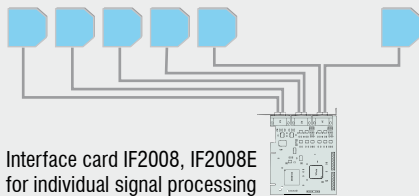
IF2008E - Expansion board

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
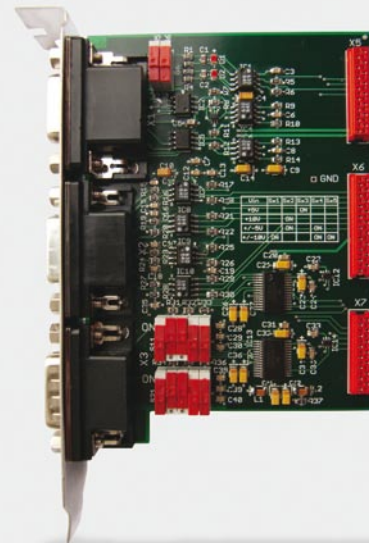
CSP2008 - Universal controller

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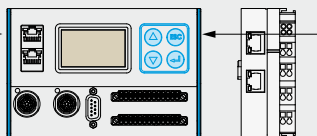
Universal controller with DIN rail TS 35 (dimensions not to scale)
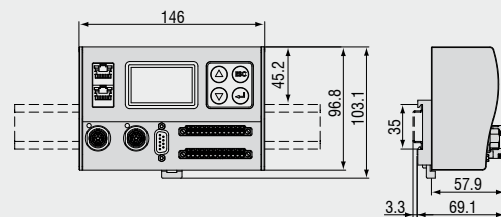
System setup

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)
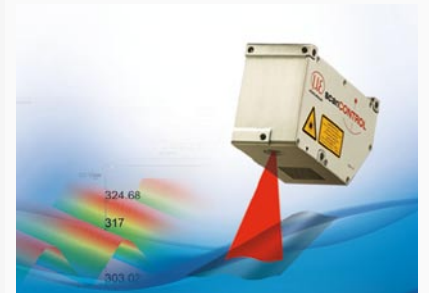
RS422 Extension terminal for CSP2008

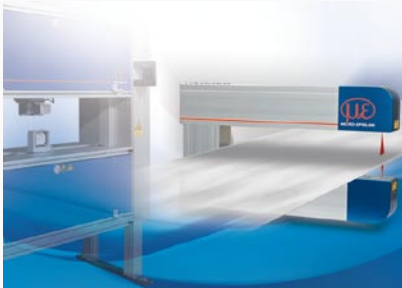# High performance sensors made by Micro-Epsilon

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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