MICRO-EPSILON

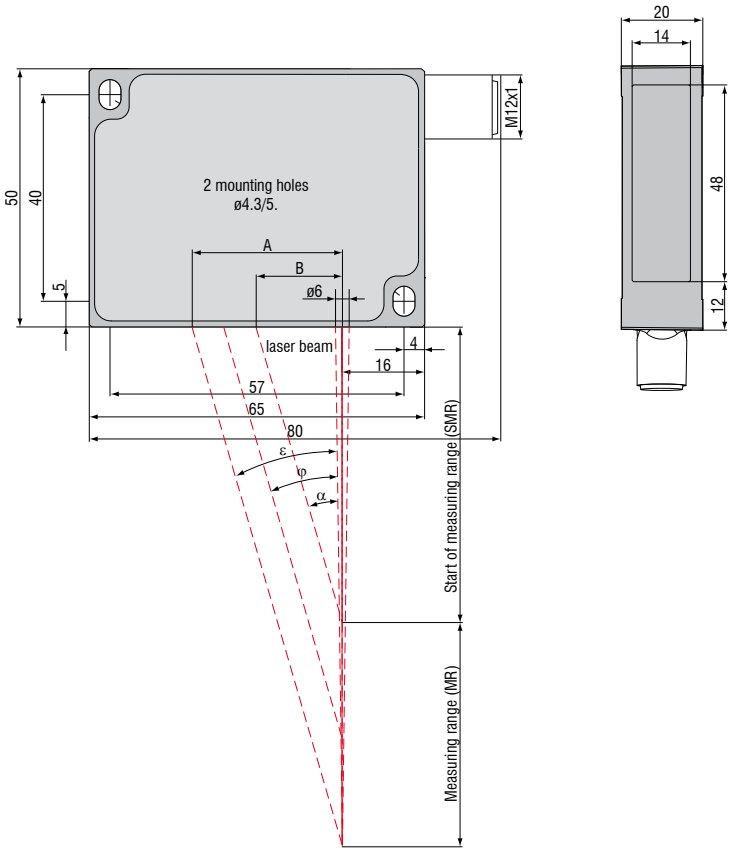
More Precision

optoNCDT // Laser Triangulation Displacement Sensors

- Eight models with measuring ranges from 5mm to 600mm
- Ideal for OEM applications
- Adjustable measuring rate up to 1.5kHz
- Analogue (U/I) and digital output
- Trigger input
- Adjustable filter functions Peak selection (firmware)
- Telemetry qualified by low power consumption
- IP69K Protection class IP69K for harsh environments

The optoNCDT 1402SC sensor is protected to IP69K and is available in all measuring ranges between 5mm and 600mm. Due to its very robust design, the sensor is suitable for the food industry, outdoor use or for demanding process manufacturing applications. The housing for this model comprises V4A steel and complies with all food industry requirements. In this version, the sensor is resistant to high pressure jet washing and to aggressive cleaning detergents and disinfection agents, including hydrogen peroxide and other alkaline-based cleaning materials and cleaning materials that contain chlorine. The sensor electronics are similar to those used by the optoNCDT 1402 standard model.

optoNCDT 1402SC



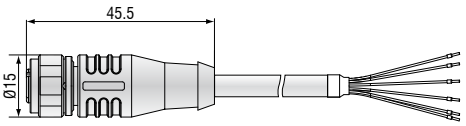
(Dimensions in mm, not to scale)

MR	SMR	α	φ	ε	A	B
5	20.0	33.5	35.5	37.1	18.9	13.2
10	20.0	33.5	32.9	32.4	19.1	13.2
20	30.0	31.2	27.9	25.8	24.2	18.2
50	45.0	25.1	19.6	16.9	28.9	21.1
100	50.0	23.1	14.4	11.3	30.1	21.3
200	60.0	20.1	9.4	6.8	30.8	22.0
250VT	100.0	14.7	7.6	5.5	33.9	26.2
600	200.0	9.7	4.3	3	41.6	33.7

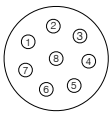
Model		ILD 1402-5SC	ILD 1402-10SC	ILD 1402-20SC	ILD 1402-50SC	ILD 1402-100SC	ILD 1402-200SC	ILD 1402-600SC
Measuring range		5mm	10mm	20mm	50mm	100mm	200mm	600mm
Start of measuring range		20mm	20mm	30mm	45mm	50mm	60mm	200mm
Midrange		22.5mm	25mm	40mm	70mm	100mm	160mm	500mm
End of measuring range		25mm	30mm	50mm	95mm	150mm	260mm	800mm
Linearity [1]		5...9µm	5...18µm	7...36µm	12...90µm	20...180µm	40...360µm	120...3000µm
		≤0.18% FSO						≤0.5% FSO
Resolution [2]	averaged with averaging factor 64	0.6µm	1µm	2µm	5µm	10µm	13µm	80µm
		0.01% FSO						
	dynamic 1.5 kHz	1...3µm	2...5µm	5...10µm	6...25µm	12...50µm	13...100µm	80...600µm
		0.02...0.05% FSO						0.02...0.12% FSO
Measuring rate, programmable		1.5kHz; 1kHz; 750Hz; 375Hz; 50Hz						
Light source		semiconductor laser <1mW, 670nm (red)						
Laser safety class		class 2 IEC 60825-1 : 2008-05						
Spot diameter	SMR	110µm	110µm	210µm	1100µm	1400µm	2300µm	2.6 x 5mm
	MMR	380µm	650µm	530µm	110µm	130µm	2200µm	2.6 x 5mm
	EMR	650µm	1200µm	830µm	1100µm	1400µm	2100µm	2.6 x 5mm
Protection class		IP 69 K						
Vibration		15g / 10Hz … 1kHz						20g / 10Hz…1kHz
Shock		15g / 6ms (IEC 68-2-29)						
Weight (without cable)		appr. 173g						
Temperature stability		0.03 % FSO/°C				0.08 % FSO/°C		
Operation temperature		0 …+50°C						
Storage temperature		-20 ... +70°C						
Output	analogue	4 ... 20mA (1 ... 5V with cable PC 1402SC-3/U); free scalable within the nominal range						
	digital	RS422 / 14bit						
Control I/O		1x open collector output (switching output, switch, error); 1x input (trigger)						
Supply		11 ... 30VDC, 24VDC / 50mA						
Controller		integrated signal processor						
Software		free setup and aquisition tool + SDK (software development kit)						
Electromagnetic compatibility (EMC)		EN 61326-1:2006 / EN 55011 Class B (Interface emission) EN 61326-1:2006 / EN 61000-4-2:1995 + A1:1998 + A2:2001 (Interference resistance)						

FSO = Full scale output All specifications apply for a diffusely reflecting matt white ceramic target
[1] values apply for 0 - 30% FSO and 30 - 100 % FSO [2] resolution digital output 14bit
SMR = Start of measuring range MMR = Midrange EMR = End of measuring range

Connector axial



8-pin-connector



Pin	Description	colour
1	I_{OUT}	white
2	Error	brown
3	RS422 Rx+	green
4	RS422 Rx–	yellow
5	RS422 Tx+	grey
6	RS422 Tx–	pink
7	GND	blue
8	$+U_B$	red
	Laser off	
	Teach in	

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)

Converter
- IF2004/USB 4 Channel RS422/USB Converter

Accessories optoNCDT 1302/1402/1402SC

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)

Supply and output cable 1402SC
- PC1402SC-3/I (3m, output 4...20 mA)
- PC1402SC-8/I (8m, output 4...20 mA)
- PC1402SC-10/I (10m, output 4...20 mA)
- PC1402SC-3/U (3m, output 1...5 V)
- PC1402SC-6/U (6m, output 1...5 V)
- PC1402SCT-3/I (3m, output 4...20 mA)
- PC1402SC-12/IF2008 (12m, supply and output cable)

Protective housing
- SGH ILD 1402(01)
- SGHF ILD 1402(01)

Accessories optoNCDT 1610 / 1630

Supply and output cable
- PC 1605-3 (3m)
- PC 1605-6 (6m)
- PC 1607-5/BNC (5m, BNC connector)

Accessories optoNCDT1700/1700LL/1700BL

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)

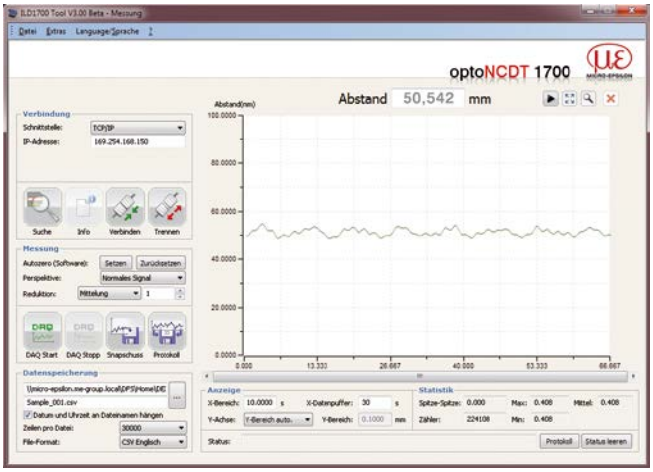
Supply and output cable (robot rated)
- PCR 1700-5 (5m)
- PCR 1700-10 (10m)

Protective housing
- SGH (size S and M)
- SGHF (size S and M)

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)

Protective housing
- SGH (size S and M)
- SGHF (size S and M)



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 16x0]

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

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 provides protection against solvents and detergents.

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

SGH ILD 1402(01) & SGHF ILD 1402(01)
for optoNCDT 1402(025)

SGx ILD size S (140x140x71mm)
for optoNCDT 1700 / 2300
dimensions 97x75mm

SGx ILD size M (140x180x71mm)
for optoNCDT 1700 / 2300
dimensions 150x80mm

IF2008 - PCI interface card

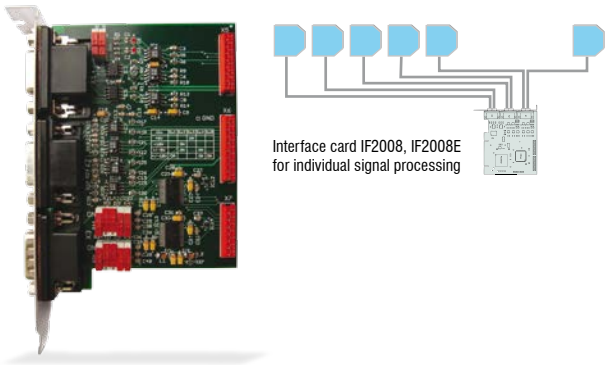
The IF 2008 interface card is designed for installation in PCs and enables the synchronous capture of 4 digital sensor signals and 2 encoders. The absolutely synchronous data acquisition plays an important role particularly for planarity or thickness measurement tasks. The data are stored in a FIFO memory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

IF2004/USB 4 Channel RS422/USB Converter

The RS422/USB converter is used for transforming digital signals from up to 4 ILD sensors into USB data signals. Equipped with 4 trigger inputs and 1 trigger output additional USB converters can be adapted.

Particular Benefits

- 4x digital signals via RS422
- 4 trigger inputs, 1 trigger output
- Synchronous data aquisition
- USB interface

C-Box controller for up to 2 displacement signals

The C-Box is a compact controller for the digital-to-analogue conversion of a digital sensor signal and for the evaluation of two digital sensor signals. The output occurs via parameterisable analogue output, Ethernet, RS422 or USB. Besides the averaging and statistics function the measurement of thickness, average, step or tilting is possible. The C-Box may be used with ILD2300 and IFC2451/2471. The digital-to-analogue conversion happens with 16 Bit and 70 kHz maximum.

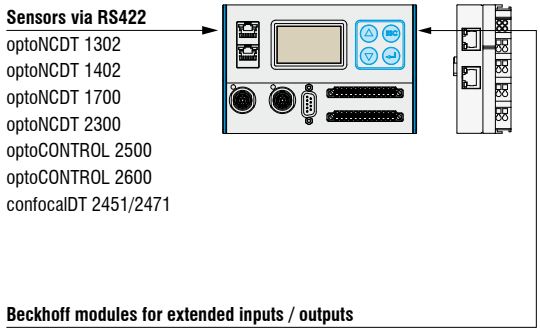
CSP2008 - Universal controller for up to six sensor signals

The controller CSP2008 has been designed to process 2 to 6 both optical and other sensors from Micro-Epsilon (6 digital or 4 analogue input signals max., 2x internal + 4x external via EtherCAT modules from the company Beckhoff. EtherCAT is intended as external bus for connecting further sensors and I/O modules. The controller is equipped with a display offering multicolour backlighting which changes its color in the case of exceeding the limit value while a signal is displayed.

Features

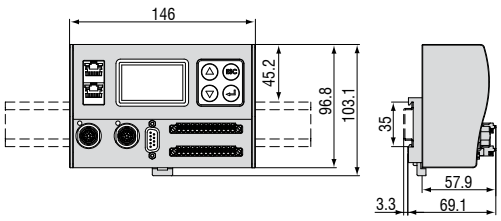
- Real-time processing of input and output signals at up to 100kHz (user selectable)
- Unique user interface for the configuration of the controller via Ethernet on a PC or laptop. All user selectable functions of the controller and the measured values can be viewed, displayed and stored in real time 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 web browser
- 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)
- Extremely flexible and powerful functionality; function modules can be combined in many ways.
- Simple mounting using DIN rail TS 35

System setup



Beckhoff modules for extended inputs / outputs

EK1100, EtherCat bus coupler
EL4102, Analogue output terminal 0 V bis +10 V, 2 channels (16 Bit), EtherCAT
EL4132, Analogue output terminal -10 V bis +10 V, 2 channels (16 Bit), EtherCAT
EL4024, Analogue output terminal 4 ... 20 mA, 4 channels (12 Bit), EtherCAT
EL2002, Digital output terminal, 24 VDC/ 0,5 A, 2 channels, EtherCAT
EL2002, Digital output terminal, 24 VDC/ 0,5 A, 2 channels, EtherCAT
EL2004, Digital output terminal, 24 VDC/ 0,5 A, 4 channels, EtherCAT
EL3142, Analogue input terminal 0 ... 20 mA, 2 channels (16 Bit), EtherCAT
EL3162, Analogue input terminal 0 ... 10 V, 2 channels (16 Bit), EtherCAT
EL1002, Digital input terminal 24 VDC/3 ms, 2 channels, EtherCAT
EL1012, Digital input terminal 24 VDC/10 µs, 2 channels, EtherCAT
EL1014, Digital input terminal 24 VDC/10 µs, 4 channels, EtherCAT
EL1104, Digital input terminal 24 VDC/3 ms, 4 channels, EtherCAT
EL5101, Incremental encoder interface, RS485 differential inputs, EtherCAT
EK1122, 2-Port EtherCAT junction
RS422 extension terminal



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

High performance sensors made by Micro-Epsilon

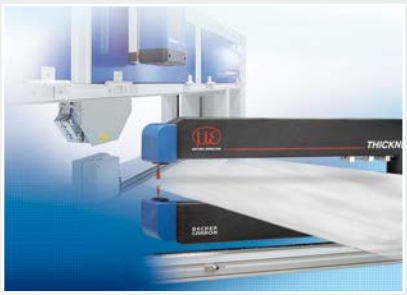
Sensors and systems for displacement and position

Sensors and measurement devices for non-contact temperature measurement

2D/3D profile sensors (laser scanner)

Optical micrometers, fibre optic sensors and fibre optics

Colour recognition sensors, LED analyzers and colour online spectrometer



Measurement and inspection systems

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