MICRO-EPSILON

More Precision

optoNCDT // Laser displacement sensors (triangulation)

Compact laser sensors for industry & automation

optoNCDT 1320

- For common surfaces
- Measuring rate up to 2 kHz
- Analog (I) / RS422
- Active Surface Compensation
- Repeatability 1 µm
- Ideal for series and OEM applications
- Low weight, ideal for high accelerations

The optoNCDT 1320 is a very compact laser triangulation sensor intended for entry-level precision measurement tasks. This series is used to measure displacement, distance and position. The controller is integrated in the housing which considerably simplifies the installation procedure.

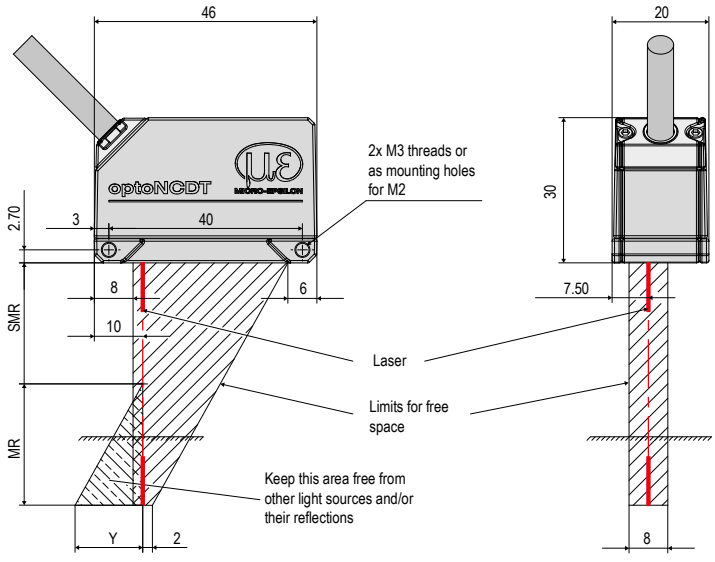
Since the sensor is extremely compact, it can also be integrated into restricted installation spaces. Due to its low weight, the optoNCDT 1320 is ideally suited to applications with high accelerations, e.g., on the robot arm or in pick-and-place machines.

The optoNCDT 1320 offers high measurement accuracy and adjustable measuring rates up to 2 kHz. The Active Surface Compensation (ASC) provides stable distance signal control regardless of target color or brightness.

Very small objects can be detected reliably due to the small and sharply projected measurement spot size.

Unique ease of use

The optoNCDT 1320 models enable quick sensor commissioning using the multifunction sensor button. If required, further sensor settings can be made via the web interface. With the "Standard", "Changing surfaces" and "Material with penetration" settings included in the web interface, precise measurement results are easily achieved without any complex optimization. The quality slider enables the sensor to be adapted to static and dynamic processes.



(dimensions in mm, not to scale)

MR	SMR	Y
10	20	10
25	25	21
50	35	28
100	50	46

Model		ILD1320-10	ILD1320-25	ILD1320-50	ILD1320-100
Measuring range		10 mm	25 mm	50 mm	100 mm
Start of measuring range		20 mm	25 mm	35 mm	50 mm
Mid of measuring range		25 mm	37.5 mm	60 mm	100 mm
End of measuring range		30 mm	50 mm	85 mm	150 mm
Measuring rate [1]		4 adjustable stages: 2 kHz / 1 kHz / 0.5 kHz / 0.25 kHz			
Linearity		< ±10 µm	< ±25 µm	< ±50 µm	< ±100 µm
		< ±0.10 % FSO			
Repeatability [2]		1 µm	2.5 µm	5 µm	10 µm
Temperature stability		±0.015 % FSO / K			±0.01 % FSO / K
Light spot diameter (±10 %)	SMR	90 x 120 µm	100 x 140 µm	90 x 120 µm	750 x 1100 µm
	MMR	45 x 40 µm	120 x 130 µm	230 x 240 µm	
	EMR	140 x 160 µm	390 x 500 µm	630 x 820 µm	
	smallest diameter	45 x 40 µm with 24 mm	55 x 50 µm with 31 mm	70 x 65 µm with 42 mm	-
Light source		Semiconductor laser < 1 mW, 670 nm (red)			
Laser safety class		Class 2 in accordance with DIN EN 60825-1: 2015-07			
Permissible ambient light [3]		30,000 lx			20,000 lx
Supply voltage		11 ... 30 VDC			
Power consumption		< 2 W (24 V)			
Signal input		1 x HTL laser on/off; 1 x HTL multifunction input: trigger in / zero setting / mastering / teach			
Digital interface		RS422 (16 bit) / PROFINET [4] / EtherNet/IP [4]			
Analog output		4 ... 20 mA (12 bit, freely scalable within the measuring range) [5]			
Switching output		1 x error output: npn, pnp, push pull			
Connection		integrated cable 3 m, open ends, minimum bending radius 30 mm (fixed installation)			
Mounting		Screw connection via two mounting holes			
Temperature range	Storage	-20 ... +70 °C (non-condensing)			
	Operation	0 ... +50 °C (non-condensing)			
Shock (DIN EN 60068-2-27)		15 g / 6 ms in 3 axes, 1000 shocks each			
Vibration (DIN EN 60068-2-6)		20 g / 20 ... 500 Hz in 3 axes, 2 directions and 10 cycles each			
Protection class (DIN EN 60529)		IP65			
Material		Aluminum housing			
Weight		approx. 30 g (without cable), approx. 145 g (incl. cable)			
Control and display elements		Select button: zero, teach, factory setting; Web interface for setup with defined presets [6]; 2 x color LEDs for power / status			

FSO = Full Scale Output
SMR = Start of measuring range, MMR = Mid of measuring range, EMR = End of measuring range
The specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)
[1] Factory setting 1 kHz; modifying the factory setting requires the IF2001/USB converter (see accessories)
[2] Measuring rate 1 kHz, median 9
[3] Illuminant: light bulb
[4] Connection via interface module (see accessories)
[5] The D/A conversion is executed at 12 bits
[6] Connection to PC via IF2001/USB (optionally available)

Accessories for all optoNCDT series

Power supply

- PS2020 (power supply 24 V / 2.5 A, input 100 - 240 VAC, output 24 VDC / 2.5 A, mounting onto symmetrical standard rail 35 mm x 7.5 mm, DIN 50022)

Accessories for 1220 / 1320 series

Protective film

- Transparent protective film 32 x 11 mm for ILD1x20

Accessories for 1420 series

Supply and output cable (drag-chain suitable)

- PCF1420-1/I (1 m, output 4 ... 20 mA)
- PCF1420-1/I(01) (1 m, output 4...20 mA)
- PCF1420-3/I (3 m, output 4 ... 20 mA)
- PCF1420-6/I (6 m, output 4 ... 20 mA)
- PCF1420-10/I (10 m, output 4 ... 20 mA)
- PCF1420-15/I (15 m, output 4 ... 20 mA)
- PCF1420-3/U (3 m, with integrated resistor, output 1 ... 5 VDC)*
- PCF1420-6/U (6 m, with integrated resistor, output 1 ... 5 VDC)*
- PCF1420-10/U (10 m, with integrated resistor, output 1 ... 5 VDC)*
- PCF1420-15/U (15 m, with integrated resistor, output 1 ... 5 VDC)*
- PCF1420-3/IF2008 (3 m, interface and supply cable)
- PCF1420-6/IF2008 (6 m, interface and supply cable)
- PCF1420-10/IF2008 (10 m, interface and supply cable)
- PCF1420-3/C-Box (3 m)

* on request with output 2 ...10 VDC

Supply and output cable, suitable for use with robots

(available in 90° version)

- PCR1402-3/I (3 m)
- PCR1402-6/I (6 m)
- PCR1402-8/I (8 m)

Protective film

Transparent protective film 32 x 11mm for ILD1x20

Accessories for 1710 / 1750 series

Supply and output cable (drag-chain suitable)

- PC1700-3 (3 m)
- PC1700-10 (10 m)
- PC1700-10/IF2008 (10 m, for use with interface card IF2008)
- PC1750-3/C-Box (3 m)
- PC1750-6/C-Box (6 m)
- PC1750-9/C-Box (9 m)

Supply and output cable (suitable for use with robots)

- PCR1700-5 (5 m)
- PCR1700-10 (10 m)

Supply and output cables for temperatures up to 200 °C

- PC1700-3/OE/HT (3 m)
- PC1700-6/OE/HT (6 m)
- PC1700-15/OE/HT (15 m)

Protective housings

- SGH model (sizes S and M)
- SGHF model (sizes S and M)
- SGHF-HT model

Accessories for 1900 series

Supply and output cable (drag-chain suitable)

- PC1900-3/IF2008 Supply/output cable 3 m
- PC1900-6/IF2008 Supply/output cable 6 m
- PC1900-9/IF2008 Supply/output cable 9 m
- PC1900-15/IF2008 Supply/output cable 15 m
- PC1900-3/C-Box Power/output cable 3 m
- PC1900-6/C-Box Power/output cable 6 m
- PC1900-9/C-Box Power/output cable 9 m
- PC1900-15/C-Box Power/output cable 15 m
- PC1900-3/OE Supply/output cable 3 m
- PC1900-6/OE Supply/output cable 6 m
- PC1900-9/OE Supply/output cable 9 m
- PC1900-15/OE Supply/output cable 15 m

Accessories for 2300 / 2310 series

Supply and output cable

- PC2300-0,5Y (connection cable to PC or PLC; for operation a PC2300-3/SUB-D will be required in addition)
- PC2300-3/SUB-D (3 m; for operation a PC2300-0,5Y will be required in addition)
- PC2300-3/IF2008 (interface and supply cable)
- PC2300-3/OE (3 m)
- PC2300-6/OE (6 m)
- PC2300-9/OE (9 m)
- PC2300-15/OE (15 m)
- PC2300-3/C-Box/RJ45 (3 m)

* other cable lengths on request

Supply and output cables for temperatures up to 200 °C

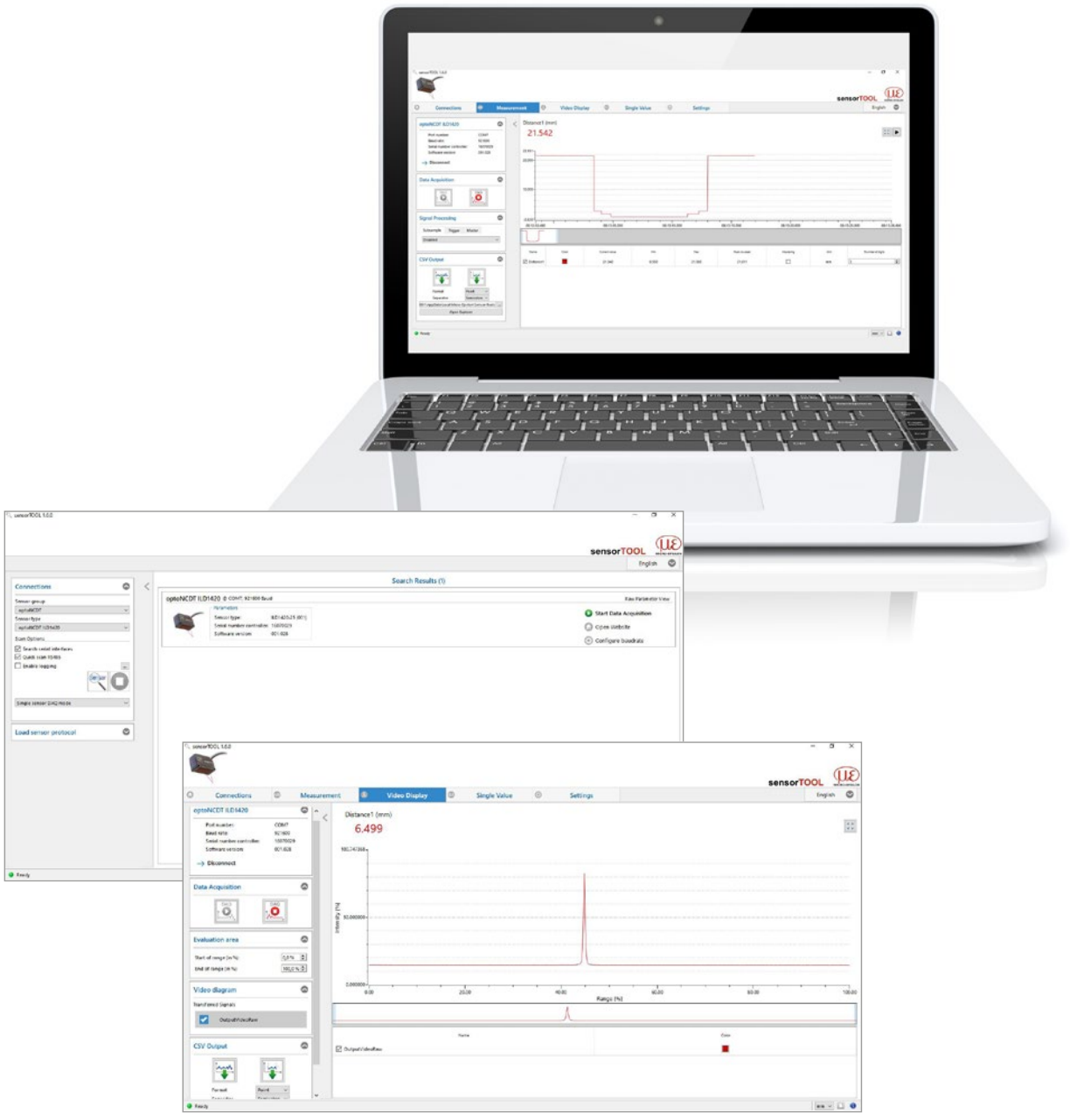
- PC2300-3/OE/HT (3 m)
- PC2300-6/OE/HT (6 m)
- PC2300-9/OE/HT (9 m)
- PC2300-15/OE/HT (15 m)

Protective housings

- SGH model (sizes S and M)
- SGHF model (sizes S and M)
- SGHF-HT model

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.com/download

Protective housings for demanding environments

To protect the optoNCDT laser sensors in harsh environments, protective housings are available in different designs.

SGH model:

The SGH protective housing encloses the sensor and is equipped with a replaceable protective window. The water-resistant housing protects the sensor from solvents and detergents.

Size S for the following models:

- 1750-20BL and 1750-200BL
- 2300-2, 2300-5, 2300-10, 2300-20, 2300-50 and 2300-100
- 2300-2LL, 2300-10LL, 2300-20L and 2300-50LL
- 2300-2BL, 2300-5BL and 2300-10BL

Size M for the following models:

- 1750-500BL and 1750-750BL
- 1750 500 and 1750-750
- 2300-200 and 2300-300
- 2310-10, 2310-20 and 2310-40

SGH size S (140 x 140 x 71 mm)

SGH size M (180 x 140 x 71 mm)

SGHF model:

With window and compressed-air connection ideal for high ambient temperatures. The integrated air cooling of the housing offers optimum protection for the sensor.

Size S for the following models:

- 1750-20BL and 1750-200BL
- 2300-2, 2300-5, 2300-10, 2300-20, 2300-50 and 2300-100
- 2300-2LL, 2300-10LL, 2300-20L and 2300-50LL
- 2300-2BL, 2300-5BL and 2300-10BL

Size M for the following models:

- 1750-500BL and 1750-750BL
- 1750 500 and 1750-750
- 2300-200 and 2300-300
- 2310-10, 2310-20 and 2310-40

SGHF size S (140 x 140 x 71 mm)

SGHF size M (180 x 140 x 71 mm)

SGHF-HT model:

This water-cooled protective housing with window and compressed-air connection is designed for measurement tasks in ambient temperatures up to 200 °C.

For the following models:

- 1710-50 and 1710-1000
- 1710-50BL and 1710-1000BL
- 1750-500 and 1750-750
- 1750-500BL and 1750-750BL
- 2300-200 and 2300-300
- 2310-50BL
- 2310-10, 2310-20, 2310-40 and 2310-50

Maximum temperature of cooling water T(max) = 10 °C
Minimum water flow rate Q(min) = 3 liters/min

SGHF-HT (260 x 180 x 154 mm)

Interface modules

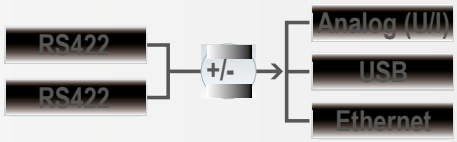
Module	optoNCDT 1220	optoNCDT 1320	optoNCDT 1420	optoNCDT 1710	optoNCDT 1750	optoNCDT 1900	optoNCDT 2300	optoNCDT 2310
C-Box/2A Controller unit for evaluation and signal conversion of up to 2 sensor signals	⊘	⊘	✔	⊘	✔	✔	✔	✔
IF2001/USB RS422/USB converter to transform a digital signal to USB	✔	✔	✔	✔	✔	✔	✔	✔
IC2001/USB Single-channel RS422/USB converter cable	✔	✔	✔	✔	✔	✔	✔	✔
IF2004/USB RS422/USB converter to convert up to 4 digital signals to USB	⊘	⊘	✔	✔	✔	✔	✔	✔
IF2008/ETH Interface module for Ethernet connection for up to 8 sensors	⊘	⊘	✔	⊘	✔	✔	✔	✔
IF2008PCIE Interface card for multiple sensor signals; analog and digital interfaces	⊘	⊘	✔	✔	✔	✔	✔	✔
IF2030/PNET Interface module for Industrial Ethernet connection (PROFINET)	✔	✔	✔	⊘	✔	✔	✔	✔
IF2030/ENETIP Interface module for Industrial Ethernet connection (EtherNet/IP)	✔	✔	✔	⊘	✔	✔	✔	✔

C-Box/2A Controller for D/A conversion and evaluation of up to 2 sensor signals

C-Box/2A is used for fast D/A conversion of two digital input signals or for evaluating two digital sensor signals. The controller is compatible with the optoNCDT 1420, 1750, 1900 and 2300 models. Handling of the C-Box/2A and of the connected sensors are performed via web interface. Averaging functions, thickness, diameter, step and inclinations can be calculated. The D/A conversion is executed at 16 bit and max. 70 kHz.

Special features

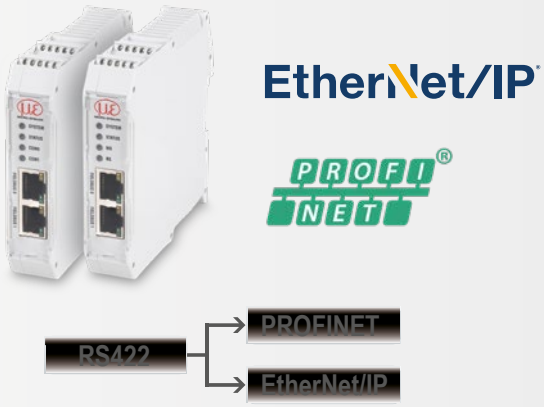
- Trigger input
- Multi-function output
- Measurement value output via Ethernet, USB, analog output
  4 ... 20 mA / 0 ... 5 V / 0 ... 10 V / ±5 V / ±10 V
  (scalable via web interface)
- 2x switching outputs for sensors or C-Box/2A status
- Parallel data output via three output interfaces



IF2030

Interface module for Industrial Ethernet connection

The IF2030 interface modules are designed for easy connection of Micro-Epsilon sensors to Ethernet-based fieldbuses, e.g., plant control systems. The PROFINET and Ethernet/IP modules are compatible with sensors that output data via an RS422 or RS485 interface. These modules operate on the sensor side with up to 4 MBd and have two network connections for different network topologies. Installation in control cabinets is via a DIN rail.



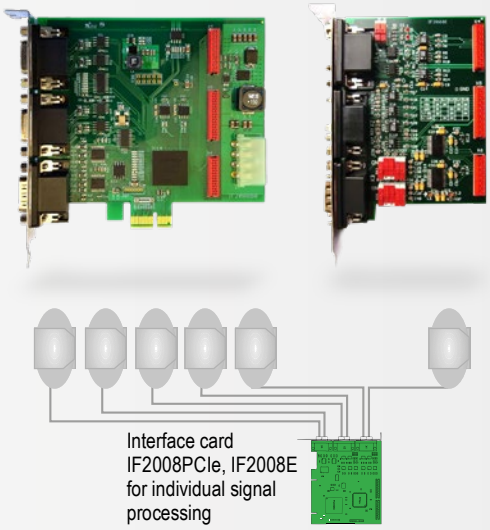
IF2008PCIe / IF2008E

Interface card for synchronous data acquisition

Absolute synchronous data acquisition is a decisive factor for the planarity or thickness measurement using several laser sensors. The IF2008PCIe interface card is designed for installation in PCs and enables the synchronous capture of four digital sensor signals and two encoders. The data is stored in a FIFO memory in order to enable resource-saving processing in blocks in the PC. The IF2008E expansion board enables to detect in addition two digital sensor signals, two analog sensor signals and eight I/O signals.

Special features

- IF2008PCIe - Basic printed circuit board:
  4 digital signals and 2 encoders
- IF2008E - Expansion board:
  2x digital signals, 2x analog signals and 8x I/O signals



IF2008/ETH

IF2008/ETH Interface module for Ethernet connection with up to 8 sensors

The IF2008/ETH integrates up to eight sensors and/or encoders with an RS422 interface into an Ethernet network. Four programmable switching in-/outputs (TTL and HTL logic) are available. Ten indicator LEDs directly on the module show both the channel and the device status. In addition, acquisition and output of data via Ethernet is in addition performed at high speeds up to 200 kHz. Parameter setting of the interface module can be easily done via the web interface.

IC2001/USB Single-channel converter cable RS422/USB

The IC2001/USB single-channel converter cable is used for the USB connection of optoNCDT sensors equipped with an RS422 interface. The cable is easy to assemble and can therefore also be used for installation in machines and systems.

Special features

- 5-core interface cable without outer shield
- Conversion from RS422 to USB
- Easy sensor connection via USB
- Supports baud rates from 9.6 kBaud to 1 MBaud

IF2001/USB converter RS422 to USB

The RS422/USB converter transforms digital signals from a laser-optical sensor into a USB data packet. The sensor and the converter are connected via the RS422 interface of the converter.

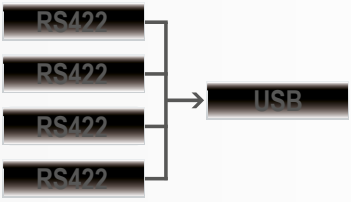
Data output is done via USB interface. The converter loops through further signals and functions such as laser on/off, switch signals and function output. The connected sensors and the converter can be programmed through software.

Special features

- Robust aluminum housing
- Easy sensor connection via screw terminals (plug & play)
- Conversion from RS422 to USB
- Supports baud rates from 9.6 kBaud to 12 MBaud

IF2004/USB: 4-channel converter from RS422 to USB

The RS422/USB converter is used for transforming digital signals from up to four optical sensors into USB data signals. The converter has four trigger inputs and a trigger output for connecting additional converters. Data is output via an USB interface. The connected sensors and the converter can be programmed through software.



Special features

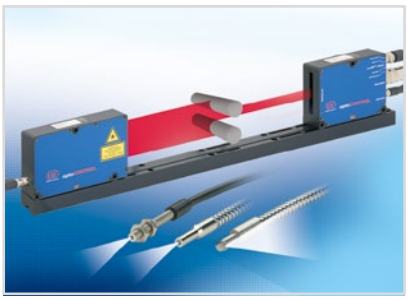
- 4x digital signals via RS422
- 4x trigger inputs, 1x trigger output
- Synchronous data acquisition
- Data output via USB

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