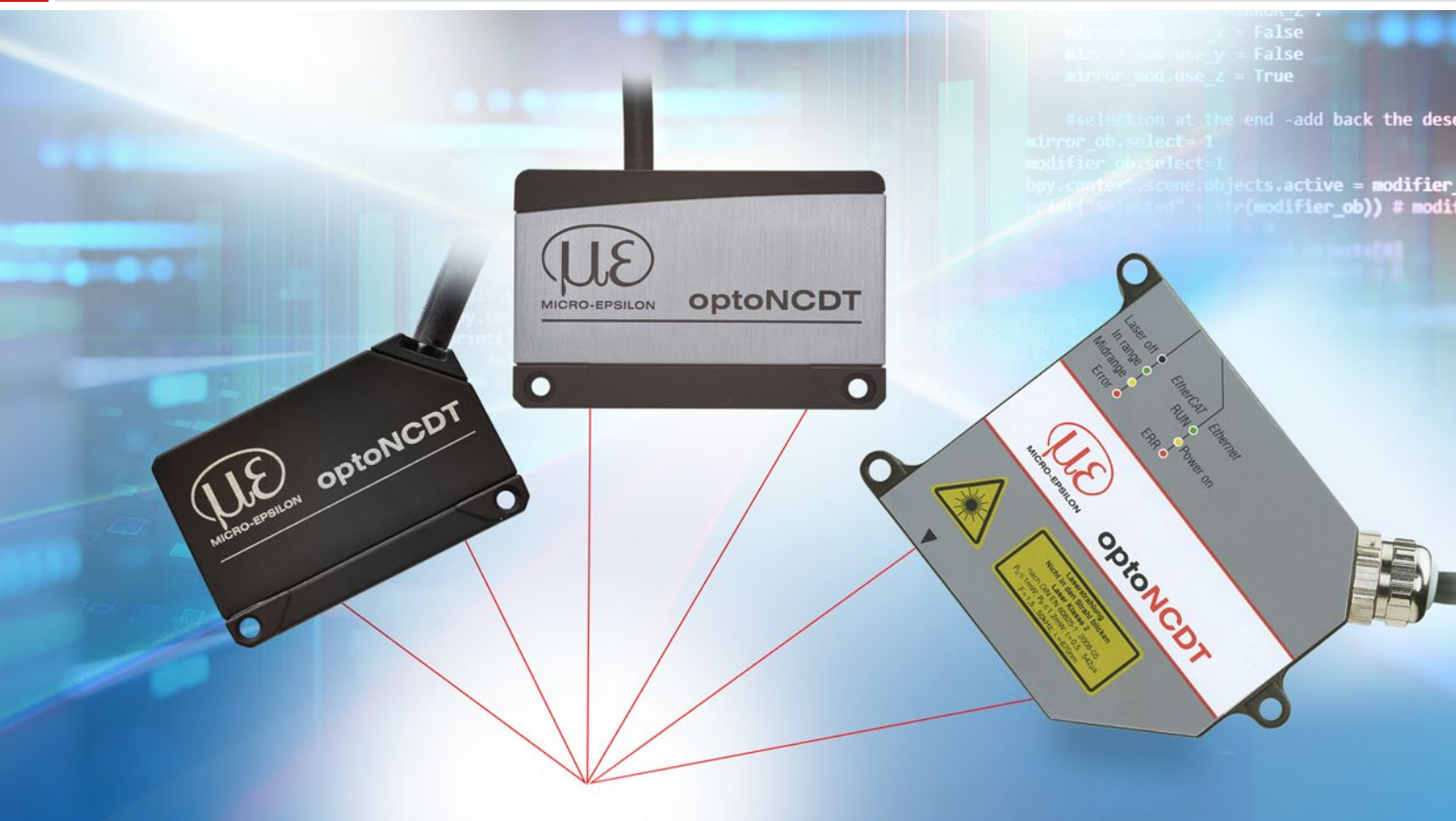










More Precision

optoNCDT // Laser displacement sensors (triangulation)



High precision laser sensors in miniature design optoNCDT 1220 / 1320 / 1420

designed for advanced
AUTOMATION

-  Measuring rate up to 8 kHz
-  Analog (U/I) / RS422 / PROFINET / EtherNet/IP / EtherCAT
-  Active Surface Compensation
-  Repeatability 0.5 μm
-  Ideal for series and OEM applications
-  Low weight, ideal for high accelerations



Best in Class:

Compact, precise and faster






The optoNCDT 1x20 laser sensors are among the best in their class. The sensors offer a unique combination of speed, size and performance. The laser sensors are used for the precise measurement of displacement, distance and position in all fields of automation technology, such as machine building, 3D printers and robotics.

The optoNCDT 1x20 sensors use an intelligent surface control feature. The Active Surface Compensation (ASC) ensures stable measurement results regardless of changing colors or brightness of the target surface.

Ideal for industrial series applications

Different output signals enable the sensor to be integrated into plant and machine control systems. As well as analog voltage and current outputs, a digital RS422 interface provides distance information from the sensor.

Due to the universal setting and evaluation possibilities, the optoNCDT 1x20 sensors meet all the requirements for use in industrial series and OEM applications.

Model	Technology	Measuring range	Repeatability	Linearity
optoNCDT 1220		10 - 500 mm	1 μm	0.10 %
optoNCDT 1320		10 - 500 mm	1 μm	0.10 %
optoNCDT 1420		10 - 500 mm	0.5 μm	from 0.08 %
optoNCDT 1420LL		10 - 50 mm	0.5 μm	from 0.08 %
optoNCDT 1420CL1		10 - 50 mm	0.5 μm	from 0.08 %

Highest precision in a minimum of space

Compact size combined with low weight opens up new fields of application. The selectable connector type, i.e. cable or pigtail, together with compact size reduce the sensor installation effort to a minimum.

Now even more powerful!

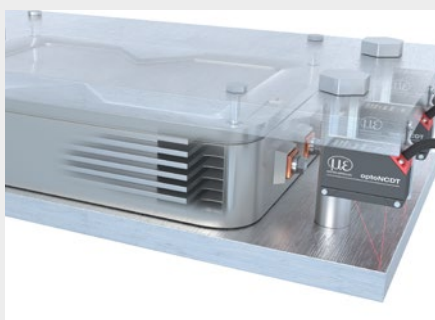
The optoNCDT 1x20 sensors have been optimized for industrial series use. Furthermore, the robust IP67 sensor housing allows use in industrial environments, even with high accelerations. A high-performance D/A converter enables 16 bit resolution at the analog output. Therefore, the sensor achieves even more precise measurement results. With the doubled measuring rate, even faster measurements can now be performed.



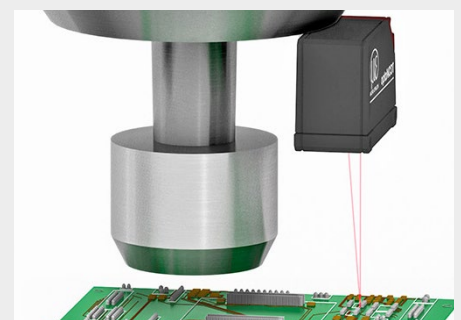
Application examples



Dimension control of turned parts



Monitoring the expansion of battery cells



Distance control of print heads

Technical data

optoNCDT 1420

optoNCDT 1420 (General technical data)

Model		ILD1420-xx
Measuring rate ^[1]		6 adjustable stages: 8 kHz / 4 kHz / 2 kHz / 1 kHz / 0.5 kHz / 0.25 kHz
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, teach
Digital interface ^[2]		RS422 (16 bit) / EtherCAT / PROFINET / EtherNet/IP
Analog output ^[3]		4 ... 20 mA / 1 ... 5 V with PCF1420-3/U cable (16 bit, freely scalable within the measuring range)
Switching output		1 x error output: npn, pnp, push pull
Connection		integrated cable 3 m, open ends, min. bending radius 30 mm (fixed installation) or integrated pigtail 0.3 m with 12-pin M12 plug (see accessories for suitable connection cable)
Installation		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) ^[4]		IP67
Material		Aluminum housing
Weight		approx. 60 g (incl. pigtail), approx. 145 g (incl. cable)
Control and indicator elements ^[5]		Select button: zero, teach, factory setting; web interface for setup: selectable presets, peak selection, video signal, freely selectable averaging, data reduction, setup management; 2 x color LEDs for power / status

^[1] Factory setting 4 kHz, modifying the factory setting requires the IF2001/USB converter (see accessories)

For models with laser class 1 the maximum measuring rate is 4 kHz

^[2] For EtherCAT, PROFINET and EtherNet/IP connection via interface module is required (see accessories)

^[3] For models with laser class 1 the D/A conversion is done with 12 bit

^[4] Models with laser class 1 have the protection class IP65

^[5] Access to web interface requires connection to PC via IF2001/USB (see accessories)



Laser point - optoNCDT 1420

Model		ILD1420-10	ILD1420-25	ILD1420-50	ILD1420-100	ILD1420-200	ILD1420-500
Measuring range		10 mm	25 mm	50 mm	100 mm	200 mm	500 mm
Start of measuring range		20 mm	25 mm	35 mm	50 mm	60 mm	100 mm
Mid of measuring range		25 mm	37.5 mm	60 mm	100 mm	160 mm	350 mm
End of measuring range		30 mm	50 mm	85 mm	150 mm	260 mm	600 mm
Linearity ^[1]		< ±8 μm	< ±20 μm	< ±40 μm	< ±80 μm	< ±160 μm	< ±500 ... ±1000 μm
		< ±0.08 % FSO					
Repeatability ^[2]		0.5 μm	1 μm	2 μm	4 μm	8 μm	20 ... 40 μm
Temperature stability ^[3]		±0.015 % FSO / K			±0.01 % FSO / K		
Light spot diameter ^[4]	SMR	90 x 120 μm	100 x 140 μm	90 x 120 μm	750 x 1100 μm	750 x 1100 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 Ø	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 class		Class 2 in accordance with IEC 60825-1: 2014					
Permissible ambient light ^[5]		50.000 lx			30.000 lx	10.000 lx	

^[1] FSO = Full Scale Output; the specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)

^[2] Measuring rate 2 kHz, median 9

^[3] The specified value is only achieved by mounting on a metallic sensor holder. Good heat dissipation from the sensor to the holder must be ensured.

^[4] ±10 %; SMR = Start of measuring range; MMR = Mid of measuring range; EMR = End of measuring range

^[5] Illuminant: light bulb



Laser line - optoNCDT 1420LL

Model		ILD1420-10LL	ILD1420-25LL	ILD1420-50LL
Measuring range		10 mm	25 mm	50 mm
Start of measuring range		20 mm	25 mm	35 mm
Mid of measuring range		25 mm	37.5 mm	60 mm
End of measuring range		30 mm	50 mm	85 mm
Linearity ^[1]		< ±8 µm	< ±20 µm	< ±40 µm
		< ±0.08 % FSO		
Repeatability ^[2]		0.5 µm	1 µm	2 µm
Temperature stability ^[3]		±0.015 % FSO / K		
Light spot diameter ^[4]	SMR	140 x 720 µm	220 x 960 µm	240 µm x 1250 µm
	MMR	65 x 680 µm	80 x 970 µm	130 µm x 1450 µm
	EMR	140 x 660 µm	240 x 1000 µm	380 µm x 1650 µm
	smallest Ø	65 x 680 µm with 25 mm	80 x 970 µm with 37.5 mm	110 x 1400 µm with 52.5 mm
Light source		Semiconductor laser < 1 mW, 670 nm (red)		
Laser class		Class 2 in accordance with IEC 60825-1: 2014		
Permissible ambient light ^[5]		50,000 lx		

^[1] FSO = Full Scale Output; the specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)

^[2] Measuring rate 2 kHz, median 9

^[3] The specified value is only achieved by mounting on a metallic sensor holder. Good heat dissipation from the sensor to the holder must be ensured.

^[4] ±10 %; SMR = Start of measuring range, MMR = Mid of measuring range, EMR = End of measuring range

Light spot diameter with line-shaped laser determined based on the emulated 90/10 knife-edge method

^[5] Illuminant: light bulb



Laser class 1 - optoNCDT 1420 CL1

Model		ILD1420-10CL1	ILD1420-25CL1	ILD1420-50CL1
Measuring range		10 mm	25 mm	50 mm
Start of measuring range		20 mm	25 mm	35 mm
Mid of measuring range		25 mm	37.5 mm	60 mm
End of measuring range		30 mm	50 mm	85 mm
Linearity ^[1]		< ±8 µm	< ±20 µm	< ±40 µm
		< ±0.08 % FSO		
Repeatability ^[2]		0.5 µm	1 µm	2 µm
Temperature stability ^[3]		±0.015 % FSO / K		
Light spot diameter ^[4]	SMR	90 x 120 µm	100 x 140 µm	90 x 120 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 Ø	45 x 40 µm with 24mm	55 x 50 µm with 31 mm	70 x 65 µm with 42 mm
Light source		Semiconductor laser < 0.39 mW, 670 nm (red)		
Laser class		Class 1 in accordance with DIN EN 60825-1: 2015-07		
Permissible ambient light ^[5]		15,000 lx		

^[1] FSO = Full Scale Output; the specified data apply to white, diffuse reflecting surfaces (Micro-Epsilon reference ceramic for ILD sensors)

^[2] Measuring rate 2 kHz, median 9

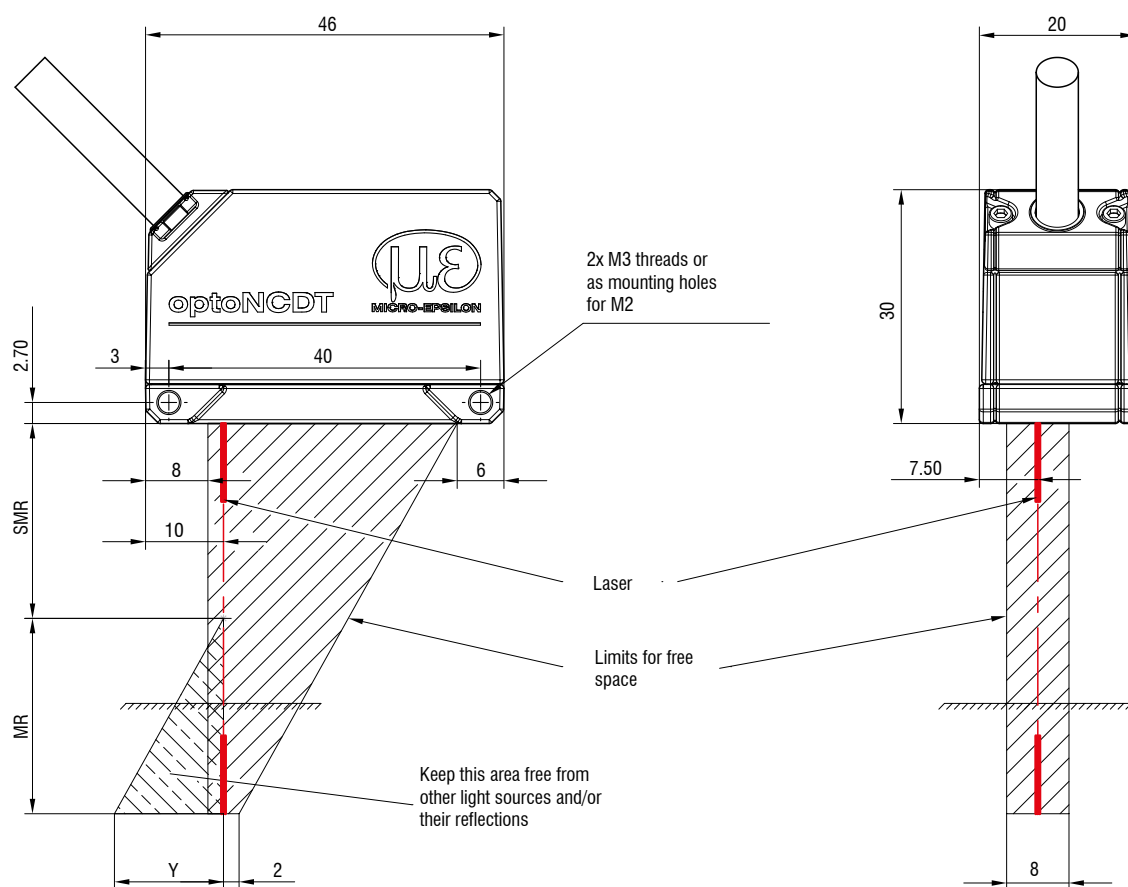
^[3] The specified value is only achieved by mounting on a metallic sensor holder. Good heat dissipation from the sensor to the holder must be ensured.

^[4] ±10 %; SMR = Start of measuring range, MMR = Mid of measuring range, EMR = End of measuring range

^[5] Illuminant: light bulb

Dimensions

optoNCDT 1220 / 1320 / 1420



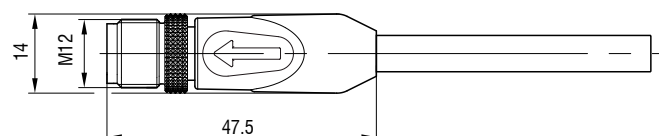
MR	SMR	Y
10	20	10
25	25	21
50	35	28
100	50	46
200	60	70
500	100	190

(Dimensions in mm, not to scale)

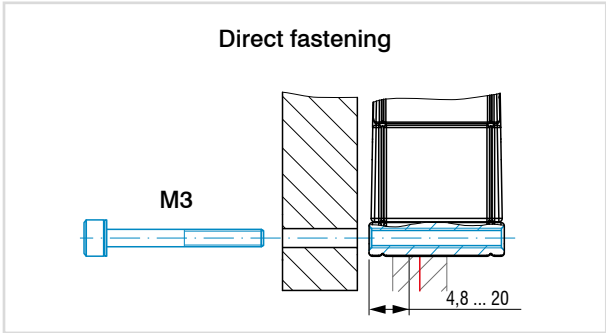
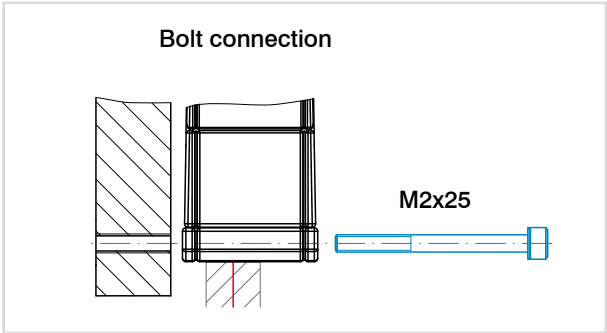
MR = measuring range; SMR = start of measuring range;

MMR = mid of measuring range; EMR = end of measuring range

Connector (sensor side)



Installation options



Accessories for optoNCDT 1220/1320/1420

Power supply unit

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)

Protective film

Transparent protective film 32 x 11 mm for ILD1x20

Scope of supply

- 1 ILD1x20 sensor
- 1 Assembly instructions
- 1 digital calibration protocol accessible via web interface
- Accessories (2x M2 screws and 2 washers)

Article designation

ILD1420-	10	LL	CL1
			Laser class No indication: class 2 (standard) CL1: Class 1 (only with ILD1420)
			Laser type No indication: Red laser point (standard) LL: Laser Line (only with ILD1420)
			Measuring range in mm
Series			
ILD1220: Compact laser displacement sensor for OEM and serial applications			
ILD1320: Compact laser triangulation displacement sensor			
ILD1420: Smart laser triangulation displacement sensor			

Connection possibilities

optoNCDT 1220 / 1320 / 1420

Sensors with integrated cable

Cable diameter:	5.40 ±0.2 mm
Drag chain:	no
Robot:	no
Temperature range:	-25 ... 105 °C (moving) -40 ... 105 °C (not moving)
Bending radius:	> 27 mm (fixed installation) > 54 mm (dynamic)

Sensor	Cables	Type	Connection possibilities and accessories
ILD1220-xx	Integrated cable Length 2 m	Open ends	Supply voltage connection Power supply unit PS2020
ILD1320-xx ILD1420-xx ILD1420-xxLL	Integrated cable Length 3 m		Interface module of RS422 to USB IF2001/USB IC2001/USB
			Interface module for Industrial Ethernet connection IF2035-PROFINET IF2035-EIP IF2035-EtherCAT




Drag-chain suitable extension and adapter cables

Cable diameter:	6.0 ±0.2 mm
Drag chain:	yes
Robot:	no (optional on request)
Temperature range:	-40 ... 90 °C
Bending radius:	> 30 mm (fixed installation) > 60 mm (dynamic)

Sensor	Cables	Type	Connection possibilities and accessories
ILD1420-xx ILD1420-xxLL	Extension cable pigtail Length 3 m / 6 m / 10 m / 15 m <i>Art. no. Designation</i> 29011067 PCF1420-3/I 29011068 PCF1420-6/I 29011069 PCF1420-10/I 29011070 PCF1420-15/I 29011071 PCF1420-3/U 29011072 PCF1420-6/U 29011073 PCF1420-10/U 29011074 PCF1420-15/U	Open ends	Supply voltage connection Power supply unit PS2020
			Interface module of RS422 to USB IF2001/USB IC2001/USB
			Interface module for Industrial Ethernet connection IF2035-PROFINET IF2035-EIP IF2035-EtherCAT
	Adapter cable for PC interface card Length 3 m / 6 m / 10 m <i>Art. no. Designation</i> 29011079 PCF1420-3/IF2008 29011088 PCF1420-6/IF2008 29011089 PCF1420-10/IF2008	Sub-D	Interface card for synchronous data acquisition IF2008PCle / IF2008E
	Adapter cable for sensor calculation Length 3 m / 6 m / 9 m <i>Art. no. Designation</i> 29011171 PCF1420-3/C-Box 29011172 PCF1420-6/C-Box 29011170 PCF1420-9/C-Box	Sub-D	4-fold interface module from RS422 to USB IF2004/USB
	Adapter cable for sensor calculation Length 2 m <i>Art. no. Designation</i> 29011149 PCE1420-2/M12	M12	Controller for D/A conversion and evaluation of up to 2 sensor signals Dual Processing Unit
			Interface module for Ethernet connection of up to 8 sensors IF2008/ETH

Other cables

- Cable diameter: 6.7 mm
Drag chain: yes
Robot: no
Temperature range: -40 ... 80 °C
Bending radius: > 27 mm (fixed installation)
> 51 mm (dynamic)

Input	Cables	Type	Connection possibilities and accessories	
2 x Sub-D (PCF1420-x/ IF2008)	Adapter cable for the connection of two sensors per Sub-D connector Length 0.1 m <div>Art. no. Designation</div> <div>2901528 IF2008-Y-adapter cable</div> <div></div>	Sub-D	Interface card for synchronous data acquisition IF2008PCle / IF2008E <div></div>	
			4-fold interface module from RS422 to USB IF2004/USB <div></div>	

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