



# More Precision






## **profileGAUGE**

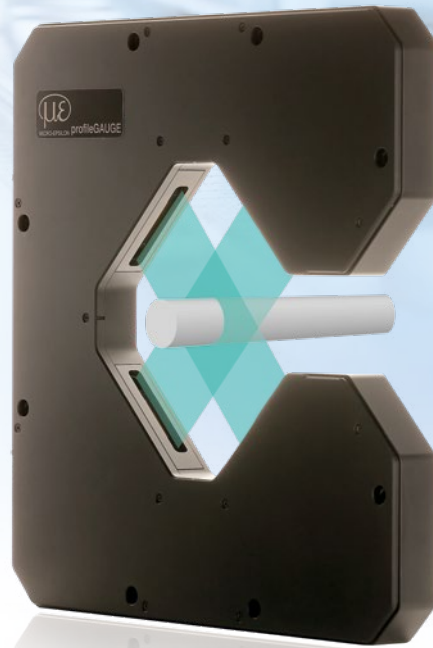
Measuring and inspection system for (inline) profile measurement



# Measuring and inspection system for (inline) profile measurement

## profileGAUGE

-  X-configuration of two ODC2700 sensors
-  Synchronous and asynchronous operation possible
-  Parallel output via sensor tool
-  Angle measurement and active inclination correction of the measuring object
-  Ethernet / EtherCAT / RS422 / Analog / EtherNet/IP / PROFINET



The profileGAUGE is a precise sensor system for biaxial measurement of the profile, diameter, and position of ultra-fine wires and round materials. Two pre-mounted optoCONTROL ODC2700 micrometers arranged in an X-configuration measure the target on two axes. The system is fully aligned and wired. The statistical values of both axes can be calculated downstream by the customer. The common fieldbus interfaces EtherCAT, EtherNET/IP, or PROFINET are available as standard.

### Inline round profile and diameter measurement

The profileGAUGE can be used to perform non-contact diameter measurements from 30  $\mu\text{m}$ . The active inclination correction of the two ODC2700 micrometers on two axes avoids measurement errors caused by a tilted measuring object, as the measurement values are automatically adjusted to the inclination - and therefore the alignment of the measuring object. The inclination correction is performed up to 5000 times per second for each output measurement value in the measurement programs for outside diameter, wire and contour measurement. Based on a high-precision optical method, the integrated ODC2700 micrometers reliably detect transparent objects, enabling the measurement of transparent glass or plastic.

### Reliable and precise measurements

The extremely short exposure time of 8.5  $\mu\text{s}$  easily enables very precise measurements of objects that vibrate or move at high speed through the light curtain. Synchronous or optionally asynchronous measurement acquisition allows for measurement values at exactly the same time in both axes. This means, for example, that center axis positions can also be determined in motion with maximum precision.

A shared encoder input is available for both axes, providing further system-related information or trigger functionality.

### Soiling check

The integrated soiling check feature identifies soiling on the lenses at an early stage, enabling the system to compensate accordingly and prevent measurement distortion. This prevents failures and malfunctions. Via the integrated interfaces, the optoCONTROL 2700 provides information on the degree of soiling on request, e.g. at maintenance intervals. The intelligent evaluation detects even minor soiling, both on the glass panes and in the measuring field. Dust particles or oil splashes, for example, which are invisible to the human eye, are reliably detected.

### Three types of soiling can be output:

- **Clean:** no soiling detected in the entire measuring range
- **Restricted:** detected soiling is in the ignored area
- **Contaminated:** detected soiling is in the relevant area

### Optional accessories

The profileGAUGE can optionally be fitted with a protective glass or an air purge collar. The former ensures that the glass of the ODC2700 micrometers is not damaged in harsh environments. The purge collar is used to blow out the LED beam path so that no foreign particles affect the measurement accuracy.

Model	C.ODC-10/2	C.ODC-10/2.PG	C.ODC-10/2.PGA	C.ODC-40/2	C.ODC-40/2.PG	C.ODC-40/2.PGA
Sensor used	ODC2700-10			ODC2700-40		
Measuring range	10 mm			40 mm		
Min. target size <sup>[1]</sup>	0,05 mm (0,03 mm)			0,3 mm (0,1 mm)		
Distance light source - receiver	300 mm			300 mm		
Measuring distance target - receiver	150 (±2,5) mm			150 (±10) mm		
Version	without protective glass attachment and air purge	with protective glass attachment	with protective glass attachment and air purge	without protective glass attachment and air purge	with protective glass attachment	with protective glass attachment and air purge
Sampling rate <sup>[2]</sup>	15.0 kHz			5.0 kHz		
Measuring rate <sup>[3]</sup>	8.5 μs			10 nm		
Exposure time <sup>[4]</sup>	≤ 0.5 μm <sup>[7]</sup>			≤ 1 μm <sup>[8]</sup>		
Resolution <sup>[5]</sup>	≤ 0.03 μm			≤ 0.1 μm		
Linearity <sup>[6]</sup>	LED turquoise 508 nm (blue-green)			LED turquoise 508 nm (blue-green)		
Repeatability <sup>[6]</sup>	no laser, LED according to DIN EN 62471 risk group 1			no laser, LED according to DIN EN 62471 risk group 1		
Light source	30,000 lx indirect; 5000 lx direct irradiation					
Laser class	11 ... 30 VDC					
Permissible extraneous light	≤ 1 A					
Supply voltage	3x inputs (for both axes) optionally for encoder, zero point, reset, trigger; light on/off (can be switched off via menu)					
Max. current consumption	Ethernet, RS422 (up to 8 MBaud) EtherCAT, EtherNet/IP, PROFINET					
Signal input	3 outputs (per axis), optionally for error and 2x limit values, not galvanically isolated 24V logic (HTL), High level depends on operating voltage Switchable TTL level					
Digital interface <sup>[9]</sup>	Synchronization					
Switching output	2x 12-pin M12 sockets for power supply, sync, and RS422, 2x 4-pin M12x1 sockets for Ethernet or fieldbus, 1x 12-pin M12 plug for outputs (errors, limit values) - inputs (trigger/encoder)					
Digital output	Both a feed-through connection with 8 × M10 and a screw connection with 8 × M12 screws are possible.					
Connection	Receiver					
Mounting	Storage	-20 ... +70 °C				
Temperature range <sup>[10]</sup>	Operation	0 ... +50 °C				
Shock (DIN EN 60068-2-27)	15 g / 6 ms in XY axis, 100 shocks each					
Vibration (DIN EN 60068-2-6)	2 g / 20 ... 500 Hz in XY axis, 10 cycles each					
Protection class (DIN EN 60529)	IP67 (with protective glass and connected cables)					
Material	Aluminum housing					
Weight	26 kg					
Measuring programs	Diameter / gap / segment measurement / edge measurement with rising or falling edge / search and measurement direction / additional detection of edge positions and center axes					
Presets	Strip edge / wire measurement / (outer) diameter incl. inclination correction / contour measurement incl. encoder value / Multi-segment as well as roller, gap and angle measurement					
Control and indicator elements	4x LEDs (Power, Status, Link, Speed) Website; Inclination correction, soiling indicator, 6 application-specific presets, freely selectable averaging, data reduction, 8 editable user programs, value-time charts, measurement chart in mm/inch, video signal, setup mode with measuring line and measuring object; menu languages: German, English, and others					
Special features	Includes "sensorTOOL" software for data acquisition and processing, "MedaQLib" programming library					

<sup>[1]</sup> Value in brackets related to the mid of the measuring range

<sup>[2]</sup> Number of measurements taken per second

<sup>[3]</sup> Number of measured values that are output at the sensor interface

<sup>[4]</sup> With video averaging switched on = 3 x 8.5 μs exposures per measurement

<sup>[5]</sup> At the digital interface

<sup>[6]</sup> The data applies to a 95% confidence interval for diameter measurements with an average of 1024 values over a period of 5 minutes in a temperature-stabilized environment after a warm-up time of 45 minutes.

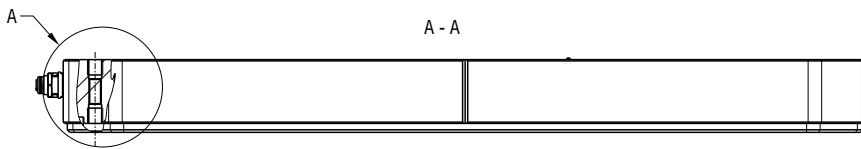
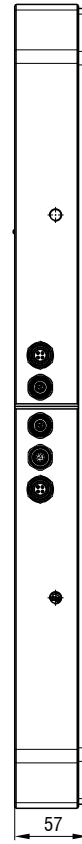
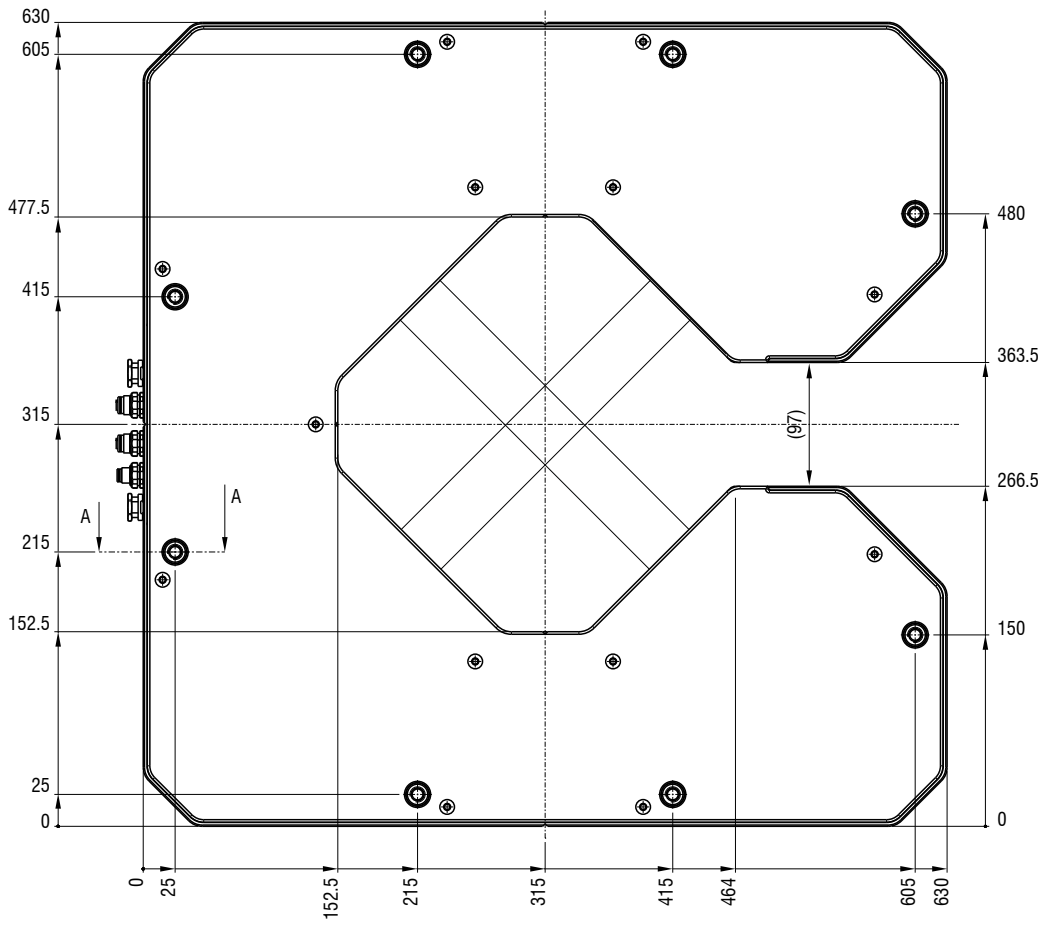
<sup>[7]</sup> Measured with 2 mm testing pin at a measurement distance of 150 mm in measuring field 1 (Z=±0.5 mm) linearity ≤ 0.5, in measuring field 2 (Z=±1.5 mm) linearity ≤ 1 μm, in measuring field 3 (Z=±2.5 mm) linearity ≤ 2,5 μm

<sup>[8]</sup> Measured with 2 mm testing pin at a measurement distance of 150 mm in measuring field 1 (Z=±2.5 mm). In measuring field 2 (Z=±10 mm) linearity ≤ 3 μm - 95% confidence interval

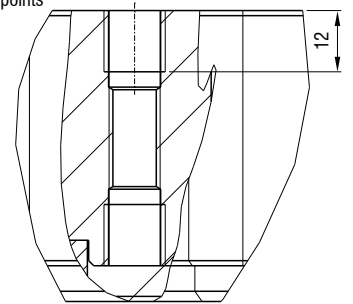
<sup>[9]</sup> EtherCAT, PROFINET, and EtherNet/IP: Connection via interface module (see accessories) or directly in the sensor "on board" as an alternative to Ethernet on request

<sup>[10]</sup> Relative humidity % 5 ... 95 (non-condensing)

# Dimensions profileGAUGE




A  
2:1  
8x fixing points



(Dimensions in mm, not to scale)

# Interface modules and accessories

## profileGAUGE

Connection	Interface modules	Connection cables	Mounting
<b>Power supply</b> 2420096 (24V; 1A) 2420062 (24 VDC/2,5 A)  <b>Power supply</b> Power supply unit PS2031            2420096 Power supply unit PS2020           2420062		<b>Supply, interface and signal cables with open ends</b> PC/SC2700-3 (3 m)            29011452 PC/SC2700-5 (5 m)            29011453 PC/SC2700-10 (10 m)        29011454 PC/SC2700-20 (20 m)        29011455  	
<b>PLC ProfiNET / EthernetIP</b>  	IF2035-EtherCAT            2211036 IF2035-PROFINET        2211039 IF2035-EtherNetIP       2211038  		
Serial RS422	Direct RS422 OE to PC		
<b>Digital output / USB / Ethernet</b>  	IC2001/USB            2213041 Converter cable    IF2001/USB            2213025 Converter  		
Serial RS422	Direct RS422 to PC		
Analog 0 ... 10 V	IF2004/USB            2213024   IF2008PCIE            2213032   IF2008E                2213018 	<b>Interface and supply cables for IF2008;</b> PC/SC2700-3/IF2008 (3 m)    29011508    IF2008-Y adapter cable for connection of a 3rd or 4th sensor (0.1 m)  	
	Encoder and IOs  	<b>Output cable</b> Phoenix Cable            0467957 12-pin / shielded / coding A / 5 m / SAC-12P-5,0-35T/FS SH	
Ethernet	Directly via Ethernet to PC via RJ45	<b>Digital output cables</b> SCD2700-3 (3 m)            29011456 SCD2700-5 (5 m)            29011457 SCD2700-10 (10 m)        29011458 SCD2700-20 (20 m)        29011459  	
<b>EtherCAT, EtherNET/IP, PROFINET</b>  	Directly via RJ45   via EtherCAT Switch M12	SCD2700-5 M12 (5 m)        29011460	
<b>Digital output Ethernet</b>  	IF2008ETH            2213018  	<b>Supply and output cable</b> PCE2700-3/M12 (3 m)        29011541  	<b>For extension:</b> Connection cable extension Transmitter / Receiver CE2700-1/E (1 m)            29011483 CE2700-2/E (2 m)            29011484 CE2700-5/E (5 m)            29011485

PS2020 Power supply unit 24 VDC / 2.5 A for mounting on DIN rail  
 PS2031 Power supply unit Universal power supply unit 100-240V/24V/ 1A

2420062 PS2020  
 2420096 PS2031



# Interface modules and accessories

## profileGAUGE

### IF2001/USB converter RS422 to USB

The RS422/USB converter converts the digital signals of an optical micrometer 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 and play)
- Conversion from RS422 to USB
- Supports baud rates from 9.6 kBaud to 12 MBaud



### IC2001/USB Single-channel converter cable RS422/USB

The IC2001/USB single-channel converter cable is used for the USB connection of optoCONTROL 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

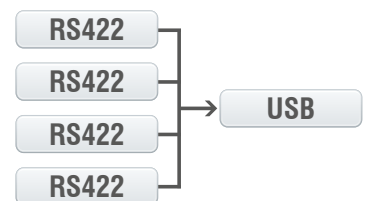


### IF2004/USB: 4-channel converter from RS422 to USB

The RS422/USB converter is used for transforming digital signals from up to four precision micrometers 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. The COM interfaces can be used individually and can be switched.

#### Special features

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



### 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.



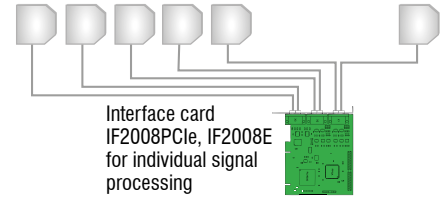
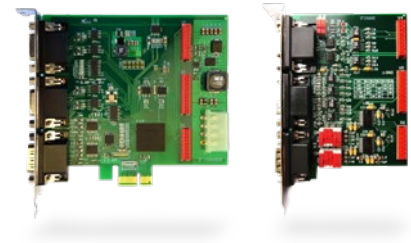
## IF2008PCle/IF2008E

### Interface card for synchronous data acquisition

Absolute synchronous data acquisition is a decisive factor for the deflection or straightness measurement using several micrometers. The IF2008PCle 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

- IF2008PCle - Basic printed circuit board: 4 digital signals and 2 encoders
- IF2008E - Expansion board: 2x digital signals, 2x analog signals and 8x I/O signals

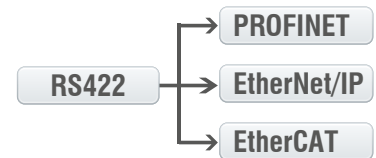


## IF2035

### Interface module for Industrial Ethernet connection

The IF2035 interface modules are designed for easy connection of Micro-Epsilon sensors to Ethernet-based fieldbuses. The IF2035 is compatible with sensors that output data via an RS422 or RS485 interface and supports the common Industrial Ethernet protocols EtherCAT, PROFINET and EtherNet/IP.

These modules operate on the sensor side with up to 4 MBd and have two network connections for different network topologies. In addition, the IF2035-EtherCAT offers a 4-fold oversampling function, which enables faster measurements than the bus cycle allows, if required. Installation in control cabinets is via a DIN rail.



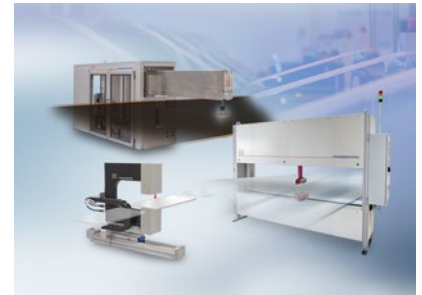
## Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, distance and position



Sensors and measurement devices for non-contact temperature measurement



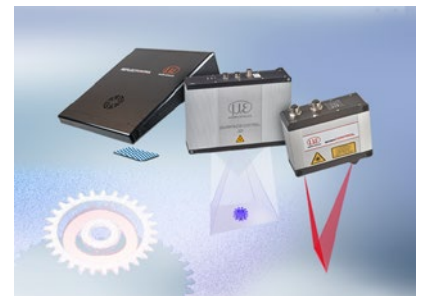
Measuring and inspection systems for metal strips, plastics and rubber



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