



More Precision

optoCONTROL 2700 // High-performance micrometer



High-performance micrometer for the highest demands optoCONTROL 2700

High precision and sampling rate

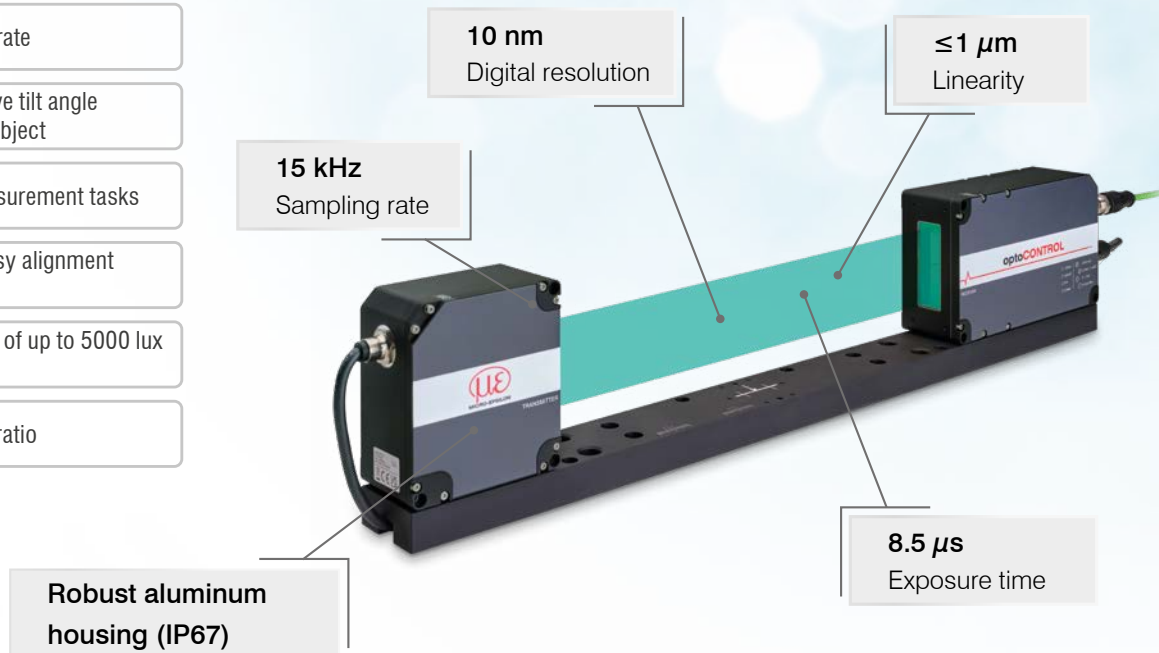
Angle measurement and active tilt angle correction of the measuring object

Six presets for common measurement tasks

Black and white image for easy alignment with the measuring object

High ambient light resistance of up to 5000 lux in direct light

Excellent price/performance ratio



EtherCAT®

EtherNet/IP®

PROFI
NET®

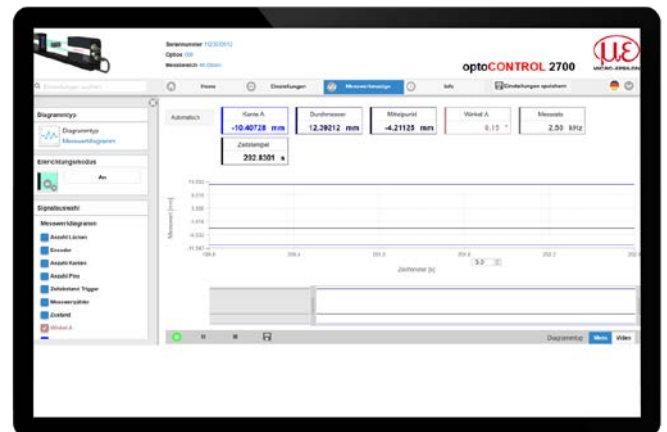
*With integrated interfaces from Q3 2024

The optoCONTROL 2700 is a compact LED micrometer for the precise measurement of diameter, gap, edge and segment. The micrometer is characterized by its high accuracy with a measuring range of 40 mm and is used for inline quality assurance and machine monitoring. The micrometer works according to the shadow casting principle and has telecentric optics on both sides. The controller integrated in the receiver reduces the cabling and installation effort as no external control unit is required. The optoCONTROL 2700 has a real-time inclination correction of the measuring object, which makes the exact alignment of the measuring object superfluous. The measured value for the diameter measurement is automatically adjusted to the inclination of the measuring object. In addition to the tilt angle correction, the micrometer detects angles of up to 45° and outputs them via the integrated web interface and digital interfaces. The excellent price-performance ratio rounds off the service package.

The optoCONTROL 2700 is suitable for all measuring objects, including transparent objects such as glass rods or glass fibers, and is highly insensitive to interferences such as dust or ambient light.

The entire configuration of the LED micrometer is carried out without additional software via an easy-to-use web interface. The web interface is accessed via an Ethernet connection and enables quick and easy setting of e.g. averaging or measuring rate and offers extensive parameterization options for every measurement task.

Six presets enable quick and easy set-up for the measurement task. The web interface also offers a scalable black and white image for easy alignment. This makes it graphically possible to optimally position the micrometer or the measuring object.



Simple parameter set up via web interface

The entire configuration of the optoCONTROL 2700 is carried out without additional software via an easy-to-use web interface.

Model	ODC 2700-40	
Measuring range	40 mm	
Min. target size	0.3 mm	
Distance light source - receiver	300 mm	
Measuring distance target - receiver	150 (± 10) mm	
Sampling rate ^[1]	15.0 kHz	
Measuring rate ^[2]	5.0 kHz	
Exposure time ^[3]	8.5 μ s	
Resolution ^[4]	10 nm	
Linearity ^[5] ^[6]	$\leq 1 \mu$ m	
Repeatability ^[6]	$\leq 0.1 \mu$ m	
Light source	LED turquoise 508 nm (blue-green)	
Laser class	no laser, LED according to DIN EN 62471 risk group 0	
Permissible ambient light	30,000 lx indirect; 5000 lx direct irradiation	
Supply voltage	11 ... 30 VDC	
Maximum current consumption	≤ 1 A	
Signal input	3x inputs optionally for encoder, zero point, reset, trigger; light on/off (can be switched off via menu)	
Digital interface ^[7]	Ethernet, RS422 (up to 2 Mbaud) EtherCAT, EtherNet/IP, PROFINET	
Analog output	0 ... 10 VDC / 4 ... 20 mA (16 bit, freely scalable within the measuring range)	
Switching output	3 outputs, optionally for errors and 2x limit values, not electrically separated 24V logic (HTL), high level depends on operating voltage Switchable TTL level	
Digital output	Synchronization	
Connection	Light source	integrated cable 0.8 m, with 8-pin M8 socket for power supply
	Receiver	8-pin M12 plug for light source supply, 12-pin M12 socket for power supply and signals, 4-pin M12x1 socket for Ethernet, 17-pin M12 plug for analog sync inputs (trigger/encoder)
Mounting	integrated mounting rail with mounting holes	
Temperature range ^[8]	Storage	-20 ... +70 °C
	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	
Material	Aluminum housing	
Weight	Light source	approx. 500 g
	Receiver	approx. 1400 g
	Mounting rail	approx. 1000 g
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 LED (power, status, link, speed) Website: Tilt angle correction, contamination display, 6 application-specific presets, freely selectable averaging, data reduction, 8 editable user programs, measured value time diagrams, measured value display in mm / inch, video signal, set-up mode with measuring line and measuring object; menu language German, English	
Special features	Including "sensorTOOL" software for data acquisition and processing, "MedaQLib" programming database	

^[1] Number of measurements carried out per second

^[2] Number of measured values that are output at the sensor interface

^[3] With video averaging switched on = 3 x 8.5 μ s exposures per measurement

^[4] At the digital interface

^[5] 95% confidence interval for diameter measurement when averaging 1024 over a period of 5 minutes in a temperature-stabilized environment

^[6] Measured with 2 mm testing pin at a working distance of 150 mm in measuring field 1 (Z = ± 2.5 mm), in measuring field 2 (Z = ± 10 mm) Linearity $\leq 3 \mu$ m - 95 % confidence interval

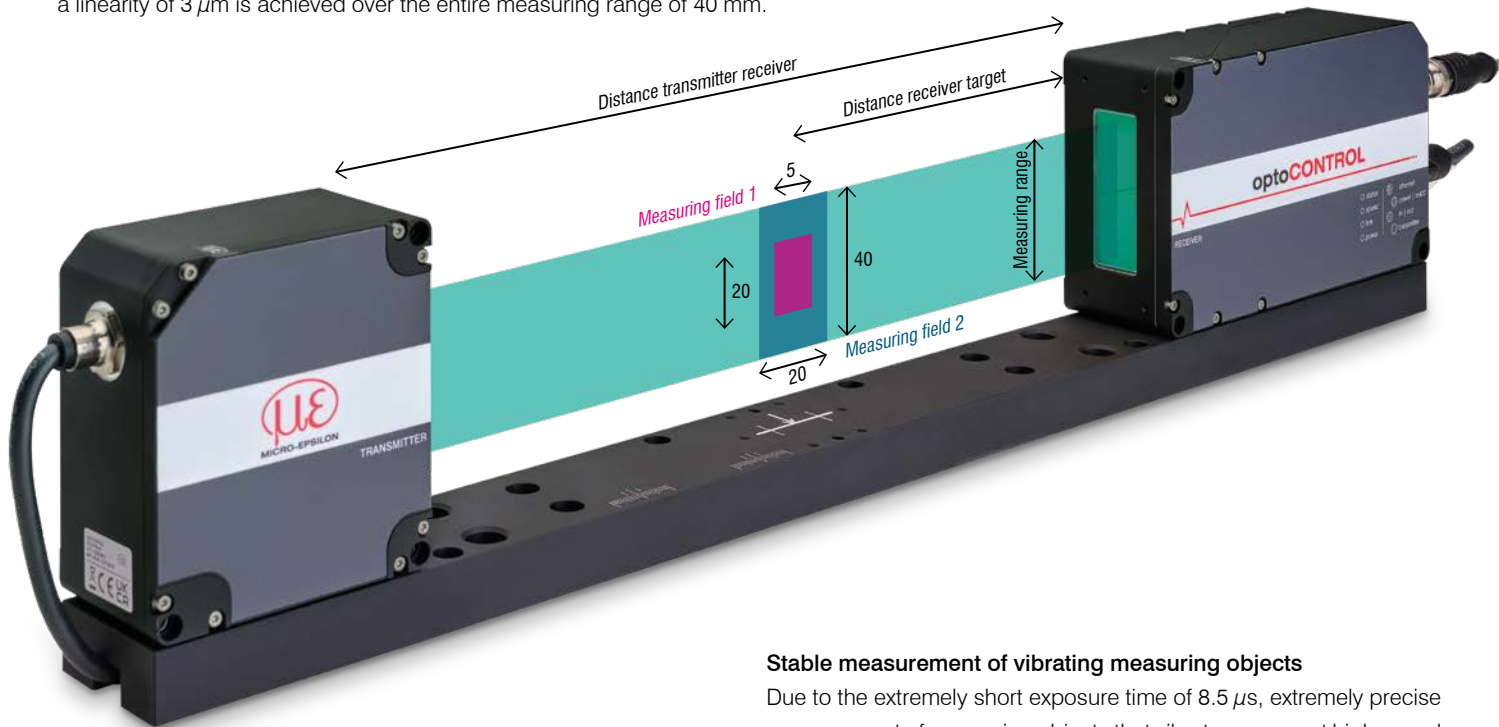
^[7] EtherCAT, PROFINET and EtherNet/IP: Connection either via interface module (see accessories) or as a sensor option

^[8] Relative humidity 5...95 % (non-condensing)

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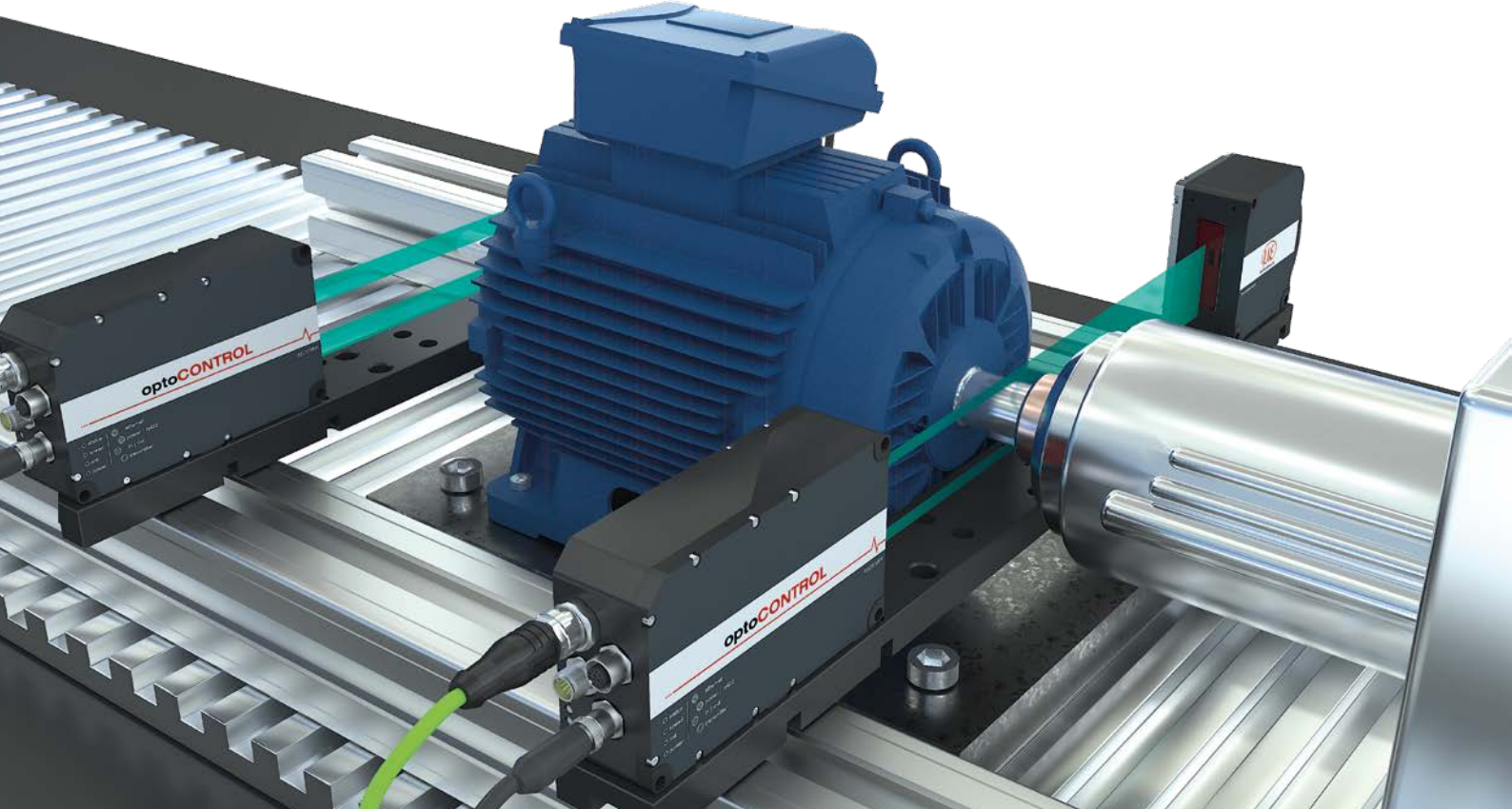
Highest linearity in two measuring fields

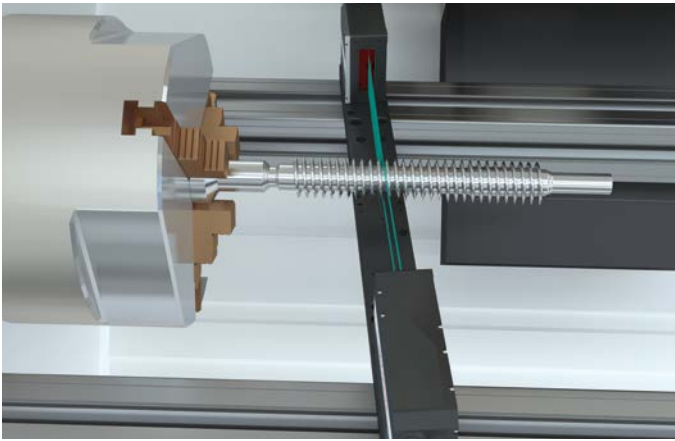
The optoCONTROL 2700 has two measuring fields. The micrometer reaches its maximum precision in the mid of the measuring range. In measuring field 1, the precise micrometer achieves an excellent linearity of $1\ \mu\text{m}$ in the mid of the measuring range. In measuring field 2, a linearity of $3\ \mu\text{m}$ is achieved over the entire measuring range of 40 mm.



Stable measurement of vibrating measuring objects

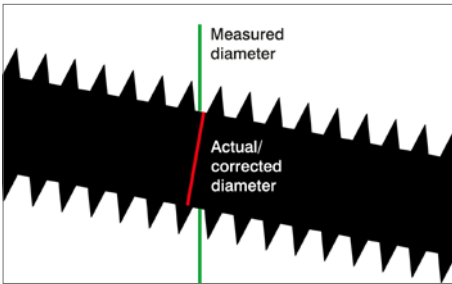
Due to the extremely short exposure time of $8.5\ \mu\text{s}$, extremely precise measurement of measuring objects that vibrate or move at high speed through the light curtain is possible without any problems.



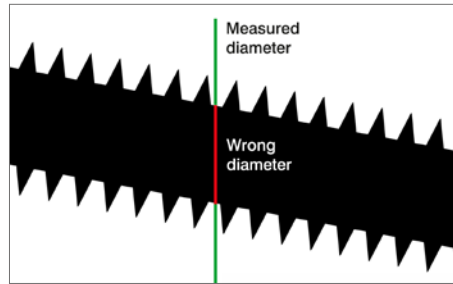


Active tilt correction of the measuring object in real time

The receiver's image matrix captures the exact alignment and therefore the angle of the object in the light beam via the primary line and secondary lines. The internal controller automatically adjusts the measured value to the inclination of the measured object. As a result, the exact measurement value is output and no measurement errors occur. The inclination correction applies for the entire measuring rate of 5 kHz and can be used in the measuring programs for outside diameter, web edge and contour measurement. In this case, the inclination of the object is corrected when the measurement is carried out. The detected image can be output and checked via the web interface. This makes the tilt correction immediately recognizable for the viewer.



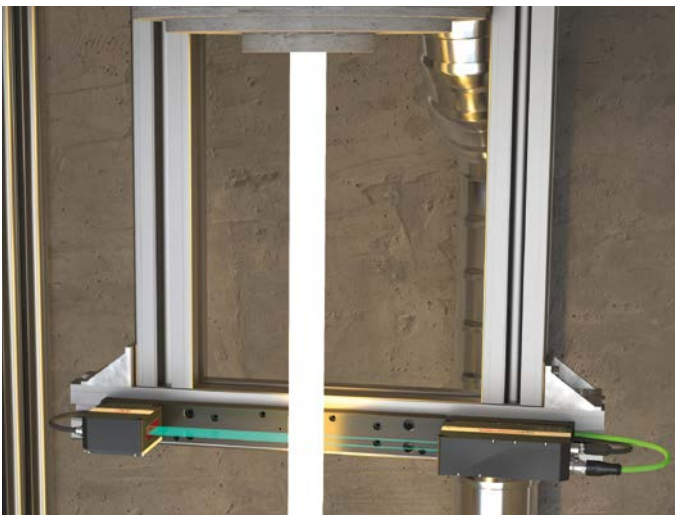
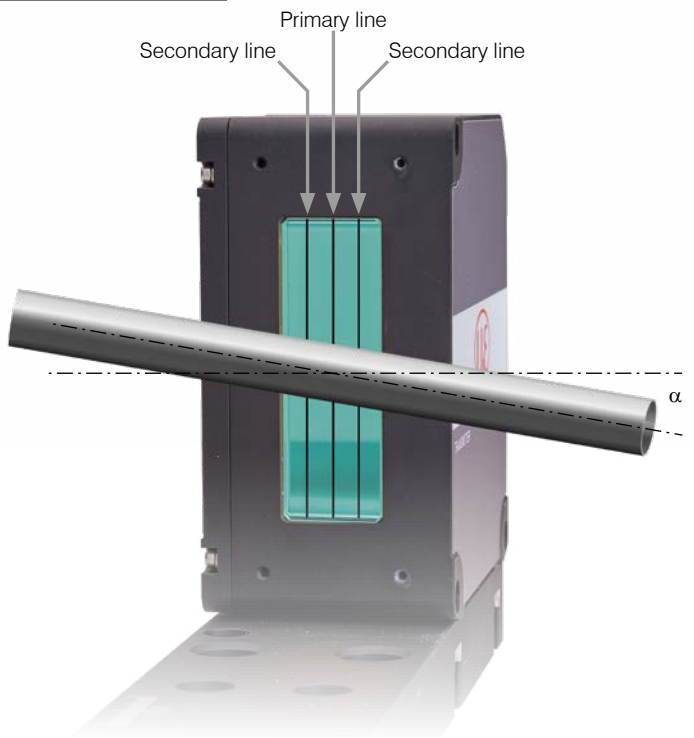
✓ With tilt correction



✗ Without tilt correction

Reliable angle measurement of the measuring object to the XY plane

The optoCONTROL 2700 can be used to reliably measure objects in the light beam that are not positioned at an exact 90° angle to the light beam. In addition, the angle is precisely determined via the micrometer's image matrix and output via the integrated controller. This enables angles of up to 45° to be measured. In addition to tilt correction, this also allows objects to be measured for their exact position and alignment.

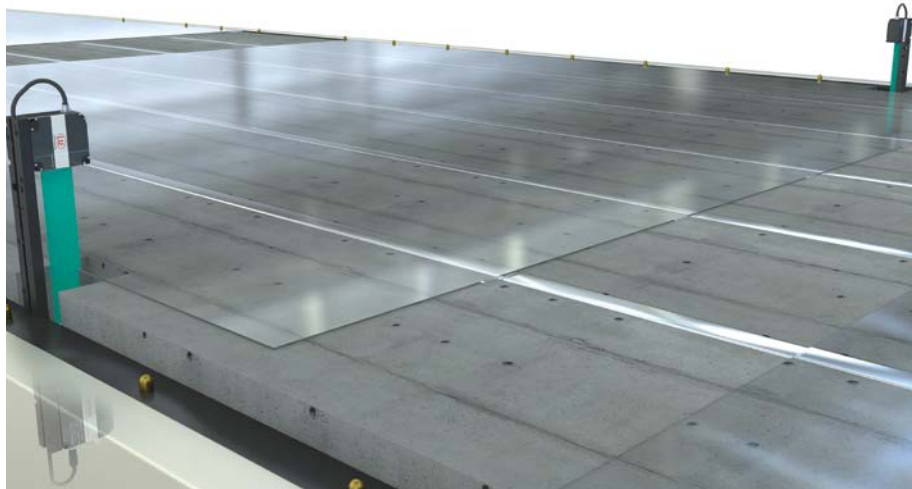


Turquoise LED instead of laser

The optoCONTROL 2700 uses a turquoise LED with a wavelength of 508 nm. The LED gives the micrometer increased safety, as no laser protection class and associated laser safety measures are required. There are advantages to using the turquoise LED light source: The wavelength of 508 nm allows easy measurement of red, glowing red and red-hot objects. In addition, the measurement of transparent and organic surfaces and measuring objects is possible, as the short-wave LED light does not penetrate the measuring object, thus achieving significantly better stability of the measurement signal.

Applications

optoCONTROL 2700



Edge control of glass sheets

The exact positioning of glass sheets in the manufacturing process during separation is a prerequisite for the exact size of the glass pane. Two optoCONTROL 2700 micrometers measure the exact position on both sides of the glass pane and transmit the signal to the production control system. The control unit corrects the exact alignment of the glass sheet based on the position signal.

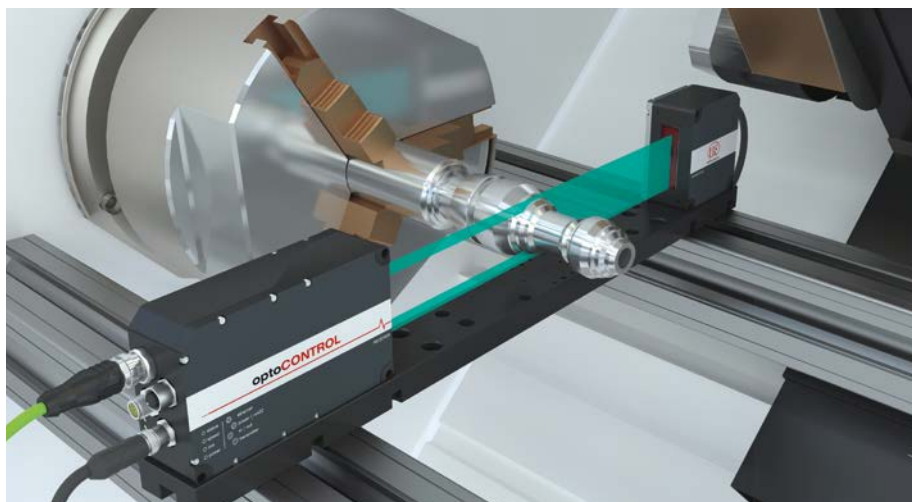
Diameter measurement of extruded products

Hot extruded material is checked for its exact thickness directly after the extruder using the optoCONTROL 2700. This enables continuous 100% quality inspection of continuous profiles and hoses with a diameter of up to 40 mm.



Inline contour measurement of turned parts

The optical and non-contact contour measurement of threads, undercuts or cones on turned shafts enables precise measurement without causing scratches or damage. Turned parts are measured directly in the machine after turning or milling. This makes it possible to analyze the shape and dimensions of workpieces of all kinds.



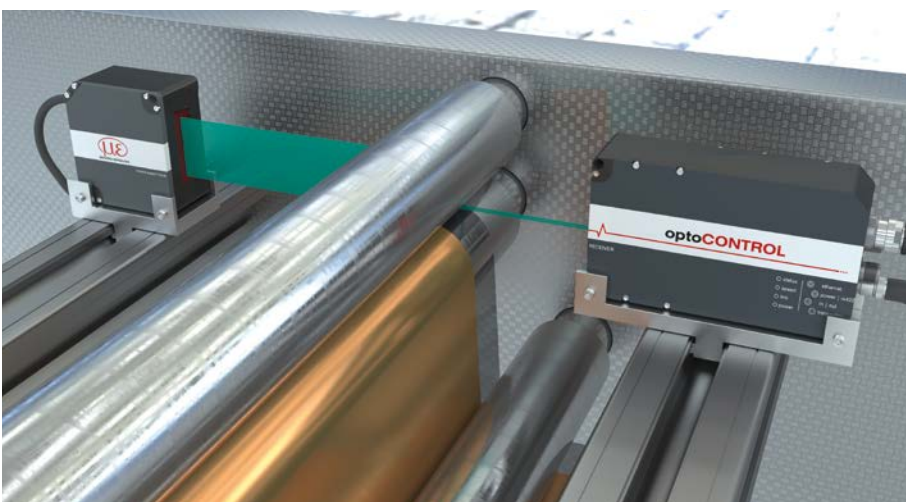


Wire measurement during wire drawing

Wire drawing is a sliding drawing process in which a wire of larger dimensions is drawn through a drawing ring of smaller dimensions. This gives the wire the shape and cross-sectional dimensions of the drawing ring. The optoCONTROL 2700 checks the diameter of the drawn wire directly after the drawing die. The vibration and fast speed of the wire pose no problems due to the high exposure time of 8.5 μ s.

Multi-segment measurement on stainless steel belts

During the continuous slitting of thin cold-rolled aluminum and stainless steel strips with strip thicknesses of 0.1 and 0.5 mm in the strip processing line, the width tolerance of the individual stainless steel strips is checked directly after the cutting roller with the optoCONTROL 2700. This enables a 100% quality check in the production line.









Gap measurement in calender rollers

The measurement of the roller gap is an important factor for controlling and monitoring production in the manufacture of strip and sheet products in calendering systems. The optoCONTROL 2700 optical micrometer can precisely measure the roller gap during the rolling process for distance control. The pair of rollers is located between the transmitter and receiver. Thanks to the automatic tilt angle correction and angle measurement, the position of the rollers in relation to each other is measured with just one micrometer. The micrometer thus contributes to high material accuracy in numerous rolling processes and avoids material waste.

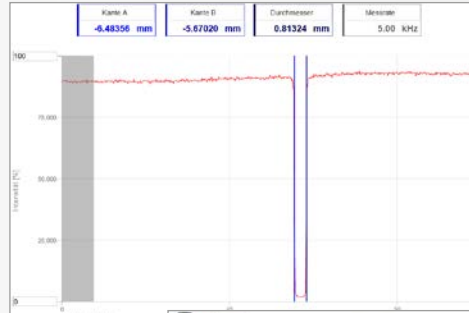
Ease of use via web interface

optoCONTROL 2700

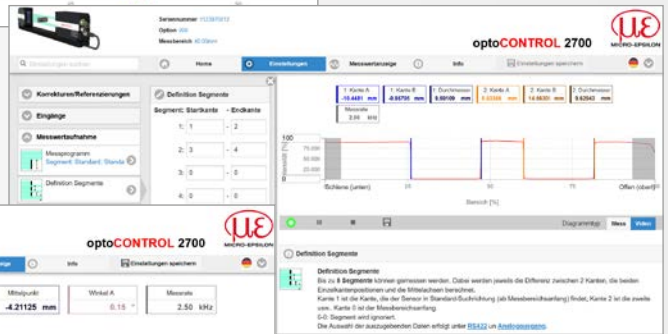
The entire configuration of the optoCONTROL 2700 is carried out without additional software via an easy-to-use web interface. The web interface is accessed via an Ethernet connection and enables quick and easy setting of e.g. averaging, measuring rate or presets and offers extensive parameterization options for every measurement task.

-  Web edge
-  Wire measurement
-  Diameter
-  Contour measurement
-  Multi-segment
-  Gap measurement

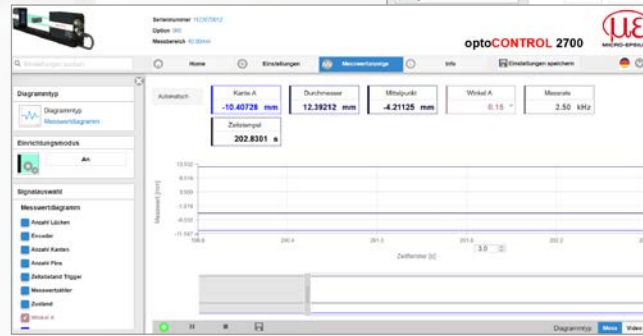
Presets for easy operation



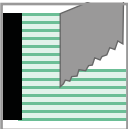

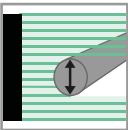
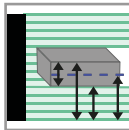
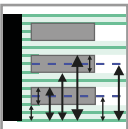
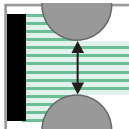
Video signal display



Various parameterization options

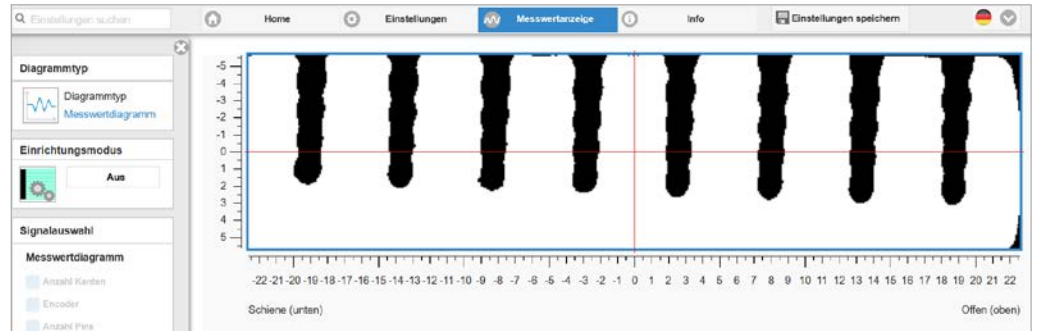


Measurement chart

<p>Strip edge</p> 	<p>For controlling and measuring strip edges, such as paper, glass, sheet metal or film. The signal quality is simply adapted to the material.</p>	<p>Wire measurement</p> 	<p>For measuring a thin, fast-moving object (e.g. wire). The measurement provides the current measurement value at all times and is therefore insensitive to vibrations</p>
<p>Diameter</p> 	<p>For measuring the diameter of cylindrical objects (e.g. dowel pins, bolts, bar stock, pipes, hydraulic lines). The tilt angle of the object in relation to the measurement plane is compensated for in real time by the active tilt correction.</p>	<p>Contour measurement</p> 	<p>For measuring component contours on a stepped turned part. The lower edge, upper edge, center axis, diameter and the encoder value are detected</p>
<p>Multi-segment</p> 	<p>For simultaneous measurement of several objects in the beam path (e.g. strips or wires) or for targeted detection of segments selected by the user. The individual definition of user and application-specific segments is possible.</p>	<p>Gap measurement</p> 	<p>For measuring the gap between two objects. The width of the gap and the angular deviation of the gap edge are output. Application in roller systems such as calender rollers.</p>

Setup mode / black and white image for easy alignment on the measuring object with the aid of scaling

The exact positioning of the measuring object in the light beam is quick and easy thanks to the setup mode. The measuring object can be set up via the XY plane using the integrated black and white image. This saves the user time and effort when setting up and adjusting the exact position. The mid of the measuring range is shown in both axes by a red line.



Contamination detection

Thanks to the integrated real-time data analysis, contamination of the lens and thus distortions of the measurement result can be detected at an early stage and compensated for accordingly. This prevents expensive failures or malfunctions of the micrometer.

The optoCONTROL 2700 provides information on the degree of soiling on request, e.g. at maintenance intervals, via the integrated interfaces. The intelligent evaluation detects even the smallest 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 contamination was detected in the entire measuring range
- Restricted: The detected contamination is in the ignored area
- Contaminated: Soiling has been detected in the relevant area



Integrated controller with integrated Industrial Ethernet in one housing

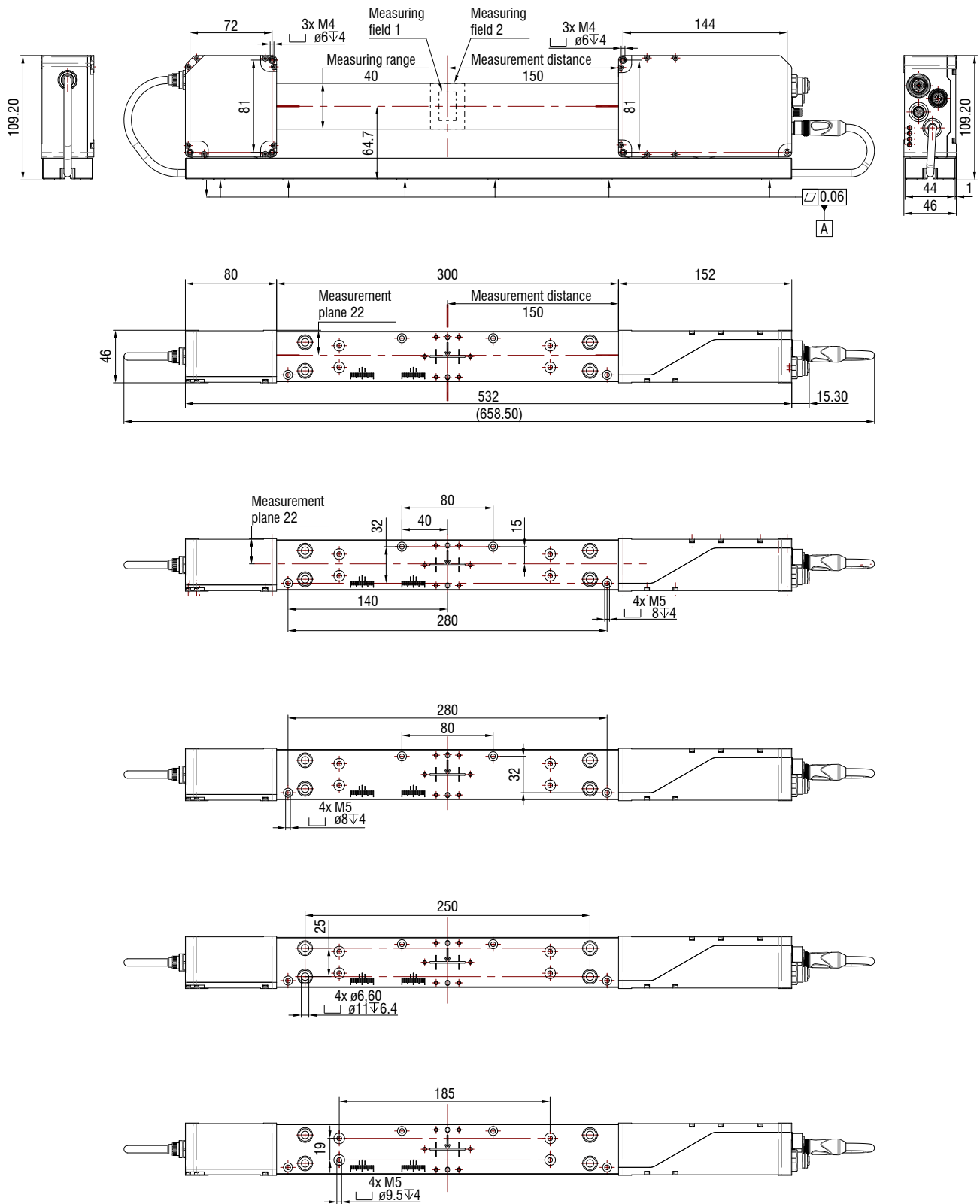
The optoCONTROL 2700 transmitter and receiver are housed in a compact IP67-certified housing. As no external control unit is required, space is saved in the control cabinet and the wiring and installation work is reduced to a minimum. The micrometer is connected directly to the machine or production environment without any detours.

The optoCONTROL 2700 will be equipped with integrated Industrial Ethernet from Q3 2024. The micrometer can be integrated directly into Industrial Ethernet systems via EtherCAT, EtherNet/IP and PROFINET without the need for an additional interface module. Signal conversion takes place directly in the integrated controller without additional interface modules.



Technical drawings optoCONTROL 2700

Dimensioned drawing optoCONTROL ODC2700

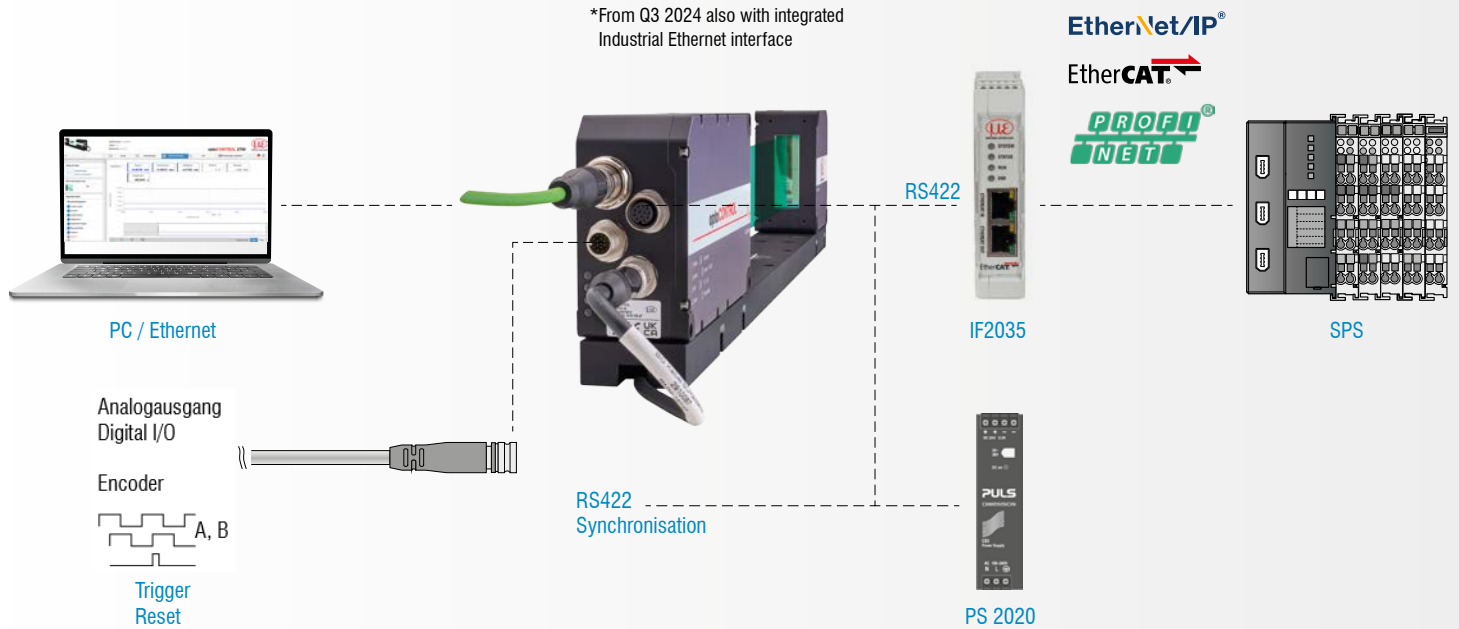


(Dimensions in mm, not to scale)

System structure & accessories

optoCONTROL C2700

System design



Accessories

Art. no.	Designation
29011460	SCD2700-5 M12 Digital output cable EtherCAT, 5 m long
29011457	SCD2700-5 Digital output cable, 5 m long
29011456	SCD2700-3 Digital output cable, 3 m long
29011459	SCD2700-20 Digital output cable, 20 m long
29011458	SCD2700-10 Digital output cable, 10 m long
29011449	SCA2700-5 Output cable, 5 m long
29011448	SCA2700-3 Output cable, 3 m long
29011451	SCA2700-20 Output cable, 20 m long
29011450	SCA2700-10 Output cable, 10 m long
29011453	PC/SC2700-5 Supply, interface and signal cable, 5 m long
29011452	PC/SC2700-3 Supply, interface and signal cable, 3 m long
29011455	PC/SC2700-20 Supply, interface and signal cable, 20 m long
29011454	PC/SC2700-10 Supply, interface and signal cable, 10 m long
2211039	IF2035-PROFINET interface module for Profinet with top-hat rail housing
2211036	IF2035-EtherCAT interface module for EtherCAT with top-hat rail housing
2211038	IF2035-EtherNet/IP Interface module for EtherNet/IP with top-hat rail housing

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