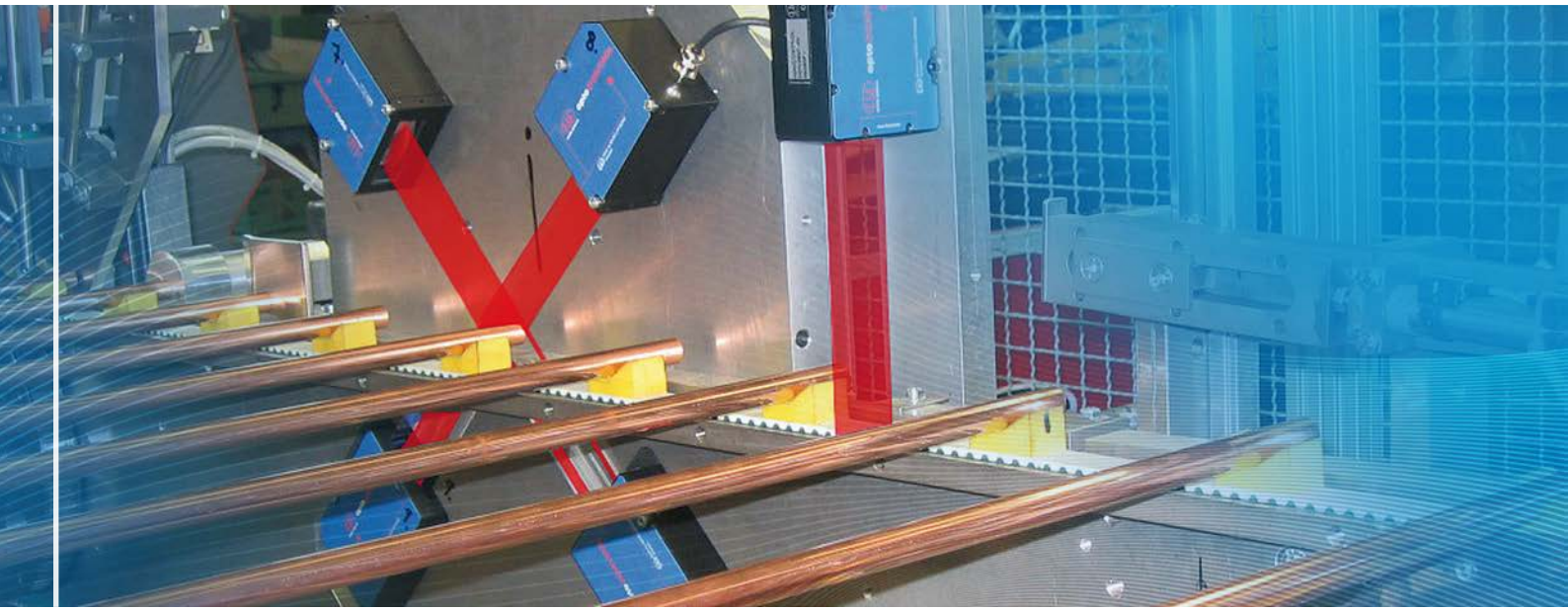
MICRO-EPSILON

More Precision

optoCONTROL // Optical precision micrometers



- High accuracy and measuring rate
- Resolution from 0.1µm
- Measurement objects from 0.02mm
- Wear-free measurement for long service life
- Different models for numerous application areas

Optical precision micrometers

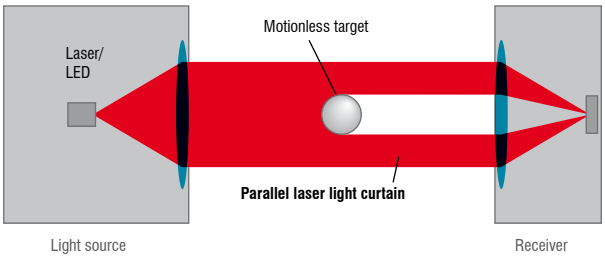
Micrometers from Micro-Epsilon operate according to the ThruBeam principle. Here, the transmitter produces a parallel light curtain that is transmitted via a lens arrangement into the receiving unit. The beam is interrupted if there is an object in the light path. The shadowing generated by this object is recorded by the receiving optical system and output as a geometric value.

Several types of ThruBeam technology are used across the six different sensor models in the range so as to cover as wide a field of applications as possible.

Optical micrometers can be used for dimensional measurements in production, quality assurance and service tasks. Factors such as the diameter, gap, height, position and also the received amount of light or opacity can be measured.

Wear-free and long service life

All optoCONTROL sensors function without a rotating mirror and so are completely wear-free. The parallel light curtain is produced by a special lense arrangement in the light source (transmitter). High quality components in the receiving optical system, e.g. filter and lenses, enable high accuracies to be achieved. Therefore, the optoCONTROL micrometers are ideally suited to applications in which high precision and complete reliability are required.



opto CONTROL - wear free thrubeam micrometers:
High speed real time consistent data enables true precision profile without distortion. The product range contains models with CCD and light quantity measurement for various applications.

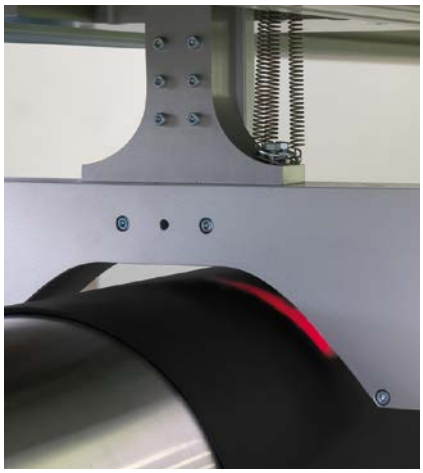
	Measuring ranges	Measurement mode	Page
optoCONTROL 1200			
Compact, fast and space-saving 90° version; integrated controller	Measuring range up to 30mm		4 - 5
optoCONTROL 1202			
Target-sensor gap up to 2000mm; integrated controller / resolution 8µm	Measuring range up to 98mm		6 - 7
optoCONTROL 1220			
Target-sensor gap up to 2000mm; integrated controller / resolution 2µm	Measuring range up to 28mm		8 - 9
optoCONTROL 2500			
High accuracy and stability / resolution 1µm; target-sensor gap up to 700mm (optional 1850mm)	Measuring range up to 34mm		10 - 11
optoCONTROL 2520			
Compact design with integrated controller; target-sensor gap up to 2000mm / resolution 1µm	Measuring range up to 46mm		12 - 13
optoCONTROL 2600			
Maximum accuracy and stability; target-sensor gap up to 400mm; telecentric lenses / resolution 0.1µm	Measuring range up to 40mm		14 - 15

Flexible in use

Micrometers are primarily used as part of the manufacturing process and quality control of a production line, measuring continuous material, as well as single parts. The relevant technologies used here, such as laser intensity measurements and CCD chip imaging, are suitable for a wide variety of applications.

The compact models in the optoCONTROL product family work for production line applications and for integration into machine tools and other production machinery. High measuring rates ensure a high, continuous production rate.

Diameter of a pulley

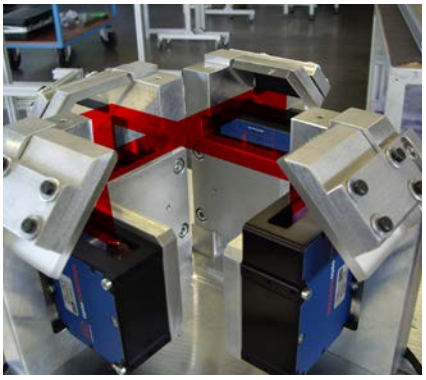


Thickness measurement of flat plastic film and rubber strips

Special application areas

The optoCONTROL 2500 and 2600 model ranges can be modified for customer specific applications, for example:

- Carry case version for service tasks
- Customised cable lengths, modified cable outlet
- Version with reduced light source to receiver gap
- Version with deflection mirror for installation in tight spaces
- Customer-specific software, e.g. measurement programs, statistics (only for ODC2600)
- Customer-specific linearity adjustment



Measuring system detects the X/Y position of the needle in an industrial sewing machine

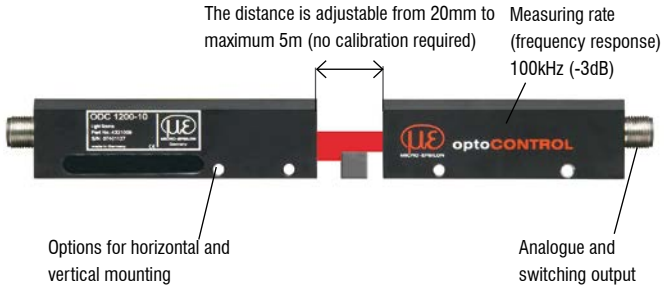
Bearing shell detection in automotive manufacturing

- High quality glass lense optics
- Robust and compact design with integrated controller
- Limit switch with up to 60kHz switching frequency
- Axial and radial design

Measurement mode

Measuring principle

The optoCONTROL 1200 is based on the principle of light quantity measurement. The light of a red laser diode is spread out by a lens to a parallel light curtain which is aimed at the receiving unit. In the receiving unit, the light is guided via various filters and lenses through a precision shutter to a light-sensitive detector. The amount of occurring light is provided by analogue electronics and output as an analogue signal.



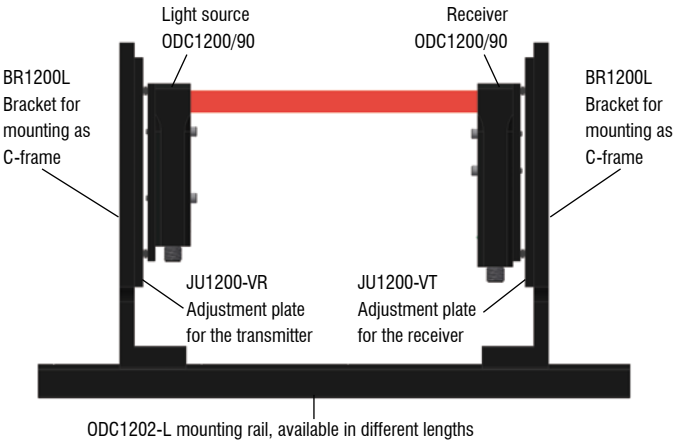
System design

optoCONTROL 1200 consists of a light source and a receiving unit. The complete controller electronics are integrated in the receiver housing. The light source and receiver can be installed at any distance up to 5 meters from each other. All models can be installed without additional brackets in both vertical and horizontal positions. The compact design of the housing and the 90° version also enable easy mounting of the miniature micrometers in tight installation spaces.
As well as the analogue output, an adjustable limit switch is also available. This can be operated both as NPN (bright switching) as well as in PNP logic (dark switching).

The target must be positioned inside the measuring window for the diameter measurement. Smallest diameter typ. >0.3mm. For gap measurement from 50 - 400µm there is an option using light quantity measurement.

optoCONTROL 1200/90:

Version with 90° beam path for mounting in tight spaces.
Optional mounting with ODC1202-L mounting rail as C-frame.

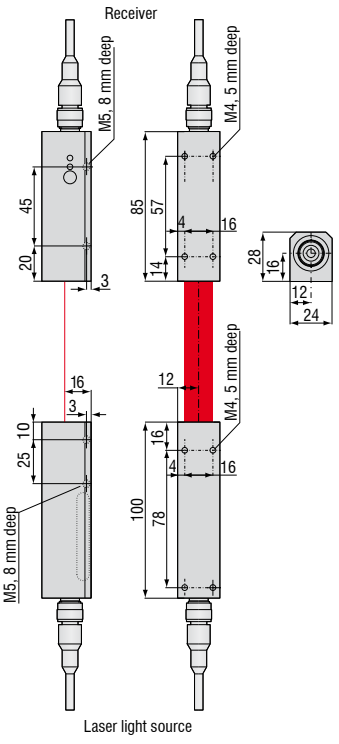


Model		ODC1200 (axial model)				ODC 1200/90 (90° model)				ODC1201	
Measuring range		2mm	5mm	10mm	16mm	2mm [2]	5mm	10mm	16mm	20mm	30mm
Distance light source - receiver (free space) [1]		min. 20mm to max. 5m									
Linearity		±2% FSO		±3,5% FSO		±2% FSO		±3,5% FSO			
Resolution (dynamic) typ.		10µm	25µm	50µm	80µm	10µm	25µm	50µm	80µm	100µm	150µm
Measuring rate (frequency response)		100kHz (-3db)									
Light source		semiconductor laser <0.39mW, 670nm (red, laser class 1)									
Permissble ambient light		≤ 5000lx [3]									
Analogue output		0 ... 10VDC (adjustable gain)									
Temperature drift of the analogue output		≤130mV (at 10 - 50°C)									
Switching output		PNP dark switching and NPN bright switching (max. switching frequency 60kHz) adjustable signal threshold									
Shock		15g / 6ms									
Vibration		15g / 10Hz…1kHz									
Operation temperature		0 ... 50°C									
LED display		Switching state and dusty optics									
Storage temperature		-20 ... 70°C									
Operation voltage		12-32VDC, reverse polarity protection									
Mounting holes	straight up	M4 x 5mm								ø4.1mm	
	horizontal	M5 x 8mm								M4 x 6mm	
Weight (without cable)	light source	appr. 150g				appr. 170g				appr. 260g	
	receiver	appr. 120g				appr. 160g				appr. 220g	
Protection class		IP 67									

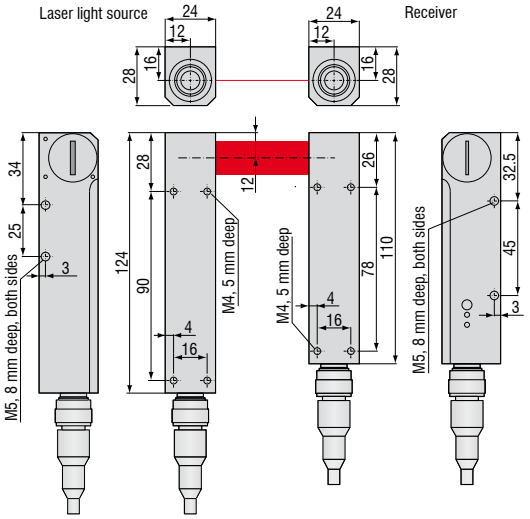
FSO = Full Scale Output
The quoted data apply for a constant room temperature of 20°C after a warm-up period of 30min,
in the range 10 ... 90% of the analogue output at a distance between light source and receiver of 0.5m.
Analogue offset <0.05V

[1] Increasing the distance, the measurement of hot targets is possible without damaging the controller electronics
[2] For gap measurements 50 - 400µm there is an controller option available: thrubeam operation with distances up to 700mm
[3] Shadowing from ambient daylight increases the signal stability

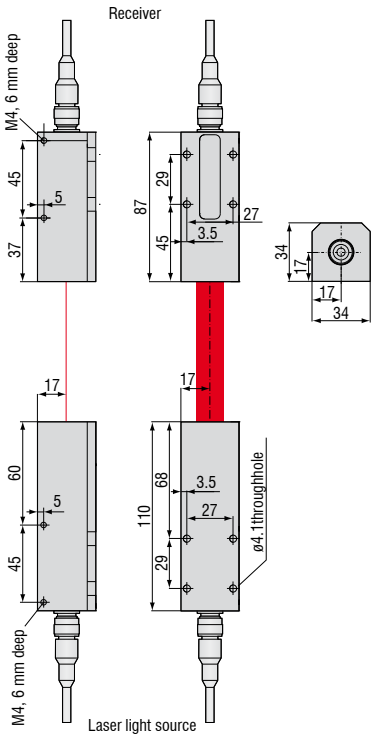
optoCONTROL 1200



optoCONTROL 1200/90

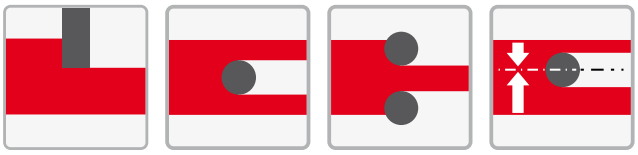


optoCONTROL 1201



- High resolution CCD array detector with integrated controller
- Sub-pixel evaluation
- Measuring distance selectable from 20 to 2000mm
- Integrated polarisation filter / interference filter
- 2 digital inputs
- 3 digital outputs (limit switch)
- ODC1202-Tool software included

Measurement mode (programmable via software)

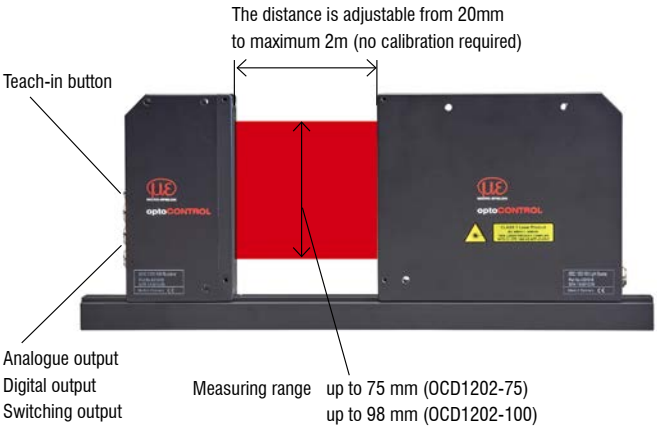


Measuring principle

The laser beam for the optoCONTROL 1202 laser micrometers is output from the optical transmitter as a parallel aimed laser beam. The laser line strikes a CCD array in the receiving optical system. The amount of light collected by each of these receiving elements during the integration time is read out separately as analogue voltage and stored as a digital value in a data field after analogue-todigital conversion.
If there is a non-transparent measurement object in the laser line, only the receiving elements of the lines outside the shadow zone of the measurement object are illuminated. As the spacing of the pixels of the CCD array is known, the size and position of the measurement object can be determined.

System design

optoCONTROL consists of a light source and a receiving unit. The complete controller electronics are integrated in the receiver housing. The light source and receiver can be installed at any distance from each other. All models can be installed without additional brackets in both the vertical and horizontal positions.



Model		optoCONTROL 1202-75	optoCONTROL 1202-100
Measuring range		typ. 75mm	typ. 98mm
Distance light source - receiver		minimal 20mm, maximal 2000mm	
Resolution [1]		typ. 8µm	typ. 8µm
Repeatibility [2]		≤±10µm	≤±10µm
Linearity [3]		±0.2% (±150µm)	±0.2% (±196 µm)
Measuring rate		max 400Hz / 700Hz (digital)	max 360Hz / 600Hz (digital)
Max. switching current		100mA, short-circuit proof	
Interface		Measurement values via RS232, parameterizable under Windows using the ODC-1202 tool (included in scope of supply)	
Laser		Semiconductor laser, 670nm, DC-operation, ≤0,39mW max opt. power, laser class 1 [4], the use of these laser sensors therefore requires no additional protective measures	
Permissible external light		≤5000Lux [5]	
Optical filter		interference filter, red light filter RG630, polarization filter	
Housing material		aluminium, anodised in black	
Connector receiver		8-pin female connector type binder series 712 (SPS/Power); 4-pin female connector type binder series 707 (PC/RS232) 3-pin female connector binder series 712 (connection to the light source)	
Connector light source		3-pin female connector type binder 712 (connection to receiver)	
Connection cable		Connection to PC: SCD12xx (USB version incl. driver); connection serial interfaces: SCD1202 (RS232); connection analogue and Power: SCA1202; connection cable light source/receiver: CE1202	
Output polarity		bright-/dark-switching, adjustable using Windows	
Teach button		Teach button at the housing for set point value teaching	
LED- indication		LED red (+): measured value > upper tolerance threshold; LED green: measured value lies within tolerance window LED red (-): measured value < lower tolerance threshold; LED yellow: multifunction	
EMC		IEC 60947-5-2	
Shock		15g / 6ms	
Vibration		15g / 10Hz…1kHz	
Protection class		electronics IP 54, optics: IP 67	
Operation temperature		-10°C to +50°C	
Storage temperature		-20°C to +85°C	
Output	analogue	0 …+10V (scalable)	
	digital	(OUT0, OUT1, OUT2): pnp bright-switching/npn dark-switching or pnp dark-switching/npn bright-switching, adjustable using Windows, 100mA, short-circuit proof	
Digital input	IN0	external trigger, input voltage +Ub/0V with protective circuit	
	IN1	teach/reset, input voltage +Ub/0V with protective circuit	
Power supply		+15VDC …+ 30VDC	
Sensitivity adjustment		using Windows via PC (parameterization software included)	
Laser adjustment		adjustable using Windows via PC	
Consumption		typ. 200mA	

The quoted technical data apply for a displacement light source to receiver about 300mm and a temperature of 20°C after a warm-up time of 30 minutes.

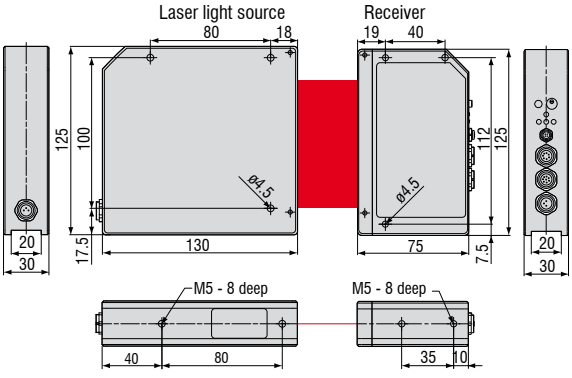
[1] Display resolution of the software ≥10µm

[2] Valid for ΔT≤5°C and ambient leight 5000lx. For stable measurement shadowing of the receiver is advisable. Smooth video AVG 64 values.

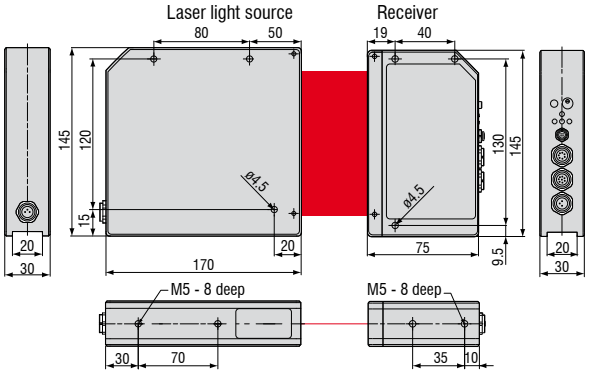
[3] Is only valid with the adaption of the threshold and the laser performance as well as the execution of an calibration; 20mm target-receiver distance; 250mm transmitter-receiver distance

[4] Laser class 1: IEC 60825-1: 2008-05; [5] Shadowing from ambient daylight increases the signal stability

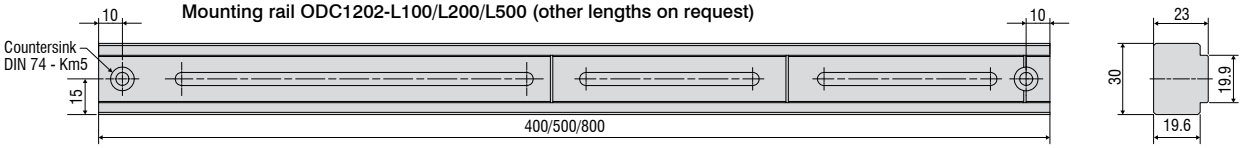
optoCONTROL 1202-75



optoCONTROL 1202-100

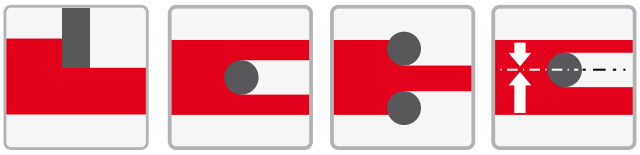


Mounting rail ODC1202-L100/L200/L500 (other lengths on request)



- Visible laser line (red light 670nm)
- Working distance of up to 2,000mm
- Integrated interference filter
- CCD line detector with 2,048 pixels, 16,384 sub-pixels (8-fold)
- 2 digital inputs, 2 digital outputs
- Robust aluminium housing suitable for industrial use

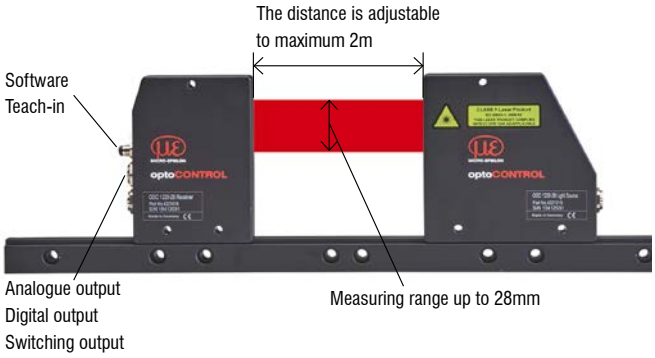
Measurement mode (programmable via software)



Measuring principle

The laser beam for the optoCONTROL 1220 laser micrometers is output from the optical transmitter as a parallel aimed laser beam. The laser line strikes a CCD array in the receiving optical system. The amount of light collected by each of these receiving elements during the integration time is read out separately as analogue voltage and stored as a digital value in a data field after analogue-todigital conversion.

If there is a non-transparent measurement object in the laser line, only the receiving elements of the lines outside the shadow zone of the measurement object are illuminated. As the spacing of the pixels of the CCD array is known, the size and position of the measurement object can be determined.



System design

optoCONTROL 1220 series is specifically designed for measuring edges, diameters and gaps of up to 2,000mm. The laser micrometer consists of a light source and a receiving unit. The complete controller electronics are integrated in the receiver housing.The light source and receiver can be installed at any distance from each other. All models can be installed without additional brackets in both vertical and horizontal positions.

Model	ODC1220-28
Measuring range	typ. 28mm
Distance light source - receiver	min. 20mm to max. 2000mm
Resolution	typ. 2µm
Repeatibility [1]	typ. ±4µm
Linearity [2]	typ. ±0.08% [typ. ±22µm]
Measuring rate	max. 200Hz
Max. switching current	100mA, short-circuit proof
Interface	Measurement values via RS232, parametrizable under Windows using the ODC1202 tool (included in scope of supply)
Laser	semiconductor laser, 670nm, DC-operation, ≤0.39mW max. opt. power, laser class 1 [3] the use of these laser sensors therefore requires no additional protective measures
Optical filter	interference filter, RG645; polarisation filter
Housing material	aluminium, anodised in black
Connector receiver	8-pin female connector type binder series 712 (SPS/Power); 4-pin M5 female connector type binder series 707 (RS232/PC) 4-pin female connector type binder series 712 (connection to the light source)
Connector light source	4-pin female connector type binder 712 (connection to receiver))
Connection cable	connection to PC: SCD1202 (RS232) or SCD12xx (USB version incl. driver) Power and connection to SPS: SCA1202; connection cable light source/receiver: CE1220
Output polarity	bright-/dark-switching, adjustable using Windows
LED-indication	LED red (+) : measured value > upper tolerance threshold; LED green : measured value lies within tolerance window LED red (-) : measured value < lower tolerance threshold; LED yellow : Power-LED (multifunction)
EMC	IEC 60947-5-2
Protection class	electronics: IP54, optics: IP67
Operation temperature range	-10°C ... +50°C
Storage temperature range	-20°C ... +85°C
Analogue output (ANA)	1x voltage output 0 ... +10V (scalable)
Digital outputs (OUT0, OUT1)	OUT0: (-) measured value < lower tolerance threshold; OUT1: (+) measured value > upper tolerance threshold pnp bright-switching/npn dark-switching or pnp dark-switching/npn bright-switching, adjustable using Windows®, 100mA, short-circuit proof
Digital inputs (IN0, IN1)	IN0: external trigger, IN1: teach/reset (double function); input voltage +Ub/0V with protective circuit
Power supply	+24VDC (± 10%)
Sensitivity adjustment	using Windows® via PC (parameterization software included)
Laser adjustment	adjustable under Windows® via PC
Consumption	typ. 200mA
Mounting rail	ODC1220-L220/L420/L620 (max. distance light source - receiver ≤ 220/420/620mm)

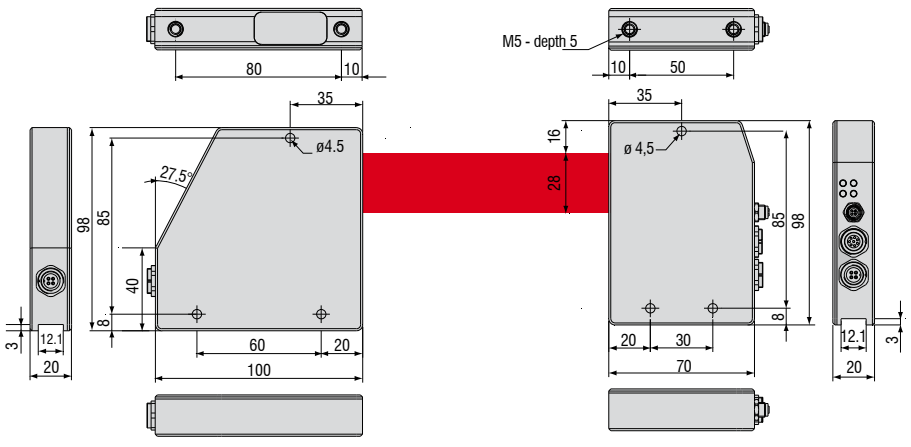
All specifications are measured at a constant temperature of 20 °C after a warm-up time of 30 minutes.

[1] Valid for ΔT≤5°C and ambient leight 5000lx. For stable measurement shadowing of the receiver is advisable. Smooth video AVG 64 values.

[2] Is only valid with the adaption of the threshold and the laser performance as well as the execution of an calibration; 20mm target-receiver distance; 250mm transmitter-receiver distance

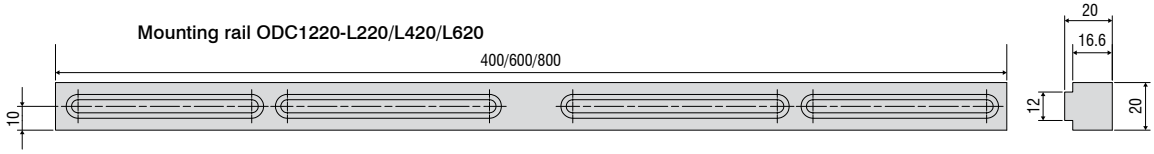
[3] Laser class 1: IEC 60825-1: 2008-05

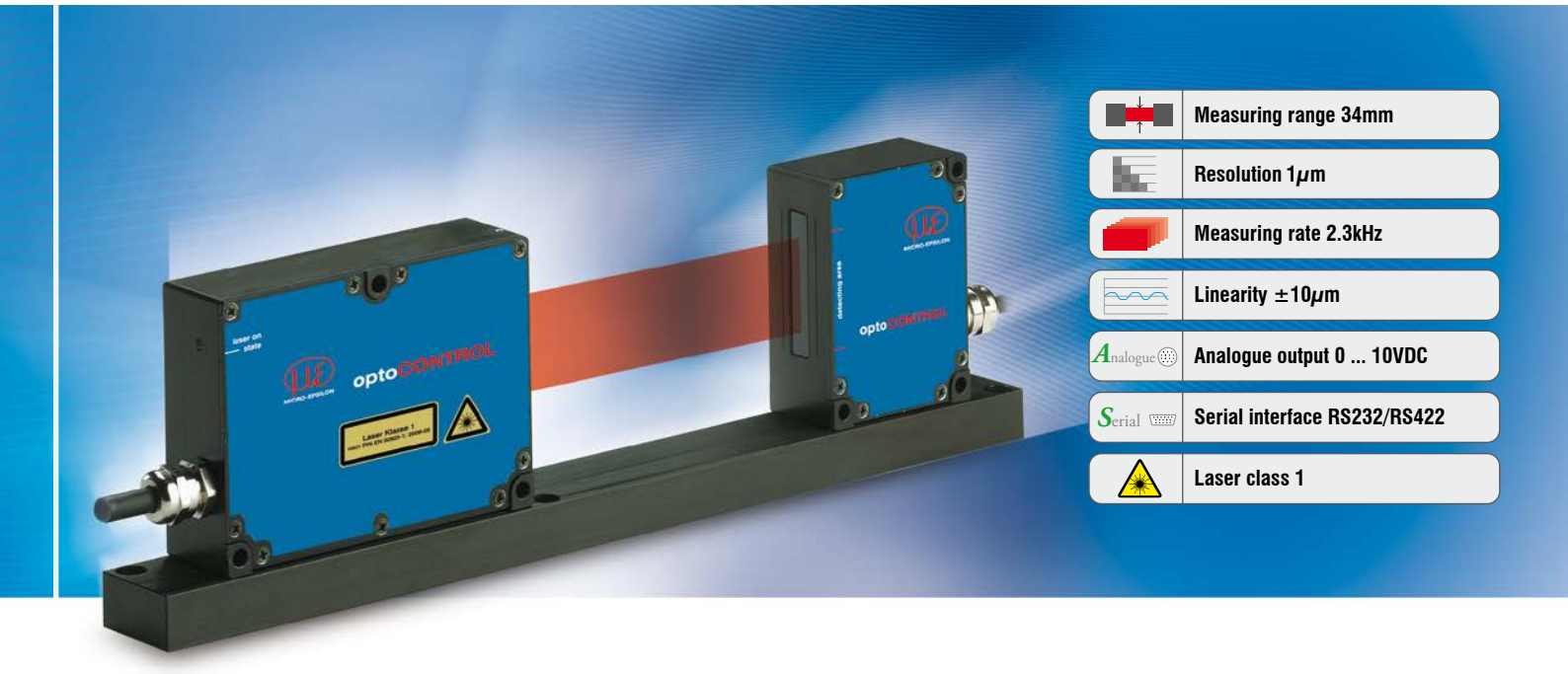
ODC1220-28-T (light source)



ODC1220-28-R (receiver)

Mounting rail ODC1220-L220/L420/L620

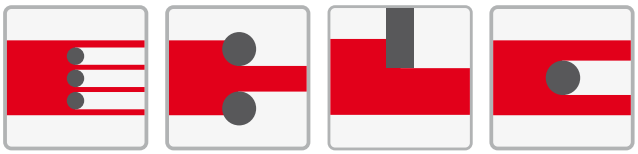




- Measuring range 34mm
- Resolution 1µm
- Measuring rate 2.3kHz
- Linearity ±10µm
- Analogue output 0 ... 10VDC
- Serial interface RS232/RS422
- Laser class 1

- High resolution and precision
- Measuring rate 2.3kHz for fast processes
- Laser-ThruBeam technology
- Six different measuring programs
- Free parameterisation and data acquisition tool

Predefined measurement modes
(six individual programs can be selected)



Segment
Two-Segment

Gap

Edge light/dark
Edge dark/light

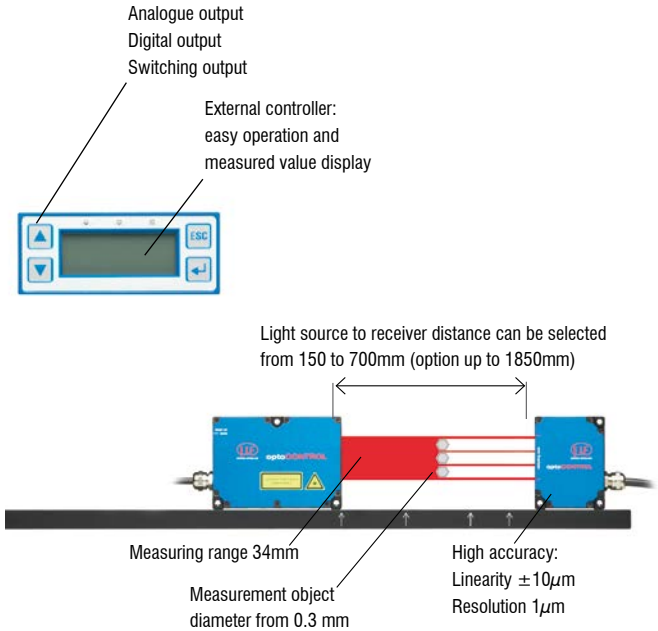
Diameter
Centre

Measuring principle

optoCONTROL 2500 is a laser-based measuring system with integrated high resolution CCD camera. The Thru-Beam micrometer measures the dimension of an object or the position of an edge by using the shadow-casting principle. The data obtained with various, selectable measuring programs is output via analogue and digital interfaces. Thanks to the high measuring rate, the outstanding accuracy and excellent resolution, the laser micrometer is ideally suited to precision measurement and inspection tasks on moving products in production lines.

System design

optoCONTROL 2500 consists of a sensor unit and a controller. The sensor unit comprises a laser light source (transmitter) and a CCD camera (receiver). A parallel light curtain is produced with the laser light source. The CCD array in the receiver measures the contour formed by shadow casting of the measurement object with high accuracy. The sensor unit is controlled and evaluated by an intelligent controller with graphical display for operation and display of the measured values.

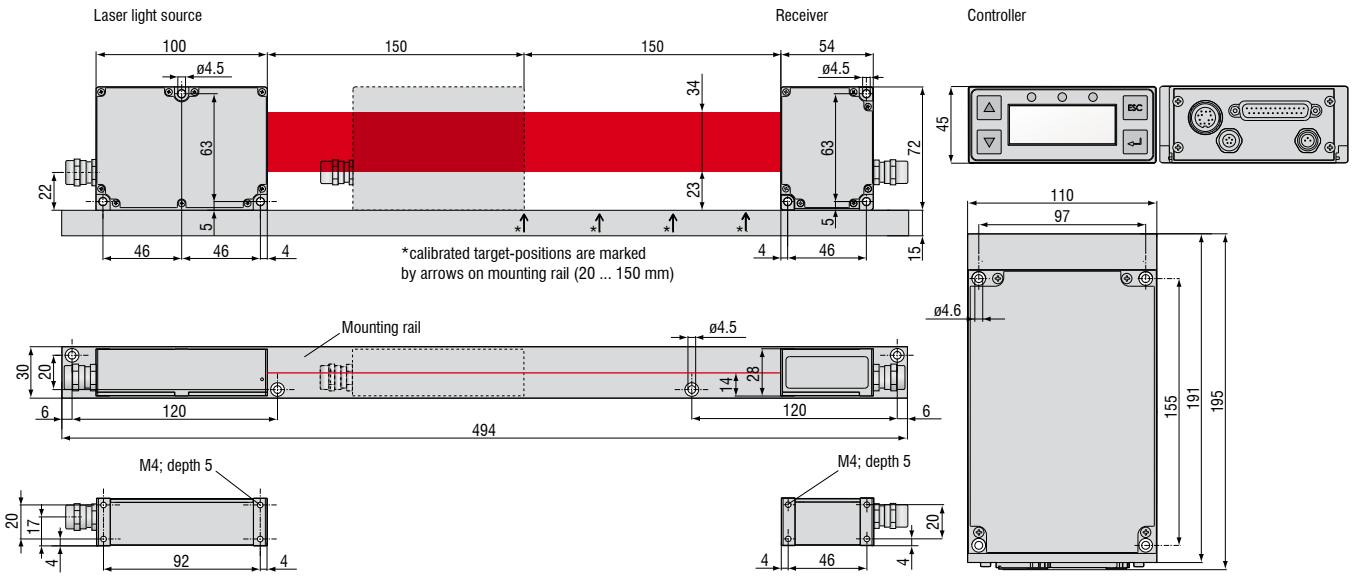


Model		ODC 2500-35
Measuring range		34mm
Smallest diameter or gap (detectable target)		typ. ≥0.3mm
Distance light source - CCD-camera		300mm (150mm - 700mm) (Option up to 1850mm) [1]
Distance (target to receiver)		20 ... 150mm
Linearity [2]		±10µm
Resolution [3]		1µm
Repeatability		≤3µm
Measuring rate		2.3kHz
Light source		Semiconductor laser 670nm, class 1
Analogue output		0 ... 10V, range -10 ... +10V
Digital output		RS 232 or RS 422
Switching output		1 x error, 2 x limit, 2 x warning; LC-display, 3 x LED; Sync-Out
Input		Sync-In; zero; Laser On/Off
Shock		acc. IEC 68-2-29
Vibration		acc. IEC 68-2-6
Operation temperature		0°C to 50°C
Storage temperature		-20°C to 70°C
Power supply		24VDC (± 15%)
Cable length		2m (option: extension 3m / 8m)
Protection class	receiver / light source	IP 64
	controller	IP 40
Display		LCD-display (value, maximum, minimum, peak-to-peak)) display in mm or inch, selectable; menu languages in german / english, selectable 3x LED (power on, light on, error)
Measuring programs		diameter, gap, position / edge, segment,two-segment

All specifications are measured at a constant temperature of 20 °C after a warm-up time of 30 minutes.
[1] If distances increase, linearity and resolution may decline
[2] Valid for distance of the target to receiver 20±5 mm; distance distance light source - receiver 150mm
[3] Display resolution

Customer specific versions

- Carry case version for service tasks
- Customised cable lengths, modified cable outlet
- Version with reduced light source to receiver gap
- Version with deflection mirror for installation in restricted, tight spaces
- OEM measuring programs adaption



- Measuring range 46mm
- Target-sensor gap up to 2m
- Linearity ±12µm
- INTERFACE: Ethernet / EtherCAT / RS422 / Analogue interface
- Laser class 1M
- Configurable via web interface

- Position target anywhere in measurement field
- Output multiple measurement values simultaneously
- Triggering and synchronisation of multiple channels
- Many filtering modes and statistical calculations
- View video signal via web browser
- Display of light and dark edges
- Measures up to 8 segments simultaneously

Compact multifunction micrometer with large working range

The optoCONTROL 2520 is a high performance, self contained laser micrometer with integrated controller and many programmable functions. It has a maximum measurement width of 46mm and the transmitter to receiver gap can be up to 2m (further can be achieved with reduction in measurement performance). Unlike current high accuracy micrometers, the optoCONTROL 2520 can have the target positioned at any point in the gap rather than just a small ‚working position'. This gives the user much more flexibility in use. Small objects with 0.5mm diameter can be reliably detected.

RS422, Ethernet / EtherCAT interfaces are available directly from the sensor. For analogue outputs, a small DIN rail module is supplied. An intuitive web browser interface is used for viewing and recording measurement values, configuration of sensor parameters and visualisation of the sensor video signal.

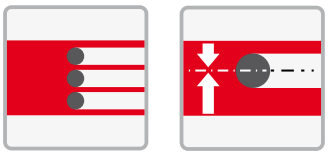
Measuring modes

The centre line as well as the position of the single edges can be output for every segment, gap or diameter.

Edge light / dark
Edge dark / light

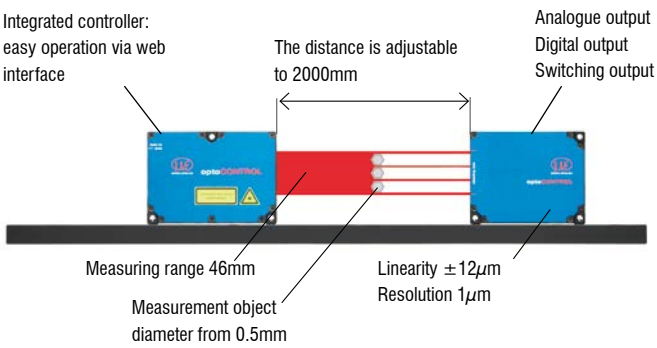
Diameter

Gap



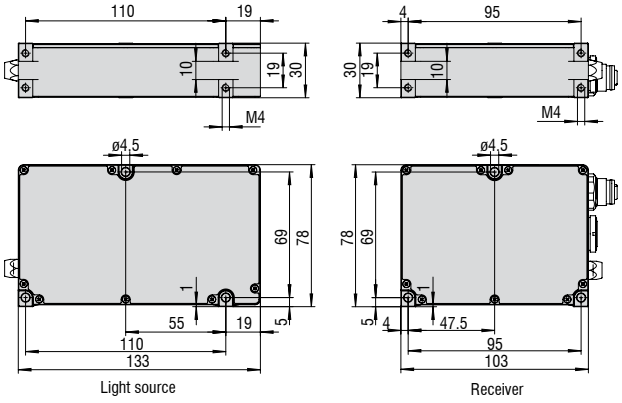
Segment

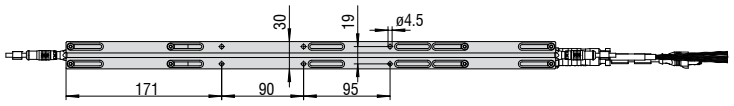
Centre

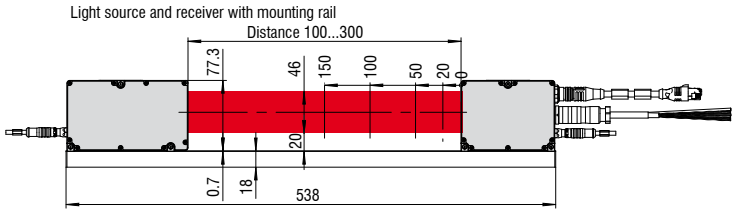


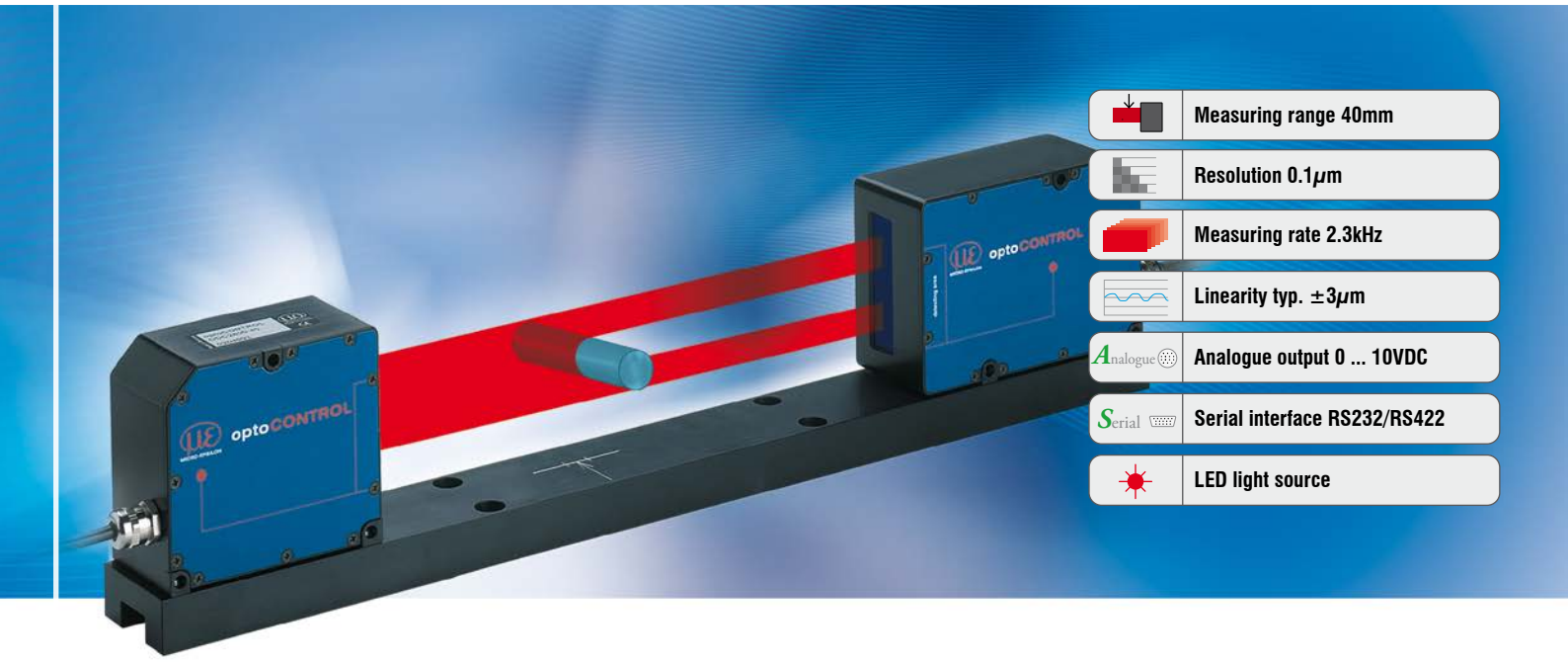
Modell		ODC 2520
Measuring range		46mm
Smallest diameter or gap		typ. ≥0.5mm
Distance light source - receiver (free space)		with mounting rail 100 … 300mm; without mounting rail up to approx. 2m
Distance (target to receiver)		20mm, max. 1500 ... 2000mm
Linearity (3σ) [1]		< ± 12µm
Digital resolution		1µm
Repeatibility [1] [2]		≤5µm
Measuring rate		2.5kHz
Light source		semiconductor laser 670nm (red), laser class 1M (P_{max} 2mW)
Analogue output		0 … 10V not electrically isolated, 14Bit D/A
Digital output		RS 422; max. 4 MBaud, full-duplex, not electrically isolated
		Ethernet, electrically isolated
		EtherCAT
Switching outputs		2 outputs, selectable for error or limit values, not electrically isolated 24V logic (HTL), High level depends to operating voltage
In-/Outputs		Zeroing / mastering, reset to factory setting; not electrically isolated, 24 V logic (HTL), High level depends to operating voltage
		TrigIn / SyncIn / symmetrical SyncOut, RS422 level, load resistance (120 Ohm) and direction switchable via software, not electrically isolated
Shock		15g / 6ms
Vibration		2g / 20 ... 500Hz
Operation temperature		0 ... 50°C
Storage temperature		-20 ... 70°C
Power supply		+24VDC (11…30VDC), < 1A
Connector	receiver	3-pin connector M8 for supply of the light source, 14-pin connector M16 for power supply and signals 4-pin connector M12x1 for Ethernet / EtherCAT
Display LEDs	receiver	Power on, Status, Speed, Link / activity
Protection class	receiver / light source	IP 64
Measuring programs		Edge light/dark; edge dark/light (outer-) diameter/ width incl. centre gap / (inner diameter) incl. centre Any segment edges incl. centre
Functions		averaging, filter; Threshold adjustment for transparent targets; edge detection and measurement direction reversible; current measuring value, Maximum, Minimum, Peak to Peak; edge / level / software triggering synchronization, counting function
Operation, measured value display		Web interface for parametrisation and display (incl. measurement server for transmitting multiple measuring values to the PC)

All specifications are measured at a constant temperature of 20 °C, sensor in continuous operation.
[1] Distance light source - receiver 300mm, distance target - receiver 20mm and 50mm, mode: edge light/dark
[2] Measured at static noise for 3 min.



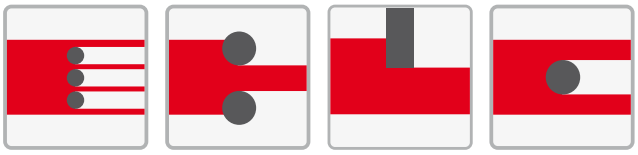


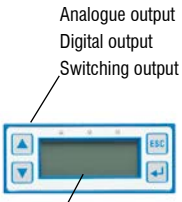




- Maximum resolution and accuracy
- Outstanding repeatability
- Measuring rate 2.3kHz for fast processes
- Insensitive to external light
- Measurement against glass and transparent plastics
- Six different measuring programs
- Measures up to 4 segments simultaneously (e.g. 4 x diameter)
- Free parameterisation and data acquisition tool

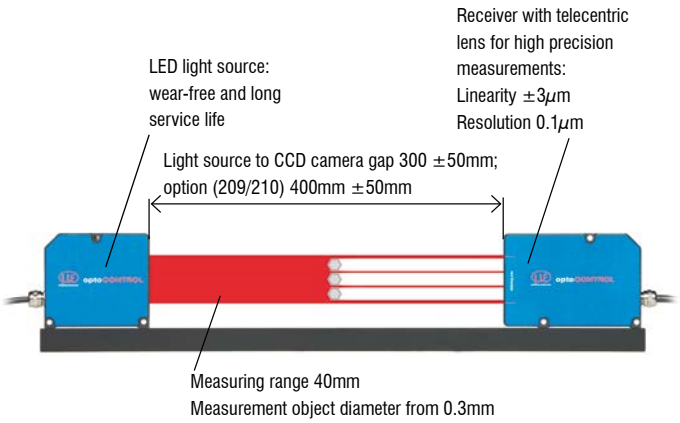
Predefined measurement modes
(six individual programs can be generated)





Measuring principle
optoCONTROL 2600 is an optical measuring system with integrated high resolution CCD camera. Using a special lens arrangement, an LED light source produces a parallel light curtain (visible red light), which is imaged on the CCD camera via a telecentric lens. If an object to be measured is placed in the light curtain, the shadow it creates is detected by the CCD array. The measured data is output via analogue and digital interfaces. The system is insensitive to high external light conditions.

System design
optoCONTROL 2600 consists of a sensor unit and a controller, which are attached to a mounting rail. The sensor unit comprises a light source with high power LED and a receiver with telecentric lens and CCD array. The sensor unit is controlled and evaluated by an intelligent controller with graphical display for operation and display of the measured value.
The adjustable light source enables precise measurement of most transparent objects. Significantly higher accuracies and repeatability of measured data is made possible due to the combination of LED with telecentric lens arrangement. The system is insensitive to dirt and moisture.

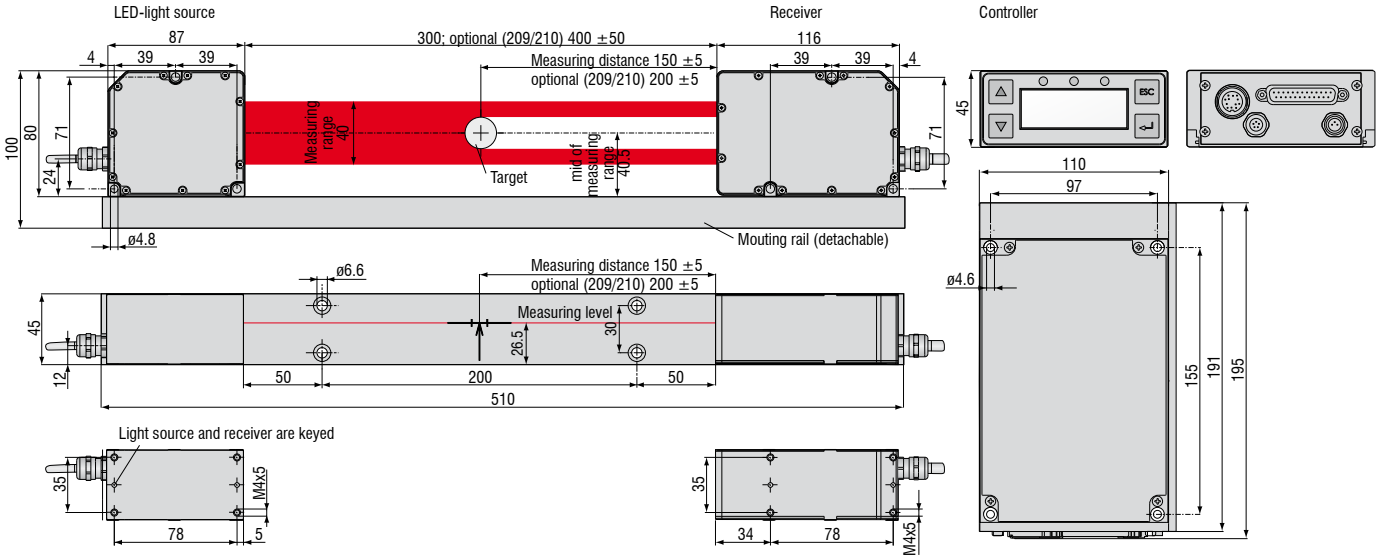


Model	ODC2600-40	ODC2600-40(209)	ODC2600-40(210)
Measuring range	40mm		
Smallest diameter or gap (detectable target)	0.3mm		
Distance light source - CCD camera (free space)	300 (±50)mm	400 (±50)mm	400 (±50)mm
Distance (target to receiver)	150 (±5)mm	200 (±5)mm	200 (±5)mm
Linearity (3 s) [1]	<±3µm		
Resolution [2]	0.1µm		
Repeatibility [1] [3]	±1µm	±1.5µm	±1.5µm
Measuring rate	2.3kHz		
Light source	red LED		
Analogue output (voltage)	0 ... 10VDC, range ±10VDC, selectable		
Digital output	RS232 (115.2kBaud) or RS422 (691.2kBaud)		
Switching output	error, 4x limit, synchronisation		
Input	zero; reset; trigger; synchronisation; light on/off (programmable)		
Shock	acc. IEC 60068-2-29		
Vibration	acc. IEC 60068-2-6		
Operation temperature	0 to 50°C		
Storage temperature	-20 to 70°C		
Power supply	24VDC (±15%), <1A		
Cable length (controller-light source / controller-CCD camera)	standard: 2m		standard: 2m, cable outlet light source and receiver 90°
Protection class — receiver / light source	IP 64		
Protection class — controller	IP 40		
Measurement programs	edge light-dark; edge dark-light; diameter; gap; segment; multi-segments; 4 user-programs		
Display	LC-display (value, maximum, minimum, peak-to-peak); display in mm or inch, selectable; menu languages in German / English, selectable; 3x LED (power on, light on, error)		

All specifications are measured at a constant temperature of 20°C after a warm-up time of 30 minutes.
[1] (edge measurement, no averaging at the target, operating distance 150 ±5mm) <±3µm
[2] Display resolution (resolution digital output 0.6µm)
[3] Measured at static noise for 3 min.

Optional versions

- Carry case version for service tasks
- Customised cable lengths, modified cable outlet
- Customer-specific software (measuring programs, statistics)
- System for measurement of grooved surfaces
- System with reduced distance between transmitter and receiver
- System with reduced and increased distance between transmitter and receiver



IF2008 - PCI interface card

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

Example: measurement of diameters with two optoCONTROL. The diameter to be measured can be increased using two optoCONTROL. See CSP2008 universal controller.

IF2008E - Expansion board

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 and8 I/O signals
- FIFO data memory
- Synchronous data acquisition

Diverse ODC tools

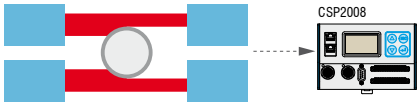
Depending on the sensor, diverse tools for continuous measurement value recording and parameter set up are available free of charge.

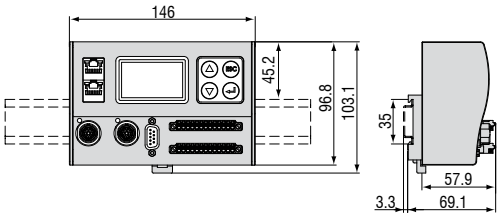
CSP2008 - Universal controller for up to six sensor signals

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 colour 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





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

IF1032/ETH

The IF1032/ETH interface module now enables to run sensors equipped with analogue interfaces with the proven operating concept based on a web interface. The Ethernet interface permits to easily display the measured data on a PC. Moreover, sensors can be connected to an EtherCAT bus. The RS485 interface allows to connect new sensors that use the Micro-Epsilon specific RS485 protocol.

Interfaces

- 1x RS485 (ME-internal protocol)
- 2x analogue-in (14 bit, max. 4 ksps), voltage
- 1x analogue-in, (14 bit, max. 4 ksps), current
- Inputs for supply voltage
- Trigger input
- EtherCAT synchronisation output
- Output for sensor power supply

Accessories optoCONTROL 1200/1201		
Article number	Model	Description
2901260	PC1200-5	Power supply and signal cable 5m, straight connector, for light source and receiver unit
2901483	PC1200-10	Power supply and signal cable 10m, straight connector, for light source and receiver unit
2901261	PC1200/90-5	Power supply and signal cable 5m, angled connector, for light source and receiver unit
0260031.11	DD241PC(11)-U	Digital display unit, RS232, connection for 1 analogue sensor 0-10V, 2 limit switches
2420066	IF1032/ETH	ME Ethernet/EtherCAT interface module max.14Bit/4k samples/sec
2966006 *	ODC1202-L100	Mounting rail for ODC1202, 400mm; distance light source/receiver max.100mm
2966007 *	ODC1202-L200	Mounting rail for ODC1202, 500mm; distance light source/receiver max. 200mm
2966008 *	ODC1202-L500	Mounting rail for ODC1202, 800mm; distance light source/receiver max. 500mm
2966018	JU1200-VR	ODC1200 adjustment plate for vertical mounting of the receiver
2966019	JU1200-HR	ODC1200 adjustment plate for horizontal mounting of the receiver
2966020	JU1200-VT	ODC1200 adjustment plate for vertical mounting of the transmitter
2966021	JU1200-HT	ODC1200 adjustment plate for horizontal mounting of the transmitter
2966024	BR1200L220	Bracket for mounting as C-frame, length 220mm, 2 pcs. required
2966025	BR1200L320	Bracket four mounting as C-frame, height 320mm, 2 pcs. required

*only for C-frame mounting combined with adjustment plate JU1200 and bracket BR1200

Accessories optoCONTROL 1202		
2901497	CE1202-2	Connecting cable light source-receiver, 2m
2901482	CE1202-5	Connecting cable light source-receiver, 5m
2901371	SCD1202-2-RS232	Digital output cable, 2m, for connection to a RS232 port
2901509	SCD1202-5-RS232	Digital output cable, 5m, for connection to a RS232 port
2901848	SCD12xx-2-USB	Digital output cable for USB connection incl. driver, 2m
2901373	SCA1202-2	Power supply and analogue output cable, 2m
2901510	SCA1202-5	Power supply and analogue output cable, 5m
2966006	ODC1202-L100	Mounting rail for ODC1202, 400mm; distance light source/receiver max.100mm
2966007	ODC1202-L200	Mounting rail for ODC1202, 500mm; distance light source/receiver max. 200mm
2966008	ODC1202-L500	Mounting rail for ODC1202, 800mm; distance light source/receiver max. 500mm
6414114	EK1100/CSP2008	Bus terminal
6414107	EL3162/CSP2008	Bus terminal; 2-channel analogue input terminal
2420057	CSP2008	Universal controller for displacement sensors
2420066	IF1032/ETH	ME Ethernet/EtherCAT interface module max.14Bit/4k samples/sec

Accessories optoCONTROL 1220		
2901871	CE1220-1	Connecting cable light source-receiver, 1m
2901851	CE1220-2	Connecting cable light source-receiver, 2m
2901852	CE1220-5	Connecting cable light source-receiver, 5m
2901371	SCD1202-2-RS232	Digital output cable, 2m, for connection to a RS232 port
2901509	SCD1202-5-RS232	Digital output cable, 5m, for connection to a RS232 port
2901848	SCD12xx-2-USB	Digital output cable for USB connection incl. driver, 2m
2901373	SCA1202-2	Power supply and analogue output cable, 2m
2901510	SCA1202-5	Power supply and analogue output cable, 5m
2966009	ODC1220-L220	Mounting rail for ODC1220, 400mm; distance light source/receiver max. 220mm
2966011	ODC1220-L420	Mounting rail for ODC1220; 600mm; distance light source/receiver max. 420mm
2966012	ODC1220-L620	Mounting rail for ODC1220; 800mm; distance light source/receiver max. 620mm
6414114	EK1100/CSP2008	Bus terminal
6414107	EL3162/CSP2008	Bus terminal; 2-channel analogue input terminal
2420057	CSP2008	Universal controller for displacement sensors
2420066	IF1032/ETH	ME Ethernet/EtherCAT interface module max.14Bit/4k samples/sec

Accessories optoCONTROL 2500/2600		
2901123	PC2500-3	Power supply cable 3m, open
2901124	PC2500-10	Power supply cable 10m, open
2901120	SCA2500-3	Signal output cable, analogue, 3m
2901215	SCA2500-10	Signal output cable, analogue, 10m
2901121	SCD2500-3/3/RS232	Signal output cable, 3m, analogue / RS232
2213017	IF2008	PCI interface card RS422
2213018	IF2008E	Expansion board analogue / RS422 / PCI
2901122	SCD2500-3/10/RS422	Signal output cable, 3m, analogue / RS422, 10m
2901057	CE1800-3	Sensor cable extension for camera, 3m
2901118	CE2500-3	Sensor cable extension for light source, 3m
2901058	CE1800-8	Sensor cable extension for camera, 8m
2901119	CE2500-8	Sensor cable extension for light source, 8m
2420057	CSP2008	Universal controller for up to six sensor signals
2901504	SCD2500-3/CSP	Output cable, 3m, for connection to CSP2008
2901505	SCD2500-10/CSP	Output cable, 10m, for connection to CSP2008

Accessories optoCONTROL 2500/2600		
2964022	MBC300	Assembly block for controller ODC2500/2600
2213024	IF2004/USB converter	4 channel RS422/USB converter
2213025	IF2001/USB converter	IF2001/USB converter RS422 to USB
2213022	RS-422/USB converter	Industrial converter for ODC2xxx sensors, RS-422/USB
29011111	SCD2500-3/RS422	Output cable RS422, 3m, open ends
2901528	IF2008-Y adaptation cable	Adaptation cable, Y-type, 100mm
2901561	SCD2500-3/IF2008	Interface cable
2901563	SCD2500-8/IF2008	Interface cable
6414071	Extension clamp	Extension clamp RS422 to CSP2008

Accessories optoCONTROL 2520		
2901925	SCD2520-3	Digital output cable, 3m, RJ45/ Ethernet/EtherCAT
29011002	SCD2520/90-5	Digital output cable, 5m, RJ45/ Ethernet/EtherCAT
29011042	SCD2520/90-8	Digital output cable, 8m, RJ45/ Ethernet/EtherCAT
29011003	PC/SC2520/90-5	Supply-, interface- and signal cable, 5m
2901918	PC/SC2520-3	Supply-, interface- and signal cable, 3m
29011037	PC/SC2520-10	Supply-, interface- and signal cable, 10m
29011038	PC/SC2520-20	Supply-, interface- and signal cable, 20m
29011039	PC/SC2520-30	Supply-, interface- and signal cable, 30m
29011040	SCD2520-5 M12	Digital output cable Ethernet/EtherCAT, 5m
2901919	CE2520-1	Connecting cable light source-receiver, 1m
2901920	CE2520-2	Connecting cable light source-receiver, 2m
2901921	CE2520-5	Connecting cable light source-receiver, 5m
2901922	CE2520/90-1	Connecting cable light source-receiver, 1m
2901923	CE2520/90-2	Connecting cable light source-receiver, 2m
2901924	CE2520/90-5	Connecting cable light source-receiver, 5m
2901967	PC/SC2520-3/CSP	Interface and supply cable for CSP2008
29011014	PC/SC2520-3/IF2008	Interface and supply cable for IF2008
2213024	IF2004/USB converter	4 channel RS422/USB converter
2213022	RS-422/USB converter	Industrial converter for ODC2xxx sensors, RS-422/USB
2213025	IF2001/USB converter	Single channel RS422/USB converter
0260031.10	DD241PC(10)-U	Digital process display, 0...10V
0260031.11	DD241PC(11)-U	Digital process display, 2 limit switches, 0...10V
2213017	IF2008	PCI interface card RS422
2213018	IF2008E	Expansion board analogue / RS422 / PCI
2901528	IF2008-Y adaptation cable	Adaptation cable, Y-type, 100mm
2420057	CSP2008	Universal controller for displacement sensors
6414071	Extension clamp	Extension clamp RS422 to CSP2008
6414113	EK1122/CSP2008	2 port RJ45 EtherCAT junction
6414114	EK1100/CSP2008	Bus terminal

Accessories power supplies		
2420065	PS2030	Wall power supply 24V/24W/ 1A; 2m-PVC; clamp
2420062	PS2020	Power supply for DIN rail mounting 24VDC / 2.5A
2420042	PS2011	Power supply for laboratory use 230VAC/ 24VDC / 5.2A

Further cable lengths on request.

optoCONTROL 2520 use a semiconductor class 1M laser with a wavelength of 670nm. The maximum optical output power is <=2mW . This laser class does not require any additional protection equipment. Be careful with the dazzling effect related to optical instruments.

optoCONTROL 12xx and 2500 use a semiconductor class 1 laser with a wavelength of 670nm. The maximum optical output power is ≤0.39 mW. This laser class does not require any additional protection equipment.

High performance sensors made by Micro-Epsilon

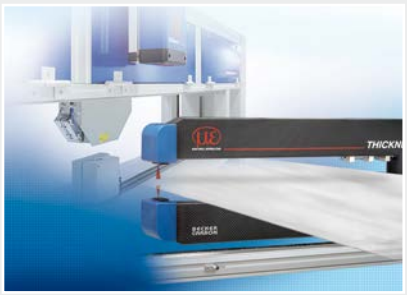
Sensors and systems for displacement and position

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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