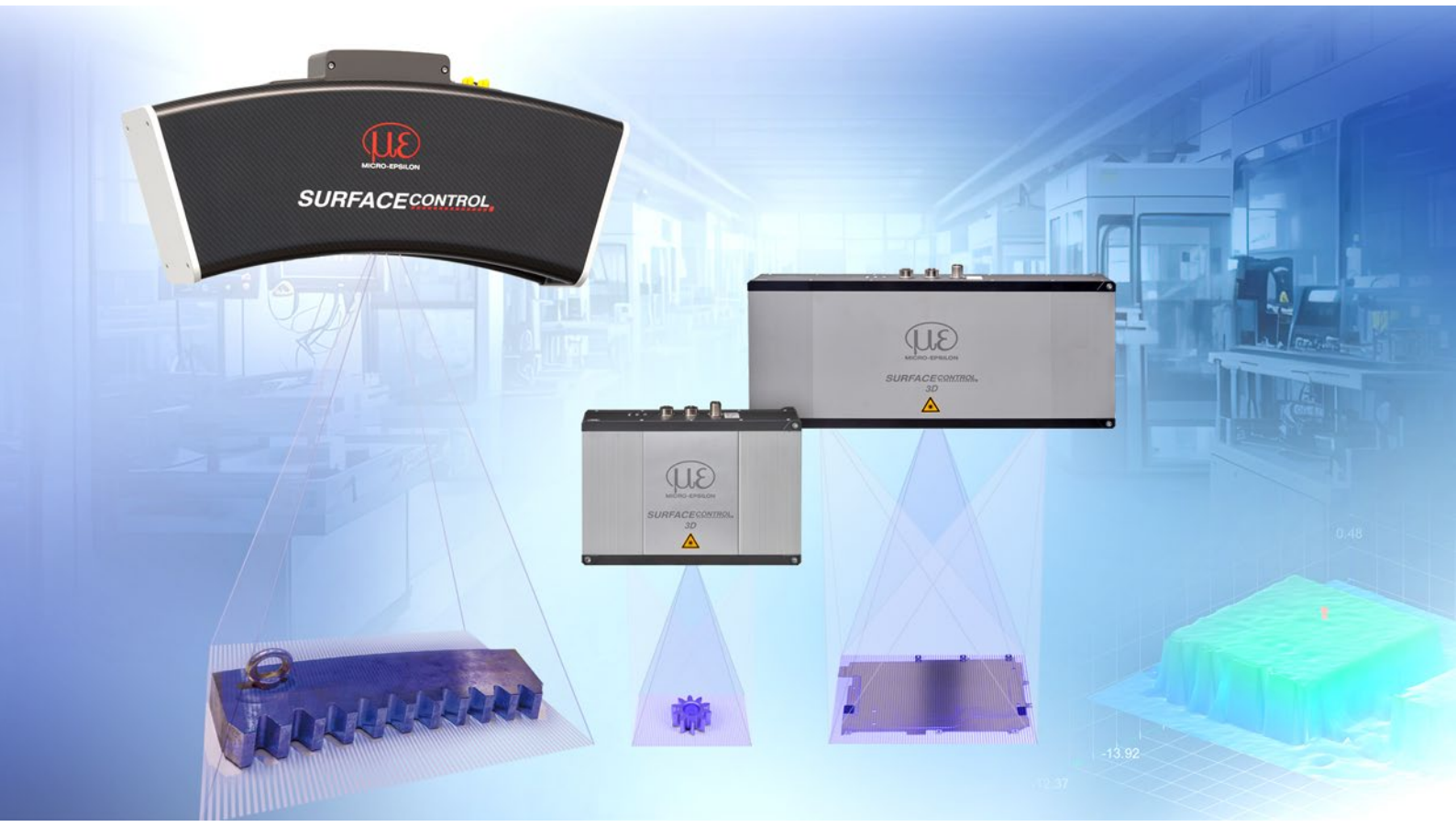
MICRO-EPSILON

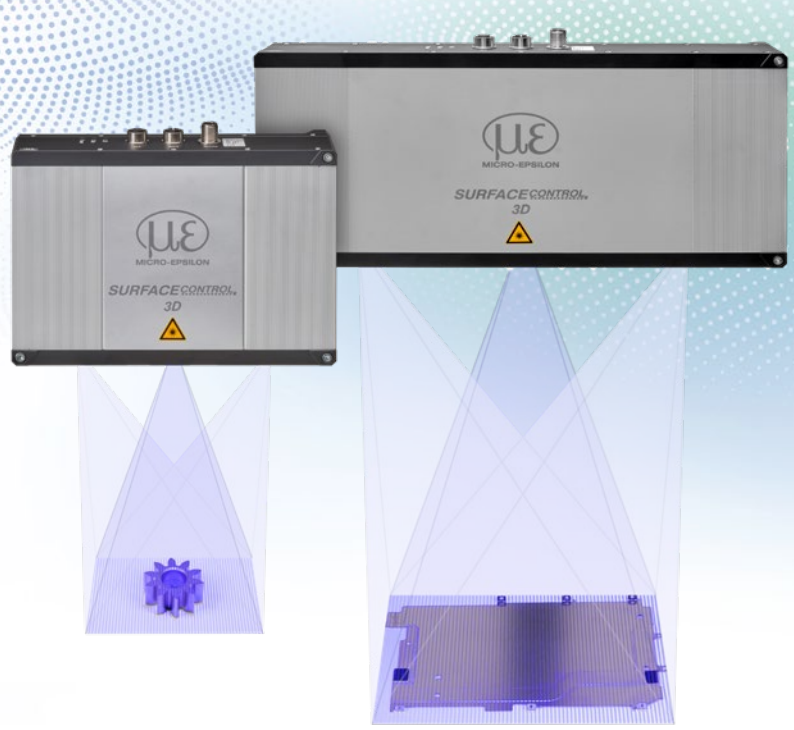
More Precision.

surfaceCONTROL 3D // 3D snapshot sensors



Precise 3D sensors for industrial measurement tasks
surfaceCONTROL 3D 3200

- High XY resolution starting at 12 µm for measuring the smallest details
- z-axis repeatability starting at 0.4 µm for the smallest height differences
- Short acquisition time starting at 0.3 s for high-speed processes
- GigE Vision & GenICam for standardized 3D image processing
- Excellent price-performance ratio

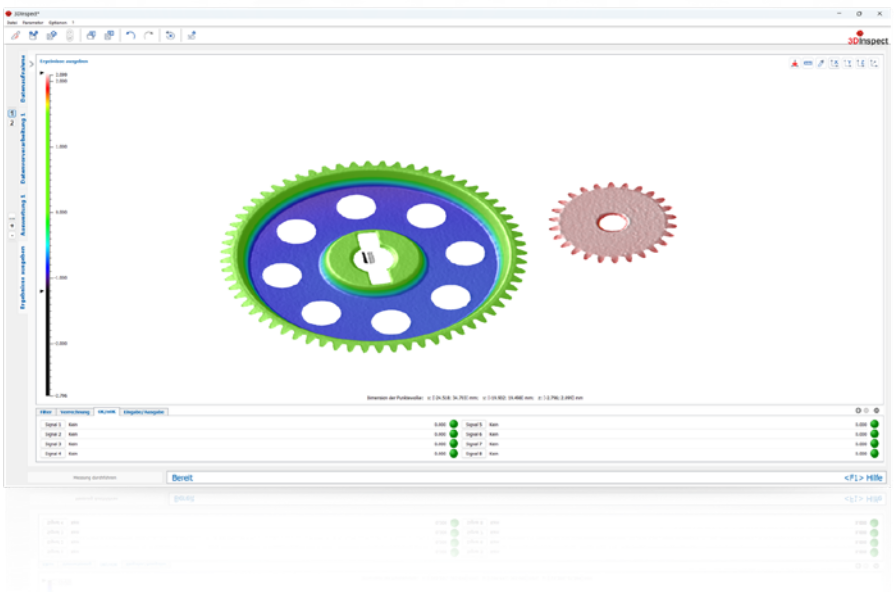


High precision with an excellent price-performance ratio

surfaceCONTROL 3D 3200 series sensors are ideally suited for automated, high-precision inline inspection of geometry, form and surfaces on diffusely reflecting surfaces. The 3D snapshot sensors are characterized by their robustness, compact design, high measurement accuracy, and an excellent price-performance ratio. With XY resolution up to 12 µm and z-axis repeatability up to 0.4 µm, they detect the smallest flatness deviations and height differences reliably.

Ideal for integrators and image processing specialists

The surfaceCONTROL 3D sensors in the SC3200 series capture complete images of a component and process them into precise 3D data. These are output over Gigabit Ethernet in accordance with the GenICam standard and can be processed or evaluated in any image processing software.



Model		SC3200-30	SC3200-80	SC3200-120	SC3200-240
Measuring range length (x) x width (y)	Start of measuring range	29.5 mm x 18 mm	65 mm x 47 mm	100 mm x 70 mm	180 mm x 130 mm
	Mid of measuring range	30 mm x 18.5 mm	75 mm x 50 mm	115 mm x 75 mm	235 mm x 150 mm
	End of measuring range	30.5 mm x 19 mm	74 mm x 53 mm	115 mm x 79 mm	235 mm x 170 mm
Working distance	z	130 ±3 mm	130 ±10 mm	206 ±15 mm	440 ±60 mm
	Extended z	130 ±6 mm	130 ±20 mm	206 ±35 mm	440 ±100 mm
Resolution	x, y	12 µm	30 µm	45 µm	90 µm
	z [1]	1 µm	1.5 µm	3.4 µm	5 µm
Repeatability	z [1]	< 0.4 µm	< 0.6 µm	< 1.2 µm	< 1.8 µm
Acquisition time [2]		from 0.3 s			
Light source		LED			
Supply voltage		24 VDC ±20%			
Max. current consumption		0.5 … 1.5 A			
Digital interface		Gigabit Ethernet (GigE Vision / GenICam)			
Digital I/Os		4 digital I/Os for which parameters can be set (for external trigger, sensor control, output of sensor states)			
Connection		8-pin M12 socket for Gigabit Ethernet, 12-pin M12 socket for digital I/Os, 4-pin M12 plug for power supply			
Mounting		3 mounting holes (installation can be reproduced with centering sleeves)			
Temperature range	Storage	-20 °C ... +70 °C			
	Operation [3]	0 °C … +45 °C			0 °C … +40 °C
Permissible extraneous light		10,000 lx			
Shock (DIN EN 60068-2-27)		15g / 6 ms in XY axis, 1000 shocks each			
Vibration (DIN EN 60068-2-6)		2g / 20 … 500 Hz in XY axis, 10 cycles each			
Protection class (DIN EN 60529)		IP67 (when connected)			
Material		Aluminum housing			
Weight		1.9 kg			2.3 kg
Control and indicator elements		3x color LEDs for power, state and LED			
Software	3D evaluation software	Micro-Epsilon 3DInspect for visualization of 3D data			
	3D sensor SDK	Micro-Epsilon 3D Sensor SDK for custom integration into third-party software			

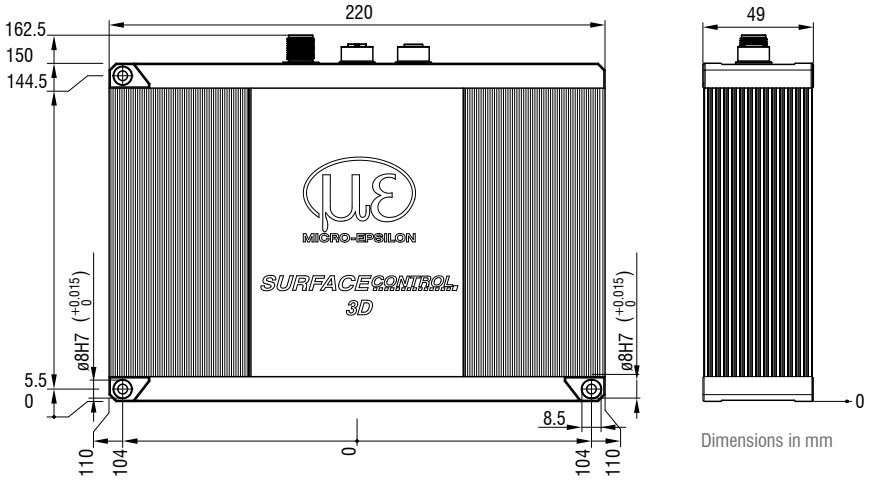
[1] Measured on measuring object with cooperative surface in the center of the measurement area while the EnhancedSNR parameter is enabled and a 3x3 mean value filter is used once at a room temperature between 20 °C and 25 °C.

[2] Duration that the sensor requires for the image acquisition of the pattern projections (without processing and evaluation time). Applies to exposure times < 6,800 µs.

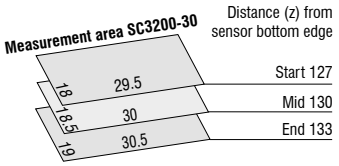
[3] Max. permissible operating temperature depends on installation scenario, connection and operating mode. In combination with a ventilation unit (art. no. 2105079), continuous measurement operation is possible at ambient temperatures of up to 45 °C (valid for measuring ranges 30, 80 and 120 mm).

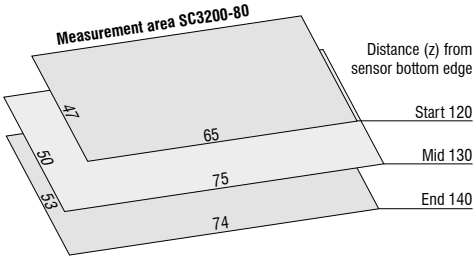
Dimensions and measuring ranges
surfaceCONTROL 3D 3560, 3500 & 3200

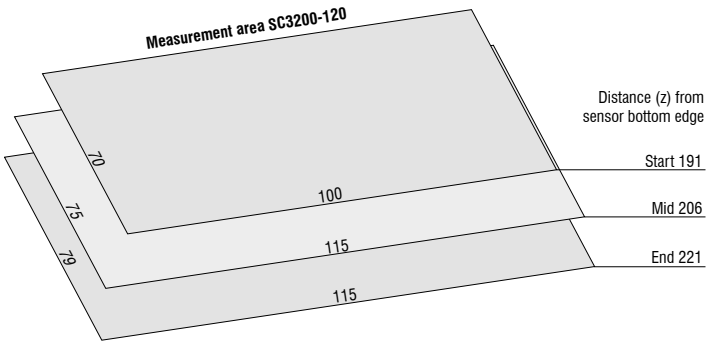
Measuring ranges -30, -80 and -120



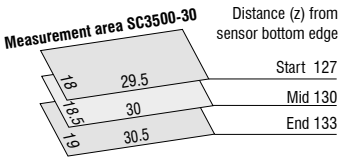
surfaceCONTROL 3D 3200

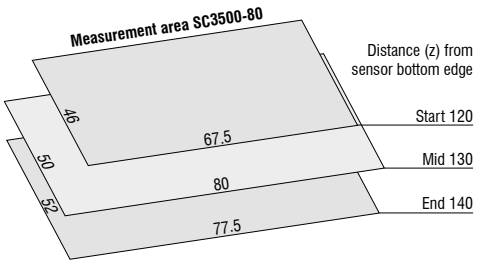


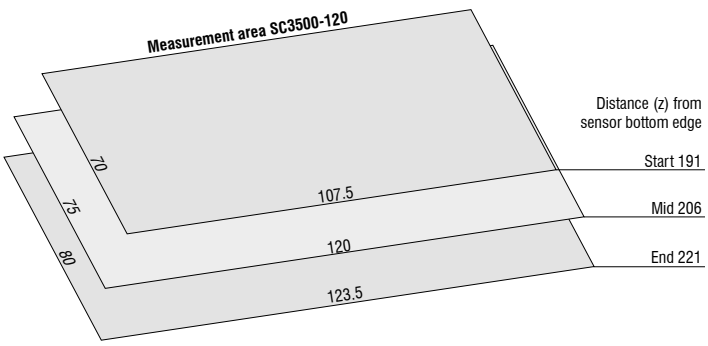




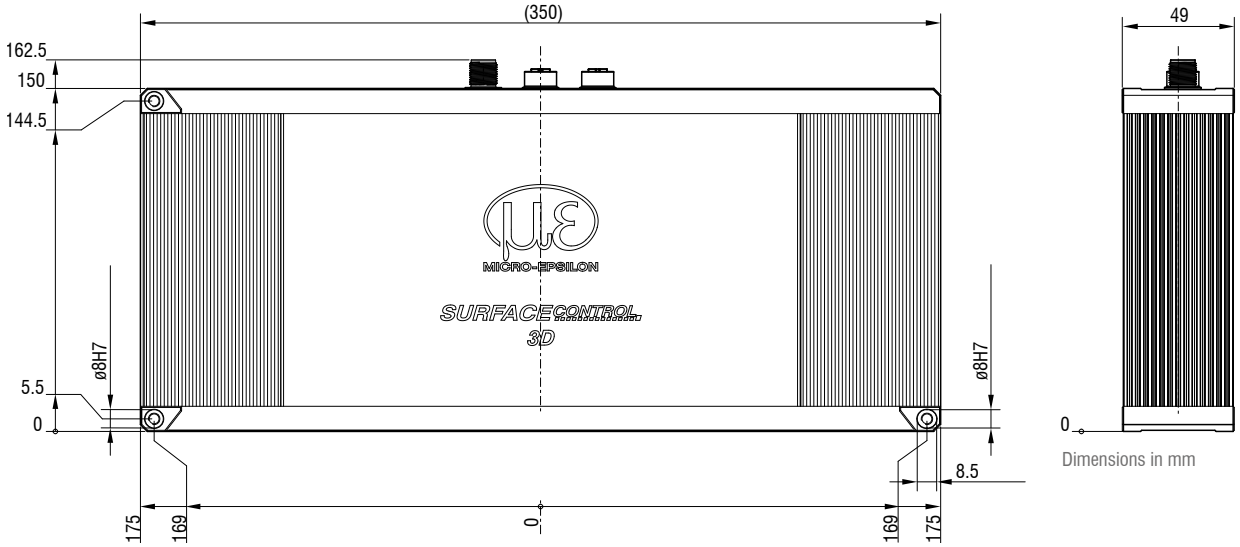
surfaceCONTROL 3D 3560 /3500



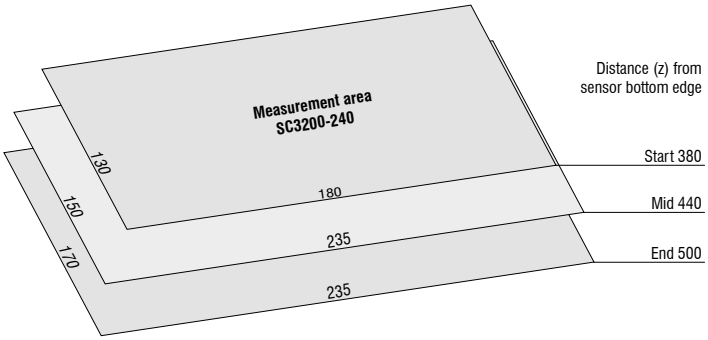




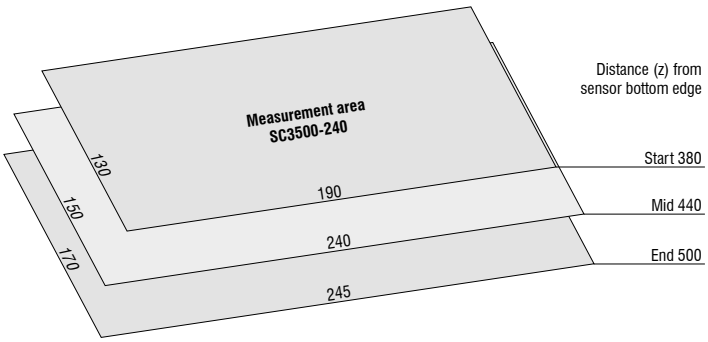
Measuring range -240



surfaceCONTROL 3D 3200



surfaceCONTROL 3D 3560 /3500



Connection options
surfaceCONTROL 3D

SC3560

SMART

PROFINET, EtherCAT, EtherNet/IP, Modbus TCP, UDP

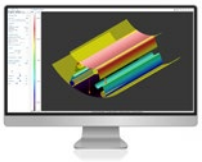
Interface cable PC3000-IE-x/RJ45 (see accessories)

PLC

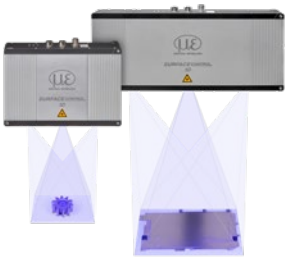
3D DATA

GigE Vision

Ethernet connection cable SCR3000X-x (see accessories)



Third-party software

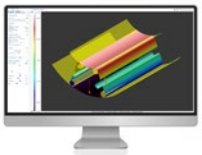


SC3200/3500

3D DATA

GigE Vision

Ethernet connection cable SCR3000X-x (see accessories)



Third-party software

3DInspect

SC26x0

3DInspect

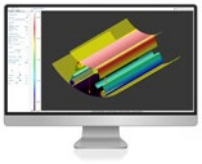
GigE Vision

PROFINET, EtherCAT, EtherNet/IP, Modbus TCP, UDP

PLC

3D DATA

GigE Vision



Third-party software

Software for surface inspection and 3D measurement
3DInspect

More information

3DInspect: powerful software for 3D measurement and inspection tasks

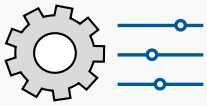
3DInspect is powerful software for industrial measurement and inspection tasks. The 3D measurement data generated by the sensor are processed, evaluated, and automatically assessed in the software based on defined criteria. Measurement results can be visualized, logged and, if required, output directly to a machine or line PLC. In addition, both the measurement results and the complete 3D data can be saved for documentation and later analysis.

Fast & intuitive path to a high-precision 3D solution

The 3D sensors are parameterized directly in 3DInspect. This enables quick configuration of the optimal sensor settings for the specific measurement task. The captured 3D data are preprocessed and optimized. For example, the part position is aligned automatically to enable repeatable evaluation of the point cloud regardless of the workpiece orientation. In addition, functions are available for filtering, smoothing, cropping, creating cross-sections, and highlighting relevant features.

3DInspect offers over 80 powerful measurement programs for data evaluation. This enables reliable localization and measurement of features such as edges, spheres, or bores. In addition to evaluating the complete 3D data, cross-sections can also be evaluated. All 2D and 3D objects can be referenced to one another to determine, for example, distances between a sphere and a plane or the angle between two edges. All determined values and performed evaluations can be output as measurement results.

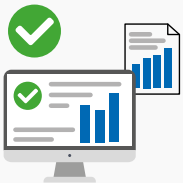
End-to-end workflow from parameterization to output



Parameterization
- Optimal sensor parameters for the application
- Save and reuse parameter sets
- Select measuring ranges

Data preprocessing
- Align and position the point cloud
- Set filters and cross-sections
- Highlight features, remove interference

Data evaluation
- Over 80 measurement programs
- Combination of multiple programs
- Evaluation of cross-sections or 3D areas

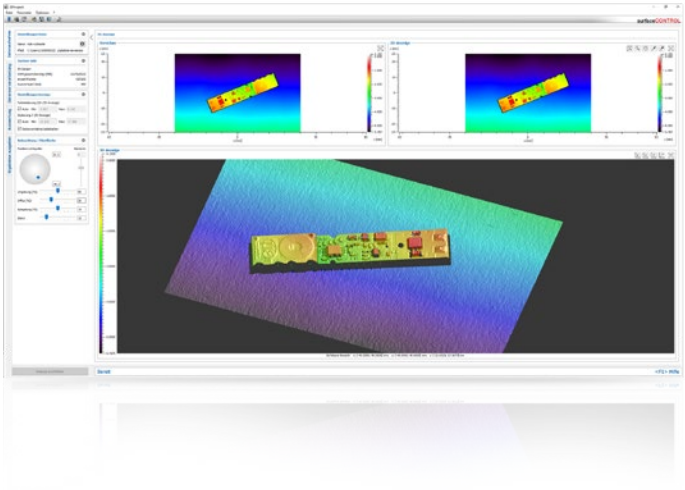


Evaluation & output
- Evaluation of results (OK/NOK)
- Output via digital outputs, fieldbus or Ethernet
- Logging and export of measurement values and 3D data

3DInspect with surfaceCONTROL

The 3DInspect software supports all surfaceCONTROL sensors. In the surfaceCONTROL 3D 3560 series, the 3DInspect evaluation programs can be run directly on the sensor. surfaceCONTROL 2610 series sensors require an external computing unit for evaluation. Both series support automated output of measurement values.

3DInspect supports the surfaceCONTROL 3D 3500, 3200 and 2600 series for test measurements and visualization. However, direct output of measurement values from the sensor is not possible with these models, as they are designed to transmit 3D point clouds.



All benefits at a glance

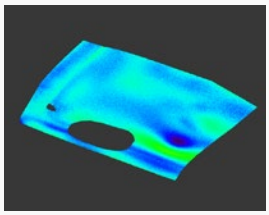
- User-friendly interface – easy creation of measurement programs
- Inline operation – stand-alone operation of the measurement programs directly on the SMART sensors
- Wide range of predefined programs for 2D & 3D geometry measurements and surface inspection
- Logging and storage of 3D data directly in the software
- Valid3D – real 3D instead of only 2.5D enables a true representation of the measuring object without data loss
- Parameterization of fieldbus integration via the automation interface

Functional extensions

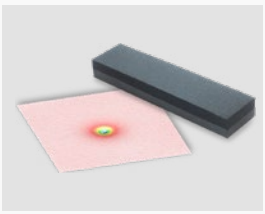
Optional functional extensions allow the functionality to be tailored specifically to the application. The following functional extension is available for surfaceCONTROL:

Functional extension: Surface inspection

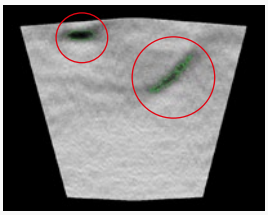
The *surface inspection* extension enables reliable detection of deviations from a homogeneous surface. Tools such as Digital Stone, Digital Master, and defect detection with sorting and counting options are available from 3DInspect 3.1 onwards.



Digital Master:
Objective target/actual comparison with good parts (including variance taken into account)



Digital Stone:
Simulates a physical whetstone. High precision with high repeatability



Defect detection with sorting and counting function:
Automatic defect detection and height evaluation

Other accessories

Articulated arms

Article no.: 2961008 for MR -30, -80, -120
Article no.: 2961011 for MR -240
For mounting and alignment. Ideal for rapid, flexible testing or laboratory setups.

Compact tripod

Article no.: 2961007
For mounting and alignment.
Ideal for rapid, flexible testing or laboratory setups.

Mounting brackets / adapter plates

Article no.: 3007579 for MR -30, -80, -120
Article no.: 3008681 for MR -240

Air cooling

Article no.: 2105079
Industrial-grade, IP67-rated ventilation unit for quiet, continuous cooling.
Suitable for models -30, -80 and -120 mm.

Desktop power supply PS3000

Article no.: 2420103
Input 90-240 VAC
(50/60 Hz ~1.5 A)
Output 24 VDC (12.5 A)

Power supply PS2020

Article no.: 2420062
For mounting on a symmetrical 35 mm × 7.5 mm DIN rail (DIN 50022)
Input 100–240 VAC
Output 24 VDC / 2.5 A

Other accessories

Mounting adapter

Article no.: 4350954

Mounting the sensor on a quick-release plate with a dovetail profile of size 050/87 or on a profile system.

Mounting adapter 47°

Article no.: 4350953

Mounting the sensor on a quick release plate with a dovetail profile of size 050/87. Enables perpendicular alignment to the floor.

Tripod set

Article no.: 2961010

For mounting and alignment. Includes tripod bag, ground spreader, tripod head, tripod adapter.

Column stand

Article no.: 2961002

For mounting and alignment.

Desktop power supply PS2600

Article no.: 2420137

Input 90-240 VAC (50/60 Hz ~1.5 A)

Output 24 VDC (12.5 A)

Power supply PS2020

Article no.: 2420062

For mounting on a symmetrical 35 mm × 7.5 mm DIN rail (DIN 50022)

Input 100–240 VAC

Output 24 VDC / 2.5 A

Transport case

Article no.: 9335492

For SC2600 and SC2610 models, a rugged case is available for safe transport of the sensors.

Calibration kit

Article no.:

2968003.01 for model -300

2968003.02 for model -400

2968003.03 for model -575

Enables on-site recalibration of the projector and cameras. Includes camera calibration plate, projector calibration plate and calibration plate mount for surfaceCONTROL 3D in a case.

Industrial Performance Unit

Article no.: 6414160

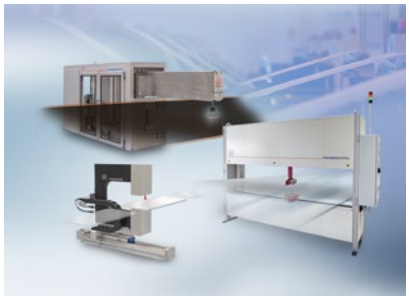
The Industrial Performance Unit (IPU) is a high-performance computing platform for evaluating 3D data from SC2610 models:

- Solving 3D measurement tasks
- Full compatibility and inline capability for customer applications
- Intuitive 3DInspect software with Valid3D technology
- Efficient commissioning of Micro-Epsilon sensors
- Hardware with passive cooling suitable for industrial use
- Integrated interfaces: Modbus/TCP, EtherCAT, PROFINET, EtherNet/IP

Sensors and Systems from Micro-Epsilon

Sensors and systems for displacement, distance and position

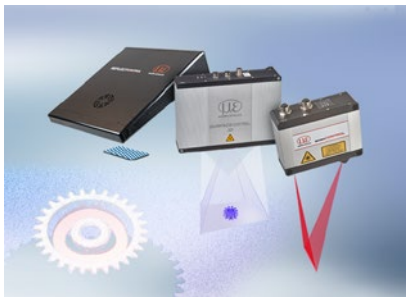
Sensors and measurement devices for non-contact temperature measurement



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

MICRO-EPSILON

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