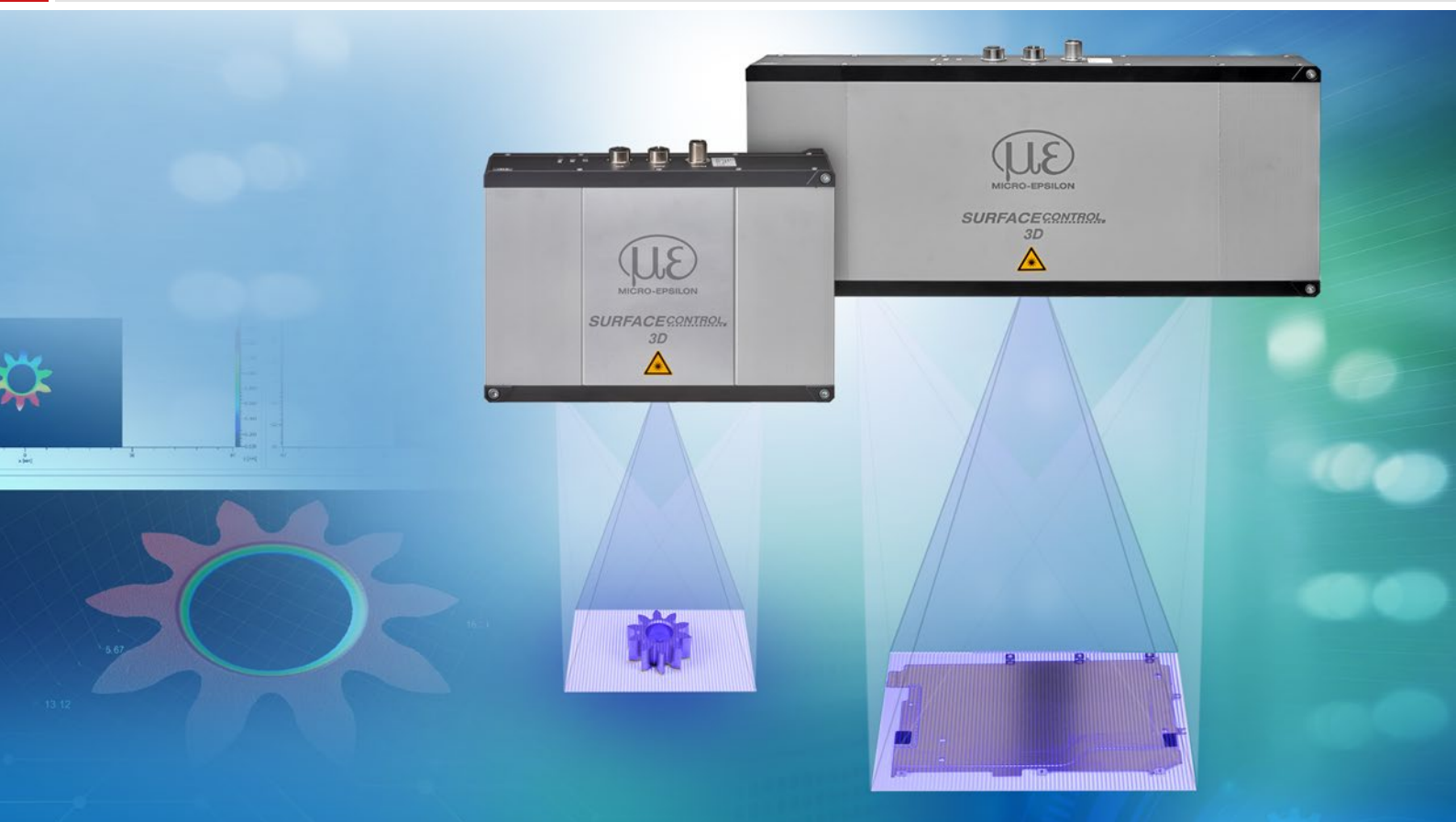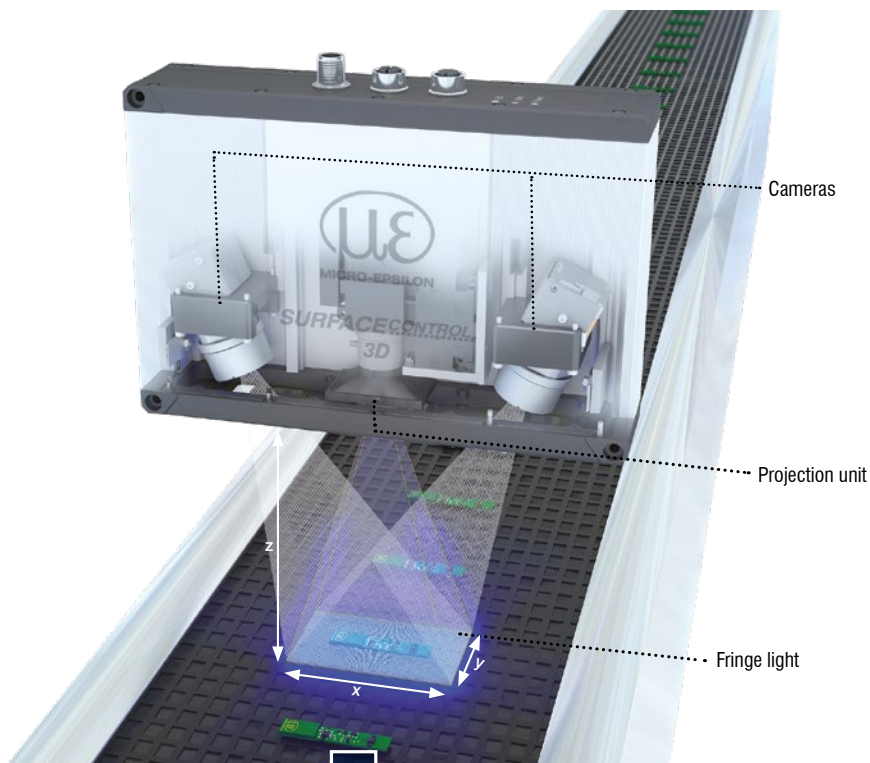# MICRO-EPSILON

More Precision

surfaceCONTROL 3D // 3D sensors for geometry, shape and surface inspections

Precise sensor for 3D measurements and surface inspections
surfaceCONTROL 3D

Cameras

Projection unit

Fringe light

Measuring principle

The surfaceCONTROL 3D sensors work according to the principle of optical triangulation based on fringe projection. Using a matrix projector, a sequence of patterns is projected onto the test object surface. The light of the patterns diffusely reflected by the test object surface is captured by two cameras. The three-dimensional surface of the test object is then calculated from the recorded image sequence and the knowledge of the arrangement of the two cameras to each other.
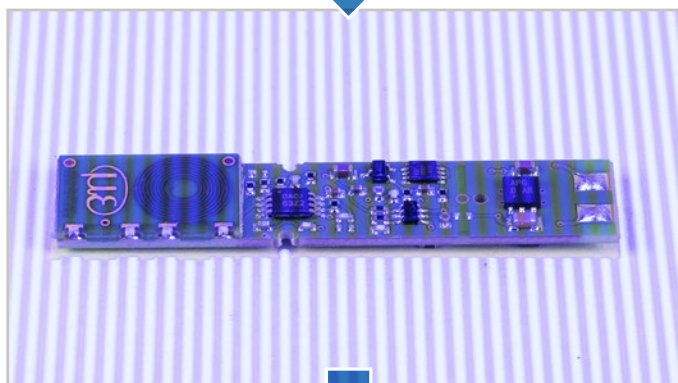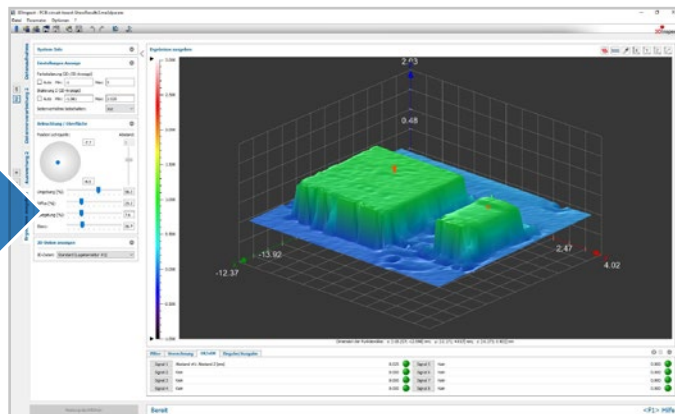

Measuring object with fringe light

surfaceCONTROL 3D sensors for inline 3D measurement tasks

surfaceCONTROL 3D sensors use individual snapshots to detect objects. The fast measurement combined with high data density allows use in 100% in-line testing during the production process. The superiority of surfaceCONTROL 3D sensors lies in their ability to detect the entire surface in a fraction of a second. The sensors generate a digital 3D image of the entire measuring object and provide significantly more detailed quality information than tactile measurement methods, for example.
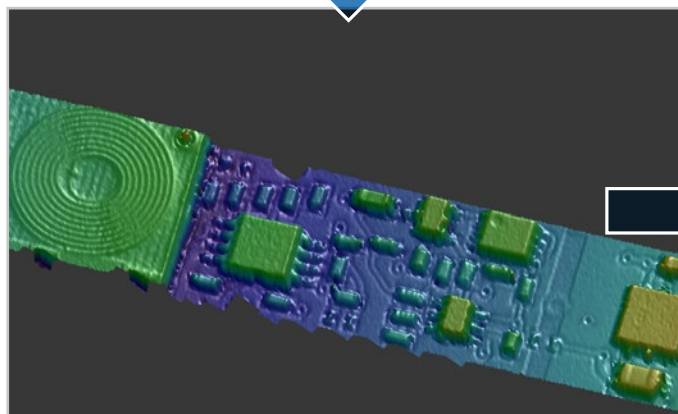
Detailed 3D display due to extremely high Z-axis resolution

Automated evaluation in Micro-Epsilon software

The surfaceCONTROL 3D sensors provide a wide range of different measurement areas from 80 x 50 mm to 245 x 180 mm.

The variety of measurement areas allows the detection of the smallest details and structures as well as the detection of large objects with a large working distance and high precision.

Precise sensor for 3D measurements and surface inspections
surfaceCONTROL 3D

Highest z-axis repeatability up to 0.4 μm

Automated inline 3D measurement for geometry, shape and surface inspections

Up to 2.2 million 3D points / second

Fully integrated industry sensor (IP67) with passive cooling

Real 3D data via latest 3D GigE Vision standard

Easy integration in all common 3D image processing packets

The new generation of high precision inline 3D measurements
The surfaceCONTROL 3D sensors are ideally suited to automated inline inspection of geometry, shapes and surfaces on diffuse reflecting surfaces. The sensors are characterized by their compact design and high measurement accuracy combined with high-speed data processing. With a z-axis repeatability of up to 0.4 μm, the surfaceCONTROL 3D sensors set new standards in high precision 3D measurement technology. This enables reliable detection of even the smallest deviations in flatness and height. Two models cover different measuring fields.

In addition to the fast data output via Gigabit Ethernet, the sensors offer an additional digital I/O interface. The 2D/3D Gateway II supports EtherNet/IP, PROFINET and EtherCAT connections. Powerful software tools enable precise 3D measurements and surface inspection. GigE Vision compatibility also allows easy integration into third-party image processing software. The comprehensive SDK for customer software integration rounds off the software package.

For system integrators

SC3x00

Without functional extension 3DInspect
- Supported by 3DInspect in setup mode
- supported by SDK
- supports GigE Vision

Evaluation by customer

GiGE VISION   C/C++   .NET
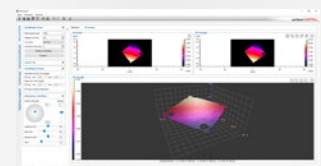
For end users

SC3x10

With functional extension 3DInspect
- Supported by 3DInspect in setup mode
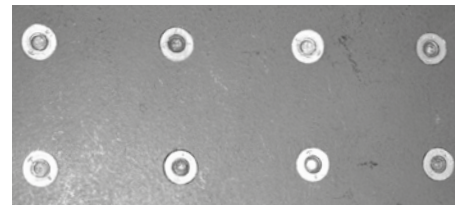- Is additionally supported by 3DInspect in automatic operating mode

Integrated evaluation via Micro-Epsilon 3DInspect software

Advantages of surfaceCONTROL 3D sensors compared to 2D cameras

Conventional 2D cameras do not recognize depth information when capturing images. If the position of a measuring object changes, errors can occur during evaluation. The advantage of surfaceCONTROL 3D sensors lies in the high-precision measurement of height differences, which are visualized in color by the software. Due to the additional height information generated, the sensors automatically compensate for errors caused by changes in height. As a result, they work much more reliably than cameras, even for objects in different positions. In addition, the surfaceCONTROL 3D sensors have two integrated cameras that are optimally aligned and combine the captured points in a point cloud.

Gray image with a 2D camera image
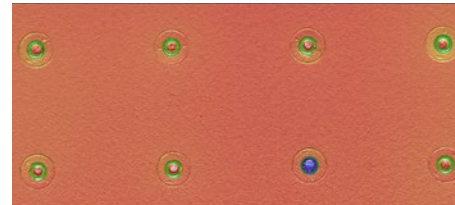No depth information through the camera image

Image from a 3D sensor
Depth information and height deviations from the target value

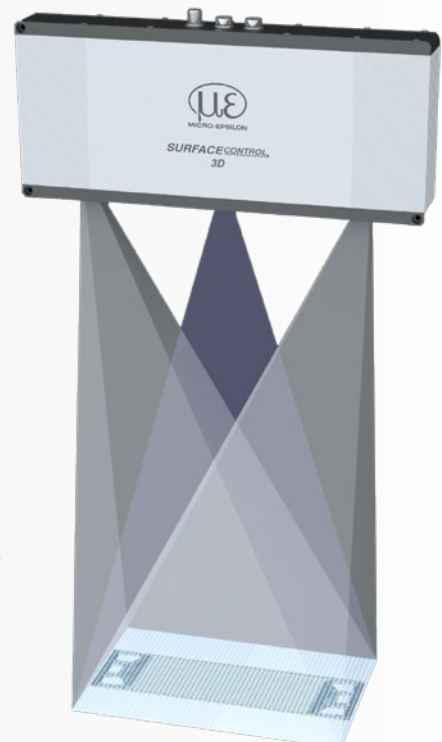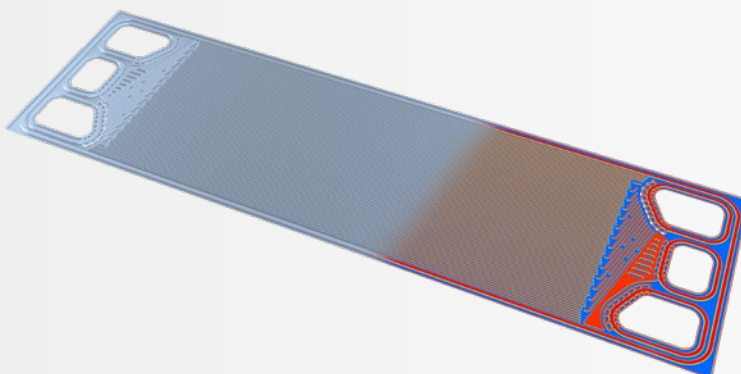|	2D	3D
Analysis of volume and/or shapes	✖	✔
Contrast information is well recognizable	✔	✔
Recognition of height variations	✖	✔
Positioning task / detection in the third dimension	✖	✔
Component identification	✔	✔
Presence monitoring of components	✔	✔
Damage detection	✔	✔
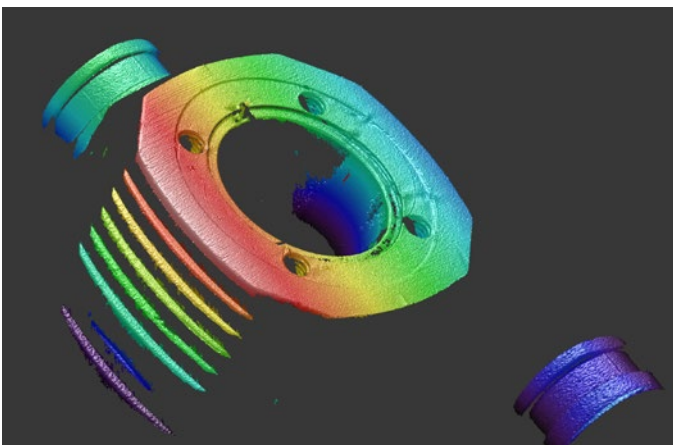
Point clouds with up to 2.2 million 3D points per second

The surfaceCONTROL 3D achieves acquisition speeds of up to 2.2 million 3D points per second, each point of which has an x, y and z coordinate. This large number of measuring points, the so-called point cloud, is used to generate and visualize inventory data for subsequent analysis and evaluation. Point clouds can have information on reflection and color, and thus reproduce a realistic image.

The subsequent processing of captured point clouds consists of generating point clouds of the individual viewpoints and linking them to form an overall point cloud.

New: large measuring range with excellent z-precision

With a measurement area of up to 245 x 180 mm, the surfaceCONTROL 35x0-240 captures structures and details on larger targets with high precision. Due to their high z-axis measuring range of 240 mm, the sensors are ideal for applications with large measuring volumes. The high z-axis resolution of 4 μm in combination with the larger measuring range enables maximum precision for a wide range of applications, e.g. for testing bipolar plates for fuel cells.

Precise sensor for 3D measurements and surface inspections
surfaceCONTROL 3D

Height condenser / installation height 1.46 mm

Distance condenser 2.31 mm

Cross section condenser 1.25 mm

With its extremely high z-axis resolution of 1.0 μm, the surfaceCONTROL 3D detects even the smallest of height differences with extremely high precision. Furthermore, the 3D snapshot sensor impresses with a z-axis repeatability of up to 0.4 μm. This means that the convergence of the individual measurement results of repeated measurements with Micro-Epsilon 3D sensors is particularly outstanding. Due to the high precision, height differences, parallelism and coplanarity can be detected reliably and precisely, even with the smallest objects.

Precise raw data for integrators and image processors

The surfaceCONTROL 3D sensors from Micro-Epsilon are used for a variety of measurement and inspection tasks on matt surfaces. The results can be documented and compared. This allows for important conclusions to be drawn for process improvements. The sensors can be used in offline applications as well as in fully automated operation.

Software integration via Micro-Epsilon's 3D-SDK

3D sensors from Micro-Epsilon are equipped with a user-friendly SDK (Software Development Kit). The SDK is based on the GigE Vision and GenICam industry standards including the following essential function blocks:

- Network configuration and sensor connection
- Control of data transmission (3D measurement data, video images, profile counters, ...)
- Comprehensive sensor control
- User sets
- Documentation
- C++ example programs
- 3D Viewer

3D SDK at a glance:

- GigE Vision / GenICam compatible
- Access to all sensor parameters
- Examples included
- Comprehensive documentation

Individual evaluation via SDK

Automation technology in combination with 3D precision sensor technology

Robust hardware combined with an intelligent software concept makes the surfaceCONTROL 3D ideal for use in automation technology. Due to their compact design and low weight, the sensors can be easily mounted on robots and devices. The signal and supply cables are suitable for drag chains.

In factory automation, in autonomous assembly systems or in complex process monitoring - the surfaceCONTROL 3D sensors deliver the most precise results directly to the machine and system control due to their high precision, fast data processing speed and large number of interfaces.

Automatic 100% inline inspection at high speed

The surfaceCONTROL 3D sensors generate a 3D image of an area with just one shot and detect the position of the target underneath. It is therefore not necessary to position the measuring object on a precision measuring table. The 3D snapshots are created in fractions of a second without the need for time-consuming orientation of the measuring object. This reduces the measuring time and enables a 100% inspection in the production line as well as a good/bad evaluation of each individual object.

- Complete measurement with just one 3D snapshot
- No positioning of the measuring object required, automatic alignment by 3DInspect software
- New measurement during evaluation, short capture time thanks to high-resolution cameras
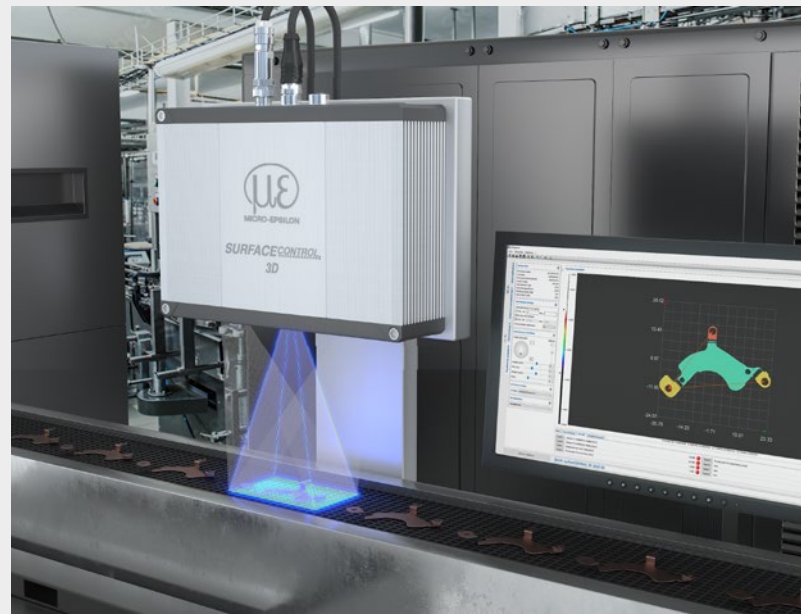
Simple and precise at-line inspection

The surfaceCONTROL 3D sensors provide a fast inspection solution for random tests during production. At-line processes are used either for the inspection of individual objects from the production line or for the inspection of defective parts at a special measuring station.
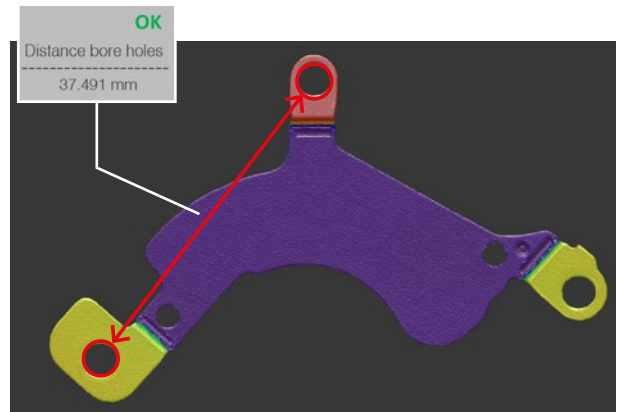
- Not necessary to orientate the target precisely
- Less measuring devices and equipment
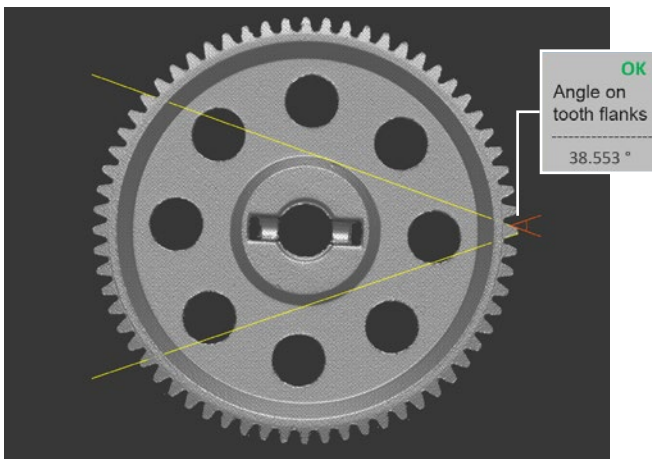- Avoids potential positioning errors
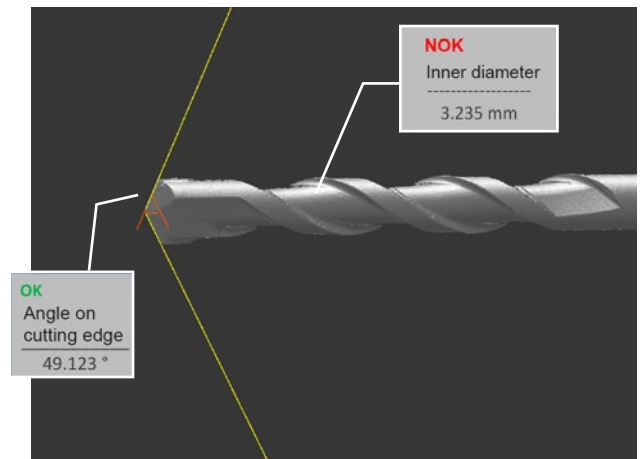
Geometry and shape detection
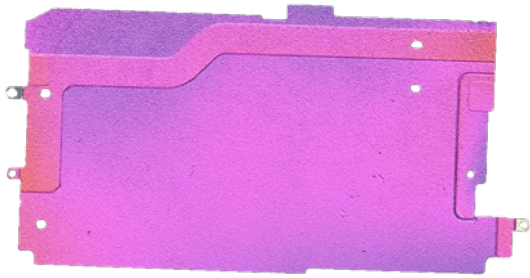
Flatness inspection of high-precision middle boards of smartphone carrier plates

3D measurement of high precision mechanical parts: distance between the holes, planarity and coplanarity of mounting surfaces

Angle on tooth flanks of a gear wheel

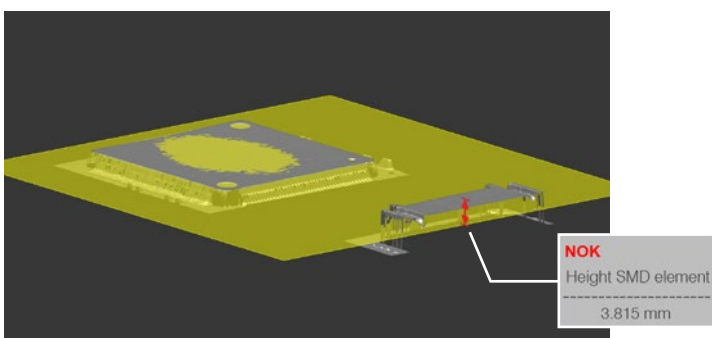Measurement of the tip angle of the main cutting edge of a drill head and measurement of the internal diameter

Inspection of the smallest of components
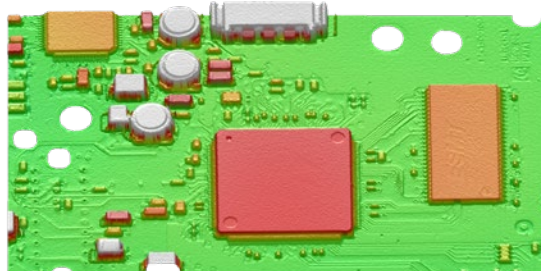
Completeness check of electronic components on fitted PCBs

Monitoring of distance and plane-parallelism of assembled elements to each other and to the base surface (e.g. tombstone effect)
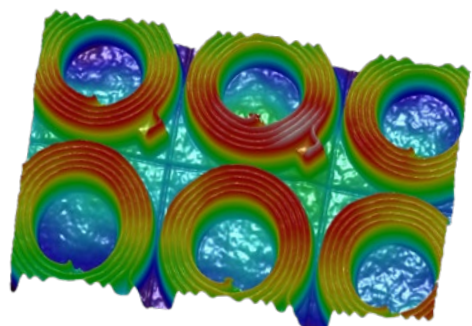
Planarity inspection of unpopulated PCB substrates

Defect detection

Detection and evaluation of breaks on clutch discs
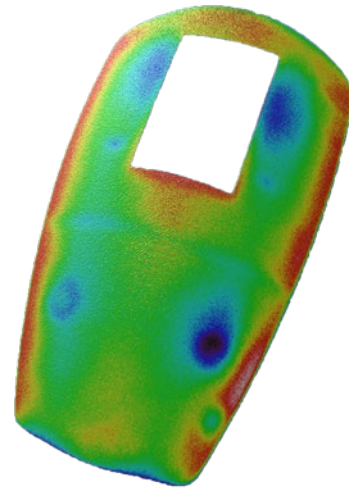
Determination of shape deviation defects on the front side of injection-molded parts caused by injection of bridges and joining elements on the rear side
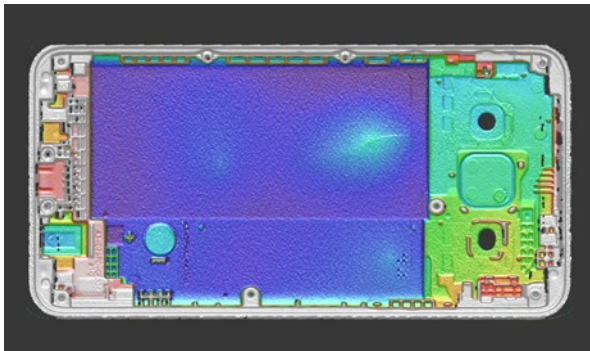
Detection of surface defects on a smartphone shell
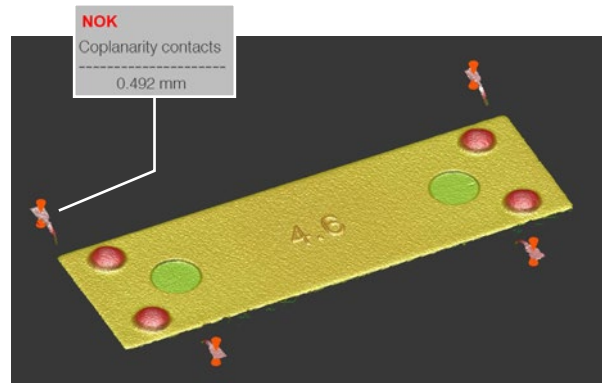
Coplanarity measurement of contacts on electrical components
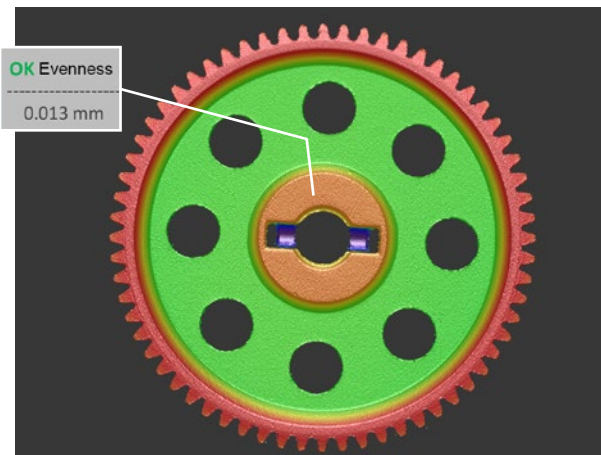
Flatness measurement of the flange of a gear wheel
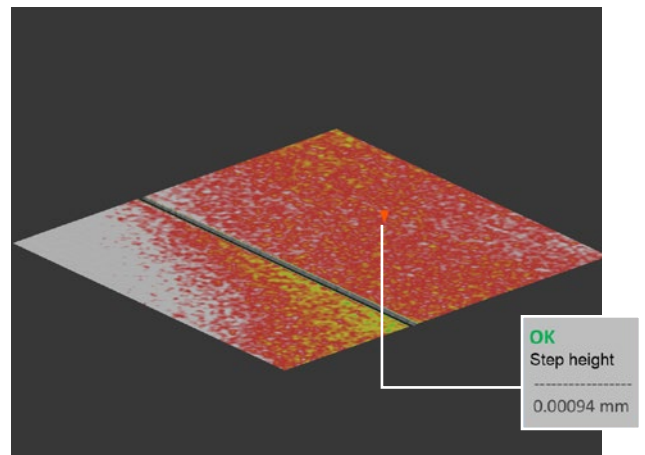
Reliable and high-precision measurement of a 1 μm high step
Depiction of a height difference.

3D performance for industrial applications
surfaceCONTROL 3D 32x0

High repeatability up to 0.6 μm

Automated inline 3D measurement for geometry, shape and surface inspections

Recording time from 0.3 s

Fully integrated industrial sensor (IP67) with passive cooling

Real 3D data via latest 3D GigE Vision standard

Easy integration in all common 3D image processing packets

Ideal for industrial 3D applications

The surfaceCONTROL 32x0 3D sensors are ideally suited to automated inline inspection of geometry, shapes and surfaces on diffuse reflecting surfaces. The 3D snapshot sensors are characterized by their compact design and high measurement accuracy combined with high-speed data processing. With a z-axis repeatability of up to 0.6 μm, the sensor sets new standards in high precision 3D metrology. This enables reliable detection of even the smallest deviations in flatness and height. Three measuring ranges cover different fields of application.
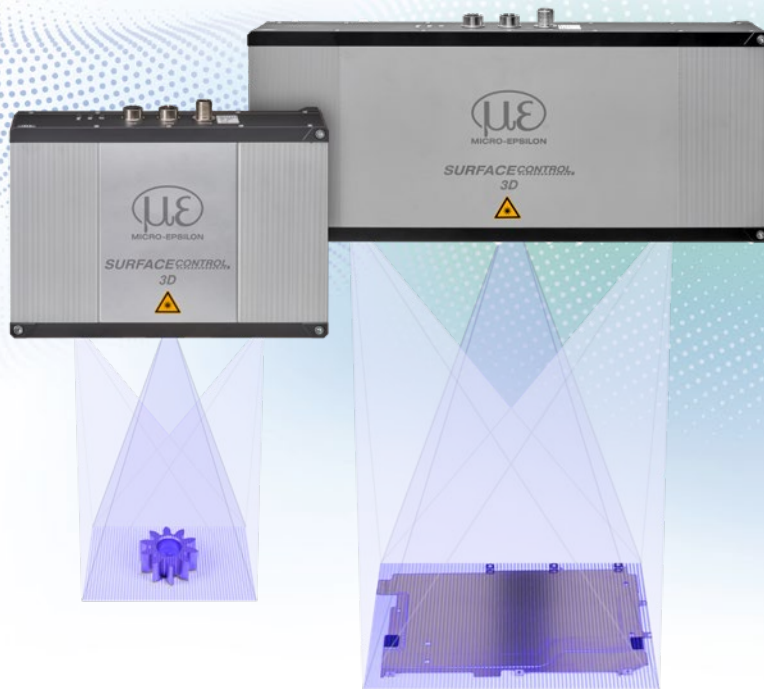
New: larger measuring range with high repeatability

With a measuring range of up to 230 x 180 mm, the surfaceCONTROL 32x0-240 captures structures and details on larger targets with high precision. The high z-axis resolution of 5 μm in combination with the larger measurement area enables maximum precision for a wide range of applications, e.g., for testing bipolar plates.

Article designation

SC	32	00	-80

Measuring range
80 mm
120 mm
240 mm

Class
00 = Standard
10 = Functional extension

Series
32x0

3DInspect functional extension

The surfaceCONTROL 32x0 series is available with the 3DInspect functional extension. For connection to an automation interface, the 3DInspect Automation function extension is enabled with use of the SC3210 sensors, which also includes comprehensive data logging.
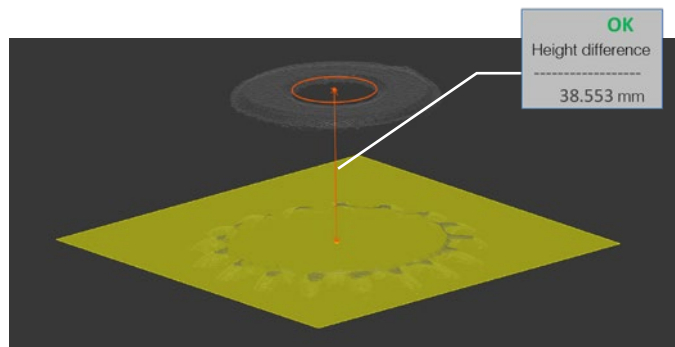
Height difference measurement of the bore in a gear wheel

Model		SC3200-80	SC3210-80	SC3200-120	SC3210-120	SC3200-240	SC3210-240
Measurement area Length (x) * width (y) at distance (z)	Start of expanded area	50 x 44 at 110 mm		78 x 62 at 171 mm		135 x 115 at 340 mm	
	Start	65 x 47 at 120 mm		100 x 70 at 191 mm		180 x 130 at 380 mm	
	Mid	75 x 50 at 130 mm		115 x 75 at 206 mm		235 x 150 at 440 mm	
	End	74 x 53 at 140 mm		115 x 79 at 221 mm		235 x 170 at 500 mm	
	End of expanded area	70 x 56 at 150 mm		113 x 85 at 241 mm		230 x 180 at 540 mm	
Working distance	z	130 ±10 mm		206 ±15 mm		440 ±60 mm	
	extended Z	130 ±20 mm		206 ±35 mm		440 ±100 mm	
Resolution	x, y	55 … 70 μm		80 … 100 μm		160 ... 210 μm	
	z[1]	1.5 μm		3.0 μm		5 μm	
Repeatability	z(σ) [1]	< 0.6 μm		< 1.2 μm		< 1.8 μm	
Acquisition time [2] [3]		0.3 … 0.7 s					
Light source		LED					
Supply voltage		24 VDC ±20 %					
Max. current consumption		0.5 … 1.5 A					
Digital interfaces		Gigabit Ethernet (GigE Vision / GenICam)/ PROFINET [4] / EtherCAT [4] / EtherNet/IP [4]					
Digital in-/outputs		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					
Installation		3 mounting holes (installation can be reproduced with centering sleeves)					
Temperature range	Storage	-20 °C … 70 °C					
	Operation [5]	0 °C … 45 °C					
Shock (DIN EN 60068-2-27)		15 g / 6 ms in XY axis, 1000 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, passive cooling; external cooling optionally available (see accessories)					
Weight		1.9 kg				2.3 kg	
Control and display elements		3 LEDs (for device status, power, data transmission)					
Sensor SDK		Micro-Epsilon 3D sensor SDK					
3D evaluation software		Micro-Epsilon 3DInspect					
Functional extension		-	3DInspect Automation	-	3DInspect Automation	-	3DInspect Automation

MR = Measuring range

[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 consistent room temperature of (20 ± 1 °C).

[2] Duration that the sensor requires for the image acquisition of the pattern projections (without processing and evaluation time).

[3] Applies for exposure times < 6,800 μs

[4] Connection via 2D/3D gateway interface module

[5] 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 80 and 120 mm)

Highest 3D performance for industrial applications
surfaceCONTROL 3D 35x0

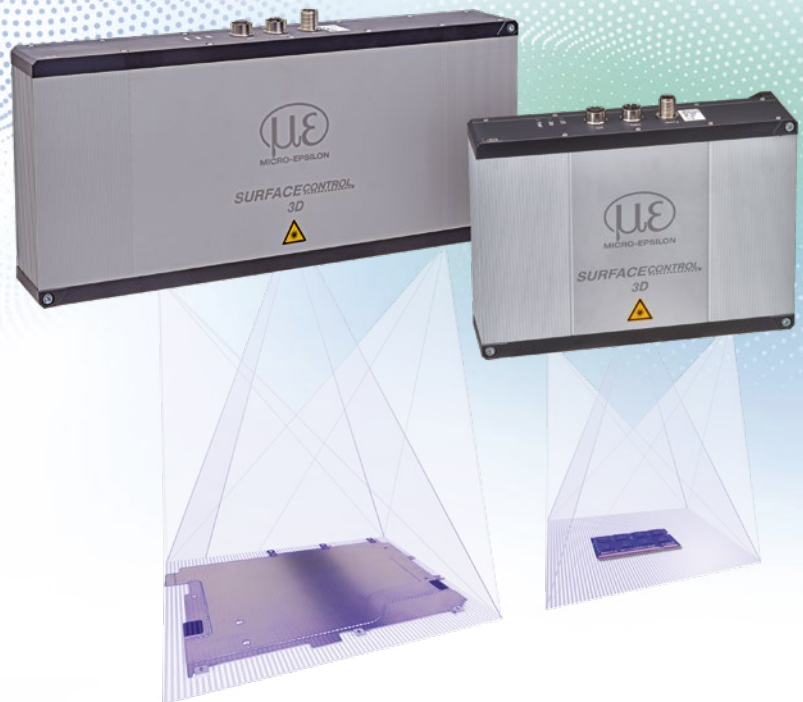- Highest z-axis repeatability up to 0.4 μm

- Automated inline 3D measurement for geometry, shape and surface inspections

- Recording time from 0.2 s

- Fully integrated industrial sensor (IP67) with passive cooling

- Real 3D data via latest 3D GigE Vision standard

- Easy integration in all common 3D image processing packets

Ideal for high precision 3D measurements

The surfaceCONTROL 35x0 3D sensors are ideally suited to automated inline inspection of geometry, shapes and diffuse reflecting surfaces. The 3D snapshot sensors are characterized by their compact design and high measurement accuracy combined with high-speed data processing. With a z-axis repeatability of up to 0.4 μm, the sensor sets new standards in high precision 3D metrology. This enables reliable detection of even the smallest deviations in flatness and height. Three measuring ranges cover different fields of application.

Larger measuring range with highest repeatability

With a measuring range of up to 245 x 180 mm, the surfaceCONTROL 35x0-240 captures structures and details on larger targets with highest precision. The high z-axis resolution of 4 μm in combination with the larger measurement area enables maximum precision for a wide range of applications, e.g., for testing bipolar plates.

Available with the 3DInspect functional extension

The surfaceCONTROL 35x0 series is also available with the 3DInspect functional extension. For connection to an automation interface, the 3DInspect Automation function extension is enabled with use of the SC3210 sensors, which also includes comprehensive data logging.

Article designation

SC	35	00	-80

Measuring range
80 mm
120 mm
240 mm

Class
00 = Standard
10 = Functional extension

Series
35x0

Model	surfaceCONTROL	SC3500-80	SC3510-80	SC3500-120	SC3510-120	SC3500-240	SC3510-240
Measurement area Length (x) * width (y) at distance (z)	Start of expanded area	55 mm x 42 mm at 110 mm		87.5 mm x 62.5 mm at 171 mm		145 x 115 at 340 mm	
	Start	67.5 mm x 46 mm at 120 mm		107.5 mm x 70 mm at 191 mm		190 x 130 at 380 mm	
	Mid	80 mm x 50 mm at 130 mm		120 mm x 75 mm at 206 mm		240 x 150 at 440 mm	
	End	77.5 mm x 52 mm at 140 mm		123.5 mm x 80 mm at 221 mm		245 x 170 at 500 mm	
	End of expanded area	75 mm x 54 mm at 150 mm		122 mm x 82.5 mm at 241 mm		245 x 180 at 540 mm	
Working distance	z	130 ±10 mm		206 ±15 mm		440 ±60 mm	
	extended Z	130 ±20 mm		206 ±35 mm		440 ±100 mm	
Resolution	x, y	35 … 45 μm		50 … 70 μm		110 ... 140 μm	
	z [1]	1.0 μm		2.0 μm		4.0 μm	
Repeatability	z (σ) [1]	< 0.4 μm		< 0.8 μm		< 1.4 μm	
Acquisition time [2] [3]		0.2 … 0.4 s					
Light source		LED					
Supply voltage		24 VDC ±20 %					
Max. current consumption		0.5 ... 2.5 A					
Digital interfaces		Gigabit Ethernet (GigE Vision / GenICam) / PROFINET [4] / EtherCAT [4] / EtherNet/IP [4]					
Digital in-/outputs		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					
Installation		3 mounting holes (installation can be reproduced with centering sleeves)					
Temperature range	Storage	-20 … +70 °C					
	Operation [5]	0 … +45 °C					
Shock (DIN EN 60068-2-27)		15 g / 6 ms in XY axis, 1000 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, passive cooling; external cooling optionally available (see accessories)					
Weight		1.9 kg				2.3 kg	
Control and display elements		3 LEDs (for device status, power, data transmission)					
Sensor SDK		Micro-Epsilon 3D sensor SDK					
3D evaluation software		Micro-Epsilon 3DInspect					
Functional extension		-	3DInspect Automation	-	3DInspect Automation	-	3DInspect Automation

MR = Measuring range

[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 consistent room temperature of (20 ± 1 °C).

[2] Duration that the sensor requires for the image acquisition of the pattern projections (without processing and evaluation time).
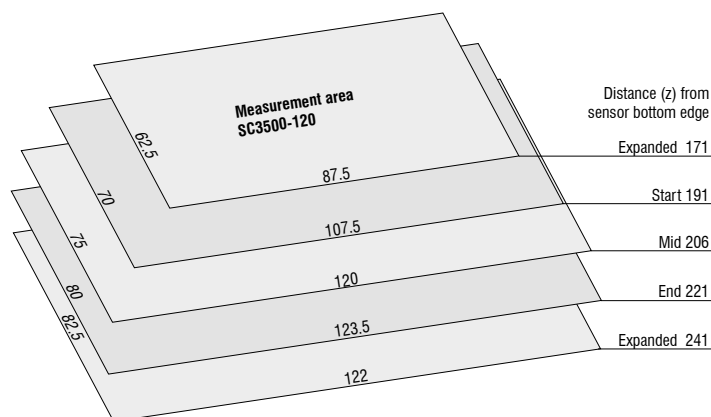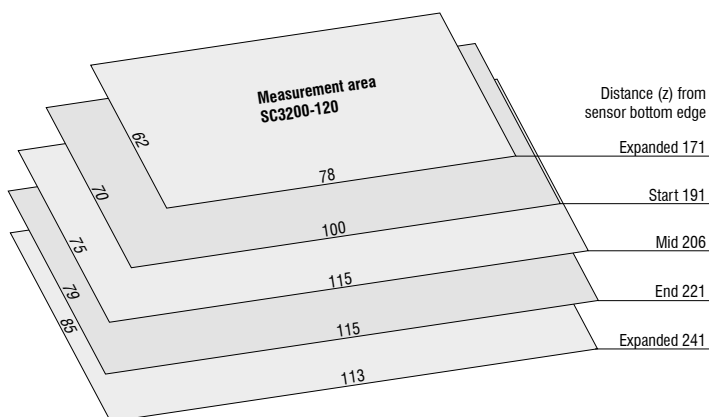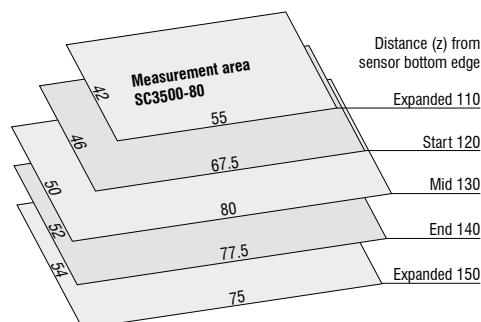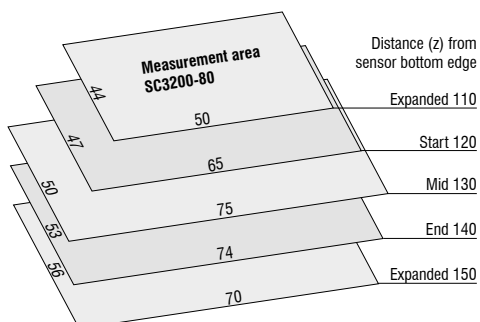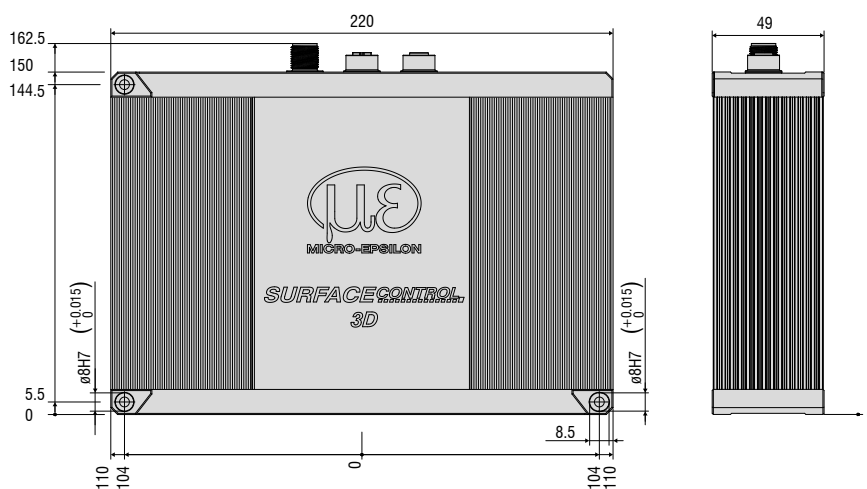
[3] Applies for exposure times < 6,800 μs
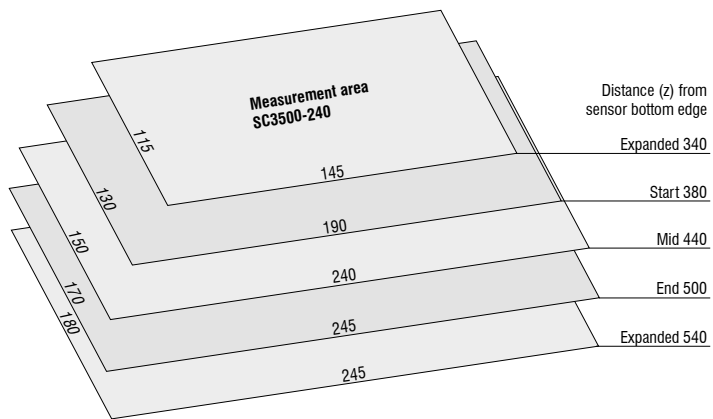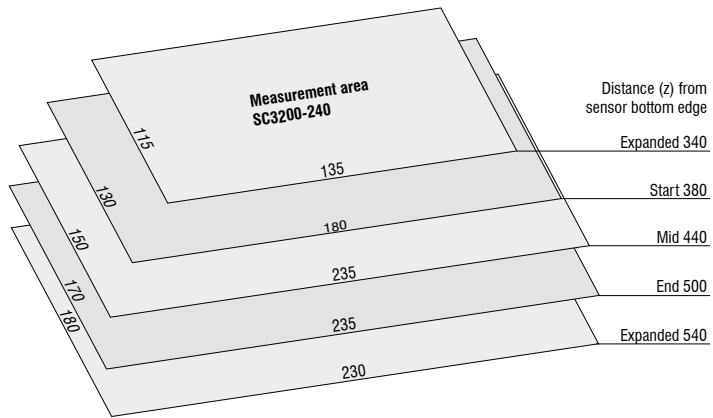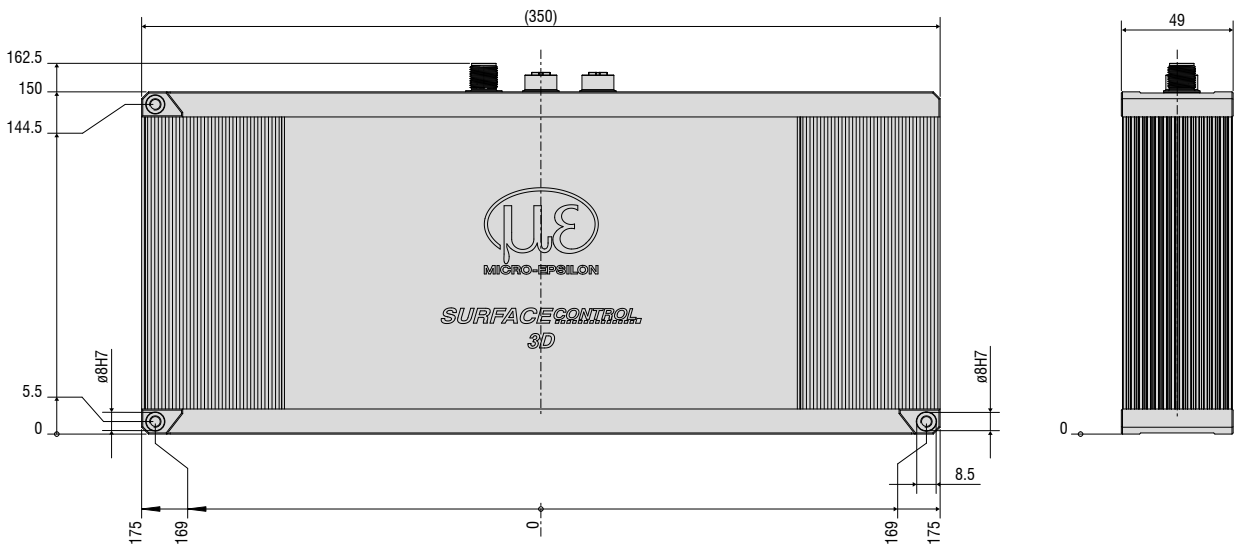
[4] Connection via 2D/3D Gateway

[5] 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 80 and 120 mm)

Dimensions and measurement areas
surfaceCONTROL 3D

Measurement area SC3200-80

Distance (z) from sensor bottom edge	
44 / 50	Expanded 110
47 / 65	Start 120
50 / 75	Mid 130
53 / 74	End 140
56 / 70	Expanded 150

Measurement area SC3500-80

Distance (z) from sensor bottom edge	
42 / 55	Expanded 110
46 / 67.5	Start 120
50 / 80	Mid 130
52 / 77.5	End 140
54 / 75	Expanded 150

Measurement area SC3200-120

Distance (z) from sensor bottom edge	
62 / 78	Expanded 171
70 / 100	Start 191
75 / 115	Mid 206
79 / 115	End 221
85 / 113	Expanded 241

Measurement area SC3500-120

Distance (z) from sensor bottom edge	
62.5 / 87.5	Expanded 171
70 / 107.5	Start 191
75 / 120	Mid 206
80 / 123.5	End 221
82.5 / 122	Expanded 241

(350)

162.5
150
144.5
5.5
0

ø8H7

SURFACE CONTROL
3D
MICRO-EPSILON

ø8H7

8.5

175 169   0   169 175

49

0

Measurement area
SC3200-240

115
130
150
170
180

135
180
235
235
230

Distance (z) from
sensor bottom edge

Expanded 340
Start 380
Mid 440
End 500
Expanded 540

Measurement area
SC3500-240

115
130
150
170
180

145
190
240
245
245

Distance (z) from
sensor bottom edge

Expanded 340
Start 380
Mid 440
End 500
Expanded 540

Software for 3D measurement and inspection tasks
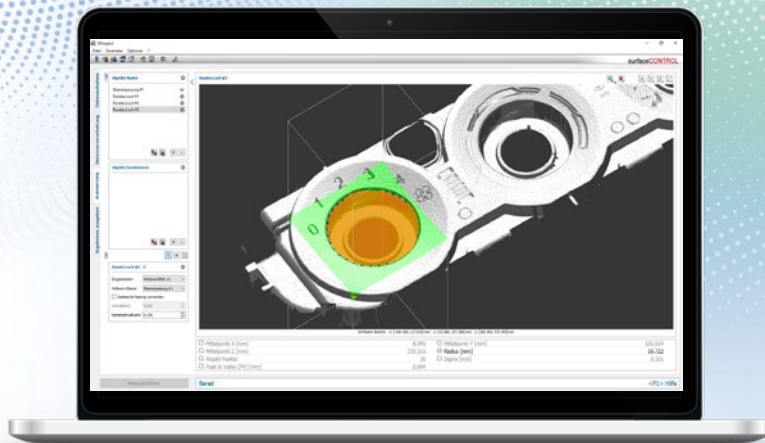# **3D**Inspect

Intuitive user interface

Real 3D evaluation, not just 2.5D

Automatic output of measured values for inline operation

Object extraction in 3D

Direct feedback with algorithms

Compatible with all 3D sensors
from Micro-Epsilon

The 3DInspect software is a powerful tool for sensor parameter set up and industrial measurement tasks. This software transmits the measurement data from the sensor via Ethernet and provides the data in three-dimensional form. This 3D data is further processed, evaluated and assessed with 3DInspect measuring programs on the PC and, if necessary, logged and transmitted via Ethernet to a control unit. Furthermore, the software enables the storage of 3D data.

Valid3D technology from Micro-Epsilon vs. conventional 2.5D systems
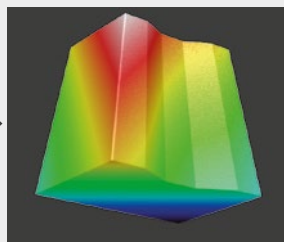
Valid3D:
Real 3D
without
data loss

The unique Valid3D technology enables lossless display and processing of the point clouds. This is how scanned 3D objects can be moved arbitrarily in the coordinate system.
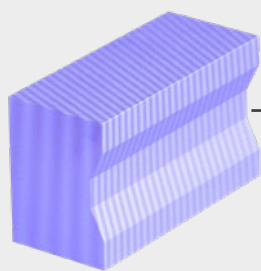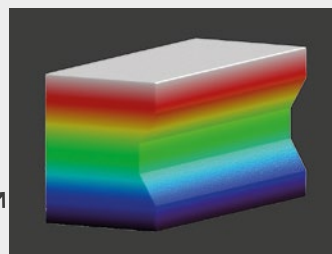
Point cloud after turn

3DInspect with Valid3D
- Real 3D image of test object without data loss
- Analysis and evaluation of complete test object

Measuring object

Point cloud

Common 3D software
- Algorithms based on 2.5D
- Only one z-coordinate per x/y coordinate possible
- Data loss during data processing

Data preprocessing

In data preprocessing, the point cloud can be adjusted before evaluation. This enables, for example, the correction of a changing component position, so that the point cloud for the evaluation is always in the same position.
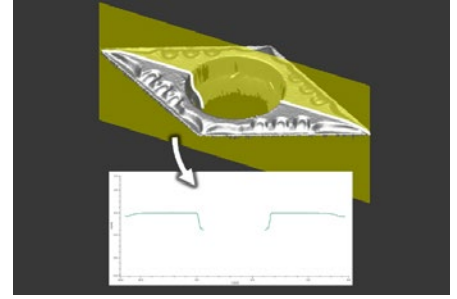
In addition, it is possible to refine the point cloud before evaluation, to apply filters to highlight features, to cut away irrelevant points or to set sections.
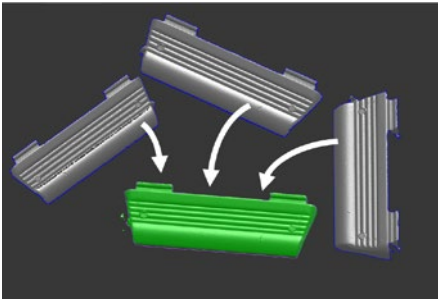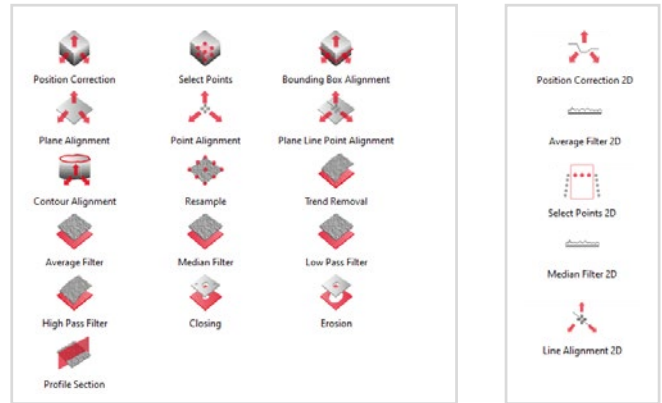
Automatic alignment of the point cloud
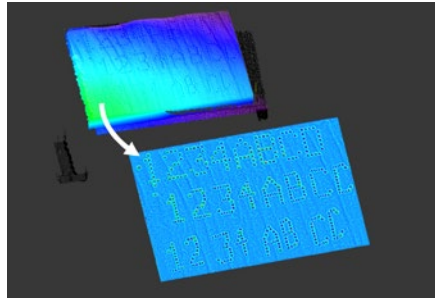

Processing of data

Setting cuts

Data evaluation

For data analysis, numerous programs are available to locate and measure characteristics. These can be edges, spheres or holes, for example. Both the evaluation of the 3D data, and a measurement or evaluation directly in previously generated sections is possible.

The 2D and 3D objects can also be set in relation to each other using combinations, for example to determine distances between a sphere and a plane or the angle between two edges.
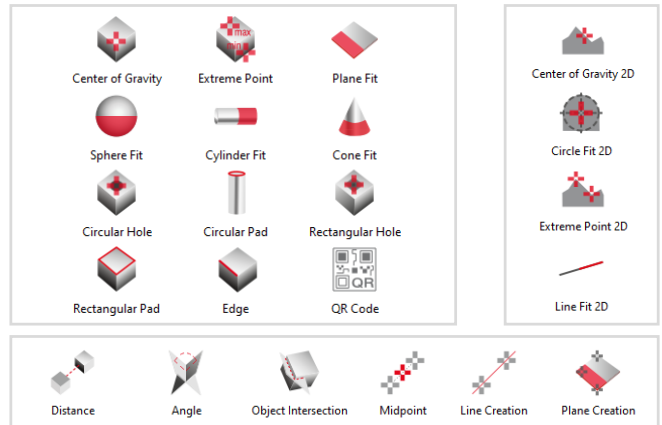
Accessories & Connection cables

Accessories for continuous cooling

A ventilation unit is available for continuous cooling of the surfaceCONTROL 3D 3500 and 3200 sensors. The ventilator is housed in an industrial-grade IP67 enclosure and is particularly quiet.

Industrial Ethernet:
Output of measurement values via integrated interfaces

The Industrial Performance Unit offers integrated interfaces for connection to the PROFINET, EtherCAT and Ethernet/IP industrial fieldbuses. Prepared device description files allow easy integration into the respective control environment. For reliable communication, the sequential control model developed by Micro-Epsilon is available for smooth commissioning. It is available as an implementation example for typical controllers.

- High-performance solution for 3D measurement tasks
- Full compatibility and inline capability for customer applications
- Intuitive 3DInspect software with Valid3D technology
- Efficient commissioning of Micro-Epsilon sensors
- Industrial-grade hardware with passive cooling
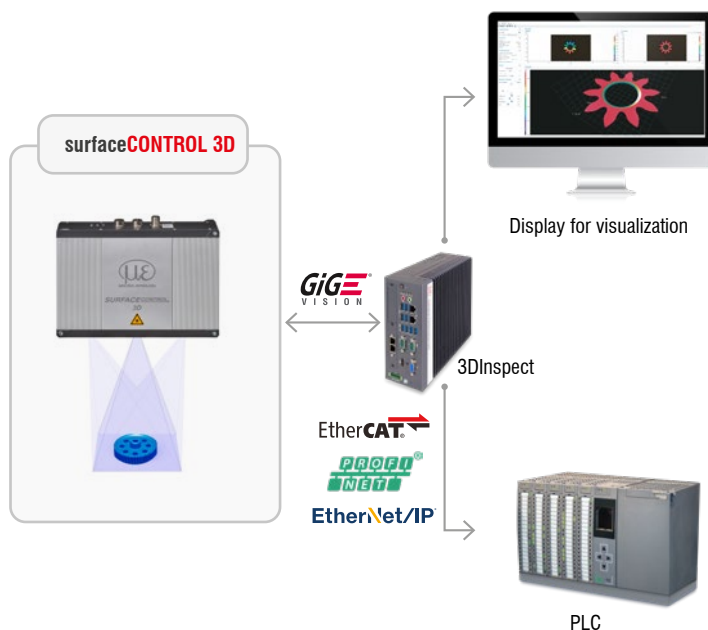
PROFINET / EtherCAT / EtherNet/IP for all sensors
with integrated evaluation

One 2D/3D Gateway is connectable with up to 4 sensors. Operation of more than one sensor requires a switch. The 2D/3D Gateway communicates with the surfaceCONTROL sensors via Ethernet Modbus. The resultant values are then converted to PROFINET, EtherCAT or EtherNet/IP. The customer carries out the parameter setup with a detailed instruction manual. The gateway can also be preparameterized in advance at the factory.

Models

| 6414142 | 2D/3D Gateway | Fieldbus coupler, configurable for PROFINET, EtherNet/IP and EtherCAT |
| 6414142.001 | 2D/3D Gateway, pre-parameterized, | Pre-parameterized to customer log and IP addresses |

Supply cable ECR3000-x
Power supply cable suitable for drag chains and robots
Cable length: 2 / 5 / 10 / 15 / 20 / 25 / 35 m

PCR3000-x Multi-function cable
Cable for power supply, digital inputs;
suitable for drag chains and robots
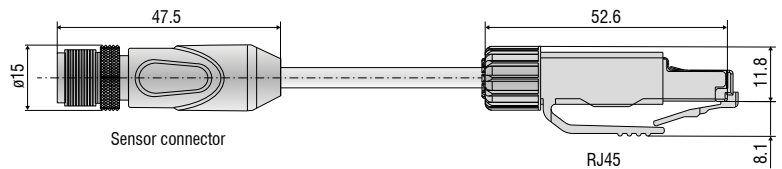(TTL or HTL), RS422 (half-duplex)
Cable length: 2 / 5 / 10 / 15 / 20 / 25 / 35 m

47.5
ø15
12 braids
Sensor connector

Ethernet connection cable SCR3000X-x
Cable for parameter setting, value and profile transmission;
suitable for drag chains and robots
Cable length: 2 / 5 / 10 / 15 / 20 / 25 / 35 m

47.5
ø15
52.6
11.8
8.1
Sensor connector
RJ45

Other accessories

| Art. no.	Model	Description
2420103	PS3000	Table power pack
2105079	Air cooling for surfaceCONTROL 3D	Cooling accessories for temperatures up to 45 °C
2961007	Tripod surfaceCONTROL 3D	Tripod for mounting and adjusting 3D sensors
2961008	Articulated arm for surfaceCONTROL	Articulated arm for mounting and adjusting 3D sensors
2961011	Articulated arm for surfaceCONTROL 240	Articulated arm for mounting and aligning the 240 series sensors
3007579	Adapter plate for surfaceCONTROL 3D	Mounting bracket
3008681	Adapter plate for surfaceCONTROL 240	Mounting bracket for measurement area 240 mm

Innovative 3D Technologies from Micro-Epsilon
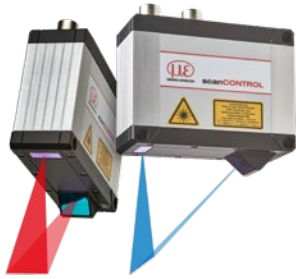
scanCONTROL

- Precise laser line scanners for 3D point clouds
- Red laser & patented Blue Laser Technology
- Up to 2048 points per profile
- Measuring rates up to 10,000 kHz
- Numerous measuring ranges
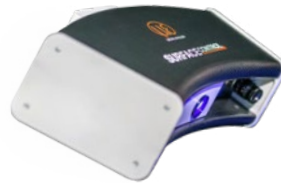
surfaceCONTROL 2500

- Inspection of matt surfaces with high accuracy
- Large measuring fields up to 575 x 435 x 300 mm^3
- Detection of different surface form defects
- Objective evaluation of the deviations
- Continuous process monitoring
- Optical error marking with back projection

reflectCONTROL Sensor

- Measurement of shiny, flat components
- Fast, full-surface inspection
- High-precision measurements, flatness deviation in the submicron range
- Large measuring field

MICRO-EPSILON

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