



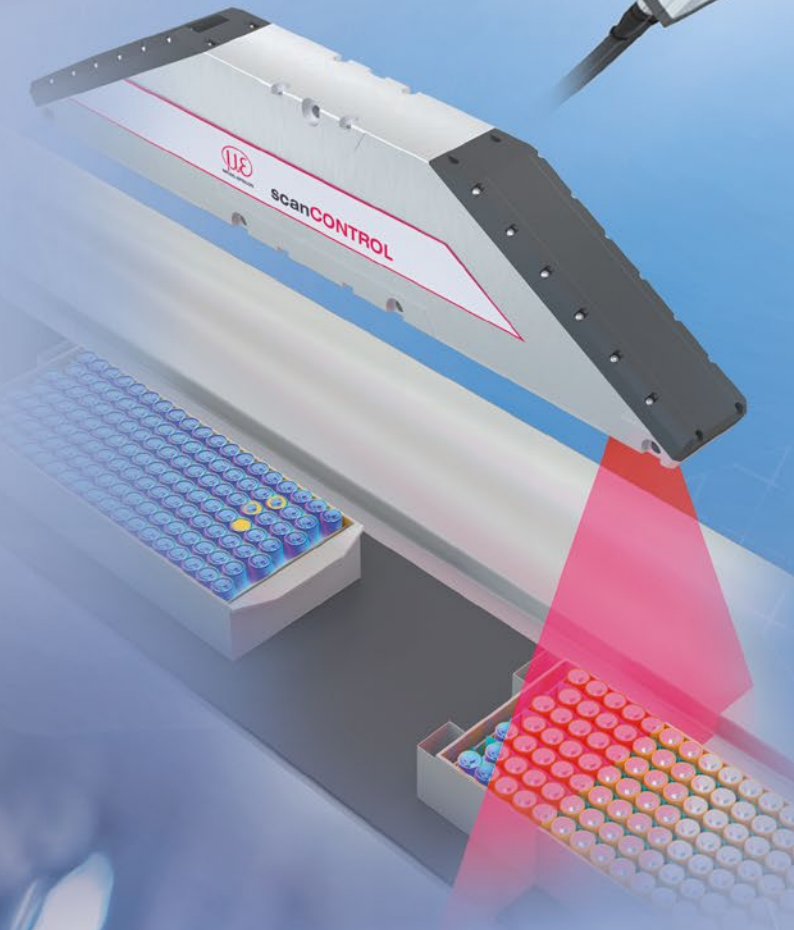
# More Precision

**scanCONTROL** // 2D/3D Laser profile sensors



New products  
**scanCONTROL**

```
...use_y = False  
...mod.use_z = False  
...rotation = "MIRROR_Y":  
...mod.use_x = False  
...mod.use_y = True  
...mod.use_z = False  
...rotation = "MIRROR_Z":  
...mod.use_x = False  
...mod.use_y = False  
...mod.use_z = True  
  
...selection at the end -add back the Base  
...ob.select= 1  
...ob.select=1  
...context.scene.objects.active = modifier ob  
...selected" + str(modifier ob) + modifier  
...ob.select = 0  
...context.selected_objects[0]  
...objects[one.name].select  
...print("please select...")
```



**NEW** scanCONTROL 30xx  
Large measuring range  
with 430 and 600 mm

**NEW** 3D Profile Unit  
Profile calculation of up to  
8 laser scanners

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# Advantages and special features

## scanCONTROL

Compact size and integrated evaluation without external controller or IPC

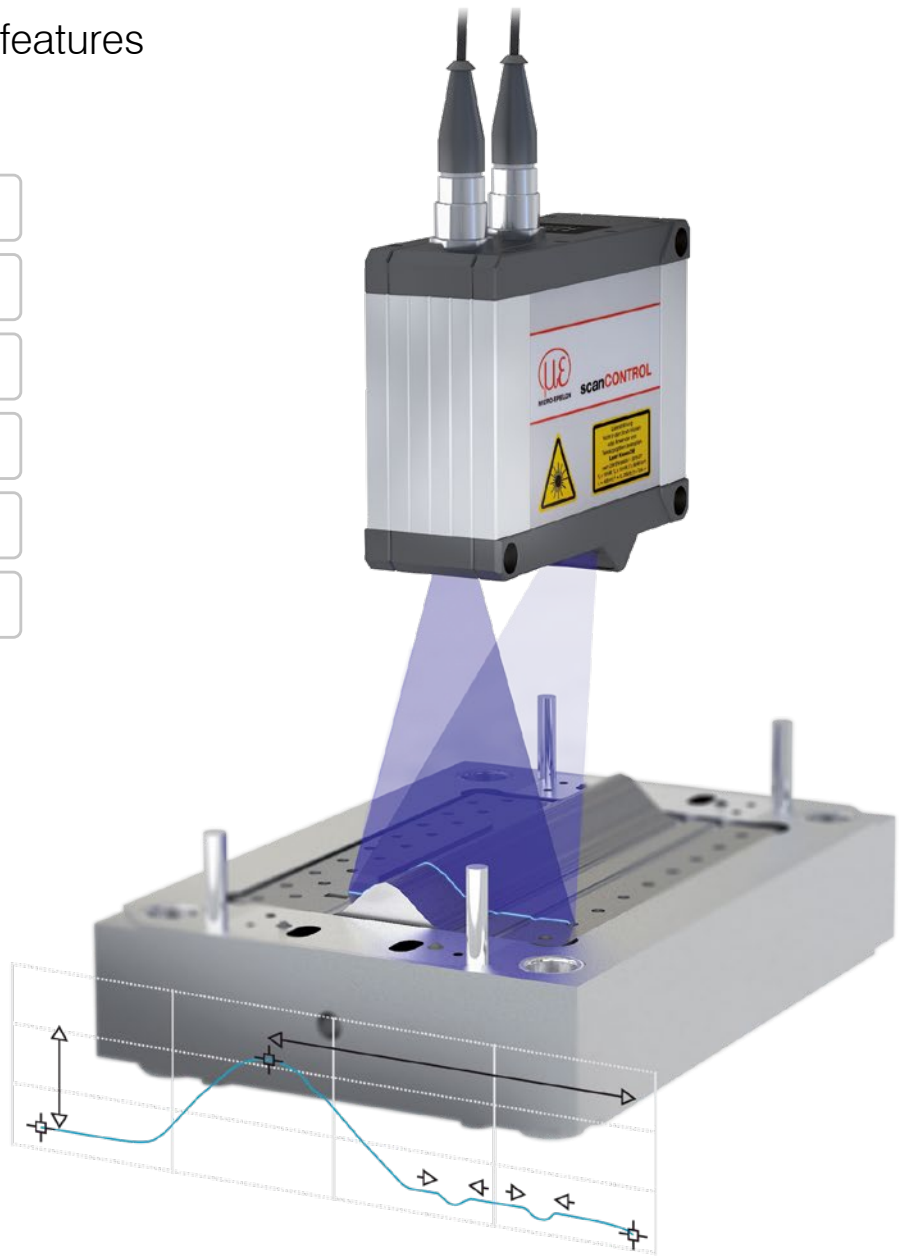
High profile resolution for the detection of finest details

High profile rate for dynamic measurement tasks

Made / Developed in Germany

Numerous references worldwide

Proven high operational safety in the 24/7 operation over many years



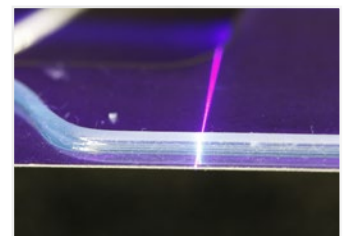
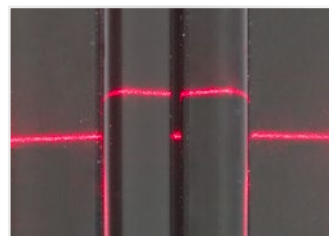
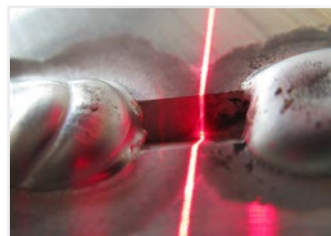
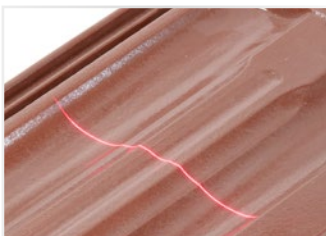
## Compact. Powerful. Integrable.

Laser profile scanners from Micro-Epsilon are among the highest performing profile sensors with respect to accuracy and measuring rate. Equipped with powerful processors and highly sensitive optical components, these scanners ensure precise profile measurements on almost any type of surface.

While they can be integrated in various environments, the scanners also impress with their compact design which includes an integrated controller.

## Universal Application

- Comprehensive scanner portfolio for transmission of profiles or measured values in industrial measurement tasks
- 2D inline measurement of different parameters (gap, step, radius, circle)
- 3D data and images for image processing
- Also suitable for robots & multi-sensor applications





## Integrated Controller for Direct Processing

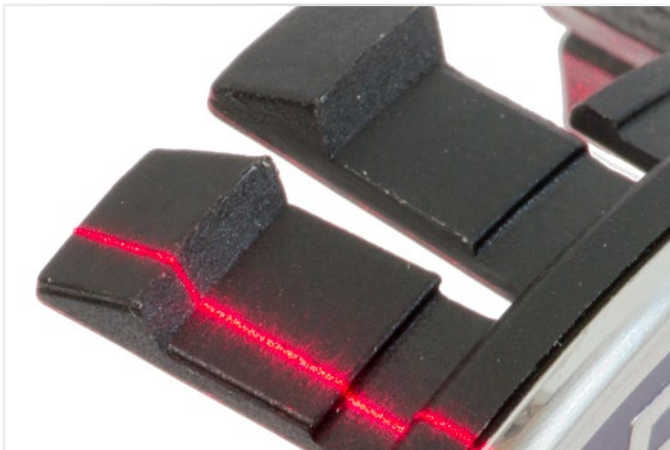
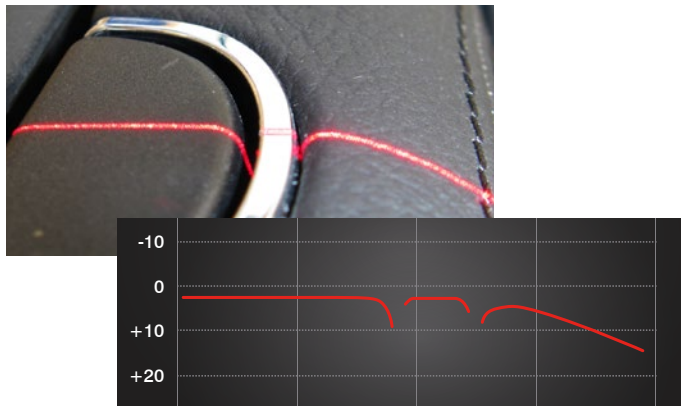
scanCONTROL laser scanners have an integrated controller and therefore do not require any external control unit. This considerably simplifies wiring and their integration into restricted spaces or on a robot. The available interfaces allow the scanners to be integrated in industrial environments. For multi-scanner applications, interface modules are available.



## Real Time Surface Compensation

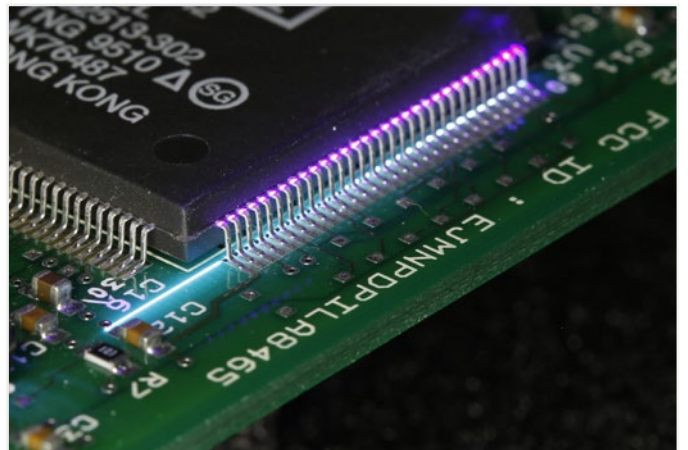
### Dynamic adaption to rapidly changing surfaces

Laser profile scanners use diffusely reflected laser light of which the intensity is highly dependent on the color and how shiny and reflective the respective component is. In order to be able to measure reliably under rapidly changing conditions, scanCONTROL sensors offer the Real-Time-Surface-Compensation feature. Due to this smart feature, the exposure time and the threshold of reflection detection are adapted in real time in order to generate stable measurement results. Moreover, the scanCONTROL 3000 series comes with an HDR function which ensures accurate detection of inhomogeneous surfaces.



## Red and Blue Laser

Laser scanners from Micro-Epsilon are available with red and blue laser. For common measurement tasks, scanCONTROL laser scanners with red laser line are used. With objects into which the laser light penetrates, such as transparent or organic surfaces, blue laser scanners are recommended. Blue Laser scanners are also ideal for red-hot glowing metals.



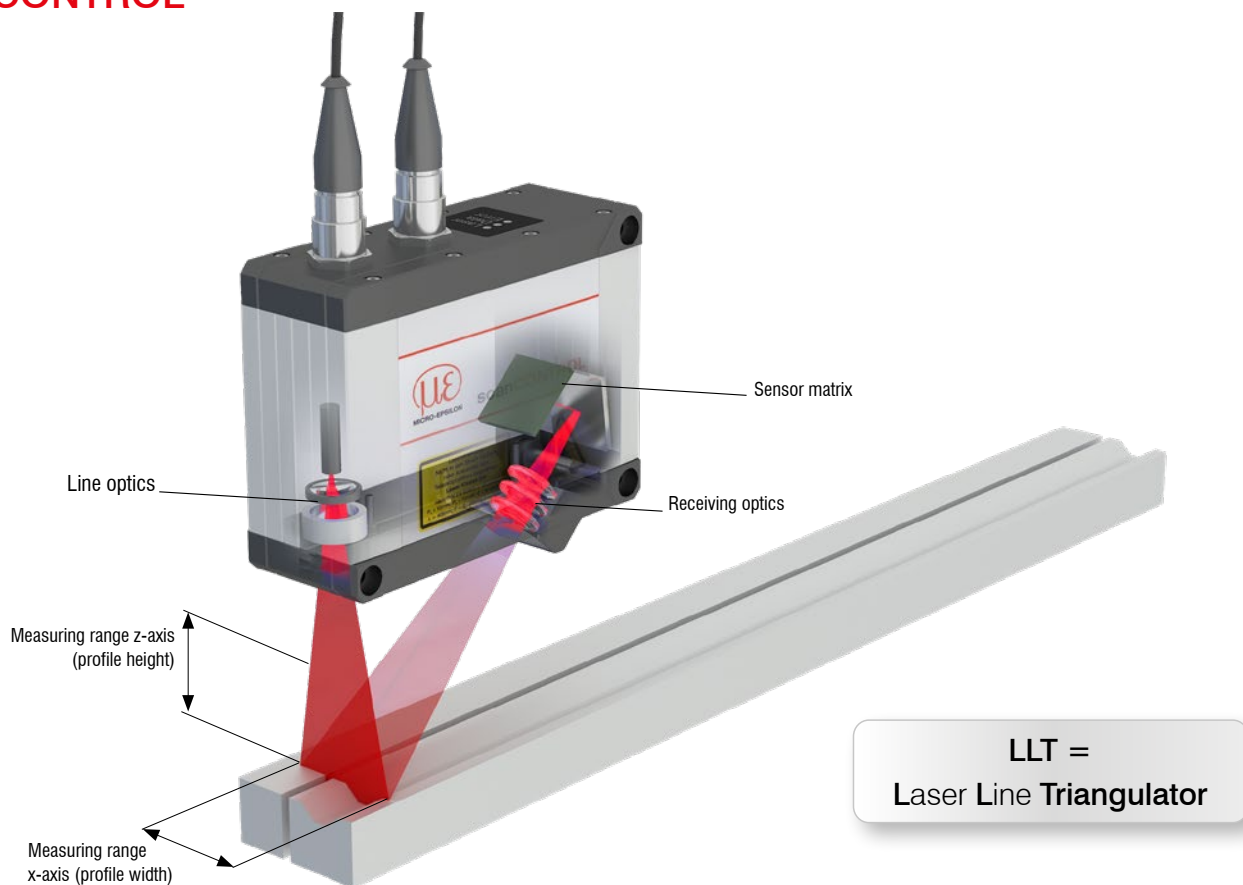
## Patent Protection

### for red-hot glowing and transparent objects

The internationally patented measurement methods for Blue Laser Technology allow precise measurements to be made on transparent or red-hot glowing objects above 700 °C.

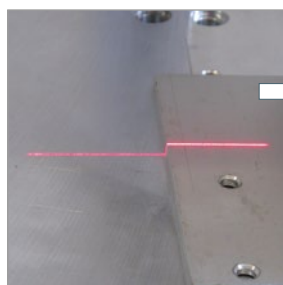
Transparent objects include plastics, glass, adhesives, silicones, paints, coatings, Plexiglas and seals. Any questions about Blue Laser scanners? We will be pleased to advise you.

# Measuring principle scanCONTROL

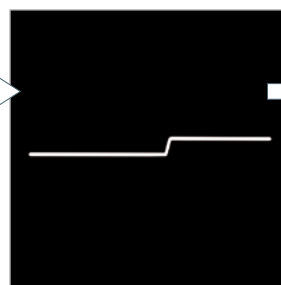


## The principle of laser line triangulation

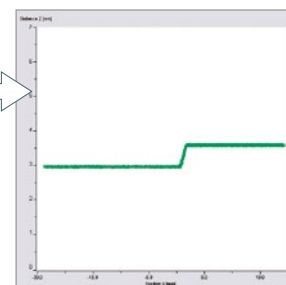
Laser scanners – often referred to as profile sensors – use the laser triangulation principle for two-dimensional profile detection on different target surfaces. By using special lenses, a laser beam is enlarged to form a static laser line and is projected onto the target surface. The receiving optics projects the diffusely reflected light of this laser line onto a highly sensitive sensor matrix. In addition to distance information (z-axis), the controller also uses this camera image to calculate the position along the laser line (x-axis). These measured values are subsequently output in a two-dimensional coordinate system that is fixed with respect to the sensor. In the case of moving objects or a traversing sensor, it is therefore possible to obtain 3D measurement values.



**Laser line**  
Projecting a laser line onto the target surface



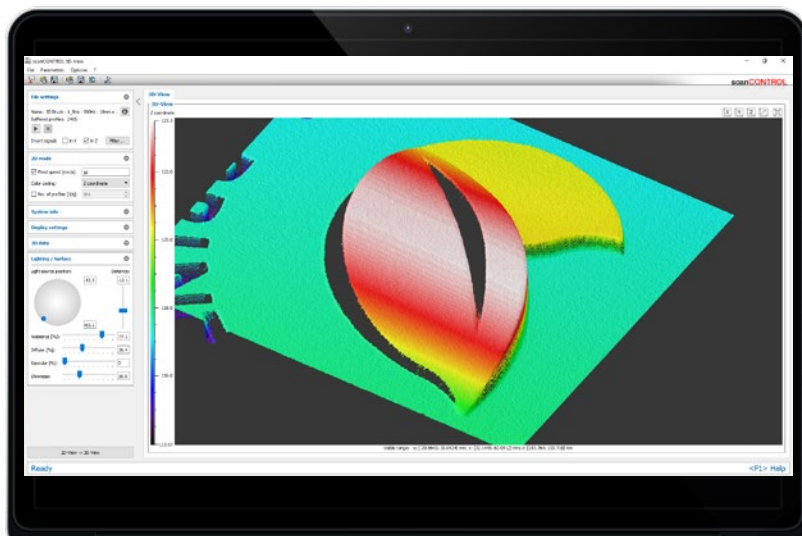
**Sensor matrix (pixels)**  
Diffuse reflected light of the laser line is registered by a high quality sensor array



**Calibrated x/z measuring points**  
Calculation of the distance coordinate z and the actual position x along the laser line for each measuring point

# Software features

## scanCONTROL



### Powerful SDKs

- Libraries for C, C++, C# and VB
- LabVIEW driver
- Linux implementation
- Cognex VisionPro

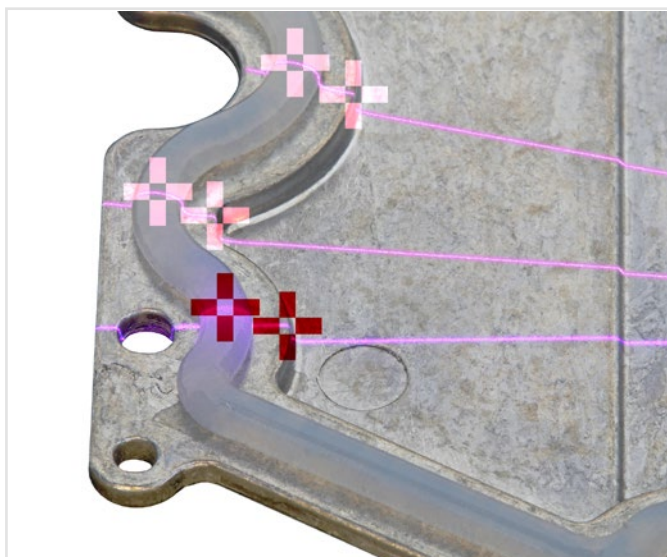
### Powerful Software

The scanCONTROL Configuration Tools software offers numerous measuring programs with a total of 94 evaluation variants. This is how all important profile measurement tasks can be set up and combined.

- User-friendly parameter software for all scanCONTROL SMART models
- Analysis and evaluation directly in the sensor

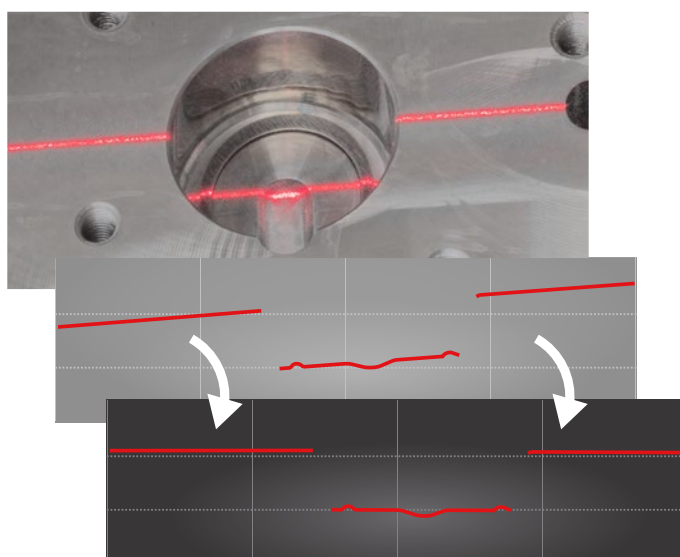
The 3DInspect software is a powerful tool for sensor parameter set up and industrial measurement tasks.

- Compatible with all 3D sensors from Micro-Epsilon
- Intuitive user interface
- Real 3D evaluation
- Object extraction in 3D



### Intelligent Tracking


scanCONTROL SMART sensors can be used to track complex structures and to guide robots. Therefore, anchor points are set in the Configuration Tools software which are used to track and measure the profiles.



### Profile Correction

With obliquely detected profiles, the Configuration Tools software corrects the inclination and therefore simplifies the sensor alignment.

All products at a glance  
**scanCONTROL**

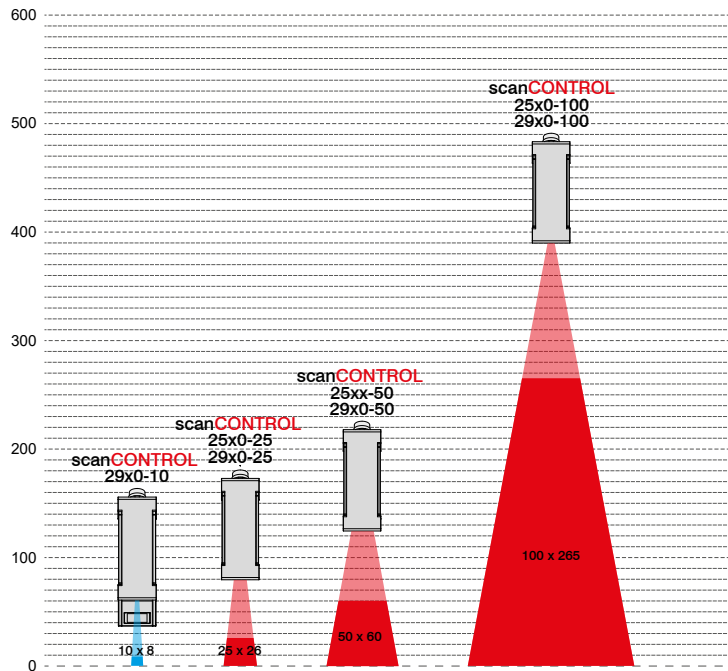
|   | PROFILE  | SMART   |
|---|--|---|
|   | <p><b>Evaluation by customer</b></p> <p>The PROFILE models provide <b>calibrated profile data</b> that can be further processed on a PC with software evaluation provided by the customer.</p> | <p><b>Integrated evaluation</b></p> <p>The SMART models provide selected <b>measurement values</b>. The parameter setup for the sensors and the measurement programs are stored in the internal controller.</p> |
|  <p><b>LLT25x0</b><br/>           640 points/profile<br/>           Profile frequency up to 2000 Hz<br/>           Red laser / blue laser</p>  | <p><b>scanCONTROL 2500</b></p>   | <p><b>scanCONTROL 2510</b></p>  |
|  <p><b>LLT29x0</b><br/>           1280 points/profile<br/>           Profile frequency<br/>           Standard up to 300 Hz<br/>           High speed up to 2000 Hz<br/>           Red laser / blue laser</p> | <p><b>scanCONTROL 2900</b></p>   | <p><b>scanCONTROL 2910</b></p>  |
|  <p><b>LLT30x2</b><br/>           1024 points/profile<br/>           Profile frequency up to 10000 Hz<br/>           Red laser / blue laser</p>  | <p><b>scanCONTROL 3002</b></p>   | <p><b>scanCONTROL 3012</b></p>  |
|  <p><b>LLT30x0</b><br/>           2048 points/profile<br/>           Profile frequency up to 10000 Hz<br/>           Red laser / blue laser</p>  | <p><b>scanCONTROL 3000</b></p>   | <p><b>scanCONTROL 3010</b></p>  |
|   | <p>3D evaluation with 3DInspect or integration (SDK for C/ C++, LabView-VI, Cognex VisionPro and examples for C#, Linux and VB are available.)</p>   | <p>Evaluation:<br/> <b>scanCONTROL Configuration Tools</b></p>  |



# Measurement areas

## scanCONTROL

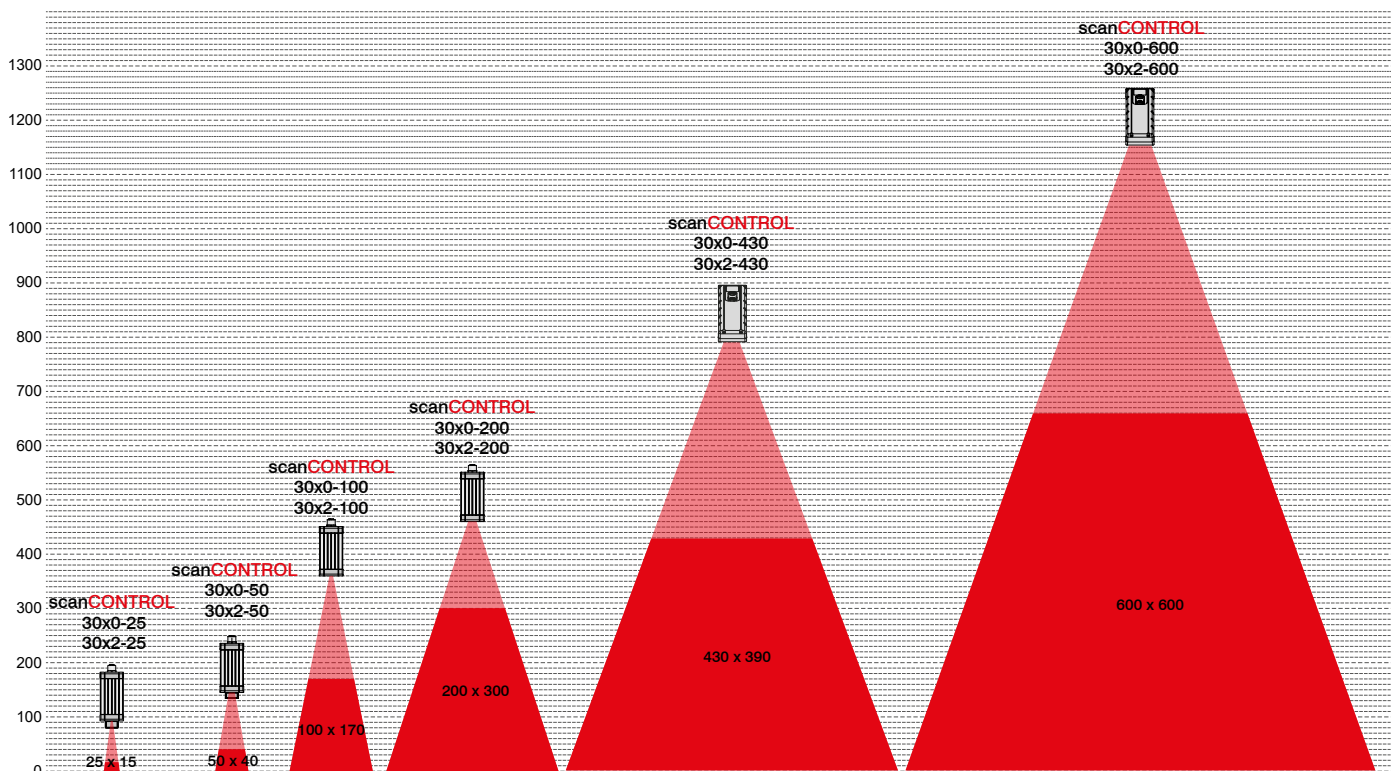
### scanCONTROL 2500 and 2900



scanCONTROL laser profile scanners feature a wide range of different measurement areas from 10 x 8 mm up to 600 x 600 mm. Regardless of the size of the measurement area, these laser scanners impress with fast measurements and high precision at the same time.

The variety of measurement areas allows, on the one hand, both the acquisition of smallest details and structures, and, on the other hand, the measurement of large objects with a large offset distance. For this reason, scanCONTROL sensors are used for numerous measurement tasks in various industries.

### scanCONTROL 3002 and 3000

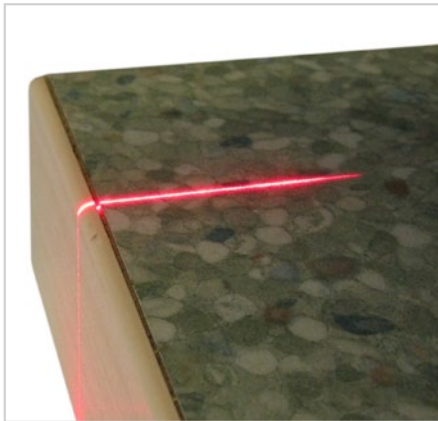


# Application examples

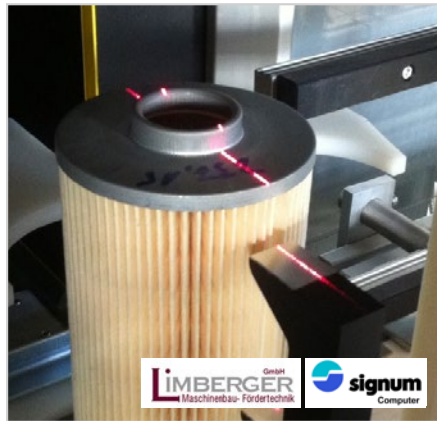
## scanCONTROL

### scanCONTROL

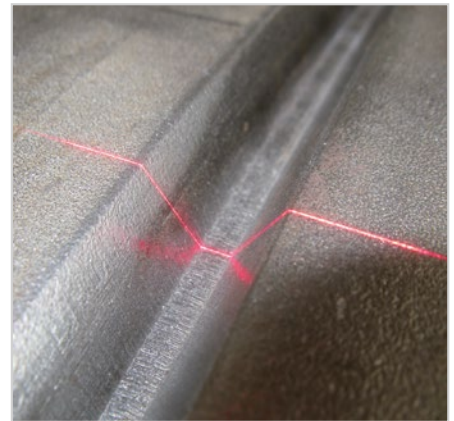
Red laser scanners are ideally suited to numerous measurement tasks. A higher light intensity and better performance on weakly reflective or matt surfaces, especially with fast moving objects, make the red laser scanners ideal for common measurement tasks.



Defect recognition on worktops



Filter height measurement for the automotive industry



V-gap measurement on pipes



Gap measurement on car bodies



Profile measurement of the brake disc



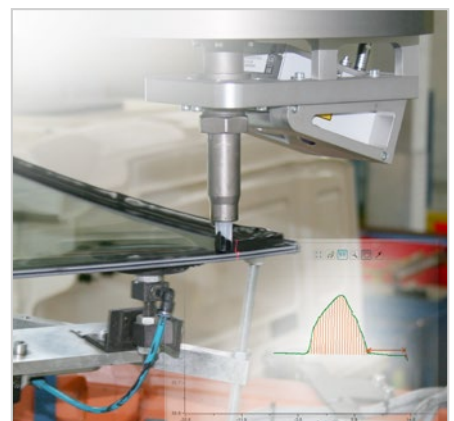
Text recognition on the cast part



Tire control



Distance measurement at the center console

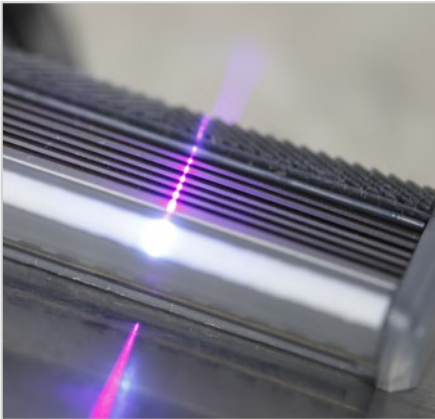


Inspection of the adhesive beading

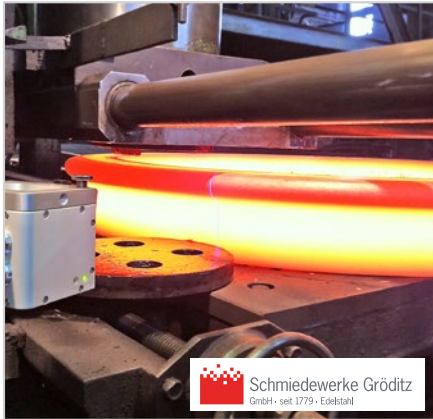


## scanCONTROL BL

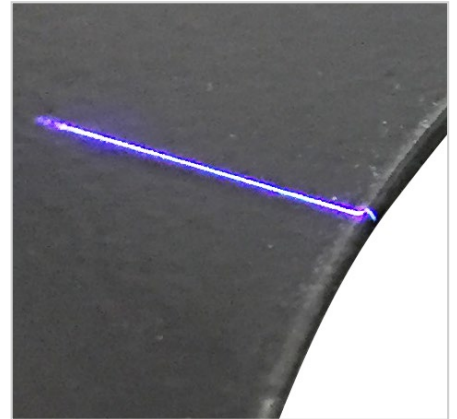
For profile measurements on red-hot glowing metals as well as transparent and organic surfaces, laser scanners with blue laser line are recommended. While allowing higher stability, the blue laser light does not penetrate the measuring object due to the shorter wavelength of the blue-violet laser. Compared to red lasers, blue laser sensors ensure higher reliability with measurements on red-hot glowing, organic and (semi-)transparent objects.



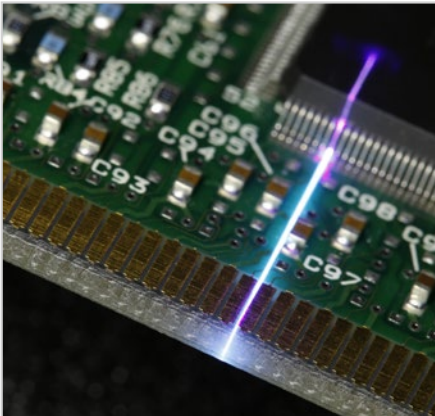
Razor blade angle



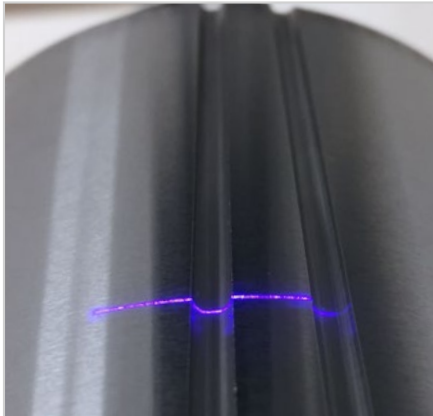
Production of steel-forged rings



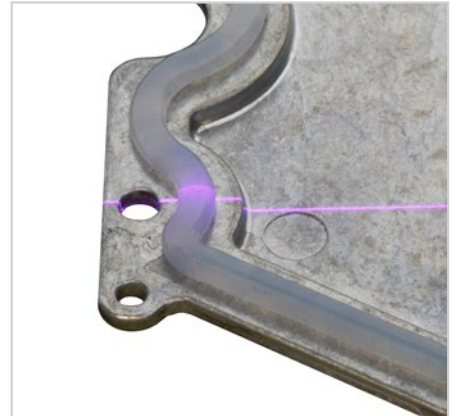
Burr measurement on punched sheets



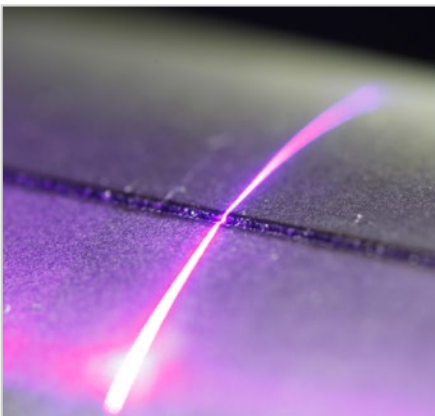
Position of electronic components



Notch position in silicon ingots



Inspection of silicone beads



Completeness of laser welding seams



Thermal tests

### Blue Laser patent protection with red-hot glowing and transparent surfaces

Measurements involving blue laser scanners on red-hot glowing objects exceeding 700 °C and (semi-)transparent objects are protected by patent law. Transparent objects include plastics, glass, adhesives, silicones, paints, coatings, Plexiglas and seals. Any questions about Blue Laser scanners? We will be pleased to advise you.

# Laser scanner for industrial series applications

## scanCONTROL 25x0

Ideal for industrial series applications in production line & automation

Resolution (x-axis) 640 points

High signal stability

Also available with patented Blue Laser Technology

Numerous references worldwide

Compatible with **COGNEX® VisionPro**



### Ideal for series applications

scanCONTROL 25x0 laser scanners are designed for industrial measurement tasks. Thanks to their high signal stability, versatility and excellent price-performance ratio, the scanners are particularly suitable for measurement tasks involving large quantities. They measure and evaluate, e.g., angles, steps, gaps, distances and extreme values. Due to their compact design and low weight, these scanners are also suitable for applications with high accelerations, such as on robots.

### Available as PROFILE and SMART versions

The scanCONTROL 25x0 series is available as PROFILE and SMART versions. The PROFILE scanners provide calibrated profile data that can be further processed on a PC with software evaluation provided by the customer. SMART scanners operate autonomously and provide selected measurement values. The sensor parameters and the desired measuring programs are set in the scanCONTROL Configuration Tools software and directly stored in the internal controller.

### Ideal for production and machine monitoring

The scanCONTROL 25x0 laser scanners are available with three measuring ranges with red or blue laser. Optional accessories, cable types and interface modules allow a wide range of applications in the production line and in machine building.

### Article designation

|                         |    |    |     |     |
|-------------------------|----|----|-----|-----|
| LLT                     | 25 | 00 | -25 | /PT |
| Options - see below     |    |    |     |     |
| <b>Measuring ranges</b> |    |    |     |     |
| 25 mm                   |    |    |     |     |
| 50 mm                   |    |    |     |     |
| 100 mm                  |    |    |     |     |
| <b>Class</b>            |    |    |     |     |
| 00=PROFILE              |    |    |     |     |
| 10=SMART                |    |    |     |     |
| <b>Series</b>           |    |    |     |     |
| LLT25x0                 |    |    |     |     |

### Laser options\*

|  |     |   |
|--|-----|---|
|  | /SI | Hardware switch-off of the laser line   |
|  | /3B | Increased laser power (class 3B, ≤ 20 mW), e.g., for dark surfaces                      |
|  | /BL | Blue laser line (405 nm) for (semi-) transparent, red-hot glowing and organic materials |

### Cable outlet options\*

|  |     |  |
|--|-----|--|
|  | /PT | Cable directly out of the sensor ("Pigtail")<br>Length 0.3 m |
|--|-----|--|

\*Options can be combined

Accessories from page 42



| Model   |  | LLT 25xx-25  | LLT 25xx-50  | LLT 25xx-100         |          |
|---|--|--|--|----------------------|----------|
| Available laser type  |  | Red Laser Blue Laser   | Red Laser Blue Laser                                 | Red Laser Blue Laser |          |
| z-axis  | Measuring ranges                                     | Start of measuring range   | 53.5 mm  | 70 mm                | 190 mm   |
|   |  | Mid of measuring range   | 66 mm  | 95 mm                | 240 mm   |
|   |  | End of measuring range   | 78.5 mm  | 120 mm               | 290 mm   |
|   | Extended measuring range                             | Height of measuring range  | 25 mm  | 50 mm                | 100 mm   |
|   |  | Start of measuring range   | 53 mm  | 65 mm                | 125 mm   |
|   |  | End of measuring range   | 79 mm  | 125 mm               | 390 mm   |
| Line linearity <sup>1) 2)</sup>                             |  | 2 μm   | 4 μm   | 12 μm                |          |
|   |  | ±0.008 %   | ±0.008 %   | ±0.012 %             |          |
| x-axis  | Measuring range                                      | Start of measuring range   | 23.4 mm  | 42 mm                | 83.1 mm  |
|   |  | Mid of measuring range   | 25 mm  | 50 mm                | 100 mm   |
|   |  | End of measuring range   | 29.1 mm  | 58 mm                | 120.8 mm |
|   | Extended measuring range                             | Start of measuring range   | 23.2 mm  | 40 mm                | 58.5 mm  |
|   |  | End of measuring range   | 29.3 mm  | 60 mm                | 143.5 mm |
|   | Resolution   |  | 640 points/profile                                   |                      |          |
| Profile frequency   |  | up to 2,000 Hz   |  |                      |          |
| Interfaces  | Ethernet GigE Vision                                 | Output of measurement values<br>Sensor control<br>Profile data transmission  |  |                      |          |
|   | Digital inputs                                       | Mode switching<br>Encoder (counter)<br>Trigger   |  |                      |          |
|   | RS422 (half-duplex) <sup>3)</sup>                    | Output of measurement values<br>Sensor control<br>Trigger<br>Synchronization   |  |                      |          |
| Output of measurement values                                |  | Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)<br>analog <sup>4)</sup> ; switch signal <sup>4)</sup><br>PROFINET <sup>5)</sup> ; EtherCAT <sup>5)</sup> ; EtherNet/IP <sup>5)</sup> |  |                      |          |
| Control and display elements                                |  | 3x color LEDs for laser, data and error  |  |                      |          |
| Light source  | Red Laser  |  | ≤ 8 mW   |                      |          |
|   |  |  | Standard: laser class 2M, semiconductor laser 658 nm |                      |          |
|   | Blue Laser   |  | ≤ 20 mW  |                      |          |
|   |  |  | Option: laser class 3B, semiconductor laser 658 nm   |                      |          |
|   |  |  | ≤ 8 mW   |                      |          |
|   | Standard: laser class 2M, semiconductor laser 405 nm |  |  |                      |          |
|   | Laser switch-off                                     | via software, hardware switch-off with /SI option  |  |                      |          |
| Aperture angle of laser line                                |  | 20°  | 25°  | 25°                  |          |
| Permissible ambient light (fluorescent light) <sup>1)</sup> |  | 10,000 lx  |  |                      |          |
| Protection class (DIN EN 60529)                             |  | IP65 (when connected)  |  |                      |          |
| Vibration (DIN EN 60068-2-27)                               |  | 2 g / 20 ... 500 Hz  |  |                      |          |
| Shock (DIN EN 60068-2-6)                                    |  | 15 g / 6 ms  |  |                      |          |
| Temperature range   | Storage  | -20 ... +70 °C   |  |                      |          |
|   | Operation  | 0 ... +45 °C   |  |                      |          |
| Weight  |  | 380 g (without cable)  |  |                      |          |
| Supply voltage  |  | 11 ... 30 VDC, nominal value 24 V, 500 mA, IEEE 802.3af class 2, Power over Ethernet (PoE)   |  |                      |          |

<sup>1)</sup> Based on the measuring range; measuring object: Micro-Epsilon standard object

<sup>2)</sup> According to a one-time averaging over the measuring field (640 points)

<sup>3)</sup> RS422 interface, programmable either as serial interface or as input for triggering/synchronization

<sup>4)</sup> Only with 2D/3D Output Unit

<sup>5)</sup> Only with 2D/3D Gateway

# Compact laser scanner with high precision scanCONTROL 29x0

Ideal for precise 2D/3D measurements

Resolution (x-axis) 1,280 points

High accuracy for the detection of finest details

Profile frequency up to 2,000 Hz

Also available with patented Blue Laser Technology

Compatible with **COGNEX® VisionPro**



## Compact design for precise measurements

scanCONTROL 29x0 laser scanners are designed for industrial measurement tasks where compact design and high accuracy are required. Thanks to their high resolution, versatility and excellent price-performance ratio, the scanners are particularly suitable for static and dynamic applications, e.g., on robots. They measure and evaluate, e.g., angles, steps, gaps, distances and extreme values.

## Available as PROFILE and SMART versions

The scanCONTROL 29x0 series is available as PROFILE and SMART versions. The PROFILE scanners provide calibrated profile data that can be further processed on a PC with software evaluation provided by the customer. SMART scanners operate autonomously and provide selected measurement values. The sensor parameters and the desired measuring programs are set in the scanCONTROL Configuration Tools software and directly stored in the internal controller.


## Small measuring range with high resolution

With a laser line of just 10 mm, the scanCONTROL 29x0-10/BL models recognize the finest of details and structures. The high profile resolution combined with the blue laser line allow for maximum precision in versatile applications, e.g., monitoring in electronics production.


## Article designation

|                         |    |    |     |     |
|-------------------------|----|----|-----|-----|
| LLT                     | 29 | 00 | -25 | /SI |
| Options - see below     |    |    |     |     |
| <b>Measuring range</b>  |    |    |     |     |
| 10 mm (only Blue Laser) |    |    |     |     |
| 25 mm                   |    |    |     |     |
| 50 mm                   |    |    |     |     |
| 100 mm                  |    |    |     |     |
| <b>Class</b>            |    |    |     |     |
| 00=PROFILE              |    |    |     |     |
| 10=SMART                |    |    |     |     |
| 50=HIGHSPEED            |    |    |     |     |
| 60=HIGHSPEED SMART      |    |    |     |     |
| <b>Series</b>           |    |    |     |     |
| LLT29x0                 |    |    |     |     |

## Laser options\*

|   |     |   |
|---|-----|---|
|  | /SI | Hardware switch-off of the laser line   |
|   | /3B | Increased laser power (class 3B, ≤ 20 mW), e.g., for dark surfaces                      |
|   | /BL | Blue laser line (405 nm) for (semi-) transparent, red-hot glowing and organic materials |

## Cable outlet options\*

|   |     |  |
|---|-----|--|
|  | /PT | Cable directly out of the sensor ("Pigtail")<br>Length 0.3 m                                   |
|   | /VT | Cable directly out of the sensor ("Variable Tail")<br>Length 0.1 ... 1.0 m (freely selectable) |

\*Options can be combined

Accessories from page 42

| Model   |  | LLT29x0-10/BL  | LLT 29xx-25   | LLT 29xx-50          | LLT 29xx-100         |          |
|---|--|--|---|----------------------|----------------------|----------|
| Available laser type  |  | Blue Laser   | Red Laser Blue Laser  | Red Laser Blue Laser | Red Laser Blue Laser |          |
| z-axis  | Measuring range  | Start of measuring range   | 52.5 mm   | 53.5 mm              | 70 mm                | 190 mm   |
|   |  | Mid of measuring range   | 56.5 mm   | 66 mm                | 95 mm                | 240 mm   |
|   |  | End of measuring range   | 60.5 mm   | 78.5 mm              | 120 mm               | 290 mm   |
|   |  | Height of measuring range  | 8 mm  | 25 mm                | 50 mm                | 100 mm   |
|   | Extended measuring range   | Start of measuring range   | -   | 53 mm                | 65 mm                | 125 mm   |
|   |  | End of measuring range   | -   | 79 mm                | 125 mm               | 390 mm   |
| Line linearity <sup>1)2)</sup>                              |  | 1 μm   | 2 μm  | 4 μm                 | 12 μm                |          |
|   |  | ±0.0125 %  | ±0.008 %  | ±0.008 %             | ±0.012 %             |          |
| x-axis  | Measuring range  | Start of measuring range   | 9.4 mm  | 23.4 mm              | 42 mm                | 83.1 mm  |
|   |  | Mid of measuring range   | 10 mm   | 25 mm                | 50 mm                | 100 mm   |
|   |  | End of measuring range   | 10.7 mm   | 29.1 mm              | 58 mm                | 120.8 mm |
|   | Extended measuring range   | Start of measuring range   | -   | 23.2 mm              | 40 mm                | 58.5 mm  |
|   |  | End of measuring range   | -   | 29.3 mm              | 60 mm                | 143.5 mm |
|   | Resolution   |  | 1,280 points/profile  |                      |                      |          |
| Profile frequency   | Standard   | up to 300 Hz   |   |                      |                      |          |
|   | High speed   | up to 2000 Hz  |   |                      |                      |          |
| Interfaces  | Ethernet GigE Vision   | Output of measurement values<br>Sensor control<br>Profile data transmission                |   |                      |                      |          |
|   | Digital inputs   | Mode switching<br>Encoder (counter)<br>Trigger   |   |                      |                      |          |
|   | RS422 (half-duplex) <sup>3)</sup>  | Output of measurement values<br>Sensor control<br>Trigger<br>Synchronization               |   |                      |                      |          |
| Output of measurement values                                | Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)<br>analog <sup>4)</sup> ; switch signal <sup>4)</sup><br>PROFINET <sup>5)</sup> ; EtherCAT <sup>5)</sup> ; EtherNet/IP <sup>5)</sup> |  |   |                      |                      |          |
| Control and display elements                                | 3x color LEDs for laser, data and error  |  |   |                      |                      |          |
| Light source  |  | -  | ≤ 8 mW  |                      |                      |          |
|   | Red Laser  | -  | Standard: laser class 2M, semiconductor laser 658 nm  |                      |                      |          |
|   |  | -  | ≤ 20 mW   |                      |                      |          |
|   |  | -  | Option: laser class 3B, semiconductor laser 658 nm  |                      |                      |          |
|   | Blue Laser   |  | ≤ 8 mW  |                      |                      |          |
|   |  | Laser switch-off   | Standard: laser class 2M, semiconductor laser 405 nm<br>via software, hardware switch-off with /SI option |                      |                      |          |
| Aperture angle of laser line                                |  | 10°  | 20°   | 25°                  | 25°                  |          |
| Permissible ambient light (fluorescent light) <sup>1)</sup> |  | 10,000 lx  |   |                      |                      |          |
| Protection class (DIN EN 60529)                             |  | IP65 (when connected)  |   |                      |                      |          |
| Vibration (DIN EN 60068-2-27)                               |  | 2 g / 20 ... 500 Hz  |   |                      |                      |          |
| Shock (DIN EN 60068-2-6)                                    |  | 15 g / 6 ms  |   |                      |                      |          |
| Temperature range   | Storage  | -20 ... +70 °C   |   |                      |                      |          |
|   | Operation  | 0 ... +45 °C   |   |                      |                      |          |
| Weight  |  | 440 g (without cable)  | 380 g (without cable)   |                      |                      |          |
| Supply voltage  |  | 11 ... 30 VDC, nominal value 24 V, 500 mA, IEEE 802.3af class 2, Power over Ethernet (PoE) |   |                      |                      |          |

<sup>1)</sup> Based on the measuring range; measuring object: Micro-Epsilon standard object

<sup>2)</sup> According to a one-time averaging over the measuring field (640 points)

<sup>3)</sup> RS422 interface, programmable either as serial interface or as input for triggering/synchronization

<sup>4)</sup> Only with 2D/3D Output Unit

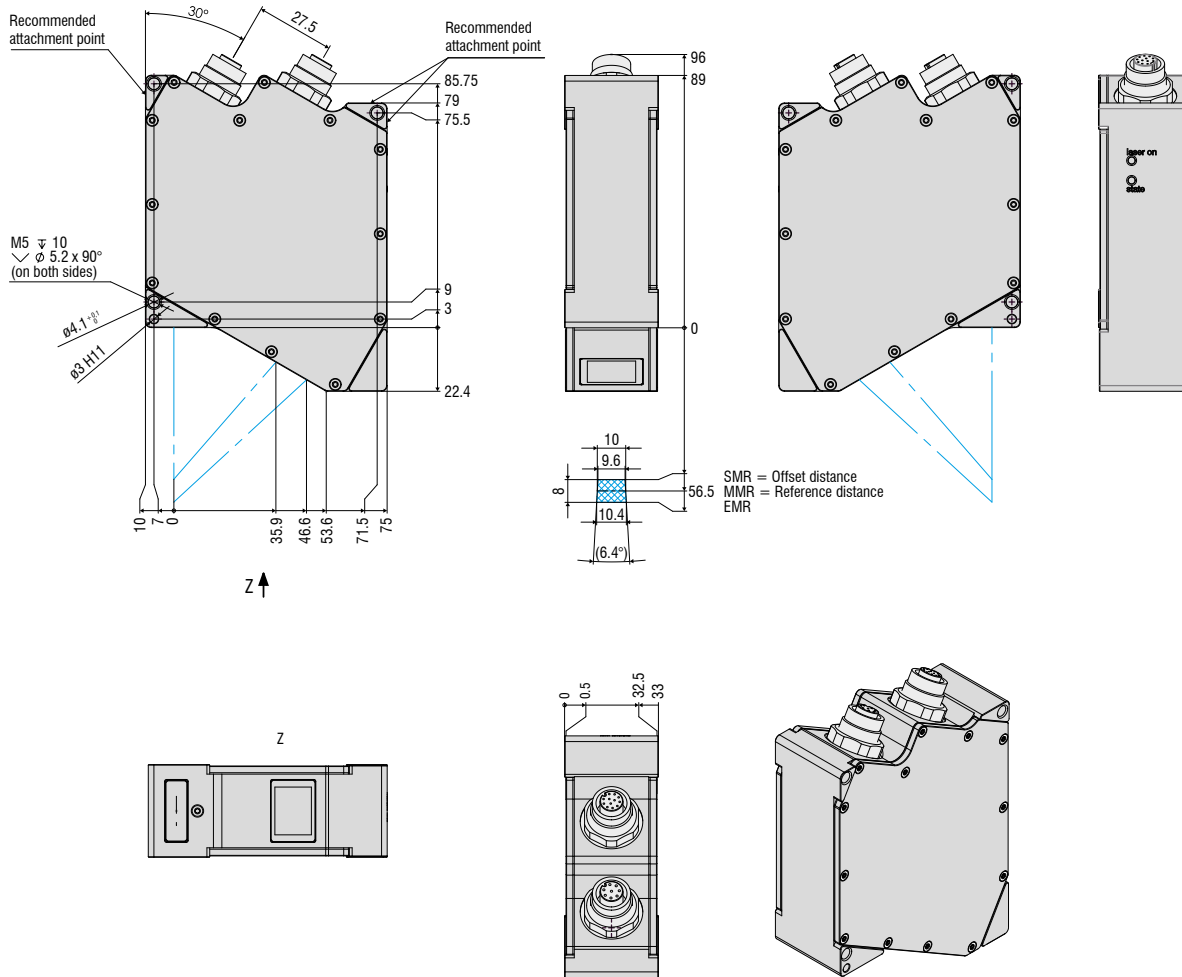
<sup>5)</sup> Only with 2D/3D Gateway

# Dimensions and measuring ranges

## scanCONTROL

LLT29x0-10/BL

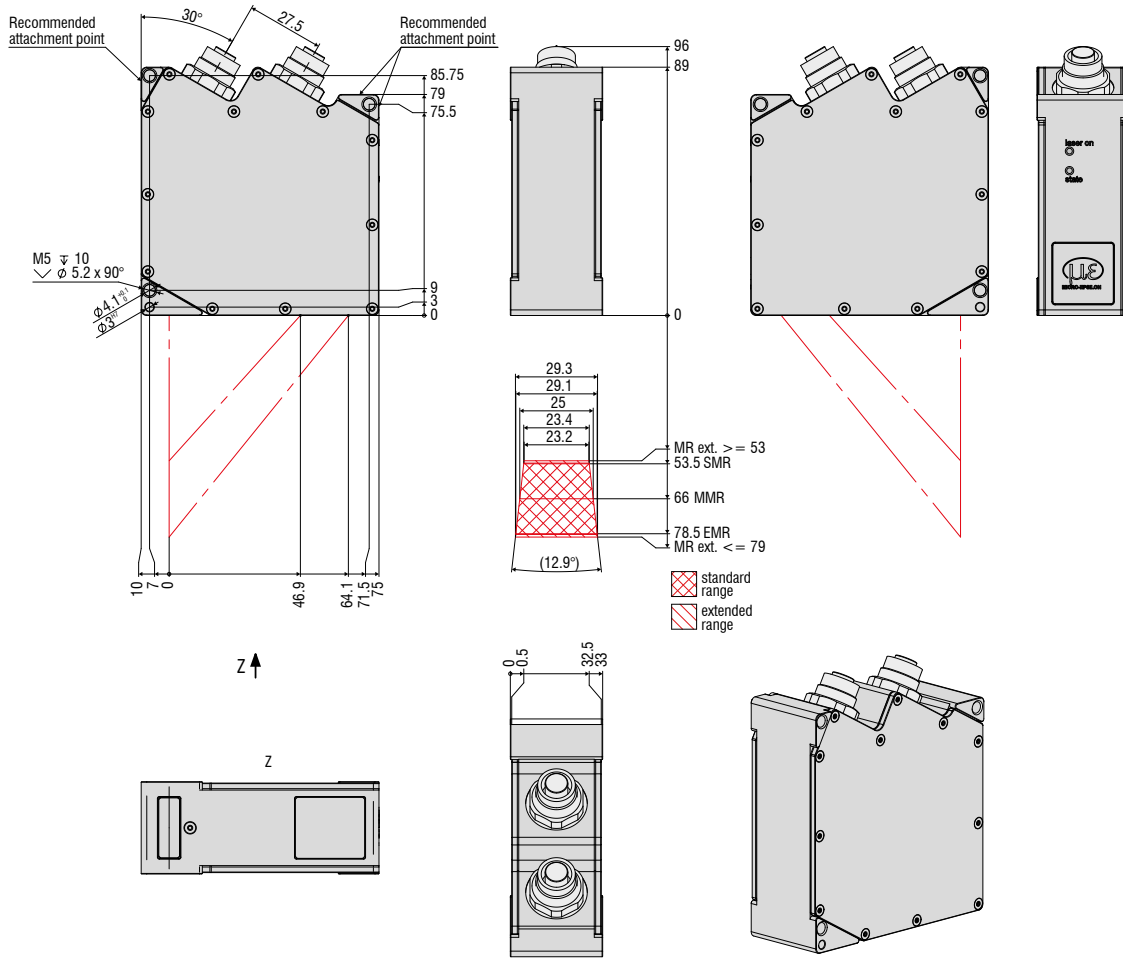
Blue Laser





# LLT25x0-25 / LLT29x0-25

Red Laser Blue Laser



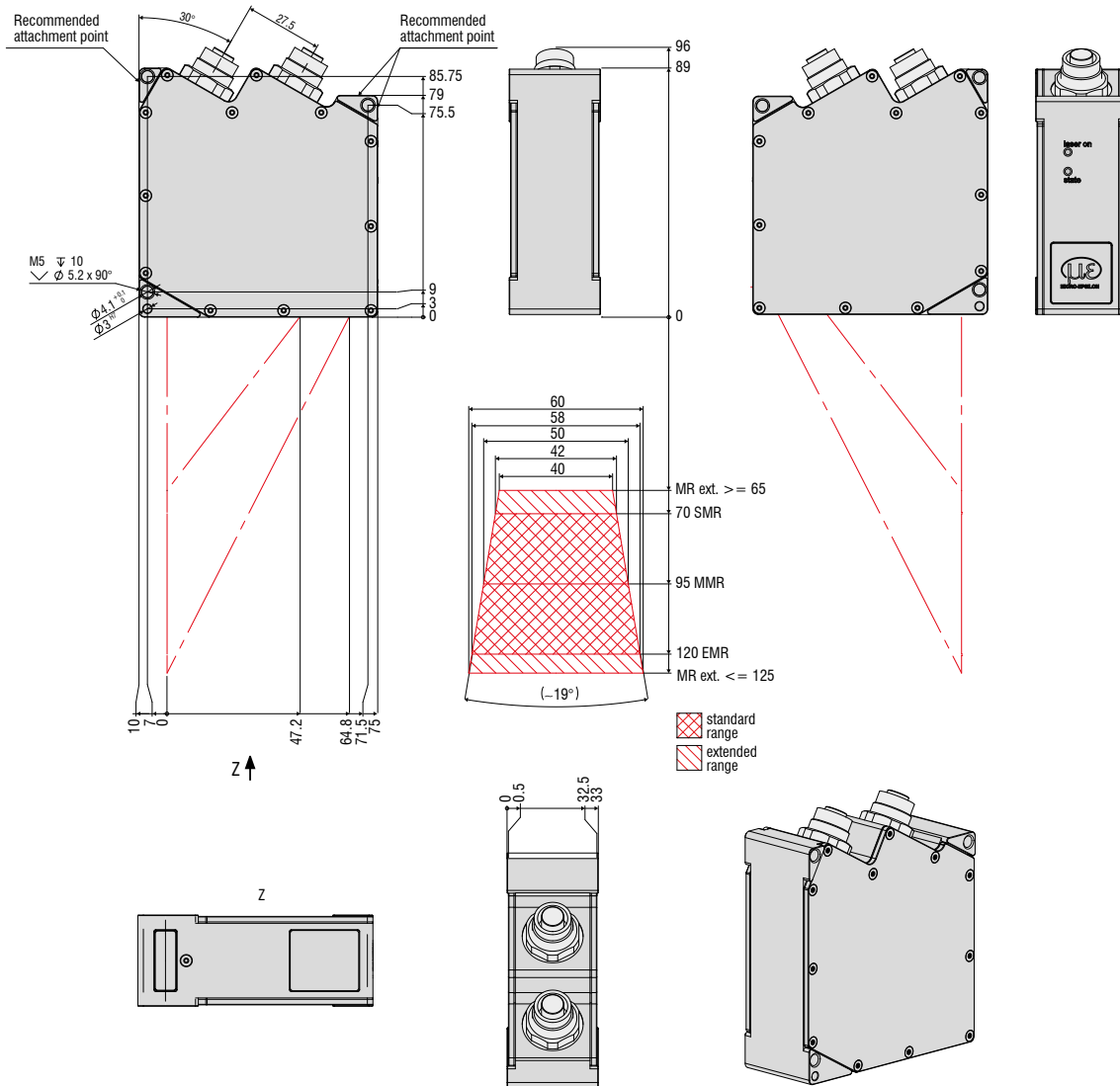
# Dimensions and measuring ranges

## scanCONTROL

LLT25x0-50 / LLT29x0-50

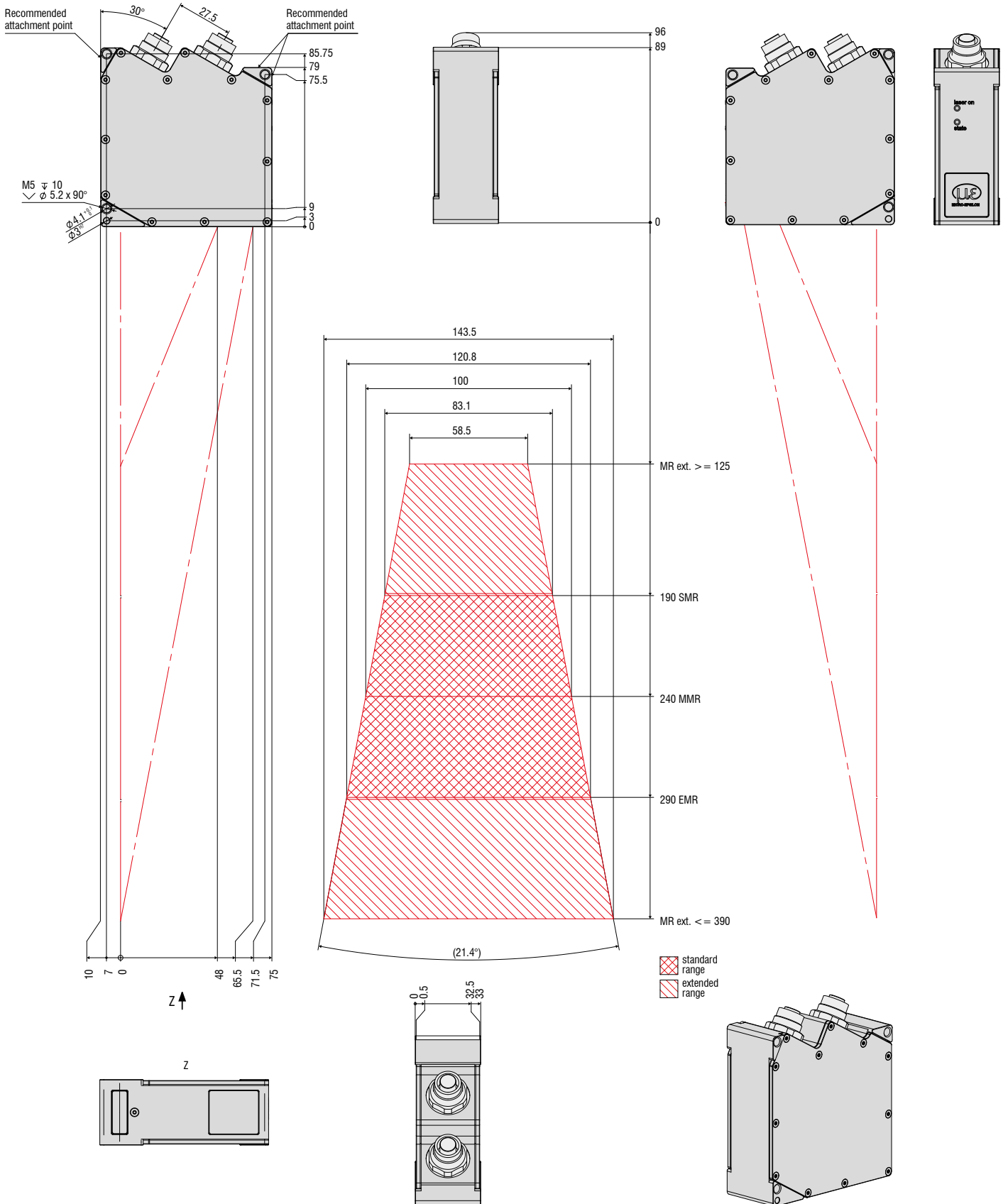
Red Laser

Blue Laser



# LLT25x0 / LLT29x0-100

Red Laser Blue Laser



# Powerful 2D/3D laser scanners

## scanCONTROL 30x2

- Precise profile measurements for industrial measurement tasks
- Resolution (x-axis) 1,024 points
- Profile frequency up to 10,000 Hz
- For small and large measuring ranges
- Also available with patented Blue Laser Technology
- Compatible with **COGNEX® VisionPro**



### Precise 2D/3D profile measurements

The new LLT30x2 laser profile scanners provide calibrated profile data with up to 7.9 million points per second. They allow profile frequencies up to 10 kHz and resolutions up to 1,024 points. Thanks to their high accuracy and versatility, the scanners are particularly suitable for static and dynamic applications as well as robotic applications. They measure and evaluate, e. g., angles, steps, gaps, distances, and circles.

### Available as PROFILE and SMART versions

The scanCONTROL 30x2 series is available as PROFILE and SMART versions. The PROFILE scanners provide calibrated profile data that can be further processed on a PC with software evaluation provided by the customer. The 3DInspect software allows for the scanCONTROL sensors to be used also for 3D evaluations. SMART scanners operate autonomously and provide selected measurement values. The scanCONTROL 30x2 series supports all SMART functions and programs that are set in the scanCONTROL Configuration Tools software and directly stored in the internal controller.

### Article designation

|  |    |    |     |     |
|--|----|----|-----|-----|
| LLT  | 30 | x2 | -25 | /SI |
| Options - see below  |    |    |     |     |
| <b>Measuring range</b><br>25 mm<br>50 mm<br>100 mm<br>200 mm<br>430 mm<br>600 mm |    |    |     |     |
| <b>Class</b><br>02 =PROFILE<br>12 =SMART   |    |    |     |     |
| <b>Series</b><br>LLT30xx   |    |    |     |     |

### Laser options\*

|  |     |  |
|--|-----|--|
|  | /SI | Hardware switch-off of the laser line  |
|  | /3R | Increased laser power (class 3R) e.g., for dark surfaces   |
|  | /BL | Blue laser line (405 nm) for (semi-) transparent, red-hot glowing and organic materials (Measuring ranges 25 - 100 mm) |

### Cable outlet options\*

|  |     |  |
|--|-----|--|
|  | /RT | Cable outlet on the rear side ("Rear Tail") for space-saving installation, cable length 0.3 m. Sockets at cable end (Measuring ranges 25 - 200 mm) |
|  | /PT | Cable directly out of the sensor ("Pigtail") Available lengths: 0.3 / 0.6 / 1.00 m   |

\*Options can be combined

Accessories from page 42





### The easy way of machine integration

The design of the LLT30x2 series is compact and lightweight. The controller is integrated in the sensor itself, which simplifies mechanical integration. The measurement data can be output directly.

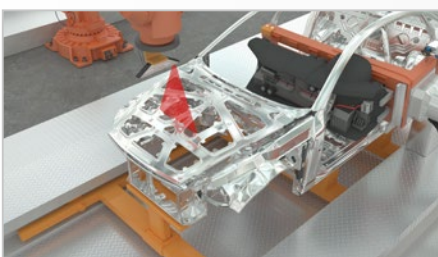
**NEW**

Large measurement area up to 600 x 600 mm

The scanCONTROL 30x2 laser scanners are now also available with a large measuring field up to 600 x 600 mm. This allows large measuring objects to be detected with high accuracy.



### Application examples



Assembly monitoring of car body shell construction



Detection of the road surface profile



Geometry inspection in metals processing

# Powerful 2D/3D laser scanners

## scanCONTROL 30x2

| Model   |                                   | LLT 30x2-25  | LLT 30x2-50          | LLT 30x2-100         | LLT 30x2-200 |        |
|---|-----------------------------------|--|----------------------|----------------------|--------------|--------|
| Available laser type  |                                   | Red Laser Blue Laser   | Red Laser Blue Laser | Red Laser Blue Laser | Red Laser    |        |
| z-axis  | Measuring range                   | Start of measuring range   | 77.5 mm              | 105 mm               | 200 mm       | 200 mm |
|   |                                   | Mid of measuring range   | 85 mm                | 125 mm               | 270 mm       | 310 mm |
|   |                                   | End of measuring range   | 92.5 mm              | 145 mm               | 340 mm       | 420 mm |
|   |                                   | Height of measuring range  | 15 mm                | 40 mm                | 140 mm       | 220 mm |
|   | Extended measuring range          | Start of measuring range   | -                    | -                    | 190 mm       | 160 mm |
|   |                                   | End of measuring range   | -                    | -                    | 360 mm       | 460 mm |
| Line linearity <sup>1) 2)</sup>                             |                                   | 2 µm   | 4 µm                 | 10 µm                | 30 µm        |        |
|   |                                   | ±0.013 %   | ±0.01 %              | ±0.007 %             | ±0.014 %     |        |
| x-axis  | Measuring range                   | Start of measuring range   | 23.0 mm              | 43.3 mm              | 75.6 mm      | 130 mm |
|   |                                   | Mid of measuring range   | 25.0 mm              | 50.0 mm              | 100 mm       | 200 mm |
|   |                                   | End of measuring range   | 26.8 mm              | 56.5 mm              | 124.4 mm     | 270 mm |
|   | Extended measuring range          | Start of measuring range   | -                    | -                    | 72.1 mm      | 100 mm |
|   |                                   | End of measuring range   | -                    | -                    | 131.1 mm     | 290 mm |
|   | Resolution                        |  | 1,024 points/profile |                      |              |        |
| Profile frequency   |                                   | up to 10,000 Hz  |                      |                      |              |        |
| Interfaces  | Ethernet GigE Vision              | Output of measurement values<br>Sensor control<br>Profile data transmission  |                      |                      |              |        |
|   | Digital inputs                    | Mode switching<br>Encoder (counter)<br>Trigger   |                      |                      |              |        |
|   | RS422 (half-duplex) <sup>3)</sup> | Output of measurement values<br>Sensor control<br>Trigger<br>Synchronization   |                      |                      |              |        |
| Output of measurement values                                |                                   | Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)<br>analog <sup>4)</sup> ; switch signal <sup>4)</sup><br>PROFINET <sup>5)</sup> ; EtherCAT <sup>5)</sup> ; EtherNet/IP <sup>5)</sup> |                      |                      |              |        |
| Control and display elements                                |                                   | 3x color LEDs for laser, data and error  |                      |                      |              |        |
| Light source  |                                   | ≤ 10 mW  |                      |                      | ≤ 12 mW      |        |
|   | Red Laser                         | Standard: laser class 2M, semiconductor laser 658 nm   |                      |                      |              |        |
|   |                                   | ≤ 30 mW  |                      | ≤ 50 mW              |              |        |
|   | Blue Laser                        | Option: laser class 3R, semiconductor laser 658 nm   |                      |                      |              |        |
|   |                                   | ≤ 10 mW  |                      |                      | -            |        |
|   |                                   | Standard: laser class 2M, semiconductor laser 405 nm   |                      |                      |              |        |
|   | Laser switch-off                  | via software, hardware switch-off with /SI option  |                      |                      |              |        |
| Aperture angle of laser line                                |                                   | 23°  | 28°                  | 30°                  | 45°          |        |
| Permissible ambient light (fluorescent light) <sup>1)</sup> |                                   | 10,000 lx  |                      |                      |              |        |
| Protection class (DIN EN 60529)                             |                                   | IP67 (when connected)  |                      |                      |              |        |
| Vibration (DIN EN 60068-2-27)                               |                                   | 2 g / 20 ... 500 Hz  |                      |                      |              |        |
| Shock (DIN EN 60068-2-6)                                    |                                   | 15 g / 6 ms  |                      |                      |              |        |
| Temperature range   | Storage                           | -20 ... +70 °C   |                      |                      |              |        |
|   | Operation                         | 0 ... +45 °C   |                      |                      |              |        |
| Weight  |                                   | 415 g (without cable)  |                      |                      |              |        |
| Supply voltage  |                                   | 11 ... 30 VDC, nominal value 24 V, 500 mA, IEEE 802.3af class 2, Power over Ethernet (PoE)   |                      |                      |              |        |

<sup>1)</sup> Based on the measuring range; measuring object: Micro-Epsilon standard object

<sup>2)</sup> According to a one-time averaging over the measuring field (1,024 points)

<sup>3)</sup> RS422 interface, programmable either as serial interface or as input for triggering/synchronization

<sup>4)</sup> Only with 2D/3D Output Unit

<sup>5)</sup> Only with 2D/3D Gateway

| Model   |                                   | LLT 30x2-430   | LLT 30x2-600  |         |
|---|-----------------------------------|--|---|---------|
| Available laser type  |                                   | Red Laser  | Red Laser   |         |
| z-axis  | Measuring range                   | Start of measuring range   | 330 mm  | 530 mm  |
|   |                                   | Mid of measuring range   | 515 mm  | 770 mm  |
|   |                                   | End of measuring range   | 700 mm  | 1010 mm |
|   | Extended measuring range          | Height of measuring range  | 370 mm  | 480 mm  |
|   |                                   | Start of measuring range   | 330 mm  | 450 mm  |
|   |                                   | End of measuring range   | 720 mm  | 1050 mm |
| Line linearity <sup>1)2)</sup>                              |                                   | 15 µm  | 22 µm   |         |
|   |                                   | ±0.0041 %  | ±0.0045 %   |         |
| x-axis  | Measuring range                   | Start of measuring range   | 324 mm  | 456 mm  |
|   |                                   | Mid of measuring range   | 430 mm  | 600 mm  |
|   |                                   | End of measuring range   | 544 mm  | 762 mm  |
|   | Extended measuring range          | Start of measuring range   | 324 mm  | 408 mm  |
|   |                                   | End of measuring range   | 560 mm  | 788 mm  |
| Resolution  |                                   | 1,024 points/profile   |   |         |
| Profile frequency   |                                   | up to 10,000 Hz  |   |         |
| Interfaces  | Ethernet GigE Vision              | Output of measurement values<br>Sensor control<br>Profile data transmission  |   |         |
|   | Digital inputs                    | Mode switching<br>Encoder (counter)<br>Trigger   |   |         |
|   | RS422 (half-duplex) <sup>3)</sup> | Output of measurement values<br>Sensor control<br>Trigger<br>Synchronization   |   |         |
| Output of measurement values                                |                                   | Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)<br>analog <sup>4)</sup> ; switch signal <sup>4)</sup><br>PROFINET <sup>5)</sup> ; EtherCAT <sup>5)</sup> ; EtherNet/IP <sup>5)</sup> |   |         |
| Control and display elements                                |                                   | 3x color LEDs for laser, data and error  |   |         |
| Light source  | Red Laser                         |  | ≤ 26 mW   |         |
|   |                                   |  | Standard: laser class 2M, semiconductor laser 660 nm  |         |
|   |                                   |  | ≤ 100 mW  |         |
|   | Laser switch-off                  |  | Option: laser class 3R, semiconductor laser 660 nm<br>via software, hardware switch-off with /SI option |         |
| Aperture angle of laser line                                |                                   | 60 °   |   |         |
| Permissible ambient light (fluorescent light) <sup>1)</sup> |                                   | 5,000 lx   |   |         |
| Protection class (DIN EN 60529)                             |                                   | IP67 (when connected)  |   |         |
| Vibration (DIN EN 60068-2-27)                               |                                   | 2 g / 20 ... 500 Hz  |   |         |
| Shock (DIN EN 60068-2-6)                                    |                                   | 15 g / 6 ms  |   |         |
| Temperature range   | Storage                           | -20 ... +70 °C   |   |         |
|   | Operation                         | 0 ... +45 °C   |   |         |
| Weight  |                                   | 2620 g (without cable)   |   |         |
| Supply voltage  |                                   | 11 ... 30 VDC, nominal value 24 V, 500 mA,<br>IEEE 802.3af class 2, Power over Ethernet (PoE)  |   |         |
| Connections   |                                   | Sockets, cable outlets on top (/PT)  |   |         |

<sup>1)</sup> Based on the measuring range; measuring object: Micro-Epsilon standard object

<sup>2)</sup> According to a one-time averaging over the measuring field (1,024 points)

<sup>3)</sup> RS422 interface, programmable either as serial interface or as input for triggering/synchronization

<sup>4)</sup> Only with 2D/3D Output Unit

<sup>5)</sup> Only with 2D/3D Gateway

# Powerful 2D/3D laser scanners with highest precision

## scanCONTROL 30x0

- High resolution in x- and z-axis for accurate profile measurement
- Profile frequency up to 10 kHz for monitoring of dynamic processes
- Innovative exposure control
- For small and large measuring ranges
- Also available with patented Blue Laser Technology
- Compatible with **COGNEX® VisionPro**



### Fast and precise 2D/3D profile measurements

The new LLT30x0 laser profile scanners provide calibrated profile data with up to 9.6 million points per second. Thanks to their high accuracy, high profile frequency and versatility, these powerful scanners are suitable for demanding measurement tasks. They measure and evaluate, e.g., angles, steps, gaps, distances and circles with high precision. These sensors also offer predefined operating modes that enable optimal results for various applications.

### Available as PROFILE and SMART versions

The scanCONTROL 30x0 series is available as PROFILE and SMART versions. The PROFILE scanners provide calibrated profile data that can be further processed on a PC with software evaluation provided by the customer. The 3DInspect software allows for the scanCONTROL sensors to be used also for 3D evaluations. SMART scanners operate autonomously and provide selected measurement values. The scanCONTROL 30x0 series supports all SMART functions and programs that are set in the scanCONTROL Configuration Tools software and directly stored in the internal controller.

### Article designation

|  |    |    |     |     |
|--|----|----|-----|-----|
| LLT  | 30 | x0 | -25 | /SI |
| Options - see below  |    |    |     |     |
| <b>Measuring range</b><br>25 mm<br>50 mm<br>100 mm<br>200 mm<br>430 mm<br>600 mm |    |    |     |     |
| <b>Class</b><br>00 =PROFILE<br>10 =SMART   |    |    |     |     |
| <b>Series</b><br>LLT30xx   |    |    |     |     |

### Laser options\*

|  |     |  |
|--|-----|--|
|  | /SI | Hardware switch-off of the laser line  |
|  | /3R | Increased laser power (class 3R) e.g., for dark surfaces   |
|  | /BL | Blue laser line (405 nm) for (semi-) transparent, red-hot glowing and organic materials (Measuring ranges 25 - 100 mm) |

### Cable outlet options\*

|  |     |  |
|--|-----|--|
|  | /RT | Cable outlet on the rear side ("Rear Tail") for space-saving installation, cable length 0.3 m. Sockets at cable end (Measuring ranges 25 - 200 mm) |
|  | /PT | Cable directly out of the sensor ("Pigtail") Available lengths: 0.3 / 0.6 / 1.00 m   |

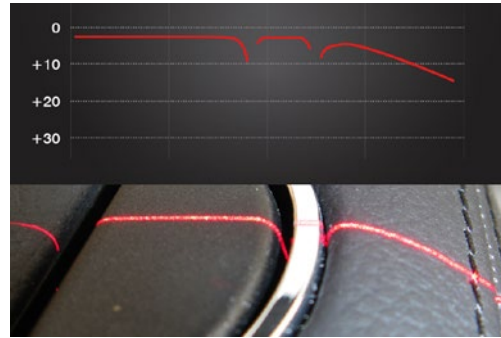
\*Options can be combined

Accessories from page 42

### Innovative exposure control to master difficult surfaces

On inhomogeneous or dark surfaces, the HDR (High Dynamic Range) data acquisition mode and the improved auto exposure optimizes the measurement results.

In HDR mode, the rows of the sensor matrix are exposed differently but at the same time which avoids time offsets between the recordings. This is how moving objects can be detected reliably. The areas for auto exposure can be selected individually.



High resolution

High dynamic range

High speed

### Fast measurement results with operation modes

Choose from three predefined operating modes for your specific measurement task: "High-Resolution" for maximum precision, "High Dynamic Range" for optimal profile detection on difficult surfaces and "High Speed" for ultra-fast measurements.

**NEW**

### Large measurement area up to 600 x 600 mm

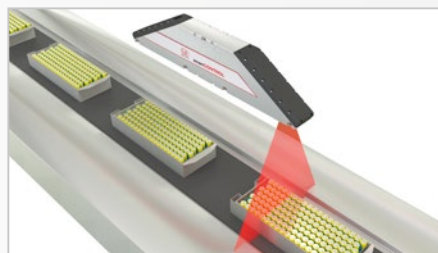
The scanCONTROL 30x2 laser scanners are now also available with a large measuring field up to 600 x 600 mm. This allows large measuring objects to be detected with high accuracy.



### Application examples



Planarity of coated battery film



Assembly monitoring of battery packs



Inline 3D inspection of tire geometry



# High performance laser scanner

## scanCONTROL 30x0

| Model   |                                   | LLT 30x0-25  | LLT 30x0-50          | LLT 30x0-100         | LLT 30x0-200 |        |
|---|-----------------------------------|--|----------------------|----------------------|--------------|--------|
| Available laser type  |                                   | Red Laser Blue Laser   | Red Laser Blue Laser | Red Laser Blue Laser | Red Laser    |        |
| z-axis  | Measuring range                   | Start of measuring range   | 77.5 mm              | 105 mm               | 200 mm       | 200 mm |
|   |                                   | Mid of measuring range   | 85 mm                | 125 mm               | 270 mm       | 310 mm |
|   |                                   | End of measuring range   | 92.5 mm              | 145 mm               | 340 mm       | 420 mm |
|   |                                   | Height of measuring range  | 15 mm                | 40 mm                | 140 mm       | 220 mm |
|   | Extended measuring range          | Start of measuring range   | -                    | -                    | 190 mm       | 160 mm |
|   |                                   | End of measuring range   | -                    | -                    | 360 mm       | 460 mm |
| Line linearity <sup>1) 2)</sup>                             |                                   | 1.5 µm   | 3 µm                 | 9 µm                 | 26 µm        |        |
|   |                                   | ±0.01 %  | ±0.0075 %            | ±0.006 %             | ±0.012 %     |        |
| x-axis  | Measuring range                   | Start of measuring range   | 23.0 mm              | 43.3 mm              | 75.6 mm      | 130 mm |
|   |                                   | Mid of measuring range   | 25.0 mm              | 50.0 mm              | 100 mm       | 200 mm |
|   |                                   | End of measuring range   | 26.8 mm              | 56.5 mm              | 124.4 mm     | 270 mm |
|   | Extended measuring range          | Start of measuring range   | -                    | -                    | 72.1 mm      | 100 mm |
|   |                                   | End of measuring range   | -                    | -                    | 131.1 mm     | 290 mm |
|   | Resolution                        |  | 2,048 points/profile |                      |              |        |
| Profile frequency   |                                   | up to 10,000 Hz  |                      |                      |              |        |
| Interfaces  | Ethernet GigE Vision              | Output of measurement values<br>Sensor control<br>Profile data transmission  |                      |                      |              |        |
|   | Digital inputs                    | Mode switching<br>Encoder (counter)<br>Trigger   |                      |                      |              |        |
|   | RS422 (half-duplex) <sup>3)</sup> | Output of measurement values<br>Sensor control<br>Trigger<br>Synchronization   |                      |                      |              |        |
| Output of measurement values                                |                                   | Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)<br>analog <sup>4)</sup> ; switch signal <sup>4)</sup><br>PROFINET <sup>5)</sup> ; EtherCAT <sup>5)</sup> ; EtherNet/IP <sup>5)</sup> |                      |                      |              |        |
| Control and display elements                                |                                   | 3x color LEDs for laser, data and error  |                      |                      |              |        |
| Light source  |                                   | ≤ 10 mW  |                      |                      | ≤ 12 mW      |        |
|   | Red Laser                         | Standard: laser class 2M, semiconductor laser 658 nm   |                      |                      |              |        |
|   |                                   | ≤ 30 mW  |                      | ≤ 50 mW              |              |        |
|   | Blue Laser                        | Option: laser class 3R, semiconductor laser 658 nm   |                      |                      |              |        |
|   |                                   | ≤ 10 mW  |                      |                      | -            |        |
|   |                                   | Standard: laser class 2M, semiconductor laser 405 nm   |                      |                      |              |        |
|   | Laser switch-off                  | via software, hardware switch-off with /SI option  |                      |                      |              |        |
| Aperture angle of laser line                                |                                   | 23°  | 28°                  | 30°                  | 45°          |        |
| Permissible ambient light (fluorescent light) <sup>1)</sup> |                                   | 10,000 lx  |                      |                      |              |        |
| Protection class (DIN EN 60529)                             |                                   | IP67 (when connected)  |                      |                      |              |        |
| Vibration (DIN EN 60068-2-27)                               |                                   | 2 g / 20 ... 500 Hz  |                      |                      |              |        |
| Shock (DIN EN 60068-2-6)                                    |                                   | 15 g / 6 ms  |                      |                      |              |        |
| Temperature range   | Storage                           | -20 ... +70 °C   |                      |                      |              |        |
|   | Operation                         | 0 ... +45 °C   |                      |                      |              |        |
| Weight  |                                   | 415 g (without cable)  |                      |                      |              |        |
| Supply voltage  |                                   | 11 ... 30 VDC, nominal value 24 V, 500 mA, IEEE 802.3af class 2, Power over Ethernet (PoE)   |                      |                      |              |        |

<sup>1)</sup> Based on the measuring range; measuring object: Micro-Epsilon standard object

<sup>2)</sup> According to a one-time averaging over the measuring field (2,048 points)

<sup>3)</sup> RS422 interface, programmable either as serial interface or as input for triggering/synchronization

<sup>4)</sup> Only with 2D/3D Output Unit

<sup>5)</sup> Only with 2D/3D Gateway

| Model   |  | LLT 30x0-430  | LLT 30x0-600   |            |
|---|--|---|----------------|------------|
| Available laser type  |  | Red Laser   | Red Laser      |            |
| z-axis  | Measuring range  | Start of measuring range  | 330 mm         | 530 mm     |
|   |  | Mid of measuring range  | 515 mm         | 770 mm     |
|   |  | End of measuring range  | 700 mm         | 1010 mm    |
|   |  | Height of measuring range   | 370 mm         | 480 mm     |
|   | Extended measuring range   | Start of measuring range  | 330 mm         | 450 mm     |
|   |  | End of measuring range  | 720 mm         | 1050 mm    |
|   | Line linearity <sup>1)2)</sup>   |   | 12 $\mu$ m     | 15 $\mu$ m |
|   |  | $\pm 0.0032$ %  | $\pm 0.0031$ % |            |
| x-axis  | Measuring range  | Start of measuring range  | 324 mm         | 456 mm     |
|   |  | Mid of measuring range  | 430 mm         | 600 mm     |
|   |  | End of measuring range  | 544 mm         | 762 mm     |
|   | Extended measuring range   | Start of measuring range  | 324 mm         | 408 mm     |
|   |  | End of measuring range  | 560 mm         | 788 mm     |
| Resolution  | 2,048 points/profile   |   |                |            |
| Profile frequency   | up to 10,000 Hz  |   |                |            |
| Interfaces  | Ethernet GigE Vision   | Output of measurement values<br>Sensor control<br>Profile data transmission                             |                |            |
|   | Digital inputs   | Mode switching<br>Encoder (counter)<br>Trigger  |                |            |
|   | RS422 (half-duplex) <sup>3)</sup>  | Output of measurement values<br>Sensor control<br>Trigger<br>Synchronization                            |                |            |
| Output of measurement values                                | Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)<br>analog <sup>4)</sup> ; switch signal <sup>4)</sup><br>PROFINET <sup>5)</sup> ; EtherCAT <sup>5)</sup> ; EtherNet/IP <sup>5)</sup> |   |                |            |
| Control and display elements                                | 3x color LEDs for laser, data and error  |   |                |            |
| Light source  | Red Laser  | $\leq 26$ mW  |                |            |
|   |  | Standard: laser class 2M, semiconductor laser 660 nm  |                |            |
|   |  | $\leq 100$ mW   |                |            |
|   | Laser switch-off   | Option: laser class 3R, semiconductor laser 660 nm<br>via software, hardware switch-off with /SI option |                |            |
| Aperture angle of laser line                                | 60 °   |   |                |            |
| Permissible ambient light (fluorescent light) <sup>1)</sup> | 5,000 lx   |   |                |            |
| Protection class (DIN EN 60529)                             | IP67 (when connected)  |   |                |            |
| Vibration (DIN EN 60068-2-27)                               | 2 g / 20 ... 500 Hz  |   |                |            |
| Shock (DIN EN 60068-2-6)                                    | 15 g / 6 ms  |   |                |            |
| Temperature range   | Storage  | -20 ... +70 °C  |                |            |
|   | Operation  | 0 ... +45 °C  |                |            |
| Weight  | 2630 g (without cable)   |   |                |            |
| Supply voltage  | 11 ... 30 VDC, nominal value 24 V, 500 mA,<br>IEEE 802.3af class 2, Power over Ethernet (PoE)  |   |                |            |
| Connections   | Sockets, cable outlets on top (/PT)  |   |                |            |

<sup>1)</sup> Based on the measuring range; measuring object: Micro-Epsilon standard object

<sup>2)</sup> According to a one-time averaging over the measuring field (2,048 points)

<sup>3)</sup> RS422 interface, programmable either as serial interface or as input for triggering/synchronization

<sup>4)</sup> Only with 2D/3D Output Unit

<sup>5)</sup> Only with 2D/3D Gateway

# Options

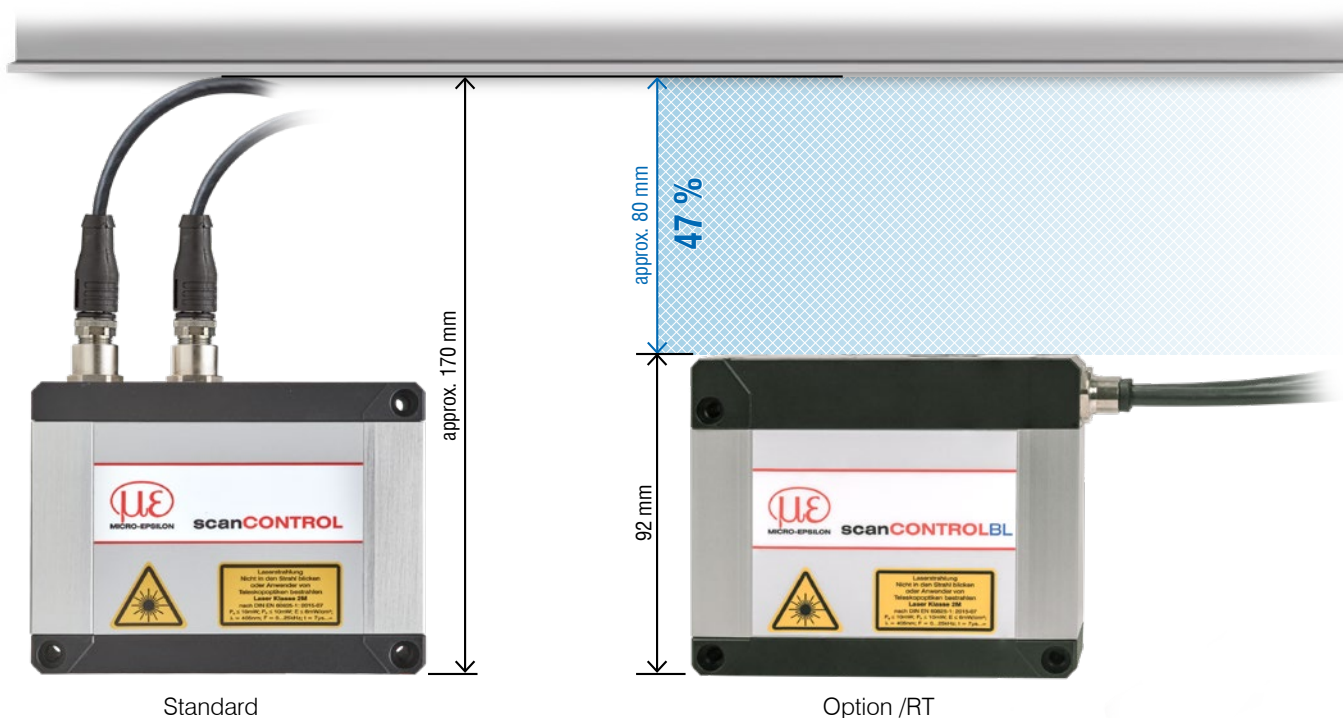
## scanCONTROL 30xx

**NEW**

### Option /RT = "Rear Tail"

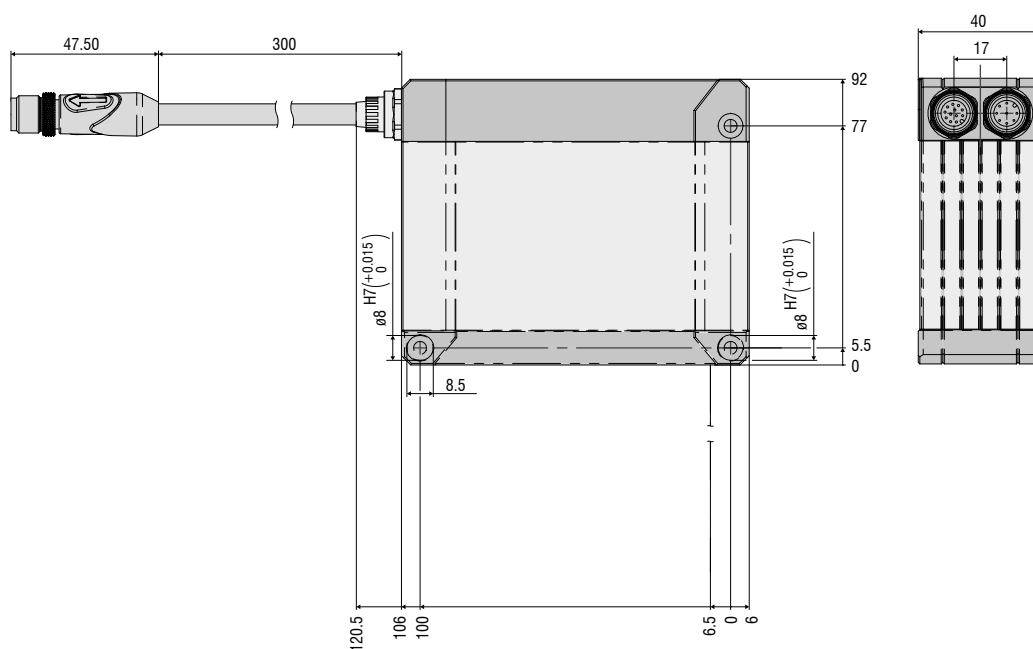
Cable outlet on the rear side ("Rear Tail") for space-saving installation

- Available for the measuring ranges from 25 to 200 mm
- 30 cm pigtail
- Reduces the installation height by 47%



Standard

Option /RT



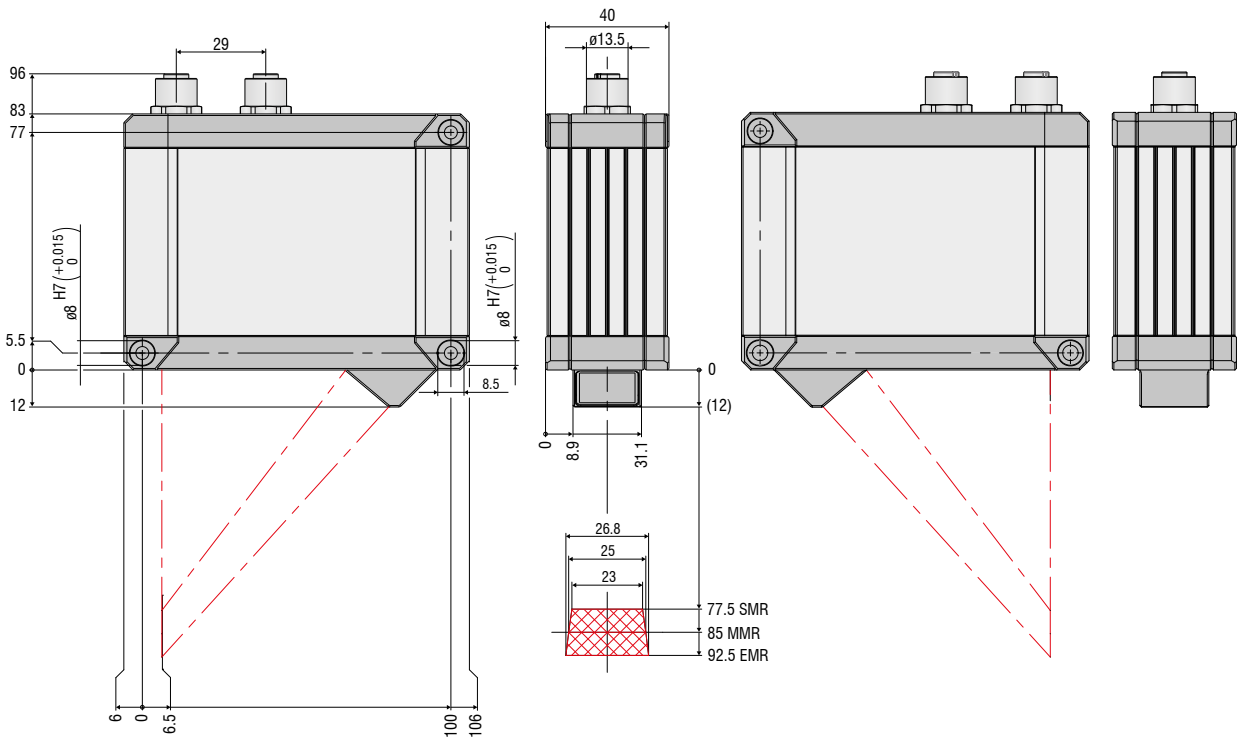
# Dimensions and measuring ranges

## scanCONTROL 30xx

LLT30x2-25 / LLT30x0-25

Red Laser

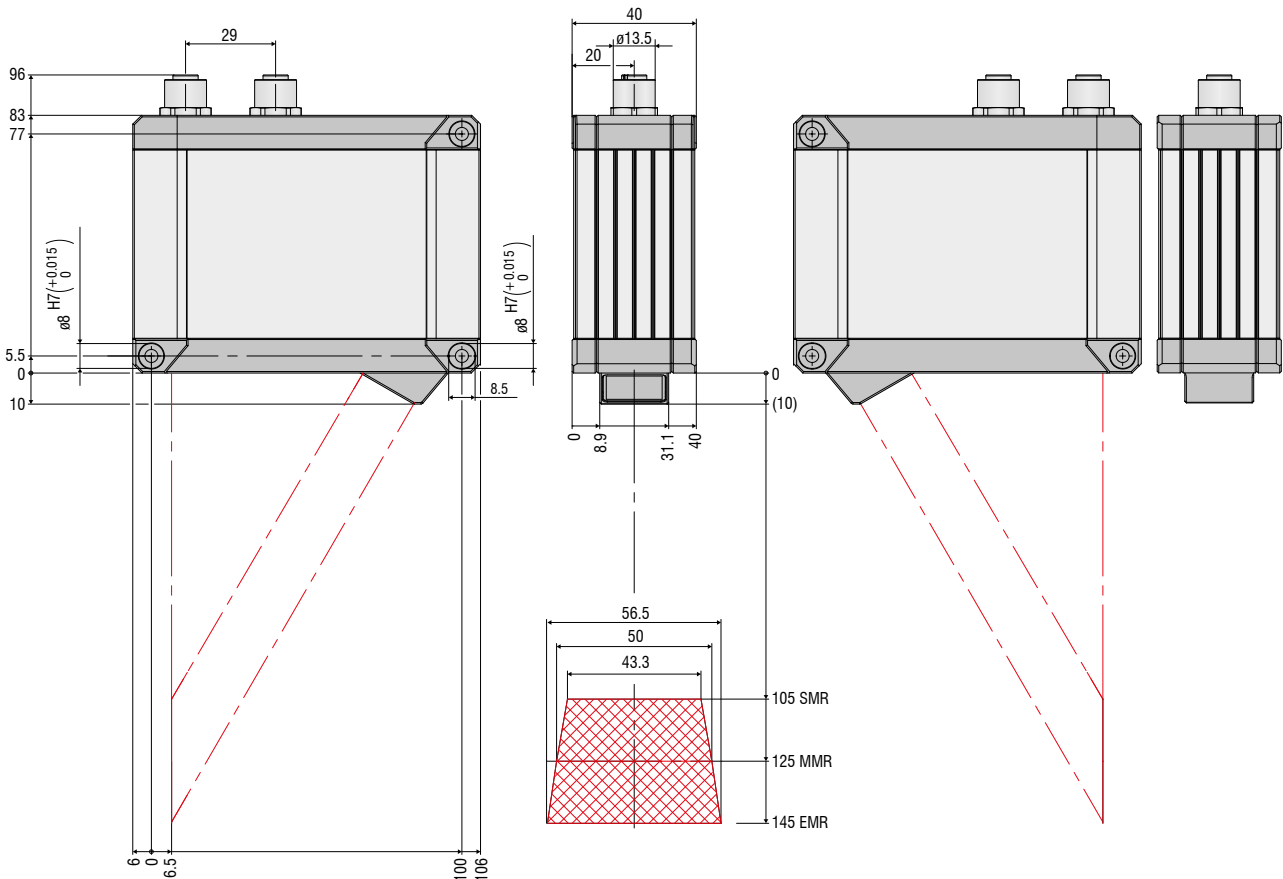
Blue Laser



LLT30x2-50 / LLT30x0-50

Red Laser

Blue Laser



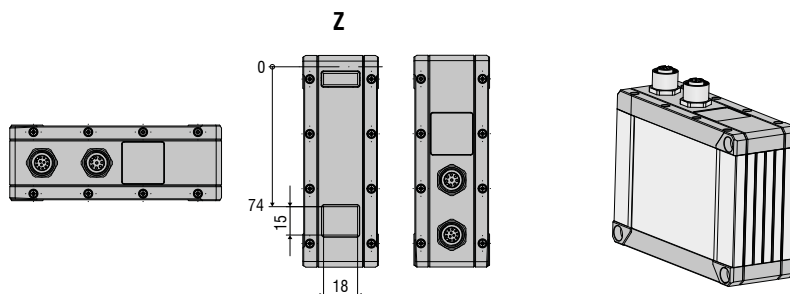
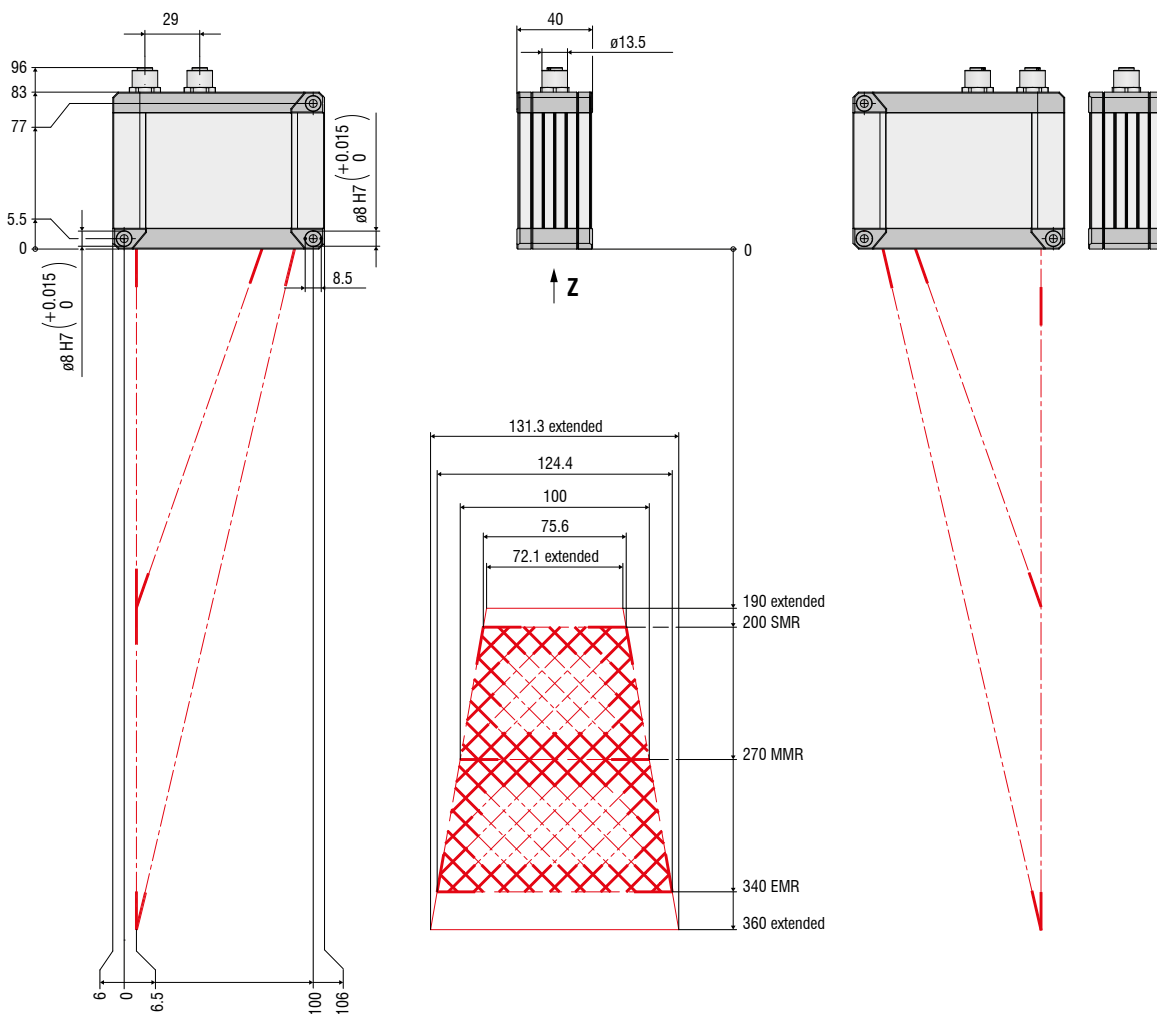
# Dimensions and measuring ranges

## scanCONTROL 30xx

LLT30x2-100 / LLT30x0-100

Red Laser

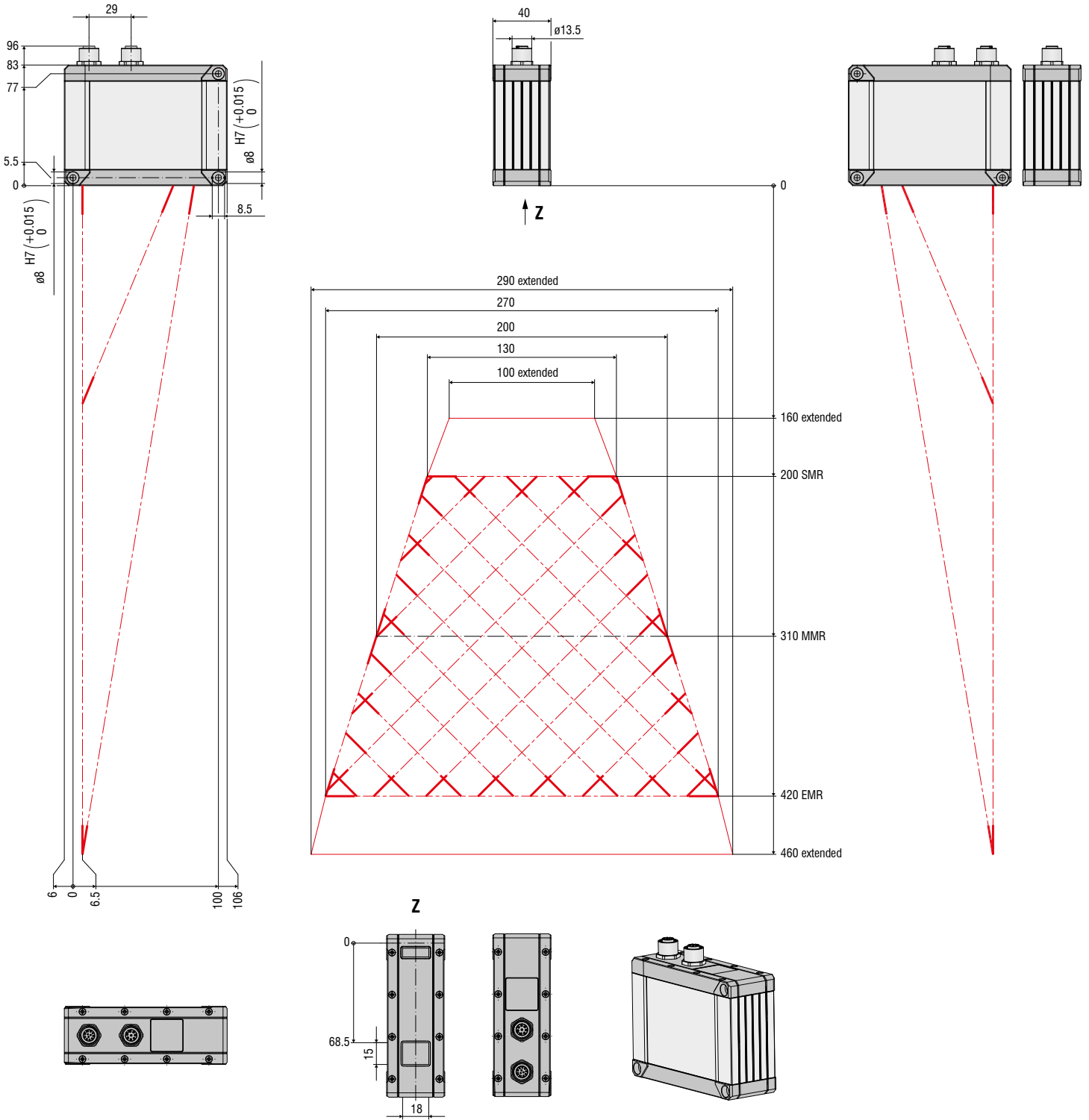
Blue Laser





LLT30x2-200 / LLT30x0-200

Red Laser

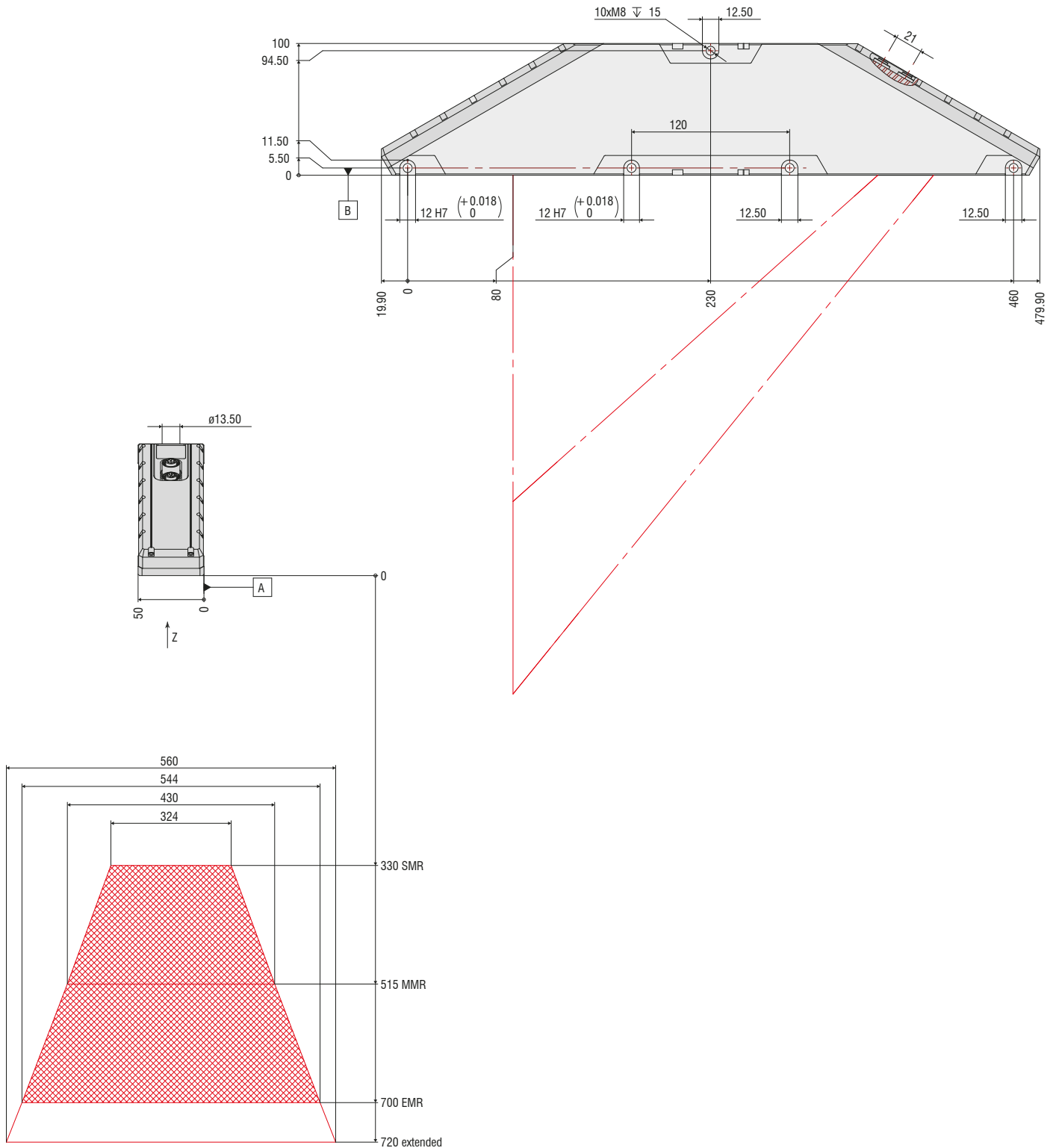


# Dimensions and measuring ranges

## scanCONTROL 30xx

LLT30x2-430 / LLT30x0-430

Red Laser



(dimensions in mm, not to scale)



# Software scanCONTROL Configuration Tools

Plug & Play solution for complex measurement tasks

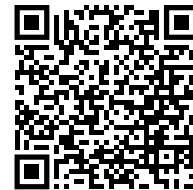
Evaluation directly in the sensor without external controller

Parallel execution of different measurement tasks and multiple evaluation

Easy online and offline analysis

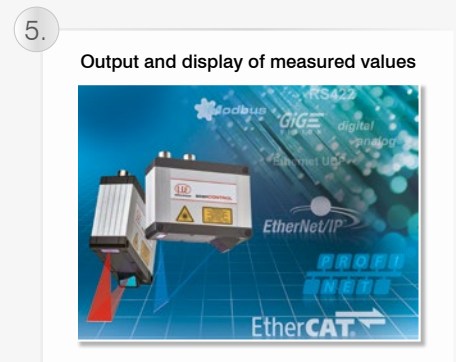
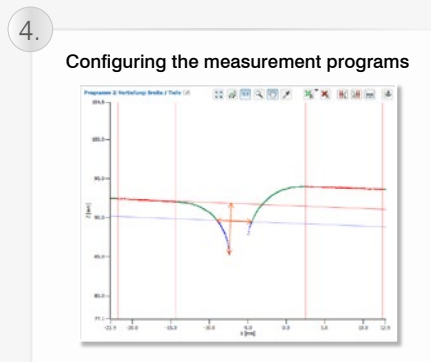
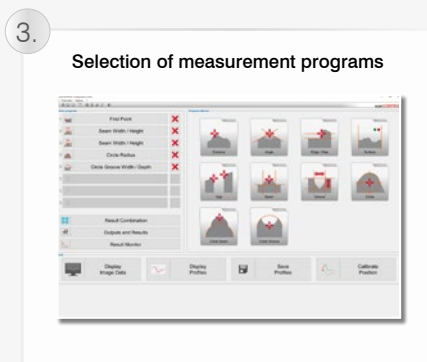
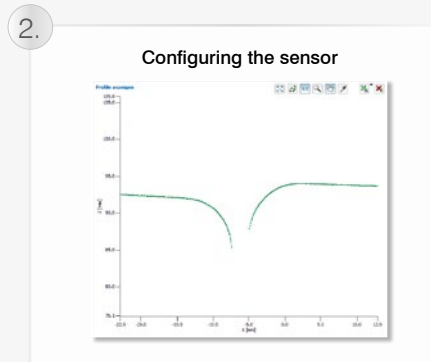
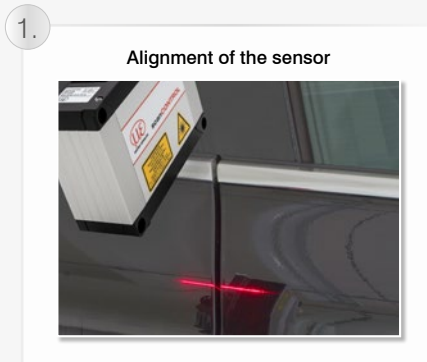


scanCONTROL SMART sensors have an integrated intelligent controller for easy profile evaluation without requiring an additional PC. Configuration and parameter setup of the sensor is via the scanCONTROL Configuration Tools software. It enables sensor setup, viewing of profiles, as well as saving, loading and exporting profiles. All software functions can also be executed without a sensor in order to test the measurement task offline for very fast processes.



Download:  
[micro-epsilon.com/  
2D\\_3D/laser-scanner/  
Software/downloads/](http://micro-epsilon.com/2D_3D/laser-scanner/Software/downloads/)

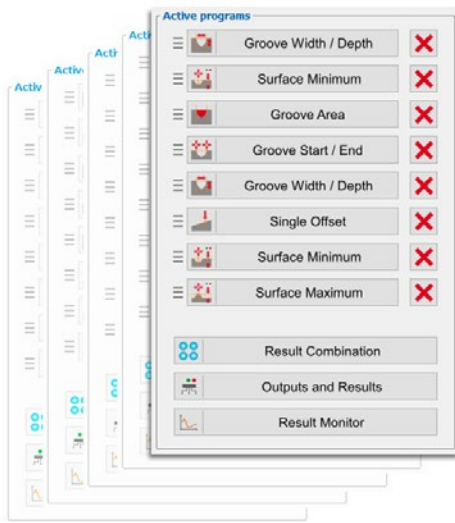
## Easy 5-Step Configuration



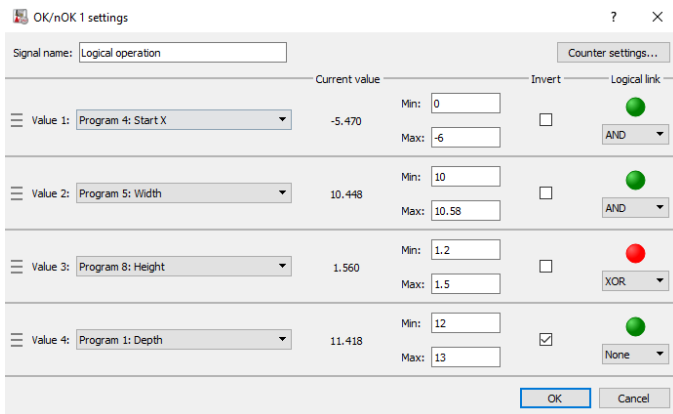
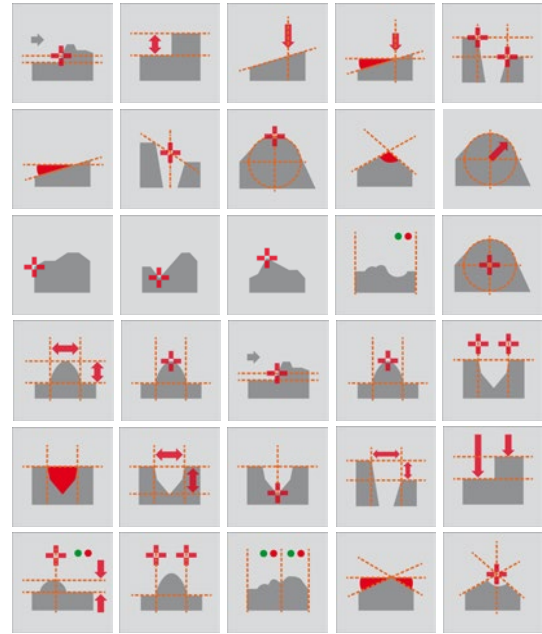
The software enables the user to completely configure the scanner in just five simple steps. After configuration, the scanner is in standalone mode and transmits the measured values to a PLC.

## Numerous Setting Options

- 16 measuring programs + 8 evaluations per parameter set
- 15 independent parameter packages can be stored in the sensor
- Unlimited memory for parameter sets on the computer



## Wide Range of Measurement Tools



## Logical Links

- Combined query of different conditions
- Summarized result evaluation in the sensor as OK/NOK

## scanCONTROL Result Monitor

Result Monitor is a new software tool for displaying measured values of up to 4 SMART sensors.

- Display of profile and measured value history
- Different views, e.g., for workers
- Parallel transmission of the measured values to the control unit is possible and recommended
- Ring buffer logging and memory
- Adjustable layout





# Software 3DInspect

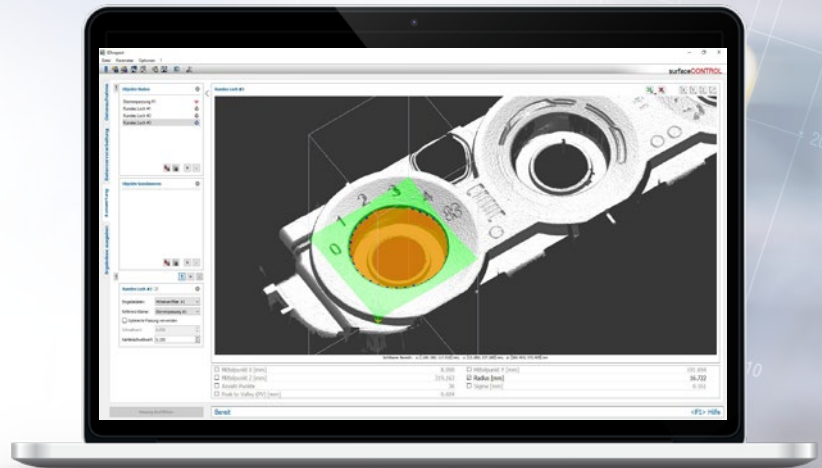
Intuitive user interface

Real 3D evaluation, not just 2.5D

Object extraction in 3D

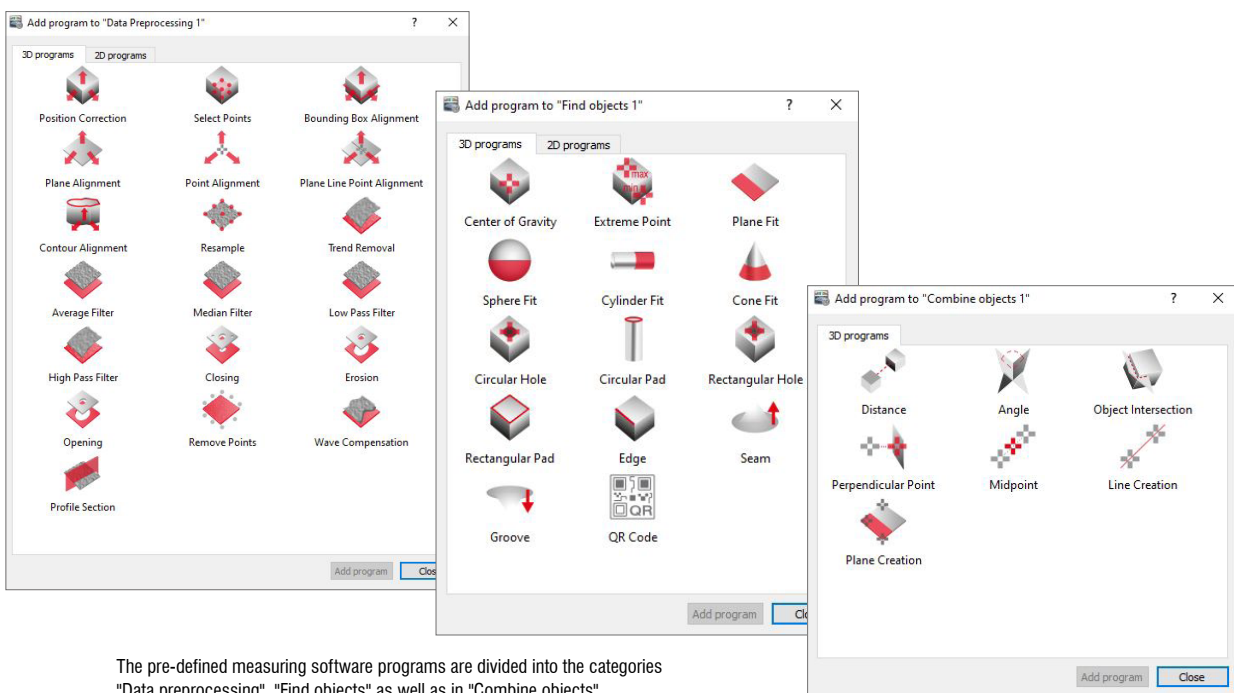
Direct feedback with algorithms

Compatible with all 3D sensors  
from Micro-Epsilon



## 3DInspect software for 3D measurement and inspection tasks

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. In addition to the scanCONTROL 30xx models, the 3DInspect software is also supported by the 3D Profile Unit as well as the surfaceCONTROL and reflectCONTROL sensors.

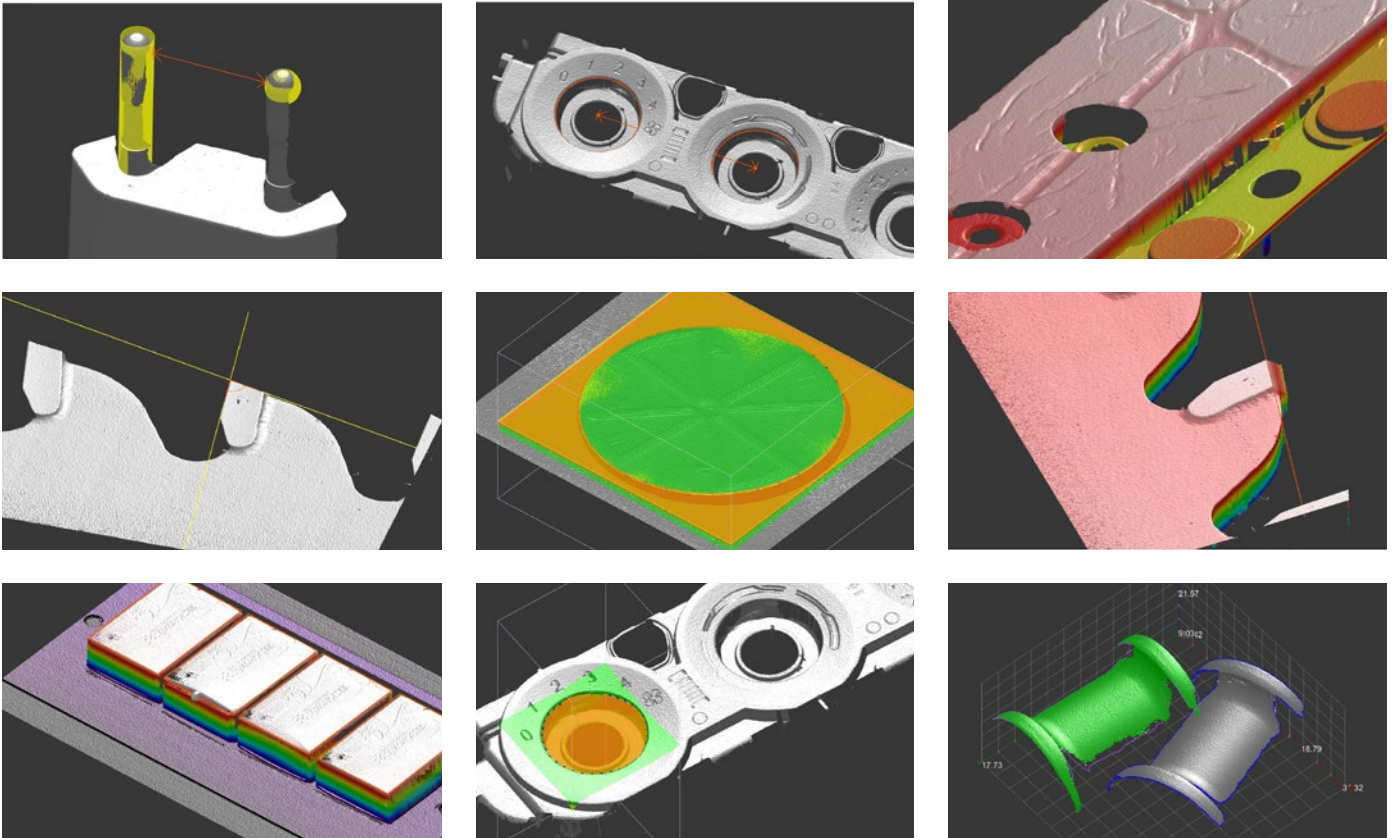


The pre-defined measuring software programs are divided into the categories "Data preprocessing", "Find objects" as well as in "Combine objects".



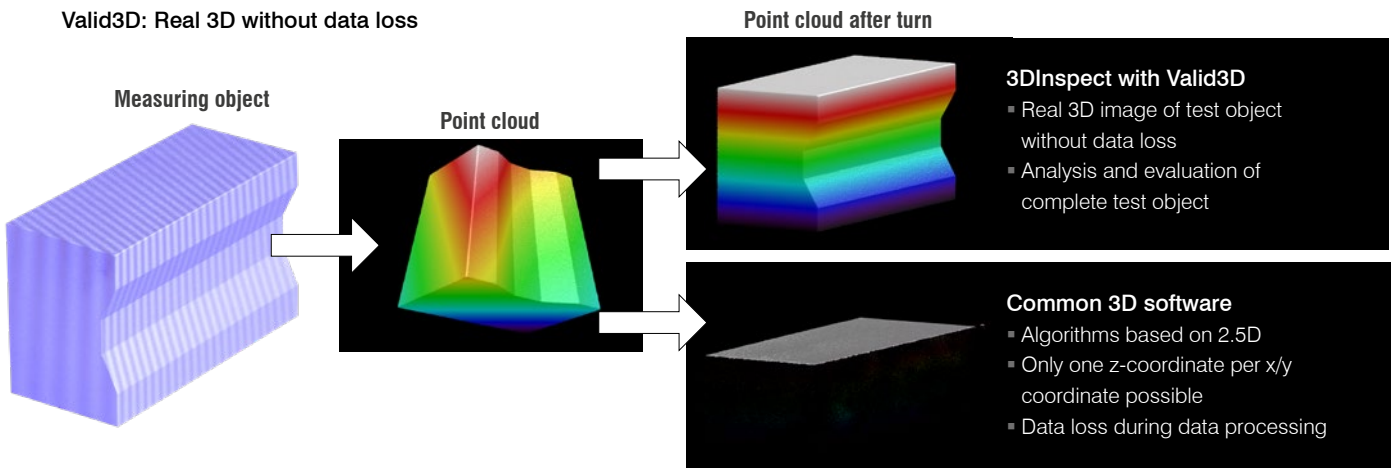
**Industrial Performance Unit:  
Industrial PC with GigE Vision Sensors**

The Industrial Performance Unit is a powerful computing platform for 3D applications. The scanner can be parameterized directly via the 3DInspect software, allowing measurements to be started immediately. Results can be output via the integrated PROFINET, EtherCAT and EtherNet/IP interfaces.



**Valid3D technology from Micro-Epsilon vs. conventional 2.5D systems**

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.



# Integration of LLT sensors scanCONTROL



The scanCONTROL PROFILE sensors detect one profile from individual, calibrated points per measurement. Users can transfer these profiles to their own applications either individually or combined as an array/matrix in a container set. In addition to the data transfer of individual measuring points and their additional information (e.g. intensity, counter reading) the entire configuration of the sensor can also be controlled from its own application software.

Micro-Epsilon provides a number of interfaces to access the parameter and data transfer functions. The transmission interface primarily used by scanCONTROL sensors for communications and profile transfer is Ethernet.

## Ethernet and GigE Vision

Each scanCONTROL sensor complies with the GigE Vision Standard (Gigabit Ethernet for Machine Vision) of the AIA (Automated Imaging Association).

The standard is widely used in the image processing industry and is therefore supported by all conventional computer vision tools. This ensures fast and smooth integration into different image processing tools – also for 3D evaluation.

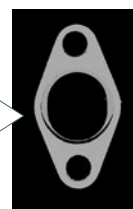
The GigE Vision standard stands for optimal data security, perfect performance and short implementation times. GigE Vision is based on Gigabit Ethernet and thus offers a high data transfer rate. Ethernet technology offers advantages such as long cable lengths without using repeaters/hubs, and it permits the use of inexpensive network components. The GigE Vision standard provides an open framework for data transmission (e.g. profiles, data sets) and control signals between the laser scanner and a PC. There are numerous infrastructure topology options for single- and multi-scanner applications.



Download:  
[micro-epsilon.com/2D\\_3D/  
laser-scanner/Software/  
scanCONTROL-Integration/](http://micro-epsilon.com/2D_3D/laser-scanner/Software/scanCONTROL-Integration/)



Profile acquisition



Grayscale image

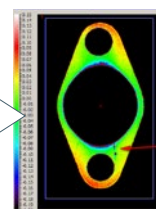


Image processing software



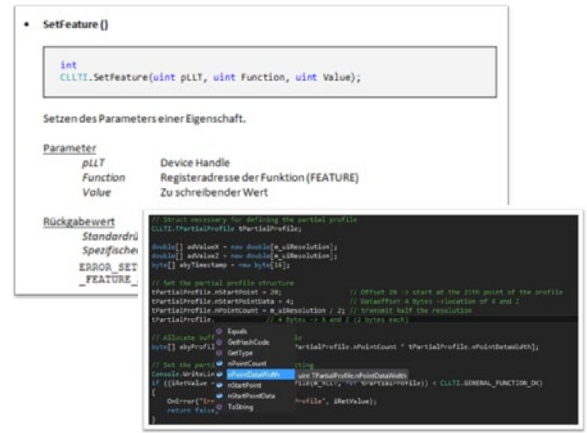
## Integration with the C/C++ library

The C/C++ library for scanCONTROL supports both static and dynamic loading. Both stdcall and cdecl are supported as calling conventions. The individual functions of the library are clearly documented in the interface description and explained using examples.

The scanCONTROL SDK integration package includes:

- LLT.DLL library file
- Interfaces and scanCONTROL documentation
- Numerous programming examples for C++, Python, C# and Visual Basic (e.g. trigger, container mode)

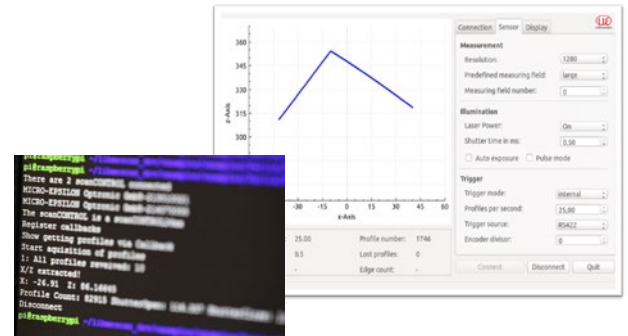
The scanCONTROL Developer Tool demo program offers a complete integration example based on C++ for quick testing of the sensor configuration.



## Integration with Linux

The integration into Linux is performed using an Open Source C library which has been extended with some important control features for scanCONTROL. An additional C++ library enables fast sensor integration of the entire functionality into a user-friendly API.

This library is based on the GeniCam standard which is why the sensor can be controlled via GeniCam commands or directly with the control parameters listed in the documentation. For integration support, some example programs are available (e.g. trigger, container mode). Use on ARM embedded PCs (e.g. Raspberry Pi) is possible with restrictions.

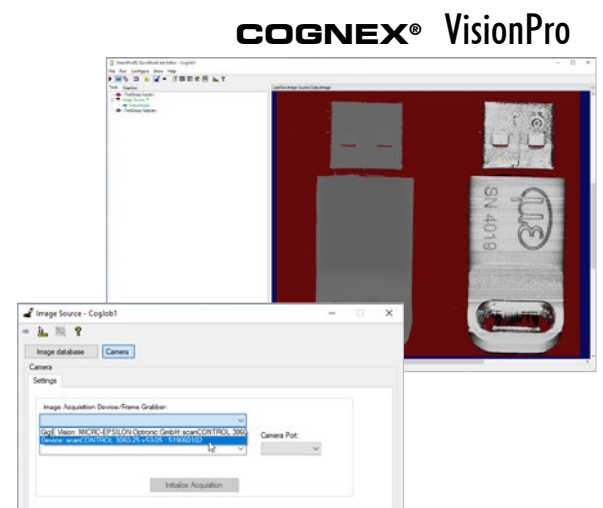


## Integration with Cognex VisionPro

The scanCONTROL AIK adapter enables fast integration into Cognex VisionPro via the Cognex AIK Server. It combines the advantages of the Cognex VisionPro environment to generate fast and reliable measurement solutions with the advantages of native scanCONTROL integration.

Cognex Integrators and users of Cognex VisionPro can use the adapter to generate Cognex Range Images out of scanCONTROL's measurement points to process it comfortably with the VisionPro data evaluation algorithms for Range Images. Beyond that, all well-known configuration options for scanCONTROL sensors are available to the user.

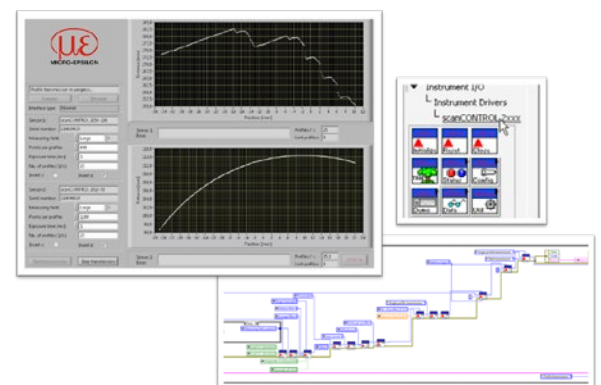
To get a quick start, the scanCONTROL AIK adapter for Cognex VisionPro comprises an elaborate documentation on all sensor settings and the necessary configuration steps in Cognex VisionPro.



## Integration with LabVIEW

The LabVIEW scanCONTROL instrument driver supports fast integration of scanCONTROL sensors into the LabVIEW application environment. For accessing a scanCONTROL sensor and its basic settings, users can drag-and-drop modules directly from the function palette into their VIs. Example VIs illustrating the scanCONTROL integration are also part of this package.

The integration of scanCONTROL sensors into the LabVIEW environment is based on the C/C++ library (LLT.DLL) of Micro-Epsilon. The documentation also shows how to set up additional special sensor parameters.



# Profile stitching for up to 8 sensors 3D Profile Unit

**NEW**

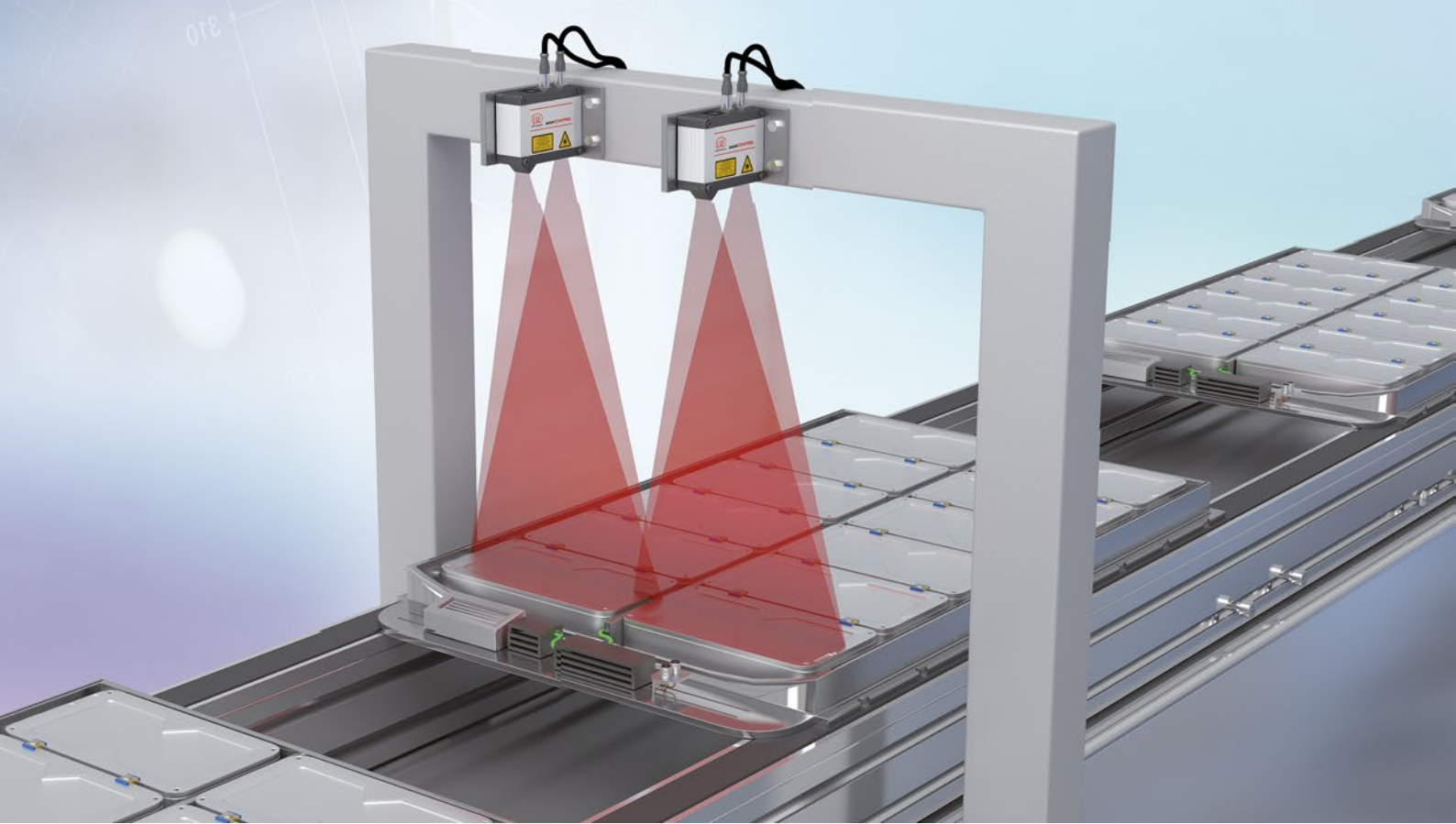
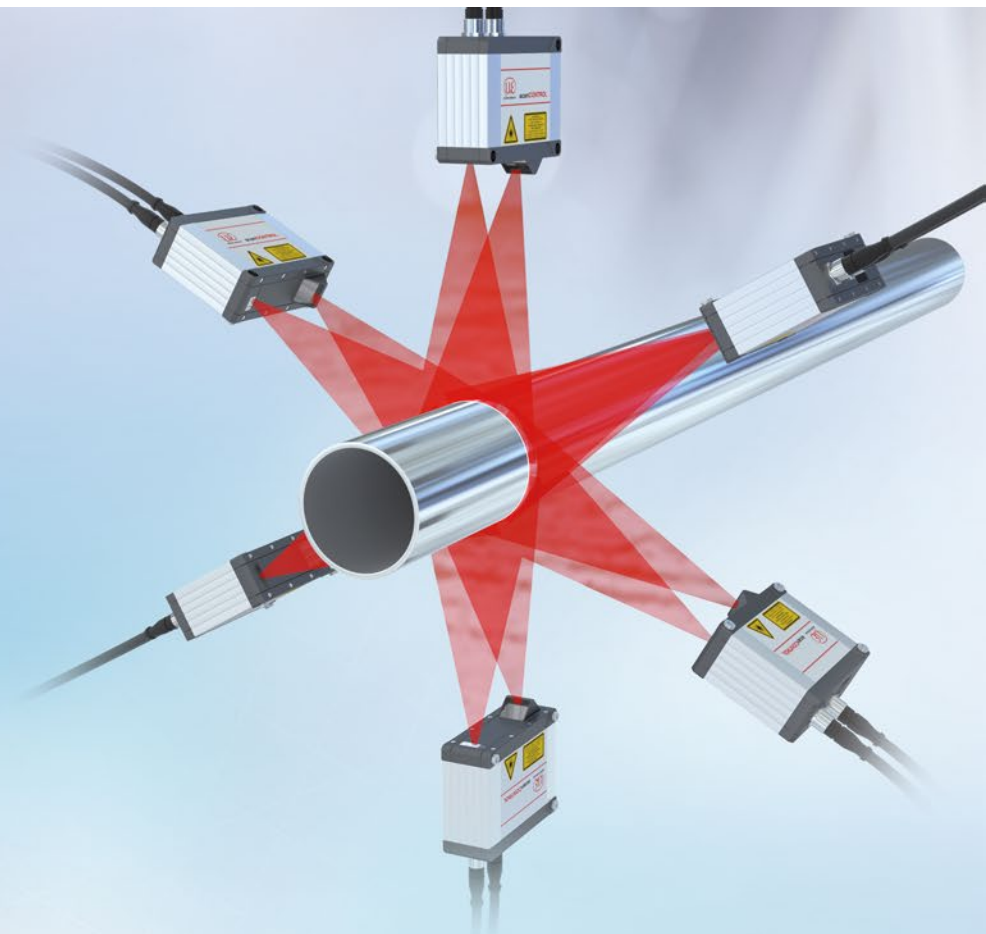
Profile stitching for up to 8 laser scanners

Integration in GigE Vision as raw data provider

Industrial Ethernet connection for control and transmission of measured values

Evaluation of composite 2D sections or 3D point clouds

Compatible with scanCONTROL 30xx





The 3D Profile Unit enables the calculation of several individual profiles of scanCONTROL 30xx sensors in a common coordinate system. This is how a composite 2D profile or a composite 3D point cloud can be generated. This enables the detection of various geometries, the extension of measuring ranges and the performance of thickness measurements.

The evaluation of the data and the parameterization of the system can be implemented in the 3DInspect software. The 3D-Profile-Unit controller offers an optional integrated evaluation feature in conjunction with the Industrial Ethernet connection, enabling the application to be controlled and measured values to be output to a PLC.

Alternatively, the 3D-Profile-Unit controller can also be integrated into common image processing programs via GigE Vision and acts as a raw data provider.

### 3D-Profile-Unit Controller

- Communication with any GigE Vision clients
- Direct integration into image processing software
- Transfer of profile data or 3D point clouds

### 3D-Profile-Unit Controller with Industrial Ethernet

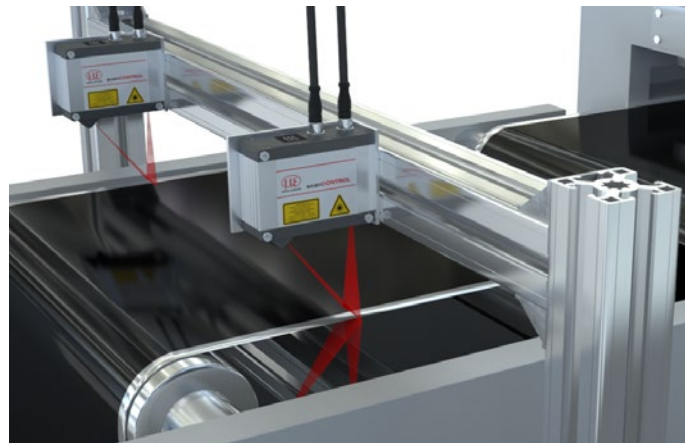
- Integrated evaluation
- Transmission of measured values
- Industrial Ethernet interface for control and transmission of measured values



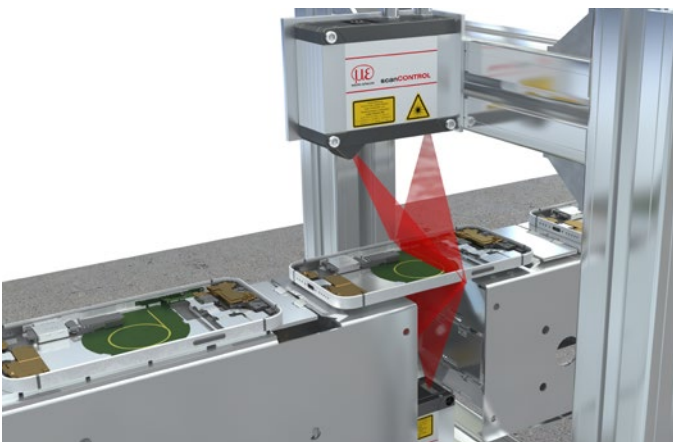
### Application examples:



Volume measurement of food



Width, thickness and Heavy Edge of battery film



Thickness of smartphone carrier plates



Inspection of pouch cells

# Accessories

## scanCONTROL

### 2D/3D Gateway

#### PROFINET / EtherCAT / EtherNet/IP for all SMART scanners

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 scanCONTROL SMART sensor 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 parameterized in advance at the factory.

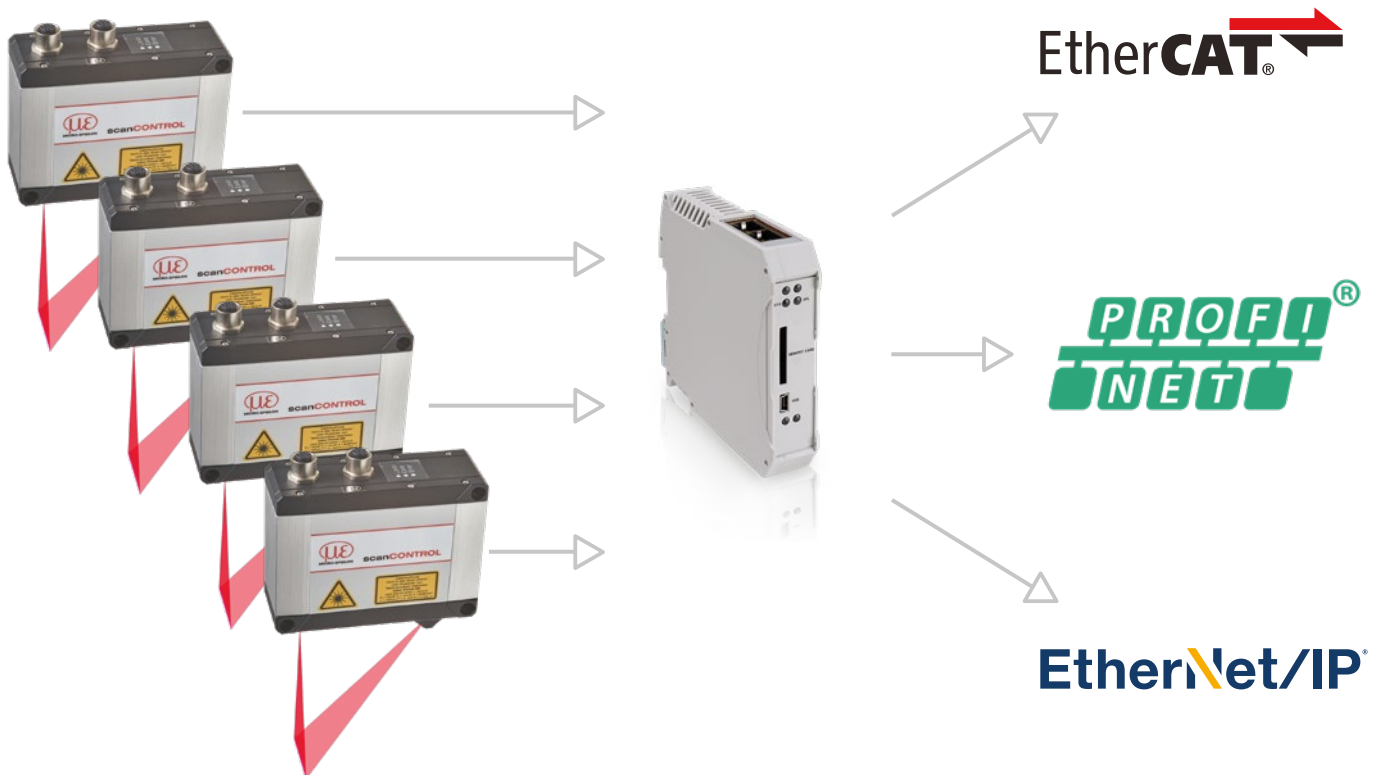
#### Models

|             |                                  |   |
|-------------|----------------------------------|---|
| 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                    |

| Number of sensors on the gateway | Maximum measurement frequency |
|----------------------------------|-------------------------------|
| 1                                | 500 Hz                        |
| 2                                | 500 Hz                        |
| 3                                | 330 Hz                        |
| 4                                | 250 Hz                        |

**NEW**

Higher measurement frequencies are also possible with the 30xx sensors due to the Modbus bundling option.



## 2D/3D Output Unit

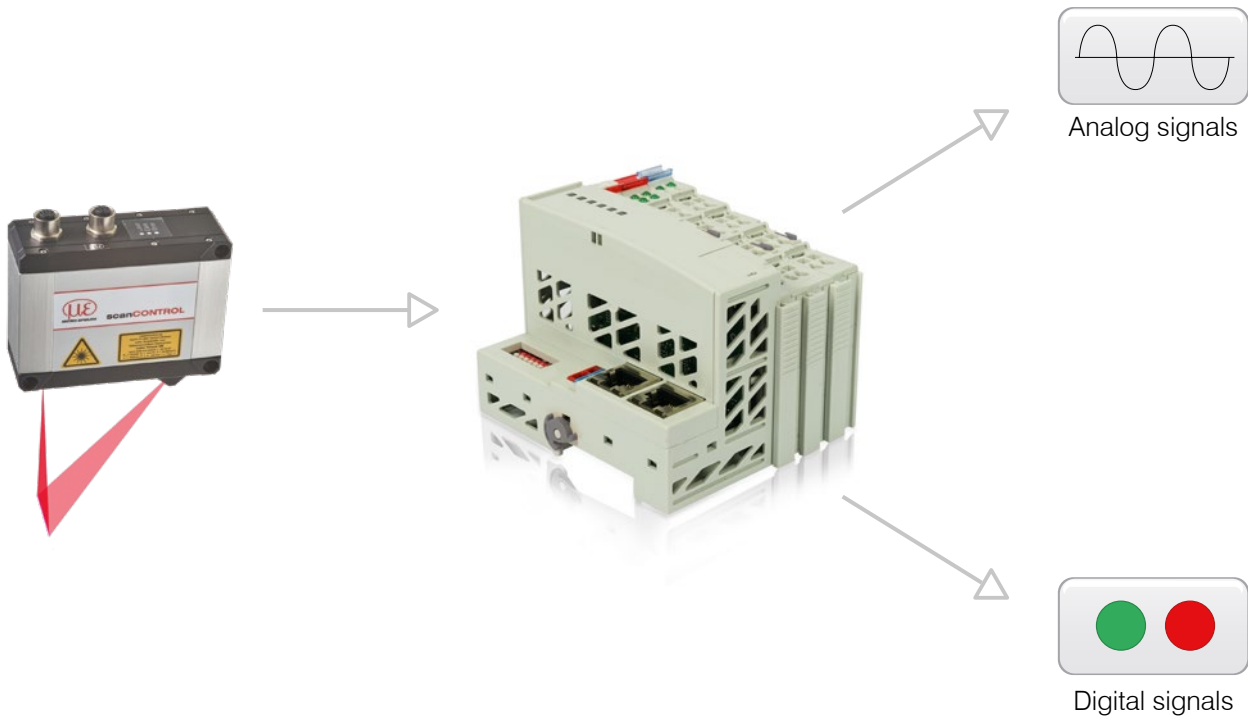
### Analog signals / digital switch signals for all SMART scanners

The 2D/3D Output Unit is addressed via Ethernet and outputs analog and digital signals. Different output terminals can be connected to the fieldbus coupler.

#### Models

|         |   |   |
|---------|---|---|
| 6414073 | 2D/3D Output Unit Basic/ET                  | Fieldbus coupler with filter module and bus end terminal              |
| 0325131 | OU-DigitalOut/8-channel/DC24V/0.5A/negative | 8-channel digital output terminal; DC 24 V; 0.5 A; negative switching |
| 0325115 | OU-DigitalOut/8-channel/DC24V/0.5A/positive | 8-channel digital output terminal; DC 24 V; 0.5 A; positive switching |
| 0325116 | OU-AnalogOut/4-channel/ $\pm 10$ V          | 4-channel analog output terminal; $\pm 10$ V                          |
| 0325135 | OU-AnalogOut/4-channel/0-10 V               | 4-channel analog output terminal; 0-10 V                              |
| 0325132 | OU-AnalogOut/4-channel/0-20 mA              | 4-channel analog output terminal; 0-20 mA                             |
| 0325133 | OU-AnalogOut/4-channel/4-20 mA              | 4-channel analog output terminal; 4-20 mA                             |

Other terminals available on request.



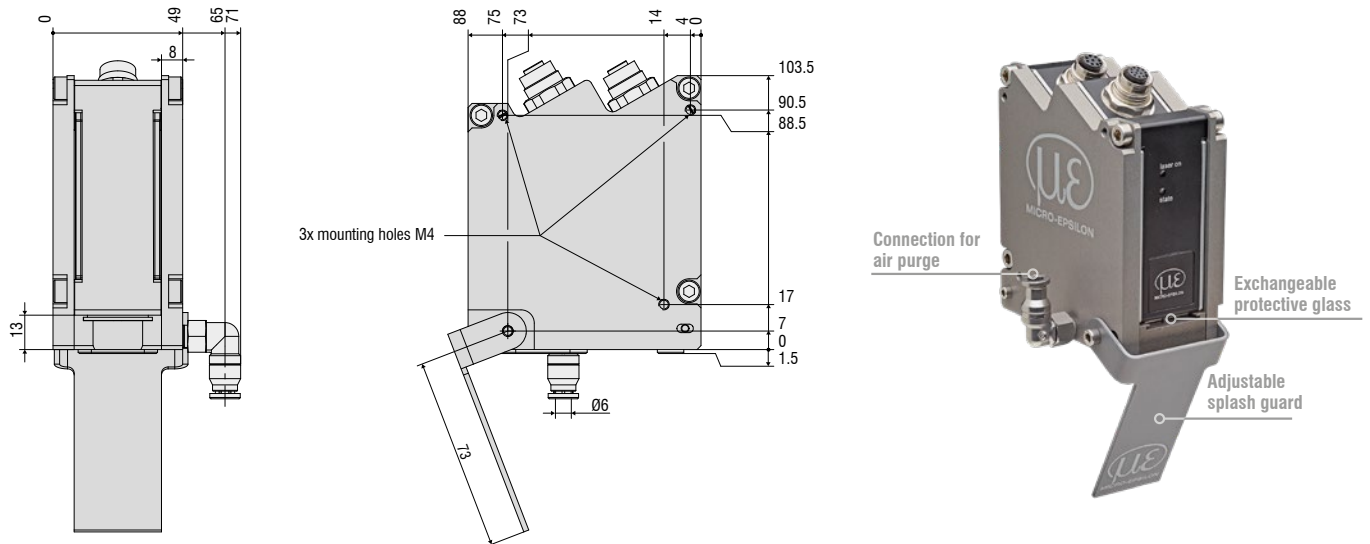
# Accessories

## scanCONTROL

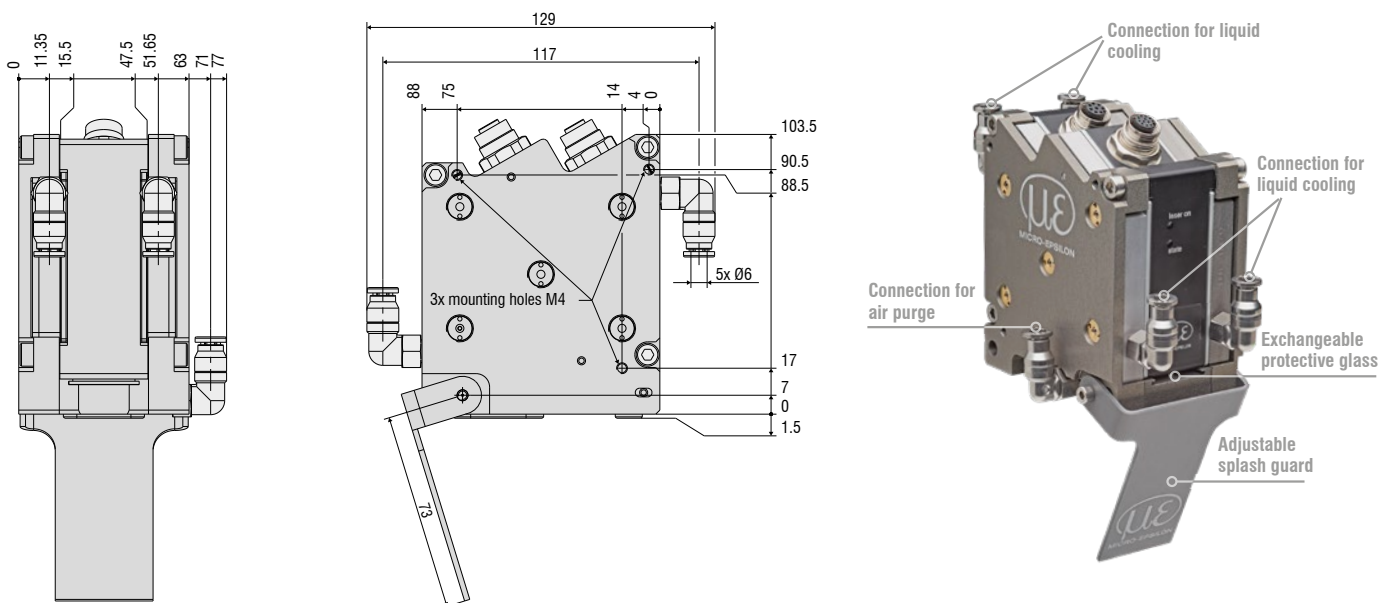
### Protection and cooling housing for LLT25x0 and 29xx

(Not available for scanCONTROL 29xx-10/BL)

#### Protective housing with blow-out system



#### Protective housing with blow-out system and water cooling



#### Art. no. Model

- 2105058 Protective housing for LLT25/29 series
- 2105059 Protective cooling housing for LLT25/29 series
- 0755075 Exchangeable glass for protective housing LLT25/29

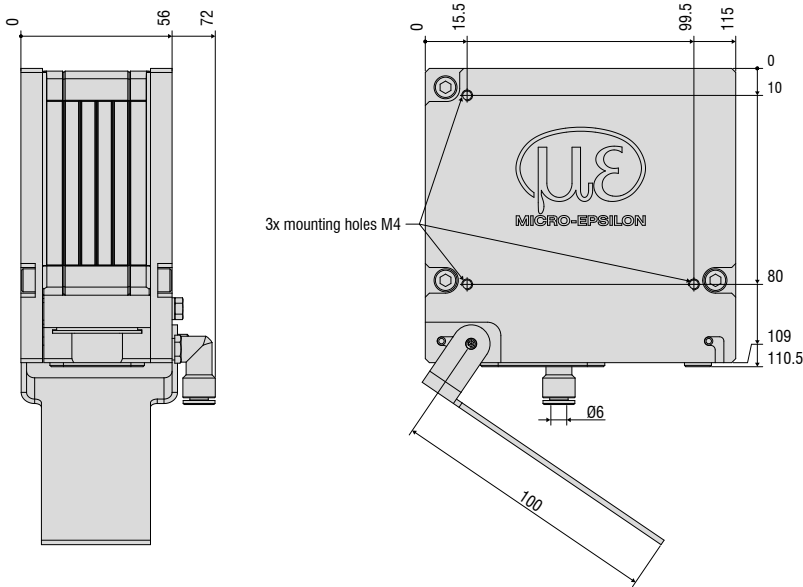
#### Description

- Adaptive protective housing for LLT25x0/29xx
- Adaptive protection and cooling housing for LLT25x0/29xx
- Exchangeable glass for protection/cooling concept LLT25/29, packaging unit with 50 pcs.

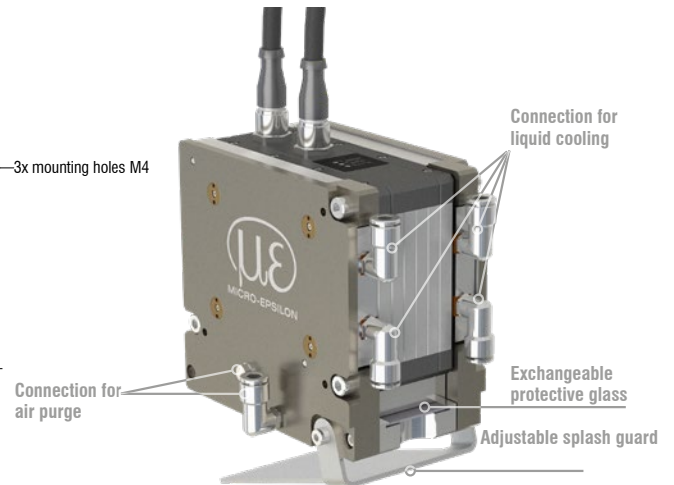
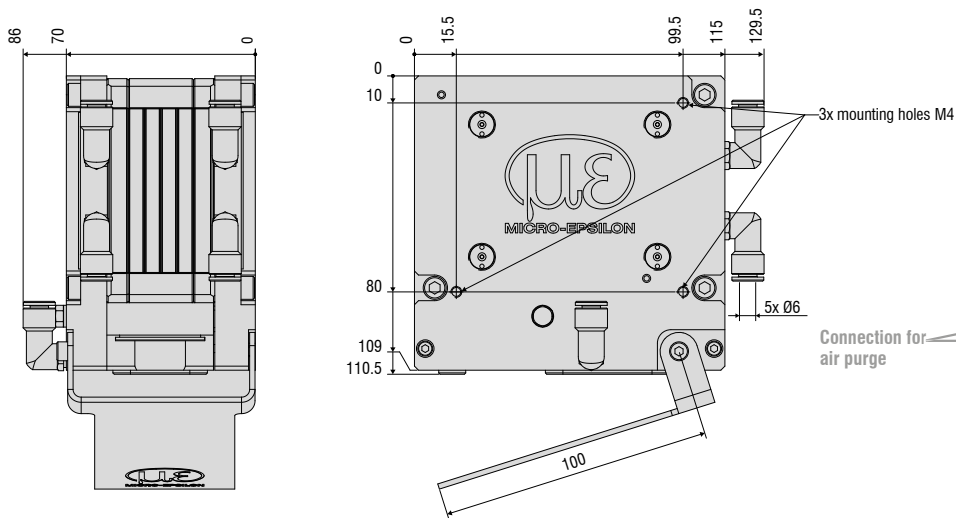
## Protection and cooling housing for LLT30xx

for the measuring ranges 25 - 200 mm

### Protective housing with blow-out system



### Protective housing with blow-out system and water cooling



#### Art. no. Model

- 2105076 Protective housing for LLT30 series
- 2105077 Protective housing for LLT30 series
- 0755083 Exchangeable glass for protective housing LLT30

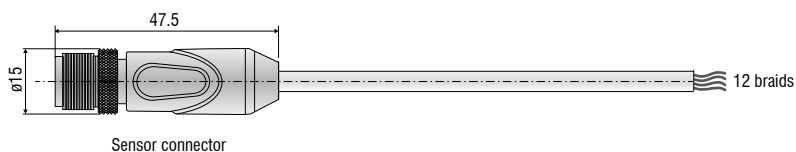
#### Description

- Adaptive protective housing for LLT30xx
- Adaptive protection and cooling housing for LLT30xx
- Exchangeable glass for protection/cooling concept LLT30, packaging unit with 30 pcs.

### Connection cables

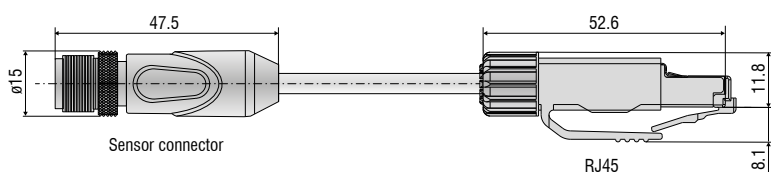
#### PCR3000-x Multi-function cable

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



#### SCR3000A-x Ethernet connection cable

Cable for parameter setting, value and profile transmission; suitable for drag chains and robots  
Cable length (m): 0.5 / 2 / 5 / 10 / 15 / 20 / 25 / 35



### Other accessories

#### Art. no. Model

0323478 Connector/12-pin/Multifunction for LLT25/29/30 series  
0323479 Connector/8-pin/Ethernet for LLT25/29/30 series  
2420067 PS25/29/30  
0254111 Case for LLT25/29/30 (up to MR 200)  
0254153 Case for LLT30 series, MR 430/600  
2960097 Measuring stand for LLT25/26/29/30 series  
2960115 Measuring stand for LLT30 series, MR 430/600

#### Description

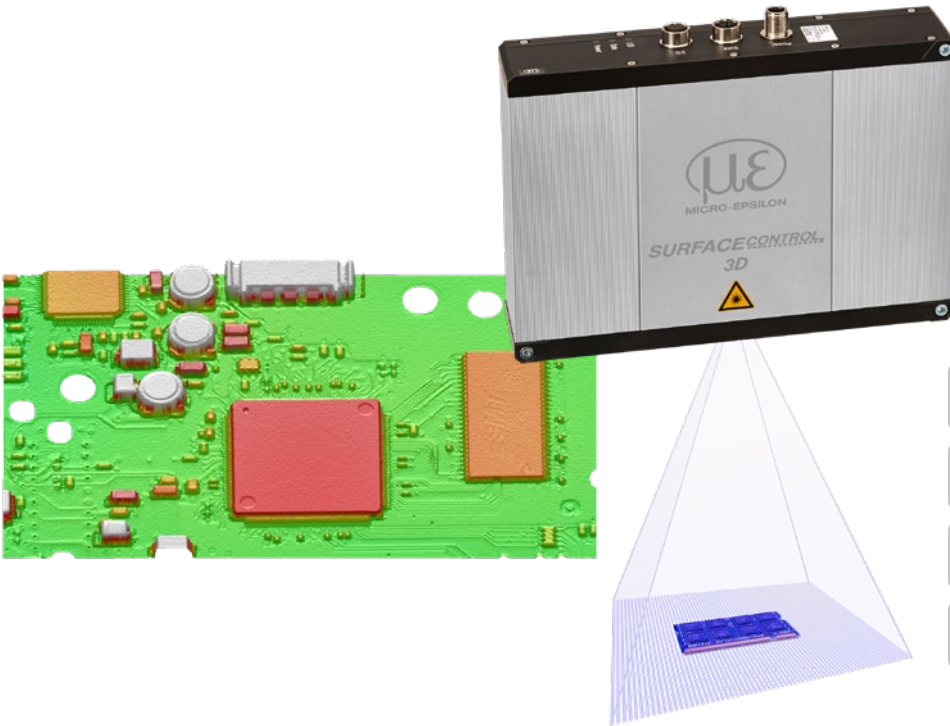
Plug for multifunction port  
Plug for Ethernet socket  
Power supply unit for scanCONTROL  
Transport case for scanCONTROL sensors incl. measuring stand  
Transport case for scanCONTROL sensors incl. measuring stand  
Measuring stand with sensor adapter board, flexible rod and clamp base  
Measuring stand with sensor adapter board, flexible rod and clamp base



# 3D snapshot sensors for the inspection of shapes and surfaces

## surfaceCONTROL 3D 3500

Innovative 3D snapshot sensor for inline inspection of geometry, shapes and surfaces

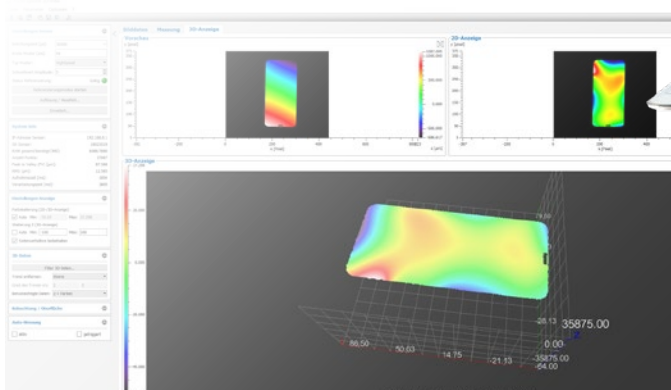
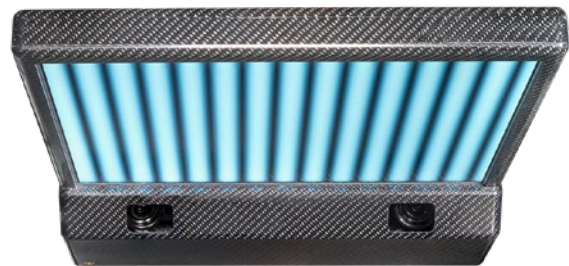


- Highest repeatability up to  $0.25 \mu\text{m}$
- Best Z-axis resolution from  $0.7 \mu\text{m}$
- Up to 2.2 million 3D points / second
- Easy integration in all common 3D image processing packets

## reflectCONTROL

3D inline inspection of shiny surfaces: flat glass, mirrors and wafers

- Complete inspection of reflecting and shiny surfaces
- Highest z-accuracy  $< 1 \mu\text{m}$
- Fastest 3D inspection  $< 1 \text{ s}$
- High compatibility via different interfaces



## Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, position and dimension



Sensors and measurement devices for non-contact temperature measurement



Measuring and inspection systems for quality assurance



Optical micrometers, fiber optics, measuring and test amplifiers



Color recognition sensors, LED Analyzers and inline color spectrometers



3D measurement technology for dimensional testing and surface inspection

