

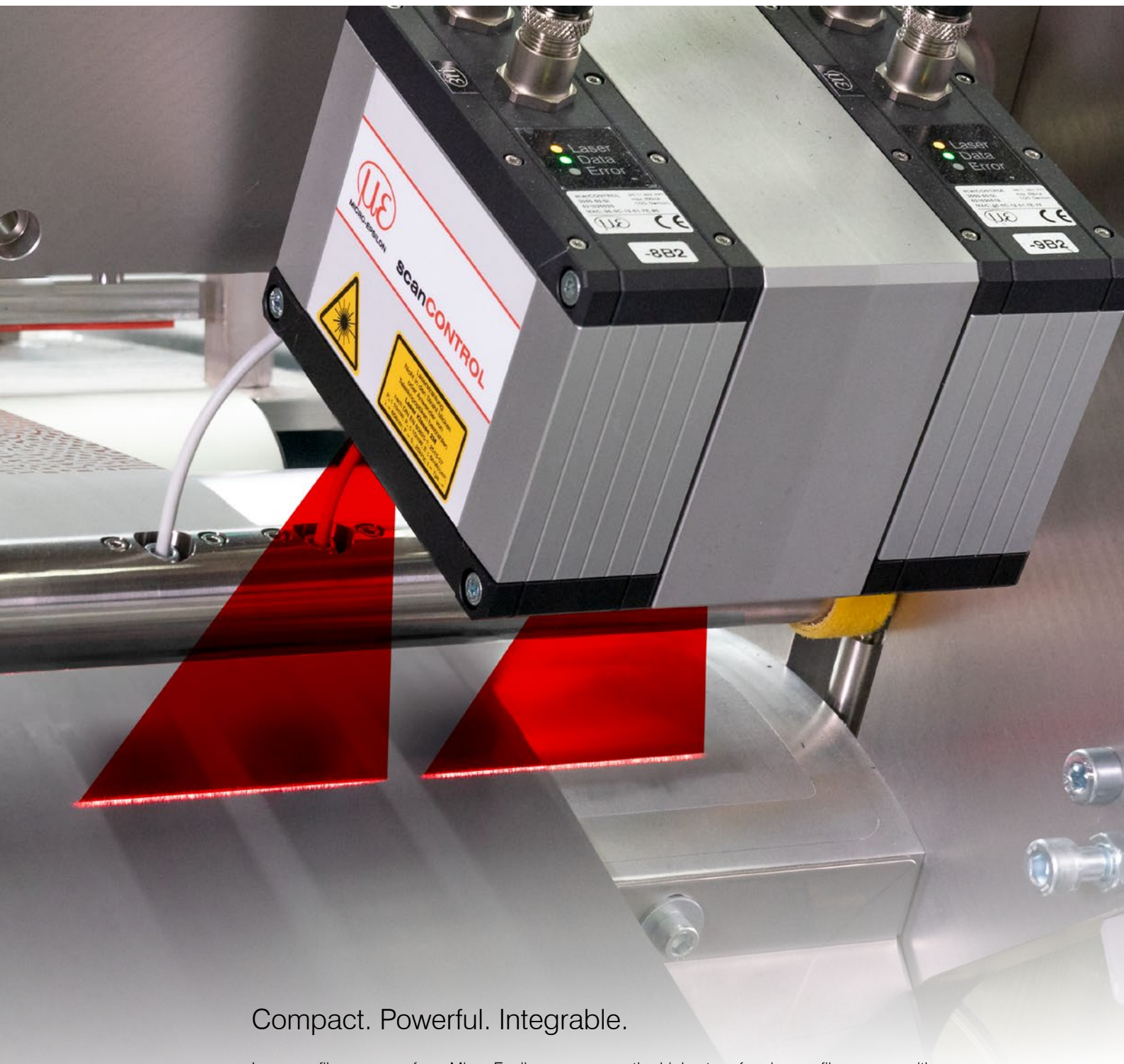


# More Precision

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



## Powerful laser scanners for 2D and 3D measurements scanCONTROL



### 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.

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.

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

| <b>General information</b>      | <b>Page</b> |
|---------------------------------|-------------|
| Measurement areas               | 4 - 5       |
| Measuring principle             | 6           |
| Software features               | 7           |
| Advantages and special features | 8- 9        |
| Application examples            | 10 - 11     |

| <b>Laser scanners</b> | <b>Page</b> |
|-----------------------|-------------|
| scanCONTROL 25x0      | 12 - 13     |
| scanCONTROL 29x0      | 14 - 15     |
| scanCONTROL 30x2      | 20 - 23     |
| scanCONTROL 30x0      | 24 - 27     |

| <b>Integration/Software</b> | <b>Page</b> |
|-----------------------------|-------------|
| Integration/Software        | 34 - 35     |
| 3DInspect software          | 36 - 37     |

| <b>System for multi-scanner applications</b>         | <b>Page</b> |
|--|-------------|
| 3D Profile Unit – Controller for profile calculation | 38          |

| <b>Accessories</b>                  | <b>Page</b> |
|-------------------------------------|-------------|
| 2D/3D Gateway                       | 39          |
| 2D/3D Output Unit                   | 39          |
| Housings for protection and cooling | 40 - 41     |
| Connection cables                   | 42          |

# Measurement areas

## scanCONTROL

LLT29xx-10 BL

Blue Laser

Measurement area  
10 x 8 mm



LLT2xxx-25

Red Laser

Blue Laser

Measurement area  
25 x 25 mm



LLT2xxx-50

Red Laser

Blue Laser

Measurement area  
50 x 60 mm

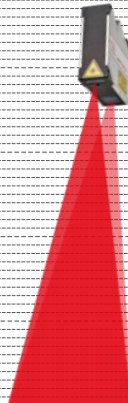


LLT2xxx-100

Red Laser

Blue Laser

Measurement area  
100 x 265 mm



LLT30xx-25

Red Laser

Blue Laser

Measurement area  
25 x 15 mm



LLT30xx-50

Red Laser

Blue Laser

Measurement area  
50 x 40 mm

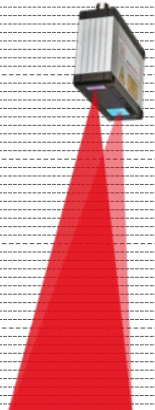


LLT30xx-100

Red Laser

Blue Laser

Measurement area  
100 x 170 mm



Resolution x-axis  
640 / 1,280 points

Max. profile frequency  
2,000 Hz

SMART

PROFILE

Resolution x-axis  
1,024 / 2,048 points

Max. profile frequency  
10,000 Hz

SMART

PROFILE

3DInspect

LLT30xx-200

Red Laser

Measurement  
area  
200 x 300 mm

LLT30xx-430

Red Laser

Measurement  
area  
430 x 390 mm

LLT30xx-600

Red Laser

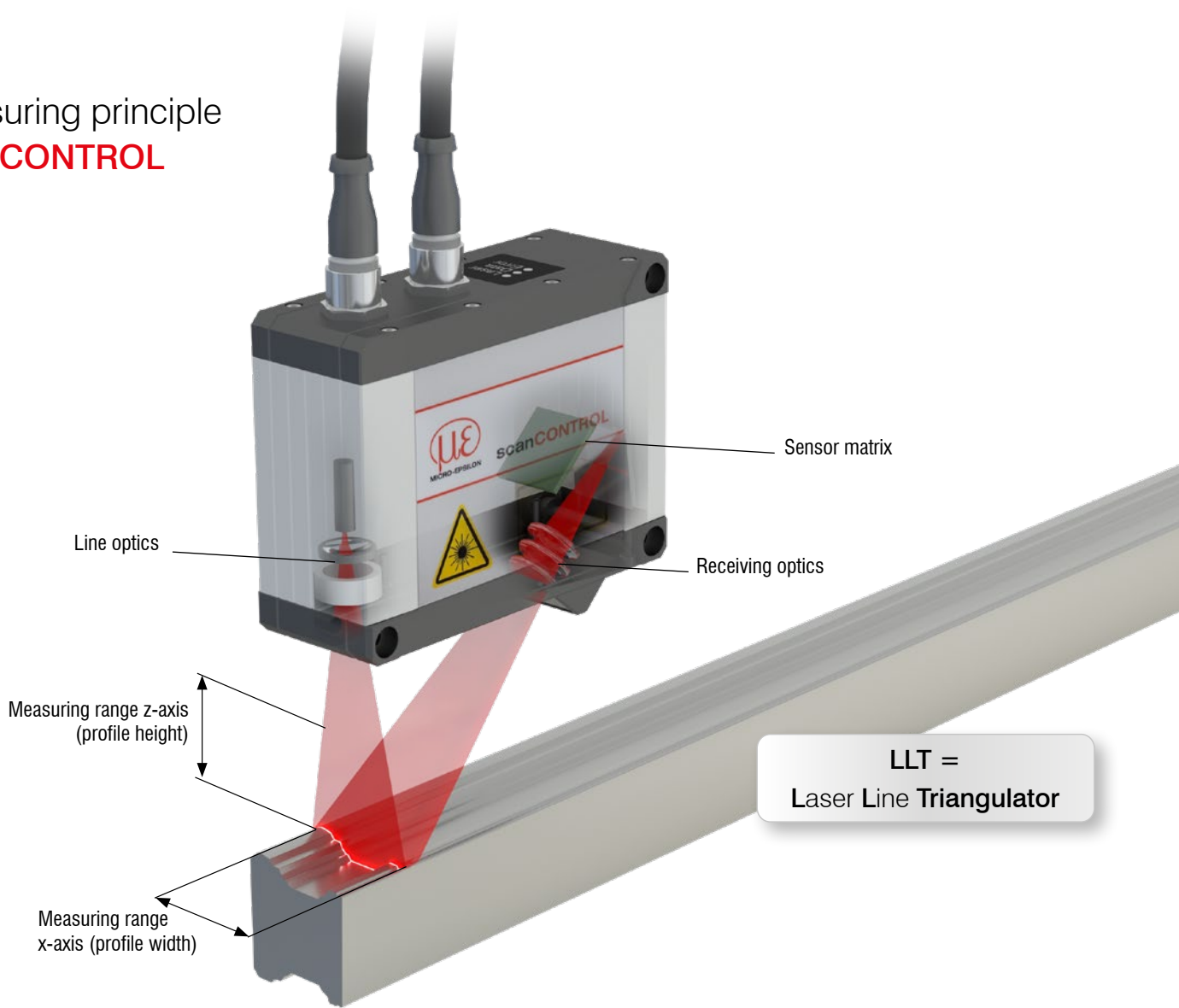
Measurement  
area  
600 x 600 mm

Resolution x-axis  
1,024 / 2,048 points

Max. profile frequency  
10,000 Hz

SMART PROFILE 3DInspect

# Measuring principle scanCONTROL



## Laser line triangulation

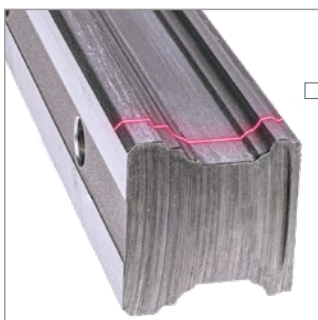
Laser scanners – often referred to as profile sensors – use the laser triangulation principle for two-dimensional profile detection on different target surfaces.

## Highly sensitive lens systems

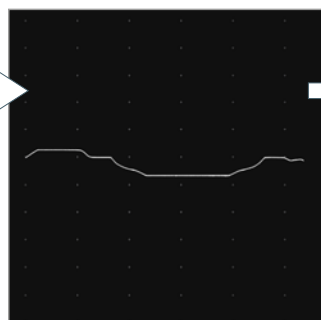
By using highly-sensitive special lenses, a laser beam is enlarged to form a static laser line and is projected onto the target surface. The receiving optics projects the diffusely reflected light of this laser line onto a highly sensitive sensor matrix.

## Performance controller

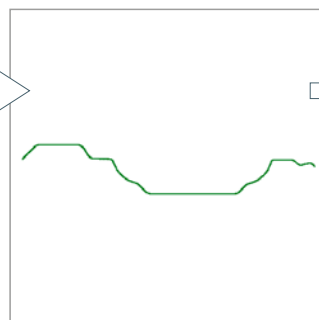
In addition to distance information (z-axis), the controller also uses this camera image to calculate the position along the laser line (x-axis). These measured values are subsequently output in a two-dimensional coordinate system that is fixed with respect to the sensor. In the case of moving objects or a traversing sensor, it is therefore possible to obtain 3D measurement values.



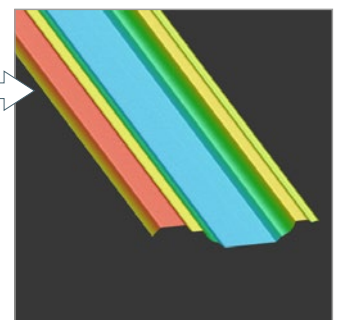
**Laser line**  
Projecting a laser line onto the target surface



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



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



**3D measurement values**

# Software features

## scanCONTROL

### SMART



#### Integrated evaluation

##### Profile evaluation directly in the sensor head

The SMART models provide selected measurement values. The measuring programs are parameterized on the PC and saved directly in the sensor controller. Therefore, no external controller is required.

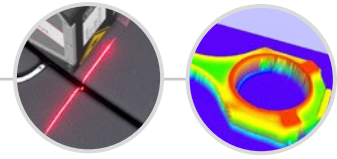
### scanCONTROL Configuration Tools

#### Software solution for complex 2D measurement tasks

- Measuring programs featuring 94 evaluation variants
- Parameter set freely selectable from over 30 measuring programs
- Inclination correction for obliquely detected profiles
- Easy alignment and adjustment of sensor
- Logical operations for digital outputs
- Configuration of the measurement value transfer and the outputs



### PROFILE



#### Evaluation by customer

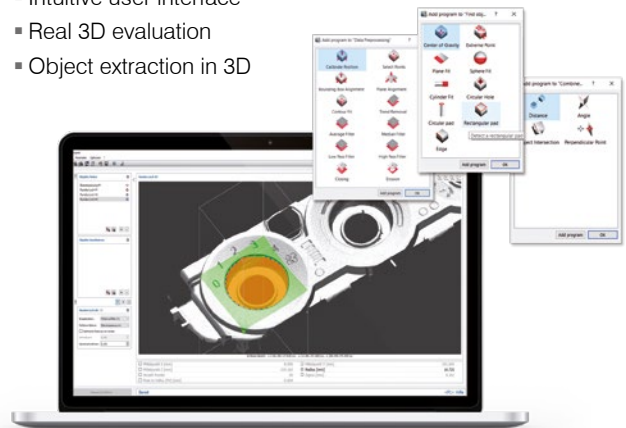
##### Output of high precision 2D profiles and 3D point clouds

The PROFILE models provide calibrated profile data that can be further processed on a PC. These can be used for 2D and 3D measurement tasks.

### 3DInspect

#### High-performance software for 3D measurement tasks

- Powerful tool for sensor parameter set up and industrial measurement tasks
- Intuitive user interface
- Real 3D evaluation
- Object extraction in 3D



#### Software integration SDKs

- Powerful SDKs (LLT.DLL) support developers in integrating scanCONTROL sensors into their own environments

**COGNEX® VisionPro**



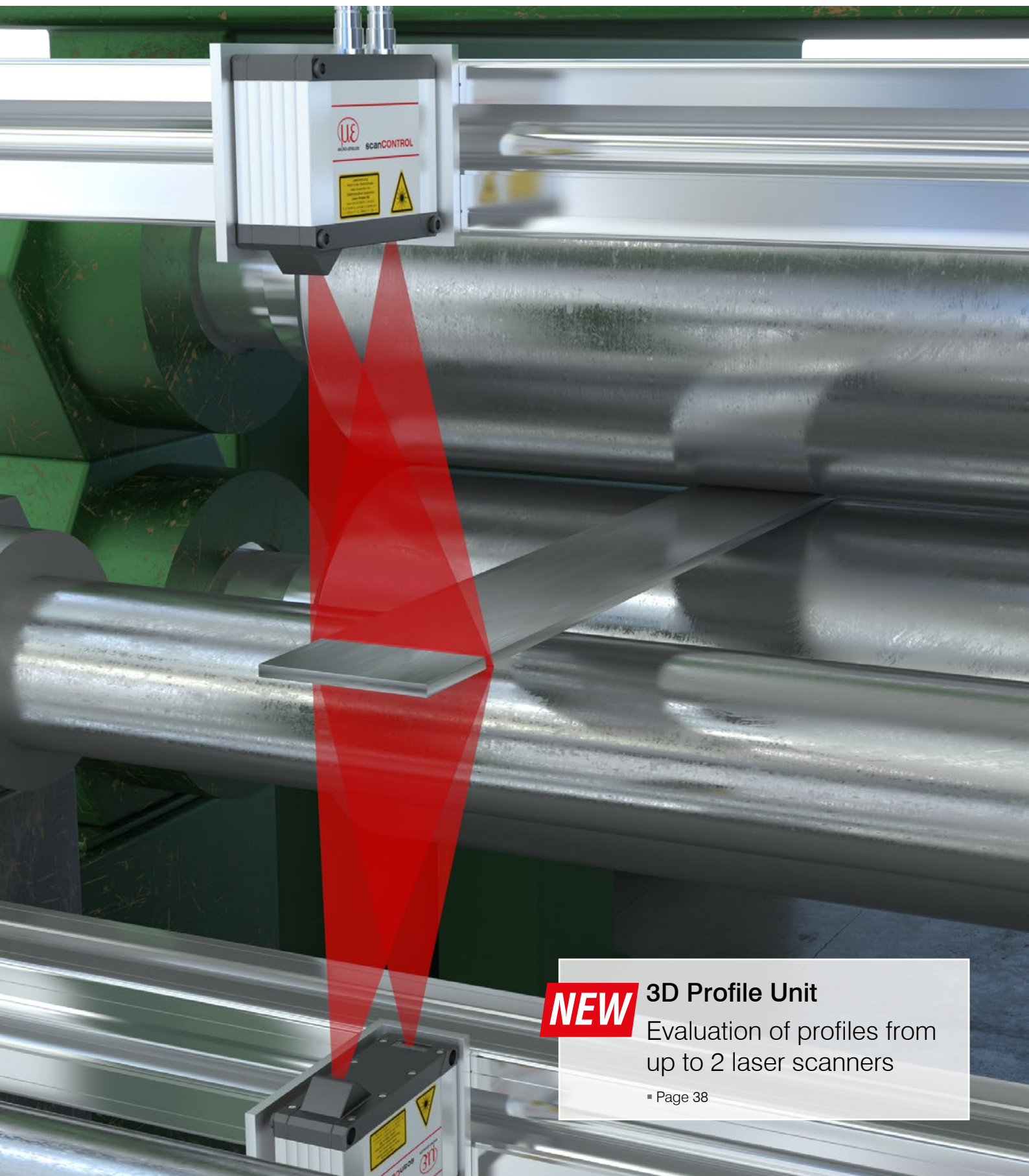
### Online tutorials for software features



[micro-epsilon.com/  
service/tutorials/](http://micro-epsilon.com/service/tutorials/)



Advantages and special features  
**scanCONTROL**



**NEW**

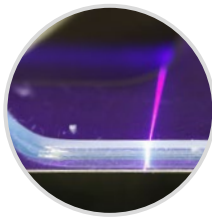
**3D Profile Unit**

Evaluation of profiles from  
up to 2 laser scanners

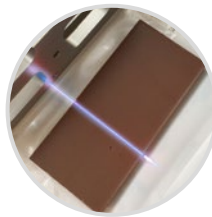
▪ Page 38



Red-hot glowing objects



Transparent surfaces



Organic materials

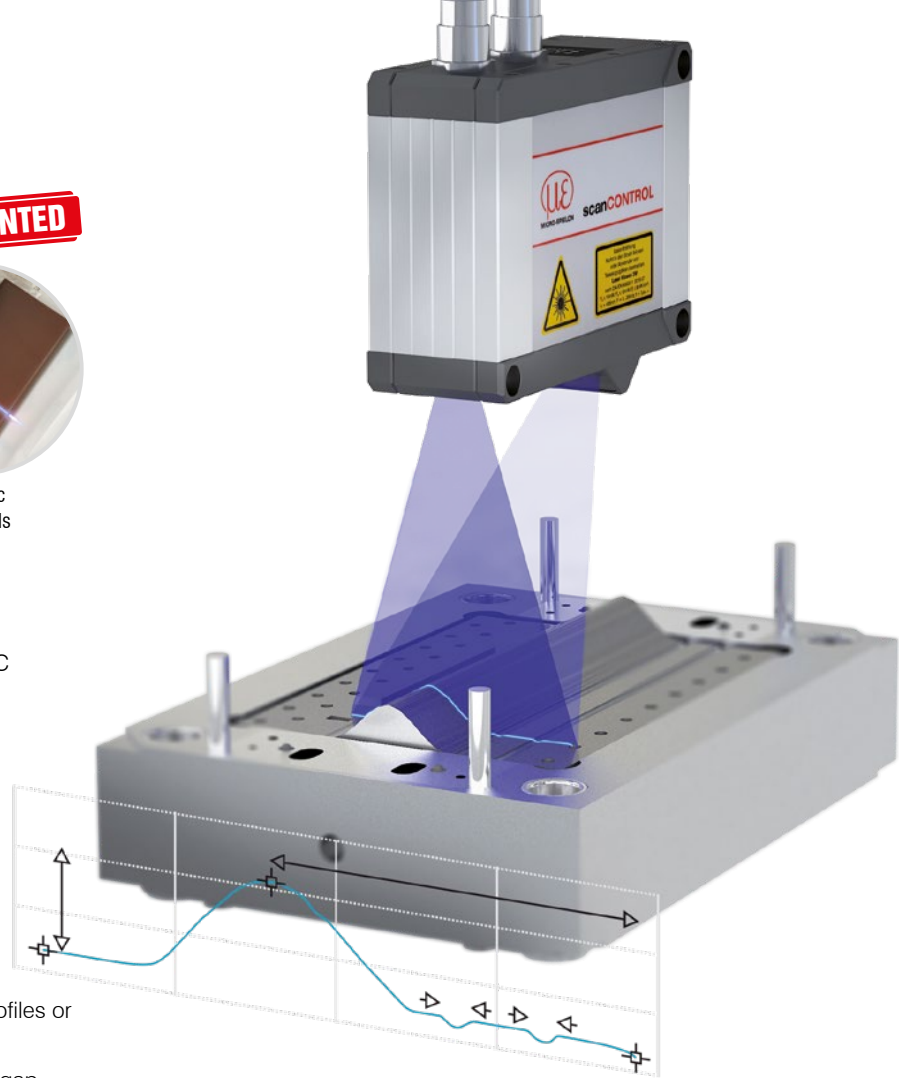
**PATENTED**

## Patented Blue Laser Technology

- Internationally patented measuring method for precise measurements on red-hot glowing objects above 700 °C
- Reliable for transparent objects such as plastic, glass, adhesives, silicone, paints, coatings
- Stable measurements on organic objects

## Universal Application

- Comprehensive scanner portfolio for transmission of profiles or measured values in industrial measurement tasks
- 2D inline measurement of different parameters such as gap, step, radius, circle
- 3D data and images for image processing



## Ideal for Robots & Multi-Sensor Applications

- Ideal for integration in robot applications
- Evaluation of up to 8 scanners by the 3D Profile Unit
- Low weight, no external controller



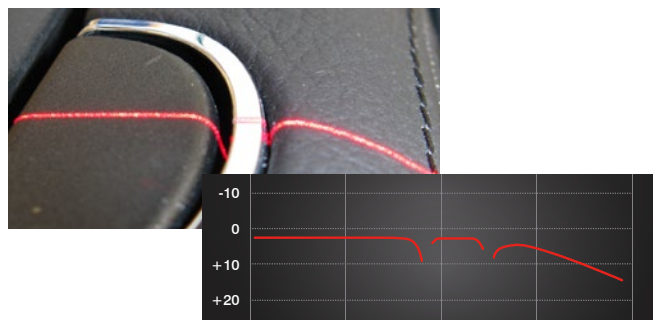
## Space-Saving Lateral Cable Outlet

- Reduces the installation height by 47%
- "Rear-tail" version available for all scanCONTROL 3002 and 3000 models (up to 200 mm measuring range)

## Real Time Surface Compensation

### Dynamic adaption to rapidly changing surfaces

- Real-time detection of reflective surfaces
- Enables stable measurement results
- scanCONTROL 3000 series with additional HDR function



# Application examples

## scanCONTROL

### scanCONTROL Red Laser

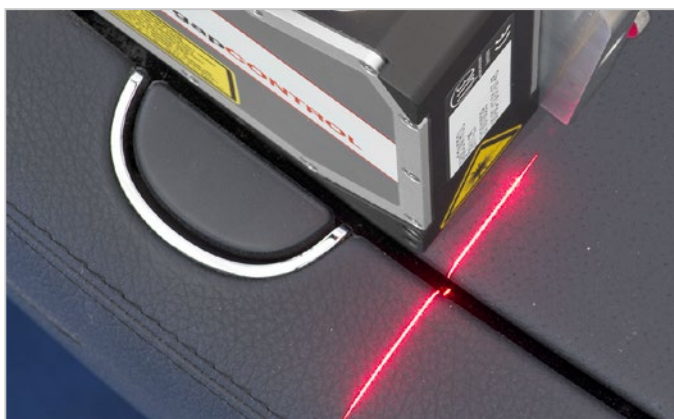
Red laser scanners are ideally suited to numerous measurement tasks. A higher light intensity and better performance on weakly reflective or matt surfaces, especially with fast moving objects, make the red laser scanners ideal for common measurement tasks.



Inspection of the adhesive beading



V-seam measurement on pipes



Distance measurement at the center console



Gap measurement on car bodies



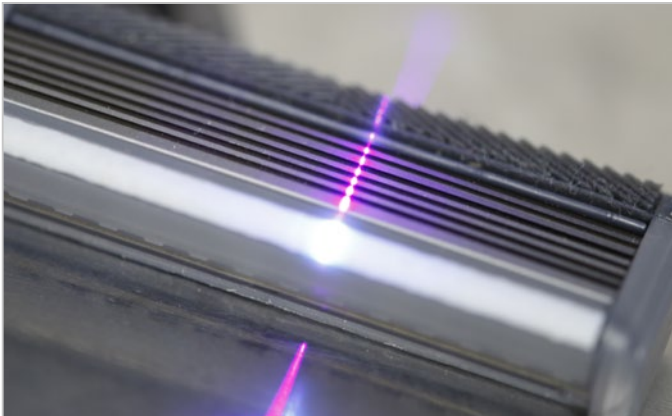
Tire control



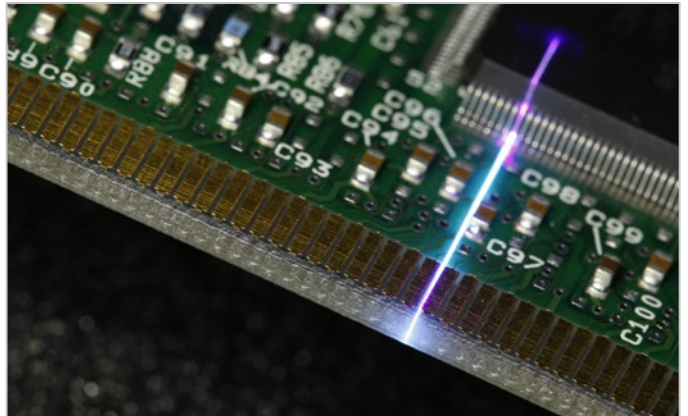
Text recognition on the cast part

## scanCONTROL BL Blue Laser

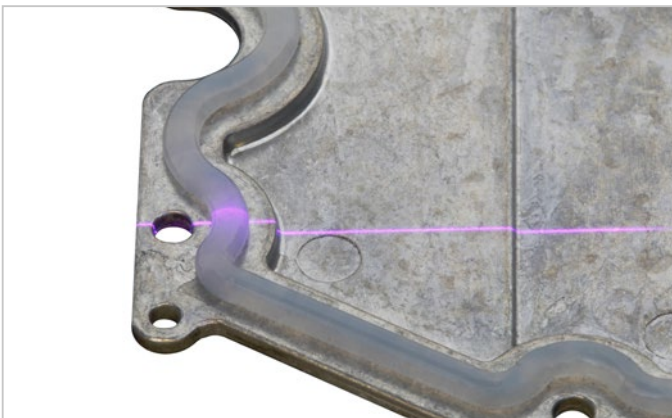
For profile measurements on red-hot glowing metals as well as transparent and organic surfaces, laser scanners with blue laser line are recommended. While allowing higher stability, the blue laser light does not penetrate the measuring object due to the shorter wavelength of the blue-violet laser. This allows incandescent, organic and (semi-)transparent objects to be measured more reliably compared to the red laser.



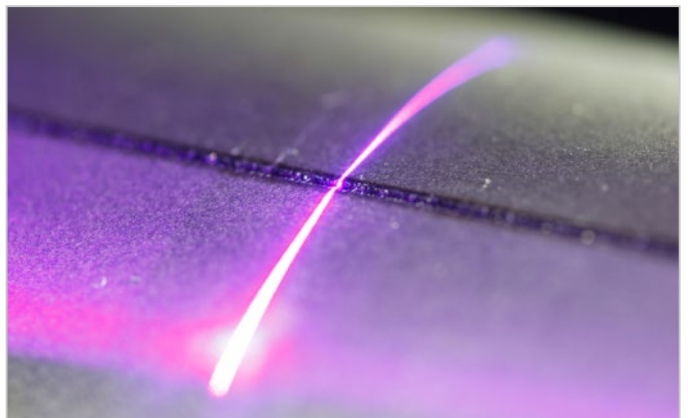
Razor blade angle



Position of electronic components



Inspection of silicone beads



Completeness of laser welding seams





Dimensional measurement of extremely small, mechanical structures



Production of steel-forged rings

# 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**



**SMART**  
**PROFILE**

### 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. As PROFILE scanners, they provide calibrated profile data that can be further processed on a PC using software provided by the customer. The SMART scanners work independently and provide selected measurement values. All sensor parameters and the desired measurement programs are set in the scanCONTROL Configuration Tools software and saved directly in the internal controller.


### Ideal for production and machine monitoring

The scanCONTROL 25x0 series scanners are available in three different measuring ranges with a 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 range</b><br>25 mm<br>50 mm<br>100 mm |    |    |     |     |
| <b>Class</b><br>00=PROFILE<br>10=SMART             |    |    |     |     |
| <b>Series</b><br>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 39

| Model  |                                    | LLT25xx-25  | LLT25xx-50    | LLT25xx-100   |
|--|------------------------------------|---|---------------|---------------|
| Measuring range (z-axis)                                     | 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        |
|  | Height of measuring range          | 25 mm   | 50 mm         | 100 mm        |
| Extended measuring range (z-axis)                            | Start of measuring range           | 53 mm   | 65 mm         | 125 mm        |
|  | End of measuring range             | 79 mm   | 125 mm        | 390 mm        |
| Line linearity (z-axis) <sup>[1] [2]</sup>                   |                                    | 2 $\mu$ m   | 4 $\mu$ m     | 12 $\mu$ m    |
|  |                                    | $\pm$ 0.008 %   | $\pm$ 0.008 % | $\pm$ 0.012 % |
| Measuring range (x-axis)                                     | 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 (x-axis)                            | 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 (x-axis)  |                                    | 640 points/profile  |               |               |
| Profile frequency  |                                    | up to 2,000 Hz  |               |               |
| Interfaces   | Ethernet GigE Vision               | Output of measurement values Sensor control Profile data transmission   |               |               |
|  | Digital inputs                     | Mode switching Encoder (counter) Trigger  |               |               |
|  | RS422 (half-duplex) <sup>[3]</sup> | Output of measurement values Sensor control Trigger Synchronization   |               |               |
| Output of measurement values <sup>[4] [5]</sup>              |                                    | Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)<br>Analog; switch signal<br>PROFINET; EtherCAT; EtherNet/IP |               |               |
| Control and indicator elements                               |                                    | 3x color LEDs for laser, data and error   |               |               |
| Light source   | Red Laser                          | $\leq$ 8 mW   |               |               |
|  |                                    | Standard: laser class 2M, semiconductor laser 658 nm  |               |               |
|  | Blue laser                         | $\leq$ 20 mW  |               |               |
|  |                                    | Option: laser class 3B, semiconductor laser 658 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)                                |                                    | 2g / 20 ... 500 Hz  |               |               |
| Shock (DIN EN 60068-2-6)                                     |                                    | 15g / 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 across the measuring field (640 points)

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

<sup>[4]</sup> Analog | switching signal: Only in conjunction with 2D/3D output unit

<sup>[5]</sup> PROFINET | EtherCAT | EtherNet/IP: Only in conjunction with 2D/3D gateway

# Compact laser scanner with high precision

## scanCONTROL 29x0

- 2D/3D** 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
- BL** Also available with patented Blue Laser Technology
- Compatible with **COGNEX® VisionPro**



**SMART**  
**PROFILE**

### 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. As PROFILE scanners, they provide calibrated profile data that can be further processed on a PC using software provided by the customer. The SMART scanners work independently and provide selected measurement values. All sensor parameters and the desired measurement programs are set in the scanCONTROL Configuration Tools software and saved directly in the internal controller.

### Short 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 39

| Model   |                                    | LLT29xx-10/BL   | LLT29xx-25   | LLT29xx-50    | LLT29xx-100   |
|---|------------------------------------|---|--|---------------|---------------|
| Measuring range (z-axis)                        | 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 (z-axis)               | Start of measuring range           | -   | 53 mm  | 65 mm         | 125 mm        |
|   | End of measuring range             | -   | 79 mm  | 125 mm        | 390 mm        |
| Line linearity (z-axis) <sup>[1] [2]</sup>      |                                    | 1 $\mu$ m   | 2 $\mu$ m  | 4 $\mu$ m     | 12 $\mu$ m    |
|   |                                    | $\pm 0.0125$ %  | $\pm 0.008$ %  | $\pm 0.008$ % | $\pm 0.012$ % |
| Measuring range (x-axis)                        | 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 (x-axis)               | 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 (x-axis)                             |                                    | 1,280 points/profile  |  |               |               |
| Profile frequency                               | Standard                           | up to 300 Hz  |  |               |               |
|   | High speed                         | up to 2,000 Hz  |  |               |               |
| Interfaces                                      | Ethernet GigE Vision               | Output of measurement values Sensor control Profile data transmission   |  |               |               |
|   | Digital inputs                     | Mode switching Encoder (counter) Trigger  |  |               |               |
|   | RS422 (half-duplex) <sup>[3]</sup> | Output of measurement values Sensor control Trigger Synchronization   |  |               |               |
| Output of measurement values <sup>[4] [5]</sup> |                                    | Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)<br>Analog; switch signal<br>PROFINET; EtherCAT; EtherNet/IP |  |               |               |
| Control and indicator elements                  |                                    | 3x color LEDs for laser, data and error   |  |               |               |
| Light source                                    | Red Laser                          | -   | $\leq 8$ mW  |               |               |
|   |                                    | -   | Standard: laser class 2M, semiconductor laser 658 nm |               |               |
|   | Blue laser                         | -   | $\leq 20$ mW   |               |               |
|   |                                    | -   | Option: laser class 3B, semiconductor laser 658 nm   |               |               |
| Laser switch-off                                |                                    | 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)                   |                                    | 2g / 20 ... 500 Hz  |  |               |               |
| Shock (DIN EN 60068-2-6)                        |                                    | 15g / 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 across the measuring field (640 points)

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

<sup>[4]</sup> Analog | switching signal: Only in conjunction with 2D/3D output unit

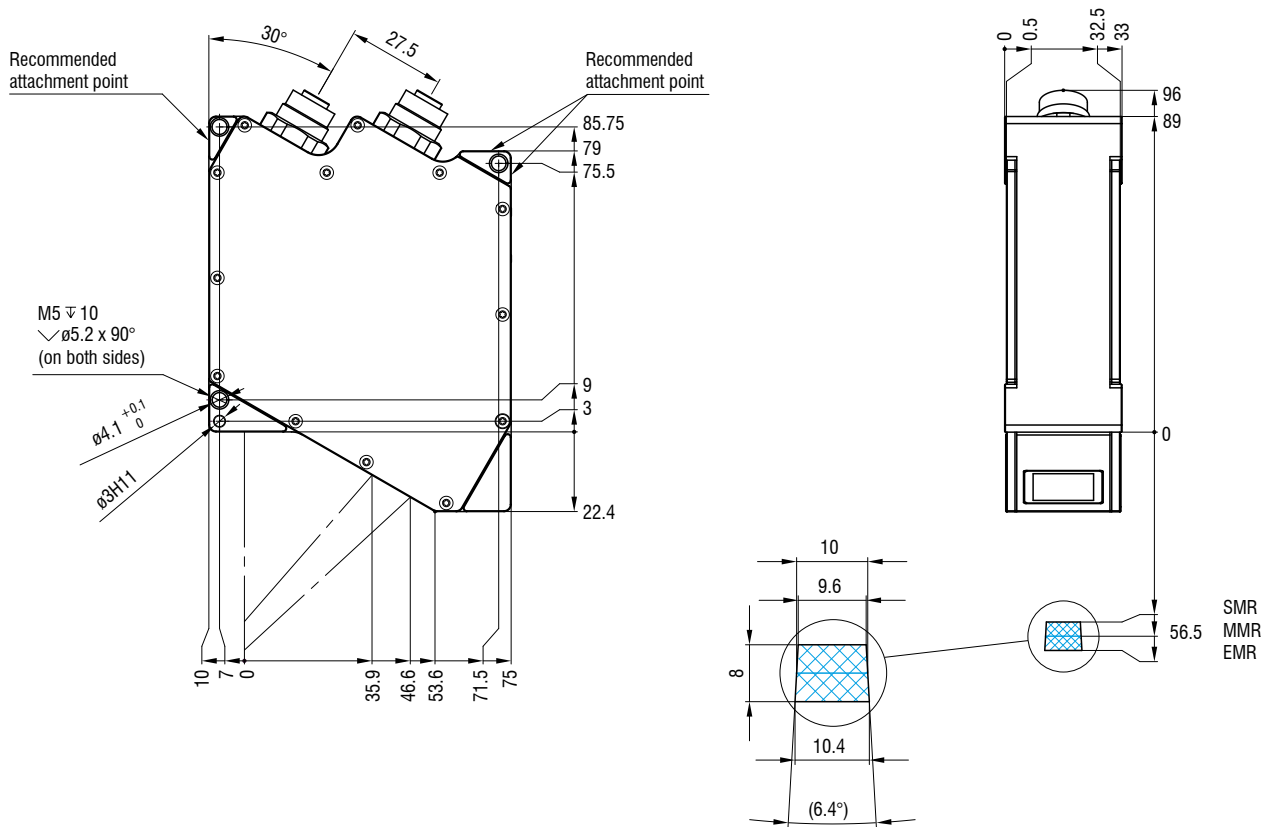
<sup>[5]</sup> PROFINET | EtherCAT | EtherNet/IP: Only in conjunction with 2D/3D gateway

# Dimensions and measuring ranges

## scanCONTROL

LLT29x0-10/BL

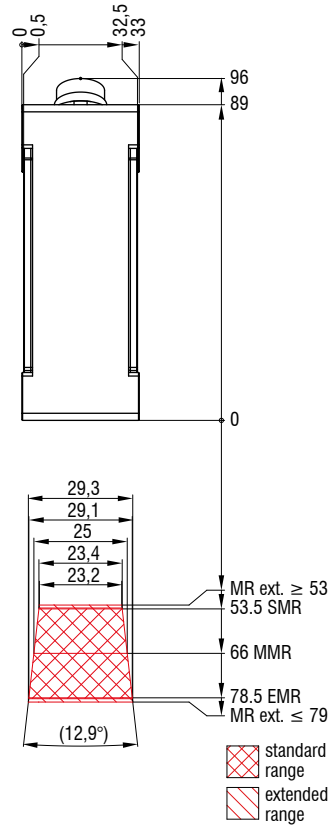
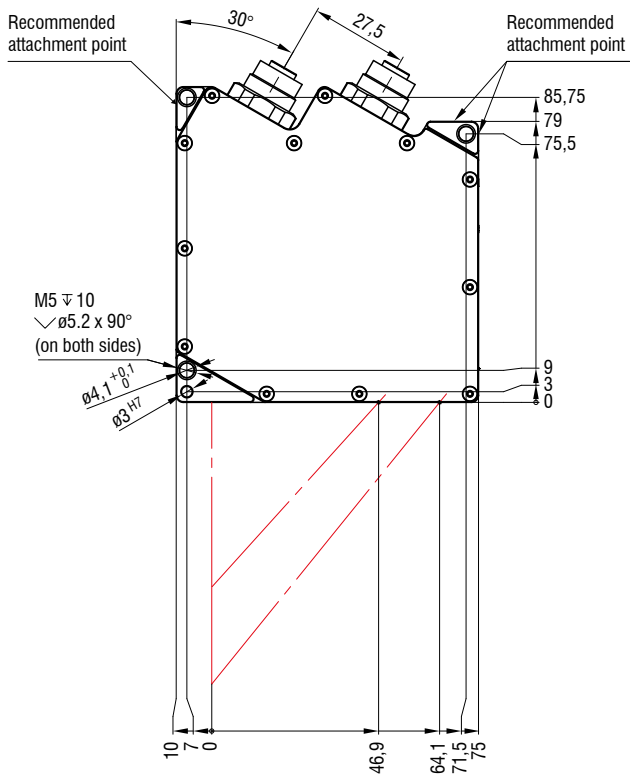
Blue Laser



(dimensions in mm, not to scale)

# LLT25x0-25 / LLT29x0-25

Red Laser    Blue Laser



(dimensions in mm, not to scale)

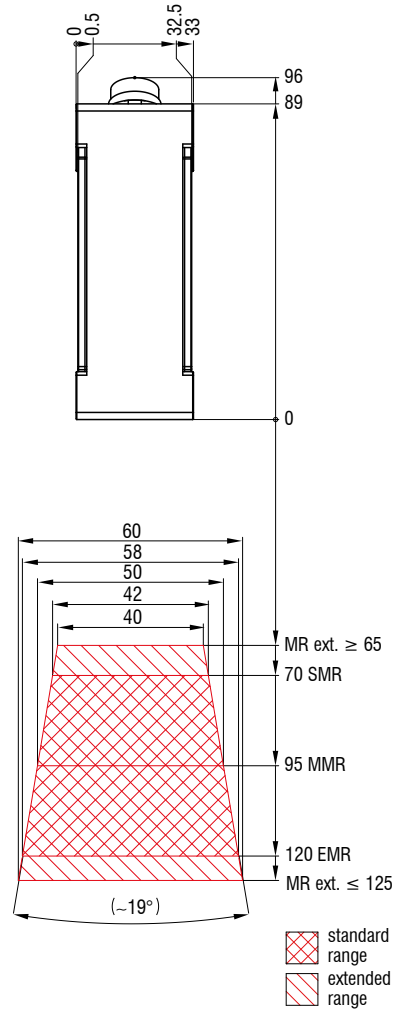
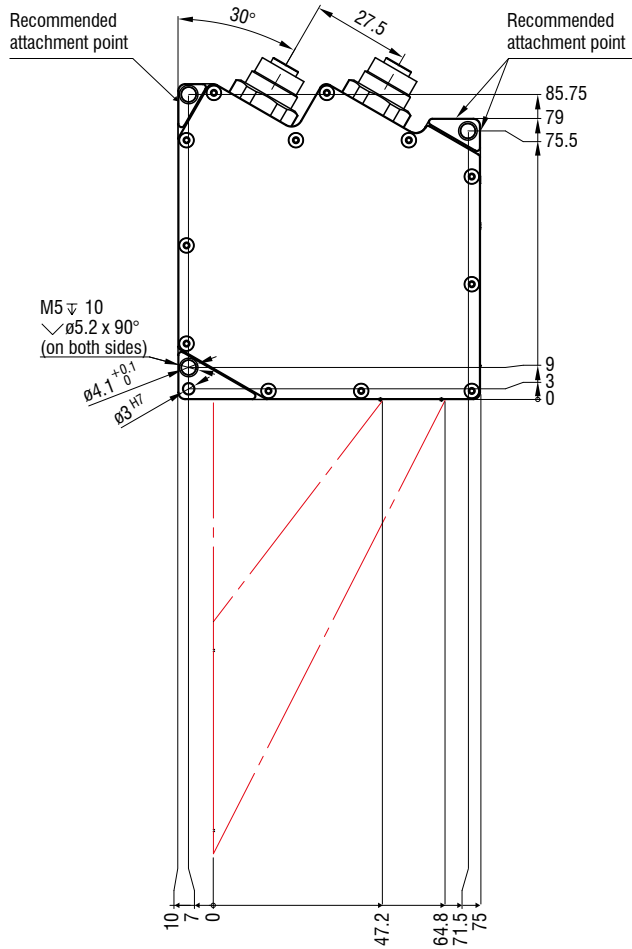
# Dimensions and measuring ranges

## scanCONTROL

LLT25x0-50 / LLT29x0-50

Red Laser

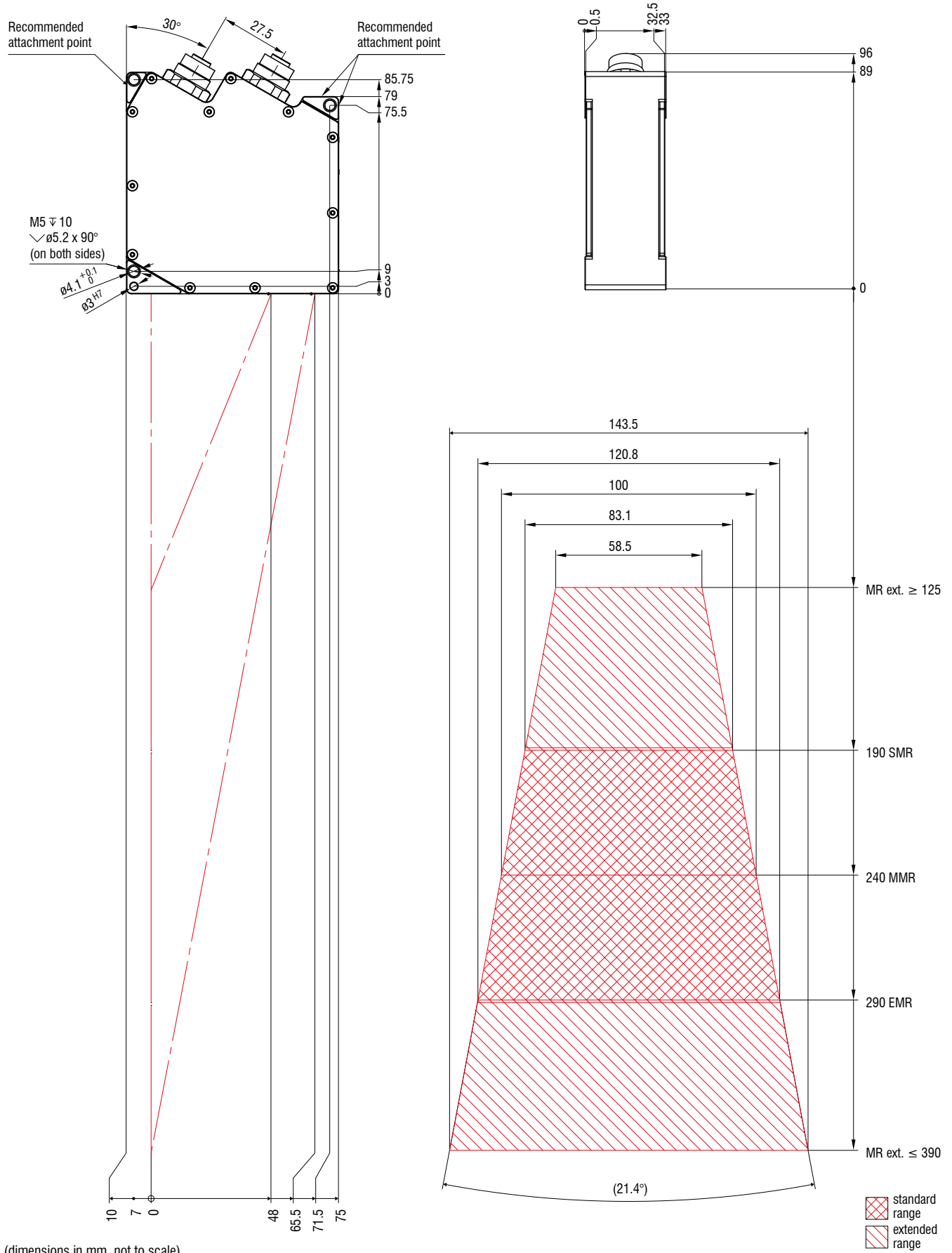
Blue Laser



(dimensions in mm, not to scale)







LLT25x0-100 / 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 measurement areas
-  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. PROFILE scanners provide calibrated profile data that can be further processed on a PC using software provided by the customer. With the 3DInspect software, the scanCONTROL sensors can also be used for 3D evaluations. SMART series scanners work independently 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> |    |    |     |     |
| 25 mm                  |    |    |     |     |
| 50 mm                  |    |    |     |     |
| 100 mm                 |    |    |     |     |
| 200 mm                 |    |    |     |     |
| 430 mm                 |    |    |     |     |
| 600 mm                 |    |    |     |     |
| <b>Class</b>           |    |    |     |     |
| 02 =PROFILE            |    |    |     |     |
| 12 =SMART              |    |    |     |     |
| <b>Series</b>          |    |    |     |     |
| LLT30xx                |    |    |     |     |

### Laser options\*

|   |     |  |
|---|-----|--|
|  | /SI | Hardware switch-off of the laser line  |
|   | /3R | Increased laser power (class 3R)<br>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 39



### The easy way of machine integration

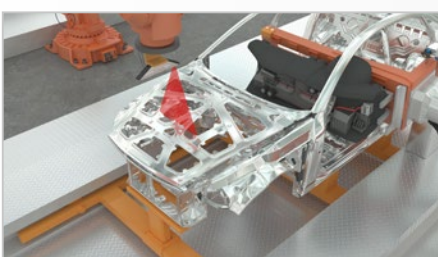
The design of the LLT30x2 series is compact and lightweight. The controller is integrated in the sensor itself, which simplifies mechanical integration. The measurement data can be output directly.

### 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 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  |                                    | LLT30x2-25   | LLT30x2-50   | LLT30x2-100   | LLT30x2-200  |
|--|------------------------------------|--|--------------|---------------|--|
| Measuring range (z-axis)                                     | 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 (z-axis)                            | Start of measuring range           | -  | -            | 190 mm        | 160 mm   |
|  | End of measuring range             | -  | -            | 360 mm        | 460 mm   |
| Line linearity (z-axis) <sup>[1]</sup> <sup>[2]</sup>        |                                    | 2 $\mu$ m  | 4 $\mu$ m    | 10 $\mu$ m    | 30 $\mu$ m   |
|  |                                    | $\pm$ 0.013 %  | $\pm$ 0.01 % | $\pm$ 0.007 % | $\pm$ 0.014 %                                      |
| Measuring range (x-axis)                                     | Start of measuring range           | 23 mm  | 43.3 mm      | 75.6 mm       | 130 mm   |
|  | Mid of measuring range             | 25 mm  | 50 mm        | 100 mm        | 200 mm   |
|  | End of measuring range             | 26.8 mm  | 56.5 mm      | 124.4 mm      | 270 mm   |
| Extended measuring range (x-axis)                            | Start of measuring range           | -  | -            | 72.1 mm       | 100 mm   |
|  | End of measuring range             | -  | -            | 131.1 mm      | 290 mm   |
| Resolution (x-axis)  |                                    | 1,024 points/profile   |              |               |  |
| Profile frequency  |                                    | up to 10,000 Hz  |              |               |  |
| Interfaces   | Ethernet GigE Vision               | Output of measurement values Sensor control 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 <sup>[4]</sup> <sup>[5]</sup>   |                                    | Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU) Analog;<br>switch signal PROFINET; EtherCAT; EtherNet/IP |              |               |  |
| Control and indicator elements                               |                                    | 3x color LEDs for laser, data and error  |              |               |  |
| Light source   | Red Laser                          | $\leq$ 10 mW   |              |               | $\leq$ 12 mW                                       |
|  |                                    | Standard: laser class 2M, semiconductor laser 658 nm   |              |               | Option: laser class 3R, semiconductor laser 660 nm |
|  | Blue laser                         | $\leq$ 30 mW   |              | $\leq$ 50 mW  |  |
|  |                                    | Option: laser class 3R, semiconductor laser 658 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)                                |                                    | 2g / 20 ... 500 Hz   |              |               |  |
| Shock (DIN EN 60068-2-6)                                     |                                    | 15g / 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 across 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> Analog | switching signal: Only in conjunction with 2D/3D output unit

<sup>[5]</sup> PROFINET | EtherCAT | EtherNet/IP: Only in conjunction with 2D/3D gateway

| Model  |                                    | LLT30x2-430   | LLT30x2-600 |
|--|------------------------------------|---|-------------|
| Measuring range (z-axis)                                   | Start of measuring range           | 330 mm  | 530 mm      |
|  | Mid of measuring range             | 515 mm  | 770 mm      |
|  | End of measuring range             | 700 mm  | 1 010 mm    |
|  | Height of measuring range          | 370 mm  | 480 mm      |
| Extended measuring range (z-axis)                          | Start of measuring range           | 330 mm  | 450 mm      |
|  | End of measuring range             | 720 mm  | 1 050 mm    |
| Line linearity (z-axis) <sup>[1]</sup> <sup>[2]</sup>      |                                    | 15 $\mu$ m  | 22 $\mu$ m  |
|  |                                    | 0.0041 %  | 0.0045 %    |
| Measuring range (x-axis)                                   | 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 (x-axis)                          | Start of measuring range           | 324 mm  | 408 mm      |
|  | End of measuring range             | 560 mm  | 788 mm      |
| Resolution (x-axis)  |                                    | 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 <sup>[4]</sup> <sup>[5]</sup> |                                    | Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)<br>Analog; switch signal<br>PROFINET; EtherCAT; EtherNet/IP |             |
| Control and indicator 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   |             |
|  |                                    | Option: laser class 3B, semiconductor laser 660 nm  |             |
| Laser switch-off   |                                    | 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)                              |                                    | 2g / 20 ... 500 Hz  |             |
| Shock (DIN EN 60068-2-6)                                   |                                    | 15g / 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, 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 across 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> Analog | switching signal: Only in conjunction with 2D/3D output unit

<sup>[5]</sup> PROFINET | EtherCAT | EtherNet/IP: Only in conjunction 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 measurement areas
-  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. PROFILE scanners provide calibrated profile data that can be further processed on a PC using software provided by the customer. With the 3DInspect software, the scanCONTROL sensors can also be used for 3D evaluations. SMART series scanners work independently 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\*

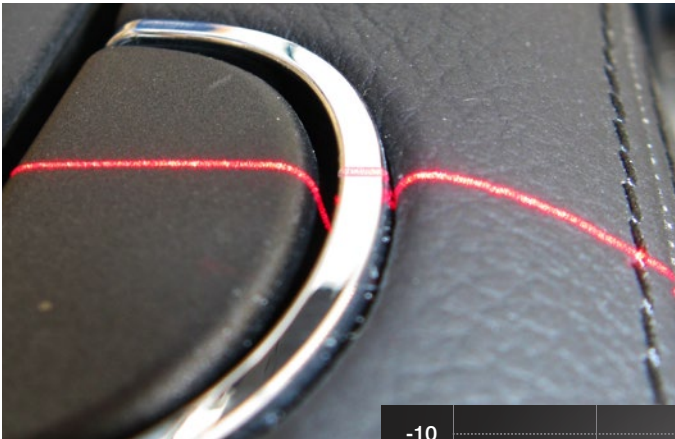
|   |     |  |
|---|-----|--|
|  | /SI | Hardware switch-off of the laser line  |
|   | /3R | Increased laser power (class 3R) e.g., for dark surfaces   |
|   | /BL | Blue laser line (405 nm) for (semi-) transparent, red-hot glowing and organic materials (Measuring ranges 25 - 100 mm) |

### 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

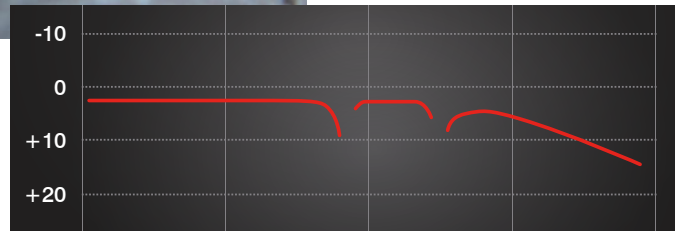
Accessories from page 39



**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 also 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.

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

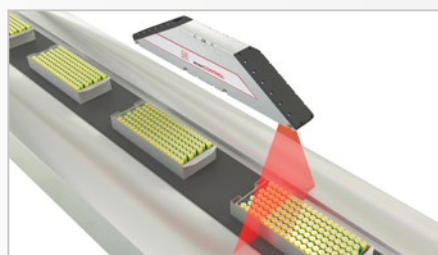
The scanCONTROL 30x0 laser scanners are now also available with a large measuring field up to 600 x 600 mm. This allows measuring objects to be detected with high accuracy.



**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   |                                    | LLT30x0-25   | LLT30x0-50     | LLT30x0-100   | LLT30x0-200  |
|---|------------------------------------|--|----------------|---------------|--|
| Measuring range (z-axis)                        | 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 (z-axis)               | Start of measuring range           | -  | -              | 190 mm        | 160 mm   |
|   | End of measuring range             | -  | -              | 360 mm        | 460 mm   |
| Line linearity (z-axis) <sup>[1] [2]</sup>      |                                    | 1.5 $\mu$ m  | 3 $\mu$ m      | 9 $\mu$ m     | 26 $\mu$ m   |
|   |                                    | $\pm$ 0.01 %   | $\pm$ 0.0075 % | $\pm$ 0.006 % | $\pm$ 0.012 %  |
| Measuring range (x-axis)                        | Start of measuring range           | 23 mm  | 43.3 mm        | 75.6 mm       | 130 mm   |
|   | Mid of measuring range             | 25 mm  | 50 mm          | 100 mm        | 200 mm   |
|   | End of measuring range             | 26.8 mm  | 56.5 mm        | 124.4 mm      | 270 mm   |
| Extended measuring range (x-axis)               | Start of measuring range           | -  | -              | 72.1 mm       | 100 mm   |
|   | End of measuring range             | -  | -              | 131.1 mm      | 290 mm   |
| Resolution (x-axis)                             |                                    | 2,048 points/profile   |                |               |  |
| Profile frequency                               |                                    | up to 10,000 Hz  |                |               |  |
| Interfaces                                      | Ethernet GigE Vision               | Output of measurement values Sensor control 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 <sup>[4] [5]</sup> |                                    | Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU) Analog;<br>switch signal PROFINET; EtherCAT; EtherNet/IP |                |               |  |
| Control and indicator elements                  |                                    | 3x color LEDs for laser, data and error  |                |               |  |
| Light source                                    | Red Laser                          | $\leq$ 10 mW   |                |               | $\leq$ 12 mW   |
|   |                                    | Standard: laser class 2M, semiconductor laser 658 nm   |                |               | Option: laser class 3R,<br>semiconductor laser<br>660 nm |
|   | Blue laser                         | $\leq$ 30 mW   |                | $\leq$ 50 mW  |  |
|   |                                    | Option: laser class 3R, semiconductor laser 658 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)                   |                                    | 2g / 20 ... 500 Hz   |                |               |  |
| Shock (DIN EN 60068-2-6)                        |                                    | 15g / 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 across 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> Analog | switching signal: Only in conjunction with 2D/3D output unit

<sup>[5]</sup> PROFINET | EtherCAT | EtherNet/IP: Only in conjunction with 2D/3D gateway

| Model   |                                    | LLT30x0-430   | LLT30x0-600    |
|---|------------------------------------|---|----------------|
| Measuring range (z-axis)                        | Start of measuring range           | 330 mm  | 530 mm         |
|   | Mid of measuring range             | 515 mm  | 770 mm         |
|   | End of measuring range             | 700 mm  | 1 010 mm       |
|   | Height of measuring range          | 370 mm  | 480 mm         |
| Extended measuring range (z-axis)               | Start of measuring range           | 330 mm  | 450 mm         |
|   | End of measuring range             | 720 mm  | 1 050 mm       |
| Line linearity (z-axis) <sup>[1] [2]</sup>      |                                    | 12 $\mu$ m  | 15 $\mu$ m     |
|   |                                    | $\pm$ 0.0032 %  | $\pm$ 0.0031 % |
| Measuring range (x-axis)                        | 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 (x-axis)               | Start of measuring range           | 324 mm  | 408 mm         |
|   | End of measuring range             | 560 mm  | 788 mm         |
| Resolution (x-axis)                             |                                    | 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 <sup>[4] [5]</sup> |                                    | Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)<br>Analog; switch signal<br>PROFINET; EtherCAT; EtherNet/IP |                |
| Control and indicator 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   |                |
|   |                                    | Option: laser class 3B, semiconductor laser 660 nm  |                |
| Laser switch-off                                |                                    | 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)                   |                                    | 2g / 20 ... 500 Hz  |                |
| Shock (DIN EN 60068-2-6)                        |                                    | 15g / 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, 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 across 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> Analog | switching signal: Only in conjunction with 2D/3D output unit

<sup>[5]</sup> PROFINET | EtherCAT | EtherNet/IP: Only in conjunction with 2D/3D gateway

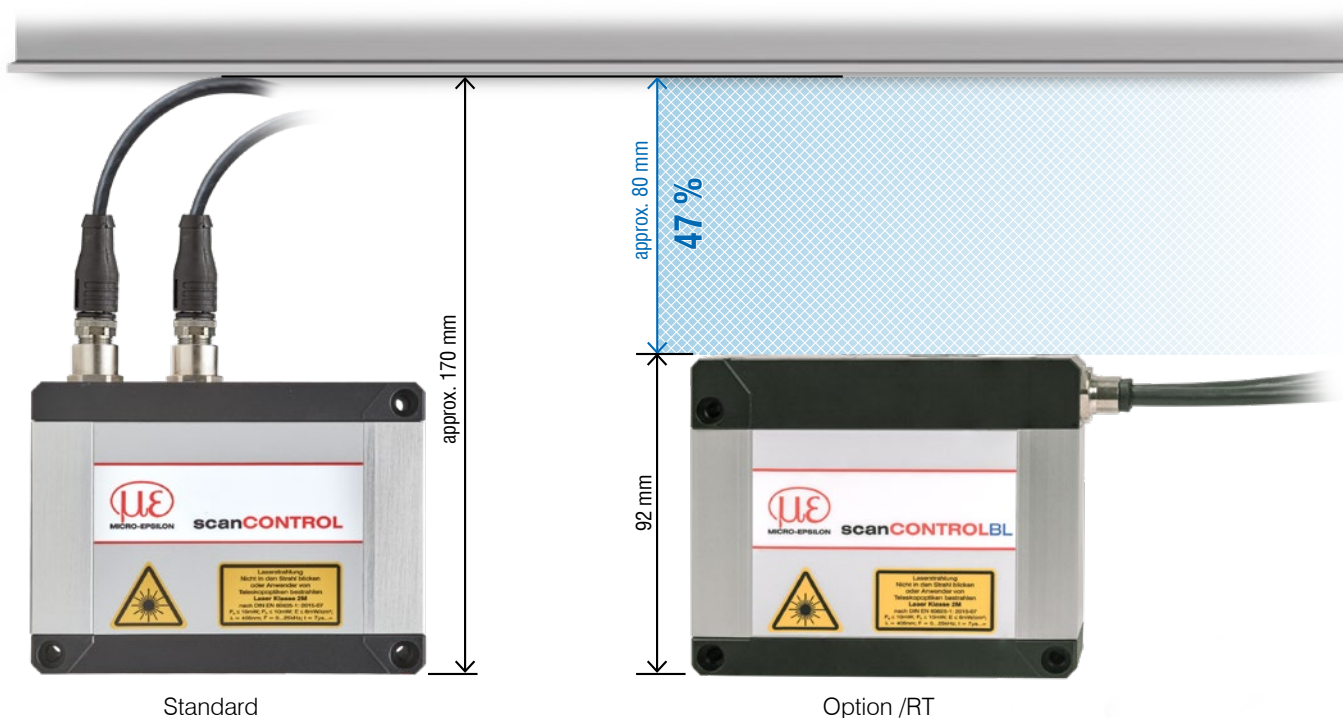
# Options

## scanCONTROL 30xx

### Option /RT = "Rear Tail"

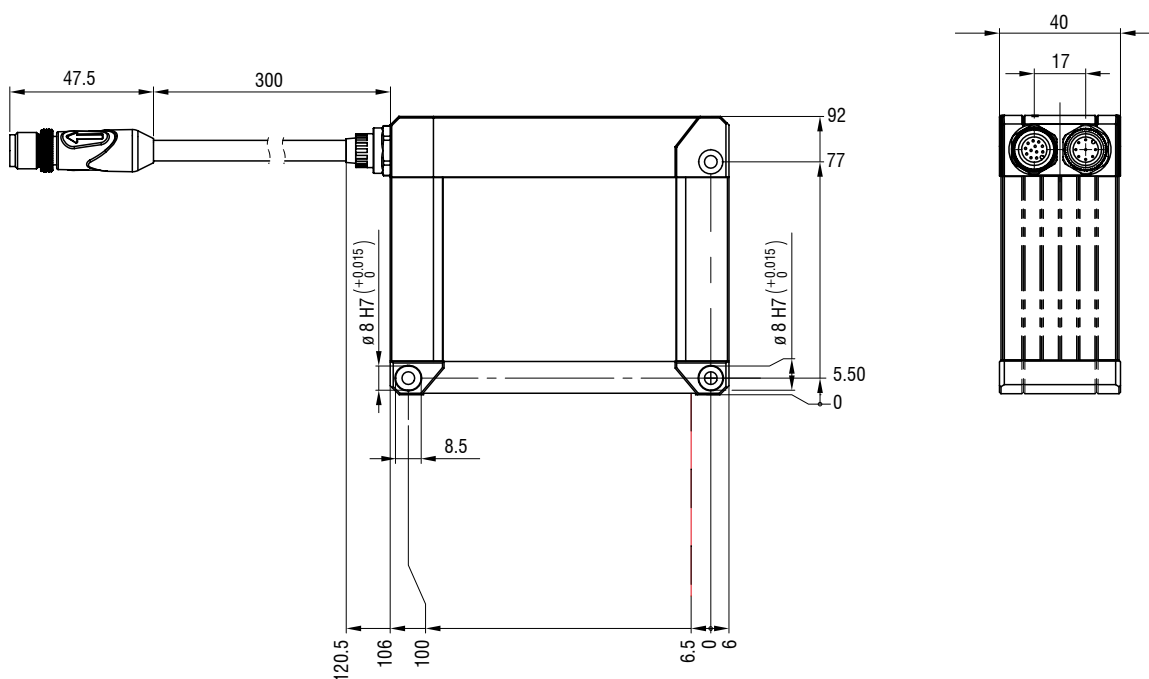
Cable outlet on the rear side ("Rear Tail") for space-saving installation

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



Standard

Option /RT



(dimensions in mm, not to scale)

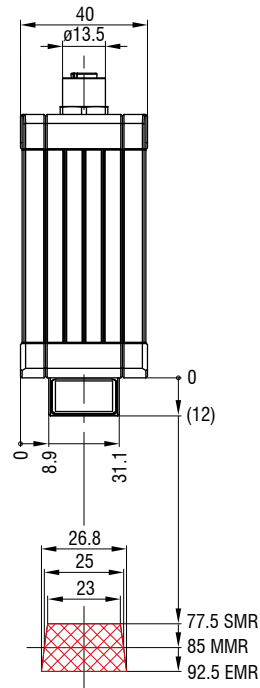
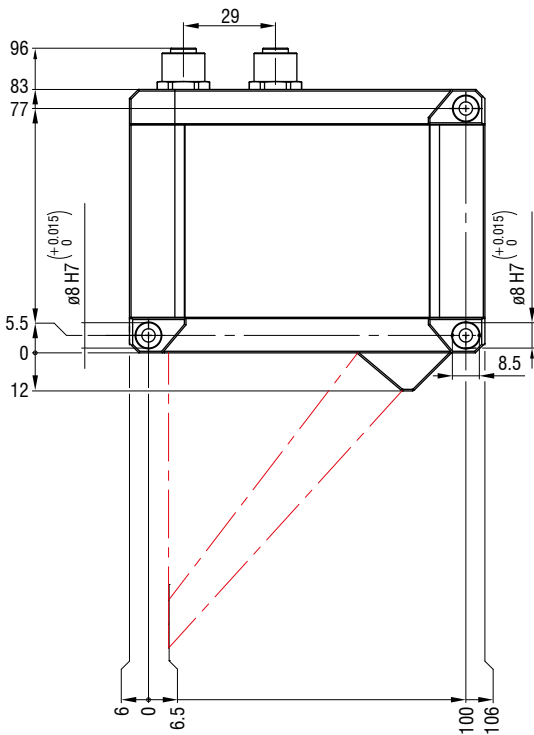
# Dimensions and measuring ranges

## scanCONTROL 30xx

LLT30x2-25 / LLT30x0-25

Red Laser

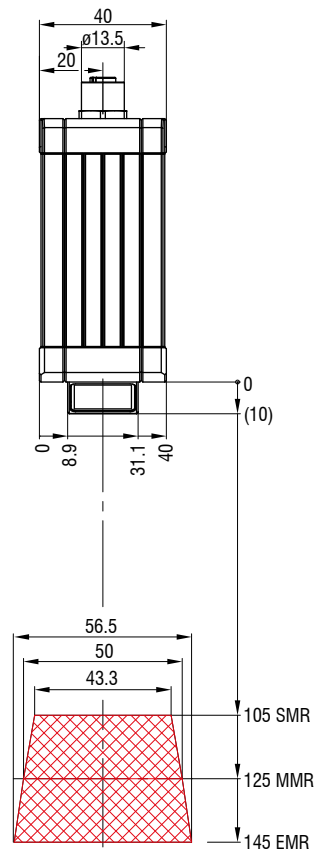
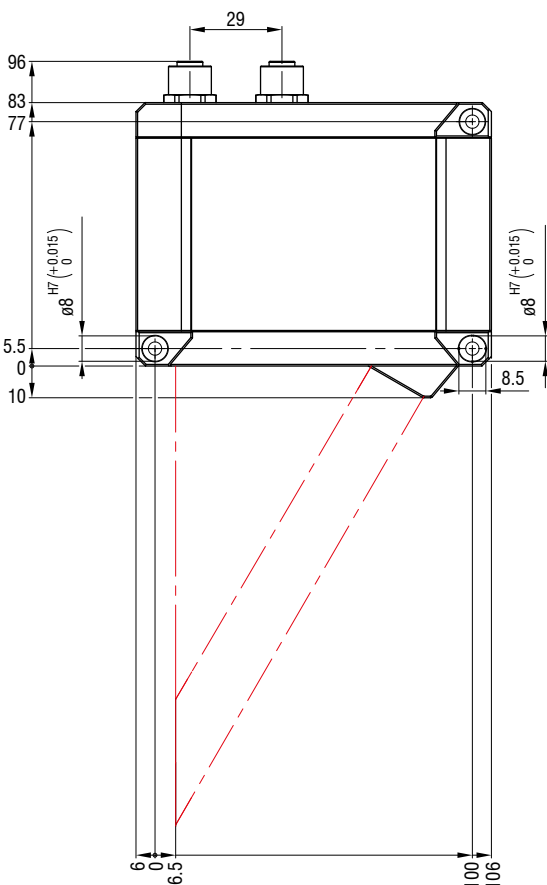
Blue Laser



LLT30x2-50 / LLT30x0-50

Red Laser

Blue Laser



(dimensions in mm, not to scale)

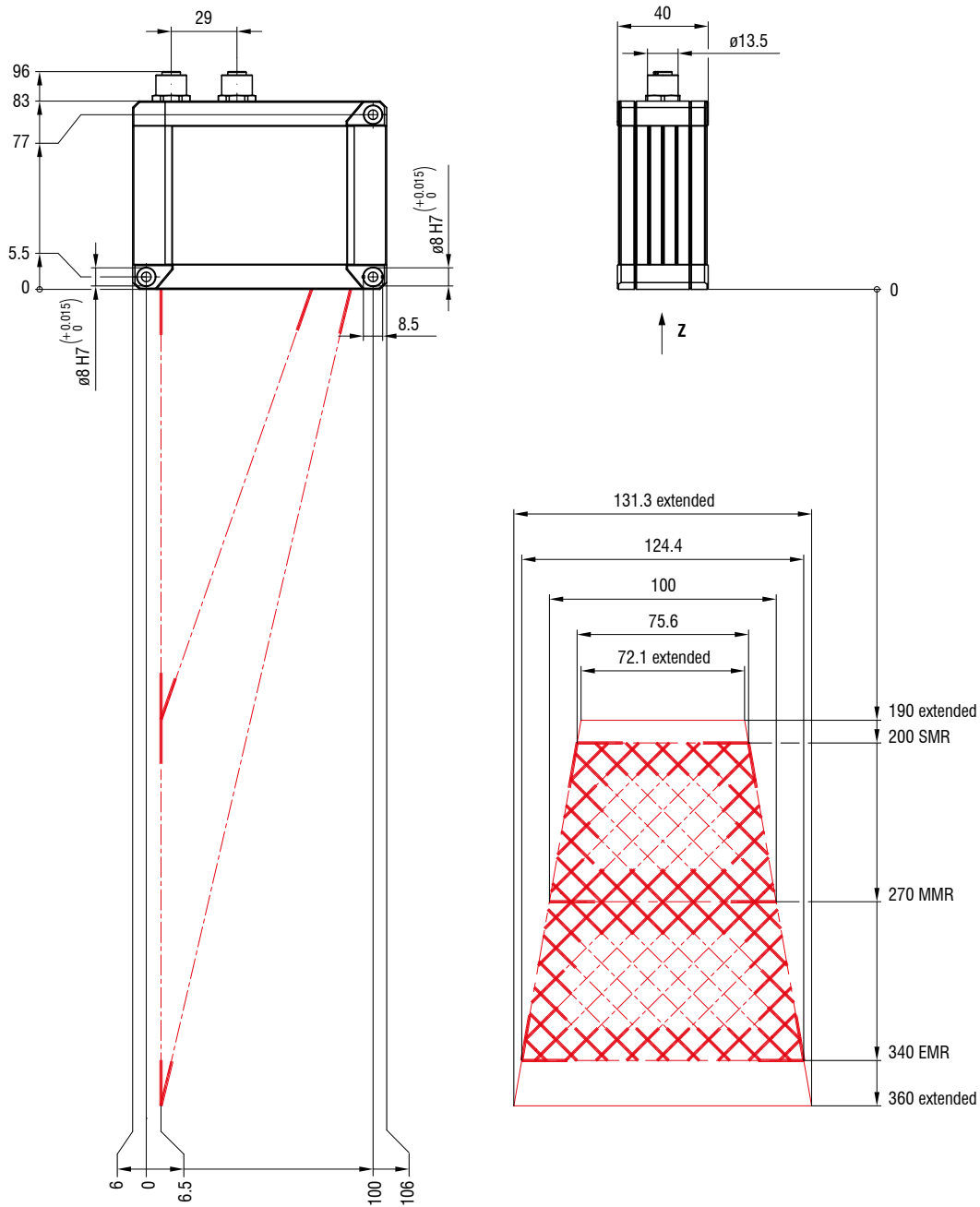
# Dimensions and measuring ranges

## scanCONTROL 30xx

LLT30x2-100 / LLT30x0-100

Red Laser

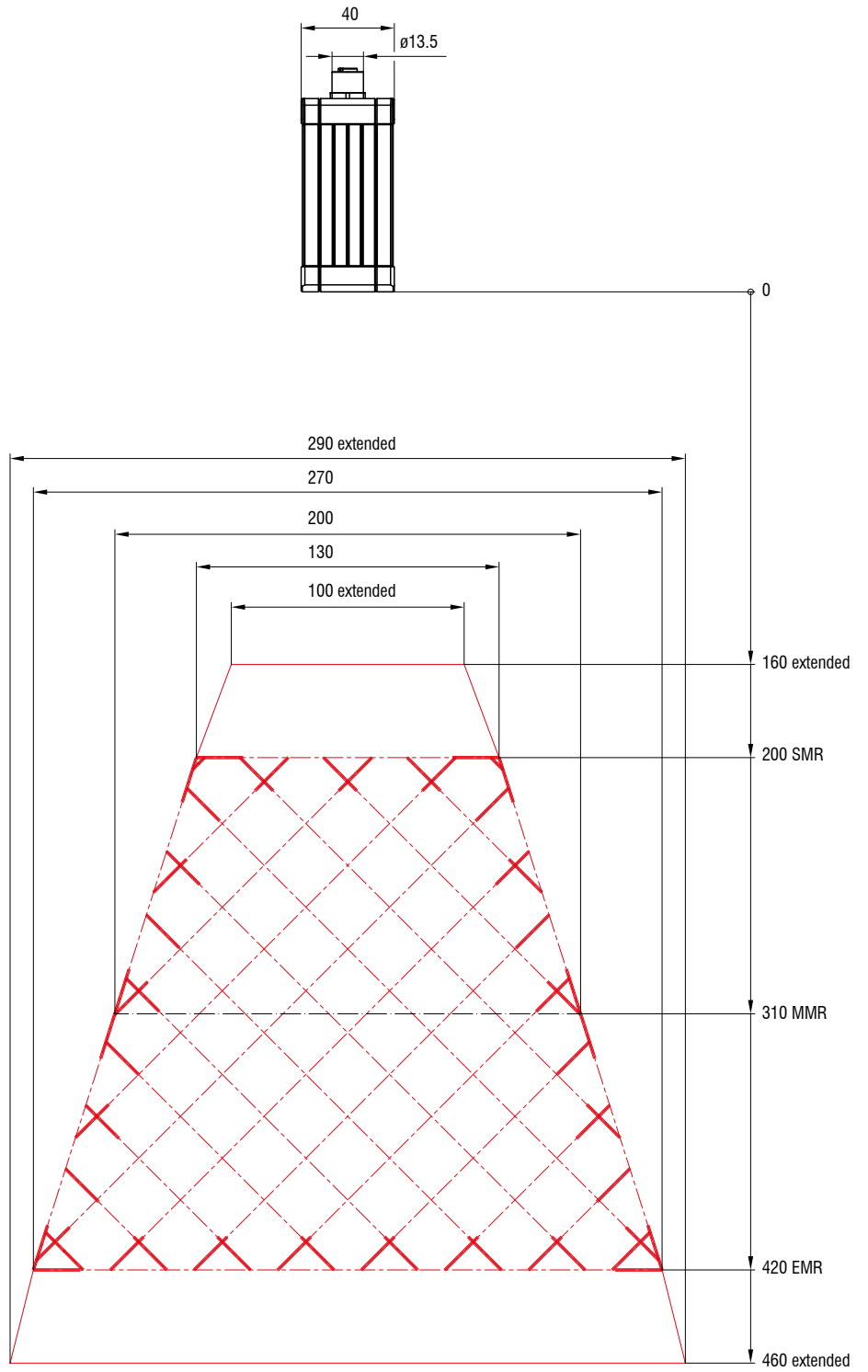
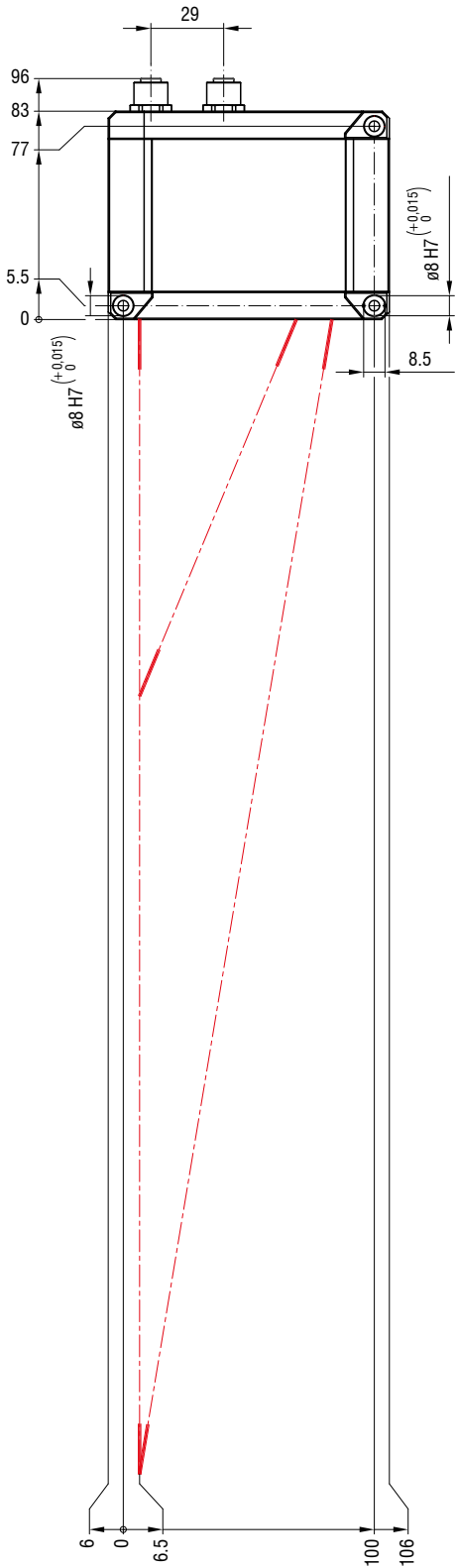
Blue Laser



(dimensions in mm, not to scale)

LLT30x2-200 / LLT30x0-200

Red Laser



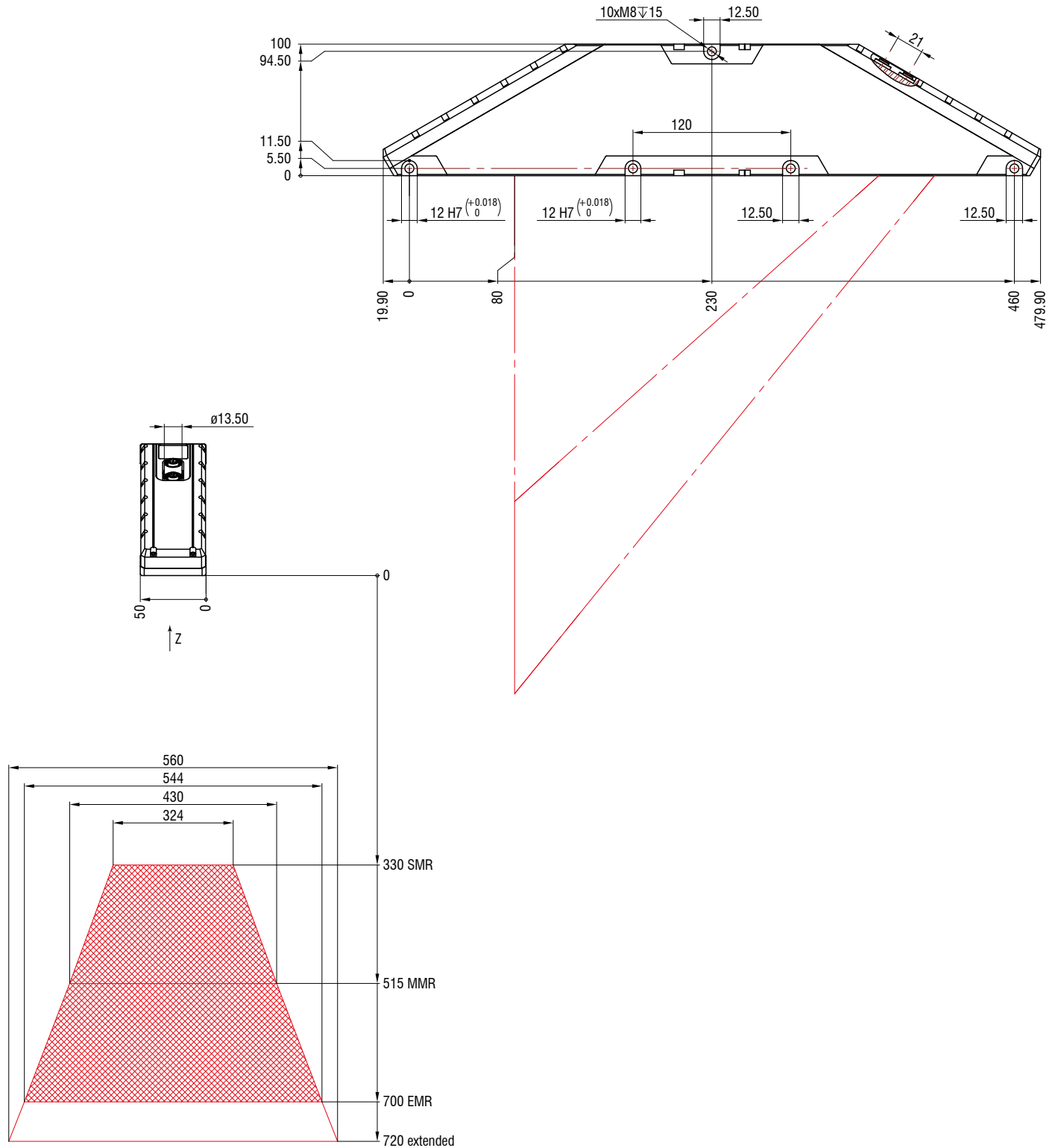
(dimensions in mm, not to scale)

# Dimensions and measuring ranges

## scanCONTROL 30xx

LLT30x2-430 / LLT30x0-430

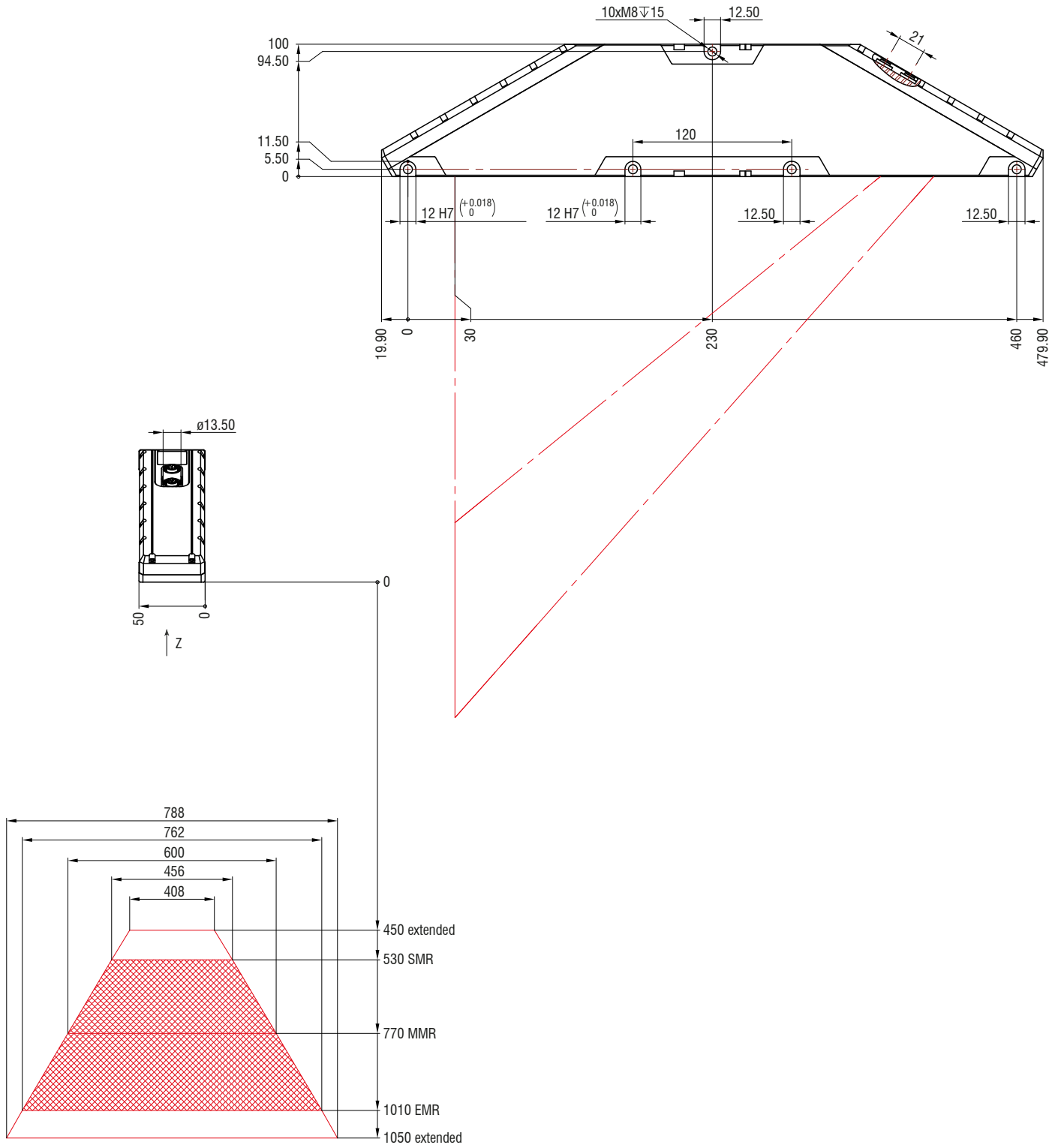
Red Laser



(dimensions in mm, not to scale)

LLT30x2-600 / LLT30x0-600

Red Laser



(dimensions in mm, not to scale)



Software for scanCONTROL SMART sensors

**SMART**

**scanCONTROL Configuration Tools**

*Solution of complex 2D measurement tasks*

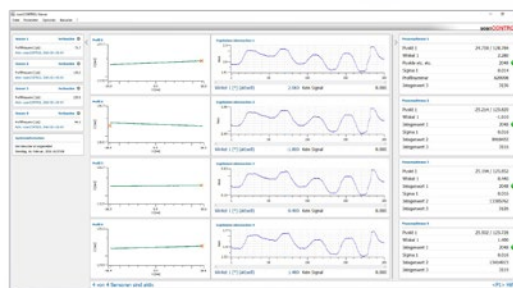
- Can be used with all SMART sensors
- Sensor alignment and adjustment
- 16 measuring programs x 8 evaluations per parameter set
- 15 independent parameter packages can be stored in the sensor
- Data processing
- Logical operations for digital outputs
- Configuration of the measurement value transfer and the outputs



**scanCONTROL Result Monitor**

*Visualization of measurement sequences*

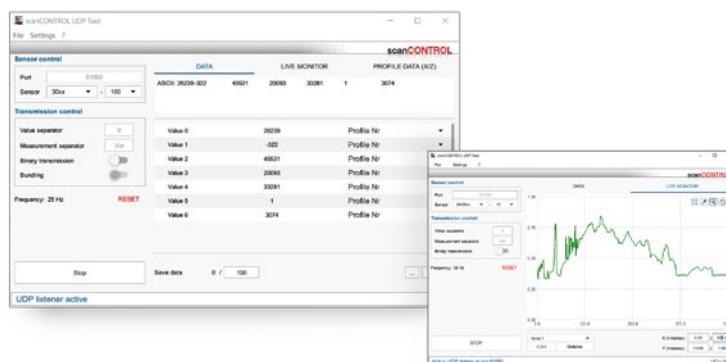
- For up to 4 scanCONTROL SMART sensors
- Display of profile and measured value history during operation
- Adjustable layout (different views, e.g. for workers)
- Parallel transmission of the measured values to the control unit is possible and recommended
- Logging and saving of profiles



**scanCONTROL UDP Tool**

*Testing the UDP output of measured values*

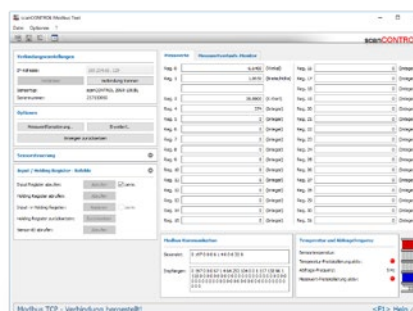
- For all scanCONTROL SMART sensors
- Logging possible up to 1,000 Hz
- Source code available



**scanCONTROL Modbus Tool**

*Testing the Modbus communication*

- For all scanCONTROL SMART sensors
- Transfer of measured data
- Sensor control via Modbus TCP  
 (load user modes, laser on/off, change exposure time, ...)



## Integration of scanCONTROL sensors

**SMART**

**PROFILE**

### Integration into customer software

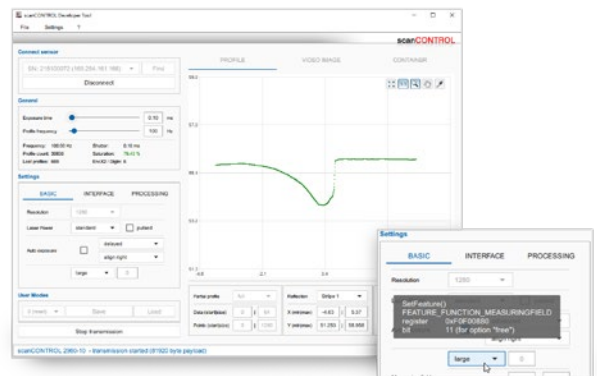
- LLT.DLL and SDK for fast integration in /C++ or C# (NET) applications
- LabVIEW device driver
- Various example VIs (profile transmission, container mode, ...)
- Comprehensive documentation
- Linux integration
  - Based on GigE Vision/GenICam API
  - Fast integration via additional C++ library
  - Various sample programs
  - Comprehensive documentation
- Cognex VisionPro
  - AIK adapter for fast integration via Cognex AIK server
  - Cognex Range Images can be generated and processed based on the scanCONTROL measuring points
- Others on request



### scanCONTROL Developer Tool

*Complete integration example (demo tool)*

- Source code available (QML / C++, usable for Windows and Linux)
- Serves as support for the development of own software with scanCONTROL sensors
- MouseOver over the sensor parameters directly displays the corresponding function in the LLT.DLL
- All data transmission options can be set and tested



### Integration into image processing software

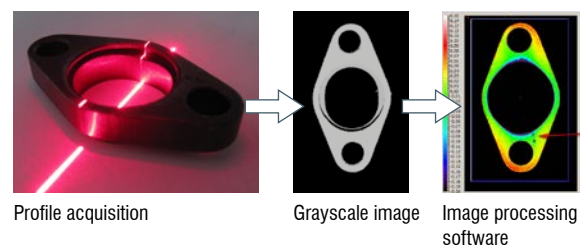
*Easy integration due to GenICam/GigE Vision standard*

- Direct connection to compatible 3D and image processing software possible
- Sensor is recognized by the standard and parameters are read out directly
- scanCONTROL 25/29xx: output in 2.5D
- scanCONTROL 30xx: output in Valid3D (corresponds to coord3D data formats)

*Easy integration due to GigE Vision standard*

- 3D comparisons and measurement
- Integration into various software solutions via GigE Vision possible
- Detection of fine surface defects
- OCR/text recognition independent of contrast
- Completeness, position detection, planarity, ... and much more!

**GEN*i*CAM** **GigE VISION**



# Software 3DInspect

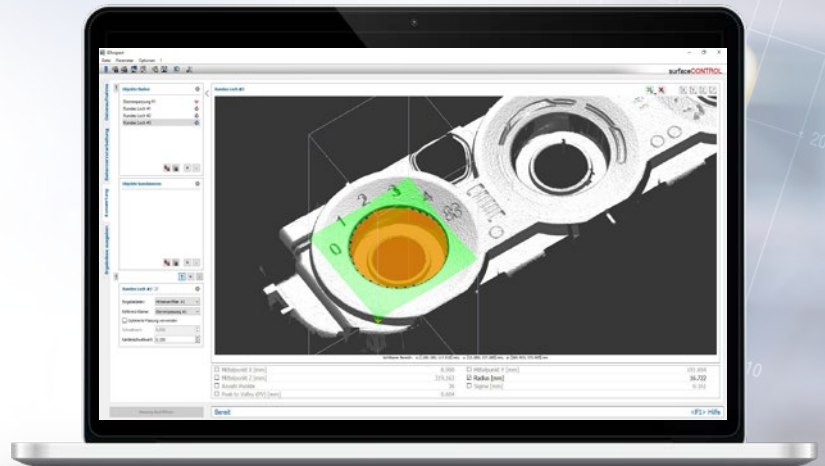
Intuitive user interface

Real 3D evaluation, not just 2.5D

Object extraction in 3D

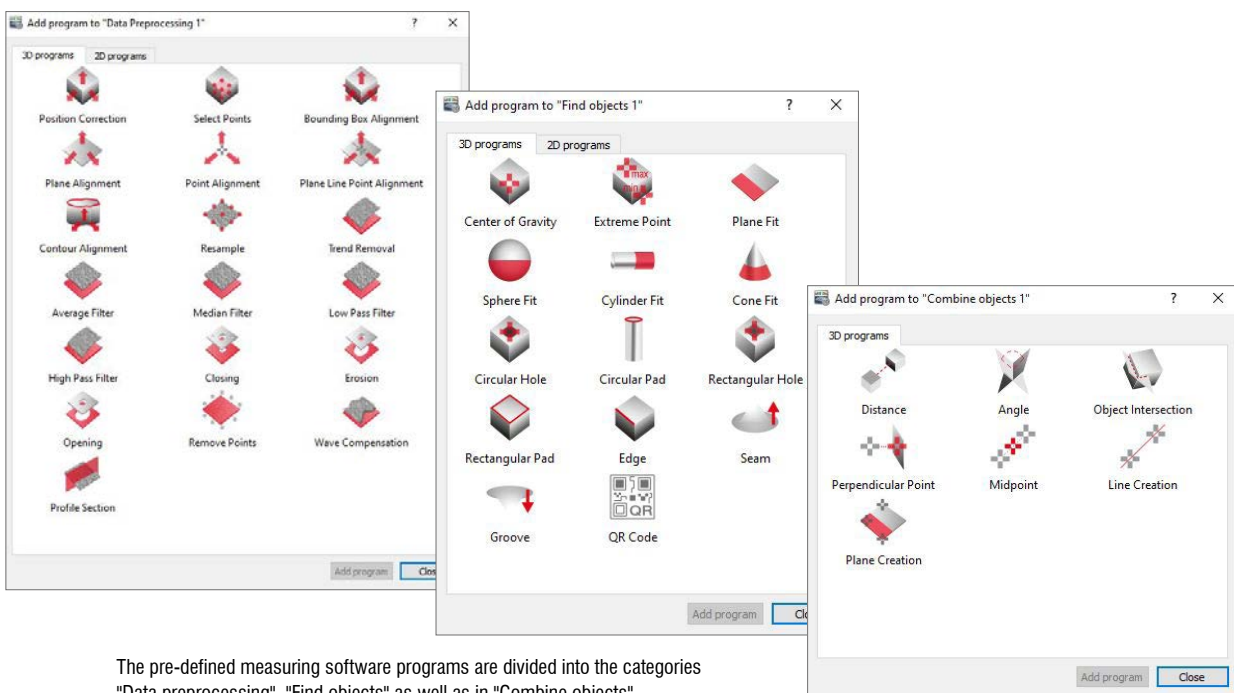
Direct feedback with algorithms

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. The 3D data is then further processed on the PC using 3DInspect measurement programs, evaluated, assessed and, if necessary, logged and transmitted to a control unit via Ethernet. The 3D data can also be saved with the software. In addition to the scanCONTROL 30xx models, the 3DInspect software is also supported by the 3D Profile Unit and the surfaceCONTROL and reflectCONTROL sensors.

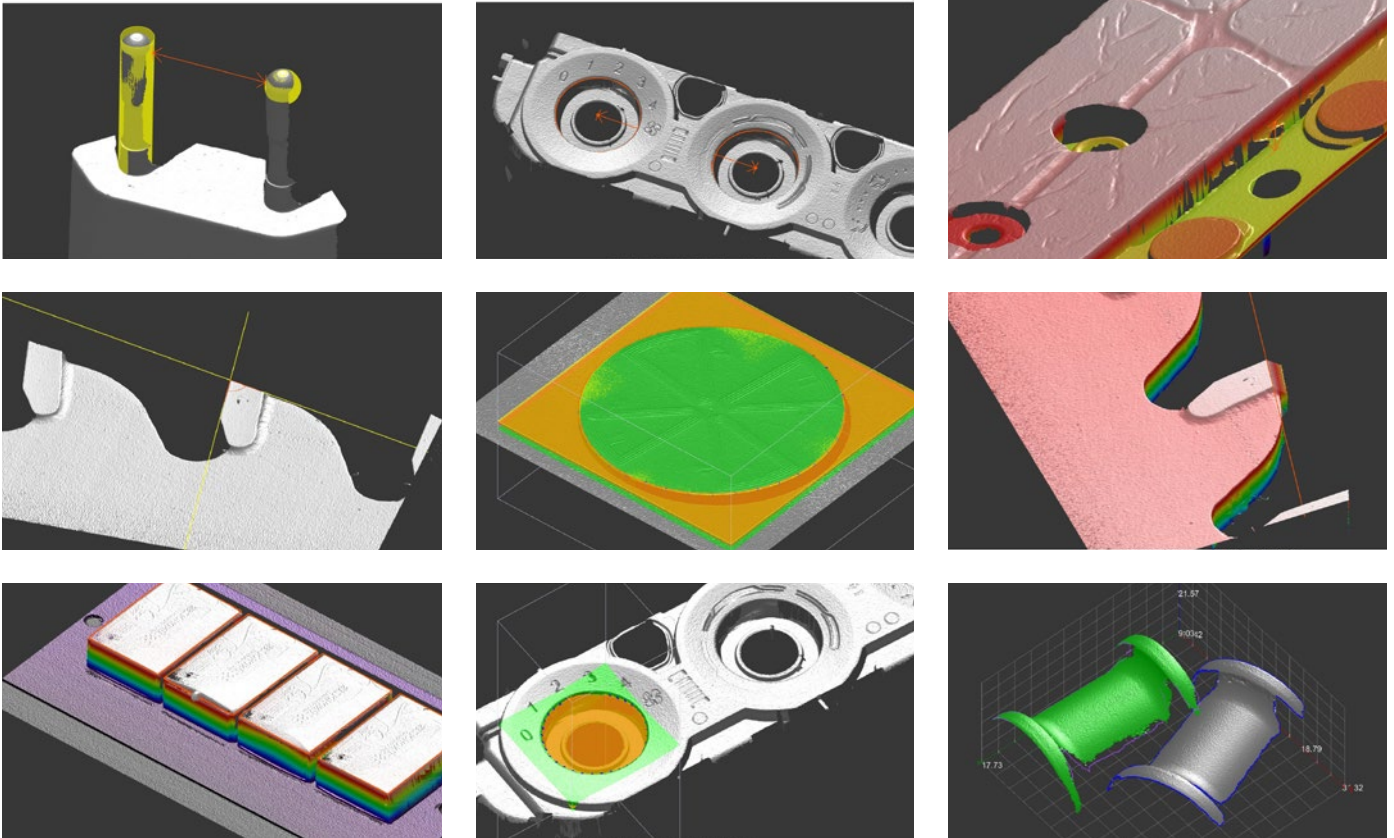


The pre-defined measuring software programs are divided into the categories "Data preprocessing", "Find objects" as well as in "Combine objects".



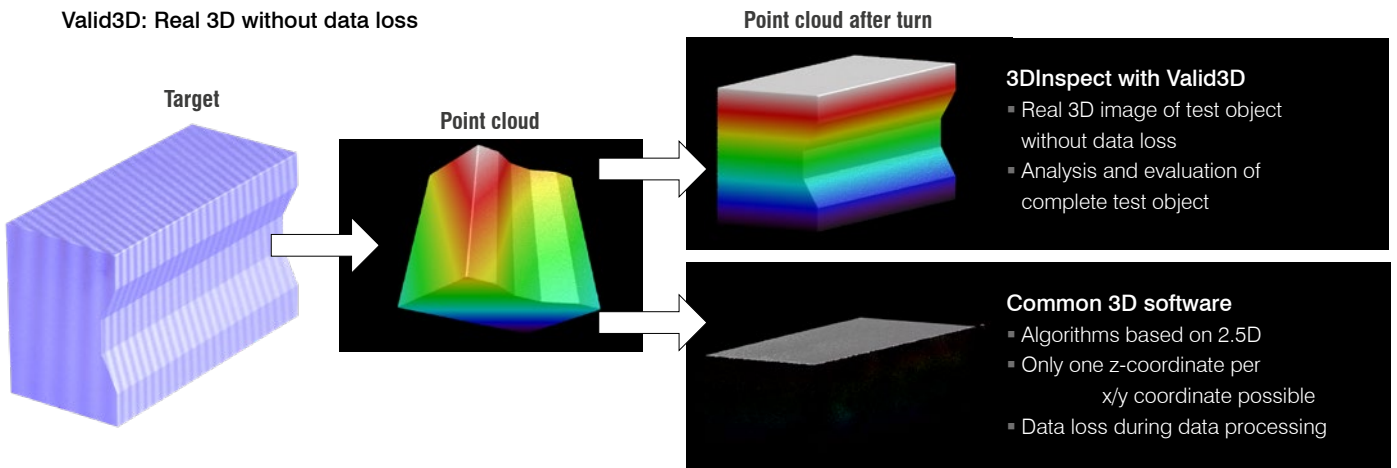
**Industrial Performance Unit:  
Industrial PC with GigE Vision Sensors**

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 interfaces RPOFINET, EtherCAT and EtherNet/IP.



**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.



# System for multi-scanner applications

## 3D Profile Unit



[micro-epsilon.com/3DPU](http://micro-epsilon.com/3DPU)

Profile stitching for up to 2 sensors

### 3D Profile Unit Controller

Powerful industrial computer

- Communication with any GigE Vision clients
- Direct integration into image processing software
- Transfer of profile data or 3D point clouds
- Data evaluation and system parameterization is implemented in the 3DInspect software
- Optionally available with Industrial Ethernet:
  - Integrated evaluation
  - Transfer of measured values to PLC
  - Industrial Ethernet interface for control and transfer of measured values

**NEW**



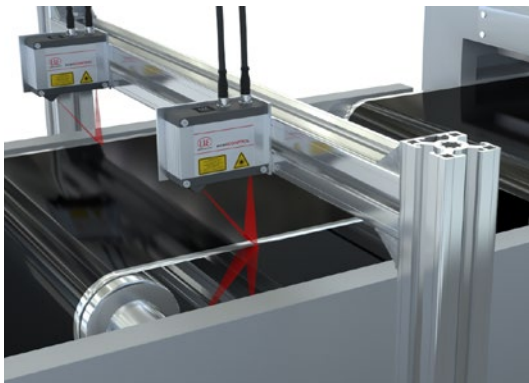
**SMART  
PROFILE**



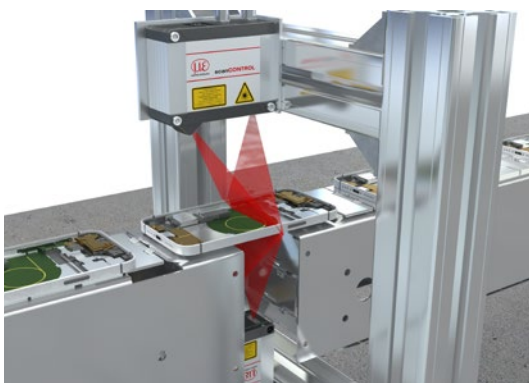
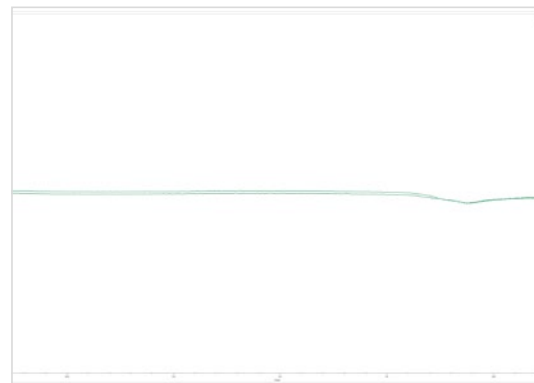
EtherNet/IP



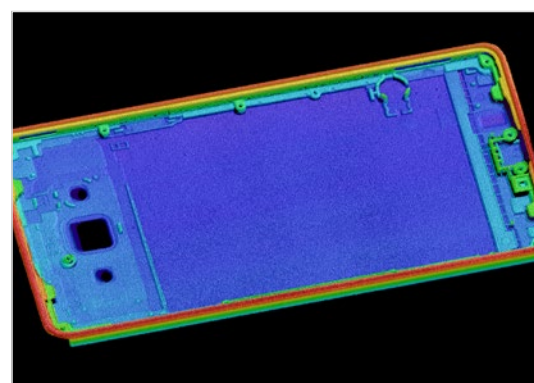
### Application examples:



Width, thickness and Heavy Edge of battery film



Thickness of smartphone carrier plates



Stitched 3D point cloud of the smartphone carrier plate in 3DInspect

# 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

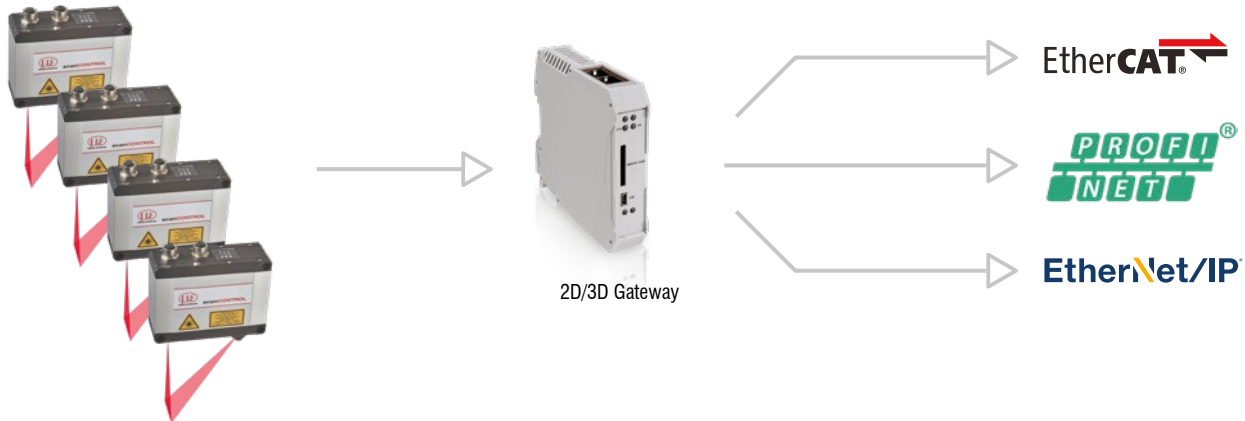
6414142.001 2D/3D Gateway, pre-parameterized,

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 series 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 configured 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/±10 V

4-channel analog output terminal; ±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

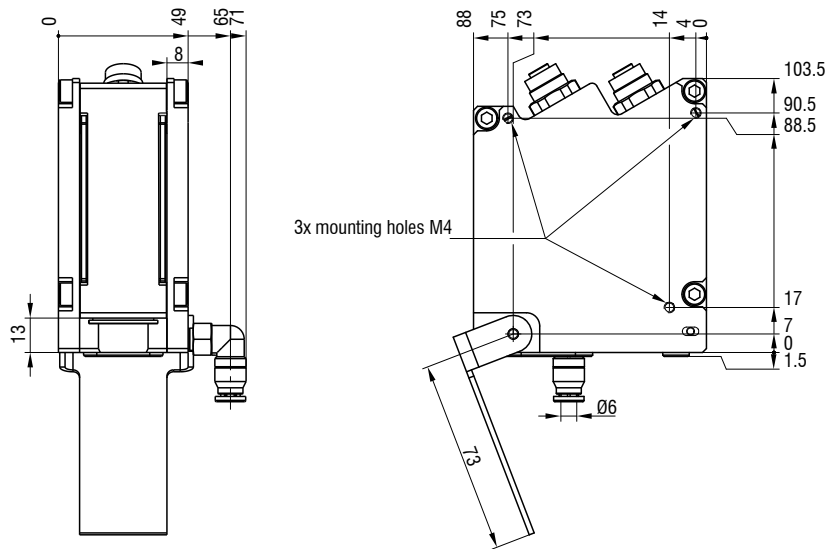
Other terminals available on request.



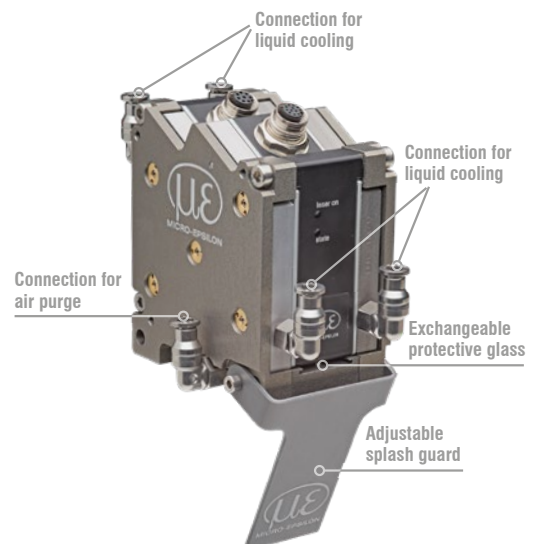
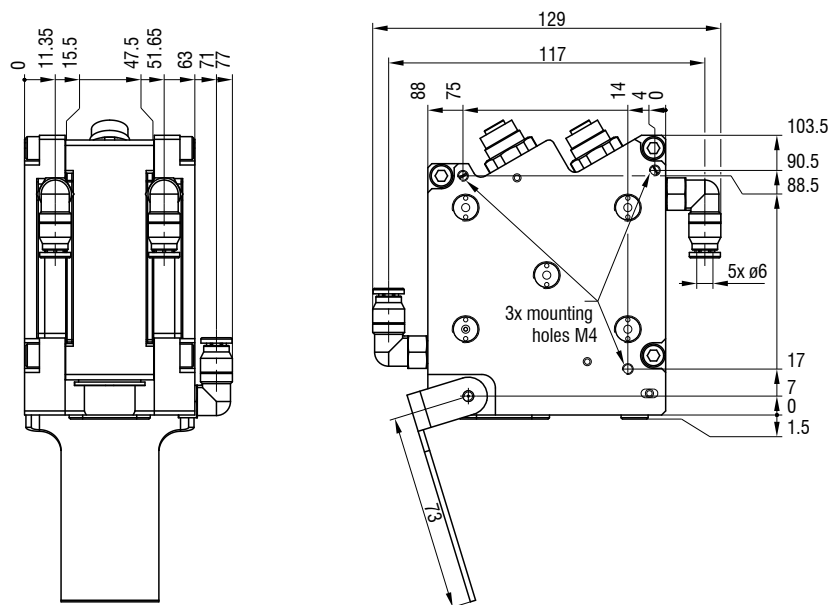
**Housings for protection and cooling for LLT25x0 and 29xx**

(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/LLT29
- 2105059 Protective cooling housing LLT25/LLT29
- 0755075 Exchangeable glass for protective housing LLT25/LLT29

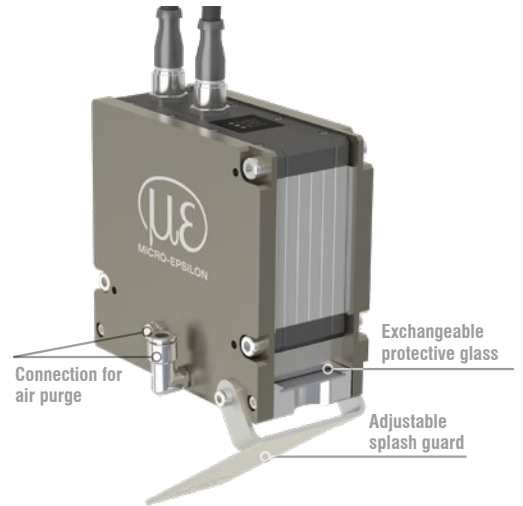
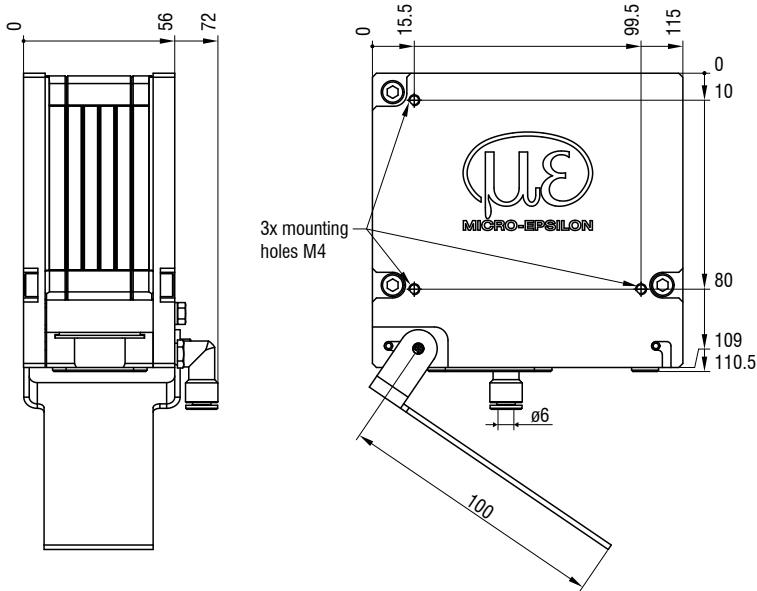
**Description**

- Adaptive protective housing for LLT25/LLT29
- Adaptive protective and cooling housing for LLT25/LLT29
- Exchangeable glass for protection / cooling concept LLT25/LLT29, pack of 50 pieces

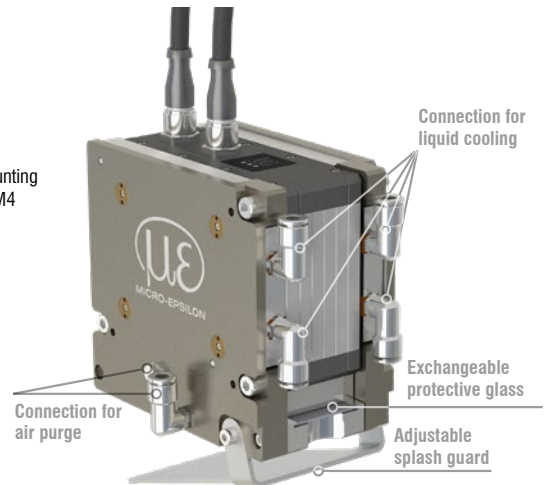
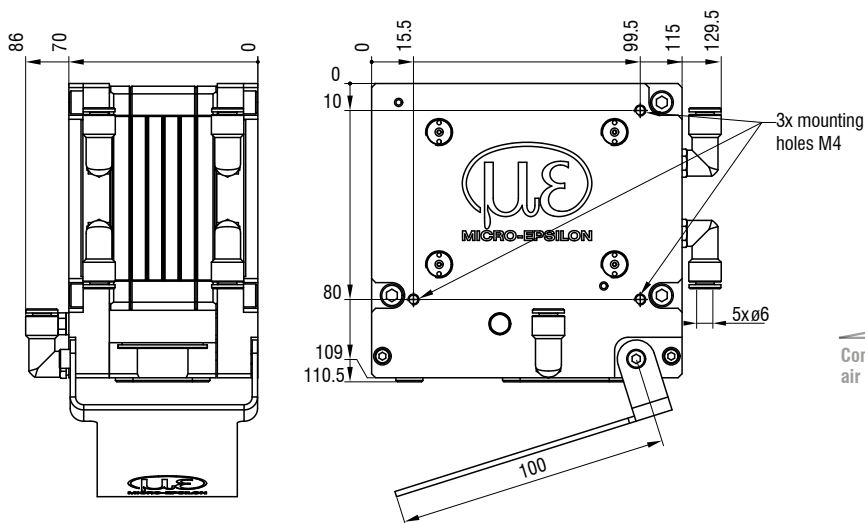
## Housings for protection and cooling for LLT30xx

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
- 2105077 Protective cooling housing for LLT30
- 0755083 Exchangeable glass for protective housing LLT30

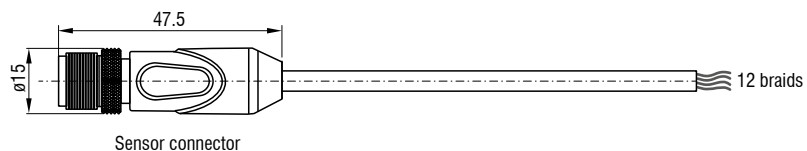
#### Description

- Adaptive protective housing for LLT30
- Adaptive protective and cooling housing for LLT30
- Exchangeable glass for protective / cooling concept LLT30, pack of 30 pieces

### Connection cables

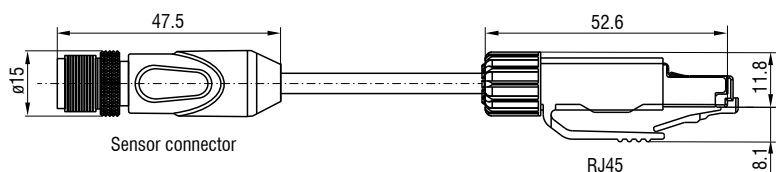
#### PCR3000-x Multi-function cable

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

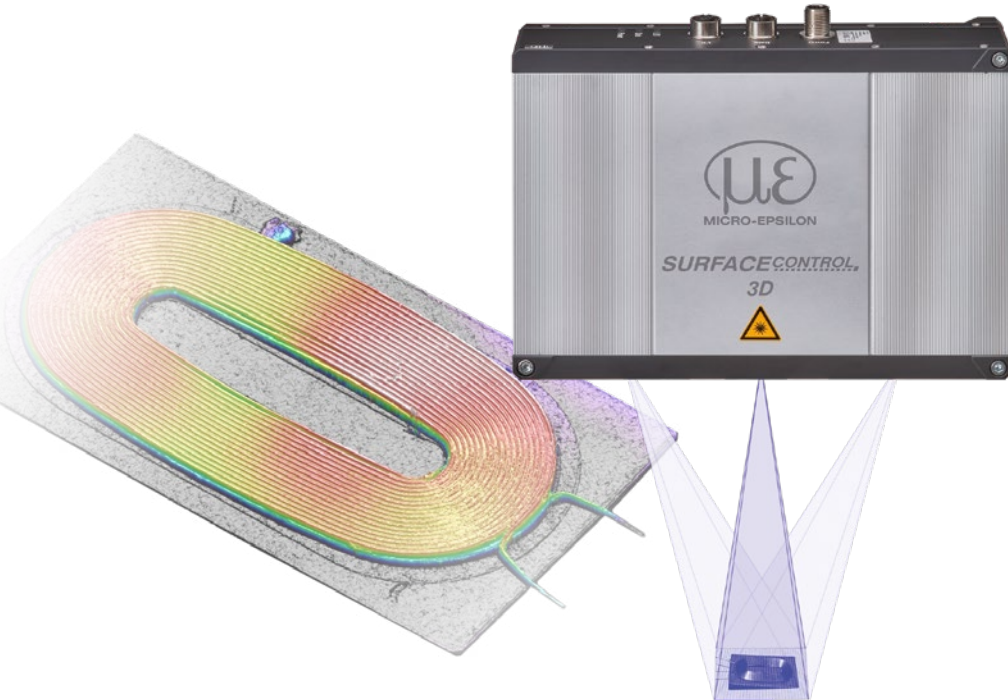
#### Description

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 sensors for the inspection of shapes and surfaces

## surfaceCONTROL 3D 3500

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



**3DInspect**

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

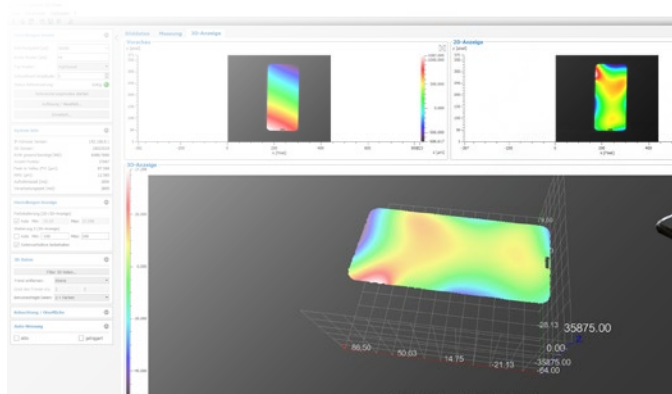
Highest repeatability  $\pm 1 \mu\text{m}$

Detects minor deviations  $>10 \text{ nm}$

3DInspect: Powerful evaluation software with intuitive operating concept

Easy integration in all common 3D image processing packets

**3DInspect**



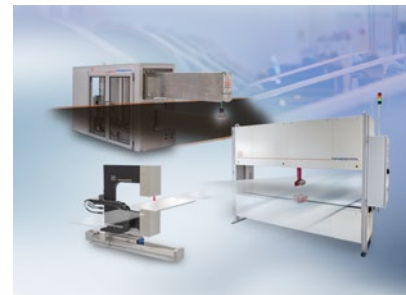
## Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, distance and position



Sensors and measurement devices for non-contact temperature measurement



Measuring and inspection systems for metal strips, plastics and rubber



Optical micrometers and fiber optics, measuring and test amplifiers



Color recognition sensors, LED analyzers and inline color spectrometers



3D measurement technology for dimensional testing and surface inspection

