More Precision

scanCONTROL // 2D/3D Laser profile sensors
scanCONTROL 3000 laser profile scanners impress in 2D/3D measurement tasks with high precision and dynamics. With their high resolution sensor matrix and high profile frequency, these scanners are designed for precise profile measurements in dynamic processes.

- High performance scanner: 2048 points / profile and 10 kHz profile frequency
- HDR mode for accurate measurement results on inhomogeneous surfaces
- Measuring ranges from 25 to 200 mm

scanCONTROL 3002

- Powerful scanner: 1024 points / profile and 5 kHz profile frequency
- Measuring ranges 25 to 200 mm

scanCONTROL 2500

- Compact scanner with high signal stability
- Full SMART functionality
- NEW: now with 2 kHz profile frequency and Blue Laser Technology
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</tr>
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<td>Ethernet and GigE Vision, C++, LabVIEW, Linux</td>
<td></td>
</tr>
<tr>
<td>System for multi-scanner applications</td>
<td>Application software for combination of measured values/ scanCONTROL Smart PLC Unit</td>
<td>34 - 35</td>
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<td>38 - 39</td>
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<tr>
<td>3D sensors for shape and surface measurements</td>
<td>• surfaceCONTROL 3D 3500</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>• reflectCONTROL</td>
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</tr>
</tbody>
</table>

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 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

Made / Developed in Germany
Numerous references worldwide
Proven high operational safety in the 24/7 operation over many years

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
**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.
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.
Software features

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

Powerful SDKs
- Libraries for C, C++, C# and VB
- LabVIEW driver
- Linux implementation

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.
The COMPACT models provide calibrated profile data that can be further processed on a PC with software evaluation provided by the customer.

### COMPACT

<table>
<thead>
<tr>
<th>Model</th>
<th>Points/Profile</th>
<th>Frequency</th>
<th>Laser Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLT25x0</td>
<td>640</td>
<td>up to 2,000 Hz</td>
<td>Red/Blue</td>
</tr>
<tr>
<td>LLT29x0</td>
<td>1,280</td>
<td>up to 2,000 Hz</td>
<td>Red/Blue</td>
</tr>
<tr>
<td>LLT30x2</td>
<td>1,024</td>
<td>up to 5,000 Hz</td>
<td>Red/Blue</td>
</tr>
<tr>
<td>LLT30x0</td>
<td>2,048</td>
<td>up to 10,000 Hz</td>
<td>Red/Blue</td>
</tr>
</tbody>
</table>

### SMART

The SMART models provide selected measurement values. The parameter setup for the sensors and the measurement programs are stored in the internal controller.

### Evaluation by customer

- **scanCONTROL 2500**
- **scanCONTROL 2900**
- **scanCONTROL 3002**
- **scanCONTROL 3000**

### Integrated evaluation

- **scanCONTROL 2510**
- **scanCONTROL 2910**
- **scanCONTROL 3012**
- **scanCONTROL 3010**

Integration: SDK for C/ C++, LabVIEW-VI and examples for C#, Linux and VB are available.

Evaluation: **scanCONTROL Configuration Tools**
scanCONTROL laser profile scanners feature a wide range of different measuring ranges from 10 x 8 mm up to 200 x 300 mm. In all measuring ranges, these laser scanners impress both with fast measurements and high precision.

The variety of measuring ranges 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**

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
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.

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.
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 COMPACT and SMART versions

The scanCONTROL 25x0 series is available as COMPACT and SMART versions. The COMPACT 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

<table>
<thead>
<tr>
<th>LLT</th>
<th>25</th>
<th>00</th>
<th>-25</th>
<th>/PT</th>
</tr>
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<tbody>
<tr>
<td>Options - see below</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring range</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 mm</td>
<td></td>
<td></td>
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<tr>
<td>50 mm</td>
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<td>100 mm</td>
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<tr>
<td>Class</td>
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<td>00=COMPACT</td>
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<td>10=SMART</td>
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<td></td>
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Laser options*

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

Cable output options*

<table>
<thead>
<tr>
<th>/PT</th>
<th>Cable directly out of the sensor (“Pigtail”) Length 0.25 m</th>
</tr>
</thead>
</table>

*Options can be combined

Ideal for industrial series applications in production line & automation

Resolution (x-axis) 640 points

High signal stability

Also available with patented Blue Laser Technology

Accessories from page 38
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>Start of measuring range</td>
<td>53.5 mm</td>
<td>70 mm</td>
</tr>
<tr>
<td></td>
<td>Mid of measuring range</td>
<td>66 mm</td>
<td>95 mm</td>
</tr>
<tr>
<td></td>
<td>End of measuring range</td>
<td>78.5 mm</td>
<td>120 mm</td>
</tr>
<tr>
<td></td>
<td>Height of measuring range</td>
<td>25 mm</td>
<td>50 mm</td>
</tr>
<tr>
<td></td>
<td>Extended measuring range</td>
<td>Start of measuring range</td>
<td>53 mm</td>
</tr>
<tr>
<td></td>
<td>End of measuring range</td>
<td>79 mm</td>
<td>125 mm</td>
</tr>
<tr>
<td></td>
<td>Max. deviation of a single point (2 sigma)</td>
<td>±0.10 %</td>
<td>±0.10 %</td>
</tr>
<tr>
<td></td>
<td>Linearity</td>
<td>2 µm</td>
<td>4 µm</td>
</tr>
<tr>
<td></td>
<td>Measuring range</td>
<td>Start of measuring range</td>
<td>23.4 mm</td>
</tr>
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<td></td>
<td>Mid of measuring range</td>
<td>25 mm</td>
<td>50 mm</td>
</tr>
<tr>
<td></td>
<td>End of measuring range</td>
<td>29.1 mm</td>
<td>58 mm</td>
</tr>
<tr>
<td></td>
<td>Extended measuring range</td>
<td>Start of measuring range</td>
<td>23.2 mm</td>
</tr>
<tr>
<td></td>
<td>End of measuring range</td>
<td>29.3 mm</td>
<td>60 mm</td>
</tr>
<tr>
<td>Resolution</td>
<td>640 points/profile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profile frequency</td>
<td>up to 2,000 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interfaces</td>
<td>Ethernet GigE Vision</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Digital inputs</td>
<td>Mode switching</td>
<td>Encoder (counter)</td>
</tr>
<tr>
<td></td>
<td>RS422 (half-duplex)</td>
<td>Output of measurement values</td>
<td>Sensor control</td>
</tr>
<tr>
<td>Output of measurement values</td>
<td>Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU) analog; switch signal; PROFINET; EtherCAT; EtherNet/IP</td>
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<td></td>
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<tr>
<td>Control and display elements</td>
<td>3x color LEDs for laser, data and error</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light source</td>
<td>≤ 8 mW</td>
<td>≤ 20 mW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Standard: laser class 2M, semiconductor laser 658 nm</td>
<td>Option: laser class 3B, semiconductor laser 658 nm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤ 8 mW</td>
<td>Standard: laser class 2M, semiconductor laser 405 nm</td>
<td></td>
</tr>
<tr>
<td>Laser switch-off</td>
<td>via software, hardware switch-off with /SI option</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aperture angle of laser line</td>
<td>20°</td>
<td>25°</td>
<td>25°</td>
</tr>
<tr>
<td>Permissible ambient light (fluorescent light)</td>
<td>≤ 10,000 lx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class (DIN EN 60529)</td>
<td>IP65 (when connected)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration (DIN EN 60068-2-27)</td>
<td>2 g / 20 … 500 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock (DIN EN 60068-2-6)</td>
<td>15 g / 6 ms</td>
<td></td>
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</tr>
<tr>
<td>Temperature range</td>
<td>Storage</td>
<td>-20 … + 70 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operation</td>
<td>0 … + 45 °C</td>
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</tr>
<tr>
<td>Weight</td>
<td>380 g (without cable)</td>
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<tr>
<td>Supply voltage</td>
<td>11 … 30 VDC, nominal value 24 V, 500 mA, IEEE 802.3af class 2, Power over Ethernet (PoE)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Measuring range (standard); Measuring object: Micro-Epsilon standard object
2) According to a one-time averaging over the measuring field (640 points)
3) RS422 interface, programmable either as serial interface or as input for triggering/synchronization
4) Only with 2D/3D Output Unit
5) Only with 2D/3D Gateway
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 COMPACT and SMART versions

The scanCONTROL 29x0 series is available as COMPACT and SMART versions. The COMPACT 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

<table>
<thead>
<tr>
<th>Measuring range</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 mm (only Blue Laser)</td>
</tr>
<tr>
<td>25 mm</td>
</tr>
<tr>
<td>50 mm</td>
</tr>
<tr>
<td>100 mm</td>
</tr>
</tbody>
</table>

Class

00=COMPACT
10=SMART
50=HIGHSPEED
60=HIGHSPEED SMART

Series

LLT 29x0

Laser options*

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

Cable output options*

<table>
<thead>
<tr>
<th>/PT</th>
<th>Cable directly out of the sensor (&quot;Pigtail&quot;) Length 0.25 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>/VT</td>
<td>Cable directly out of the sensor (&quot;Variable Tail&quot;) Length 0.1 ... 1.0 m (freely selectable)</td>
</tr>
<tr>
<td>/ST</td>
<td>1 cable directly out of the sensor (&quot;Single Tail&quot;) multi-function port is omitted, Length 0.1 ... 1.0 m (freely selectable)</td>
</tr>
</tbody>
</table>

* Options can be combined
### Technical data

<table>
<thead>
<tr>
<th>Model</th>
<th>LLT29x0-10/BL</th>
<th>LLT 29xx-25</th>
<th>LLT 29xx-50</th>
<th>LLT 29xx-100</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Available laser type</strong></td>
<td>Blue Laser</td>
<td>Red Laser</td>
<td>Blue Laser</td>
<td>Blue Laser</td>
</tr>
<tr>
<td><strong>Measuring range</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>52.5 mm</td>
<td>53.5 mm</td>
<td>70 mm</td>
<td>190 mm</td>
</tr>
<tr>
<td>Mid of measuring range</td>
<td>56.5 mm</td>
<td>66 mm</td>
<td>95 mm</td>
<td>240 mm</td>
</tr>
<tr>
<td>End of measuring range</td>
<td>60.5 mm</td>
<td>78.5 mm</td>
<td>120 mm</td>
<td>280 mm</td>
</tr>
<tr>
<td>Height of measuring range</td>
<td>8 mm</td>
<td>25 mm</td>
<td>50 mm</td>
<td>100 mm</td>
</tr>
<tr>
<td><strong>Extended measuring range</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>End of measuring range</td>
<td>8 mm</td>
<td>79 mm</td>
<td>125 mm</td>
<td>390 mm</td>
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<tr>
<td>Max. deviation of a single point (2 sigma)</td>
<td>±0.17 %</td>
<td>±0.10 %</td>
<td>±0.10 %</td>
<td>±0.10 %</td>
</tr>
<tr>
<td><strong>Linearity</strong></td>
<td>1 µm</td>
<td>2 µm</td>
<td>4 µm</td>
<td>12 µm</td>
</tr>
<tr>
<td><strong>Measuring range</strong></td>
<td>1 µm</td>
<td>2 µm</td>
<td>4 µm</td>
<td>12 µm</td>
</tr>
<tr>
<td><strong>Max. deviation of a single point (2 sigma)</strong></td>
<td>±0.0125 %</td>
<td>±0.008 %</td>
<td>±0.008 %</td>
<td>±0.012 %</td>
</tr>
</tbody>
</table>

**Profile frequency**
- Standard: up to 300 Hz
- Highspeed: up to 2,000 Hz

**Interfaces**
- Ethernet GigE Vision: Output of measurement values, Sensor control, Profile data transmission
- RS422 (half-duplex): Output of measurement values, Sensor control, Trigger, Synchronization
  - Standard: laser class 2M, semiconductor laser 658 nm
  - Option: laser class 3B, semiconductor laser 658 nm
  - ≤ 8 mW
  - ≤ 20 mW

**Output of measurement values**
- Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)
- analog; switch signal
- PROFINET; EtherCAT; EtherNet/IP

**Control and display elements**
- 3x color LEDs for laser, data and error

**Light source**
- Red Laser: ≤ 8 mW
- Blue Laser: ≤ 20 mW

**Aperture angle of laser line**
- 10°
- 20°
- 25°
- 25°

**Permissible ambient light (fluorescent light)**
- ≤ 10,000 lx

**Protection class (DIN EN 60529)**
- IP65 (when connected)

**Vibration (DIN EN 60068-2-7)**
- 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)

---

1) Measuring range (standard); Measuring object: Micro-Epsilon standard object
2) According to a one-time averaging over the width of the measuring field (640 points)
3) RS422 interface, programmable either as serial interface or as input for triggering/synchronization
4) Only with 2D/3D Output Unit
5) Only with 2D/3D Gateway
Dimensions and measuring range

LLT29x0-10/BL

Blue Laser

Dimensions and measuring range

- **Recommended attachment point**
- **MS ± 10**
  - Φ 0.2 x 90°
  - (on both sides)
- **SMR = Offset distance**
- **MMR = Reference distance**

![Diagram of LLT29x0-10/BL with dimensions and measuring range annotations.](image-url)
LLT25x0-25 / LLT29x0-25

Recommended attachment point

MR ext. \( \geq 53 \)

SMR 66

MMR 78.5

EMR

MR ext. \( \leq 79 \)

89

96

Z

M5 \( \pm 10 \)

\( \sigma 5.2 \times 90^\circ \)

4.1

+ 0.1

0

3

H7

71.5

75

75.5

79

85.75

64.1

46.9

Recommended attachment point

Recommended range

Extended range

Red Laser

Blue Laser

LLT25x0-25 / LLT29x0-25

Recommended attachment point

MR ext. \( \geq 53 \)

SMR 66

MMR 78.5

EMR

MR ext. \( \leq 79 \)

89

96

Z

M5 \( \pm 10 \)

\( \sigma 5.2 \times 90^\circ \)

4.1

+ 0.1

0

3

H7

71.5

75

75.5

79

85.75

64.1

46.9

Recommended attachment point

Recommended range

Extended range

Red Laser

Blue Laser
Dimensions and measuring range

**LLT25x0-50 / LLT29x0-50**

- **Red Laser**
- **Blue Laser**

Recommended attachment point

Recommended attachment point

- MR ext. >= 65
- 70 SMR
- 95 MMR
- 120 EMR
- MR ext. <= 125

- ~19°
- 5.2 x 90°
- 4.1 +0.1
- H7

**Recommended attachment point**

- standard range
- extended range

**Recommended attachment point**

**Recommended attachment point**
Powerful 2D/3D laser scanners

The new LLT30x2 laser profile scanners provide calibrated profile data with up to 5.12 million points per second. They allow profile frequencies up to 5 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 COMPACT and SMART versions

The scanCONTROL 30x2 series is available as COMPACT and SMART versions. The COMPACT 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 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.

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.

### Precise 2D/3D profile measurements

<table>
<thead>
<tr>
<th>Article designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLT 30 xx -25 /SI</td>
</tr>
</tbody>
</table>

#### Options - see below

- **Measuring range**
  - 25 mm
  - 50 mm
  - 100 mm
  - 200 mm

- **Class**
  - 02 = COMPACT
  - 12 = SMART

#### 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

#### Cable output options*

- **/PT** Cable directly out of the sensor ("Pigtail")
  - Available lengths: 0.3 / 0.6 / 1 m
- **/ST** 1 cable directly out of the sensor ("Single Tail"), no multi-function port
  - Available lengths: 0.3 / 0.6 / 1.00 m

*Options can be combined

---

Precise profile measurements for industrial measurement tasks

Resolution (x-axis) 1,024 points

Profile frequency 5,000 Hz

For small and large measuring ranges

Also available with patented Blue Laser Technology

---

Accessories from page 38
### Technical data

<table>
<thead>
<tr>
<th>Model</th>
<th>LLT 30x2-25</th>
<th>LLT 30x2-50</th>
<th>LLT 30x2-100</th>
<th>LLT 30x2-200</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measuring range</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>77.5 mm</td>
<td>105 mm</td>
<td>200 mm</td>
<td>200 mm</td>
</tr>
<tr>
<td>Mid of measuring range</td>
<td>85 mm</td>
<td>125 mm</td>
<td>270 mm</td>
<td>310 mm</td>
</tr>
<tr>
<td>End of measuring range</td>
<td>92.5 mm</td>
<td>145 mm</td>
<td>340 mm</td>
<td>420 mm</td>
</tr>
<tr>
<td>Height of measuring range</td>
<td>15 mm</td>
<td>40 mm</td>
<td>140 mm</td>
<td>220 mm</td>
</tr>
<tr>
<td><strong>Extended measuring range</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>-</td>
<td>-</td>
<td>190 mm</td>
<td>160 mm</td>
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<tr>
<td>End of measuring range</td>
<td>-</td>
<td>-</td>
<td>360 mm</td>
<td>460 mm</td>
</tr>
<tr>
<td><strong>Max. deviation of a single point</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2 sigma)</td>
<td>±0.09 %</td>
<td>±0.09 %</td>
<td>±0.08 %</td>
<td>±0.12 %</td>
</tr>
<tr>
<td></td>
<td>±0.08 %</td>
<td>±0.08 %</td>
<td>±0.07 %</td>
<td>-</td>
</tr>
<tr>
<td><strong>Height of measuring range</strong></td>
<td>15 mm</td>
<td>40 mm</td>
<td>140 mm</td>
<td>220 mm</td>
</tr>
<tr>
<td><strong>Extended measuring range</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>-</td>
<td>-</td>
<td>72.1 mm</td>
<td>100 mm</td>
</tr>
<tr>
<td>End of measuring range</td>
<td>-</td>
<td>-</td>
<td>131.1 mm</td>
<td>290 mm</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>1,024 points/profile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Profile frequency</strong></td>
<td>up to 5,000 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td>Ethernet GigE Vision</td>
<td>Digital inputs</td>
<td>RS422 (half-duplex)</td>
<td>Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>analog; switch signal; PROFINET; EtherCAT; EtherNet/IP</td>
</tr>
<tr>
<td><strong>Output of measurement values</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control and display elements</strong></td>
<td>3x color LEDs for laser, data and error</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Light source</strong></td>
<td>Red Laser</td>
<td>Blue Laser</td>
<td>Red Laser</td>
<td>Blue Laser</td>
</tr>
<tr>
<td><strong>Permissible ambient light (fluorescent light)</strong></td>
<td>≤ 10 mW</td>
<td>≤ 30 mW</td>
<td>≤ 50 mW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Standard: laser class 2M, semiconductor laser 658 nm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aperture angle of laser line</strong></td>
<td>23°</td>
<td>28°</td>
<td>30°</td>
<td>45°</td>
</tr>
<tr>
<td><strong>Permissible ambient light (fluorescent light)</strong></td>
<td>10,000 lx</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protection class (DIN EN 60529)</strong></td>
<td>IP67 (when connected)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vibration (DIN EN 60068-2-27)</strong></td>
<td>2 g / 20 … 500 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shock (DIN EN 60068-2-6)</strong></td>
<td>15 g / 6 ms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Temperature range</strong></td>
<td>Storage</td>
<td>Operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-20 … +70 °C</td>
<td>0 … +45 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>415 g (without cable)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Supply voltage</strong></td>
<td>11 … 30 VDC, nominal value 24 V, 500 mA, IEEE 802.3af class 2, Power over Ethernet (PoE)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) According to measuring range; Measuring object: Micro-Epsilon standard object
2) According to a one-time averaging across the measuring field (1,024 points)
3) RS422 interface, programmable either as serial interface or as input for triggering/synchronization
4) Only with 2D/3D Output Unit
5) Only with 2D/3D Gateway
Fast and precise 2D/3D profile measurements
The new LLT30x0 laser profile scanners provide calibrated profile data with up to 7.37 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 COMPACT and SMART versions
The scanCONTROL 30x0 series is available as COMPACT and SMART versions. The COMPACT 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 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.

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.

### Article designation

<table>
<thead>
<tr>
<th>LLT</th>
<th>30</th>
<th>xx</th>
<th>-25</th>
<th>/SI</th>
</tr>
</thead>
</table>

- **Options - see below**
- **Measuring range**
  - 25 mm
  - 50 mm
  - 100 mm
  - 200 mm
- **Class**
  - 00 = COMPACT
  - 10 = SMART
- **Series**
  - LLT30xx

### Laser options*

<table>
<thead>
<tr>
<th>/SI</th>
<th>Hardware switch-off of the laser line</th>
</tr>
</thead>
<tbody>
<tr>
<td>/3R</td>
<td>Increased laser power (class 3R) e.g., for dark surfaces</td>
</tr>
<tr>
<td>/BL</td>
<td>Blue laser line (405 nm) for (semi-) transparent, red-hot glowing and organic materials</td>
</tr>
</tbody>
</table>

### Cable output options*

<table>
<thead>
<tr>
<th>/PT</th>
<th>Cable directly out of the sensor (<em>Pigtail</em>) Available lengths: 0.3 / 0.6 / 1.00 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ST</td>
<td>1 cable directly out of the sensor (<em>Single Tail</em>), no multi-function port Available lengths: 0.3 / 0.6 / 1.00 m</td>
</tr>
</tbody>
</table>

*Options can be combined

**Accessories from page 38**
## Technical data

### Model

<table>
<thead>
<tr>
<th>Available laser type</th>
<th>LLT 30x0-25</th>
<th>LLT 30x0-50</th>
<th>LLT 30x0-100</th>
<th>LLT 30x0-200</th>
</tr>
</thead>
<tbody>
<tr>
<td>z-axis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring range</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>77.5 mm</td>
<td>105 mm</td>
<td>200 mm</td>
<td>200 mm</td>
</tr>
<tr>
<td>Mid of measuring range</td>
<td>85 mm</td>
<td>125 mm</td>
<td>270 mm</td>
<td>310 mm</td>
</tr>
<tr>
<td>End of measuring range</td>
<td>92.5 mm</td>
<td>145 mm</td>
<td>340 mm</td>
<td>420 mm</td>
</tr>
<tr>
<td>Height of measuring range</td>
<td>15 mm</td>
<td>40 mm</td>
<td>140 mm</td>
<td>220 mm</td>
</tr>
<tr>
<td>Extended measuring range</td>
<td>-</td>
<td>-</td>
<td>190 mm</td>
<td>160 mm</td>
</tr>
<tr>
<td>Max. deviation of a single point</td>
<td>±0.08 %</td>
<td>±0.08 %</td>
<td>0.06 %</td>
<td>±0.10 %</td>
</tr>
<tr>
<td>Line linearity</td>
<td>1.5 µm</td>
<td>3 µm</td>
<td>9 µm</td>
<td>26 µm</td>
</tr>
<tr>
<td>x-axis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring range</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>23 mm</td>
<td>43.3 mm</td>
<td>75.6 mm</td>
<td>130 mm</td>
</tr>
<tr>
<td>Mid of measuring range</td>
<td>25 mm</td>
<td>50 mm</td>
<td>100 mm</td>
<td>200 mm</td>
</tr>
<tr>
<td>End of measuring range</td>
<td>26.8 mm</td>
<td>56.5 mm</td>
<td>124.4 mm</td>
<td>270 mm</td>
</tr>
<tr>
<td>Extended measuring range</td>
<td>-</td>
<td>-</td>
<td>72.1 mm</td>
<td>100 mm</td>
</tr>
<tr>
<td>Resolution</td>
<td>2,048 points/profile</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Profile frequency**: up to 10,000 Hz

**Interfaces**

- Ethernet GigE Vision
- Digital inputs
- RS422 (half-duplex)

**Output of measurement values**

- Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)
- analog \(^4\); switch signal \(^4\)
- PROFINET \(^5\); EtherCAT \(^5\); EtherNet/IP \(^5\)

**Control and display elements**

- 3x color LEDs for laser, data and error

**Light source**

- Red Laser: ≤ 10 mW
- Blue Laser: ≤ 30 mW

**Aperture angle of laser line**

- Red Laser: 23°
- Blue Laser: 28°
- Standard: laser class 2M, semiconductor laser 658 nm
- Option: laser class 3R, semiconductor laser 658 nm

**Supply voltage**

- 11 … 30 VDC, nominal value 24 V, 500 mA, IEEE 802.3af class 2, Power over Ethernet (PoE)

### Notes

- \(^1\) According to measuring range; Measuring object: Micro-Epsilon standard object
- \(^2\) According to a one-time averaging over the width of the measuring field (2,048 points)
- \(^3\) RS422 interface, programmable either as serial interface or as input for triggering/synchronization
- \(^4\) Only with 2D/3D Output Unit
- \(^5\) Only with 2D/3D Gateway
Dimensions and measuring range

LLT30x2-25 / LLT30x0-25

Red Laser  Blue Laser
**Dimensions and measuring range**

**LLT30x2-100 / LLT30x0-100**

- **Red Laser**
- **Blue Laser**

Diagram showing the dimensions and measuring range for LLT30x2-100 and LLT30x0-100 sensors. The diagram includes measurements in millimeters for various parts such as body dimensions, laser positions, and other relevant specifications. The diagram is color-coded to differentiate between red and blue lasers.
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.

**Easy 5-Step Configuration**

1. **Alignment of the sensor**
2. **Configuring the sensor**
3. **Selection of measurement programs**
4. **Configuring the measurement programs**
5. **Output and display of measured values**

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.

Download: micro-epsilon.com/2D_3D/laser-scanner/Software/downloads/
Numerous Setting Options

- 8 measuring programs x 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
3D visualization for all scanCONTROL models
A third dimension of the measured data is obtained by a relative movement between sensor and target. The y-coordinates are assigned via a trigger or CMM counter.

The scanCONTROL 3D-View software is designed for viewing and exporting 3D data. In addition, 3D-View also supports the configuration of the sensor. The software enables the interactive viewing of 3D data and the export of this measurement data to common data formats. Different display modes, views and color coding simplify sensor setup and profile analysis. The software supports the online visualization of the profiles as well as offline analysis of stored profile sequences.

Different visualization options for better visibility of characteristics:
- Color visualization: z-coordinate
- Color visualization: intensity
- Color visualization: reflection width
- Color visualization: moment 0

Download:
micro-epsilon.com/
2D_3D/laser-scanner/
Software/downloads/
Different illumination options to highlight surface structures. With (left) and without illumination (right).

Fitting of a plane to make even the slightest unevenness on multiple-bent components visible.

Scan (left) and 3D image of the scanned object (right).
The scanCONTROL COMPACT 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 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. Numerous infrastructure topology options are possible for single and multi-scanner applications.
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 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. Detailed documentation also shows how to set up additional special sensor parameters.

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 either via GeniCam commands or directly via the control parameters listed in the documentation. For integration support (e.g. trigger, container mode), some example programs are also available.

Use on ARM embedded PCs (e.g. Raspberry Pi) is possible with restrictions.
System for multi-scanner applications

**scanCONTROL Smart PLC Unit**

- Combination of measured results from up to 8 laser scanners
- Transmission of measured value to higher-level system control
- Digital/analog IN/OUT
- Numerous possibilities for recording measurement values

Smart PLC Unit

Übertragung von Messwerten und/oder Gut-/Schlecht-Bewertung

Ethernet (UDP oder Modbus TCP)
- Analoge Messwerte
- Digitale Schaltsignale
- PROFINET, ...

Empfänger (z.B. übergroßnetes SPS)
Measurement tasks such as contour measurement or the scanning of large components require the use of several scanners. The scanCONTROL Smart PLC Unit is an industrial control unit that includes tailor-made application software for the combination of measurement values from scanCONTROL SMART laser scanners. It evaluates and logs the measured values in order to transmit them to the higher-level control system. For this purpose, analog and digital interfaces as well as numerous fieldbus connections (e.g. Profinet, Ethernet IP, EtherCAT) are available. The modular design of the Smart PLC Unit enables the user to connect up to 8 laser scanners.

Application examples:

- Determination of cross-section in the extrusion process
- Contour measurement of a land
- Profile control (profile width, land width, groove width, groove depth)
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

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6414142</td>
<td>2D/3D Gateway</td>
</tr>
<tr>
<td>6414142.001</td>
<td>2D/3D Gateway, pre-parameterized</td>
</tr>
<tr>
<td>6411168</td>
<td>scanCONTROL SPU Switch, 5 ports</td>
</tr>
<tr>
<td>6411167</td>
<td>scanCONTROL SPU Switch, 8 ports</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of sensors on the gateway</th>
<th>Maximum measurement frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>500 Hz</td>
</tr>
<tr>
<td>2</td>
<td>500 Hz</td>
</tr>
<tr>
<td>3</td>
<td>330 Hz</td>
</tr>
<tr>
<td>4</td>
<td>250 Hz</td>
</tr>
</tbody>
</table>
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/±10V
  - 4-channel analog output terminal; ±10 V

- **0325135** OU-AnalogOut/4-channel/0-10V
  - 4-channel analog output terminal; 0-10 V

- **0325132** OU-AnalogOut/4-channel/0-20mA
  - 4-channel analog output terminal; 0-20 mA

- **0325133** OU-AnalogOut/4-channel/4-20mA
  - 4-channel analog output terminal; 4-20 mA

Other terminals available on request.
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                  Description
2105058    Protection housing for LLT25/29 series    Adaptive protective housing for LLT25x0/29xx
2105059    Protective cooling housing for LLT25/29 series   Adaptive protection and cooling housing for LLT25x0/29xx
Protection and cooling housing for LLT30xx

Protective housing with blow-out system

Connection for air purge

3x mounting holes M4

Exchangeable protective glass

Adjustable splash guard

Protective housing with blow-out system and water cooling

Connection for liquid cooling

Connection for air purge

3x mounting holes M4

Exchangeable protective glass

Adjustable splash guard

<table>
<thead>
<tr>
<th>Art. no.</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2105076</td>
<td>Protective housing for LLT30 series</td>
<td>Adaptive protective housing for LLT30xx</td>
</tr>
<tr>
<td>2105077</td>
<td>Protective cooling housing for LLT30 series</td>
<td>Adaptive protective and cooling housing for scanCONTROL 30xx</td>
</tr>
<tr>
<td>0755083</td>
<td>Exchangeable glass for protective housing LLT30</td>
<td>Exchangeable glass for protection/cooling concept LLT30, packaging unit 30 pcs.</td>
</tr>
</tbody>
</table>
Accessories

Connection cables

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

![PCR3000-x Multi-function cable](image)

**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

![SCR3000A-x Ethernet connection cable](image)

Other accessories

<table>
<thead>
<tr>
<th>Art. no.</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0323478</td>
<td>Connector/12-pin/Multifunction for LLT25/29/30 series</td>
<td>Plug for multifunction port</td>
</tr>
<tr>
<td>0323479</td>
<td>Connector/8-pin/Ethernet for LLT25/26/29/30 series</td>
<td>Plug for Ethernet socket</td>
</tr>
<tr>
<td>2420067</td>
<td>PS25/29/30</td>
<td>Power supply unit for scanCONTROL</td>
</tr>
<tr>
<td>0254111</td>
<td>Case for LLT25/26/29/30 series</td>
<td>Transport case for scanCONTROL sensors incl. measuring stand</td>
</tr>
<tr>
<td>2960097</td>
<td>Measuring stand for LLT25/26/29/30</td>
<td>Measuring stand with sensor adapter board, flexible rod and clamp base</td>
</tr>
</tbody>
</table>
**surfaceCONTROL 3D 3500**
Innovative 3D snapshot sensor for inline inspection of geometry, shapes and surfaces

- Highest repeatability up to 0.4 µm
- Best z-resolution from 1.0 µm
- Up to 2.2 million 3D points / second
- Easy integration in all common 3D image processing packets

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

- Complete inspection of reflecting and shiny surfaces
- Highest z-accuracy < 1 µm
- Fastest 3D inspection < 1 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