More Precision

scanCONTROL // 2D/3D laser scanners (laser profile sensors)
Compact design for precise measurement tasks
The design of the LLT 29xx series is focused on compact size and low weight. The controller is integrated in the housing, simplifying cabling arrangements and mechanical integration. Due to its compact design and the high profile resolution, the LLT29xx series is especially suitable for static, dynamic and robotic applications.

Interfaces for universal integration
The multi-function port can be used for power supply, as data output, for switching parameters, as trigger input or for synchronizing several scanCONTROL sensors. During synchronous operation, an integrated mode can be used to operate the sensors alternately compensating for overlapping laser lines. One scanner is measuring whilst the other laser line is switched off. The scanners can be supplied via Ethernet if necessary. If Industrial Ethernet is used as data output, only one cable will remain that connects the sensor to the periphery.

For all SMART sensors, the measurement data output can be carried out in three different ways, e.g., via Ethernet UDP, Modbus TCP or serial. Micro-Epsilon converters enable data transmission via analog signals, digital switching signals, PROFINET, Ethernet/IP or EtherCAT.

Small measuring range with high resolution
With a laser line of just 10 mm, the LLT29xx-10/BL models recognize the finest of details and structures. The high profile resolution combined with the blue laser line allow for maximum precision destined for versatile applications, e.g., in the electronics production.

Available with patented Blue Laser Technology
The Blue Laser technology uses a laser diode with a shorter wavelength of 405 nm. The outstanding characteristics of this wavelength range enable measurements on red-hot glowing metals, (semi-)transparent and organic objects.
### Technical Data

<table>
<thead>
<tr>
<th>Model</th>
<th>LLT</th>
<th>29xx-10/BL</th>
<th>29xx-25</th>
<th>29xx-50</th>
<th>29xx-100</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>z-axis (height)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard measuring range</td>
<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></td>
<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></td>
<td>End of measuring range</td>
<td>60.5 mm</td>
<td>78.5 mm</td>
<td>120 mm</td>
<td>290 mm</td>
</tr>
<tr>
<td></td>
<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>Extended measuring range</td>
<td>Start of measuring range</td>
<td>-</td>
<td>-</td>
<td>53 mm</td>
<td>65 mm</td>
</tr>
<tr>
<td></td>
<td>End of measuring range</td>
<td>-</td>
<td>79 mm</td>
<td>125 mm</td>
<td>390 mm</td>
</tr>
<tr>
<td>Linearity</td>
<td>(2 sigma)</td>
<td>±0.17 % FSO</td>
<td>±0.10 % FSO</td>
<td>±0.10 % FSO</td>
<td>±0.10 % FSO</td>
</tr>
<tr>
<td>Reference resolution</td>
<td></td>
<td>1 µm</td>
<td>2 µm</td>
<td>4 µm</td>
<td>12 µm</td>
</tr>
</tbody>
</table>

| **x-axis (width)** | | | | |
| Standard measuring range | Start of measuring range | 9.4 mm | 23.4 mm | 42 mm | 83.1 mm |
| | Mid of measuring range | 10 mm | 25 mm | 50 mm | 100 mm |
| | End of measuring range | 10.7 mm | 29.1 mm | 58 mm | 120.8 mm |
| Extended measuring range | Start of measuring range | - | - | 23.2 mm | 40 mm |
| | End of measuring range | - | 29.3 mm | 58.5 mm | 143.5 mm |
| Resolution (x-axis) | | | | 1,280 points/profile |

**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
- Multi-junction port: Digital inputs
  - Mode switching
  - Encoder (counter)
  - Trigger
- RS422 (half-duplex): Output of measurement values, Sensor control, Trigger, Synchronization

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

**Display (LED)**
- 1x laser ON/OFF, 1x power/error/status

**Light source**
- Standard: Semiconductor laser 405 nm (blue)
- Optional: Semiconductor laser 658 nm (red)

**Aperture angle of laser line**
- Standard: 10°, 20°, 25°, 25°
- Optional: Hardware safety switch-off

**Laser power**
- Standard: ≤ 8 mW (laser class 2M)
- Optional: ≤ 20 mW (laser class 3B)

**EMC requirements**
- according to: EN 61326-1: 2006-10
- DIN EN 55011: 2007-11 (group 1, B class)
- EN 61000-6-2: 2006-03

**Vibration**
- 2 g / 20 ... 500 Hz

**Shock**
- 15 g / 6 ms

**Operating temperature**
- 0 °C ... +45 °C

**Storage temperature**
- -20 °C ... +70 °C

**Dimensions**
- 96 x 118.5 x 33 mm
- 96 x 85 x 33 mm

**Sensor weight (without cable)**
- 440 g
- 380 g

**Supply**
- 11 ... 30 VDC, nominal value 24 V, 500 mA, IEEE 802.3af class 2, Power over Ethernet

---

1) Measuring range (standard)
2) Measurement object: Micro-Epsilon standard object (metallic, diffusely reflecting material)
3) According to a one-time averaging across the measuring field (640 points)
4) RS422 interface, programmable either as serial interface or as input for triggering/synchronization
5) Only with Output Unit
6) Only with scanCONTROL Gateway
FSO = Full Scale Output
LLT25x0/LLT26x0/29x0-25

Recommended attachment point

85.75
79
75.5

MR ext. >= 53
53.5 SMR
66 MMR
78.5 EMR

MR ext. <= 79
89
96

Recommended attachment point

Z
Z

standard
range
extended
range
Dimensions and measuring range

LLT25x0/LLT26x0/29x0-50

Recommended attachment point

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

standard range
extended range

Recommended attachment point
LLT25x0/LLT26x0/29x0-100

Recommended attachment point

Recommended attachment point

MR ext. >= 125
MR ext. <= 390

190 SMR
240 MMR
290 EMR

standard range
extended range

Recommended attachment point

Recommended attachment point
Sensors and Systems from Micro-Epsilon

Sensors and systems for displacement, distance and position

Optical micrometers and fiber optics, measuring and test amplifiers

Color recognition sensors, LED analyzers and inline color spectrometers

Sensors and measurement devices for non-contact temperature measurement

3D measurement technology for dimensional testing and surface inspection

Measuring and inspection systems for metal strips, plastics and rubber

Measuring and inspection systems for metal strips, plastics and rubber