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.

Article designation

<table>
<thead>
<tr>
<th>LLT</th>
<th>29</th>
<th>00</th>
<th>-25</th>
<th>/SI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Options</td>
<td>see below</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Measuring range
10 mm (only Blue Laser)
25 mm
50 mm
100 mm

Class
00 = COMPACT
10 = SMART
50 = HIGH SPEED
60 = HIGH SPEED SMART

Series
LLT29xx

Laser options*

<table>
<thead>
<tr>
<th>/SI</th>
<th>Hardware switch-off of the laser line</th>
</tr>
</thead>
<tbody>
<tr>
<td>/3B</td>
<td>Improved 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 (&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

Accessories from page 32
## Technical Data

### Model LLT 29xx-10/BL 29xx-25 29xx-50 29xx-100

#### z-axis (height)

<table>
<thead>
<tr>
<th>Standard measuring range</th>
<th>Start of measuring range</th>
<th>52.5 mm</th>
<th>53.5 mm</th>
<th>70 mm</th>
<th>190 mm</th>
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</thead>
<tbody>
<tr>
<td>Mid of measuring range</td>
<td></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></td>
<td>60.5 mm</td>
<td>78.5 mm</td>
<td>120 mm</td>
<td>290 mm</td>
</tr>
<tr>
<td>Height of measuring range</td>
<td></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>53 mm</td>
<td>65 mm</td>
<td>125 mm</td>
</tr>
<tr>
<td>End of measuring range</td>
<td></td>
<td>-</td>
<td>79 mm</td>
<td>125 mm</td>
<td>390 mm</td>
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</table>

#### Linearity 1) (2 sigma)

<table>
<thead>
<tr>
<th>Standard measuring range</th>
<th>±0.17 % FSO</th>
<th>±0.10 % FSO</th>
<th>±0.10 % FSO</th>
<th>±0.10 % FSO</th>
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</thead>
</table>

#### Reference resolution 2) 3)

<table>
<thead>
<tr>
<th>Standard measuring range</th>
<th>1 µm</th>
<th>2 µm</th>
<th>4 µm</th>
<th>12 µm</th>
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</thead>
</table>

#### Standard measuring range

<table>
<thead>
<tr>
<th>Start of measuring range</th>
<th>9.4 mm</th>
<th>23.4 mm</th>
<th>42 mm</th>
<th>83.1 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid of measuring range</td>
<td>10 mm</td>
<td>25 mm</td>
<td>50 mm</td>
<td>100 mm</td>
</tr>
<tr>
<td>End of measuring range</td>
<td>10.7 mm</td>
<td>29.1 mm</td>
<td>58 mm</td>
<td>120.8 mm</td>
</tr>
<tr>
<td>Extended measuring range</td>
<td>Start of measuring range</td>
<td>-</td>
<td>23.2 mm</td>
<td>40 mm</td>
</tr>
<tr>
<td>End of measuring range</td>
<td>-</td>
<td>29.3 mm</td>
<td>60 mm</td>
<td>143.5 mm</td>
</tr>
</tbody>
</table>

#### Resolution (x-axis) 1,280 points/profile

#### Interfaces

<table>
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<tr>
<th>Interfaces</th>
<th>Ethernet GigE Vision</th>
<th>Output of measurement values</th>
<th>Sensor control</th>
<th>Profile data transmission</th>
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<tr>
<td></td>
<td>Digital inputs</td>
<td>Mode switching</td>
<td>Encoder (counter)</td>
<td>Trigger</td>
</tr>
<tr>
<td></td>
<td>RS422 (half-duplex)</td>
<td></td>
<td>Sensor control</td>
<td>Trigger</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Synchronization</td>
<td></td>
</tr>
</tbody>
</table>

#### Output of measurement values

- Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)
- PROFINET (6); EtherCAT (6); EtherNet/IP (6)

#### Display (LED)

- 1x laser ON/OFF, 1x power/error/status

#### Light source

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

#### Aperture angle of laser line

- Standard: 10°
- Optional: 20°
- 25°
- Optional: 25°

#### Laser power

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

#### Laser switch-off

- Optional: Hardware safety switch-off

#### Permissible ambient light (fluorescent light) 7)

- 10,000 lx

#### Protection class (sensor)

- IP65

#### 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 ... +45 °C

#### Storage temperature

- -20 ... +70 °C

#### Dimensions

- 96 x 118.5 x 33 mm
- 96 x 85 x 33 mm

#### Sensor weight (without cable)

- 440 g
- 308 g

#### Supply

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

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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
7) Only with Output Unit
FSO = Full Scale Output
Dimensions and measuring range

LLT29x0-10/BL

Recommended attachment point

SMR = Offset distance
56.5

MMR = Reference distance
56.5

EMR

10
8
9.6
10.4
0
0.5
(6.4°)

Z
LLT25x0/LLT26x0/29x0-25

Recommended attachment point

M5 z ≥ 1.5 × 90°

MR ext. ≥ 53
53.5  SMR
66  MMR
78.5  EMR

MR ext. ≤ 79
89
96

Recommended attachment point

Z

standard range
extended range
Dimensions and measuring range

LLT25x0/LLT26x0/29x0-50

Recommended attachment point

Recommended attachment point

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

Z

~19°
standard
range
extended
range

Recommended attachment point

Recommended attachment point

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

standard
range
extended
range

Z
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