More Precision

**scanCONTROL // 2D/3D laser scanner (laser profile sensors)**
Compact design for precise measurement tasks
The design of the LLT29xx series is focused on minimal 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 29xx 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.

Article description structure

<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></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/SI = integrated laser switch-off</td>
<td></td>
<td></td>
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<tr>
<td>/PT = integrated pigtail cable 0.25 m</td>
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</tr>
<tr>
<td>/3B = 3B laser class</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/BL = Blue Laser (blue-violet laser line)</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>10mm (only Blue Laser) / 25mm / 50mm / 100mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 = COMPACT / 10 = SMART</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 = GAP / 50 = HIGH-SPEED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LLT29xx</td>
<td></td>
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</tr>
</tbody>
</table>

For all SMART and GAP class sensors, the measurement data output can be carried out in 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.

Also available with blue laser
The Blue Laser technology uses a laser diode with a shorter wavelength of 405nm. The outstanding characteristics of this wavelength range enable reliable measurements to be made that to date have been difficult to achieve using red laser scanners. Its advantages can be seen particularly well on red-hot glowing metals, (semi-) transparent and organic materials.

Short measuring range
The laser line of only 10mm enables to reliably detect smallest details. The high profile resolution combined with the blue laser line allow for maximum precision destined for versatile applications, e.g. in the electronics production.

Options*

<table>
<thead>
<tr>
<th>/SI</th>
<th>Integrated laser switch-off</th>
</tr>
</thead>
<tbody>
<tr>
<td>/PT</td>
<td>Pigtail cable</td>
</tr>
</tbody>
</table>

| Hardware switch-off of the laser line |
| 0.25m long cable directly out of the sensor |

| /3B | 3B laser class |

| Improved laser power (20mW) e.g. for dark surfaces |
| Blue laser line (405nm) for (semi-) transparent, red-hot glowing and organic materials |

*Options can be combined

Accessories from page 18
<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></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>52.5mm</td>
<td>53.5mm</td>
<td>70mm</td>
<td>190mm</td>
<td></td>
</tr>
<tr>
<td>Midrange</td>
<td>56.5mm</td>
<td>66mm</td>
<td>95mm</td>
<td>240mm</td>
<td></td>
</tr>
<tr>
<td>End of measuring range</td>
<td>60.5mm</td>
<td>78.5mm</td>
<td>120mm</td>
<td>290mm</td>
<td></td>
</tr>
<tr>
<td>Height of measuring range</td>
<td>8mm</td>
<td>25mm</td>
<td>50mm</td>
<td>100mm</td>
<td></td>
</tr>
<tr>
<td>Extended measuring range</td>
<td></td>
<td>53mm</td>
<td>65mm</td>
<td>125mm</td>
<td></td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>-</td>
<td>79mm</td>
<td>125mm</td>
<td>390mm</td>
<td></td>
</tr>
<tr>
<td>End of measuring range</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Linearity</strong> (2sigma)</td>
<td>±0.17%</td>
<td>±0.10%</td>
<td>±0.10%</td>
<td>±0.10%</td>
<td></td>
</tr>
<tr>
<td>Reference resolution (2σ)</td>
<td>1µm</td>
<td>2µm</td>
<td>4µm</td>
<td>12µm</td>
<td></td>
</tr>
<tr>
<td><strong>Extended measuring range</strong></td>
<td></td>
<td>23.4mm</td>
<td>42mm</td>
<td>83.1mm</td>
<td></td>
</tr>
<tr>
<td>Start of measuring range</td>
<td>10mm</td>
<td>25mm</td>
<td>50mm</td>
<td>100mm</td>
<td></td>
</tr>
<tr>
<td>End of measuring range</td>
<td>10.7mm</td>
<td>29.1mm</td>
<td>58mm</td>
<td>120.8mm</td>
<td></td>
</tr>
<tr>
<td>Height of measuring range</td>
<td>10.7mm</td>
<td>29.3mm</td>
<td>60mm</td>
<td>143.5mm</td>
<td></td>
</tr>
<tr>
<td><strong>Resolution x-axis</strong></td>
<td>1,280 points/profile</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Profile frequency**
- COMPACT / SMART / GAP: up to 300Hz
- HIGHSPEED: up to 2,000Hz

**Interfaces**
- Ethernet GigE-Vision: Output of measurement values, Sensor control, Profile data transmission
- Digital inputs: Mode switching, Encoder, Trigger
- RS422 (half-duplex): Output of measurement values, Sensor control, Trigger, Synchronisation

**Output of measurement values**
- Ethernet (UDP / Modbus TCP); RS422 (ASCII / Modbus RTU)
- Analog 8): Switch signal 9)
- PROFINET 10), EtherCAT 11), EtherNet/IP 12)

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

**Light source**
- standard: Semiconductor laser 405nm (blue)
- optional: Semiconductor laser 658nm (red)
- 10° 20° 25° 25°

**Laser power**
- standard: ≤ 8mW (2M laser class)
- optional: ≤ 20mw (3B laser class)

**Integrated laser switch-off**
- optional: Safety interlock, hardware switch-off

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

**Protection class (sensor)**
- IP 65

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

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

**Shock**
- 15g / 6ms

**Operating temperature**
- 0°C to 45°C

**Storage temperature**
- -20°C to 70°C

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

**Weight sensor (without cable)**
- 440g
- 380g

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

1) Standard measuring range
2) Measuring 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 input for triggering / synchronisation
5) Only with Output Unit
6) Only with scanCONTROL Gateway
7) FSO = Full scale output
Dimensions and measuring range

scanCONTROL 26x0 / 29x0

gapCONTROL 26x1 / 29x1

LLT29xx-10/BL

Recommended attachment point

SMR = Offset distance

56.5 MMR = Reference distance

EMR

10

8

9.6

10.4

0

0.5

(6.4°)
LLT26xx/29xx-25

Recommended attachment point

MR ext. >= 53
- SMR 53.5
- MMR 66
- EMR 78.5
MR ext. <= 79
- 89
- 96

H7
M5

Recommended attachment point

Z
standard
range
extended
range

MR ext. >= 53
- SMR 53.5
- MMR 66
- EMR 78.5
MR ext. <= 79
- 89
- 96

H7
M5

Recommended attachment point

Z
standard
range
extended
range
**Dimensions and measuring range**

**scanCONTROL 26x0 / 29x0**

**gapCONTROL 26x1 / 29x1**

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**LLT26xx/29xx-50**

- **Recommended attachment point**
- **Recommended range**
- **Extended range**

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**Recommended attachment point**

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

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**Recommended range**

- **MR ext. <= 125**

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**Extended range**

- **standard range**
- **extended range**
PROFINET / EtherCAT / EtherNet/IP – for all scanners of the SMART and GAP classes
Each scanCONTROL Gateway can be connected with up to 4 sensors. It communicates with the scanCONTROL SMART sensor or the gapCONTROL sensor via Ethernet Modbus. The resultant values are then converted to PROFINET, EtherCAT or EtherNet/IP.
The customer carries out the parameter set up with a detailed instruction manual.
*operating more than one sensor requires a switch.

<table>
<thead>
<tr>
<th>Sensors on the gateway</th>
<th>Max. measurement frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>450Hz</td>
</tr>
<tr>
<td>2</td>
<td>240Hz</td>
</tr>
<tr>
<td>3</td>
<td>160Hz</td>
</tr>
<tr>
<td>4</td>
<td>120Hz</td>
</tr>
</tbody>
</table>

Gateway
6414129  scanCONTROL Gateway
6411168  scanCONTROL SPU Switch, 5 ports
6411167  scanCONTROL SPU Switch, 8 ports

Fieldbus coupler, configurable for PROFINET, EtherNet/IP and EtherCAT
Industrial Ethernet Switch (unmanaged) for mounting rail, 10/100/1000 Mbit/s, 5 ports
Industrial Ethernet Switch (unmanaged) for mounting rail, 10/100/1000 Mbit/s, 8 ports
Analog signals / digital switching signals – for all scanners of the SMART and GAP classes

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

### scanCONTROL Output Unit

**Analog signals**

- **Fieldbus coupler with filter module and bus end terminal**
- **8-channel digital output terminal; DC 24V; 0.5A; negative switching**
- **8-channel digital output terminal; DC 24V; 0.5A; positive switching**
- **4-channel analog output terminal; ±10V**
- **4-channel analog output terminal; 0-10V**
- **4-channel analog output terminal; 0-20mA**
- **4-channel analog output terminal; 4-20mA**

**Further terminals are available on request.**
Connection cable

**Multi-function cable**
For power supply, digital inputs (TTL or HTL), RS422 (half-duplex)

<table>
<thead>
<tr>
<th>Sensor type</th>
<th>PC 2600/2900 -5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable length in metres</td>
<td></td>
</tr>
</tbody>
</table>

SC = Multi-function cable qualified for drag chain use
PCR = Multi-function cable suitable for use with robots

**Ethernet connection cable**
For parameter setup, value and profile transmission

<table>
<thead>
<tr>
<th>Sensor type</th>
<th>SC 2600/2900 -5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable length in metres</td>
<td></td>
</tr>
</tbody>
</table>

SC = Ethernet connection cable qualified for drag chain use
SCR = Ethernet connection cable suitable for use with robots

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**Accessories**

<table>
<thead>
<tr>
<th>Art. No.</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0323478</td>
<td>Connector/12-pol/LLT2600-2900/PS/RS422/DigIn</td>
<td>Connector multi-function port for scanCONTROL series LLT26xx and 29xx</td>
</tr>
<tr>
<td>0323479</td>
<td>Connector/8-pol/LLT2600-2900/Ethernet</td>
<td>Connector for Ethernet socket for scanCONTROL series LLT26xx and 29xx</td>
</tr>
<tr>
<td>2420067</td>
<td>PS2600/2900</td>
<td>Power supply unit for scanCONTROL 2600/2900</td>
</tr>
<tr>
<td>0254072</td>
<td>Suitcase scanCONTROL 26/27/29 MR 10-100</td>
<td>Transport suitcase for scanCONTROL sensors, incl. measuring stand</td>
</tr>
</tbody>
</table>
Protection and cooling housing for LLT26xx and 29xx

Protection housing including blow-out system

Protection housing including blow-out system and water cooling

Art. No.  Model Description
2105058  scanCONTROL LLT26/29 protection housing
2105059  Protective scanCONTROL LLT26/29 cooling housing
0755075  Exchangeable glass for protection housing

Adaptive protection housing for scanCONTROL 26xx/29xx
Adaptive protection and cooling housing for scanCONTROL 26xx/29xx
Exchangeable glass for protection/cooling concept LLT 26/29, pack. with 50 pcs
High performance sensors made by Micro-Epsilon

- Sensors and systems for displacement and position
- Sensors and measurement devices for non-contact temperature measurement
- 2D/3D profile sensors (laser scanner)
- Optical micrometers, fiber optic sensors and fiberoptics
- Color recognition sensors, LED analyzers and color inline spectrometer
- Measurement and inspection systems