### Assembly Instructions
### gapCONTROL 2711/2761 (500)

## 1. Warnings

Connect the power supply and the display-/output device in accordance with the safety regulations for electrical equipment. The power supply must not exceed the specified limits.

> Danger of injury, damage or destruction of the sensor

Avoid shock and vibration to the sensor. Avoid continuous exposure to dust and spray on the sensor. Avoid exposure to aggressive materials (e. g. washing agent, penetrating liquids or similar) on the sensor.

> Damage to or destruction of the sensor

Read the detailed instruction manual before operating the sensor. You will find this manual on the provided CD or online at www.micro-epsilon.com.

## 2. Notes on CE Marking

The following apply to the gapCONTROL 27xx:

- EU directive 2014/30/EU
- EU directive 2011/65/EU, „RoHS" category 9

The sensor fulfills the specifications of the EMC requirements, if the instructions in the manual are followed.

## 3. Proper Environment

- Protection class:        IP 65 (Only applies to connected output plugs or protective caps)
- Operating temperature: 0 to +50 °C (+32 to +122 °F), by free circulation of air
- Storage temperature:    -20 to +70 °C ( -4 to +158 °F)
- Humidity:               5 - 95 % (non condensing)
- Vibration:              DIN EN 600068-2-6 (sine shaped)
- Mechanical shock:       DIN EN 60068-2-29

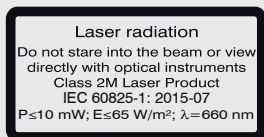## 4. Scope of Delivery of gapCONTROL 27xx

- 1 Sensor gapCONTROL 27xx with integrated controller
- 1 power supply cable PC2700-4,5, length 4,5 m; ODU round connector and free cable ends
- 1 gapCONTROL Setup Software CD with documentations
- 1 Sensor inspection log / assembly instructions
- 1 Bag of accessories with one ODU male connector 6-pin (RS 422) and two protective caps for ODU female connector (6- or 8-pin)

## 5. Laser Safety

The gapCONTROL 27xx sensors operate with a semiconductor laser having a wavelength of 660 nm (visible/red). The laser operation is indicated visually by the LED on the sensor.

gapCONTROL 27xx sensors with a maximum laser power up to 10 mW are classified in Laser Class 2M (IIM). The following information labels are fitted to the sensor housing (front and rear side). If both information labels are hidden in the installed state, the user must ensure that additional labels are fitted at the point of installation.

Laser radiation
Do not stare into the beam or view
directly with optical instruments
Class 2M Laser Product
IEC 60825-1: 2015-07
P≤10 mW; E≤65 W/m²; λ=660 nm

THIS PRODUCT COMPLIES
WITH FDA REGULATIONS
21CFR 1040.10 AND 1040.11

**⚠ CAUTION**    Hazard to the eye via laser radiation! Consciously close your eyes or turn away if the laser radiation impinges on the eye.

Lasers of Class 2M are not subject to notification and a laser protection officer is not required. Mark the laser area recognizable and everlasting.
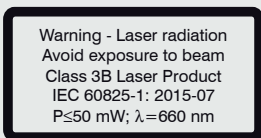
### Laser Class 3B

gapCONTROL 27xx sensors with a maximum laser power up to 20 mW are classified in Laser Class 3B (IIIB).

**⚠ CAUTION**    When using lasers of 3B class appropriate protective glasses are necessarily! Injury of the eyes and the skin by laser radiation!

Class 3B (IIIB) laser sensors are notifiable and a laser protection officer is required either. During operation the laser area has to be restricted and marked. The following information label should be fitted to the sensor housing (front and rear side):

Warning - Laser radiation
Avoid exposure to beam
Class 3B Laser Product
IEC 60825-1: 2015-07
P≤50 mW; λ=660 nm

THIS PRODUCT COMPLIES
WITH FDA REGULATIONS
21CFR 1040.10 AND 1040.11

ℹ Sensors of Laser Class 3B (IIIB) need an external key switch to switch off the laser, see Chap. "Laser switching".
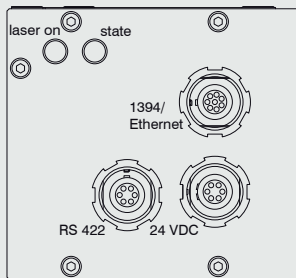
### Beam attenuator

The beam attenuator prevents access to all laser and collateral radiation. The figures show the sensor with closed and open beam attenuator. The beam attenuator must be open during measurement.
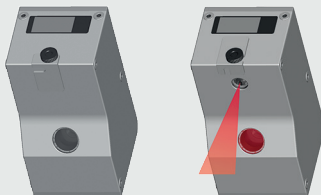
# 6. Connections, LED Displays
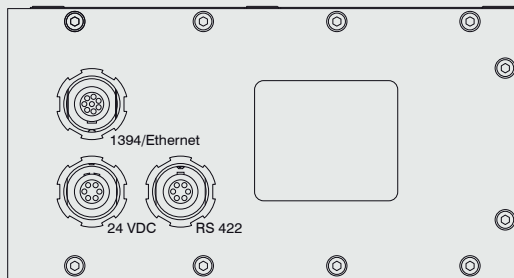


LLT27xx, top side                           LLT27xx (501), rear side

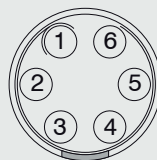The sensors are available in two versions: Sockets on the top side or on the rear side.

## LED displays

| LED „laser on"                              | Green: Laser on                                                                                  | Note: The "status" LED                                                                                |
|---------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| LED „state":<br>Two-color LED<br>(red / green) | Green: Measurement<br>Green flashing: Data transmission<br>Red flashing: Error code            | flashes green; long during<br>active data transmission<br>and short for controller<br>accesses.       |

The state LED indicates different error conditions by flashing. If no flashing occurs for several seconds, no error has occurred.

## Power supply (Power)

| Pin no. | Belegung Steckverbinder „24 VDC"                                    |       |                    |                                                   |        | Range:<br>11 V – 30 V |
|---------|---------------------------------------------------------------------|-------|--------------------|---------------------------------------------------|--------|-----------------------|
|         | Standard<br>Adernfarbe PC2700;<br>alte Ausführung in ( )            |       |                    | Options 502, 503, 504, 505<br>Color PC2700(002)   |        | (Rated value<br>24 V) DC;<br>maximum cur- |
| 1       | 24V+                                                                | white | (rot)              | 24V+                                              | pink   | rent 500 mA           |
| 2       | n.c.                                                                | n.c.  | n.c.               | LH+                                               | gray   |                       |
| 3       | n.c.                                                                |       | n.c.               | Laser off+                                        | yellow |                       |
| 4       | n.c.                                                                | n.c.  | n.c.               | Laser off-                                        | green  |                       |
| 5       | n.c.                                                                |       | n.c.               | LH-                                               | brown  | View on solder<br>pin side, male<br>cable connec- |
| 6       | 24V GND                                                             | brown | (black or<br>blue) | 24V GND                                           | white  | tor, counting<br>direction anti-<br>clockwise |

## External laser switching

Series LLT27xx(502), LLT27xx(503), LLT27xx(504) and LLT27xx(505) sensors offer this function.
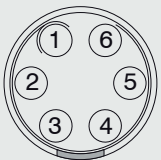
i Sensors of Laser Class 3B (IIIB) need an external key switch to switch off the laser.

➡ Use a serial key switch inside the control circuit to switch off the laser. You will find details for the wiring in the instruction manual, Chap. 5.2.4.

## RS422, Synchronization

| Pin no. | Assignment connector „RS422" | | | View on solder pin side, male cable connector | The pin numbers refer to the gapCON-TROL 27xx unit. Micro-Epsilon recommends the use of the interface cable SC2700-4.5 RS422 from the optional accessories. |
|---------|------|---------|----------|---|---|
| | RS422 | General | 9-pin Sub-D[1] | | |
| 1 | RX1 | CH1 | 2 | | |
| 2 | /RX1 | /CH1 | 3 | | |
| 5 | GND1 | | 5 | | |
| 3 | TX2 | CH2 | 9 | | |
| 4 | /TX2 | /CH2 | 1 | | |
| 6 | GND2 | | 5 | | |

The RS422 port can be used with either of the following configurations:

- RS422: Loading of programs and transmitting of measurement results.
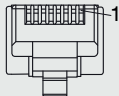- Synchronization/Triggering: Synchronization resp. triggering using switching signals.

1) Optional RS422 interface cable (SC2700-4,5RS422) from Micro-Epsilon, compatible to the RS422 to USB converter. All outputs or inputs are designed symmetrically. Internal terminating resistors 120 Ohm.
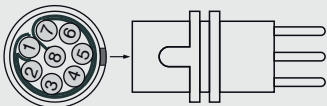
## 7.     Further Information

Please refer to the enclosed online manual. You will find details to the separate programs in the respective instruction manuals or in the instruction manual of this sensor, Chap. 6.2. You will find the instruction manuals online or on the provided CD.

## Ethernet connection, standard link to the PC

| RJ45 connector | | 8-pin. connector | | | The pin |
|---|---|---|---|---|---|
| Pin no. | Color stranded hook-up wire | Pin no. | 10BaseT, 100BaseTX | 1000BaseT | numbers refer to the gapCON- |
| 1 | white (orange) | 5 | Tx+ | D1+ | TROL 27xx unit. |
| 2 | orange | 6 | Tx- | D1- | |
| 3 | white (green) | 8 | Rx+ | D2+ | Micro-Ep- silon |
| 4 | blue | 1 | | D3+ | recom- |
| 5 | white (blue) | 2 | | D3- | mends using the |
| 6 | green | 7 | Rx- | D2- | Ethernet |
| 7 | white (brown) | 3 | | D4+ | connection |
| 8 | brown | 4 | | D4- | cable SC2700-5/ |



View: pin side male cable connector

View on solder pin side, ODU

ET from the recommended accessories.

- The sensors are supported by an automatically, sensor adapted IP address in the link-local-net (169.254.x.x). There is no collision testing effected. This is the standard setting.
- The sensor supports the DHCP protocol. This setting is activated by default and has priority over the retrieval in the link-local-net.
- A fixed IP address can be used.

➡️ Use the „Ethernet Configurator" software provided on the CD in order to make the sensor settings described above.
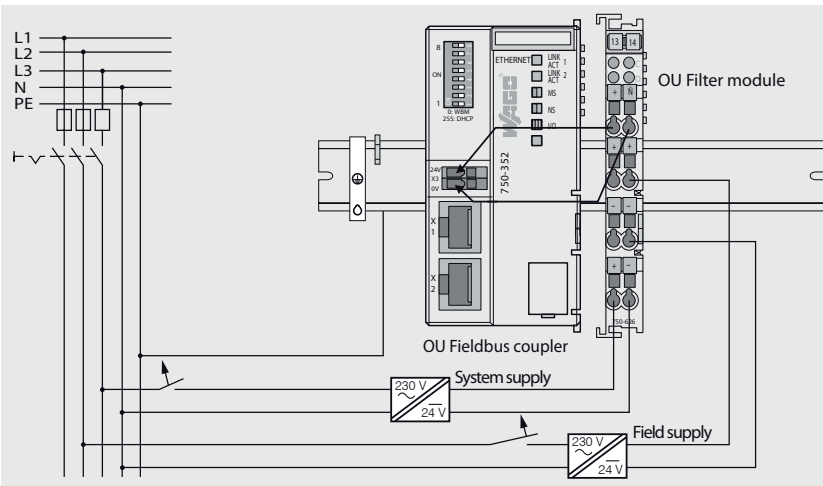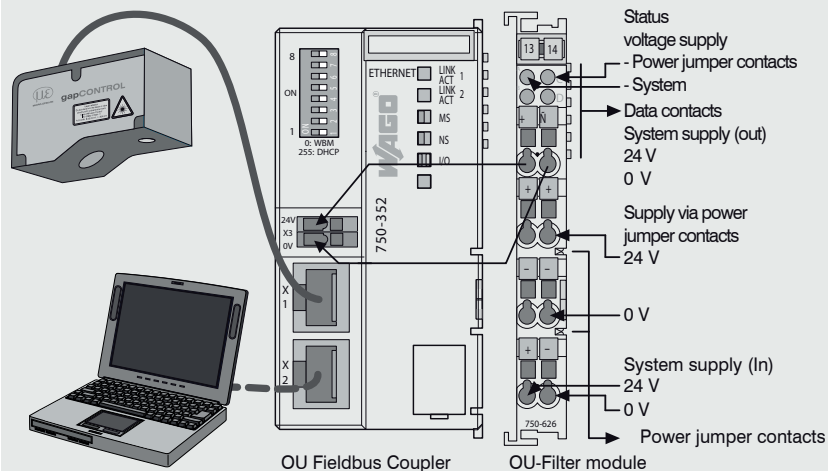
## 8. First Profile

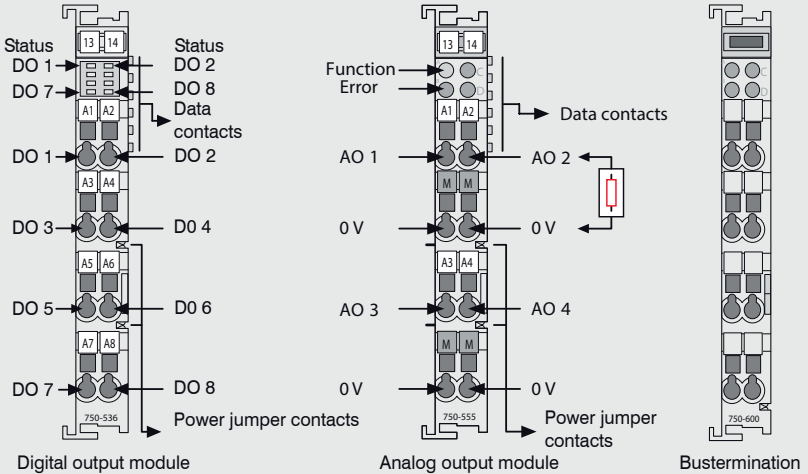➡️ Now start the gapCONTROL Setup Software. Click on "Display Profiles" in the main window.
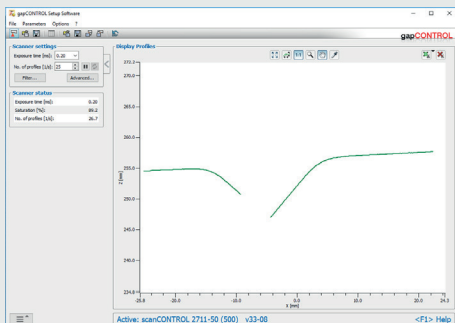


If the software shows the error message "No gap-CONTROL found" in the status line, please check the Ethernet connection between gapCONTROL and PC.

On the left side you can adjust the settings for your measurement task, the right side shows the profile data and information about the measurement.

# 9. gapCONTROL 27xx with scanCONTROL Output Unit



OU Fieldbus Coupler          OU-Filter module

Status
voltage supply
- Power jumper contacts
- System
Data contacts
System supply (out)
24 V
0 V

Supply via power
jumper contacts
24 V

0 V

System supply (In)
24 V
0 V

Power jumper contacts



L1
L2
L3
N
PE

OU Filter module

OU Fieldbus coupler

System supply
230 V / 24 V

Field supply
230 V / 24 V

## for Connection to an SPS



Digital output module     Analog output module     Bustermination

**Connect the Supply Voltage**

Digital output modules need a field supply of 5 VDC or 24 VDC depending on the module type.

After mounting of the modules install the required wiring.

➡️ Connect the "System supply (out)" terminals of the OU-Filter module to the "System supply (in)" terminals of the OU-Fieldbus Coupler (0 V and 24 V).

➡️ Connect the system supply (in) of the OU-Filter module to the power supply (0 V and 24 V).

➡️ Connect the field supply (in) of the OU-Filter module to the power supply (0 V and 24 V resp. 0 V and 5 V).

ⅈ The system supply and field supply should be separated to ensure the bus operation and electrical isolation in case of a short-circuit of an actor.

## 10.    System Requirements gapCONTROL Setup Software

The following minimum system requirements are necessary:

- Windows 7 (32 bit and 64 bit), Windows 8 oder 8.1 (32 bit und 64 bit), Windows 10 (32 bit und 64 bit)
- 1-GHz-Prozessor (32 bit und 64 bit) or faster / 1 GB RAM
- Screen resolution: 1024 x 768

## 11.    Quick Start: Commissioning, Software

➡️ Install the software.

Please insert the gapCONTROL Setup Software CD in the CD-ROM device. Follow the dialog through the installation process.

A. Reading of installation help

B. Installation of software

C. Further informations in the online documentation

➡️ Mount the sensor according to the installation instructions.

➡️ Connect the sensor to the PC via the Ethernet cable.

➡️ Connect the sensor to display or monitoring units.

➡️ Connect the sensor to the power supply.

The connectors for the operating voltage, switching signals and Ethernet are fitted with push-pull locking.

➡️ Pull apart at the grip to release the connection.

➡️ Connect the shield of the power supply cable to the PE protective earth conductor of the main power supply. Close unused connection plugs with the provided protective caps. Switch on the power supply (24 VDC).

ⅈ Only connect the sensor to the peripheral equipment, if it is disconnected from the power supply, i.e. only when the operating voltage is switched off. The sensor needs a warm-up time of typically 20 minutes for high precision measurements.

➡️ Please wait until the gapCONTROL device is recognized by the PC.

This may take a few seconds.

Now you can operate the gapCONTROL measurement system with the gapCONTROL Setup Software.

ⅈ No driver is required for sensors with an Ethernet interface.

# www.micro-epsilon.com

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