1. **Warnings**

Connect the power supply and the display/output device according to the safety regulations for electrical equipment. The supply voltage must not exceed the specified limits.

> Risk of injury, damage to or destruction of the sensor
> Avoid shocks and impacts to the sensor. Avoid constant exposure of the sensor to dust and splashes of water. Avoid exposure of sensor to aggressive media (detergents, cooling emulsions).
> Damage to or destruction of the sensor

2. **Notes on CE Marking**

The following apply to the scanCONTROL 25xx measuring system:

- EU Directive 2014/30/EU
- EU Directive 2011/65/EU

The measuring system is designed for use in industrial applications. The measuring system satisfies the requirements if the guidelines in the operating instructions are maintained in installation and operation.

3. **Proper Environment**

- Protection class: IP65
- Temperature range:
  - Operation: 0 ... +45 °C (+32 ... +113 °F), when air is circulating freely
  - Storage: -20 ... +70 °C (-4 ... +158 °F)
- Humidity: 5 - 95 % (non-condensing)
4. Laser Safety

The scanCONTROL 25xx sensors operate with a semiconductor laser with a wavelength of 658 nm (visible/red). Operation of the laser is indicated visually by the LED on the sensor, see operating instructions Chap. 3.3.

When operating the scanCONTROL 25xx sensors, the relevant regulations according to IEC 60825, Part 1 of 05/2014 and the applicable accident prevention regulations must be followed. The laser warning labels for Germany have already been attached. For other non German speaking countries, an IEC standard label is included in delivery and the versions valid for the user’s country must be attached before the device is put into operation for the first time.

If both warning labels are covered over when the unit is installed, the user must ensure that supplementary labels are attached.

Laser Class 2M

The sensors fall within laser class 2M (IIM). The laser is operated on a pulsed mode, the maximum optical power is ≤ 8 mW.

⚠️ CAUTION

Laser radiation. Close your eyes or immediately turn away if the laser beam hits the eye. Irritation or injury of the eyes possible.

Attach the following warning labels to the cover (front and rear side) of the sensor housing.


Only for USA

Mark the laser area recognizable and everlasting.
**Laser Class 3B**

The sensors with the /3B option fall within laser class 3B. The laser is operated on a pulsed mode, the maximum optical power is \( \leq 50 \text{ mW} \).

---

**CAUTION**  
Laser radiation. Wear suitable protective glasses. Injury of the eyes and the skin are possible.

---

Attach the following warning labels to the cover (front and rear side) of the sensor housing:

- **WARNING - LASER RADIATION**  
- **AVOID EXPOSURE TO BEAM**  
- **CLASS 3B LASER PRODUCT**

In addition, the following information label must be attached to the laser output on the sensor housing:

- **LASER APERTURE**

---

Class 3B laser sensors are notifiable and a laser protection officer is required. Mark the laser area recognizable and everlasting. During operation the laser area has to be restricted and marked.

Sensors of laser class 3B require an external key switch to switch off the laser, see operating instructions Chap. 5.2.6.

---

**Beam attenuator**

Laser products certified as Class 3B products (EN 60825-1) require a beam attenuator, other then the key-operated control. The beam attenuator prevents access to all laser and collateral radiation.

To open or close the aperture please follow the steps below:

- Loosen the knurled screw
- Change the attenuator position and tighten the knurled screw.

The laser aperture must be open during measurement. Please observe the notes on external laser switching, see operating instructions Chap. 5.2.6.
5. Connections, LED Indication

1 Ethernet port
2 Multifunction port (power supply, I/O)

Multifunction Port

<table>
<thead>
<tr>
<th>Designation</th>
<th>Sensor connector pin</th>
<th>Cable color PCR3000-x</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_+</td>
<td>9</td>
<td>Red</td>
<td>+ 11 V - 30 V DC (rated value 24 V); max. 500 mA</td>
</tr>
<tr>
<td>GND</td>
<td>2</td>
<td>Blue</td>
<td>0 V</td>
</tr>
<tr>
<td>+Laser on/off</td>
<td>3</td>
<td>White</td>
<td>available with SI option</td>
</tr>
<tr>
<td>-Laser on/off</td>
<td>1</td>
<td>Brown</td>
<td></td>
</tr>
<tr>
<td>RS422</td>
<td>12</td>
<td>Red-Blue</td>
<td>RS422 input or output</td>
</tr>
<tr>
<td>/RS422</td>
<td>11</td>
<td>Gray-Pink</td>
<td></td>
</tr>
<tr>
<td>In1</td>
<td>6</td>
<td>Yellow</td>
<td>Switching input In1</td>
</tr>
<tr>
<td>GND-In1</td>
<td>4</td>
<td>Green</td>
<td>Ground connection In1</td>
</tr>
<tr>
<td>In2</td>
<td>5</td>
<td>Pink</td>
<td>Switching input In2</td>
</tr>
<tr>
<td>GND-In2</td>
<td>8</td>
<td>Gray</td>
<td>Ground connection In2</td>
</tr>
<tr>
<td>In3</td>
<td>10</td>
<td>Purple</td>
<td>Switching input In3</td>
</tr>
<tr>
<td>GND-In3</td>
<td>7</td>
<td>Black</td>
<td>Ground connection In3</td>
</tr>
<tr>
<td>Screen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td></td>
<td>Black</td>
<td>Not electrically connected to GND</td>
</tr>
</tbody>
</table>

12-pin screw connector, view on solder pin side (cable)

RS422, Synchronisation

The RS422 connection (pins 11 and 12 of the multifunction port) can be used in either of the following configurations:
- RS422 (half-duplex): Load programs, control sensor and transmit measurement results (Modbus RTU or ASCII format).
- Synchronization/triggering: Synchronization or triggering using switching signals.
**Trigger, Encoder, Mode Switching**

The switching inputs of the multifunction port can either be used for encoder input, trigger input or to load previously stored user modes.

The signal levels are switchable for all switching inputs between LLL (TTL logic) and HLL (HTL logic):
- **LLL level:** Low 0 V … 0.8 V, high 2.4 V … 5 V, internal pull-up 10 kΩ connected to 5 V
- **HLL-Pegel:** Low 0 V … 3 V, high 11 V … 24 V (up to 30 V are permissible), internal pull-up 10 kΩ connected to 24 V
- **Pulse duration:** ≥ 5 µs

**External Laser Switch-off, Optional**

The external laser switch-off is implemented as a hardware solution and is a top priority. The laser can also be switched off by software.

This function is offered by sensors with the /SI option.

➤ Use a serial key switch in the control circuit to switch off the laser

With standard sensors, connecting the supply voltage activates the laser light source in the sensor.

Wiring details are available in the operating instructions, Chap. 5.2.6.

**Ethernet Connection, Standard Connection to PC**

<table>
<thead>
<tr>
<th>RJ45 connector</th>
<th>8-pin screw connector (sensor side)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin no.</td>
<td>Color of stranded hook-up wire SCR3000A-x</td>
</tr>
<tr>
<td>1</td>
<td>White (orange)</td>
</tr>
<tr>
<td>2</td>
<td>Orange</td>
</tr>
<tr>
<td>3</td>
<td>White (green)</td>
</tr>
<tr>
<td>4</td>
<td>Blue</td>
</tr>
<tr>
<td>5</td>
<td>White (blue)</td>
</tr>
<tr>
<td>6</td>
<td>Green</td>
</tr>
<tr>
<td>7</td>
<td>White (brown)</td>
</tr>
<tr>
<td>8</td>
<td>Brown</td>
</tr>
</tbody>
</table>

- View on pin side of male cable connector
- View on solder side (cable) of screw connector (A-coded)

- The sensor supports an automatic, sensor-specific IP address in the link-local net (169.254.x.x). No collision detection is implemented. This is also the default setting.
- The sensor supports DHCP. This setting is activated by default and has priority over search the link-local net.
- The scanCONTROL 25xx sensor supports Power over Ethernet.
**NOTICE**

If the sensor is connected to a POE-capable network adapter/switch and you also use the power supply of the multifunction port, these two power supplies must be galvanically isolated.

> Damage to the sensor and/or Ethernet card!

- A fixed IP address can be assigned.

➤ **Use the sensorTOOL program to specify the sensor settings described above.**

The program is available online at [www.micro-epsilon.com/download/software/sensor-TOOL.exe](http://www.micro-epsilon.com/download/software/sensor-TOOL.exe).

**LED Indication**

<table>
<thead>
<tr>
<th>LED laser on</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Laser is on</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LED state</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Measurement is active</td>
</tr>
<tr>
<td>Green, flashes long</td>
<td>Data transmission is active</td>
</tr>
<tr>
<td>Green, flashes short</td>
<td>Controller is accessing laser</td>
</tr>
<tr>
<td>Red, flashes</td>
<td>Error code</td>
</tr>
</tbody>
</table>

6. **System Requirements**

**scanCONTROL Configuration Tools**

The following minimum system requirements are necessary:

- Windows 7, Windows 8 or 8.1, Windows 10 (each 32 bit and 64 bit)
- 1 GHz processor or faster (32 bit and 64 bit) / 1 GB RAM (recommended 4 - 8 GB)
- Screen resolution: 1024 x 768 (recommended 1920 x 1080)

**scanCONTROL 3D-View**

The following minimum system requirements are necessary:

- Windows 8 or 8.1, Windows 10 (each 64 bit)
- 1 GHz processor or faster (64 bit)
- 1 GB RAM (recommended 16 GB)
- Screen resolution: 1024 x 768 (recommended 1920 x 1080)
- Graphics card / GPU with OpenGL 3.1 or higher
7. Quickstart: Initial Operation, Software

Mount the sensor according to the installation instructions.

Install the software.

You will find the software online on the product website of the sensor or in the download area:

www.micro-epsilon.com/2D_3D/laser-scanner/Software/downloads/

Follow the dialog through the installation process:

A. Reading the installation help
B. Installing the software
C. Additional information in the online documentation

Connect the sensor to the PC using the optionally available SCR3000A-x Ethernet cable.

Connect the shield of the power supply cable to the PE grounding conductor of the main power supply. Close unused connection plugs with the included protective caps. Turn on the power supply (24 VDC).

Please wait until the scanCONTROL measuring system is recognized by the PC. This may take a few seconds.

Now you can operate the scanCONTROL measuring system with the scanCONTROL software packages.

Operating the sensors via Ethernet may require the IP settings of the PC/sensor or the firewall settings to be adjusted, see Chap. 5.2.5 of the operating instructions.

The connectors for Ethernet and the multifunction port include a screw connector.

Loosen the screws connection before you remove the connector from the socket.

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

Now start the scanCONTROL Configuration Tools software. Click **Display Profiles** in the main window.

If the software shows the error message *No scanCONTROL found* in the status line, please check the Ethernet connection between scanCONTROL and the PC.

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

9. **How to Access Profile Data**

Profile data of scanCONTROL can be accessed via:

- GigEVision and GenICam for digital cameras via Ethernet interface
- SDK for fast integration into applications (C, C++, C# and others)

Please refer to the respective SDK documentation for further information on accessing the profile data.

10. **Transmitting Measurement Results**

scanCONTROL 25xx offers the following options for transmitting measurement results:

- Ethernet interface
  - Modbus TCP protocol
  - UDP protocol
  - Analog output of measurement values (via optional 2D/3D Output Unit)
  - Digital output of switching signals (via optional 2D/3D Output Unit)
  - Fieldbus connection PROFINET, Ethernet/IP, EtherCAT (via optional 2D/3D Gateway)
- RS422 interface
  - Modbus RTU protocol
  - Transmission of measurement values in ASCII format

11. **2D/3D Gateway**

2D/3D Gateway allows for scanCONTROL SMART sensors to be integrated into various fieldbus systems:

- PROFINET
- EtherNet/IP
- EtherCAT

All measurement results obtained from the profile evaluation performed by a scanCONTROL SMART sensor can be transmitted to a PLC via one of these fieldbus systems. Furthermore, all scanCONTROL sensor settings can be set via the 2D/3D Gateway (e.g. Laser on/off or User Mode).

The 2D/3D Gateway can connect up to four scanCONTROL SMART sensors to the fieldbus. Measurement values are transmitted at up to 500 Hz. Please refer to the TechNote T026 (scanCONTROL fieldbus integration) for more details.
12. scanCONTROL 25xx with 2D/3D Output Unit for PLC Connection

![Diagram of scanCONTROL 25xx with 2D/3D Output Unit for PLC Connection]

- **Status of operating voltage**
  - Power contacts
- **System data contacts**
- **System supply (OUT)**
  - 24 V
  - 0 V
- **Supply via power contacts**
  - 24 V
- **System supply (In)**
  - 24 V
  - 0 V
- **Power contacts**

**OU fieldbus coupler**

**OU filter module**

**OU Filter module**

**OU Fieldbus coupler**

**System supply**

**Field supply**
Connecting the Supply Voltage
Digital output terminals need a field supply of 5 VDC or 24 VDC depending on the module type.

After mounting the modules, install the required wiring.

- Connect the “System supply (out)” contacts of the OU-Filter module to the “System supply (in)” contacts 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 or 0 V and 5 V).

The system supply and field supply should be separated to ensure the bus operation and electrical isolation if an actor short-circuits.
13. **Unpacking, Included in Delivery**
   - 1 scanCONTROL 25xx sensor with integrated controller
   - 1 PCR3000-5 multifunction cable, length 5 m; for power supply, trigger and RS422; M12x1 screw connector and free cable ends
   - Calibration protocol / assembly instructions
   - 2 Protective caps

14. **Additional Information**

Please refer to
   - the enclosed online documentation
   - the “Status and Error Messages” and “Notes” sections in the scanCONTROL Configuration Tools operating instructions.

You will find details about the individual programs in the respective operating instructions or in the operating instructions of this sensor, Chap. 6.2.

You can find more information about the sensor in the operating instructions. They are available online at: