# OLR*-F285-B12-*

# Laser profile sensor

**Mounting Instructions**



Your automation, our passion.

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With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

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# 1 Introduction

## 1.1 Content of this Document

This document contains safety-relevant information for using the device. This information is required to use the product in the relevant phases of the product life cycle. This may include information on the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal

**Note**

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**Availability of the complete product documentation**

Full information about the product can be found in the product documentation online at www.pepperl-fuchs.com. This documentation can be accessed by entering the product name (type code) or the item number of the product into the search field on the website.

The documentation comprises the following parts:

- Mounting instructions (this document)
- Declaration of Incorporation
- Datasheet

For more information about Pepperl+Fuchs products with functional safety, see www.pepperl-fuchs.com/sil.

## 1.2 About This Documentation

### Note on Figures in the Documentation

The figures in this documentation are provided for basic understanding and may deviate from the actual design.

## 1.3 Licenses

Licenses are stored on the device and can be accessed at any time on demand.

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## 1.4 Symbols Used

This document contains symbols for the identification of warning messages and of informative messages.

### Warning Messages

You will find warning messages, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damage.

Depending on the risk level, the warning messages are displayed in descending order as follows:

**Danger!**

This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.

**Warning!**

This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.

**Caution!**

This symbol indicates a possible fault.

Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure.

### Informative Symbols

**Note**

This symbol brings important information to your attention.

**Action**

1.  This symbol indicates a paragraph with instructions. You are prompted to perform an action or a sequence of actions.

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# 2 Safety

This section provides a comprehensive overview of all the main safety aspects that ensure the safety of personnel and safe, seamless operation. Failure to follow the actions and safety instructions listed in these instructions may result in significant risks.

## 2.1 Intended Use

### Use

The laser profile sensor is designed for the optical control of viscous or pasty media such as adhesive beads, sealing beads, and even heat-conducting pastes. The sensor can be mounted either on a robot arm with an appropriate adhesive nozzle or in a stationary position. In a stationary assembly, the component to be applied is moved while the sensor and the adhesive nozzle are stationary. If mounted directly, the sensor moves with the robot arm.

The sensor is an incomplete machine which only becomes capable of its intended function and the necessary safety measures by activating the control unit, which determines the rotational movement and evaluates the data supplied. Application of the sensor is only useful if the rotation is correctly controlled and takes place in combination with the movement of the robot. The intended use also includes compliance with all information in these instructions and applicable documents.

### Misuse

Any application that exceeds the intended use or use in any other way shall be deemed as misuse. Classic misuse cannot be foreseen. The sensor cannot be used as a stand-alone sensor without connection to a robot or an appropriate higher-level controller. Both the rotational movement and the trigger signals that mark the start and end of a measurement on the component must come from an external controller. Operation in office networks may result in operational or cybersecurity problems if the operator does not take the appropriate precautions.

### Further Limitations

- The sensor is only approved for proper and intended use. Any other use will void all the manufacturer's warranty and liability.
- The sensor may be operated only within the specified ambient temperature range and relative humidity without condensation. Please refer to the relevant datasheet.
- The sensor must only be operated by trained and qualified personnel and is not suitable for the consumer goods market.
- Due to the network capability of the sensor, it is essential to observe cybersecurity guidelines and regulations.

## 2.2 Responsibility of the Operator

The sensor is for use in the commercial sector. The operator of the sensor is therefore bound by the statutory occupational safety obligations.

In addition to the safety instructions in these instructions, observe the relevant safety, accident prevention, and environmental regulations for the area of application of the sensor. This applies especially to the following:

- The sensor (incomplete machine) must not be commissioned until it has been determined that the machine in which the incomplete machine is to be installed complies with the requirements of the Machinery Directive (2006/42/EC).
- The operator is obliged to familiarize themselves with the applicable occupational safety regulations and to carry out a hazard assessment to identify additional risks that may arise as a result of the specific working conditions at the operating location of the sensor. These findings must be implemented in the form of operating instructions to ensure safe operation of the sensor.
- Throughout the entire period of use of the sensor, the operator is obliged to regularly check whether the operating instructions drawn up comply with the current framework. If necessary, the instructions must be updated and adjusted accordingly. This ensures that the sensor is always operated in accordance with current safety standards.

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- Throughout the entire period of use of the sensor, the operator is obliged to regularly check whether operating instructions drawn up comply with the current framework. If necessary, the operating instructions must be updated and adjusted accordingly. This ensures that the sensor is always operated in accordance with current safety standards.

## 2.3 Personnel Requirements

**Warning!**

Risk of injury for personnel with inadequate qualifications

Improper handling of the sensor poses the risk of significant personal injury and property damage.

- Ensure that all work is carried out by authorized personnel only.

Personnel responsible for integrating the sensor in the robot and for its use in applications must have adequate qualifications in the field of electrical/electronic installation. In addition, personnel must have specific knowledge of the applicable laws, regulations, standards, and guidelines for the protection of persons and property when handling machines and equipment. This ensures that the sensor can be integrated and used safely and in compliance with standards, and that possible hazards are minimized.

## 2.4 Fundamental Hazards

The following section lists the residual risks resulting from the risk assessment. The safety instructions listed in the other chapters of these instructions must be followed to reduce health hazards and avoid dangerous situations.

**Warning!**

Class 2 laser beam

The laser beams from the laser pointer may damage the eyes.

- Do not look directly into the laser beam. Ensure that the laser beam is not directed directly into the eyes or at an angle that can cause reflection into the eyes.
- Do not point the laser beam at other people.
- Do not use optical instruments (e.g., magnifiers, microscopes, binoculars) to view the laser source. The laser beam is additionally focused by these instruments.
- Do not look into the laser light beam or view it using optical instruments such as magnifiers, microscopes, telescopes, and binoculars.
- Servicing and repairs may only be carried out by authorized service personnel.

**Caution!**

Opening the sensor or operating it in open mode

There is a risk of a higher laser class when opening the sensor or operating in open mode.

Therefore, opening the sensor or operating it in open mode is strictly prohibited.

**Caution!**

Repair work on the sensor

Repair work on the sensor may only be carried out by trained and qualified personnel or by the manufacturer. Unauthorized interference may result in serious damage or safety risks and void the warranty.

Repair work may only be carried out when the machine is switched off.

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**Caution!**

Tampering with the laser

Tampering with the laser is strictly prohibited. No changes or modifications to the laser source are permitted as they may result in serious hazards.

**Warning!**

Servicing of the sensor

Servicing of the sensor may only be carried out by trained and qualified personnel or by the manufacturer. Unauthorized interference may result in malfunctions, safety risks, and damage.

- Opening or otherwise tampering with the sensor is strictly prohibited. This may compromise safety and result in serious injury. Any work on the sensor must only be carried out by authorized personnel.
- If a sensor is found to be faulty, it must be taken out of service immediately and not used again. Do not use the sensor if there is any doubt about its functional safety. Instead, inform expert personnel immediately.

**Warning!**

Safety measures when dismounting the sensor

Inside the sensor, there are other higher-class lasers in the invisible wavelength range (850 nm). It is therefore essential to take additional safety precautions when dismounting the sensor:

- Dismounting of the sensor must only be carried out by trained and qualified personnel who are familiar with the specific safety requirements for laser class 3B.
- Wear appropriate protective clothing, such as laser safety goggles and protective gloves, to minimize potential risks to the eyes and skin.
- Ensure that the electric power supply to the lasers inside the sensor is completely switched off and deactivated before you begin the dismounting work.

**Caution!**

Risk of injury through exposure to the hazardous area

The hazardous area must be considered by the manufacturer of the complete machine and appropriate protective measures must be taken.

**Caution!**

Glare effect of the sensor

Use of the sensor may cause glare effects.

The users working in the business must therefore take appropriate measures to protect third parties from possible glare.

**Caution!**

Rotational movement of the sensor

The activation of the sensor may cause rotational movement.

The sensor itself does not have its own control system, so it is important that the complete machine has suitable safety devices to prevent unintentional rotation.

**Caution!**

Risk of injury through contact with the rotating part of the sensor

The sensor contains a rotating part that must not be touched during operation to prevent injury.

Always keep hands, arms, and other body parts away from the rotating sensor part to minimize the risk of injury.

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**Caution!**

Caution near hot surfaces

Contact with heated sensor surfaces can cause a shock response for operating personnel.

**Caution!**

Unexpected sensor movement in the case of a fault

In the case of a fault, the sensor may move unexpectedly.

If there is any indication of a malfunction, keep the sensor at a safe distance and notify trained and qualified personnel.

**Warning!**

Caution near strong magnetic fields

Strong magnetic fields occur on motor components containing permanent magnets. Additional electromagnetic fields occur during operation.

There is a risk when assembling and dismounting the magnetic rotor: Due to the high attraction forces, special care should be taken in the immediate vicinity of the magnets. Therefore, no objects made of iron or steel must be carried in close proximity to the magnets.

**Danger!**

People with pacemakers

A limit value of 0.7 mT applies to people with pacemakers. In this case, the safety distance to the magnetic rotor or the primary part must be at least 500 mm.

The relevant national and local regulations and requirements must be followed in other countries.

**Danger!**

Hazard due to strong magnetic fields

Strong magnetic fields affect people and can cause damage. Berufsgenossenschaftliche Regel (Professional Association Rule) BGR B 11 "Electromagnetic Fields," relating to the influence of strong magnetic fields on people, must be observed in the Federal Republic of Germany. The rule lists the requirements that must be satisfied at workstations. The relevant national and local regulations and requirements must be followed in other countries!

People with active medical devices (e.g., pacemakers and insulin pumps), metallic implants, and magnetically or electrically conductive foreign objects are strongly advised against handling permanently magnetic components. This applies, for example, to work during assembly, servicing, or storage.

**Danger!**

Risk of crushing due to strong attraction forces of permanent magnets

When working close to components with permanent magnets, especially if the distance is less than 100 mm, there is a high risk of crushing due to strong attractive forces on magnetizable materials.

- Do not underestimate the strength of attraction forces. It is important to avoid moving objects made of magnetizable materials (such as watches and steel or iron tools) and/or permanent magnets by hand in the area close to the motor or a component with permanent magnets.
- In the event of an accident in which parts of the body (hand, finger, foot, etc.) are trapped, it is essential that the following devices are available for releasing trapped parts:
    - Hammer (approx. 3 kg) made of solid, non-magnetizable material.
    - Two pointed wedges (wedge angle approx. 10° ... 5°) made of solid, non-magnetizable material, such as hardwood.

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**Caution!**

Do not expose sensitive objects to the magnetic field

Strong magnets can affect the functionality and integrity of credit cards, watches, computers, monitors, measuring instruments, and read/write tags.

Keep these objects away from the magnets to prevent damage and data loss.

**Danger!**

Danger to life due to strong magnetic radiation

The rotors are equipped with high-performance permanent magnets. The risk from magnetic fields is therefore very high.

## 2.5 Labeling

The following symbols and information signs are found within the work area. They refer to the immediate environment in which they are located.

**Warning!**

Risk of injury due to illegible symbols

Over time, stickers and symbols on the sensor may become dirty or otherwise illegible.

- Ensure that all safety and warning messages on the sensor are in a legible condition at all times.
- Damaged signs or stickers must be replaced immediately.

### 2.5.1 Warning Signs

| Symbol | Meaning |
|---|---|
| | Warning of dangerous electrical voltage (D-W008) |
| | Warning of magnetic field (D-W013) |
| | Warning of hot surfaces (D-W026) |
| | Warning of potential hand injuries (D-W027) |

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## 2.5.2 Prohibition Signs

| Symbol | Meaning |
|---|---|
| | Carrying magnetic or electronic read/write tags is prohibited (D-P021) |
| | Prohibited for people with pacemakers (D-P011) |
| | Prohibited for people with metal implants (D-P016) |
| | Carrying metal parts or watches is prohibited (D-P020) |

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### 2.5.3 Other Signs

### Laser Safety for Class 2 Lasers
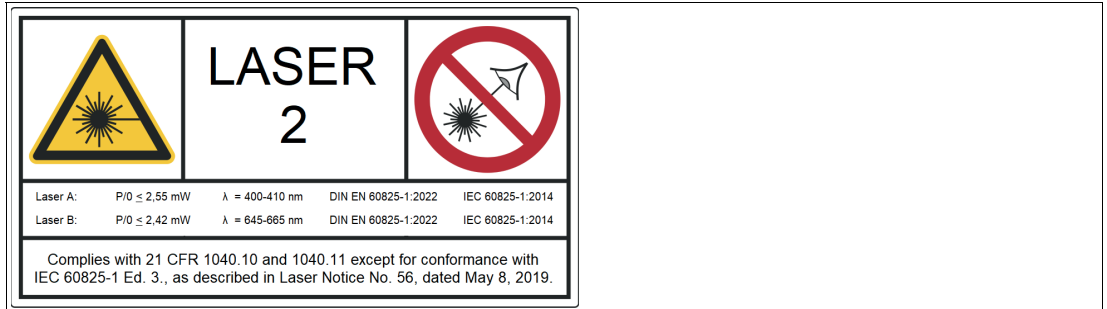


OLR*-F285-B12-* laser profile sensors are equipped with a class 2 laser according to EN/IEC 60825- Ed. 3 (laser class 2 according to DIN EN 60825-1:2022 and IEC 60825-1:2014) and conforms to 21 CFR1040.10 except for compliance with IEC 60825-1 Ed. 3, as described in Laser Notice No. 56, dated May 8, 2019. Class 2 laser products do not normally cause eye injury, but may present a hazard due to glare and temporary vision loss caused by the laser pulse. The lid-closure reflex of the human eye occurs within 0.25 seconds of impact of the class 2 laser beam and provides adequate protection. However, it is possible to suppress the lid-closure reflex and look into the class 2 laser long enough to cause eye injury.

**Warning!**

Risk of injury from laser beam

This sensor is certified to laser class 2.
The laser light can be an irritant, especially in a dark environment.
Using operating or adjusting equipment other than that specified, or performing procedures other than those specified may result in harmful laser beam exposure.

- Do not point lasers at people.
- Do not look directly into the laser beam.
- Servicing must be carried out by authorized service personnel only.
- Install the device so that the warning messages are clearly visible and legible.

## 2.6 Cybersecurity Information

### Security Context

From a security perspective, the following precautions must be taken for the sensor by the plant operator:

- Physically prevent unauthorized access to the sensor.
- Ensure that the sensor communicates with the remote station via a point-to-point connection.
- Ensure that the VSX interface is not accessible from the outside.
- Ensure that the sensor is operated on an isolated network which is not connected to the corporate network, internet, or cloud services;
    - The sensor may only communicate with a higher-level controller, or with a defined, trusted circle of network participants.

### Countermeasures Required to Operate the Device

Management and Maintenance

- Operate the sensor with the latest firmware.
- Check the website regularly for the release of security advisories and subscribe to the RSS feed: https://www.pepperl-fuchs.com/global/en/29079.htm

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# 3 Technical Specifications

## 3.1 Dimensions

The main dimensions of the sensor are listed below, giving a first impression of the sensor dimensions and illustrating the resulting sensor design. More detailed data, such as the 3-D model, can be provided on request.



Figure 3.1

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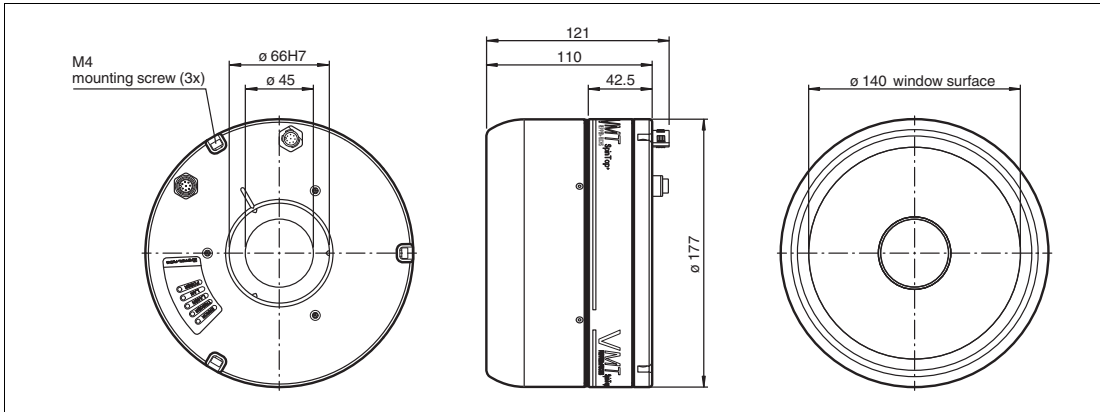
# 4 Product Description

## 4.1 Design and Function

The laser profile sensor has been specially developed for the optical control of viscous or pasty media such as adhesive beads, sealing beads, and even heat-conducting pastes. With this laser light section technology, two laser lines are projected onto an adhesive bead, for example, at a specified angle, and recorded by two cameras. Height and width information is determined using the triangulation principle.

The sensor is integrated into a component in compact form. This component comprises the motor, laser units, cameras, and a DSP unit for digitalizing and further processing captured image information.



Figure 4.1

**PEPPERL+FUCHS**
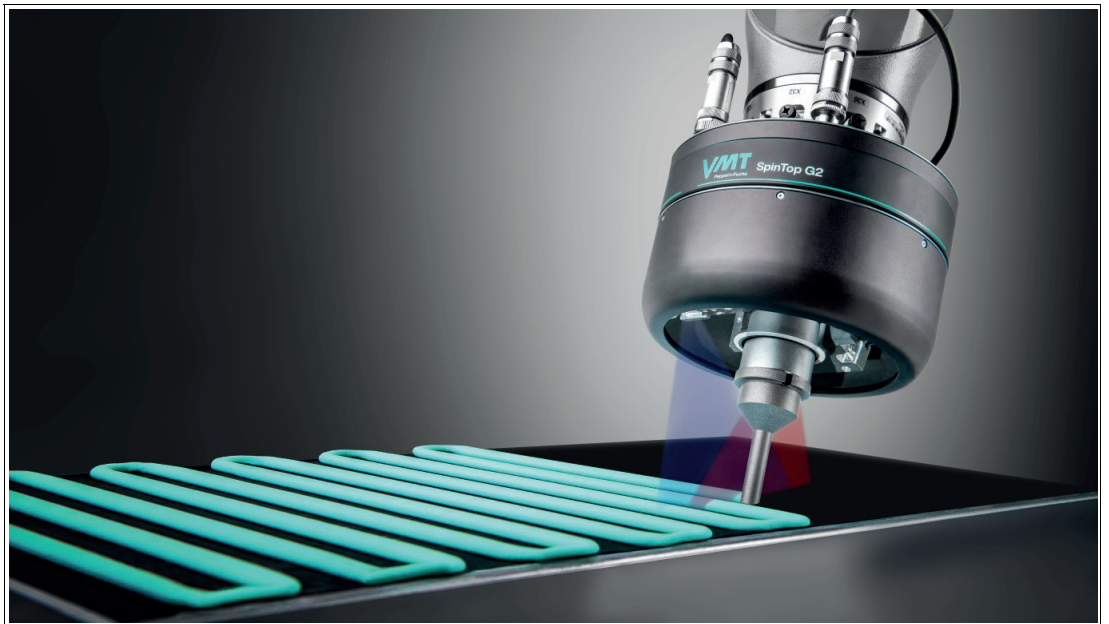
## 4.2    Indicators and Operating Elements

There are 5 LEDs on the sensor to provide information about the different states of the sensor.
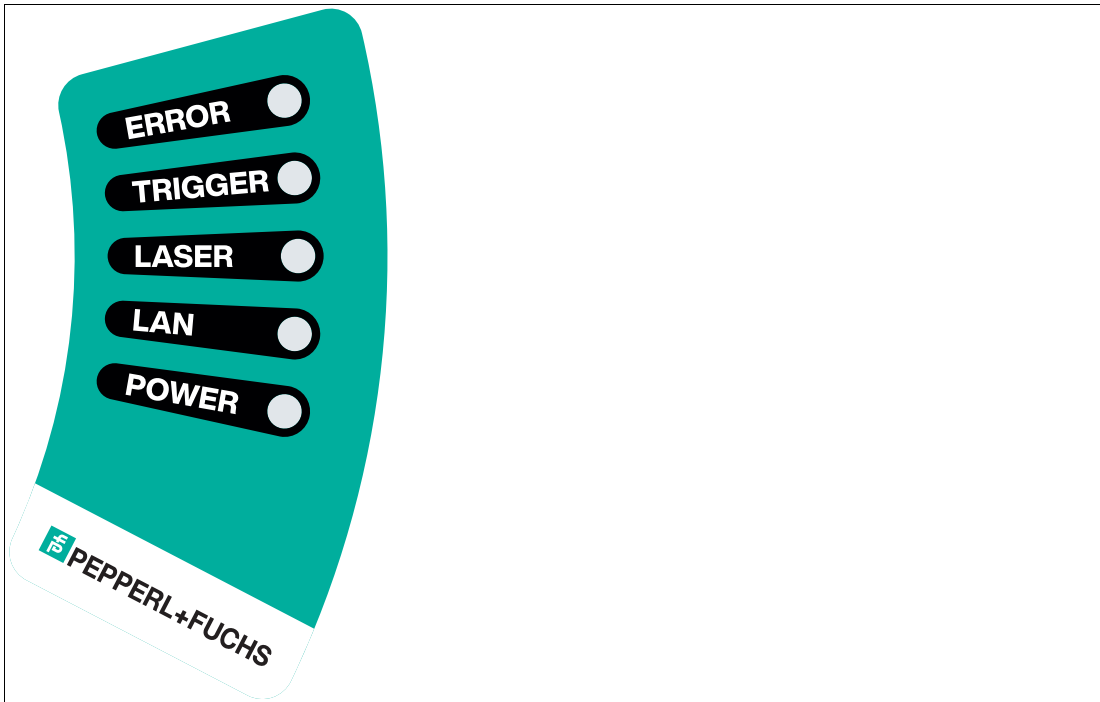


Figure 4.2    Indicators and operating elements

| LED | Color | State | Description |
|---|---|---|---|
| ERROR | ● (red) | On | Lights up red if the sensor reports an error |
| TRIGGER | ● (yellow) | On | Lights up yellow in the case of a trigger signal |
| | ☼ (yellow) | Flashing | Flashes yellow in the case of an encoder warning |
| LASER | ● (green) | On | Lights up green as soon as the laser is activated |
| LAN | ● (green) | On | Lights up yellow as soon as a LAN connection is established |
| POWER | ● (green) | On | Lights up green if the sensor is ready for operation |

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## 4.3 Interfaces and Connections

The following connections are located on the sensor.

**Connection assignment**

| | 24 V DC + IO (voltage supply, inputs, and outputs) |
|---|---|
| | M12 plug, A-coded, 8-pin |
|  |  1. OUT 1 <br> 2. + UB <br> 3. IN 1 <br> 4. OUT 2 <br> 5. IN 2 <br> 6. IN 3 <br> 7. GND <br> 8. IN 4 |
| | **LAN (network)** |
| | M12 socket, D-coded, 4-pin |
| |  1. TX+ Ethernet <br> 2. RX+ Ethernet <br> 3. TX- Ethernet <br> 4. RX- Ethernet |

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## 4.4 Measuring Range

The measuring range can be found in the appropriate datasheet.
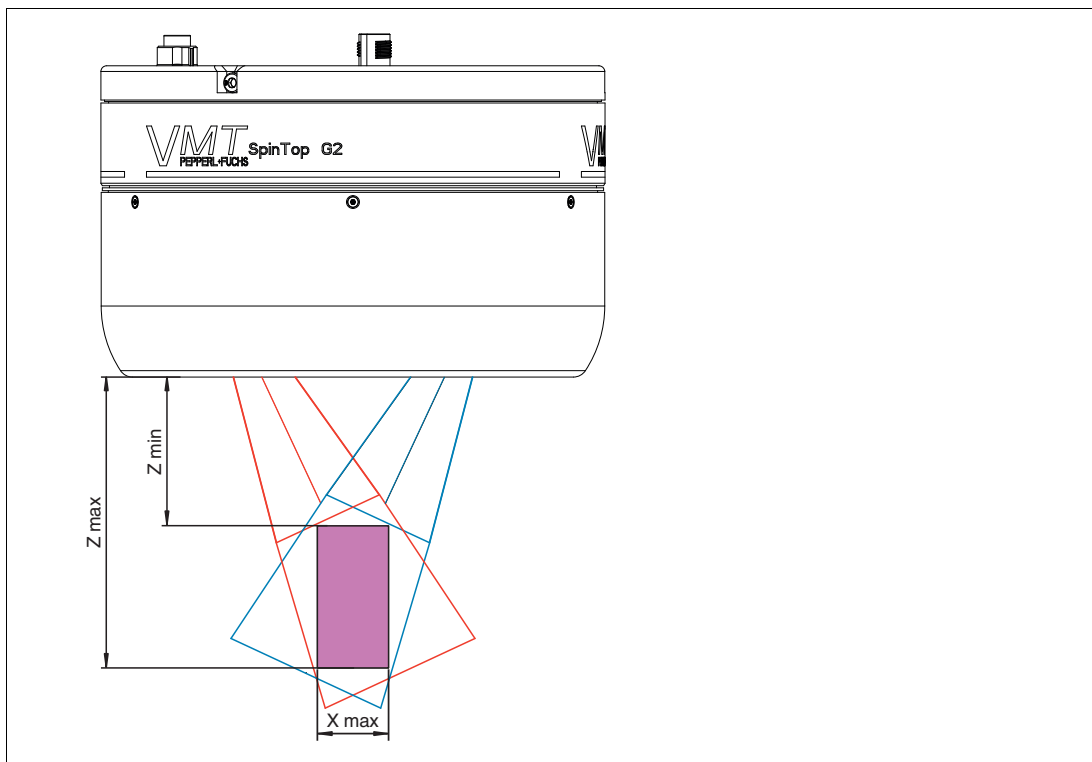


Figure 4.3          Measuring range

## 4.5 Scope of Delivery

Check the packaging and contents for damage.

Check if you have received every item and if the items received are the ones you ordered.

Scope of delivery:

• Laser profile sensor

Appropriate mounting accessories, cables, and other information can be found at http://www.pepperl-fuchs.com.

Keep the original packaging. Always store and transport the device in the original packaging.

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## 4.6    Accessories

### Voltage supply

The following connection cables are available for the voltage supply.

**Field-attachable, single-ended female cordset**

| Designation | Item number | Description |
|---|---|---|
| V19-G-2M-PUR-ABG | 200764 | M12 socket, straight, 8-pin, length = 2 m, open cable end with stranded conductors |
| V19-G-5M-PUR-ABG | 200765 | M12 socket, straight, 8-pin, length = 5 m, open cable end with stranded conductors |
| V19-G-10M-PUR-ABG | 207994 | M12 socket, straight, 8-pin, length = 10 m, open cable end with stranded conductors |

**Field-attachable M12 socket**

| Designation | Item number | Description |
|---|---|---|
| V19-G-ABG-PG9 | 212494 | M12 socket, straight, 8-pin, screw terminals for max. 0.75 mm$^2$ PG9 gland, cable diameter: 5 mm ... 8 mm |

**Robot-controlled mounting**

| Designation | Item number |
|---|---|
| LTGLÜT 24V 2xM12 01m 8pol ROB | 241810 |
| LTGLÜT 24V 2xM12 02m 8pol ROB | 258866 |
| LTGLÜT 24V 2xM12 03m 8pol ROB | 241811 |
| LTGLÜT 24V 2xM12 04m 8pol ROB | 241812 |
| LTGLÜT 24V 2xM12 05m 8pol ROB | 241813 |
| LTGLÜT 24V 2xM12 06m 8pol ROB | 241814 |
| LTGLÜT 24V 2xM12 07m 8pol ROB | 241815 |
| LTGLÜT 24V 2xM12 08m 8pol ROB | 241816 |
| LTGLÜT 24V 2xM12 10m 8pol ROB | 241817 |
| LTGLÜT 24V 2xM12 12m 8pol ROB | 241818 |

**Connection to the robot foot/stationary mounting**

| Designation | Item number |
|---|---|
| LTGVMT VDC OFFEN/M12/8BU 03m | 260639 |
| LTGVMT VDC OFFEN/M12/8BU 05m | 279449 |
| LTGVMT VDC OFFEN/M12/8BU 06m | 278907 |
| LTGVMT VDC OFFEN/M12/8BU 07m | 243035 |
| LTGVMT VDC OFFEN/M12/8BU 10m | 243337 |
| LTGVMT VDC OFFEN/M12/8BU 15m | 229086 |
| LTGVMT VDC OFFEN/M12/8BU 20m | 226974 |
| LTGVMT VDC OFFEN/M12/8BU 25m | 238848 |
| LTGVMT VDC OFFEN/M12/8BU 30m | 238865 |
| LTGVMT VDC OFFEN/M12/8BU 35m | 243277 |
| LTGVMT VDC OFFEN/M12/8BU 40m | 273432 |
| LTGVMT VDC OFFEN/M12/8BU 45m | 225840 |

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## Network connection

The following connection cables are available for the network connection.

**Field-attachable cable plug**

| Designation | Item number | Description |
|---|---|---|
| V45-G | 202386 | RJ45 network plug, field attachable |
| V1S-G | 117119 | M12 plug, 4-pin, field attachable |
| V1SD-G-2M-PUR-ABG-V45X-G | 205436 | Cordset, RJ45 network plug with M12 plug, crossed, 4-pin |
| V1SD-G-2M-PUR-ABG-V45-G | 205437 | Cordset, RJ45 network plug with M12 plug, 4-pin |

**Robot-controlled mounting**

| Designation | Item number |
|---|---|
| LTGLÜT 100MBIT 2xM12D ST/BU01 m | 241821 |
| LTGLÜT 100MBIT 2xM12D ST/BU02 m | 258845 |
| LTGLÜT 100MBIT 2xM12D ST/BU03 m | 241822 |
| LTGLÜT 100MBIT 2xM12D ST/BU04 m | 241823 |
| LTGLÜT 100MBIT 2xM12D ST/BU05 m | 241824 |
| LTGLÜT 100MBIT 2xM12D ST/BU06 m | 241825 |
| LTGLÜT 100MBIT 2xM12D ST/BU07 m | 241826 |
| LTGLÜT 100MBIT 2xM12D ST/BU08 m | 241827 |
| LTGLÜT 100MBIT 2xM12D ST/BU10 m | 241828 |
| LTGLÜT 100MBIT 2xM12D ST/BU12 m | 241829 |

**Connection to the robot foot/stationary mounting**

| Designation | Item number |
|---|---|
| LTGVMT 100MBIT IP20M12D 03m | 260637 |
| LTGVMT 100MBIT IP20M12D 07m | 257108 |
| LTGVMT 100MBIT IP20M12D 10m | 257109 |
| LTGVMT 100MBIT IP20M12D 15m | 257110 |
| LTGVMT 100MBIT IP20M12D 18m | 257111 |
| LTGVMT 100MBIT IP20M12D 20m | 257112 |
| LTGVMT 100MBIT IP20M12D 25m | 257113 |
| LTGVMT 100MBIT IP20M12D 30m | 257114 |
| LTGVMT 100MBIT IP20M12D 35m | 257115 |
| LTGVMT 100MBIT IP20M12D 40m | 257531 |
| LTGVMT 100MBIT IP20M12D 45m | 257116 |

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## 4.7 Marking

| Pepperl+Fuchs Group<br>Lilienthalstraße 200, 68307 Mannheim, Germany |
| --- |
| Internet: www.pepperl-fuchs.com |

| OLR100-F285-B12-1000 |
| --- |
| OLR185-F285-B12-2000 |

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# 5 Transport and Storage

Retain the original packaging. Always store or transport the device in the original packaging to protect it from electrostatic discharge (ESD) and mechanical damage.

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# 6 Installation and Commissioning

## 6.1 General Information on Installation and Commissioning

**Caution!**

Hazards from being drawn in by or caught on rotating parts

The gap between the rotating and fixed parts of the sensor poses a certain risk of items such as clothing and other objects being drawn in or caught.

Avoid direct contact with the rotating sensor side during operation.

**Caution!**

Risk of injury due to incorrect fastening

Incorrect fastening of the sensor can cause the sensor to detach from the connection part. This can cause the sensor to fall and cause serious injury or damage due to its weight.

- Ensure that the sensor is secure and properly fastened to the connection part. To do this, use the appropriate fastenings and ensure that they are securely and correctly attached.
- Thoroughly read the mounting instructions and follow all safety instructions, including wearing protective clothing when transporting the sensor.

**Warning!**

Use suitable fasteners and use the specified torques

Use only the appropriate fasteners for mounting or attaching parts to the sensor. In addition, the specified tightening torques must never be exceeded.

## 6.2 Mounting the Sensor

The sensor is installed directly on the glue gun. The sensor can be guided along the workpiece by a robot, or used in a stationary position. In this case, the robot, for example, moves the workpiece along under the gluing unit.

**i**

**Note**

**Mounting an optical device**

- Do not aim the sensor at the sun.
- Protect the sensor from direct long-term exposure to sun.
- Prevent condensation from forming by not exposing the sensor to any major fluctuations in temperature.
- Do not expose the sensor to the effects of any aggressive chemicals.
- Keep the lenses and reflector of the device clean. Clean with a soft cloth, using standard commercial glass cleaner if necessary.

We recommend to clean the optical surface and to check screw fittings and electrical connections at regular intervals.

**>**

### Mounting the Sensor

Attach the sensor directly to the application nozzle using the mounting hole. After installing the sensor, ensure that there is still enough space to connect the connection cable to the sensor, and that the laser projection field is clear.

1. Ensure that the entire system is de-energized. Switch off all electric power supplies and secure them to prevent them being switched on unintentionally.

2. Attach the sensor to the mounting on the machine using the mounting hole. Ensure that the mounting is inserted as far as possible and that a solid connection is made.

    **i**

    **Note**

    Mounting:

    - Diameter: 66H7
    - Depth: 10 mm

3. Secure the sensor to the machine mounting using the three fixing screws (1). Tighten the screws to a torque of 1.5 Nm. Ensure that the sensor is secure and properly fastened.
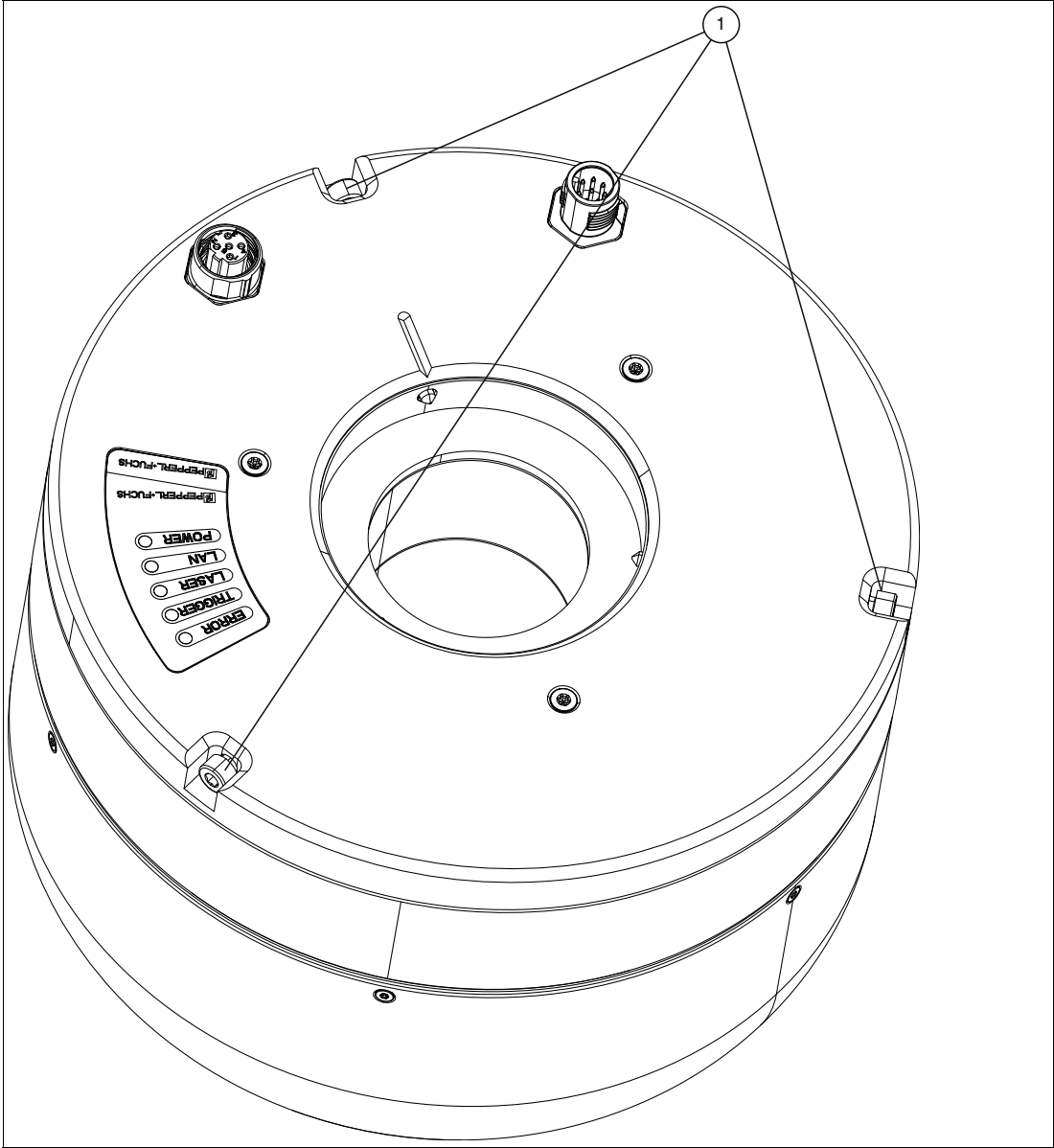
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Figure 6.1

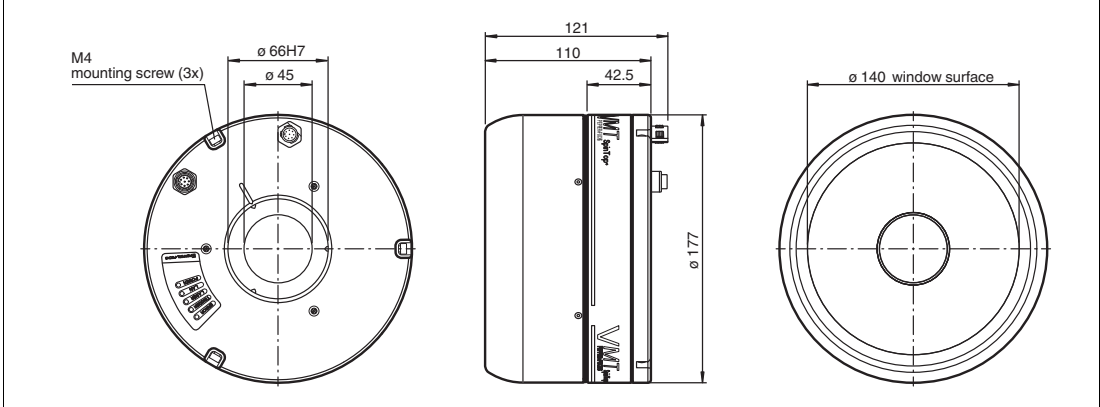The following figure shows all the relevant housing dimensions in mm.



Figure 6.2

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The laser profile sensors are available in different versions, which differ based on their operating distance and measuring range (see chapter 4.4). Refer to the relevant datasheet to find the appropriate data.

## 6.3  Connecting the Sensor

You can use the preconfigured connection cable to connect the sensor to the supply voltage or the network more quickly. This can be found in the chapter entitled Accessories (see chapter 4.6).

**Warning!**

Initialization of the motor when the sensor is started

Please note that the motor is initialized when the sensor is switched on. The motor starts to rotate until the sensor detects the correct position.

To avoid injury or damage to the sensor, ensure that the motor initialization is completed before using the sensor.

### Connecting the Supply Voltage

1. Insert the 8-pin M12 socket of the power cable into the plug provided on the side of the housing.

2. Screw the union nut onto the connector until it reaches the end stop. This ensures that the power cable cannot be pulled out inadvertently.

3. First connect the GND pin of the voltage supply to the relevant core of the connected power cable.
   Then connect the +UB pin of the voltage supply to the corresponding core of the connected power cable.

4. Connect the cable shield to the functional earth. Use the available terminal lug (eyelet) to do this. Ensure that the shielding is also connected to the same functional earth on the machine side.
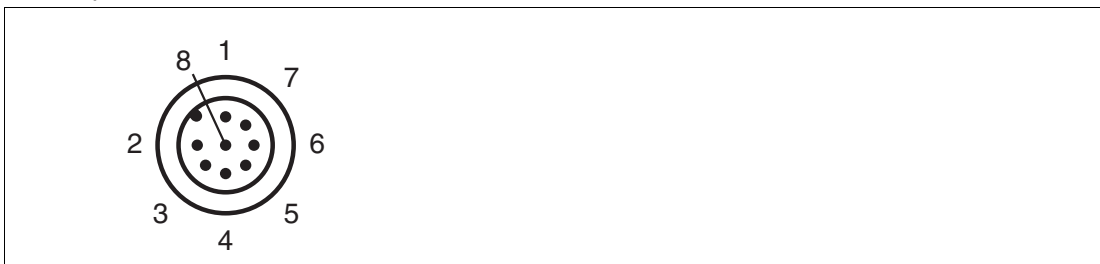
↳ The power cable has been connected.



Figure 6.3          Connection layout for operating voltage, and inputs and outputs
1. OUT 1
2. +UB
3. IN 1
4. OUT 2
5. IN 2
6. IN 3
7. GND
8. IN 4

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### Establishing a Network Connection

1. Use a network cable that has an RJ45 network plug on one side and a 4-pin M12 D-coded plug on the other. Insert the 4-pin M12 D-coded plug into the socket with the **LAN** designation on the side of the sensor.

2. The factory default IP address is `192.168.002.002`.
   To facilitate communication within the network, you must configure your network.

**Note**

**Documenting the Network Configuration**

The sensor communicates with the connected machine control system using the TCP/IP protocol. To ensure proper communication, you must record all the changes made to the network configuration.

## 6.4    Network Interface

The network interface transfers the following data.

- Control commands (start/stop measurement, position angle)
- Firmware updates (data transfer from the network host to the sensor)
- Result data such as scans and images (data transfer from the sensor to the network host)

The transfer of parameters and status requests occurs as XML strings. The transfer of data (scans, images) and firmware occurs as binary data.

The data is communicated over TCP/IP via port `50005`.

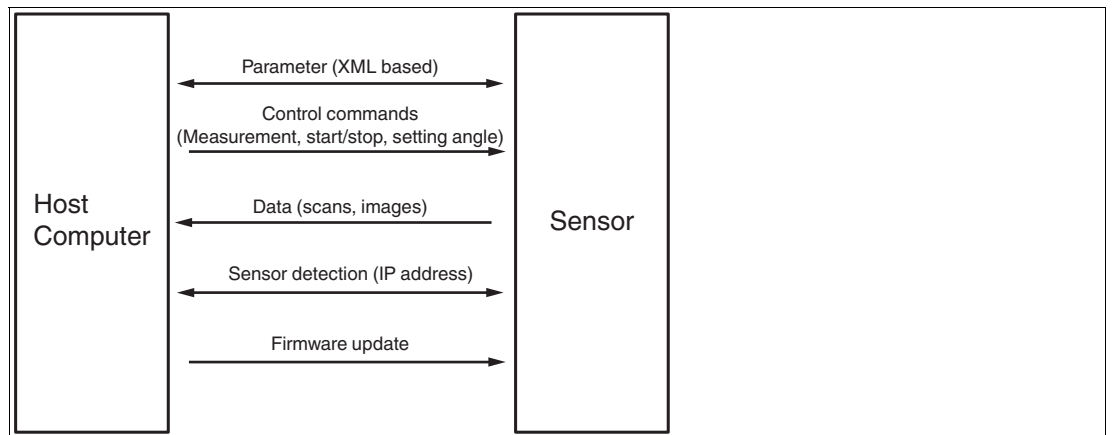The factory default IP address is `192.168.002.002`.



Figure 6.4        Network interface

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## 6.5  Setting up a Network Connection

When delivered, the sensor has a fixed IP address. To enable communication within the network, the network settings of your PC/laptop must be synchronized with the device and may need to be adjusted. To do so, proceed as follows.

> **i**
>
> **Note**
>
> **IP address**
>
> When delivered, the sensors have fixed IP addresses.
>
> • **192.168.2.2**
>
> To enable communication within the network, the network settings of your PC/laptop must be synchronized with the relevant sensor and may need to be adjusted.

> **i**
>
> **Note**
>
> **Changing the IP address**
>
> If you want to change the default IP address of the sensor, you can do so using the Vision Configurator.

> **i**
>
> **Note**
>
> **Internal IP address**
>
> The sensor internally uses IP addresses 10.0.0.2 and 10.0.0.3 with subnet mask 255.255.255.0. These addresses are reserved for the internal operation of the sensor.
>
> The subnet configured by you cannot contain either of the two IP addresses (10.0.0.2 and 10.0.0.3). To avoid conflicts, ensure that your device is in a separate IP range.

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> **Setting the IP Address of the PC**

The following section describes how to check the network connection settings of your Windows PC and adapt them accordingly. The images in this description were created using Windows 10. The description below also applies to later versions of Windows.

1. Click the Windows **"Start"** button.

2. Select **"Control Panel > Network and Sharing Center."**

3. Now click **"Change adapter settings."**
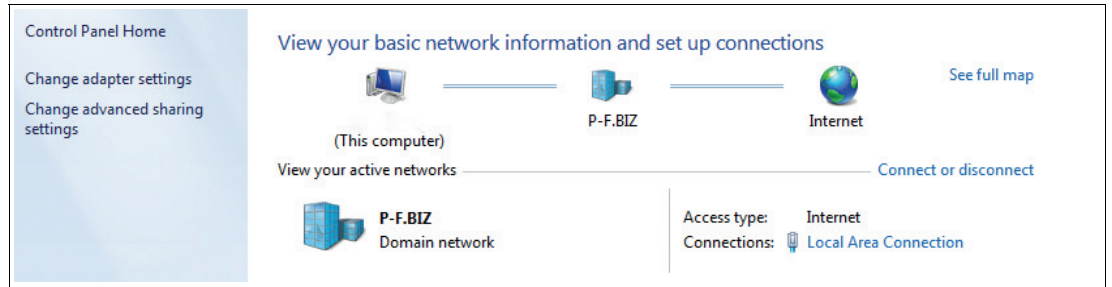


**i** | **Note**

Changes to the network settings of the PC/laptop require advanced user rights. If necessary, consult with your administrator.

4. Select the required connection and right-click on your selection. In the selection window, select **"Properties."**
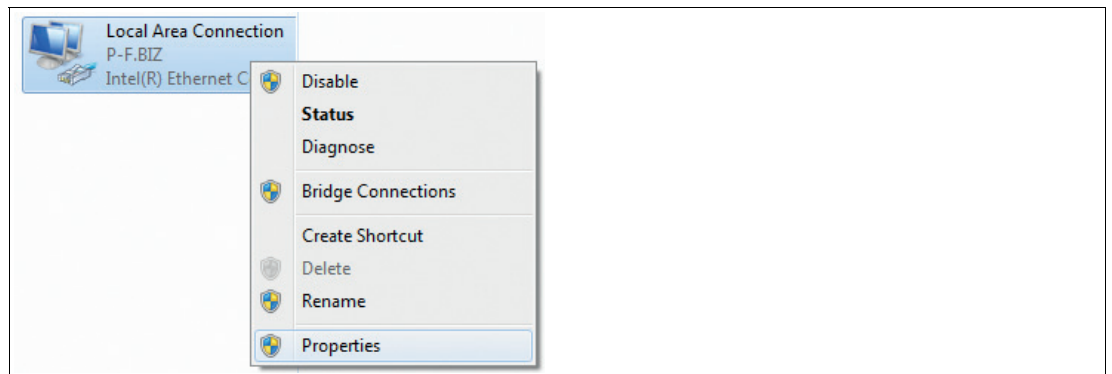


5. Double-click **"Internet Protocol Version 4 (TCP/IPv4)."**

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↳ The **Properties** window for the TCP/IP protocol opens.
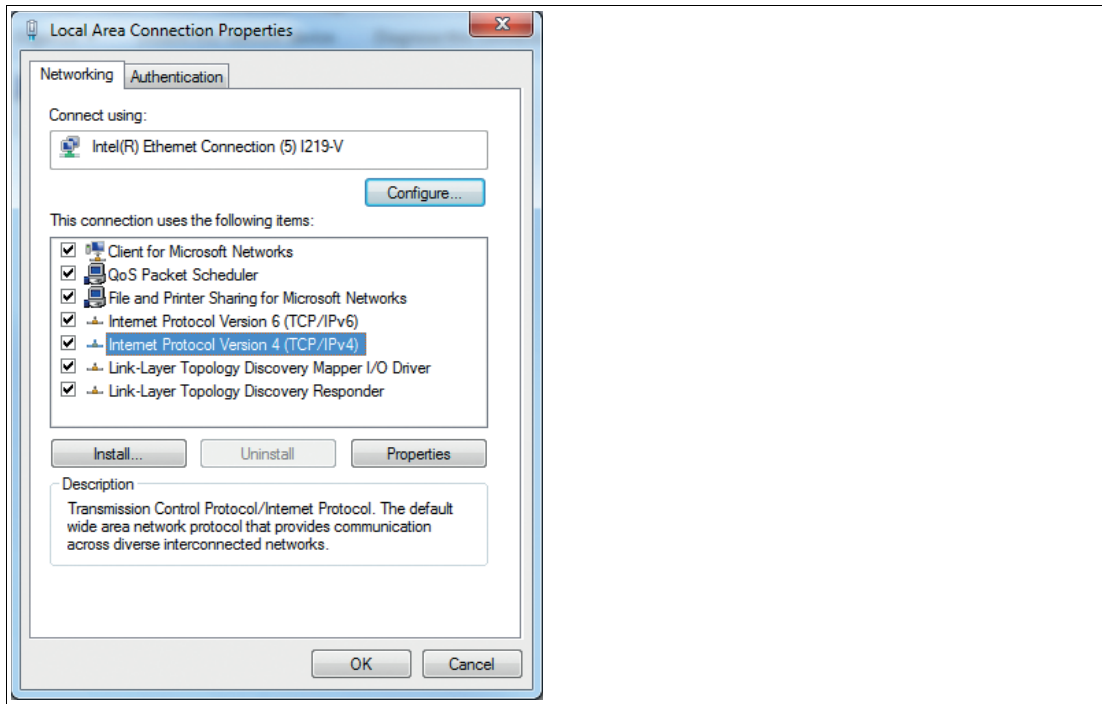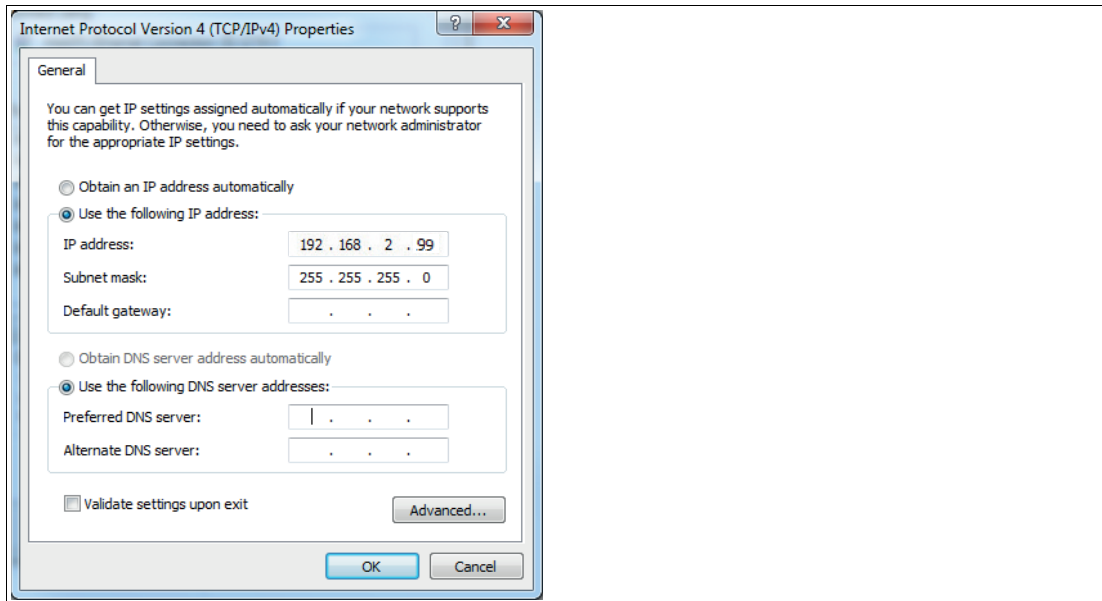


6. Select the **"General"** tab.

7. Select the input function **"Use the following IP address."**

8. Enter the IP address of the sensor, but only the first three segments of the IP address. The last segment must be different from the IP address of the sensor.

9. In this example, enter the following IP address and subnet mask:
   - **IP address: 192.168.2.99**
   - **Subnet mask: 255.255.255.0**

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> **i** **Note**
>
> **Subnet mask**
>
> To ensure seamless communication between the computer and the sensor, both devices must be on the same subnet. Ensure that the IP addresses and subnet masks of both devices are configured correctly and are in the same IP address range. Otherwise, communication problems may occur and the sensor may not be able to access the computer properly or vice versa.

**10.** Click **"OK"** and click **"Cancel"** in the next dialog.

↳ This completes the network configuration and the sensor can be used.

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# 7 Operation and Communication

## General Safety Information for Operation and Communication

**Danger!**

Danger to life from missing safety function

If the safety loop is put out of service, the safety function is no longer guaranteed.

- Do not deactivate the device.
- Do not bypass the safety function.
- Do not repair, modify, or manipulate the device.

**Warning!**

Risk of injury due to dazzling

The device camera is an intense light source with a significant dazzling effect. After glancing into the bright light source, temporarily restricted vision or after-images can lead to irritation, impairments, injury, or accidents.

Never look directly into the camera during operation.
Only carry out a visual inspection on the lens when the reader is no longer active.

**Warning!**

Verletzungsgefahr durch Blitzfrequenzen

Bestimmte Blitzfrequenzen der Gerätekamera können u. U. epileptische Anfälle auslösen.

Epilepsiegefährdete Personen dürfen sich nicht über längere Zeit hinweg im Ausleuchtungs-bereich des Sensors aufhalten oder in die Beleuchtung blicken.

Observe the safety information given in the product documentation.

Only connect the device to devices that are suitable for the safety application.

## 7.1 TCP/IP Communication

The TCP/IP protocol enables communication between the PC and read head. The individual telegrams exchanged during communication are described in the following sections.

**Note**

**Security information**

The read head has a configuration interface on TCP port 50021 with a fixed IP address. This is used for parameterization and firmware updates. The configuration interface is disabled when the read head is in operating mode.

The read head can be set to a recovery mode by restarting with 8 V input voltage, which also allows firmware updates to be completed.

From a safety point of view, the operator responsible for the application must therefore take the following precautions for the read head:

- Physically secure the read head against unauthorized access
- Ensure that the device is only operated on an isolated network without connection to the corporate network, internet, or cloud services;
  - The device may only communicate with a higher-level controller, or with a defined, trusted circle of network participants

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## 7.2          VsxProtocolDriver

### General

The **VsxProtocolDriver** driver provides full access to the input and output data of the sensor and facilitates integration in a C#-based programming environment. The driver connects to the sensor and handles communication in accordance with the communication protocol. The user can access functions for setting parameters on the sensor, retrieving parameter values from the sensor, and saving and loading entire parameter sets both locally and on the sensor. The user can also receive sensor images. Each function also contains an error object from which information can be obtained in the event of an error in the function.

The driver is implemented in C# and requires .NET 5.0 or higher.

The functions of the driver can be used **synchronously** or **asynchronously**. For this, the required instance must be created using the Init function of the respective classes. The VsxProtocolDriver class provides the asynchronous driver. The VsxProtocolDriverSync class provides the synchronous interface.

| i | **Note** |
| --- | --- |
| | **Integrating the NuGet** |
| | To use the SDK, the NuGet must be integrated. This can be done in Visual Studio using the NuGet package manager, for example. The SDK can be found in the software folder on the product page for the appropriate Pepperl+Fuchs sensor. The NuGet is located in the ZIP file stored in this folder under the project folder ext. |

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# 8 Maintenance

⚠️ **Caution!**

Device may become hot during prolonged operation

After a long operation time, the metal surfaces (plug) and the housing of the sensor have an elevated temperature relative to the environment.

This must be taken into account during service work. Let the device cool down before operating.

Testing, servicing, and maintenance work may only be carried out by trained and qualified personnel.

The required maintenance intervals vary depending on the application and should therefore be determined according to the operational conditions.

## Servicing

No servicing is necessary if the devices are operated properly and the mounting instructions and ambient conditions are observed.

## Repairs

The device must not be repaired, modified, or tampered with. In the event of a failure, always replace the device with an original device.

## Testing

A regular proof test is not required since the minimum interval for a proof test is longer than the useful lifetime. If the device is subjected to sources of potential mechanical damage or vibration in the plant, we recommend regularly inspecting the device with regard to the integrity of the housing (water ingress) and the right fastening (loose fixing screws).

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# 9 Troubleshooting

**Note**

Do not repair, modify, or manipulate the device.

If there is a defect, always send back the device to Pepperl+Fuchs.

**Fault repair**

| Error | Possible cause | Remedy |
|---|---|---|
| POWER LED does not light up | The voltage supply is switched off. | Check whether there is a reason for the shut-down, e.g., servicing or installation work. Switch on the voltage supply if appropriate. |
| | There is a wiring fault in the distribution panel or switch cabinet. | Check the wiring and repair any wiring faults as necessary. |
| LAN LED flashes No connection to the device | Network cable not connected. | Connect the network cable. |
| | The wrong network cable is being used. | If you are operating the sensor on a PC, use a crossover cable or crossed network cable. If you are operating the sensor within a network, use an uncrossed network cable to connect the sensor to the network. |
| No connection to the device | The wrong IP address is being used. | Check whether the correct IP address has been entered for the sensor, and that your PC is connected to the same network. |

If the fault cannot be resolved by following the above points, contact the Service Center. Have the version number of the sensor ready. The version number is located in the top right of the sensor interface.

# 10   Disposal

The device, built-in components, packaging, and any batteries contained within must be disposed in compliance with the applicable laws and guidelines of the respective country.

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## 11    Log of Changes

The "Log of Changes" chapter lists the respective changes made to this document for each version of the mounting instructions documentation.

| Document version | Change | See |
|---|---|---|
| DOCT-8718 | First edition of the mounting instructions | - |

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