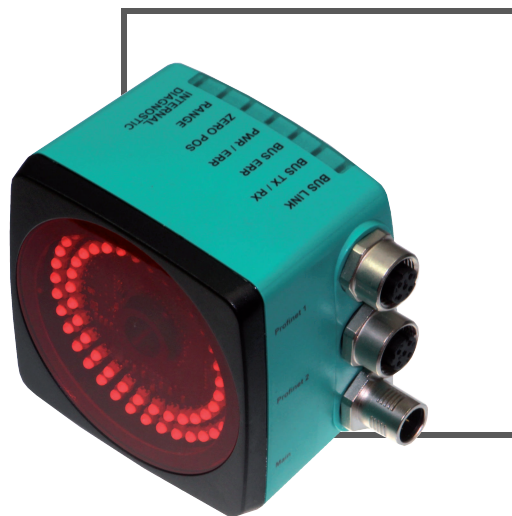


# MANUAL

## PHA\*-F200\*-B17-\*

### Vision Sensor for Rack Fine Positioning





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 Contents

This document contains information that you need in order to use your product throughout the applicable stages of the product life cycle. These can include the following:

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



### **Note!**

This document does not substitute the instruction manual.



### **Note!**

For full information on the product, refer to the instruction manual and further documentation on the Internet at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

The documentation consists of the following parts:

- Present document
- Instruction manual
- Datasheet

Additionally, the following parts may belong to the documentation, if applicable:

- EU-type examination certificate
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Additional documents

## 1.2 Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the product. The personnel must have read and understood the instruction manual and the further documentation.

Prior to using the product make yourself familiar with it. Read the document carefully.



## 1.3 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**

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

## 2 Product Description

### 2.1 Vision Sensor for Rack Fine Positioning — Use and Applications

The PHA\* Vision Sensor for rack fine positioning from Pepperl+Fuchs facilitates fast and simple positioning of stock feeders. The Vision Sensor detects circular holes in the rack structure and determines their position deviation in the X and Y directions relative to the target position.

The Vision Sensor comprises:

- Camera
- Lighting unit
- PROFINET interface





## 2.2

### LED Indicators and Controls

The Vision Sensor is equipped with seven indicator LEDs for carrying out visual function checks and rapid diagnostics.

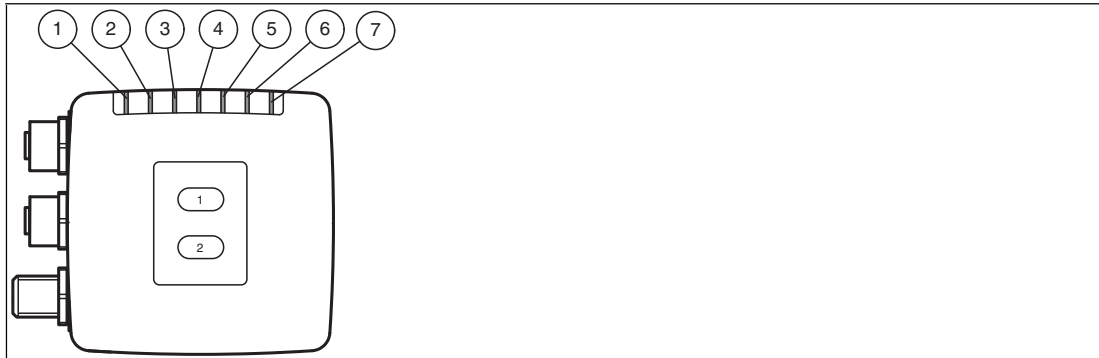


Figure 2.1 Displays on the operator side

1. **BUS LINK**

Green LED. Indicates if the sensor is communicating with PROFINET.

2. **BUS TX / RX**

Yellow LED. Indicates a PROFINET TX/RX data transfer.

3. **BUS ERR**

Red LED. Indicates an error in the communication.

4. **PWR / ERR**

Red/green dual LED. Green indicates that the sensor is ready for operation. Red indicates an error with the sensor.

5. **ZERO POS**

Yellow LED. Indicates whether the hole is in the target position.

6. **RANGE**

Yellow LED. Indicates whether the hole is in the capture range.

7. **INTERNAL DIAGNOSTICS**

Yellow LED. Internal diagnostics, no function

| LED    | BUS LINK  | BUS TX / RX | BUS ERR   | PWR / ERR          | ZERO POS  | RANGE     | INTERNAL DIAGNOSTIC      | Description                           |
|--------|-----------|-------------|-----------|--------------------|-----------|-----------|--------------------------|---------------------------------------|
| Color  | Green     | Yellow      | Red       | Red/<br>green      | Yellow    | Yellow    | Red/<br>green/<br>yellow |                                       |
| Status | x         | x           | x         | Lights up<br>red   | x         | x         | x                        | System error                          |
|        | x         | x           | x         | Lights up<br>green | x         | x         | x                        | Normal operation                      |
|        | Lights up | x           | x         | x                  | x         | x         | x                        | PROFINET connection<br>activated      |
|        | x         | Flashes     | x         | x                  | x         | x         | x                        | PROFINET TX/RX data<br>transfer       |
|        | x         | x           | Lights up | x                  | x         | x         | x                        | PROFINET<br>communication error       |
|        | x         | x           | x         | x                  | x         | Lights up | x                        | Hole detected in the<br>capture range |
|        | x         | x           | x         | x                  | Lights up | x         | x                        | Hole detected in the zero<br>position |

Table 2.1 x = LED status has no meaning

LEDs are mounted around the camera element on the front of the Vision Sensor. The LEDs are used for light, to align the X and Y position, and for the status display.



Figure 2.2 Displays on the camera side

1. Camera
2. Infrared illumination LEDs
3. **-X position**  
Red LED. Indicates whether the sensor is within the tolerance range.
4. **-Y position**  
Red LED. Indicates whether the sensor is within the tolerance range.
5. **+X position**  
Red LED. Indicates whether the sensor is within the tolerance range.
6. **Normal operation**  
Red LED. Flashes when the sensor is in normal operation.
7. **+Y position**  
Red LED. Indicates whether the sensor is within the tolerance range.



## 2.3 Scope of Delivery

- PHA\*

Appropriate mounting hardware, cables, and other information can be found in the Accessories section and at <http://www.pepperl-fuchs.com>.

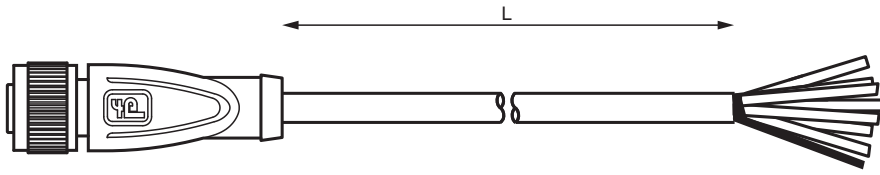
## 2.4 Accessories

Various accessories are available.

### 2.4.1 Power Supply

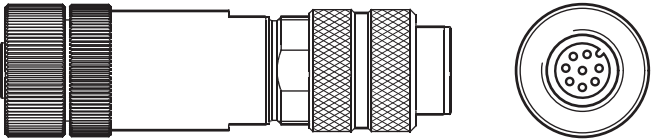
Use the following double-ended cordset to connect the power supply, inputs, and outputs to the sensor.

#### Female field connector

| Model number      |  |          |                                              |
|-------------------|------------------------------------------------------------------------------------|----------|----------------------------------------------|
| V19-G-2M-PUR-ABG  | 8-pin M12 socket, straight                                                         | L = 2 m  | Open cable end with multistranded conductors |
| V19-G-5M-PUR-ABG  | 8-pin M12 socket, straight                                                         | L = 5 m  | Open cable end with multistranded conductors |
| V19-G-10M-PUR-ABG | 8-pin M12 socket, straight                                                         | L = 10 m | Open cable end with multistranded conductors |

Other lengths on request.

#### Field-attachable M12 socket

| Model number  |                                                                                                             |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V19-G-ABG-PG9 | <ul style="list-style-type: none"> <li>■ 8-pin M12 socket, straight</li> <li>■ Screw terminals for max. 0.75 mm<sup>2</sup> PG9 cable gland</li> <li>■ Cable diameter: 5 mm ... 8 mm</li> </ul> |

### 2.4.2 Accessories

| Model number             | Description                                         |
|--------------------------|-----------------------------------------------------|
| V19-G-ABG-PG9-FE         | Field-attachable M12 socket with grounding terminal |
| V1SD-G-*M-PUR-ABG-V1SD-G | Ethernet bus cable, M12 to M12, 4-pin               |
| V1SD-G-*M-PUR-ABG-V45-*  | Double-ended cordset, M12 to RJ-45, 4-pin           |
| VAZ-V1S-B                | Blind plug for M12 plug                             |
| V19-G-*M-*               | Field-attachable cable                              |

Other lengths on request.

### 3 Installation

#### 3.1 Storage and transport

For storage and transport purposes, package the unit using shockproof packaging material and protect it against moisture. The best method of protection is to package the unit using the original packaging. Furthermore, ensure that the ambient conditions are within allowable range.

#### 3.2 Preparation



##### Unpacking the unit

1. Check that all package contents are present and undamaged.  
↳ If anything is damaged, inform the shipper and contact the supplier.
2. Check that all items are present and correct based on your order and the shipping documents.  
↳ If you have any questions, please contact Pepperl+Fuchs.
3. Keep the original packing material in case you need to store or ship the unit at a later time.

#### 3.3 Mounting the Sensor



##### **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.

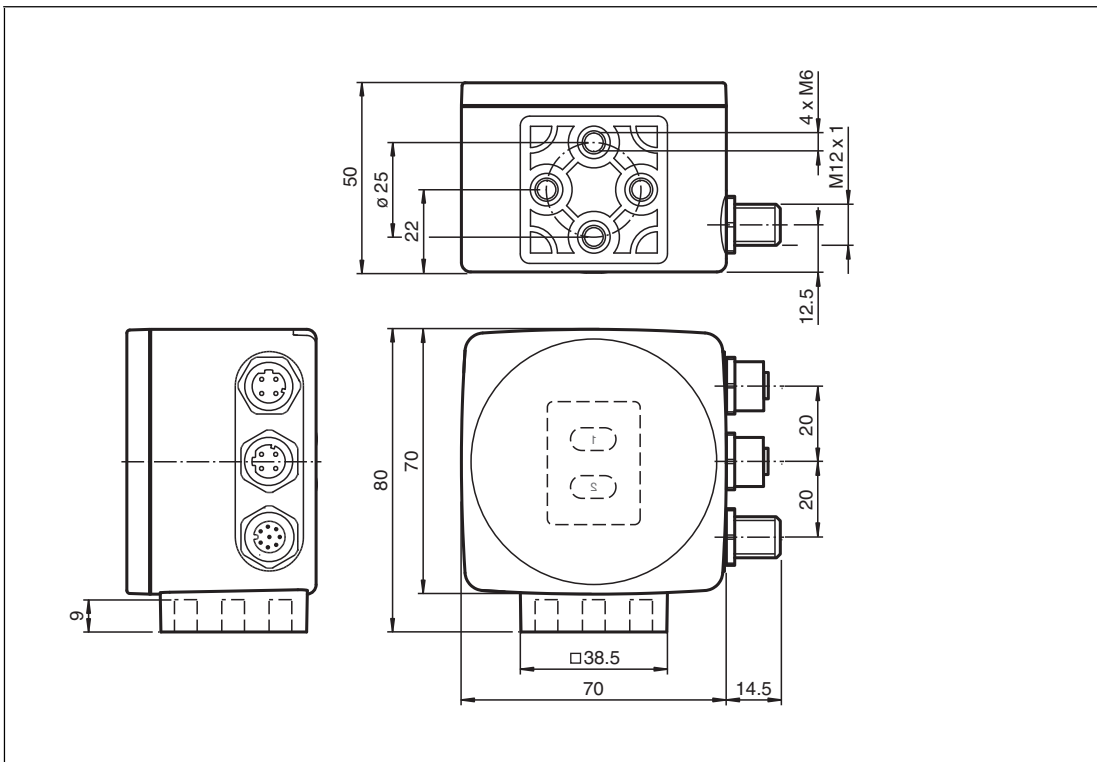
We recommend to clean the optical surface and to check screw fittings and electrical connections at regular intervals.

The device is equipped with a mounting block with four symmetrical M6 threads.

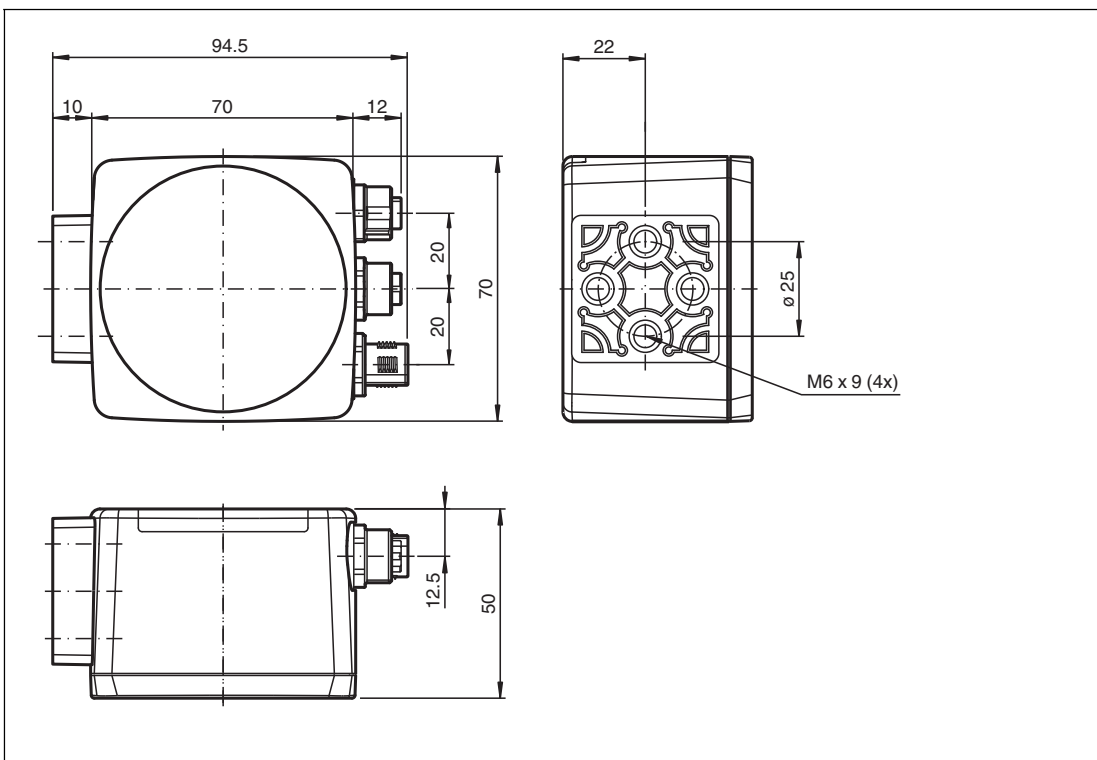
The operating distance differs depending on the sensor. The correct operating distance can be found in the technical data for the sensor to be installed.

The following illustration shows the housing dimensions in mm:

**Housing variant: PHA\*-F200-\***



**Housing variant: PHA\*-F200A-\***



The surface must be level to prevent the housing from becoming distorted when the fittings are tightened. We advise securing the screws with spring disks in order to prevent the sensor becoming misaligned. After mounting the sensor, ensure that there is still sufficient space for the connecting cable.

## 3.4 Electrical Connection

The PHA\* Vision Sensor is connected electrically via an 8-pin M12 x 1 connector plug on the side of the housing.



Figure 3.1 1) = not assigned

2) = not relevant for the electrical connection

### Connector Assignment



Figure 3.2

### Color Assignment

Pepperl+Fuchs single-ended cordsets (female) are manufactured in accordance with EN60947-5-2. When using a type V19-... () female cordset with an open cable end on the **Main** connection, the colors are assigned as follows:

| Connection pin | Strand color | Color abbreviation |
|----------------|--------------|--------------------|
| 1              | White        | WH                 |
| 2              | Brown        | BN                 |
| 3              | Green        | GN                 |
| 4              | Yellow       | YE                 |
| 5              | Gray         | GY                 |
| 6              | Pink         | PK                 |
| 7              | Blue         | BU                 |
| 8              | Red          | RD                 |

### Shielding Connection Lines

The shielding of connection lines is required to suppress electromagnetic interference. Establishing a low resistance or low impedance connection with the conductor or equipotential bonding circuit is a particularly important factor in ensuring that these interference currents do not become a source of interference themselves. Always use connection lines with braided shield, never use connection lines with a film shield. The shield is integrated at both ends, i.e. in the switch cabinet or on the controller **and** on the Vision Sensor. The grounding terminal included in the scope of delivery allows easy integration in the equipotential bonding circuit.



In exceptional cases, the shielding of a connection at one end may be more favorable if

- An equipotential bonding cable is not laid or cannot be laid.
- A film shield is used.

The following points relating to shielding must also be noted:

- Use metal cable clips that cover large areas of the shield.
- After installing the cable shield in the control cabinet, place it directly on the equipotential bonding rail.
- Direct the protective grounding connections to a common point in a star configuration.
- The cross-section of the cables used for grounding should be as large as possible.



**Caution!**

Damage to the device

Connecting an alternating current or excessive supply voltage can damage the device or cause the device to malfunction.

Electrical connections with reversed polarity can damage the device or cause the device to malfunction.

Connect the device to direct current (DC). Ensure that the supply voltage rating is within the specified device range. Ensure that the connecting wires on the female cordset are connected correctly.

### 3.5

## PROFINET Connection

The PHA\* Vision Sensor is connected to PROFINET via two 4-pin, D-coded connector sockets, M12 x 1, **PROFINET 1** (port 1) and **PROFINET 2** (port 2) on the side of the housing.



Figure 3.3

### Connector Assignment



Figure 3.4

For details of suitable PROFINET cables, see chapter 2.4.2.

## 4 Commissioning

### 4.1 Sensor Functionality

The PHA\* Vision Sensor detects circular holes in the rack structure and determines their position deviation from the target position. The Vision Sensor operates in two dimensions: X and Y. X is the horizontal direction and Y the vertical direction. The operating distance (distance between the rack profiles and the front panel of the sensor) must be within the working range of the sensor.

#### Orientation coordinate system

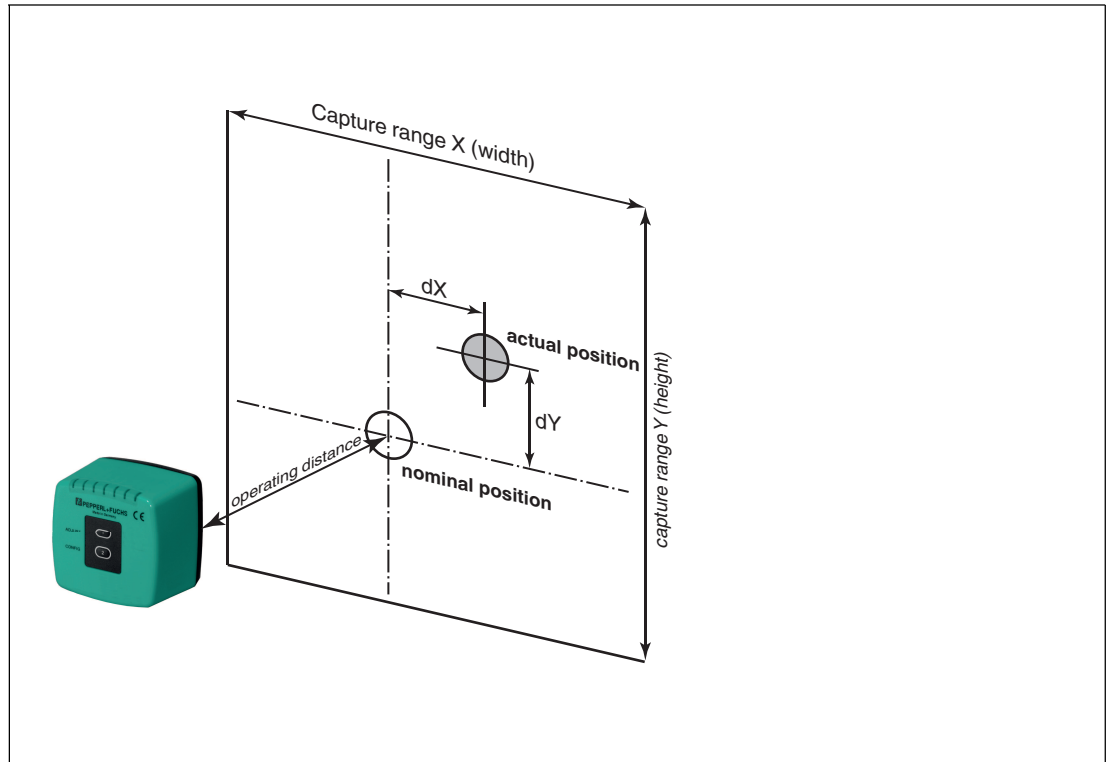


Figure 4.1

If the hole is located in the target position, a deviation zero is output.

The Vision Sensor detects dark holes on a light background. Observe the following points:

- Only one circular hole may be present in the capture range.
- All holes to be detected must have the same diameter.
- The surface surrounding the hole should only reflect diffusely.
- The area behind the hole should be unobstructed to a range of 500 mm.
- There should be no light source behind the hole.
- The Vision Sensor must be aligned parallel to the capture range.
- The actual operating distance must correspond to the operating distance of the Vision Sensor.

#### Capture Range

The capture range is the area in the camera's line of vision, within which the Vision Sensor can detect a hole.

The hole diameter should be 10 % to 15 % of the capture range width.

## Tolerance Range

The sensor provides the -X, +X, -Y, and +Y deviation as an LED display. The target position is located within a rectangular tolerance range. The LEDs are switched as follows, depending on the X and Y deviations.

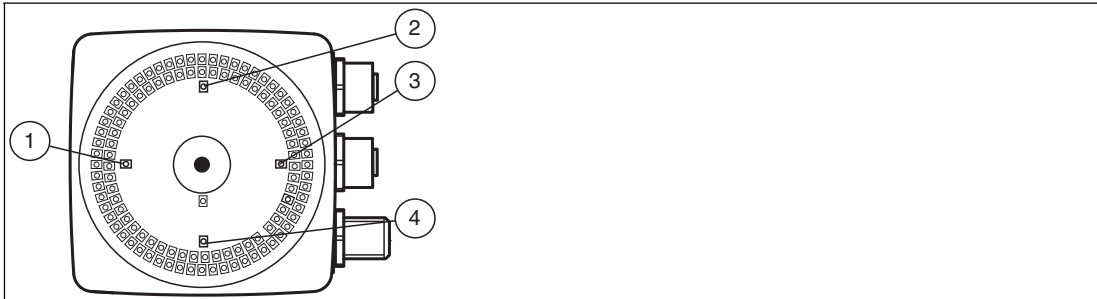


Figure 4.2 Displays on the camera side

### 1. -X position

Red LED. Indicates whether the sensor is within the tolerance range.

### 2. -Y position

Red LED. Indicates whether the sensor is within the tolerance range.

### 3. +X position

Red LED. Indicates whether the sensor is within the tolerance range.

### 4. +Y position

Red LED. Indicates whether the sensor is within the tolerance range.

## Tolerance in X direction

| -X position LED | +X position LED |                              |
|-----------------|-----------------|------------------------------|
| Red             | Red             | X direction within tolerance |
| Off             | Red             | X too large                  |
| Red             | Off             | X too small                  |

## Tolerance in Y direction

| -Y position LED | +Y position LED |                              |
|-----------------|-----------------|------------------------------|
| Red             | Red             | Y direction within tolerance |
| Off             | Red             | Y too large                  |
| Red             | Off             | Y too small                  |

## 5 Operation

### 5.1 Communication via PROFINET

#### 5.1.1 General Information on Communication via PROFINET

PROFINET is an open standard for industrial automation based on industrial Ethernet. PROFINET integrates information technology with established standards such as TCP/IP and XML in automation technology.

The communication concept for setting up decentralized applications within PROFINET is PROFINET IO, i.e. decentralized field devices are integrated by PROFINET IO. The familiar IO view of PROFIBUS DP is used where the usable data of the field devices is transferred to the controller process image in cycles. PROFINET IO is a device model consisting of slots and channels, which is based on the main features of PROFIBUS DP. The field device properties are written in a GSDML (generic station description markup language) based on XML. PROFINET IO is engineered in the same way as has long been the case for system integrators of PROFIBUS DP. The decentralized field devices are assigned in the design of a controller.

PROFINET IO draws a distinction between three device types: IO controller, IO device, and IO supervisor.

IO controller: Controller that executes the automation program.

IO device: Decentrally assigned field device that is assigned to an IO controller.

IO supervisor: Programming unit/PC with commissioning and diagnostic functions.

#### 5.1.2 PROFINET IO Interface

The PHA\* Vision Sensor is a PROFINET IO device that communicates cyclically with the assigned PROFINET I/O controller during operation.

The PROFINET interface supports:

- A transfer rate of 100 Mbit/s
- The real-time category RT
- The range of functions in accordance with **Conformance Class B**
- The identification and maintenance functions (I&M) IM0–IM4

#### Identification & Maintenance Data

Identification and maintenance data (I&M data) is information stored in a device. I&M data uniquely identifies a device within a system. The identification data (I data) includes information about the device, for example the item number and device name. Identification data cannot be changed.

Maintenance data (M data) includes information regarding the device within the system, for example the installation location and installation date. Maintenance data is initially stored in the device during installation; this data can be changed.

#### Data Input

The Step7 software from Siemens can be used to display and change the I&M data. You can read and write I&M data 1, 2 and 3 in the "Target System" menu of the HW Config hardware configuration using the functions "Download Module Identification" and "Download Module Identification to PG". → see Figure 5.1 on page 18.

### I&M Data

|            |   |                           |
|------------|---|---------------------------|
| I&M data 1 | = | system ID<br>location ID  |
| I&M data 2 | = | installation date         |
| I&M data 3 | = | additional<br>information |

Figure 5.1

### 5.1.3 Project Planning Using Device Description

As with PROFIBUS DP, a field device is integrated into the project planning tool by way of a device description. The field device properties are described in the GSD file. The GSD file contains the field device data (technical features and information for communication) that you need to operate the device in a PROFINET network.

Import the GSD file into a project planning tool. Peripheral addresses are assigned to the individual channels of the field devices. The peripheral input addresses incorporate the received data. The user program evaluates and processes this data. The user program generates the peripheral output values and sends them to the control interface.

Once project planning is complete, the I/O controller receives the planning and configuration data. The I/O controller parameterizes and configures the field devices automatically.

#### Downloading the GSD File

You can find the relevant GSD file in the **Software** section of the product detail page for the device.

To access the product detail page for the device, go to <http://www.pepperl-fuchs.com> and type information about the device (e.g., the product description or the item number) into the search function.

## Configuring the Vision Sensor Using a GSD File

Import the GSD file into your controller. The PHA\* Vision Sensor appears under the following structure.

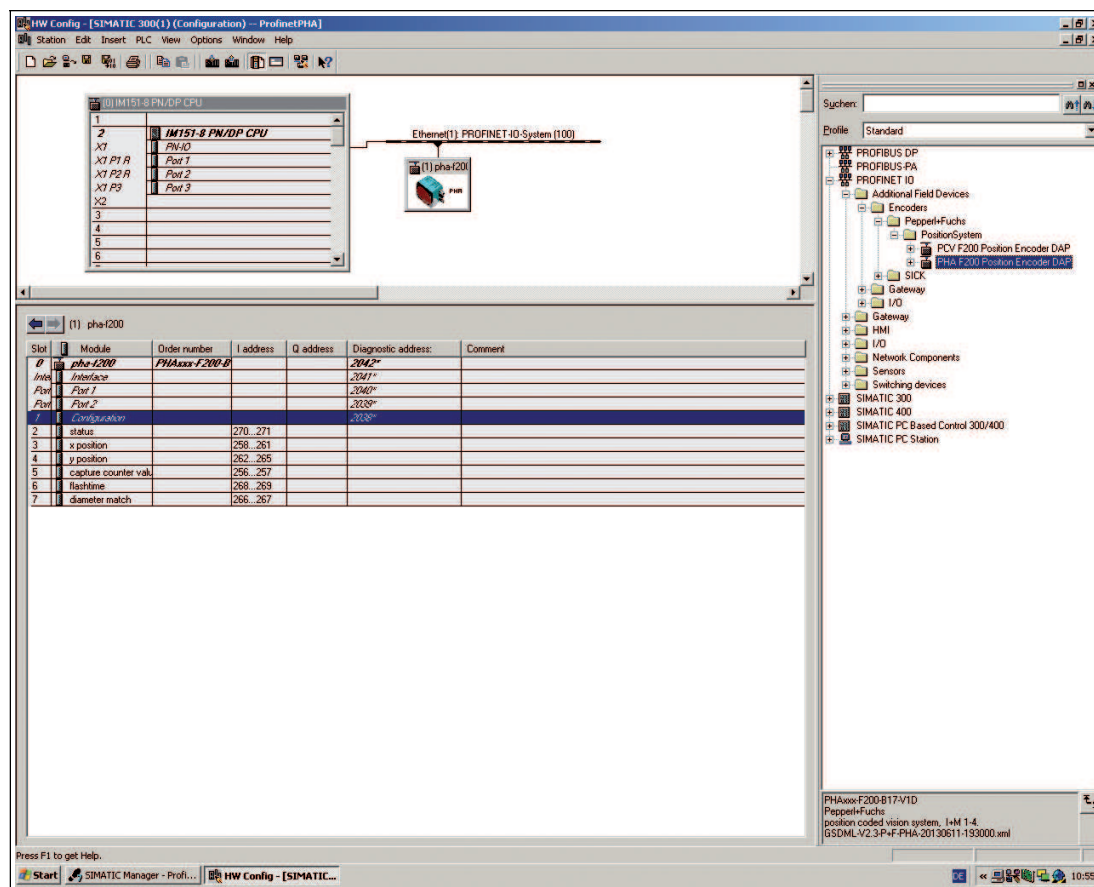


Figure 5.2

### 5.1.4 PROFINET Address and Identifying a Device

Every PROFINET IO device has a unique device identification. This device identification consists of the following:

- A unique **MAC address**. This MAC address is printed on the back of the device.
- A **device name**. The default device name is `pha-f200`.
- An **IP address**. The default IP address is `192.168.2.3`.

## 5.1.5 PROFINET Modules

The PHA\* Vision Sensor has the following PROFINET modules. For all modules, the bit with the highest value is transferred first.



### Example!

#### Illustration in the controller

| Slot | Module                | Order number  | I address | Q address | Diagnostic address: | Comment |
|------|-----------------------|---------------|-----------|-----------|---------------------|---------|
| 0    | pha-F200              | PHAxxx-F200-B |           |           | 2041*               |         |
| Inte | Interface             |               |           |           | 2040*               |         |
| Port | Port 1                |               |           |           | 2039*               |         |
| Port | Port 2                |               |           |           | 2038*               |         |
| 7    | Configuration         |               |           |           | 2037*               |         |
| 2    | status                |               | 268...269 |           |                     |         |
| 3    | x position            |               | 258...261 |           |                     |         |
| 4    | y position            |               | 262...265 |           |                     |         |
| 5    | capture counter value |               | 256...257 |           |                     |         |
| 6    | flashtime             |               | 272...273 |           |                     |         |
| 7    | diameter match        |               | 266...267 |           |                     |         |
| 8    |                       |               |           |           |                     |         |

Figure 5.3 PROFINET modules in SIMATIC Manager

The e-address is assigned dynamically by the controller.

### Counter Module

The counter module can be used to call up the number of images captured via PROFINET.

| Module        | Type       | Size                | Description                                                                                                                                                                              |
|---------------|------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Image counter | Input data | 1 word<br>(2 bytes) | Displays all captured images. After an overflow, the counter starts at 0 again. Can be used to indicate that a new result is present or to check whether the sensor is working properly. |

### Position Modules

The position modules can be used to request data from the Vision Sensor via PROFINET.

| Module     | Type       | Size                 | Description                                                                                                                             |
|------------|------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| X position | Input data | 2 words<br>(4 bytes) | X deviation from the target position in µm<br>0 if no hole has been detected. In this case, the status module should also be evaluated. |
| Y position | Input data | 2 words<br>(4 bytes) | Y deviation from the target position in µm<br>0 if no hole has been detected. In this case, the status module should also be evaluated. |

## Quality Modules

The quality modules can be used to read data concerning image capture and image evaluation via PROFINET.

| Module             | Type              | Size                                                               | Description                                                                                                                                                                                                                       |
|--------------------|-------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Diameter           | Input data        | 1 word<br>(2 bytes)                                                | Deviation from the target hole diameter in %<br>If a hole is detected with the set hole diameter, the value is 100.                                                                                                               |
| Firmware version   | Input data        | 2 words<br>(4 bytes)                                               | Outputs the firmware version of the sensor<br>Bit 31 ... 24: major application<br>Bit 23 ... 16: minor application<br>Bit 15 ... 8: major PROFINET communication processor<br>Bit 7 ... 0: minor PROFINET communication processor |
| Flash duration     | Input data        | 1 word<br>(2 bytes)                                                | Current flash duration in $\mu$ s                                                                                                                                                                                                 |
| Stop image capture | Output data       | 1 word<br>(2 bytes)                                                | Stops and starts the image capture<br>Only the first bit is meaningful:<br>1 = stop image capture<br>0 = continue image capture                                                                                                   |
| Parameter query    | Input/output data | 1 word of output data + 3 words of input data<br>(2 + 2 + 4 bytes) | Queries a parameter value<br><ul style="list-style-type: none"> <li>Word 1: ID of the parameter to be queried</li> <li>Word 2: ID of the returned parameter</li> <li>Words 3 and 4: value of the returned parameter</li> </ul>    |
| Parameter update   | Output data       | 3 words<br>(4 + 2 bytes)                                           | Sets a parameter value<br><ul style="list-style-type: none"> <li>Words 1 and 2: value of the parameter to be set</li> <li>Word 3: ID of the parameter to be set</li> </ul>                                                        |

## Status Module

The status module can be used to check whether the position output is valid.

| Module | Type       | Size                | Description                                                                                                                                                |
|--------|------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Status | Input data | 1 word<br>(2 bytes) | Status information<br>Only the first bit has a meaning:<br><ul style="list-style-type: none"> <li>0: hole detected</li> <li>1: no hole detected</li> </ul> |

## Configuration Module

The configuration module can be used to adjust the parameters of the Vision Sensor.

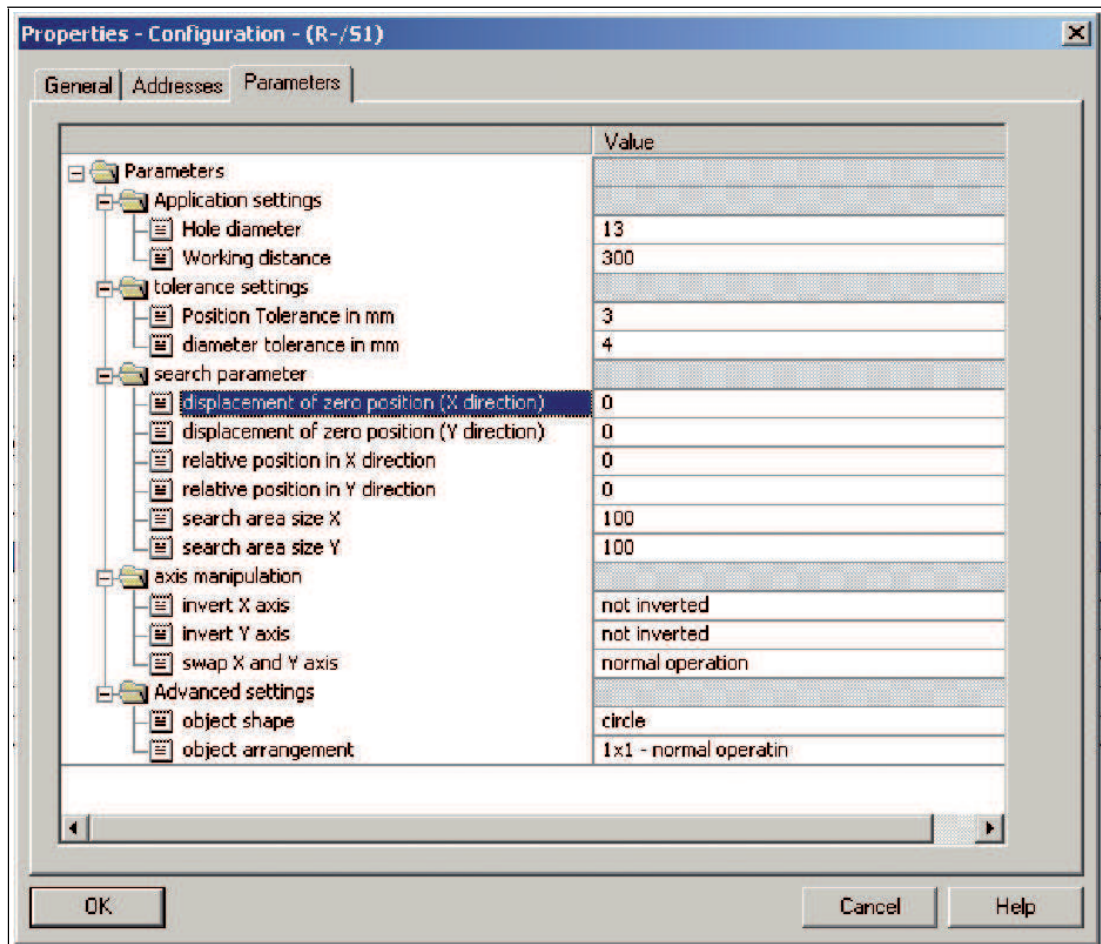


Figure 5.4 **Parameters** tab in the **Properties** window



### **Note!**

The parameters represented in the configuration module show the entire spectrum of the PHA series. Details of the configurable values for your Vision Sensor can be found on the relevant data sheet.

| Parameter                         | Factory default setting | Description                                                                                         |
|-----------------------------------|-------------------------|-----------------------------------------------------------------------------------------------------|
| Hole diameter                     | 13                      | Diameter of the holes in mm; this value is used as the basis for positioning.                       |
| Operating distance                | 300                     | Distance in mm between the sensor and the hole, as measured from the front panel on the sensor.     |
| Positional tolerance              | 3                       | Permitted deviation from the ideal position in mm.                                                  |
| Tolerance for the diameter        | 3                       | Maximum permissible deviation of the hole diameter detected from the hole diameter specified in mm. |
| Movement of the X/Y zero position | 0                       | Enables the zero position to be shifted in mm in relation to the hole position.                     |

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| Parameter                      | Factory default setting | Description                                                                                                                |
|--------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Search area in the X direction | 100                     | Dimensions in mm of the search window in which a search is to be conducted for holes. This window is centered in the image |
| Search area in the Y direction | 100                     |                                                                                                                            |
| Invert X/Y axis                | Not inverted            | Specifies whether the X and/or Y coordinates are to be inverted in the output.                                             |
| Swap X and Y axis              | Normal operation        | Specifies whether the X and Y coordinates are to be swapped in the output.                                                 |
| Extended configuration data    | -                       | Sets the internal parameters                                                                                               |

## 5.2 Establishing a Connection to the PC

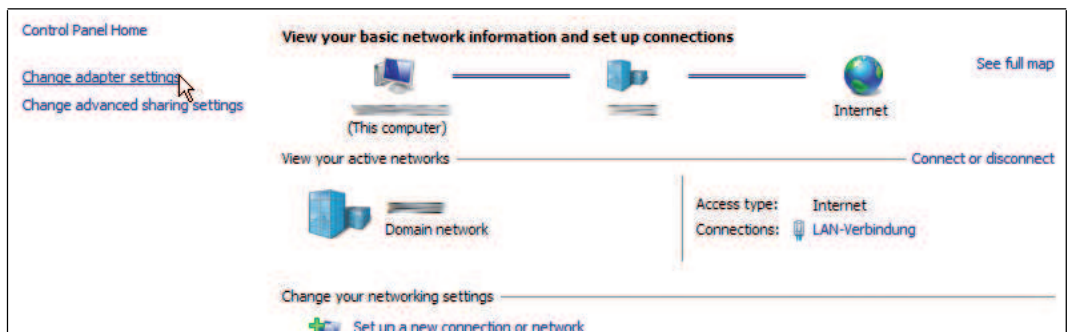


### Configuring the IP Address of the PC (Windows 7)

1. Select **Start > Control Panel**.
2. Select **Network and Sharing Center**.

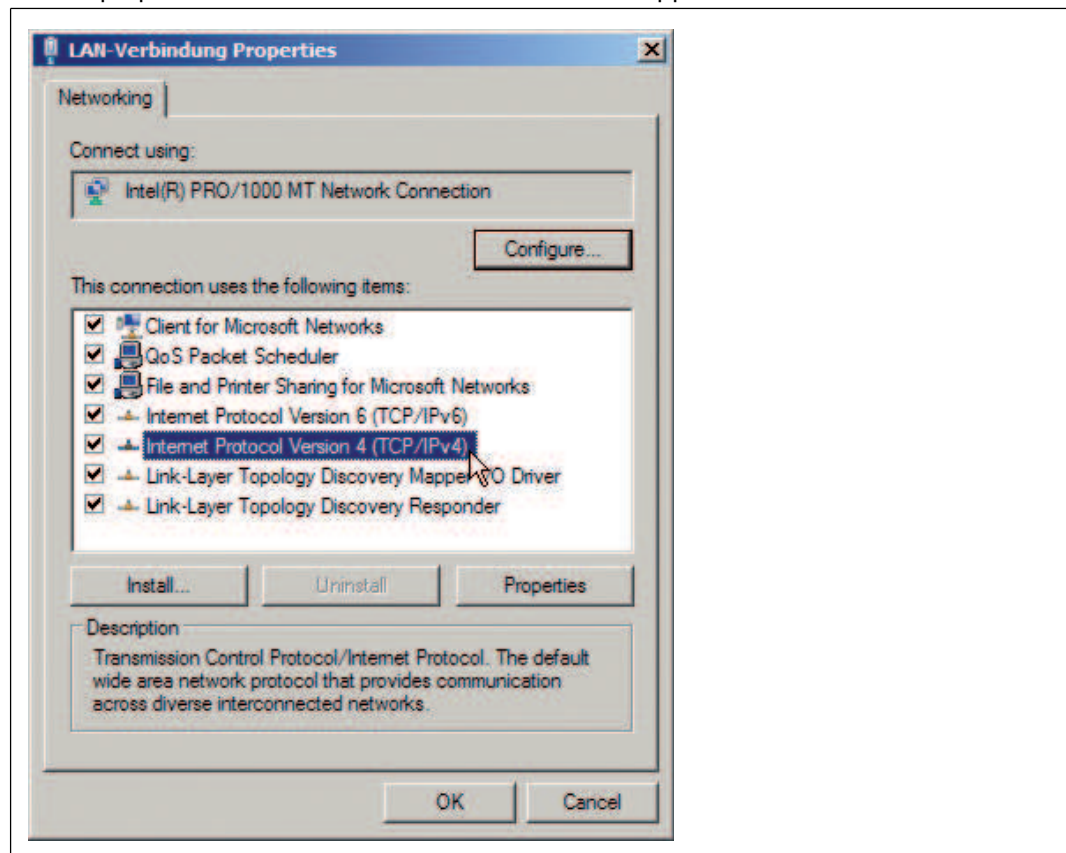


3. Select **Change adapter settings** in the Network and Sharing Center view.



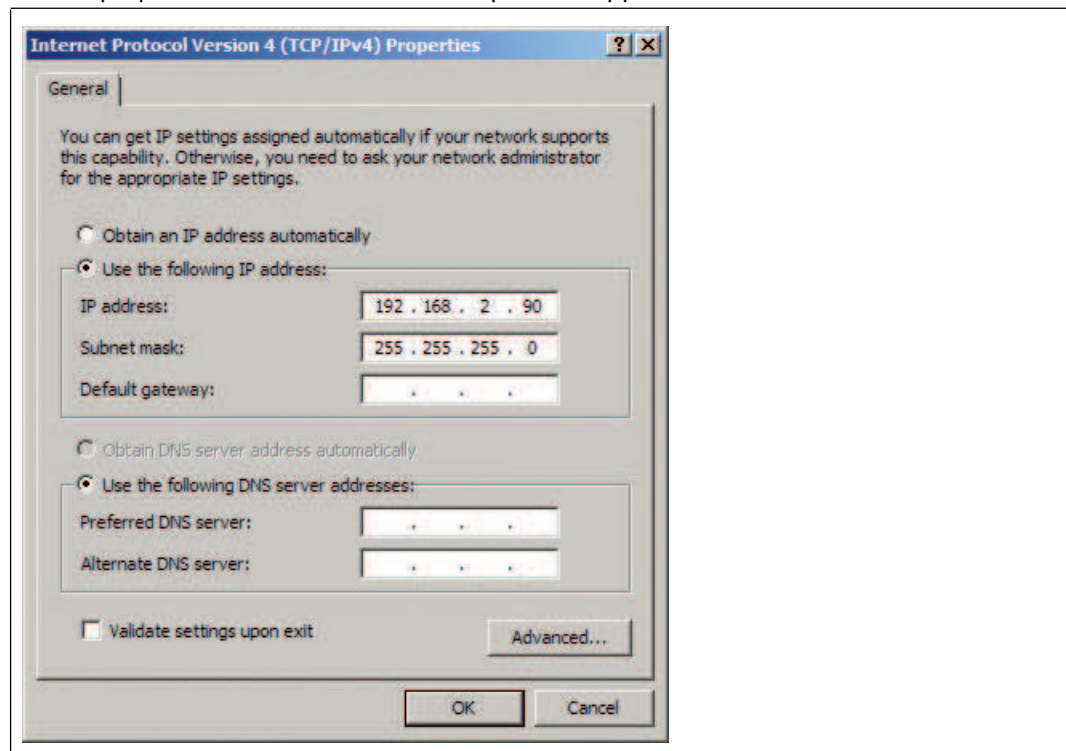
4. Double-click on the required connection.

↳ The properties window for the selected connection appears.



5. Double-click on **Internet Protocol version 4 (TCP/IPv4)**.

↳ The properties window for the TCP/IP protocol appears.



6. Select **Use the following IP address**.
7. Enter an IP address with a network portion (the first three segments) that is identical to that of the sensor, e.g., 192.168.002.090. The device portion (the last segment) must be different to the IP address of the sensor. In the event that you do not know the IP address of the sensor, you can assign a new IP address to the sensor using a control code.
8. Enter 255.255.255.0 as the network mask.
9. Click **OK** and **Close**.

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

### 5.3

## Configuration Process Using Vision Configurator

The sensor is usually configured exclusively using the machine control system. For test purposes and to work out the optimum settings, the sensor can be configured using Vision Configurator.



### **Note!**

As soon as the sensor has established a PROFINET connection to the machine control system, the settings that were made using Vision Configurator, including the network configuration, are overwritten by the machine control system settings.

The Vision Configurator software makes it easy to operate the sensor with its user-friendly interface. Standard functions include making connections to the sensor, specifying the operating parameters, saving data sets, and displaying data and error diagnostics.

## Downloading Vision Configurator

You can find the current version of Vision Configurator in the **Software** section of the product detail page for the sensor.

To access the product detail page for the sensor, go to <http://www.pepperl-fuchs.com> and type information about the device (e.g., the product description or the item number) into the search function.

The following user roles are predefined in Vision Configurator.

| User           | Description                                                                         | Password                   |
|----------------|-------------------------------------------------------------------------------------|----------------------------|
| <b>Default</b> | View all information<br>Create users at same or lower level                         | A password is not required |
| <b>User</b>    | View all information<br>Sensor configuration<br>Create users at same or lower level | User                       |
| <b>Admin</b>   | View all information<br>Sensor configuration<br>Create and delete users             | PF                         |

The application screen opens after the log-in process. Certain functions are not available depending on which user is selected during the log-in process.

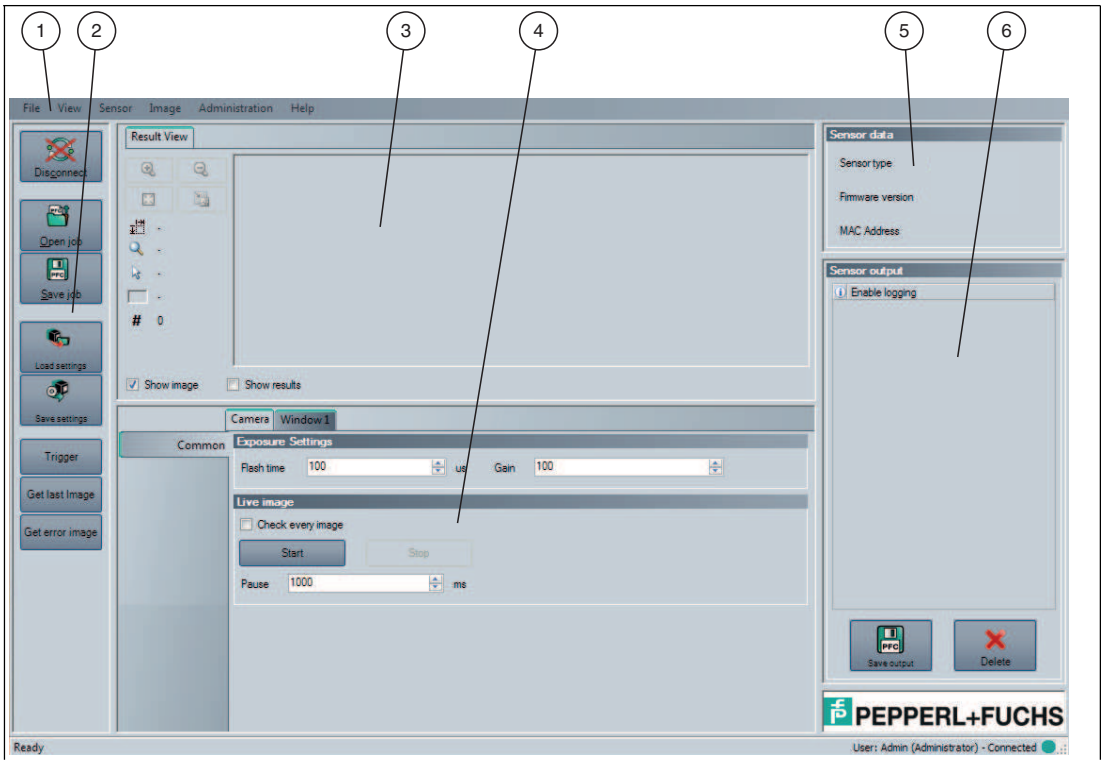


Figure 5.5 Application screen

|   |                             |                                                                                                |
|---|-----------------------------|------------------------------------------------------------------------------------------------|
| 1 | Menu bar                    | The menu bar contains all program options.                                                     |
| 2 | Toolbar                     | The toolbar contains buttons for all standard functions.                                       |
| 3 | Image Display               | The image display shows images that have been captured and result information.                 |
| 4 | Configuration window        | The configuration window contains sensor-specific parameters that can be set.                  |
| 5 | <b>Sensor data</b> window   | The <b>Sensor data</b> window contains information about the connected sensor.                 |
| 6 | <b>Sensor output</b> window | The <b>Sensor output</b> window contains a protocol about the most recently performed actions. |

### 5.3.1 Menu Bar

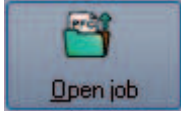
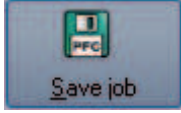
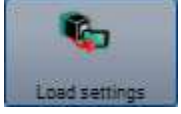
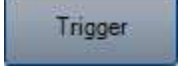
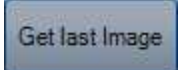
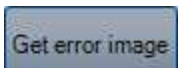
The menu bar contains a list of menu items. The functionality depends on the type of sensor that is connected and the permissions of the user logged in.



Figure 5.6 Menu Bar

### 5.3.2 Toolbar

The toolbar contains the following functions.

|                                                                                     |                                                                     |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------|
|    | Disconnects the connection between the PC and the sensor.           |
|    | Loads the settings from a configuration file.                       |
|    | Saves the settings that have been made in a configuration file.     |
|    | Loads the settings from the sensor.                                 |
|    | Transfers the settings that have been made to the sensor.           |
|  | Triggers the sensor.                                                |
|  | Loads the most recently captured image in the image display.        |
|  | Loads the last image in the image display where the reading failed. |

### 5.3.3 Image Display

In the image display, there are different options for displaying the captured data. You can show and hide the image display in the left-hand section and the results display in the right-hand section using the checkboxes **Show image** and **Show results**.

The image display shows the image captured by the sensor.



Figure 5.7      Toolbar

**Toolbar**

|                                |                                                                     |
|--------------------------------|---------------------------------------------------------------------|
| <b>Magnifier +</b>             | Zooms in on sensor image                                            |
| <b>Magnifier -</b>             | Zooms out on sensor image                                           |
| <b>Fit to window</b>           | Fits the sensor image to the window                                 |
| <b>Original size</b>           | Sets original image size                                            |
| <b>Size details</b>            | Specifies the size of the sensor image                              |
| <b>Zoom factor</b>             | Displays the zoom factor. Zoom factor 1 is the original size        |
| <b>Position details</b>        | Specifies the position of the cursor                                |
| <b>Grayscale value details</b> | Grayscale value details for the pixel indicated by the mouse cursor |
| <b>Image number</b>            | Specifies the image number                                          |



**Tip**

You can use the mouse wheel to zoom in to or out of the sensor image.

5.3.4

**Sensor Data**

This area shows the type of sensor connected, the firmware version of the connected sensor, and the MAC address.



Figure 5.8      Sensor data

### 5.3.5 Sensor Output

This area shows the communication between the Vision Configurator and the connected sensor. To select which messages are to be displayed, select **View > Displayed message types**.



Figure 5.9 Sensor output

Two buttons are located in the lower area.



|                    |                                                 |
|--------------------|-------------------------------------------------|
| <b>Save output</b> | Saves the content of the window to a text file. |
| <b>Delete</b>      | Deletes the contents of the window.             |

### 5.3.6 Generating Control Codes

Using the Vision Configurator software, you can create control codes that can assign a device name and an IP address to the sensor.



#### Tip

It is also possible to generate control codes when no sensor is connected to Vision Configurator. In this case, you can generate a control code to assign a particular IP address to a sensor and then establish a connection with a PC.



#### Generating an AENABLE Control Code

This control code activates parameterization using control codes.

1. In the menu bar, select **Administration > Create reader programming code**.
2. Choose **AENABLE** in the **Select function** section.  
↳ The control code is displayed in different sizes in the **Control Code** section.
3. To print out the control code, click **Print** or **Print preview**.  
To save the control code, click **Save image**.



#### Generating a Control Code for an IP Address

This control code assigns an IP address to the sensor.

1. In the menu bar, select **Administration > Create reader programming code**.
2. Select **Input IP** in the **Select function** section and enter the required IP address into the text box. Enter the network mask as a CIDR notation into the **Network mask** section, e.g., if the CIDR notation is 24, enter the network mask 255.255.255.0.  
↳ The control code is displayed in different sizes in the **Control Code** section.
3. To print out the control code, click **Print** or **Print preview**.  
To save the control code, click **Save image**.



## Generating a Control Code for Device Names

This control code assigns a device name to the sensor.

1. In the menu bar, select **Administration > Create reader programming code**.
2. Select **Input device name** in the **Select function** section and enter the device name for the sensor into the text box.
  - ↳ The control code is displayed in different sizes in the **Control Code** section.
3. To print out the control code, click **Print** or **Print preview**.  
To save the control code, click **Save image**.

### 5.3.7

## Setting Device Parameters via Control Code

You can assign the device name and IP address via a control code. Use Vision Configurator to generate control codes. See chapter 5.3.6



### **Note!**

Parameterization mode can be activated only within ten minutes of the sensor being switched on.



## Activating Parameterization Mode

1. Hold down the **2** button on the back of the sensor for more than two seconds.
  - ↳ The PWR/ERR LED goes out and the ZERO POS LED flashes yellow.
2. Position the **AENABLE** control code in the sensor's field of view.
  - ↳ The control code has been captured correctly once the PWR/ERR LED briefly lights up green and the RANGE LED lights up orange.



## Setting Parameters

To assign a parameter, position the relevant control code in the sensor's field of view.

↳ The control code has been captured correctly once the PWR/ERR LED briefly lights up green and the RANGE LED lights up orange.



## Deactivating Parameterization Mode

1. Press the **2** button on the back of the sensor.
2. Carry out a power reset.

## 6 Maintenance and Repair

### 6.1 Maintenance

The cable is maintenance-free. To get the best possible performance out of your device, keep the optical unit on the device clean and clean it when necessary.

Observe the following instructions when cleaning:

- Do not touch the optical unit with your fingers.
- Do not immerse the device in water. Do not spray the device with water or other fluids.
- Do not use a scouring agent to clean the surface of the device.
- Use a cotton or paper cloth moistened with water or isopropyl alcohol (not soaked).
- Remove any residual alcohol using a cotton or paper cloth moistened with distilled water (not soaked).
- Wipe the device surfaces dry using a lint-free cloth.

### 6.2 Repair

The devices must not be repaired, changed or manipulated. If there is a defect, the product must always be replaced with an original device.



## 7 Troubleshooting

### 7.1 What to Do in the Event of an Error

Before you have the device repaired, take the following actions:

- Test the equipment according to the checklist below.
- Contact our Service Center in order to localize the problem.

#### Checklist

| Fault                       | Cause                                                        | Remedy                                                                                                                                                    |
|-----------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| "PWR" LED does not light up | The power supply is switched off.                            | Check whether there is a reason why the power supply is switched off (installation or maintenance work, etc.). Switch on the power supply if appropriate. |
| "PWR" LED does not light up | Wiring fault in the splitter or control cabinet, cable break | Check the wiring carefully and repair any wiring faults. Check the cable to ensure proper function.                                                       |
| No connection to the device | Network cable not connected                                  | Connect the network cable.                                                                                                                                |
| No connection to the device | Wrong network cable used                                     | Direct connection between PC and device: use a crossover network cable.<br>Connection via an existing network: use a twisted-pair network cable.          |
| No connection to the device | Wrong network IP used                                        | Check the entry for the network IP and ensure that you have entered the correct IP for the sensor.                                                        |

- If none of the above remedies corrects the problem, please contact our Service Center. Please have the fault patterns and the version number of the firmware available. The firmware version number can be found at the top right of the user interface.



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