

Industrial Event Camera VOC*M-F256-B12-V1D-CR0*

Manual



With regard to the supply of products, the current issue of the following document is applicable:
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1 Introduction

1.1 Content of this Document

This document contains information 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

For full information on the product, refer to the further documentation on the Internet at www.pepperl-fuchs.com.



Note

For specific device information such as the year of construction, scan the QR code on the device. As an alternative, enter the serial number in the serial number search at www.pepperl-fuchs.com.

The documentation comprises the following parts:

- This document
- Datasheet

In addition, the documentation may comprise the following parts, if applicable:

- EU-type examination certificate
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Instruction manual
- Functional safety manual
- Other documents

1.2 Target Group, Personnel

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

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismantling 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

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

2 Product Specifications

2.1 Use and Application

This manual applies to the industrial event camera (hereinafter referred to as camera). The camera is supplied with 24 V DC and features a network interface (10BaseT/100Base-TX) and trigger input. The camera is used for the continuous monitoring of machinery and systems in industrial applications.

Recording can be triggered directly from the PLC via the network interface. The recording function supports a pre-run buffer of up to 15 minutes to optimally capture events. The rugged design and the integrated heater to prevent condensation mean that the camera can be used under harsh operating conditions. The camera is automated and integrated via a web interface.

Design of the Sensor

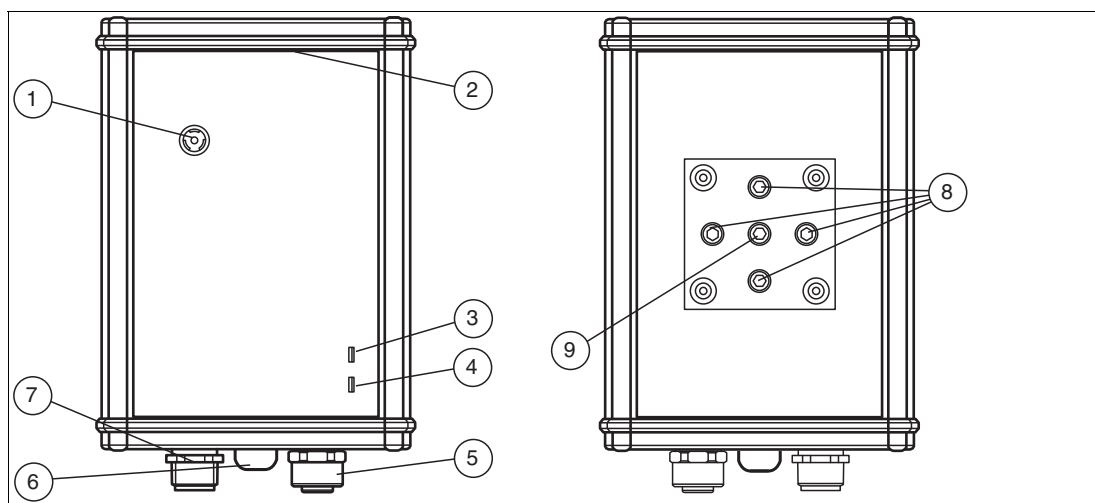


Figure 2.1 Overview

- 1 Fixed-focus camera
- 2 MicroSD card behind the cover
- 3 LED power
- 4 LED status
- 5 Ethernet port
- 6 Pressure-compensation element
- 7 Power supply and digital input connection
- 8 Mounting bracket with 4 x M6 female threads
- 9 Thread ¼" - 20 UNC for mounting standard photo stands

Special Product Features

Video Recording Function with Pre-Run and Post-Run Buffer

- In addition to the video recording function, the recording function supports pre-run buffers to capture actions that occur before the trigger event. The user can see what happened 60 seconds before and after an event. With the expert settings, the recording time can be extended up to 15 minutes. This can be useful for applications whereby unexpected events and operations must be stored for fault analysis or documentation purposes.

Integrated Web-Based, Password-Protected User Interface

- The camera has a web interface for easy commissioning and diagnostic purposes. The camera can be configured via a standard web browser.

Integrated Heater

- Since the camera can be used at ambient temperatures as low as -30 °C, a heater that can be adjusted via software is integrated to minimize the formation of condensation around the camera lens .

Static and Dynamic Text Overlays in the Video

- **Static:** camera name, time, date in live view, and recording.
- **Dynamic:** The User Datagram Protocol (UDP) interface enables user-defined overlay information to be added to the video sequence, e.g., for certain error messages. This simplifies fault analysis.

REST API

- REST API allows an individual user interface to be programmed and for the camera to be integrated directly into IT systems. The REST API can read out information and issue commands (e.g., a trigger signal).

Real-Time Streaming Protocol (RTSP)

- The camera supports the RTSP standard protocol for video streaming, so audio-visual data can be transferred across the network. This allows the camera live view to be displayed on standard HMI displays using RTSP.

Application Examples

Accessories for Safety Devices

The camera is an accessory for safety devices to quickly identify the cause of a safety-related fault.

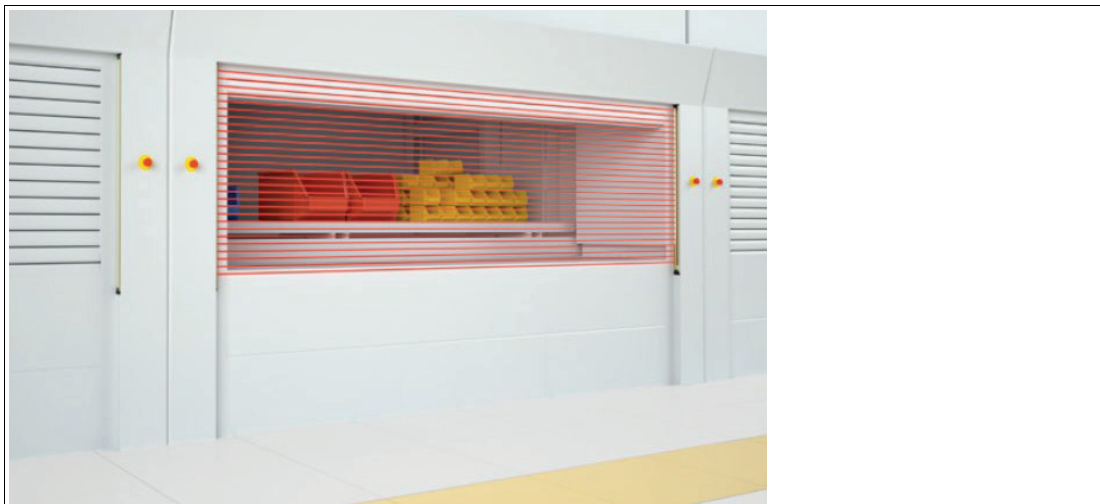


Figure 2.2 Safety light grid

High-Bay Warehouses

The camera will record a video leading up to and after the event if the storage process has failed.



Figure 2.3 Automated storage and retrieval systems

Production Machines

The camera sends a live view to a screen to monitor the status of a machine or a hard-to-reach area.

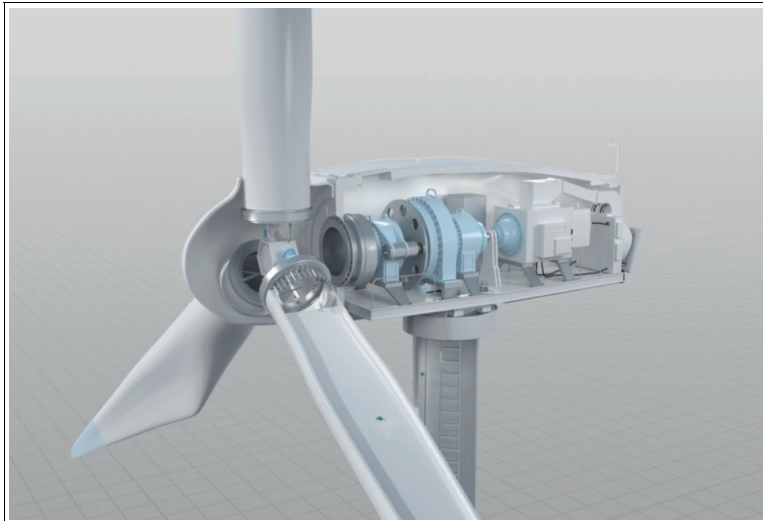


Figure 2.4 Wind turbine

2.2 Dimensions

The camera housing has the following dimensions.

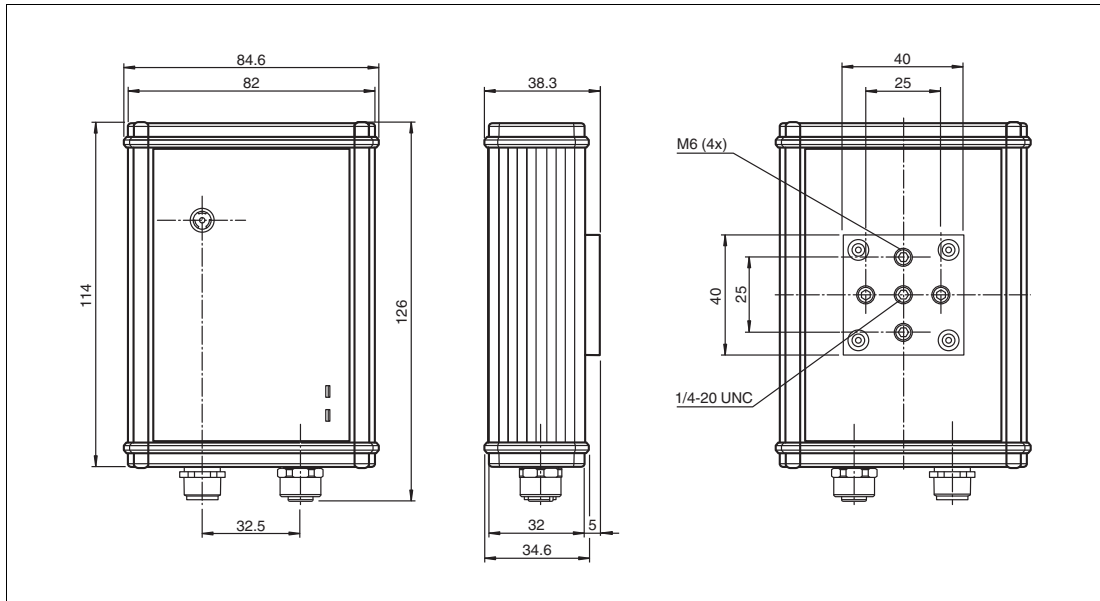


Figure 2.5 Housing dimensions

The camera has a powder-coated aluminum housing and a glass front panel. The mounting bracket is securely attached to the housing and cannot be removed.

2.3 Field of view size

Rotating the camera creates a zoom effect due to the 4:3 aspect ratio. With a 90°/270° orientation, the field of view becomes smaller because a rectangular field of view is transferred from the real image sensor.

VOC5M-F256-B12-V1D-CR02

Size of the Field of View

Distance	Orientation 0°/180°	Orientation 90°/270°
0.5 m	1.4 m x 0.8 m	1.0 m x 0.6 m
1.0 m	2.8 m x 1.6 m	2.1 m x 1.2 m
2.5 m	6.9 m x 3.9 m	5.2 m x 2.9 m
5.0 m	13.9 m x 7.8 m	10.4 m x 5.8 m

90°/270° Orientation

- In the 90° orientation, the connector faces to the right when viewed from the rear. The 90° orientation is the factory default.
- In the 270° orientation, the connector faces to the left when viewed from behind.

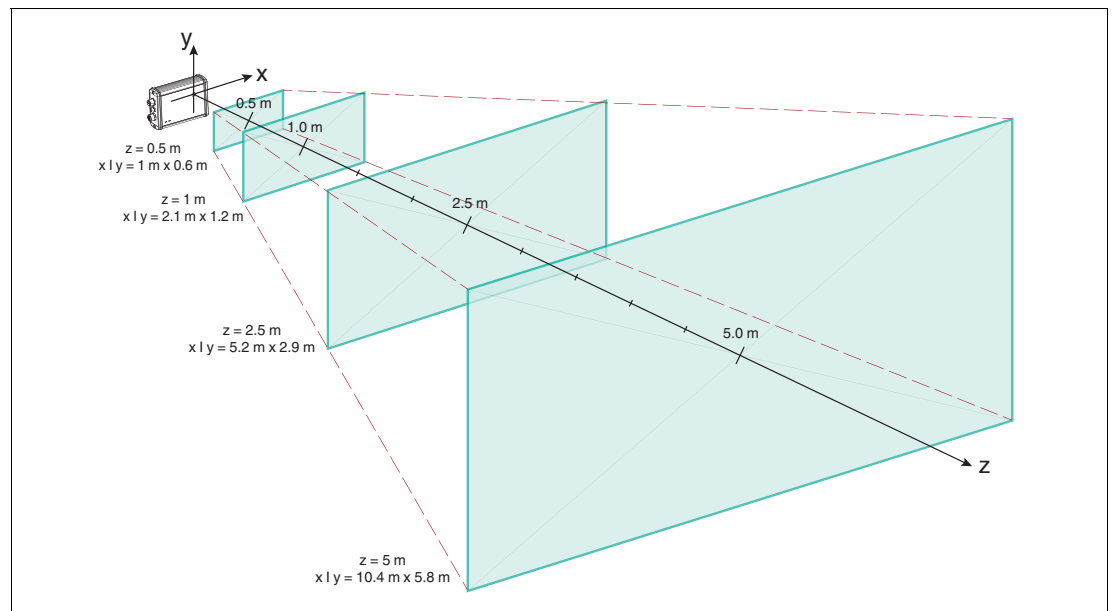


Figure 2.6

0°/180° Orientation

- In the 0° orientation, the connector faces upwards.
- In the 180° orientation, the connector faces down.

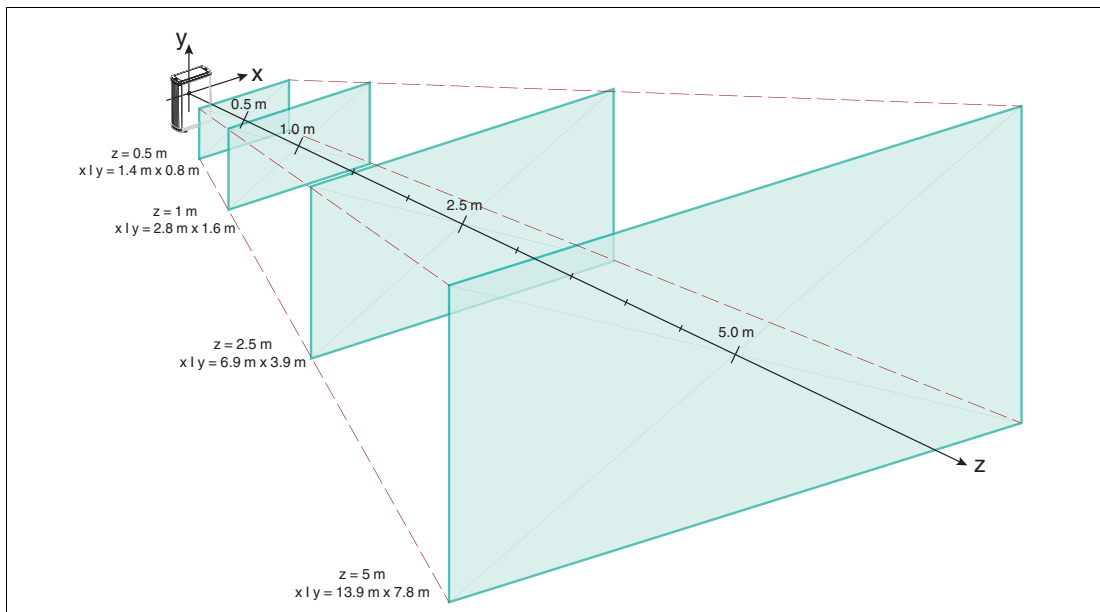


Figure 2.7

VOC10M-F256-B12-V1D-CR03

Size of the Field of View

Distance	Orientation 0°/180°	Orientation 90°/270°
0.5 m	0.6 m x 0.3 m	0.5 m x 0.3 m
1.0 m	1.2 m x 0.7 m	0.9 m x 0.5 m
2.5 m	3.0 m x 1.7 m	2.3 m x 1.3 m
5.0 m	6.0 m x 3.4 m	4.5 m x 2.6 m
10.0 m	12.1 m x 6.8 m	9.1 m x 5.1 m

90°/270° Orientation

- In the 90° orientation, the connector faces to the right when viewed from the rear. The 90° orientation is the factory default.
- In the 270° orientation, the connector faces to the left when viewed from behind.

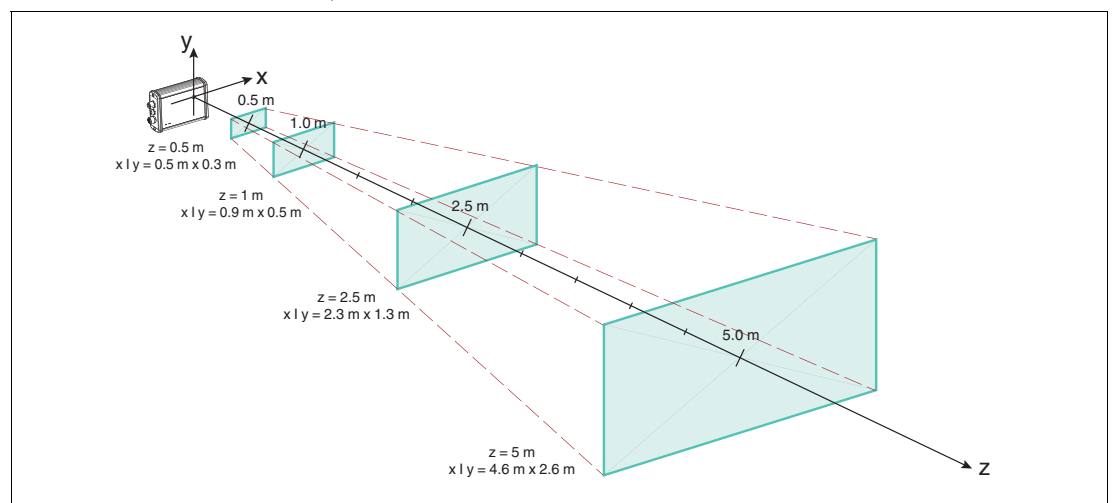


Figure 2.8

0°/180° Orientation

- In the 0° orientation, the connector faces upwards.
- In the 180° orientation, the connector faces down.

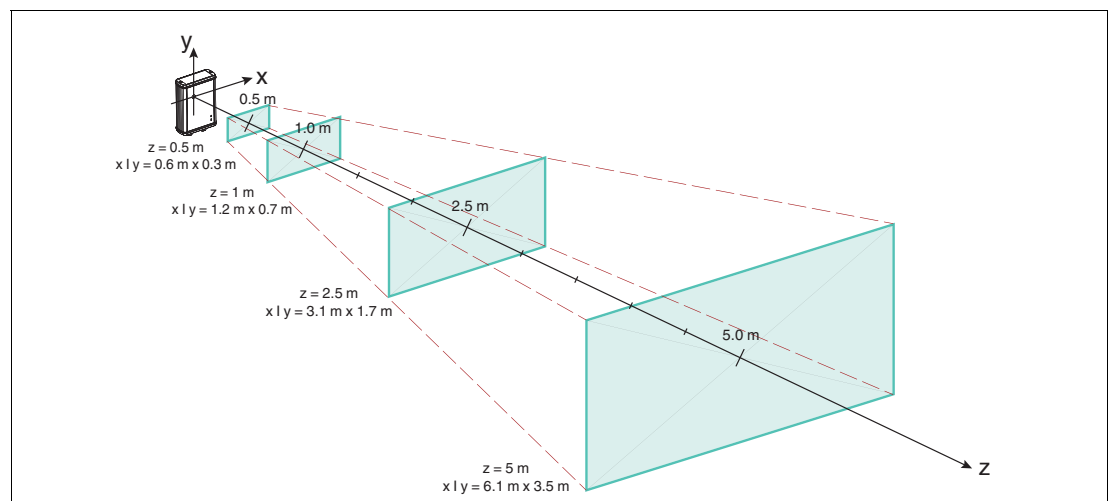


Figure 2.9

2.4 Display Elements

Two LEDs on the front of the camera indicate the operating status.

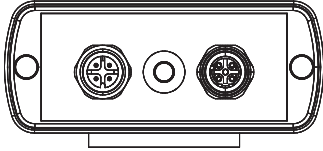
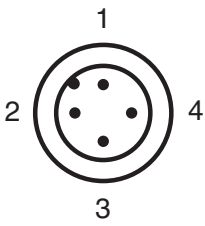
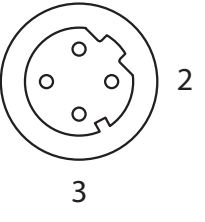
Description of the LEDs

LED	Color	Meaning
Power	Green	Illuminates when the camera is switched on
Status	Blue	Illuminates blue from the trigger to the end of the recording
	Yellow	Lights up yellow a few seconds after the system is switched on. The LED turns off when the camera has been successfully initialized and is ready for operation. A software restart is also indicated via the yellow status LED.

2.5 Electrical Connection

The following connections are located on the sensor.

Connection Assignment

	Power supply and digital input connection	
	M12 plug, A-coded, 4-pin	
		<ol style="list-style-type: none"> 1. Power supply + (18 V DC ... 28 V DC) 2. Digital input Low: 0 % ... 5 V DC High: 16 V DC ... 32 V DC 3. Power supply - (0 V) 4. Not used
	Ethernet interface 10/100 Mbit	
M12 socket, D-coded, 4-pin		
	<ol style="list-style-type: none"> 1. TX+ Ethernet 2. RX+ Ethernet 3. TX- Ethernet 4. TX- Ethernet 	

Note

Current Consumption

The maximum input current of the camera is 200 mA over the entire input voltage range with the heater deactivated. When the heater is activated, the maximum input current is 700 mA.



2.6 Camera Optics

The VOC10M* camera has a horizontal angle of view of 62.2° and a vertical angle of view of 48.8°. In comparison, the VOC5M* camera has an even wider angle of view. It offers a horizontal angle of view of 108.4° and a vertical angle of view of 92.2°.



Note

All cameras from production date 01/2023 are equipped with a motorized focus. The motorized focus can be set via the user interface.

All cameras before production date 01/2023 have a fixed focus. The object distance is 1 m at optimum depth of focus.

The integrated CMOS sensor has a resolution of 8 MP and a sensor surface of 3.68 mm x 2.76 mm.

An IR-cut filter is installed to prevent image quality from being affected by IR radiation.

2.7 The Heater

The integrated heater reduces condensation around the camera lens, especially in cold environments. The heater can be activated as required.

The temperature in the area around the heater is controlled by a two-point controller. Depending on the status of the controller, the heating power has a nominal value of $P = 0 \text{ W}$ ("off") or depending on the supply voltage V_{CC} , $P = V_{CC}^2/50 \Omega$ ("on", 18 V --> 6.5 W, 24 V --> 11.5 W).



Note

To avoid impermissibly high temperatures in the event of a control system failing due to software, a software-independent excess temperature shut-off function for the heater unit is integrated into the camera (shut-off value: $103 \text{ °C} \pm 2.5 \text{ °C}$).

The shut-off value refers to the position of the excess temperature sensor in the area around the heater; other areas may be even warmer.

2.8 MicroSD card

An 8 GB industrial microSD card (Class 10 U1) is integrated into the camera for storing video recordings.



Note

The microSD card must only be removed or replaced for service purposes. If servicing is required, the two housing cover screws on the top (opposite the connector plugs) must be removed. The two black plastic screw covers must be removed first.

2.9 Digital Input Trigger Signal

Triggering the digital input (DIGIN) initiates the recording of a video file.

- This requires a rising edge at the DIGIN input in the high-level range, starting from the specified low level range, and a corresponding minimum pulse length of 20 ms. A low signal must be present for 20 ms for a trigger signal to occur again. The software prevents the acceptance of a new trigger signal for two seconds after a trigger signal is accepted.
- Trigger signals with a pulse length of < 1.5 ms are not accepted. Pulses with a length between 1.5 ms and 20 ms may result in a trigger signal.

2.10 Accessories

The following products are available as accessories.

Designation	Description
V1SD-G-GN2M-PUR-E1S-V45-G	Bus cable, Ethernet, straight M12 plug, D-coded to RJ45, Ethernet-coded, 4-pin, PUR cable, green, Cat5e
V1-G-2M-PUR	Straight single-ended female cordset, M12, 4-pin, PUR cable
PCV-MB1	Mounting bracket

Additional accessories can be found online at www.pepperl-fuchs.com.

3 Installation

3.1 Storage and Disposal

Keep the original packaging. Always store and transport the device in the original packaging. Store the device in a clean and dry environment. The permitted ambient conditions must be considered, see datasheet.

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.

3.2 Preparation



Unpacking the Device

1. Check the packaging and contents for damage.
↳ In the event of damage, inform the shipping company and notify the supplier.
2. Check the package contents against your order and the shipping documents to ensure that all items are present and correct.
↳ Should you have any questions, direct them to Pepperl+Fuchs.
3. Retain the original packaging in case the device is to be stored or shipped again at a later date.

3.3 Mounting the Camera

The surface must be level to prevent the housing from becoming misaligned when the fittings are tightened. Following installation of the sensor, ensure that there is still sufficient space to connect the connection cable to the sensor



Caution!

Damage to the equipment caused by improper mounting!

Device components can be damaged if the permissible screw-in depth and the maximum permissible tightening torque is exceeded.

Note that the threads on the bottom of the housing are not thru-holes.

Observe the maximum permissible screw-in depth to avoid damaging the device or mounting it incorrectly.

Never exceed the maximum permissible tightening speed for the fixing screws. The maximum tightening torque of the fixing screws must not exceed 1 Nm.

Mounting the Housing

So that the sensor can easily be mounted in your plant, the device has four M6 threads on the mounting fixture.

3.4 Connecting the Camera



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.



Connecting the Supply Voltage

To supply voltage to the sensor, proceed as follows:

1. Connect the 4-pin M12 socket on the power cable to the plug located on the side of the camera.
2. Manually screw the union nut onto the connector as far as it will go.

↳ This ensures that the power cable cannot be pulled out inadvertently.



Establishing a Network Connection

To establish a network connection, proceed as follows:

1. Use a network cable (minimum category 5e cable, max. length of 100 m) that has an RJ45 network connector on one side and a 4-pin M12 plug on the other. Insert the 4-pin M12 plug into the socket on the side of the camera.
2. Manually screw the union nut onto the connector as far as it will go.

↳ This ensures that the network cable cannot be pulled out inadvertently.

3. When delivered, the camera has a fixed IP address (192.168.100.50). To facilitate communication within the network, you must configure your network. You can find the configuration data in the network configuration overview.



Note

Network

The camera has a 100 Mbit Ethernet interface. The camera has a static IP address. If required, an IP address can also be obtained via DHCP. If DHCP is enabled but not available, the static IP address is always used as a fallback solution.

Assigning a Fixed IP Address

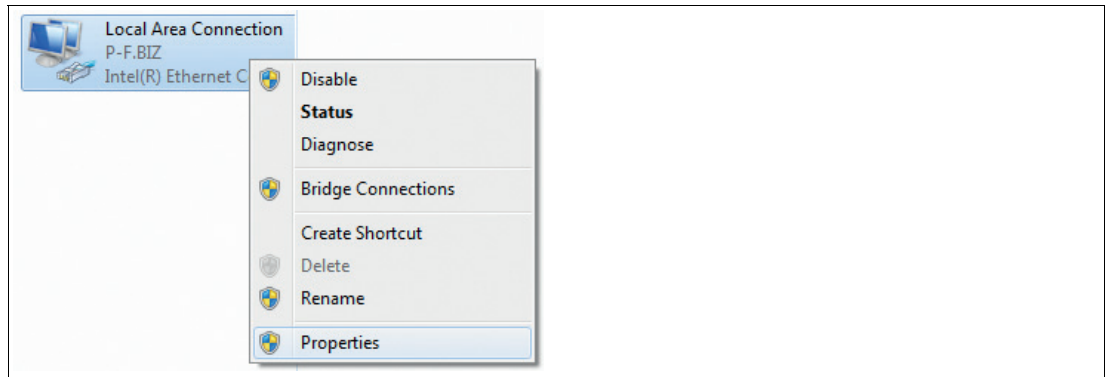
When delivered, the sensor has a fixed IP address **192.168.100.50** and subnet mask **255.255.255.0**. To enable communication within the network, the network settings of your PC/laptop must be synchronized with the camera and may need to be adjusted. To do so, proceed as follows:



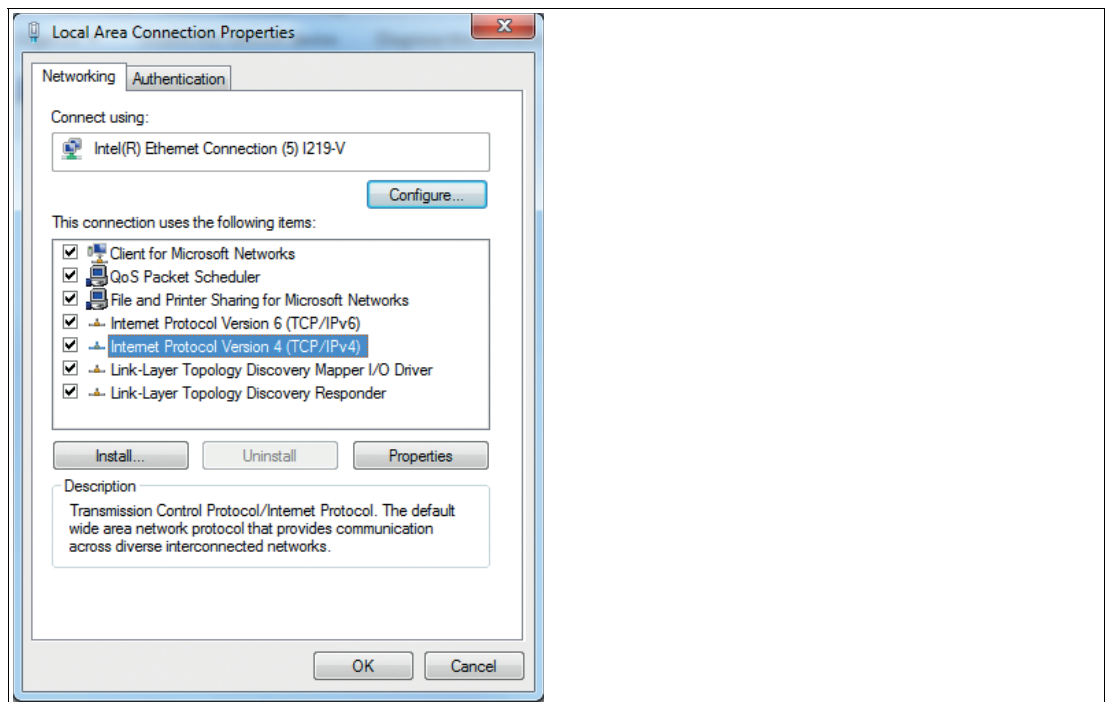
Setting the Fixed IP Address

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.

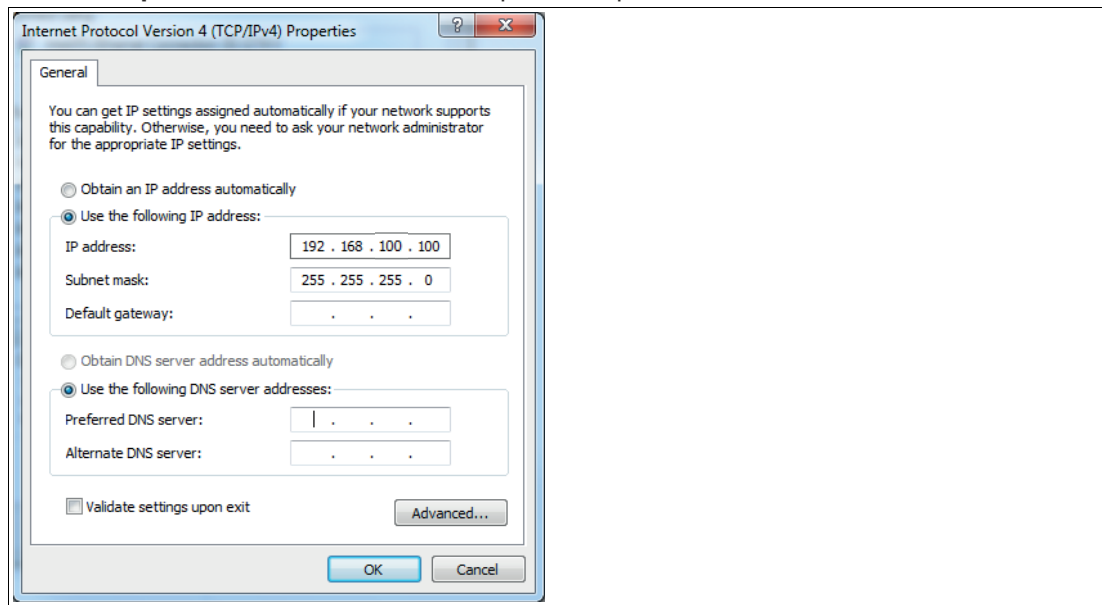
1. Click the Windows **"Start"** button.
2. Select **"Control Panel > Network and Sharing Center."**
3. In the left window range, click **"Change adapter settings."**
4. Select the required connection and right-click on your selection. In the selection window, select **"Properties."**



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



↳ 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: 192.168.100.100**
 - **Subnet mask: 255.255.255.0**
10. Click **"OK"** and click **"Cancel"** in the next dialog.

↳ This completes the network configuration so that the device can be used.

3.5 System Requirements

Ports

To ensure that the system functions properly, the following ports must not be blocked by a fire-wall within the camera's network.

Port	Protocol	Function
80	TCP	Web application
5001	UDP	Text overlay
5002	UDP	Event trigger
8080	TCP	Web application
8554 or 554	TCP and UDP	RTSP stream
53100	UDP	Management tool

Browser Support

Google Chrome > 84 (stable channel)



Note

Security Information

From a security perspective, the following precautions must be taken for the product by the responsible application operator:

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

4 Functions

4.1 Streaming

Stream	Resolution	FPS	Codec/ Container	URL
HD	1280 x 720, 1024 x 576, 960 x 540, 800 x 450, 640 x 360	24	MJPEG	http://<camera-ip>/stream-hd
RTSP Stream 1	1280 x 720, 1024 x 576, 960 x 540, 800 x 450, 640 x 360	24	H264 RTSP	rtsp://<cameraip>: 554/stream1
RTSP Stream 2	640 x 360	3	H264 RTSP	rtsp://<camera-ip>:<rtspsport>/< rtsp-path>

RTSP Stream 1 and 2 are mutually exclusive.

4.2 Recording

The camera can record a video sequence in response to a trigger signal. The recording begins with the set pre-run buffer time before the trigger point and ends the set post-run buffer time after the trigger point.

Video recording properties:

Resolution	FPS	Codec/Container
1920 x 1080 1280 x 720, 1024 x 576, 960 x 540, 800 x 450, 640 x 360	24	H264 MP4, adjustable quality

Trigger Settings

Digital Input

- A rising edge at the digital input triggers a recording.

UDP

- Sends the character string TRIG to UDP port 5002 of the camera.

Web Interface

- The trigger button at the top right of the user interface can be used to trigger the operation manually.

When a trigger signal is detected, the blue status LED on the camera illuminates until all ongoing recordings are complete. If the recording cannot be saved, the blue LED flashes several times. Multiple recordings may overlap. At least two seconds must pass between each trigger. No more than three recordings can run at the same time.

To ensure that there is always enough memory, there is a function that deletes older videos to make sure there is enough space available.



Note

Recording Fault

A recording fault is indicated by the blue LED flashing several times after a trigger has occurred.

Possible reasons for this include:

- Memory card is full
- Memory card is missing
- Memory card is faulty



Note

Recording with a Resolution of 1920 x 1080 Pixels

Live view, recording, and RTSP share the limited computing power of the camera. Recording with a resolution of 1920 x 1080 pixels requires the most computing power and can result in the live view having a very low frame rate. To reduce the impact on the live view or in case of other performance problems, we recommend disabling the RTSP stream when recording with a resolution of 1920 x 1080 pixels.

When using 1920 x 1080, only one recording can run at a time.

When using a recording resolution of 1920 x 1080 pixels, the field of view is reduced due to sensor limitations. This applies to all streams, although only the recording function supports 1920 x 1080.

Operating Limits and Recommendations

The operating limits are automatically enforced by the system. The operating recommendations indicate the limits of the system as tested by the manufacturer. If the system is used outside of these limits, performance can be affected and manufacturer support is not always guaranteed.

Feature	Type	Value
MicroSD memory capacity	Recommendation	8 GB
Count of recordings	Recommendation	10,000
Minimum time interval between recordings	Limit value	2 s
Simultaneous recordings	Limit value	3
Simultaneous HTTP connections	Limit value	8
Simultaneous MJPEG streams	Recommendation	2
Simultaneous RTSP streams	Recommendation	1

4.3 Access Protection

Two users are available:

- viewer
- admin

On delivery, no password is set for either user. If a password is set, a login prompt appears when the user interface is launched.

The **admin** user has no restrictions.

The **viewer** user can view streams and recordings but cannot make any changes. The viewer is not permitted to change settings, delete videos, or perform updates.

The names of the two users can be changed.



Note

Forgotten Password

All camera settings are saved to the SD card in the file `ipcam_settings.json`.

Delete this file from the SD card to reset the camera to factory settings. This is only necessary if the password for the admin user has been forgotten. Otherwise, all settings can be adjusted via the user interface.

5 Web Interface

The camera has a web interface that allows you to configure the camera and perform diagnostics.

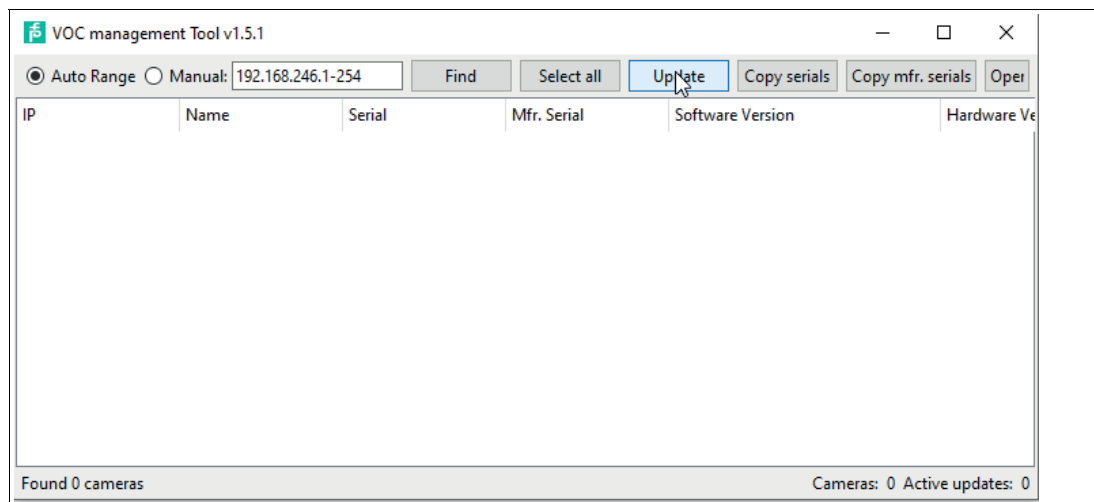
5.1 Opening the User Interface in the Web Browser



Accessing the User Interface

1. Open the web interface using a current web browser, such as Google Chrome. The web interface is accessed via an HTTP request: `http://<ip - address> .`
2. Enter the camera IP address (192.168.100.50).

5.2 Camera Management Tool



- Find cameras on the network (automatic/manual)
- Display general information
 - Name
 - Serial number
 - Software version
 - Hardware version
 - Free / used memory
 - Uptime (operating time since the last restart)
- Status
- Update cameras (download firmware)
- Copy serial numbers
- Open cameras in the browser
- Export settings from cameras / back up data
- Import settings into cameras / import backups

5.3 User interface

The following descriptions refer to the user interface display on a desktop PC.

Main Window

The main window is divided into the following areas:

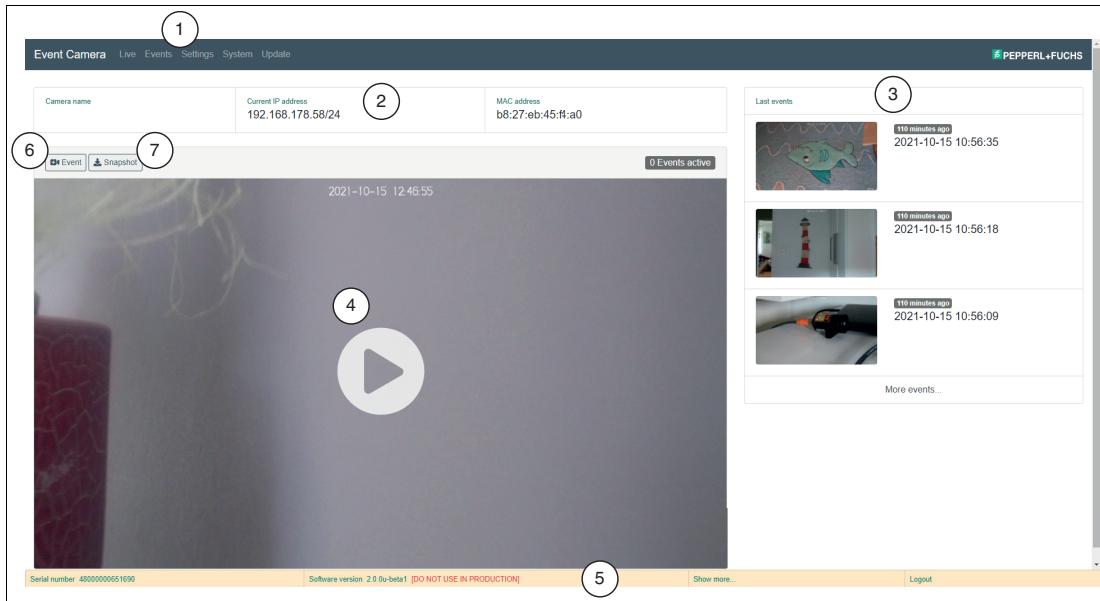


Figure 5.1 Main window

Item	Designation	Function	
1	Main menu	Live	Main window
		Events	The Event view allows access to the recordings
		Settings	Camera settings
		System	System information
		Update	Use this menu to install a software update
2	Camera information	This area contains camera information such as the camera name, current IP address, and MAC address.	
3	Recent events	The right window range displays the most recent recordings.	
4	Live preview	The live preview shows the current camera recording.	
5	Status bar	Displays current status information about the application	
6	Event button	Prompts a recording trigger and starts a recording.	
7	Snapshot download button	Downloads an image with the set live view resolution	

5.3.1 Events

The Event view allows access to the recordings. The recordings are presented via thumbnails of a still image taken at the time of the trigger. The images are spread over several pages, which can be selected via the navigation menu (1) above the thumbnails. Memory usage is displayed next to the navigation menu (2).

The events displayed can be filtered by selecting a date range from the dropdown list (3) in the top left-hand corner.

The thumbnails include three buttons:

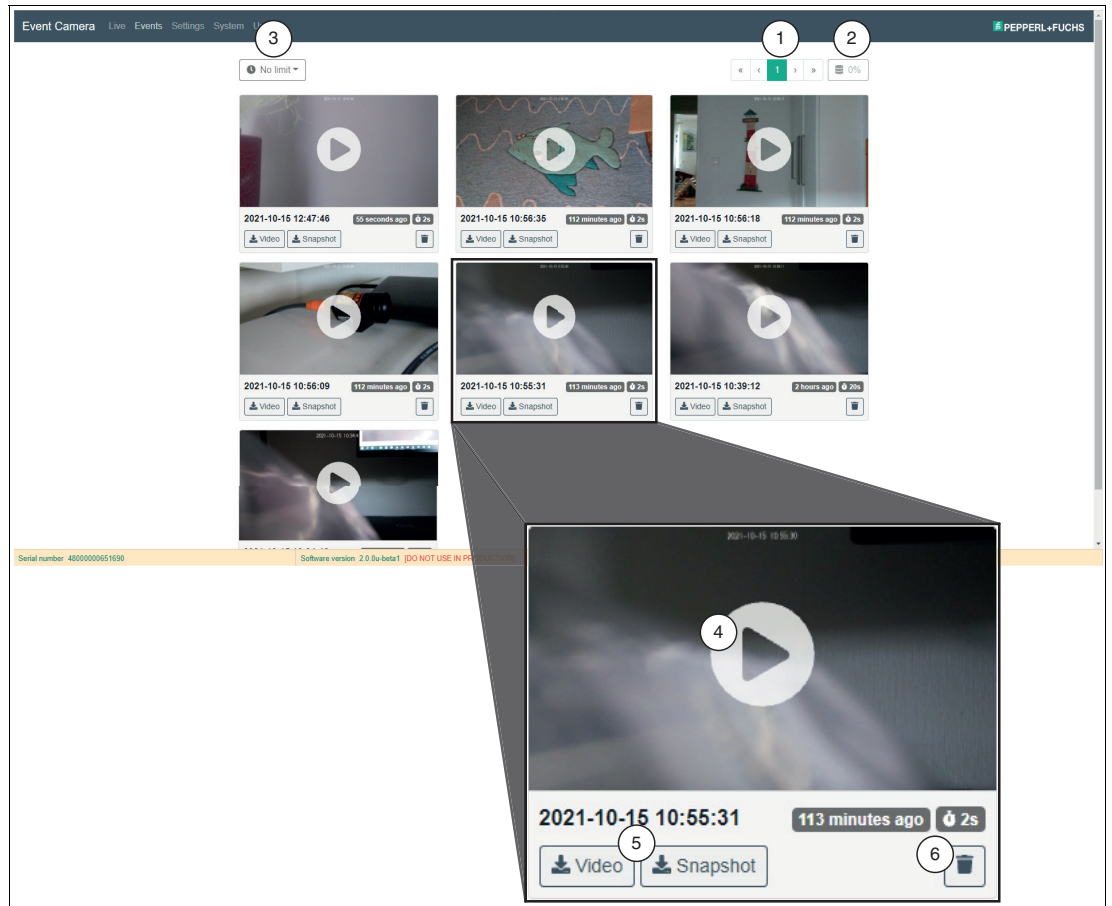


Figure 5.2 Event view

Thumbnails

Item	Buttons	Function
4	Play	Plays the video in the browser and displays the file name.
5	Download video	Starts downloading the video and displays the file size.
	Download snapshot	Downloads an image with the set live view resolution.
6	Delete	Deletes the video following confirmation.

5.3.2 Settings

All camera settings are saved to the SD card in the file `ipcam_settings.json`. If this file does not exist or is invalid due to incorrect manual editing, the default settings are loaded and a message appears at the top of the Settings page.

When settings are saved on the Settings page, the `ipcam_settings.json` file is created or overwritten.

Delete this file from the SD card to reset the camera to factory settings. This is only necessary if the password for the admin user has been forgotten. Otherwise, all settings can be adjusted via the user interface.

By clicking the Backup/Restore button, you can either download the settings file or restore the settings from a previously backed up file. The backup file should not be edited manually.

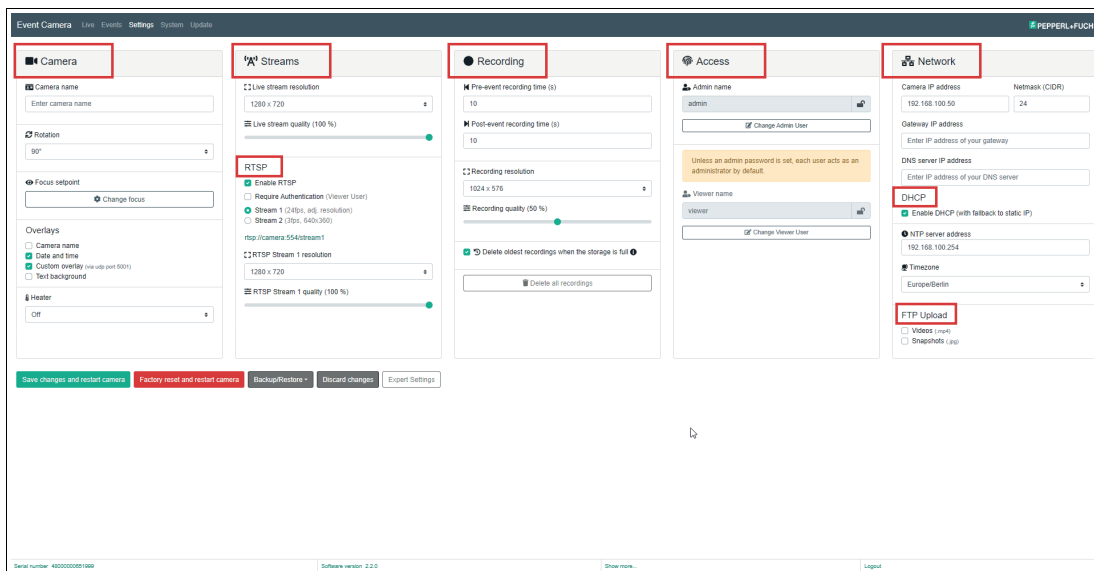


Figure 5.3 Settings

Camera

Setting	Default Setting	Values	Description
Camera name	-	0 ... 255 characters, a ... z, A ... Z, 0 - 9, " - "; no "-" as the first or last character; special characters are not allowed.	The name of the camera, which is freely selectable, is displayed on the start page and can be superimposed on the camera stream.
Rotation	0 °	0 °, 90 °, 180 °, 270 °	Image rotation. The aspect ratio remains the same, which enlarges the image by 90 ° and 270 °.
Focus setpoint	-	Far - Near	The preview is used to set the focus distance.

Setting	Default Setting	Values	Description
Overlays	Camera name, Date and time, Custom overlay, Text background	-	The activated elements appear at the top of the camera image. The overlay is limited to 255 characters and is shortened if necessary. For the overlay, the fields are combined, truncated to 255 characters, and overlaid at the top of the screen. An automatic line break is applied if necessary. A black background for the white overlay text can be white overlay text can be configured in the settings.
Heater	off	off, low, medium, high	Activate and set the heater level



Adjust motorized focus

All cameras from production date 01/2023 are equipped with motorized focus. Starting with software version 2.2.0, the motorized focus can be set via the user interface. The following describes how to set the focus using the user interface.

1. Make sure your camera has motorized focus and software version 2.2.0 or higher.
2. Turn on the camera and open the user interface in your web browser (see chapter 5.1).

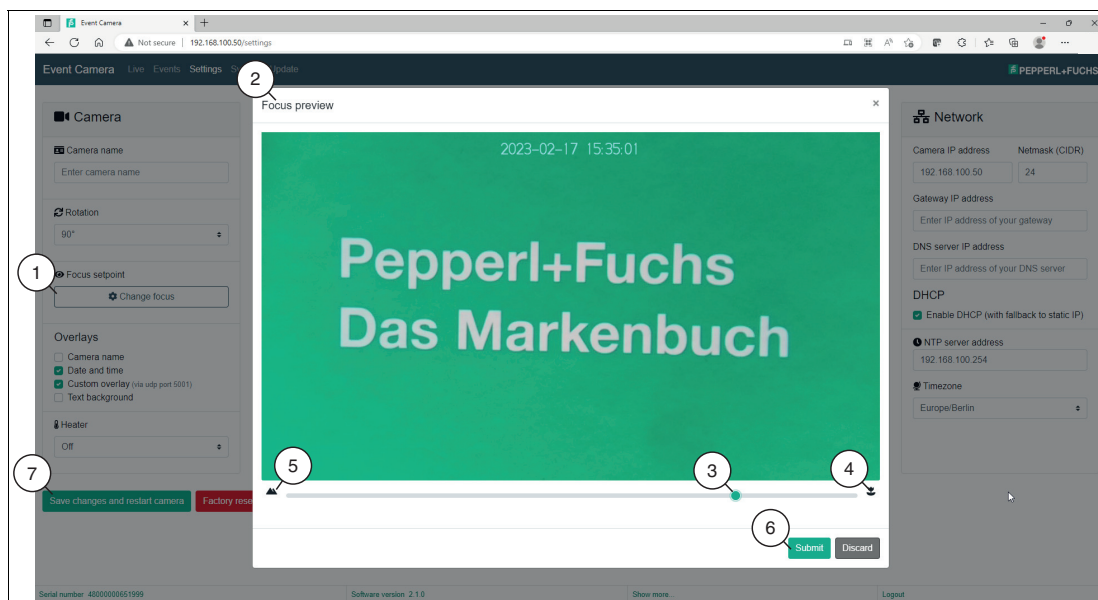


Figure 5.4

3. Find the focus settings under **Camera > Focus setpoint > Change focus** (1).
 ↳ After opening the "Change focus" menu, the "Focus preview" (2) window appears for setting the focus.

4. Locate the focus slider (3) at the bottom of the Preview window. This slider allows you to manually adjust the focus setpoint. Note the icons at the edge of the slider. There is a flower icon (4) for close-ups and a mountain icon (5) for distant shots.
5. Move the slider to the right toward the flower icon to adjust the focus point for close-ups. This movement optimizes focus on nearby objects.
6. Move the slider to the left toward the mountain icon to adjust the focus point for distant shots. This movement optimizes focus on distant objects.
7. Check the on-screen preview as you move the slider to make sure the focus is correct. Adjust the slider until the desired focus is achieved.
8. After setting the desired focus point, confirm your selection with the "Submit" button (6) and close the focus menu. To transfer the settings to the camera, select the "Save changes and restart camera" button (7).

↳ The camera will now reboot to apply the changes. During the reboot, the camera's LEDs will display certain signals to indicate progress (see chapter 2.4).

Streams

Setting	Default Setting	Values	Description
Resolution of the live stream	1280 x 720	1280 x 720, 1024 x 576, 960 x 540, 800 x 450, 640 x 360	Resolution of the live stream
Quality of the live stream	100	0 ... 100 %	Quality of the live stream

RTSP

The RTSP stream can be switched between stream 1 and stream 2.

- Stream 1: up to 1280 x 720 (configurable), 24 fps
- Stream 2: 640 x 360, 3 fps
- RTSP stream can be protected with name/password

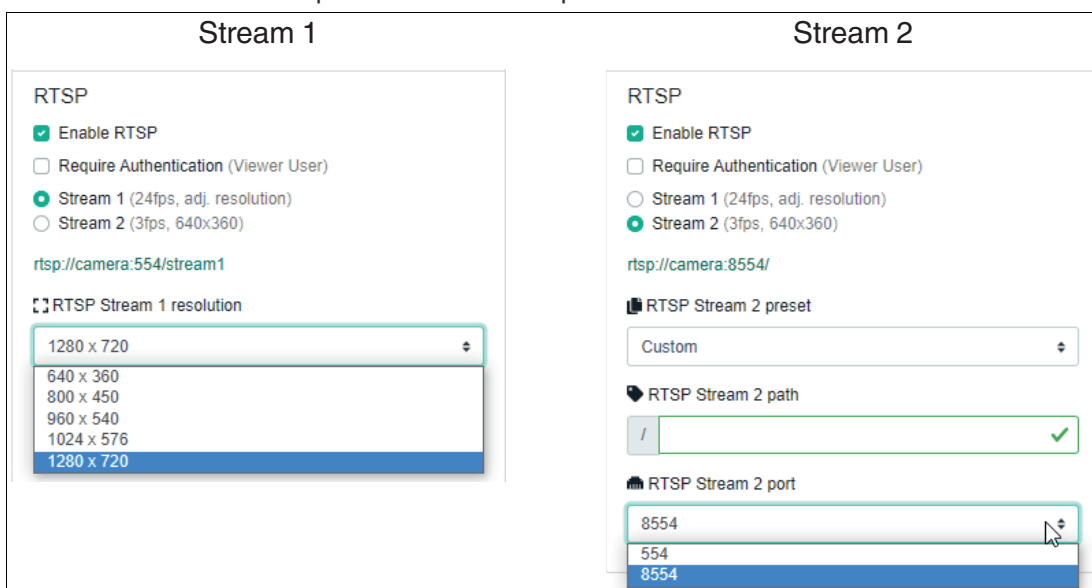


Figure 5.5

Setting	Default Setting	Values	Description
Enable RTSP	active	-	Enable RTSP stream, not recommended when using 1920x1080 recording resolution to avoid live stream frame dropping
Require Authentication	inactive	-	If password protection is enabled, RTSP stream requires viewer user credentials
Stream 1/2	Stream 2	-	Select the active RTSP stream
RTSP Stream 1 resolution	1280 x 720	1280 x 720, 1024 x 576, 960 x 540, 800 x 450, 640 x 360	Resolution of RTSP Stream 1
RTSP Stream 1 quality	50	0 ... 100%	Quality of RTSP Stream 1
RTSP Stream 2 path	<empty>	0 ... 30 characters, a ... z, A ... Z, 0 ... 9	Path segment of the RTSP URI
RTSP Stream 2 port	8554	554, 8554	RTSP port



Note

- Stream 1 and Stream 2 cannot be active at the same time, there is not enough computing power.
- For Stream 2, the path and port can be changed for backward compatibility.
- If multiple clients need to access an RTSP stream at the same time, it is recommended to distribute the stream through an RTSP proxy and only allow this proxy to access the camera.
- The server ports for RTP and RTCP have changed to 8000-8001

Recording

Setting	Default Setting	Values	Description
Pre-event recording time (s)	10	1 ... 60	Recording before the trigger
Post-event recording time (s)	10	1 ... 60	Recording time after the trigger
Recording stream resolution	640 x 360	1920 x 1080, 1280 x 720, 1024 x 576, 960 x 540, 800 x 450, 640 x 360	Recording stream resolution
Recording stream quality	50	0 – 100 %	Recording stream quality
Delete oldest when memory is full	active	-	Deletes the oldest videos, if necessary.

Access

Setting	Default Setting	Values	Description
Admin user name	admin	1 ... 255 characters	User name for admin user
Admin password	<empty>	1 ... 50 characters	Password for the admin user. Password protection can be disabled.
Viewer user name	viewer	1 ... 255 characters	User name for viewer user
Viewer password	<empty>	1 ... 50 characters	Password for the viewer user. Password protection can be disabled.

Network

Setting	Default Setting	Values	Description
IP address	192.168.100.50	IPv4 address	The IPv4 address of the camera. If DHCP is enabled, it is used as the fallback address.
Netmask (CIDR)	24	0 – 30	Netmask in CIDR notation
Gateway IP address	<empty>	IPv4 address, optional	The gateway is required if the NTP server is on a different subnet.
DNS server IP address	<empty>	IPv4 address, optional	DNS server, currently not required
DHCP	enabled	-	DHCP enabled. If a DHCP server is not available, the camera uses the set IP address as the static address.
NTP server address	<empty>	IPv4 address, optional	NTP server. Required to set the time on the camera.
Time zone	Europe/Berlin	-	Time zone of the camera for local time in the overlay and recordings.

FTP Upload

Automatically upload snapshots (.jpg) and/or videos (.mp4) of events to an FTP server. Failed uploads are not repeated. This function is available from firmware 2.2.0.

FTP Upload

Videos (.mp4)
 Snapshots (.jpg)

FTP server IP/Hostname Port

User Password

FTP path

Figure 5.6

Setting	Default Setting	Values	Description
Videos	-	-	Upload videos to FTP server
Snapshots	-	-	Upload event snapshots to FTP server
FTP Server IP / Hostname	<empty>	0 ... 255 characters	-
Port	21	0 ... 65536	-
User	<empty>	0 ... 255 characters	-
Password	<empty>	0 ... 255 characters	-
FTP path	<empty>	0 ... 255 characters	Optional Path



Note

- At the end of a recording, the image and/or video will be uploaded, depending on the setting.
- If the upload fails, e.g. because the FTP server is down, no new attempt will be made. If you want more control here, you should use a manual download via HTTP API instead of the FTP upload, ideally in combination with HTTP triggers.

5.3.3

Expert Settings



Note

Expert settings can limit the functionality of the camera in certain areas. Use these settings only if the limitations are known and acceptable in your application.

The expert settings are available as of firmware 2.2.0.

Expert Settings

⚠ Expert settings can affect the camera's function in certain aspects. Use them only if the limitations are known and acceptable.

Manual Exposure Control ▲

Shutter: 1/25 s
ISO (Gain): auto

Extended Recording Time ▲

Pre-event recording time (s): 120
Post-event recording time (s): 120

Extended File Size Limit ▲

Size limit: 2 GB (Extended)

Storage quota

Storage quota unnamed events (100 %):

Storage quota named events (100 %):


Serial number: 400000051009 Software version: 2.2.0

Figure 5.7 Expert Settings

Setting	Default Setting	Values	Description
Manual Exposure Controls	inactive	-	Use a fixed shutter and fixed or auto gain control. Limit or disable automatic adjustment to changing light conditions.
Shutter	1/25 s	1/25, [...], 1/8000	Shorter shutter time decreases motion blur, but also reduces image brightness.
ISO (Gain)	auto	auto, 50, [...], 3200	Higher ISO increases image brightness, but also noise. Auto can only use range 100 ... 800.
Extended Recording Time	inactive	-	Overwrites Pre- and Post-Time settings
Pre-event recording time [s]	120	1 ... 900	Pre-event buffer is limited to 150MB. Video is shorter than requested if buffer limit applies.
Post-event recording time [s]	120	1 ... 900	Video file size is limited to 500MB. Recording will stop when this limit is reached.
Extend File Size Limit	inactive	-	Extends the video file size limit to 2 GB. Processing of large files may slow down Camera and Web Interface.
Storage quota for named and unnamed events	-	-	Can be useful when naming events using the API for triggering. Limits the used storage for each event type to the selected percentage of the whole storage to ensure free space for the others.

Manual Exposure Controls

When this function is selected, automatic exposure control is disabled. This function is not suitable for environments with changing light conditions, such as daylight.

Manual Exposure Control 

Shutter: 1/25 s ISO (Gain): auto

Figure 5.8

- Manual selection of exposure time

- Manual selection of sensitivity / gain (ISO / Gain)
- Automatic ISO selection also possible with fixed shutter time
- The automatic ISO setting only works in the range 100 ... 800



Note

To capture moving objects without motion blur, the exposure time can be fixed at a correspondingly short value. Stronger illumination may be required.

At speeds above approx. 1 m/s, the image is significantly distorted by the rolling shutter effect. It must be checked on an application-specific basis whether this is a problem.

Extended Recording Time

The recorded files can be very large. The Pre-event recording time is limited to 150 MB, the actual Pre-event recording time will be shorter when this size is reached. The total file size is limited to 500 MB, the actual Post-event recording time will be shorter when this file size is reached.

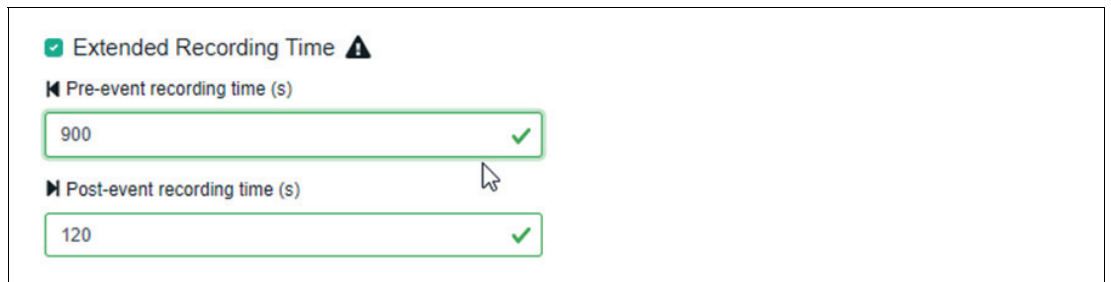


Figure 5.9

- Default setting for pre- and post-trigger time is max. 60 seconds
- Pre- and Post-trigger can be extended up to 900 seconds with the expert setting.
- The pre-trigger has a maximum file size of 150 MB. The video is correspondingly shorter if the file size is not enough for the required time.
- The total size of the video is limited to 500 MB. Recording ends when this limit is reached.



Note

The video size depends on the following factors:

- Image content (static / dynamic) due to video compression
- Brightness change
- Resolution and quality setting (changeable in the user interface)
- —> Rough values: 0.1 ... 1.5 MB/s



Example

The data rate can be set according to the requirement:

- Recording: e.g. 2 min
- File size: e.g. 60 MB
- —> 60 MB / 120 s = 0.5 MB/s

Extend File Size Limit

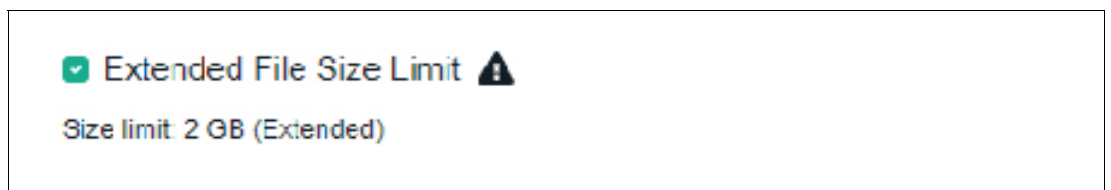


Figure 5.10



Note

Large video files (>500 MB) can slow down the camera and interface. You may experience lost triggers, jumps in the video, and similar performance issues.

- Large video files may load very slowly or not at all in the browser.
- Aborted loading processes can block one of the max. 8 HTTP connections to the camera for several minutes → User interface will not load if all connections are blocked → wait
- Each customer needs to check if this setting is unproblematic, absolutely necessary or not.

5.3.4

System

This page displays system information:

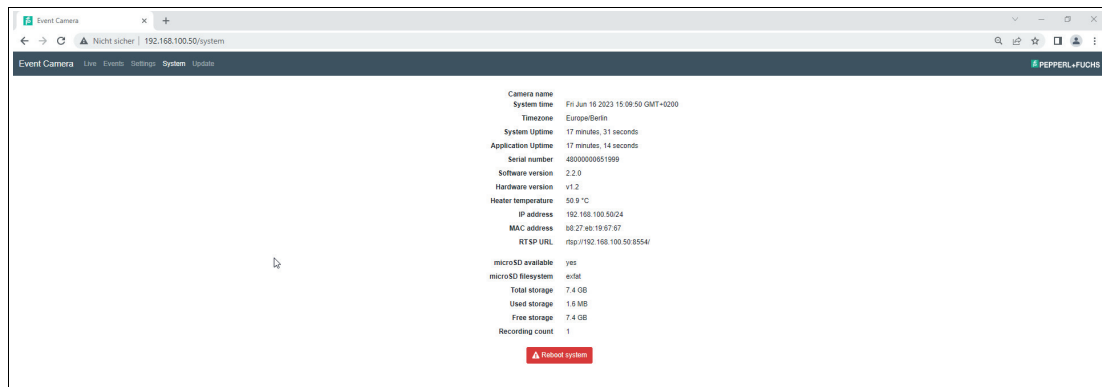


Figure 5.11 System

- Camera name
- System time
- Time zone
- System uptime
- Application uptime
- Serial number
- Software version
- Hardware version
- Heater temperature
- IP address
- MAC address
- RTSP URL
- microSD available
- microSD file system
- Total storage
- Used storage
- Free storage
- Recording count

5.3.5

Update

This page is used to install a software update. Select the update file and start the update using the "Update software" button.



Note

Do not switch off the camera during the update.

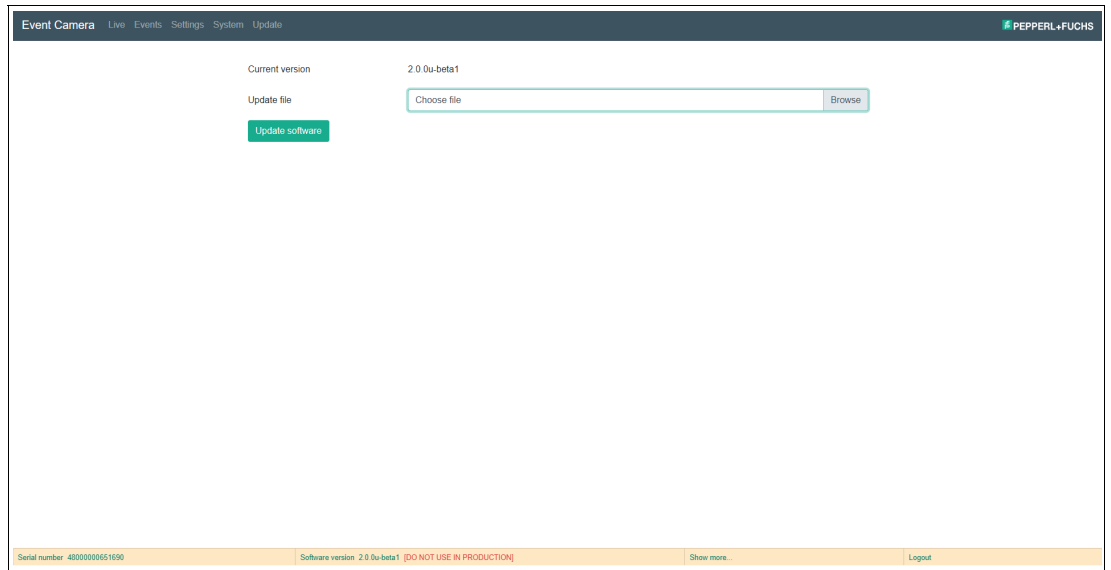


Figure 5.12 Update

First, the update file is uploaded to the camera. The upload speed depends on the network connection between the user's computer and the camera. When the upload is complete, the update file is checked and the update process begins. This may take a few minutes. Do not cancel the process or interrupt the power supply to the camera while the update is taking place. The camera restarts once the update is complete.



Note

Update fault

If something has gone wrong and the camera cannot start the new software version following a restart, it will automatically revert to a backup copy of the old software, which is available again after a restart.

5.3.6

REST API Interface

REST API allows an individual user interface to be programmed and for the camera to be integrated directly into IT systems. The REST API can read out information and issue commands (e.g., a trigger signal).

`http://<camera-ip>/api/ui/` takes you to the API description / command list. Individual commands can be tested here.

The screenshot displays a web interface with three main sections: **events**, **sse**, and **streams**. Each section contains one or more HTTP endpoint cards. The **events** section has five cards: a red **DELETE** card for `/events` (Delete all events), a blue **GET** card for `/events` (List all events descending by triggeredAt property), a green **POST** card for `/events` (Create event), a red **DELETE** card for `/events/{fileName}` (Delete event), and a blue **GET** card for `/events/{fileName}` (Get event). The **sse** section has one blue **GET** card for `/sse/recordings` (Get recording info). The **streams** section has one blue **GET** card for `/streams` (Get video streams).

- Customizable user interface.
- Transfer status indicators to the PLC via HTTP commands.
- Automated file download via HTTP command
- Direct use of the camera via the controller
- Independent of a platform and programming language because it is based on HTTP. Device for data retrieval only needs to support the HTTP protocol.

6 Maintenance and Repair

6.1 Servicing



Danger!

Danger to life due to electrical current!

Contact with live parts causes immediate danger to life.

- Allow only qualified electricians to carry out work on the electrical installation.
 - Switch off the power supply before carrying out servicing, cleaning, and repairs, and prevent the supply from being switched on again.
 - Keep the live parts free from moisture.
-

The device 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 liquids.
- Do not use abrasive agents to clean the surface of the device.
- Use a cotton or paper cloth moistened (not soaked) with water or isopropyl alcohol.
- Remove any residual alcohol using a cotton or paper cloth moistened (not soaked) with distilled water.
- Wipe the device surfaces dry using a lint-free cloth.

6.2 Repair

The device must not be repaired, changed, or manipulated. In case of failure, always replace the device with an original device.

7 Troubleshooting

7.1 What to Do in the Case of a Fault

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

Checklist

Fault	Cause	Fault Repair
"Power" 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 necessary.
	Wiring fault in the splitter or switch cabinet, cable break	Check the wiring carefully and repair any faults with the wiring. Check the cables to ensure that they are functioning properly.
Control panel receiving no measurement data	Connection cable not connected	Connect the connection cable.
	Incorrect connection cable used	Use the appropriate connection cable only.
Recording fault, blue LED flashes several times	<ul style="list-style-type: none"> • Memory card is full • Memory card is missing • Memory card is faulty 	Change or replace memory card
Event not recorded	Incorrect trigger setting	Change the trigger setting, see chapter 4.2.
Update fault	Fault during update	If something has gone wrong and the camera cannot start the new software version following a restart, it will automatically revert to a backup copy of the old software, which is available again after a restart.
Camera switches off	Camera overheats	To avoid impermissibly high temperatures in the event of a control system failing due to software, a software-independent excess temperature shut-off function for the heater unit is integrated into the camera (shut-off value: $103^{\circ}\text{C} \pm 2.5^{\circ}\text{C}$). The shut-off value refers to the position of the excess temperature sensor in the area around the heater; other areas may be even warmer. See chapter 2.7

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- Photoelectric Sensors
- Industrial Vision
- Ultrasonic Sensors
- Rotary Encoders
- Positioning Systems
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