

Industrial Event Camera

VOC12M-F356-B12-V1D-
CR2P

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

You can find the serial number by scanning the QR code on the device.

The documentation comprises the following parts:

- This document
- Datasheet

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.



Tip

This symbol brings an useful tip to your attention.



Example

This symbol provides an example of the issue described.



Action

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

2 Product Specifications

2.1 Design and Function

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

The camera supports both live streaming and internal event-based recording of videos and images. Recording can be triggered in various ways, such as via a digital input (hardware trigger) or via the network interface (software trigger).

A built-in passive NFC tag allows wireless reading of device-specific information, like the serial number and software version—especially useful for maintenance, inventory management, and support cases.

The camera is securely mounted using a base, allowing stable and flexible integration into existing infrastructures.

Layout

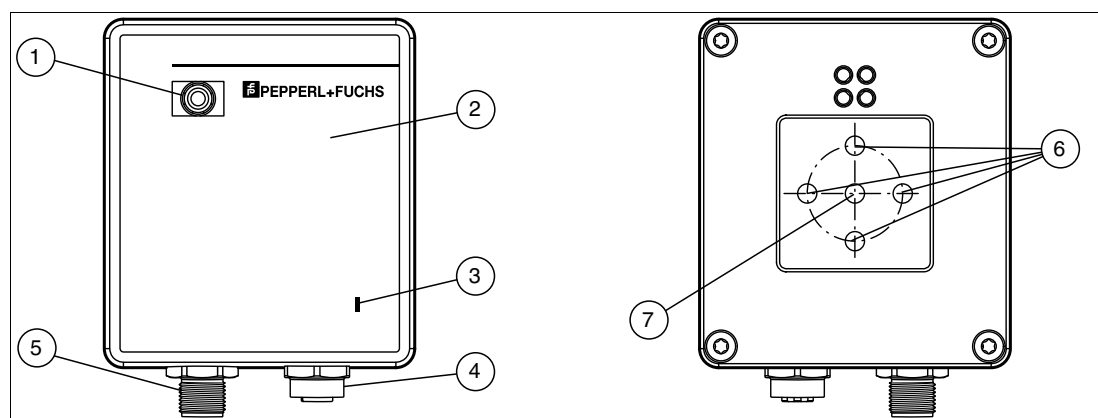


Figure 2.1 Overview

- 1 Camera lens
- 2 NFC tag antenna position
- 3 Power/status LED
- 4 Ethernet port
- 5 Power supply. Digital input and digital output
- 6 Mounting bracket with four M6 internal threads
- 7 $\frac{1}{4}$ " - 20 UNC thread for mounting on standard tripods

Special Product Features

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

- A live stream and event-triggered image or video capture up to 900 seconds before and after the trigger signal allow simple remote diagnostics and automatic documentation. Users can see what happened immediately before and after a particular event. This is especially useful in applications where unexpected events need to be recorded for troubleshooting or documentation.

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.

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 that video data can be transferred across the network. This allows the camera live view to be displayed on standard HMI displays using RTSP.

Application Examples

Recording Storage and Retrieval Operations

If the storage process fails, the camera captures video footage of the situation before and after the event.



Figure 2.2 Storage and retrieval operations

- Visual access to hard-to-reach areas in material flow systems
- Recording storage and retrieval operations
- Rapid error analysis using event-triggered video clips
- Recording for documentation or long-term process optimization

Monitoring Palletizing And Depalletizing Processes

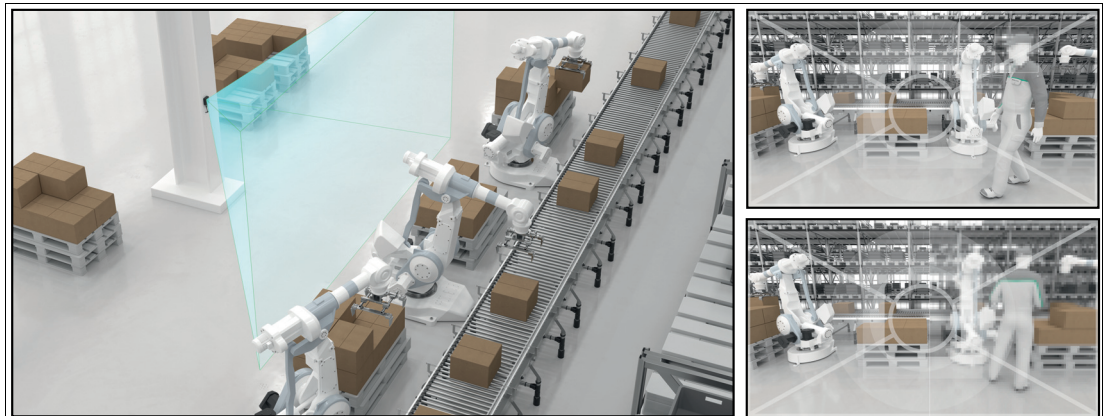


Figure 2.3 Palletizing and depalletizing processes

- Continuous recording of critical process steps during palletizing, such as movements and gripping actions
- Objective analysis of mechanical and control errors
- Detection of material handling issues such as faulty stacking

Monitoring Production Processes

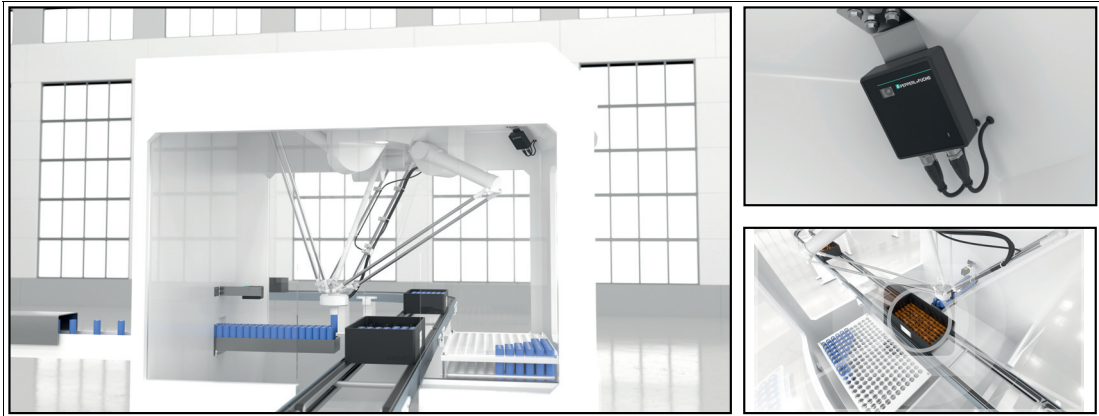


Figure 2.4 Production processes

- Recording and analysis of key production steps, such as battery module assembly
- Targeted and simple remote diagnostics and documentation

2.2 Dimensions

The camera housing has the following dimensions.

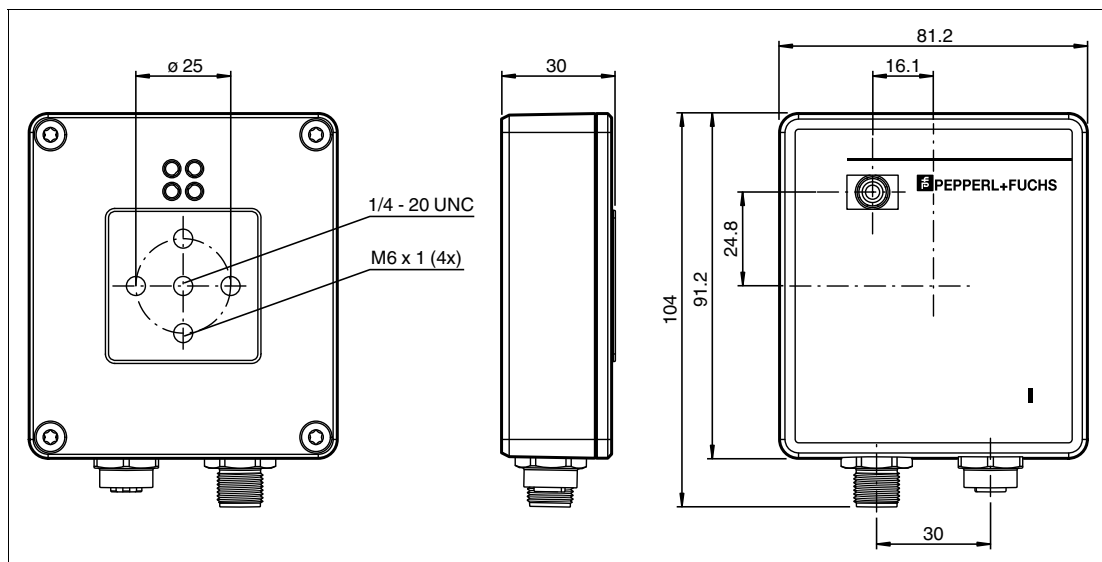


Figure 2.5 Housing dimensions

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

Distance	Horizontal field of view	Vertical field of view
0.5 m	1.235 m	0.662 m
1.0 m	2.470 m	1.324 m
2.5 m	6.174 m	3.309 m
5.0 m	12.349 m	6.619 m

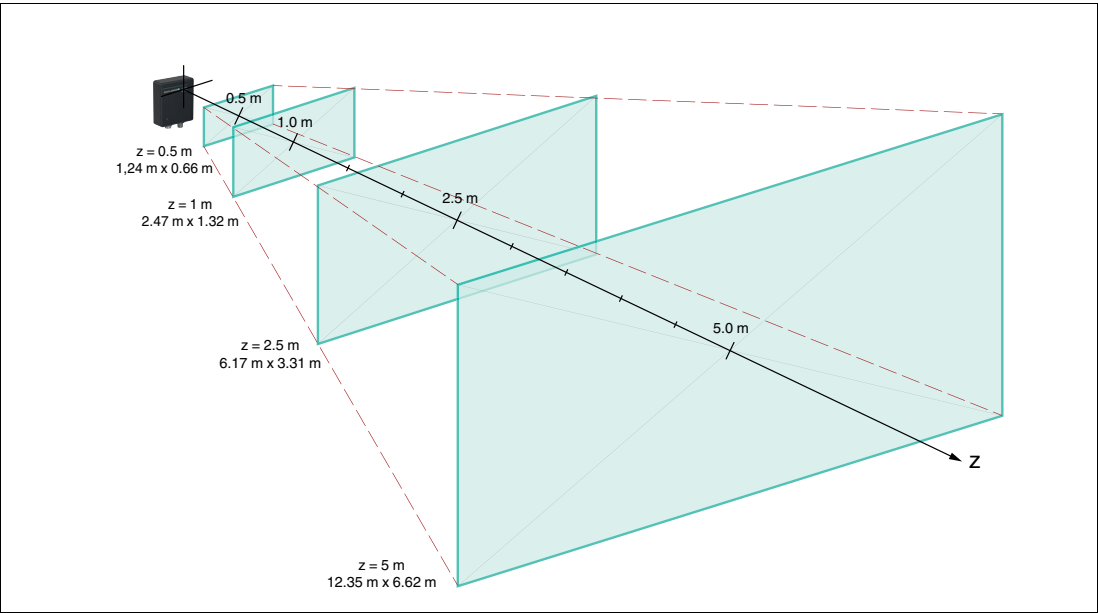


Figure 2.6

2.4 LED Indicator

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

Description of the LEDs

Color	State	Meaning
-	Off	Camera has no power
Green	Lit	Camera is in operation
Yellow	Lit	Camera is starting up
Blue	Lit	Recording in progress
Cyan	Lit	"Do not record mode" is active
Blue	Flashing	Trigger ignored
Red/pink		Used in reset procedure

2.5 Electrical Connection

The following connections are located on the sensor.

Connection assignment

Power supply, digital input, and output connections			
M12 plug, A-coded, 4-pin			
	Pin	Signal	Function
	1	UB+	Supply voltage
	2	IN	Digital input
	3	UB-	Ground
	4	OUT	Digital output

Ethernet interface 10/100 Mbit			
M12 socket, D-coded, 4-pin			
	Pin	Signal	Function
	1	TX+	Send data +
	2	RX+	Receive data +
	3	TX-	Send data -
	4	RX-	Receive data -
	Housing	Shield	Shielding

Digital Input and Output

Digital input

The function of the digital input can be selected via the settings:

- Off
- Trigger event (rising edge, pulse length min. 100 ms)
- Do not record mode

Digital output

The function of the digital output can be selected via the settings.

- Off
- Recording Indicator

In "Recording Indicator" mode, the output is active as long as at least one recording is in progress. This corresponds to the function of the blue LED. The output can be used to control lighting, for example.



Warning!

Using the digital output

The digital output must **not** be used for safety-relevant functions. If the digital output is connected, a thorough risk evaluation and any necessary protective measures are required to ensure that no personal or property damage can occur in the event of a malfunction.

2.6 Resetting the Camera Settings

The camera settings can be reset to the factory default settings via the web interface. If you cannot access the web interface, for example, because you do not know the login credentials or the IP address, you can reset the camera using a magnet.



Resetting to Factory Default Settings with a Magnet

1. Restart the camera.
2. Hold the magnet near the "Pepperl+Fuchs" label on the front of the camera.
↳ The LED lights up pink.
3. Wait until the LED lights up red (after about 3 seconds).
4. Briefly remove the magnet (for no more than 3 seconds) and hold it in the same position again.
↳ The LED lights up pink again.
5. Wait again for the LED to turn red.
6. Remove the magnet.
↳ The LED starts to flash red and pink alternately. The reset was successful.



Note

Failed Reset and Retry

If the procedure is not executed correctly, the process is aborted and the LED changes back to green. You can try again by restarting the camera. The magnet must then be held up again within 60 seconds.

2.7 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. Insert the 4-pin M12 plug into the socket on the side of the camera. Use a network cable (minimum Cat 5e cable, maximum length 100 m).
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 adjust them accordingly. The images in this description were created using Windows 10.

1. Click on the Windows "**Start**" button.
2. Select "**Control Panel > Network and Sharing Center**".
3. In the left part of the window, 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 "**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 then **Cancel** in the next dialog.
↳ This completes the network configuration, and 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, 433	TCP	Web application
5001	UDP	Text Overlay
5002	UDP	Event trigger
8554, 8322	TCP and UDP	RTSP(S) stream
53100	UDP	Management tool
8189	UDP	WebRTC stream

WebRTC Stream When Using NAT

If the web interface is not called up via the local IP address of the camera displayed on the system page (e.g., when using NAT), the IP address actually used must be stored in the settings as an additional host. Otherwise the WebRTC stream will not work.

Furthermore, it must be ensured that port 8189 is forwarded to the camera for WebRTC.

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 company network, internet, or cloud services;
 - The device may only communicate with a higher-level controller, or with a defined, trusted circle of network participants

4 Functions

Live Streaming

The camera provides multiple live streams accessible via various network protocols.

Event-Based Recording

The camera has an event recording function that automatically saves video data to the internal memory when predefined triggers occur.

A continuously running circular buffer allows recording to begin before the event takes place.

Web Interface

The built-in web interface provides access to live streams, saved recordings, and all device settings and configuration options.

HTTP(S) API

All camera functions are also available via an HTTP(S) API. This allows the system to be flexibly integrated into existing applications and infrastructures.

Real-Time Clock (RTC)

The camera has a built-in real-time clock that displays the current time and retains it for up to a week in the event of a power outage.

4.1 Live Streaming

The camera provides two live streams in H.264 format. Both streams can be accessed via the WebRTC and RTSP protocols. The resolution, frame rate, and quality can be adjusted to manage the file size and bandwidth.

main

- Used for recordings
- Embedded in the web interface
- RTSP: `rtsp://<ip>:8554/main`
- WebRTC: `http://<ip>/main`

sub

- Resolution and frame rate lower than or equal to main
- RTSP: `rtsp://<ip>:8554/sub`
- WebRTC: `http://<ip>/sub`

Maximum Video Data Rate in Mb/s

Resolution [px]	Quality 0 %	Quality 100 %
1920 x 1080	0.5	1.0
1280 x 720	0.25	1.0
800 x 450	0.13	0.77
384 x 216	0.07	0.41

4.2

Image Settings

**Note****Impact of features on performance**

The following features require a high level of computing power. If several of these features are activated simultaneously at high image resolution and frame rate, the frame rate can drop. This will be evident as the image becomes less fluid.

- Text overlay (minor impact)
- Masking areas (minor impact)
- Vision (high impact)
- Face masking (high impact, especially with pixilation)
- Code reader (high impact)
- Person detection (high impact)

If the frame rate drops visibly when using these features, the following actions may help:

- Deactivating individual features, especially features with a high impact
- Decreasing the resolution of the main and/or sub stream
- Reducing the frame rate of the main stream
- Using no pixelation when masking faces

Text Overlay

A configurable text overlay can be displayed at the top of the image. This is visible in all streams and recordings. The content can be freely configured:

- Date + time
- Device name
- Custom text

The custom text can be set via the API or by sending a UDP packet to port 5001. This feature can be used, for example, to display runtime information from the monitored system in the camera image. A black background can be enabled to improve readability regardless of the image content.

Manual Exposure Adjustment

You can adjust the exposure time and sensitivity manually in areas where automatic exposure is insufficient.

- **Exposure time:** Shorter exposure times reduce motion blur, but make the image darker.
- **Sensitivity:** Higher values brighten the image, but increase noise.

For manual exposure, make the exposure time as short as necessary but as long as possible to keep motion blur within acceptable limits. The faster the objects move, the shorter the exposure time needs to be. Increase the sensitivity until the image is bright enough. However, this will increase image noise. If too much noise makes the image unusable, additional lighting is required.

Zoom

The camera has a digitally adjustable zoom in the range of 1x to 4x.

The enlarged image section can be moved within the image field to determine the desired recording area.

Masking Areas

If certain image areas should be hidden, up to five rectangular masking areas can be defined.

These areas are shown in black. The position and size of each area can be individually adjusted.

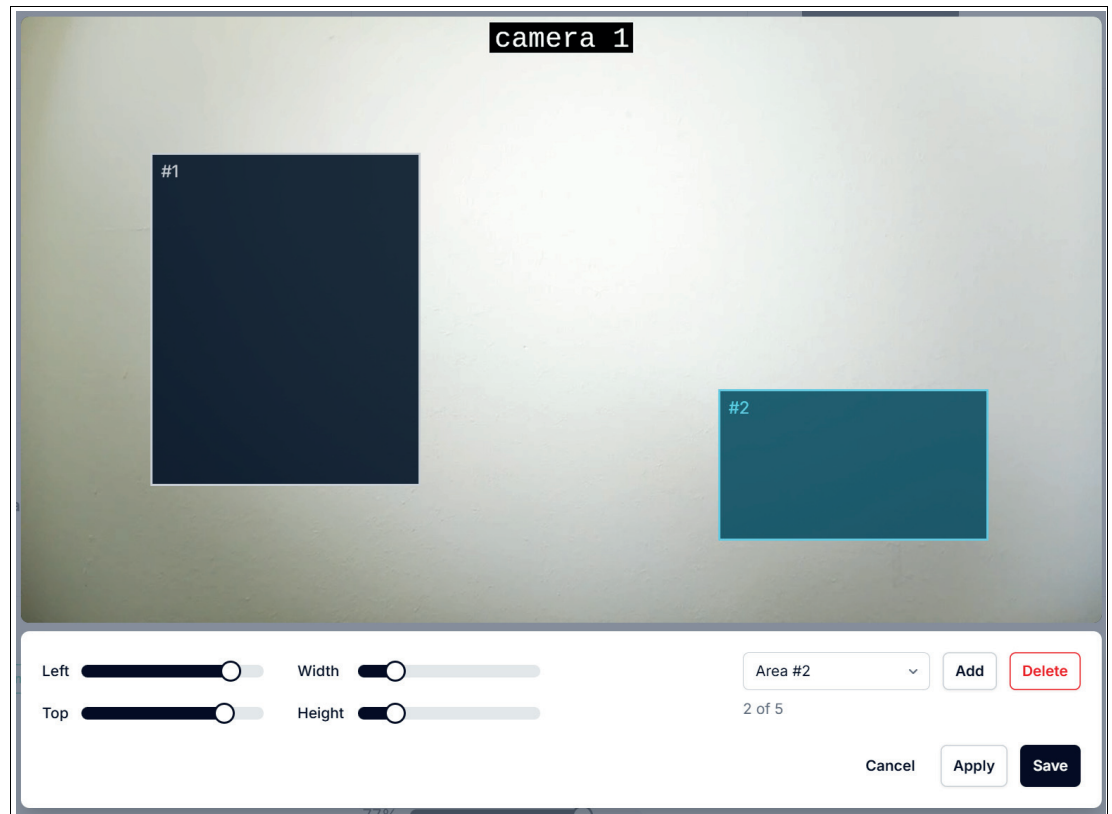


Figure 4.1 Masking areas

Face masking

With AI-based face masking, faces can be made unrecognizable. Faces can be hidden or pixelated (requires more computing power).

Up to 10 faces can be made unrecognizable.

The **Confidence threshold** can be used to set the level of detection reliability at which a face is made unrecognizable. The lower the value, the sooner a face will be detected as a face. At the same time, the probability increases that other objects will be detected as faces.

The accuracy of face detection depends on the technology. To reliably make faces unrecognizable, the faces should be:

- fully visible
- as big as possible
- visible from the front
- well lit

Code Reader

The code reader can detect and read QR codes. As an option, detected QR codes can be labeled with an overlay in the image. The content of the most recently read QR code can be called up via the API along with the time stamp.

The accuracy of the code reader depends on the technology. To reliably read codes, the codes should be:

- fully visible
- as big as possible
- undistorted
- well lit

4.3 Event Recording

The camera supports various trigger sources for capturing events. A circular buffer can be used to start a recording before the actual trigger event occurs. A still image is also saved separately at the moment the trigger is activated.

Trigger Sources

- **UI:** Web interface
- **API:** HTTP API
- **UDP:** UDP packet (TRIG on port 5002)
- **DI:** Digital input (rising edge)
- **VISION:** see "Vision Trigger" section below
- **ACC:** see "Acceleration Trigger" section below

The UDP, DI, VISION, and ACC trigger sources can be disabled in the settings.

For the UI, UDP, DI, VISION, and ACC trigger sources, the recordings are based on the pre-trigger and post-trigger times defined in the settings.

The HTTP API trigger offers the most configuration options. You can assign an event name and set custom pre-trigger and post-trigger times, independently of the global settings.

The HTTP API also supports recordings with unlimited post-trigger time and includes functions for listing and stopping active recordings.

Any trigger that occurs within 2 seconds of a previous one is ignored.

Note

Trigger Error

A trigger error is indicated by the LED repeatedly flashing blue.

Possible reasons for this include:

- The previous recording is still copying video from the circular buffer (duration depends on the pre-trigger time, up to 10 seconds)
- The maximum number of simultaneous recordings (3) has been reached
- The memory is full and automatic deletion is disabled



Vision Trigger

The system has two optional vision triggers that analyze the video stream for different changes:

- Motion detection
- Detection of changes in brightness

For both versions, the **detection area** can be limited to a rectangular section of the overall image. The **sensitivity** can also be individually adjusted.

An **overlay** can be optionally enabled that visualizes detected movements or changes in brightness in the image.

Sensitivity Adjustment

- For optimal adjustment of the sensitivity, it is recommended to enable the overlay and align the camera to the event that should activate the trigger. During recording, the sensitivity can be gradually adjusted until the desired response is achieved.

Behavior with Multiple Triggering

- If a vision trigger is enabled again during a recording that was started by the same trigger, no new recording starts.
To ensure that all relevant events are recorded, the pre-trigger and post-trigger times should be adjusted according to the expected trigger frequency.

Motion Detection

Motion detection analyzes the video stream for dynamic image content against a static background and measures its expansion.

Higher sensitivity means that even slight and minor image changes can be detected.

A motion overlay can be enabled for better visualization. This marks all detected objects with a red border.

The overlay can be displayed independently of the trigger to monitor or test motion detection. The trigger by motion can be enabled or disabled depending on the desired system response.

As soon as the motion trigger is enabled and motion is detected, the system automatically starts recording.

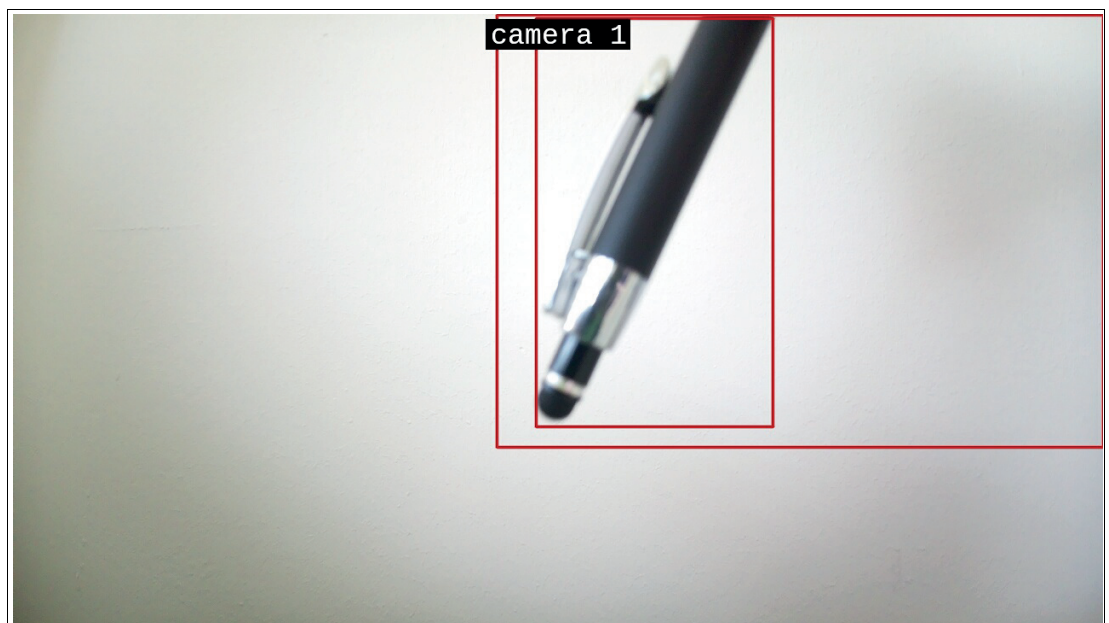


Figure 4.2 Motion Detection

Detection of Changes in Brightness

The detection of changes in brightness responds to rapid changes in the average image brightness.

As the sensitivity increases, the difference in brightness required to activate a trigger decreases.

An overlay for changes in brightness can be enabled for visualization. This shows the detected changes in brightness in a bar chart. The trigger threshold value determined by the sensitivity is marked in the diagram.

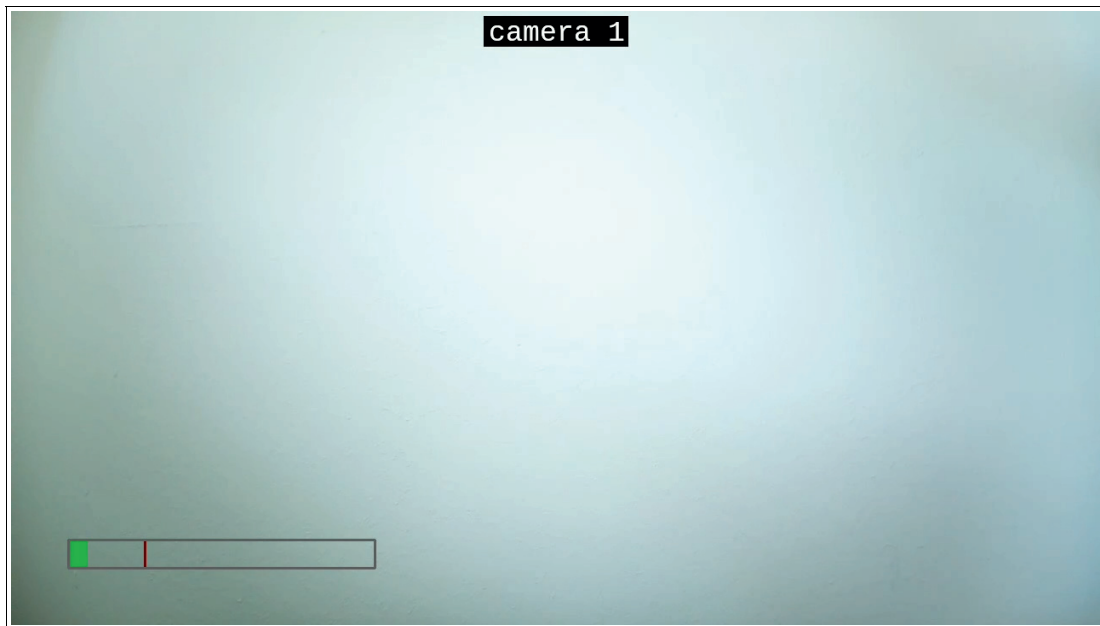


Figure 4.3 Detection of Changes in Brightness

Acceleration Trigger

The camera is equipped with an acceleration sensor, which enables vibrations to be detected as trigger events.

The trigger threshold value can be individually adjusted. In addition, an overlay can be enabled that graphically displays the measured acceleration over time.

The camera records the acceleration with a sampling rate of 50 Hz in the range of 0 to 24 g on three axes. A moving RMS value with a window length of 1 s is calculated from the high-pass-filtered acceleration vector value. This value is displayed in the visualization and continuously compared with the set threshold value.



Figure 4.4 Acceleration Trigger

Person Detection

AI-based person detection can trigger when there are people in the image. Optionally, people can be marked with an overlay.

Up to three people can be detected at the same time.

The confidence threshold can be used to set the detection reliability above which a person is detected. The detection reliability is also shown in the overlay as a label. The lower the value, the sooner a person will be detected as a person. At the same time, the probability increases that other objects will be detected as people.

The accuracy of person detection depends on the technology. To reliably detect people, the people should be:

- fully visible
- as big as possible
- well lit
- stand out from the background

Options

- Video length before trigger
- Video length after trigger
- Recording name

Recording Mode

Mode	Description
Videos and Snapshots	For each event, a video and a still image from the main stream are recorded. The resolution and frame rate match the settings of the main stream. The still image is captured at the moment of the trigger and serves as a preview in the event overview.
Snapshots	The same as with Videos and Snapshots, but without saving a video.
High-Resolution Snapshots	In this mode, only a still image is captured at the moment of the trigger, but with a resolution of 4608×2592 px. The main stream is not available. The sub-stream is used instead via its WebRTC and RTSP addresses. If a higher frame rate is set for the sub-stream, it is limited to 12 fps in this mode.

"Do not record" Mode

In "Do not record" mode, no image data is saved on the camera. All triggers are ignored and the circular buffer is deleted.

This mode can be permanently enabled in the settings or dynamically controlled via the digital input, if so configured.

FTP Upload

Once a recording is completed, you can optionally upload it to an FTP server. You can specify separately whether to upload the video, the snapshot, or both.

4.4 Linking to Other Cameras

A camera can be linked to other cameras. This enables the following functions:

- Transferring triggers to linked cameras
- Displaying the video streams of linked cameras on the Streams page

Up to ten cameras can be linked. The following parameters are available for each linked camera:

Field	Value Range	Description
Label	Free text	Designation of the camera for identification.
IP Address	IP address	IP address of the linked camera.
Trigger	On/off	Transfers trigger signals to the linked camera. The test button can be used to check whether the camera can be reached. (Does not activate a trigger.)
Stream	On/off	Displays the video stream of the linked camera. Stream display can be enabled for a maximum of five linked cameras. The test button can be used to check whether the camera can be reached.

3 of 10 devices

Add device

Label	Trigger	Stream	
Kamera B 192.168.10.71	☒	☐	Edit
Kamera C 192.168.10.72	☐	☒	Edit
Kamera D 192.168.10.73	☒	☒	Edit

Figure 4.5



Note

If the Streams page is called up via HTTPS, a valid certificate classified as trustworthy by the used web browser must be stored for all participating cameras.

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Access Protection and Authorization

If access protection is enabled, other cameras must be authorized to send triggers or display video streams.

To do this, they must be entered as an "Authorized Device." Up to ten cameras can be authorized.

Field	Value Range	Description
Label	Free text	Designation of the authorized camera for identification.
IP Address	IP Address	IP address of the authorized camera.
Trigger	On/off	Specifies whether the authorized camera is allowed to send triggers.
Stream	On/off	Specifies whether the authorized camera can display the stream.

When an authorized camera is established, it is contacted once via the specified IP address in order to obtain a key. Therefore, the authorized camera must be available at the time of setup.

After successful setup, authorization remains in place even if the IP address is changed.

Example

Linking and Authorization

Camera A should transfer its trigger to Camera B. On the Streams page of Camera A, the streams from Cameras B and C should also be displayed.

- In the web interface of Camera A, Cameras B and C are entered as "Linked Devices."
 - Trigger and stream are enabled for Camera B.
 - For Camera C, only stream is enabled.
- Camera B does not have access protection enabled, so no further steps are required.
- Access protection is enabled for Camera C. For this reason, Camera A must be entered as an "Authorized Device" in the web interface of Camera C. The stream authorization must be activated.

If the web interface of Camera A is called up via HTTPS, a valid certificate classified as trustworthy by the web browser must be stored for Cameras B and C.

4.5 HTTP(S) API

The documentation for the HTTP(S) API is available at the URL `http(s)://<ip>/API/docs`.

The HTTP(S) API is a machine interface that can be used to control all camera functions. It enables the comprehensive integration and automation of the camera with other systems.

Access protection enabled via the web interface also applies to the HTTP(S) API.

4.6

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 1600 x 900 1280 x 720, 1024 x 576, 832 x 468 512 x 288 640 x 360 384 x 216	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 "New Event" 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 there is always enough memory, there is a function that deletes older videos to make sure there is enough space available.



Note

Recording Error

A recording error is indicated by the blue LED flashing several times.

Possible reasons for this include:

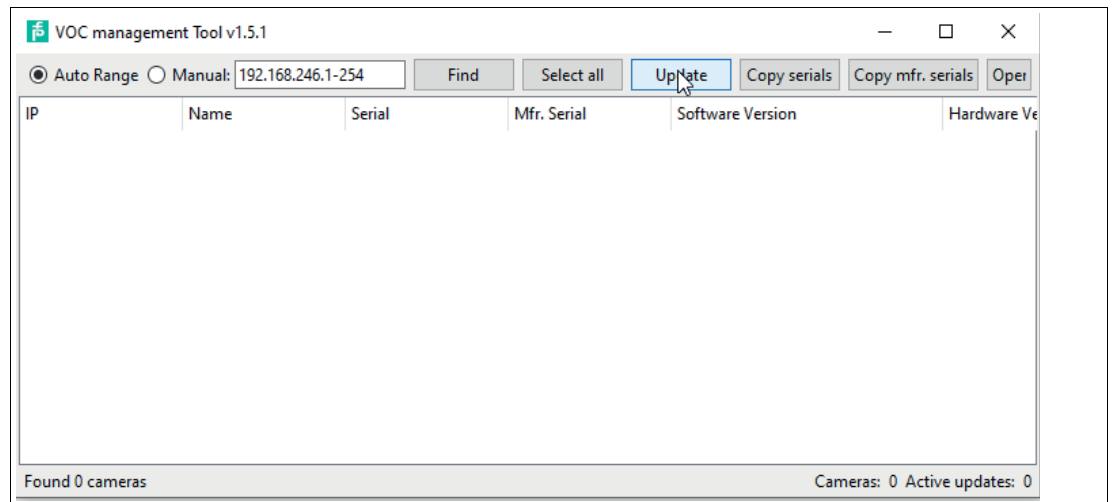
- The recording of the last trigger also copies video material from the circular buffer. The duration depends on the configured pre-trigger time and can last up to 10 seconds.
- Maximum number of simultaneous recordings reached (3).
- Memory full. Automatic deletion is disabled.

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.

Function	Type	Value
Number 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 RTSP streams	Recommendation	1

1 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

6 Web Interface

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

The web interface can be accessed via `http://<ip>/` or `https://<ip>/`.



Note

Encryption via HTTPS

The web interface is accessible with encryption via `HTTPS`.

To ensure confidentiality and integrity, a custom certificate that is trusted by the browser must be created and uploaded.

The required `.pem` file is created by combining the camera's certificate with any necessary intermediate certificates and the private key into a file.



Note

Access Protection

Access protection can be enabled for the web interface, requiring login with username and password.

Two user accounts are available, with customizable names and passwords.

User	Standard access data	Permissions
Admin	<code>admin:admin</code>	Full access
Viewer	<code>user:user</code>	Read access, triggering events

6.1 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).

6.2 User Interface

The functions of the main menus in the web interface are outlined below.

The main menu is divided into the following sections. From the main menu, you can access the submenus, which are described in more detail in the following chapters.

- Home
- Recordings
- Settings
- System
- Streams

6.2.1 Home

The "Home" menu (1) provides the following functions:

- Displaying the number of active recordings (2)
- Manually triggering a recording using "New Event" (3)
- Downloading a still image using "Snapshot" (4)
- Previewing the last three saved recordings (5)
- Live view of the main stream (6)

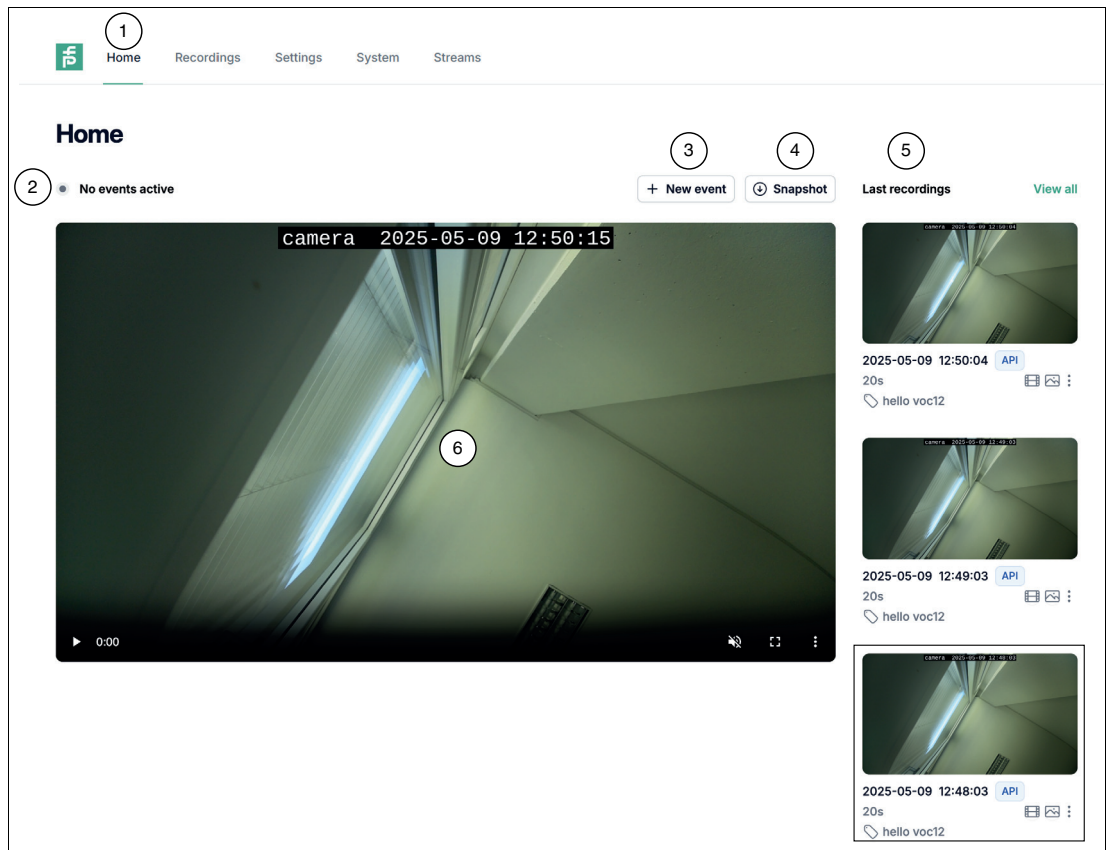


Figure 6.1 Web interface "Home" page

6.2.2 Recordings

The **Recordings** menu (1) provides access to saved recordings. These are displayed as thumbnails, each showing a still image from the moment the event was triggered. The recordings are spread over several pages, which can be navigated using the controls (2) below the thumbnails.

You can filter the displayed recordings by named or unnamed entries (3) and by the time of the trigger event (4). Alternatively, all recordings can be displayed at once.

The thumbnails contain three buttons with the following functions:

Overview of buttons

Item	Buttons	Function
5	Download video	Download the video recording
6	Download image	Download a still image
7	Delete	Delete the recording

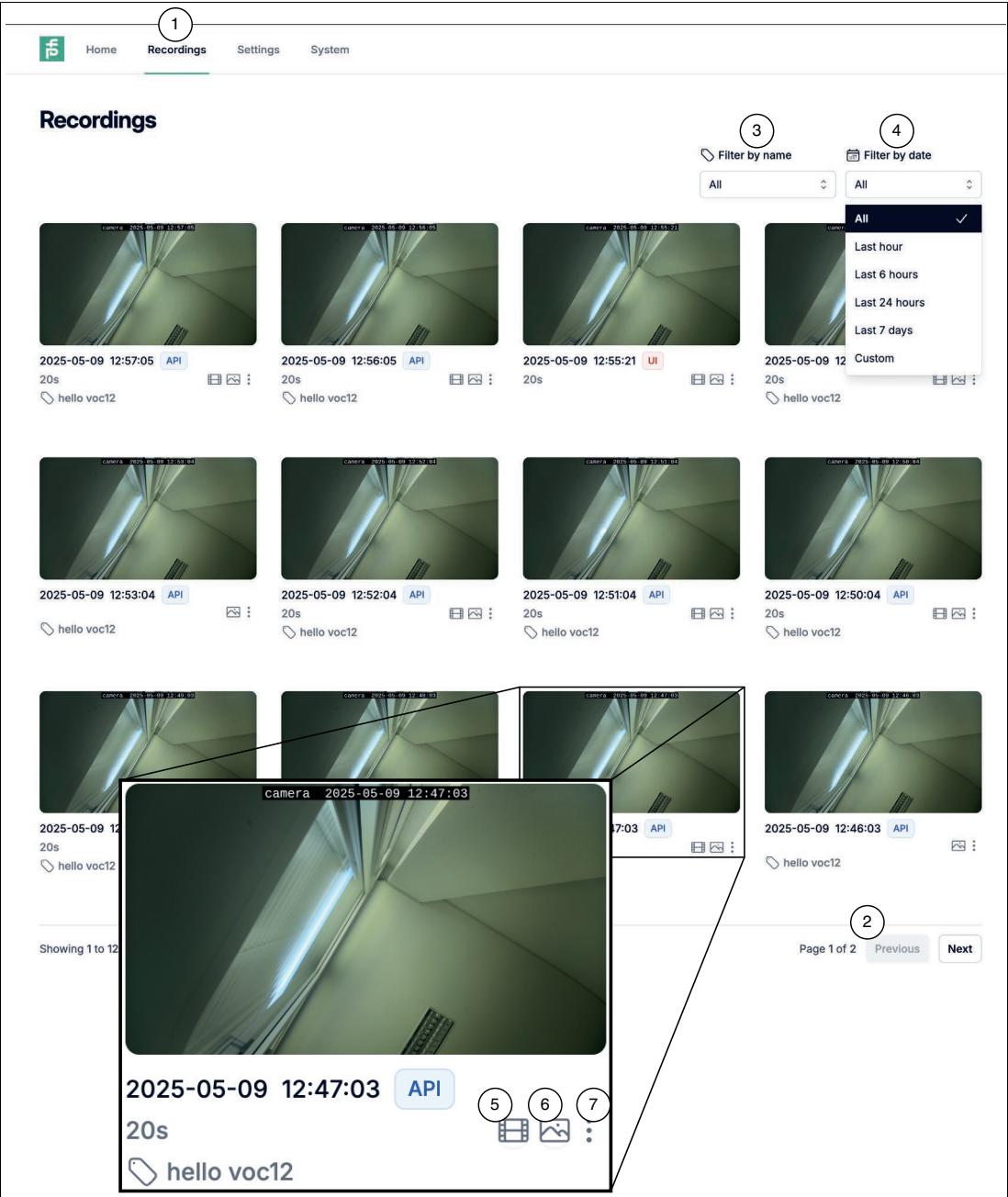


Figure 6.2 Recordings

6.2.3 Settings

Various camera parameters can be configured in the "Settings" menu. Below is a selection of the available options.

Setting	Standard	Value range	Description
Name	Camera	0 ... 100 characters	The camera name can be part of the stream overlay
Time zone	Europe/Berlin	Selection from drop-down list	Time zone of the camera
Resolution (main/sub)	1920x1080 (main) 640x360 (sub)	7 levels from 1920x1080 to 384x216 (drop-down list) Condition: main $\geq$ sub	Higher resolution improves the image quality but increases the stream data rate and file size.
Frame rate (main/sub)	24 (main, sub)	3, 6, 12, 24 Condition: main $\geq$ sub	A higher frame rate results in smoother video but increases the stream data rate and file size.
Quality (main/sub)	50 (main, sub)	0 ... 100	Higher quality enhances the image appearance but increases the stream data rate and file size.

pf

HomeRecordingsSettingsSystemStreams

Settings

ExportImportReset

Except to the network settings all other properties are auto-updated on edit.

Device

Name

camera 1

Timezone

Europe/Berlin

Streams

Sub stream resolution and framerate must not exceed main stream values.

Main stream

Sub stream

Resolution

1280x720

Resolution

384x216

Framerate

24

Framerate

24

Quality

50%

Quality

50%

Figure 6.3

Setting	Standard	Value range	Description
Image rotation	0°	0°, 180°	Image rotation
Image zoom	1x	1x ... 4x	Zoom with area selection
Image overlay	Datetime, Device name, Custom, Background	Datetime, Device name, Custom, Background	The selected properties appear as an overlay at the top of the image. The "Custom" value can be updated via UDP packet to port 5001 or via the HTTP API, but is not saved permanently and is lost after a restart. It is useful for displaying status or position information for the monitored object, for example. The "Background" option activates a black background behind the overlay to ensure readability regardless of the image content.
Do not record	Off	Off/on	In "Do not record" mode, no events can be triggered and the circular buffer remains empty.
Recording mode	Videos and snapshots	Videos and snapshots, Snapshots, High-resolution snapshots	This mode determines which data is saved when a trigger event occurs. "High-resolution snapshots" mode captures high-resolution images, but limits streaming functionality.

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Setting	Standard	Value range	Description
Recording pre-trigger duration	10 s	0 ... 900 s	Specifies how many seconds before the trigger event are included in the recording. The corresponding data is retrieved from the circular buffer.
Recording post-trigger duration	10 s	1 ... 900 s	Specifies how many seconds after the trigger event are included in the recording.
Enable UDP trigger	On	Off/on	The UDP trigger can be disabled.
Focus	Autofocus	Autofocus Manual focus (0 ... 100)	If continuous autofocus does not capture the desired image content correctly, the focus can be manually set to a fixed distance (0 = near, 100 = far).
Shutter speed	Auto	Auto, 1/25 s ... 1/8000 s in 10 levels	Longer exposure time produces brighter images but also increases motion blur.
Sensitivity	Auto	Auto, ISO 100-6400 in 11 levels	Higher sensitivity produces brighter images but also increases noise.

Image rotation

180°

Image zoom

Advanced

No zoom

Set zoom

Region of interest

Image overlay

☒ Datetime

YYYY-MM-DD hh:mm:ss

☒ Device name

camera

☒ Custom

Custom text set via UDP

☒ Background

Semi-transparent text background for better readability

Recording

Do not record

Mode

Videos and snapshots

Pre-trigger duration

10

0 to 900 seconds

Post-trigger duration

10

1 to 900 seconds

Enable UDP trigger

Focus

Autofocus

Set manual focus

Exposure

Shutter speed

auto

Sensitivity

auto

S/N 000000000000209

MAC d8:3a:dd:6d:67:7b

Figure 6.4

Setting	Standard	Value range	Description
Digital input	Trigger event	Off, Trigger event, Do not record	Function of the digital input
Digital output	Off	Off, Indicate recording	Function of the digital output

Setting	Standard	Value range	Description
Storage auto-delete	On	Off/on	If this function is enabled, the oldest recordings are deleted one by one during active recording when the memory is full.
FTP File Transfer	Off	Off, Upload snapshots and/or videos	Snapshots and videos are automatically uploaded to an FTP server after recording. The test function allows you to check whether the camera can connect to the server and upload files successfully.

Digital I/O

Digital input

Trigger event

Digital output

Off

Storage

☒ Automatically delete oldest recordings to free up storage

File transfer

Via FTP protocol

☐ Upload snapshots

☐ Upload videos

Host

Port

21

Path

User

Password

Test FTP connection

Figure 6.5

Setting	Standard	Value range	Description
Network	DHCP Fallback IP: 192.168.100.50/24	IP address, Gateway (optional), DNS (optional), NTP (optional), Subnet mask: 0 ... 30 (CIDR notation)	If DHCP is enabled, the camera automatically retrieves its network settings from the DHCP server. If no server is available, it uses the fallback IP. When DHCP is disabled, static settings are used. Network Time Protocol (NTP) allows the camera to sync its time with other devices on the network (e.g., a router).
	Additional host	IP Address	If the camera can be accessed under an additional IP in addition to its local IP address, e.g., when using NAT, this must be entered as an additional host for the WebRTC stream.
Access	Off	Off, Login required	Enables protected access for the web interface. The admin user has full access, while users with viewer access cannot perform write operations and can only trigger events. Note: Make sure you remember the newly assigned password. Resetting is not possible if the password has been forgotten!
Encryption		Upload certificate bundle	Upload your own certificate chain in .pem format for HTTPS access to the web interface.

Network

Be careful! You might not be able to reconnect to your device on bad configuration.

DHCP

IP address

192.168.100.50

DHCP fallback IP

Subnet mask (CIDR)

24

0 to 30

Gateway

DNS server

NTP server

Additional host

Update network settings

Access

Login required

Admin username

admin

Set new password

Viewer username

user

Set new password

Encryption

Enforce HTTPS

Upload certificate bundle or drag and drop

PEM containing certificate chain and private key

Figure 6.6

Setting	Standard	Value range	Description
Masking areas	Off	0 ... 5 areas	Areas that are masked in black can be adjusted in size and position.
Vision mode	Motion Detection	Motion detection, Detection of changes in brightness	Motion detection or detection of changes in brightness with area selection
Vision sensitivity	50 %	0 % ... 100 %	Sensitivity of motion detection or detection of changes in brightness
Vision overlay	Off	Off, overlay	Overlay for visualizing motion detection or detection of changes in brightness
Trigger vision event	Off	Off, trigger	Motion detection or detection of changes in brightness activates a trigger if the threshold value set via the sensitivity is exceeded
Face redaction	Off	Off, activated	Makes faces unrecognizable
Face redaction Confidence threshold	50 %	10 % ... 90 %	Threshold value for the detection reliability from which a face is made unrecognizable
Face redaction Blur	Off	Off, blur	Pixelating faces instead of masking, computationally intensive
Person detection Confidence threshold	40 %	10 % ... 90 %	Threshold value for the detection reliability from which a person is detected
Person detection overlay	Off	Off, overlay	Overlay for visualizing the detected people with detection reliability
Person detection Trigger	Off	Off, trigger	Triggers as soon as a person is detected in the image

The screenshot displays the web interface for configuring an Industrial Event Camera. It is divided into four main sections, each with a title and a category label (Advanced or Performance).

- Masking areas (Advanced):** Includes a 'No masking areas' label and a 'Set masking areas' button.
- Vision (Advanced):** Includes a 'Vision mode' dropdown menu set to 'Motion detection', a 'Set detection area' button, a 'Sensitivity' slider set to 77%, and two toggle switches for 'Overlay' and 'Trigger event', both currently turned off.
- Face redaction (Performance):** Includes an 'Enabled' toggle switch (turned off), a 'Confidence threshold' slider set to 25%, and a 'Blur' toggle switch (turned off).
- Person detection (Performance):** Includes a 'Confidence threshold' slider set to 25%, and two toggle switches for 'Overlay' and 'Trigger', both currently turned off.

Figure 6.7

Setting	Standard	Value range	Description
QR Code Reader	Off	Off, activated	Detection of QR codes. The most recently read code with time stamp can be called up via API
QR Code Reader Overlay	Off	Off, overlay	Overlay for visualizing the detected QR codes with a preview of the content
Acceleration threshold	2 g	2 g ... 24 g	Trigger threshold value for acceleration
Acceleration overlay	Off	Off, overlay	Overlay for visualizing acceleration
Acceleration trigger	Off	Off, trigger	Acceleration via threshold value activating the trigger
Linked devices	Empty	0 ... 10 cameras	Label, IP, trigger (on/off), and stream (on/off) for each camera. Stream can be enabled for up to five cameras
Authorized devices	Empty	0 ... 10 cameras	Label, IP, trigger (on/off), and stream (on/off) for each camera

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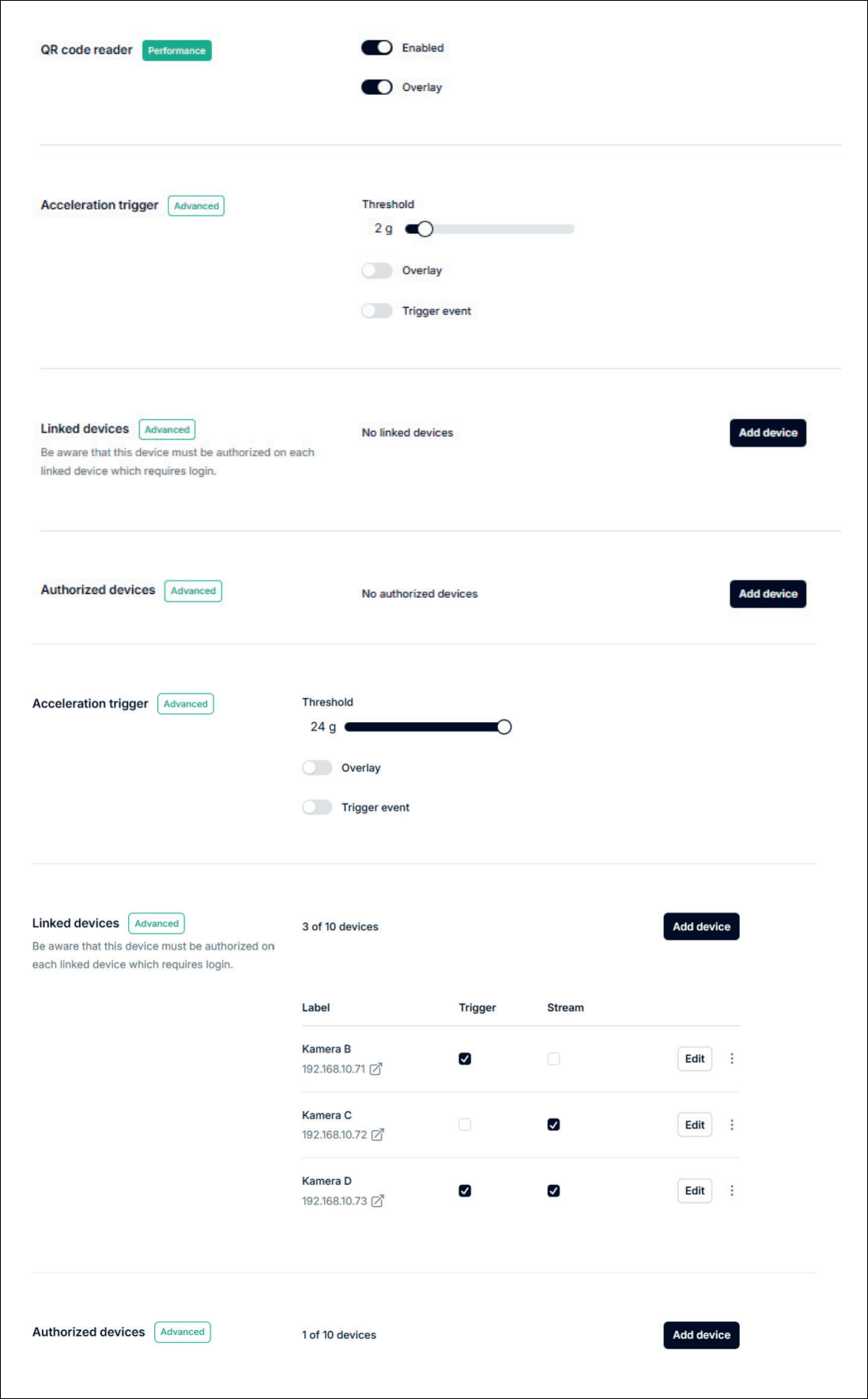


Figure 6.8

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6.2.4

System

The System menu item displays information about the system status. The firmware can also be updated here.

Circular Buffer

The Memory Buffer section shows how full the circular buffer is. After the camera starts or "Do not record" mode is deactivated, the buffer is empty and begins to fill continuously. It stores up to the last 15 minutes of video; the time currently available is shown.

If an event is requested with a pre-trigger time longer than the available time in the circular buffer, the recording before the event will be correspondingly shorter.

At high video data rates, the buffered time may be less than 15 minutes, even when the buffer is completely full. The circular buffer has a maximum memory limit of 500 MB, which corresponds to about 8 minutes at the highest data rate of 1 MB/s.

Firmware Update

A status bar indicates the progress of uploading and installing a firmware update. Once complete, the camera restarts automatically.

Do not switch off the camera during an update.

If the update fails and the camera does not restart automatically or cannot be reached, a power reset will automatically restore the previous version.

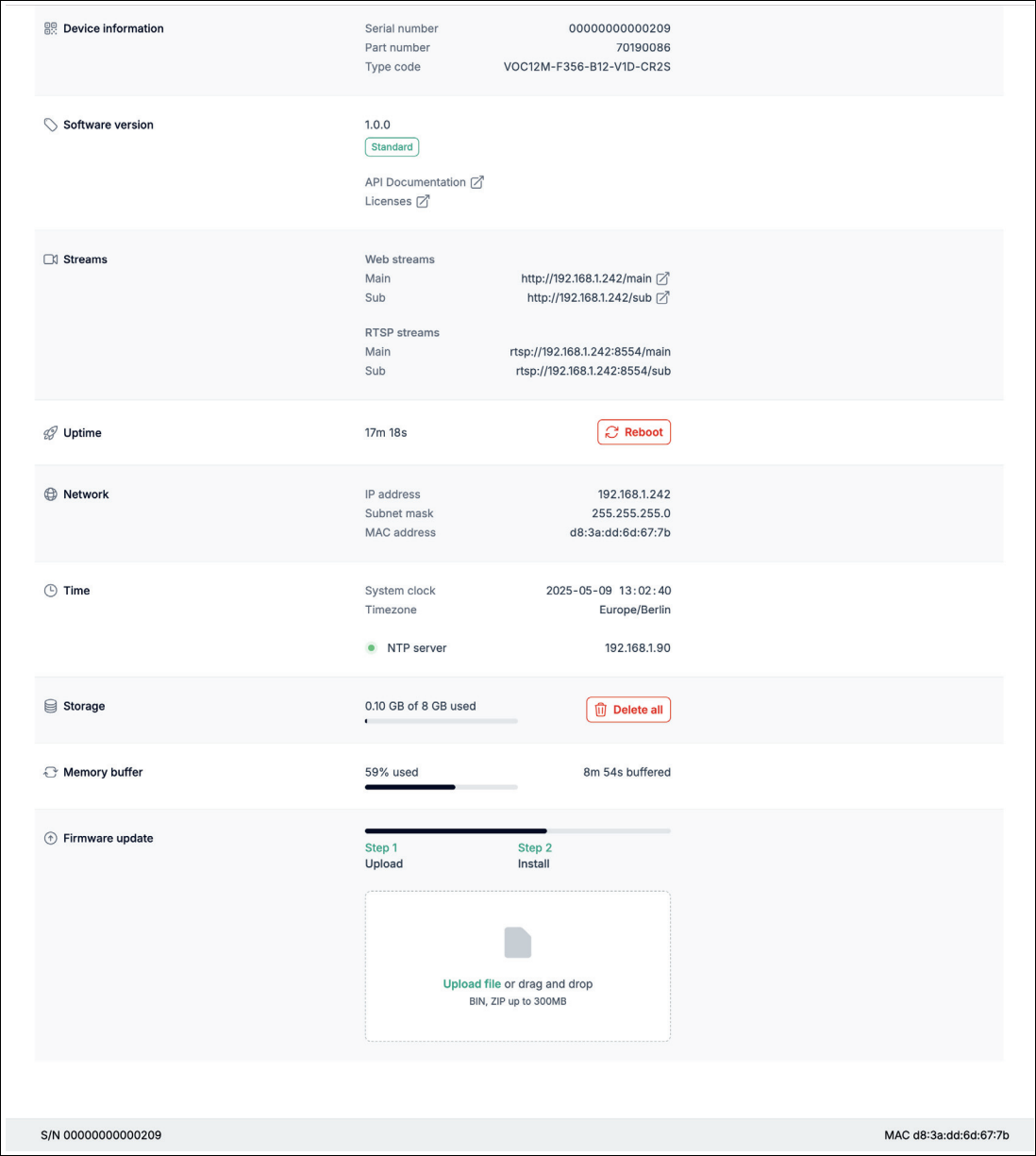


Figure 6.9

Property	Value	Description
Serial number	00000000000209	Unique device identifier
Part number	70190086	Manufacturer's internal part number
Type code	VOC12M-F356-B12-V1D-CR2S	Model number of the device
Software version	1.0.0	Installed firmware version
Web streams	http://192.168.1.242/main http://192.168.1.242/sub	Direct links to the stream (browser)
RTSP streams	rtsp://192.168.1.242:8554/main rtsp://192.168.1.242:8554/sub	Streaming via RTSP protocol
Uptime	17 m 18 s	Time elapsed since the last restart
IP address	192.168.1.242	Current network address of the device
Subnet mask	255.255.255.0	Subnet mask

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Property	Value	Description
MAC address	d8:3a:dd:6d:67:7b	Physical network address
System clock	2025-05-09 13:02:40 (Europe/Berlin)	Current time and time zone
NTP server	192.168.1.90	Synchronizes system time
Storage	0.10 GB of 24 GB used	Internal memory used
Memory buffer	59 % used (8 m 54 s buffered)	Live stream buffer for recordings
Firmware update	File upload: .BIN, .ZIP up to 300 MB	Firmware can be uploaded and installed

6.2.5 Streams

In addition to your own stream, this page also shows streams of up to five other cameras. These cameras must be entered as linked cameras (see chapter 4.4) and have the stream option enabled.

When using HTTPS, streams can only be viewed by cameras with certificates classified as trustworthy by the browser.

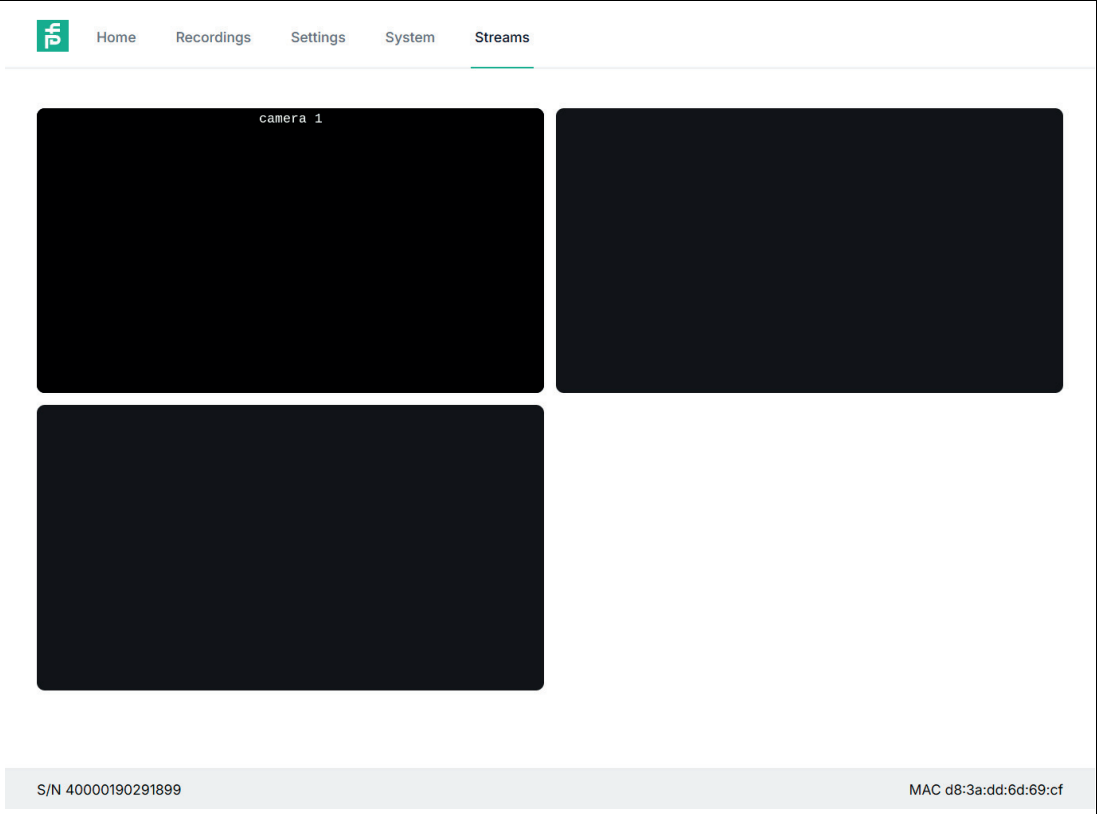


Figure 6.10

1 Maintenance and Repair

1.1 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.

1.2 Repair

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

8 Troubleshooting

8.1 What to Do in Case of Fault

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

Checklist

Error	Cause	Remedy
"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. 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.
Event not recorded	Incorrect trigger setting	Change the trigger setting, .
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.

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