Leuze

Original operating instructions

LCAM 308
Camera

The Sensor People

We reserve the right to make technical changes
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1 General

This manual describes the installation and operation of the device LCAM 308, hereinafter only referred to as camera, so that its use complies with relevant requirements, particularly regarding safety and electromagnetic compatibility when used as intended.

It is therefore essential to read this manual completely and carefully before installing and operating the camera.

Furthermore, it must be ensured that this manual is available to the end users of the camera for the complete period of use. This manual may also have to be handed over together with the camera. Any additions or changes provided by the manufacturer must be incorporated into the operating manual without delay.

1.1 Manufacturer of the camera

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1.2 Free and Open Source Software (FOSS)

Some parts of the software are licensed under the **GNU General Public License** or other Open Source and Free Software licenses. The corresponding list can be found in the download section of this product. Source code is available on request. Shipping and handling fees may apply.

1.3 Meaning of the symbols

	⚠ CAUTION
	Instructions and information for reliable use of the camera, especially regarding safety and electromagnetic compatibility, are marked with this symbol and must be followed to ensure reliable use.

	NOTICE
	This symbol indicates information and tips that may be helpful, especially regarding using the individual camera functions.

1.4 Intended Use

The camera is intended for use in industrial applications, whereby the camera is supplied with direct current via a normal direct voltage power supply unit and not via a direct current network.

The camera is used for live streaming and internal recording, in general, for event-based storage of image and video snapshots. The recording can be triggered by the digital input (hardware) or the network interface (software).

An integrated passive NFC tag is used to read information from the camera, such as serial number or software version, wirelessly via the corresponding NFC interface.

To reduce the risk of condensation inside the camera, a heater can be switched on if required. A mounting socket is used for mounting and fastening for adaptation.

The camera may only be used and operated in accordance with the specifications given under „Technical Data“. Furthermore, the instructions for „Mounting and connecting“ must be observed.

The camera is only intended for use with the pre-installed software or with updated versions provided by Leuze.

2 Safety instructions

The most important safety instructions, some of which appear elsewhere in this document, are summarized here. As mentioned at the beginning of this manual, all instructions and information in this manual must be followed when using the camera.

	⚠ CAUTION
	↳ All work on the camera, such as installation, connecting, servicing, maintenance, decommissioning, etc., may only be carried out by qualified electrical personnel with the required expertise according to the field of application of the camera. ↳ For all work on and operation of the camera, the applicable accident prevention regulations for the field of application of the camera must be observed. ↳ Before working on the camera, the connecting cables of the camera must be disconnected. ↳ The camera must be fastened using the mounting socket provided and the M6 female threads integrated in it. ↳ In case of obvious damage to the camera which affects or may affect the safety and electromagnetic compatibility of the camera, and in case of a defect, the camera must be immediately taken out of operation or not operated at all and secured against inadvertent operation.

3 Device description

The 24V DC powered fixed focus camera with network interface (10BaseT/100Base-TX) and trigger input is used for live streaming and internal recording of videos in industrial applications.

In addition to post-triggering the recording feature supports pre-triggering to capture actions that occur before the trigger moment. This might be useful for applications where unexpected events and operations shall be saved for further examination.

As the camera can be used at ambient temperatures as low as -30 °C, a software-adjustable heater is integrated to minimize the risk of condensation in the lens area of the camera.

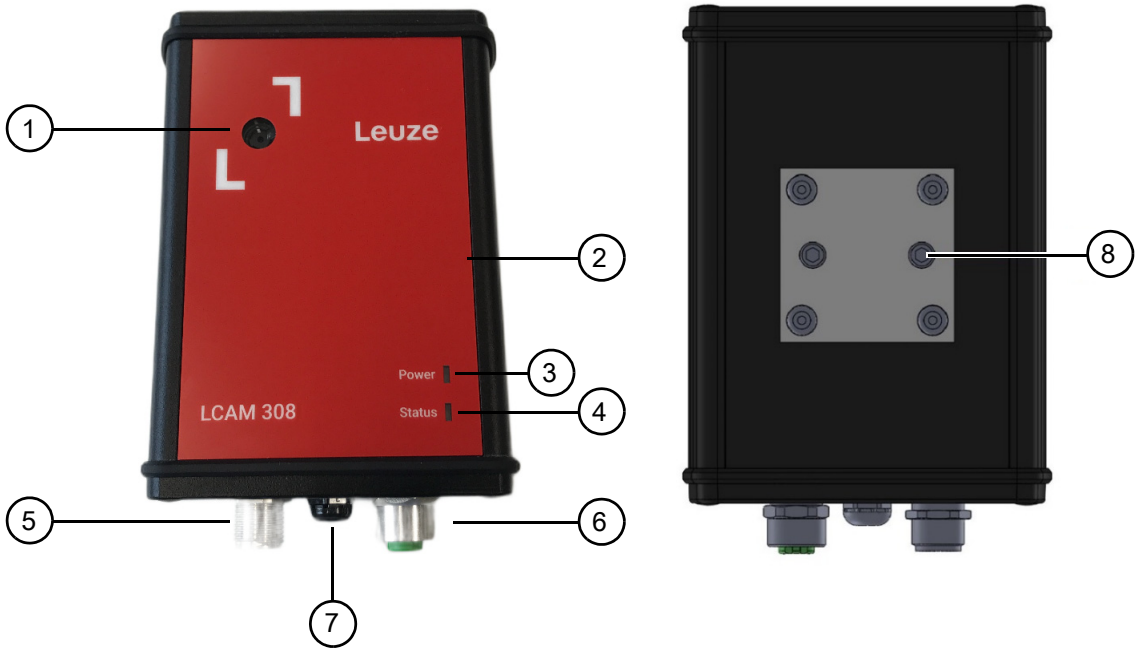
Two status LEDs indicate the operating status and may provide support for error analysis.

An NFC tag is integrated in the camera to enable device information to be read independently of the network interface and even when the power supply is disconnected.

An IP65 housing, a mounting plate attached to the camera with two M6 internal threads and the design of the two connector plugs (supply/digital input and Ethernet) as M12 variants ensure a robust design of the complete device.

The camera complies with the applicable requirements of the EU directives, provided that the camera is operated and installed in accordance with this manual.

3.1 Device overview



1 Fixed focus camera
2 NFC tag antenna
3 Power LED
4 Status LED
5 Power supply and digital input connector
6 Ethernet connector
7 Pressure compensation element
8 Mounting socket

Figure 3.1: Camera components

3.2 Power supply and digital input

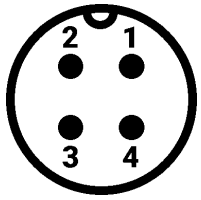
Pin	Signal	Function	Specification	
1	V+	Power supply +	18..28 V DC	 M12-A, plug, 4-pole, not shielded
2	DIGIN	Digital input	Low: 0..5 V DC	
			High: 16..32 V DC	
3	V-	Power supply -	0 V	
4	NU	Not used	N/A	
Housing	NC	Not connected	N/A	

Table 3.1: Pinout power supply and digital input

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

By triggering the digital input DIGIN, recording a video file is initiated.

	NOTICE
	↳ This requires a rising edge at the DIGIN input into the logical "High" range starting from the specified logical "Low" range and a corresponding minimum pulse length of 20 ms. A logic "low" signal must also be present for 20 ms for retriggering. Furthermore, after a trigger is accepted, renewed acceptance is blocked by software for 2 s.

	NOTICE
	↳ Trigger signals with a pulse length of < 1.5 ms are not accepted. Pulses with length between 1.5 ms and 20 ms can eventually cause a trigger.

The maximum digital input current is 7 mA over the complete specified digital input voltage range.

	⚠ CAUTION
	↳ The power supply must be provided by a normal DC power supply unit. Connection to a direct current supply network is permissible.

3.3 Ethernet interface

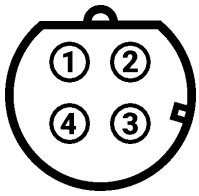
Pin	Signal	Function	
1	TX+	Transmit data +	 M12-D, jack, 4-pole, shielded
2	RX+	Receive data +	
3	TX-	Transmit data -	
4	RX-	Receive data -	
Housing	Shield	Shield	

Table 3.2: Pinout ethernet

A network interface is used for IPv4 communication with the camera.

	NOTICE
	↳ According to the 10BaseT/100Base-TX interface standards, this results in a maximum transfer rate of 10/100 MBit and a maximum cable length of 100 m, whereby at least one Cat. 5e network cable must be used.

NOTICE
↳ The ethernet shield is capacitively connected to the supply ground via a 100 nF capacitor, otherwise there is no direct connection to the supply ground (V-).

3.4 NFC tag

A dynamic IEC 15693 type 5 NFC tag is installed on the camera. Information stored on it, e.g. serial number, software version, etc., can be read out by means of an NFC-capable reader (e.g. smartphone with corresponding function).

For the position of please refer to Figure 3.1

The NFC interface is based on RFID and operates with a nominal carrier frequency of 13.56 MHz.

NOTICE
↳ The NFC tag is powered by the reader and thus readable even if the camera is not powered. It can be used, for example, to check the IP address of a camera.

NOTICE
↳ The NFC antenna of the reader used must be placed as close, flat and central as possible above the NFC symbol of the camera (see Figure 3.1).

3.5 Optics

The camera used to record images and videos has a viewing angle of 62.2 ° horizontally and 48.8 ° vertically.

NOTICE
↳ The focus is a fixed focus (object distance when adjusted for optimum sharpness: 1 m).

The focal length of the lens is 3.04 mm and the focal ratio is 2.

The built-in sensor is of the CMOS type, has a resolution of 8 MP and a sensor image area of 3.68 mm x 2.76 mm.

To avoid the image quality being affected by IR radiation, an IR cut filter is installed.

3.6 Heater

To reduce condensation in the camera lens area, especially in cold environments, a heater is integrated in the camera, which can be activated via software interface if required.

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

NOTICE
↳ In order to avoid intolerably high temperatures in the event of a software-related loss of control, a software-independent overtemperature shutdown for the heating unit is integrated in the camera (shutdown value: 103 °C +/- 2.5 °C).

⚠ CAUTION
↳ The specified shutdown value refers to the position of the overtemperature sensor in the heating area, other areas may well be even warmer.

3.7 Display elements

Two LEDs on the front of the camera indicate the operating status. The Power LED lights up green, the Status LED is multicolored.

LED	Color	Function
Power	Green	Lights up while camera is powered
Status	Blue	Lights up blue from trigger to end of recording
Status	Yellow	Lights up yellow while initializing the system

Table 3.3: Function assignment of the LEDs

3.8 microSD card

For the storage of video recordings an 8 GB industrial microSD card (class 10 U1) is installed in the camera.

⚠ CAUTION

- Removing or replacing the microSD card is only intended for service purposes. In case of service, the two housing cover screws on the side with the microSD card symbol must be removed. The corresponding screw covers must be opened first.

3.9 Housing

The camera has a powder-coated aluminum housing and a glass front panel. The main dimensions of the camera body are 114 x 85 x 35 mm (l x w x h). The mounting socket is fixed to the body and not removable.

NOTICE

- The integrated pressure compensation element reduces the risk of condensation inside the camera.

NOTICE

- The camera housing is capacitively connected to the supply ground by contact to the housing of the ethernet connector via a 100 nF capacitor, otherwise there is no direct connection to the supply ground (V-).

NOTICE

- A mounting socket with two M6 internal threads for adaptation is provided for fastening the camera (see drawing below).

3.10 Regulations, Directives and standards

The Directives 2014/53/EU (Radio equipment), 2001/95/EC (General product safety), 2011/65/EU (RoHS), 2012/19/EU (WEEE) and the Regulation (EC) No 1907/2006 (REACH) apply to the camera.

Among others, the harmonized standards EN 61326-1:2013 (Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements) and ETSI EN 300 330 V2.1.1 (Short range devices) were used to assess compliance with applicable requirements of the EU Directives.

3.11 Technical Data

Power supply	
Supply voltage	18..28 V DC
Input current (heater not activated)	< 200 mA
Input current (heater activated)	< 700 mA
Digital input	

Table 3.4: Technical Data

Signal voltage high	16..32 V DC
Signal voltage low	0..5 V DC
Input current	< 7 mA
Trigger type	Positive edge
Length of trigger pulse	Min. 20 ms
Input filter	> 1.5 ms
Ethernet interface	
Transmission rates	10/100 MBit/s (10BaseT/100Base-TX)
Transmission medium	At least ethernet Cat. 5e cable, max. 100 m
NFC tag	
Nominal carrier frequency	Typ. 13.56 MHz
Camera	
Focus type	Fixed focus (Adjusted for 0.5 m to 8, optimum sharpness distance: 1 m)
Horizontal field of view	max.[a)] 62.2 °
Vertical field of view	max.[a)] 48.8 °
Focal length	3.04 mm
Focal ratio	2
IR cut filter	Yes
Sensor type	CMOS
Sensor image area	3.68 mm x 2.76 mm
Heater	
Controller type	Two-point controller
Max. heating power depending on supply voltage	18 V DC: typ. 6.5 W 24 V DC: typ. 11.5 W 28 V DC: typ. 15.5 W
Max. current consumption depending on supply voltage	18 V DC: max. 400 mA 24 V DC: max. 500 mA 28 V DC: max. 600 mA
Overtemperature shutdown threshold	103 °C +/- 2.5 °C ⚠ At position of overtemperature sensor, other positions can reach higher temperatures
SD card	
Type	microSD, industrial, class 10 U1
Memory size	8 GB
Connection data	
Power supply including digital input	M12-A, plug, 4-pole, not shielded

Table 3.4: Technical Data

Ethernet	M12-D, jack, 4-pole, shielded
Mechanical data	
Dimensions basic housing (l x w x h)	114 x 85 x 35 mm
Base material housing	Al Mg Si 0.5
Coating of housing	Powder-coated, black
Front panel	Fully bonded glass
Fastening the camera	Via mounting socket
Maximum torque for camera fastening	Up to manufacturing date 09/2020: 15 Ncm From manufacturing date 10/2020: 1 Nm
Weight	0.3 kg
Ambient conditions	
Ambient temperature during operation and storage	-30..+50 °C
Relative humidity during storage and transport	No condensation
Protection class	IP65
Regulations, Directives and standards	
2014/53/EU	Radio equipment Directive
2001/95/EC	General product safety Directive
EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
ETSI EN 300 330 V2.1.1	Short range devices
(EC) No 1907/2006	REACH Regulation
2011/65/EU	RoHS Directive
2012/19/EU	WEEE Directive

Table 3.4: Technical Data

a) Field of view depends on selected resolution and rotation

3.12 System requirements

Ports

To ensure proper functionality of the system the following ports shall not be blocked by a firewall in the cameras network.

Port	Protocol	Feature
80	TCP	Web Application
5001	UDP	Text overlay
5002	UDP	Event trigger

Table 3.5: Ports

Port	Protocol	Feature
8080	TCP	Web Application
8554 or 554	TCP and UDP	RTSP stream
53100	UDP	Management tool

Table 3.5: Ports

Browser Support

Google Chrome	> 84 (stable channel)

Table 3.6: Browser Support

3.13 Operation limits and recommendations

Characteristic	Type	Value
microSD memory capacity [GB]	Recommendation	8
Recording count	Recommendation	10.000
Min. time interval between recordings [s]	Limit	2
Concurrent recordings	Limit	3[a)]
Concurrent HTTP connections	Limit	8
Concurrent MJPEG streams	Recommendation	2
Concurrent RTSP streams	Recommendation	1

Table 3.7: Operation limits and recommendations

a) Only 1 recording if resolution is set to 1920x1080

Operation limits are enforced automatically by the system. Operation recommendations indicate the tested boundaries of the system by the manufacturer. If use takes place beyond these limits, performance may decrease and support from the manufacturer may not always be guaranteed.

4 Mounting and connecting

	⚠ CAUTION
	↳ The camera must be installed using the M6 female threads in the mounting socket (see drawing). No other type of mounting is permitted.

	⚠ CAUTION
	↳ Fasteners that are screwed into the M6 female threads may be tightened depending on the manufacturing date to a maximum torque of 1 Nm (from manufacturing date 10/2020).

	⚠ CAUTION
	↳ The camera must be fastened regarding the operating conditions. The mounting must be checked and maintained at regular intervals.

	NOTICE
	↳ For a vibration-resistant screw connection, we recommend screw locking lacquer, e.g. Loctite 243 from Henkel.

	⚠ CAUTION
	↳ The two electrical connections of the camera must also be made with M12 connectors, including mechanical locking via the M12 threads, according to the connectors of the camera. These mechanical interlocks must be hand-tightened after plugging in the connection cables. The fastening of the connections must be carried out in accordance with the operating conditions and conditions of use and, if necessary, checked and repaired regularly so that they do not become loose over time.

	⚠ CAUTION
	↳ When selecting the connecting cables, the information in this manual and the data sheet for the camera, especially with regard to the electrical specifications, have to be taken into account.

	⚠ CAUTION
	↳ The electrical connection of the camera must not be established until the mounting according to the specifications has been carried out.

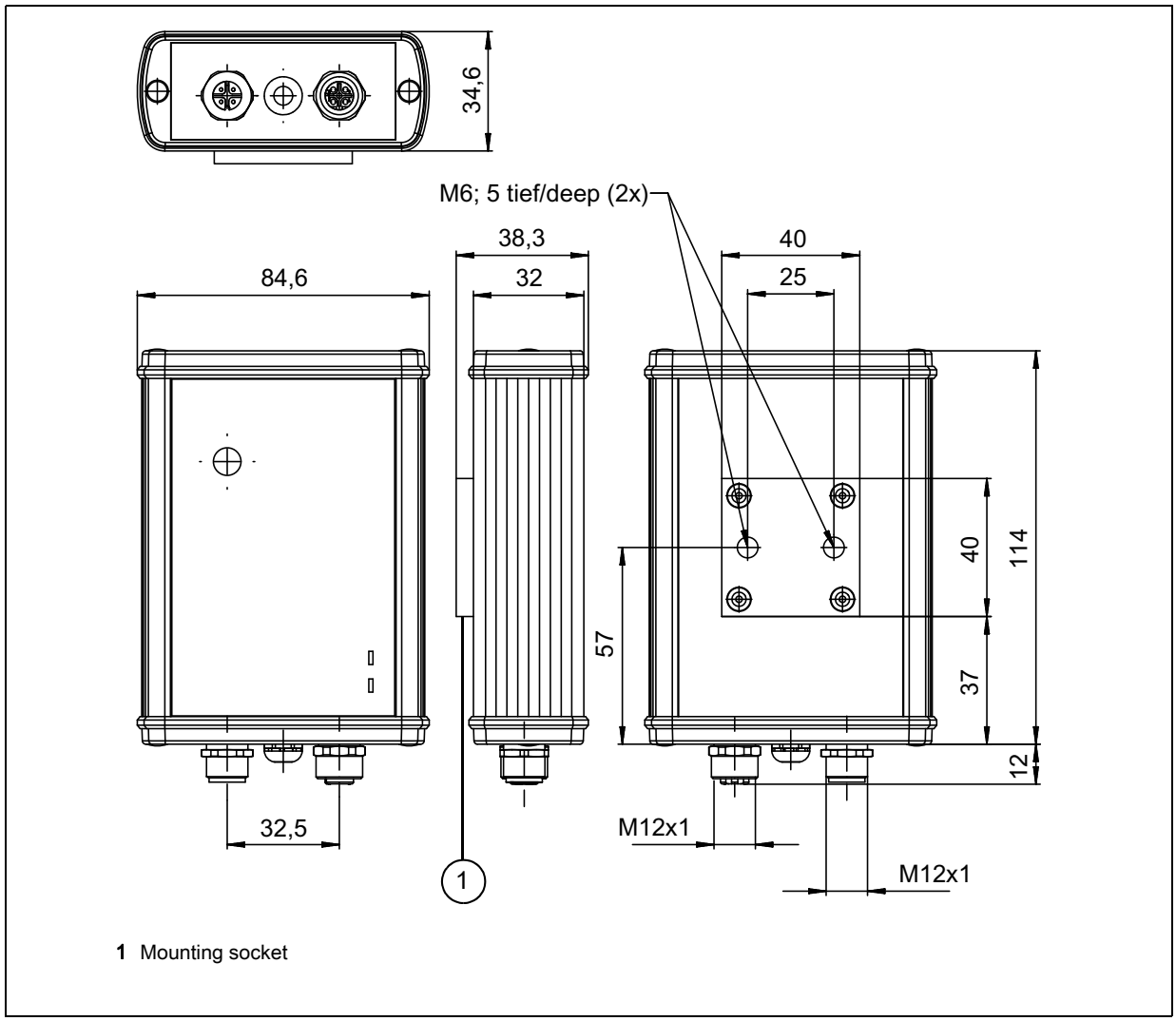


Figure 4.1: Mechanical drawing of housing, position of mounting socket

5 Features

5.1 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	640 x 360	3	H264 RTSP	rtsp://<camera-ip>:<rtsp-port>/<rtsp-path>

Table 5.1: Streaming

5.2 Recording

The camera can record the video image on a trigger signal. Recording starts the set pre-trigger time before the trigger point and ends the set post-trigger time after the trigger point.

Recording video specifications:

Resolution	FPS	Codec / Container
1920x1080, 1280 x 720, 1024 x 576, 960 x 540, 800 x 450, 640 x 360	24	H264 MP4, adjustable quality

Table 5.2: Recording

Recording with 1920x1080

Live Stream, Recording and RTSP share the processing power of the camera, which is limited. Recording with a resolution of 1920x1080 is most computation-intensive and can cause the live stream to have a very low framerate. To reduce impact on the live stream or when noticing any other performance problems, it is recommended to disable the RTSP stream when recoding with 1920x1080.

Only one recording can run at a time when using 1920x1080.

When using a recording resolution of 1920x1080, the field of view is reduced due to sensor limitations. This applies for all streams, although only the recording supports 1920x1080.

Trigger options

- Digital input
  A rising edge on the digital input will trigger a recording
- UDP
  Send the string **TRIG** to UDP port 5002 on the camera
- Web frontend
  The trigger button on the top right in the frontend can be used as manual trigger

If a trigger signal is detected, the blue LED Status on the camera will light up until the end of all running recordings. If the recording cannot be saved, the blue LED will flash several times. Multiple recordings can overlap, but at least 2s must elapse between each trigger. No more than three recordings can run at the same time.

To ensure that there is always enough free memory, there is a deactivatable function that deletes the oldest videos if necessary, to ensure enough free storage.

NOTICE

Recording failure

A recording failure is indicated by the blue led flashing several times after a trigger occurred. Possible causes include

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

5.3 Text overlay

Three fields of information can be overlayed at the top edge of the screen:

- Camera Name
  The name of the camera set in the settings, maximum 255 characters long
- Date and Time
  Date and time are obtained from the NTP server
- User Defined Text
  The custom text is set by sending it to UDP port 5001 of the camera, it will be truncated after 255 characters if necessary. Only Ascii characters up to 127 are supported, no umlauts. The user-defined text is not stored persistently and will be reset each time the camera is started.

For the overlay, the fields are combined, truncated to 255 characters and overlayed at the top of the screen. An automatic line break is performed if necessary. If required, a black background for the white overlay text can be configured in the settings.

5.4 Access protection

Two users are available:

- viewer
- admin

No password is set for either user at delivery. If a password is set, a prompt to log in appears when a page is called.

The user admin has no restrictions.

The user viewer may view streams and recordings but may not make any changes. He is not allowed to change any settings, delete videos or perform updates.

The names of both users can be changed.

5.5 Network

The camera has a 100MBit Ethernet interface. It can have a static IP or obtain one using DHCP. If DHCP is activated but not available, the static IP will always be used as fallback.

5.6 Heater

The camera has an integrated heater to reduce condensation on the lens cover especially in cold environments. The heater features the three levels Low, Med, High and is disabled by default.

If condensation occurs, the heater level should be increased until the lens cover stays clear. It will take a few minutes until a higher heater level has an effect on the condensation as the case has to be warmed up.

The heater can safely stay enabled on every level over the full operating temperature range. Internal temperature control prevents overheating in warm environments.

5.7 NFC Tag

A dynamic IEC 15693 Type 5 NFC tag is installed on the camera, in which some information about the camera is stored:

- Current IP address
- Static/fallback IP address
- Software version
- Hardware version
- MAC address of ethernet interface
- Serial number
- Timestamp of last update and NTP sync status

The NFC tag can be read with compatible reader or a NFC-enabled smartphone. Current android smartphones will show the information without any additional app while iPhones need a NFC reader app.

The information in the NFC tag is updated once on every boot. The IP address is updated a second time one minute after each boot to have some delay for the DHCP request.

The NFC tag is powered by the reader (e.g. smartphone) and thus readable even if the camera is not powered. It can be used, for example, to check the unknown static IP address of a camera.

6 User Interface

The user interface can be reached via the URL **http://<camera-ip>**

6.1 Main page / Live

The start page (Live) of the web interface consists of four areas.

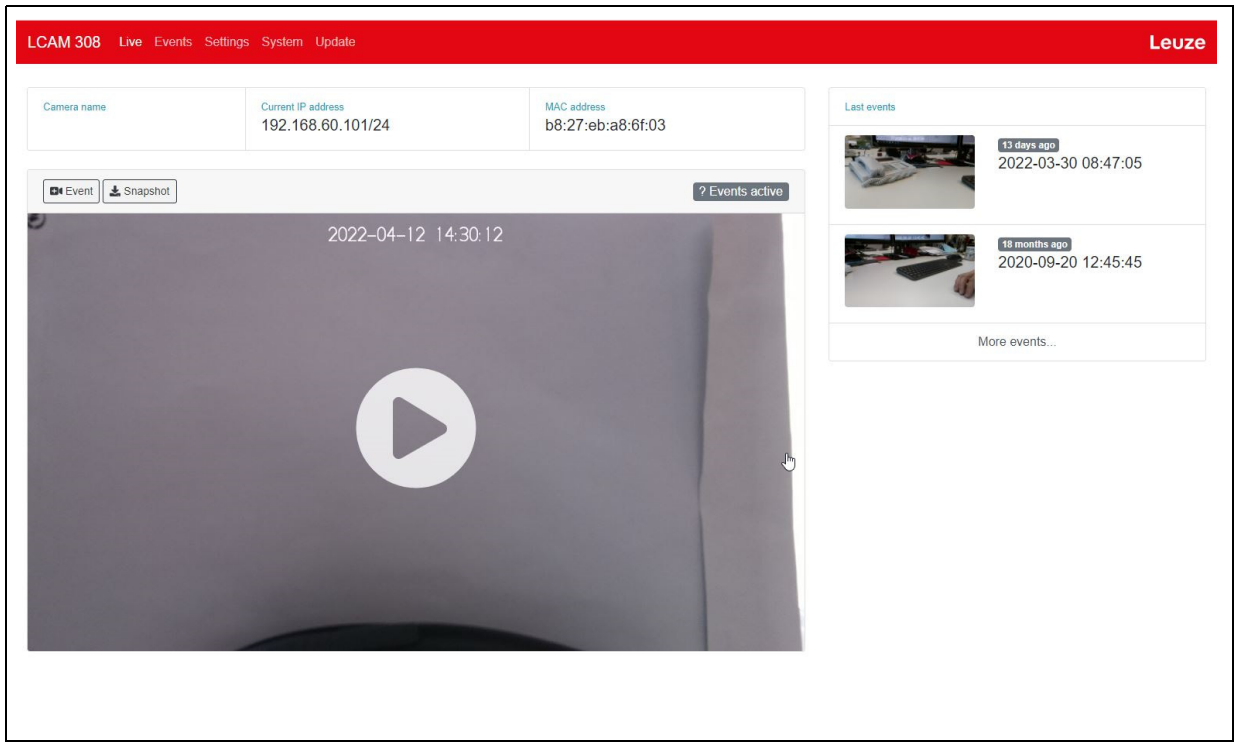


Figure 6.1: Start page (Live)

- Livestream
  - Manual trigger button
  - Snapshot[1] download button
  - Active events count indicator
- Last Events
- Camera information
  - Camera name
  - IP address
  - MAC address of ethernet interface

6.2 Events

The events view allows access to the recordings. They are represented by thumbnails of a still image taken at the trigger time. The recordings are spread over several pages, which can be selected using the navigation above the thumbnails. The storage usage is displayed next to the navigation.

The displayed events can be filtered by selecting a date range from the drop-down on the top left.

1. Snapshots are taken with Live stream resolution

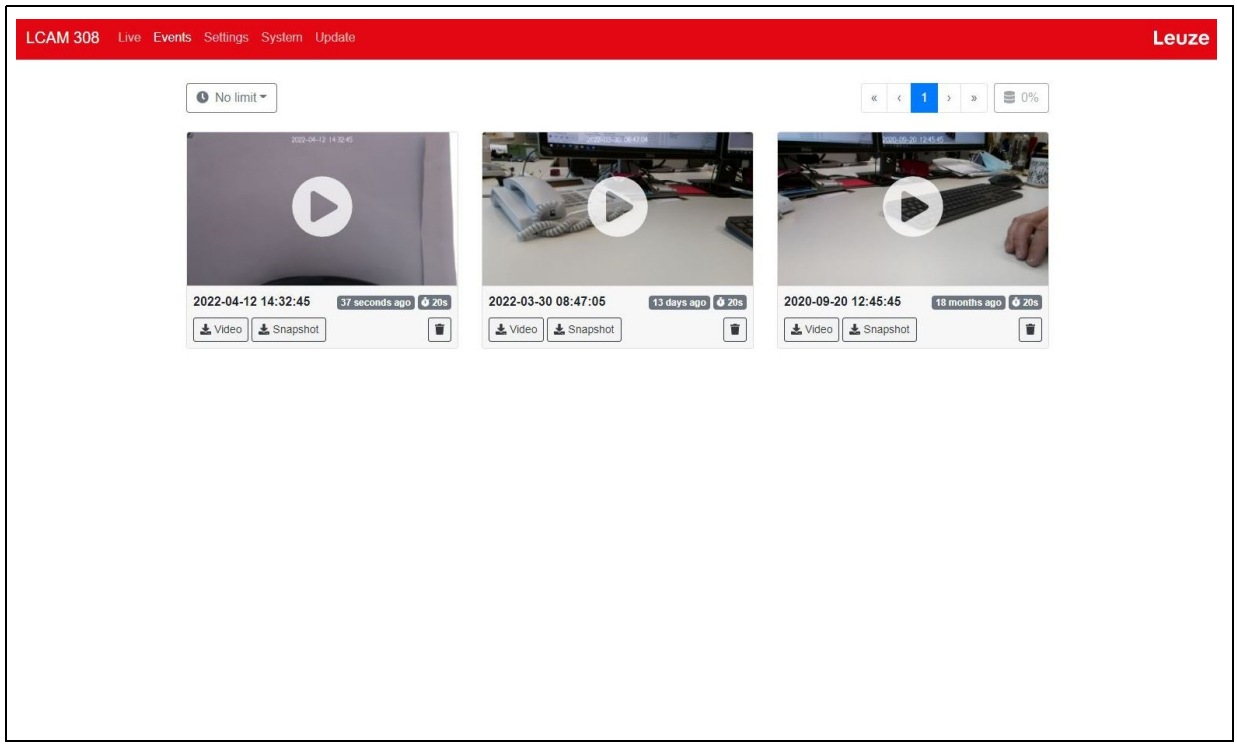


Figure 6.2: Events

A click on the thumbnail plays the recording. Below are three buttons:

- Download Video
  Starts the download of the video
- Download Snapshot[1]
  Download still image taken at the trigger time
- Delete
  Deletes the video after a confirmation

6.3 Settings

All camera settings are stored on 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 is displayed at the top of the settings page.

By saving the settings on the settings page, the file **ipcam_settings.json** is created or overwritten.

To reset the camera to factory defaults, this file can be deleted from the SD card. This is only necessary if the password of the admin user has been forgotten. Otherwise all settings can be edited through 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.

1. Snapshots are taken with Live stream resolution

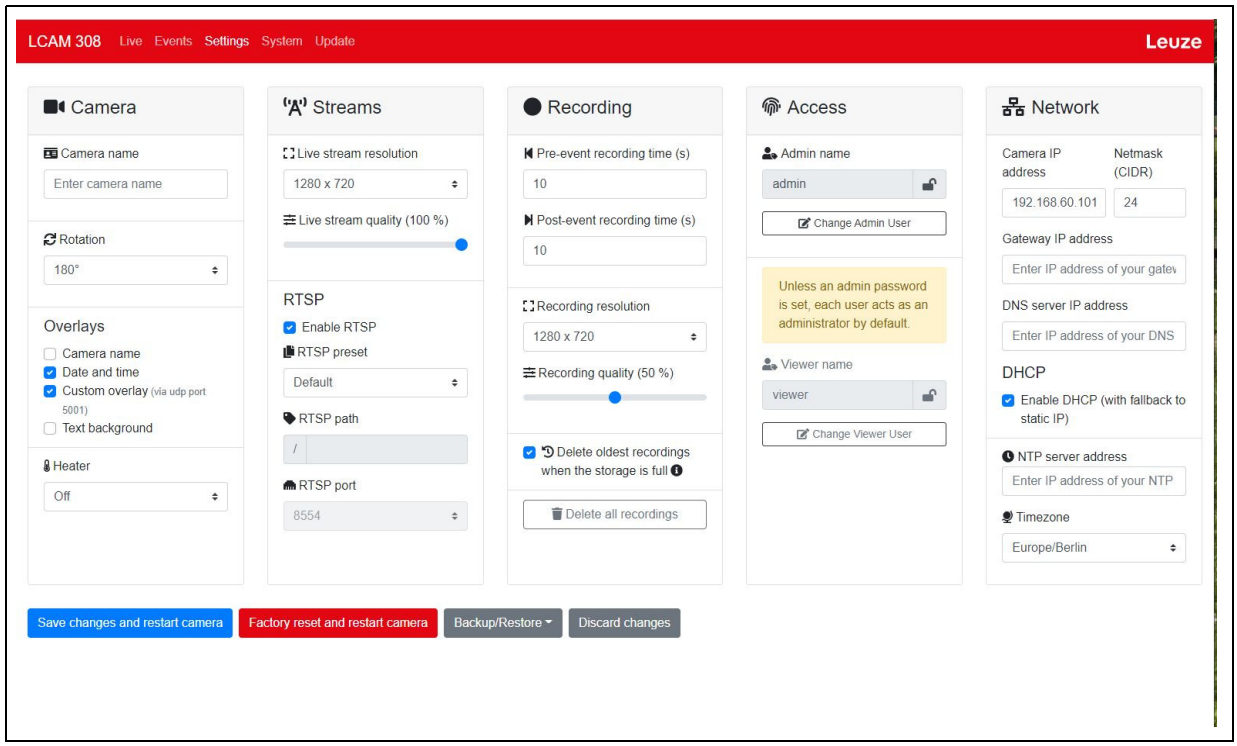


Figure 6.3: Settings

Camera

Setting	Default	Input restriction	Description
Camera			
Camera name	<empty>	0-255 characters, a-z, A-Z, 0-9, '-'; no '-' as first or last character	Freely selectable name of the camera, is displayed on the start page and can be overlayed on the camera stream.
Rotation	0°	0°, 90°, 180°, 270°	Image rotation. The aspect ratio remains the same, causing the image to be enlarged at 90 ° and 270 °.
Overlays	Camera Name, Date and Time, Custom overlay, Text background		The activated elements are displayed at the top of the camera image. The overlay is limited to 255 characters and will be shortened if necessary.
Heater	off	Off, Low, Med, High	Activation and setting of the heating level
Live Stream			
Live stream resolution	1280 x 720	1280 x 720, 1024 x 576, 960 x 540, 800 x 450, 640 x 360	Live stream resolution
Live stream quality	100	0-100%	Live stream quality
RTSP Stream			
Enable RTSP	active		Enable RTSP stream, not recommended when using 1920x1080 recording resolution to avoid live stream frame dropping

Table 6.1: Camera

Setting	Default	Input restriction	Description
RTSP path	<empty>	0-30 characters, a-z, A-Z, 0-9	Path segment of RTSP URI
RTSP port	8554	554, 8554	RTSP port
Recording			
Pre-event recording time [s]	10	1-60	Recording time before the trigger point
Post-event recording time [s]	10	1-60	Recording time after the trigger point
Recording stream resolution	640x360	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			
admin user name	admin	1-255 characters	User name for admin user
admin password	<empty>	1-50 characters	The password for the user admin. Password protection can be disabled
viewer user name	viewer	1-255 characters	User name for viewer user
viewer password	<empty>	1-50 characters	The password for the user viewer. Password protection can be disabled
Network			
IP address	192.168.60.101	IPv4 address	The IPv4 address of the camera. If DHCP is enabled, this is used as fallback.
Netmask (CIDR)	24	0-30	Net mask in CIDR notation
Gateway IP address	<empty>	IPv4 address, optional	The gateway is required if the NTP server is in another subnet.
DNS server IP address	<empty>	IPv4 address, optional	DNS server, currently not required
DHCP	active		Enables DHCP. If no DHCP server is available, the camera uses the set IP address as static address.
NTP server address	<empty>	IPv4 address, optional	NTP server. Is required to set the camera time.
Timezone	Europe/Berlin		Camera timezone for local time in overlay and recordings

Table 6.1: Camera

6.4 System

This page displays system information:

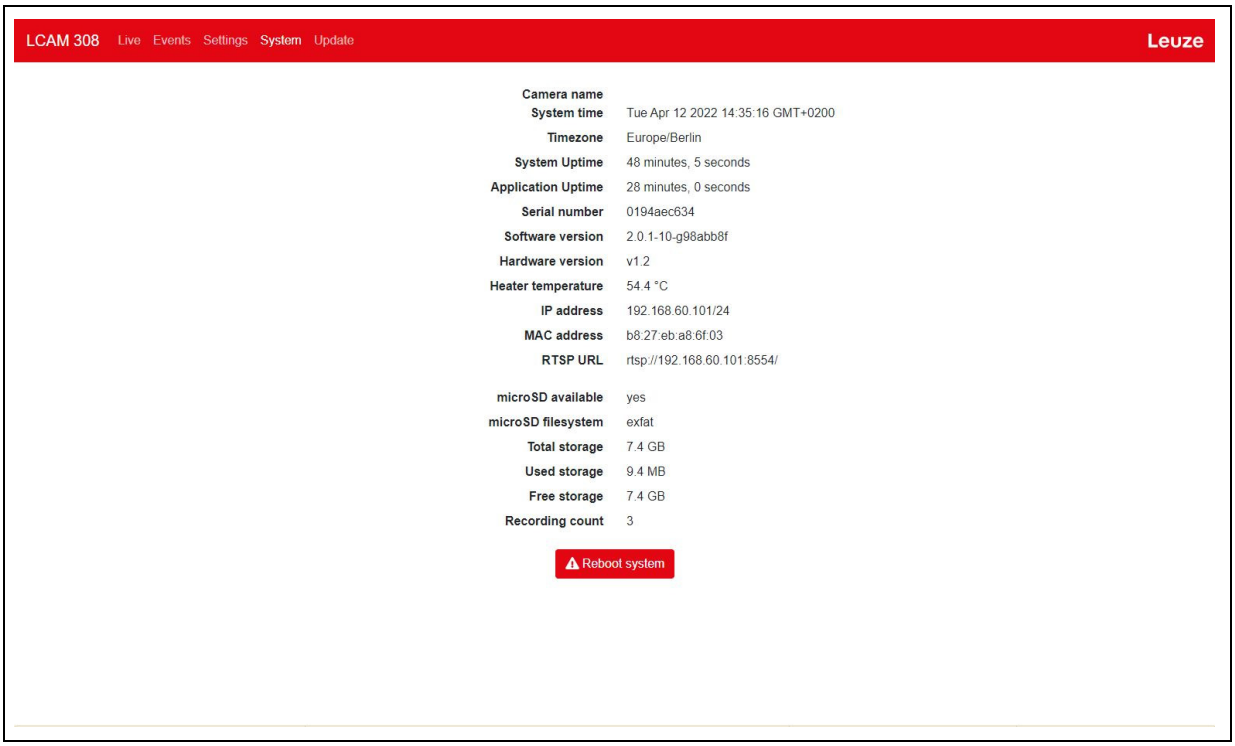


Figure 6.4: System

- Camera name
- System time[1]
- Timezone
- System Uptime
- Application Uptime
- Serial number
- Software version
- Hardware version
- Heater temperature
- IP address
- MAC address
- RTSP URL
- microSD available
- microSD filesystem
- Total storage
- Used storage
- Free storage
- Recording count

6.5 Update

This page is used to install a software update. Select the update file and start the update with *Update software*.

1. If the camera clock differs from the user interface viewers device clock, for example if the NTP server is not available, a warning is shown here. This warning includes a button to set the camera clock to the viewers device time. This is only a temporary fix as the camera is not able to keep its clock running without power supply.

	⚠ CAUTION
⚠	↳ Do not power off or use the camera in other means while an update is in progress.

Figure 6.5: Update

At first the update file is uploaded to the camera. The speed depends on the network connection between the user's computer and the camera. After the upload is completed, the update file is checked, and the update progress starts. It will take several minutes. Do not abort or disrupt the camera power while the update is running. The camera will reboot after the update is finished.

If something went wrong and the camera cannot start the new software version after the reboot, it will automatically revert to a backup of the old software, which is available again after a power cycle.

7 Service, maintenance and repair

The camera is maintenance-free and a closed system in which the user is not allowed to intervene.

In case of queries, malfunction or even defect of the camera, please contact the technical service listed below.

7.1 Cleaning

Clean the outside of the camera with a dry or slightly moistened soft cloth. Dust and solids should be removed carefully without scratching the glass front panel, especially around the lens.

	⚠ CAUTION
	↳ Do not use any special solvents or materials that may damage the camera, especially the housing, the glass front panel, the seals, and the connectors.

7.2 Service and support

Service hotline

You can find the contact information for the hotline in your country on our website www.leuze.com under **Contact & Support**.

Repair service and returns

Defective devices are repaired in our service centers competently and quickly. We offer you an extensive service packet to keep any system downtimes to a minimum.

Our service center requires the following information:

- Your customer number
- Product description or part description
- Serial number and batch number
- Reason for requesting support together with a description

Please register the merchandise concerned. Simply register return of the merchandise on our website www.leuze.com under **Contact & Support > Repair Service & Returns**.

To ensure quick and easy processing of your request, we will send you a returns order with the returns address in digital form.

What to do should servicing be required?

NOTICE	
	**Please use this chapter as a master copy should servicing be required!** ↳ Enter the contact information and fax the form together with your service order to the fax number given below.

Customer data (please complete)

Device type:	
Serial number:	
Firmware:	
Display messages:	
LED states:	
Error description:	
Company:	
Contact person/department:	
Phone (direct):	
Fax:	
Street/No:	
ZIP code/City:	
Country:	

Leuze Service fax number:

+49 7021 573 - 199

8 Decommissioning and dismantling

	⚠ CAUTION
	↳ In case of obvious damage to the camera which affects or may affect the safety and electromagnetic compatibility of the camera, and in case of a defect, the camera must be immediately taken out of operation or not operated at all and secured against inadvertent operation. ↳ Decommissioning includes immediately disconnecting the connection cables, dismantling the camera and repair by the manufacturer or disposal. ↳ Before dismantling, the camera's connecting cables must be disconnected.

9 Disposal

The camera contains electronic components that must be disposed of properly and therefore must not be disposed of with household waste.

Please return cameras to us for disposal. We will arrange for the disposal of these in accordance with the law and in an environmentally friendly manner.

	⚠ CAUTION
	↳ After taking the unit out of service for disposal, please delete all data stored on the SD card of the camera immediately.