BASIC MK2
Quick Installation Guide
v 1.16

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Index

Revision History

Rev	Date	Description	Author	Approved by
1.0	2022-07-11	First Version	F. Battistone, L. Bonisoli	Team review
1.1	2022-09-13	New template and updated properties	F. Battistone	Team review
1.2	2022-09-20	Updated some sections and changed some images	F. Battistone	Team review
1.3	2023-01-20	Added Advanced Configuration section	F. Battistone	Team review
1.4	2023-04-20	Added User section and Monitoring Events	F. Battistone	Team review
1.5	2023-05-03	Added some references to RMM	F. Battistone	Team review
1.6	2023-07-13	Improve lanes and ROI description	F. Battistone M. Zaffignani	Team review
1.7	2023-09-13	Overall improvements	F. Battistone M. Zaffignani	Team review
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1.11	2024-03-20	- Update Tattile logos - Improve ROI definition and lane/ROI configuration - Improve pointing procedure description - Improve transit detection modalities description	M. Zaffignani	Team review
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1.15	2024-06-18	- Add description of Scheduled Outputs - Add description of Calendars feature	M. Zaffignani	Team review
1.16	2024-08.28	- Minor fixes	M. Zaffignani	Team review

About this Document

Who this Document is for

User group	Description	Aim
Installer	Technician responsible for product installation in the traffic application	Supply all information about: • Mechanical installation • Electrical installation • Product maintenance
System integrator	IT administrator responsible for product integration, configuration and software development	Supply all information about: • Product characteristics • Product application

Typographic Conventions

Convention		Meaning
✓	Prerequisite	Preceding condition required before starting an action
►	Action	Single action
1.	Step	Action in a step-by-step procedure
-	Sub-step	Additional action within a step
→	Intermediate outcome	Intermediate result of a step in a procedure
→	Final outcome	Result of a step-by-step procedure
•	List	List item
-	Sub-list	Additional element of a list item
Save	UI element	Buttons, windows, tabs and other user interface elements
[CTRL]	Key	Keyboard strikes
true	Value	Inserted or selected value
Completed	Message	Program message

Special Notes and Warnings

Warning: <Type and source of danger>
Indicates an hazardous situation that, if not avoided, will result in death or serious injury.

- <Possible consequences (optional)>

► Preventive measure

Notice: <Type and source of danger>
Used to address practices not related to physical injury.

- <Possible consequences (optional)>

► Preventive measure

Info: <Information>
Useful suggestion or additional information.

1. Scope

The current document provides quick install instructions on configuration of the Basic Mk2 camera. The document is intended for personnel that need to operate the cameras.

The document doesn't include electrical connection, mechanical information, or safety instructions. These instructions are included in "RMM_00064 BASIC MK2 Reference Manual".

An external component that may be required for camera operation is the external IR illuminator whose electrical, mechanical and safety instructions are included in the "RMM_00049 External Illuminator Reference Manual".

1.1. References

- Camera Reference manual: "RMM_00064 BASIC MK2 Reference Manual"
- Illuminator reference manual: "RMM_00049 External Illuminator Reference Manual"

Info:
To get these manuals, Tattile Academy.

1.2. Description

The Basic MK2 camera provides Automatic Number Plate Recognition feature together with optional additional hardware and software capabilities.

The camera can be used in multiple applications, including parking, tolling and smart city. It provides different functionalities:

- Self-trigger mode;
- Number plate and country recognition;
- Configurable output protocols, metadata and image and formats;

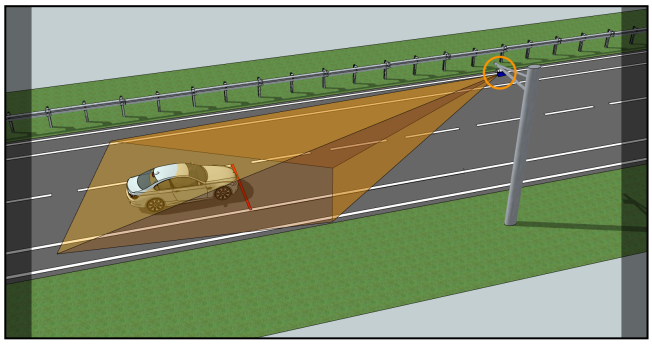
The output of the Camera can be integrated in various environment, allowing to provide metadata and images for each passing vehicle. The camera can be configured to operate with multiple trigger sources or to operate stand-alone with self-triggering mode.

1.3. Geometry and connections

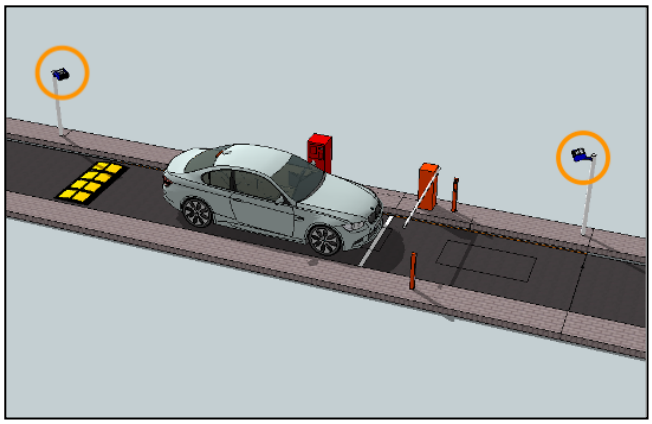
The Camera is connected as described in “RMM_00064 BASIC MK2 Reference Manual”. The exact installation layout depends on the project requirements and on the application. It comes with pre-configured optics and focus; thus, no further mechanical configuration is needed after a correct installation.

The following drawings show some examples of possible installation layouts of the ANPR camera.

Roadside installation.



Parking access control, with front and rear reading.



1.4. Data processing

Images are continuously captured and processed in the camera, without the need for external processing or external triggering system; however, the system can be optionally configured to work triggered.

The system is configured via web interface and via APIs. The web interface configuration allows to set all the system parameters, read device status, upgrade, and manage the system.

The camera processes the images to detect a passing vehicle, and it collects and processes all relevant data such as reading the plates, estimating vehicle direction..., and additional features. Image capture parameters are automatically adjusted by the device to maintain correct levels of illumination both during the day and during the night.

For each processed vehicle the camera provides the output metadata and images. Data are then sent to the Traffic Controller to be further handled by the system integrator. Temporary network failures are managed by local buffering until the data can be safely sent to the receiver.

2. Installation Workflow

The camera installation includes the following steps:

1. Mounting the system
2. Accessing the device
3. Network configuration
4. Camera pointing and installation
5. Device configuration
6. Configuration of output events

Info: Read the “RMM_00064 BASIC Mk2 Reference Manual” carefully before installing the camera.

2.1. Tools

The table lists the suggested tools to use during installation.

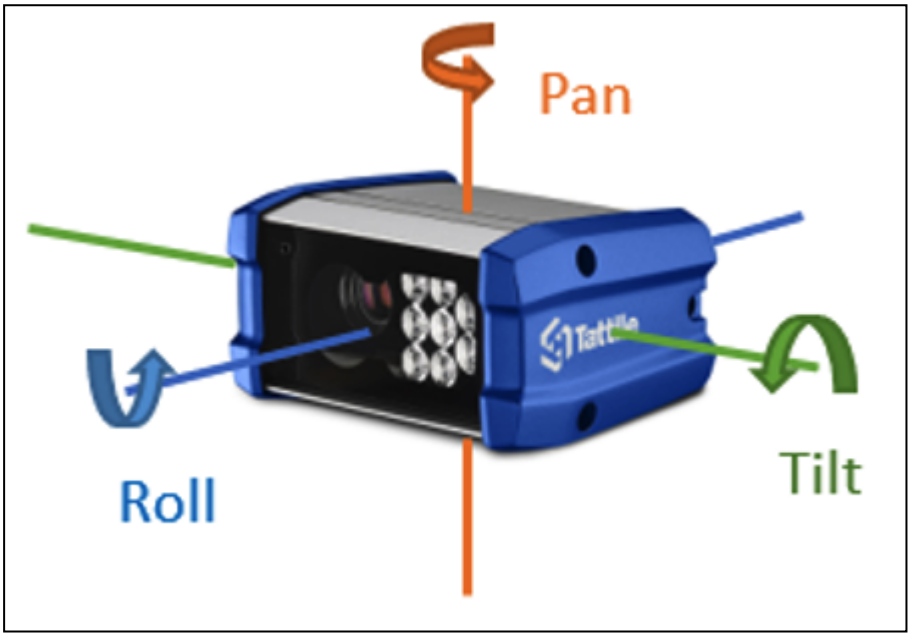
Tool	Description
Traffic cone	The traffic cone is needed to mark the center position on the lane
Distance meter	To measure the correct distances is recommended to use a measuring tool for camera height, offset from lane center and lane width.

3. System setup

The system must be properly installed and configured by following the guidelines described in the current chapter.

3.1. Reference system

The rotation angles of the camera are described as in the image below.



- **Roll**: rotation on the optical axis.
- **Tilt**: rotation on the transverse axis.
- **Pan**: rotation on the camera vertical axis.

3.2. Mounting

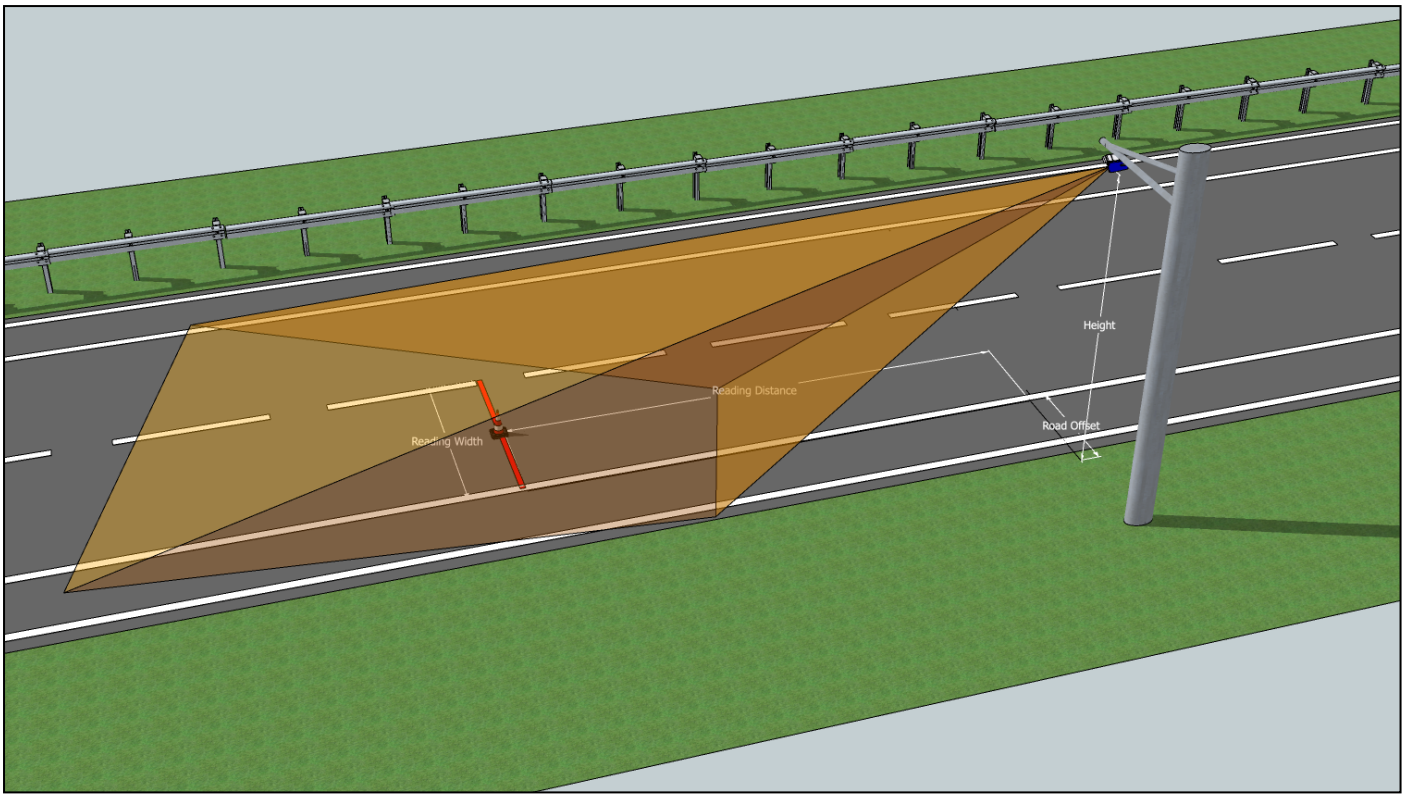
3.2.1. Positioning the Camera

The camera layout is defined by a few parameters that must be defined during project definition; depending on the intended application, the camera can be installed on gantry or roadside poles.

The camera comes with pre-configured optics and focus; thus, no further mechanical configuration is needed after a correct installation.

The main parameters are:

- Installation Height: height of the camera from the road plane.
- Reading Distance: distance along the driving direction of the reference position for reading a plate.
- Reading Width: width of the field of view at the reference position.
- Road Offset: offset of the camera from the beginning of the analyzed area.



Mounting the camera:

- Install the camera at the defined Camera Height and Road Offset.
- Be sure of the absence of obstruction of the camera field of view to allow the camera to fully analyze the images and to maximize camera performances.
- Further operations require the access to the web page, described in next chapters

Info:
See “RMM_00064 BASIC Mk2 Reference Manual” for more details on the mounting of device.

3.2.2. Optional External Illuminator

Optionally, the camera can control an external illuminator; it provides additional light to correctly detect and read the plates, often in case of non-reflective plates, or long reading distances. The wavelength, power and aperture angles shall be defined together with the project definition to match the Camera characteristics.

The external illuminator must be connected to the Camera as described in the Camera Reference Manual (“RMM_00064 BASIC Mk2 Reference Manual”) and in the External Illuminator (“RMM_00049 External Illuminator”) documents. The Camera communicates with the external IR illuminator by using a RS485 serial port and the strobe out signal.

3.3. Accessing the device

The camera can be accessed with any web browser with the default credentials shown below. After the first access, it is suggested to change the user password.

Factory default configuration:

Parameter	Default value
IP address	192.168.0.21
Netmask	255.255.0.0
Username	superuser
Password	superuser

In case the network configuration is unknown, the Pathfinder tool allows a broadcast network search (local network only) and temporary configuration of basic network parameters.

The Pathfinder saves the network parameters in the volatile memory of device, to set these permanently it is necessary access to the web interface and save the network configuration changes.

For more information refer to Tattile Academy or “RMM_00064 BASIC Mk2 Reference Manual”.

3.3.1. Accessing to the camera storage by FTP

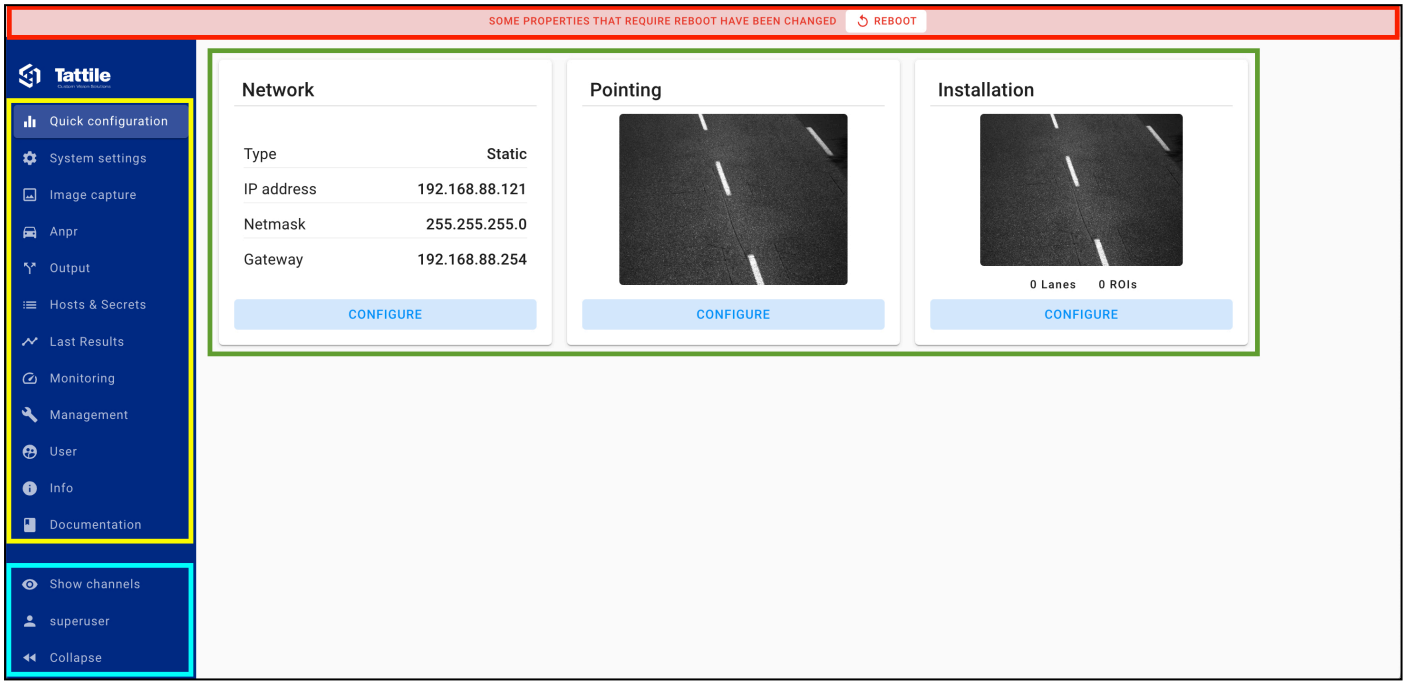
The public camera storage can be accessed by FTP protocol using the default following parameters:

Parameter	Default value
Port	21
Username	tattile
Password	tattile

In the "Services" section of the "System settings" page the FTP protocol can be disabled and the default parameters can be changed.

3.4. Homepage

Upon successful login, the web interface shows the homepage as below:



The area indicated by the red rectangle is visible when some properties that require reboot have been changed, the camera configuration menu is indicated by the yellow rectangle, the quick configuration menu is indicated by green rectangle while the light blue rectangle indicates the quick view menu.

3.5. Quick Configuration Menu

It provides easy access to the basic configuration options:

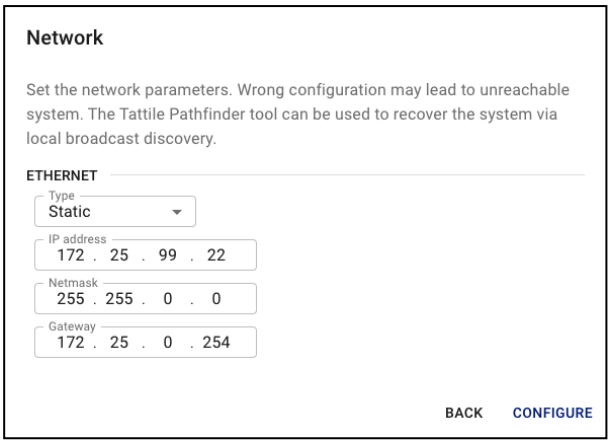
- Network configuration
- Point the camera
- Region of Analysis and Lane configuration

3.5.1. Network configuration

3.5.1.1. Quick network configuration

Info: Web App
Quick installation menu / Network section

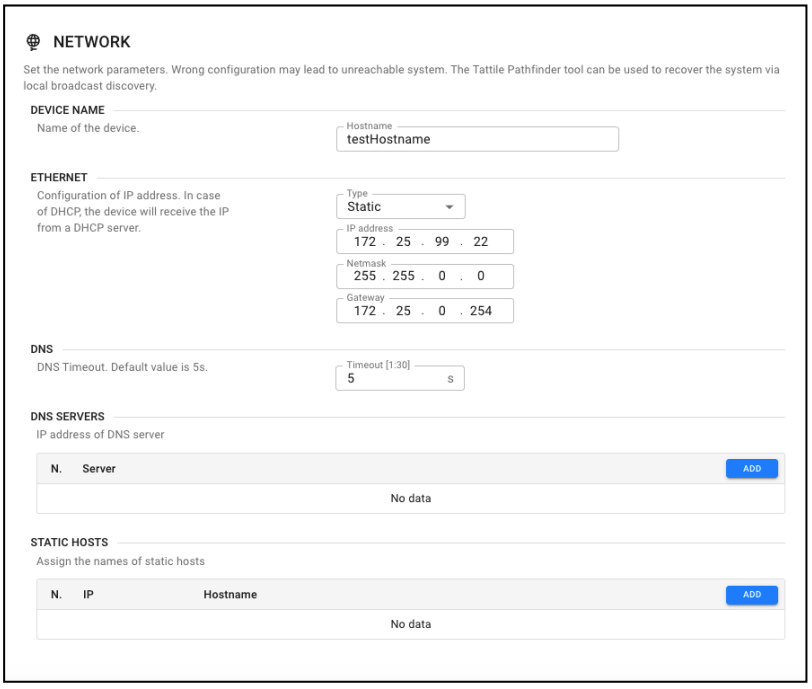
1. Click on the CONFIGURE button on the quick setup page, or access the network menu
2. Set the “IP Address”, “Netmask”, “Gateway” accordingly to the desired network configuration.



3.5.1.2. Complete network configuration

Info: Web App
System Settings Application / Network Section

1. Set the “IP Address”, “Netmask”, “Gateway” accordingly to the desired network configuration.
2. Add the “DNS server” IP address to allow the camera to resolve host names.

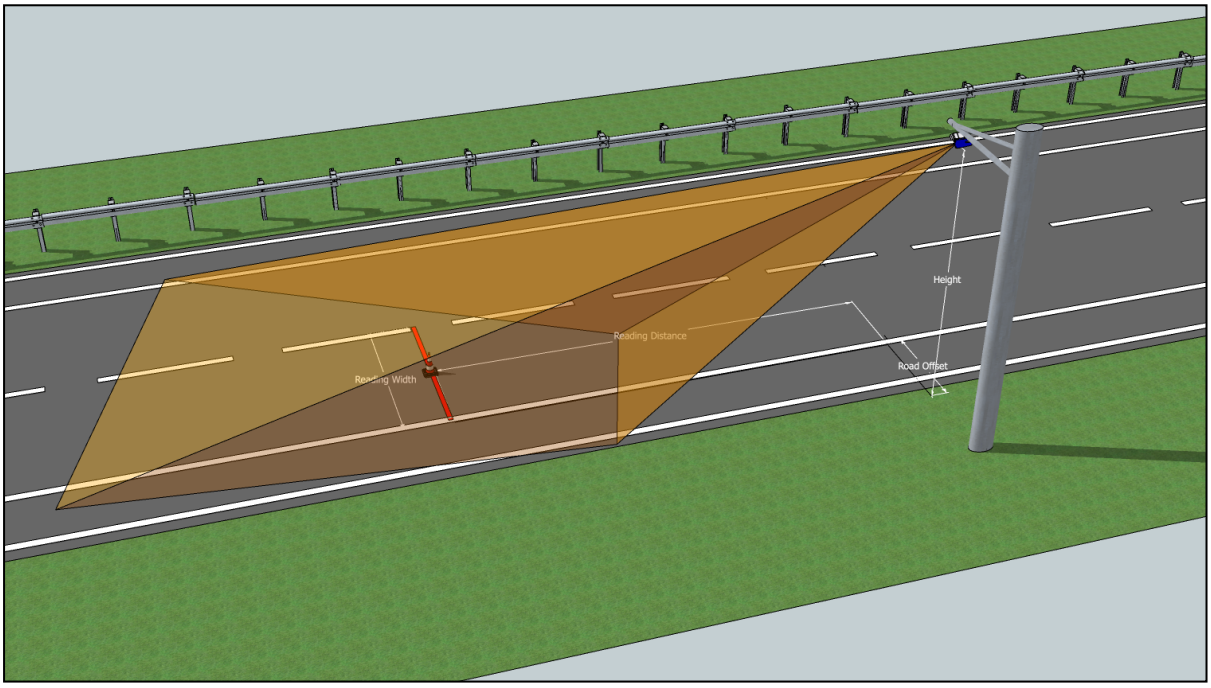


3.5.2. Pointing the camera

Info: Web App
Quick configuration menu / Pointing

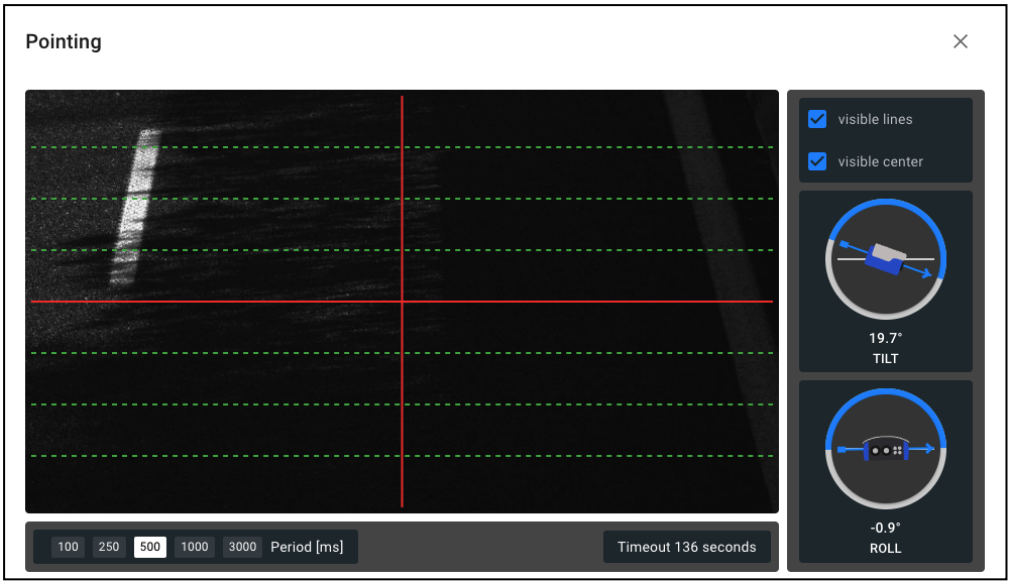
With the camera mounted at the proper height and road offset, and with correct image capture parameters, to correctly point the camera proceed as described below.

1. Put a traffic cone on the road, at the Reading Distance as in the image, in the middle of the reading field (Reading Width). Alternatively, you can use a vehicle centered in the lane as reference.



2. Access the QUICK CONFIGURATION menu and click on the “configure” button in the Pointing section.
3. Point the camera such as the marker cone is centered as in the image as below. Use the “Visible Center” option to show the target lines.
4. Adjust the camera to minimize the rotation angle of the plate; optionally you can use the “Visible Lines” option to show the horizontal lines.

The image below shows an example of setup. The cone is in the center of the analyzed area, that is, on the road markings.



3.5.3. Lane configuration

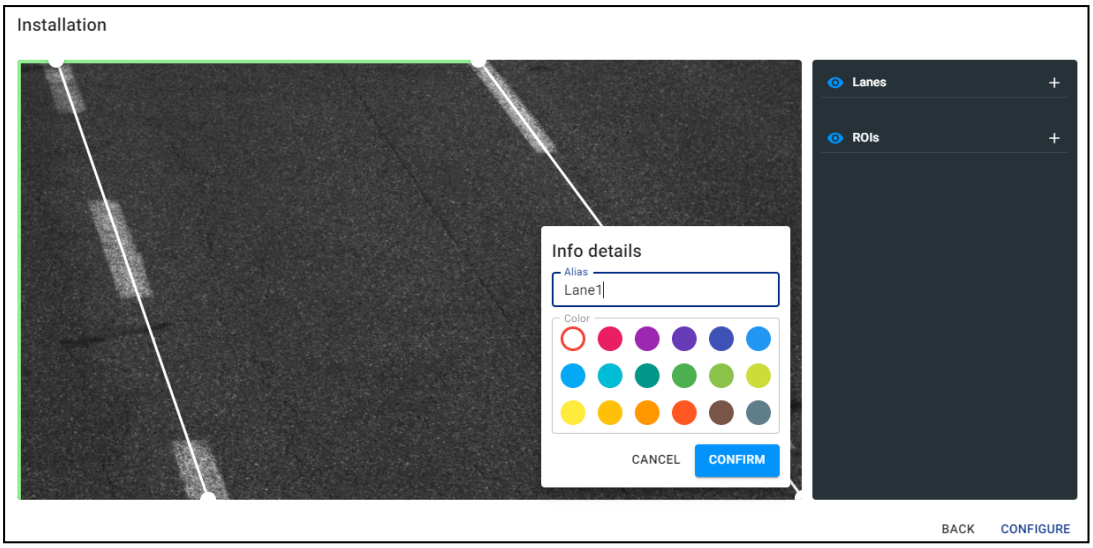
Info: Web App
Quick configuration menu / Installation

The Lanes configuration defines the physical lanes of the road. It is possible to configure one or more lanes according to the camera type and to assign an Alias to each configured lane.

Lanes configuration is used by the camera to optimize ANPR results and to report lane information associated to the transit vehicles.

Lanes configuration does not affect transit generation process.

1. Open Quick Configuration menu and press on configuration button in Installation section.
2. In the pop-up press “+” of Lanes section and select the two contours of the lane. Insert an Alias, a target color and press on confirm.



3. Press on Configure.

For each generated transit, configured Lane Aliases are shown in the Last Result page and can be retrieved using tags.

3.5.4. Region of Interest configuration

Info: Web App
Quick configuration menu / Installation

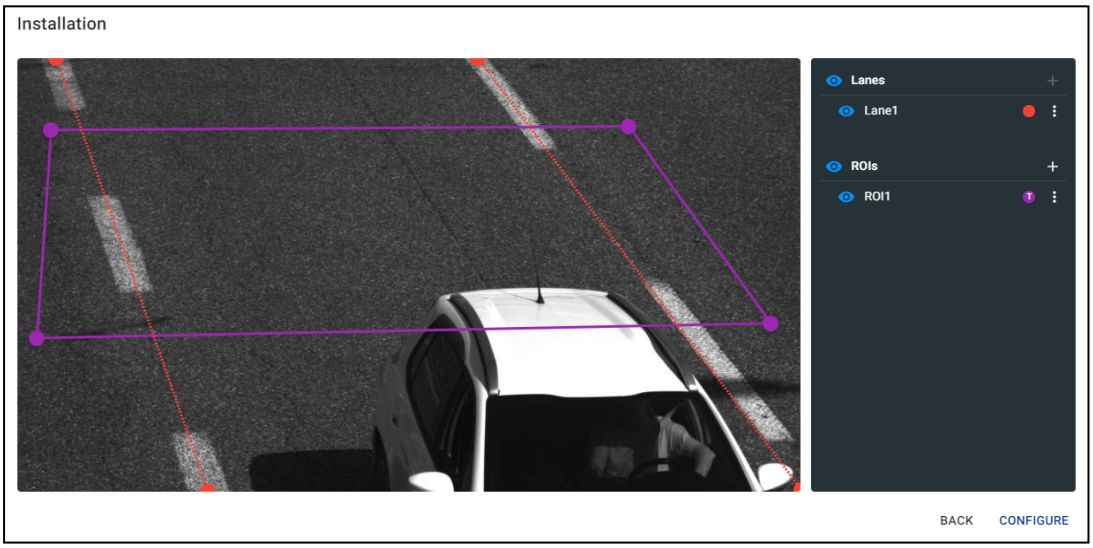
The Regions of Interest (ROI) represent areas of the image where the vehicle must pass for the transit to be generated. Configuration of ROI is useful to exclude portions of the image where transit should not be generated.

Moreover, when a ROI has been drawn, by configuring the Image Selection Mode parameter as "Detection ROI" (as described in "Transit Image Selection" on page 27 Section), the transit image will be chosen with the vehicle inside the ROI (and the transit plate read). This is of particular interest in those applications where the transit plate should be read in a specific portion of the image.

Please consider that configuration of the ROI is not directly related to Lane configuration.

1. Open Quick Configuration menu and press on configuration button in Installation section.
2. In the pop-up press “+” of ROI and select the four corners of the region of analysis. Insert an Alias, a target color and press confirm.

3. Press on Configure.



4. Configuration

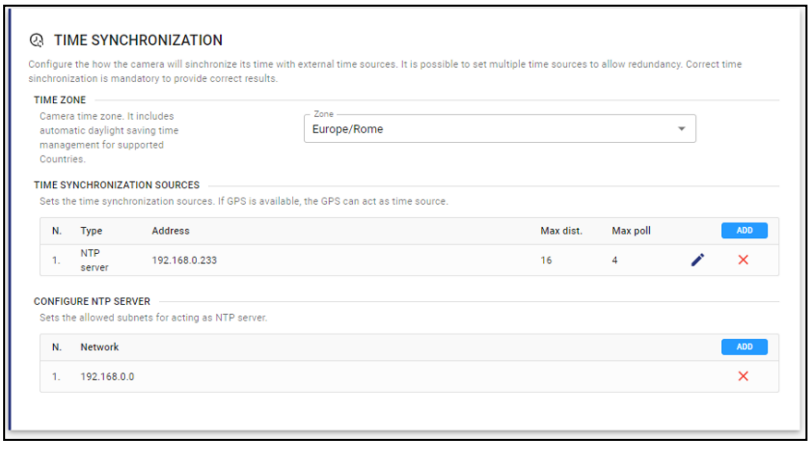
The Configuration sections allow to configure the device. When changing one or more options, a blue button appears on the bottom right of the browser window. To validate, save and apply the changes, press the blue button. If some parameters can't be applied run-time and the camera needs a reboot, the top red bar will show as a reminder.

4.1. Time synchronization

Info: Web App
System settings / Time synchronization

To provide reliable timestamping to the events the device must be synchronized with a time reference server. The correct time synchronization allows the data sent to the system integrator to be correctly referenced to other data provided by different systems and assigned to the same vehicle.

1. Set the correct local time zone in the "TIME ZONE" section.
2. Set the NTP time server address or name in the "TIME SYNCHRONIZATION SOURCE" section.
3. Optionally the camera acts as a time server. Use the "CONFIGURE NTP SERVER" section to configure the allowed networks.

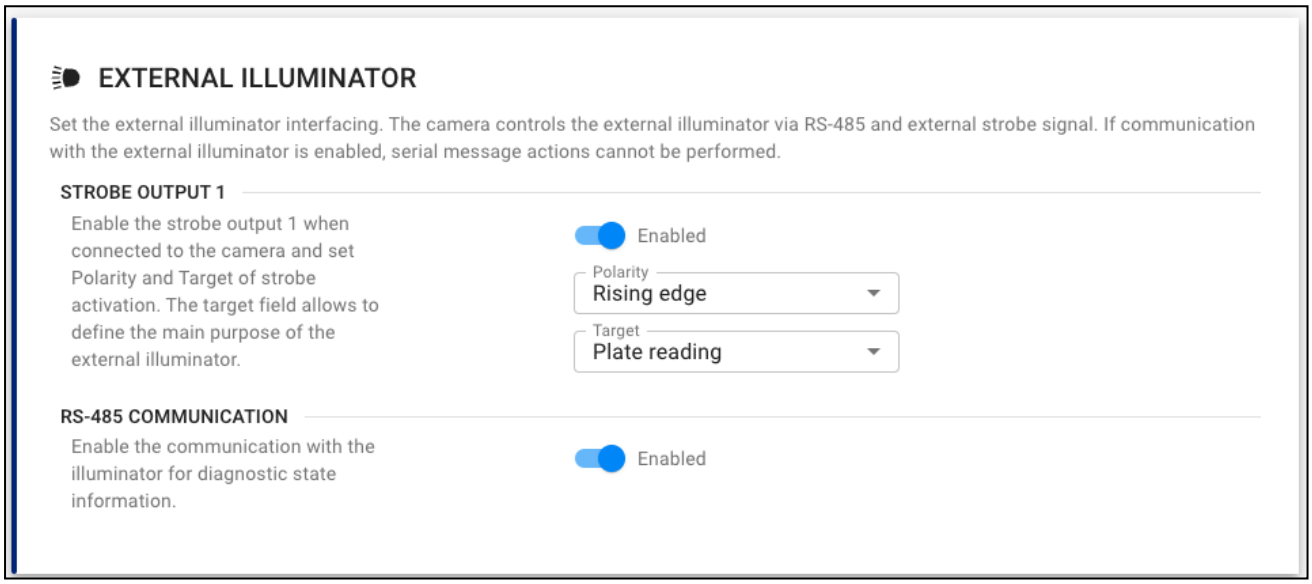


4.2. Optional external illuminator

Info: Web App
System settings / Illuminator

The external illuminator is pre-configured to provide additional light. It is directly controlled by the camera.

1. Verify that the illuminator is enabled on “Falling Edge” signal, and RS-485 serial communication is enabled.



4.3. Image Capture on OCR channel

Info: Web App
Image capture / Main Channel

The Camera imaging subsystem is in charge to provide adaptive capture parameters to compensate any light change, shadow, glares and obtain the best images to be processed for reading plates. The camera comes configured but depending on specific conditions they can be adjusted.

4.3.1. Automatic Exposure

The default working mode, “Automatic”, uses an Automatic Exposure (also known as Autoiris) algorithm to provide automatic compensation of capture parameters, given the configured “Target Luminosity Level”, that is the equalized target luminosity level of the image (0% to 100%). The camera will change automatically gain and exposure values to maintain the luminosity level required by the “Target Luminosity Level” parameter with the defined time to reach the target a defined by light control speed.

1. Set the camera in “Automatic” mode. Apply the following default parameters:

Parameter	Value
Target Luminosity	25 %
Minimum exposure	3 us
Maximum exposure	1000 us
Minimum gain	128
Maximum gain	368
Convergence time	30 s
Fixed strobe time	OFF
Strobe duration	[1000] us
Autoexposure window	Limit region of analysis if needed

   The default values provide standard configuration that fits general use, and no changes should be required unless specific installation conditions may require, to provide enough light in the field of view.

2. The “Target Luminosity” can be increased to allow the system to reach a higher image luminosity level.

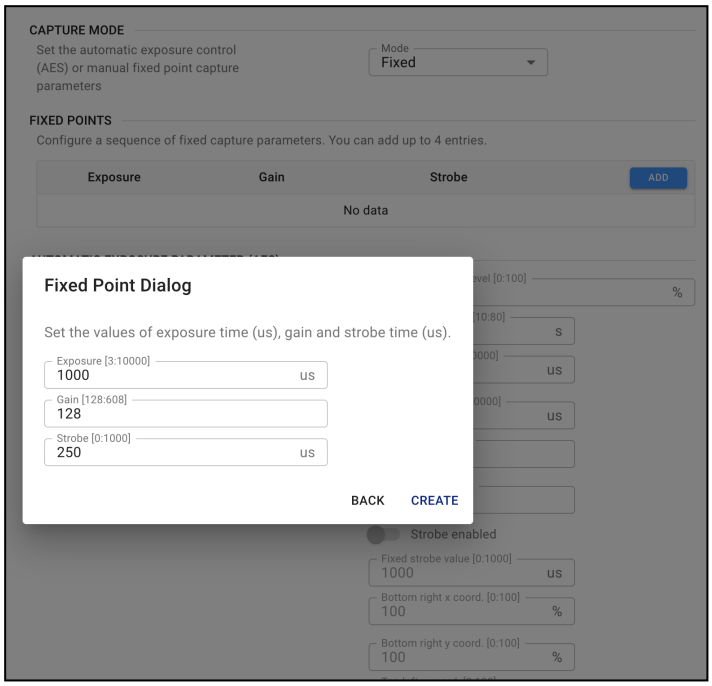
3. The “Maximum Gain” and “Maximum Exposure” set the upper limits of the automatic parameter adjustment and can be decreased to limit saturation of images, especially during the night with low height camera installation.

4. The external illuminator light duration is automatically controlled by the camera within the same process. The “Fixed Strobe time” and “Strobe duration” allows to fix the duration of the light impulse regardless the duration of the exposure time. This configuration is useful to avoid visible flickering when illuminator light is visible or infrared 730nm.

5. The presence of structures or objects that don’t relate with the road surface, such as portion of the gantry, might interfere with the automatic evaluation of the illumination level. It’s important to exclude these structures from the scene luminosity evaluation by changing the region of analysis defined by the “Auto Exposure Window” configuration.

4.3.2. Fixed Exposure Mode

The camera can be configured in “Fixed Mode” to use fixed capture parameters. It’s possible to manually define exposure time (shutter), sensor gain and strobe impulse duration. Maximal four fixed points can be defined.



4.4. Transit Detection

Info: Web App
Anpr /Transit Detection

Define the transit detection mode. In Automatic mode the system generates a transit for each processed vehicle. In the Network mode and in the Digital Input mode the system provides results upon the reception of a trigger message or trigger signal respectively.

The available modes are suitable for many applications and system configuration. The following section describe their main features.

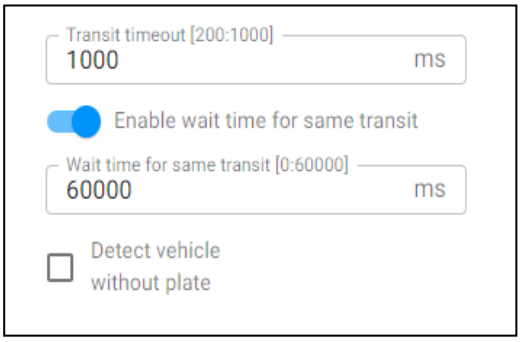
4.4.1. Automatic Transit Detection

When the automatic transit detection mode is enabled, the camera automatically generates an Event when its internal processing generates a result. Few parameters can be configured: the “transit timeout“, and the “wait time” for same transit.

The timeout value is the possible maximal duration of transit, that is, the time within the camera decides that a detected object is a vehicle to be processed.

The wait time is the minimal time between two consecutive transits of the same object. It limits the frequency of generating the same result when a vehicle is stopped in the camera field of view.

By enabling the "Detect vehicle without plate" option, the camera will generate transits also for vehicle without plate.



4.4.2. Network Transit Detection

The camera configured in network mode, receives a network trigger. Upon receiving the trigger, it provides the result according to the configuration shown below. The following parameters can be used to configure the type of network trigger:

- Single shot: if enabled, the camera processes only one image for plate detection and reading, acquired at trigger signal reception. Based on reading result, the output might contain a plate reading or a no plate in case no plates are found (e.g.: no vehicle within the trigger time frame).
- Emit same transit for multiple triggers: when disabled, if the camera detects the same object, it will generate only the first result. Subsequent triggers will provide a “no plate” results.
- Emit multiple transits for single trigger: when the trigger is received and the camera finds multiple results, it will generate multiple results with the same trigger identification.

The command to send a network trigger is described in the APIs Description Manual.

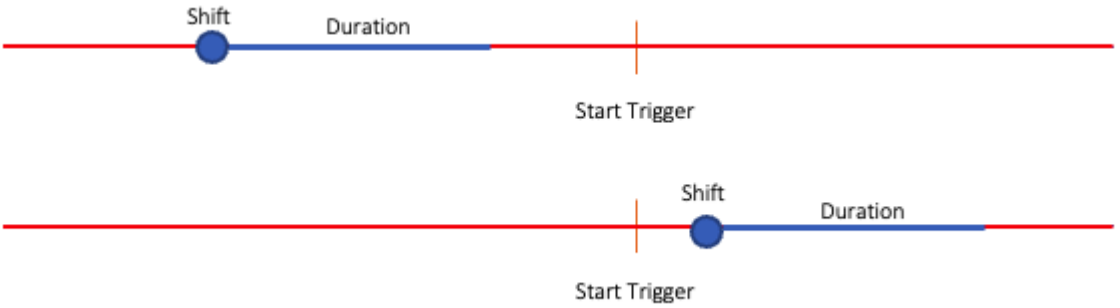
4.4.3. Digital Input Transit Detection

Set the digital input mode between the following types:

- Start & Stop: it is possible to define a “previous time” value to anticipate the start trigger and a “post time” value to delay the stop trigger. The maximal distance between the previous time and the post time is equal to the transit timeout.

- Single shot: the camera expects only a trigger signal to acquire an image and detect/read the plate.

- Start with duration: the camera expects the start trigger, and the duration of the processing is defined by the “duration”. The shift parameter allows to delay or anticipate (negative values) the trigger management to compensate external trigger delays.



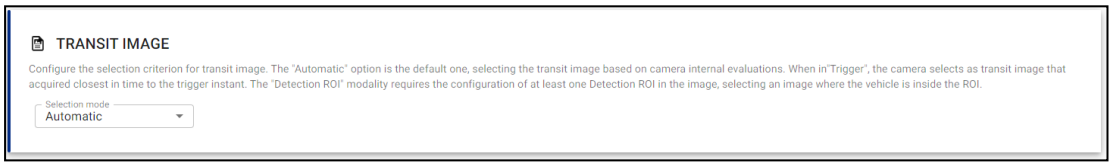
4.5. Transit Image Selection

Info: Web App
Anpr / Transit Image

Define the criterium for transit image selection.

By default the camera is configured in "Automatic" Selection mode, which means that the transit image is selected according to camera internal evaluations. In case a Transit Detection ROI has been configured as described in "Lane configuration" on page 18, if the Selection mode is configured as "Detection ROI", the camera selects a transit image where the vehicle is inside the configured ROI.

Regardless the selected configuration, the camera favours the selection of an image where the transit plate has been read.



4.6. Local Storage management

4.6.1. Partitioning configuration

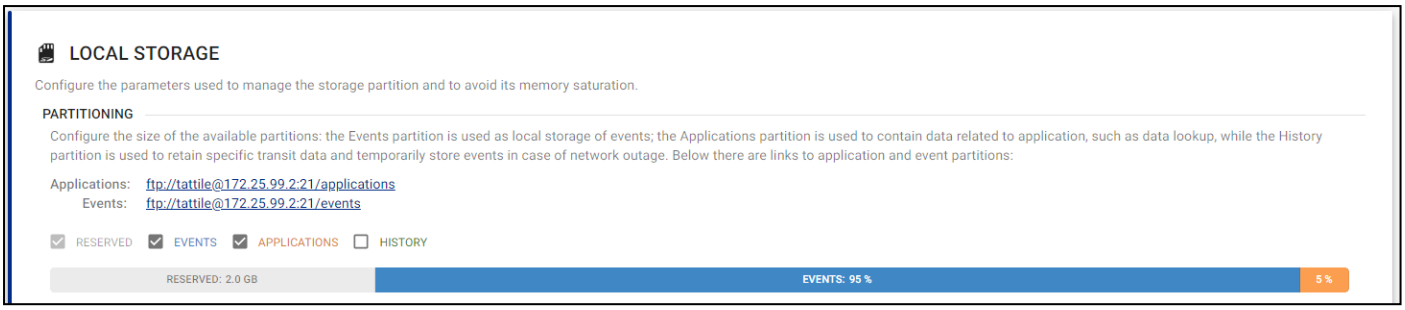
Info: Web App
System Settings / Local Storage

Configure the partitioning of the available local storage.

The camera comes with a preconfigured partitioning of the available local storage, which can be modified by the user according to his needs.

The camera storage is divided in four partitions with the following meaning:

- RESERVED: this partition is reserved for camera internal use, with a fixed size and cannot be disabled or modified.
- EVENTS: this partition (with a default size of 95% of available storage space) is used as local storage of events configured to be saved on the camera. It can be accessed via FTP.
- APPLICATIONS: this partition (with a default size of 5% of available storage space) is used to contain data associated to application functioning (eg. configured data lookup). It can be accessed via FTP.
- HISTORY: this partition (disabled by default) is used to temporarily store buffered actions which cannot be immediately executed (for example in case of temporary network outage) or to retain specific transit data configured by the user.



In order to enable or disable a partition, click on the associated button and then use the slider to define its size.

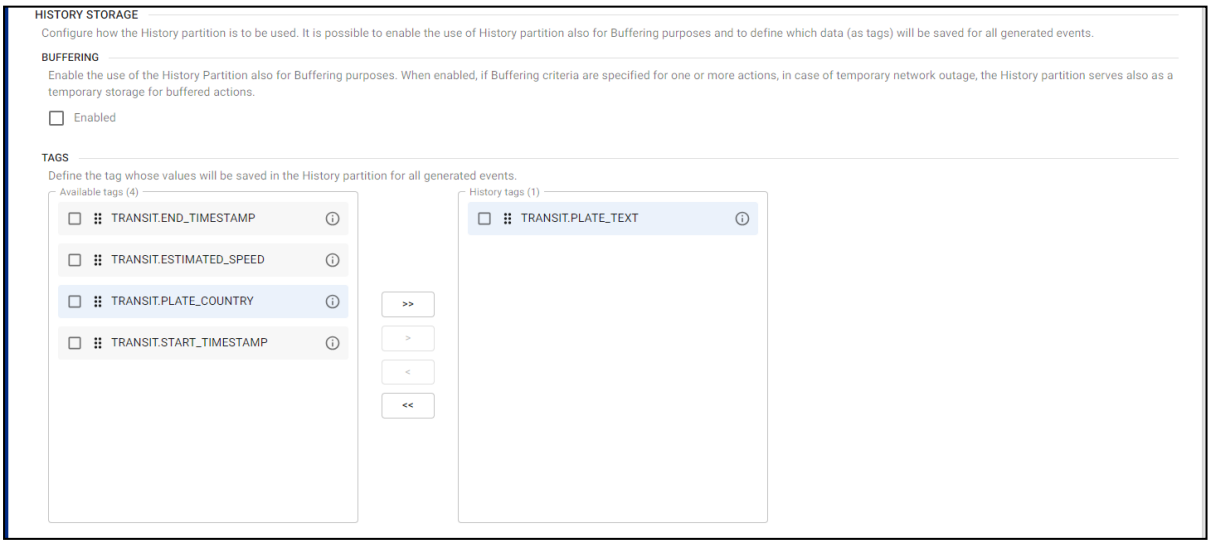
4.6.1.1. Events partition configuration

Once enabled the Events partition, the policy used to retain the locally saved events can be configured. In particular, it can be specified if the oldest or newest transit have to be maintained and if the saved events must be removed after a specific time period (in this case, the "Unlimited retention hours " parameter have to be unchecked and the retention period in hours must be specified.

4.6.1.2. History partition configuration

Once enabled the partition, it is possible to enable the use of this partition of Buffering purposes. This will apply to those Action with a configured Buffering criteria in Events definition.

Moreover, the data that will be saved for all generated transits (under the form of tags) can be configured. When one or more tags are added to the stored data, the user will be able to access those pieces of information in the Last Result Web Page or via REST API.



For the storage monitoring, refer to "Monitoring storage" on page 48

4.7. Output Data

Info: Web App Output

The processing results can be sent to remote recipient by configuring the Output section. The device provides multiple protocol options and customizable payload with different metadata, including the image of the passing vehicle.

The Events Handling section is structured as below:

1. Messages: configure the message format and content. Here you can define multiple message templates to be used in the Action section.
2. Actions: configure the actions to be executed when an Event is verified; for example, to send data via ftp or save on local storage.
3. Events: configure the execution of actions when an event occurs.

The Advanced Configuration can be optionally used to customize tag's behavior, format and content by accessing the following tabs:

1. Formatters: define the properties of a generic type (Boolean, Image, Number, String and Timestamp). E.g.: for an image you can define the type, its quality, the overlays to include and the header TAGs.
2. Tag Types: assign the format defined above as default format for a tag type.
3. Tags: assign the format defined above to a tag that can be used in the Message.

4.7.1. Tag Definition

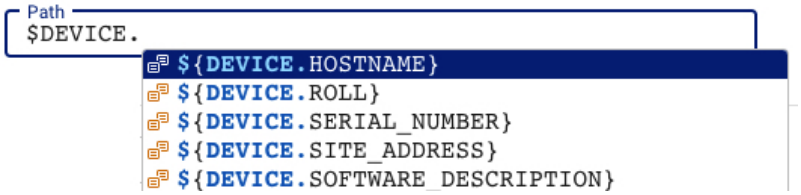
The tags are placeholders for dynamic data that the camera will replace whenever needed. They provide a flexible way to generate messages content, filenames, pathnames, image overlays, image headers, etc. The tags are identified by the *${..}* text format ant it is composed as follows:

*${*context.name*}*

- The **context** indicates the group to which the tag belongs. E.g. the context “DEVICE” contains data related to device (like the serial number); or the context “TRANSIT” contains data associated to the detected object (plate number or timestamp) that might change for each passing vehicle.
- The **name** indicates the information contained in the tag.

The tags list is available in the “TAGs Description Manual” and on the online documents on the web page.

Each time you insert the “$” symbol, the autocomplete function will provide suggestions on the available tags, as in the example below:

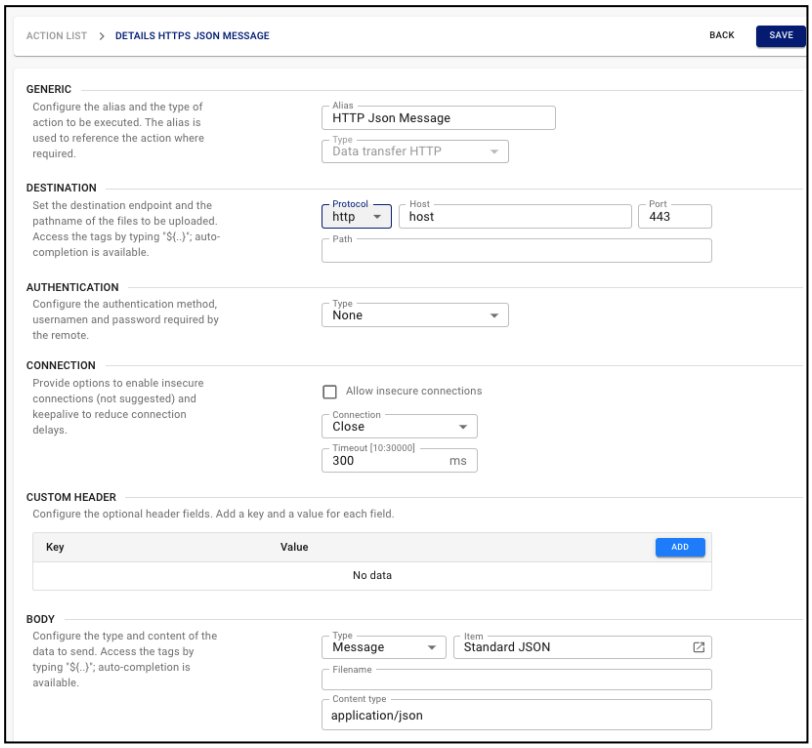


4.7.2. Messages, Events and Actions

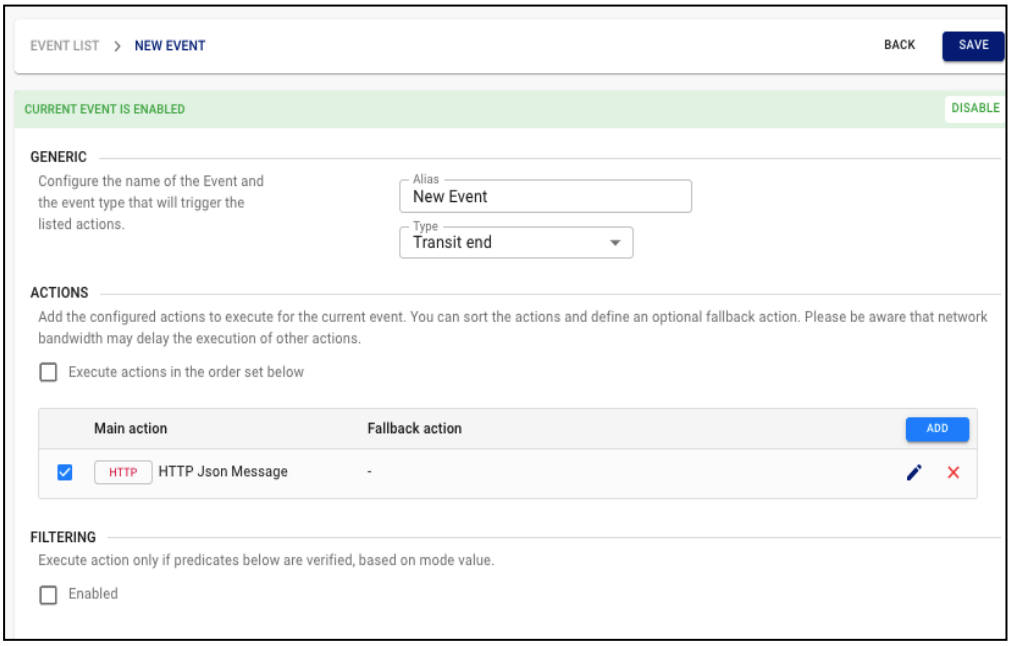
An example to configure the HTTP output by the Output Manager menu of the web interface:

1. In Messages section the defined messages are shown. To define a new message press Add and, in the new page, define an alias. The content box contains the default message in Json format. Press Save to create the new configured message.

2. In the Actions section the defined actions are shown in the list; to configure a new action: press Add, insert an alias, set the type of action to HTTP and the information of the destination end-point. It is possible to add the defined messages in the body section.



3. In the Event section all available events are shown. The "Event type" allows to define which event will trigger the execution of the configured actions. To configure a new event, insert the name of the Event and the Event type; add the actions of interest created and press Save button.



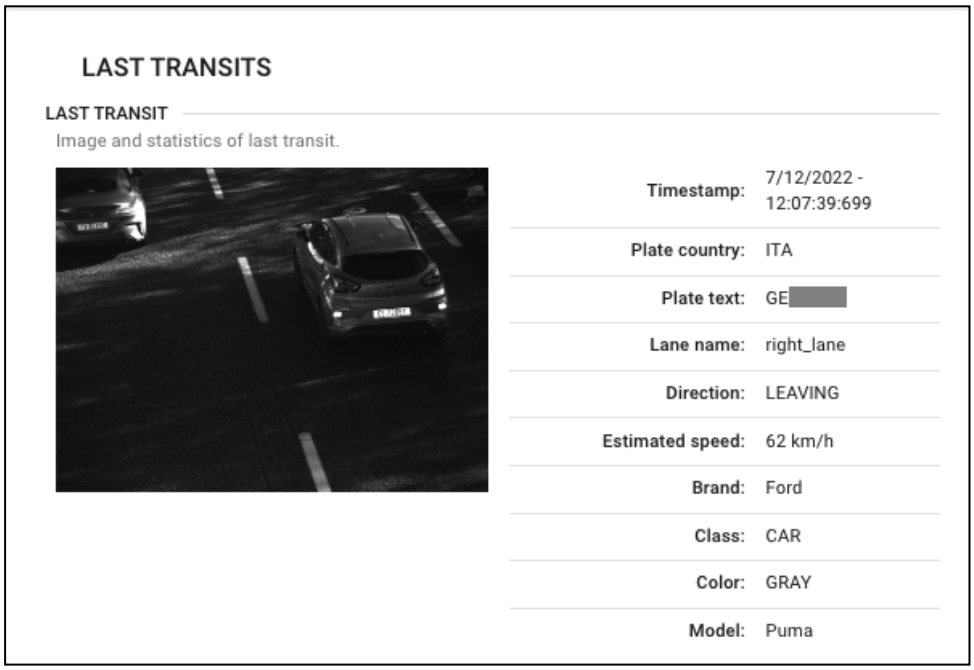
4. The output configuration is complete. Wait the first transit and check if the result is available at the destination defined in the action section.

4.8. Check result

Info: Web App
Last Results

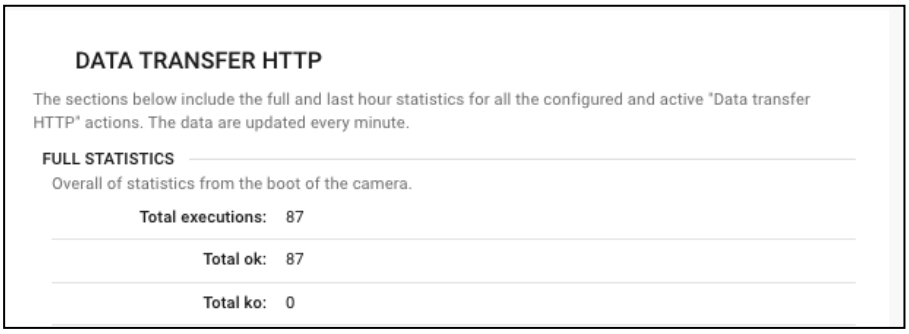
The “Last Results” web page shows the last transit results and the statistics of the transits acquired in the last 24 hours.

If the system is properly set, the section "Last transit" shows the last detected vehicle and the information obtained like plate text and plate country.



Info: Web App
Monitoring / Data transfer http

The section "Data transfer http" of the "Monitoring" web page can be used to check the configuration of the action and event. If these are properly set the counters of the "total executions" and "total ok" increase for each new transit.



5. Advanced Configuration

Other the standard configuration, there are some advanced services can be enabled to use relative implemented features.

5.1. Data Lookup

The Data Lookup are lists of plates that are checked each time a new transit is generated. If the plate of this transit is present or not in these lists, different actions can be executed.

The camera can upload one or more lists that can be stored on camera or on a remote FTP server.

A file (stored on camera or on a remote server) defines a correct data lookup if each its row follows the syntax

Pattern for plate; Pattern for country; Customer Description

and these construction rules:

- The camera deletes irrelevant spaces.
- The three fields must be separated by the ";" (semi-colon) character.
- The character "#" is the wildcard, this special character can be used in the pattern string to specify that a number or a literal character can be in its position.
- The pattern for country must be composed by three CAPITAL LETTERS. The standard used for the country code is ISO 3166-1.
- The customer description is a string of maximal 64 characters.

The following example describes a valid data lookup:

AB134HK; ITA; Description1 BS46588; ###; Description2 FP#####; ###; Description3

The first row in the example matches vehicles with defined plate and country. The second row matches all vehicles with the defined plate of all countries.

Finally, the last row matches all transits where plate starts with "FP".

5.1.1. Configuration

Info: Web App
Anpr / Data lookup

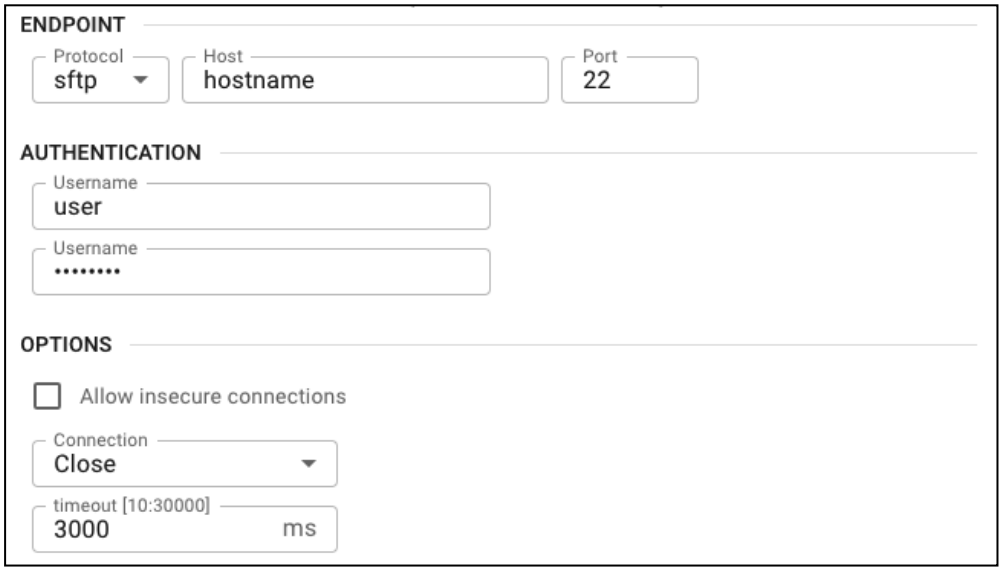
Notice:
The FTP service is necessary to enable and use the Data Lookup service.

In the Datasources table can be added all data lookup lists to use when a transit is complete. Each data lookup is defined by the following parameters:

- An **Alias** that identifies the data lookup list.
- A **Reload period** (express in minutes): the data lookup is periodically updated based on this parameter.
- The **Type** of datasource can be set to "Local" to load a file stored on camera, or set to "Remote" to load a file stored on a remote FTP server.
- The **Relative path** is the location of the file to load.

The Data Lookup file can be uploaded on the camera accessing by ftp to the following path "*applications/datalookup*".

If the Data Lookup is stored on a remote server, it is necessary configure a FTP/SFTP connection by the parameters shown in the following image.



5.1.2. Tags for Data Lookup

The camera keeps the service's output in four repeatable tags that contain, for each defined data lookup, a tuple of <alias data lookup, value>:

- DATALOOKUP.MATCHED, is TRUE when the plate matched with an entry of the data lookup, FALSE otherwise;
- DATALOOKUP.PATTERN contains the pattern for plate associated to the matched entry
- DATALOOKUP.COUNTRY contains the pattern for country associated to the matched entry;
- DATALOOKUP.DESCRIPTION contains the description associated to the matched entry.

To get the tag's value it necessary insert, after the tag name, the special character "@" and the alias of the required data lookup.

For example, by

${DATALOOKUP.MATCHED@DataLookup_1}

the value can be used in the message, actions or events.

5.2. Scheduled outputs

Stark cameras can be configured in order to generate output Events at specific timing or periodically, according to the defined scheduling rules.

Schedules represent the timing rules which must be verified for the corresponding actions to be executed. Schedules can be of two types:

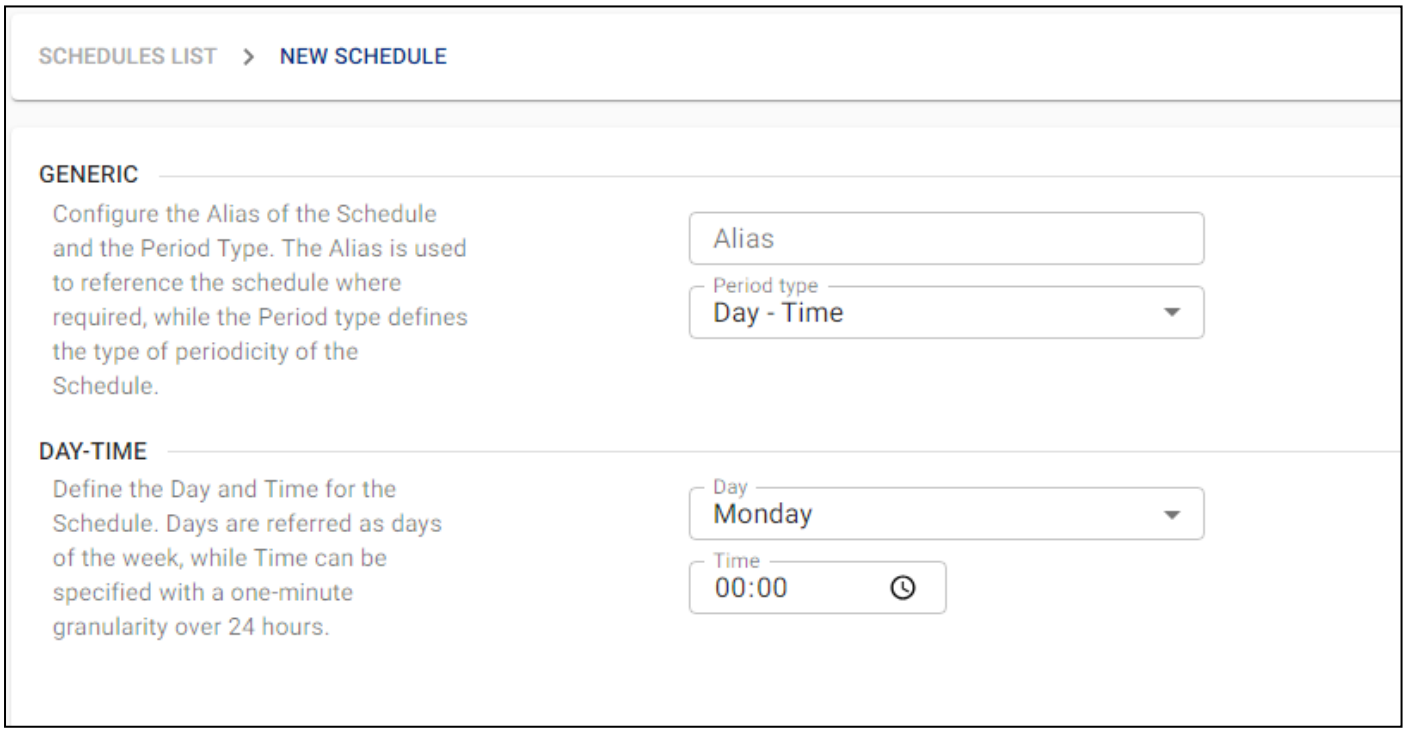
- Day-Time: actions associated to the Scheduled Output Event are executed at the configured date and time.
- Interval: actions associated to the Scheduled Output Event are executed periodically, according to the defined periodicity interval.

5.2.1. Configuration

5.2.1.1. Schedule configuration

Info: Web App
Output / Schedules

In the Schedules section it is possible to add one or more schedules, each one with its Alias.



If the **Period type** parameter is set to "Day - Time", it is necessary to define the Day of the week and the Time (hour and minute) for Scheduling execution.

If the **Period type** parameter is set to "Interval", the user must specify the recurrence of Scheduling execution in minutes.

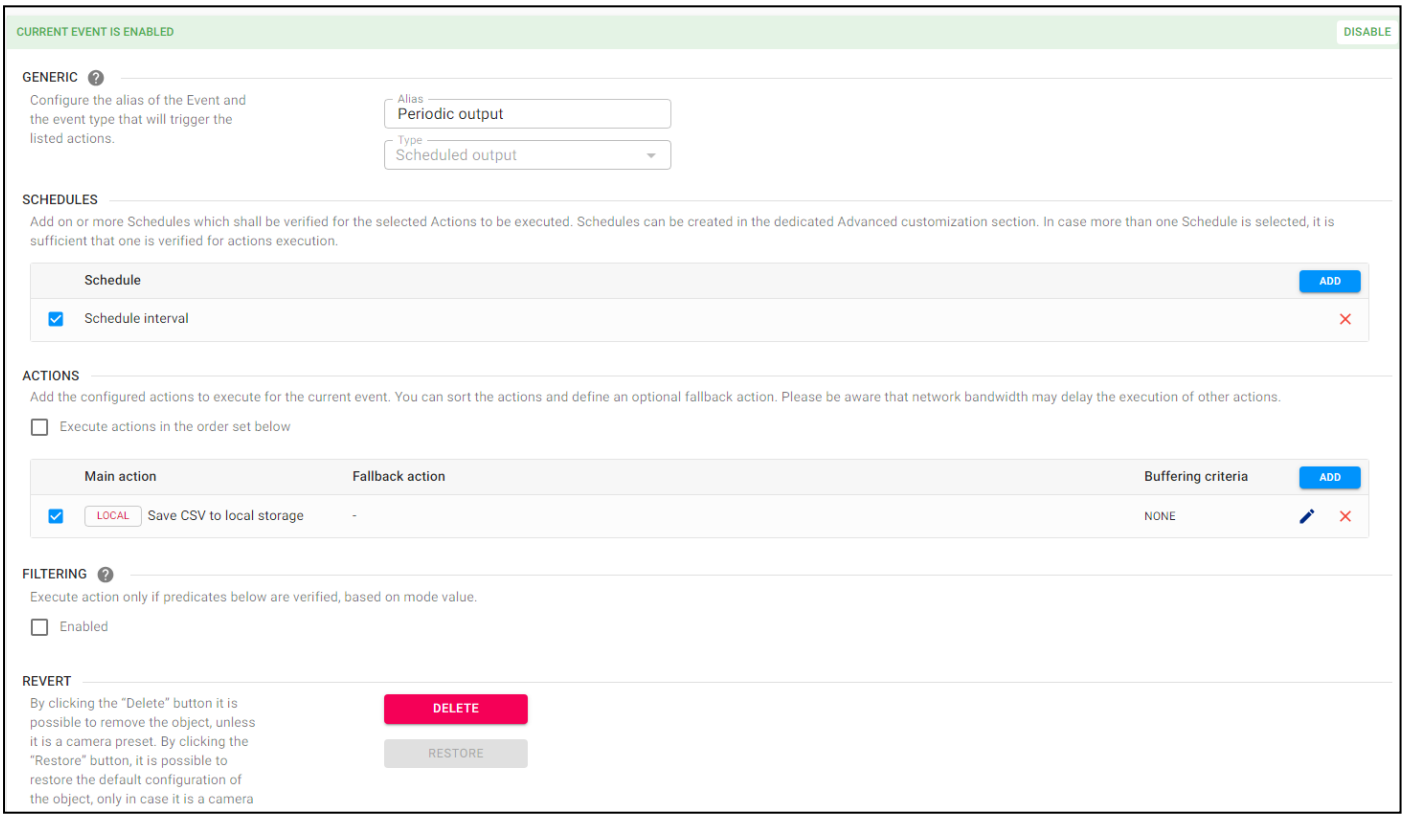
Save the created Schedule.

5.2.1.2. Scheduled output configuration

Info: Web App
Output /Events

Once at least one Schedule is configured, it is possible to define which actions the camera will execute when the schedule is verified.

1. Create a new Event by clicking on "Add" button.
2. Configure the Type of the Event as "Scheduled output".
3. In the appearing table, select the created Schedules that will trigger the output actions execution.
4. Add the actions to be executed for the created Event.



5.3. Calendars

Stark cameras can be configured in order to generate output Events when specific filtering rules based on output tag values are verified.

In particular, by configuring a calendar, it is possible to configure output Events so that they are executed when the value of one or more tags of type Timestamp are contained or not in the specified calendar.

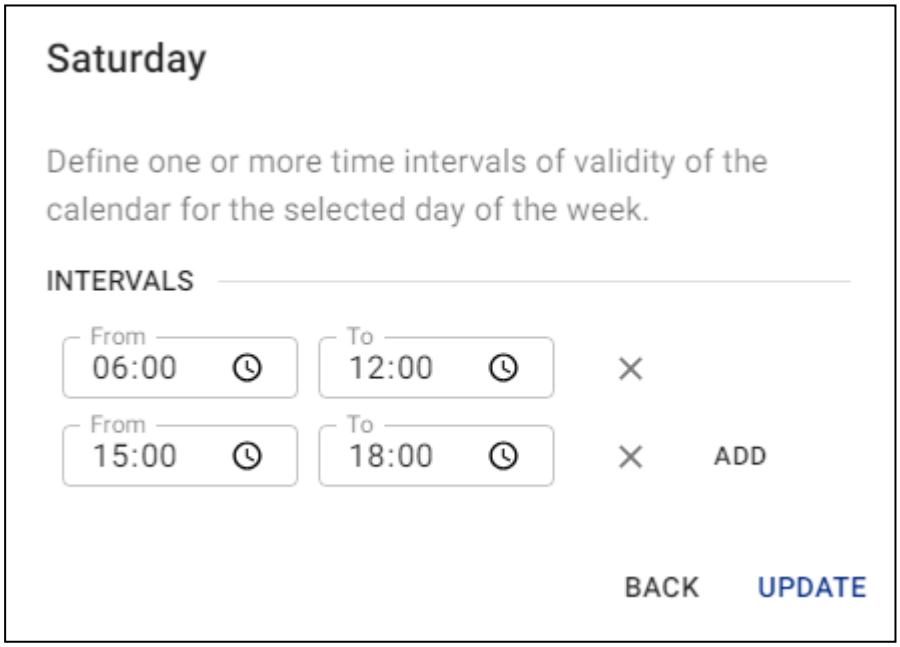
5.3.1. Configuration

5.3.1.1. Calendar configuration

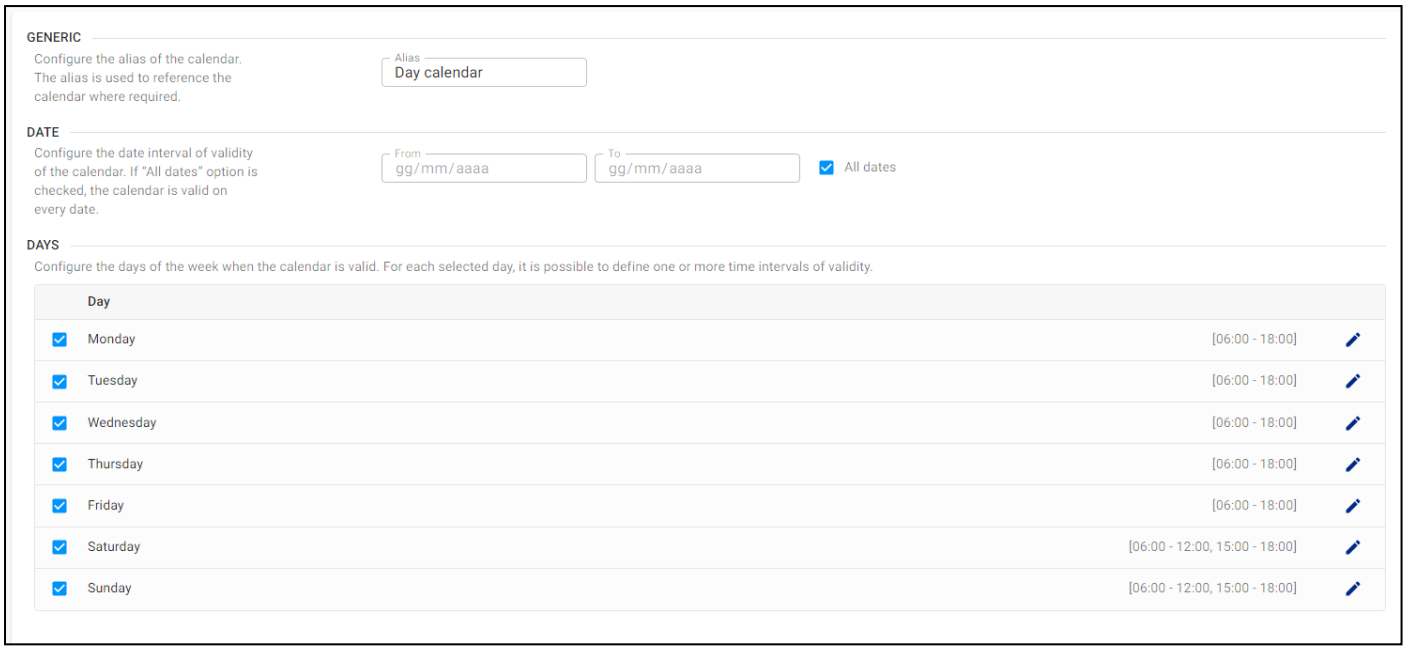
Info: Web App
Output / Calendars

In the Calendars section it is possible to add one or more calendars, each one with its Alias.

1. Click on the "Add" button to create a new Calendar.
2. Define its Alias.
3. Configure the interval of days in which the Calendar if valid. By default, the calendar is valid all days. By unchecking the "All dates" flag, it is possible to explicitly define start and end dates of validity of the Calendar.
4. Configure the time interval of validity of the Calendar for each day of the week. By default, the calendar is valid from 00:00 to 23:59 for each day of the week. By clicking on the right portion of each row, It is possible to edit the validity interval for that day, or configure more than one interval.



5. Once the configuration is complete, click on Save.

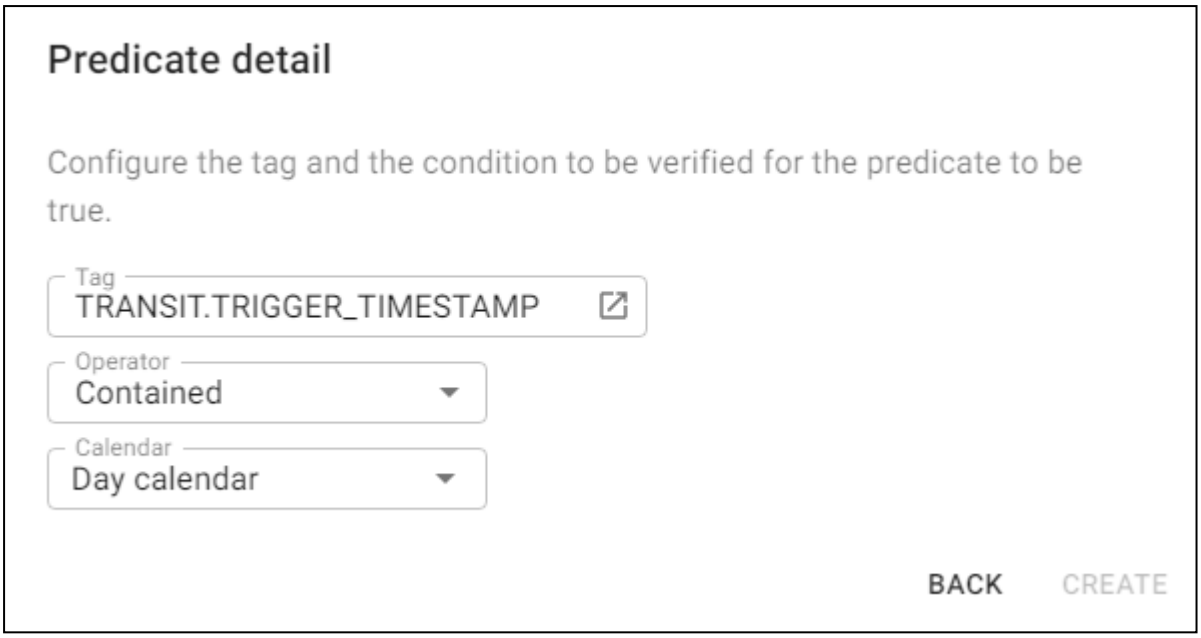


5.3.1.2. Events configuration

Info: Web App
Output /Events

Once at least one Calendar is configured, it is possible to define the filtering rules for the Event based on the Calendar. Calendar rules are one of the possible filtering rules which can be applied to Events, in order to execute the configured Actions only when the specified rules (at east one or all) are verified.

1. Create a new Event by clicking on "Add" button.
2. Configure the Type of the Event, for example "On transit End".
3. Add the Actions of interest.
4. Click on the "Enable" flag in the FILTERING portion to enable the configuration of Filtering rules for actions execution.
5. Click on the "Add" button to configure one or more predicates which are to be valid for the actions execution. To execute the actions in the validity interval of a configured Calendar, select the timestamp tag of interest and define if its value must be contained or not in the calendar for the predicate to be valid.



6. Press on Create, to add the predicate to the list.
7. If more than one predicate is added, define the Mode value of validity of the predicates.
8. Save the created Event.

In the considered example, the Configured actions will be executed for each transit whose "TRIGGER_ TIMESTAMP" is contained in the rules defined for the "Day calendar".

5.4. Wiegand Interface

Info: Web App
System settings / Interfaces

The Wiegand interface can be used to transmit a tag's content (of maximal size 4096 bytes) to an access control system.

In the "Interfaces" section of the "System settings" the following settings are available:

- Protocol: it specifies the protocol used (see the "Available Protocols" subsection).
- Idle time: it is the duration of the pause at the end of the transmission (in microseconds).
- Pulse Interval: it is the duration of the interval between each pulse (in microseconds).
- Pulse width: it is the duration of the interval between each pulse (in microseconds).

An action of "Wiegand message" type can be configured in the "Output page".

5.4.1. Available Protocols

The message to send by the Wiegand interface must be converted using one of the following protocols.

5.4.1.1. CRC-24 26-bit:

A standard 26-bit protocol with one even parity bit, 24 data bits and one odd parity bit.

The 24 data bits are the CRC-24 checksum of the plate number. The checksum is calculated according to OpenPGP's Radix-64 specification as described in RFC 4880.

Example

Plate number: AB123CD
CRC-24 value: 0x4809A8 (4721064 in decimal).
Wire output:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	1	0	0	0	0

5.4.1.2. SHA-1 26-bit

A standard 26-bit protocol with one even parity bit, 24 data bits and one odd parity bit.

The 24 data bits are the last three bytes from the SHA-1 hash of the plate number.

Example

Plate number: AB123CD
SHA-1 hash: ac0426853b0947e3ce6aafd6116c6a726d8cb9fb (8cb9fb are the last three bytes)
Wire output:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
0	1	0	0	0	1	1	0	0	1	0	1	1	1	0	0	1	1	1	1	1	1	0	1	1	0

5.4.1.3. Six-bit code 64-bit V1

A custom 64-bit protocol without parity bits. Each character of the plate is converted to a 6 bit representation using the table below.

If a character does not have a 6-bit representation, the <Unsupported> code is used. If the plate number is shorter than 10 characters, unused positions are filled with <Empty> (all zeros) characters.

Plates longer than 10 characters are truncated.

8-bit character	6-bit hex	6-bit binary	8-bit character	6-bit hex	6-bit binary
0	0x0B	001011	J	0x16	010110
1	0x10	010000	K	0x28	101000
2	0x18	011000	L	0x38	111000
3	0x12	010010	M	0x2C	101100
4	0x13	010011	N	0x2E	101110
5	0x11	010001	O	0x2A	101010
6	0x1A	011010	P	0x3C	111100
7	0x1B	011011	Q	0x3E	111110
8	0x19	011001	R	0x3A	111010
9	0x0A	001010	S	0x1C	011100
A	0x20	100000	T	0x1E	011110
B	0x30	110000	U	0x29	101001
C	0x24	100100	V	0x39	111001
D	0x26	100110	W	0x17	010111
E	0x22	100010	X	0x2D	101101
F	0x34	110100	Y	0x2F	101111
G	0x36	110110	Z	0x2B	101011
H	0x32	110010	<Unsupported>	0x35	110101
I	0x14	010100	<Empty>	0x00	000000

Example

Plate number: AB123CD
Wire output:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
0	0	0	1	1	0	0	0	0	1	0	0	1	0	1	0
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
0	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

5.4.1.4. Six-bit code 64-bit V2

A custom 64-bit protocol without parity bits. Each character of the plate is converted to a 6 bit representation using the table below.

The first four bits are always 0 1 1 0. If a character does not have a 6-bit representation, the <Unsupported> (all ones) code is used.

If plate number is shorter than 10 characters, first positions are filled with <Empty> (all zeros) characters.

Plates longer than 10 characters are truncated.

8-bit character	6-bit hex	6-bit binary	8-bit character	6-bit hex	6-bit binary
0	0x10	010000	J	0x23	100011
1	0x11	010001	K	0x24	100100
2	0x12	010010	L	0x25	100101
3	0x13	010011	M	0x26	100110
4	0x14	010100	N	0x27	100111
5	0x15	010101	O	0x28	101000
6	0x16	010110	P	0x29	101001
7	0x17	010111	Q	0x2A	101010
8	0x18	011000	R	0x2B	101011
9	0x19	011001	S	0x2C	101100
A	0x1A	011010	T	0x2D	101101
B	0x1B	011011	U	0x2E	101110
C	0x1C	011100	V	0x2F	101111
D	0x1D	011101	W	0x30	110000
E	0x1E	011110	X	0x31	110001
F	0x1F	011111	Y	0x32	110010
G	0x20	100000	Z	0x33	110011
H	0x21	100001	<Unsupported>	0x3F	111111
I	0x22	100010	<Empty>	0x00	000000

Example

Plate number: AB123CD
Wire output:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	0

33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
1	1	0	1	0	0	0	1	0	1	0	0	1	0	0	1

49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
0	0	1	1	0	1	1	1	0	0	0	1	1	1	0	1

5.4.1.5. Standard 26-bit

Standard 26-bit protocol with one even parity bit, 24 data bits and one odd parity bit.

This format maps the numeric output of the tag to be sent as a sequence of digits. Valid output numbers are in the range 0 - 16777215.

Notice: In case the Wiegand action is configured to send a tag whose output value is not numeric or exceeds the allowed range, the actions fails and no message is sent.

Example

Configured tag output value: 170118
Wire output:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	1	0	0	0	0	1	1	0	1

5.5. Diagnostic

The camera allows for the monitoring of different diagnostic variables, associated . As function of the status of such diagnostic variables, the camera can also generate Diagnostic Events as function of diagnostic status changes.

5.5.1. Configuration of diagnostic variables

Info: Web App
System Settings / Diagnostic

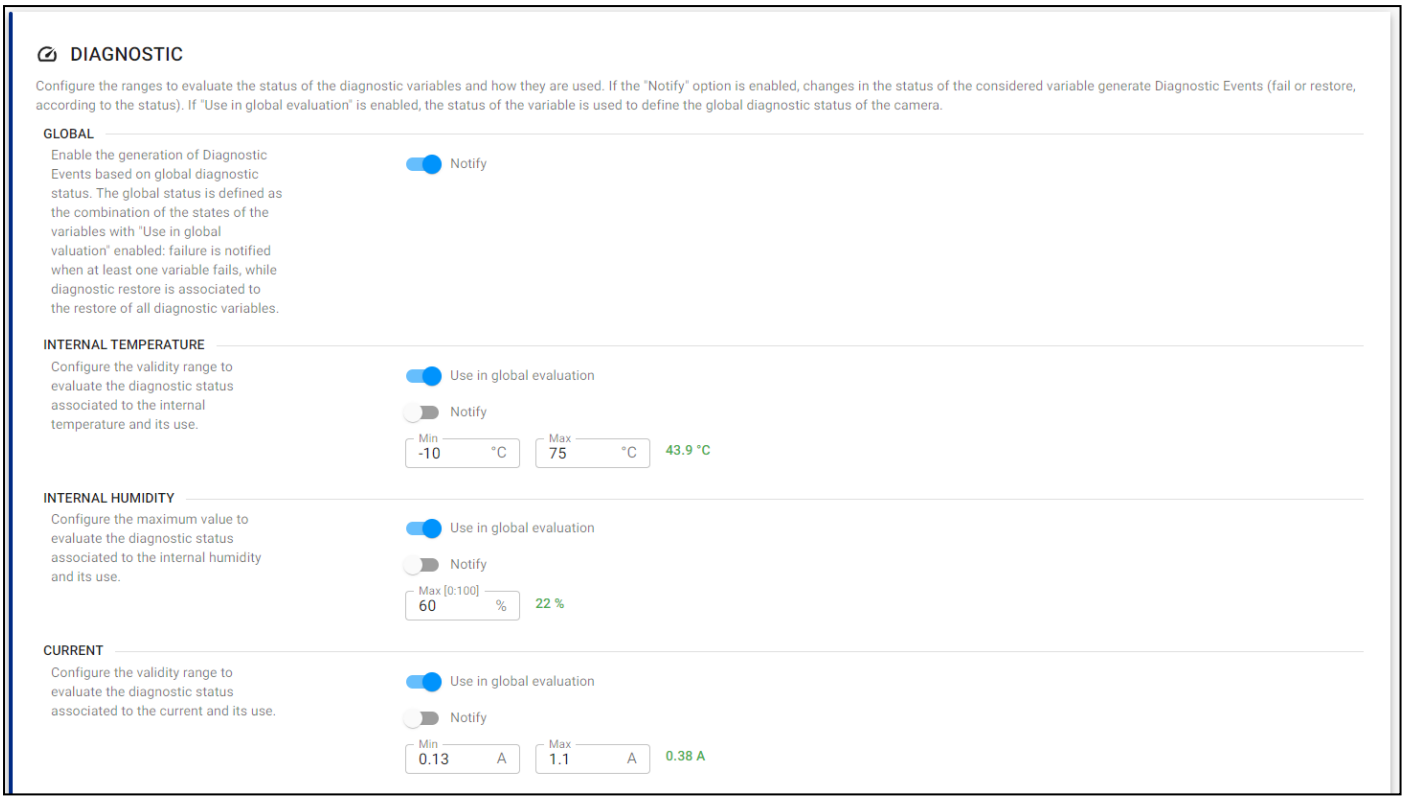
Configuration of the diagnostic variables to be monitored and their range of normal operation (when available).

The camera allows for the monitoring of:

- Single variable status. In this case, the diagnostic component is in failure if the value of the variable is outside the configured ranges of normal operation, in case of detected errors or non-standard conditions.
- Global camera status. The global diagnostic is determined as the combination of the status of all the diagnostic components which have been configured as concurring to this global status. In this case, the global status is in failure if at least one of the concurring diagnostic components is in failure, while the diagnostic restore is associated to the restore of all the diagnostic components.

For each diagnostic variable, it is possible to configure:

- The "Notify" option is used to define if changes in the status of the considered diagnostic component (the global status or the specific one) are to generate a Diagnostic Event (see "Diagnostic events" on the facing page).
- The "Use in global evaluation" option is used to define if the status of the considered diagnostic component is to be used to determine the global diagnostic status of the camera.
- For those diagnostic variables with an operating range, it is possible to define a minimum and maximum value of validity of the variable itself or a maximum value.



The status of the diagnostic components can be monitored directly on camera in the Monitoring Application (see "Monitoring" on page 47).

5.5.2. Diagnostic events

Info: Web App
Output / Events

Configuration of Diagnostic events generation.

The camera allows for the generation of events in case the status of the diagnostic variables with the "Notify" option enabled (see above). In particular, two events can be generated:

- Diagnostic fail: the event is generated (with corresponding Output execution) every time the status of one of the diagnostic components with the "Notify" option enabled changes from OK to FAIL. This applies also to the Global diagnostic.
- Diagnostic restore: the event is generated (with corresponding Output execution) every time the status of one of the diagnostic components with the "Notify" option enabled changes from FAIL to OK. This applies also to the Global diagnostic.

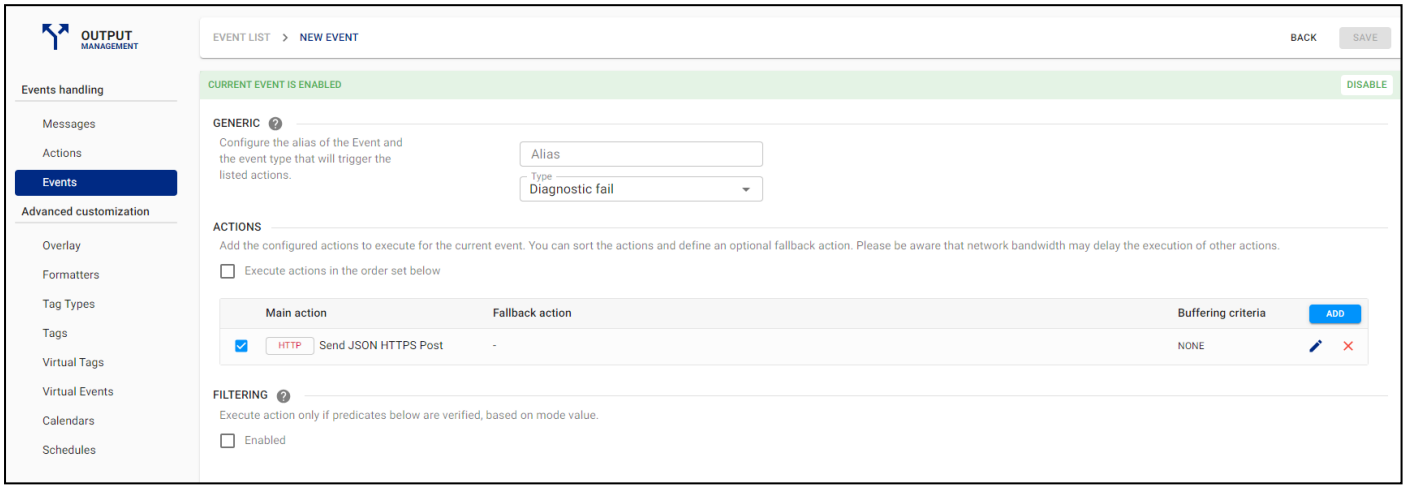
To create a diagnostic event:

1. Configure the Message and Action of interest as described in "Messages, Events and Actions" on page 30.
2. In the Events Section, click on "Add" button to create a new Event.

3. Select as Event Type the "Diagnostic fail" or "Diagnostic restore" according to the need.

4. Add the Actions to be executed when the Event occurs.

In the example below, the camera will execute a HTTP Post each time a diagnostic component (global or single variable) with the "Notify" option enabled changes from status OK to FAIL.



6. Monitoring

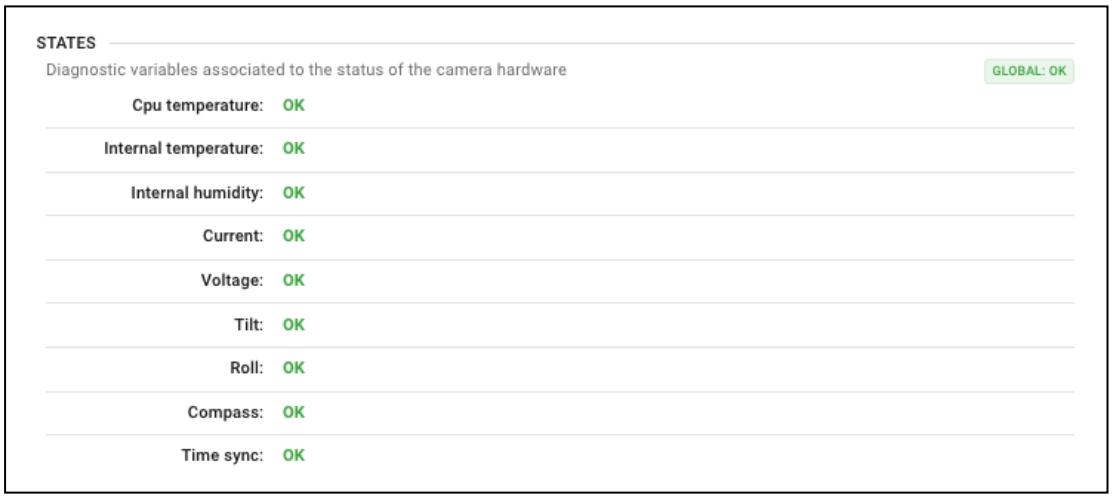
Info: Web App Monitoring

The system provides self-diagnostic check that allows to warn the user in case of unexpected status of diagnostic variables.

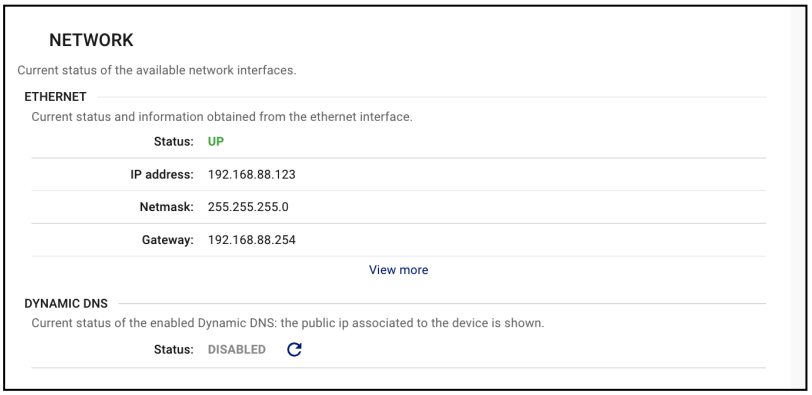
The monitored system variables are:

- Time Synchronization: status of time synchronization
- Camera Tilt, Roll and Compass: status of camera inclination
- Storage Status: availability of local storage devices
- Temperature/Humidity: internal camera temperature and humidity
- Current Consumption: electrical current absorption
- Voltage

These status are shown in the Monitoring page.

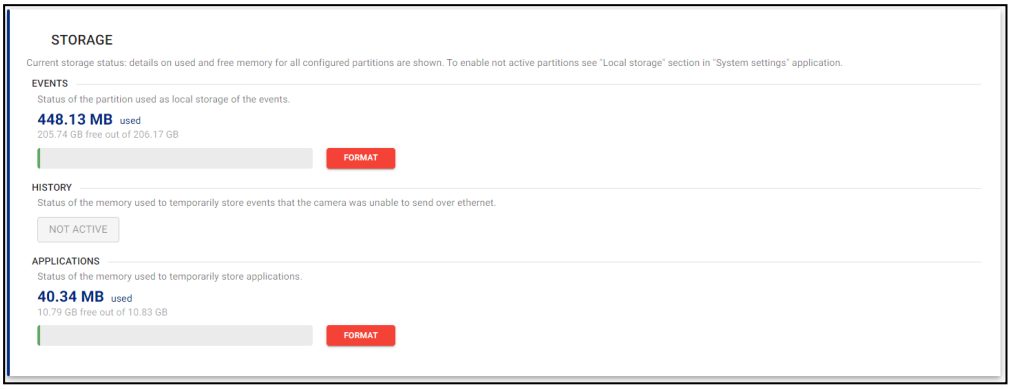


The same page also contains the detailed status of the different diagnostics components, such as digital input and outputs, illuminator, network services (ethernet, wifi and GPS if they are available).



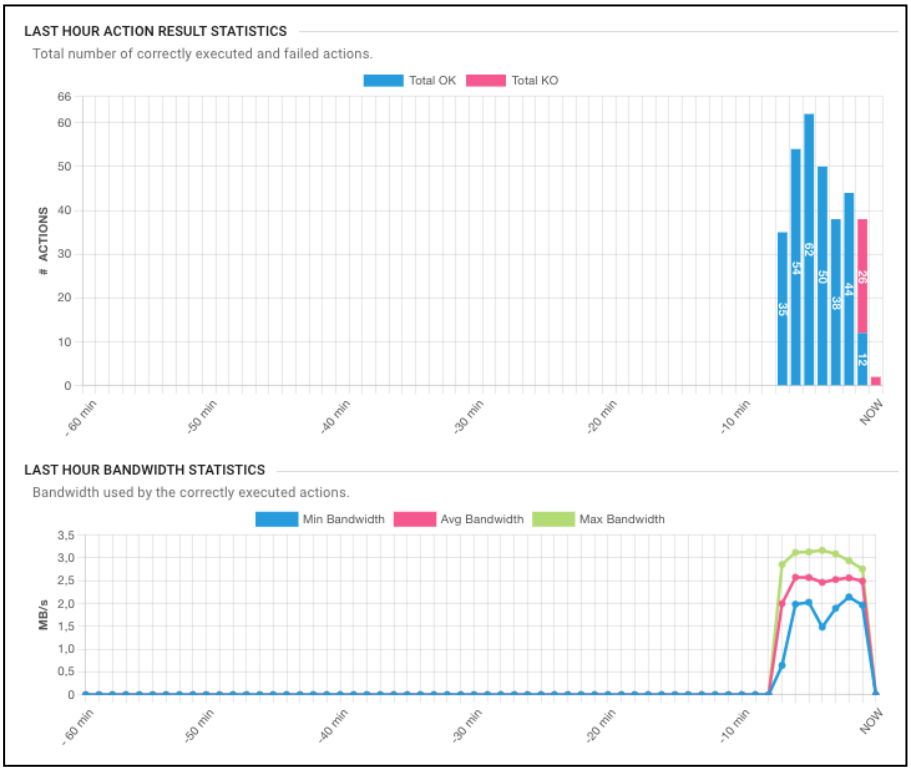
6.1. Monitoring storage

The status of all configured partitions is shown with the details about the used space. It is also possible to format the partitions using the dedicated button.



6.2. Monitoring Events

For each type of action, in the Monitoring page, there is a section with full statistics. For example, the section of Data Transfer HTTP contains information like the execution number, the number of completed executions and the number of bad executions. Two diagrams show the action result statistics and the bandwidth statistics obtained in the last hour.



The section "Last Errors" shows the errors occurred during the bad executions.

7. Management

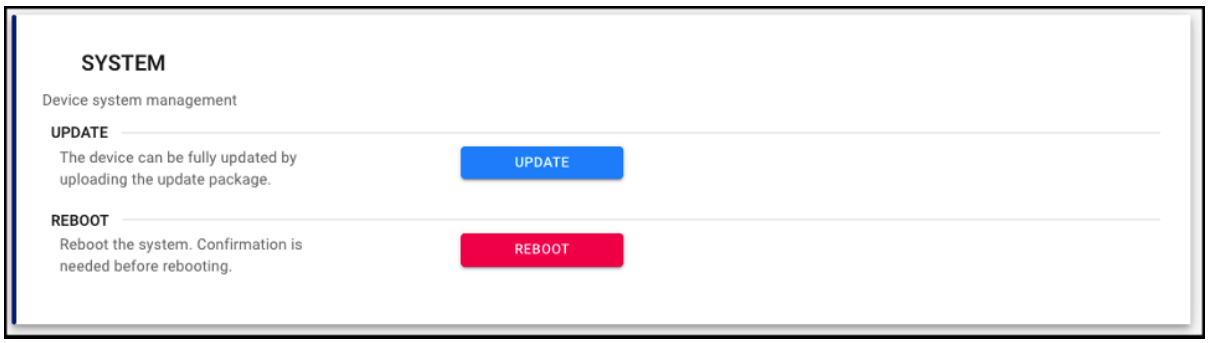
Info: Web App Management

The “Management” section allows to upgrade the software, backup and restore the configuration.

7.1. Software Upgrade

Upgrade of the system is done by uploading an update file, usually with “.gpg” extension. To upgrade the system, click on the “Update” button and follow the on-screen instructions.

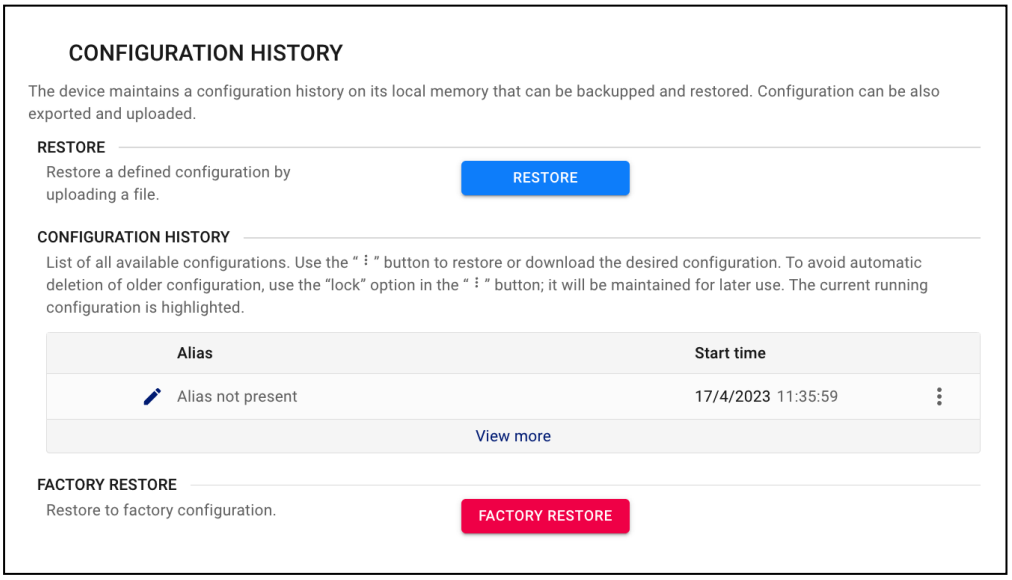
Please note that the downgrade of the system is not supported.



7.2. Configuration Backup and Restore

The camera automatically maintains a configuration history. You can select the relevant configuration and download it. The configuration can be later restored on the camera.

The configuration can be restored to the default by the Factory Restore.

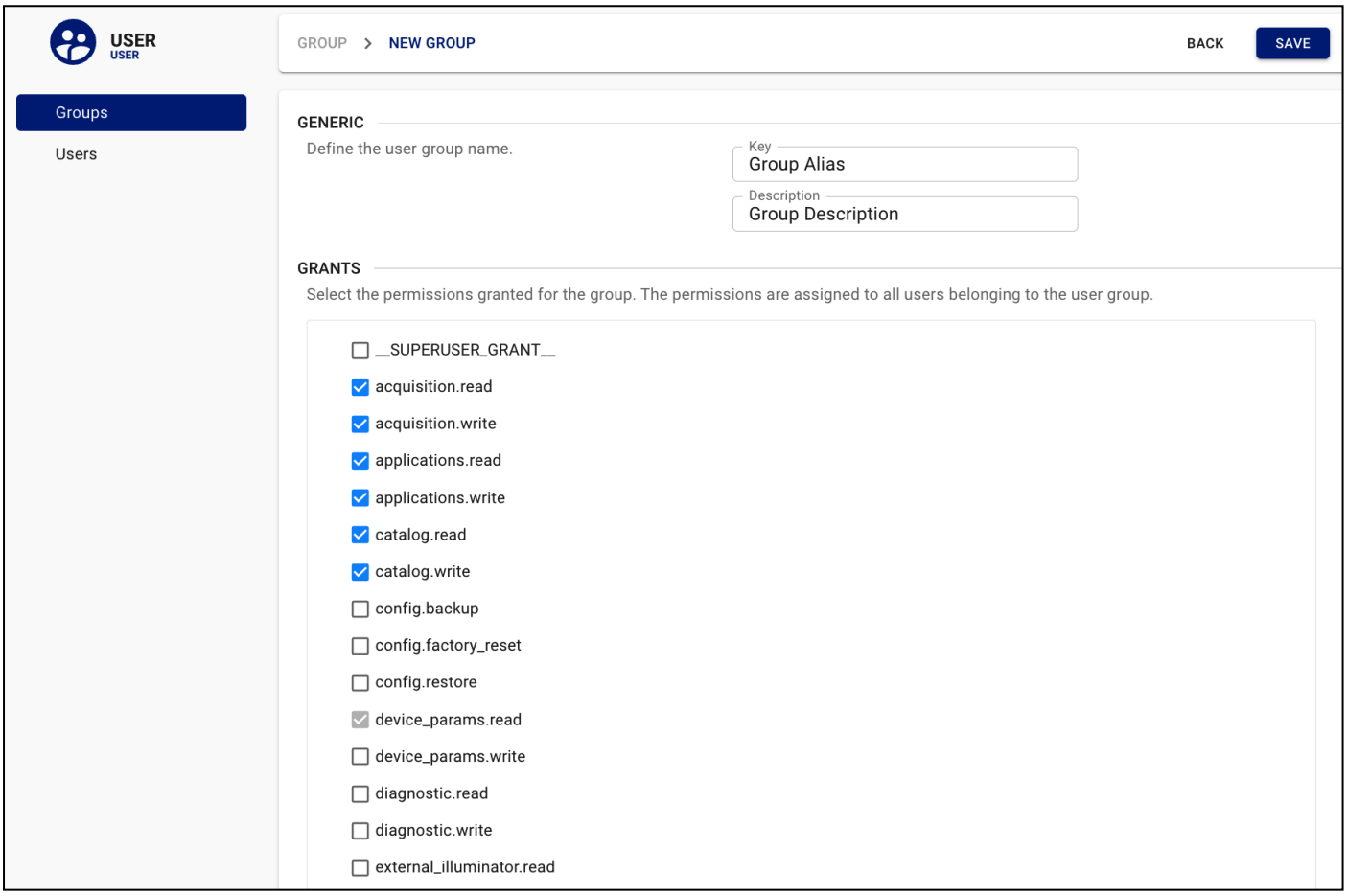


8. Groups and Users

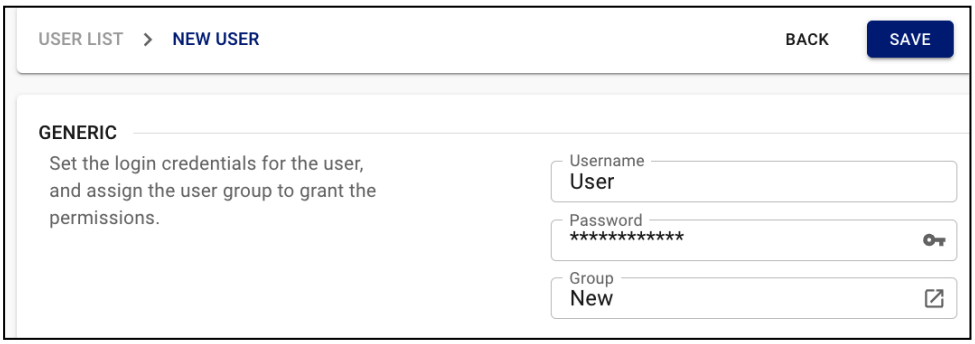
Info: Web App
User

The "User" page allows you to define the groups, their privileges and the users who belong to them.

The groups section shows the list of the defined groups, a new group can be added: define a key, a description and the grants.



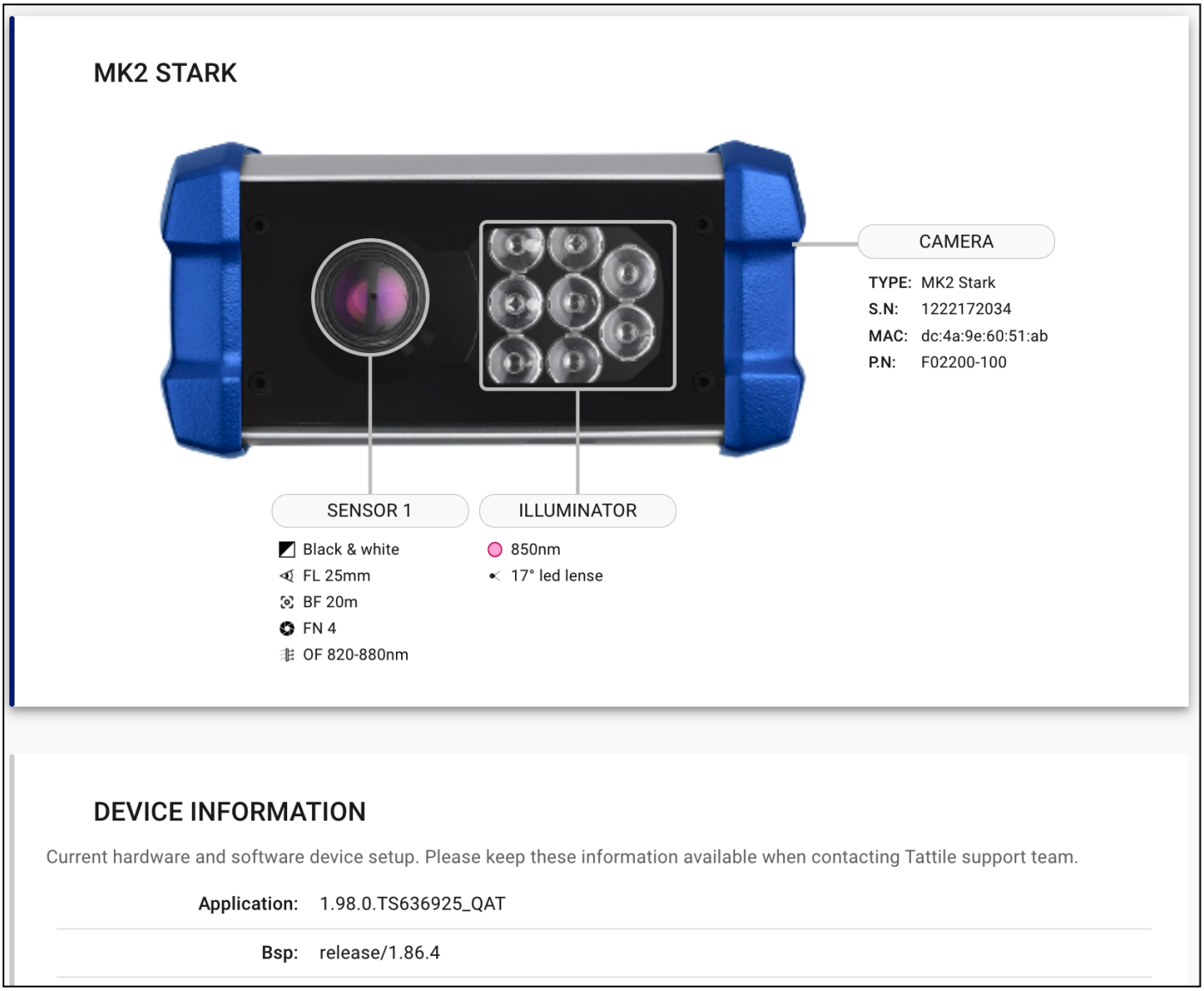
After defining a group, a new user can be assigned to this.



9. Device Information

Info: Web App
Info

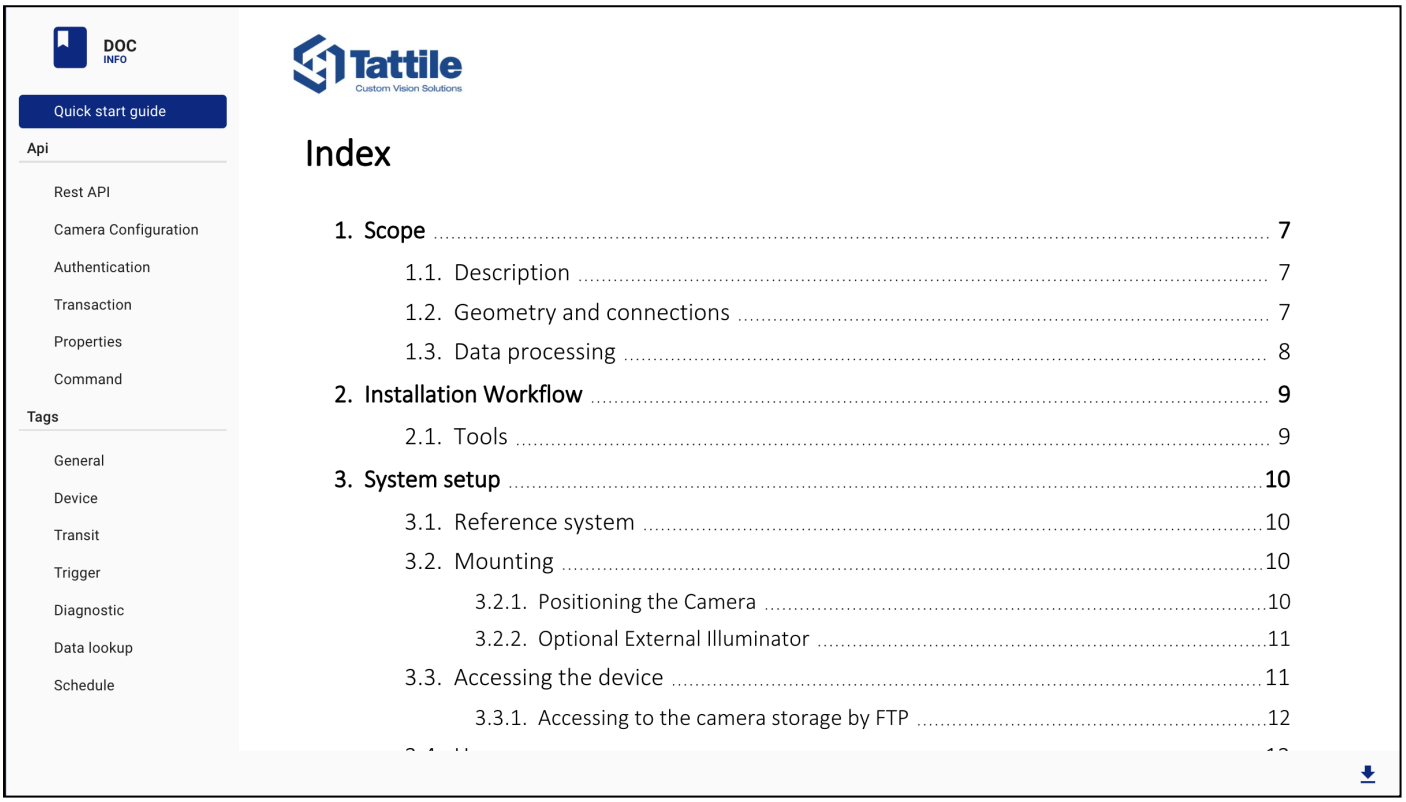
The “Info” section provides information about the camera hardware and software configuration. Please keep this information available when contacting Tattile support team to provide details about the device.



10. Documentation

Info: Web App Documentation

The “Documentation” section in the menu provides quick access to the manual and documents available on the camera itself. The documentation provides description of API-REST and available TAGs as well as the possibility to access the digital version of this document.



11. Troubleshooting

This section discusses troubleshooting techniques to resolve common issues.

11.1. Pathfinder cannot find the device on the network

Cause 1

- Device not correctly powered

Corrective Action 1

- Check the device is correctly cabled to the power source
- Check the power supply
- Check the cable PIN OUT

Cause 2

- Device not correctly cabled

Corrective Action 2

- Check the Ethernet wiring or the Wi-Fi connection
- If necessary, build a new cable

11.2. Cannot access the Web Interface

Cause 1

- The device IP address does not belong to the same Subnet as defined by the Netmask of the PC

Corrective Action 1

- Modify the IP address of the device or PC

Cause 2

- The PC is configured for DHCP IP assignment

Corrective Action 2

- On the PC, in the Network settings, set a static IP address that belong to the same Subnet as the device

11.3. The Web Interface does not display the live stream

Cause

- The device is not responding

Corrective Action

- Restart the device
- If the problem persists, contact your sales representative

11.4. The device cannot be seen from local connection

Cause

- Multiple possible causes

Corrective Action

- Verify that you can see the device from Pathfinder
- Verify the compatibility of IP address and Subnet mask
- Verify cables connections