Guideline

Vaxtor USDOT - Number Recognition App

BeyondHumanVision

MOBOTIX

V2.11_11/12/2025, Order Code: Mx-APP-VX-USD

Table of Contents

1

Before You Start

Support

MOBOTIX Support

If you need technical support, please contact your MOBOTIX dealer. If your dealer cannot help you, he will contact the support channel to get an answer for you as quickly as possible.

If you have internet access, you can open the MOBOTIX help desk to find additional information and software updates.

Please visit **www.mobotix.com > Support > Help Desk**.

MOBOTIX eCampus

The MOBOTIX eCampus is a complete e-learning platform. It lets you decide when and where you want to view and process your training seminar content. Simply open the site in your browser and select the desired training seminar.

Please visit **www.mobotix.com/ecampus-mobotix**.

MOBOTIX Community

The MOBOTIX community is another valuable source of information. MOBOTIX staff and other users are sharing their information, and so can you.

Please visit **community.mobotix.com**.

Safety Notes

- This product must be installed by qualified personnel and the installation should conform to all local codes.
- This product must not be used in locations exposed to the dangers of explosion.
- Do not use this product in a dusty environment.
- Protect this product from moisture or water entering the housing.
- Install this product as outlined in this document. A faulty installation can damage the product!
- Do not replace batteries of the device. If a battery is replaced by an incorrect type, the battery can explode.
- Install product out of reach for children.
- External power supplies must comply with the Limited Power Source (LPS) requirements and share the same power specifications with the camera.
- To comply with the requirements of EN 50130-4 regarding the power supply of alarm systems for 24/7 operation, it is highly recommended to use an uninterruptible power supply (UPS) for backing up the power supply of this product.

Legal Notes

Legal Aspects of Video and Sound Recording

You must comply with all data protection regulations for video and sound monitoring when using MOBOTIX AG products. Depending on national laws and the installation location of the cameras, the recording of video and sound data may be subject to special documentation or it may be prohibited. All users of MOBOTIX products are therefore required to familiarize themselves with all applicable regulations and to comply with these laws. MOBOTIX AG is not liable for any illegal use of its products.

Declaration of Conformity

The products of MOBOTIX AG are certified according to the applicable regulations of the EC and other countries. You can find the declarations of conformity for the products of MOBOTIX AG on www.mobotix.com under **Support > Download Center > Marketing & Documentation > Certificates & Declarations of Conformity**.

RoHS Declaration

The products of MOBOTIX AG are in full compliance with European Unions Restrictions of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS Directive 2011/65/EU) as far as they are subject to these regulations (for the RoHS Declaration of MOBOTIX, please see www.mobotix.com, **Support > Download Center > Marketing & Documentation > Brochures & Guides > Certificates**).

Disposal

Electrical and electronic products contain many valuable materials. For this reason, we recommend that you dispose of MOBOTIX products at the end of their service life in accordance with all legal requirements and regulations (or deposit these products at a municipal collection center). MOBOTIX products must not be disposed of in household waste! If the product contains a battery, please dispose of the battery separately (the corresponding product manuals contain specific directions if the product contains a battery).

Disclaimer

MOBOTIX AG does not assume any responsibility for damages, which are the result of improper use or failure to comply to the manuals or the applicable rules and regulations. Our General Terms and Conditions apply. You can download the current version of the **General Terms and Conditions** from our website at www.mobotix.com by clicking on the corresponding link at the bottom of every page.

It is the User's responsibility to comply with all applicable local, state, national and foreign laws, rules, treaties and regulations in connection with the use of the Software and Product, including those related to data privacy, the Health Insurance Portability and Accountability Act of 1996 (HIPPA), international communications and the transmission of technical or personal data.

About Vaxtor USDOT - Number Recognition App

Recognition of USDOT numbers

The certified Vaxtor USDOT - Number Recognition App recognizes, based on deep learning processes USDOT numbers (US Department of Transportation numbers) which serves as a unique identifier when collecting and monitoring a company's safety information acquired during audits, compliance reviews, crash investigations, and inspections. The OCR engine takes advantage of many current integrations and publishing capabilities that have been developed over many years.

- Recognition of USDOT identification numbers
- Operations up to a vehicle speed of 50 km/h
- MOBOTIX events via MxMessageSystem
- Consolidated event search via MxManagementCenter Smart Data Interface and / or MOBOTIX HUB
- meta data transfer through generic transmission protocols and / or pre-defined 3rd party interfaces
- Two lists for individual actions (e.g. access granted/denied, alarm, etc.)
- Free flow and Signaled operation mode

CAUTION!
Thermal sensors are not supported by this app.

Smart Data Interface to MxManagementCenter

This app has a Smart Data interface to MxManagementCenter.

With the MOBOTIX Smart Data System, transaction data can be linked to the video recordings made at the time of the transactions. Smart Data source can be e.g. MOBOTIX Certified Apps (no license required) or general Smart Data sources (license required) like POS systems or license plate recognition systems.

The Smart Data System in MxManagementCenter enables you to quickly find and review any suspicious activities. The Smart Data Bar and the Smart Data View are available for searching and analyzing transactions. The Smart Data Bar provides a direct overview of the most recent transactions (from the last 24 hours) and for this reason it is convenient to use it for reviews and searches.

NOTE!
For information on how to use the Smart Data System, see the corresponding online help of the camera software and MxManagementCenter.

Technical Specifications

Product Information

Product Name	Vaxtor USDOT - Number Recognition App
Order Code	Mx-APP-VX-USD
Supported MOBOTIX Cameras	M73, S74, D71
Minimum Camera Firmware	v7.3.1.x
MxManagementCenter compatibility	■ min. MxMC v2.4.3 ■ Configuration: Advanced Config license required ■ Event Search: Smart Data Interface license included
MOBOTIX HUB compatibility.	■ min. MOBOTIX HUB version: 2021 R1 ■ min. MOBOTIX HUB license level (Analytics Events): L2 ■ min. MOBOTIX HUB license level for Event Search Plug-In: L4

Product Features

App Features	■ Recognition of USDOT identification numbers ■ Operations up to a vehicle speed of 50 km/h ■ MOBOTIX events via MxMessageSystem ■ Consolidated event search via MxManagementCenter Smart Data Interface and / or MOBOTIX HUB ■ meta data transfer through generic transmission protocols and / or predefined 3rd party interfaces ■ Two lists for individual actions (e.g. access granted/denied, alarm, etc.) ■ Free flow and Signaled operation mode
Maximum number of recognition areas	1
Maximum number of enrolled USDOT codes	1000 per list
Meta Data / Statistic	JSON

formats	
Trial License	30-day trial license pre-installed
MxMessageSystem supported	Yes
Integration Interfaces	■ MOBOTIX SYNC ■ Milestone X-Protect (Analytics Events, Transmission Plug-In) ■ Genetec Security Center (Custom Events, Bookmarks) ■ MxMC Smart Data ■ NetworkOptix NxWitness ■ generic 3rd party integration through FTP(S), CSV, XML / JSON via HTTP(S) ■ compare supported camera's interfaces
MOBOTIX Events	Yes
ONVIF Events	Yes (Generic Message event)

Supported Code Formats

Supported Code Formats	USDOT number (U.S. Department of Transportation number) is an interstate operating authority and unique identifier assigned to a moving company performing interstate moves by the FMCSA (Federal Motor Carrier Safety Administration)

Scene Requirements

Character Height	20px - 50px
Maximum Vertical Angle	30°
Maximum Horizontal Angle	< 25°
Maximum Tilt Angle	< 25°

Technical App Specifications

Synchronous / Asynchronous App	asynchronous
Simultaneous execution of	Yes (depending on performance expectations)

other apps

Accuracy	min. 99% (considering scene requirements)
Processed frame rate	typ. 2 fps
Detection time	typ. 900 ms per USDOT number

Licensing Certified Apps

The following licenses are available for the Vaxtor USDOT - Number Recognition App:

- **30-day test license** pre-installed
- **permanent commercial license**

The usage period begins with activation of the app interface (see Activation of the Certified App Interface)

NOTE!
For buying or renewing a license, contact your MOBOTIX Partner.

NOTE!
Apps are usually pre-installed with the firmware. In rare cases, apps must be downloaded from the website and installed. In this case see **www.mobotix.com > Services > Download Center > Marketing & Documentation**, download and install the app.

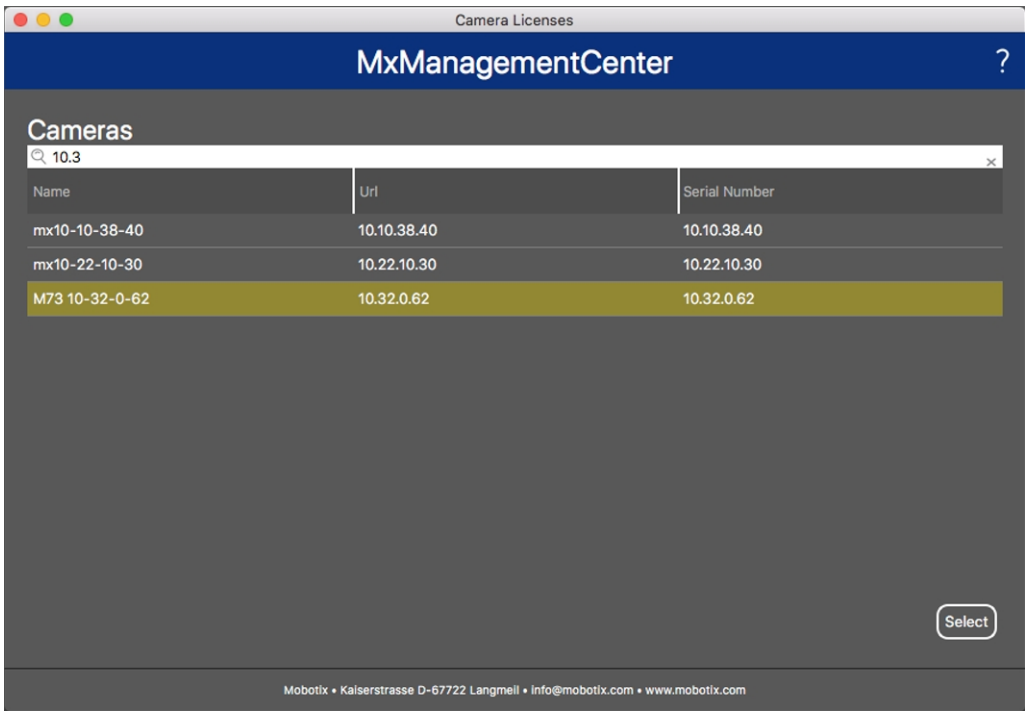
License Activation of Certified Apps in MxManagementCenter

After a test period commercial licenses must be activated for use with a valid license key.

Online-Activation

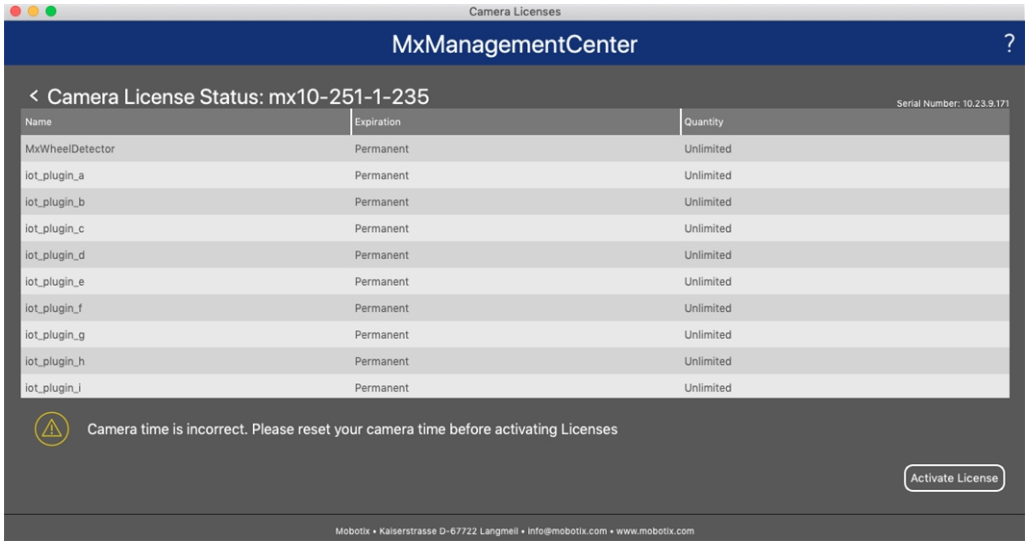
After receiving the activation IDs, activate them in MxMC as follows:

1. Select from the menu **Window > Camera App Licenses**.
2. Select the camera on which you want to license apps and click **Select**.



NOTE!
If necessary, correct the time set on the camera.

1. An overview of the licenses installed on the camera may be displayed. Click **Activate License**.



NOTE!
If necessary, correct the time set on the camera.

2. Enter a valid Activation ID and specify the number of licenses to install on this computer.
3. If you want to license another product, click on . In the new row, enter the appropriate Activation ID and the number of licenses you want.

4. To remove a line click .
5. When you have entered all Activation IDs, click **Activate License Online**. During activation, **MxMC** connects to the license server. This requires an Internet connection.

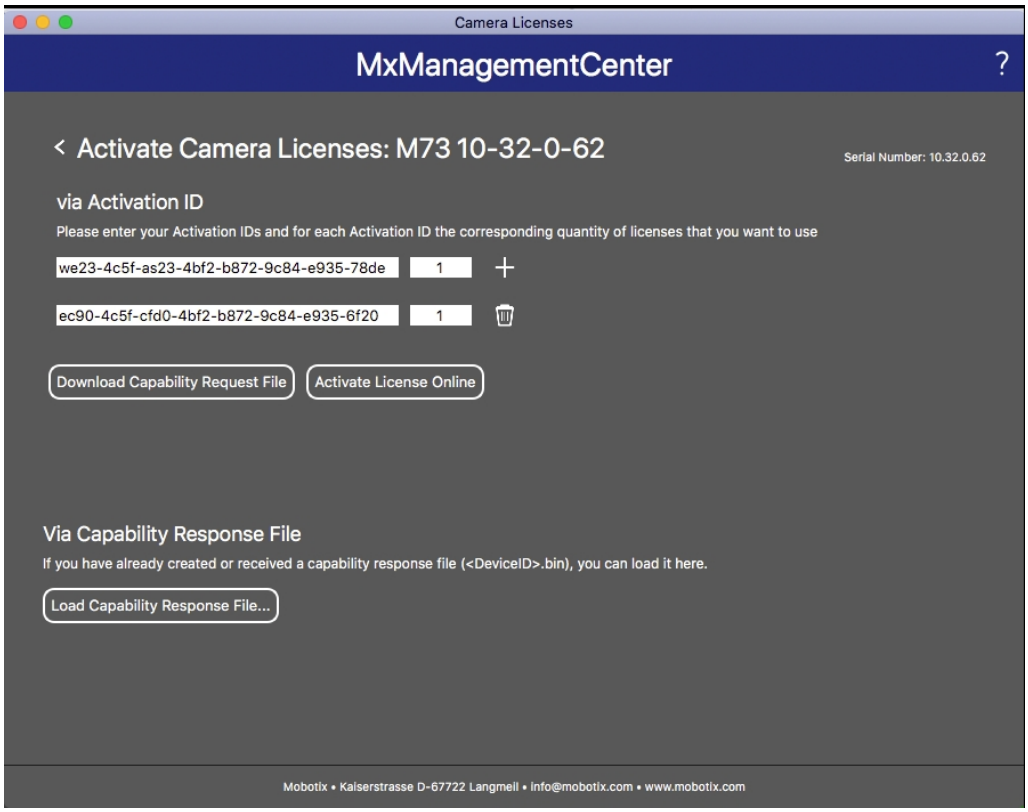


Fig. 1: Adding licenses

Successful activation

After successful activation, a new log in is required to apply the changes. Alternatively, you can return to license management.

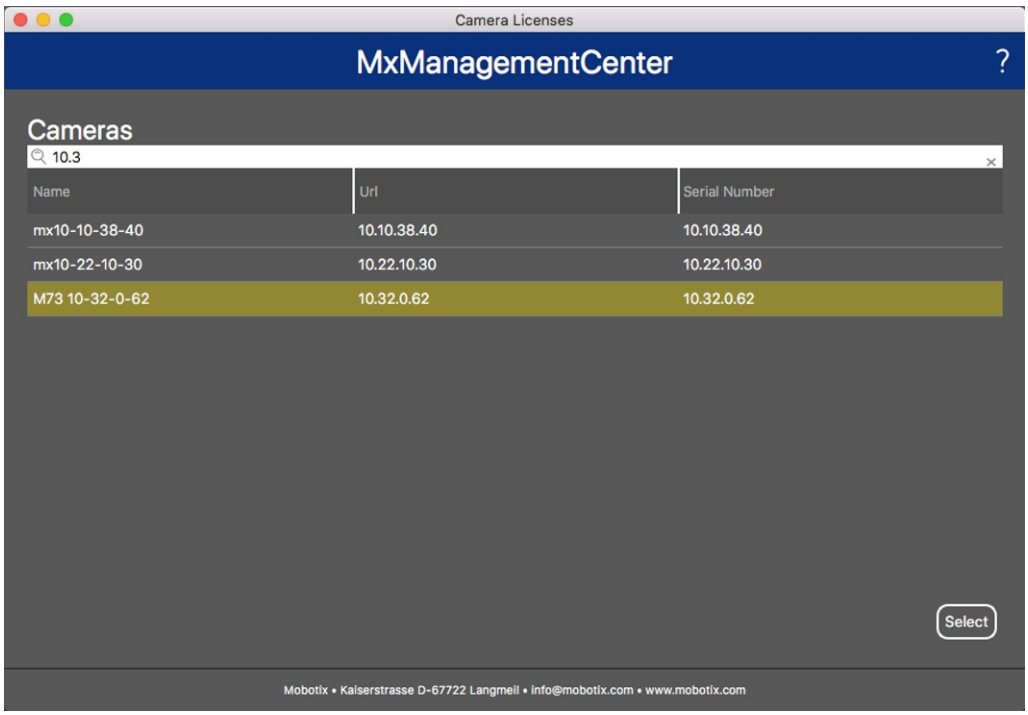
Failed activation (missing internet connection)

If the license server cannot be reached, e.g. due to a missing internet connection, apps can also be activated offline. (see Offline Activation, p. 16).

Offline Activation

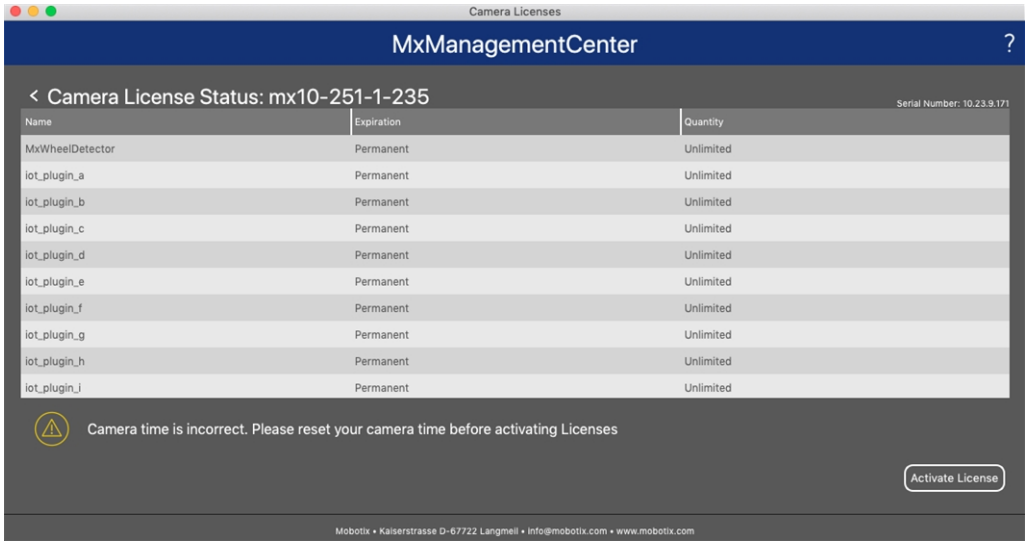
For offline activation, the partner/installer from whom you purchased the licenses can generate a capability response (.bin file) on the license server to activate their licenses.

1. Select from the menu **Window > Camera App Licenses**.
2. Select the camera on which you want to license apps and click **Select**.



NOTE!
If necessary, correct the time set on the camera.

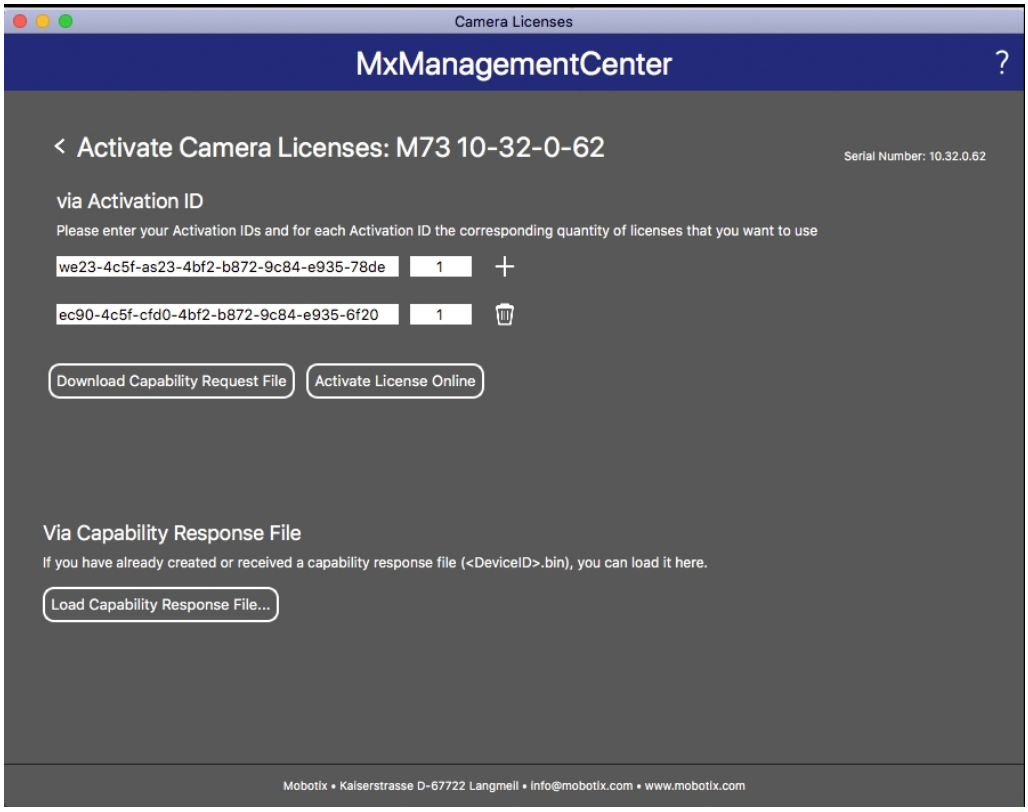
3. An overview of the licenses installed on the camera may be displayed. Click **Activate License**.



NOTE!
If necessary, correct the time set on the camera.

4. Enter a valid Activation ID and specify the number of licenses to install on this computer.
5. If you want to license another product, click on . In the new row, enter the appropriate **Activation ID** and the number of licenses you want.
6. If necessary, click to remove a line.
7. When you have entered all Activation IDs, click **Download Capability Request File (.lic)**. and send it to your partner/installer.

NOTE!
This file allows the partner / installer from whom you purchased the licenses to generate a capability response file (.bin) on the license server.



8. Click Load Capability Response File and follow the instructions.

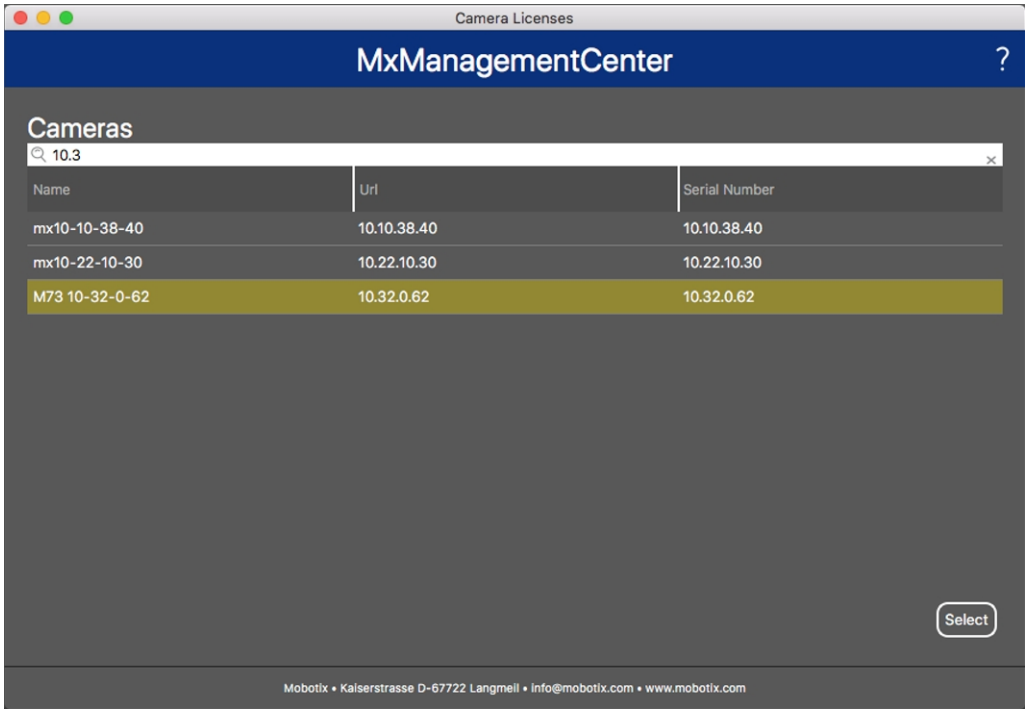
Successful activation

After successful activation, a new log in is required to apply the changes. Alternatively, you can return to license management.

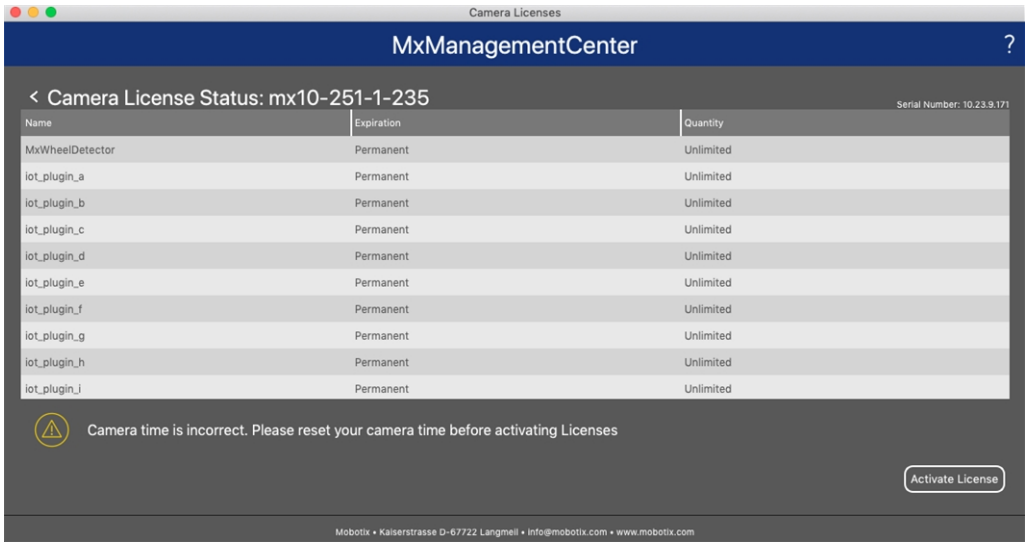
Managing Licenses in MxManagementCenter

In MxManagementCenter you can comfortably manage all licenses that have been activated for a camera.

1. Select from the menu **Window > Camera App Licenses**.
2. Select the camera on which you want to license apps and click **Select**.



An overview of the licenses installed on the camera may be displayed.



NOTE!
If necessary, correct the time set on the camera.

Column	Explanation
Name	Name of the licensed app
Expiration	the time limit of the license
Quantity	Number of licenses purchased for a product.
Serial Number	Unique identification determined by MxMC for the device used. If problems occur during licensing, please have the device ID ready.

Synchronize licenses with server

When the program starts, there is no automatic comparison of the licenses between the computer and the license server. Therefore, click **Update** to reload the licenses from the server.

Update licenses

To update temporary licenses, click **Activate Licenses**. The dialog for updating/activating licenses opens.

NOTE!
You need administrator rights to synchronize and update licenses.

Camera, image and scene requirements

The camera should be setup so that the combination of the distance, the lens's focal length and the camera's resolution provide an image that can be accurately analyzed by the OCR engine. Therefore the following pre-requisites must be fulfilled for the scene:

Quality of the USDOT code to be captured in the image

Fig. 2: Example of clearly recognizable USDOT code

- The USDOT code must be clearly legible. To achieve this, it must stand out from the background in high contrast and be well illuminated. It must also be free of dents, holes or heavy soiling.
- The code must comply with the USDOT standard.
- The character height in the image must be between 20 px and 60 px.

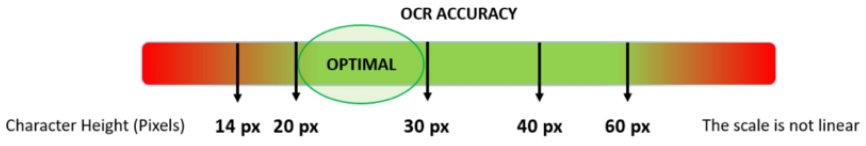


Fig. 3: Minimum character height

- Maximum rotation angle:
  - Vertical: **< 25°**
  - Slope: **< 15°**
  - Horizontal: **< 25°**

Frame rate

An optimally resonable frame rate influences the recognition quality significantly. When using Vaxtor USDOT on a MOBOTIX IoT camera, the camera sends frames at about 25fps to the app.

Shutter Speed (Exposure time)

Shutter speed, also known as the “exposure time”, is the length of time a camera shutter is open for in order to expose light onto the camera sensor. The shutter speed is measured in seconds, or fractions of a second. The bigger the denominator, the faster the speed. For example, 1/250th means one two-hundred-and-fiftieth of a second or four milliseconds.

(1 second = 1000 milliseconds)

Examples for recommended exposure times

USDOT speed	minimum exposure time (sec)
Stationary	1/125th (8 milliseconds)
Very slow	1/500th (2 milliseconds)
Slow	1/1000th (1 milliseconds)

NOTE!
USDOT codes are always read perpendicular to the camera and across the field of view, so that higher shutter speeds are required than, for example, for vehicles moving towards the camera. Fast-moving wagons can therefore not be read.

Resolution

The resolution of the camera determines the amount of detail that can be captured. The smaller the object detail, the higher the resolution that is required. There are several factors that determine the detail captured:

- The resolution (pixel size) of the camera sensor. This sensor (normally CMOS) where the light eventually falls and a typical IP camera has a sensor resolution of 2 or 4 Megapixels.
- The resolution of the camera’s electronics. Most CCTV cameras can support a minimum of 1920 x 1080 – but may be set to a lower resolution if not needed.
- The quality and focal length of the lens. The quality of the optics can play a part in challenging circumstances. The focal length (zoom factor) determines the field of view that can be seen.
- The quality of the images can be influenced by factors such as the type of lighting used.

Recommended resolution: max. 1920 x 1080 px

Focal length

The focal length of the lens determines how “zoomed in” the image is. It is usually expressed in millimeters (e.g., 6 mm, 25 mm, or 50 mm).

The focal length defines the angle of view (how much of the scene will be captured) and the magnification (how large individual elements will be). The longer the focal length, the narrower the angle of view and the higher the magnification. The shorter the focal length, the wider the angle of view and the lower the magnification.

In the case of zoom lenses, both the minimum and maximum focal lengths are stated, for example 10–40 mm.

Examples for recommended focal length

Scene (Street type)	Distance between camera and USDOT code (m)	recommended lens
Barrier or Gate	2 - 6 m	2 - 8 mm or similar
Access road	15 - 30 m	15 - 50 mm or similar

NOTE!
The lens should be **IR corrected** to avoid out of focus images. IR Corrected lenses should be used on both day/night and monochrome cameras in all lighting conditions in order to achieve a crisp sharp image.

Illumination

USDOT codes are usually placed in the area of the doors of the truck and are not reflective. Therefore sufficient ambient lighting must be used to adequately illuminate the text so that it can be read at a reasonably fast shutter speed without the camera adding too much gain to brighten the image. (a maximum gain of about 12 is advised).

NOTE!
Adding gain effectively amplifies the video signal, including any noise which can result in a very grainy image which is prone to OCR errors.

Recommendations on mounting and adjusting

- Depth of focus is a very important parameter. If you are using a camera with a CS-mount lens, use a fixed lens. Fixed lens are better for container code recognition due to greater depth of focus. Megapixel lens is also strongly recommended.

- Respect changing light conditions (e.g. due to sunrises and sunset) when choosing the place of mounting. Direct sunlight beams can distort a picture. If the code is facing a direct sunlight consider using a lens with auto iris mode.
- If mounting a camera on a roadside or trackside pole check how the pole reacts to heavy cars or a convoy of cars. Some poles have tangible tremor, this could make container code recognition almost impossible.
- It is recommended to turn down WDR and BLC. In most cases, they will make the picture more pretty, but at the cost of smudging details like an edges of letters in the container code. For the same reason keep digital noise reduction as low as possible.
- On certain rare conditions there may be a cases of false detections e.g. because of recognizing image parts that structurally or semantically look similar to a container code(e.g. fences or ads). To minimize this:
  - Adjust the region of interest accordingly. It may be a good idea to make it smaller, or change it’s shape, omitting the parts, which potentially may be false detected.
  - There may be cases, when the best performance will occur by changing angle of lens or moving the camera. In some cases, shooting a front container code is better.

Troubleshooting

Correct OCR-based reading of USDOT codes printed on doors of US trucks is difficult or impossible if the captured images have any of the following characteristics:

- Over- or under exposed
- Blurred or distorted
- Unevenly lit
- Acute camera angle
- Low contrast
- Damaged or badly painted text
- Bad weather conditions like fog, snow or heavy rain
- Very abstract designed fonts

Fig. 4: Low contrast text is almost impossible to read correctly

Acute angle increases the risks of OCR errors

Activation of the Certified App Interface

CAUTION!
The Vaxtor USDOT - Number Recognition App does not consider obscure areas defined for the live image. Therefore there is no pixelation in obscure areas while configuring the app and during image analysis by the app.

NOTE!
The user must have access to the setup menu (http(s)://<camera IP address>/control). Therefore check the user rights of the camera.

1. In the camera web interface, open: **Setup Menu / Certified App Settings** (http(s)://<camera IP address>/-control/app_config).

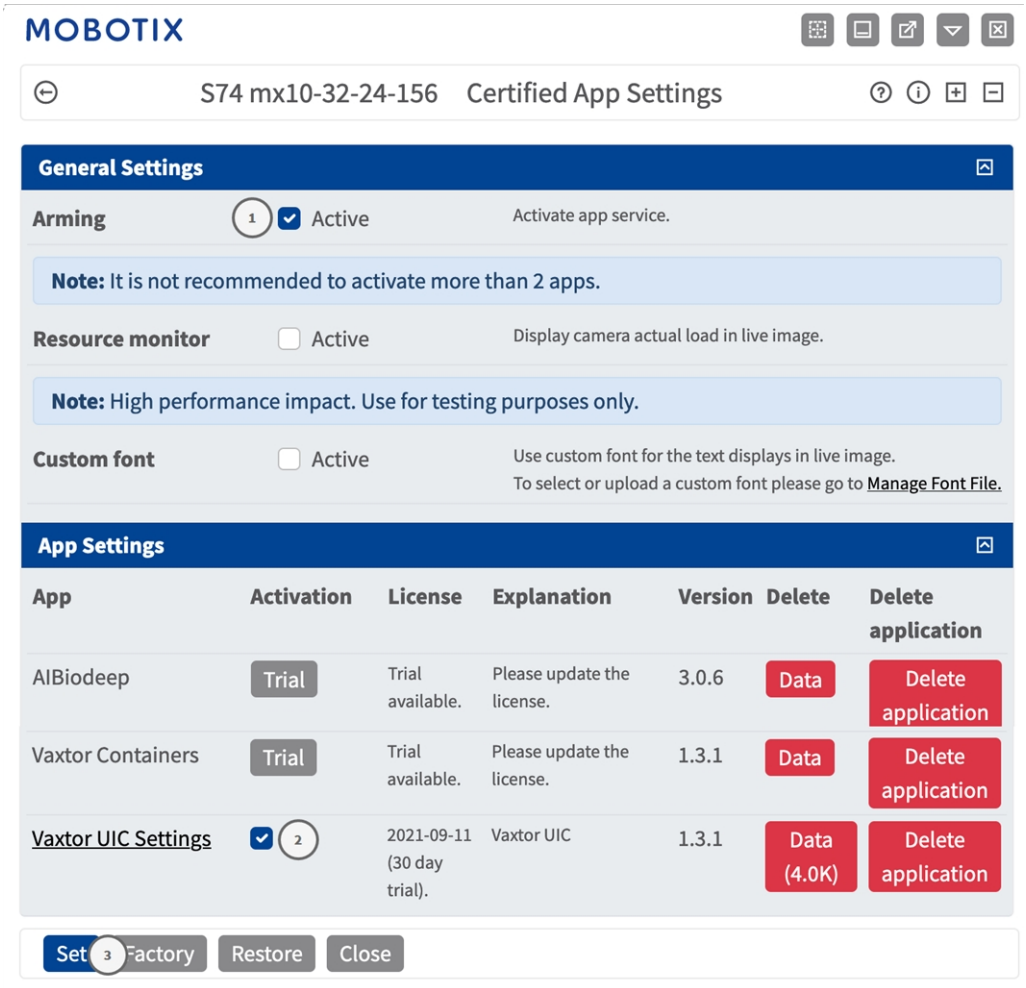


Fig. 5: Activation of Certified Apps

2. Under **General Settings** activate the **Arming**① of the app service.
3. Under **App Settings** check the **Active** option ② and click **Set**③ .
4. Click on the name of the App to be configured to open the Apps user interface.
5. For configuration of the App see Configuration of Vaxtor USDOT - Number Recognition App, p. 27.

Configuration of Vaxtor USDOT - Number Recognition App

NOTE!
For best performance and results in USDOT code processing make sure to have scene set up to meet the Camera, image and scene requirements, p. 21.

NOTE!
The user must have access to the setup menu (http(s)://<camera IP address>/control). Therefore check the user rights of the camera.

1. In the camera web interface, open: **Setup Menu / Certified App Settings** (http(s)://<camera IP address>/-control/app_config).
2. Click on the name of the **Vaxtor USDOT - Number Recognition App**.

The configuration window of the app appears with the following options:

Basic Settings

The following configurations should be taken into account:

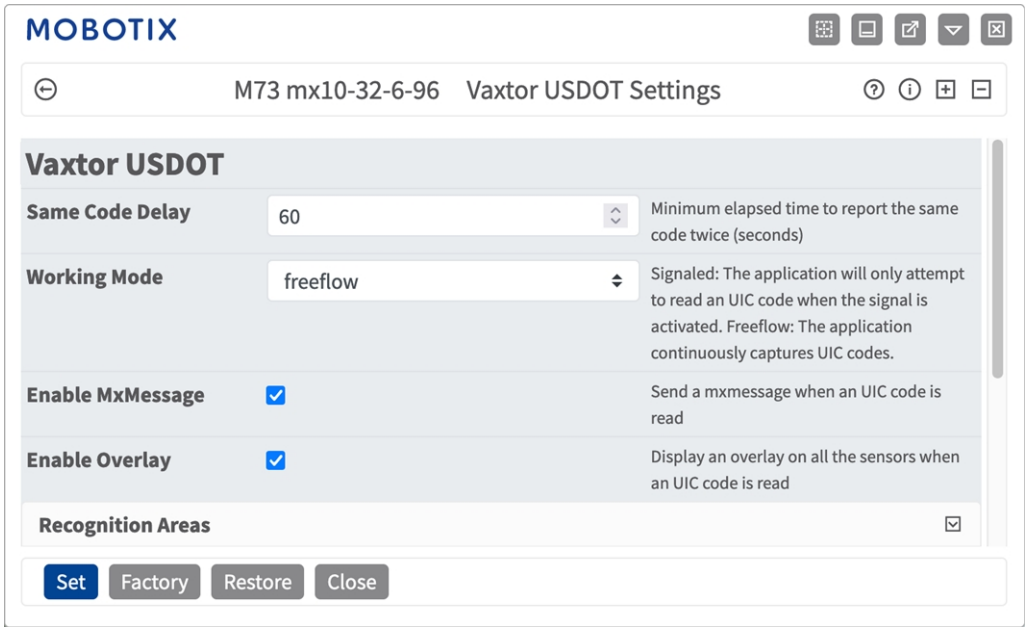


Fig. 6: Basic settings

Same code delay: Define the minimum elapsed time to report the same code twice (seconds).

Working mode: The following modes are available:

Free flow: The application continuously captures USDOT codes.

Signaled: The application will only attempt to read an USDOT code when a signal is triggered accordingly.

> **NOTE!**
> In signaled mode an signal ID will be sent with the signal event.

Enable MxMessage: Check to enable the processing of USDOT code events in the MxMessageSystem..

Enable Overlay: Check to enable the display of the USDOT code recognition result in the live view.

Recognition Areas

A Recognition Area is an area within the video frame where the OCR analytics takes place. You can draw a polygon and choose whether the area to look for plates in inside or outside this region. You can set multiple areas to respect complex situations.

> **NOTE!**
> Using Recognition Areas can decrease OCR processing time and also reduce false positives. The whole USDOT code must be in or out the Recognition Area to pass the test.

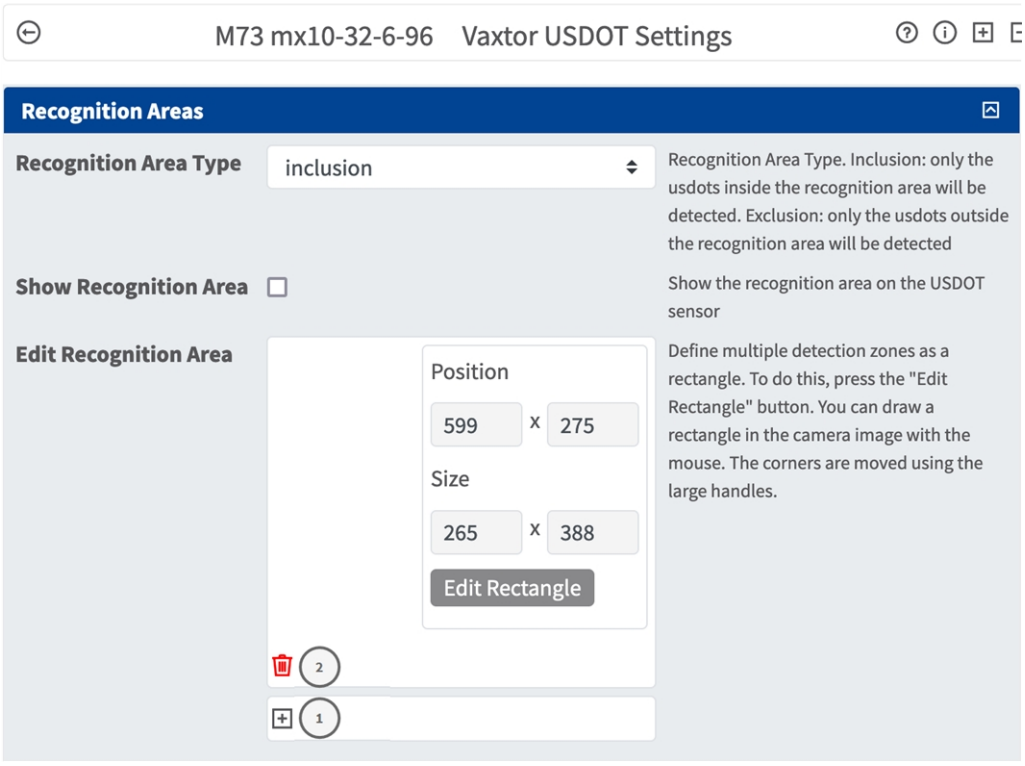


Fig. 7: Recognition Areas

Recognition Area Type: Check to activate the sending of events according to the following configuration

Inclusion: only the plates inside the recognition area will be detected.

Exclusion: only the plates outside the recognition area will be detected.

Show Recognition Area: Check to display the recognition area in the camera image.

Drawing a Recognition Area

1. Click the **plus** icon ① to switch into the live image.
2. In the live view simply click and drag a rectangular recognition area.
3. Drag the corner points to refine the recognition area.
4. In the top right corner of the live view click **Submit** to adopt the coordinates of the rectangle.
5. Optionally click the **bin** icon ② to delete the recognition area.

List Management

You can define a black list and a white list with up to 1000 USDOT codes per list. If an USDOT code from one of the lists is recognized, a corresponding event is sent within the MxMessageSystem of the camera.

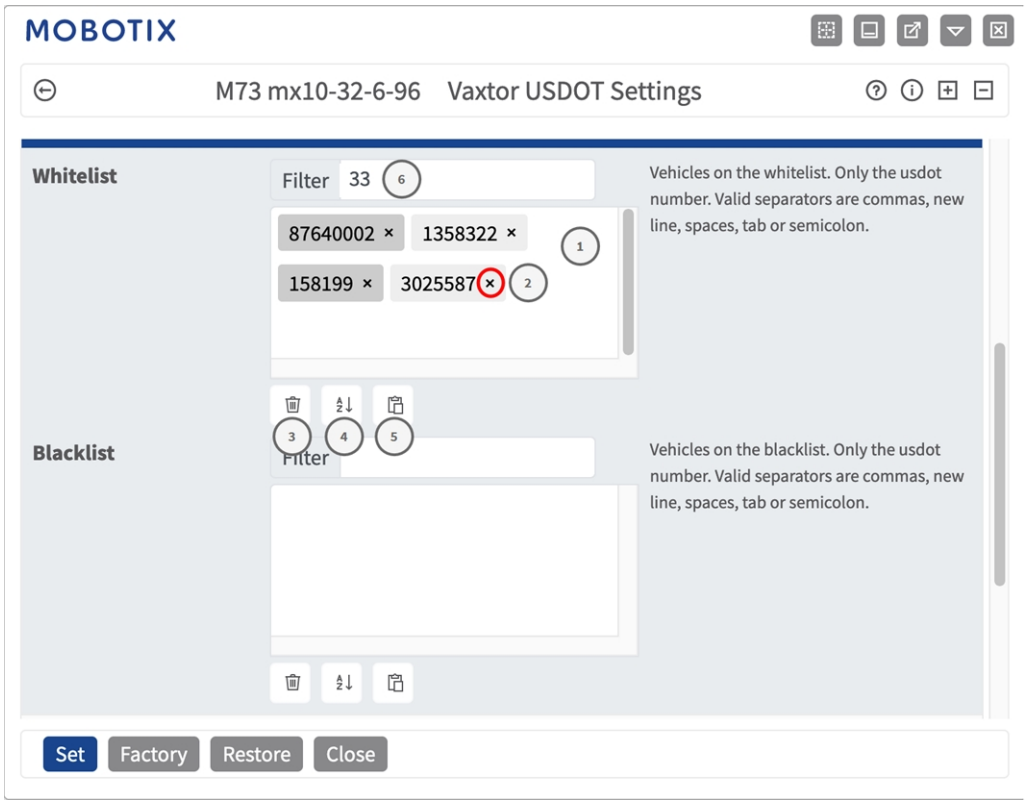


Fig. 8: Black and white lists

Adding an USDOTcode to a list

1. Enter the USDOT code text into the text field ① and click **Enter**.

Adding multiple USDOT codes from a text file

1. Make sure that your text file contains one license plate per line.
2. Copy the relevant codes from the text file and paste them into the text field ① .

Deleting an USDOT code from a list

1. Click on the small **x**② to the right of the USDOT code.

Deleting all codes from a list

1. Click the trash icon ③ .

Sorting all USDOT codes from a list alphabetically

1. Click the sort icon ④ .

Copy all codes from a list to the clip board

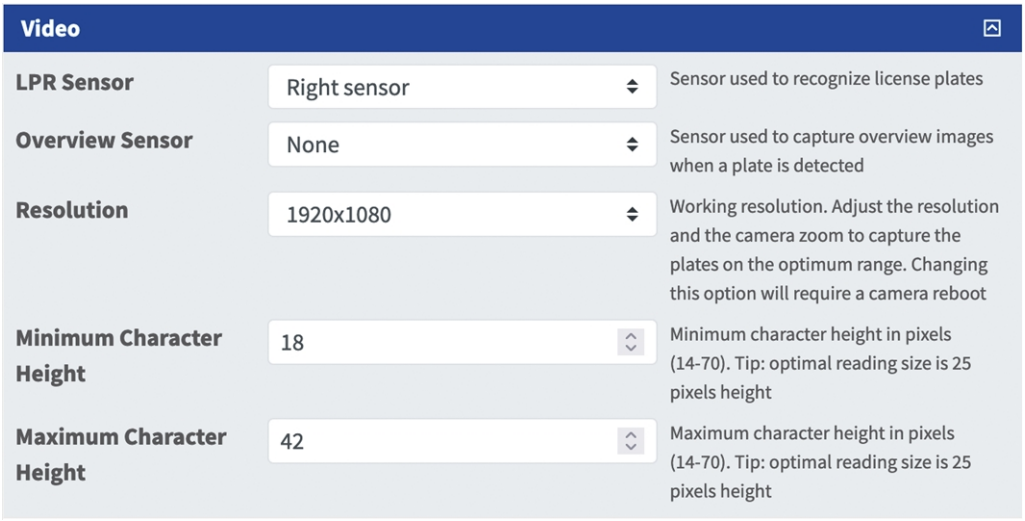
1. Click the copy to clipboard icon ⑤ .

Filtering USDOT codes

1. Enter the USDOT code or parts of it into the filter text field ⑥ . Only codes containing the filter text are displayed accordingly

Video

In the video tab you can specify video quality of the video to be analyzed.



LPR sensor: Select the camera sensor to be used for License plate recognition.

NOTE!
Changing this option requires a camera reboot.

Overview Sensor: Optionally select a sensor used to capture overview images when a plate is detected.

Resolution: Set the working resolution (current max = 1080p). Adjust the resolution and the camera zoom to capture the plates on the optimum range.

NOTE!
Changing this option requires a camera reboot.

Minimum Character Height: the minimum height that a license plate's characters should be before being read. The characters should be about 20-30 pixels high.

NOTE!
For small license plates, e.g. most Arabic plates or plates with additional small characters e.g. Costa Rica a minimum character height of 30 pixels is recommended.

The recommended difference between the min and max heights is about 10 pixels

Maximum Character Height: the maximum height is about 20-30 pixels.

NOTE!
The recommended difference between the min and max heights is about 10 pixels.

USDOTs

In the USDOTs tab you can define whether multi-line USDOT codes are to be read.

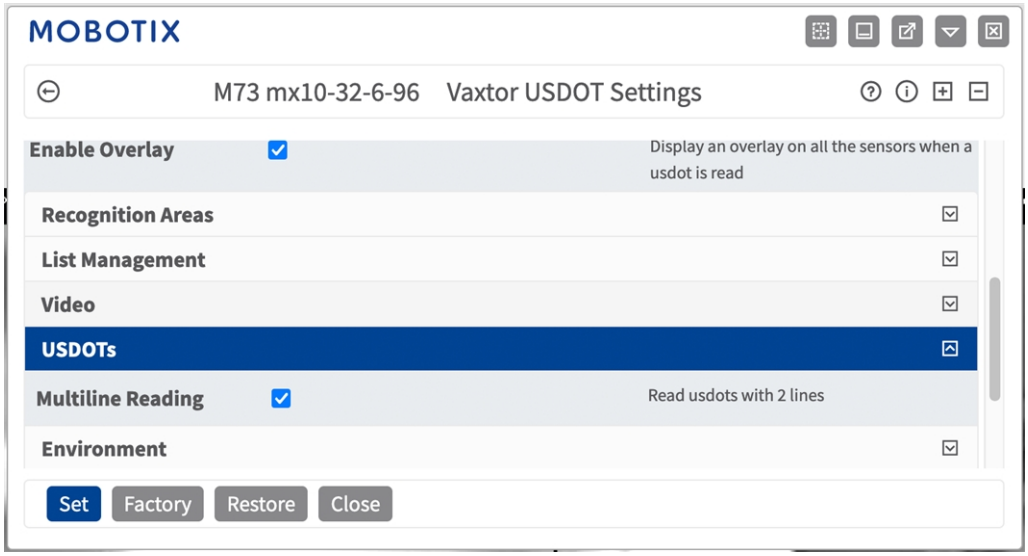
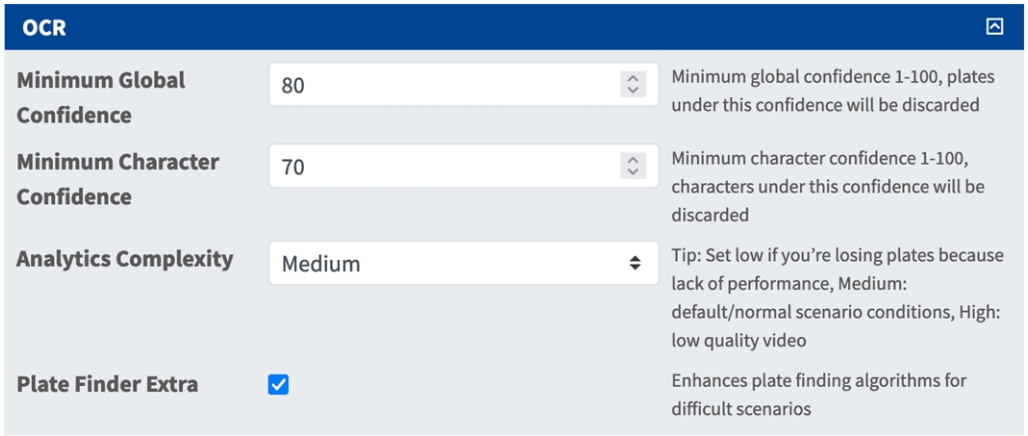


Fig. 9: USDOTs

Multiline Reading: Check if multi-line USDOT codes are to be read.

OCR

In the OCR (Optical Character Recognition) tab you can set parameters to ensure the best possible recognition results.



Minimum Global Confidence: Set the minimum confidence level that the whole license plate read must meet in order to be accepted. The global confidence is the average of all individual characters' confidences. The recommended value is 70. Set lower if you see some plates in very bad condition but want to read them.

NOTE!
Setting the Minimum Global Confidence too low will cause the OCR engine attempt to read other items such as vehicle signage etc.

Minimum character Confidence: Set the minimum confidence level that a single character must meet in order to be accepted. The recommended value is 50.

NOTE!
In regions with open grammars such as the USA keep these two values high, e.g. 90-80 respectively. Higher values mean a lower probability of false positives and a lower probability of missing plates.

Analytics Complexity: This is the complexity of the analytics to be applied during the ALPR Engine's stage of plate reading. Set this according to the OCR mode and type of traffic expected. There are three options.

Low: Recommended for very high-speed traffic where the OCR needs to work faster and your preference is for plate detection over perfect recognition.

Medium (Default) Recommended when the OCR mode is set to free-flow.

High: Recommended when the OCR mode is set to signal (triggered).

CAUTION!
Higher complexities give more accurate reading but make the ALPR engine run slower.

Plate Finder Extra: This is the complexity of the analytics to be applied during the ALPR Engine's stage of plate finding. Set this to one of the following three values:

Low: apply up to 3 levels

Medium: apply up to 8 levels

High: apply up to 12 levels

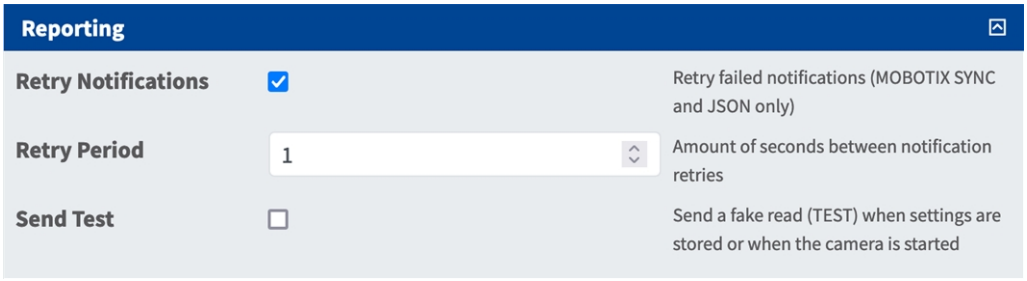
CAUTION!
Higher complexities give more accurate reading but make the ALPR engine run slower.

Reporting

Vaxtor USDOT - Number Recognition App is able to output all plate reads in real time using a variety of standard protocols so that the plate reads can be accepted remotely by a variety of programs including MOBOTIX SYNC, which can accept and store plate reads in real time from hundreds cameras.

By selecting one of the listed protocols, a sub-menu will appear with fields for setting up parameters such as remote IP addresses etc.

Basic Settings

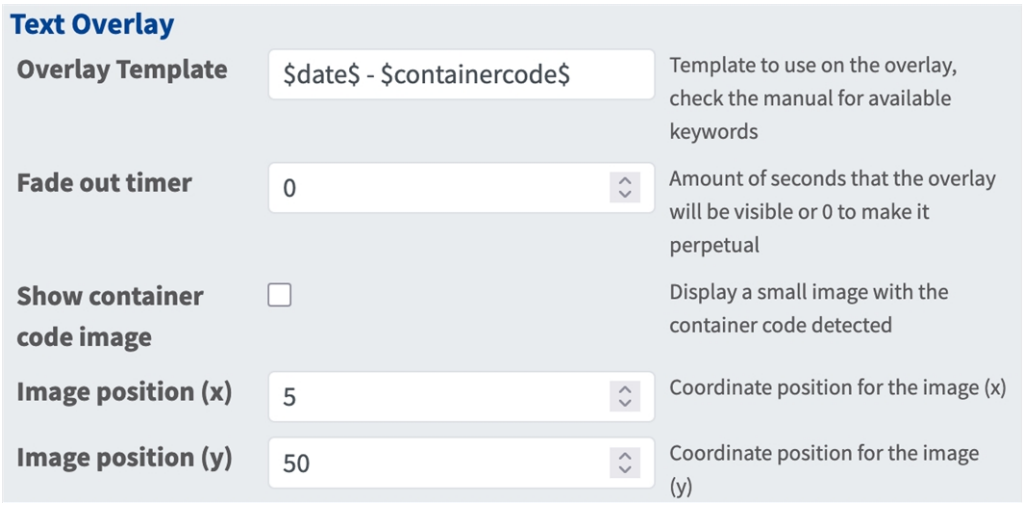


Retry notifications: Check to retry failed notifications (MOBOTIX SYNC and JSON only).

Retry period: Amount of seconds between notification retries.

Send test: Check to send a fake read (TEST) when settings are stored or when the camera is started.

Text Overlay



Text Overlay

Overlay Template: Define template to use on the overlay. Check the Variables / Template Fields for available keywords.Check the Variables / Template Fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template Fields, p. 42 for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.

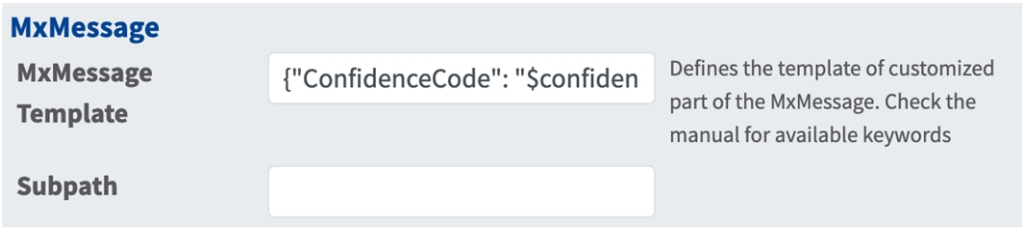
Fade out timer: Set the amount of seconds that the overlay will be visible or 0 to make it perpetual.

Show plate image: Check to display a small image with the container code detected.

Image position (x): x coordinate position for the image.

Image position (y): y coordinate position for the image.

MxMessage

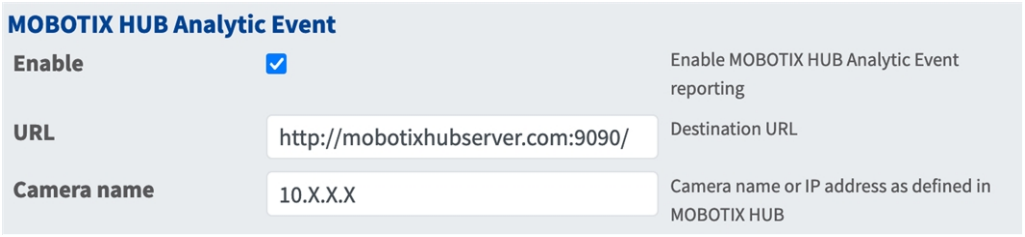


MxMessage

MxMessage Template: Define template of customized part of the MxMessage. Check the Variables / Template Fields for available keywords.Check the Variables / Template Fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template Fields, p. 42 for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.

Subpath: Define a subpath for the MxMessage. Check the Variables / Template Fields for available keywords.Check the Variables / Template Fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template Fields, p. 42 for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.

MOBOTIX HUB Analytic Event



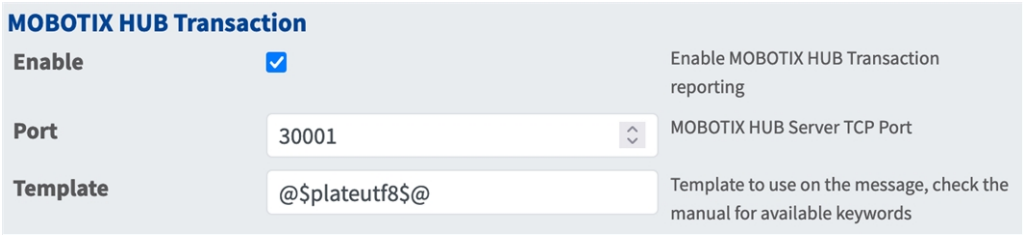
MOBOTIX HUB Analytic Event: With the Analytics Events feature it is possible to send MAD (Milestone Alert Data) formatted alerts to the MOBOTIX HUB event server over TCP/IP.

Enable: Check to enable and configure MOBOTIX HUB Analytic Event reporting.

URL: Enter the corresponding MOBOTIX HUB Server URL (e.g. http://mobotixhubserver.com:9090/)

Camera name: Enter the camera name or IP address of this camera as defined in MOBOTIX HUB.

MOBOTIX HUB Transaction



MOBOTIX HUB Transaction: With the Analytics Events feature it is possible to send transaction data to a MOBOTIX HUB server over TCP/IPport.

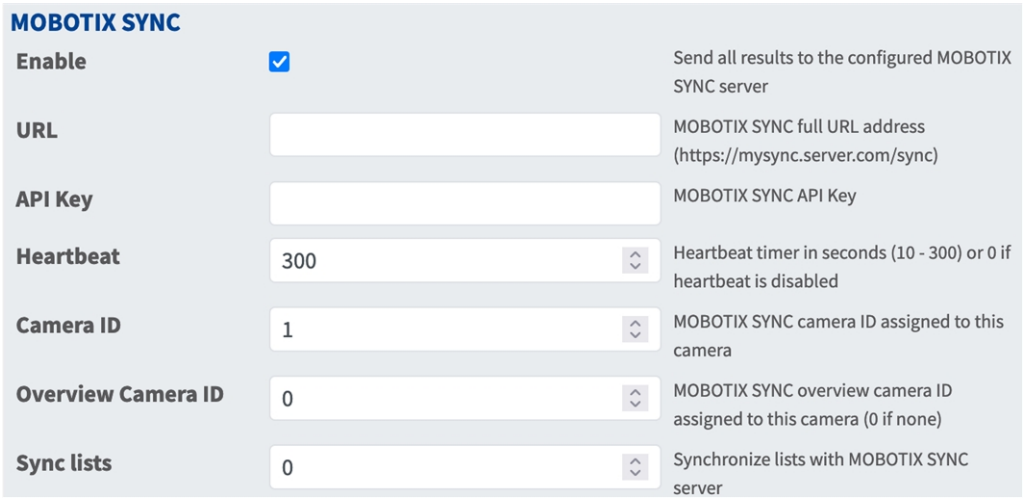
Enable: Check to enable and configure MOBOTIX HUB Transaction reporting.

Port:MOBOTIX HUB Server TCP Port.

Template: Template used when reporting. Check the Variables / Template Fields for available keyword-s.Check the Variables / Template Fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template Fields, p. 42 for available keywords.Check the Variables / Template fields for available keyword-s.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.

Vaxtor Helix-6

NOTE!
The options in this section also apply to Vaxtor Helix servers.



MOBOTIX SYNC: MOBOTIX SYNC protocol is an encrypted version of the Vaxtor protocol.

Enable: Check to enable and configure the reporting to a MOBOTIX SYNC server.

URL: Enter the full URL of your configured MOBOTIX SYNC server using this syntax https://<ip_or_server_name>/sync). When reporting to a Vaxtor Helix server, enter https://<ip_or_server_name>/helix6.

API Key: Enter the MOBOTIX SYNC (or Helix) API key generated from your server application.

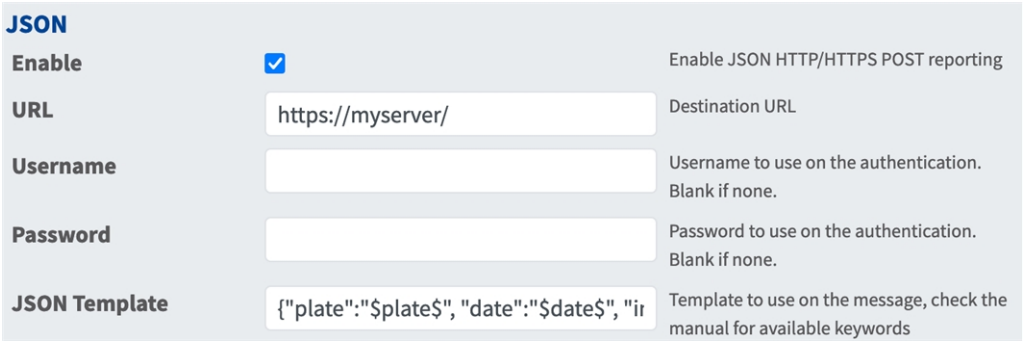
Heartbeat: Sends a heartbeat every x seconds to the specified server (enter 0 to disable).

Camera ID: Enter MOBOTIX SYNC (or Helix) camera ID assigned to this particular camera.

Overview Camera ID: Enter the MOBOTIX SYNC (or Helix) overview camera ID assigned to this particular camera (set to 0 if none).

Sync lists: Synchronizes the lists with the MOBOTIX SYNC (or Helix) server.

JSON



JSON : JSON is a compact data format in an easy-to-read text form for data exchange between applications.

Enable: Check to enable and configure JSON HTTP/HTTPS POST reporting.

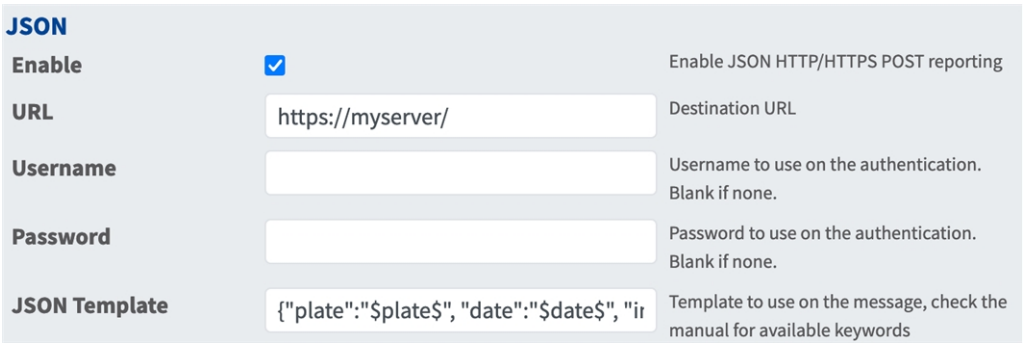
URL: Enter the destination URL (e.g., 3rd party server) where the generated meta data should be sent to.

Username: Username to be used for authentication (leave blank if no authentication is used).

Password: Password to be used for authentication (leave blank if no authentication is used).

JSON Template: Defines the content / scheme of the transmitted JSON notification. Check the Variables / Template Fields for available keywords.Check the Variables / Template Fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template Fields, p. 42 for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.

XML



XML : XML is a compact data format in an easy-to-read text form for data exchange between applications.

Enable: Check to enable and configure XML HTTP/HTTPS POST reporting.

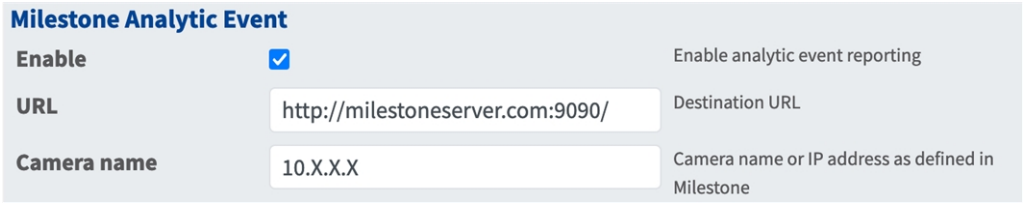
URL: Enter the destination URL (e.g., 3rd party server) where the generated meta data should be sent to.

Username: Username to be used for authentication (leave blank if no authentication is used).

Password: Password to be used for authentication (leave blank if no authentication is used).

XML Template: Defines the content / scheme of the transmitted XML notification. Check the Variables / Template Fields for available keywords.Check the Variables / Template Fields for available keyword-s.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template Fields, p. 42 for available keywords.Check the Vari-ables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.

Milestone Analytic Event



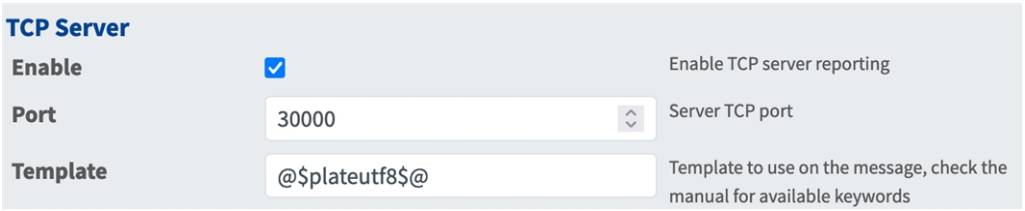
Milestone Analytic Event: With the Analytics Events feature it is possible to send MAD (Milestone Alert Data) formatted alerts to the Milestone event server over TCP/IP.

Enable: Check to enable and configure MOBOTIX HUB Analytic Event reporting.

URL: Enter the corresponding Milestone Server URL (e.g. http://milestoneserver.com:9090/)

Camera name: Enter the camera name or IP address of this camera as defined in Milestone.

TCP Server



TCP Server: You can send event data as text file and images files to a ftp server.

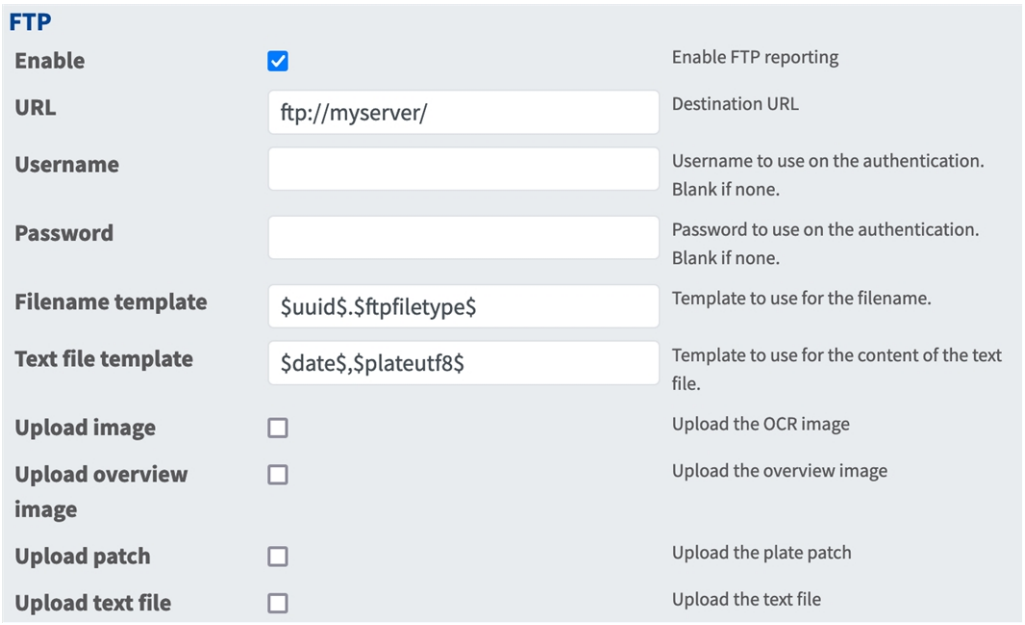
Enable: Check to enable and configure TCP server reporting.

Server IP: Enter the URL of the server to which the MxMessages will be sent.

Port: Enter the TCP port of the server.

Template: Defines the content / scheme of the transmitted TCP message. Check the Variables / Template Fields for available keywords.Check the Variables / Template Fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template Fields, p. 42 for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.

FTP



FTP: You can send event data as text file and images files to a ftp server.

Enable: Check to enable and configure FTP server reporting.

URL: Destination URL for the FTP server.

Username: Username if required, blank if none.

Password: Password if required, blank if none.

Filename Template: Template to use for the filename.

Text file template: Template to use for the content of the text file.

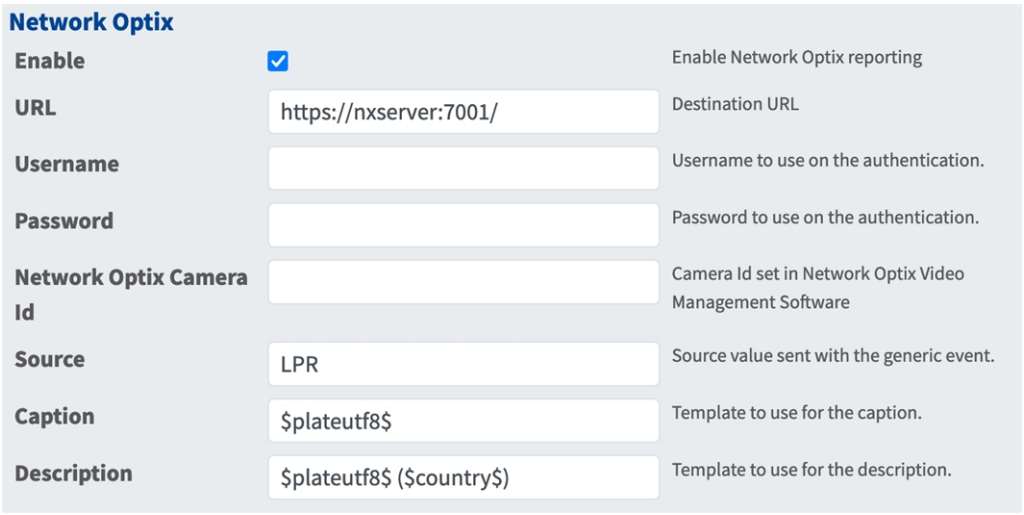
Upload image: Enables the upload of an image.

Upload overview image: Enables the upload of an overview image.

Upload patch: Enables the upload of a plate patch image (crop of the recognized code).

Upload text file: Enables the upload of a text file.

Network Optix



Network Optix: You can send event data to a Network Optix VMS server.

Enable: Check to enable and configure Network Optix server reporting.

URL: Destination URL for the Network Optix server.

Username: Username for authentication.

Password: Password for authentication.

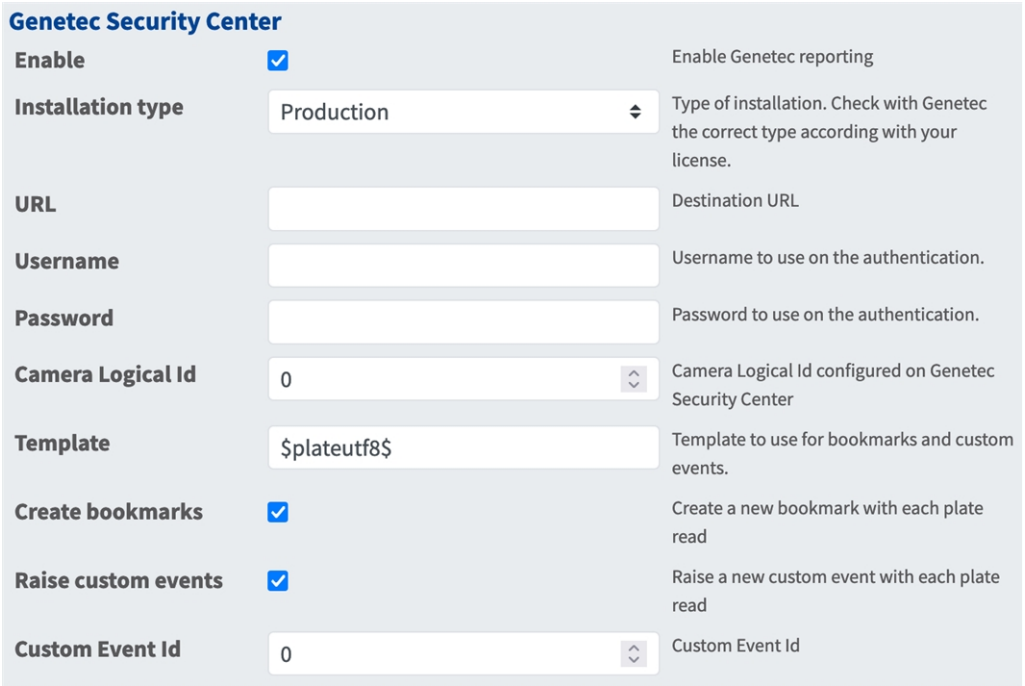
Network Optix Camera ID: Camera ID as set in the Network Optix video management software.

Source: Source value sent with the generic event.

Caption: Template to use for the caption Check the Variables / Template Fields for available keywords.Check the Variables / Template Fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template Fields, p. 42 for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.

Description: Template to use for the description. Check the Variables / Template Fields for available keywords.Check the Variables / Template Fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template Fields, p. 42 for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.

Genetec Security Center



Genetec Security Center: You can send event data to a Genetec Security Center server.

Enable: Check to enable and configure Genetec Security Center server reporting.

Installation type: Select the installation type that corresponds to your license.

URL: Destination URL for the Genetec Security Center server.

Username: Username for authentication.

Password: Password for authentication.

Camera Logical ID: Camera ID as set in Genetec Security Center.

Template: Template to use for bookmarks and custom events. Check the Variables / Template Fields for available keywords.Check the Variables / Template Fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template Fields, p. 42 for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.Check the Variables / Template fields for available keywords.

Create bookmarks: Creates a new bookmark with each plate read by the app.

Raise custom events: Raises a new custom event with each plate read by the app.

Custom Event ID: Set a custom event ID.

Variables / Template Fields

Vaxtor shared reserved variables

Variable	Category	Description	Example
$absolutebottom$	image	Plate bottom position based on the total image height (0-1).	0.44
$absoluteleft$	image	Plate left position based on the total image width (0-1).	0.59
$absoluteright$	image	Plate right position based on the total image width (0-1).	0.66
$absolutetop$	image	Plate top position based on the total image height (0-1).	0.37
$blacklist$	lists & conditions	Description on the black-list linked to the code/-	

Variable	Category	Description	Example
		plate.	
$blacklistdescription$	lists & conditions	Description specified in the blacklist record	Suspicious vehicle
$bottom$	image	Bottom coordinate for the code/plate on the image (pixels).	477
$cameraid$	other	Camera OCR ID	
$charheight$	plate info	Average character height (pixels).	33
$class$	analytics	Vehicle classification	Car
$confidence$	plate info	Global confidence (0-100).	99
$countrycode$	plate info	3 letter country code	GER
$date$	date & time	ISO 8601 Date with UTC offset appended	2023-09-19T23:47:01.65+02:00
day	date & time	Day (UTC) in two digits. Includes leading zero if single-digit number.	19
$directionstr$	plate info	Show direction as string	left
$dwelltime$	analytics	Time spent in monitored area, in seconds	336
etx	other	End of text control character (HEX 03).	
$formatted$	plate info	Plate contents in human-readable format. Empty if no result.	LU CY 1909
$height$	image	OCR image height in px.	1080
$hour$	date & time	Hour (UTC) in two digits using the 24-hour clock-.Includes leading zero if single-digit number.	23
$ifblacklist$	lists & con-	If the plate is on the	$ifblacklist$ Content

Variable	Category	Description	Example
	ditions	blacklist, returns the text between these templates.	to append $if-blacklist$
$iflist$	lists & conditions	If the plate is on llist, returns the text between these templates.	$iflist$ Content to append $iflist$
$ifnolist$	lists & conditions	If the plate is not on any list, returns the text between these templates.	$ifnolist$ Content to append $ifnolist$
$ifnotblacklist$	lists & conditions	If the plate is not on the blacklist, returns the text between these templates.	$ifnotblacklist$ Content to append $ifnotblacklist$
$ifnotwhitelist$	lists & conditions	If the plate is not on the whitelist, returns the text between these templates.	$ifnotwhitelist$ Content to append $ifnotwhitelist$
$ifwhitelist$	lists & conditions	If the plate is on the whitelist, returns the text between these templates.	$ifwhitelist$ Content to append $ifwhitelist$
$image$	image	Full image, JPEG encoded in base64.	
$imageid$	other	Signal ID in case of a trigger read.	
$imagesize$	image	Full image size in bytes	297249
$left$	image	Left coordinate for the code/plate on the image (pixels)	1255
$localday$	date & time	Day (local) in two digits. Includes leading zero if single-digit number.	15
$localhour$	date & time	Hour (local) in two digits	12

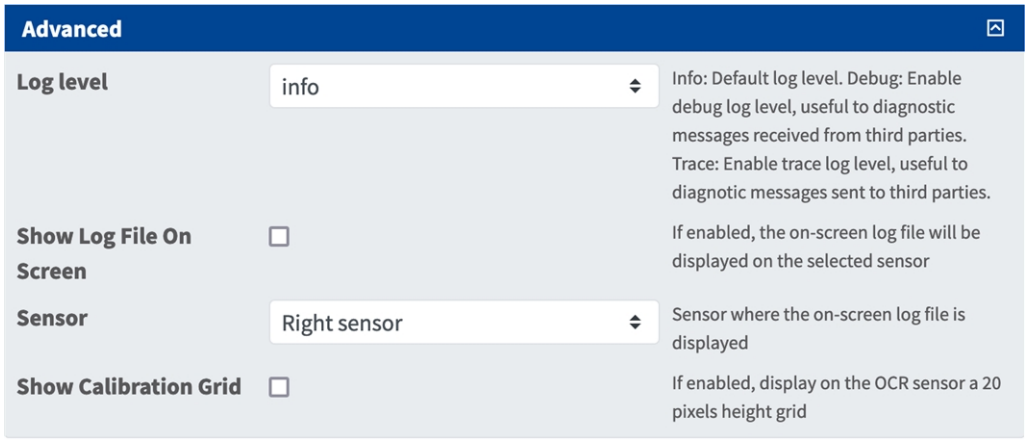
Variable	Category	Description	Example
		using the 24-hour clock-.Includes leading zero if single-digit number.	
$localmin$	date & time	Minute (local) in two digits. Includes leading zero if single-digit number.	23
$localmonth$	date & time	Month (local) in two digits. Includes leading zero if single-digit number.	11
$localsec$	date & time	Second (local) in two digits. Includes leading zero if single-digit number.	48
$localyear$	date & time	Year (local) in four digits	2024
min	date & time	Minute (UTC) in two digits. Includes leading zero if single-digit number.	47
$month$	date & time	Month (UTC) in two digits. Includes leading zero if single-digit number.	11
$multiplate$	plate info	Amount of times that the plate has been read before reporting	4
$nolist$	lists & conditions	True or False	
$numdigits$	analytics	numbers of digits in the code	12
$overviewimage$	image	Overview JPEG image encoded in base64.	
$overviewimagesize$	image	Overview image size in	297249

Variable	Category	Description	Example
		bytes.	
$overviewimagejpegsize$	image	Size of overview image size in bytes	8836
$processingtime$	Plate info	Processing time in milliseconds.	122
$right$	image	Right coordinate for the code/plate on the image (pixels)	1269
sec	date & time	Second (UTC) in two digits. Includes leading zero if single-digit number.	10
$sensor$	other	Camera sensor ID where the plate number is found (0, 1).	0
$serialnumber$	plate info	Serial number	123
$signalid$	plate info	Identificator provided on the triggering HTTP request	ab12cd34
stx	other	Start of text control character (HEX 02).	
tag	plate info	Hashed plate number. Same plate produces the same hash on repetitions.	9612548
$timestamp$	date & time	ISO 8601 date with UTC offset appended (yyyy-MM-ddTHH:mm:sszzz)	2024-09-19T23:47:01.65+02:00
top	image	Top coordinate for the code/plate on the image (pixels).	456
$uiccode$	plate info	UIC code in ASCII	12AK385
$utcdate$	date & time	ISO 8601 date UTC	2024-09-

Variable	Category	Description	Example
			19T21:47:01.65Z
$uuid$	plate info	Universally unique identifier (UUID) generated at the time of license plate detection.	de5027d5-191d-4d3d-987b- dc104cc27d5c
$vehicleaccess$	analytics	Status: "Enter", "Exit", " Overstay", or " Lost"	
$vehicletype$	analytics	Vehicle type code	
$whitelistdescription$	lists & conditions	Description specified in the Whitelist record	Mr Smith's car
$width$	image	Full image width in px	1254
$year$	date & time	Year (UTC) in four digits	2023

Advanced

In this section you find useful tools for calibration and trouble shooting.



Log level: Select a debug level to generate a log file, which can be helpful e.g. for trouble shooting.

Info: Default loge level

Trace: Select e.g. for diagnostic messages received from third parties

Debug: Select for complete log files for debug purposes

Show log file on screen: Check to display the on-screen log file on the selected sensor

Sensor: Select the sensor on which the on-screen log file is displayed

Show Calibration Grid: Check to display on the OCR sensor a 20 pixels height grid

Storing the Configuration

To store the configuration you have the following options:

- Click **Set** to activate your settings and to save them until the next reboot of the camera.
- Click **Factory** to load the factory defaults for this dialog (this button may not be present in all dialogs).
- Click **Restore** to undo your most recent changes that have not been stored in the camera permanently.
- Click **Close** to close the dialog. While closing the dialog, the system checks the entire configuration for changes. If changes are detected, you will be asked if you would like to store the entire configuration permanently.

After successfully saving the configuration, the event and meta data are automatically sent to the camera in case of an event.

MxMessageSystem

What is MxMessageSystem?

MxMessageSystem is a communication system based on name oriented messages. This means that a message must have a unique name with a maximum length of 32 bytes.

Each participant can send and receive messages. MOBOTIX cameras can also forward messages within the local network. This way, MxMessages can be distributed over the entire local network (see Message Area: Global).

For example, a MOBOTIX 7 series camera can exchange a MxMessage generated by a camera app with an Mx6 camera that does not support certified MOBOTIX apps.

Facts about MxMessages

- 128-bit encryption ensures privacy and security of message content.
- MxMessages can be distributed from any camera of the Mx6 and 7 series.
- The message range can be defined individually for each MxMessage.
  - **Local:** Camera expects a MxMessage within its own camera system (e.g. through a Certified App).
  - **Global:** the camera expects a MxMessage that is distributed in the local network by another MxMessage device (e.g. another camera of the 7 series equipped with a certified MOBOTIX app).
- Actions that the recipients are to perform are configured individually for each participant of the MxMessageSystem.

MxMessageSystem: Processing the automatically generated app event

Checking automatically generated app events

NOTE!
After successfully activating the app (see Activation of the Certified App Interface, p. 25), a generic message event for this specific app is automatically generated in the camera.

1. Go to **Setup-Menu / Event Control / Event Overview**. In section **Message Events** the automatically generated message event profile is named after the application ① (e.g. VaxALPRUSDOT).

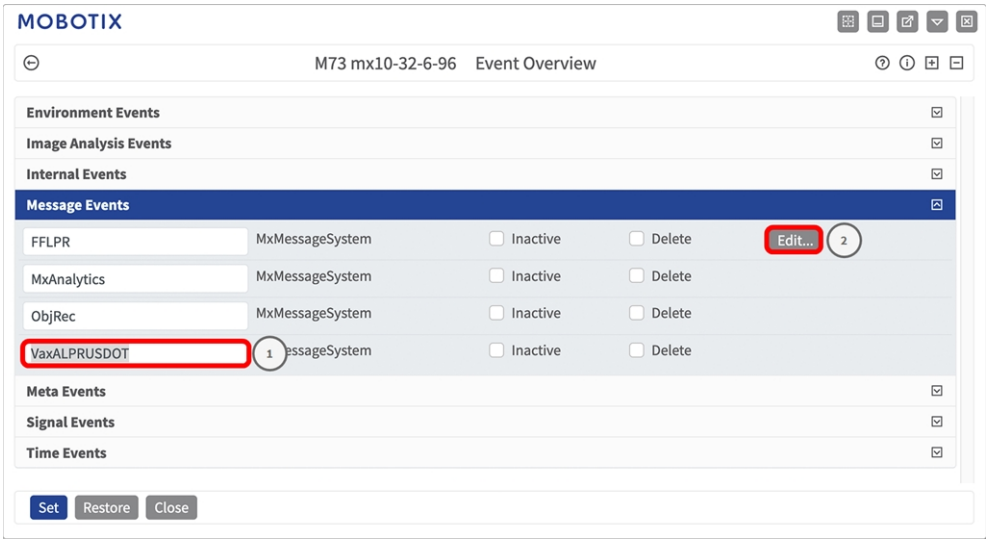


Fig. 10: Example: Generic message event from Vaxtor USDOT - Number Recognition App

2. Click **Edit**② to display and configure the event properties in detail.

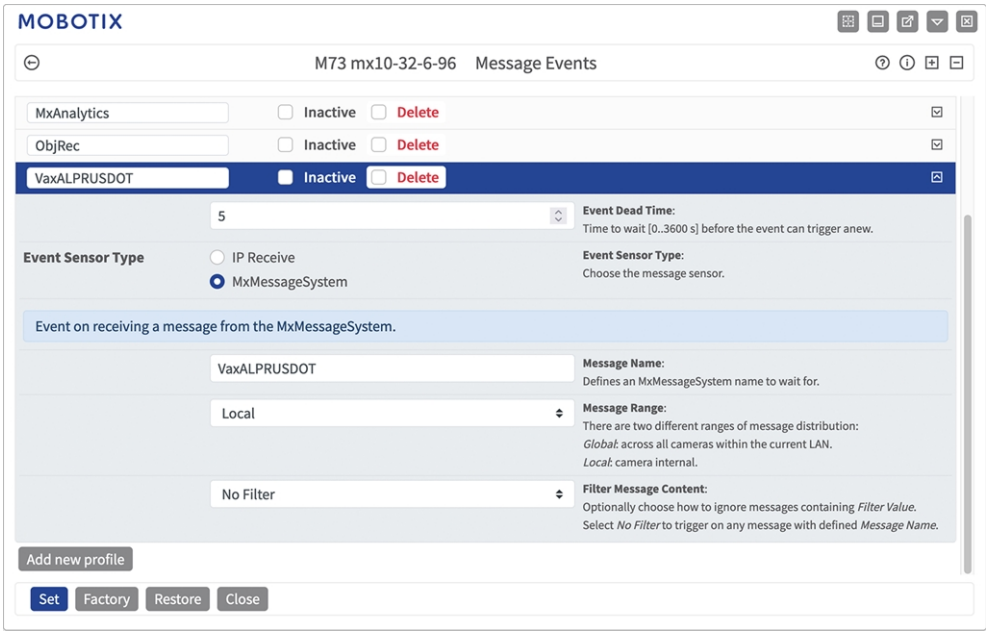


Fig. 11: Example: Generic message event details - no filter

Action handling - Configuration of an Action Group

CAUTION!
To use events, trigger Action Groups or record images the general arming of the camera must be enabled (http(s)/<camera IP address>/control/settings)

An Action Group defines which action(s) is (are) triggered by the Vaxtor USDOT - Number Recognition App event.

1. In the camera web interface, open: **Setup Menu / Action Group Overview** (http(s)://<camera IP address>/control/actions).

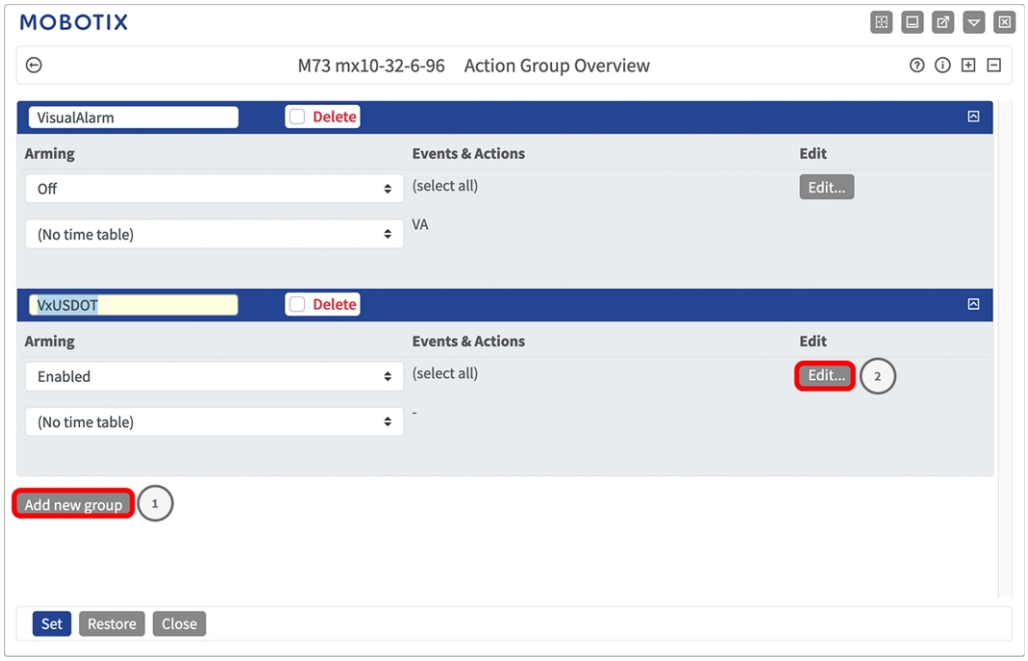


Fig. 12: Defining Action Groups

2. Click **Add new group**① and give a meaningful name.

3. Click **Edit**② , to configure the group.

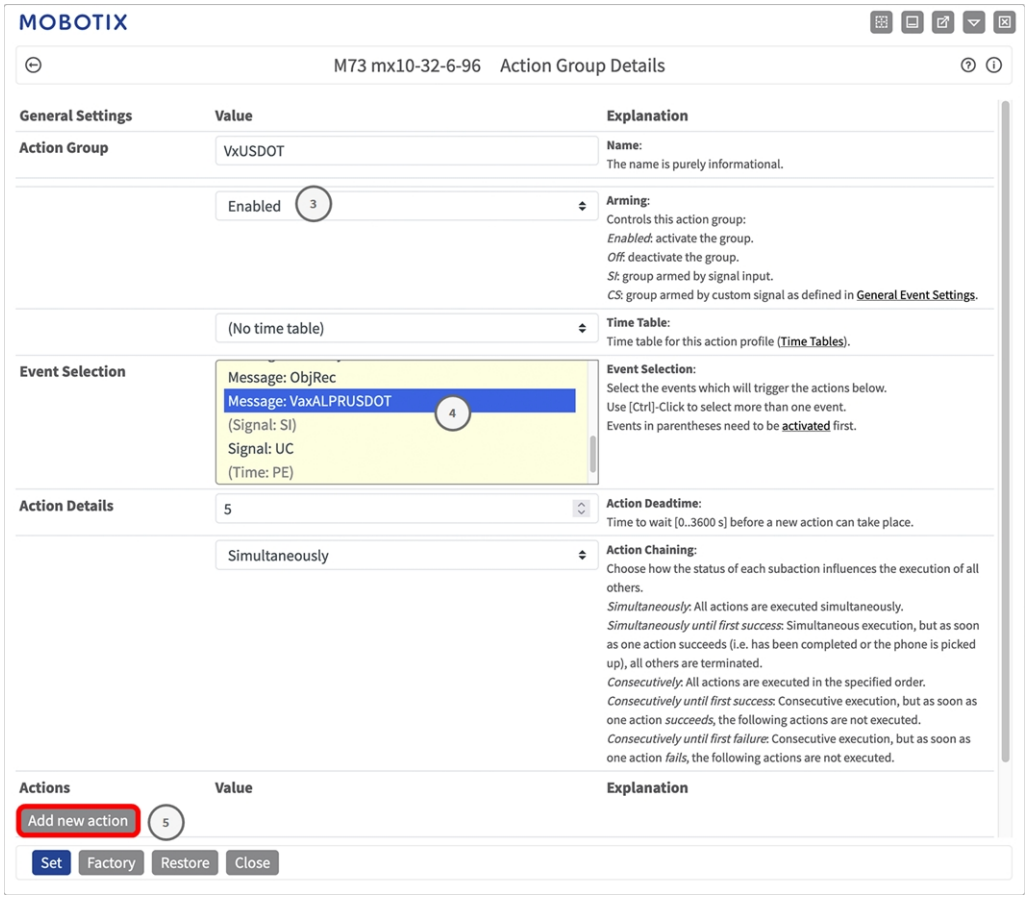


Fig. 13: Configuring an Action Group

1. Enable **Arming**③ of the Action Group.
2. Select your message event in the **Event selection** list ④ . To select multiple events, hold the shift key.
3. Click **Add new Action**⑤ .
4. Select a proper action from list **Action Type and Profile**⑥ .

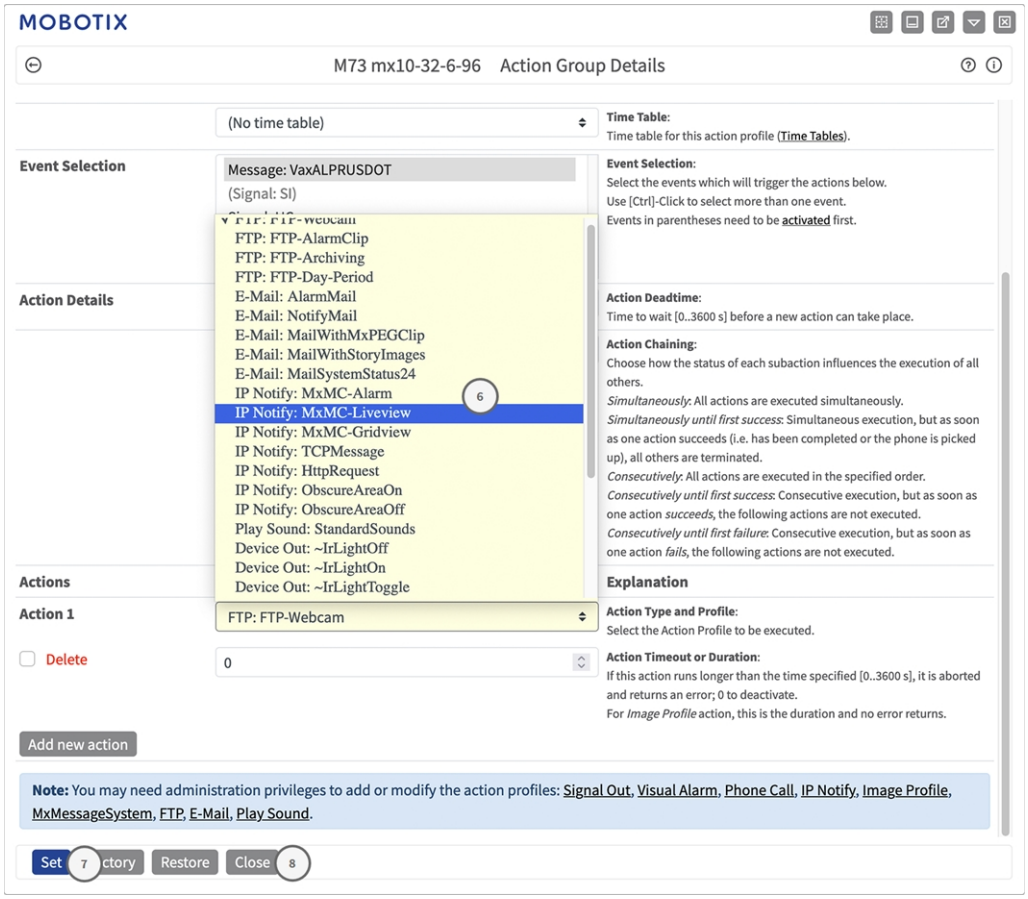


Fig. 14: Select Action Type- and Profile

NOTE!

If the required action profile is not yet available, you can create a new profile in the Admin Menu sections "MxMessageSystem", "Transfer Profiles" and "Audio and VoIP Telephony".

If necessary, you can add further actions by clicking the button again. In this case, please make sure that the "action chaining" is configured correctly (e.g. at the same time).

5. Click **Set**⑦ to confirm your settings.
6. Click on **Close**⑧ to save your settings permanently.

Action settings - Configuration of the camera recordings

1. In the camera web interface, open: **Setup Menu / Event Control / Recording** (http(s)/<camera IP address>/control/recording).

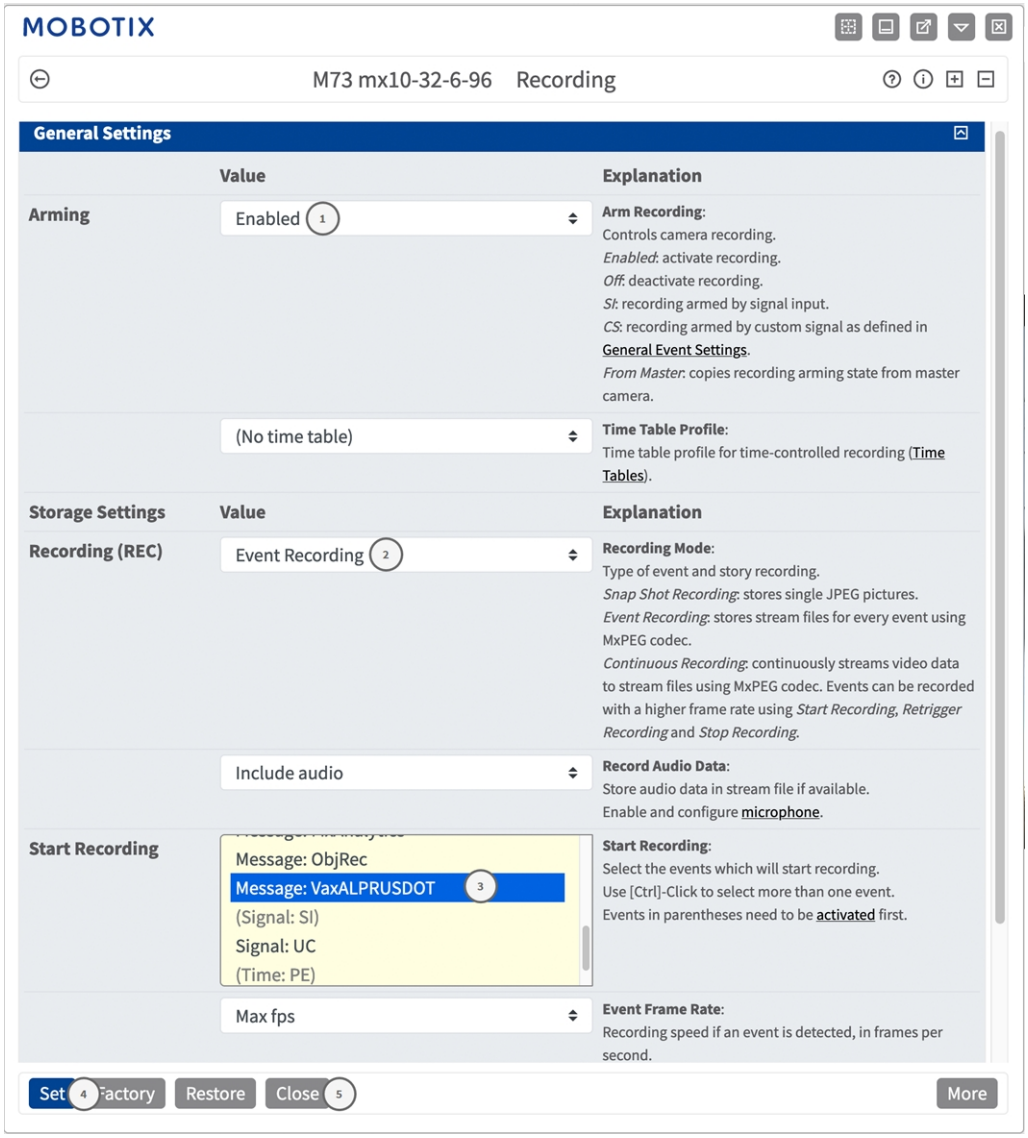


Fig. 15: Configuration of camera recording settings

2. Activate **Arm Recording**① .
3. Under **Storage Settings** / **Recording (REC)** select a **Recording mode**② . The following modes are available:

- Snap Shot Recording
- Event Recording
- Continuous Recording

4. In list **Start recording**③ select the message event just created.
5. Click on the **Set**④ button at the end of the dialog box to confirm the settings.
6. Click on **Close**⑤ to save your settings permanently.

NOTE!
Alternatively, you can save your settings in the Admin menu under Configuration / Save current configuration to permanent memory.

MxMessageSystem: Processing the meta data transmitted by apps

Meta data transferred within the MxMessageSystem

For each event, the app also transfers meta data to the camera. This data is sent in the form of a JSON schema within a MxMessage.

Fig. 16: USDOT code on a truck

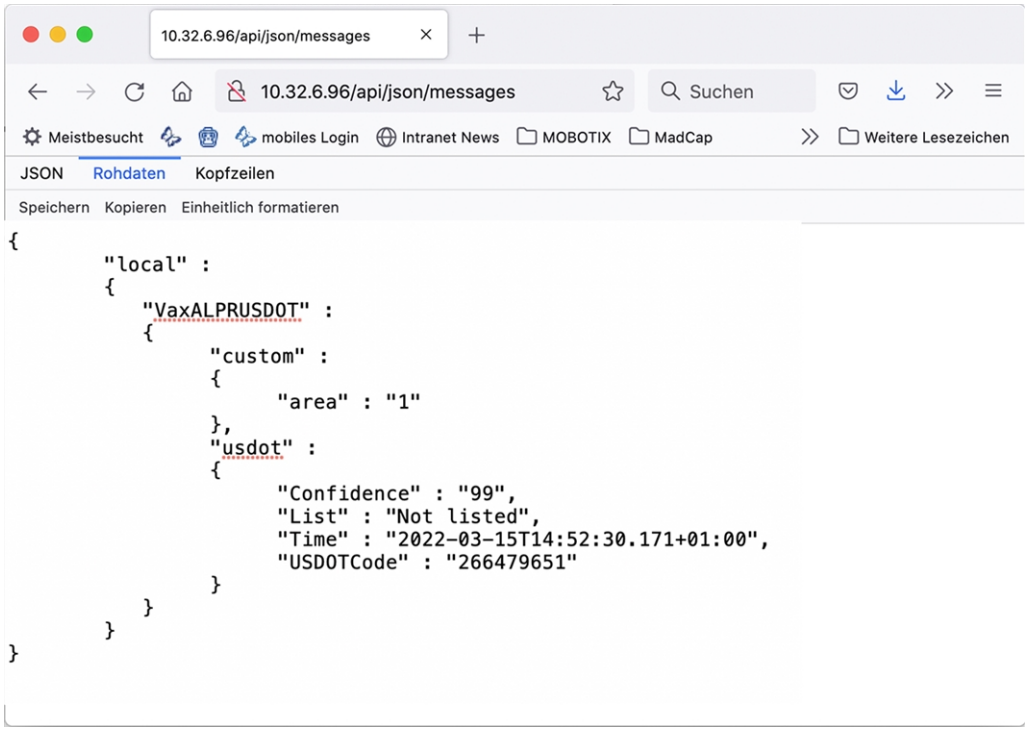


Fig. 17: Example: Meta data transmitted within a MxMessage of the Vaxtor USDOT - Number Recognition App

NOTE!
To view the meta data structure of the last App event, enter the following URL in the address bar of your browser: http(s)://IPAddresseOfYourCamera/api/json/messages

Creating a Custom Message Event

1. Go to **Setup-Menu / Event Control / Event Overview**. In section **Message Events** the automatically generated message event profile is named after the application ① (e.g. VaxALPRUSDOT).

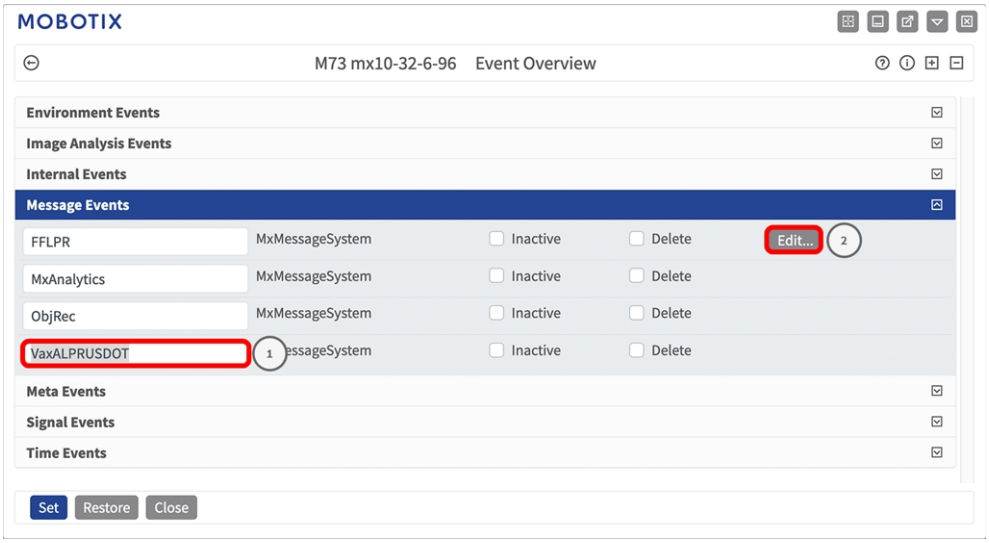


Fig. 18: Example: Generic message event from Vaxtor USDOT - Number Recognition App

2. Click **Edit**② to display and configure the event properties in detail.

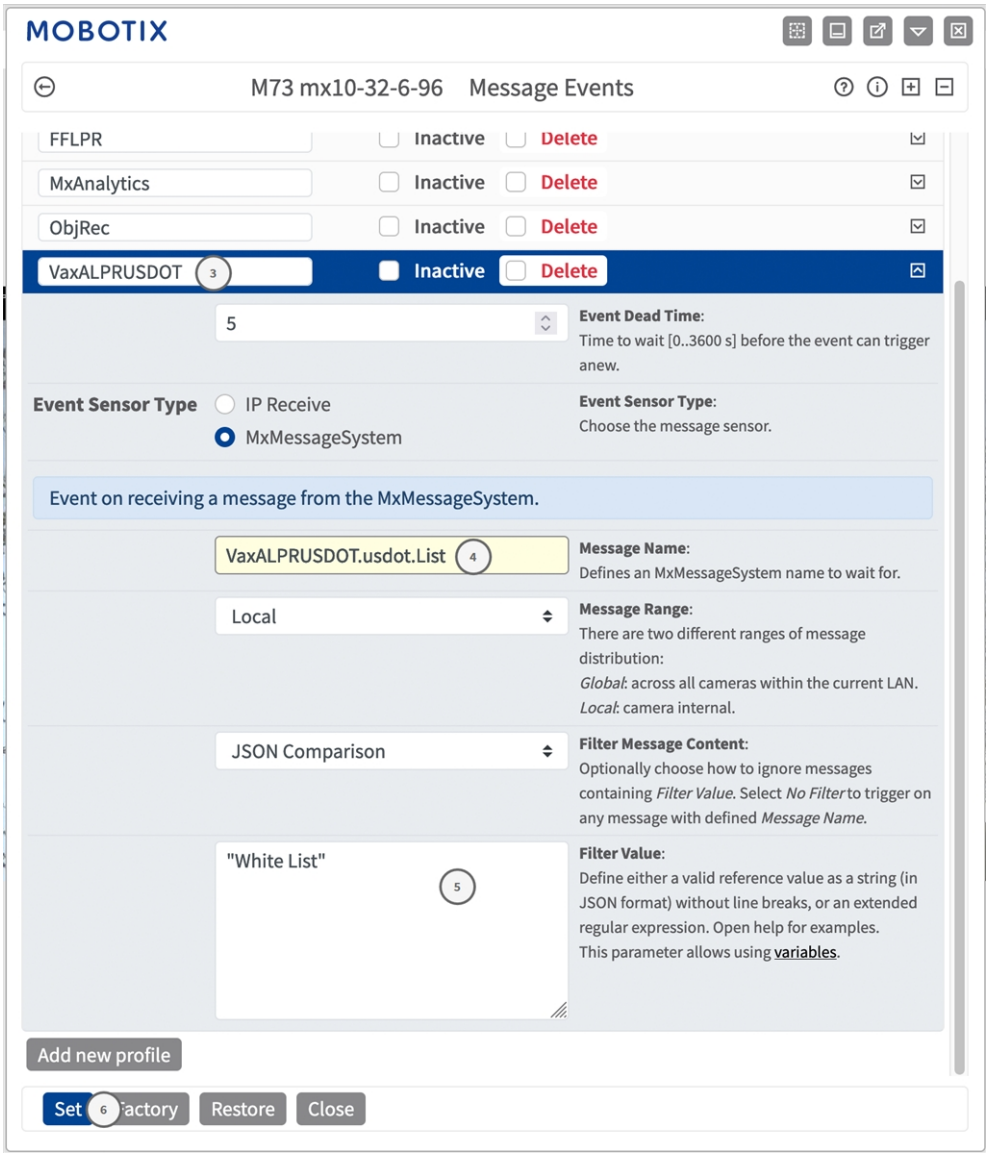


Fig. 19: Example: Black list message event

3. Click on the event (e.g. VaxALPRUSDOT) ③ to open the event settings.

4. Configure the parameters of the event profile as follows:

   - **Message Name:** Enter the "Message Name" ④ according to the event documentation of the corresponding app (seeExamples for message names and filter values of the Vaxtor USDOT - Number Recognition App, p. 60)
   - **Message Range:**
     - Local: Default settings for the Vaxtor USDOT - Number Recognition App
     - Global: (MxMessage is forwarded from another MOBOTIX camera in the local network.

- **Filter Message Content:**
  - **No Filter:** Trigger on any message according to the defined **Message Name**.
  - **JSON Comparison:** Select if filter values are to be defined in JSON format.
  - **Regular Expression:** Select if filter values are to be defined as regular expression.
- **Filter Value:**⑤ seeExamples for message names and filter values of the Vaxtor USDOT - Number Recognition App, p. 60.

CAUTION!
“Filter Value“ is used to differentiate the MxMessages of an app / bundle. Use this entry to benefit from individual event types of the apps (if available).
Choose “No Filter” if you want to use all incoming MxMessages as generic event of the related app.

2. Click on **Set**⑥ at the end of the dialog box to confirm the settings.

Examples for message names and filter values of the Vaxtor USDOT - Number Recognition App

	MxMessage-Name	Filter value
Generic Event	VaxOCRUSDOT	
White list Event	VaxOCRUSDOT.usdot.List	“White list”
Black list Event	VaxOCRUSDOT.usdot.List	“Black list”
Not listed Event	VaxOCRUSDOT.usdot.List	“Not listed”
Unique container code event	VaxOCRUSDOT.usdot.USDOTCode	USDOT code as “STRING” e.g. “266479651 (compare Meta data transferred within the MxMessageSystem, p. 56)
Owner Code Event	VaxOCRUSDOT.usdot.Direction	e.g. “left”
Vehicle Type Event	VaxOCRUSDOT.usdot.VehicleType	e.g. “33”

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