Guideline

MOBOTIX Object Recognition App

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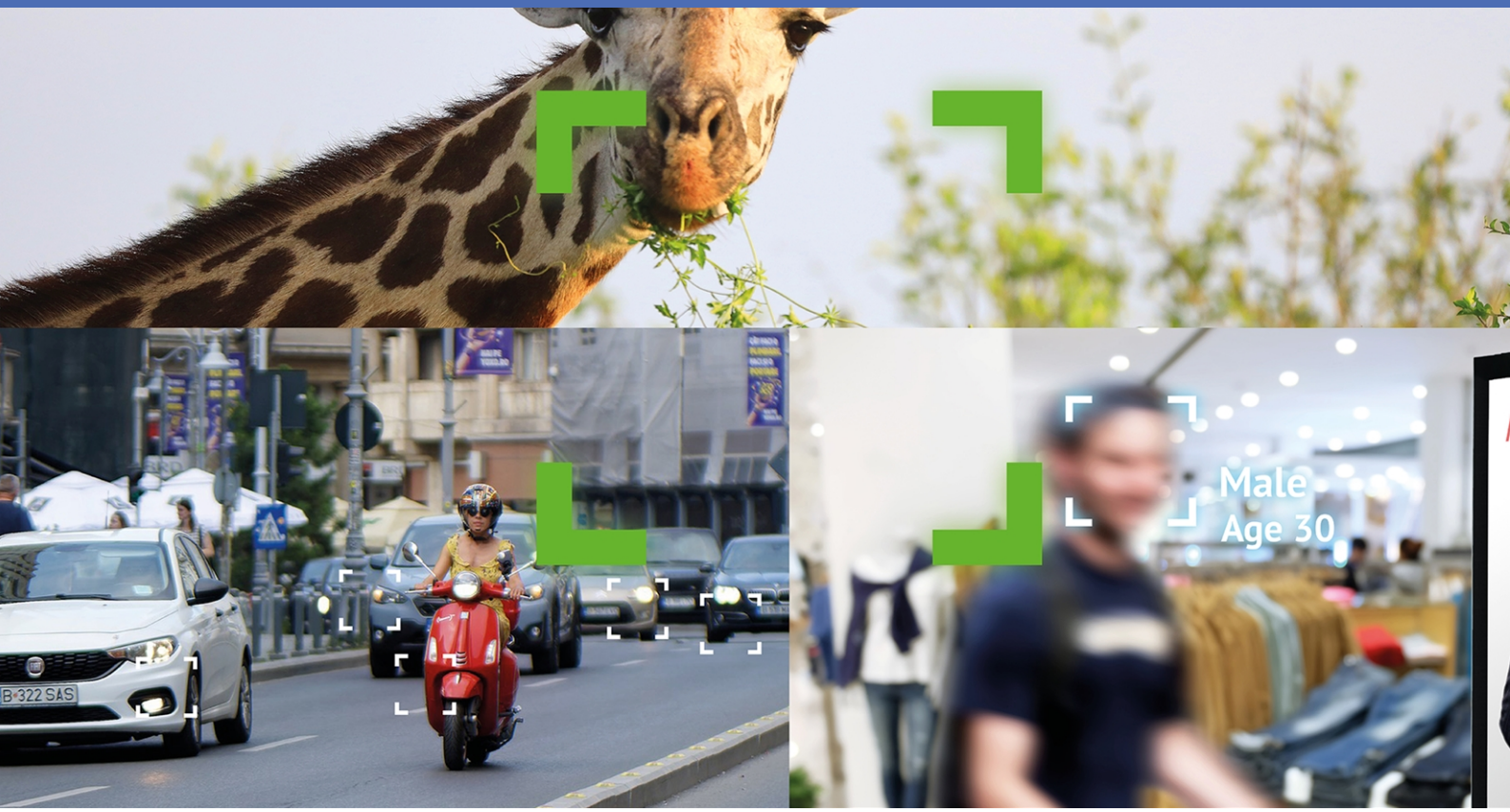

BeyondHumanVision

MOBOTIX

V2.04_1/24/2023, Order Code: Mx-APP-MX-THD

NOTE! The English version of this document may be more current.

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Before You Start

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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

Safety Notes

- 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!
- This equipment is not suitable for use in locations where children are likely to be present.
- When using a Class I adapter, the power cord shall be connected to a socket-outlet with proper ground connection.
- 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.
- This equipment is to be connected only to PoE networks without routing to other networks.

NOTE! Observe the MOBOTIX MOVE Installation Hints document to ensure optimum performance of the camera features.

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/EC) 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.

About MOBOTIX Object Recognition App

Object Recognition and Classification Based on Artificial Intelligence

The app's artificial intelligence-based algorithms collect behavioral data on persons, animals and vehicles. The detected objects can be widely classified and color-coded. Furthermore movements in defined restricted areas can be detected.

- Free of charge and license-free.
- Motion detection and object classification in (defined) restricted areas.
- The provides essential AI-based analytics functions for other MOBOTIX apps.
- MOBOTIX events via MxMessageSystem.
- Can be used with all cameras of the MOBOTIX 7 system platform.

Best suited for the requirements of the following industries:

Utilities, Energy & Mining; Industry & Production, Government, Traffic & Transportation, Retail, Healthcare, Education & Science.

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.

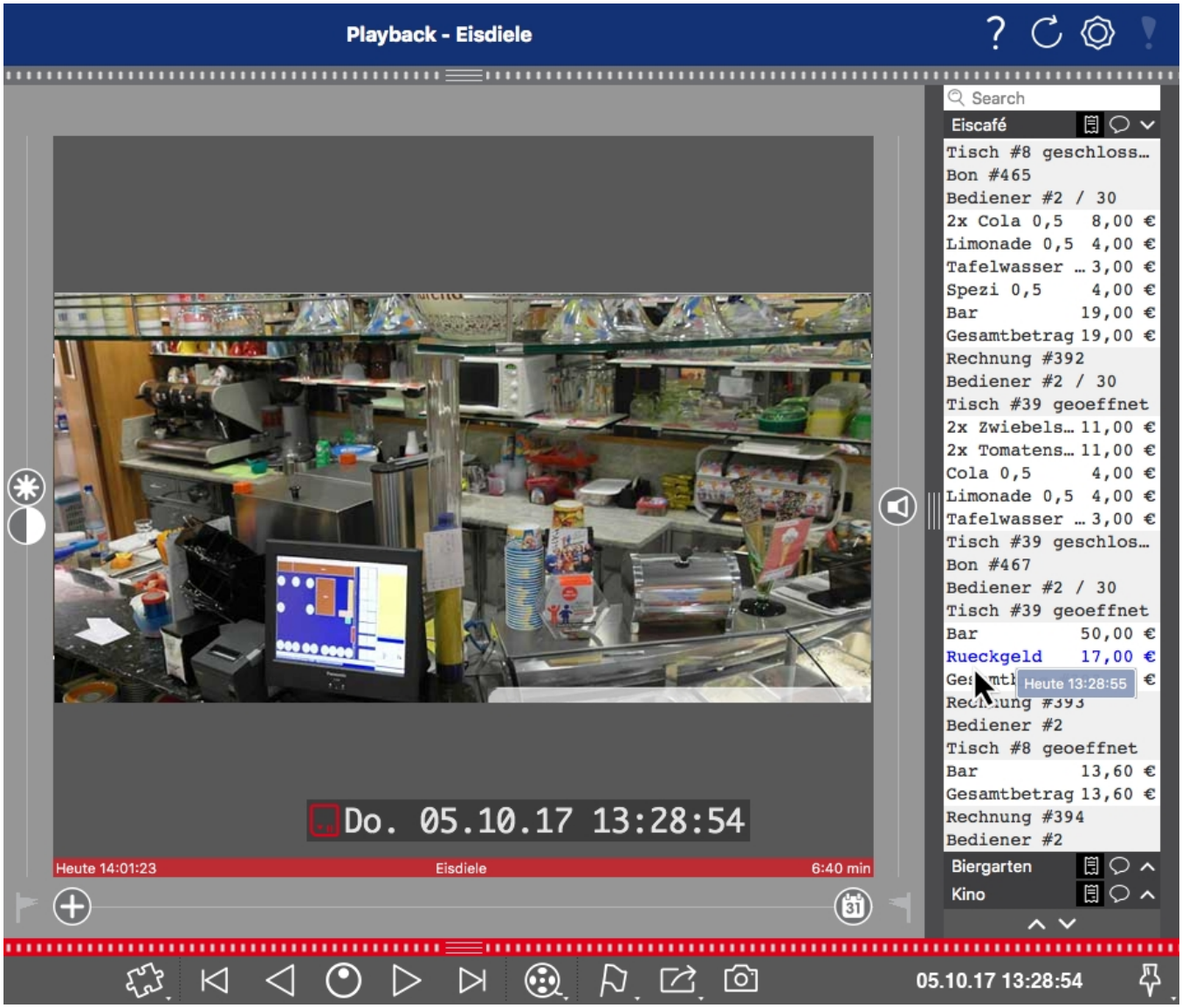

Fig. 1: : Smart Data Bar in MxManagementCenter (Example: POS System)

Technical Specifications

Product Information

Product Name	MOBOTIX Object Recognition App
Supported MOBOTIX Cameras	Mx-M73A, Mx-S74A
Minimum Camera Firmware	V7.0.6.x
MxManagementCenter Integration	■ min. MxMC v2.4 ■ Advanced Config license required

Product Features

App Features	Analytics features: ■ Deep learning object recognition as basis for MxAnalytics features ■ Restricted Area (Motion Detection) Basicfeatures: ■ time table to enable MxAnalytics only within defined schedules (e.g. opening hours) ■ MOBOTIX events via MxMessageSystem
Recognized objects	■ Persons ■ Vehicles: Car, Truck, Bus, Motorcycle, Bicycle, Boat, Airplane, Train ■ Animals: Bird, Cat, Dog, Horse, Sheep, Cow, Elephant, Bear, Zebra, Giraffe
Supported image sensor types	Day, Night, Day/Night
Dual / Multi Sensor usage	No
MxMessageSystem supported	Yes
MOBOTIX events	Yes
ONVIF Events	Yes (Generic Message events)

Hardware Requirements

Camera Sensor Connector	Connector 1 (Only one image sensor usable)

Scene Requirements for Object Recognition

Recommended camera position	wall mounted
Recommended installation height (camera)	2m - 4m
Recommended viewing angle on object	0° - 30° (wall mount perspective)
Minimum object size	1/10 of image height

Technical App Specifications

Synchronous / Asynchronous App	Asynchronous
Detection accuracy	Person: > 90% Vehicle: > 80%
Counting accuracy	> 90%
Processed number of frames per second	typ. 5 fps

Licensing Certified Apps

The following licenses are available for the MOBOTIX Object 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, p. 20)

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 > Support > 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**.

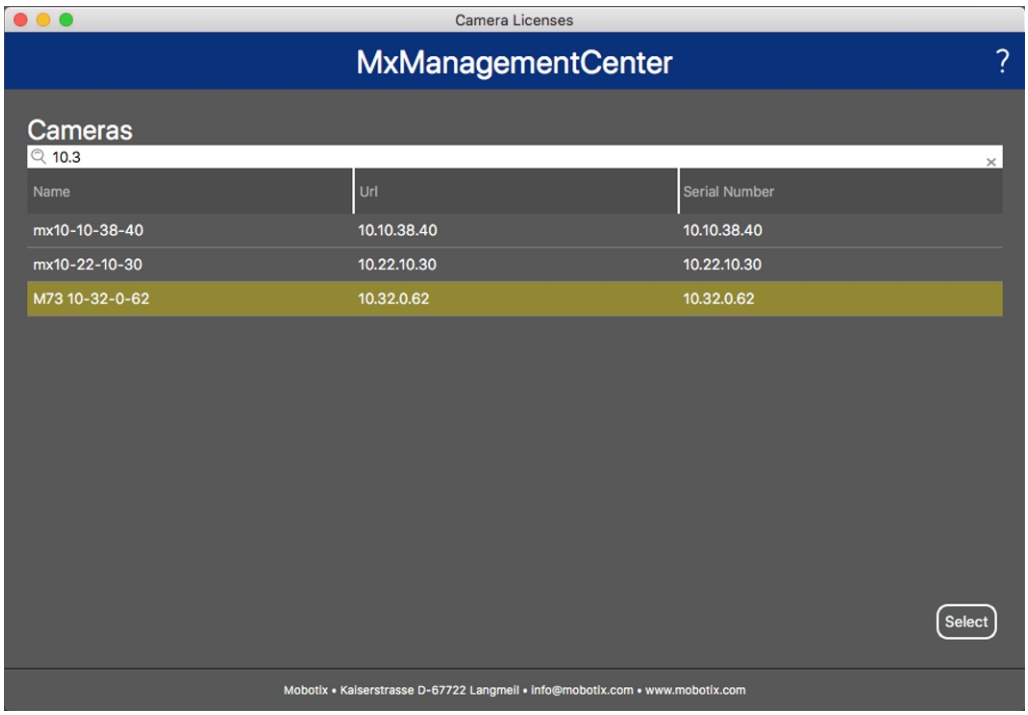

Fig. 2: Overview of Camera App Licenses in MxManagementCenter

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**.

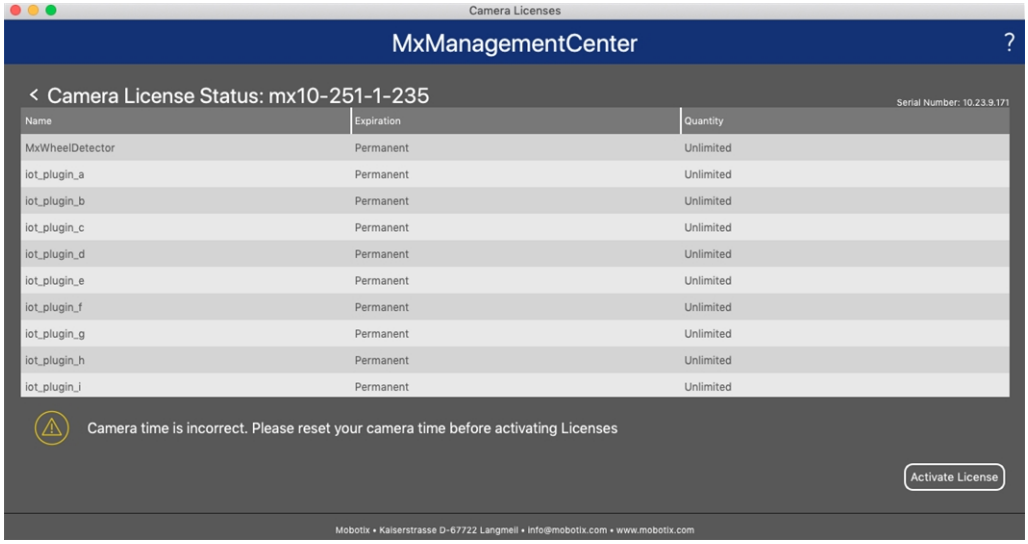

Fig. 3: Overview of the licenses installed on the camera

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.

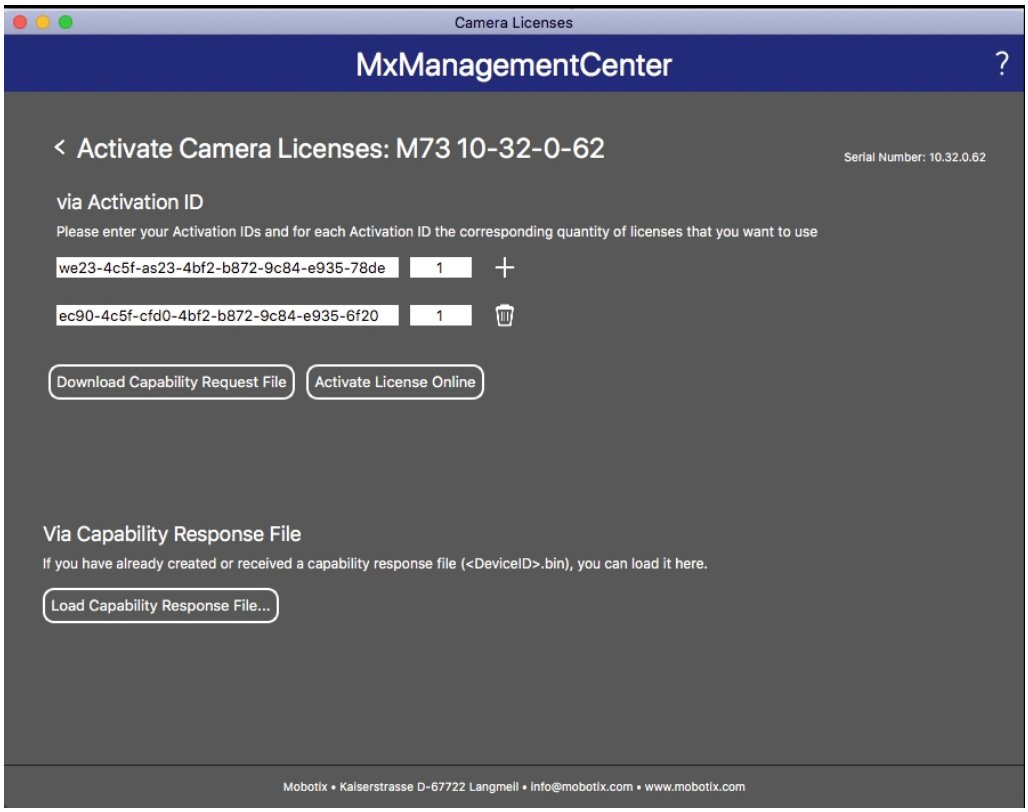

Fig. 4: Adding licenses

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. 14).

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**.

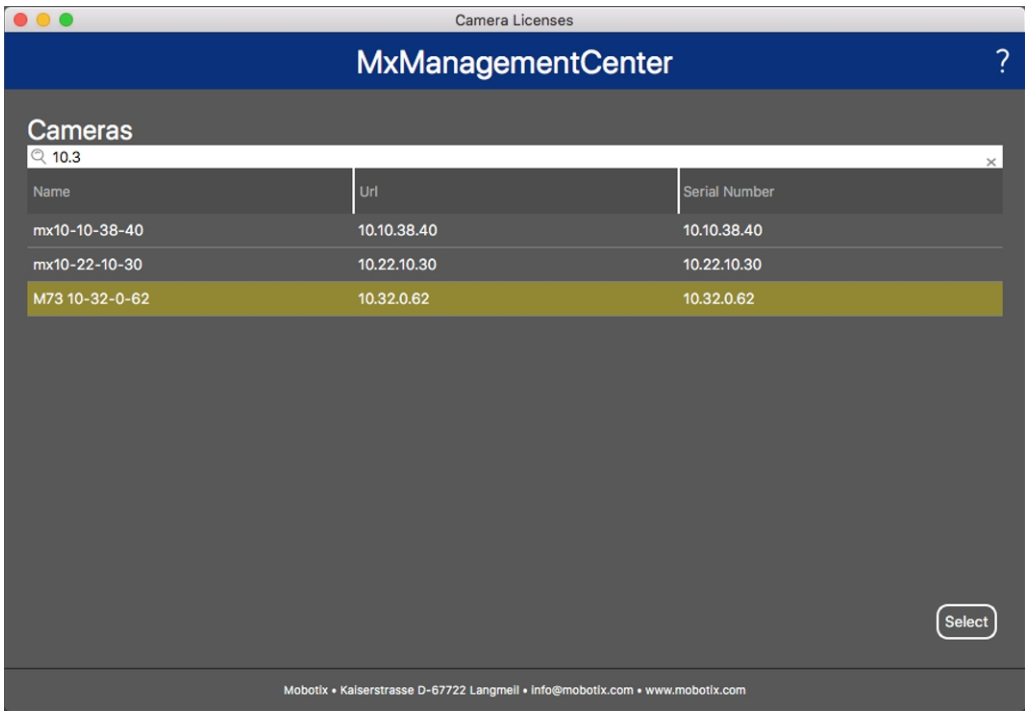

Fig. 5: Overview of Camera App Licenses in MxManagementCenter

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**.

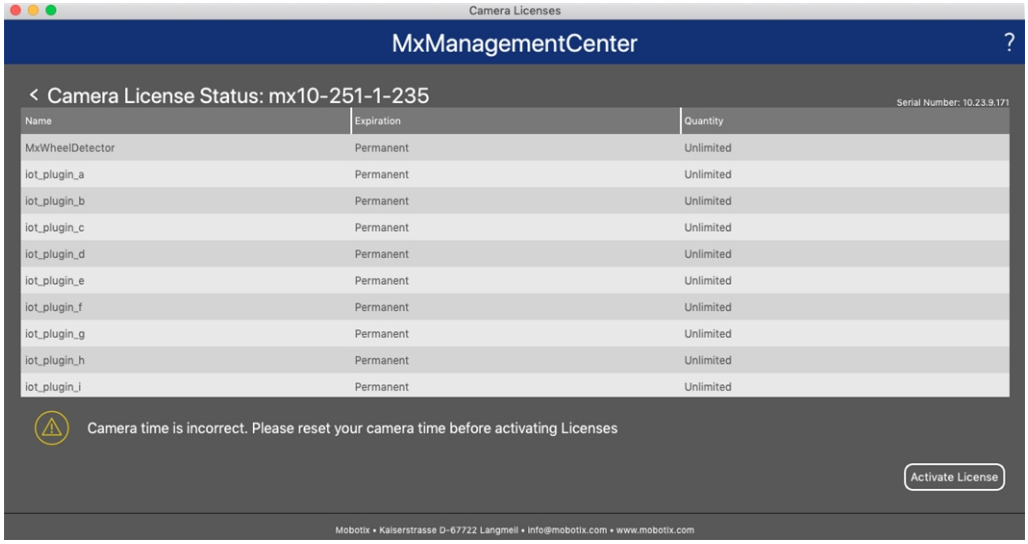

Fig. 6: Overview of the licenses installed on the camera

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.

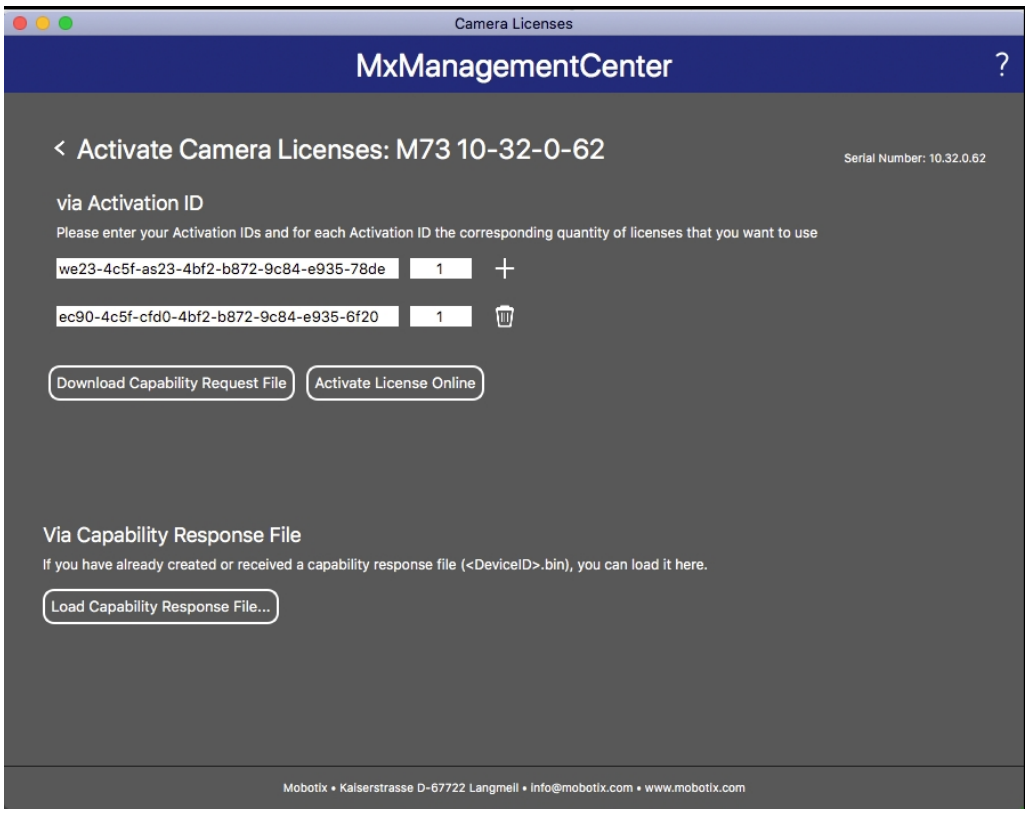

Fig. 7: Adding licenses

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**.

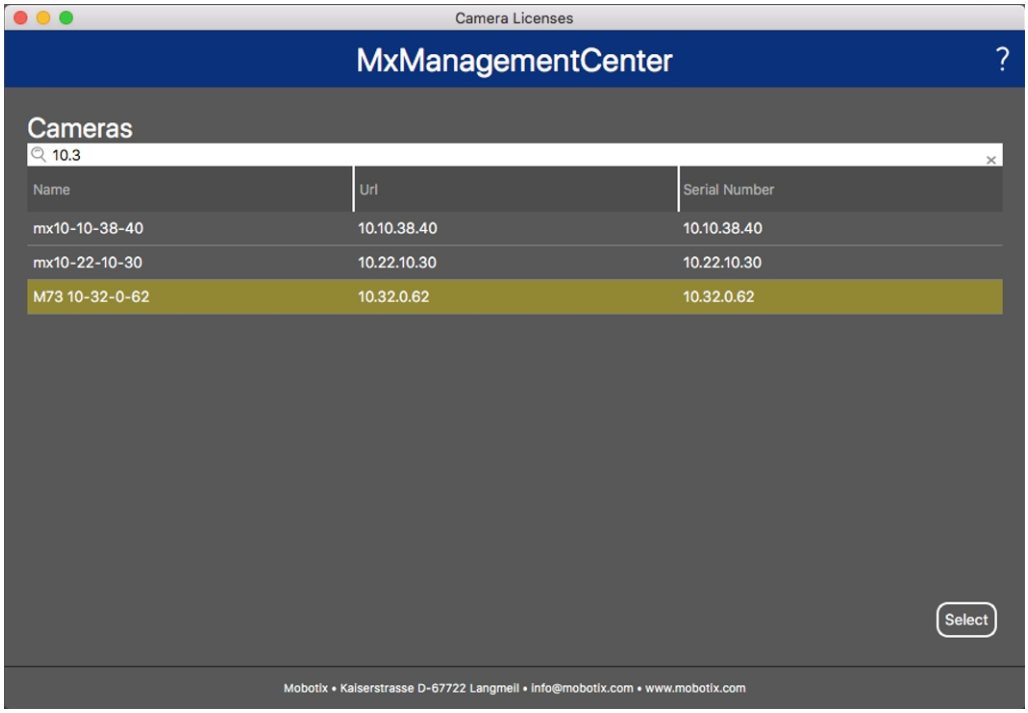

Fig. 8: Overview of Camera App Licenses in MxManagementCenter

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

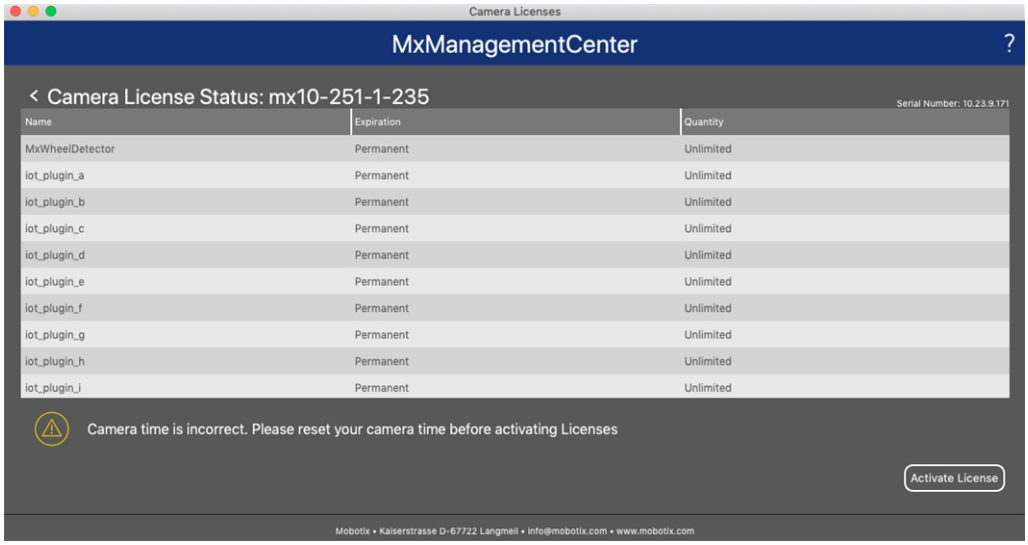

Fig. 9: Overview of the licenses installed on the camera

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.

Set Camera into AI Mode

The MOBOTIX Object Recognition App the camera to run in AI mode.

1. In the camera web interface, open: **Admin Menu** / **Hardware Configuration** /

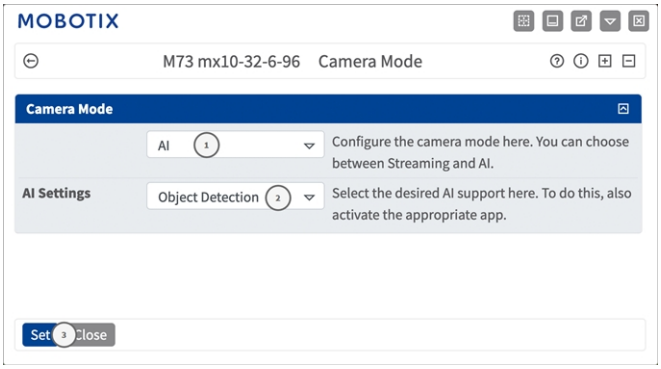

Fig. 10: Camera Mode Settings

2. Under **Camera Mode** select **AI**① .
3. Under **AI Settings** select **Object Recognition**② .
4. Decide how to store the configuration ③ :
   - Click on the **Set** button to activate your settings and to save them until the next reboot of the camera.
   - Click on the **Close** button 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.

Activation of the Certified App Interface

CAUTION! The MOBOTIX Object 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).

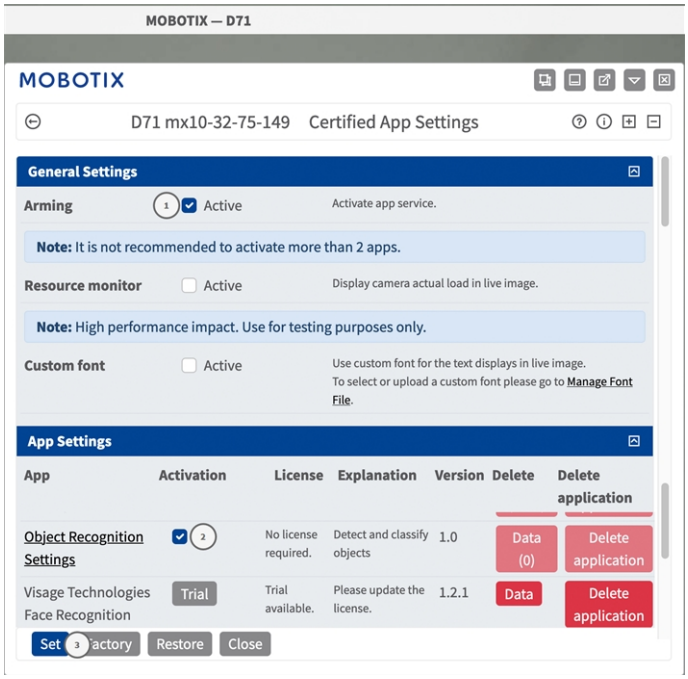

Fig. 11: Certified App: Settings

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 MOBOTIX Object Recognition App, p. 21.

Configuration of MOBOTIX Object Recognition 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).
2. Click on the name of the **MOBOTIX Object Recognition App**.

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

Basic Settings

The following configurations should be taken into account:

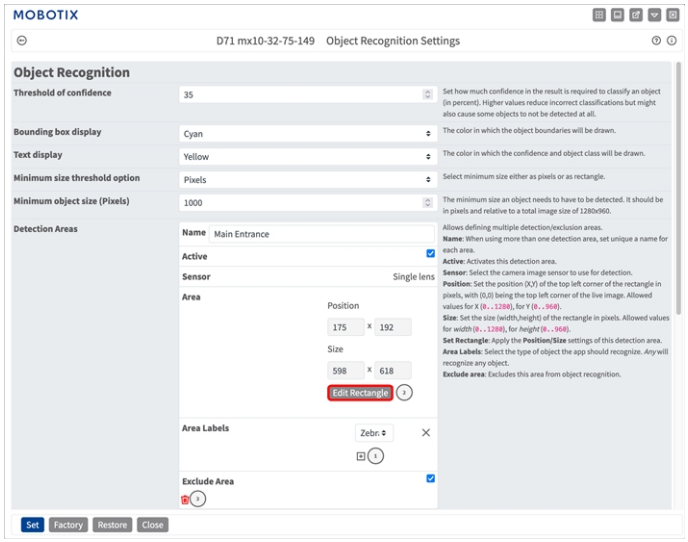

Fig. 12: Basic settings

Threshold of confidence: Set a percentage confidence value that is the minimum required for the analysis result to classify an object. Higher values reduce false classifications, but may also result in some objects not being recognized.
Bounding box display: The color of the text describing the confidence and object class.
Text display: Bounding box display.
Minimum size threshold option: Select minimum size either as pixel or as rectangle.
Minimum object size: The minimum size in pixels that an object must have in order to be recognized (based on a total image size of 1280x960 px).

Detection Areas

Unless otherwise specified, object detection always takes place in the entire image. You can define detection areas within the camera image as well as excluded areas.

Name: Set an unique name for each area.
Active: Check to activate the area.
Sensor: Select the camera image sensor for detections.
Area Position: Set the position (X,Y) of the top left corner of the rectangle in pixels, with (0,0) being the top left corner of the live image. Allowed values for X (0..1280), for Y (0..960).
Area Size: Set the size (width, height) of the rectangle in pixels. Allowed values for width (0..1280), for height (0..960).
Area Labels: Select an Area label for the Excluded Area or click the **plus** icon ① to add multiple labels.
Excluded Areas Check to exclude this area from object recognition.

Editing an Detection Area

1. Click **Edit Rectangle** ② to switch into the live image.
2. In the live view simply click and drag a rectangular excluded area.
3. Drag the corner points to refine the Excluded 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 ③ to delete the recognition area.

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.

Basic configuration: Processing the automatically generated app events

Checking automatically generated app events

NOTE! After successfully activating the app (see Activation of the Certified App Interface, p. 20), 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 (e. g. ObjRec).

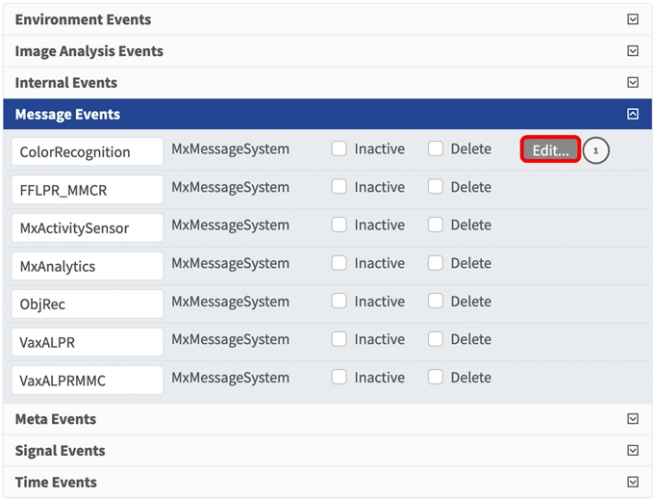

Fig. 13: Example: Generic message event from MOBOTIX Object Recognition App

2. Click **Edit**① to display a selection of all configured message events.

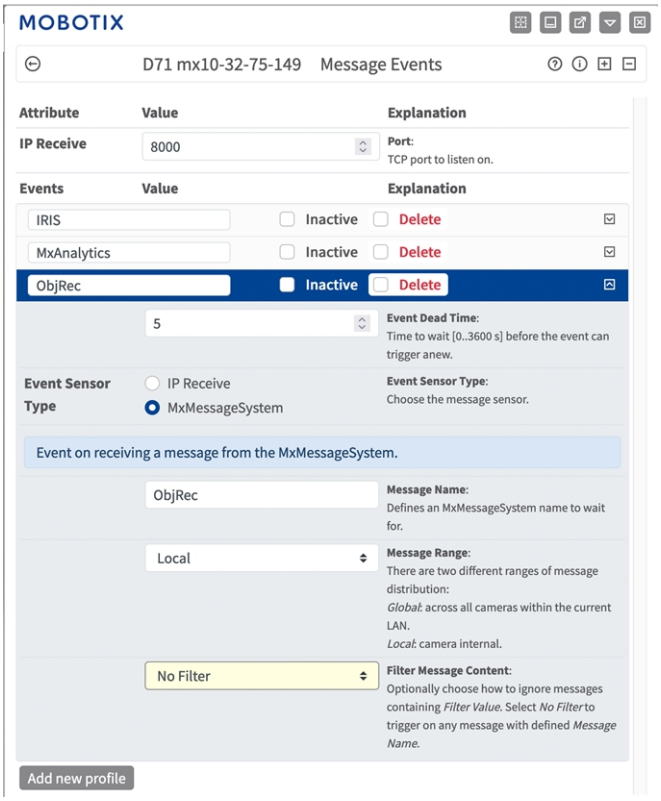

Fig. 14: Example: Generic message event details - no filter

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 MOBOTIX Object Recognition App event.

1. Go to **Setup-Menu / Event Control / Event Overview / Action Group Overview** (http(s)://<Camera IP address>/control/actions).

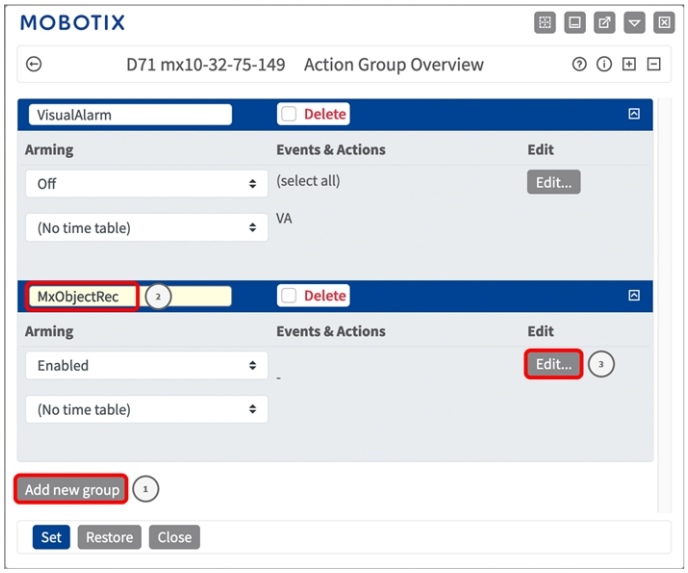

Fig. 15: Defining Action Groups

2. Click **Add new group**① and give a meaningful name ② .
3. Click **Edit**③ , to configure the group.

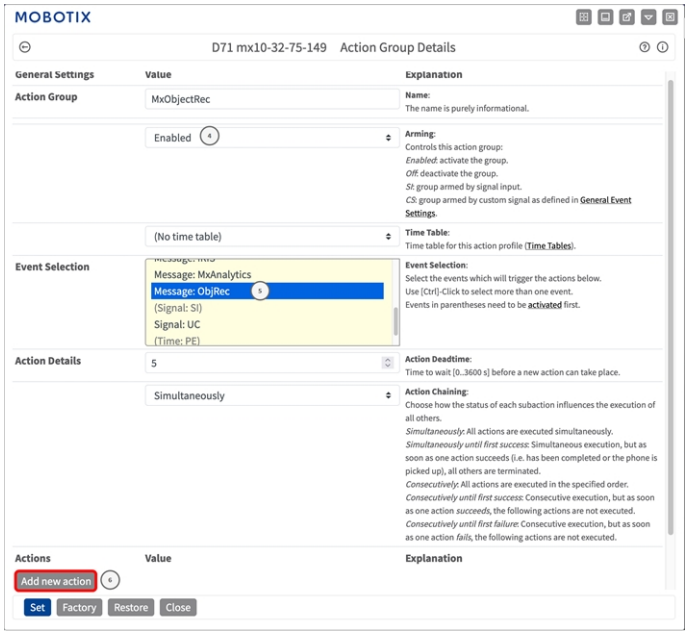

Fig. 16: Configuring an Action Group

4. Enable **Arming**④ of the Action Group.
5. Select your message event in the **Event selection** list ⑤ . To select multiple events, hold the shift key.
6. Click **Add new Action**⑥ .
7. Select a proper action from list **Action Type and Profile**⑦ .

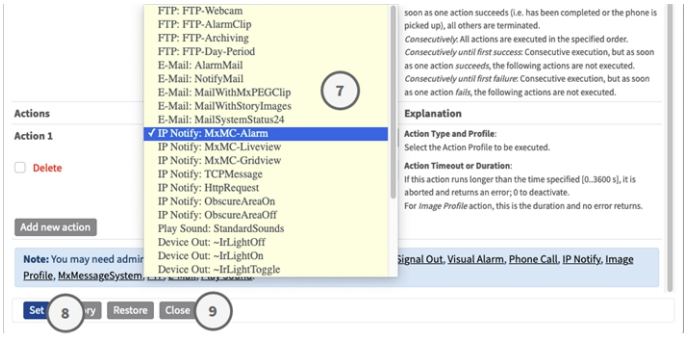

Fig. 17: Select Action Type- and Profile

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).

8. Click on the **Set**⑧ button at the end of the dialog box to confirm the settings.
9. Click on **Close**⑨ to save your settings permanently.

Action settings - Configuration of the camera recordings

1. Go to **Setup Menu / Event Control / Recording** (http(s)/<Camera IP address>/control/recording).

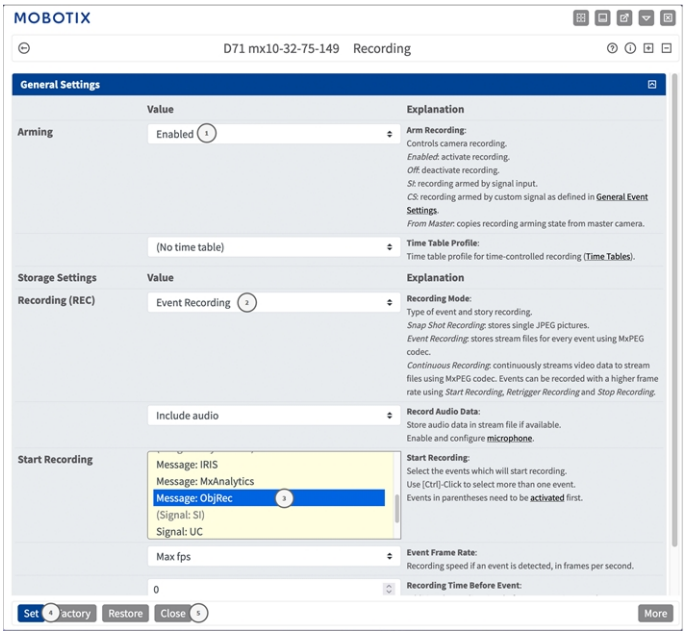

Fig. 18: Configuration of camera recording settings

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.

Advanced Configuration: 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.

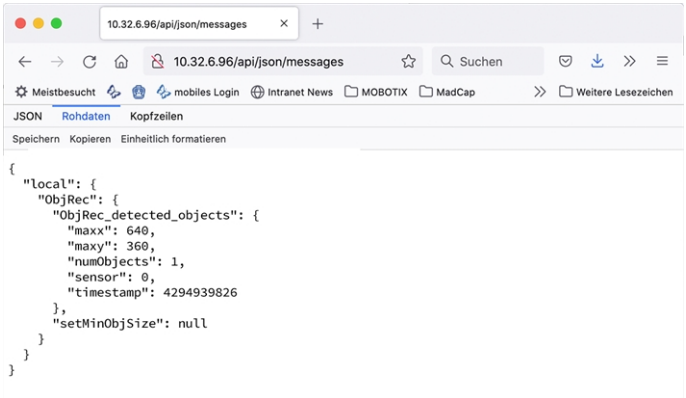

Fig. 19: Example: Meta data transmitted within a MxMessage of the MOBOTIX Object Recognition App

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 (e. g. ObjRec).

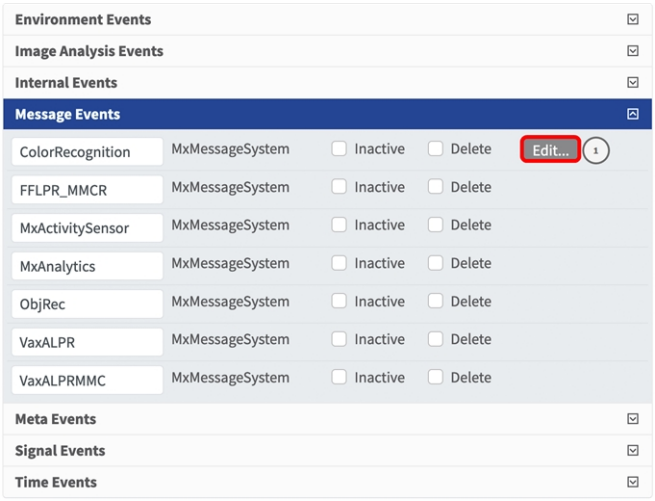

Fig. 20: Example: Generic message event from MOBOTIX Object Recognition App

2. Click **Edit**① to display a selection of all configured message events.

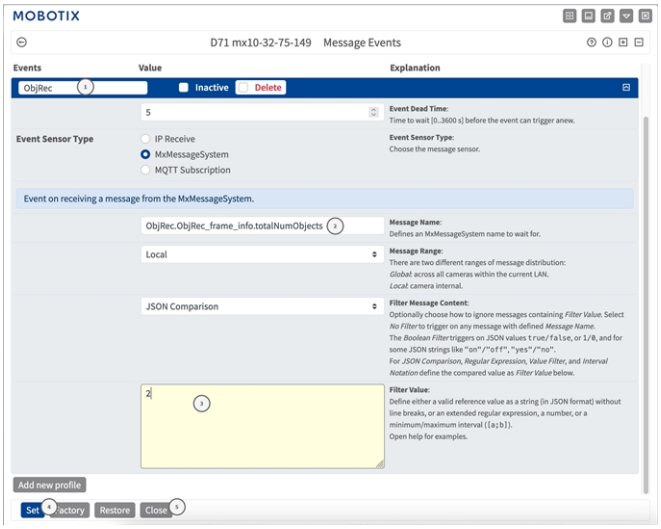

Fig. 21: Object Recognition Event

3. Click on the event (e. g. ObjRec) to open the event settings.
4. Configure the parameters of the event profile as follows:

- **Message Name:** Enter the "Message Name" ② according to the event documentation of the corresponding app (see Examples for message names and filter values of the MOBOTIX Object Recognition App, p. 31)

- **Message Range:**
  - Local: Default settings for the MOBOTIX Object 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:** ③ see Examples for message names and filter values of the MOBOTIX Object Recognition App, p. 31.

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**④ at the end of the dialog box to confirm the settings.
3. Click on **Close**⑤ to save your settings permanently.

Examples for message names and filter values of the MOBOTIX Object Recognition App

MxMessage Name	Filter Value	Explanation
ObjRec.ObjRec_frame_info	"numObjects":[^0]	Message if any object is found in the image
ObjRec.ObjRec_frame_info	"car"	Message when a car is detected in the image
ObjRec.ObjRec_frame_info	"object3“	Message if at least 3 arbitrary objects were found in the image
ObjRec.ObjRec_frame_info	^([^]*"person"){4}	Message, if at least 4 persons were found

EXAMPLE: ObjRec.ObjRec_frame_info.car using Filter Value as 2 will trigger event only when exactly 2 cars are available in frame.

EXAMPLE: ObjRec.ObjRec_frame_info.totalNumObjects using Filter Value as 3 will trigger event only when any 3 objects are available in frame.

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