

Synology Camera BC800Z License Plate Recognition Administrator's Guide

Synology

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Introduction

The Synology Camera BC800Z is purpose-built for recognizing license plates of vehicles entering designated areas. It supports plate recognition for selected countries and allows users to assign allowed or blocked labels to different plate numbers to help manage access rules.

The BC800Z can identify vehicles moving at speeds of up to 20 km/h. This makes it suitable for use at stationary checkpoints such as gate entrances, as well as in situations where vehicles are in motion. Its built-in optical zoom ensures that license plates occupy more of the frame in wide-angle views, which helps improve recognition accuracy. In low-light environments, the white LED allows for full-color license plate recognition, providing clearer results.

Quick Camera Installation

Installation requirements

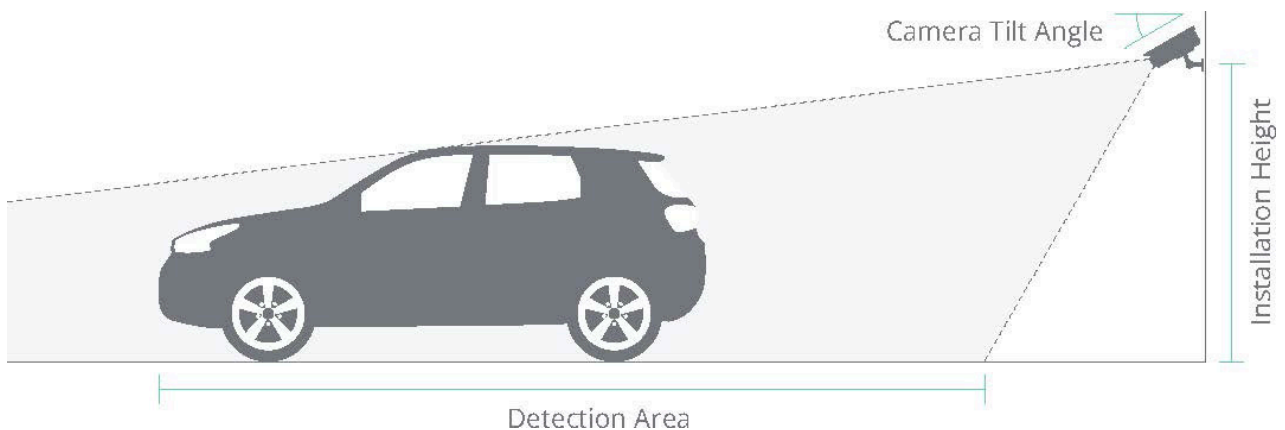
- Installation height: 1.5 - 5 meters
- Camera tilt angle: 15 - 30 degrees
- Horizontal angle: 25 degrees
- Camera roll angle: 25 degrees
- Detection area: 3~10 meters

Environment requirements

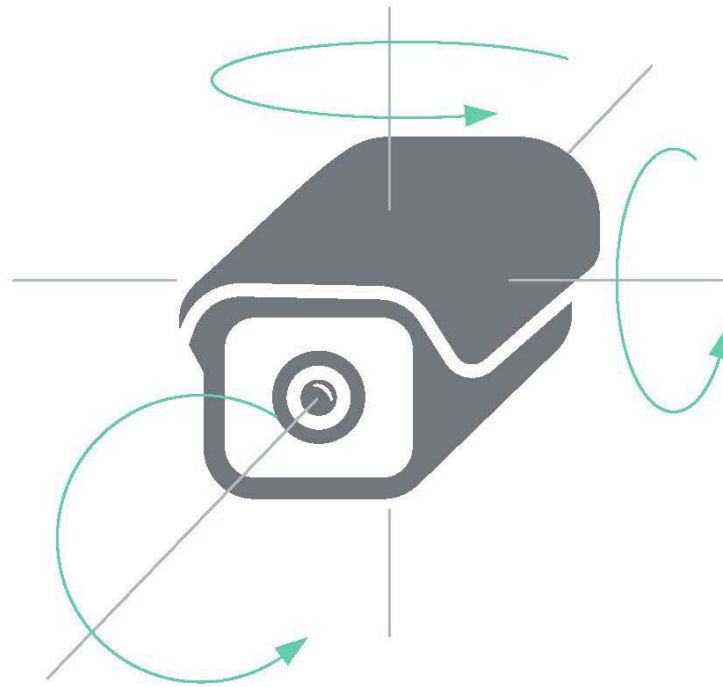
- Minimum illumination: 300 lux

Note:

- In low-light environments, the white LED can be enabled for stationary license plate recognition.



Camera Horizontal Angle



Camera Tilt Angle

Camera Roll Angle

Camera Roll Angle
Below 25 degrees

Camera Horizontal Angle
Below 25 degrees

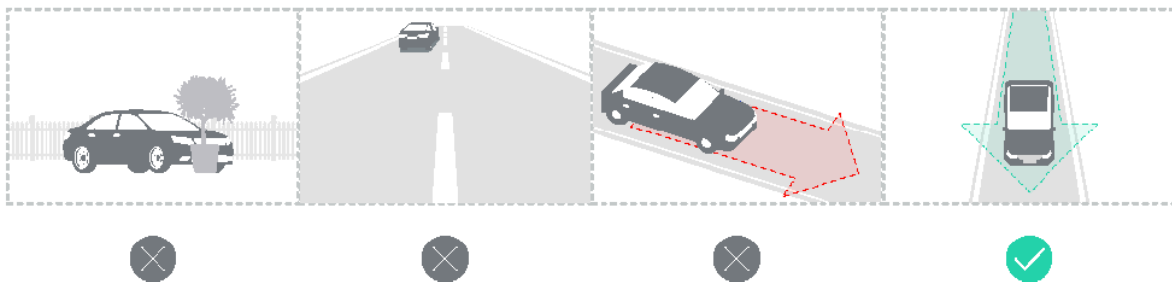
Camera Tilt Angle
Below 30 degrees



Position the camera

When you mount the camera for license plate recognition, it is important to get a good, clear view of the area of interest so the plate can be detected consistently. This ensures accurate reading and minimizes false detection. The following are methods to best position your camera:

- Avoid irrelevant moving objects such as people or traffic.
- Mount the camera as close as possible to the area of interest.
- Adjust the camera angles for optimal detection.
- Use the BC800Z's optical zoom to increase the proportion of the license plate in the image for better recognition results, if applicable.
- Mount the camera so the license plate appears from the top of the image (or bottom if traffic is driving away from the camera) instead of from the right or left side. In this way, you make sure that the recognition process of the license plate only starts when the whole plate is in the view.



Ensure Detection Accuracy

A suitable camera placement and environment can ensure detection accuracy. The following situations can affect detection by the AI:

- Light shining directly into the camera's lens may leave streaks in the images or cause overexposure, affecting the picture quality.
- The camera installed in areas where drastic changes in lighting can happen can lead to inconsistent picture quality.
- Overexposed or underexposed license plates images can impede recognition by the AI.
- Backgrounds with yellowing lighting can impede recognition by the AI; white lighting is recommended.
- Vehicle moving too fast might cause captured license plates images to blur.
- Changes in the camera's field of view might affect the video analytic results (e.g., changes in focus or zoom level).
- Weather sometimes affects the clarity of outdoor cameras. Rain and snow, changes of shadows, or differences between day and night can have an impact on detection and recognition.
- An unstable network connection might lead to incomplete or corrupt images. Wired connections are highly recommended.
- Dust, insects, or other stains can block the lens. Keep the lenses clean so that a clear image can be taken.
- Slow shutter speed can cause motion blur.
- HDR may cause motion blur or ghosting on moving vehicles, reducing the accuracy of license plate recognition. We recommend disabling HDR when using the license plate recognition feature.

Detection accuracy factors

Vehicle	Physical Surroundings	Camera
<ul style="list-style-type: none">• Speed• Plate size and position	<ul style="list-style-type: none">• Lighting conditions• Weather	<ul style="list-style-type: none">• Exposure• Field of view• Shutter speed• Resolution• Positioning• HDR

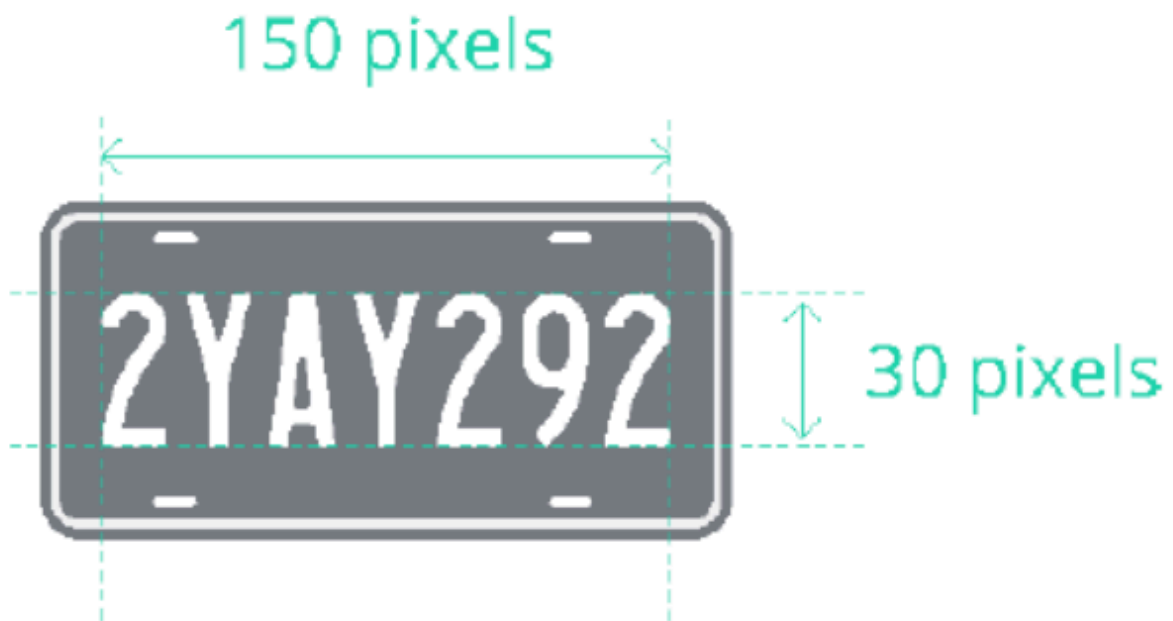
Image Quality

A bad image, like motion blur, will result in lower recognition. Make sure to check your settings to optimize the image quality.



Stroke width

A stroke width that is too wide may result in unrecognizable license plates or inaccurate results. To ensure accurate recognition, the minimum character height must be 30 pixels and the minimum plate width must be 150 pixels.



Vehicle speed

The speed of the vehicle may affect whether the license plate can be identified correctly. BC800Z can recognize vehicles moving at speeds of up to 20 km/h.

Supported Regions

We support all license plates that contain numeric or alphanumeric characters. Select the appropriate region to get an accurate reading.

- Australia
- Belgium
- Czech
- Denmark
- Estonia
- France
- Germany
- Greece
- Hungary
- Italy
- Japan
- Kazakhstan
- Lithuania
- Luxembourg
- Netherlands
- New Zealand
- Poland
- Portugal
- Romania
- Slovakia
- Slovenia
- Switzerland
- Spain
- Taiwan
- Türkiye
- Ukraine
- United Kingdom
- United States

Camera Settings

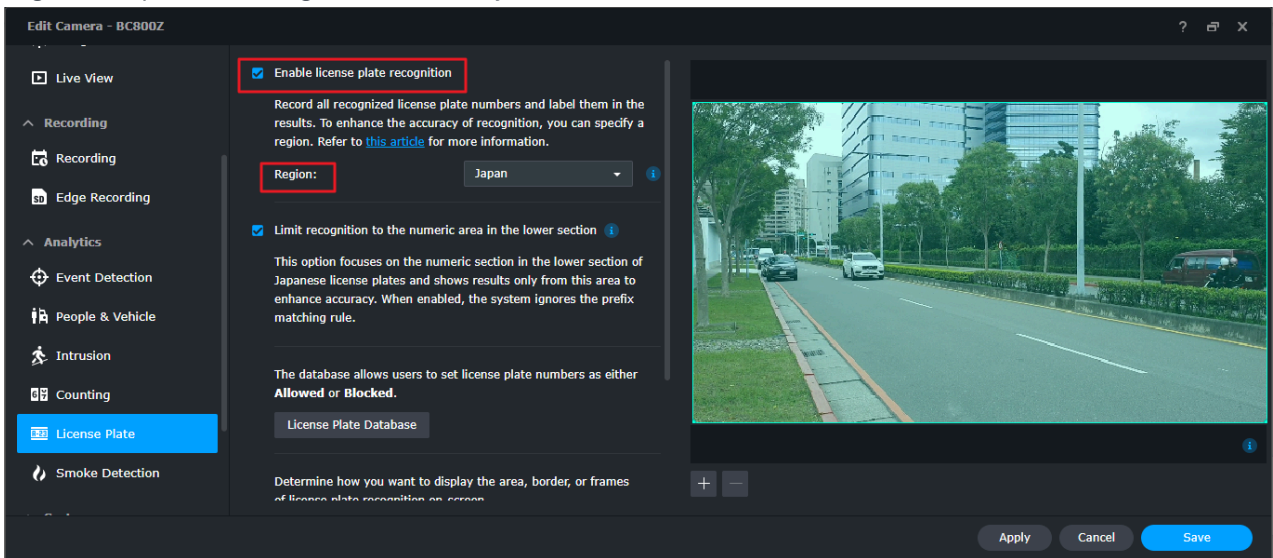
Capture distance	3 - 10m
Mounting height	1.5 - 5m
Camera orientation - Tilt	15° - 30°
Camera orientation - Horizontal	25°
Camera orientation - Roll	25°
Shutter speed	1/960 or faster
Maximum acceptable traffic speed for successful recognition	20 km/h
Maximum number of road lanes that can be recognized in one frame	2 lanes
Maximum number of license plates that can be recognized in one frame	4
Minimum character height	30 pixels
Minimum plate width	150 pixels
Minimum number of plate characters	1
Maximum number of plate characters	64
Database number	10,000
Match tolerance	2
Two-line plate detection	Only supported for Japan

Configure Software Settings

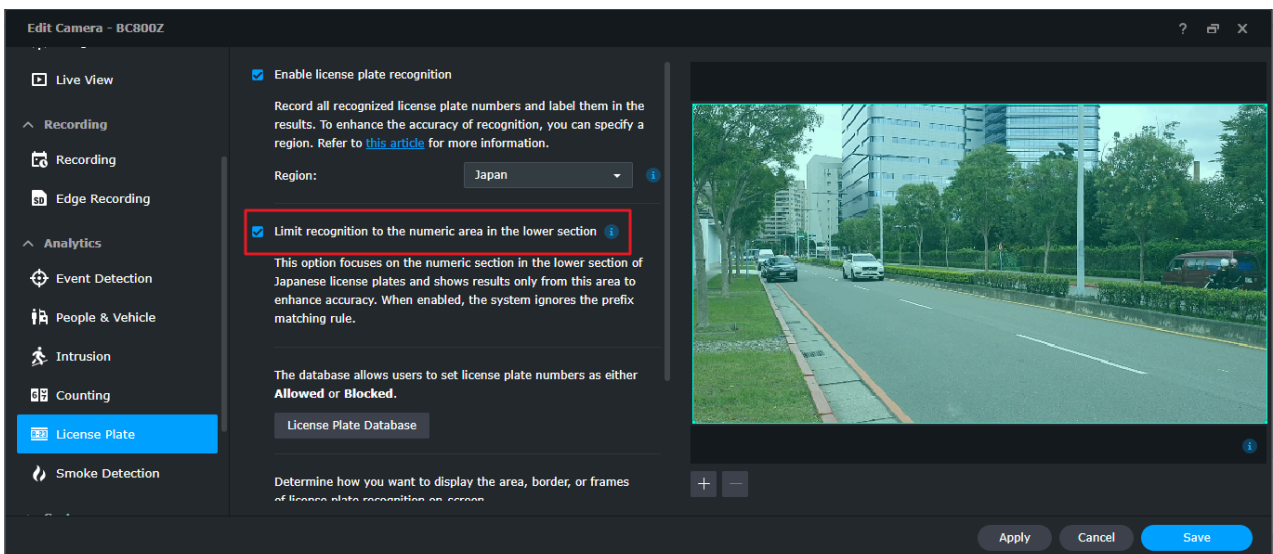
Once your BC800Z is mounted successfully, you can configure software settings to suit your requirements. This chapter covers the essential settings for the license plate recognition.

Enable the license plate recognition function

In the **License Plate** page, enable the **license plate recognition** function and select the appropriate region to optimize recognition accuracy.

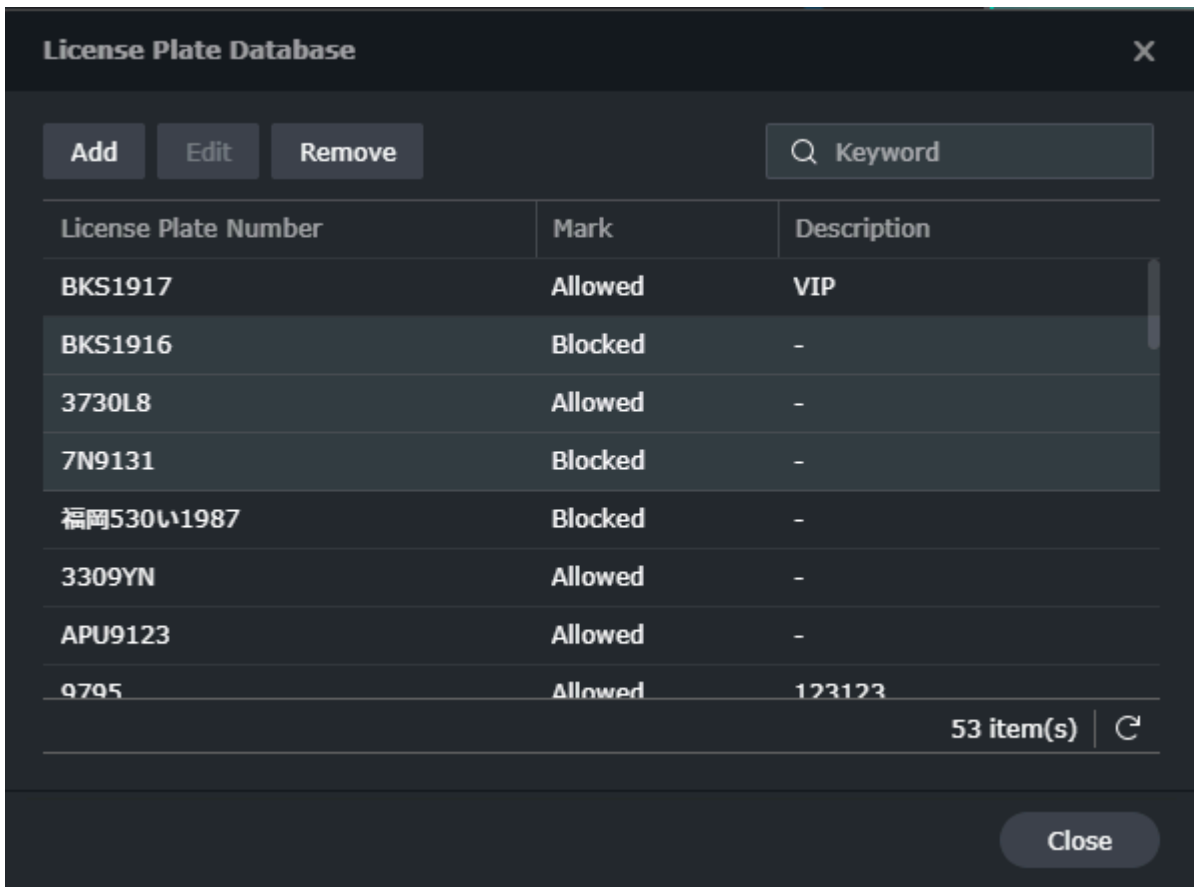


If Japan is selected, accuracy can be improved by enabling the **Limit recognition to the numeric area in the lower section** function.



You can add license plates to the license plate database. Click **License Plate Database** and then **Add**. Specify the license plate number, select whether it should be **Allowed** or **Blocked**, and click

Add to save them to the database.



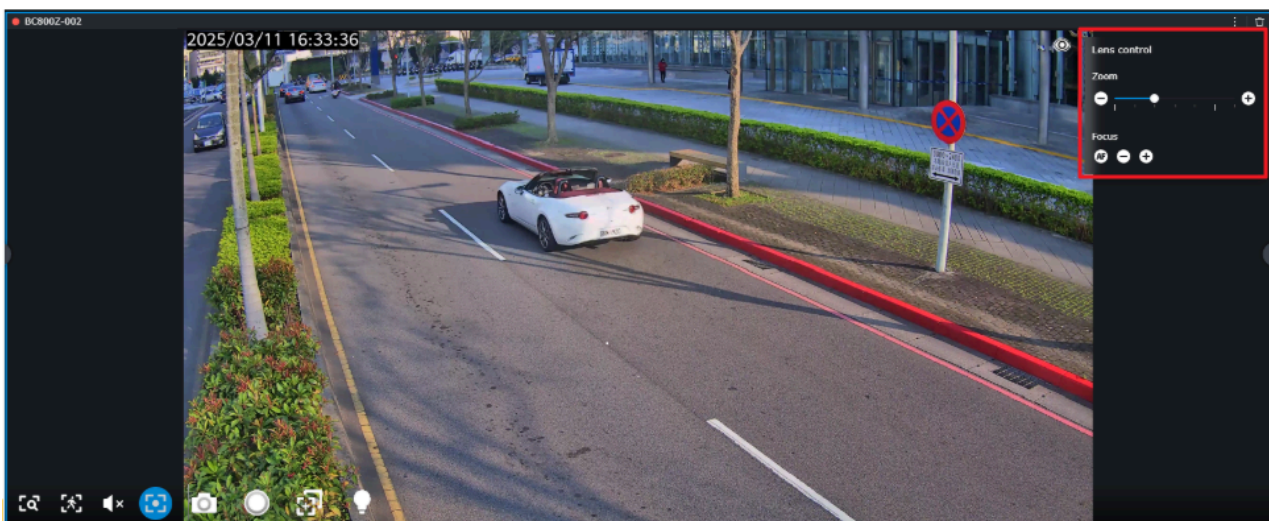
License Plate Number	Mark	Description
BKS1917	Allowed	VIP
BKS1916	Blocked	-
3730L8	Allowed	-
7N9131	Blocked	-
福阿530い1987	Blocked	-
3309YN	Allowed	-
APU9123	Allowed	-
9795	Allowed	123123

53 item(s) | Refresh

Close

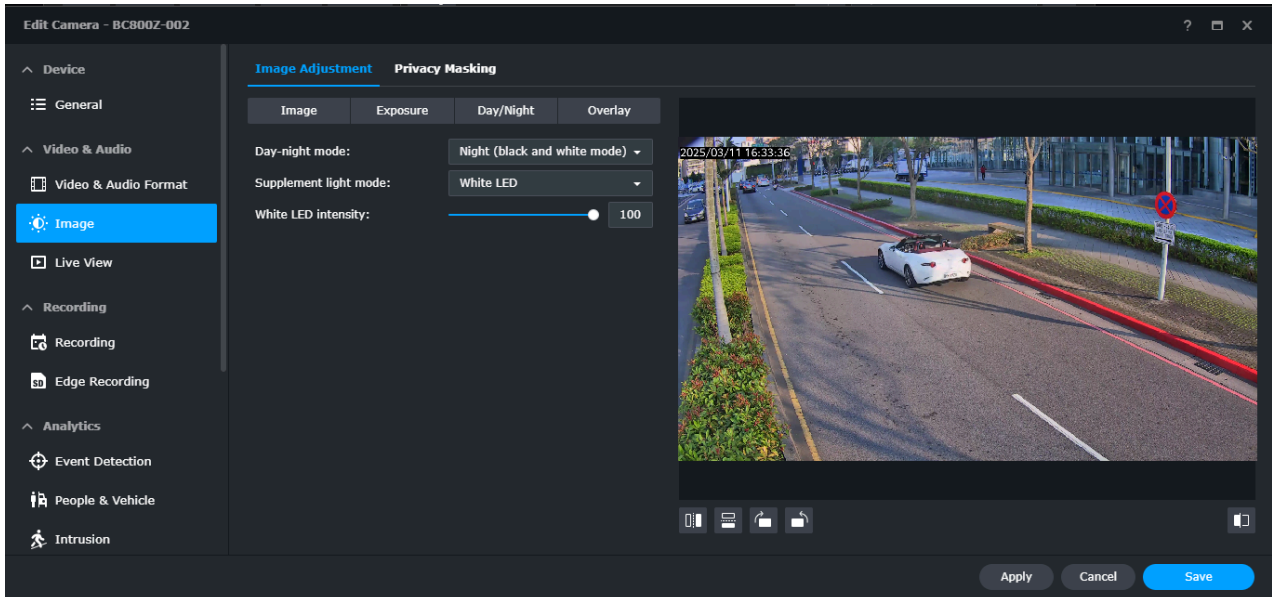
Adjust zoom

The zoom function ensures that license plates occupy a sufficiently large portion of the image even in wide-angle views, thereby improving the success rate of license plate recognition. You can adjust the optical zoom level and focus by going to **Monitor Center** > *Select the BC800Z Channel* > **Show lens control**.



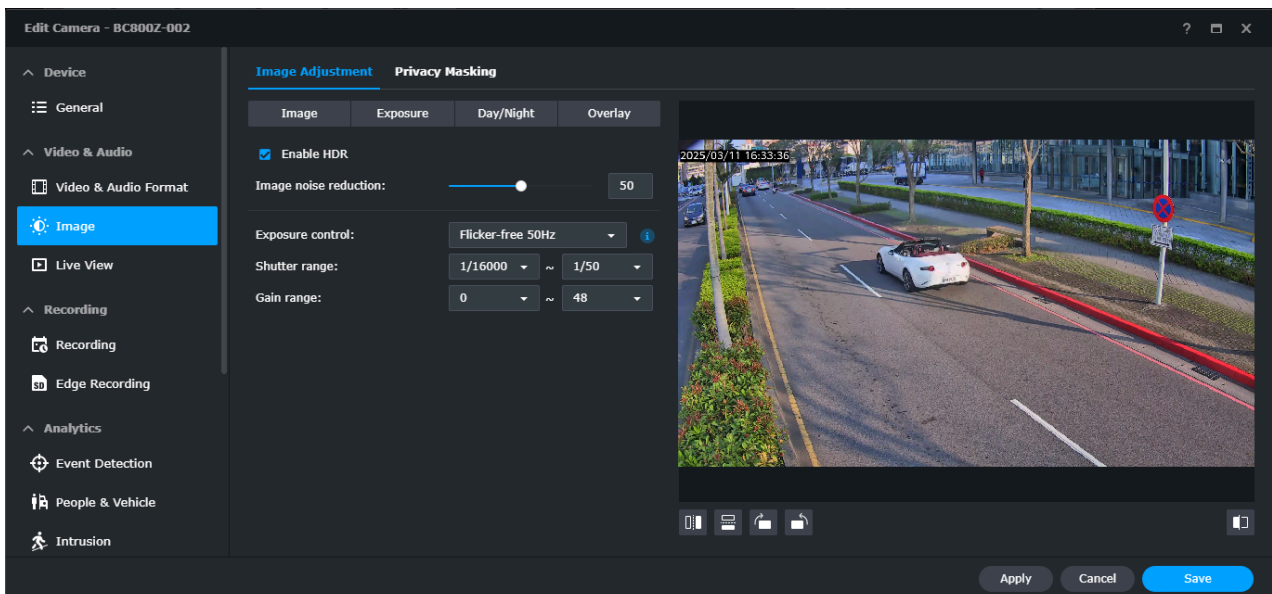
Adjust white LED

The white LED function provides full-color images at night, enhancing license plate recognition accuracy in low-light environments. You can configure the white LED by going to **IP Camera** > *select the BC800Z camera* > **Edit Camera** > **Image** > **Image Adjustment** > **Day/Night** > **Supplement light mode**.



Toggle HDR

HDR may cause motion blur or ghosting on moving vehicles, reducing the accuracy of license plate recognition. We recommend deactivating HDR when using the license plate recognition feature. You can configure this by going to **IP Camera** > *select the BC800Z camera* > **Edit Camera** > **Image** > **Image Adjustment** > **Exposure** > **Enable HDR**.




If license plate recognition is enabled while HDR is turned on, a prompt window will appear asking you to select a detection scenario. If the option for moving vehicles is selected, HDR will

automatically turn off to improve recognition accuracy.

Select scenario for HDR adjustment

For best recognition performance, please select whether to detect moving or stationary vehicles.

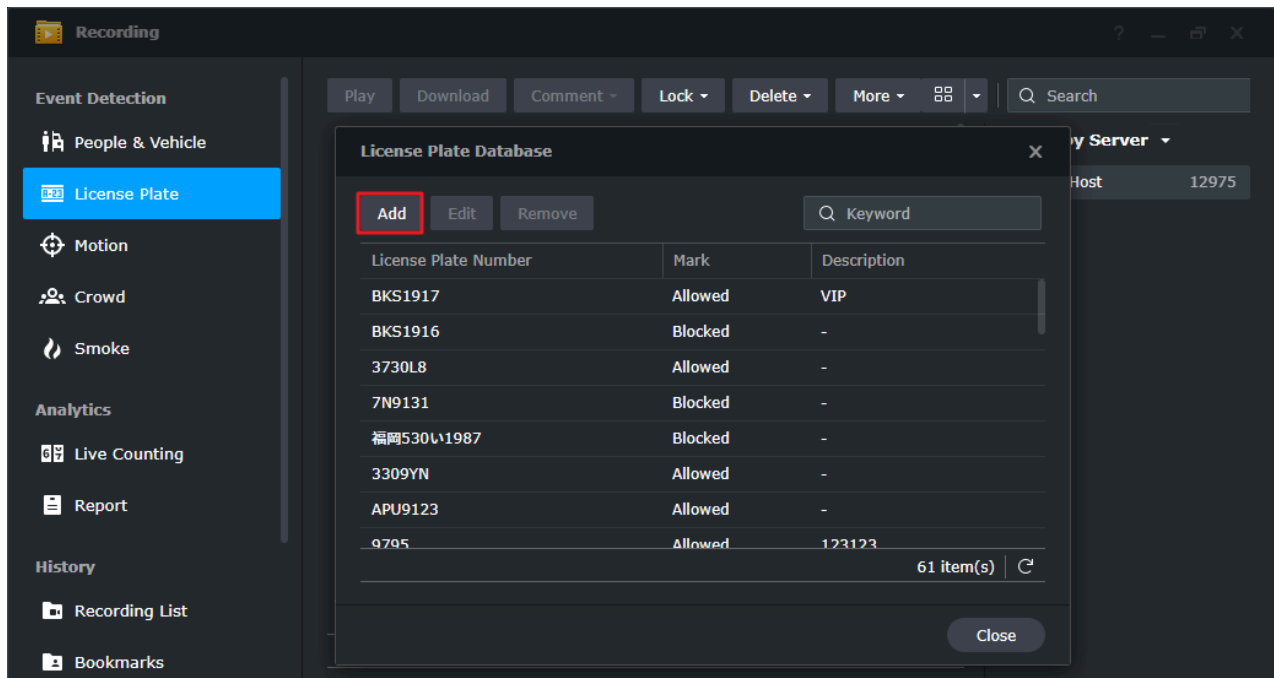
- Stationary vehicles (HDR will remain enabled)
- Moving vehicles (HDR will be turned off automatically) 

OK

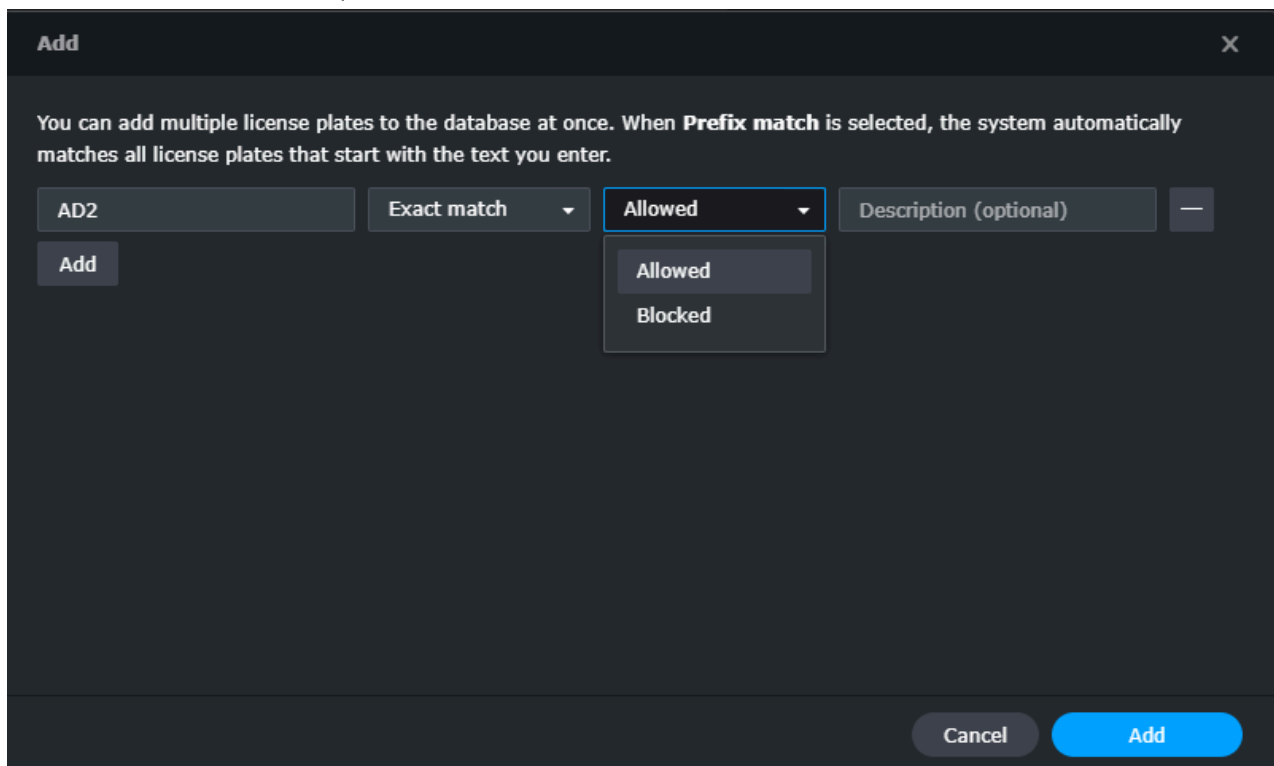
Manage the License Plate Database

You can manage your license plate database by going to **Recording App > License Plate > More > Manage License Plate Database**.

The database can contain up to a total of 10,000 user profiles and the license plate can include 1 to 64 Unicode characters.



To create a license plate profile, click **Add**. Fill in the license plate numbers, choose **Allowed** or **Blocked**, and add a description.



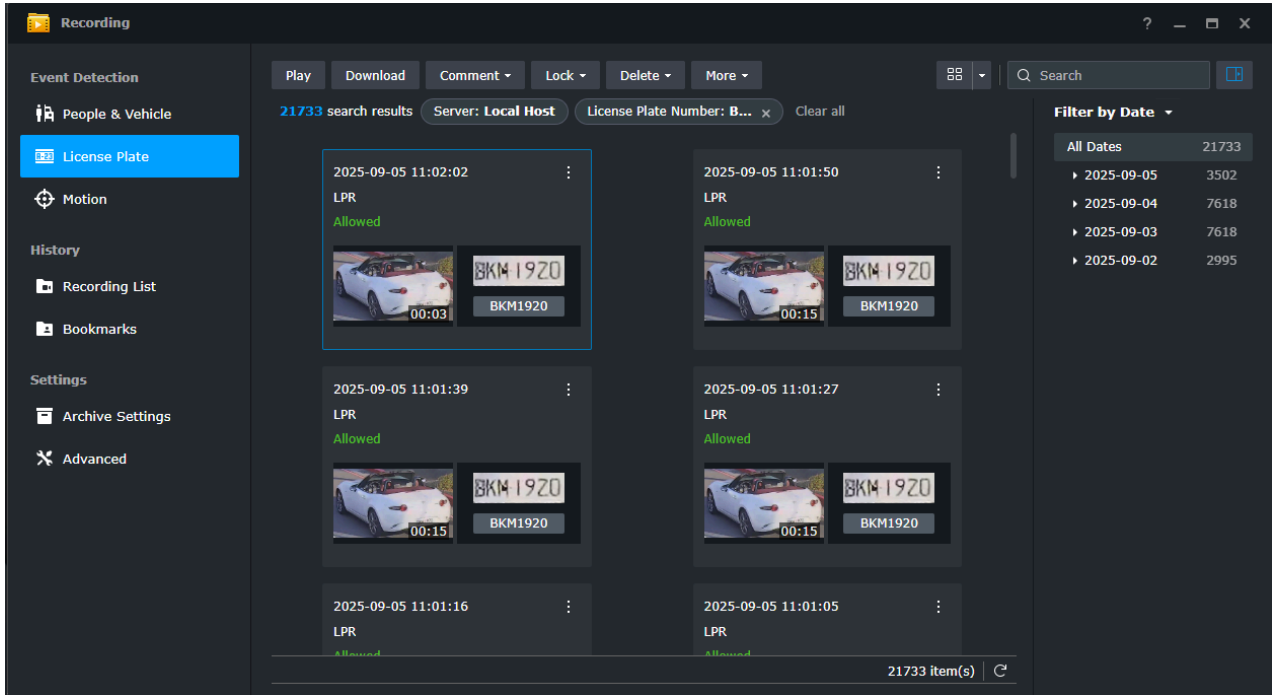
Choose how the license plate number should be recognized:

- Exact match: Only license plates that exactly match the characters you enter will be added to the database.
- Prefix match: Adds any license plate that begins with the characters you enter. This is useful when adding multiple plates that share a common starting sequence, for example, a fleet of vehicles whose plate numbers all begin with the same three characters.

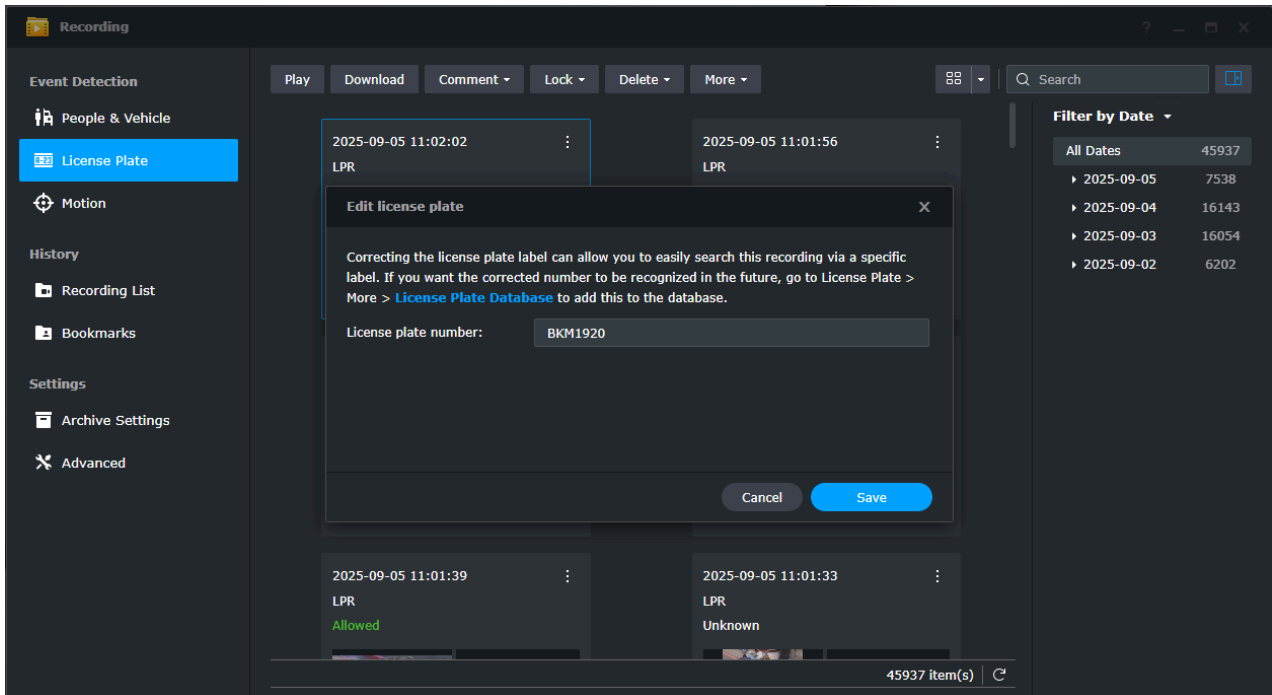
The screenshot shows a dark-themed 'Add' dialog box. At the top left is the title 'Add' and a close button 'X'. Below the title is a text instruction: 'You can add multiple license plates to the database at once. When **Prefix match** is selected, the system automatically matches all license plates that start with the text you enter.' Below this instruction are four input fields: a text field containing 'AD2', a dropdown menu currently showing 'Exact match' with a downward arrow, a dropdown menu showing 'Allowed' with a downward arrow, and a text field containing 'Description (optional)'. Below the 'AD2' field is a small 'Add' button. Below the 'Exact match' dropdown is a menu with two options: 'Exact match' and 'Prefix match'. At the bottom right of the dialog are two buttons: a grey 'Cancel' button and a blue 'Add' button.

Manage Detection Results

Go to **Recording App > License Plate** to manage the license plate results.

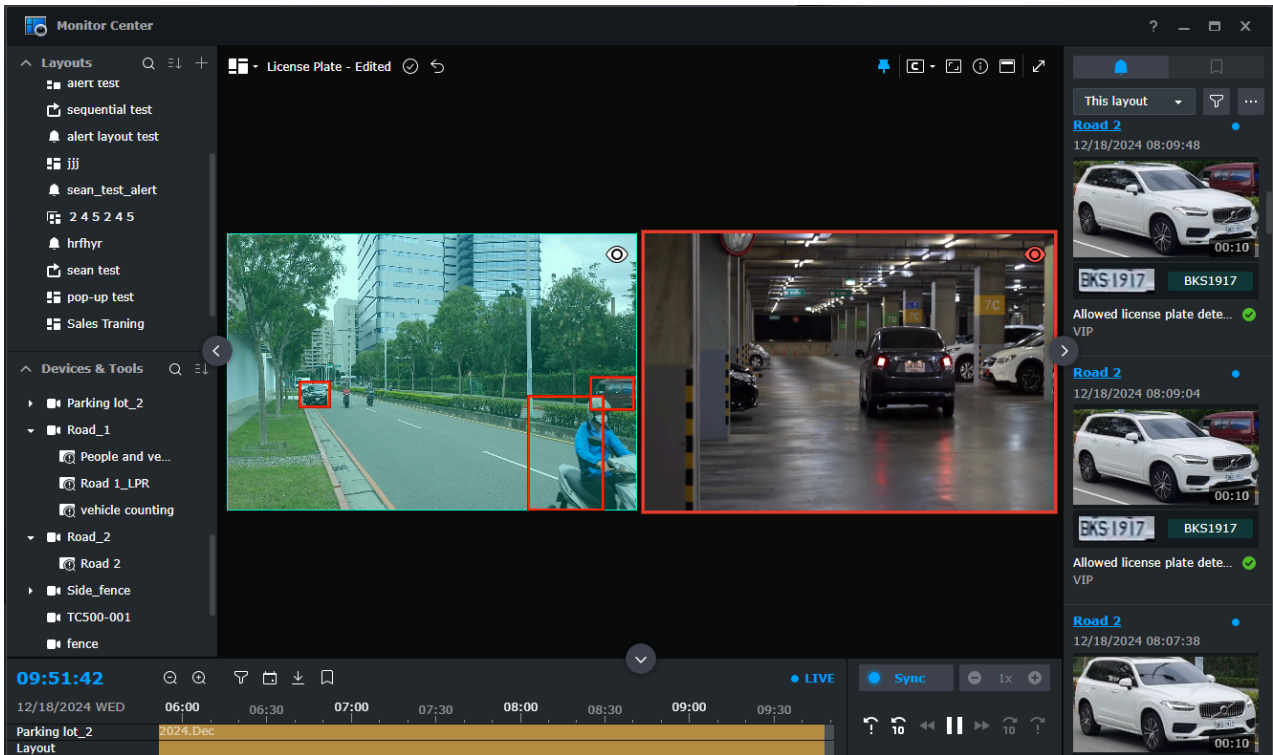


If a license plate was detected incorrectly, you can edit the license plate by right-clicking on the result or clicking on the **Menu icon > Edit license plate**.

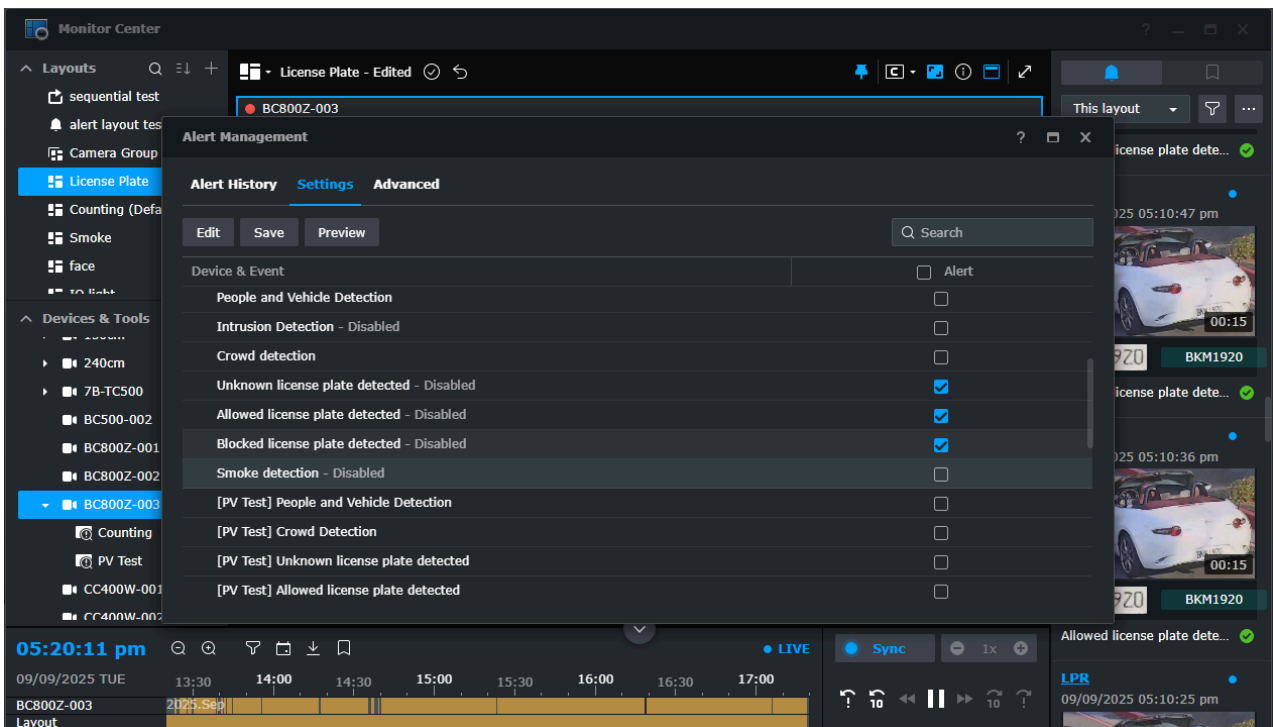


Alert Settings

If you want to receive alarms for Unknown/Allowed/Blocked license plates, go to **Monitor Center > Alert Panel > Alert settings**.



Select the device and tick the box to receive alerts for **Unknown, Allowed, or Blocked** license plates detected.



The following alert information is available in the alert panel:

- Date and time
- License plate number
- Description
- Status

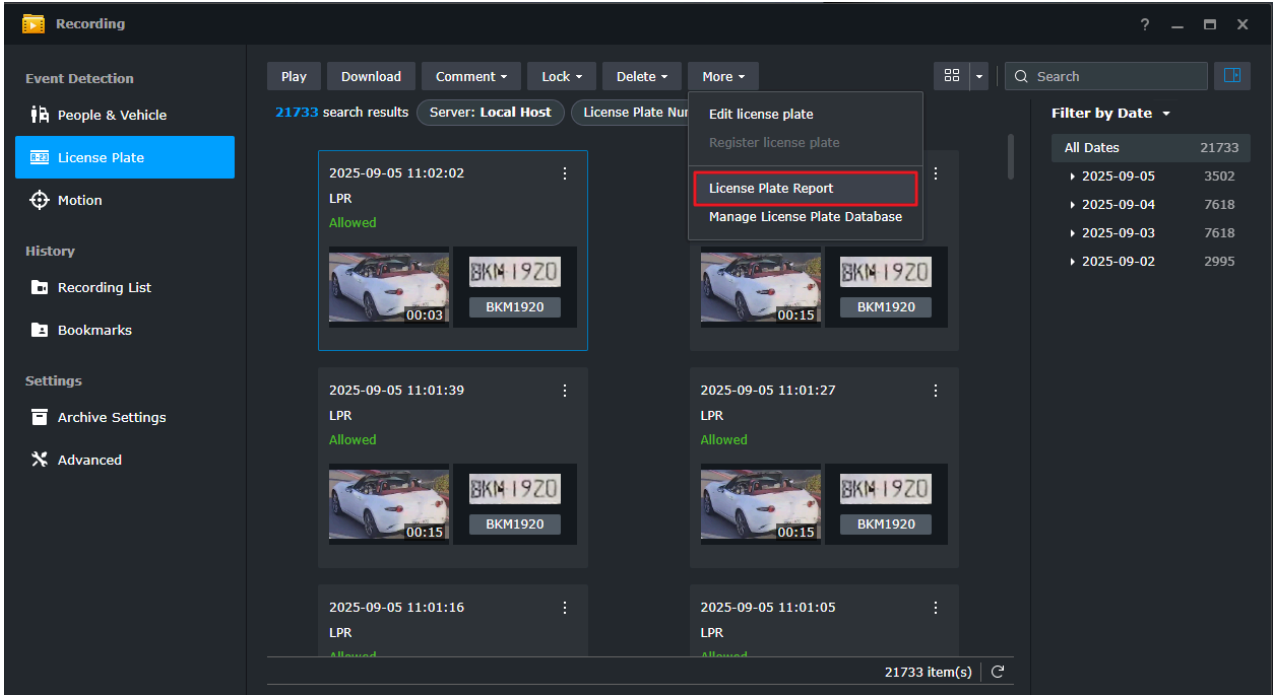
The screenshot displays the Monitor Center interface for license plate detection. On the left, a 'Layouts' sidebar lists various test configurations, and a 'Devices & Tools' sidebar shows camera locations like 'Road_2'. The main view is split into two camera feeds: an outdoor road scene and an indoor parking garage. A white SUV is detected in both, with red bounding boxes around it. The right sidebar shows a list of detected vehicles with the following details:

Layout	Date and Time	License Plate	Status
Road 2	12/18/2024 08:09:48	BKS1917	Allowed license plate detection, VIP
Road 2	12/18/2024 08:09:04	BKS1917	Allowed license plate detection, VIP
Road 2	12/18/2024 08:07:38	BKS1917	Allowed license plate detection, VIP

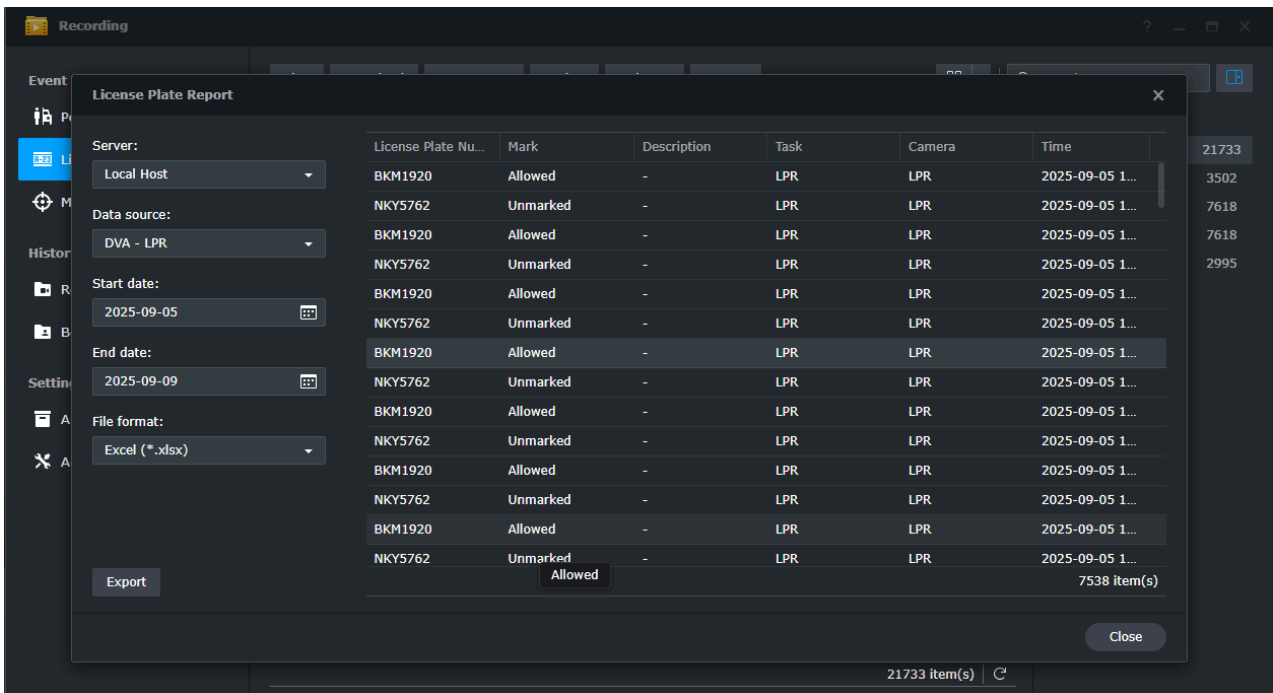
The bottom of the interface shows a timeline for 'Road 2' with a '2024-12-18 06:38:45' timestamp and playback controls.

Export Reports

If you need to manage or analyze the detected vehicles, go to the **Recording App > License Plate > More > License Plate Report**.



Filter your results and export the license plate report.



Frequently Asked Questions

Does the background color of a license plate affect recognition performance?

We perform license plate recognition using black-and-white images, so the background color of the license plate will not affect our recognition performance.

Can the BC800Z detect license plates at night?

If license plate recognition is required at night, we recommend enabling the white LED light, which provides clearer plate details to assist with identification.

Why do license plates appear blurry or have ghosting when recognizing moving vehicles?

HDR may cause motion blur or ghosting on moving vehicles, reducing the accuracy of license plate recognition. We recommend deactivating HDR when using the license plate recognition feature.