License Plate Recognition Camera

User Manual

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Precautions

Important Safety Information

Before using this device, it is essential to read and fully understand this document. Adhering to the instructions will help ensure safe operation. If this device is installed in a public area, please place a visible notice stating, *"You have entered an area under electronic surveillance."* Failure to follow the safety instructions could lead to fire hazards or serious injury. To prevent accidents, please read and follow these important precautions:

Symbols and Their Meanings

This document may contain the following symbols, each with a specific meaning:

Symbol	Description
 DANGER	Indicates an immediate and critical hazard. If not avoided, will result in death or life-threatening injuries.
 WARNING	Indicates a potential hazard with moderate risk. If not avoided, could lead to non-life-threatening injuries (e.g., burns, cuts, or temporary disability).
 CAUTION	Indicates a risk-prone scenario. If not avoided, may cause property damage, data loss, impaired performance, or unintended operational outcomes.
 TIP	Provides helpful tips to solve problems or save time.
 NOTE	Highlights important additional information that supplements the main content.

Safety Guidelines

- **Prevent Electric Shock**: Keep power plugs dry and clean to avoid the risk of electric shock.
- **Installation**: Ensure proper installation following all the specified requirements. The manufacturer is not responsible for any damage resulting from improper installation.
- **Electrical Safety**: Always use power adapters that meet local electrical safety standards and are marked with the LPS (Limited Power Source) standard to avoid damaging the device.
- **Use Proper Accessories**: Only use the accessories provided with this device. The input voltage must match the device's requirements.
- **Surge Protection**: If installed in areas with unstable voltage, ground the device to prevent damage from electrical surges, such as lightning strikes.

- **Water and Liquid**: Avoid allowing water or other liquids to enter the device. If liquid spills onto the device, immediately turn it off, disconnect all cables (power, network, etc.), and contact customer support.
- **Protect the Image Sensor**: Do not expose the device to direct strong light (e.g., light bulbs or sunlight) as it may shorten the lifespan of the image sensor.
- **Thunder and Lightning**: If the device is installed in areas prone to thunderstorms, ground the device nearby to prevent damage from lightning strikes.
- **Transportation and Storage**: Avoid heavy loads, jolts, or exposure to moisture during transportation and storage. The warranty does not cover damage that occurs after the original packaging has been opened.
- **Physical Protection**: Keep the device away from falling or heavy impacts. Do not install the device on surfaces that are prone to shaking or magnetic interference.
- **Cleaning**: Clean the device with a soft, dry cloth. For stubborn dirt, dampen the cloth with a mild, neutral cleanser, gently wipe, and dry the device.
- **Ventilation**: Ensure the device's ventilation openings are not blocked. Follow the installation instructions to ensure proper airflow.
- **Avoid Heat Sources**: Keep the device away from heat sources such as radiators, electric heaters, or other heating equipment.
- **Environmental Conditions**: Do not place the device in extremely hot, cold, or humid areas, or places with excessive dust or strong electrical radiation.
- **Outdoor Installation**: If installed outdoors, take preventive measures against insects and moisture to avoid circuit board corrosion, which could impact performance.
- **Long-Term Inactivity**: If the device will not be used for a long period, unplug it to avoid any potential hazards.
- **Fragile Sticker**: Before unpacking, check if the fragile sticker is damaged. If it is, contact customer service or sales personnel. The manufacturer is not responsible for any damage caused to the fragile sticker after it is removed.

Special Announcement

All products sold by the manufacturer undergo strict inspection and come with nameplates, operation instructions, and necessary accessories. The manufacturer is not responsible for counterfeit products.

This manual may contain inaccuracies or outdated information about product functions and operations. The manufacturer may update the manual as product features are enhanced or changed, and new versions of the manual will be provided. Updates may be applied to both hardware and software without prior notice.

This manual is for reference only and does not guarantee complete accuracy or consistency with the actual product. For the most accurate information, refer to the actual product.

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1 Device Installation

1.1 Scene Requirements

1.1.1 Scene Setup

To ensure accurate license plate recognition, follow these guidelines:

- The license plate must be well-lit and visible.
- Minimum image resolution requirements:
  - **Kazakhstan, Armenia, Uzbekistan, and Serbia**:
    - Rectangular plates: At least **150 pixels**
    - Two-row plates: At least **100 pixels**
  - **Other supported countries**:
    - Rectangular plates: At least **130 pixels**
    - Two-row plates: At least **70 pixels**
- The camera should be positioned to allow a tilt of no more than **5 degrees** (clockwise or counterclockwise) as shown in Figure 1-1.

Figure 1-1 Allowed tilt (sample)

For vehicle detection, the **horizontal size** of the license plate in the image should ideally be between **90 and 170 pixels**.

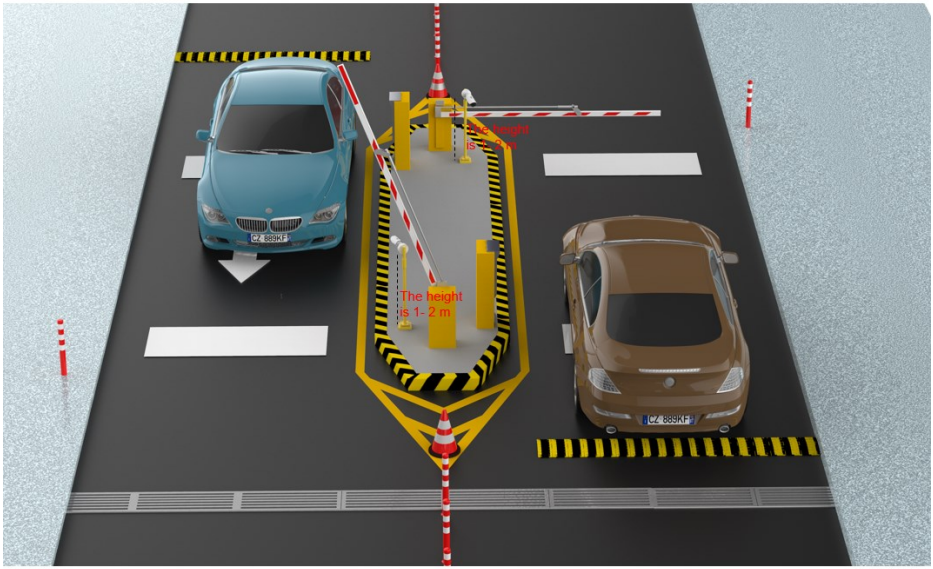
1.1.2 Camera Installation Guidelines

Installation height depends on the application:

- **Entrance and exit**

  Installation height is about **1-2 meters,** with a pitch angle of no more than **25 degrees**.

Figure 1-2 Check LP entry/exit area



- **Over-roadway mounting**

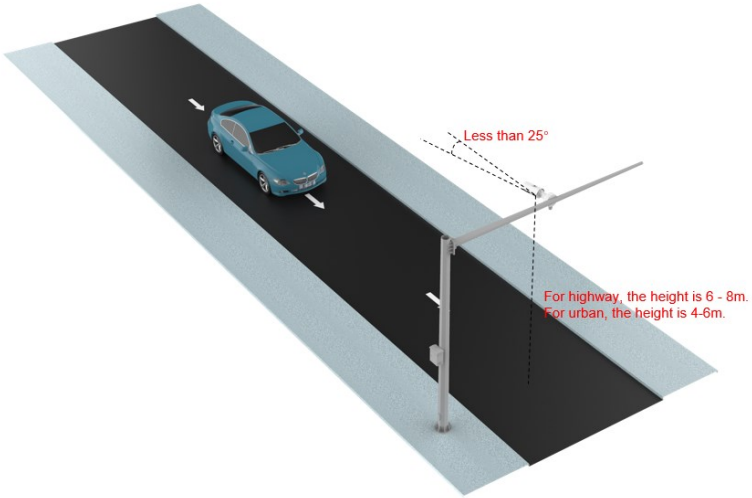
For **highway**, the height is **6 - 8m**.

For **urban**, the height is **4- 6m**.

The vertical angle is **less than 25°** .

It is applicable for **two lanes**.

Figure 1-3 Over-roadway Scene



- **Roadside mounting**

For highway, the height is 6 - 8m.

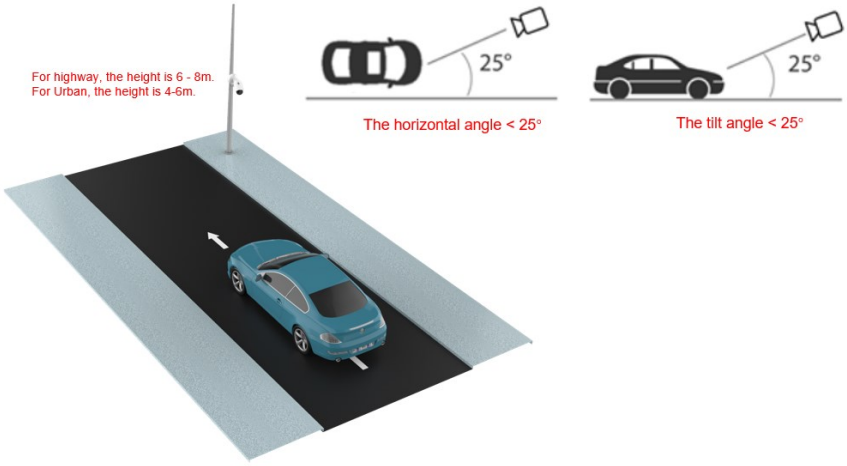
For Urban, the height is 4-6m.

The horizontal angle < 25°

The tilt angle < 25

It only is applicable for **single lane**.

Figure 1-4 Roadside Scene



- **Curved road mounting**

The height is 4-6m.

The horizontal angle < 25°

The tilt angle < 25

Figure 1-5 Curved road Scene

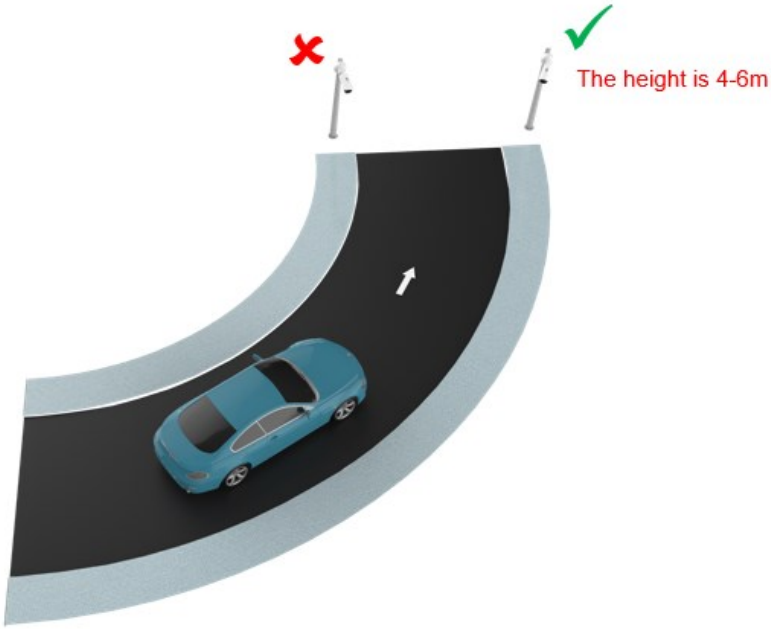
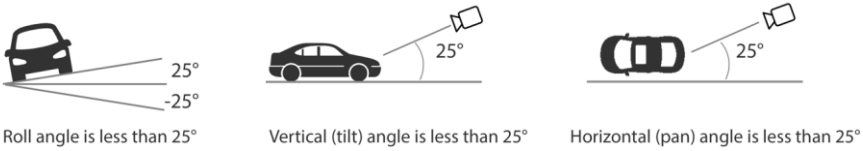


Figure 1-6 Mounting angle



Angle	The most	Acceptable	Above recommended	Unacceptable

	preferable		(the critical value)	
				
Vertical (tilt)				
Horizontal (pan)				
Accuracy	100%	95%-96%	90%	N/A

Figure 1-7 Over -roadway and roadside mounting

	Side view mount height	Angled view mount height
Optimal angle		

Maximum allowable angle		
Unacceptable angle		

1.2 Computer Requirements

To ensure smooth operation, your computer should meet the following minimum system requirements:

- **Processor**: Intel Core™ i5-7500 @ 3.4GHz or higher
- **Graphics Card**: Dedicated (discrete) graphics with at least **1GB** of memory
- **Network**: Gigabit Ethernet (compatible network card and switch required)
- **Memory (RAM)**: **4GB or more**
- **Hard Drive**: **500GB or more**
- **Display Resolution**: **1920×1080 or higher**
- **Operating System**: Windows 7 32-bit or later recommended

2 Device Login

2.1 Login and Logout

> **NOTE**
> To access the camera's web interface, use **Microsoft Edge, Google Chrome, or Mozilla Firefox**. Other browsers may not support all functions.

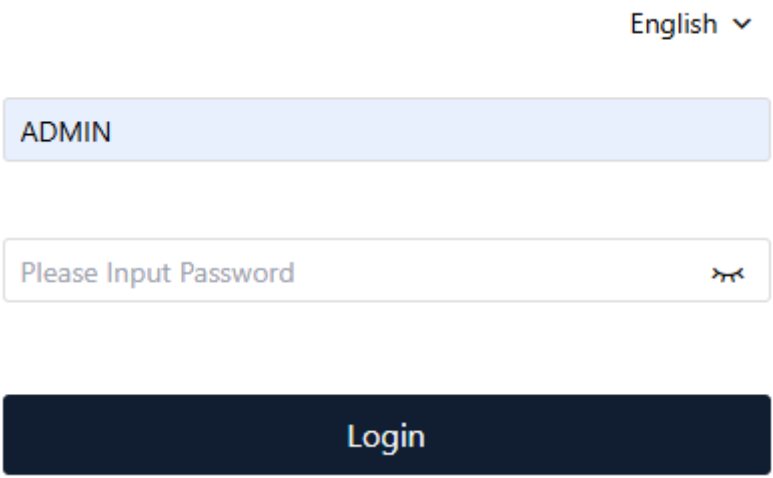
Login

1. **Open a web browser** (Chrome recommended) and enter the camera's IP address in the address bar.
   - **Default IP address**: `192.168.1.168`
2. **First-time users**: Create a password when prompted, then proceed to the login page.

Figure 2-1 Create password

3. **Enter your username and password** to log in.
   - **Default username**: ADMIN
   - You must set a password during the first login.
4. Click **Login** to access the homepage.

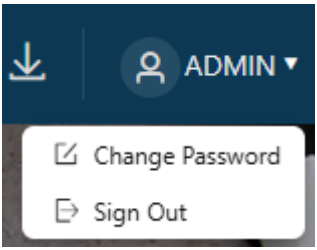
Figure 2-2 Login page



NOTE

- The default username is admin. Users should create the password for the first time login.
- **DHCP is enabled by default**, meaning the IP address may change if your network assigns a new one. You can use the provided tool to search for the current IP address.
- **Changing the password requires a reboot**: After modifying the password, wait **at least three minutes** before powering off the device. Alternatively, log in again to confirm the new password.
- For security, regularly update your password.
- You can change the system language from the login page.

Logout



- Click “**Sign Out”** in the upper right corner to return to the login page.

2.2 Homepage Layout

The homepage provides access to key system features, including:

- **Real-time video streaming**
- **Alarm and fault notifications**
- **System settings**
- **Password management**
- **Logout options**

(Refer to Figure 2-3 for the homepage layout and 2.4 for descriptions of each section.)

Figure 2-3 Homepage layout

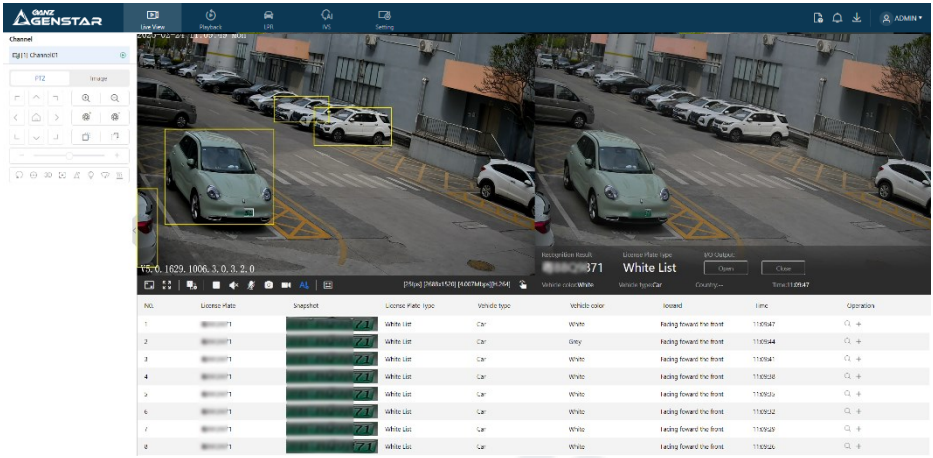


Figure 2-4

2.3 Homepage Elements

The homepage provides access to various functions, allowing users to manage live video, settings, alarms, and more. The following table outlines the key elements:

2.4 Changing Your Password

How to Change Your Password

1. Click on your **username** in the upper-right corner and select **Change Password**, OR go to **Settings > System > Change Password**.
2. Enter your **current password**, then input and confirm your **new password**.
3. Click **OK**.
    - If a message appears saying **"Password changed successfully!"**, the update was successful.
    - If the password change fails, an error message will guide you (e.g., “Password must be at least 8 characters”).
4. **Restart the device after three minutes** to ensure the password update is applied.

Figure 2-5 Change the default password page

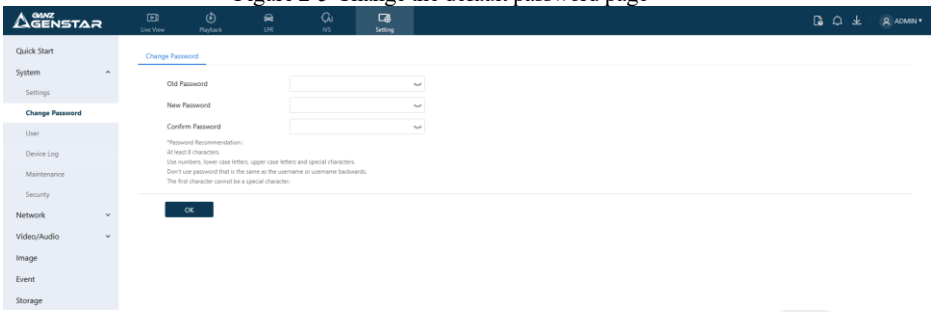
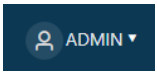


Table 2-1 Elements on the homepage

No.	Element	Description
1	Live View	Displays real-time video footage.
2	Playback	Access recorded video footage for playback. *Note: Playback is only available if an SD card or NAS storage contains recorded videos*
3	IVS setting	Configure the **Intelligent Video System (IVS)**, including AI multi-target tracking, intrusion detection, motion detection, line crossing, people counting, and more.
4	Configuration	Set device parameters, including **system settings, network, audio/video, image quality, event notifications, and storage.**
5	 Intercom Function	Manage two-way audio communication.
6	 Alarm Notifications	If an alarm is triggered, an **alarm icon** will appear..  . Click the icon to view the alarm details.
7	 SD Card Backup & Download Status	Monitor SD card video backup progress and download status.
8	 User Profile	View current user information, sign out, or change the password.

No.	Element	Description
9	 Zoom In/Out	Adjust the video zoom level.
10	 Iris Control	Manually adjust **iris settings** for brightness and clarity.
11	 Focus Control	Adjust focus for near or distant objects.
12	Image settings	Modify **brightness, contrast, saturation, and sharpness**.
13	 Window Scaling	Adjust the display scale of the live video.
14	 Full Screen Mode	View live video in full screen.
15	 Stream Selection	Switch between different video stream modes (options vary by device model). Adjust settings under **Settings > Quick Start > Video**.
16	 Pause/Start	Start or stop live video streaming.
17	 Audio Control	Enable or disable audio. Enable or disable intercom functionality.
18	 Two-way Audio	*Note: A microphone must be connected to your computer for two-way audio to work.*
19	 Snapshot	Capture an image from the live video and save it to a specified location.
20	 Record Video	Start or stop manual recording and save the video to a specified location.

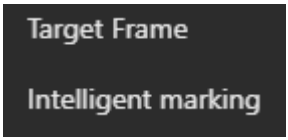
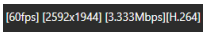
No.	Element	Description
21	 AI Recognition Mode	Play live video with AI-based object recognition. Click to exit AI mode.
22	 Target Detection & Intelligent Marking	 Highlights detected objects with a frame. **IVS detection areas** will also be outlined in the video feed.
23	 Video Information	View **frame rate, resolution, bit rate, and video encoding type**.
24	 I/O Alarm Control	Manually activate or deactivate the I/O alarm output.
25	**License Plate Data Capture**	Displays captured license plate details.
26	**License Plate Recognition**	Compares captured plates against stored data. *You can also manually trigger an I/O output.* Refer to Figure 2-7.

Figure 2-6 About the intercom function

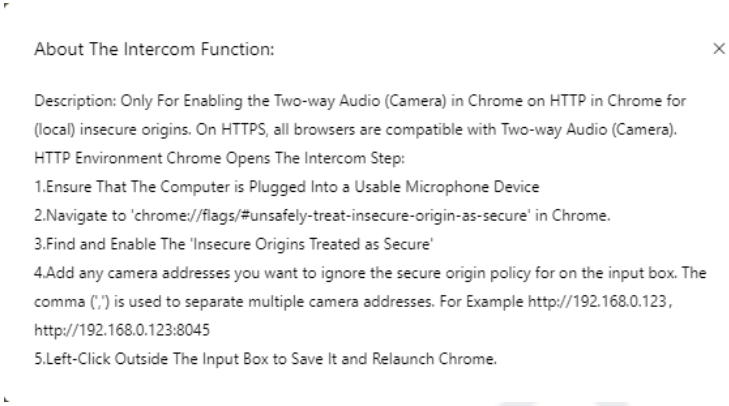
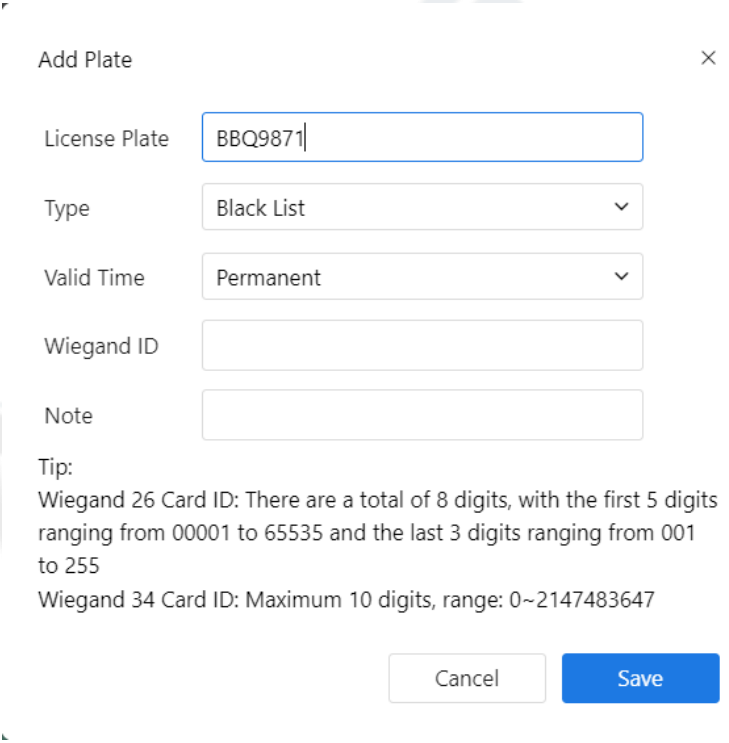


Figure 2-7 Operate the capturing plate

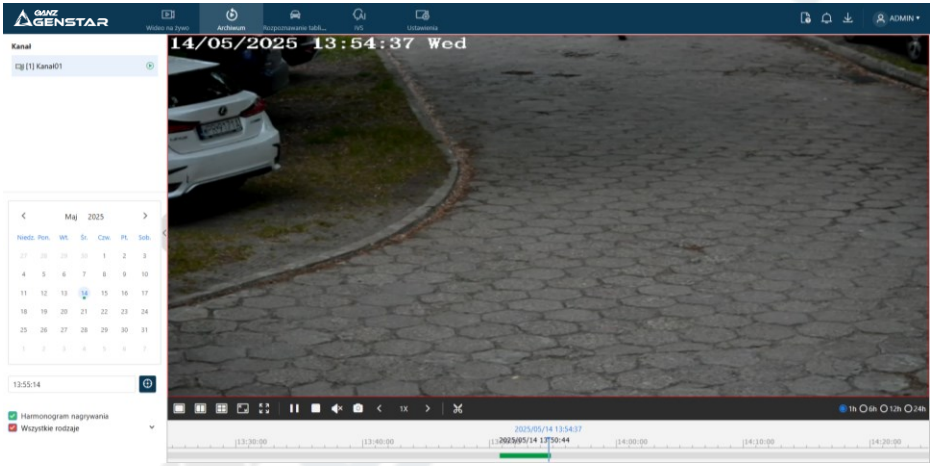


2.5 Playback

To review recorded footage:

1. Click **“Playback”** on the web interface.
2. If an SD card is installed and recording is enabled, you will see available video files.
3. Select a recording to play.

Figure 2-8 Playback page



Playback Interface & Features

No.	Element	Description
1	Calendar	25 Displays available recordings. A **green dot** indicates recorded footage for a specific day.

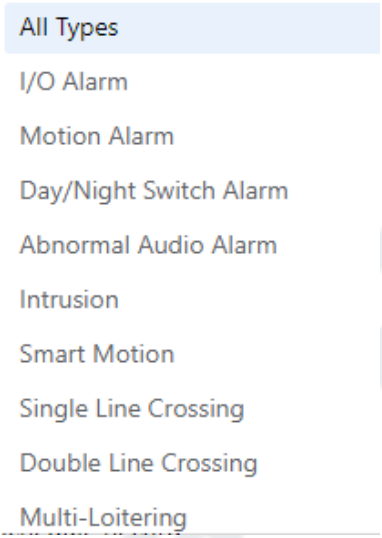
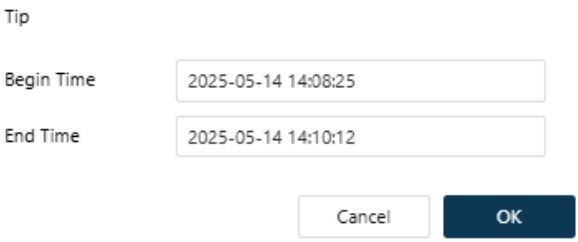
2	Timeline Schedule Record All Types	 Green = Scheduled recordings Red = Alarm-triggered recordings *(varies by model)*
3	 Window Scaling	Adjust playback window size.
4	 Full Screen	Play the recorded video in full screen.
5	 Pause/Start	Pause or resume video playback.
6	 Audio Control	Enable or disable audio during playback.
7	 Snapshot	Capture a still image from the playback video.
8	 Playback Speed	Adjust playback speed: **1/16X, 1/8X, 1/4X, 1/2X, 1X, 2X, 4X, 8X.**
9	 Backup and Download	Drag the bar to select a recording and download it to your device. A **confirmation pop-up** will appear to finalize the save.
10	 Time Selection	Choose a **1-hour, 6-hour, 12-hour, or 24-hour** viewing range.

Figure 2-9 Record backup tip



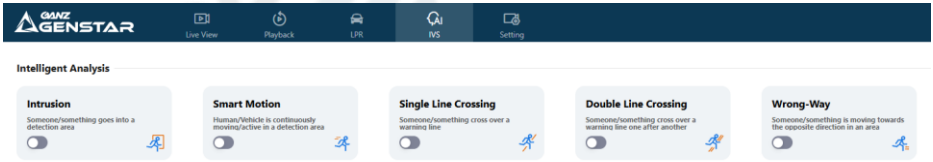
2.6 IVS Setting

1. Click **"IVS"** to open the settings page.
2. Configure features such as **deep learning, intelligent analysis, and behavior detection**.

NOTE

Different camera models offer different IVS features. Refer to your specific product manual for details.

Figure 2-10 IVS setting page



3 Quick Start Settings

3.1 Local Network

Overview

The local network settings allow you to configure essential parameters for your device's network connection, including:

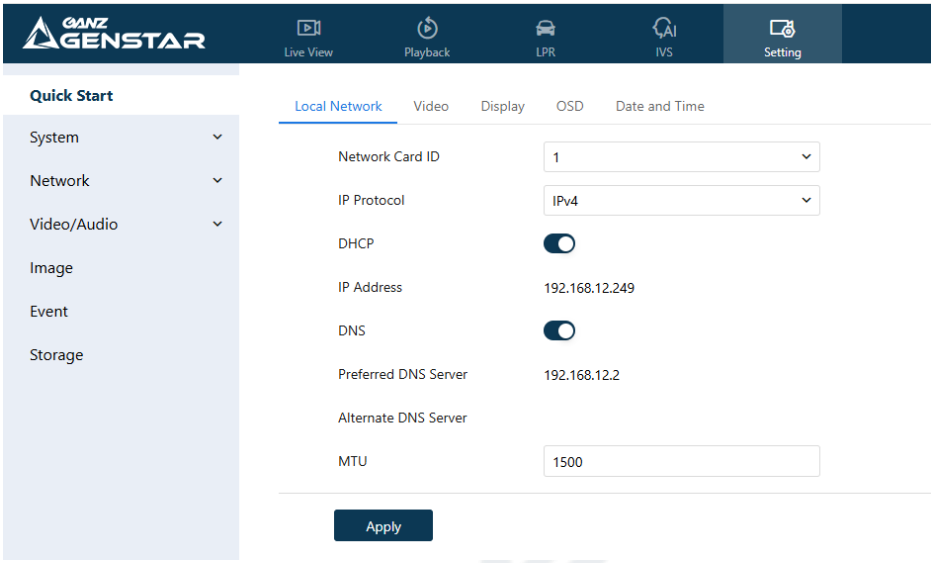
- IP protocol
- IP address
- Subnet mask
- Default gateway
- Dynamic Host Configuration Protocol (DHCP)
- Preferred and alternate Domain Name System (DNS) servers
- Maximum Transmission Unit (MTU)

By default, DHCP is enabled, meaning the device will automatically receive an IP address when connected to a network with DHCP support. If no DHCP server is available, the device will use the default IP address **192.168.0.120**. If multiple devices are connected to the same network, users must manually set unique IP addresses for each device.

Steps to Configure the Local Network

1. Navigate to **Settings > Quick Start > Local Network**.
2. Adjust the parameters as needed according to the table below:

Figure 3-1 Local network page



Set the parameters according to Table 3-1.

Table 3-1 Local network parameters

Parameter	Description	Configuration Method
Network Card ID	Identifies the network card.	[Default value] 1
IP Protocol	IPv4 is the IP protocol that uses an address length of 32 bits. IPv6 is the IP protocol that uses an address length of 64 bits.	[Setting method] Select a value from the drop-down list box. [Default value] IPv4
DHCP	Enable DHCP, and the device will automatically obtain the IP address from the DHCP server.	[Setting method] Click the button to enable **DHCP**. NOTE To query the current IP address of the device, you must query it on the platform based on the device name.
IP Address	Device IP address that can be set as required.	[Setting method] Enter a value manually. [Default value] 192.168.0.120

Parameter	Description	Configuration Method
Subnet Mask	DHCP is off. The subnet mask of the network adapter.	[Setting method] Enter a value manually. [Default value] 255.255.255.0
Default Gateway	DHCP is off. This parameter must be set if the client accesses the device through a gateway.	[Setting method] Enter a value manually. [Default value] 192.168.0.1
Preferred DNS Server	DNS is on. The IP address of a DNS server.	[Setting method] Enter a value manually. [Default value] 192.168.0.1
Alternate DNS Server	DNS is on. The IP address of a domain server. If the preferred DNS server is faulty, the device uses the alternate DNS server to resolve domain names.	[Setting method] Enter a value manually. [Default value] 192.168.0.2
MTU	Set the maximum value of network transmission data packets.	[Setting method] Enter a value manually. NOTE The MTU value ranges from 1280 to 1500, the default value is 1500, Please do not change it arbitrarily.

Click **Apply**.

- If successful, a confirmation message will appear, and you will need to log in again with the new IP address.
- If an error message appears, check and correct the parameters before applying again.

3.2 Video Settings

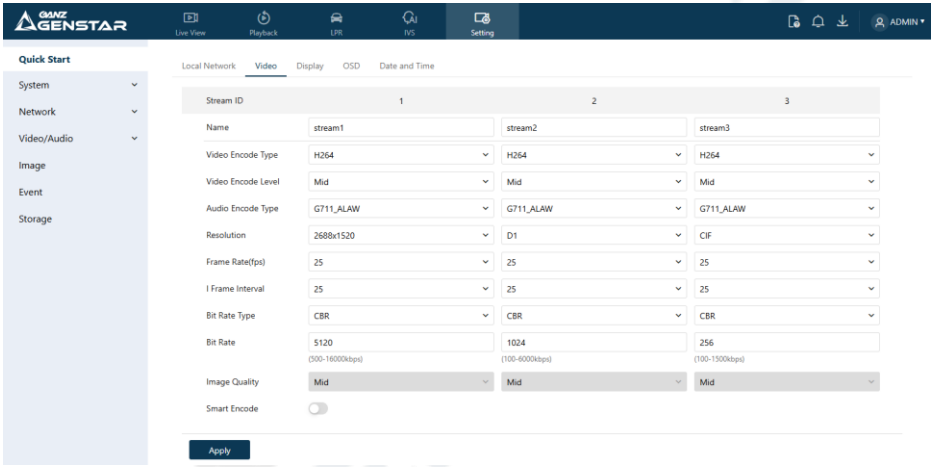
Overview

Modifying video settings affects real-time streaming quality, playback, and storage efficiency. Adjust these settings based on available network bandwidth and storage capacity.

Steps to Configure Video Settings

1. Navigate to **Settings > Quick Start > Video**.
2. Adjust the parameters according to the table below:

Figure 3-2 Video setting page



Set the parameters according to Table 3-2.

Table 3-2 Parameters of stream configuration

Parameter	Description	Configuration Method
Stream ID	The device supports at most three streams. • Streams 1 and 2 adopt the H.264 code. • Stream 1 stands for the best stream performance the device supports. Stream 2 usually offers comparatively low-resolution options. • Stream 3 is the lowest resolution. Some models may only have two streams.	[Setting method] Select a value from the drop-down list box.
Name	Stream name. NOTE The stream name consists of characters, numbers, characters, and underlines.	[Setting method] Enter a value manually. The value cannot exceed 32 bytes. [Default value] Stream 1

Parameter	Description	Configuration Method
Video Encode Type	The video encoding determines the image quality and network bandwidth required by a video. Currently, the following encoding standards are supported: • MJPEG MJPEG is a standard intra-frame compression encode. The compressed image quality is good. No mosaic is displayed on motion images. MJPEG does not support proportional compression and requires large storage space. Recording and network transmission occupy large hard disk space and bandwidth. MJPEG does not apply to continuous recording for a long period or network transmission of videos. It can be used to send alarm images. • H.264 H.264 consists of H.264 low Profile, H.264 Main Profile, and H.264 High profile. The performance of H.264 High Profile is higher than that of H.264 Main Profile, and the performance of H.264 Main Profile is higher than that of H.264 Base Profile. If a hardware decoding device is used, select the appropriate encode based on the decoding performance of the device. H.264 High Profile has the highest requirements for hardware performance, and H.264 Base Profile has the lowest requirements for hardware performance. • H.265 H.265 is the advanced video encoding standard. It's the improvement standard from H.264. H.265 improves the streams, encoding quality, and algorithm complexity to make configuration optimization.	[Setting method] Select a value from the drop-down list box. [Default value] H.264 High Profile The H.264 High Profile encode means high requirements on the hardware. If the hard-decoding capability is low, use H.264 Main Profile or H.264 Base Profile. When users choose the MJPEG for Stream 1, some functions will be an error, such as the videos of FTP upload may not be played correctly.

Parameter	Description	Configuration Method
Audio Encode Type	The following audio encoding standards are supported: • G711_ULAW: mainly used in North America and Japan. • G711_ALAW: mainly used in Europe and other areas. • RAW_PCM: encode of the original audio data. This encode is often used for platform data.	[Setting method] Select a value from the drop-down list box.
Resolution	A higher resolution means better image quality. NOTE IP cameras support different resolutions based on the model.	[Setting method] Select a value from the drop-down list box.
Frame Rate(fps)	Frame rate is the number of images, snapshots, or frames that a camera can take per second. The frames per second determine the smoothness of a video. A video whose frame rate is higher than 22.5 f/s is considered smooth by human eyes. Frame rates for different frequencies are as follows: • 50 Hz: 1–25 f/s • 60 Hz: 1–30 f/s NOTE The frequency is set on the **Device Configuration** > **Camera** page. The biggest MJPEG coding format frame rate is 12 frames per second.	[Setting method] Select a value from the drop-down list
I Frame Interval(f)	I frame does not require other frames to decode. A smaller I-frame interval means better video quality but higher bandwidth.	[Setting method] Select a value from the drop-down list
Bit Rate Type	The bit rate is the number of bits transmitted per unit of time. The following bit rate types are supported: • Constant bit rate (CBR) The compression speed is fast; however, improper bit rates may cause vague motion images. • Variable bit rate (VBR) The bit rate changes according to the image complexity. The encoding efficiency is high and the definition of motion images can be ensured.	[Setting method] Select a value from the drop-down list box.

Parameter	Description	Configuration Method
Bit Rate Range	Indicates the maximal value of the bit rate. The different models may have different ranges, please refer to the actual product.	[Setting method] Enter a value manually.
Image Quality	The video quality of the camera output.	[Setting method] Select a value from the drop-down list box.
Smart Encode	Smart Encode. • Smart encode includes H.264 & H.265. • The storage space will be reduced by fifty percent when smart encoding is enabled. • Only mainstream supports smart encodings.	[Setting method] Click the button to enable **Smart Encode**.

Click **Apply**.

- If the message "Apply success!" appears, the system has successfully saved the settings.
- If the message "Apply failed!" appears, you need to request Parameter Configure permission from an administrator.
- If a message indicates that the bit rate is invalid, enter a valid bit rate value.

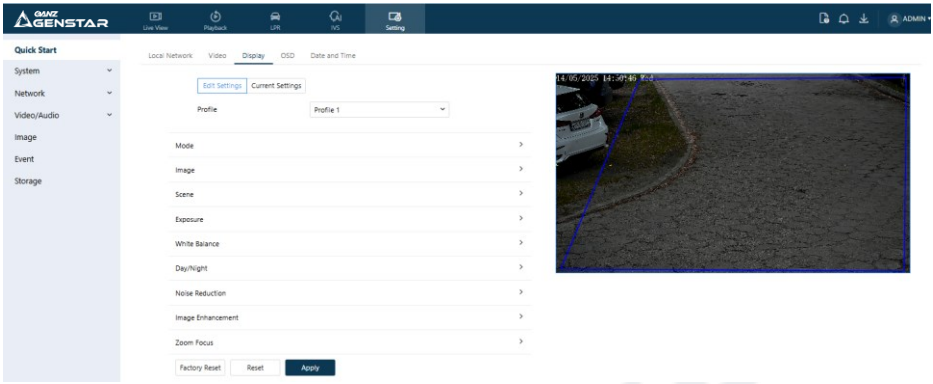
3.3 Display Settings

3.3.1 Accessing the Display Settings

Procedure:

1. Navigate to **Setting > Quick Start > Display**.

Figure 3-3 Display settings page



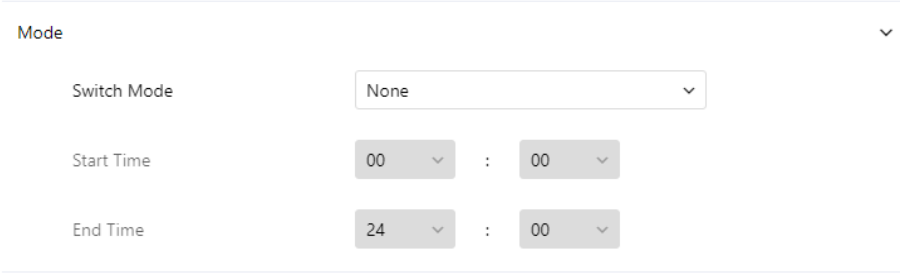
2. Select **Edit Settings** under the **Mode** section to configure the parameters. You can set up to four profiles.
    - All image settings can be modified in **Edit Settings**.
    - **Factory Reset**: Restores all parameters to factory settings.

3.3.2 Mode

Procedure:

1. Navigate to **Setting > Quick Start > Display > Mode**.

Figure 3-4 Mode page



2. Select **Switch Mode** to choose from the following modes:
    - **None**: Executes the selected profile continuously.
    - **Time Mode**: Switches profiles based on the configured start and end times.
    - **D/N Linkage Mode**: Automatically switches between **Profile 1** (Day Mode) and **Profile 2** (Night Mode) based on ambient light conditions.
3. Configure the start and end times as needed.

4. Click **Apply** to save the settings.

3.3.3 Image Settings

Users can manually adjust brightness, contrast, saturation, and sharpness based on the scene.

Procedure:

1. Navigate to **Setting > Quick Start > Display > Image**.
2. Adjust the parameters as per Table 3-3:
   - **Brightness**: Adjusts the overall brightness of the image. Default: 50.
   - **Saturation**: Controls color intensity. Default: 50.
   - **Sharpness**: Enhances image clarity. Default: 50.
   - **Contrast**: Adjusts the difference between bright and dark areas. Default: 50.
3. Click **Apply** to save the settings.

Table 3-3 Parameters of image settings parameters

Parameter	Description	Configuration Method
Brightness	Adjusts the overall brightness of the image.	[Default value] **50**
Saturation	Controls color intensity	[Default value] **50**
Sharpness	Enhances image clarity. Default: 50.	[Default value] **50**
Contrast	Adjusts the difference between bright and dark areas. Default: 50.	[Default value] **50**

3.3.4 Scene Mode

Users can modify image mirroring based on installation methods and viewing preferences.

Procedure:

1. Navigate to **Setting > Quick Start > Display > Scene**.
2. Configure the settings as per Table 3-4:
   - **Scene**: Choose from **LPR (License Plate Recognition)**, **Outdoor**, or **Indoor**. Default: Outdoor.
   - **Mirror**: Select image orientation (**Normal, Horizontal, Vertical, Horizontal & Vertical**). Default: Normal.
   - **Corridor Mode**: Rotates the image by 90° for vertical installations. Default: Disabled.
3. Click **Apply** to save the settings.

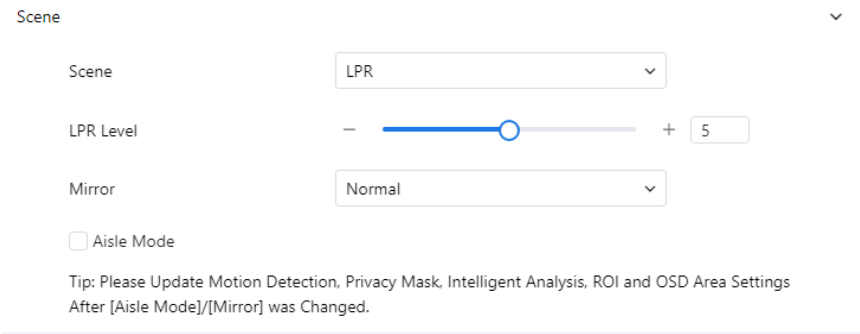


Table 3-4 Parameters of FFC

Parameter	Description	Configuration Method
Scene	○ Choose from **LPR (License Plate Recognition)**, **Outdoor**, or **Indoor**. Default: Outdoor.	[Configuration method] Select from the drop-down list [Default value] **Outdoor**
Mirror	○ Select image orientation (**Normal, Horizontal, Vertical, Horizontal & Vertical**). Default: Normal.	[Setting method] Select a value from the drop-down list. [Default value] **Normal**

Parameter	Description	Configuration Method
Corridor Mode	○ Rotates the image by 90° for vertical installations. Default: Disabled.	[Setting method] Tick the corridor mode. [Default value] Disable

3.3.5 Exposure

Adjust exposure settings when brightness changes due to ambient light variations.

Procedure:

1. Navigate to **Setting > Quick Start > Display > Exposure**.
2. Configure the settings as per Table 3-5:
   - **Exposure Mode**: Options include Auto, Manual, Shutter Priority, and Iris Priority. Default: Auto.
   - **Meter Mode**: Options include Full Metering, Spot Metering, and Partial Metering. Default: Whole.
   - **Max Shutter**: Controls the maximum shutter speed. Default: 1/25.
   - **Max Gain**: Limits the gain level to avoid overexposure. Default: 50.
   - **Iris**: Select Auto or Open Fully. Default: Auto.
   - **Iris Speed**: Adjusts auto iris adjustment speed. Default: 50.
3. Click **Apply** to save the settings.

Figure 3-5 Exposure interface for IP camera

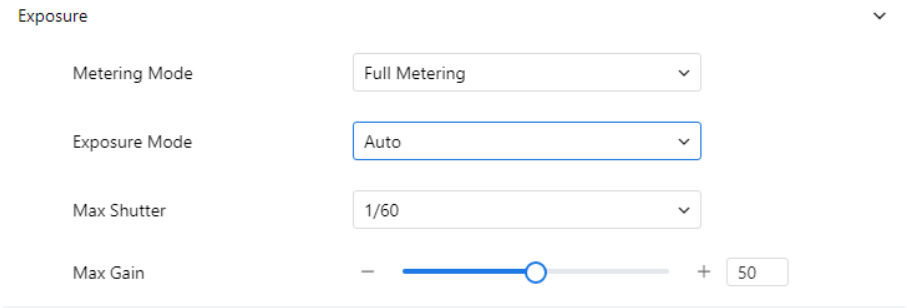


Table 3-5 Parameters of exposure

Parameter	Description	Configuration Method
Exposure Mode	The exposure modes include: • **Auto**: The system performs auto exposure based on the monitoring environment. • **Manual**: You can adjust the brightness of an image by setting the following three items: **Shutter Setting**, **Iris Setting,** and **Gain Setting**. • **Shutter Priority**: You can set **Shutter Setting** to fixed values. The iris and gain are automatically adjusted by the system. • **Iris Priority (for high-speed dome):** You can set Iris Setting to fixed values. The shutter and gain are automatically adjusted by the system.	[Setting method] Select a value from the drop-down list. [Default value] **Auto**
Meter Mode	It is used to select the metering area. • **Fulling Metering**: During metering, all areas of an image have equal weight, that is, all areas are involved in the metering. **Spot Metering**: During metering, the central spot of an image has the highest weight. • **Partial Metering**: During metering, the middle area (1/2 of the total area) of an image has the highest weight, and other areas have the lowest weight.	[Setting method] Select a value from the drop-down list. [Default value] **Whole**
Max Shutter	The device automatically adjusts the shutter time based on the ambient brightness. The shutter time is less than or equal to the value of this parameter.	[Setting method] Select a value from the drop-down list. [Default value] **1/25**
Max Gain	The device automatically adjusts the gain based on the external light. The gain is less than or equal to the value of this parameter.	[Setting method] Drag the slider. [Default value] **50**

Parameter	Description	Configuration Method
Iris	It is used to control the light admitted to the lens. The auto iris can be set to either of the following states: • **Auto** The iris is automatically adjusted to control the light admitted to the lens. • **Open fully** The iris is fully open.	[Setting method] Select a value from the drop-down list. [Default value] **Auto**
Iris Speed	It indicates the auto adjustment speed of the iris. As the value increases, the speed increases. Excessive speed may cause instability. NOTE This parameter is valid when the auto iris is enabled.	[Setting method] Drag the slider. [Default value] **50**
Fixed Gain	When the exposure Mode is Manual, you can set the fixed gain.	[Setting method] Drag the slider. [Default value] **50**

3.3.6 White Balance Setting

Adjust the white balance manually for accurate color representation.

Procedure:

1. Navigate to **Setting > Quick Start > Display > White Balance**.
2. Configure the settings as per Table 3-6:
    - **Mode**: Choose from Auto, Tungsten, Fluorescent, Daylight, Shadow, or Manual. Default: Auto.
    - **Red Gain**: Adjusts red channel intensity (valid in Manual Mode). Default: 0.
    - **Blue Gain**: Adjusts blue channel intensity (valid in Manual Mode). Default: 0.
3. Click **Apply** to save the settings.

Figure 3-6 White balance settings page

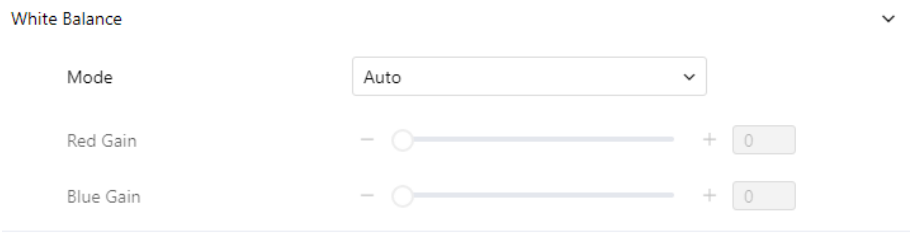


Table 3-6 Parameters of WB setting

Parameter	Description	Configuration Method
Mode	Select WB mode according to different scenes for better image color reproduction. • **Auto**: In automatic white balance (WB) mode, the system automatically performs white balance based on the monitoring environment. • **Tungsten** • **Fluorescent** • **Daylight** • **Shadow** • **Manual**: In manual WB mode, you can manually select a WB mode based on the monitoring environment.	[Setting method] Select a value from the drop-down list. [Default value] **Auto**
Red Gain	It indicates the gain applied to red channels. As the value increases, the color temperature becomes lower. NOTE This parameter is valid when **Manual Mode** is set to **Customized**.	[Setting method] Drag the slider. [Default value] **0**

Parameter	Description	Configuration Method
Blue Gain	It indicates the gain applied to blue channels. As the value increases, the color temperature becomes higher. NOTE This parameter is valid when **Manual Mode** is set to **Customized**.	[Setting method] Drag the slider. [Default value] **0**

3.3.7 Day/Night Mode

Users can switch Day/Night modes based on ambient lighting conditions.

Procedure:

1. Navigate to **Setting > Quick Start > Display > Day/Night**.
2. Configure the settings as per Table 3-7:
   - **Setting**: Options include Auto, Day, Night, and Timer. Default: Auto.
   - **Delay (s)**: Adjust the delay for switching modes. Default: 0.
   - **Illumination**: Choose from IR LED, White LED, Intelligent Dual Light, or None.
   - **Strength**: Adjust IR LED intensity. Default: 50.
   - **DTN Time**: Set the transition time from day to night. Default: 18:00.
   - **NTD Time**: Set the transition time from night to day. Default: 6:00.
   - **Anti-Overexposure**: Enable to prevent overexposure.
3. Click **Apply** to save the settings.

Figure 3-7 Day/Night page (timer)

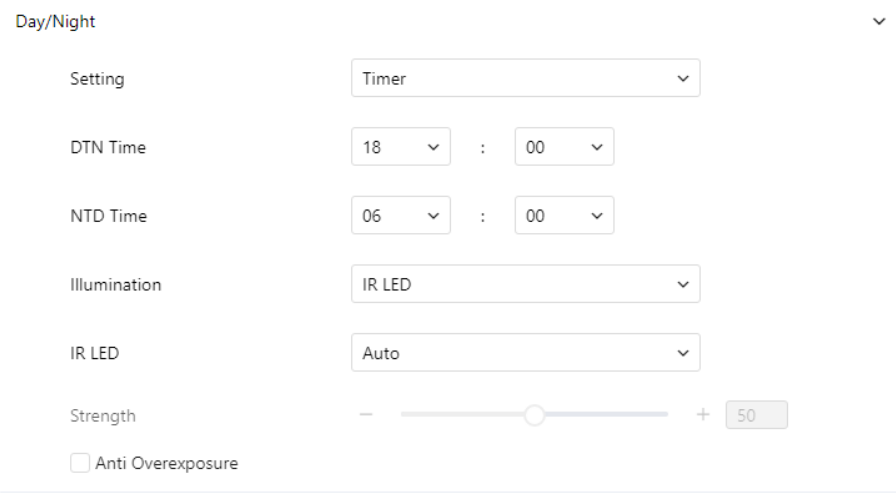
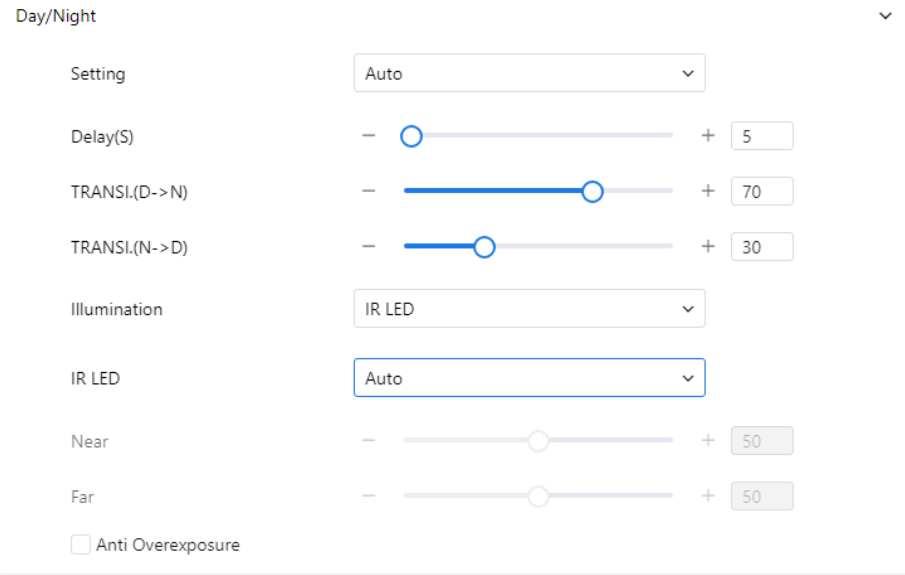


Figure 3-8 Day/Night mode page (auto)



Set the parameters according to Table 3-7.

Table 3-7 Parameters of Day/Night

Parameter	Description	Configuration Method
Setting	It can be set to **Auto**, **Day**, **Night,** or **Timer**. • Auto mode The image color and filter status are automatically switched based on the ambient brightness. The filter keeps infrared light from reaching the sensor during the day; The filter allows all light to reach the sensor at night. • Day mode The image is colored, and the filter is in the day state, preventing infrared light from entering the sensor. • Night mode The image is black and white, and the filter is in the night state, allowing infrared light to enter the sensor. • Timer Switching between day mode and night mode according to the set time.	[Setting method] Select a value from the drop-down list. [Default value] **Auto**
Delay(s)	The delay time of day to night or night to day. NOTE This parameter is valid in auto mode.	[Setting method] Drag the slider. [Default value] **0**
Illumination	For different models, you can choose the light modes, such as IR LED, White LED, Intelligent dual light (there are two lights in the camera, IR LED and white LED), and none. It depends on the performance of the cameras.	[Setting method] Select a value from the drop-down list.

Parameter	Description	Configuration Method
IR LED	• **Auto**: The infrared lamp is enabled or disabled based on the external environment identified by the light-dependent resistor (LDR). • **ON**: The system enters the night mode forcibly. • **OFF**: The infrared lamp is disabled. The filter and image color are switched based on the external environment identified by the LDR. NOTE This parameter is valid in auto mode.	[Setting method] Select a value from the drop-down list. [Default value] **Auto**
Strength	Strength of IR LED, as the value increases, the image becomes brighter.	[Setting method] Drag the slider. [Default value] **50**
DTN Time	Time of day to night.	[Setting method] Select a value from the drop-down list. [Default value] **18:00**
NTD Time	Time of night to day.	[Setting method] Select a value from the drop-down list. [Default value] **6:00**
Anti Overexposure	To keep away over-exposure.	[Setting method] Tick

Fill light settings

The camera fill light has four modes, including intelligent dual light (the current fill light will switch to warm light after an alarm is triggered, and switch back to the original fill light for fill light 30 s after the alert is released.), warm light, infrared lamp, and close (Choose to close the fill light and the color of the image will stay in the previous mode).

Different cameras can be set in different fill light modes, please set them according to the actual scene.

Day mode: It can be used in the scene with sufficient ambient light for 24 hours, where the image will be colorful without enabling the fill light.

Night mode: It can be used in a scene where there is insufficient ambient light for 24 hours, and turn on the fill light (it can be selected according to the four modes of the fill light).

Auto mode: Automatically switch the set fill light mode according to the brightness of the environment.

Timer mode: Set the start and end time of the day, this period is in day mode.

The brightness of the supplemental light can be set to either automatic or manual. In automatic mode, it adjusts based on the current environment. In manual mode, you can adjust the brightness by dragging the slider or setting a specific value.

3.3.8 Noise Reduction

Adjust noise reduction settings to improve image clarity in low-light conditions.

Procedure:

1. Navigate to **Setting > Quick Start > Display > Noise Reduction**.
2. Configure noise reduction settings according to the environment and requirements.
3. Click **Apply** to save the settings.

Figure 3-9 Noise reduction page (auto)

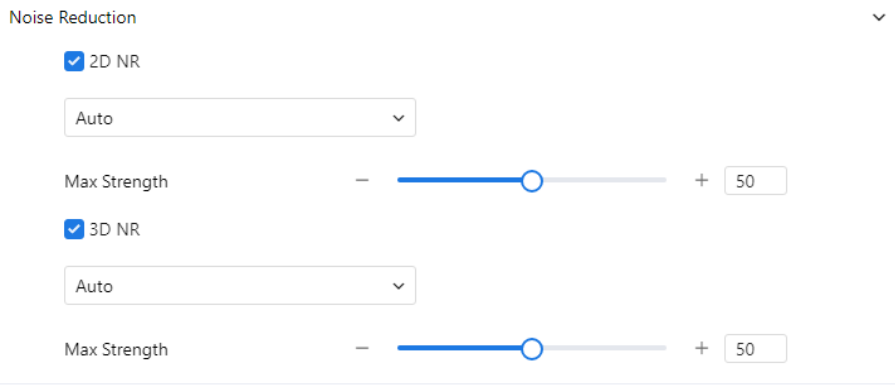
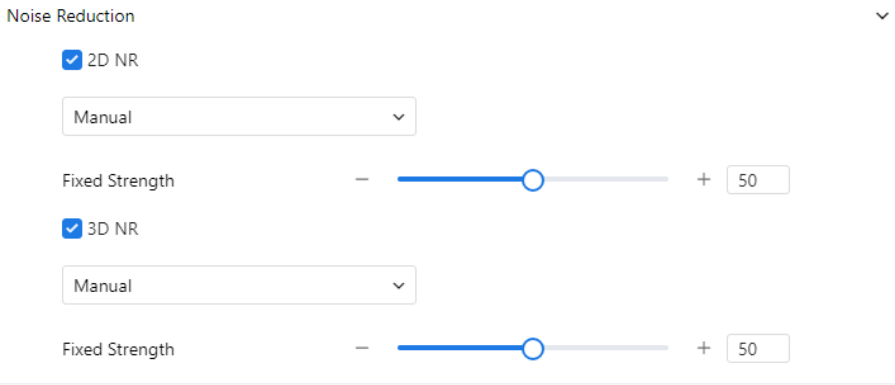


Figure 3-10 Noise reduction page (manual)



Set the parameters according to Table 3-8.

Table 3-8 Parameters of noise reduction

Parameter	Description	Configuration Method
2D NR	Reduce the noise of the image.	[Configuration method] Select from the drop-down list [Default value] **Auto**
3D NR	Reduce the noise of the image.	[Configuration method] Select from the drop-down list [Default value] **Auto**

Parameter	Description	Configuration Method
Max Strength	It is valid in auto noise filter mode. When the parameter value is **0**, the noise filter is disabled. When the parameter value is greater than **0**, the noise filter is enabled, and the system automatically adjusts the noise filter level based on the ambient brightness without exceeding the value of this parameter.	[Setting method] Drag the slider. [Default value] **50**
Fixed Strength	It is valid in a manual noise filter mode.	[Setting method] Drag the slider. [Default value] **50**

3.3.9 Image Enhancement

The **Image Enhancement** feature improves visibility and detail in different lighting conditions, ensuring clearer surveillance images.

- **Wide Dynamic Range (WDR):** Helps balance high contrast between bright and dark areas, improving visibility in challenging lighting conditions. It prevents overexposure in bright areas while enhancing details in darker regions, making it ideal for scenes with strong backlight or nighttime surveillance with headlights and streetlights.
- **High Light Compensation (HLC):** Reduces the glare caused by bright light sources, such as headlights or streetlights, preventing overexposure and ensuring a clearer view of objects in front of the light.
- **Backlight Compensation (BLC):** Adjusts brightness levels to improve visibility in backlit environments. It enhances objects in the foreground while preventing the background from becoming excessively bright.
- **Defog:** Enhances image clarity in foggy, hazy, rainy, or snowy conditions by optimizing contrast and reducing distortion caused by environmental factors.

How to Configure Image Enhancement:

1. Go to **Settings > Quick Start > Display > Image Enhancement.**
2. Adjust the following parameters:

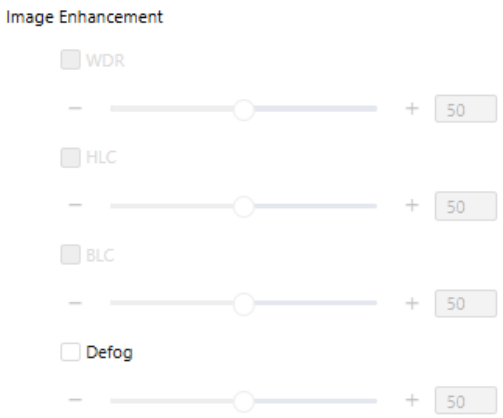


Table 3-9 Parameters of enhanced image

Parameter	Description	Configuration Method
WDR	Balances bright and dark areas in high-contrast environments.	Enable WDR and adjust the slider. [Default value] **50**
HLC	Reduces glare from strong light sources.	Enable HLC and adjust the slider. [Default value] **50**
BLC	Enhances visibility in backlit environments.	Enable BLC and adjust the slider. [Default value] **50**
Anti-shake	Reduces image shake when the camera is slightly moved.	Enable Anti-Shake mode.
DeFog	Enhances clarity in foggy or low-visibility conditions.	Enable Defog and adjust the slider. [Default value] **50**

3. Click **Apply** to save your settings.

3.3.10 Zoom Focus

The **Zoom Focus** feature ensures that the camera maintains a sharp and clear focus, whether switching between day and night modes or zooming in on objects.

How to Configure Zoom Focus:

1. Go to **Settings > Quick Start > Display > Zoom Focus.**
2. Adjust the following parameters:

Figure 3-11 Zoom focus page

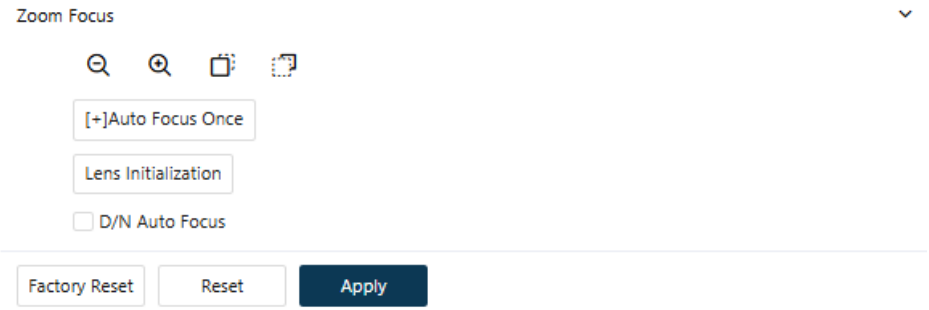


Table 3-10 Parameters of zoom focus

Parameter	Description	Configuration Method
D/N Auto Focus	Automatically adjusts focus when switching between day and night mode.	Enable the Autofocus.
Auto Focus Once	Manually triggers autofocus.	Click the button.
Initial	Resets the camera lens to its original position	Click the button.
Digital Zoom	Enables digital zoom after 37x optical zoom.	Enable Digital Zoom.

Parameter	Description	Configuration Method
Focus Mode	Determines how easily the camera refocuses on slight image changes. Autofocus mode: The system automatically triggers focus based on application scenarios. Manual focus mode: You can trigger focus by using the buttons on the client. Semi-automatic focus mode: The system only automatically triggers focus once when the PTZ moves or zooms in a scene.	Select from the drop-down list [Default value] **Semi-automatic**
Auto Focus Sensitivity	Determines how easily the camera refocuses on slight image changes.	Adjust the slider. [Default value] **50**
Minimum Focus Distance	It indicates the minimum focus distance. A camera does not focus when the distance is smaller than this value. For example, if the minimum focus distance is set to 1.5 m, a camera focuses only on objects more than 1.5 m away, and the changes in objects less than 1.5 m away do not affect the focus. NOTE This parameter applies only to visible light.	Select from the drop-down list [Default value] **4m**

3. Click **Apply** to save the settings.

On-Screen Display (OSD)

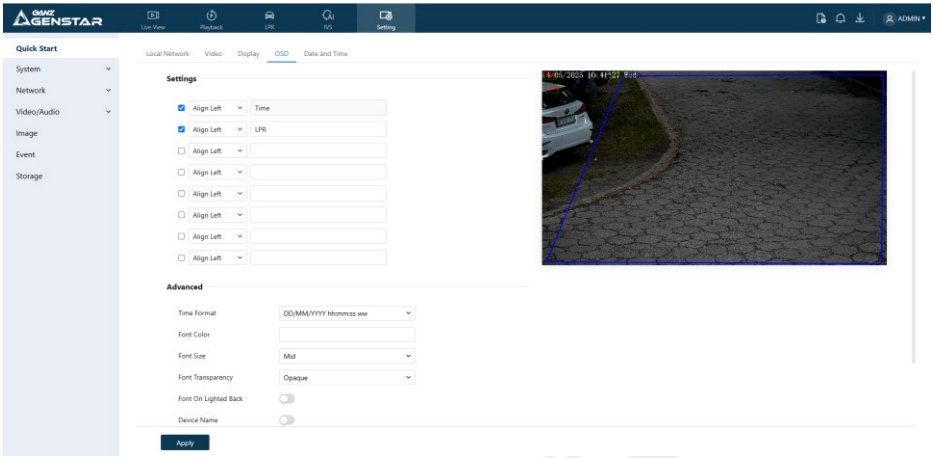
The On-Screen Display (OSD) feature overlays important information directly onto the live video feed, improving the practicality and management of your monitoring system. Commonly displayed details include time, camera location, device status, operational actions, and additional notes. It's important to arrange the information effectively to ensure it’s useful without blocking the view of the footage.

What You Can Display

The OSD allows you to show the device name, channel ID, time, and other customizable content on your videos. You can drag the OSD frames to any location on the screen.

- For resolutions such as D1 and CIF, the OSD customization can display up to 22 characters.
- The OSD supports simplified Chinese, English, numbers, and some special characters.

Figure 3-12 OSD page



Steps to Configure OSD

1. Go to **Settings > Quick Start > OSD**. The OSD configuration page will appear.
2. Set the parameters as outlined in the table below:

Table 3-11 Parameters of OSD

Parameter	Description	Configuration Method
Time	Option to display the time on the screen.	Tick the box to show the time.
Custom OSD	Customize the text that will appear on the video.	1. Tick the custom OSD list. 2. Set the position of OSD showing. Or drag the frame of OSD to adjust the position on live video. 3. Enter the characters. Click **Apply** to save the value.
Time Format	Choose the format in which the time is displayed.	Select from the dropdown menu. [Default value] YYYY-MM-DD hh:mm:ss ww

Parameter	Description	Configuration Method
Font Color	Set the color of the text	Select from the dropdown menu. [Default value] Blank
Font Size	Choose the text size	Select from the dropdown. [Default value] Mid
Font Transparency	Set the transparency of the text.	Choose from the dropdown. [Default value] Opaque
Font on Lighted Back	Enable or disable a lighted background for the text.	Click to enable
Device Name	Option to display the device name.	Click to enable
Status Display of Focus	Show focus status on the video.	Click to enable
Twelve-hour System	Display time in a 12-hour format.	Click to enable
Display Week	Show the day of the week.	Click to enable

3. Click **Advanced** to customize settings for **Time Format**, **Font Color**, **Font Transparency**, and other options.
4. Click **Apply** to save your settings. You should see a confirmation message, "Apply success!" indicating that your settings have been saved.

3.4 Date and Time Settings

Description

The Date and Time settings allow you to adjust the device's time, including time zone, daylight-saving time (DST), and synchronization with an NTP server (Network Time Protocol).

Settings You Can Modify

- **Time Zone**
- **Device Time**

- **NTP Server**

Steps to Configure Date and Time

1. Go to **Settings > Quick Start > Date and Time**. The Date and Time page will appear.
2. Modify the settings as shown in the table below:

Figure 3-13 Date and time page

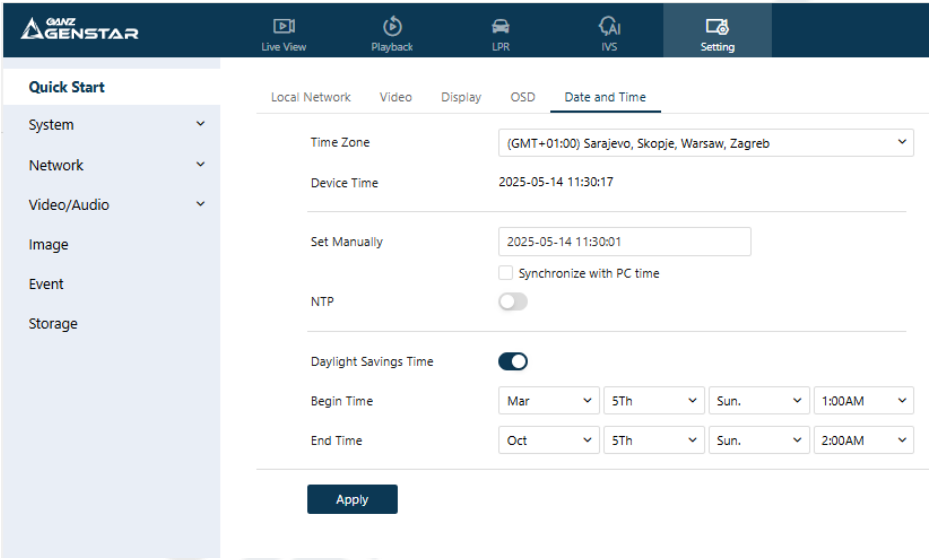


Table 3-12 Parameters of date and time

Parameter	Description	Configuration Method
Time Zone	N/A	Choose from the dropdown list. [Default: GMT]
Device Time	Adjust the device's current time.	Sync with your PC or set it manually.
Set Manually	Option to set the time manually.	Click to enter the time in the format YYYY-MM-DD HH:MM: SS.
NTP Server	Enable synchronization with an NTP server.	Type the server's IP address or domain name.

Parameter	Description	Configuration Method
Server Address	Enter the NTP server's address.	Type the server's IP address or domain name.
Port	Set the port number for the NTP server.	Enter the port number. [Default: 123]
Interval	Set how often the device checks the NTP server for time synchronization	Enter the time interval in minutes. [Default: 60]
Daylight Saving Time	Enable or disable DST adjustments.	[Setting method] Click the button to enable **Daylight Saving Time**.

3. Click **Apply** to save your settings. The confirmation message "Apply success!" will appear, indicating the changes have been saved.

License Plate Recognition (LPR) Settings

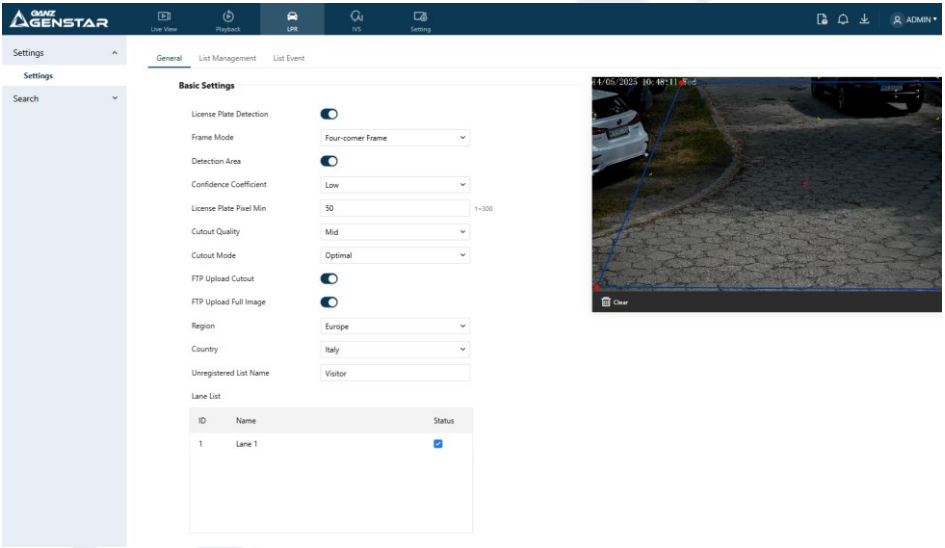
In the LPR settings interface, you can customize various settings like general configurations, capture areas, and scheduled tasks for optimal performance.

3.5 Settings

3.5.1 General Settings

Step 1: Choose **LPR** to open the License Plate Recognition settings page (as shown in Figure 3-14).

Figure 3-14 License plate recognition



Step 2: Configure the basic settings as outlined in Table 3-13 below:

Table 3-13 Operation description

Function	Description	Configuration Method
License Plate Detection	The camera will capture the license plate when a vehicle appears.	Enable
Frame Mode	Choose the mode for capturing plates: Off, Full Frame, Four-Corner Frame, or Mosaic.	Select from the drop-down list.

Function	Description	Configuration Method
Detection Area	Enables a detection frame on live video.	Enable
Confidence coefficient	Adjust the confidence level for snapshots: High, Medium, or Low.	Select from the drop-down list.
License Plate Pixel Min	Adjust the minimum pixel size for license plate detection. A lower setting may capture more plates, but could also result in errors.	Enter a value (1-300).
Cutout Quality	Adjust the quality of the snapshot: Low, Medium, or High.	Select from the drop-down list.
Cutout mode	Choose between Timer or Optimal modes for image capture.	Select from the drop-down list.
FTP upload image matting	Enable FTP to upload captured images to a specified FTP location.	Enable
FTP uploads whole image	Upload the entire image when a plate is captured.	Enable
Region	Specify the region and country of the license plate.	Set according to your location.
Country		
Lane list	Define which lanes will detect license plates.	Enable

Step 3: Set the schedule for when the system will be armed or inactive.

Step 4: Click **Apply** to save your settings. A confirmation message will appear saying "Apply success!"

3.5.2 List Management

List management allows you to add license plate numbers to a list, where each entry can be linked to specific actions (such as blacklisting or whitelisting).

Step 1: Choose **LPR > Settings > List Management** to open the page (as shown in Figure 4-2).

Step 2: To add a license plate, click **Add** and enter the plate number, select whether it should be part of the black or white list, and set the valid time. Then, click **Save**.

Step 3: Optionally, input the Wiegand ID and note. This links external devices, such as access control systems.

Step 4: Use the filter function to narrow down the list.

Step 5: To edit a plate, click the edit icon. To delete a plate or clear all plates, click the respective icons.

Note: The Wiegand ID is based on the external Wiegand device you are using. Be sure to configure the corresponding Wiegand protocol in **Settings > Event > Wiegand**.

Figure 3-15 List management page

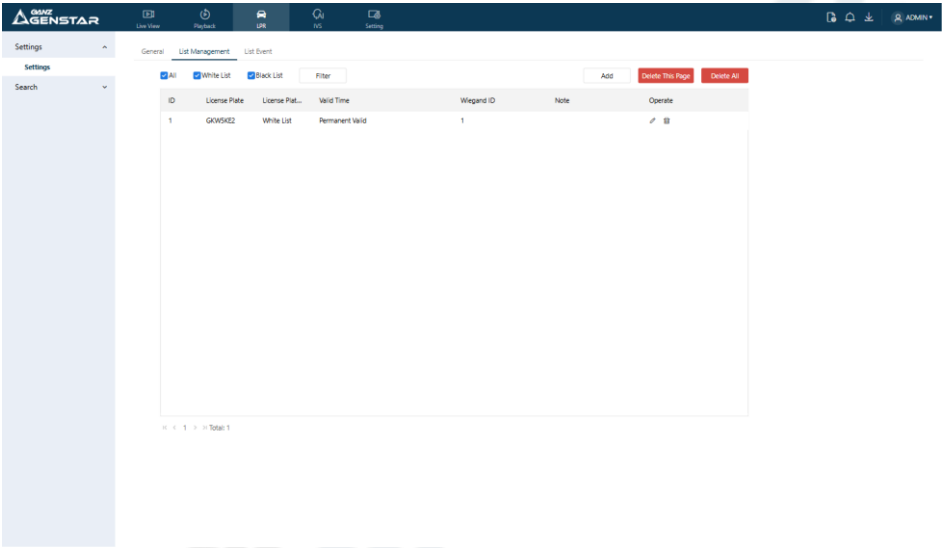


Figure 3-16 Add plate

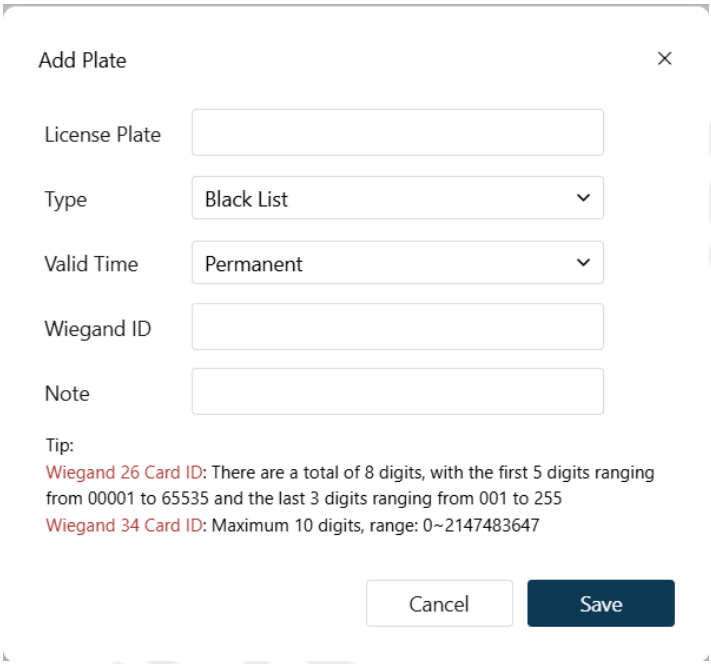
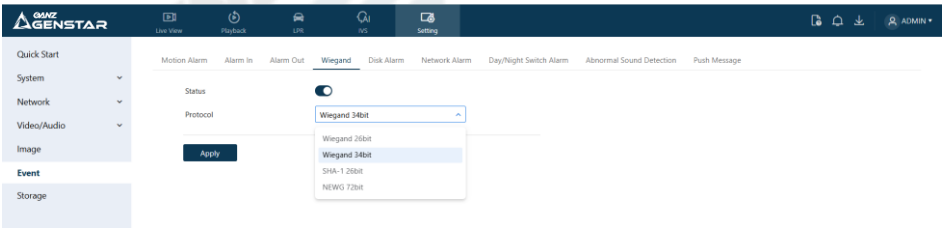


Figure 3-17 Wiegand



Understanding Wiegand ID and Protocol Settings

To ensure proper functionality, the **Wiegand ID** must be set based on the specific **Wiegand receiver** being used. The corresponding **Wiegand protocol** should also be configured in: **Settings > Event > Wiegand** to match the receiver's protocol.

Since different Wiegand protocols are linked to different Wiegand IDs, users must input the correct values according to their actual setup.

Wiegand Protocols & Card Number Encoding

Wiegand 26-bit

- The **ID number** consists of **8 digits**:
  - **First 5 digits** → Card ID (**Range: 00001–65535**)
  - **Last 3 digits** → Site Code (**Range: 001–255**)
- If the Card ID is between **0 and 65535**, and the Site Code is between **0 and 255**, the number is valid.
- If an input exceeds **8 digits**, only the **last 8 digits** will be used.
  - *Example: If you enter* **989842118**, the system will retain **89842118**.
- If an input has **fewer than 8 digits**, the system will **add leading zeros** to make it 8 digits.

Wiegand 34-bit

- The **ID number** consists of **10 digits**.
- If the input exceeds **10 digits**, only the **first 10 digits** will be kept.
- The maximum supported card number is **2,147,483,647**.

SHA-1 26-bit Wiegand

- This interface is used for **license plate recognition**.
- The system **hashes** the license plate number and extracts **24 bits** of data.
- It then **adds a parity bit** before and after the 24-bit data, following the **standard 26-bit protocol**.
- This data is sent to **Wiegand access control** for authentication.
- No **blacklist or whitelist** configuration is required on the device. However, **visitor license plate linkage** must be enabled for Wiegand output.

NEWG 72-bit Wiegand

- This format consists of **72 data bits** without parity bits.

Configuring Wiegand Settings

- The **Wiegand protocol and card number format** must match the **Wiegand signal receiver**.

- The **license plate camera** acts as the **signal transmitter** and should be configured accordingly.
- Make sure to follow the actual **requirements of the receiver** when setting up Wiegand parameters.

3.5.3 List Event Configuration

License plate recognition operates in **three modes**:

1. **Whitelist** – Pre-approved plates added in advance.
2. **Blacklist** – Restricted plates added in advance.
3. **Visitor Mode** – Unregistered plates.

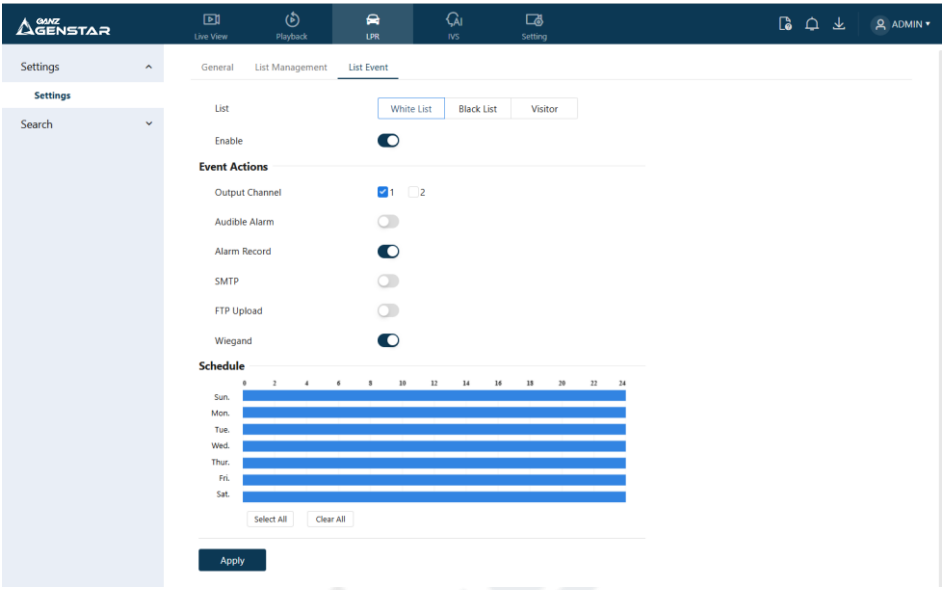
For each type of plate, you can configure specific actions, such as:

- **Alarm Output**
- **Audible Alarm**
- **Alarm Record**
- **SMTP (Email Notification)**
- **FTP Upload**
- **Wiegand (Requires a pre-connected Wiegand device)**

How to Set Up a List Event

1. Go to **LPR > Settings > List Event**.
2. Select the list you want to configure (**Whitelist, Blacklist, or Visitor**).
3. Enable the desired actions, such as **output channel, audible alarm, email alerts (SMTP), FTP upload, and Wiegand integration**.
4. Set the **alarm schedule** as needed.
5. Click **Apply**. If the setup is successful, the message **"Apply success!"** will be displayed.

Figure 3-18 List event setting



3.6 License Plate Recognition (LPR) Search

The **LPR Search** feature allows users to find captured license plates by setting specific search criteria, such as:

- **Plate Type**
- **License Plate Number**
- **Vehicle Type**
- **Vehicle Color**
- **Travel Direction**
- **Start & End Time**

How to Perform an LPR Search

1. Navigate to **LPR > Search > LPR Search**.
2. Enter the **license plate type** and **plate number**.
3. Set the **start and end time** for the search.
4. Click **Search** to view the results (see Figure 3-19).
5. Click on an image to view detailed plate information.
6. Click **Plate Search** to find additional records for that license plate (see Figure 3-20).

7. To add the plate to a list, click **Add to List** and choose either the **Whitelist** or **Blacklist** (see Figure 3-21).

Figure 3-19 LPR search

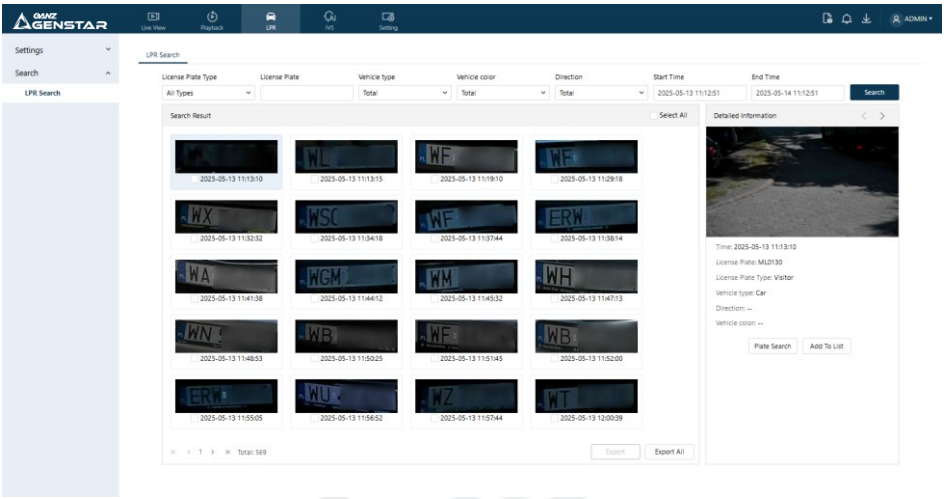


Figure 3-20 License plate search

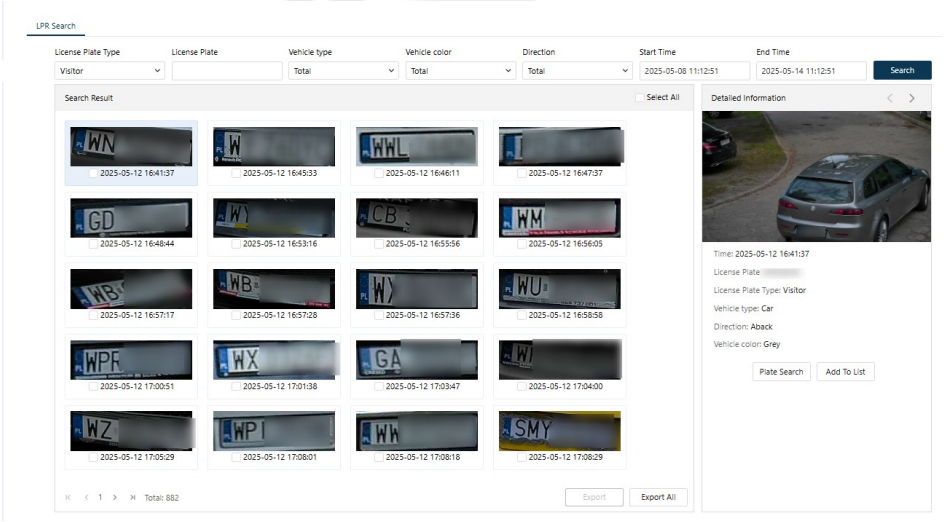
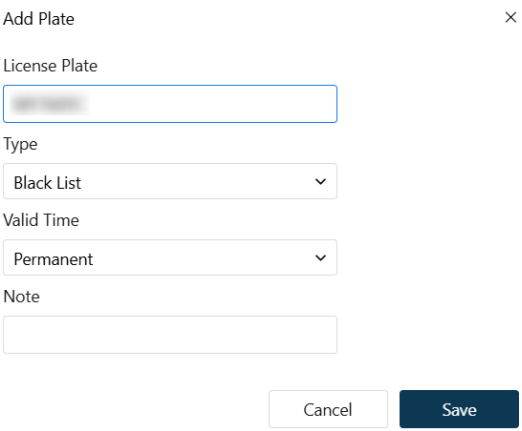


Figure 3-21 Add plate



Troubleshooting

Table 3-14 lists the troubleshooting of the camera.

Table 3-14 Troubleshooting of the camera

Problems	Countermeasure	Photo
Focus	Adjust the focus on the lens.	 
Too much light	Adjust the shutter speed or dim the IR LED at night.	 
Low quality	Adjust the "Minimum Width" for license plate detection.	
Insufficient light	Adjust the shutter speed or provide some extra light.	 

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