

Thermographic Cube Camera

User Manual

V1.0.0

Statement

The contents of this manual will be changed from time to time due to product version upgrades or other reasons, and subject to change without notice. All statements, information and suggestions in this manual do not constitute any express or implied guarantee.

Special Statement

Please strictly abide by the applicable laws and regulations for the use and maintenance of the monitoring interface. Using equipment for illegal purposes or snooping on the privacy of others are all illegal surveillance.

Symbol Conventions

For the symbols that appear in the document, the description is as follows.



Caution, Note: This is a general warning sign to remind you of important considerations during operation.



Explanation, Prompt Symbol: Provides necessary supplementary information and explanations to the main text.

About Default Settings

The factory default super administrator account for the device: admin.

The factory default super administrator password for the device: admin.

The factory default IPv4 address for the device: 192.168.1.123.

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1 Camera Login

After the camera is connected to the network, the user can enter the camera's IP address in the browser address bar to access the camera.



Ensure the camera and computer are on the same local area network (LAN).

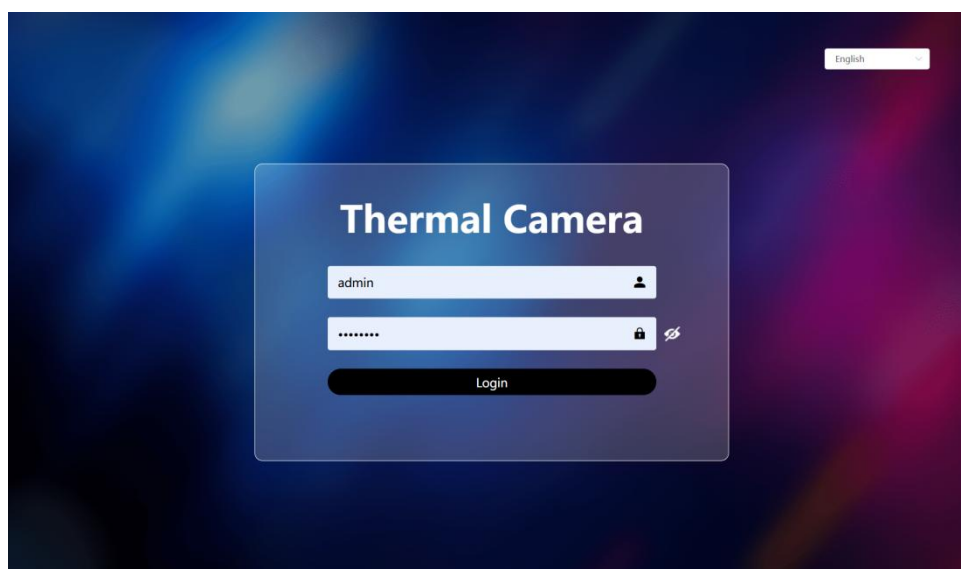


Figure 1.1 Camera Login Interface

The specific login steps are as follows:

1. Enable the browser. (Note: only Google, Edge and Firefox are supported.)
2. Enter the IP address of the camera in the browser address bar: `http://xx.xx.xx.xx`. For example, enter `http://192.168.1.123`. Enter the "Login" interface, as shown above.
3. Enter the correct user name and password (the default user name and password of the camera is admin/admin).
4. The password is forced to be changed during the first login and factory default restoring.
5. Enter the new password, Click the [Login] button to enter the home page of the camera, otherwise a related login error will be prompted.

By default, Simplified Chinese and English languages are provided, and the language can be selected on the login page.

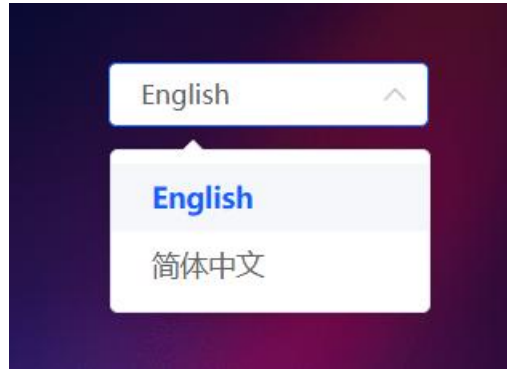


Figure 1.2 Language Option

2 Preview

The preview screen has two channels for simultaneous monitoring, one for visible light and the other for thermal imaging.

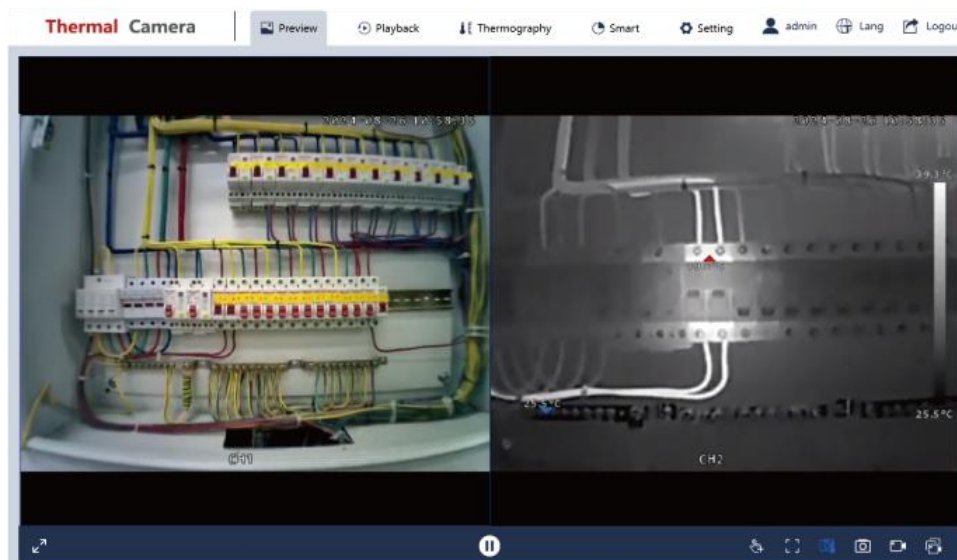


Figure 2.1 Preview Interface

Manual Temperature Measurement:

Click the manual temperature measurement icon in the bottom right corner, then click any location on the thermal imaging channel with the mouse to display the temperature at the selected position. The temperature will disappear after 10 seconds. Click the icon again to exit the manual temperature measurement function.

Full Screen:

Click the full video icon in the lower right corner, the preview image will be displayed on full screen. Quit the full screen mode by pressing ESC.

Temperature Mapping:

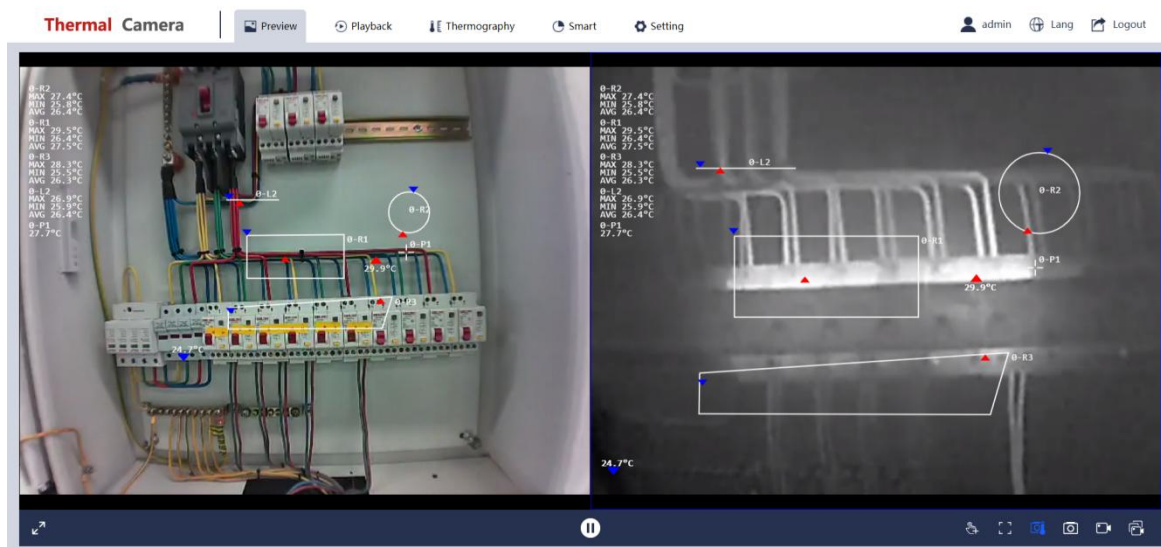


Figure 2.2 Enable Temperature Mapping Effect



After selecting the visible channel or thermal channel with the mouse, click the snap icon in the lower right corner. The current screen of the selected channel is captured, and the pictures can be viewed through the downloaded folder of the browser by default.



After selecting the visible channel or thermal imaging channel with the mouse, click the video icon in the lower right corner . Select the channel to start recording videos, and click the icon again to end the recording, the videos can be viewed through the downloaded folder of the browser by default. Please refer to section 6 *Playback* for usage instructions.



Click the full video icon in the lower right corner  , the video will be recorded in the two channels, click the icon  again to end recording, the videos can be viewed through the downloaded folder of the browser by default. Please refer to section 6 *Playback* for usage instructions.

Play/Pause: 

Click the play/pause button at the bottom of the video, and the two channels of visible light and thermal imaging will be frozen at the same time. Click the play/pause button again and the two channels will return to normal.



The images in the two channels will be automatically displayed by default after the camera is turned on.

3 Temperature Measurement

3.1 Basic Parameters



The temperature measurement function is only available on the thermal imaging channel.

Thermometry: enable the thermometry or not. The point, line and area can be drawn only after the thermometry function is enabled.

Thermographic Frame Rate: setting range is 1-25, 12 by default.

Temperature Unit: Celsius, Fahrenheit, and Kelvin are interchangeable.

Thermographic Mode: high gain, low gain and auto, high gain by default.

Thermographic Overlay: front-end overlay, back-end overlay or no overlay can be set.

■Front-end overlay: Temperature data is added to the stream and can be displayed during playback.

■Back-end overlay: temperature data is not added to the stream. In order to see the temperature data, the intelligent information overlay should be enabled when the video is played back. Please refer to section 6 *Playback* for usage instructions.

■No overlay: the thermographic rules and the related data are not shown.

Basic Parameter

▲

Temperature Switch

☒

▲

Temperature Rate

12 (1~25)

▲

Temperature Unit

Celsius

▲

Temperature Gain

Low (-20~15)

▲

Temperature Display

On live view

Figure 3.1 Temperature Measurement- Interface of Basic Parameter Settings

Environmental Parameters:

Set the environmental variables of the thermal imaging channel, including emissivity/reflected temperature/atmospheric temperature/RH/distance as shown in the below figure.

The screenshot shows a mobile application interface titled "Environmental Param." with a dropdown arrow. Below the title, there are five rows of settings, each with a label and a numeric input field:

- Emissivity: 1
- Reflection Temp: 25
- Atmospheric Temp: 25
- Humidity: 1
- Target Distance: 2

At the bottom of the interface, there are three buttons: "Read", "Set", and "Reset".

Figure 3.2 Temperature-Environmental Parameters Interface



If each temperature measurement data item is not individually configured, it will apply the environmental parameters set here by default. Individual settings can be made in the *Alarm Rule Settings*.

3.2 Cold/Hot Spot Tracing

After the above/below alarm is enabled, the highest/lowest of the whole frame reaches the set alarm threshold, the system will make alarm calls and alarm linkage actions.

Procedures: refer to Table 3-1 for detailed parameters.

- 1) Enable on the hot/cold spot trace interface.
- 2) Enable above/below alarm; Set the alarm temperature threshold.
- 3) Set the filtration time as M;
- 4) Set the temperature allowance as N;
- 5) Set the alarm linkage parameters: the corresponding event is linked when the alarm is triggered, for example, video recording (enable visible/thermal channel), alarm output, image capture, flash alarm, sending Email, etc.
- 6) Click "save" to finish. See the following figure:

Figure 3.3 Temperature-Cold/hot Spot Tracing Interface

Parameter	Descriptions
1 Enable	To make the alarm linkage rules take effect
2 High Temp Alarm	Set above alarm threshold
3 Low Temp Alarm	Set below alarm threshold
4 Filtering Time	Alarm conditions: reach the temperature threshold and meet the time period requirement e.g. the filtering time is set as 3s, then while reaching the temperature threshold reaches and lasts for 3s, the alarm will be triggered.
5 Tolerance of Temperature	A tolerant alarm temperature range needs to be set in case of drifting temperature. e.g. the tolerance of temperature is set as 3°C, the alarm temperature is set as 45°C, then the alarm will be triggered when the detected temperature

	reaches 45°C, and the alarm will stop until the temperature is below 42°C.
6 Video	Video: select this option and set the video channel No., the alarm will be automatically triggered in the selected channel. 01 stands for the visible channel, 02 stands for the thermal channel. Video Delay: type in the delay time. After the alarm is finished, the alarm video would stop after a while.
7 Alarm Output	Alarm Output: the alarm output will be enabled after this option is selected. When the alarm is triggered, the system will link the alarm output and make alarms. Alarm Delay: type in delay time. After the alarm is finished, the alarm video would stop after a while. Before the function is enabled, please make sure that the alarm device is connected. (e.g. alarm light and alarm whistle)
8 Take Pictures	Select this option and set the channel No., the image will automatically captured in the selected channel when the alarm is triggered. 01 stands for visible channel, 02 stands for thermal channel.
9 Flash Alarm	The camera flashing lamp will flash when the alarm is triggered after this option is selected. Mode: select the light flashing type during alarm. There are two options: Flashing and glowing continuously. Flicker Frequency: set the flashing speed. Three options can be chosen: high, medium and low. Residence Time: set the flashing time, 5s by default.
10 E-mail	Select this option, the system will send Email to inform the user when the alarm is triggered. The Email address should be set before this function is enabled, refer to chapter 5.2.3 SMTP for detailed operation.

3.3 Measurement Analysis

3.3.1 Measurement List

The measurement data list can be displayed after *Thermometry* is enabled. See the following picture:

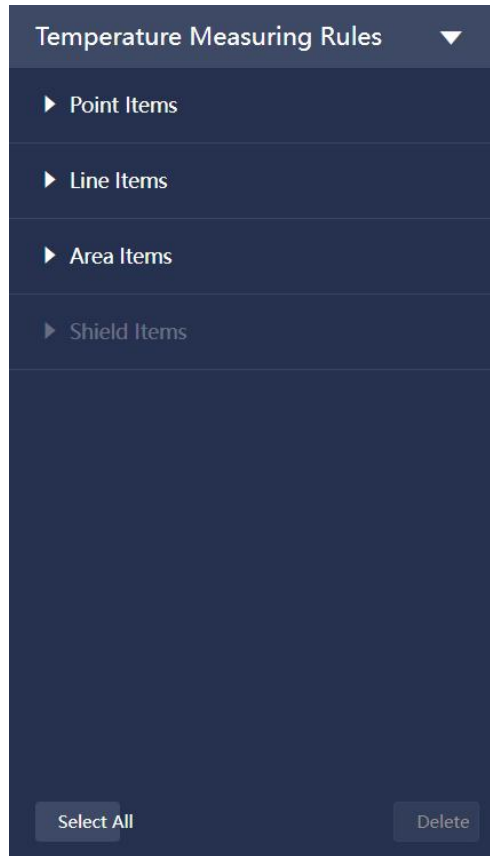


Figure 3.4 Measurement Analysis-Data List Interface

The measurement data is displayed in group: temp points list (P1~P12), temp lines list (L1~L12), temp areas list (R1~R12) and shielded areas list (SR1~SR12), maximum 12 articles of records for each group.

Alarm Rules Settings

Select an article of data among temperature measurement list. See the following figure:

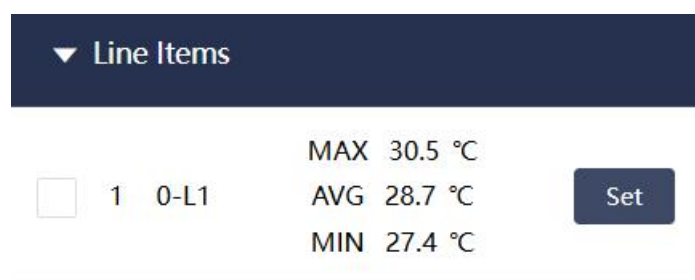


Figure 3.5 Measurement Analysis-Alarm Rules Setting Interface

1. Environmental Parameters Settings:

The environmental parameters and alarm rules can be set separately, see the following figure for environmental parameter settings:

Environmental Param.	☒
Emissivity	1
Reflection Temp	25
Atmospheric Temp	25
Humidity	1
Target Distance	0.5

Figure3.6 Measurement Analysis-Environmental Parameters Settings Interface

The environmental parameters can be set only after environmental parameters is enabled ☒ . If the environmental parameters function is enabled and set here, then the environmental parameters should be followed, or else the parameters in Basic Parameters should be followed. (Refer to the environmental parameters in chapter 3.1 for basic parameters settings.)

2. Refer to chapter 3.2 *Cold Hot Tracking* for settings of alarm rules and linkage way.

Alarm Rules	None ▾	
The Alarm Threshold	40	°C
Filtering Time	5	S
Temperature Tolerance	3	°C
Temp Rise Alarm	☒	
Temp Rise Of Temp	0	°C
Temp Rising Time	10	S
Last Times	3	Times
Alarm linkage		
☐ Video Recording	☐ 01	☐ 02
Record Delay	10	S(10~300)
☐ Alarm Output	☐ 01	
Alarm Delay	10	S(10~300)
☐ Snapshot	☐ 01	☐ 02
☐ Flash Alarm		
Mode	Flashing ▾	
Flicker Frequency	Middle ▾	
Duration	5	S(5~30)
☐ E-mail		
Confirm Reset		

Figure 3.7 Measurement Analysis-Alarm Rules Interface

Confirm to delete:

 Sure Delete

The info of drawn points, lines, circles, polygons and shielded areas are displayed in the measurement lists, which can be ticked and deleted.

Check all:

 Full Selection

The drawn measurement info can be checked all or not checked.

3.3.2 Temperature Measurement Drawing

Point/line/region Drawing:



Click the icon point/line/region to draw the corresponding temperature measurement graph in the video screen (drawing up to 12 points/line/area respectively, 36 in all, the region can be circle, rectangle or polygon), the temperature of the point will be displayed in real time, and the line/region will display 3 temperatures in real time (the highest /lowest temperature/average temperature).

Shielding Area:



Click the shielding area icon to draw the shielded area on the video screen (up to 12 shielded areas), and the temperature data will not be displayed in the shielded area.

Display Temperature Bar:



Click the icon to turn on/off temperature bar, when turned on, the temperature bar including the highest and lowest temperature value will be displayed on the right side of the temperature measurement interface. When turned off, the bar will be hidden.



Real-time temperature display requires enabling the *hot/cold spot tracking* first.

Color Palette:



20 palettes are supported as below.



Figure 3.8 Temperature-Palette

Temperature difference:

Compare the drawn several regions (circle, rectangle or polygon), the comparison rules can be added, which can be regarded as the alarm trigger. Four articles of rules can be output at most.

Regional Temperature Comparison

☒ 0-R1	And	0-R2	Average	0.2	°C	Alarm Output	☒ 01	Clear
☐ Select	And	Select	None	0.2	°C	Alarm Output	☐ 01	Clear
☐ Select	And	Select	None	0.2	°C	Alarm Output	☐ 01	Clear

Confirm
Refresh

Figure 3.9 Temperature measurement-temperature difference settings interface

Isotherm:

Click the isotherm switch to enable the isotherm settings popup. Enable the isotherm, select the type (above threshold/below threshold/ threshold range), and set the corresponding threshold. After clicking confirm, the image will change accordingly. There are three possible outcomes:

- 1) Above threshold: Set the threshold; areas that meet the above-threshold condition will be colored, while other regions will display in white-hot.
- 2) Below threshold: Set the threshold; areas that meet the below-threshold condition will be colored, while other regions will display in white-hot.
- 3) Threshold range: Set both a low and high threshold; areas that meet the threshold range will be colored, while other regions will display in white-hot.

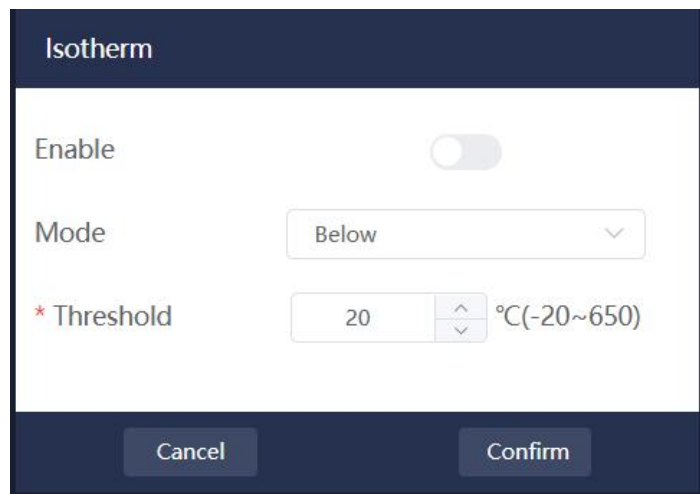


Figure 3.10 Temperature measurement-Isotherm Settings Interface

Note:

1. The isotherm function and temperature scale function are mutually exclusive; only one function can be enabled at a time.
2. The isotherm function does not work in black-hot or white-hot modes.

Temperature scale:

Click the temperature scale icon to enable the temperature scale settings popup. Set the temperature range, and within this range, the image will be highlighted to reveal finer details (the image's dynamic range will change)

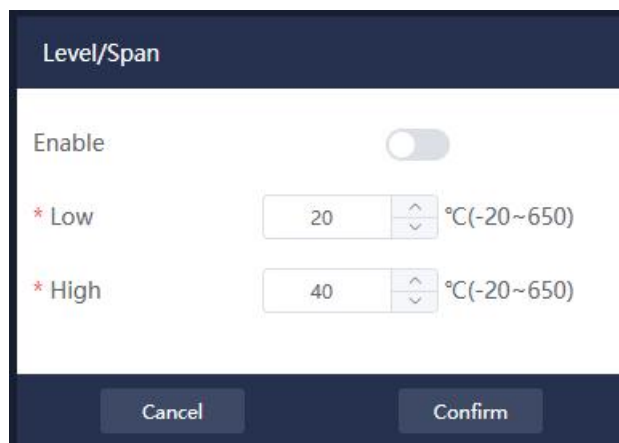


Figure 3.11 Temperature measurement-Temperature Scale Settings Interface

Note:

1. The isotherm function and temperature scale function are mutually exclusive; only one function can be enabled at a time.

Heat Map Export:

Click the heat map export icon  to export the current scene as a JPG format thermal image, which can be used for secondary analysis.

Delete:

In the temperature measurement interface, click the delete icon  in the bottom right corner. Once selected, the icon will be highlighted , and you can delete any drawn points, lines, areas, or masked areas by clicking on them in the image. (The corresponding data in the temperature measurement list will also be deleted.)



1. The delete functions for points, lines, areas, and masked areas are mutually exclusive and cannot be enabled simultaneously.
2. If the current rule is triggering an alarm, deletion is allowed, and new rules can be added or set after deletion.

3.4 Thermography OSD

Enables configurable display position and content for temperature measurement OSD.



Figure 3.12 Thermography- Thermography OSD Settings Interface

1. Max. Temperature: Check to display the highest temperature; displayed by default.
2. Min. Temperature: Check to display the lowest temperature; displayed by default.
3. Avg. Temperature: Check to display the average temperature; displayed by default.
4. Temperature Data: Two options: around the image or around the measurement rule. "Around the image" displays data on the edges of the image, while "around the measurement rule" displays it on the edges of the defined measurement rule; default is "around the image".



Figure 3.13 Thermography- Thermography OSD-Around Image Interface



Figure 3.14 Thermography- Thermography OSD-Around Measurement Rule Interface

3.5 Scheduled Plan

Set the trigger time period for full-frame high/low-temperature alarm events (default is 24/7). You can set up to six time periods per day for each day of the week, precise to the second, and also copy the settings for the same time periods. When an alarm occurs within the configured time periods, corresponding alarm actions will be triggered. The default setting is active for the entire time period.



Figure 3.15 Thermography- Scheduled Plan Settings Interface

3.6 Historical Data

View historical data for configured rules.

Steps:

1. Click “View” to open the historical data window.
2. In the window, set the start time, end time, and type, then click “Search” to display the historical report. Click “Export” to save the file as tempHistory_yyyy_mm_dd_hh_mm_ss.xls in the browser's default download location.
3. After searching, you can set the time period and temperature type to view corresponding data reports in real-time.

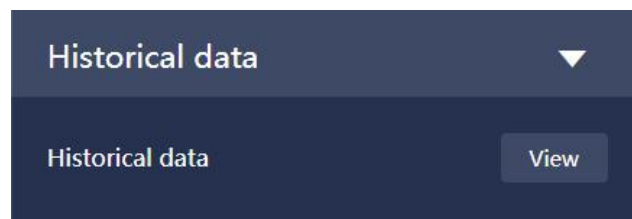


Figure 3.16 Thermography-Historical Data Interface

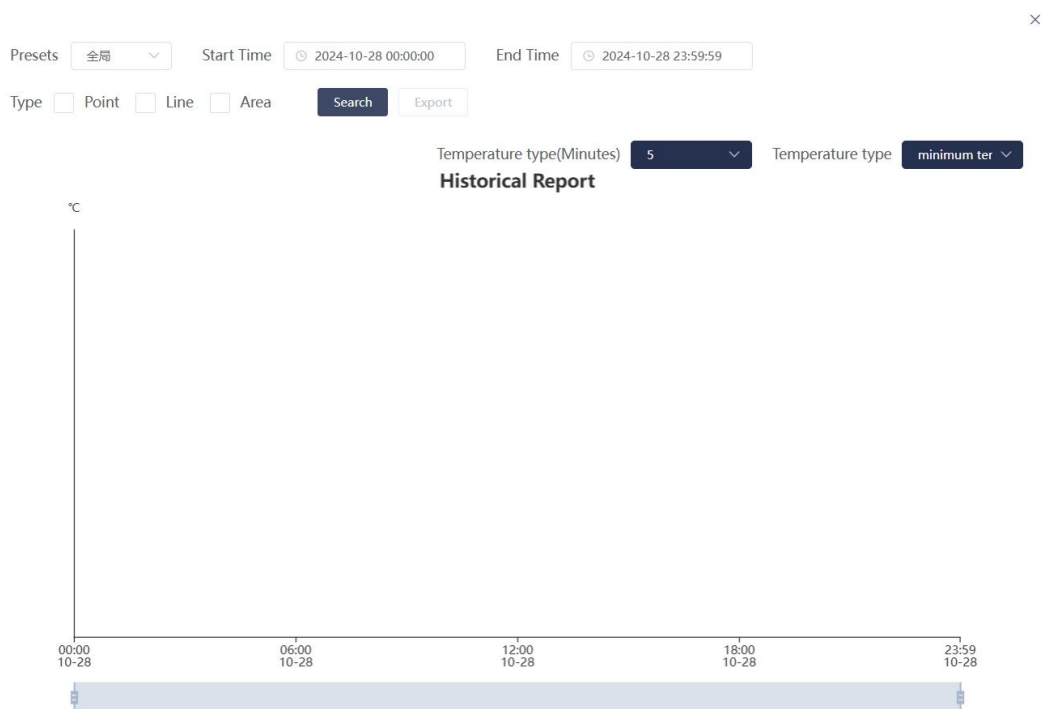


Figure 3.17 Thermography-Historical Data Popup Window Interface

4 Smart Analysis

4.1 General Behavior Analysis

There are three types: tripwire intrusion, area intrusion, and loitering. The loitering function can only be set on the infrared channel.

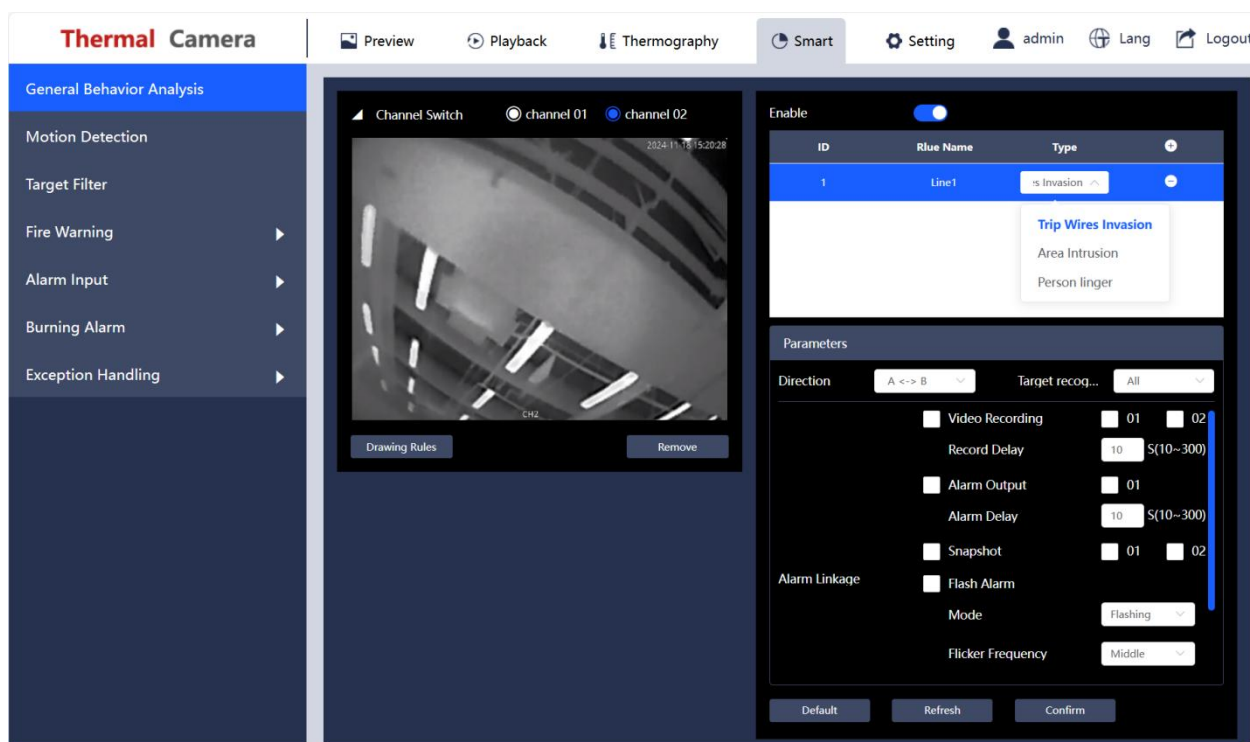


Figure 4.1 Smart Analysis-Tripwire Intrusion Settings Interface

1. Select Channel: In the Smart Analysis - General Behavior Analysis interface, select Channel 1 or Channel 2.
2. Enable: Turn this feature on or off.
3. Click the "+" in the upper right corner to add a new rule (up to 8 rules can be added, with independent parameter settings for each). Rule names are fixed. Rule types can be set as follows: tripwire intrusion and area intrusion is available in visible channel; tripwire intrusion, area intrusion, and loitering is available in thermal channel. Click "-" to delete a configured rule.
4. Click "Draw" to draw the rule on the monitoring screen. Click "Clear" to delete the current line/area. Clicking "Draw" again allows you to redraw the line/area.

4.1.1 Trip Wire Intrusion

When the target moves across the warning line in the set direction, the system will generate an alarm and link setting action.

Note: This function is supported in both visible channel and thermal channel.

Setting Steps:

1. Direction: Set the intrusion direction of the tripwire. Options are A->B, B->A, or A<->B.
2. Target Recognition: When selected, enables filtering for human and vehicle recognition, allowing you to choose the type of alarm target, with options for human, vehicle, or all. This function is supported only on thermal channels.
3. Alarm Linkage Parameter Settings: When an alarm is triggered, corresponding actions are linked. Parameter settings can refer to section 3.2 Cold and Hot Spot Tracking.
4. Schedule: Set the time period for triggering tripwire intrusion events.
5. Click "OK" to complete the setup. See the following figure:

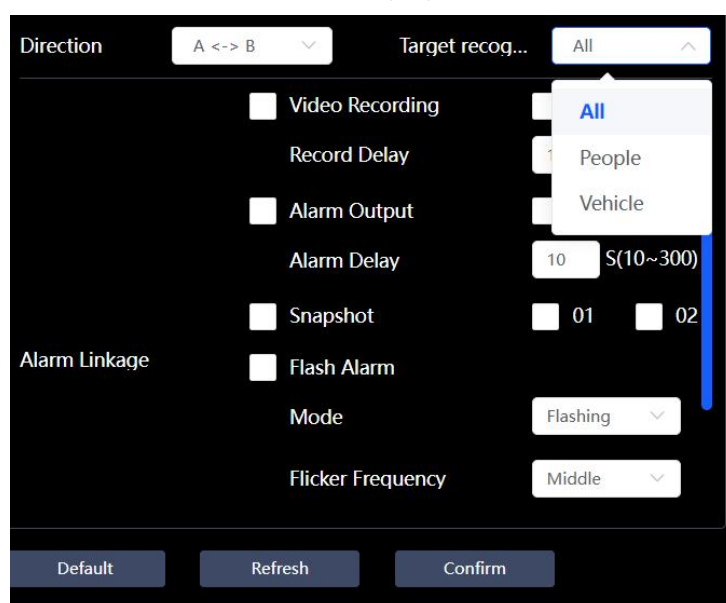


Figure 4.2 Trip Wire Intrusion Setting Interface

4.1.2 Region Intrusion

When a target crosses the designated area (Direction: Enter/Exit/Both), the system triggers an alarm and links to the configured actions.

Note: This feature is supported by both visible and thermal channels.

Steps:

1. Direction: Set the direction of area intrusion. Options are Enter/Exit/Both:
 - Selecting "Enter" triggers an alarm when the target enters the area.
 - Selecting "Exit" triggers an alarm when the target exits the area.
 - Selecting "Both" triggers an alarm when the target either enters or exits the area.
2. Target Recognition: When selected, enables filtering for human and vehicle recognition, allowing you to choose the type of alarm target with options for human, vehicle, or all.

Note: This function is only supported on thermal imaging channels.

3. Alarm Linkage Parameter Settings: When an alarm is triggered, corresponding actions are linked. Parameter settings can refer to section 3.2 Cold and Hot Spot Tracking.
4. Schedule: Set the time period for triggering area intrusion events (default is set to all times).
5. Click “OK” to complete the setup. See the figure below.

Direction: Pass In And t

Target recog...: All

Alarm Linkage

- ☐ Video Recording
- Record Delay: 10 S(10~300)
- ☐ Alarm Output
- Alarm Delay: 10 S(10~300)
- ☐ Snapshot
- ☐ Flash Alarm
- Mode: Flashing
- Flicker Frequency: Middle

Default Refresh Confirm

4.3 Region Intrusion Settings Interface

4.1.3 Loitering

When personnel remain within the designated area, the system triggers an alarm and links to the configured actions.

Note: This function is only supported on thermal channels.

1. Alarm Linkage Parameter Settings: When an alarm is triggered, corresponding actions are linked. Parameter settings can refer to section 3.2 Cold and Hot Spot Tracking.
2. Schedule: Set the time period for triggering area intrusion events (default is set to all times).
3. Click “OK” to complete the setup. See the figure below.

Figure 4.4 Loitering Settings Interface

In the preview interface during an alarm, overlay display shows the corresponding alarm configuration points, lines, or areas flashing red. The box around the object triggering the alarm also turns red.

Environment setup recommendations:

1. The distance requirement between the target and the camera:

The observing distance varies for cameras with different focal length and observing angle, the recommended distance is more than 2~3m.

2. Target size requirement:

Max.: the width should be shorter than 1/2 of the image width, the height should be shorter than the height of the image.

Min.: the width or height should be longer than the 1/16 of the image width or height.

4.2 Motion Detection

The system will make alarm and link the corresponding events when the moving target reaches the preset sensitivity.

Note: This function is available in both visible channel and thermal channel.

Operation procedures:

- 1) Select the channel: Smart-Motion Detection-Channel 1/Channel 2.
- 2) Enable: enable/disable the function.
- 3) Set the sensitivity (height by default, the higher sensitivity will trigger the alarm more easily).
- 4) Area: at most four detecting areas can be set at the same time. The area color, area name, threshold and alarm rules can be set separately for each area.
- 5) Draw Area: click the icon of draw area, then you can draw the detecting areas. Different color indicates different detection area.

- 6) Remove: click remove button, the drawn area will be removed, click Draw Area again to draw other detection areas.
- 7) Threshold: detecting area value of dynamic valid area, the smaller the value is, the more easily the alarm will be triggered.
- 8) Set the alarm linkage parameters, the corresponding events will be linked when the alarm is triggered. Parameter settings can refer to section 3.2 Cold and Hot Spot Tracking.
- 9) Set deploying time: the alarm events will be triggered only within the time range.
- 10) Click "OK" to finish the settings.

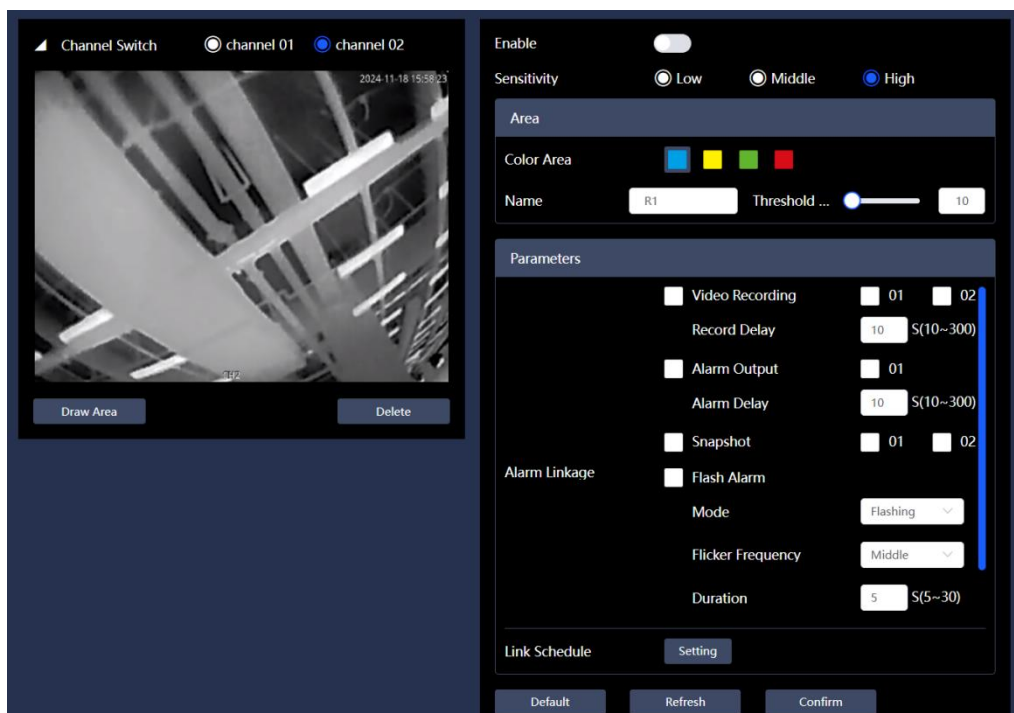


Figure 4.5 Smart-Motion Detection Interface

The setting of the dynamic detection for Channel 2(thermal) is the same with Channel 1, the settings on the two channels are independently, they can be set at the same time.

4.3 Target Filtering

Set the maximum and minimum value of the target filtering size, the alarm will be triggered only when the target size is between the two filtering boxes.



*Note: the maximum size by default is 8191*8191, the minimum size is 500*500, the size value uses the 8192 unified coordinate system within the internal program. For example, the resolution is **1920*1080**, then the actual size of 500*500 is $\lfloor 500 * (1920 / 8192) \rfloor * \lfloor 500 * (1080 / 8192) \rfloor$*

Operation procedures:

- 1) Select channel: Smart-Target Filtering-channel 1/channel 2;

- 2) Select "Draw Maximum Size" or "Draw Minimum Size", and drag the mouse in the video frame to draw a filter box of appropriate size. (An alarm will only be triggered if the target size falls between the two filter boxes.) Click "Refresh" to discard the drawing and restore the previously saved filter size.
- 3) Click "OK" as shown in Figure 4.6.
- 4) Click "Default" to reset the maximum size to 8191x8191 and the minimum size to 500x500. Click "OK" to save.

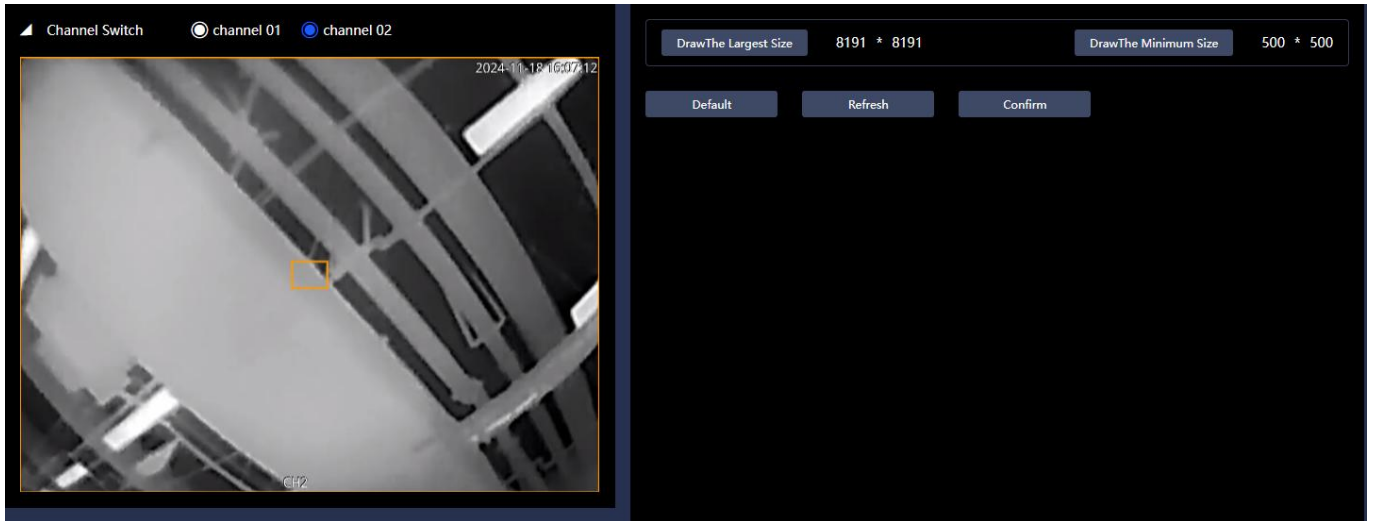


Figure 4.6 Smart-Target Filtering Settings Interface



Note: The setting of the target filtering for Channel 2(thermal) is the same with Channel 1, the settings in the two channels are independent.

4.4 Fire Warning

4.4.1 Fire&Smoke Detection

Set fire&smoke alarm rules. When it is judged as a fire by the system, an alarm and linkage setting action will be generated.

This function is only available in thermal channel.

Setting Steps:

1. Enable: enable or disable fire alarm;
2. Select the fire alarm mode according to actual needs: anti-interference or high response modes. Anti-interference mode by default.
3. Sensitivity: the greater the value, the more easily to detect the fire, 50 by default.
4. Draw Area: Click the "Draw" button to draw a fire detection area on the screen.
5. Shielding Rules: Click the "+" button to add a shielding rule name; up to 4 can be added.
6. Set the alarm linkage parameters and the corresponding actions will be linked when the alarm is triggered. Parameter settings can refer to section 3.2 Cold and Hot Spot Tracking.
7. Set Schedule: the alarm events will be triggered only within the time range.
8. Click "Confirm" to complete the settings.

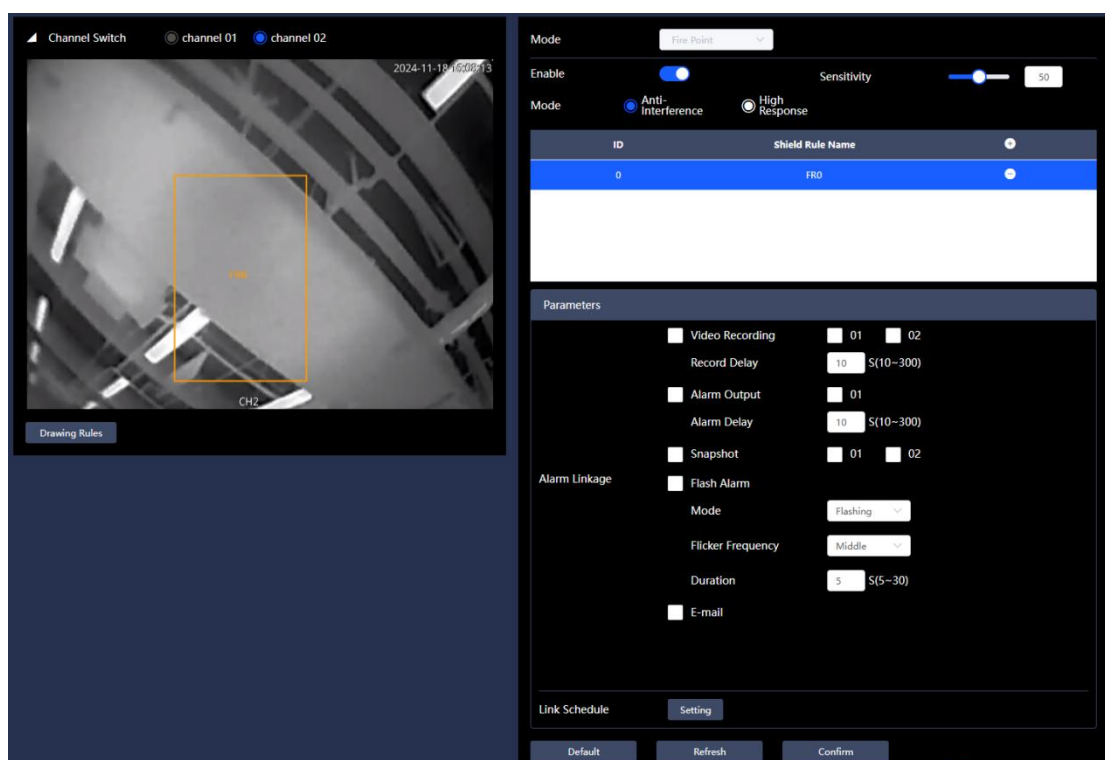


Figure 4.7 Fire Alarm-Fire&Smoke Detection Settings

4.5 Alarm Input

When an external alarm input generates an alarm, the system will generate an alarm and linkage setting action.

Prerequisite: An external alarm device is connected to the camera's alarm input interface. For wiring instructions, refer to the Quick Start Guide.

Setting Steps:

1. Enable: Enable or disable the alarm input;
2. Alarm input: the device supports 1-channel input.
3. Anti-jitter: setting range is 0-100s, and only one alarm event is recorded in the anti-jitter time period.
4. Sensor type: select "normally open" or "normally closed" according to the type of external alarm device sensor.
5. Alarm Linkage: set alarm linkage parameters and the corresponding actions will be linked when the alarm is triggered. Parameter settings can refer to section 3.2 Cold and Hot Spot Tracking.
6. Schedule: the alarm events will be triggered only within the set time range.
7. Click "Confirm" to complete the setting.

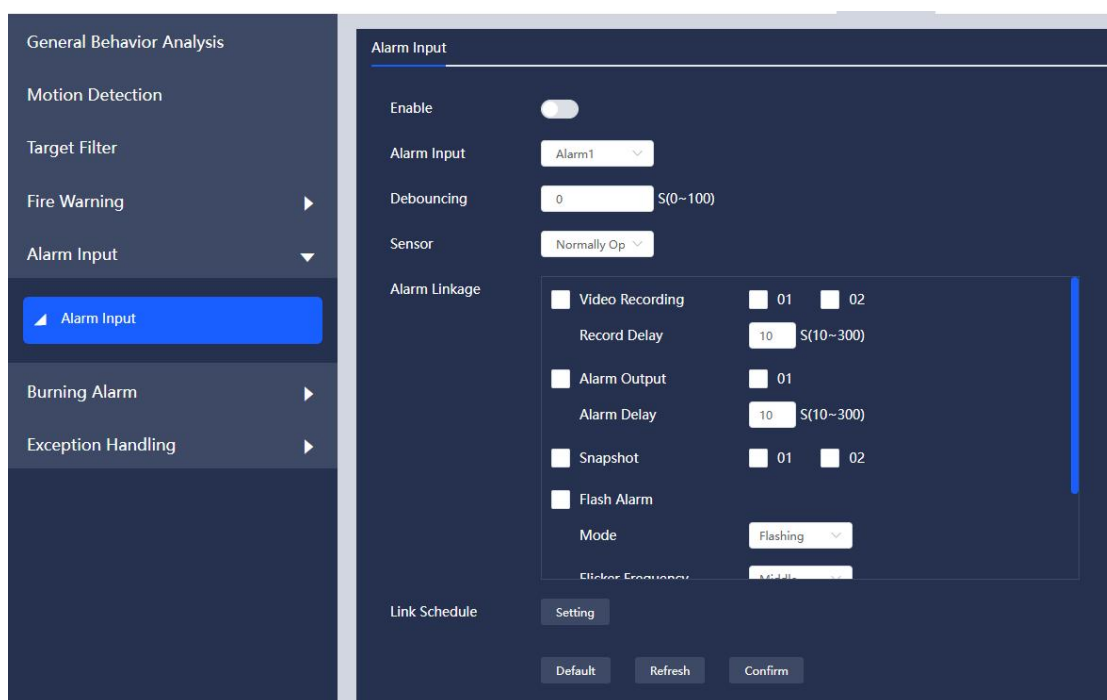


Figure 4.8 Alarm Input Settings

4.6 Burning Alarm

The strong light protection function will be enabled when the sun directly shines on the camera and the energy value reaches the threshold, the infrared lens shutter will be shut automatically and the linkage alarm will be triggered.



Note: the video stream on the thermal channel is frozen, the switch can be disabled manually to cancel the strong light protection, then the video stream will return to normal.

Operation procedures:

- 1) Enable the function.
- 2) Energy value: 0-100, the smaller energy value will trigger the alarm more easily.
- 3) Sensitivity: 0-100, the higher sensitivity will trigger the alarm more easily, 50 by default.
- 4) Alarm linkage: set the alarm linkage parameters, then the corresponding events will be linked when the alarm is triggered. Parameter settings can refer to section 3.2 Cold and Hot Spot Tracking.
- 5) Schedule: the alarm events will be triggered only within the time range.
- 6) Set "OK" to finish.

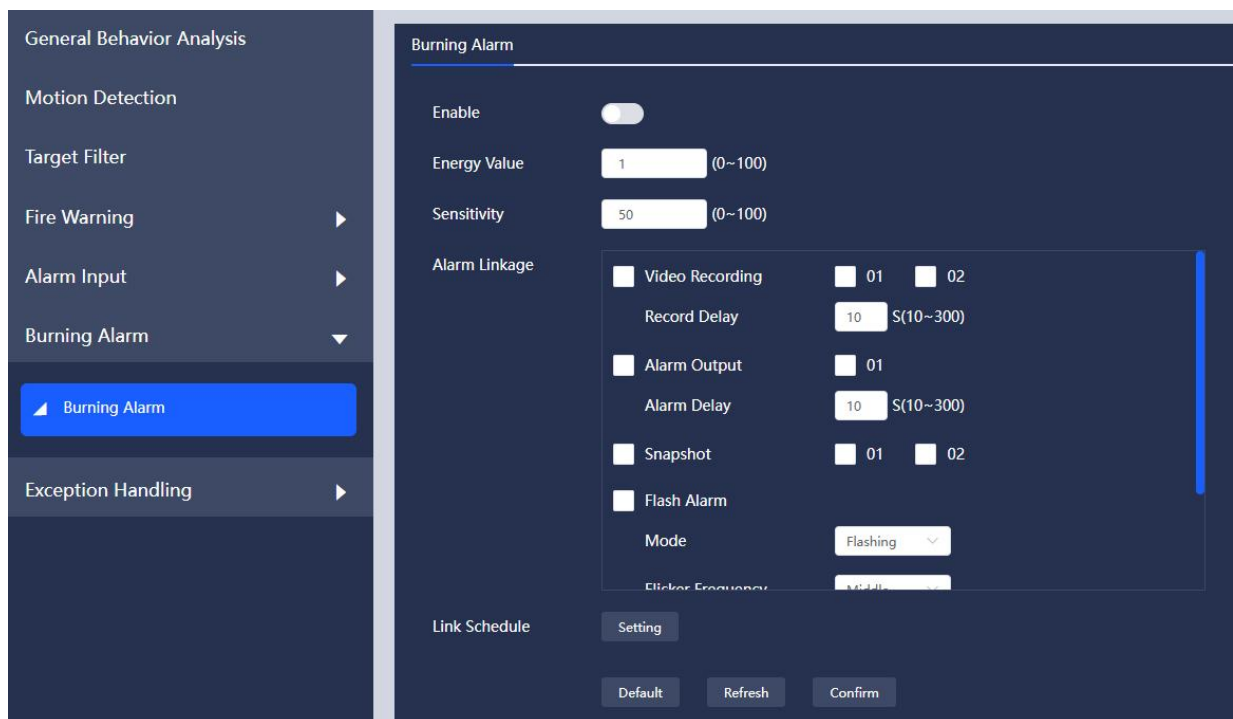


Figure4.9 Burning Alarm Settings Interface

4.7 Exception Handling

4.7.1 SD Card Exception

When an SD card error occurs, the system triggers an alarm output or sends an email to the specified address based on the configured parameters. SD Card Errors include the SD card not being present, SD card error, or insufficient SD card space.

4.7.2 Network Anomaly

After enabling this feature, when a network error occurs, the system triggers video recording or alarm output based on the configured parameters.

4.7.3 Illegal Access

When the number of incorrect login password attempts exceeds 5 or when an IP not on the whitelist attempts access, the system triggers an alarm output or sends an email to the specified address based on the configured parameters.

5 Settings

5.1 Camera Setting

5.1.1 Camera Parameters

Camera parameters can be set for both visible light and thermal imaging.

Channel 1--Visible Light

■Image Parameters Setting

Brightness: adjust the overall brightness of the image by linear adjustment, keep the default value, the larger the value, the brighter the image, and vice versa.

Contrast: The larger the value, the greater the brightness and contrast of the image, and vice versa; when the value is set too large, the dark areas of the image are too dark, and the bright areas are easy to overexpose. If the setting is too small, the image will be blurred.

Saturation: the larger the value, the brighter the image color; the smaller the value, the lighter the image color.

Acuity: adjust the sharpness of the image edge; the larger the value, the more obvious the image edge; when the value is larger, the image is prone to noise.

2D Noise Reduction: Removes spatial (2D) noise from the image; usually, the default value is sufficient. A larger value improves noise reduction but may lead to image blurriness.

3D Noise Reduction: Removes temporal (3D) noise from the image; again, the default value is usually sufficient. A larger value improves noise reduction but can cause motion blur for moving objects, while ensuring that the video output maintains stability.

Style: "Standard, Soft, Gorgeous" can be selected.

- Standard: the overall color of the image is neutral, not dark or light.
- Soft: the overall color of the image is soft and light.
- Gorgeous: the overall color of the image is brighter and darker.

Flip: You can choose from four modes: Normal / Horizontal Flip / Vertical Flip / 180-Degree Flip.

Vertical flip: the image will flip 180° up down.

Horizontal flip: the image will flip 180° from left to right.

180° flip: flip 180° both up down and left to right.

Normal: the image returns to normal state.



Note:For a cohesive fusion effect, both channels are flipped simultaneously.

Defog: When the device operates in environments with fog or haze, the image quality in the visible light channel may degrade. Enabling the defog function can improve image clarity.

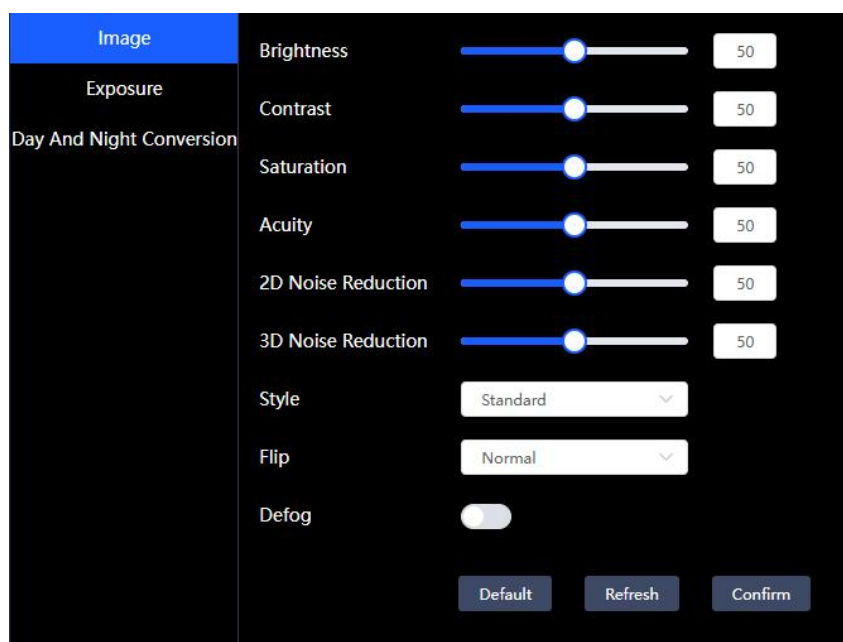


Figure 5.1 Camera Parameters Setting

■ Exposure Parameters Setting

FLK: Normal/50Hz/60Hz can be selected.

50Hz: auto/manual adjust exposure, and make sure there is no cross stripe on the image;

60Hz: auto/manual adjust exposure, and make sure there is no cross stripe on the image;

Normal: manual switch exposure mode to achieve the corresponding effect.

Mode: manual/automatic can be selected; Exposure time and gain can be set in manual mode to achieve image display brightness.

Gain Limit: The gain limit prevents the camera from increasing gain excessively, allowing gain control within a certain range. Value range is 0–100, with a default of 50.

Backlight Mode: None/Strong Inhibition/Backlight Compensation can be selected.

None: the backlight mode is disabled;

Strong Inhibition: weaken the strong light part and brighten the dark area to achieve the light balance of the whole picture.

Backlight Compensation: solve the problem of darkening of foreground objects due to underexposure.

See the following picture:

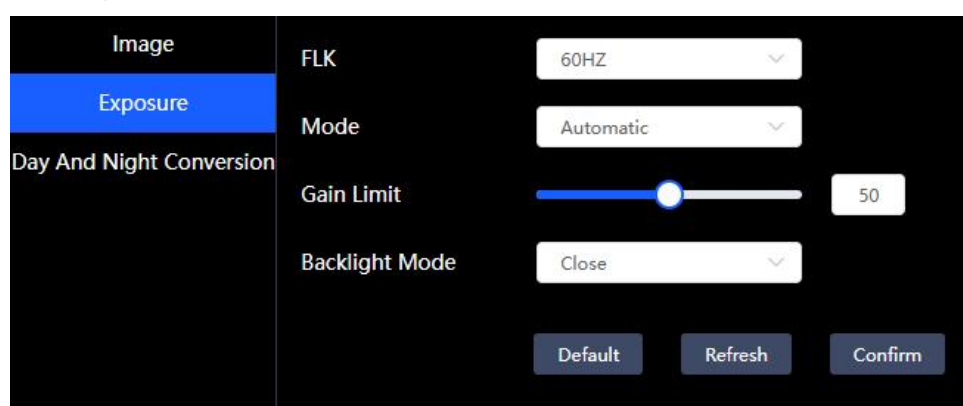


Figure 5.2 Exposure Settings Interface

■ Day and Night Conversion

Day Night Mode: Auto/Day/Night/Time Period can be selected.

Automatic: switch the day/night mode automatically;

Day: the system will be forced to switch to day mode;

Night: the system will be forced to switch to night mode;

Time Period: you can customize the time period during day or night, and switch the corresponding day and night mode.

Delay: sensitivity setting is supported in auto mode with the range from 1 to 7.



To maintain a good user experience, it is recommended to enable the NTP function to ensure that the current camera time aligns with the actual time.

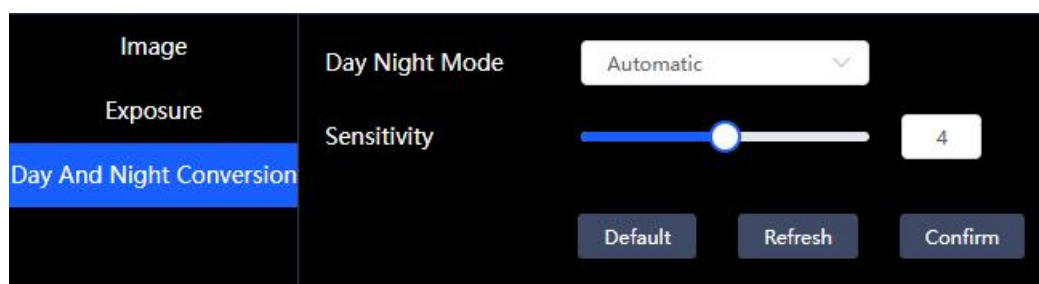


Figure 5.3 Day and Night Conversion Settings Interface

Thermal Imaging Channel**■ Image Adjust**

Brightness and contrast: refer to the descriptions of visible channel for detailed information.

Background correction: the image is optimized according to the current scene background;

Shutter correction: the image is optimized through shutter adjustment;

Image Enhancement

2D NR: remove the spatial noise of the image. The larger the value is, the less the image noise is, but the more blurred the image details are;

3D NR: remove the 3D noise of the image, keep the default value. The larger the value is, the better the noise reduction effect, to ensure stable image output, but the image tail of the moving objects more serious.

DDE: enhance the image detail manually, the higher the level, the better the detail, but the bigger the noise;

Regional video enhancement: select the ROI or important parts of the image, set the video quality enhancement area, the image of the selected area is more bright and clearer. You can choose 25% center point, 50% center point, 75% center point, full screen, bottom, middle, top and custom, corresponding to different positions and ranges in the screen.

Select "Custom", click "Draw", and then hold the left button on the screen and drag to add the video quality enhancement box. After selecting the corresponding region option, a white box marks the selected region in the left preview screen.

Color palettes: there are 20 types: white hot, black hot, rainbow, HC rainbow, Iron, Lava, Sky, MidGrey, RdGy, PuOr, Special, Red, IceFire, GreenRed, Special 2, RedHot, Greenhot, Bluehot, Green, Blue.

Image flip: refer to the settings of visible channel for detailed info.



For a cohesive fusion effect, both channels are flipped simultaneously.

Fusion: overlay the visible channel data with the thermal channel data, retain the gray information of visible image and mark different temperatures with different color palettes to make the video image of thermal channel clearer.

Refer to the following figure for the image fusion parameters.

- 1) Image Fusion Ratio: 0 stands for visual image, 100 stands for thermal image, 50 stands for the default dual-spectrum overlay effect;
- 2) Edge Fusion Ratio: 0 stands for no edge fusion, 100 stands for highlighted edge fusion, 50 stands for the default dual-spectrum edge fusion;
- 3) Horizontal: change the horizontal parameters, align the visual image with the thermal image in horizontal, range is -100~100;
- 4) Vertical: change the vertical parameters, align the visual image with the thermal image in vertical, range is -100~100.

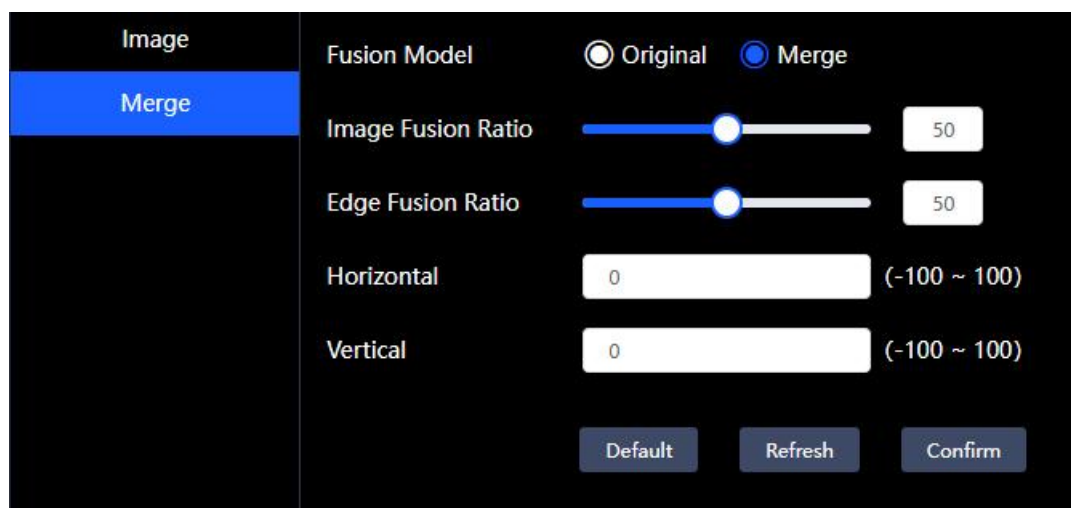


Figure 5.4 Merge Settings Interface of Thermal Channel



When PIP mode is enabled, fusion is not allowed.

5.1.2 Video

5.1.2.1 Video Stream

Visible Light

Main Stream

Main Stream: Has relatively higher resolution, bitrate, and image quality, suitable for HD preview and recording.



The preview screen defaults to dual-channel sub-stream. Double-clicking any channel switches it from sub-stream to main stream (single channel), and double-clicking again restores it to dual-channel sub-stream.

■Encoding Mode:

H.264: main Profile encoding.

H.265: High Efficiency Video Coding. Higher-quality network videos can be transmitted under limited bandwidth, and videos of the same quality can be played with only half of the original bandwidth.

■Resolution: there are four types for video resolution: 1920*1080(1080P) /1280*720 (720P) /704*576(D1) /352*288(CIF).

■Video Frame Rate: the number of frames a video contains per second; the higher the frame rate, the more realistic and smooth the image.



Note: PAL system supports up to 25 frames, NTSC system supports up to 30 frames.

■Stream Control: CBR is a fixed stream, and VBR is a variable stream. The image quality can only be set in the variable stream mode, not in the fixed stream mode.

■Picture Quality: the picture quality can be set only in VBR mode, and six levels of 1-6 can be set, the higher the level, the better the picture effect, the larger the code stream, but it will not exceed the stream limit.

■Stream Limit: in variable stream mode, this value is the upper limit of code stream; while in fixed stream mode, this is a fixed value.

■Frame Spacing: the number of P frames between two I frames ranges from the size of the set frame rate to the maximum value of 150. It is recommended to set it to 2 times the frame rate.

Sub Stream

■Encoding Mode:

H.264: Main Profile encoding mode.

H.265: High Efficiency Video Coding. Higher-quality network videos can be transmitted under limited bandwidth, and videos of the same quality can be played with only half of the original bandwidth.

■Resolution: The video resolution depends on the specifications supported by the actual product.

■Video Frame Rate: the number of frames a video contains per second; the higher the frame rate, the more realistic and smooth the image.

Note: PAL system supports up to 25 frames, NTSC system supports up to 30 frames.

■Stream Control: CBR is a fixed stream, and VBR is a variable stream. The image quality can only be set in the variable stream mode, not in the fixed stream mode.

■Picture Quality: the picture quality can be set only in VBR mode, and six levels of 1-6 can be set , the higher the level, the better the picture effect, the larger the code stream, but it will not exceed the stream limit.

■Stream Limit: in variable stream mode, this value is the upper limit of code stream. While in fixed stream mode, this value is a fixed value.

■Frame Spacing: the number of P frames between two I frames, ranges from the size of the set frame rate to the maximum value of 150. It is recommended to set it to 2 times the frame rate.

■Watermark Settings: You can overlay specified watermark characters in the video stream.



Note: the parameter settings of main stream and auxiliary stream for thermal imaging channel is basically the same with visible channel, except the resolution supported and the reference stream code value.

Video Stream

Image Stream

Video Overlay

Privacy Shelter

Area-Of-Interest

Picture In Picture

▲ Channel Switch

☒ channel 01
 ☐ channel 02

Main Stream

Auxiliary Stream

Encoding Scheme

H264

Resolution

1600*1200(UXGA)

Video Frame Rate

25

Stream Control

VBR

Image Quality

4

Reference Stream

2240 ~ 8960Kbps

Stream Limit

Customizations

2560

(Kb/s)

Frame Spacing

50

(25~150)

Watermark Set

☐

Encoding Scheme

H264

Resolution

640*480(VGA)

Video Frame Rate

25

Stream Control

VBR

Image Quality

4

Reference Stream

480 ~ 1920Kbps

Stream Limit

1024

Frame Spacing

50

(25~150)

Watermark Set

☐

Default

Refresh

Confirm

Figure 5.5 Video Stream Settings of Visible Channel

Video Stream

Image Stream

Video Overlay

Privacy Shelter

Area-Of-Interest

Picture In Picture

▲ Channel Switch

☐ channel 01
 ☒ channel 02

Main Stream

Auxiliary Stream

Encoding Scheme

H264

Resolution

1024*768(XVGA)

Video Frame Rate

25

Stream Control

VBR

Image Quality

4

Reference Stream

1280 ~ 5120Kbps

Stream Limit

2048

Frame Spacing

50

(25~150)

Watermark Set

☐

Encoding Scheme

H264

Resolution

640*480(VGA)

Video Frame Rate

25

Stream Control

VBR

Image Quality

4

Reference Stream

480 ~ 1920Kbps

Stream Limit

1024

Frame Spacing

50

(25~150)

Watermark Set

☐

Default

Refresh

Confirm

Figure 5.6 Video Stream Settings of Thermal Channel

5.1.2.2 Image Stream

Visible Channel

■ **Image Size:** The size of the captured image is consistent with the set resolution.

■ **Image Quality:** You can choose the 6 levels of image quality as best (6), better (5), good (4), poor (3), worse (2), and worst (1).

■ **Image Format:** You can choose the image format as JPEG or thermal imaging heat map. The thermal imaging heat map includes a JPEG image with the State Grid format information header and is supported only on the thermal imaging channel.

■ **Capture Interval:** the rate of capture. 1 second/frame, 2 seconds/frame, 3 seconds/frame, 4 seconds/frame, 5 seconds/frame, 6 seconds/frame, 7 seconds/frame, Custom.



Note: The image stream setting of thermal imaging channel(channel 02) is similar to that of the visible channel.

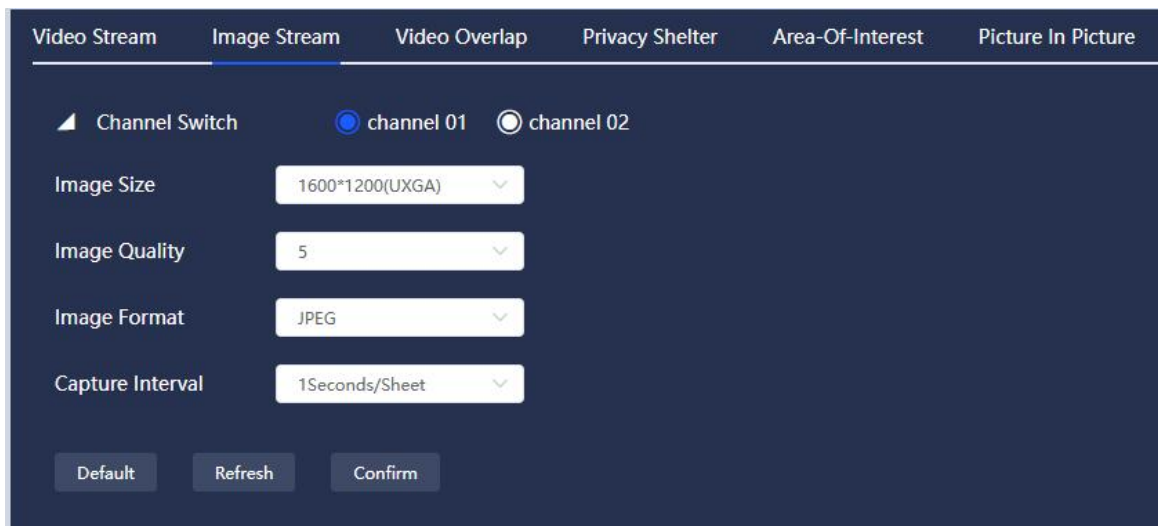


Figure 5.7 Image Stream Settings of Visible Channel

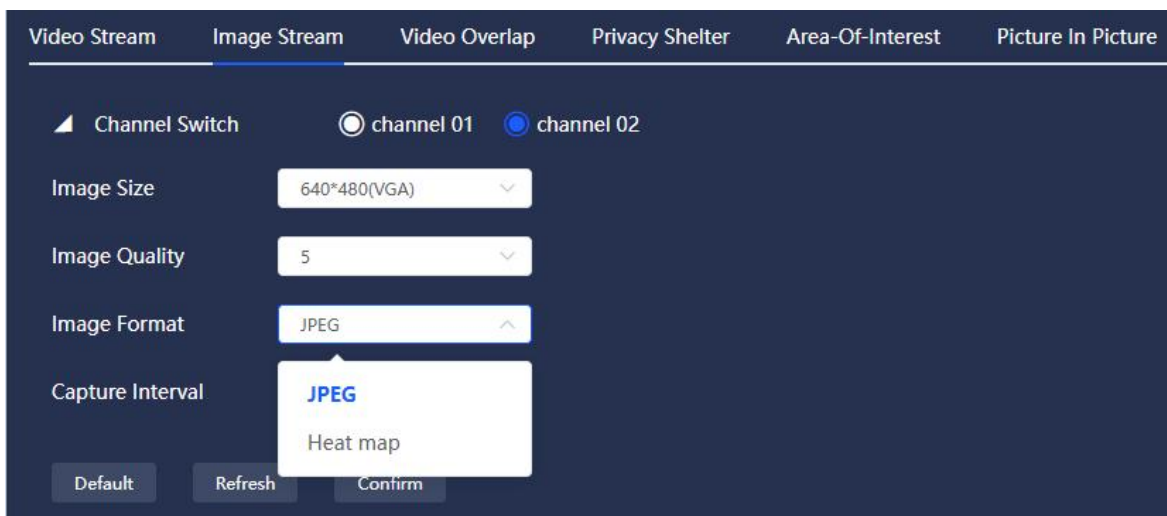


Figure 5.8 Image Stream Settings of Thermal Channel

5.1.2.3 Video Overlay

Visible Channel

■ **Channel Title:** you can set the channel title when you need to display the channel title in the video screen.

Steps:

1. Enable: enable or disable the channel title;
2. Enter the channel title to be set in the channel title input box. Drag the channel title box with the mouse to adjust the position of the channel title in the video screen;
3. Set the font color.
4. Font Size: Three options - Small, Medium, Large.
5. Alignment: The alignment of the title within the yellow box on the left image; there are two options: left alignment and right alignment.
6. Click "Confirm" to complete the setting.

The channel title setting of the thermal imaging channel is similar to that of the visible light channel.

Figure 5.9 Video Overlay—Channel Title Settings

■ **Custom Title:** you can set the custom title when you need to display multiple lines of custom titles in the video screen.

Steps:

1. Enable: enable or disable the custom title;
2. Enter the content of multiple lines of custom title in the custom title input box (up to 4 lines of input are supported); Drag the custom title area frame with the mouse to adjust the position of the custom title in the video screen;
3. Set the font color.
4. Font Size: Three options - Small, Medium, Large.

5. Alignment: The alignment of the title within the yellow box on the left image; there are two options: left alignment and right alignment.
6. Click "Confirm" to complete the setting.

The custom title setting of the thermal imaging channel is similar to that of the visible light channel.

Figure 5.10 Video Overlay—Custom Title Settings

■ **Time Title:** you can set the time title when you need to display time title in the video screen.

Steps:

1. Enable: enable or disable the time title;
2. Display Weekday: Enable/Disable this feature. Drag the time title area box with the mouse to adjust the position of the time title in the video screen;
3. Set the font color.
4. Font Size: Three options - Small, Medium, Large.
5. Alignment: The alignment of the title within the yellow box on the left image; there are two options: left alignment and right alignment.
6. Click *Confirm* to complete the settings.

The time title setting of the thermal imaging channel is similar to that of the visible light channel.

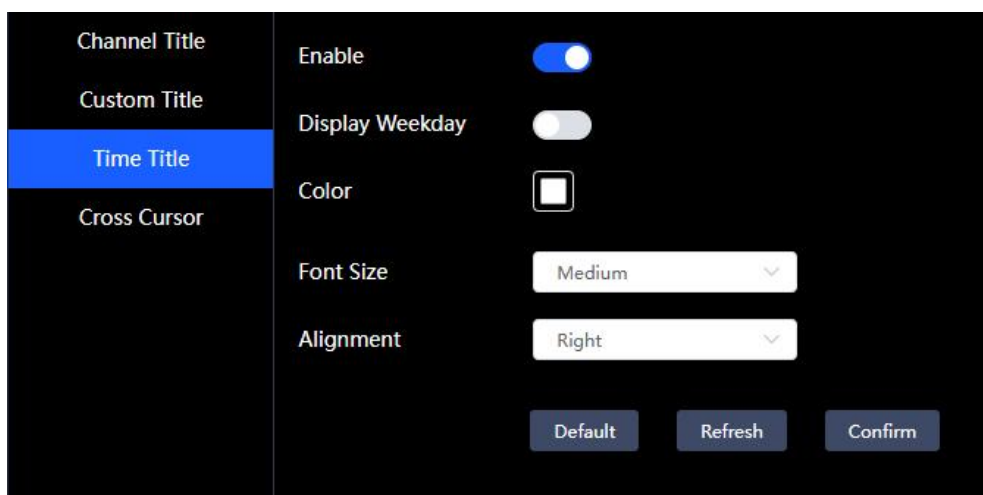


Figure 5.11 Video Overlay—Time Title Settings

Crosshair: Displays a crosshair at the center point of the video frame.

Operation Steps:

1. Enable: Turn this feature on/off.
2. Click “Confirm” to complete the settings.

5.1.2.4 Privacy Mask

Draw masking areas on the screen; these areas will display according to the configured privacy masking numbers.

Operation Steps:

1. Enable: Turn this feature on/off.
2. Click “Draw”, then hold the left mouse button to draw a privacy area on the video frame (only one privacy area can be drawn at a time, with a maximum of 4 privacy areas supported). Click “Default,” then click “Confirm” to delete the corresponding drawn privacy mask. Clicking “Draw” allows you to redraw the privacy area.
3. Click “Confirm” to complete the settings.

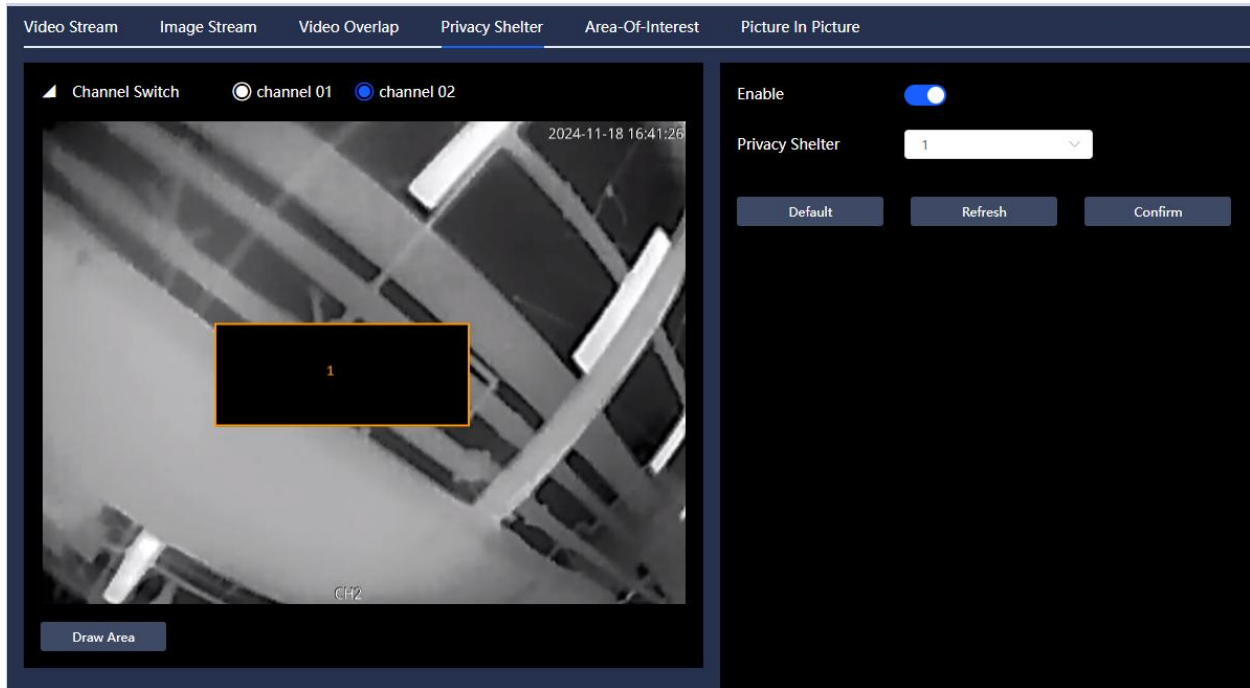


Figure 5.12 Privacy Mask Settings Interface

5.1.2.5 Region of Interest

Set the region of interest in the screen, and the area of interest will be displayed according to the set image quality.

Steps:

1. Enable: enable or disable the area of interest;
2. Click "Draw Area" to draw the area of interest on the video screen (up to 8 areas can be set), and set the image quality of the corresponding area of interest; Click "Delete" to delete the selected area frame; Click "Draw Area" to draw the area of interest again.
3. Click "Confirm" to complete the setting.

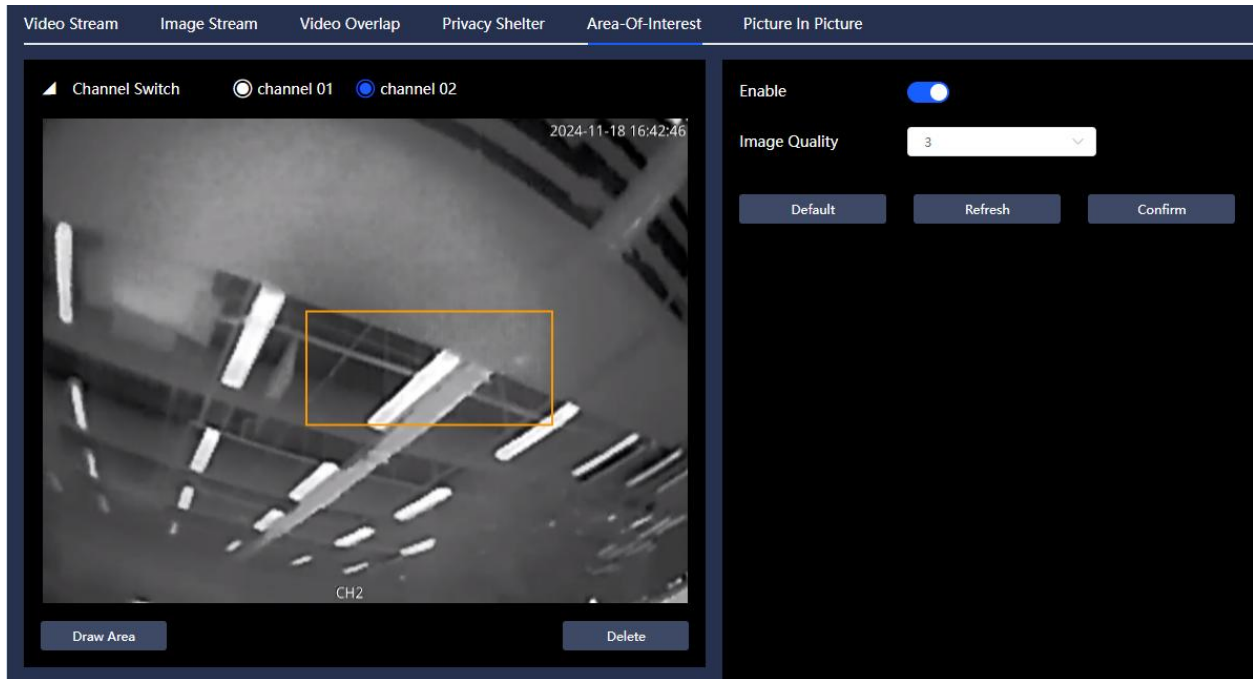


Figure 5.13 Region of Interest Settings Interface

5.1.2.6 PIP

Set the PIP area in the visual image, which will overlay the image from the infrared channel.

Operation Steps:

1. Enable: Turn this feature on/off.
2. Click “Draw” then hold the left mouse button to draw the area of interest on the video frame (a maximum of 1 area can be set). Clicking “Draw” allows you to redraw the area.
3. Click “Confirm” to complete the settings.

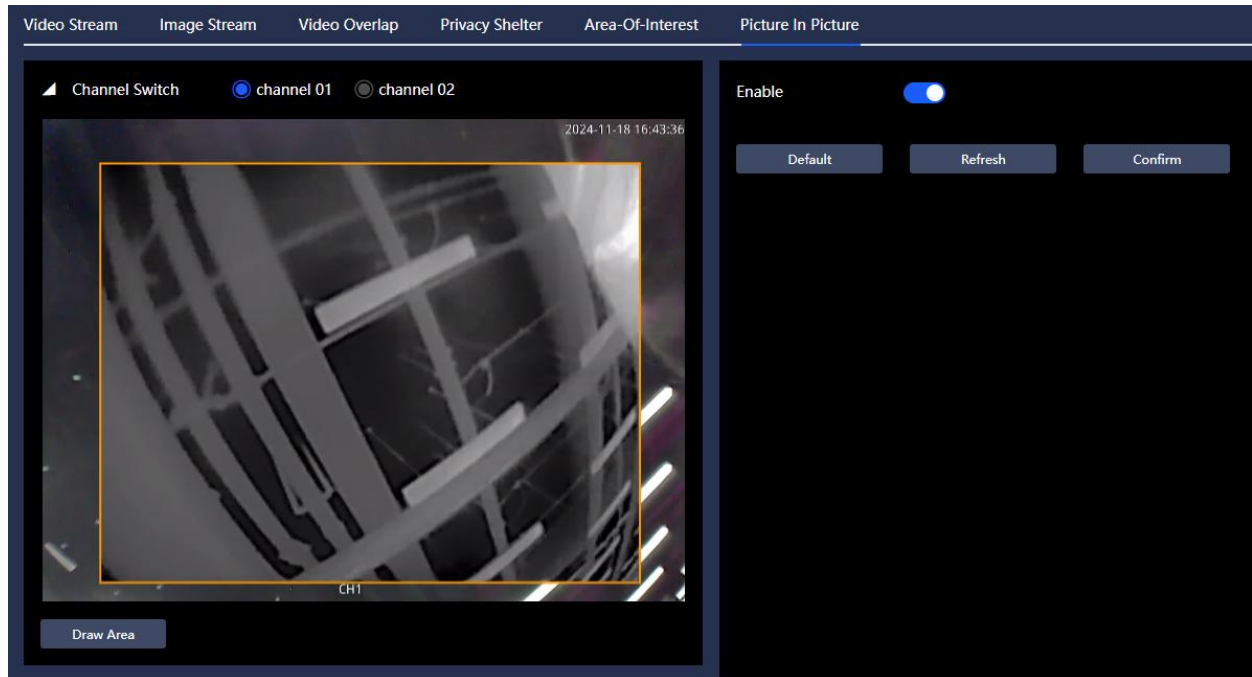


Figure 5.14 PIP Settings Interface

5.2 Network Settings

5.2.1 TCP/IP

Set the IP address and DNS server of the camera to ensure that it can communicate with other devices in the network. See below:

TCP/IP

Adapter Name

eth0

DHCP

Physical Address

98:6c:5c:87:87:87

* IP Address

192.168.1.123

* Subnet Mask

255.255.255.0

* Default Gateway

192.168.1.1

* Preferred DNS

114.114.114.114

* Alternative DNS

8.8.8.8

Default

Refresh

Confirm

Figure 5.15 Network Settings—TCP/IP Settings

Other parameters:

■DHCP:

1. when not enabled, it is in static mode. You can manually set the IP address, subnet mask, and gateway.
2. When enabled, the device will automatically obtain an IP address (there is a router with DHCP enabled in the network connected to the device); at this time, the "IP address", "subnet mask" and "default gateway" cannot be set.

■MAC address: display the MAC address of the host, which cannot be changed.

■IP address/subnet mask/default gateway: input the correct "IP address", "subnet mask" and "default gateway" according to the actual situation; the IP address and default gateway must be in the same network segment and matched with the subnet code.

■Preferred DNS server: DNS server IP address.

■Alternative DNS server: IP address of alternative DNS servers.

5.2.2 DDNS

By setting the DDNS parameters, the system can dynamically update the relationship between the domain name and IP address on the DNS server when the device's IP address frequently changes, and you can directly use the domain name to remotely access the device without recording the constantly changing IP address.

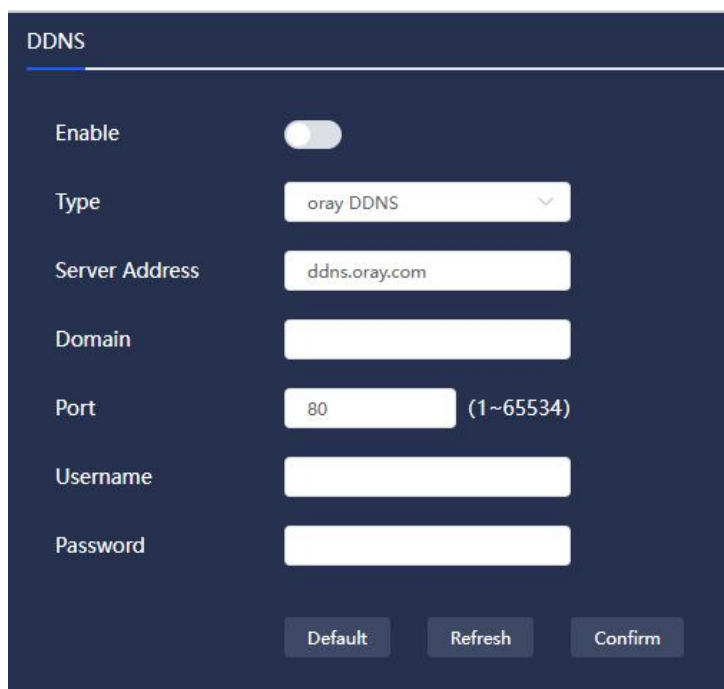
Server Type: supports 4 types (oray DDNS, NO-IP DDNS, Dynans DDNS, pubyun DDNS).

Server Address: each server type has a corresponding address.

Domain: the domain name registered by the user on the website of the DDNS server provider.

Port: the port can be customized.

Username/Password: enter the username and password obtained from the DDNS service provider; users need to register an account (including username and password) on the DDNS server provider website.



DDNS

Enable ☐

Type oray DDNS

Server Address ddns.oray.com

Domain

Port 80 (1~65534)

Username

Password

Default Refresh Confirm

Figure 5.16 Network Settings-DDNS Settings Interface

5.2.3 SMTP

Set the mailbox information. After enabling the "mail" function of the alarm linkage, the system will send an alarm email to the designated recipient when an alarm is triggered.

SMTP Server: different mailbox types have different server addresses; for example: (163 mailbox server address: smtp.163.com/Sina mailbox server address: smtp.sina.com, etc.).

Port: the port is related to the encryption method (the port for SSL encryption is generally 465, and the port for TLS or non-encryption is generally 25).

Username/Password/Sender: fill in the sender's mailbox information according to the actual situation.

Encryption: three options of None, SSL/TLS and STARTTLS are optional.

Theme: email subject information.

Recipient: recipient's email address.

SMTP

SMTP Server: none

Port: 25 (1~65534)

Username: anonymity

Password: ****

Sender: none

Encryption: None

Theme: Message

Recipient:

Test

Default Refresh Confirm

Figure 5.17 Network Settings-SMTP Settings

5.2.4 UPnP

Establish a mapping relationship between the private network and the external network through the UPnP protocol, and users of the external network can access the internal network device by accessing the external network IP address.

Prerequisites:

1. Make sure that the PC has installed the UPnP network service;
2. Log in to the router and set the router's WAN port IP address to access the external network;
3. The router enables the UPnP function;
4. Connect the device to the router's LAN port and access the private network;
5. Set the "IP address" of the device to the private network IP of the router, or select "DHCP" to obtain an IP address automatically.

Steps:

1. Enable the UPnP interface;
2. Select the port mapping method and the corresponding service name.
3. UPnP is divided into two mapping modes: custom and default.

- "Custom" mode: users can modify the external port.
- "Default" mode: users do not need to change the mapping and port.

4. Click "Confirm" to complete the setting.

***Note:** Enter "http://external network IP: external port number" in the browser to access the private network device with the corresponding port number in the router.

Enable	Internal Port	External Port	Protocol	Describe	Status	Operation
☒	80	8000	TCP	HTTP	Mapping Failure	
☒	554	554	TCP	RTSP	Mapping Failure	

Figure 5.18 Network Settings-UpnP Setting

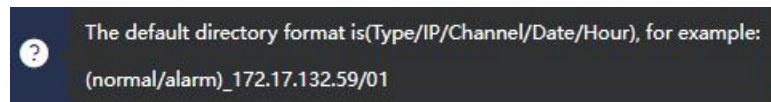
5.2.5 FTP

Figure 5.19 Network Settings-FTP Settings Interface

1. FTP is enabled;

2. Set the FTP address (e.g. 10.10.18.160), port number (e.g. 21), user name, password, etc., and perform network tests on the FTP;
3. Storage Directory: the location of the server where the snapshots are stored.

Default directory: the default directory when configuring the server, as shown in the following figure:



Custom directory: set a custom remote server storage directory.

4. Click "Confirm" to complete the setting.
5. This setting can be used to save the captured images in the corresponding FTP designated directory in the "Capture Plan".

Go to "Settings"→"Storage Management"→"Capture Plan"→"Storage"→Select "Upload FTP" and click "Confirm", as shown in the figure below:

The timetable is primarily designed for the convenience of synchronizing the time periods set in the general timetable when configuring schedules and recording/capturing plans. The general timetable can be edited (supports drag-and-drop and single-click operations) and can also be reset with one click.

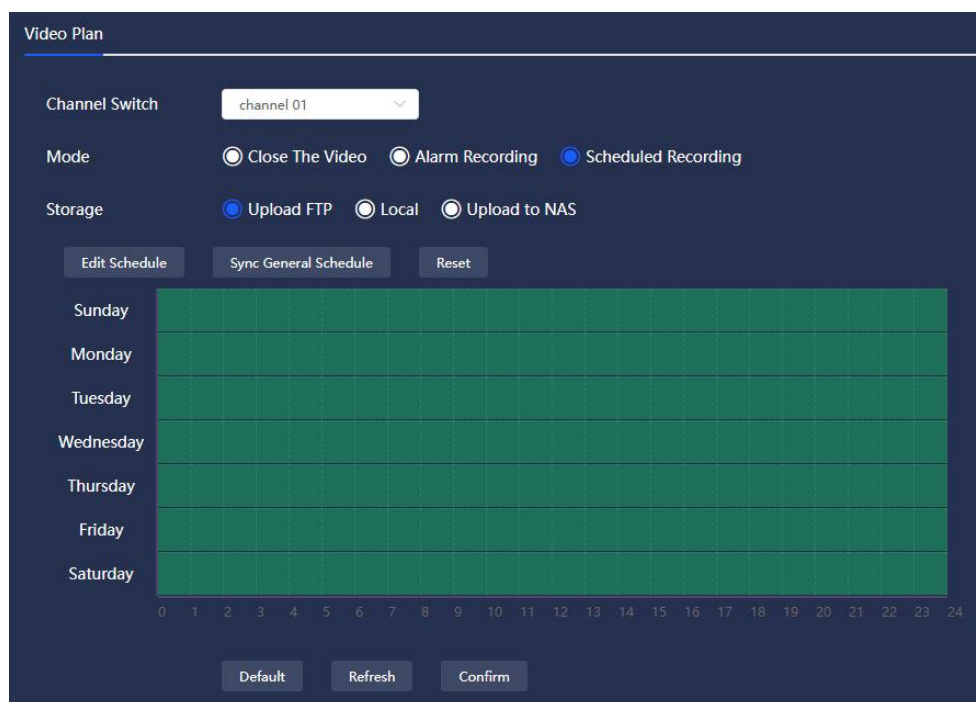
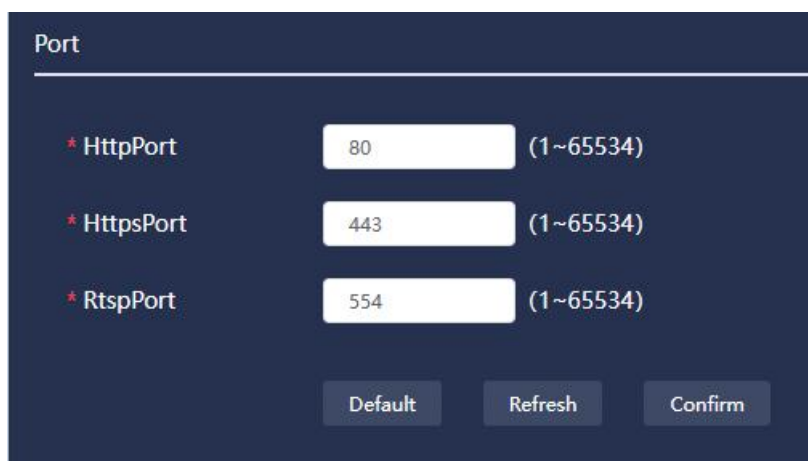


Figure 5.20 Capture Plan-Upload FTP Settings Interface

5.2.6 Port



The screenshot shows a 'Port' settings window with a dark blue background. It contains three rows of settings, each with a red asterisk, a label, a text input field, and a range in parentheses. The first row is 'HttpPort' with the value '80' and range '(1~65534)'. The second row is 'HttpsPort' with the value '443' and range '(1~65534)'. The third row is 'RtspPort' with the value '554' and range '(1~65534)'. At the bottom, there are three buttons: 'Default', 'Refresh', and 'Confirm'.

Port Type	Current Value	Range
* HttpPort	80	(1~65534)
* HttpsPort	443	(1~65534)
* RtspPort	554	(1~65534)

Figure 5.21 Network Settings-Port Settings Interface

Click to set the HTTP port, HTTPS port, and RTSP port.

5.2.7 Platform Access

5.2.7.1 GB28181

The device supports access to other devices or servers that comply with the national standard 28181 protocol, and realizes some related real-time monitoring, alarm control and other functions.

Steps:

1. Enable the platform access;
2. Set the parameters of the national standard 28181; Generally only the two parameters of SIP server IP and device number need to be set, and the other parameters are consistent with the docking device or server.

Note: Please set the parameters in accordance with the information provided by the platform during actual use. All parameters must be set correctly, otherwise there may be exceptions such as device registration failure and no response of functions.

3. Click "Confirm" to complete the settings.

The screenshot shows the 'GB28181' tab selected. The settings are organized into two columns. The left column includes an 'Enable' toggle, 'SIP Server Number' (3402000000200000001), 'SIP Server IP' (192.168.1.198), 'Equipment Number' (34020000001320000001), 'Local SIP Port' (5060, range 1024~65534), 'The Heartbeat Cycle' (60), 'Area Number' (340200), 'Channel Information' (Channel1), and 'Video channel encoding' (34020000001320000001). The right column includes 'SIP Domain' (3402000000), 'SIP Server Port' (5060, range 1~65534), 'Login Password' (masked), 'Validity Of Registration' (3600), 'Expired Times' (3), 'Transfer Protocol' (UDP), 'Alarm Related Information' (Channel1), 'Alarm channel coding' (34020000001340000001), and 'Alarm Level' (First level police situation). At the bottom right are 'Default', 'Refresh', and 'Confirm' buttons.

Figure 5.22 Network Settings-Platform Access Settings-GB28181

5.2.7.2 Modbus

This section is for Modbus TCP protocol settings. Click to go to Modbus RTU to configure Modbus RTU settings.

Modbus TCP:

1. Enable activation;
2. Set the port number;
3. Click "Confirm" to complete the settings.

The screenshot shows the 'Modbus' tab selected. It features an 'Enable' toggle switch and a 'Port' input field with the value 502 and a range of 1~65534. Below these are 'Default', 'Refresh', and 'Confirm' buttons. At the bottom, there is a yellow link that says 'Go to set modbus-RTU'.

Figure 5.23 Network Settings-Platform Access Settings-Modbus TCP

Modbus RTU:

1. Select type: Modbus RTU

2. Baud rate: 9600, Data bits: 5, Stop bits: 1, Parity: None
3. Click "Confirm" to complete the setup.

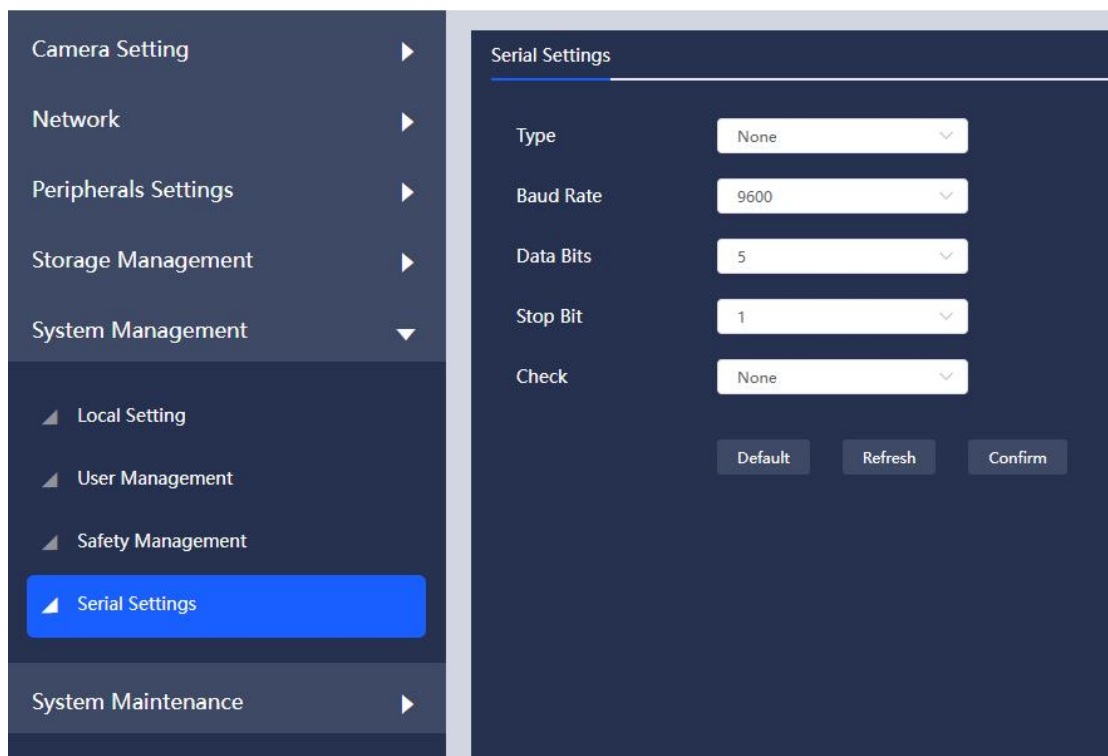


Figure 5.24 System Management-Serial Port Settings-Modbus RTU

5.2.7.3 MQTT

The steps for MQTT operation are as follows:

- 1) Enable MQTT.
- 2) Configure connection parameters on the device side, see Table 5-1 for details.

Table 5-1 MQTT Settings Parameter Description Table

Parameters	Descriptions
1 Device Name	Required, the name of the device connecting to the server.
2 Server Address	Required, the MQTT server IP used for connecting the device.
3 Port	Set the port number.
4 Time Interval	Set the time interval for sending data once.
5 Username	Required, the username for the server.
6 Password	Required, the password for the server.

- 3) Service Status

If the device parameters match the server, and the MQTT server connection is successful, this field will display in blue. Otherwise, it will show no color, indicating a connection failure (as shown below).

The screenshot shows the MQTT configuration page. At the top, there are three tabs: 'GB28181', 'Modbus', and 'MQTT'. The 'MQTT' tab is selected. Below the tabs, there are several settings:

- Enable:** A toggle switch that is currently turned off.
- Service Status:** A radio button that is currently selected.
- * Device Name:** A text input field containing 'RPTN2200722-TN2200722'.
- * Server Address:** A text input field containing '192.168.0.1'.
- Port:** A text input field containing '1883', with a range '(1~65534)' indicated to the right.
- Time Interval:** A text input field containing '5000', with a range '(ms >= 5000)' indicated to the right.
- Username:** An empty text input field.
- Password:** An empty text input field.

At the bottom of the form, there are three buttons: 'Default', 'Refresh', and 'Confirm'.

Figure 5.25 Network Settings-Platform Access Setting-MQTT

5.3 Peripherals Settings

5.3.1 Filling Light

The fill light has two modes: automatic and manual.

Note: This configuration is only supported in Channel 1.

Automatic Mode: adjust the illuminance of filling lamp according to the visual scenes.

When the illuminance of visible light channel is lower than a certain value, the screen will automatically switch to black and white. The infrared light is on, the darker the picture, the brighter the infrared light; When the illuminance of visible light channel is higher than a certain value, the screen will automatically switch to color and the infrared light will go out.

Manual Mode: The size of the infrared light can be manually adjusted, ranging from 0-100.

The screenshot shows the 'Fill Light Settings' interface. It features a 'Mode' label followed by a dropdown menu. The dropdown menu is open, showing two options: 'Automatic' (highlighted in blue) and 'Manual'. To the right of the dropdown menu is a 'Confirm' button.

Figure 5.26 Peripherals Settings-Fill Light Settings

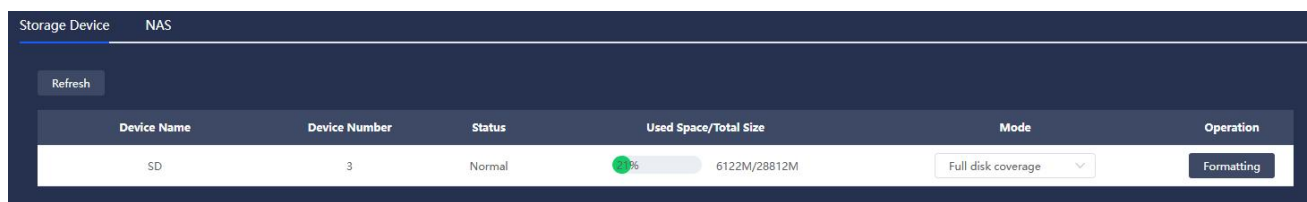
5.4 Storage Management

5.4.1 Storage Device

5.4.1.1 Storage Device

Display the relevant information of the local SD card, for example, device name, device number, status and used space etc. The SD card can also be formatted.

Mode: There are two options—Full Disk Overwrite and Full Disk Stop. In Full Disk Overwrite mode, when the storage device is nearly full (90% capacity), it overwrites the oldest stored content. In Full Disk Stop mode, when the storage device is full, it stops storing new content.

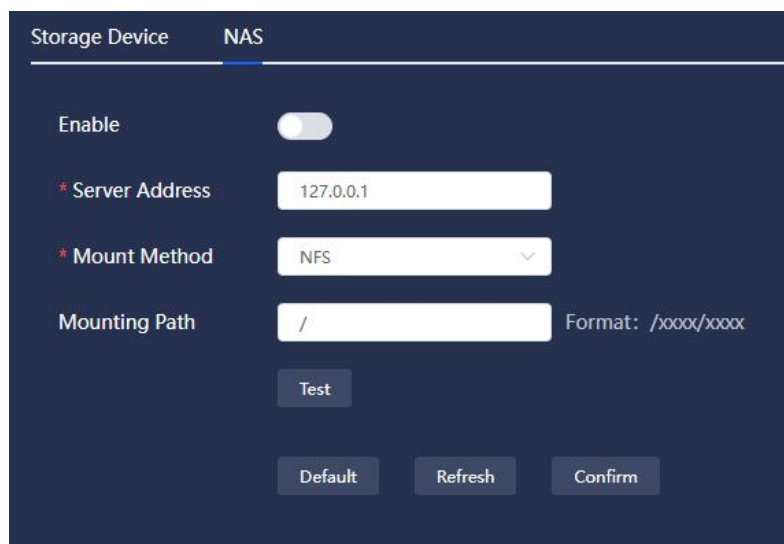


Device Name	Device Number	Status	Used Space/Total Size	Mode	Operation
SD	3	Normal	6122M/28812M	Full disk coverage	Formatting

Figure 5.27 Storage Management-Storage Device

5.4.1.2 NAS Storage

1. Enable: Whether the function is turned on.
2. Server Address: NAS server address.
3. Mount Method: Options are NFS and SMB/CIFS.
4. Mount Path: The NAS folder directory where files will be stored.



Enable	☐
* Server Address	127.0.0.1
* Mount Method	NFS
Mounting Path	/ Format: /xxxx/xxxx
Test	
Default Refresh Confirm	

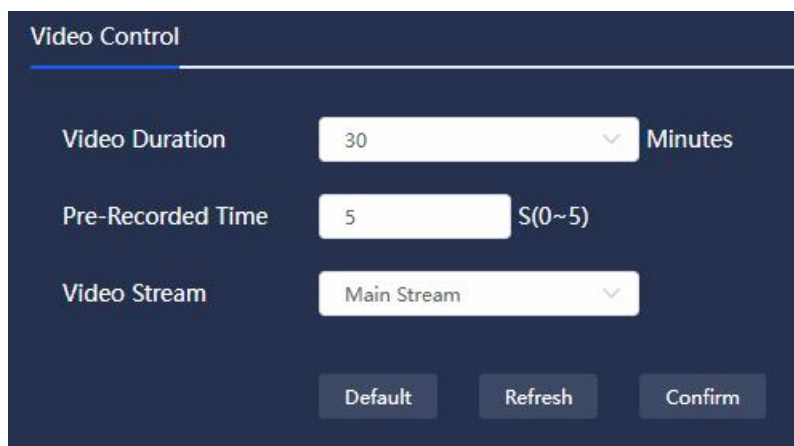
Figure 5.28 Storage Management-NAS Settings

5.4.2 Video Control

Video Duration: the duration of each video file.

Pre-recording Time: when an alarm is triggered, the time of recording is advanced. For example, when 5 is input, the system saves the recording 5 seconds before the alarm occurs to the recording file.

Video Stream: including the main stream and the sub stream.



The screenshot shows a 'Video Control' interface with a dark blue background. It contains three settings: 'Video Duration' set to 30 Minutes, 'Pre-Recorded Time' set to 5 S(0~5), and 'Video Stream' set to Main Stream. At the bottom are three buttons: 'Default', 'Refresh', and 'Confirm'.

Figure 5.29 Storage Management-Video Control

5.4.3 Video Plan

Channel Selection: configure video recording plan for 2 channels of visible light and thermal imaging, and the 2 channel configuration are independent of each other.

Mode: supports three modes, selecting from close the video, alarm recording (default), and scheduled recording.

■Close the Video: select to close the recording, the channel recording will no longer be recorded in the SD card;

■Alarm Recording: select alarm recording, check linkage recording in the alarm setting interface, and there will be alarm recording of this channel in the SD card.

■Scheduled Recording: choose to record by time period according to plan, and ordinary video will be recorded according to the set time period.

The timetable is primarily designed for the convenience of synchronizing the time periods set in the general timetable when configuring arming times and recording/capturing plans. The general timetable can be edited (supports drag-and-drop and single-click operations) and can also be reset with one click.

Storage Method: There are three options—Upload to FTP, Local Storage Device (SD card storage), and Upload to NAS. You can select any one of these options.

The screenshot displays the 'Video Plan' configuration window. At the top, there's a 'Channel Switch' dropdown set to 'channel 01'. Below it, the 'Mode' section has three radio buttons: 'Close The Video', 'Alarm Recording', and 'Scheduled Recording' (which is selected). The 'Storage' section has three radio buttons: 'Upload FTP', 'Local' (selected), and 'Upload to NAS'. Under these are three buttons: 'Edit Schedule', 'Sync General Schedule', and 'Reset'. The main part of the interface is a grid representing the recording schedule for each day of the week (Sunday to Saturday) across 24 hours (0 to 23). The grid cells are currently empty, indicating no specific recording times are set. At the bottom of the grid are three buttons: 'Default', 'Refresh', and 'Confirm'.

Figure 5.30 Storage Management-Video Plan

5.4.4 Capture Plan

Channel Selection: configure video recording plan for 2 channels of visible light and thermal imaging, and the 2 channel configuration items are independent of each other.

Mode: supports three modes to choose to close, alarm linkage drawing, and regularly as planned.

Storage Method: upload FTP and local storage device (SD card storage) are optional. You can choose one at will or two at the same time.

- Close: choose to close the capture, and all the capture functions stored in the SD card or FTP will be closed;
- Alarm linkage drawing: select the alarm linkage capture, check the linkage to take pictures in the alarm setting interface, and there will be alarm pictures of this channel in the SD card or FTP storage directory.
- Regularly as Planned: capture ordinary pictures according to the set time period to SD card or FTP storage directory.

Figure 5.31 Storage Management-Capture Plan

5.5 System Management

5.5.1 Local Setting

It includes local settings, settings for date and time and general schedule.

5.5.1.1 Local Setting

The local setting interface sets device name, system language and video format, as shown in the figure below:

Figure 5.32 System Management-Local Settings

Table 5-2 The parameter description of local settings

Parameters	Descriptions
1 Device Name	the device name can be set
2 Language	the system language, including Chinese and English
3 Video Formats	display the video formats, including PAL and NTSC

5.5.1.2 Date and Time

The date and time setting interface sets date&time format, time zone, system time and NTP, as shown in the figure below:

The screenshot shows the 'Data And Time' configuration page. It includes dropdown menus for Date Format, Time Format, and Time Zone. The System Time section shows a calendar icon, a date field (2024-11-18), a clock icon, a time field (17:08:07), and a 'Synchronous PC' button. The NTP section has a toggle switch, an NTP Server IP address field, a Port field with a range indicator, and an Update Cycle field with a range indicator. Action buttons 'Default', 'Refresh', and 'Confirm' are at the bottom.

Figure 5.33 System Management-Date and Time Setting

Table 5-3 The parameter description of date & time

Parameters	Descriptions
1 Date Format	date format in system display
2 Time Format	time format in system display, including 24-hour format and 12-hour format
3 Time Zone	The time zone where the device is located
4 System Time	The present system time Click Synchronous PC, then the time is adjusted based on the PC time.
5 NTP	To synchronize time with the NTP server, enable the NTP function. Choose this option to enable NTP function.
6 NTP Server	The IP address of NTP server
7 Port	Port of NTP server
8 Update Cycle	Interval at which the device synchronizes time with the NTP server

5.5.1.3 General Schedule

After configuring the general schedule, you can choose to synchronize with the general schedule when setting the arming schedule.

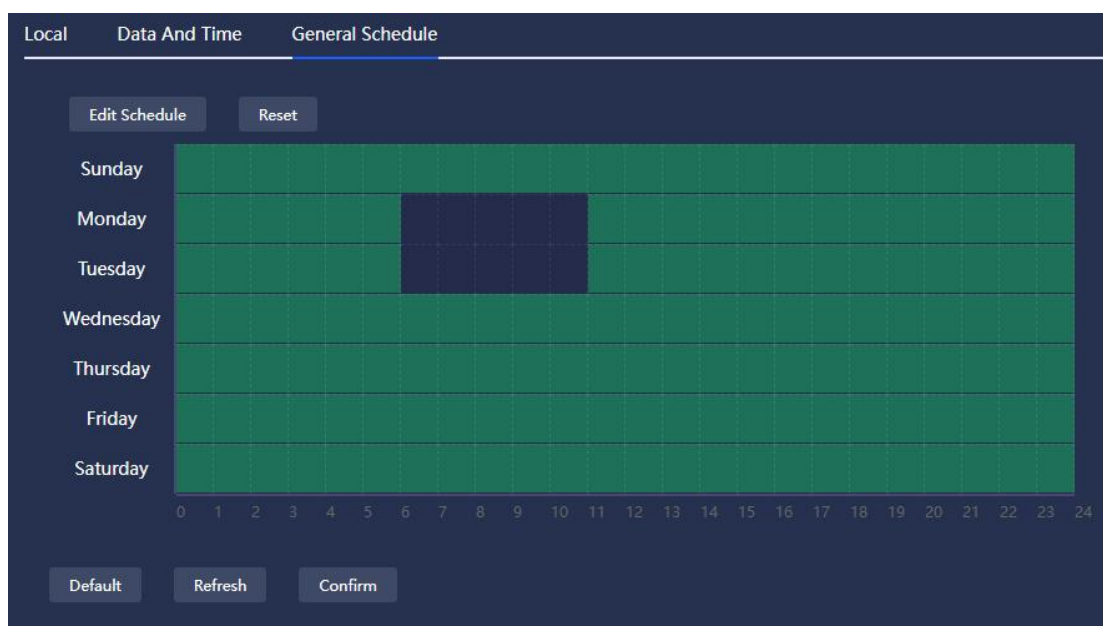


Figure 5.34 System Management-General Schedule Settings Interface

5.5.2 User Management

5.5.2.1 User Management

User management can only be performed when the user has user management authority.

User:

1. The system has a default user admin, admin belongs to the highest authority user by default (admin users cannot be deleted); the admin can add ordinary user or operator, but can not add administrator.
2. The admin user change his/her own password and delete or modify non-admin users; the operator can change his/her own password or change/delete the ordinary users; the ordinary user does not have user management rights, the ordinary user can only change his/her own password.

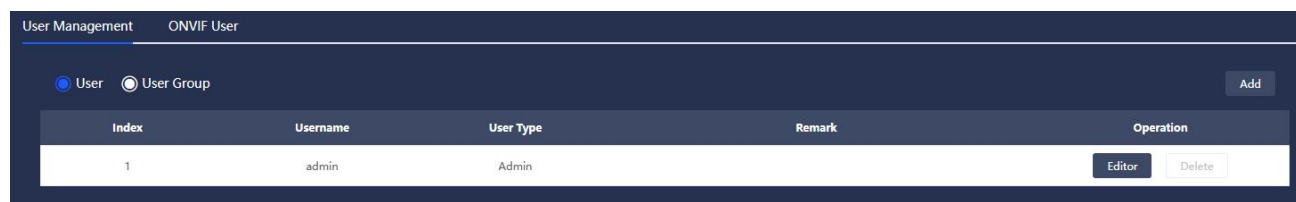
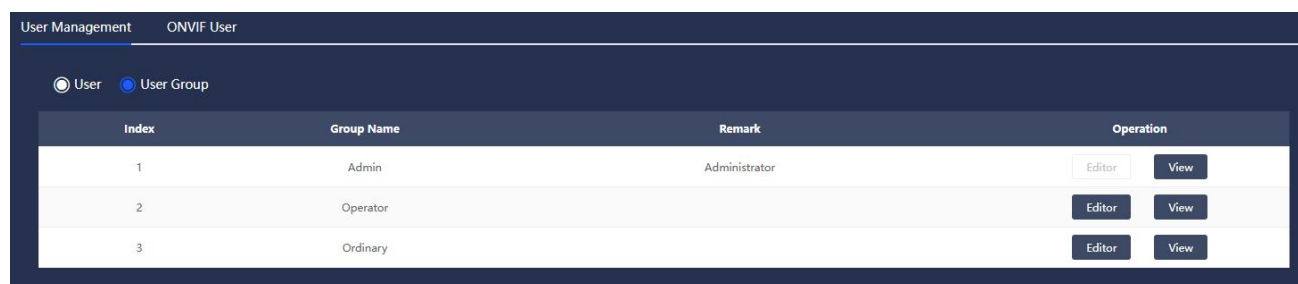


Figure 5.35 User Management-User Interface

User group:

1. There are three levels of user group: administrator, operator or ordinary user. Adding, changing or deleting new user group is not supported.
2. Only the admin can view or change the authority of user group, different user groups have different operation authorities. The authority of admin can not be changed, but can reassign the authorities to users of other levels.

As shown in the figure below.



Index	Group Name	Remark	Operation
1	Admin	Administrator	<button>Editor</button> <button>View</button>
2	Operator		<button>Editor</button> <button>View</button>
3	Ordinary		<button>Editor</button> <button>View</button>

Figure 5.36 User Management-User Group Interface (Admin)

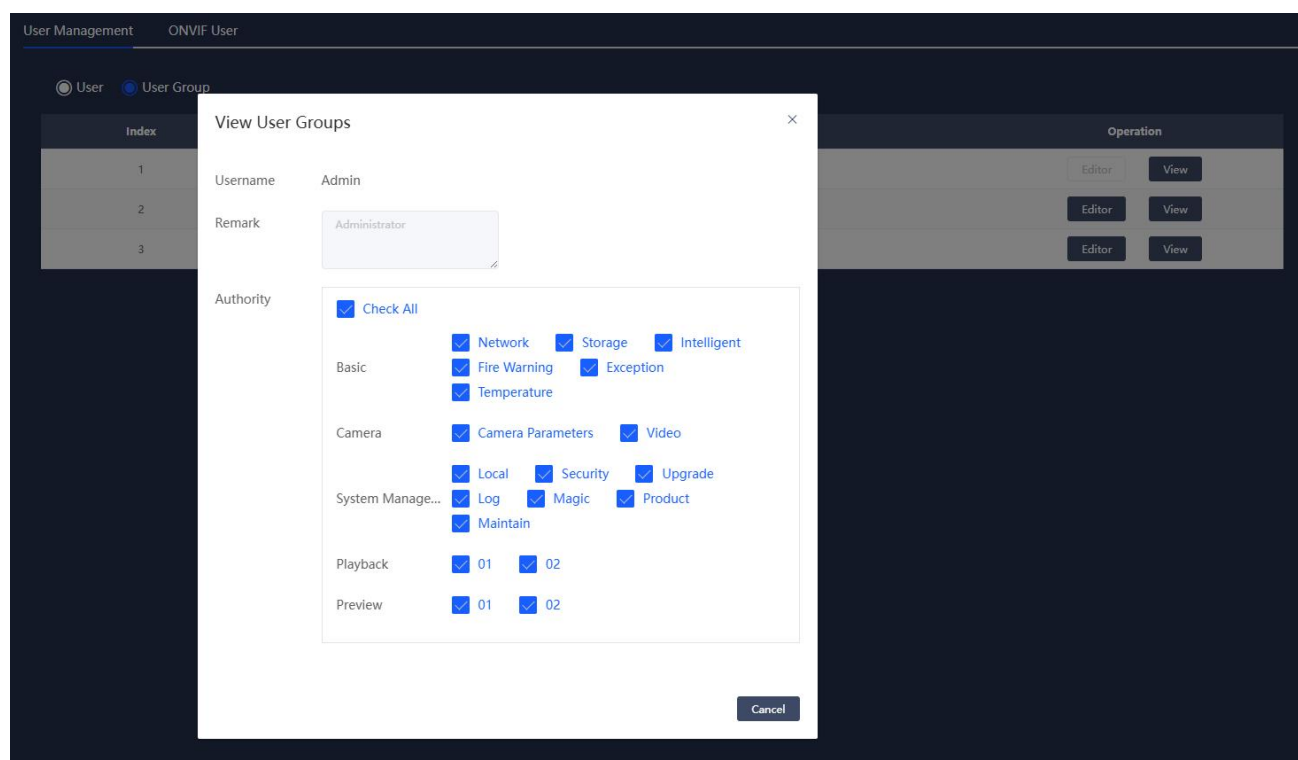


Figure 5.37 User Management-Authority Assignment (Admin)



Note: User management adopts two levels of user group and user. User names cannot be repeated. A user can only belong to one group, and the user's authority is consistent with that of the user group it belongs to.

ONVIF User:

- 1) The default onvif user is admin, who can change admin's password, (password is admin by default), but can not delete admin users.
- 2) The admin can add other onvif users.
- 3) Turn off onvif authentication, when the camera is connected with NVR via onvif, user name and password check is not needed; Turn on onvif authentication, the user name and password is needed when connected.

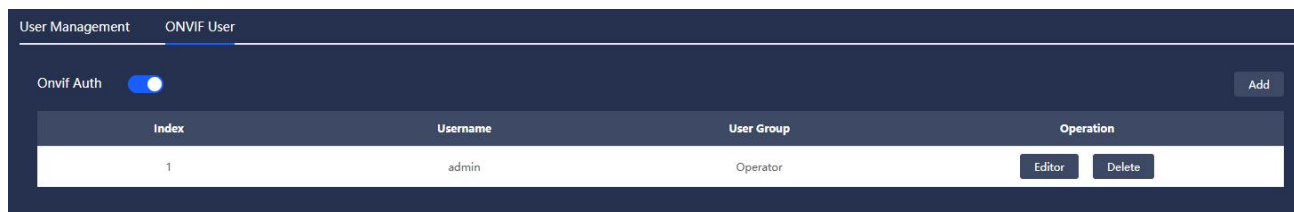


Figure 5.38 User Management-ONVIF User Interface

5.5.3 Safety Management

5.5.3.1 IP Permissions

To enhance device network security and protect device data, users can configure permissions by setting IP addresses, IP ranges, IP segments, MAC addresses, etc., to allow only specific hosts to access the device.

Whitelist: the device can only be accessed using the IP host in the whitelist, otherwise it can not be accessed. (Edit and delete the added IP address)

Operating steps:

1. Enable: Determine if the feature is activated.
2. Click "Add" to open the "New IP/MAC" dialog box. Select the type and enter the corresponding IP or MAC address. Click "Confirm" to complete the process.

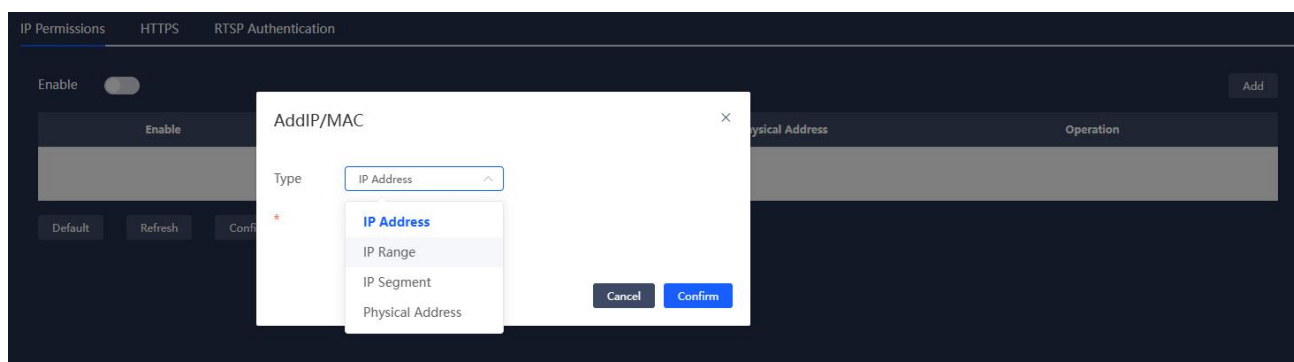


Figure 5.39 Safety Management-IP Permission Interface

5.5.3.2 HTTPS

The signed certificate can be uploaded and installed through HTTPS, so that the PC can log in to the device normally through HTTPS to ensure the security of communication data.

Steps:

1. Enable HTTPS;
2. Import the certificate and certificate key;
3. Click "Confirm", and the setting for the device will take effect after restarting.

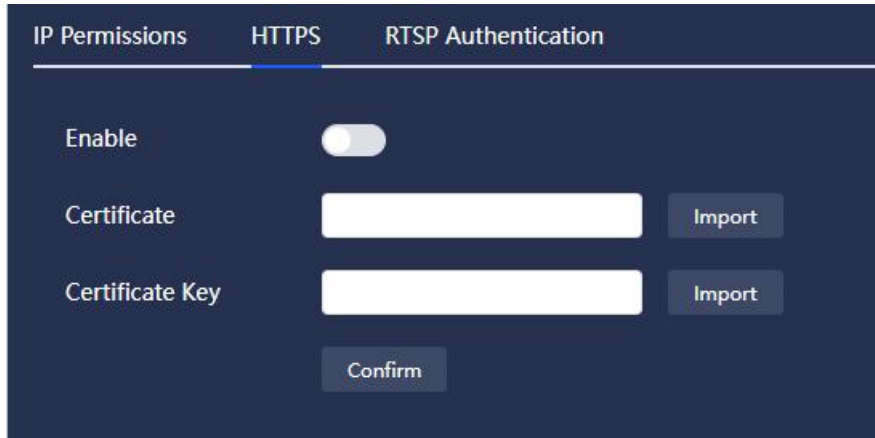
The screenshot shows a web interface with three tabs: "IP Permissions", "HTTPS", and "RTSP Authentication". The "HTTPS" tab is selected. It contains an "Enable" toggle switch, which is currently turned off. Below the toggle are two input fields: "Certificate" and "Certificate Key". Each input field has an "Import" button to its right. At the bottom of the form is a "Confirm" button.

Figure 5.40 Safety Management-HTTPS Interface

5.5.3.3 RTSP Authentication

You can configure the authentication method for media streams to ensure data security during streaming transmission.

There are three authentication mode options:

None: No authentication.

Basic: Basic authentication.

Digest: Digest authentication.

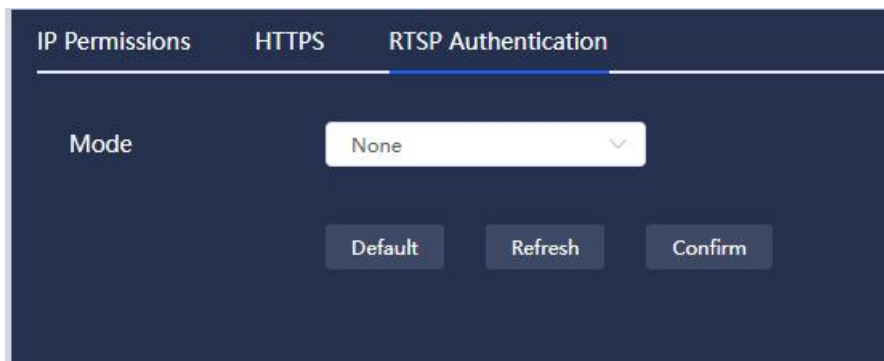
The screenshot shows a web interface with three tabs: "IP Permissions", "HTTPS", and "RTSP Authentication". The "RTSP Authentication" tab is selected. It contains a "Mode" dropdown menu with "None" selected. Below the dropdown are three buttons: "Default", "Refresh", and "Confirm".

Figure 5.41 Safety Management-RTSP Authentication

5.5.4 Serial Port Settings

Serial Port Type: You can choose either None or Modbus RTU.

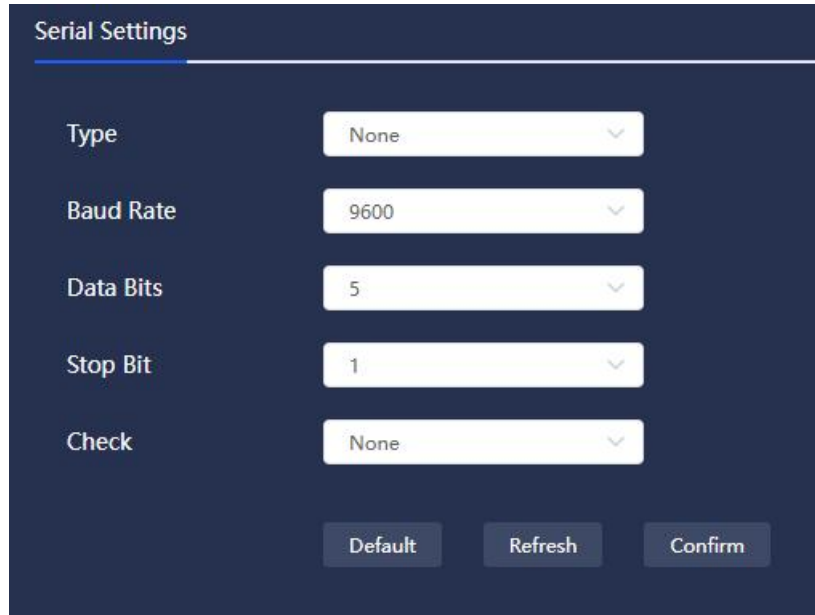
Baud Rate: Select as needed; the default is 9600.

Data Bits: Select as needed; the default is 5.

Stop Bits: Select as needed; the default is 1.

Parity: Select as needed; the default is None.

Click "Confirm" to complete the settings.



Serial Settings

Type	None
Baud Rate	9600
Data Bits	5
Stop Bit	1
Check	None

Default Refresh Confirm

Figure 5.42 System Management-Serial Port Settings

5.6 System Maintenance

5.6.1 Auto Maintenance

■Automatic maintenance can set the automatic restart time, the system will restart according to the set time period.

1. Turn on the enable;
2. Select the day of the week and the time;
3. Click OK to save the settings.

Manual Reboot:

Click "Restart" to manually restart the device.

Click "Power Off and Restart" to manually perform a one-time power cycle of the device.

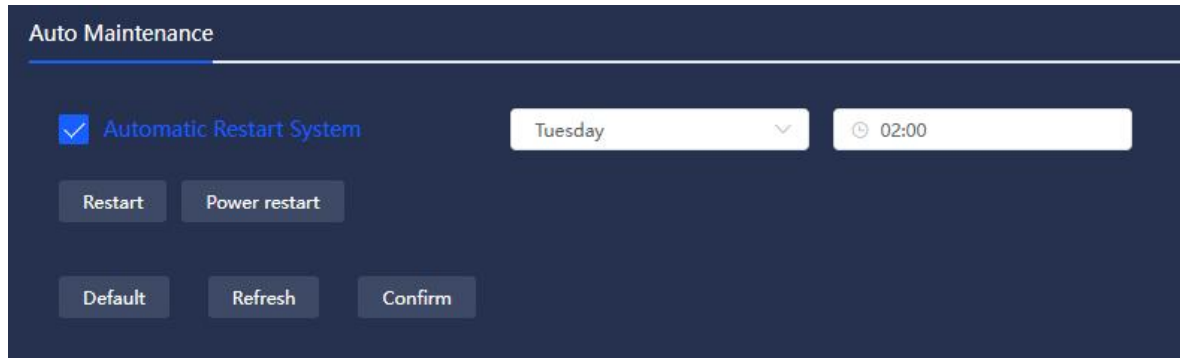


Figure 5.43 System Maintenance-Auto Maintenance

5.6.2 Backup and Restore

The "Restore Default Configuration" and "Factory Data Reset" operations involve restoring the configuration to the default and factory settings. Please operate with caution.

- Clicking "Restore Default Configuration", all other configurations will be restored to their default values except for the network IP address and user management information.
- Click "Factory Data Reset" to completely restore the device parameters to the factory state.

Import and Export:



The IP address will default to 192.168.1.123.

Import and Export Functionality:

- Import: click "selecting files" to select a config file, click "import" and the function will take effect after camera restart.
- Export: click "export" to export the current configuration to the specified path.
- Default Export Config: click "default export config" to export to the specified default path.



The default download path is the browser's downloads folder.

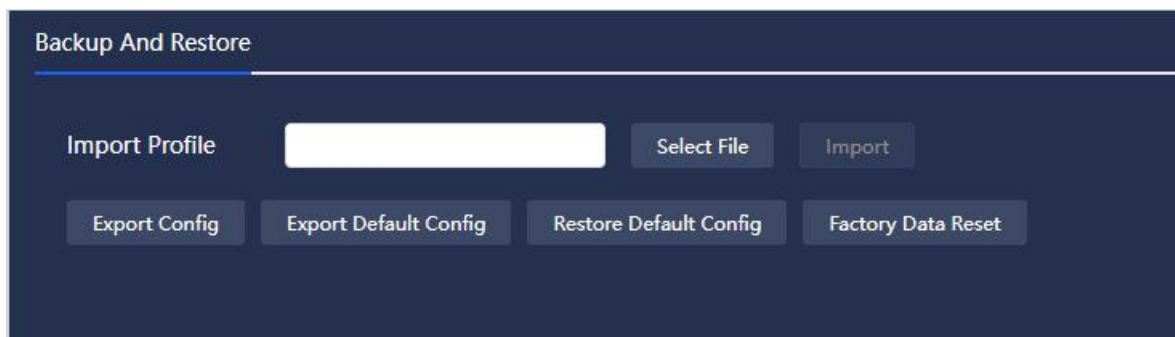


Figure 5.44 System Maintenance-Backup and Restore

5.6.3 System Upgrade

System upgrade steps:

1. Click *Import*, select the upgrade file of *.zip type, and click *Upgrade*.
2. Please **do not power off, disconnect the network, restart or turn off the camera** during the upgrade process.
3. Auto go to login page after update is completed.

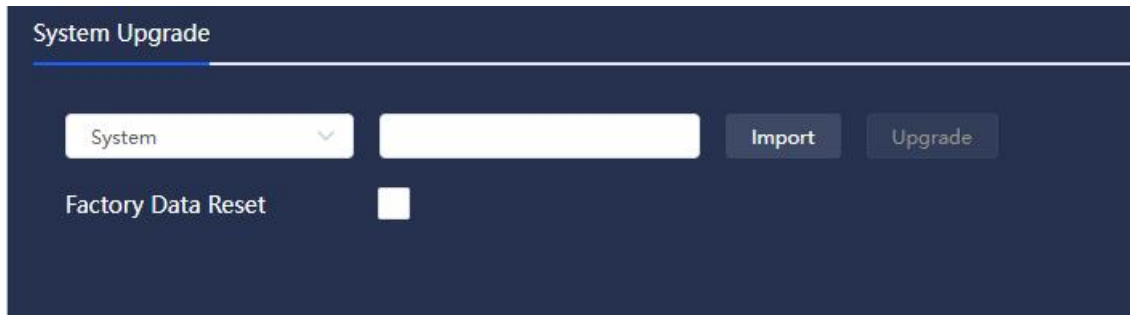


Figure 5.45 System Maintenance-System Upgrade

5.6.4 Version Information

Display device model, SN, PN, software version and release date. Please refer to the actual product.

Version Information	
Device Type	TN220
The SN No	TN2200722
The PN No	RPTN2200722
Software Version	B1.2.02.08.08, 2024-09-10
Movement version	0.0.2.34.20240523
Web Version	V1.3.18

Figure 5.46 System Maintenance-Version Information

5.6.5 System Log

View system operation, configuration operation, alarm event, temperature alarm, video operation, user management, network event, clearing log, storage management and other log information; See the following figure:

System Log

Start Time 2024-11-17 17:15:28 End Time 2024-11-18 17:15:28 Type All Search Export

Index	User	Type	Time
1	system	Configuration Operation	2024-11-18 16:48:08
2	admin	Configuration Operation	2024-11-18 16:45:32
3	admin	Configuration Operation	2024-11-18 16:43:26
4	admin	Configuration Operation	2024-11-18 16:42:25
5	admin	Configuration Operation	2024-11-18 16:42:14
6	admin	Configuration Operation	2024-11-18 16:41:58
7	admin	Configuration Operation	2024-11-18 16:41:22
8	admin	Configuration Operation	2024-11-18 16:41:12
9	admin	Configuration Operation	2024-11-18 16:40:59

Total 17 20/page < 1 > Go to 1

Figure 5.47 System Maintenance-System Log Interface

5.6.6 Online Users

View the user information of web login, as shown in the figure below.

Online Users

Index	Username	IP Address	User Operation Time
1	admin	192.168.1.201:62493	2024-11-18 17:15:44

Figure 5.48 System Maintenance-Online User

6 Playback

6.1 Play SD Card Videos/Images

Channel Switch: select channel 1 (visible light) or channel 2 (thermal imaging) video/picture for playback.

6.1.1 SD card video playback:

Steps:

1.Select SD card as video source, video as file type, the date with recording as the date (the current day is displayed by default), and click Retrieve. All the video of this day will be displayed in the retrieved file list, as shown in the figure below:

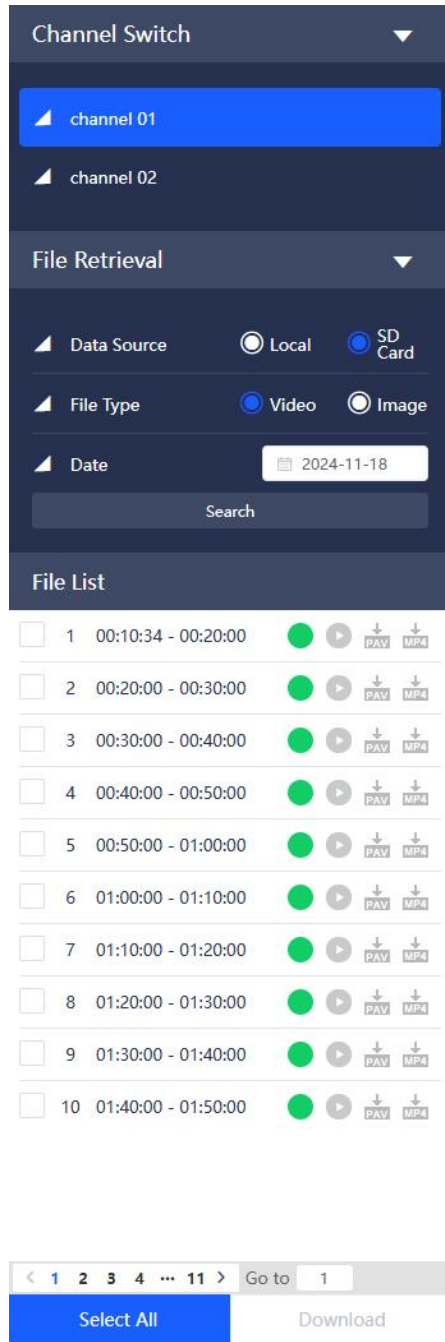


Figure 6.1 Playback-Play SD Card Videos

2. Select a video and click the play icon (there are two play icons here, one is behind the video file list

 and the other is below the video timeline ). The video starts to play; click to select a video file and play on the video broadcasting area.



: Play the next video.



: Play the last video.



: Click a certain time point on the video time axis, and the video will jump to the corresponding time point for playback.

Recording type: there are two types of recordings: general and alarm. The recording file search will display these two types of recordings by default, and you can check one of the recording types separately for search. (The green circle displayed after the video file indicates general video, and the red circle indicates alarm video)

Video Download: video files like PAV and mp4 is supported. Click the download icon   behind the video list to download the current video files. The download video files will be stored in the browser's default download files, you can select the corresponding player to play. Single or multiple video download is supported. (Tick several video files or select "all", click "download" to select the format).

Display IVS: after enabling, the smart information overlay will be displayed in the playback video.

Playback video sound switch



: after enabled, the sound can be heard when the video is played.

6.1.2 SD card image playback:

Steps:

1. Select SD card as video source, image as file type, date with image (the day is displayed by default), and click "retrieve". All image files for this day will be displayed in the search file list, as shown in the figure below:

The screenshot displays a mobile application interface for SD card image playback. It is divided into three main sections: Channel Switch, File Retrieval, and File List.

Channel Switch: Features a dropdown menu with two options: 'channel 01' (selected) and 'channel 02'.

File Retrieval: Contains settings for Data Source (Local and SD Card, with SD Card selected), File Type (Video and Image, with Image selected), and Date (2024-11-18). A Search button is located below these settings.

File List: A table listing 10 image files. Each row includes a checkbox, a file number, a timestamp, a green status indicator, and a download icon.

File Number	Timestamp	Status	Action
1	00:10:33	Green	Download
2	00:10:34	Green	Download
3	00:10:35	Green	Download
4	00:10:36	Green	Download
5	00:10:37	Green	Download
6	00:10:38	Green	Download
7	00:10:39	Green	Download
8	00:10:40	Green	Download
9	00:10:41	Green	Download
10	00:10:42	Green	Download

At the bottom, there is a pagination bar showing '< 1 2 3 4 ... 6138 >' and a 'Go to 1' button. Below the pagination bar are two buttons: 'Select All' and 'Download'.

Figure 6.2 Playback-Play SD Card Images

- Click an image in the file list to play the image. Click the icon  at the bottom right to play images one by one in order from the current position.



: Play the next image.



: Play the last image.

Capture Type: it includes two types of images: general and alarm. The image file search displays these two types of images by default. You can check one of the image types separately for retrieval. (The green circle displayed after the picture file indicates the general capture, and the red circle indicates the alarm capture).

Picture Download: you can select one or several images to download. Select all to download all images of a certain column; the downloaded images will be stored in the browser's default download files, and you can view them with image viewer supporting .jpg format.

6.2 Play Local Videos/Images

Steps:

Select local as video source, video/image for file type, and click "Select Local Files" button. Select a video/image file on the computer, and click the play icon, as shown in the figure below:



Figure 6.3 Playback-Play Local Videos

The image files can be displayed after being selected, see the following figure:

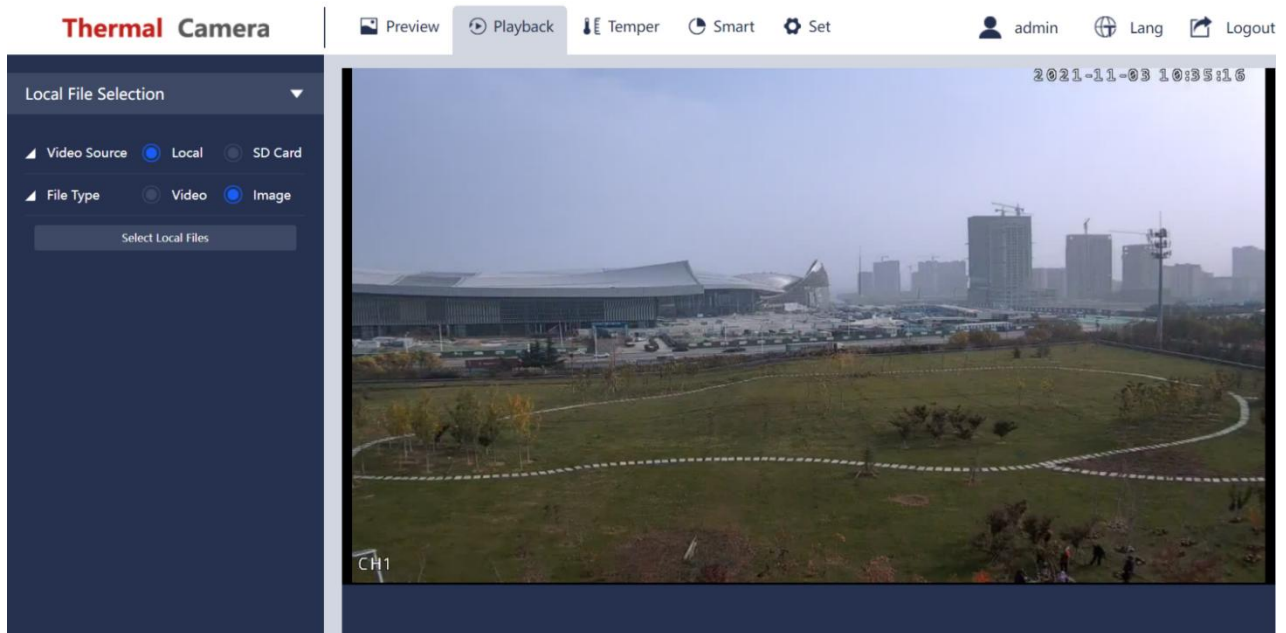


Figure 6.4 Playback-Play Local Image