Multi-spectral PTZ Camera

User Manual

V1.0.0

Statement

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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 Description

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.

Default Information:

The default super administrator account of the device: admin.

The default super administrator password of the device: admin.

The default IPv4 address of the device: 192.168.1.123.

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1 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.

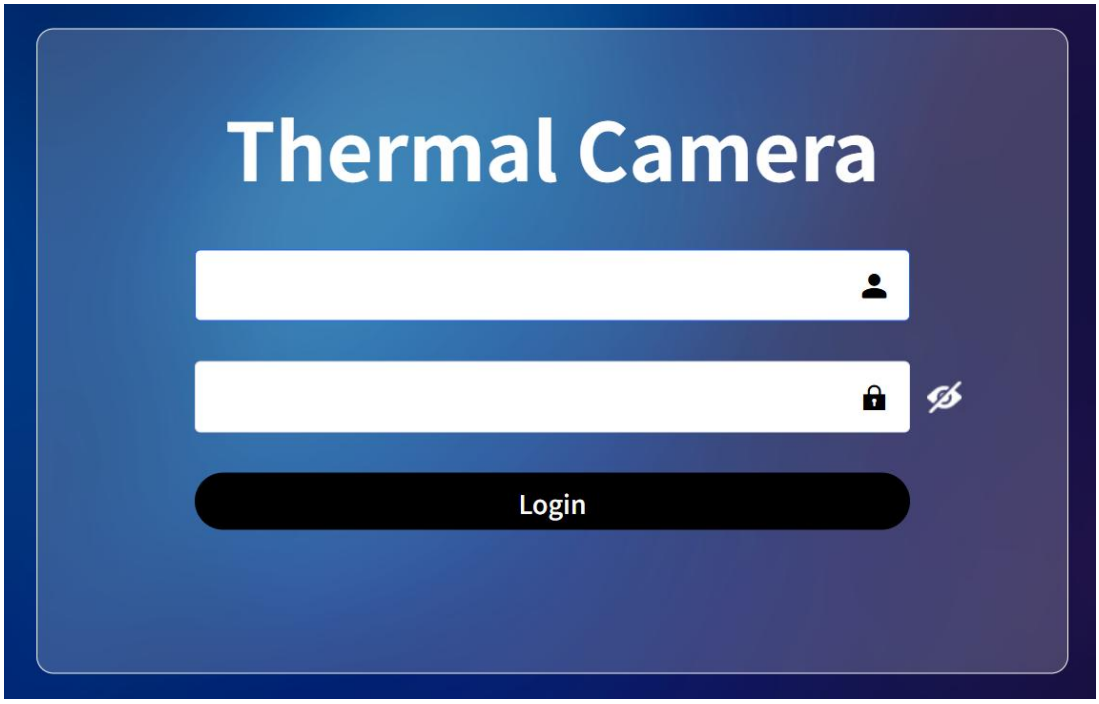


Figure 1.1 Login Interface

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 first time you log in (including after a factory reset), you are required to change the password before you can use the system.

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.

2 Preview

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

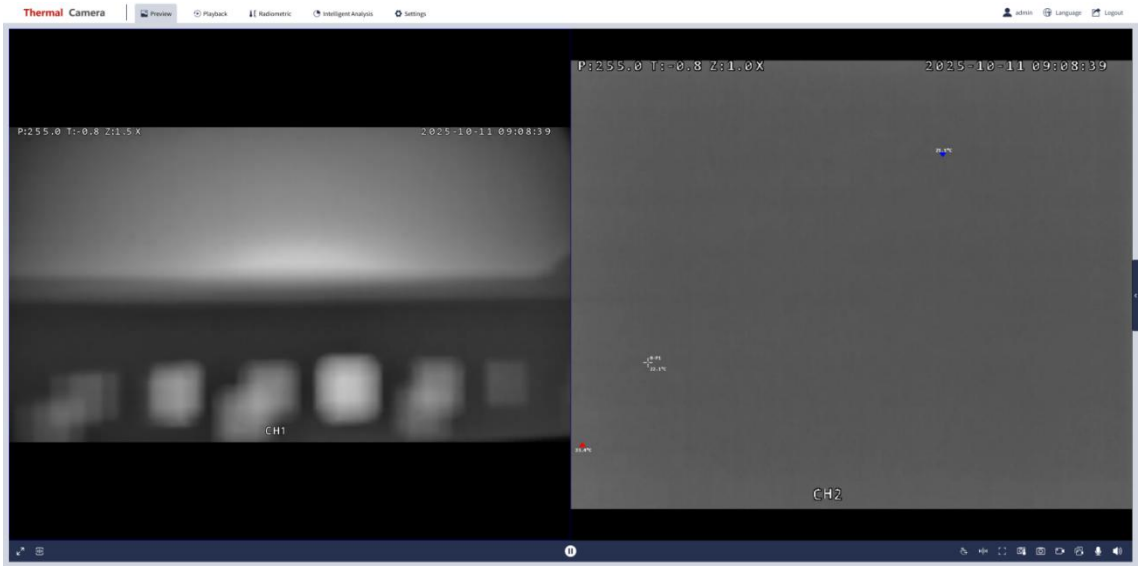
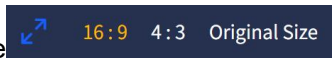


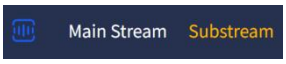
Figure 2.1 Preview Interface

Aspect Ratio: 

Click the aspect ratio button with the mouse, and three ratios will appear: 16:9, 4:3, and original size 

. The yellow one indicates the aspect ratio currently applied to the selected channel's video. Click to select the visible light or thermal imaging video screen, then click to switch to the desired aspect ratio.

Stream Type: 

Click the stream type button with the mouse, and two options will appear: Main Stream and Substream 

. The yellow one indicates the stream type currently applied to the selected channel's video. Click to select the visible light or thermal imaging video screen, then click to switch to the desired stream type.

***Note**: This function is only visible in hardware decoding mode (the method to enable hardware decoding is the same as the talk function below). In software decoding mode, double-click a channel's video screen to switch from substream to mainstream (single channel), and double-click again to restore the substream (dual channels).*

Manual Temperature Measurement:

Click the manual temperature measurement button to enable the function. Click any point on the infrared channel's video screen to display the temperature at that point for 10 seconds. Click the button again to disable the function.

***Note**: This function only works correctly when the Thermometry function is enabled on the Radiometric page.*



Figure 2.2 Manual Temperature Measurement

LRF:

After enabling the laser ranging and activating the video overlay for laser ranging display in the settings, click the manual laser ranging button with the mouse. The ranging information will be displayed at the designated location on the screen.

Full Screen:

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

Note:

1) *Double channel display uses substream; the single channel display uses mainstream by default.*
2) *The full-screen display will be achieved while the browser zoom is 100%, or else the image will be displayed in scale.*

Temperature Mapping:

Click the temperature mapping button to enable the function. The temperature measurement rule information on the infrared video screen is synchronously mapped onto the visible light video screen. Click the button again to disable the function.

Note: *This button is only displayed when "Thermometry" in the Basic Parameters of the left menu on the radiometric page is checked.*

Snapshot:

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.

Video:

After selecting the visible channel or thermal 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.

Note:

1. In software decoding mode, recorded video is split into N small segments, each about 200 seconds long (except for the final segment when recording is stopped manually). By default, recorded video can be found in the browser's download folder.

2. In hardware decoding mode, recorded video is saved as a single video file. However, when using the recording function for the first time, a dialog will pop up after clicking the record button, prompting you to select a save directory. Note that system folders cannot be used as the save directory. After stopping the recording, the video can be available in the selected directory.

Full Video:

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. For details, refer to the Video instructions above.

Talk:

The external interface of the camera "line out" is connected to the speaker, "line in" is connected to the audio source (pickup or phone player), and the talk function is turned on by clicking the icon in the lower right corner of the web preview interface. Use the headset to speak on the computer, and the sound can be heard from the speaker. The sound of the audio source through "line in" can be heard in the headset.

Note: *Before the talk function is enabled, enable the option 'Insecure origins treated as secure' first, click the Relaunch button, the microphone can be used in the webpage by typing in http://xx.xx.xx.xx in the address bar after rebooting the browser.*

The option can be enabled by typing in the following address in the browser.

Chrome: "chrome://flags/#unsafely-treat-insecure-origin-as-secure".

Edge: "edge://flags/#unsafely-treat-insecure-origin-as-secure".

Voice:

The external interface of the camera "line in" is connected to the audio source (pickup or phone player), turn on the voice switch in the lower right corner of the preview interface, and the sound can be heard on the computer web terminal.

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.

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

PTZ: /

Click the arrow on the right side of the preview interface to present or hide the PTZ control panel to achieve PTZ functions, including PTZ control and PTZ function. See the following figure:

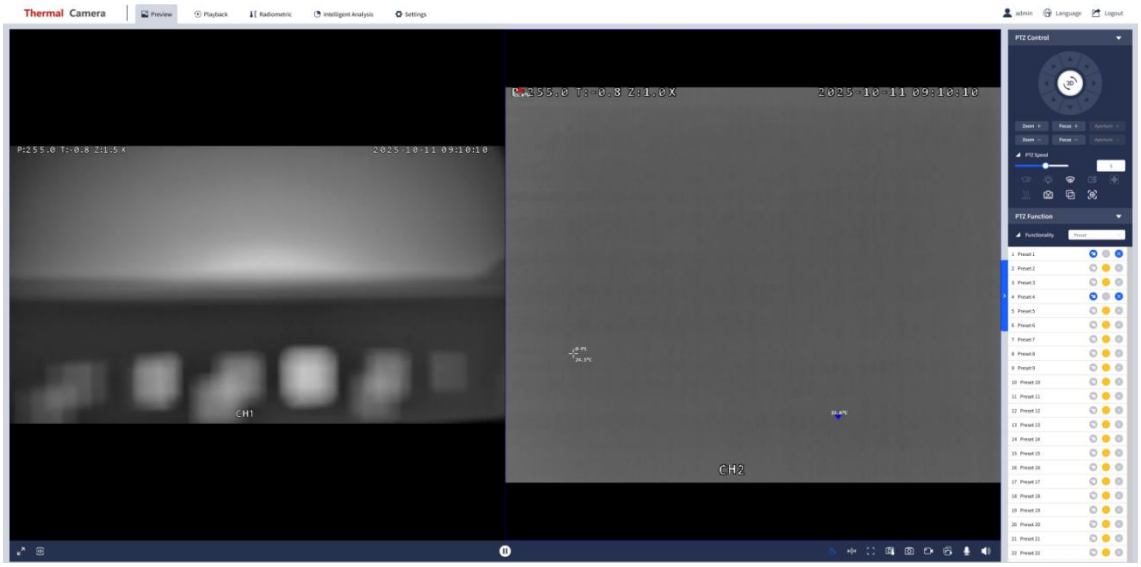


Figure 2.3 PTZ Control Panel

PTZ Control

Set PT rotation and lens control, see the following figure:



Figure 2.4 PTZ Control Interface

Direction Button: Support 8 directions: up, down, left, right, up-left, up-right, down-left, down-right.

3D Positioning: Select the visible channel or thermal channel display, and use the mouse to draw a bounding box on the screen. The pan-tilt will rotate and zoom to quickly focus on that scene. Drawing the bounding box from the top left to the bottom right will center and zoom in, while drawing from the bottom right to the top left will center and zoom out.

Zoom: Select image in visible channel/thermal channel, adjust the lens focal length to zoom in or zoom out the image. Click *Zoom+ to* zoom in the preview image, click *Zoom-* to zoom out on the preview image.

***Note**: this function is only available for devices with motorized zoom lens.*

Focus: select images in visible/thermal channel, adjust the focus to improve the image sharpness. Click Focus+ or Focus- button to adjust the focus; you can see the sharpness adjustment process on the preview image.

***Note**: this function is only available for devices with motorized focus lens.*

Aperture: set the luminous flux in the visible channel. Click Aperture+ button to make the image brighter, click the Aperture- button to make the image dimmer.

***Note:** This function is only available for devices in manual exposure mode.*

PT Speed: you can drag the adjustment bar or input the PT speed value (the value range is 1-8); the larger the value, the faster the speed.

Auxiliary Functions:

Set according to the common peripherals and functions, see the following figure:



Figure 2.5 Control Panel of the Auxiliary Functions

- Wiper: turn on/off the wiper function.
- IR Illuminator: turn on/off the IR illuminator.
- Defrost: Turn the defrost function on or off.
- Defog: turn on/off the defog function, mainly used to adjust the image sharpness in foggy or hazy environments.
- Fan: turn on/off the fan function.
- Heater: Turn the heater on or off.
- Auto focus: Select the visible light or thermal channel display and click the 'Auto Focus' button. The channel image will automatically adjust the lens's optical back focus to find the point of maximum clarity. *(Note: It is only available for devices with motorized focus lens.)*
- Bidirectional tracking: Adjusts the magnification to synchronize the field of view of both the visible and thermal channels.
- Manual tracking: Turn manual tracking on or off. *(Note: It is only available in infrared channels.)*

PTZ Function

In the PTZ function, you can set presets, tour, linear scan, area scan, pattern scan, accurate positioning, and auxiliary functions, as shown in the following figure. Refer to 6.4 PTZ Settings for detailed information.

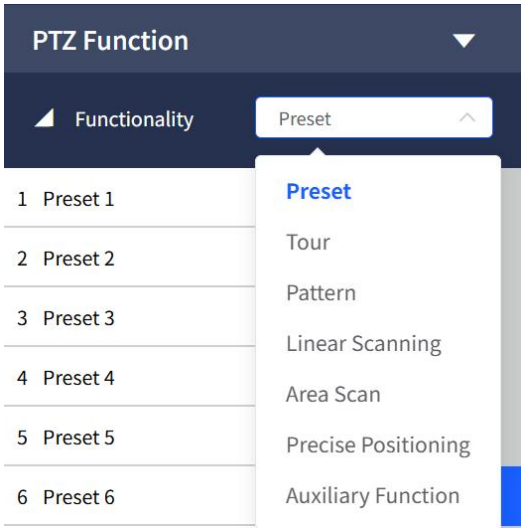


Figure 2.6 PTZ Control Interface

Preset: it refers to that the camera will save the current pan, tilt, and focal length info, which can be used quickly and adjust the PT and camera to the desired position.

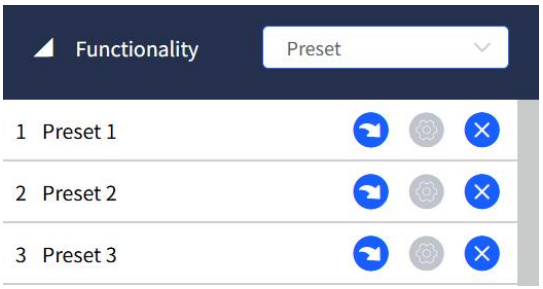


Figure 2.7 Preset Control Interface

Operation steps:

1) Choose *preset* in function area;
2) Rotate the camera to the desired direction via the direction buttons;
3) Select preset N in the preset list, click the settings button , then a prompt indicating successful operation will display on the interface;
4) Click the calling button of the preset N, and the camera will turn to the corresponding preset position;
5) Click the delete button of the preset N, and the preset N will be deleted after a successful operation prompt.

Tour: It refers to that the presets are arranged into the automatic tour according to the required sequence, so that the camera can automatically move around according to the preset route in a convenient and fast way.

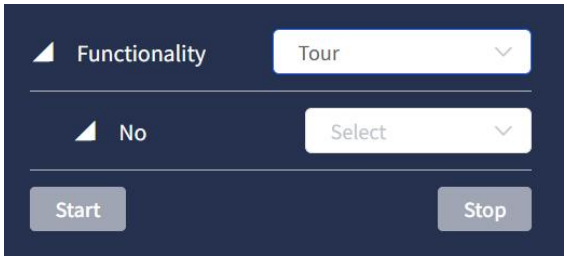


Figure 2.8 Tour Control Interface

Operation steps:

1) Select Settings-PTZ-PTZ function-Tour;
2) Select Tour in PTZ function;
3) Select Tour N;
4) Click *Start* to start the scanning tour, and click *Stop* to end it.

Pattern: By configuring pattern, you can continuously record your operation to the PTZ and record the moving pattern of the camera's lens. The Device will make the location where the recording begins as the beginning point, and move back and forward automatically following the preset movement pattern.



Figure 2.9 Pattern Control Interface

Operation steps:

1) Select Settings-PTZ-PTZ function-Pattern-N;

2) Select Pattern in PTZ function area;

3) Select N for the Pattern No.

4) Click Start to start pattern and click Stop to stop pattern.

Linear Scan: The camera moves horizontally at a certain speed between the configured left and right limits.



Figure 2.10 Linear Scan Control Interface

Operation steps:

1) Select Settings-PTZ-PTZ function- Linear Scan-Scan N;

2) Select Linear Scan in PTZ function area;

3) Select N for the Linear Scan No.

4) Click Start to start linear scan and click Stop to stop linear scan.

Area Scan: The PTZ performs a "bow"-shaped scan according to the designated area.



Figure 2.11 Area Scan Control Interface

Operation steps:

1) Select Settings-PTZ-PTZ function- Area Scan-No.;

2) Select Area Scan in PTZ function area;

3) Select N for the Area Scan No.

4) Click Start to start area scan and click Stop to stop area scan.

Precise Positioning: Input the required horizontal angle, vertical angle, and zoom parameters, then click the "Locate" button to accurately locate the corresponding position. The selected visible channel/thermal channel screen will be zoomed in or out according to the set "zoom" level. Here, each unit of the horizontal and vertical angle parameters represents 0.01°, and the zoom parameter is a linear mapping from the minimum to the maximum magnification in the range of 1 to 16,384.

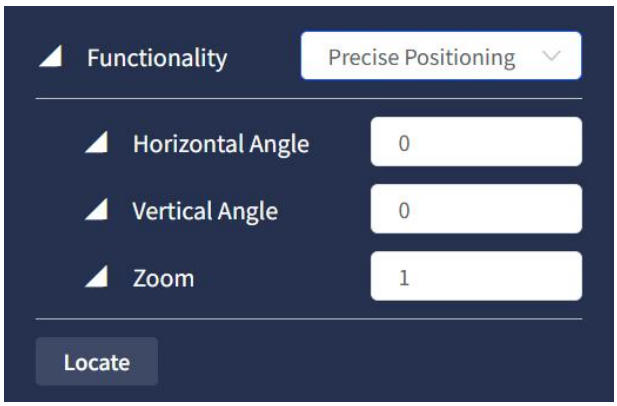


Figure 2.12 Precise Positioning Control Interface

Auxiliary Function: Quickly enable or disable the peripherals supported by the current channel.



Figure 2.13 Auxiliary Function Control Interface

3 Playback

3.1 Play SD Card Videos/Images

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

3.1.1 SD card video playback:

Operation 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 videos of this day will be displayed in the retrieved file list, as shown in the figure below:

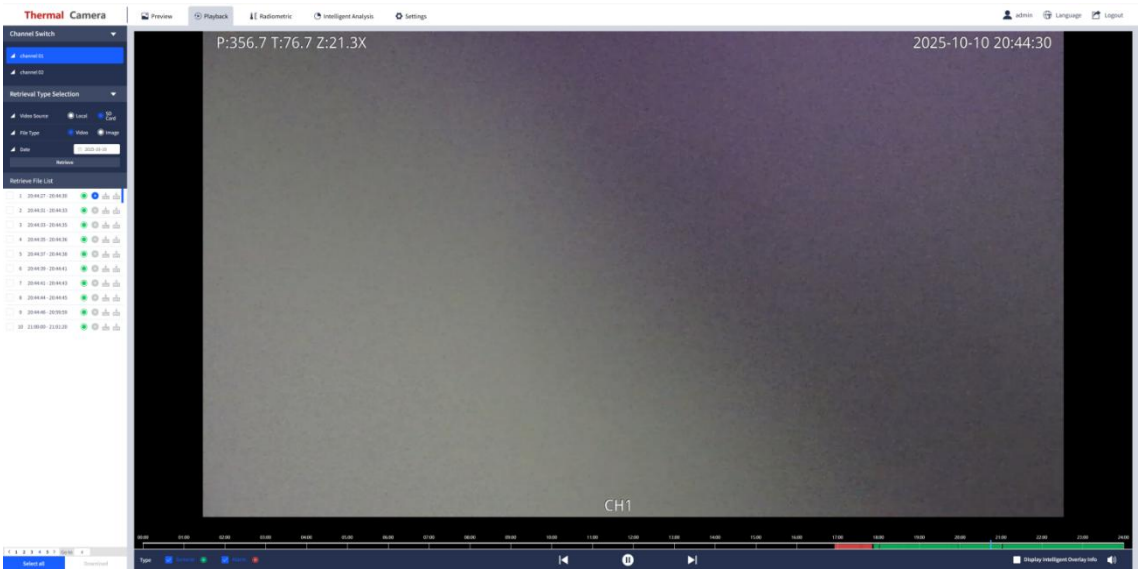


Figure 3.1 Playback-Play SD Card Videos

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 it 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 are supported. Click the download icon 

behind the video list to download the current video files. The downloaded video files will be stored in the browser's default download files, and 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 being enabled, the sound can be heard when the video is played.

3.1.2 SD card image playback:

Operation 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:

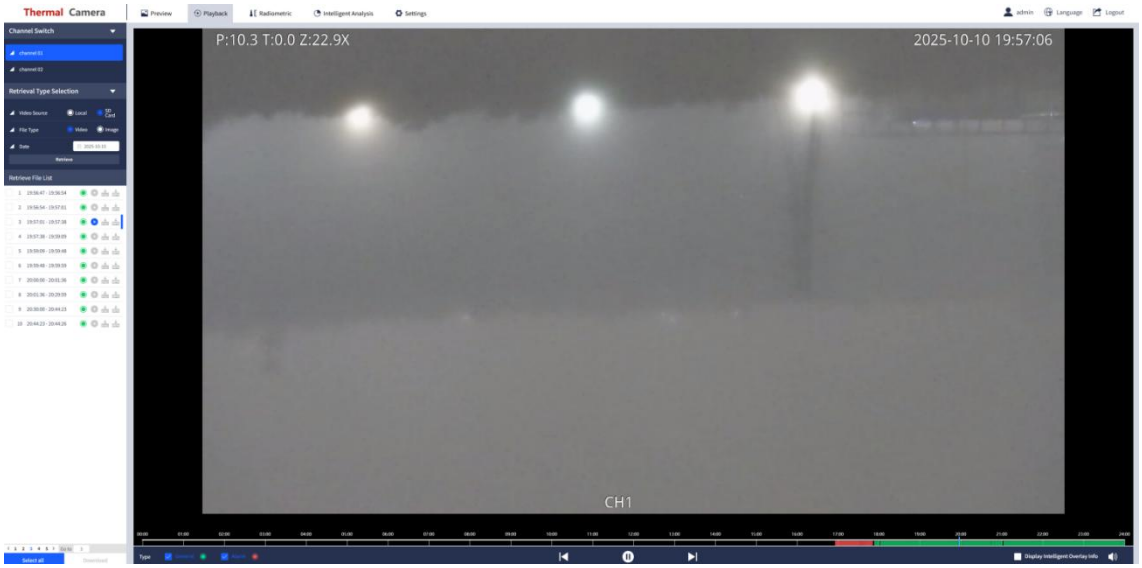


Figure 3.2 Playback-Play SD Card Images

2) 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.)

Image 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 an image viewer supporting .jpg format.

3.2 Play Local Videos/Images

Operation 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 3.3 Playback-Play Local Videos

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

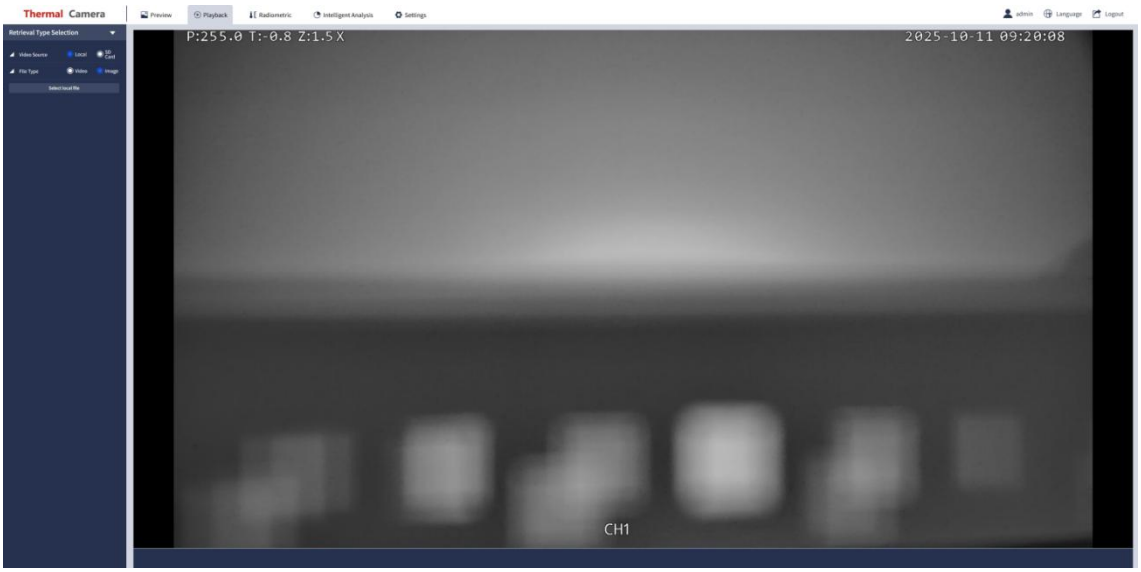


Figure 3.4 Playback-Play Local Image

4 Radiometric Function

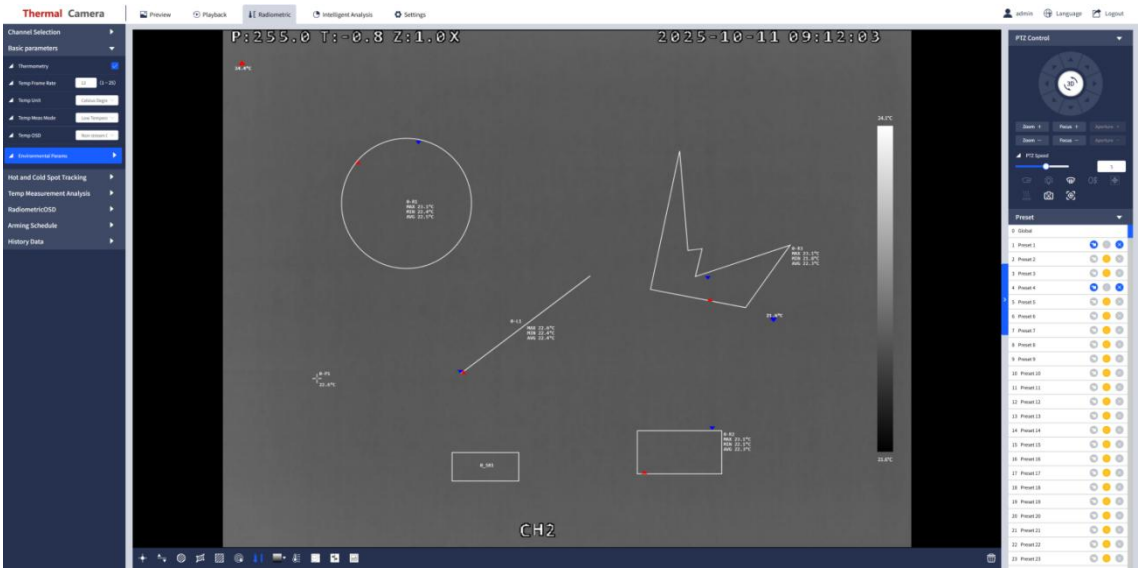


Figure 4.1 Radiometric Interface

4.1 Basic Parameters

Thermography: Enable/disable the functionality. Thermography function must be enabled to draw points, lines, or regions.

Temperature Frame Rate: The range is 1-12, with a default of 12.

Temperature Unit: Units can be switched among Celsius, Fahrenheit, and Kelvin.

Temperature Measurement Mode: Low-Temperature and High-Temperature modes can be switched, corresponding to different temperature ranges, with High-Temperature Mode as the default.

Temperature OSD: Temperature data overlay can be set to Stream Overlay, Non-stream Overlay, or No overlay, with Non-stream Overlay as the default.

(1) Stream Overlay: Temperature data is embedded into the video stream and displayed during playback.

(2) Non-stream Overlay: Temperature data is not embedded in the video stream. During playback, intelligent information overlay must be enabled to view temperature data.

(3) No Overlay: The drawn temperature measurement rules and related temperature data are not displayed as overlays.

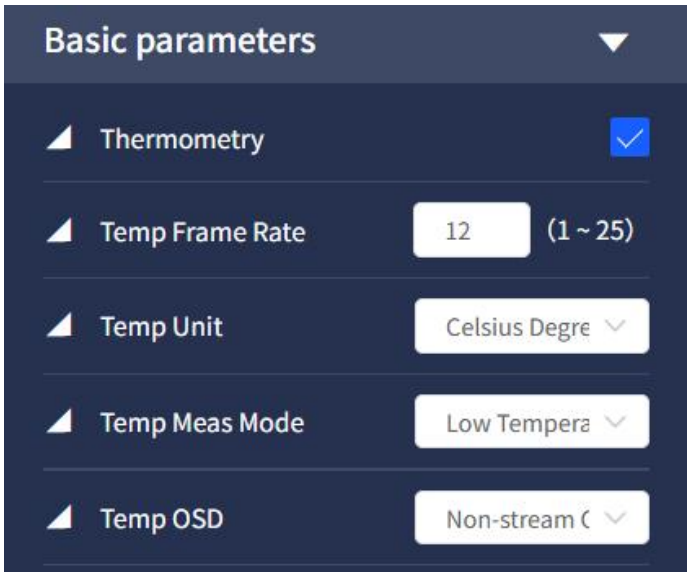


Figure 4.2 Radiometric-Basic Parameters

Environmental Parameters: This function is primarily used to configure the environmental variables for the thermal channel. Five parameters can be set: emissivity, reflected temperature, atmospheric temperature, atmospheric transmittance, and target distance. These environmental parameter settings are general settings. See the figure below:

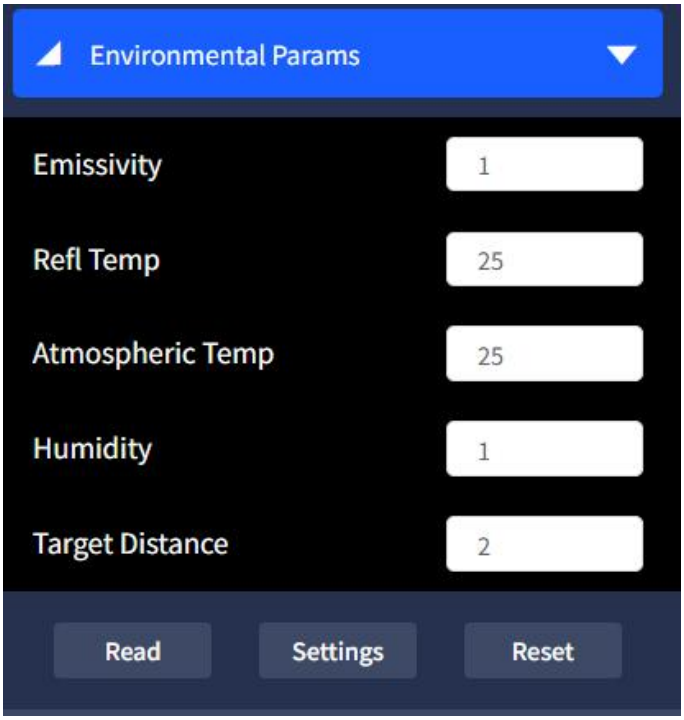


Figure 4.3 Radiometric-Environmental Parameters Settings Interface

Note:

(1) Emissivity/Atmospheric Transmittance: Range is 0.01–1, with up to two decimal places; Reflected Temperature/Atmospheric Temperature: Range is -100°C to 100°C.

(2) If individual temperature measurement data is not configured separately, all environmental parameter values will default to the settings here. For individual configurations, detailed settings can be made in the "Alarm Rule Settings".

4.2 Hot and Cold Spot Tracking

When the high-temperature/low-temperature full-frame alarm is enabled, the system will trigger an alarm and execute the configured actions when the thermal channel's full-frame high/low temperature reaches the set alarm threshold.

Operation Steps: For parameter details, refer to Table 4-1.

1) Enable the function on the cold/hotspot tracking settings interface.
2) Turn on the full-frame high/low-temperature alarm and set the alarm temperature threshold.
3) Set the filtering time to M seconds.
4) Configure the tolerance temperature to N.
5) Set the alarm linkage parameters: When the alarm is triggered, corresponding actions will be executed, such as recording (visual/infrared channel), image capture, email notifications, flash alarms, sound linkage, alarm outputs, etc.
6) Arming Schedule: Set the time period for triggering full-frame high/low-temperature alarm events (default is all time periods).
7) Click "Save" to complete the setting.

See the figure below:

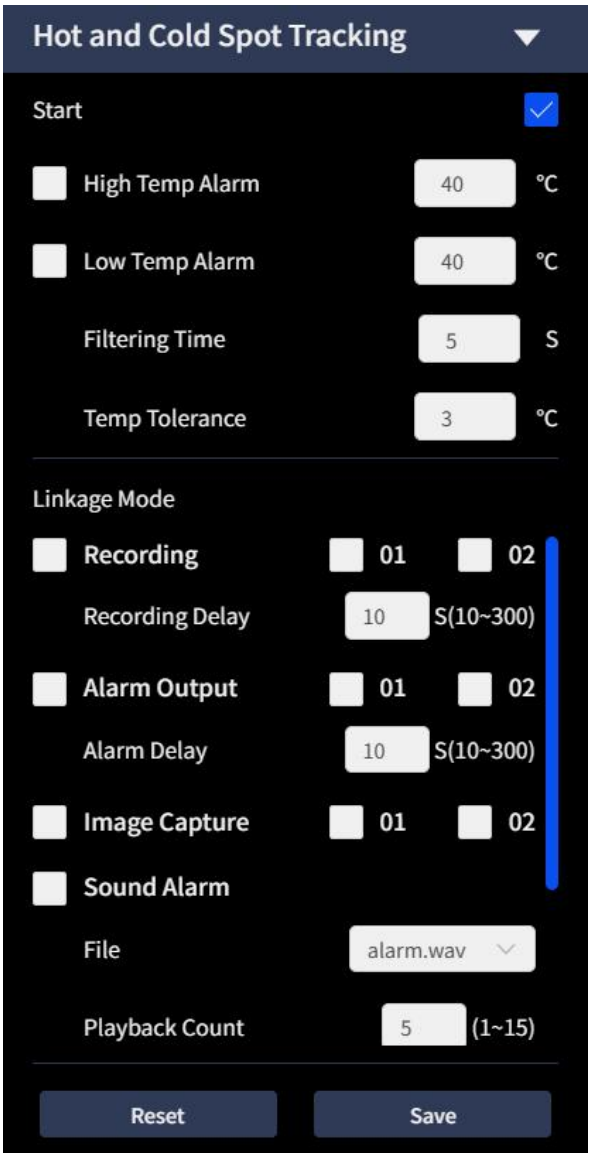


Figure 4.4 Radiometric-Hot and Cold Spot Tracking

Table 4-1 Alarm Rules Descriptions

Parameter	Descriptions
1 Enable	To make the alarm linkage rules take effect
2 High Temp Alarm	Above alarm threshold
3 Low Temp Alarm	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 and lasting 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℃, the alarm temperature is set as 45℃, then the alarm will be triggered when the detected temperature reaches 45℃, and the alarm will stop until the temperature is below 42℃.
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 will 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 will 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 be 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 filling 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 Voice Alarm	The system will link to broadcast audio files when the alarm is triggered after this option is selected. File: select the built-in audio alarm files. The audio files can be uploaded by the user. Refer to Chapter 6.1.3.2 for detailed operation. Times of Play: Set the times of broadcasting.
11 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 6.2.3 SMTP for detailed operation.

4.3 Temperature Measurement Analysis

4.3.1 Temperature Measurement List

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

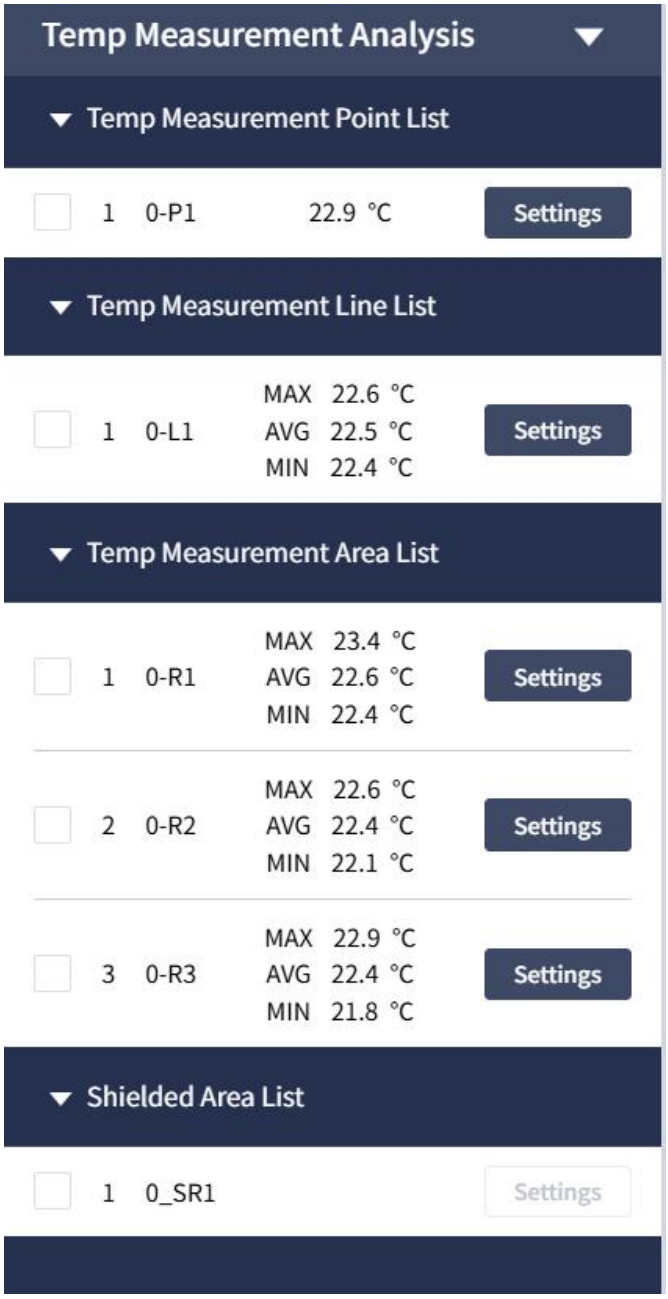


Figure 4.5 Temperature Measurement Analysis List

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

Alarm Rules Settings

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

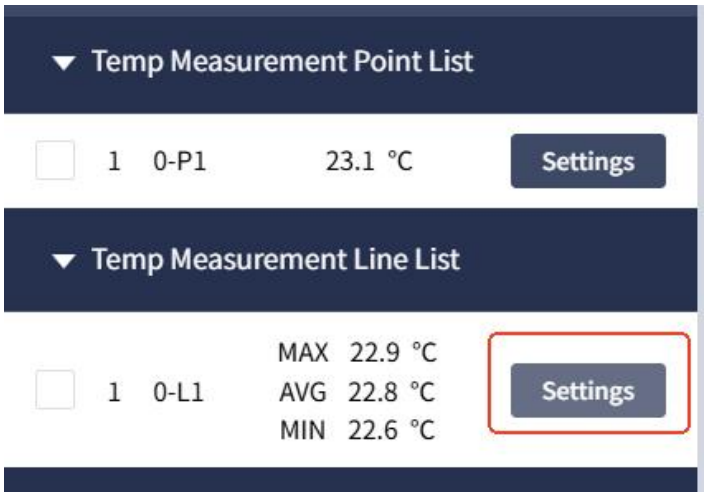


Figure 4.6 Temperature Measurement Analysis-Alarm Rules Settings Interface

1. Environmental Parameters Settings:

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

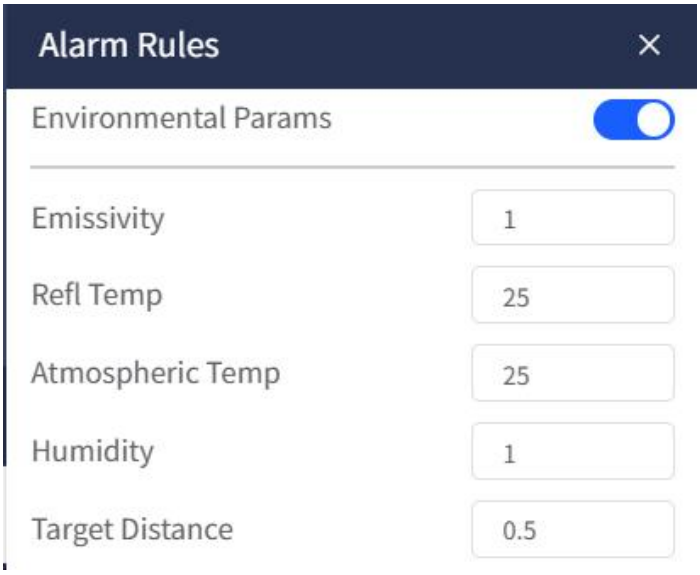


Figure 4.7 Temperature Measurement Analysis-Environmental Parameters Settings Interface

The environmental parameters can be set only after environmental parameters are 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 4.1 for basic parameter settings.)

2. Refer to Chapter 4.2 Cold &Hot Spot Tracking for the settings of alarm rules and linkage way.

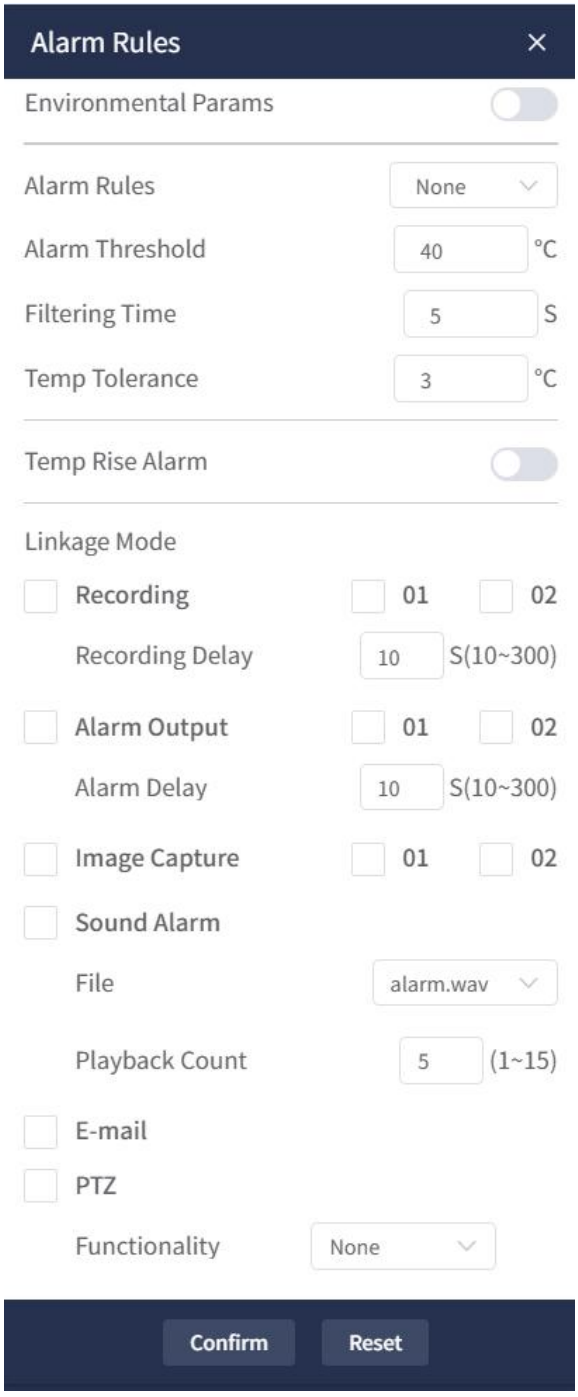


Figure 4.8 Temperature Measurement Analysis-Alarm Rules Interface

3. Temperature Rise Alarm

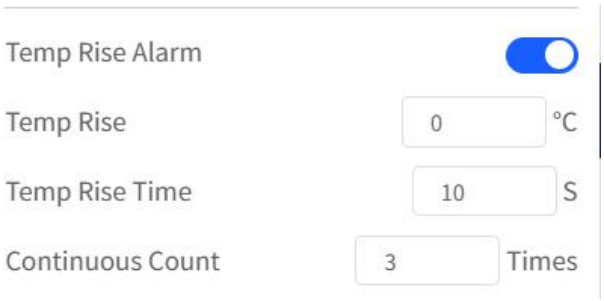


Figure 4.9 Measurement List-Temperature Rise Alarm Settings

After temperature rise alarm is enabled  , if the Max. temperature rise value is equal to or more than Temp Rising of Temp during the Temp Rising Time, and when the total times are equal to or more than Temp Rising Time, then the alarm will be triggered.

Confirm to delete: 

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

Check all: 

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

4.3.2 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 8 shielded areas), and the temperature data will not be displayed in the shielded area.

Display Temperature Bar: 

Click the icon to turn on/off the 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.

Color Palette: 

20 palettes are supported as below.



Figure 4.10 Radiometric-Color Palette Interface

Temperature Difference: 

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

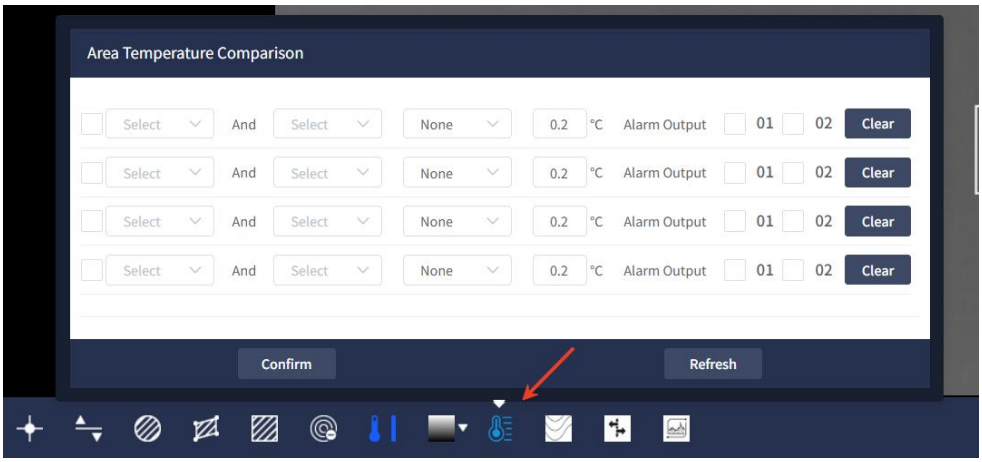


Figure 4.11 Radiometric-Temperature Difference Settings Interface

Thermal Image Export: 

Download both the current visual and infrared images simultaneously. The infrared image contains temperature data, which can be viewed using a specified tool (IR Discovery).

Delete: 

Click the delete icon  in the lower right corner of the temperature measurement interface, and click the point/line/circle/polygon/rectangle/ shielding area in the screen to delete it (the corresponding data in the temperature measurement list will also disappear after deletion).

Note: *The seven functions of delete/point/line/circle/polygon/rectangle/ region/shielding area are mutually exclusive, and any two of them cannot be turned on at the same time.*

4.4 Radiometric OSD

Temperature measurement OSD overlay configuration, controlling which OSD overlay information is displayed and the overlay rules.

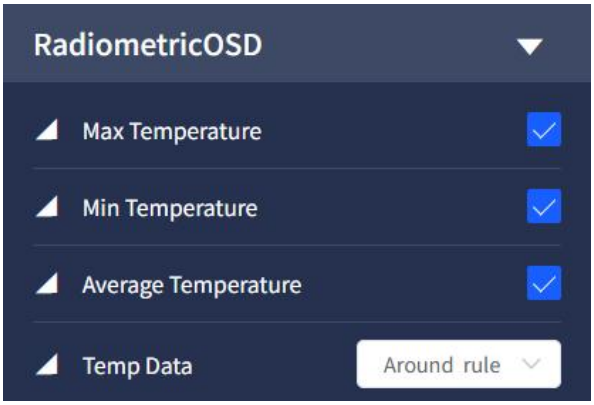


Figure 4.12 Radiometric-Radiometric OSD Settings Interface

4.5 Link Schedule

For the temperature measurement and analysis service, the schedule is arranged in time periods. If an alarm occurs within the configuring time period, the related alarm action will be linked. You can configure six time periods each day, accurate to second. You can also copy the same time period. By default, all time periods are enabled.

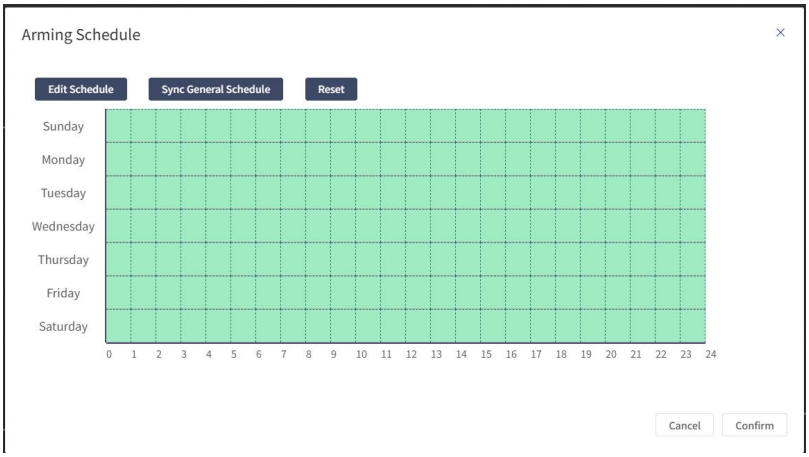


Figure 4.13 Radiometric-Link Schedule Configuring Interface

4.6 History Data

This function supports querying history data of temperature measurement rules in report format and exporting Excel files in .xls format.

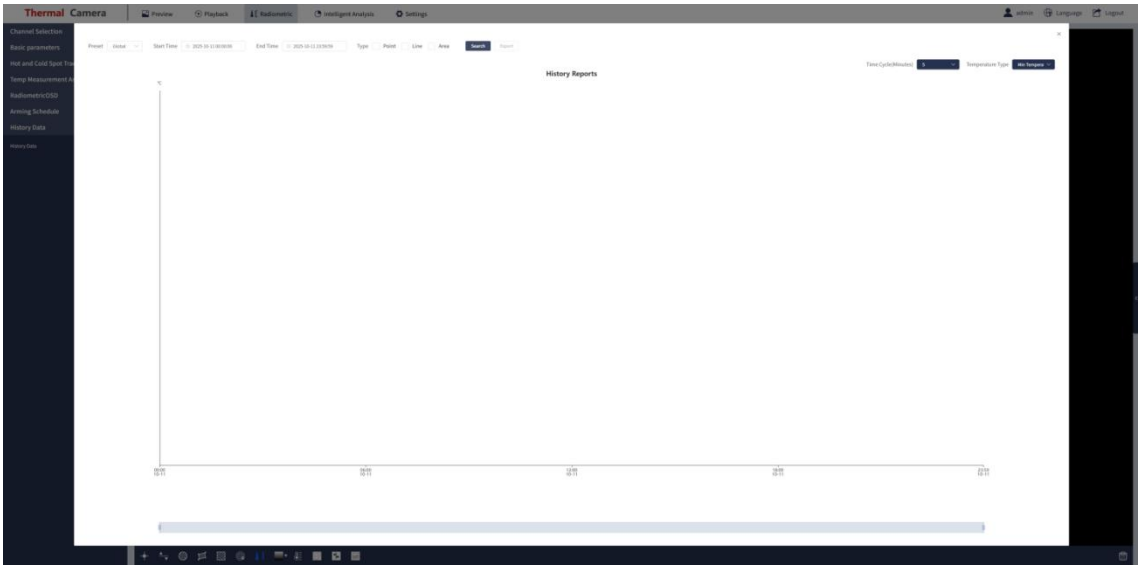


Figure 4.14 Radiometric-History Data

4.7 Temperature Measurement Scenarios

The temperature measurement analysis can be performed in global scenario or a single scenario for PTZ devices.

Global Scenario: Each scenario is scanned and measured by the global rules; the global configurations can be used in all scenarios, so presets are unnecessary to be related. The configuring temperature measurement rules in the global scenario, the name starts with 0, which will be displayed and enabled in all scenarios.

Temperature Measurement Scenario: The temperature measurement rules can be configured via preset for a certain scenario. The temperature measurement rule can be enabled when this configuration is called. Click the arrow  on temperature measurement interface to display or hide the PTZ-related functions, and turn to the corresponding preset 1-1024 via the preset menu bar, the name starts with N-, which can be enabled only on preset N.

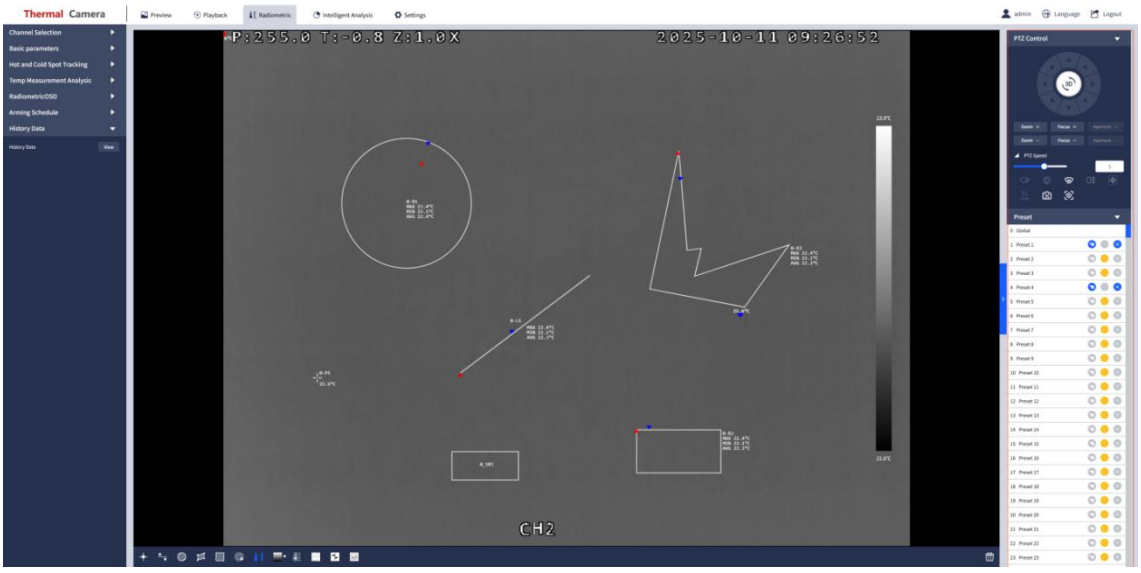


Figure 4.15 Temperature Measurement Configuring Interface

5 Intelligent Analysis

5.1 Target Recognition

It supports recognizing targets such as people, vehicles, and ships, and performs linked tracking and alarm linkage upon detection.

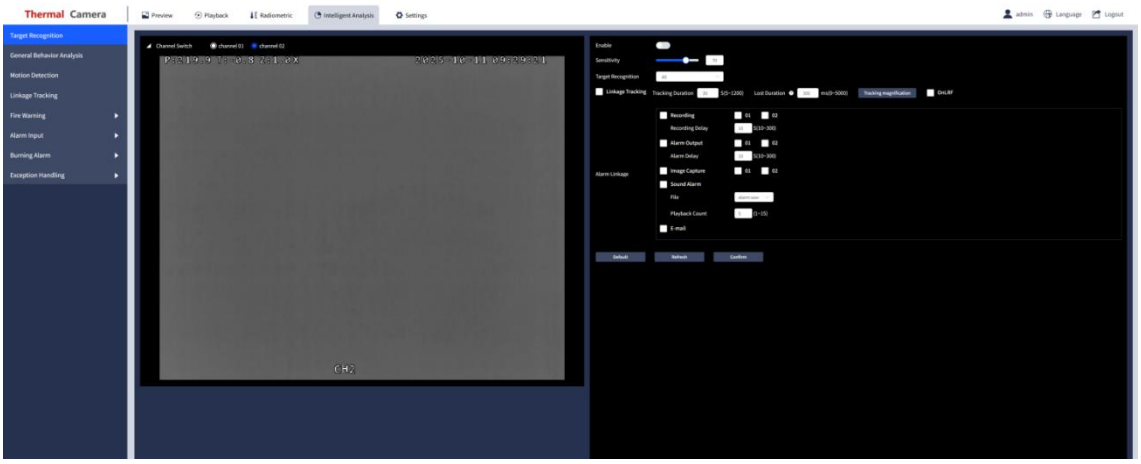


Figure 5.1 Intelligent Analysis-Target Recognition Interface

5.2 General Behavior Analysis

This interface allows you to configure tripwire intrusion and area intrusion rules.

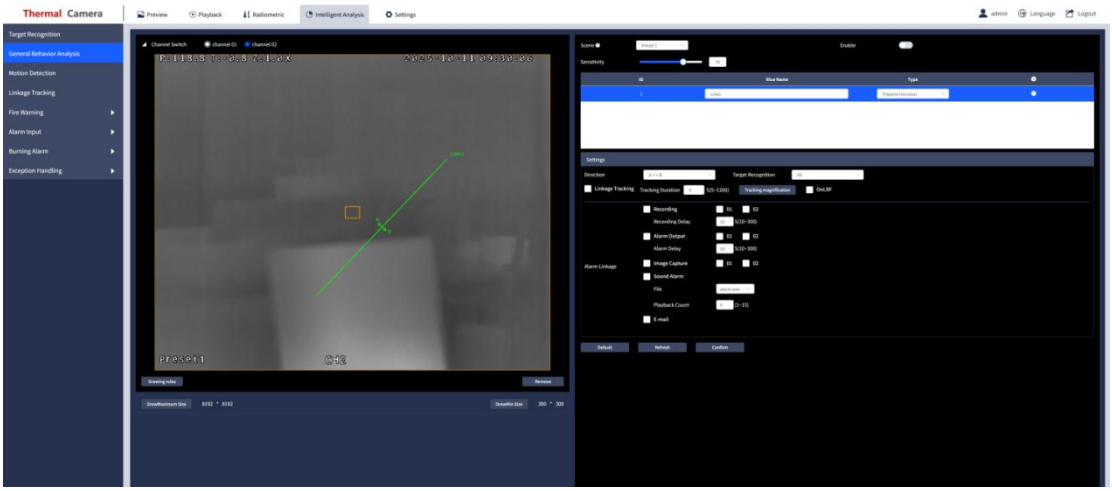


Figure 5.2 Intelligent Analysis-General Behavior Analysis Interface

5.3 Motion Detection

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

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

Operation steps:

1) Select the channel: Smart-Motion Detection-Channel 1/Channel 2.
2) Enable: Enable/disable the function.
3) Set sensitivity: The higher the sensitivity, the easier it is to trigger. The default value is high.
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 detection areas. Different color indicates different detection area.
6) Delete: Click delete button, the drawn area will be removed, click Draw Area again to draw other detection areas.
7) Threshold: The detection area value of the effective motion detection region: the smaller the value, the easier it is to trigger an alarm.
8) Set the alarm linkage parameters, the corresponding events will be linked when the alarm is triggered.
9) Set schedule: The alarm events will be triggered only within the time range.
10) Click “Confirm” to finish the setting.

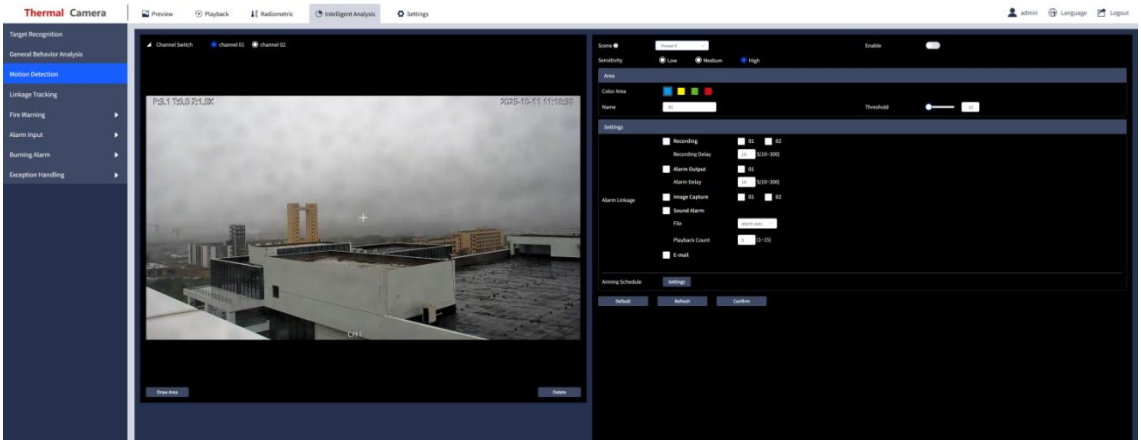


Figure 5.3 Intelligent Analysis-Motion Detection Interface

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

5.4 Linkage Tracking

Set Alarm Linkage Rules

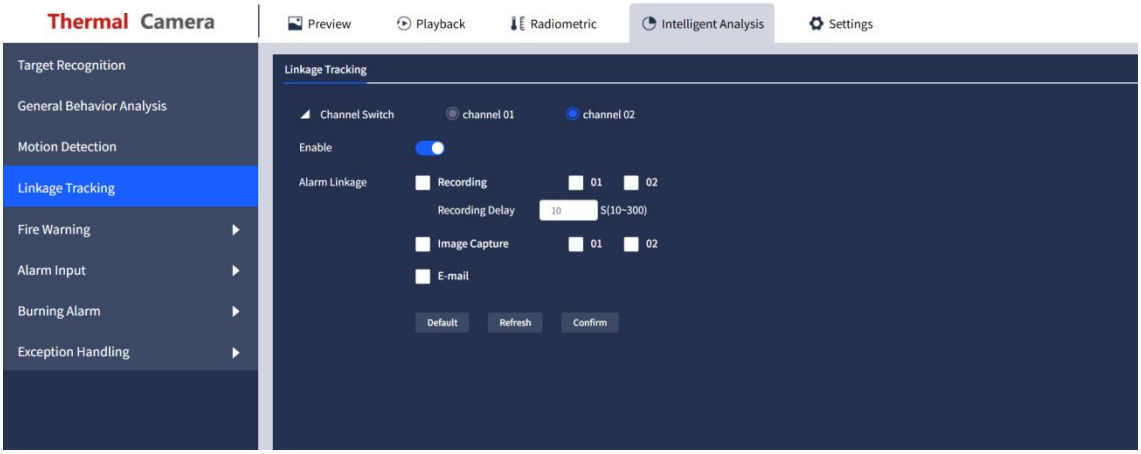


Figure 5.4 Intelligent Analysis-Linkage Tracking Interface

5.5 Fire Warning

5.5.1 Smoke & Fire Detection

Set up fire detection rules, supporting three modes: Smoke, Fire, and Smoke&Fire.

Smoke mode can only be configured in the visible channel. Fire mode can only be configured in the thermal channel. Smoke&Fire mode allows configuring both in visible and thermal channels (in dual confirmation mode, an alarm occurs only when the alarm is triggered in both channels simultaneously at the same location; otherwise, they will alarm independently).

Operation steps:

1) Enable/Disable: Turn the function on or off.
2) Select the Fire Alarm Mode: Choose between "Anti-interference" and "High Response" modes based on your needs. Anti-interference by default.
3) Sensitivity: The higher the value, the easier it is to detect a fire. The default value is 50.
4) Set Shielding Area: Click the "+" icon in the shielding rule list to add a shielding rule. Click the "Draw rules" button to draw the shielding area on the video screen.
5) Delete: Click the "Delete" button to remove the corresponding shielding area from the list.
6) Set Alarm Linkage Parameters: Trigger corresponding actions when an alarm is activated.
7) Schedule: The alarm events will be triggered within the set time range.
8) Click "Confirm" to complete the setup.

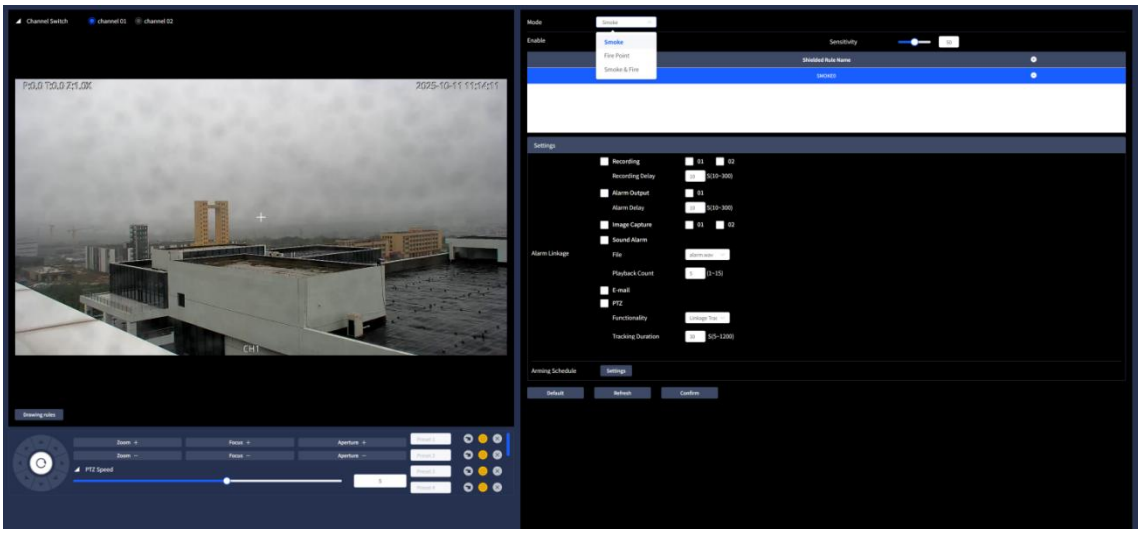


Figure 5.5 Intelligent Analysis-Fire&Smoke Detection Interface

Note: *When an alarm occurs, in addition to being able to link with the PTZ functions, the PTZ device also supports fire linkage tracking.*

5.6 Alarm Input

When an external alarm triggers an alarm, the system will generate an alert and execute the configured actions.

Operation steps:

1) Enable: Enable or disable the alarm input;
2) Alarm Input: The device supports separate channel alarm input, and 2 channels of alarm input parameter configurations are independent of each other.
3) Image Stabilization: The setting range is 0-100s, and only one alarm event is recorded in the image stabilization 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.
6) Link schedule: The alarm events will be triggered only within the set time range.
7) Click "Confirm" to complete the setting.

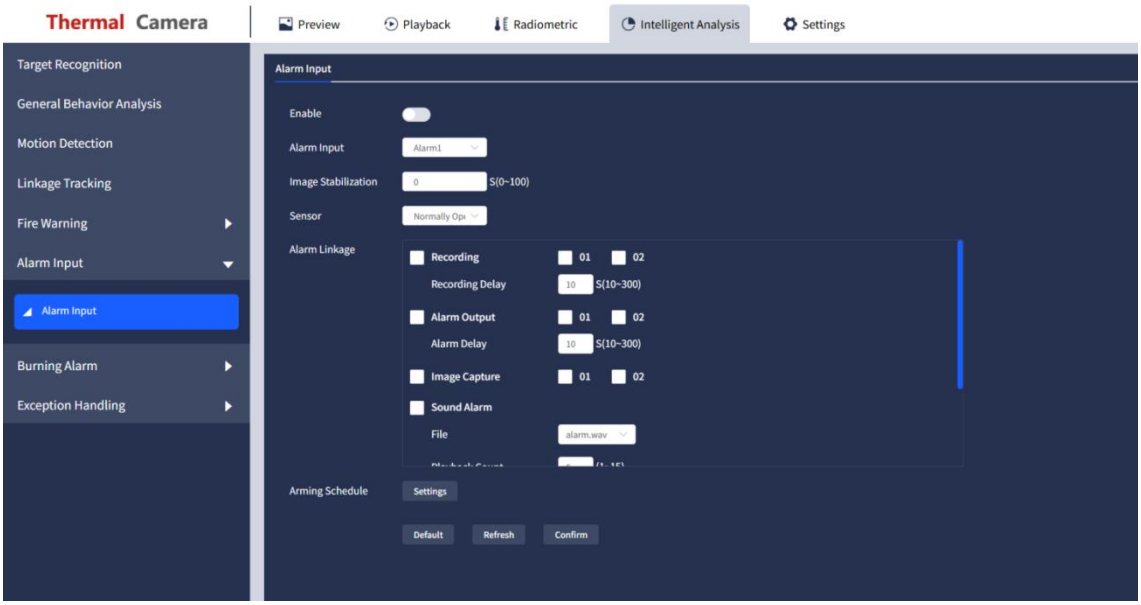


Figure 5.6 Intelligent Analysis-Alarm Input Interface

5.7 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 steps:

1) Enable the function.
2) Energy value: 0-100; the smaller the value, the easier it is to trigger the alarm.
3) Sensitivity: 0-100; the higher the value, the easier it is to trigger the alarm.
4) Alarm linkage: Set the alarm linkage parameters, and then the corresponding events will be linked when the alarm is triggered.
5) Link schedule: The alarm events will be triggered only within the time range.
6) Click "Confirm" to complete the setting.

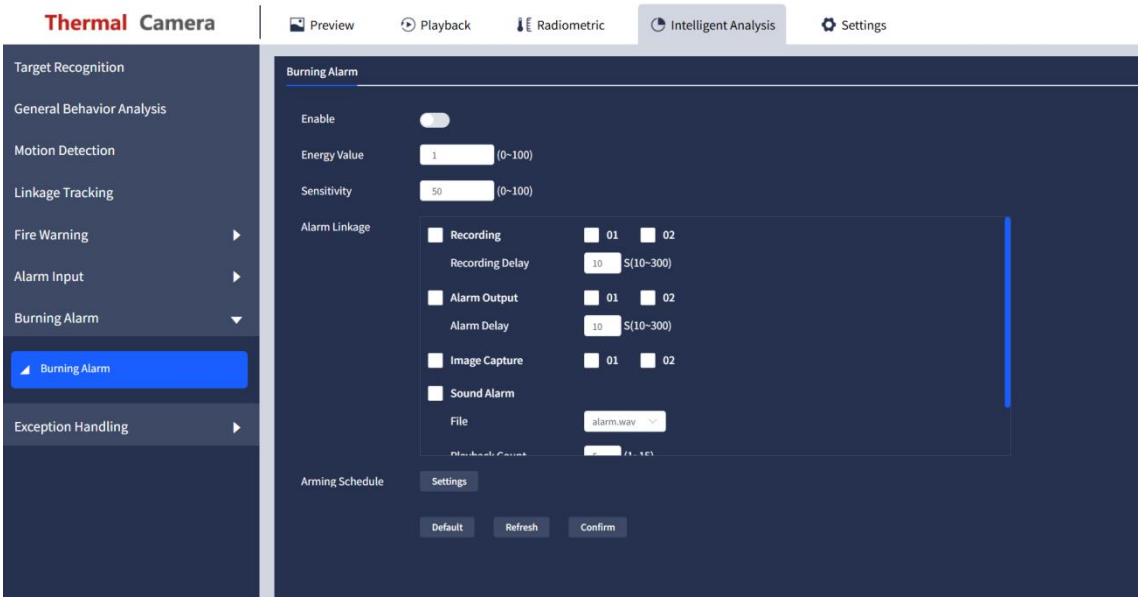


Figure 5.7 Intelligent Analysis-Burning Alarm Interface

5.8 Exception Handling

5.8.1 SD Card Exception

When there is some exception in SD card, the system will generate an alarm and linkage setting action. SD card abnormalities include not existing or SD card error.

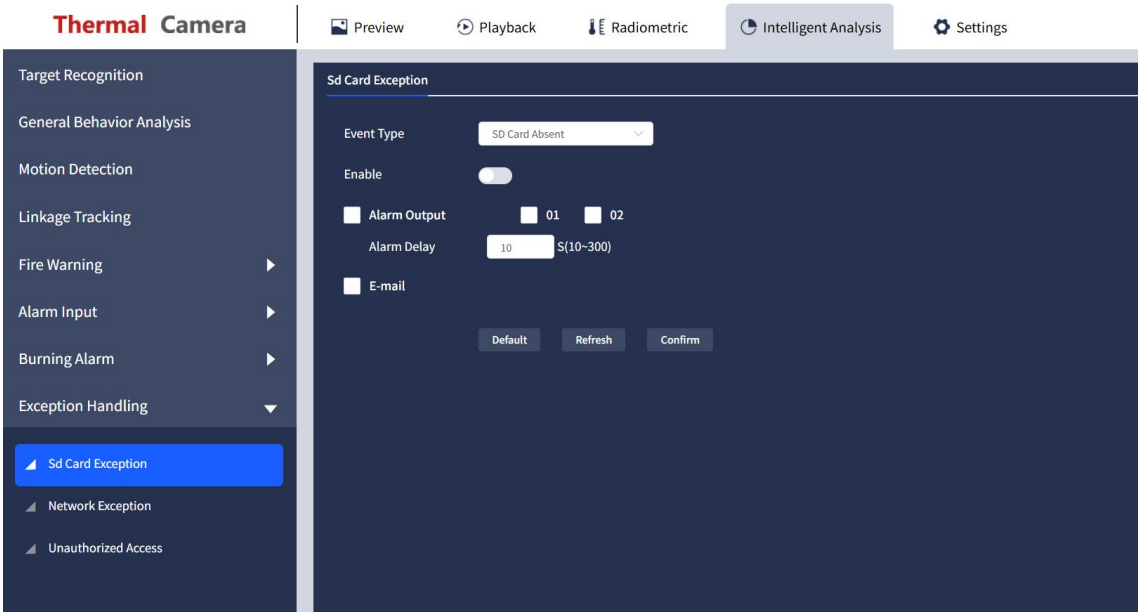


Figure 5.8 Intelligent Analysis-SD Card Exception Interface

5.8.2 Network Anomaly

When the network is abnormal, the system will generate an alarm and linkage setting action. Network abnormalities include network disconnection and IP conflicts.

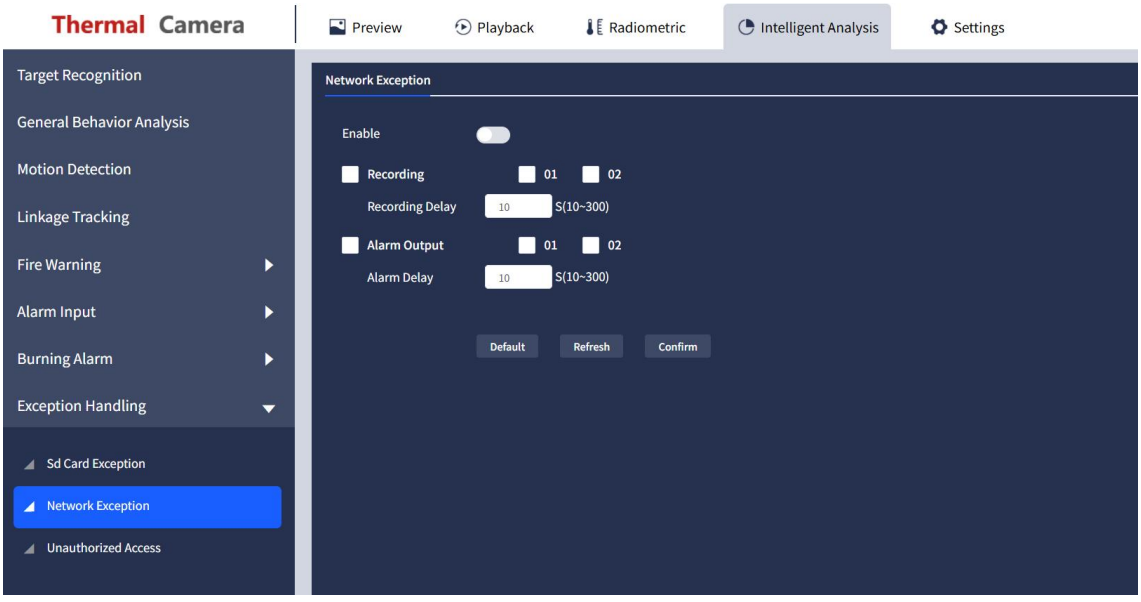


Figure 5.9 Intelligent Analysis-Network Exception Interface

5.8.3 Unauthorized Access

When the login password is entered incorrectly more than 5 times, the system will generate an alert and execute the configured actions.

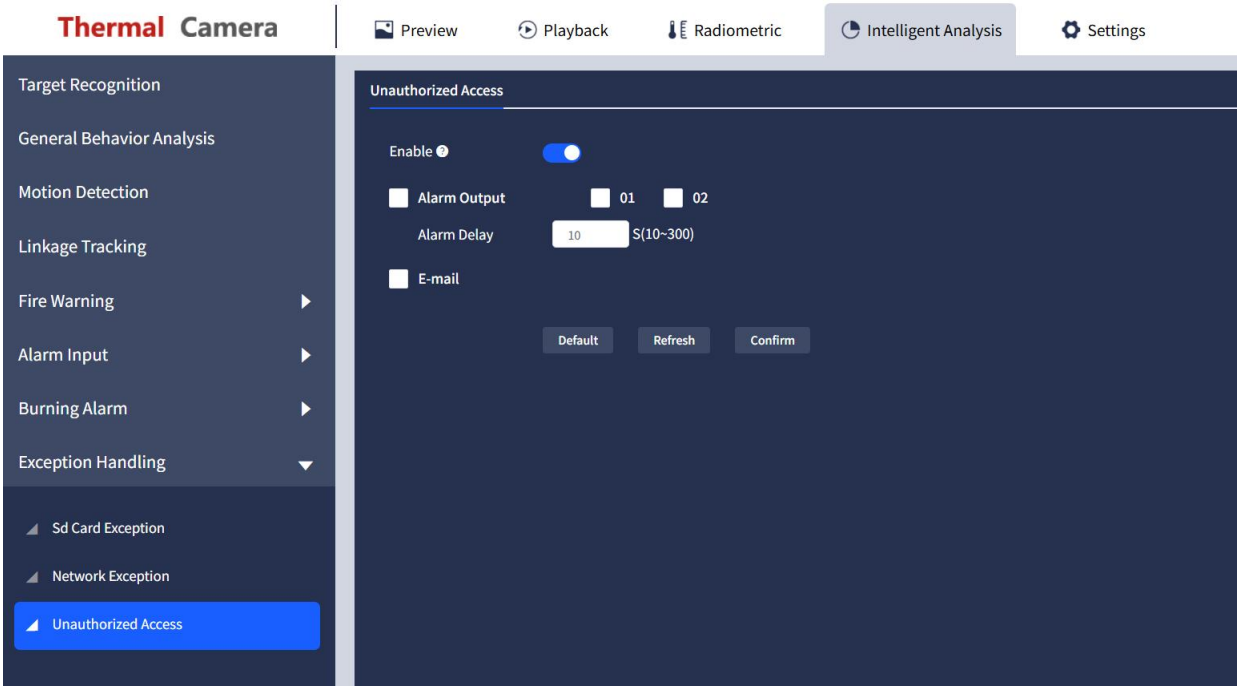


Figure 5.10 Intelligent Analysis-Unauthorized Access

6 Settings

6.1 Camera Setting

6.1.1 Camera Parameters

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

Channel 01-Visible Light

■ Image Settings

Brightness: Adjust the overall brightness of the image by linear adjustment, mostly 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.

Sharpness: 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: Adjust the spatial noise reduction degree; the larger the value is, the smaller the noise is, and vice versa.

3D Noise Reduction: Adjust the temporal noise reduction degree; the larger the value is, the smaller the noise is, and vice versa.

AI Noise Reduction: Reduce image noise to make the image clearer.

Gamma: The brightness and contrast of the image are changed by nonlinear adjustment. The larger the value, the brighter the image, and vice versa.

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: There are four modes to be selected.

- Vertical flip: The image will flip 180º up-down.
- Horizontal flip: The image will flip 180ºleft-right.
- 180º flip: Flip 180º both up-down and left-right.
- Normal: The image returns to the normal state.

Note: *The flip function in channel 1 and channel 2 is synchronized. That is, set the flip function in any one of the channels, and the image in another channel will be flipped simultaneously.*

Defog: When the device is in fog, haze, or other environments, the image quality will be degraded, and the clarity of the image will be adjusted through the defog function. After the defog function is enabled, the defog level can be set. The blurrier the image, the higher the recommended level value is.

Heat Haze Reduction: Mitigate the image distortion due to heat waves in the air via image processing and optimize the image quality.

EIS: Realize image stability via algorithm, resolve the image vibration during use to make the image clearer. The function is disabled by default. The EIS level can be configured after the function is enabled; the more severe the image vibration, the higher the recommended level is.

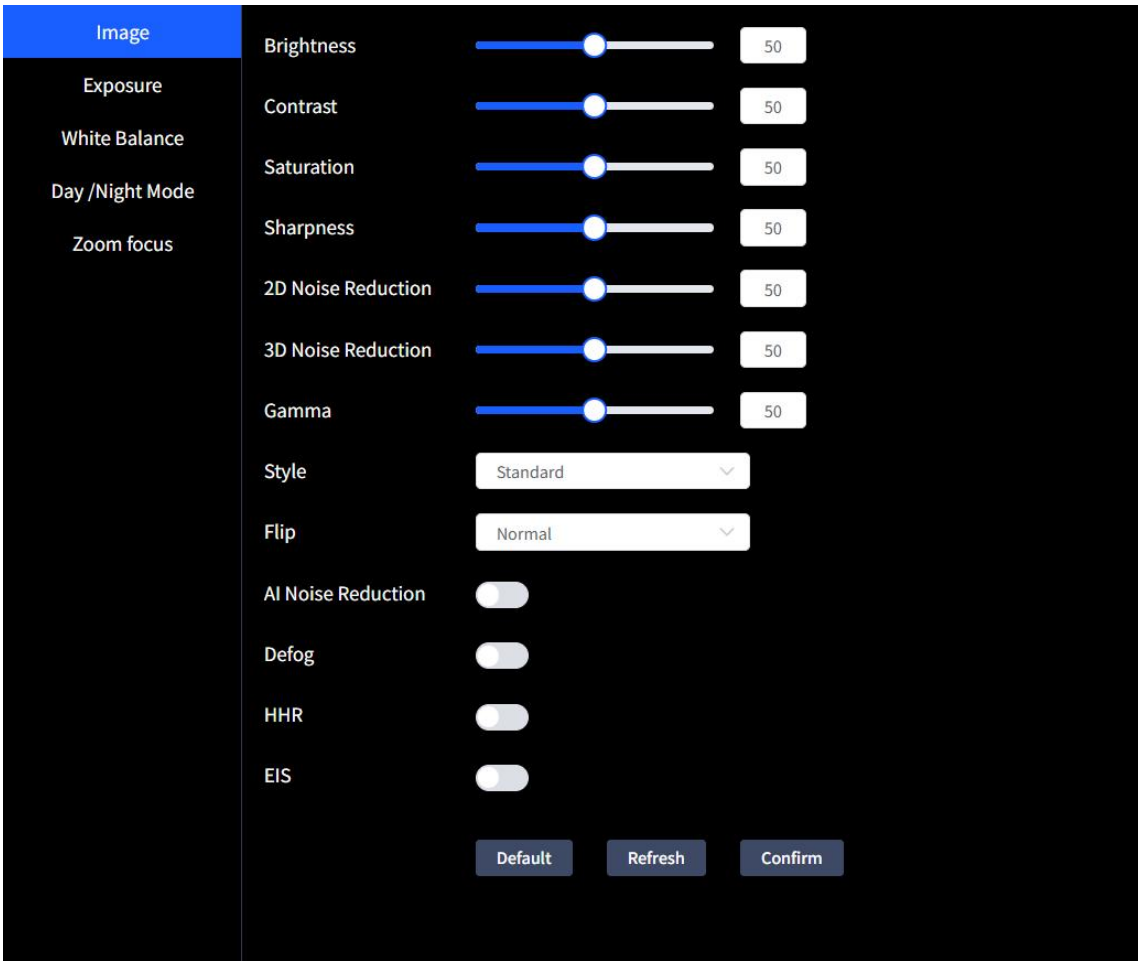


Figure 6.1 Channel 01-Image

■ Exposure Parameters Settings

Anti-Flicker: 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: In this mode, the exposure settings can be adjusted to achieve the desired effects of different exposure modes.

Mode: configure the exposure mode, adjust the image display brightness;

- Auto: Adjust the image display brightness automatically based on the environment.
- Manual: Adjust the image display brightness by manually configuring the aperture, shutter and gain.
- Aperture Priority: The aperture can be adjusted based on the actual scenario, and the shutter and gain is auto-adjusted.
- Shutter Priority: The shutter can be adjusted based on the actual scenario the aperture and gain is auto-adjusted.

Gain Limit: Configure gain limit value.

Backlight Mode: Off/Strong light suppression/ Backlight compensation.

- Off: Inactivate backlight mode;

- Strong light suppression: Restrain the image in strong light, brighten the image in dark light to balance the whole image; the higher the suppression level, the more obvious the light suppression is;
- Backlight Compensation: Compensate for the object's darkness in backlight conditions; the area to be compensated can be chosen.

See the following picture:

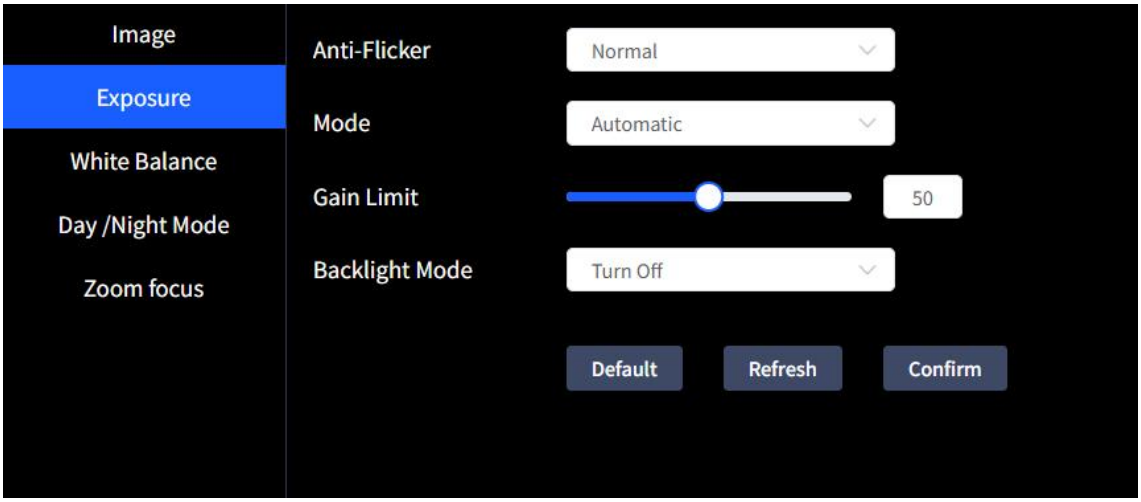


Figure 6.2 Channel 01-Exposure

White Balance Settings

The object color will change due to refracted ray; you can mitigate the color deviation by selecting the appropriate white balance mode according to the use condition. Auto, Indoor, Outdoor, and Manual are optional for white balance mode.



Figure 6.3 Channel 01-White Balance

Day and Night Mode Settings

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

- Automatic: Switch the day/night mode automatically; the sensitivity can be changed in auto mode, the larger the value is, the more easily it is to trigger day/night switch; the delay setting is also available in auto mode, the smaller the value, the higher the speed is to switch between color and B/W;
- 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 the day or night, and switch the corresponding day and night mode.

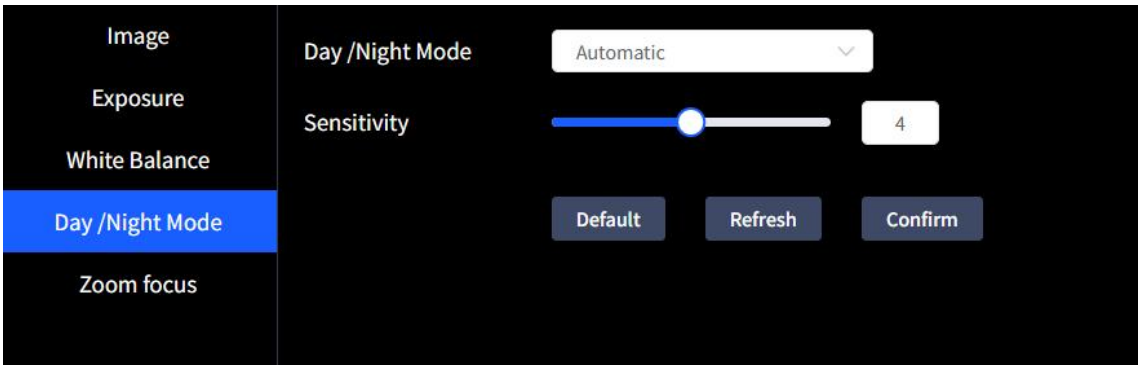


Figure 6.4 Channel 01-Day and Night Conversion

Focus&Zoom Settings

Digital Zoom: Configure the biggest magnification of digital zoom. When the optical zoom reaches its highest limit, you can perform digital zoom. If Turn Off is chosen, then the digital zoom is unavailable.

Focus Mode:

- Auto: When there is a moving object or the target is changing in the scenario and the image is blurry, then the camera will perform auto focus.
- Semi-Auto: When the zoom is performed on the lens, the camera will perform auto focus, recalling presets, accurate positioning, and rotating the pan-tilt will also trigger auto focus.
- Manual: Perform manual focus via focus+/-.

Sensitivity: Configure sensitivity to trigger focus; the bigger the value, the more easily to trigger focus.

Min. Focus Distance: Set the device's minimum focusing distance to avoid focusing on the protective cover when the focusing distance is too short. Change the focusing speed by adjusting the focusing distance.

Focus Speed: Sets the rotation speed of the focus motor, with a speed range of 1~32.

Zoom Speed: Sets the rotation speed of the zoom motor, with a speed range of 1~32.

Lens Initialization: Calibrate the lens focus and zoom parameters; the actual camera functions should prevail.

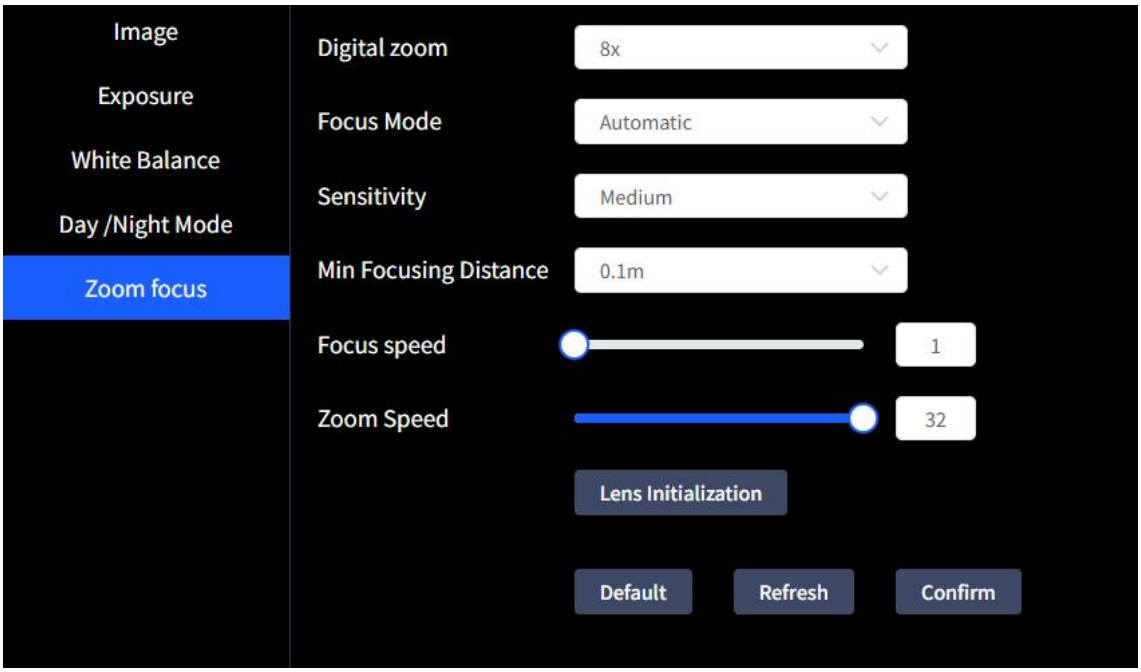


Figure 6.5 Channel 01-Focus/Zoom

Thermal Imaging Channel

■ **Image**

Brightness: Refer to the descriptions of visible channel for detailed information.

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;

2D NR: Refer to the descriptions of visible channel for detailed information;

3D NR: Refer to the descriptions of visible channel for detailed information;

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

Area Video Enhancement: Full screen, 25% center point, 50% center point, 75% center point, bottom, middle, top, and custom

Style: Classic, Sea&Sky, Forest

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 information

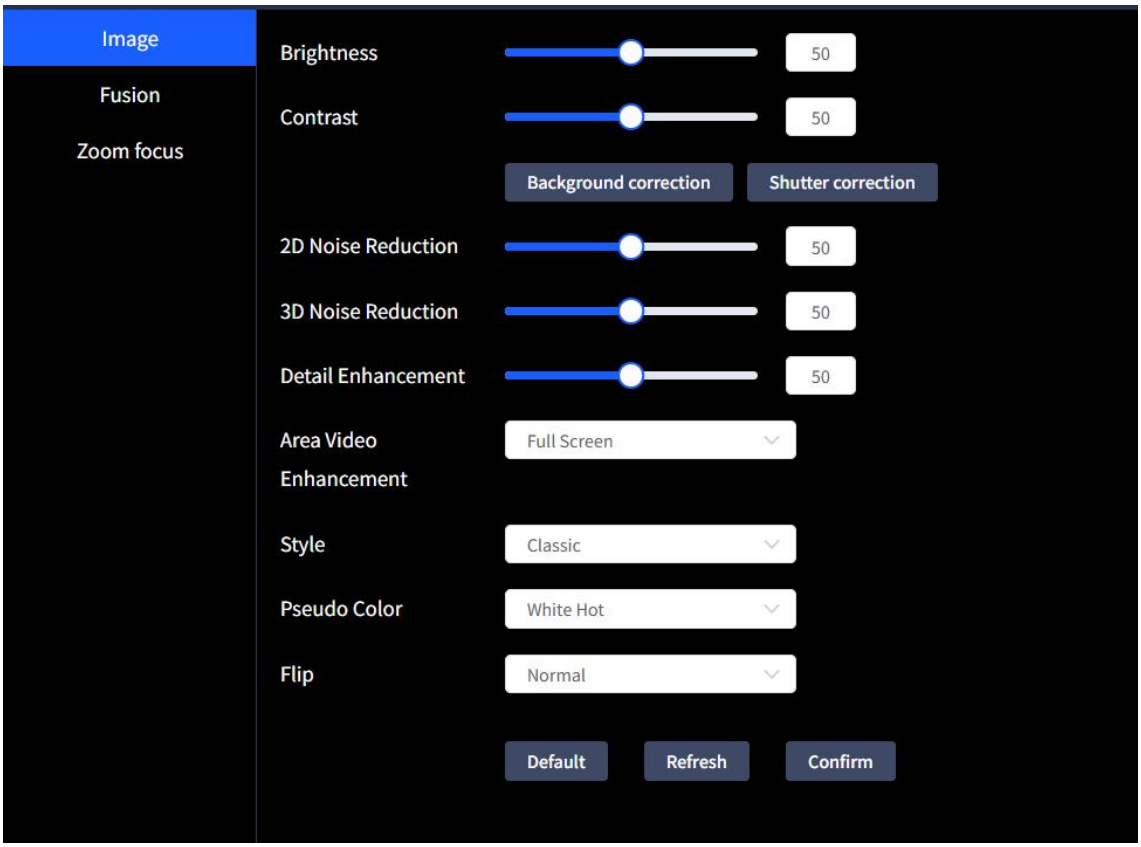


Figure 6.6 Channel 02-Image Settings Interface

Fusion

Overlay the visible image onto the thermal image in the thermal channel, enhancing the clarity of the video in the thermal channel.

Fusion Modes: Original, Fusion

Original: The Original option is selected by default. Under the Original setting, the thermal channel only displays the thermal image without overlaying the visible image.

Fusion: After selecting the Fusion mode, the fusion function is enabled. Based on the previously calibrated dual-spectrum fusion file, the visible image is overlaid onto the thermal image.

Fusion Settings parameters are as follows (Unit: Pixel):

Image Fusion Ratio (0~100): 0 for visual image, 100 for thermal image, 50 as the default dual-spectrum overlay effect.

Edge Fusion Ratio (0~100): 0 for no edge fusion, 100 for high-brightness edge fusion, 50 as the default dual-spectrum overlay edge fusion effect.

Horizontal Compensation (0~100): Adjust the horizontal alignment of visual and thermal images.

Vertical Compensation (0~100): Adjust the vertical alignment of visual and thermal images.

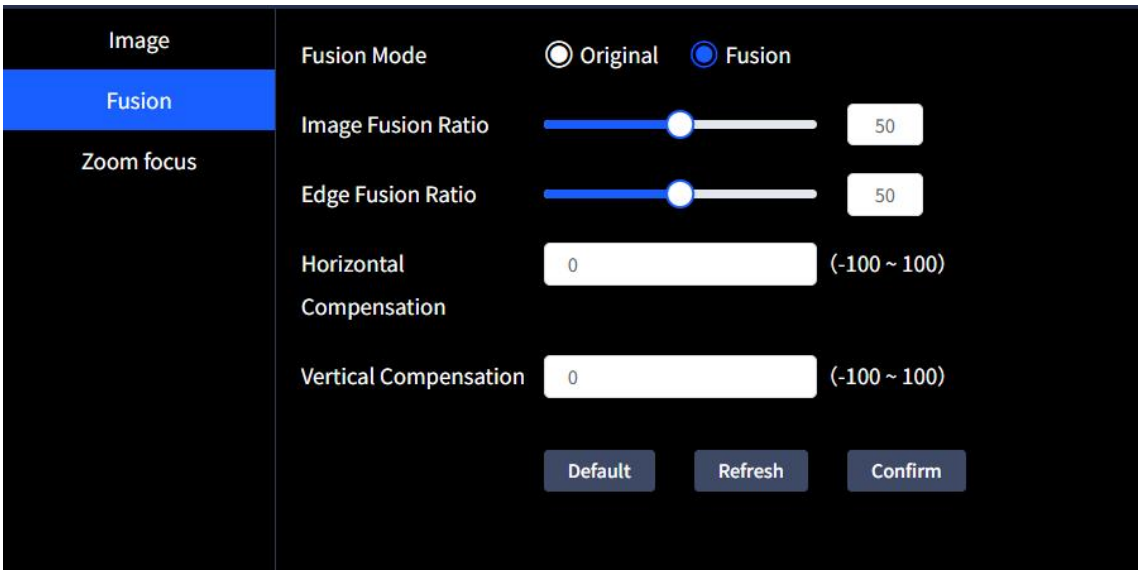


Figure 6.7 Channel 02 (Thermal)-Fusion Settings Interface

Focus&Zoom Settings

Digital Zoom: Refer to the descriptions of visible channel for detailed information.

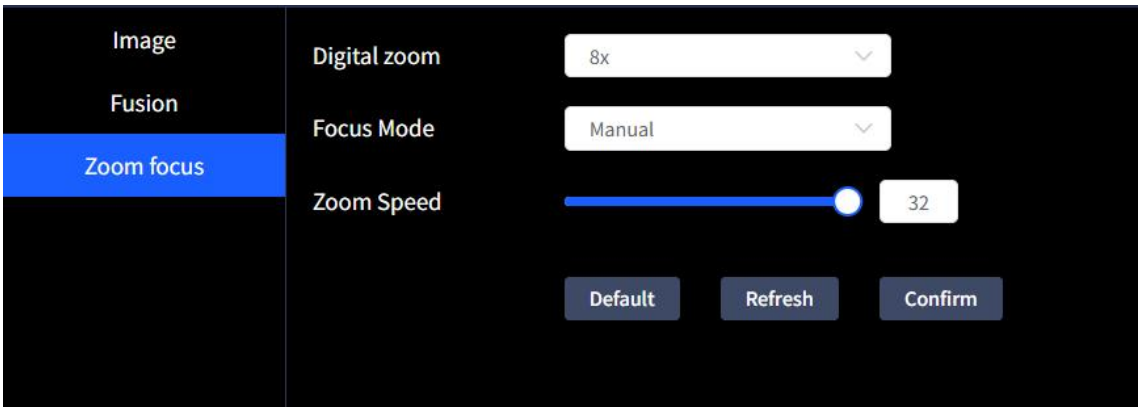


Figure 6.8 Channel 02-Focus&Zoom

6.1.2 Video

6.1.2.1 Video Stream

Visible Light

Main Stream

■Encoding Scheme:

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 three types of video resolution: 1920*1080(1080P)/2560*1440/2560*1920.

■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: *P system supports up to 25 frames, N 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.

■Image 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 image effect, the larger the code stream, but it will not exceed the stream limit.

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

■I 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 Scheme:

H.264: Main Profile encoding scheme.

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 of 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*: P system supports up to 25 frames, N 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.

■Image 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(Upper 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.

■I-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.

Note: *The parameter settings of main stream and auxiliary stream for thermal imaging channel (Channel 02) are basically the same for visible light, except the resolution supported and the reference stream code value.*



Figure 6.9 Video Stream Settings of Visible Channel



Figure 6.10 Video Stream Settings of Thermal Channel

6.1.2.2 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**: Selectable image formats, such as JPEG.

■ **Snapshot Time Interval:** The rate of capture.

Note: *The image stream settings of thermal imaging channel (channel 02) are similar to those of the visible channel.*

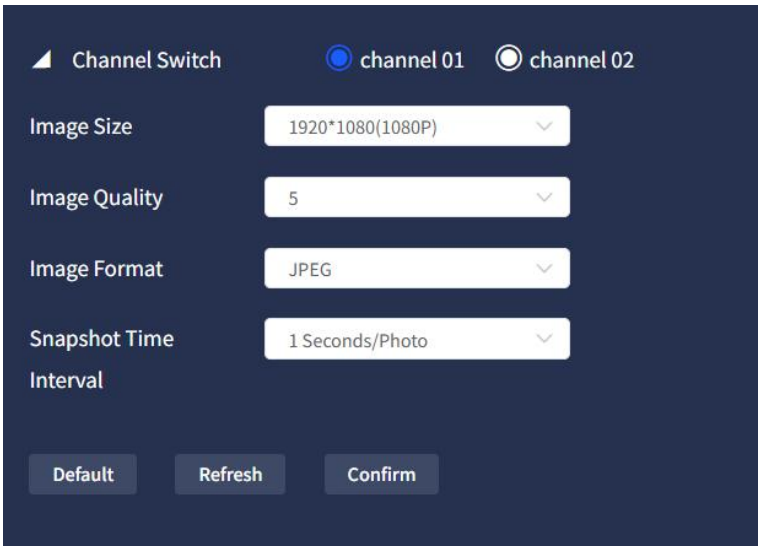


Figure 6.11 Image Stream Settings

6.1.2.3 Video Overlap

Visible Channel

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

Operation steps:

1) Enable: Enable or disable the channel title;
2) Enter the channel title to be set in the channel title input box;
3) Drag the channel title frame with the mouse to adjust the position of the channel title in the video screen;
4) Set the font color.
5) Set the font size.
6) Click "Confirm" to complete the setting.

The channel title settings of the thermal channel are similar to those of the visible channel.

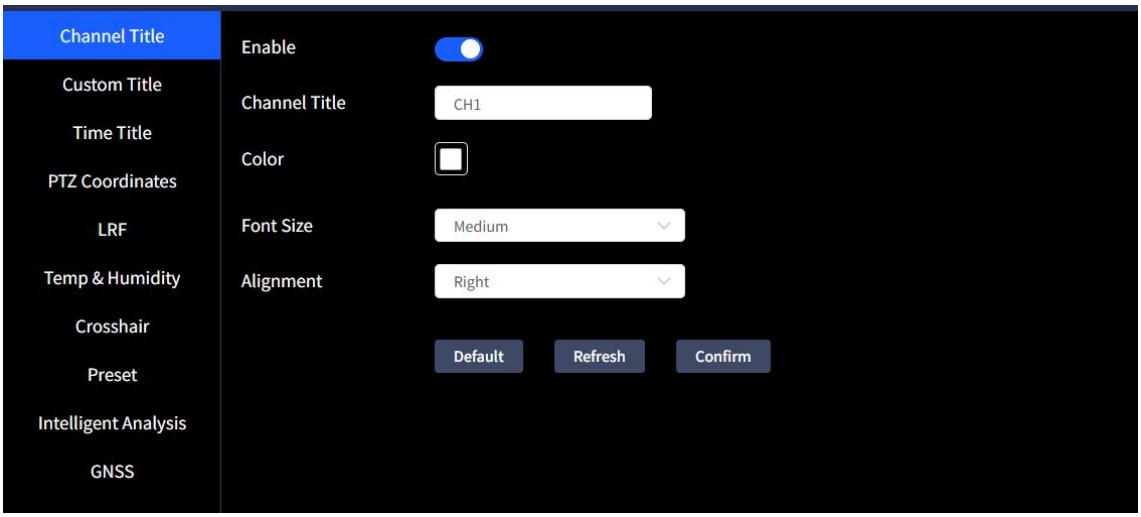


Figure 6.12 Video Overlay-Channel Title Settings

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

Operation 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);
3) Drag the custom title area frame with the mouse to adjust the position of the custom title in the video screen;
4) Set alignment, support left-justified and right-justified, left-justified by default;
5) Set the font color;
6) Set the font size;
7) Click "Confirm" to complete the setting.

The custom title settings of the thermal channel are similar to those of the visible channel.

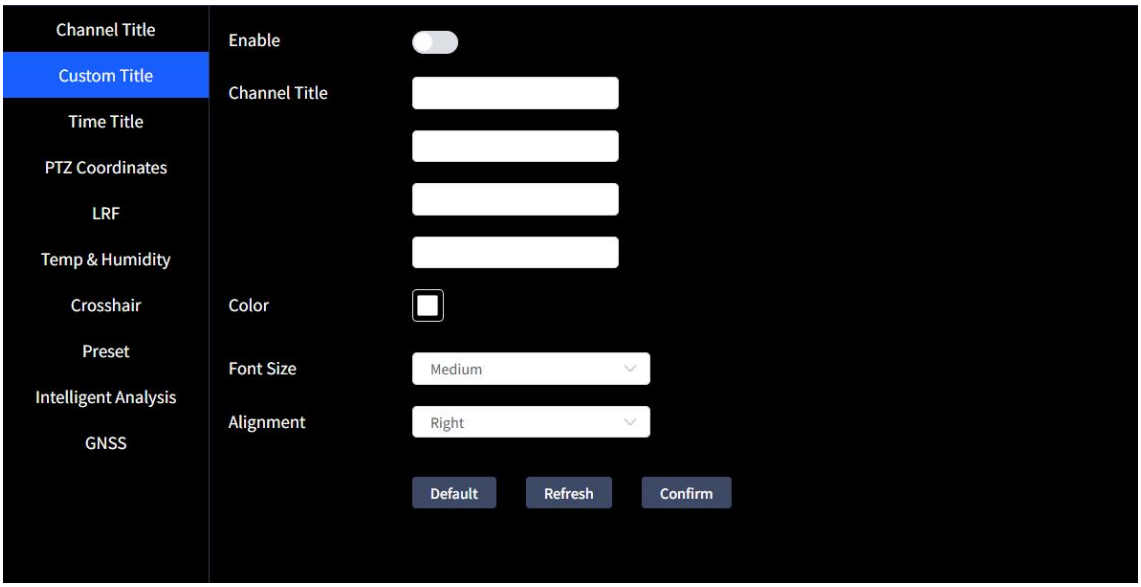


Figure 6.13 Video Overlay-Custom Title Settings

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

Operation steps:

1) Enable: Enable or disable the time title.
2) Drag the time title area frame with the mouse to adjust the position of the time title in the video screen.
3) Set week display, the current date and time is displayed by default: YY-MM-DD+Hour-Min-Sec; If Display Week is enabled, then the Date+ Day of the Week+ Time is displayed. The day of the week is displayed between date and time.
4) Set the font color.
5) Set the font size.
6) Click Confirm to complete the setting.

The time title settings of the thermal channel are similar to those of the visible channel.

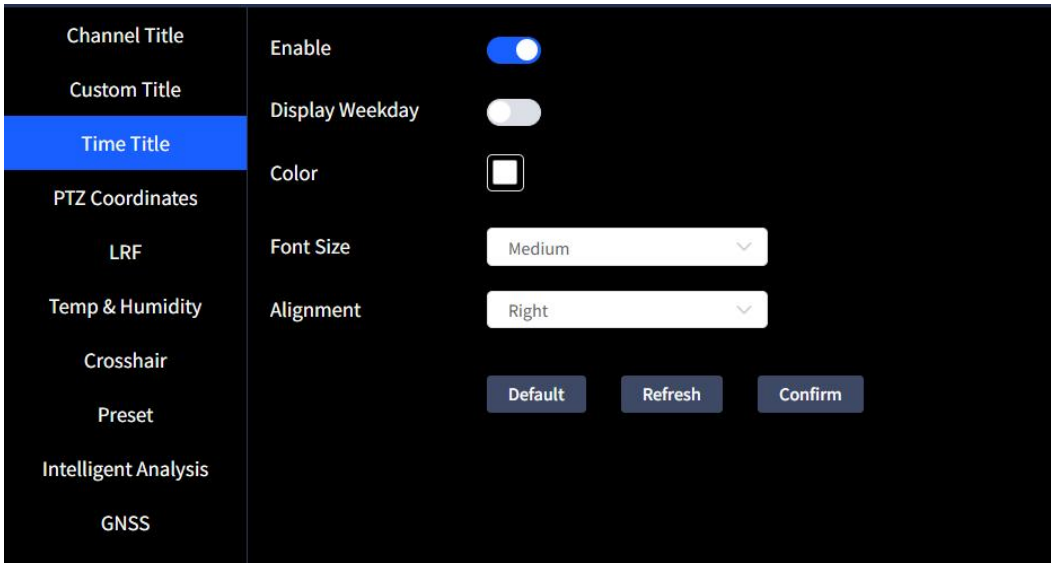


Figure 6.14 Video Overlay-Time Title Settings

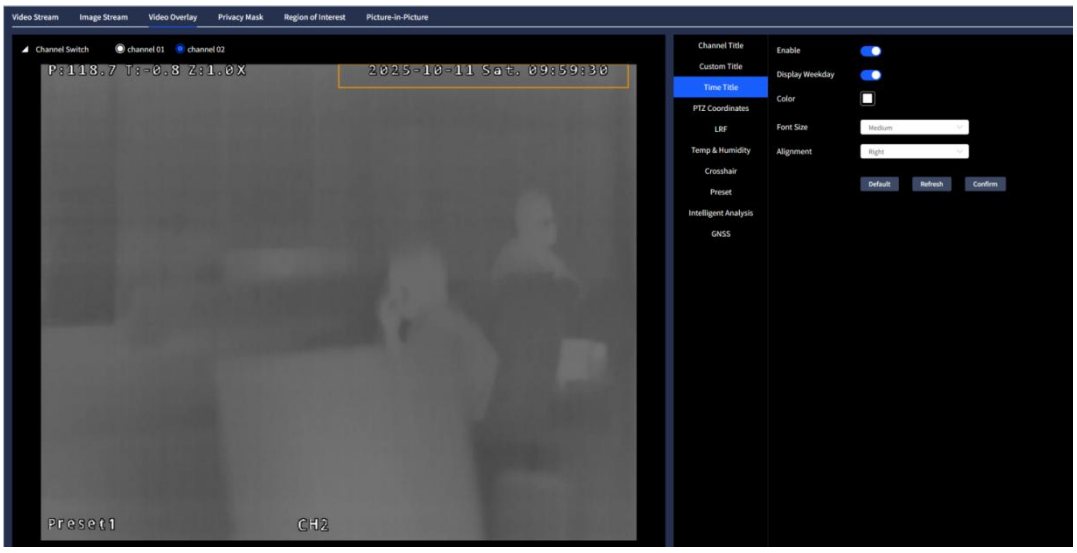


Figure 6.15 Video Overlay-Time Title-Display Week

PTZ coordinate: The PTZ coordinates can be chosen when the PTZ coordinates need to be displayed on the video.

Operation steps:

1) Enable: enable/disable the function.
2) Configure the font color.
3) Drag the PTZ coordinate box to change the PTZ coordinate position on the image.
4) Click *Confirm* to complete the setting.

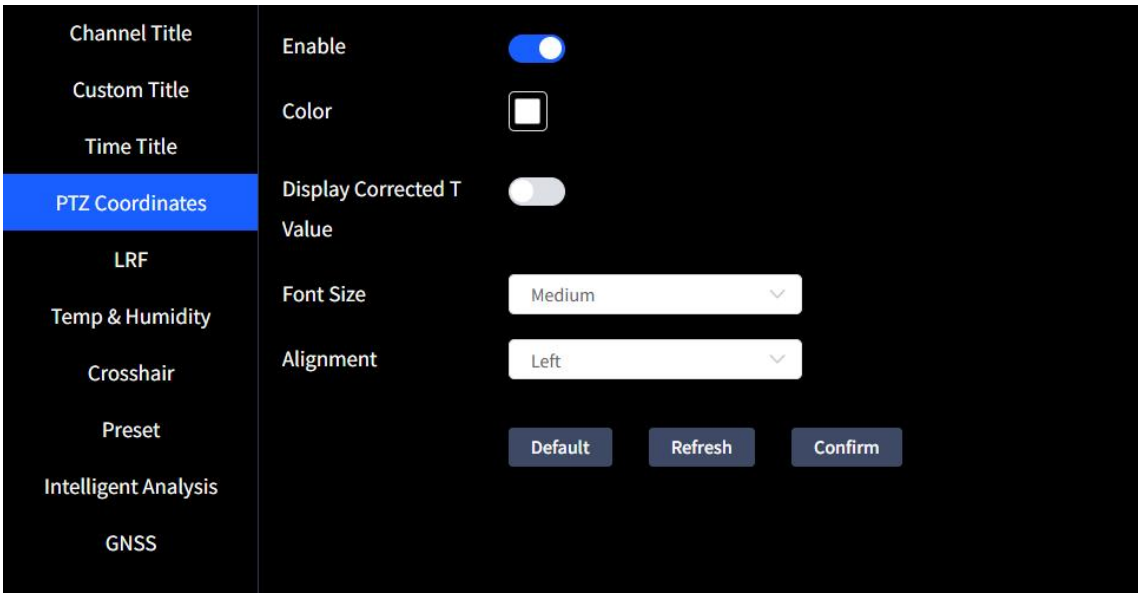


Figure 6.16 Video Overlay-PTZ Coordinate Settings Interface

Laser Ranging: When it is necessary to display laser ranging information in the video, laser ranging can be configured.

Operation steps:

1) Enable: Turn this feature on or off.
2) Color: Set the font color.
3) Font size: Choose from three sizes: large, medium, or small.
4) Alignment: Set the text alignment to either left or right.
5) Click "Confirm" to complete the setting.

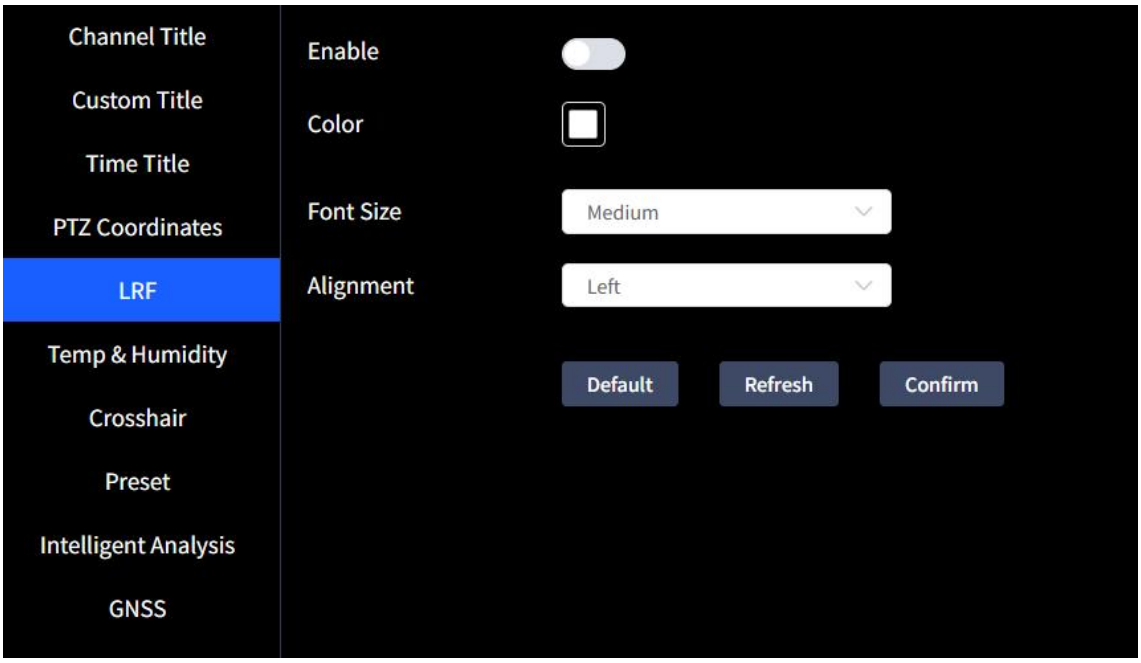


Figure 6.17 Video Overlay-Laser Ranging Settings Interface

Temperature & Humidity: When it is necessary to display temperature and humidity information in the video, you can configure the settings.

Steps for operation:

1) Enable: Turn this feature on or off.
2) Color: Set the font color.
3) Font size: Choose from three sizes: large, medium, or small.
4) Alignment: Set the text alignment to either left or right.
5) Click "Confirm" to complete the setting.

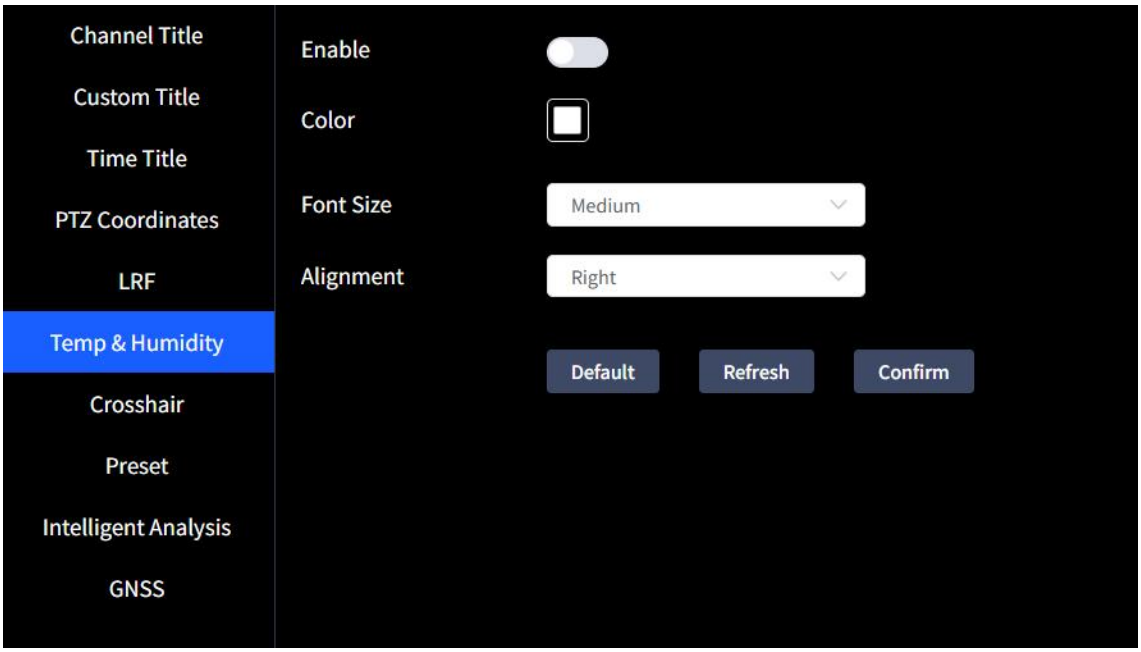


Figure 6.18 Video Overlay-Temp &Humidity Settings Interface

Crosshair: When it is necessary to display a crosshair in the video, the crosshair coordinates can be set.

Operation steps:

1) Enable: Turn this feature on or off
2) Style: General or Tracking
3) Click "Confirm" to complete the setting

The crosshair settings for the thermal channel are similar to those for the visible channel.

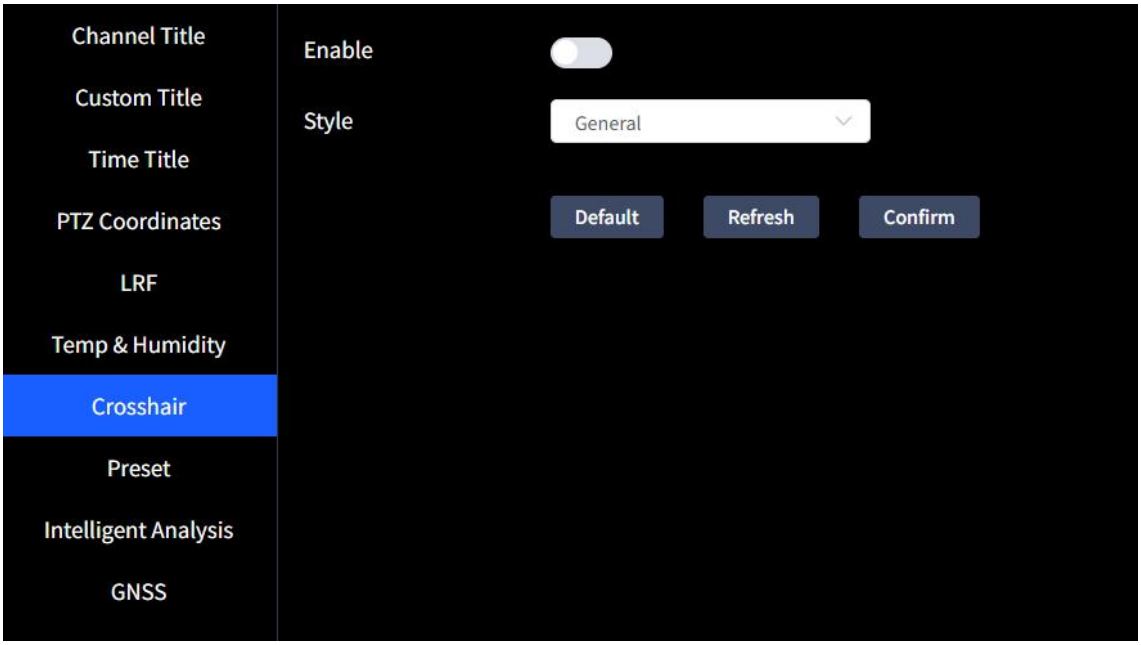


Figure 6.19 Video Overlay-Crosshair Settings Interface

Preset: When a preset name needs to be displayed in the video image, the preset can be set.

Operation steps:

1) Enable: Turn this function on/off;
2) Color: Set the font color;
3) Font Size: Choose from three font sizes—large, medium, or small;
4) Alignment: Set the font alignment to either left or right;
5) Click "Confirm" to complete the setting.

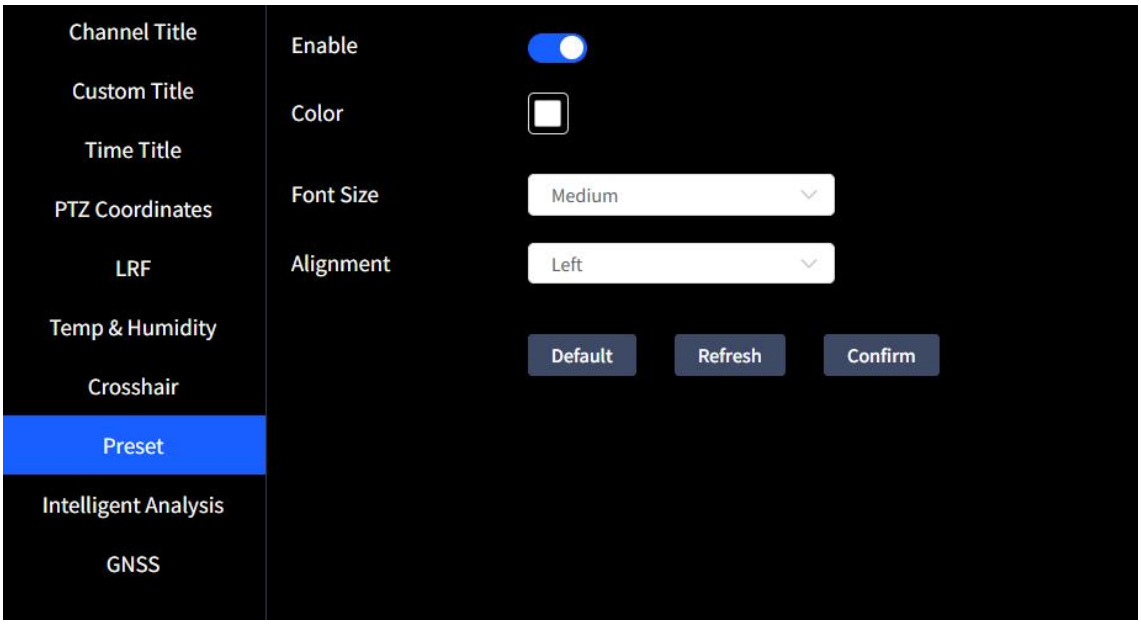


Figure 6.20 Video Overlay-Preset Settings Interface

Intelligent Analysis: Controls the display mode of intelligent analysis and temperature measurement rules.

Mode: Stream Overlay, Non-stream Overlay, and No overlay

Select all: General Behavior Analysis (tripwire intrusion and area intrusion), Motion Detection, Fire Warning (Fire&Smoke Detection), and Radiometric

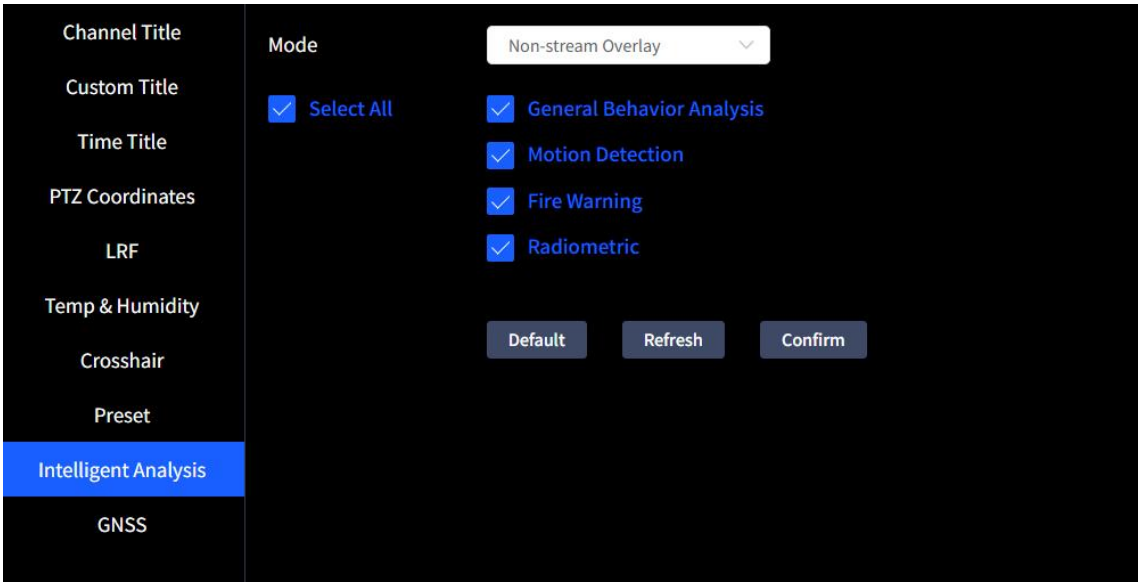


Figure 6.21 Video Overlay-Intelligent Analysis Settings Interface

GNSS: The network board obtains data such as latitude, longitude, height, azimuth angle, and orientation from satellite compass and displays it as an on-screen overlay.

Operation steps:

1) Show Title: Turn this function on/off; (display latitude, longitude, height, azimuth angle);
2) Color: Set the font color;
3) Font Size: Choose from three font sizes—large, medium, or small;
4) Alignment: Set the font alignment to either left or right;
5) Display orientation: Turn this function on/off;
6) Click "Confirm" to complete the setting.

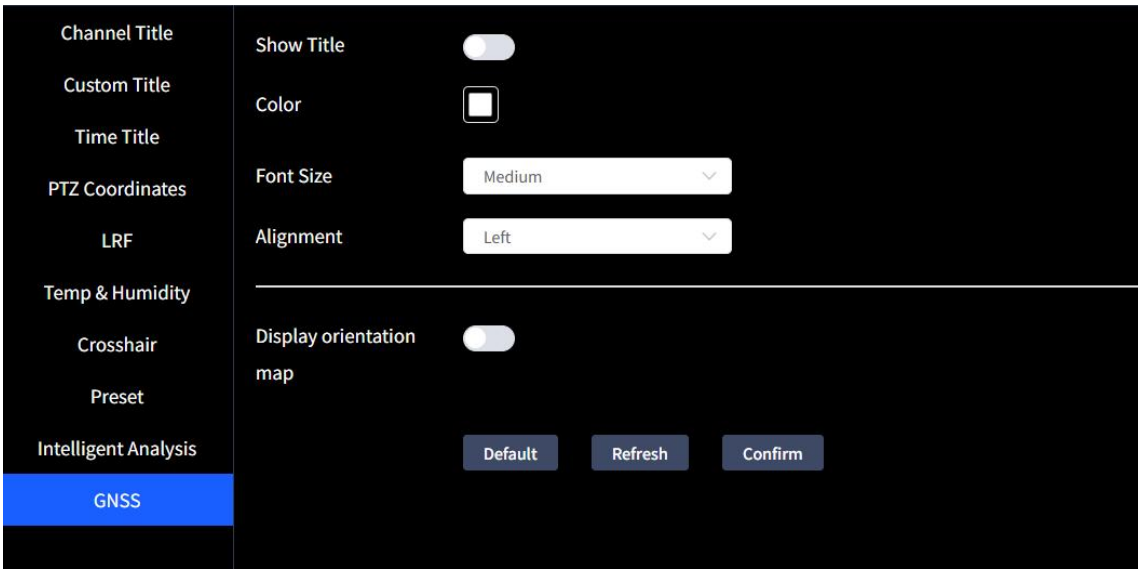


Figure 6.22 Video Overlay-GNSS Settings Interface

6.1.2.4 Privacy Mask

The privacy mask can be configured to protect certain areas on the image.

Operation steps:

1) Enable: Turn on/off the function;
2) Click “Draw Area” to draw the rectangular box on the area where the privacy is needed (4 areas at most); click *Delete* and choose the corresponding box to delete; *click* Draw Area to draw privacy mask again.
3) Click “Confirm” to complete the setting.

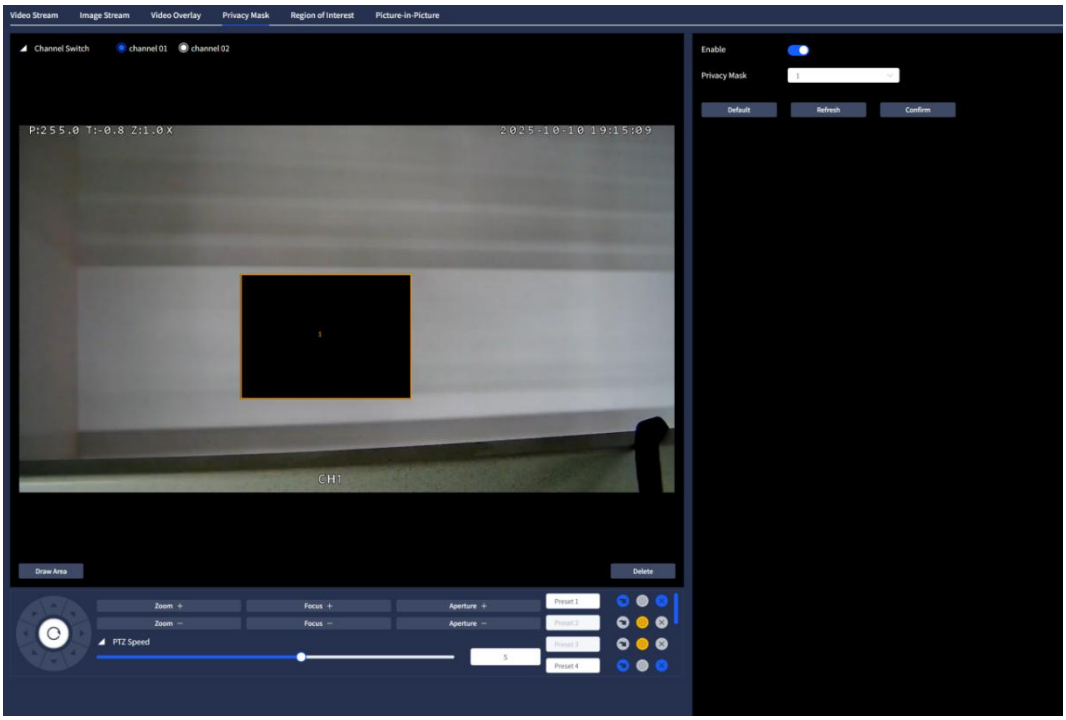


Figure 6.23 Privacy Mask Settings Interface

6.1.2.5 Region of Interest

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

Operation 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 6.24 Region of Interest Settings Interface

6.1.2.6 PIP

Set the picture-in-picture (PIP) area on the screen.

Operation steps:

1) Click the "Draw" button to start drawing the position and size of the PIP area.
2) Turn the enable switch on or off.
3) Click "Confirm" to complete the setting.



Figure 6.25 PIP Settings Interface

6.1.3 Audio

6.1.3.1 Audio Settings

Coding

Enable: Enable or disable this function; the audio can be enabled only when the video is enabled.

Encoding Scheme: The encoding scheme of the audio, which contains PCM, G.711A, G.711U, and AAC, the set audio encoding scheme will make audio and voice intercom take effect at the same time.

Sampling Rate: the audio sampling frequency.

Attribute

Audio Input Type: Support LineIn only; the device needs to be connected to an external audio input source.

Audio Output Type: Only LineOut is supported; the device requires an external audio input source.

Mic Volume: adjust the mic volume.

Speaker Volume: Adjust the speaker volume.



Figure 6.26 Audio Settings Interface

6.1.3.2 Alarm Audio

There is a default alarm audio(alarm.wav) on the interface, and the user can upload the alarm audio, which needs to meet the audio file requirements: sampling rate 16k, sampling accuracy 16bit, encoding type (PCM/G711A/G711U). The files can be downloaded, deleted, and the file name can be revised.

See the following figure:

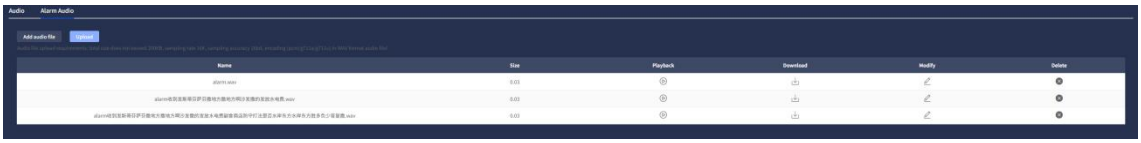


Figure 6.27 Alarm Audio Settings Interface

6.2 Network Settings

6.2.1 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:

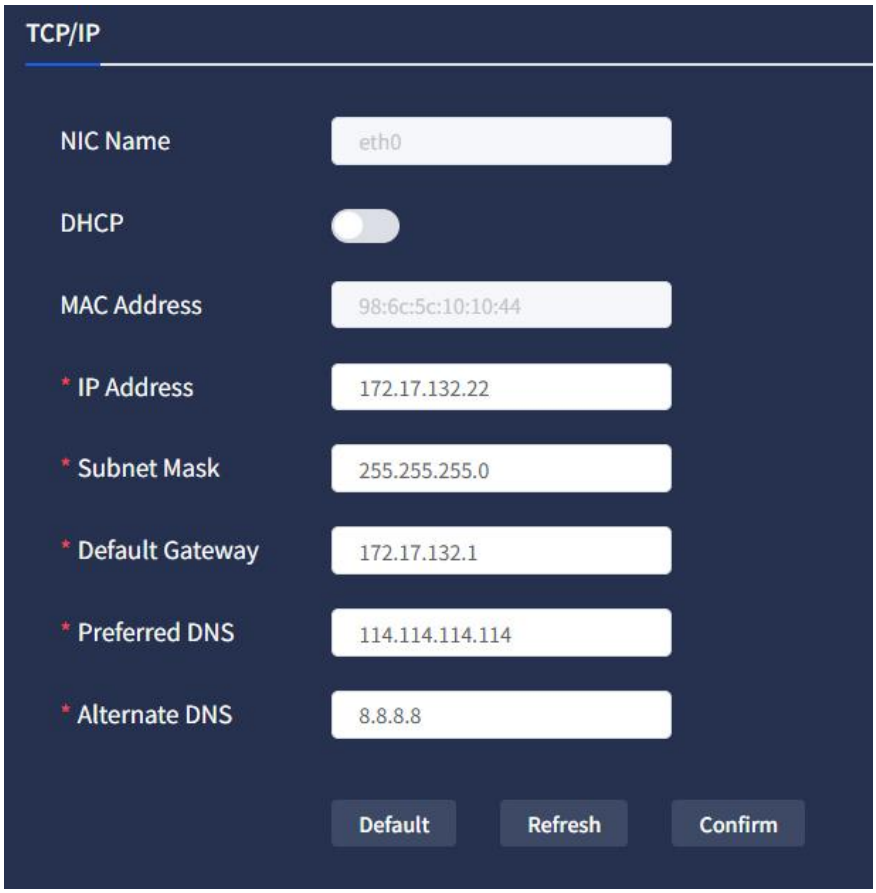


Figure 6.28 Network Settings—TCP/IP Settings

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.

6.2.2 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: Support 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.

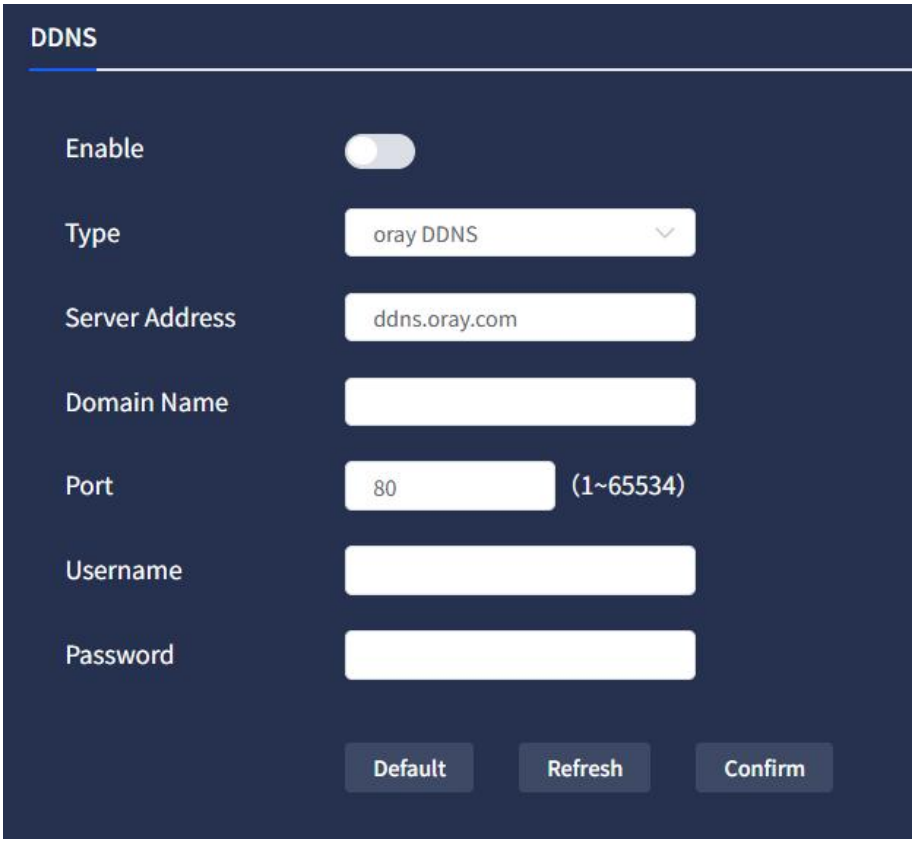


Figure 6.29 Network Settings-DDNS Settings

6.2.3 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 are optional.
- Theme: Email subject information.
- Recipient: Recipient's email address.

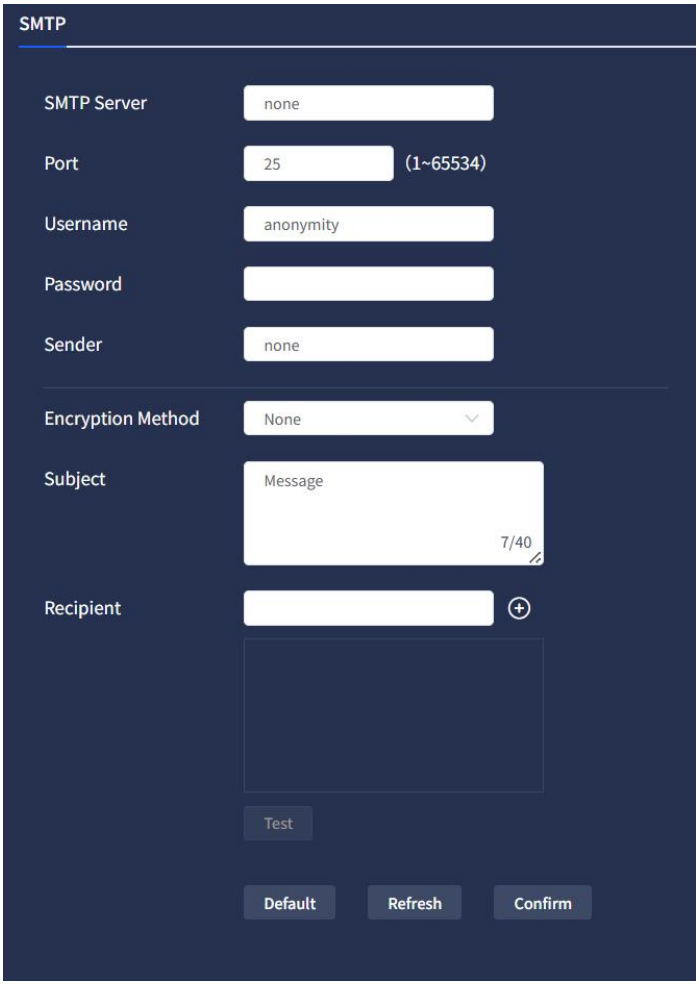


Figure 6.30 Network Settings-SMTP Settings

6.2.4 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.

Operation 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.*



Figure 6.31 Network Settings-UPnP Settings

6.2.5 FTP

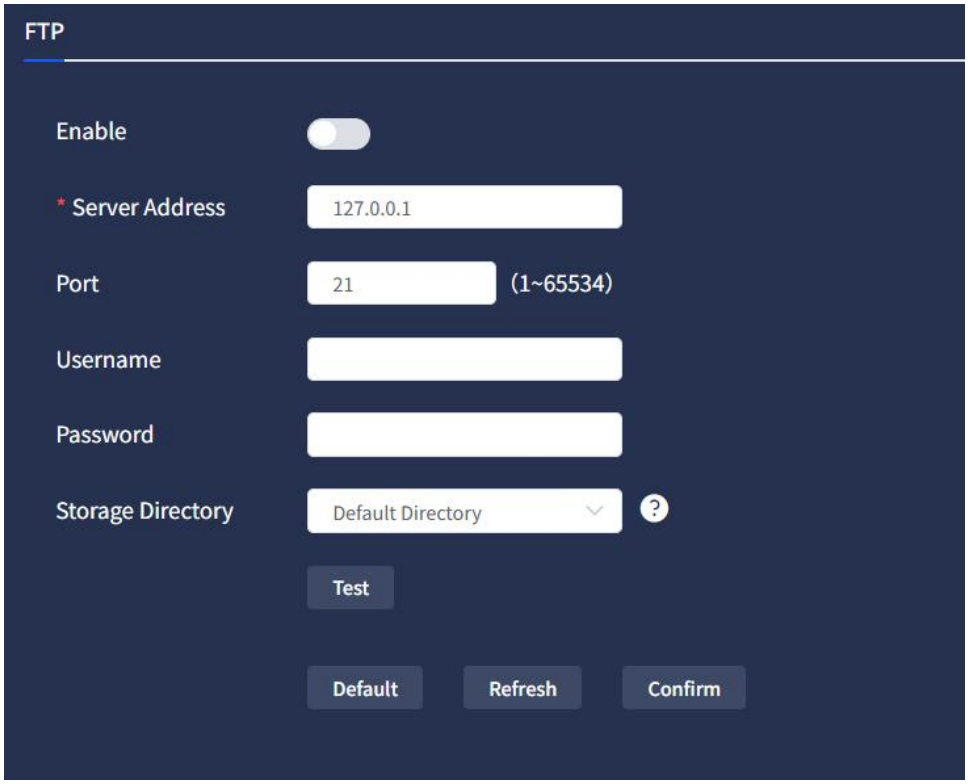


Figure 6.32 Network Settings-FTP Settings

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.

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 pictures 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:

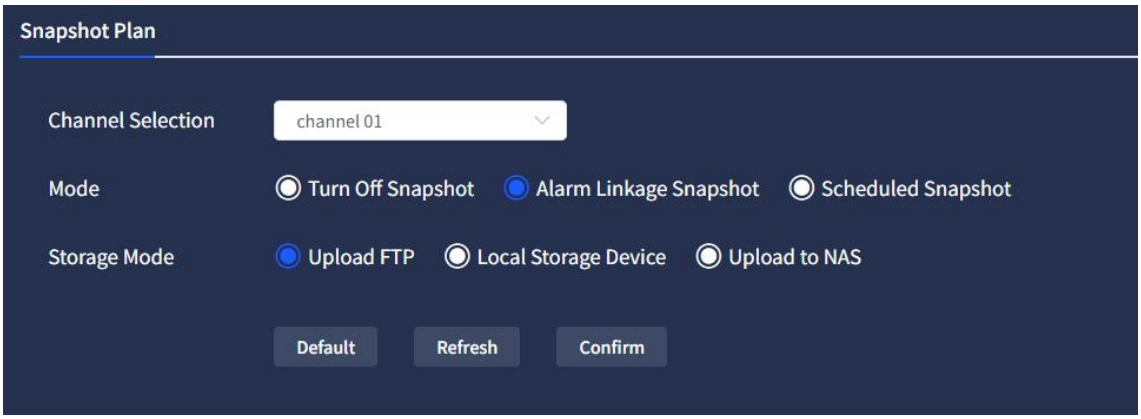


Figure 6.33 Capture Plan-Upload FTP Settings

6.2.6 Port

Set the port numbers for the HTTP, HTTPS, and RTSP protocols.

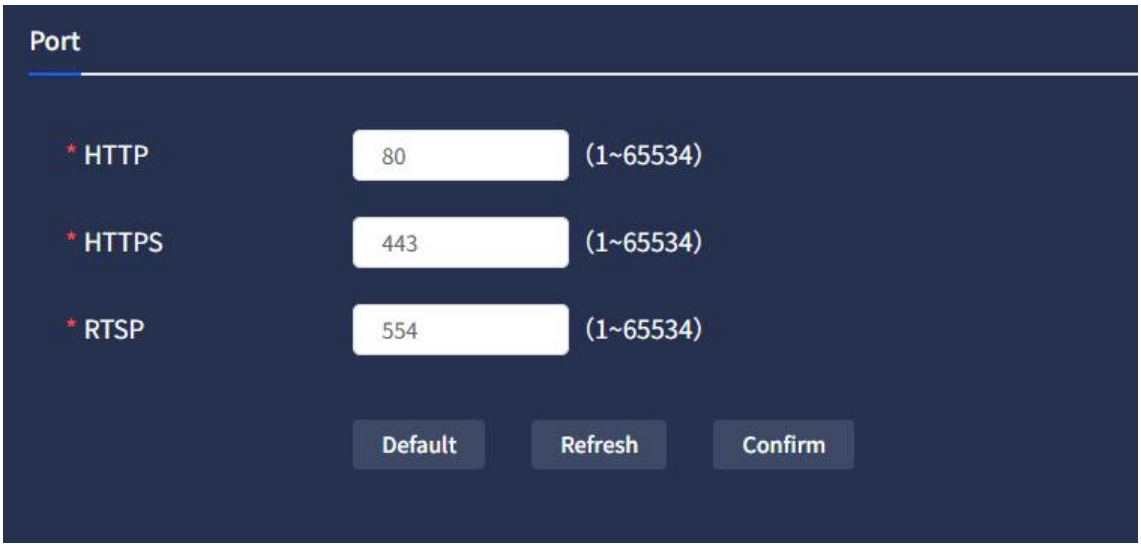


Figure 6.34 Network-Port Settings Interface

6.2.7 Multicast

When the number of device accesses exceeds the limit, new users will no longer be able to access the device. It can be solved by setting the multicast protocol.

Operation steps:

1) Enter the multicast address
2) Enter the multicast port
3) Click "Save" to complete the configuration



Figure 6.35 Network Settings-Multicast Settings Interface

6.2.8 Platform Access

6.2.8.1 Platform Access

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

Operation steps:

1) Enable the platform access.
2) Set the parameters of GB28181; 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 to functions.

3) Click "Confirm" to complete the setting.



Figure 6.36 Network Settings-Platform Access Settings Interface

6.2.8.2 Modbus

Operation steps:

1) Enable or disable the function.

2) Enter the port
3) Click "Confirm" to complete the setting

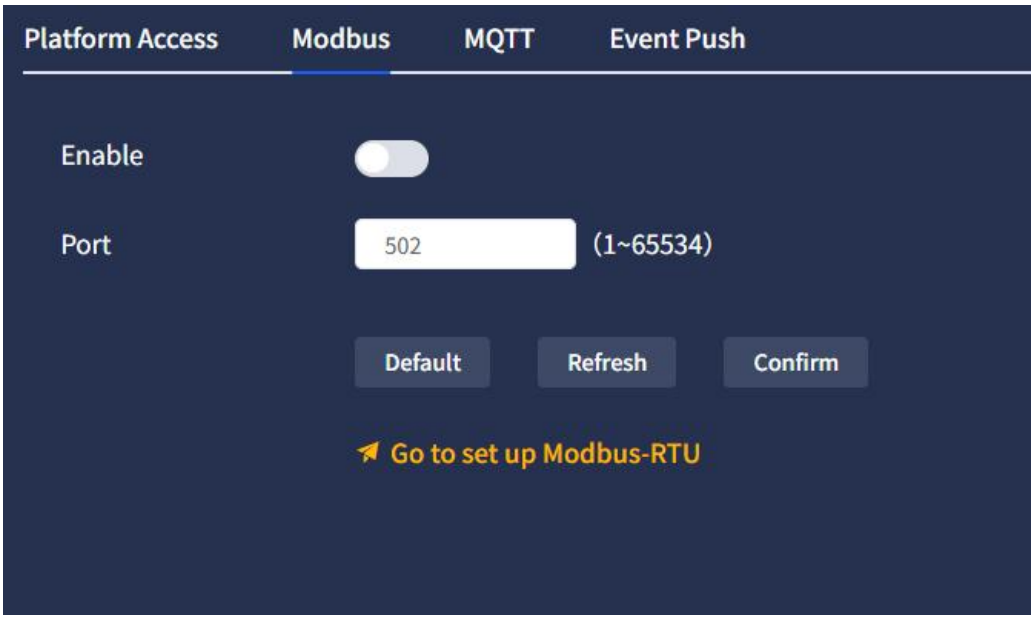


Figure 6.37 Network Settings-Modbus Settings Interface

6.2.8.3 MQTT

Operation steps:

1) Enable or disable the function.
2) Enter the device name.
3) Enter the server address.
4) Enter the port
5) Enter the time interval
6) Enter the username
7) Enter the password
8) Click "Confirm" to complete the setting

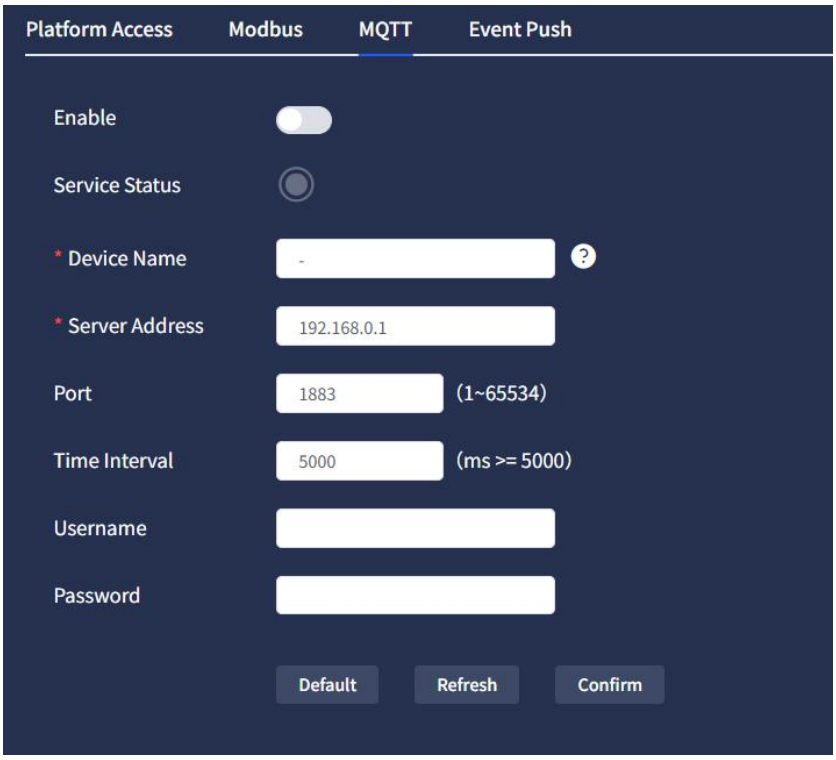


Figure 6.38 Network Settings-MQTT Settings Interface

6.2.8.4 Event Push

The device supports event push functionality.

Operation steps:

1) Enable or disable the feature.
2) Set the push method, username, password, server address, port, keep-alive path, keep-alive interval, push path, and push method.
3) Click "Confirm" to complete the setting.

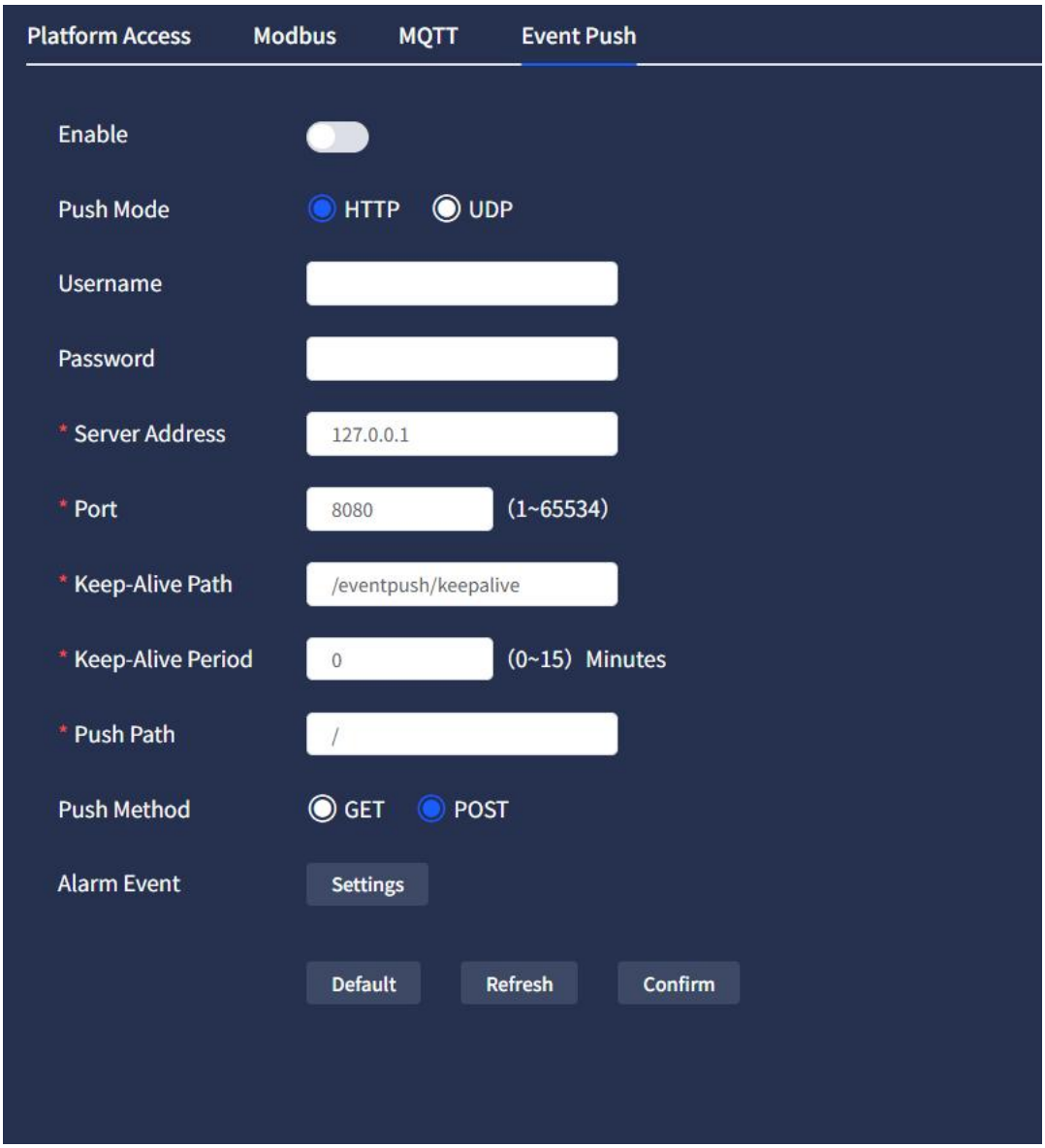


Figure 6.39 Network Settings-Event Push Settings Interface

6.3 Peripherals Settings

6.3.1 Supplementary Illuminator

The illuminator has two modes: automatic and manual.

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

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

Angle Coefficient: In automatic mode, you can set the angle coefficient.

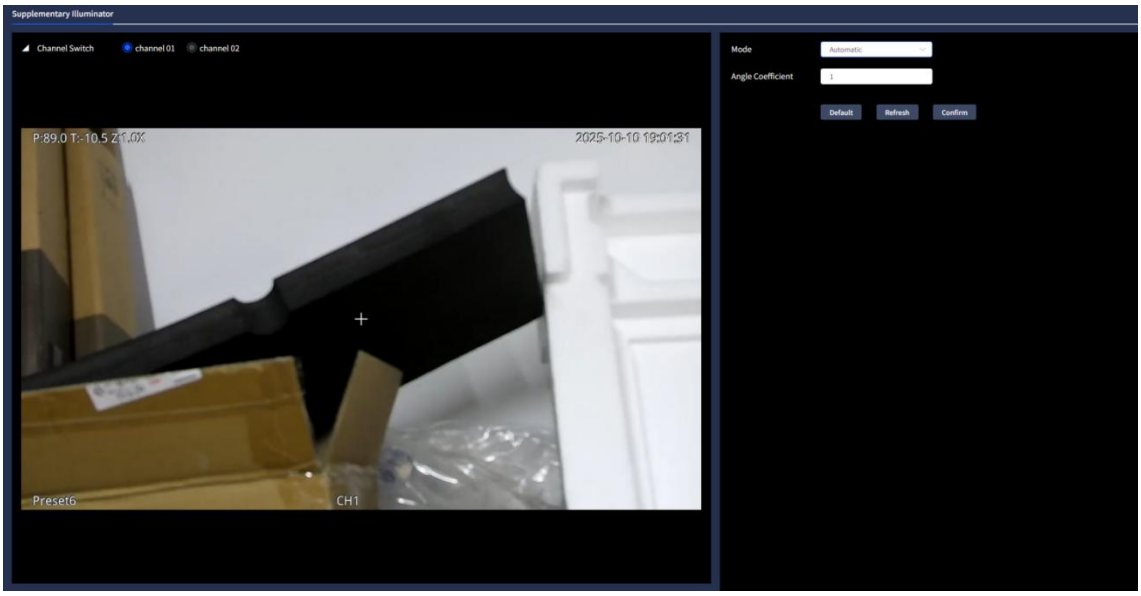


Figure 6.40 Peripherals Settings-Illuminator Settings Interface (Auto Mode)

Manual Mode: You can manually adjust the infrared light brightness (range: 0-100), field of view (range: 0-100), and laser illumination & E-O axis direction.

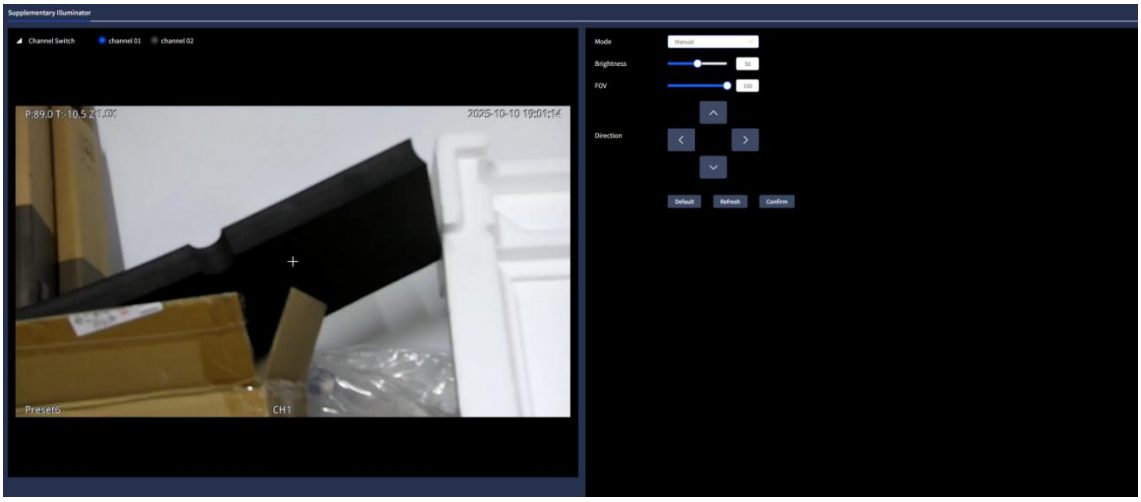


Figure 6.41 Peripherals Settings-Illuminator Settings Interface (Manual Mode)

6.3.2 Wiper

The wiper has two modes: auto and manual.

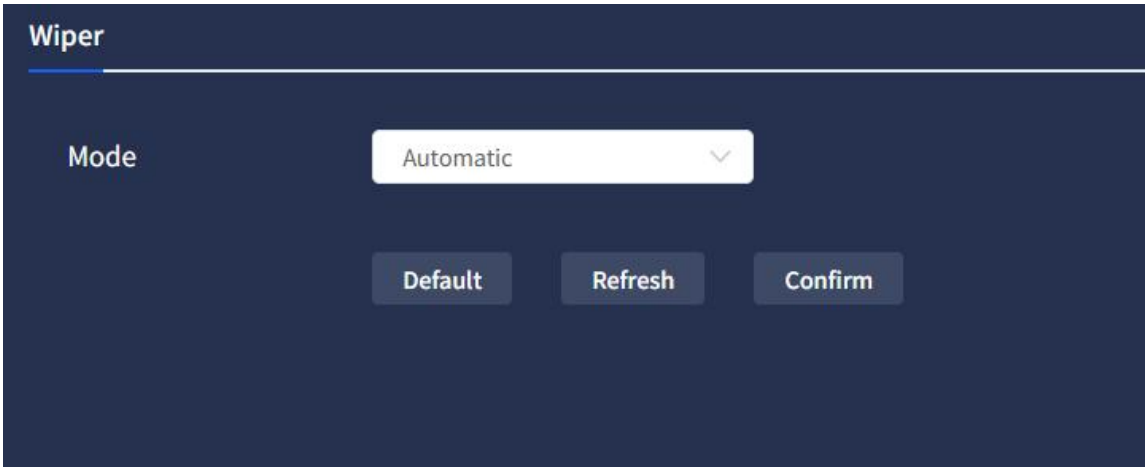


Figure 6.42 Peripherals Settings-Wiper Settings Interface

6.3.3 LRF

Laser ranging supports distance frequency, minimum gating distance, and maximum gating distance.

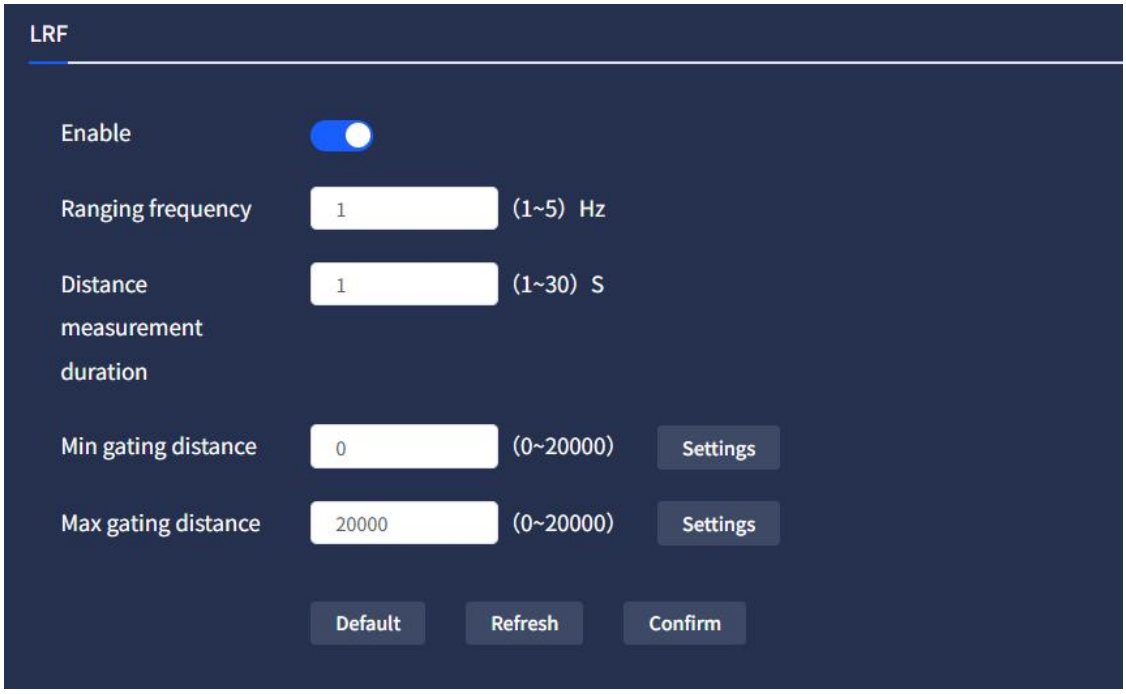


Figure 6.43 Peripherals Settings-LRF Settings Interface

6.3.4 Fan

Mode: Automatic, Manual

Automatic mode: Turns on when the temperature meets the threshold, and off when below it.

Manual mode: Manual on/off control.



Figure 6.44 Peripherals Settings-Fan Settings Interface

6.3.5 Heater

The heater offers a choice between automatic and manual modes.

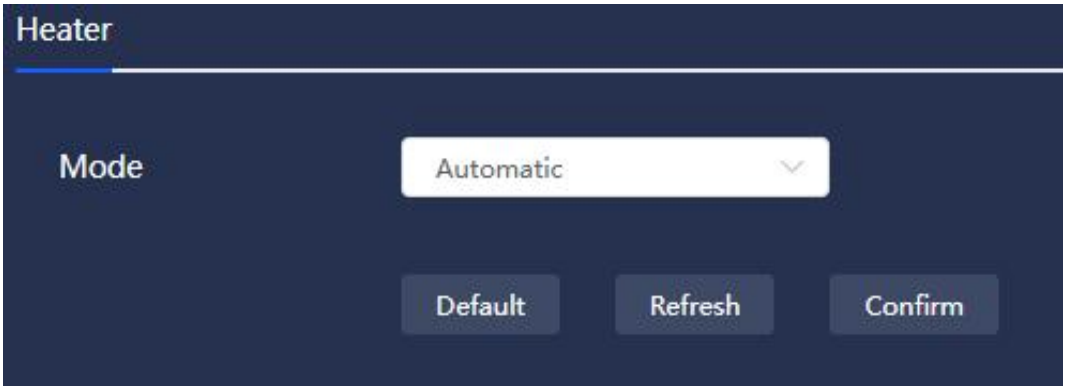


Figure 6.45 Peripherals Settings-Heater Settings Interface

6.3.6 Temperature & Humidity

Control the activation or deactivation of the temperature and humidity function.

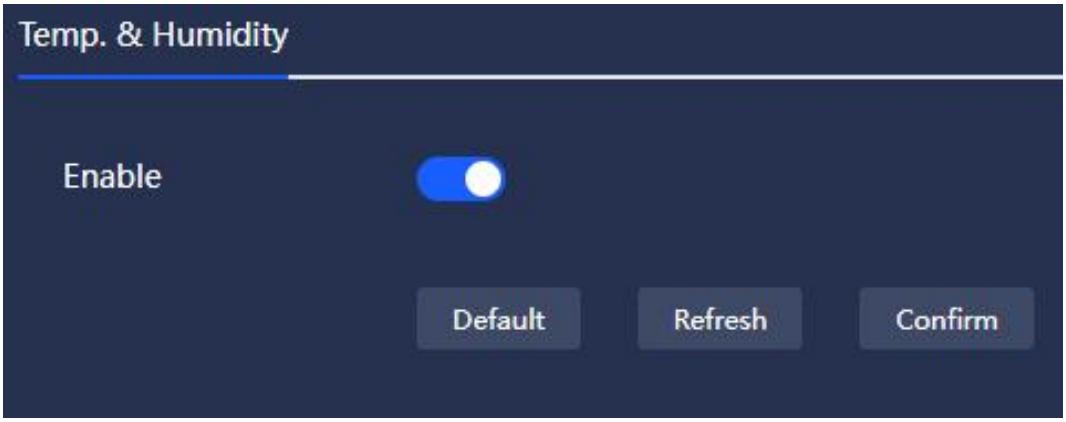


Figure 6.46 Peripherals Settings-Temperature & Humidity Settings Interface

6.3.7 Satellite Compass

Operation steps:

1) Configure the server, including the mode, server address, mounting point, port, username, and password. Click "Confirm" to save the setting.
2) Click the "Test" to verify if the configuration is correct.
3) Click "Acquire" to obtain the positioning information.

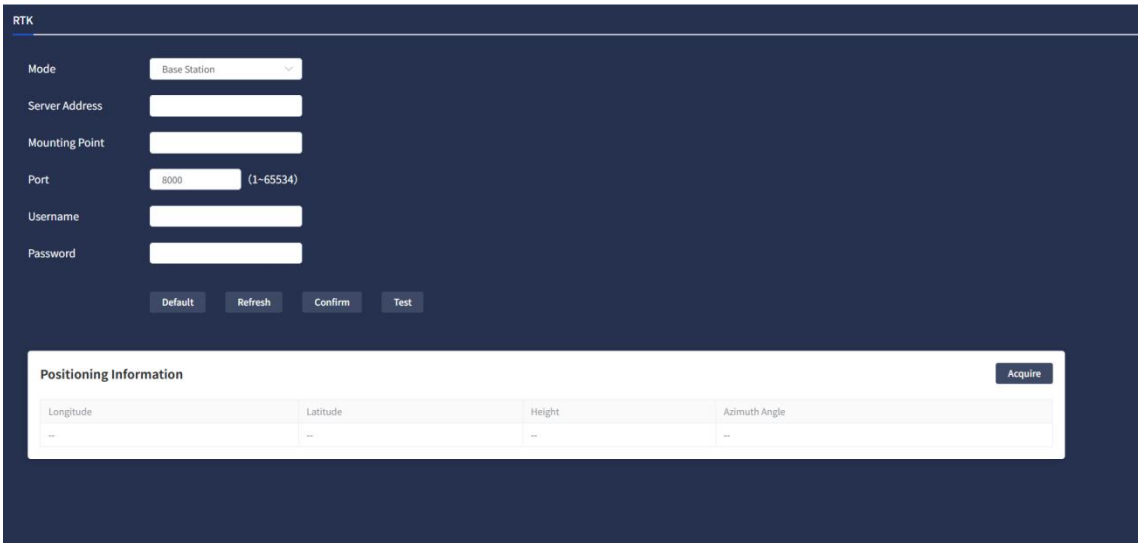


Figure 6.47 Peripherals Settings-Satellite Compass Settings Interface

6.4 PTZ Settings

6.4.1 Preset

The preset refers to that the camera will save the current pan, tilt, and focal length info, which can be used quickly and adjust the PT and camera to the desired position.

The preset operations are the same as Preview-PTZ function-preset, which will not be described in detail.

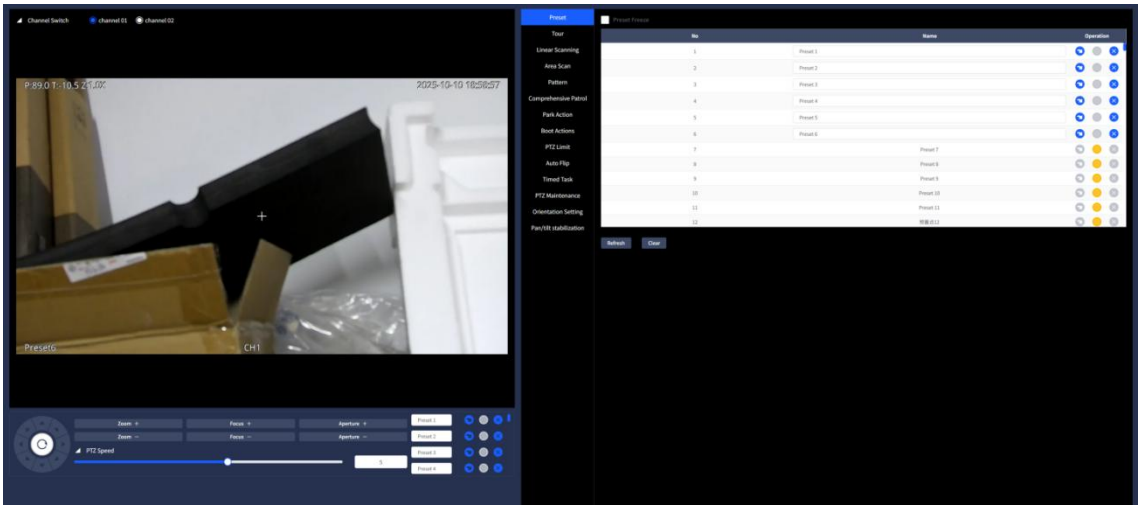


Figure 6.48 PTZ Settings-Preset Settings Interface

6.4.2 Tour

Tour refers to that the presets are arranged into the automatic tour according to the required sequence, so that the camera can automatically move round according to the preset route in a convenient and fast way.

Operation steps:

1) For presets that already existed, click *Add* to add *tour 1* by default;
2) Click Add below and configure the tour sequence among the presets and duration;
3) Click *Save*, the prompt Operate successfully will display;
4) Click the *Start* button to start the tour, and click *Stop* to stop the tour.

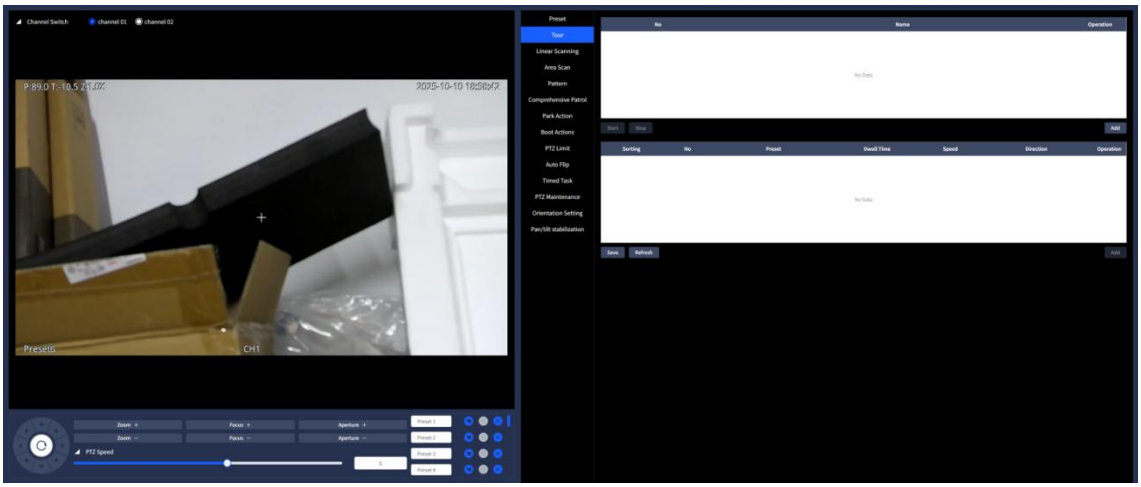


Figure 6.49 PTZ Settings-Tour Settings Interface

6.4.3 Linear Scan

The camera moves horizontally at a certain speed between the configured left and right limits.

Operation steps:

1) Select the Linear Scan No.
2) Configure the Linear Scan speed, the range is 1-5;
3) Configure the left boundary duration and right boundary duration, respectively;
4) Move the PTZ to the desired left boundary via the direction button, and click Set Left Boundary;
5) Move the PTZ to the desired right boundary via the direction button, and click Set Right Boundary;
6) Click Save, and the prompt Operate successfully will display;
7) Click the Start button to start pan, and click Stop to stop pan.

***Note**: if the PTZ boundary has not been configured (-1 by default), the PTZ camera will rotate 360° continuously.*

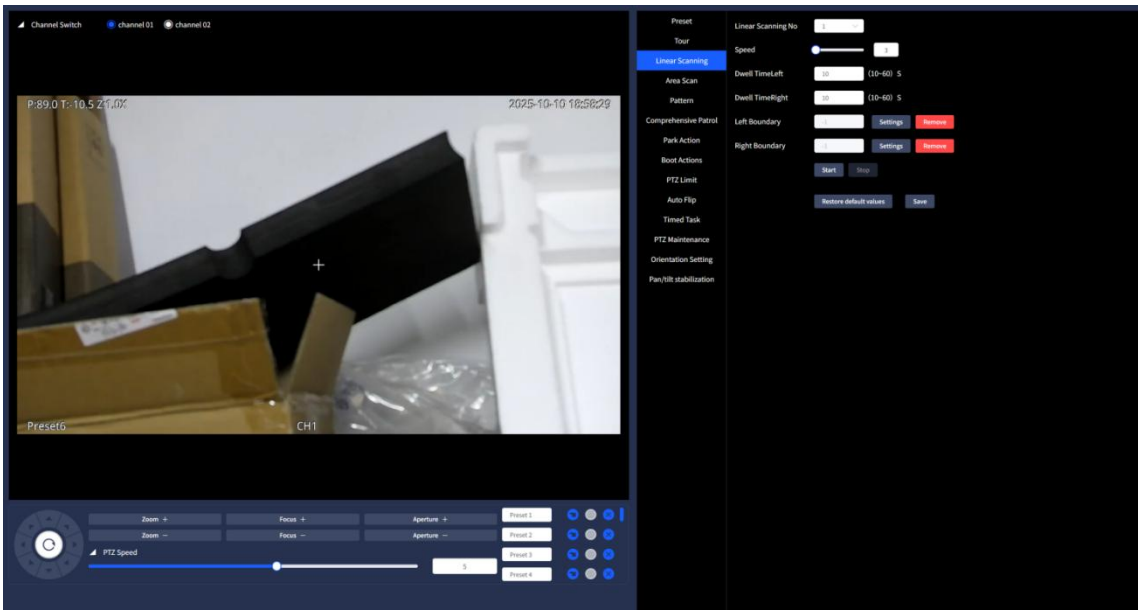


Figure 6.50 PTZ Settings-Linear Scan Settings Interface

6.4.4 Area Scan

Area scanning refers to the PTZ performing a "bow" shaped scan according to the defined area.

Operation steps:

1) Select area scan number;
2) Configure area scan speed and gradient value;
3) Configure the scan direction as clockwise or anticlockwise;
4) Configure the upper left margin: move the camera to the upper left margin via the direction button and click *settings*;
5) Configure the lower left margin: move the camera to the lower left margin via the direction button and click *settings*;
6) Click Save, and the prompt Operate successfully will display;
7) Click the *Start* button to start area scan and click *Stop* to stop area scan.

***Note**: if the PTZ margin has not been configured (the default value is "-1"), the camera can rotate 360° horizontally.*

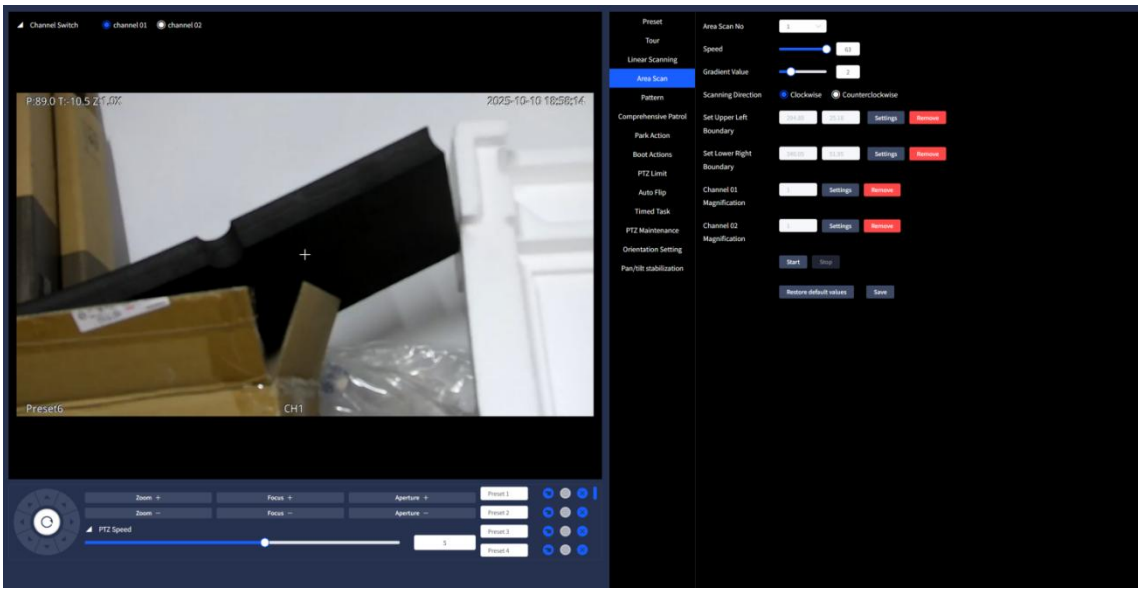


Figure 6.51 PTZ Settings-Area Scan Settings Interface

6.4.5 Pattern

By configuring pattern, you can continuously record your operation to the PTZ and record the moving pattern of the camera's lens. The Device will make the location where the recording begins as the beginning point, and move back and forward automatically following the preset movement pattern.

Operation steps:

1) Select pattern scan No.;
2) Click *Start Recording*;
3) Click the PTZ direction button or the *Zoom, Focus* button to adjust the lens focal length;
4) Click *Stop Recording*;
5) Click the *Start* button to start the pattern scan, and click *Stop* to stop pattern scan.

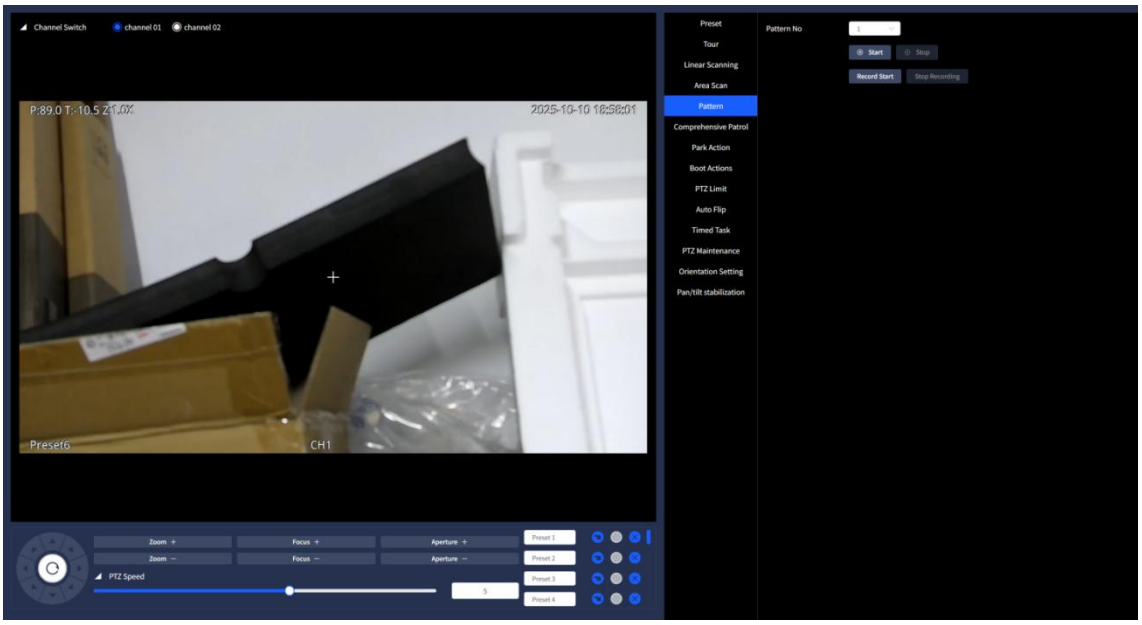


Figure 6.52 PTZ Settings-Pattern Scan Settings Interface

6.4.6 Comprehensive Patrol

If there are multiple scenes in the monitored area that need regular inspection, comprehensive patrol can be set up. During comprehensive patrol, if a target triggers an intelligent rule, corresponding actions can be initiated.

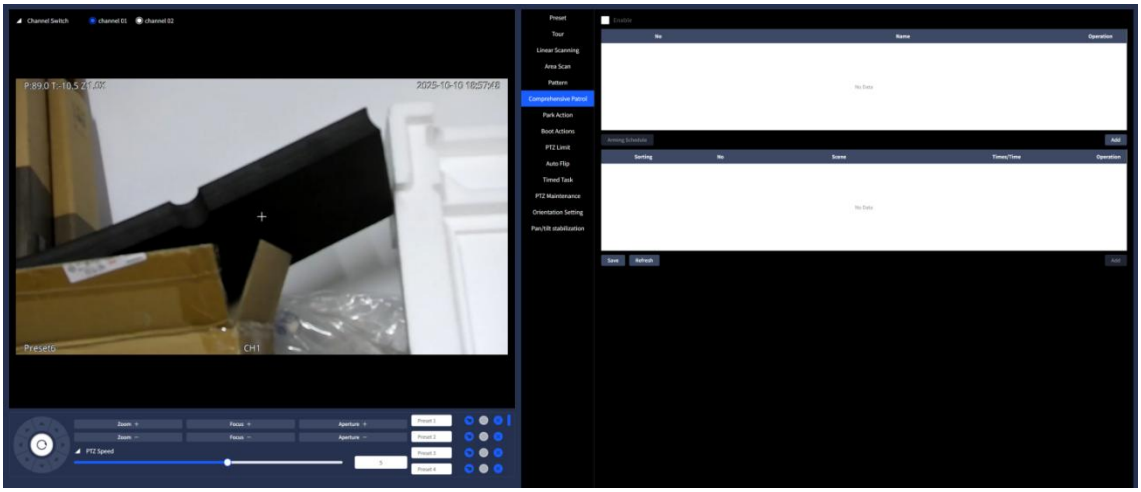


Figure 6.53 PTZ Settings-Comprehensive Patrol Settings Interface

6.4.7 Park Action

When there is a time period when PTZ does not receive any instructions, motions you have already set will be implemented. Please confirm that the already configured motion has been completed before park action.

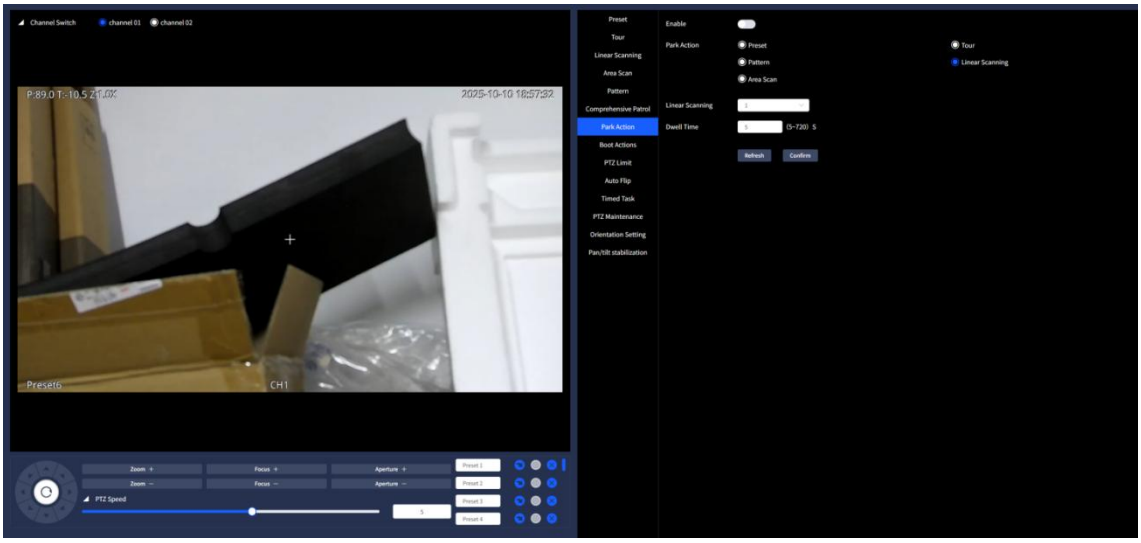


Figure 6.54 PTZ Settings-Park Action Settings Interface

6.4.8 Boot Action

Boot action refers to the action that the camera automatically performs after being powered on. When "Automatic" is selected, the system will execute the last action performed before the power was cut.

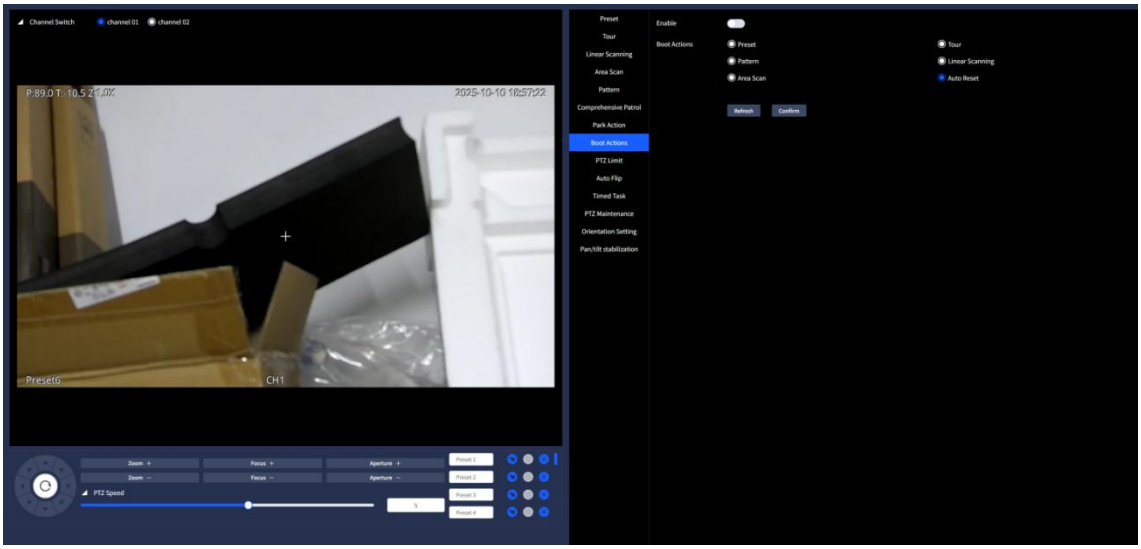


Figure 6.55 PTZ Settings-Boot Action Settings Interface

6.4.9 PTZ Limit

The PTZ limit refers to setting the motion area of the PTZ so that the camera can only move within the configured area. Limits include vertical limits (setting upper and lower boundaries), horizontal limits (setting left and right boundaries), X-axis origin settings, and origin automatic calibration (off by default).

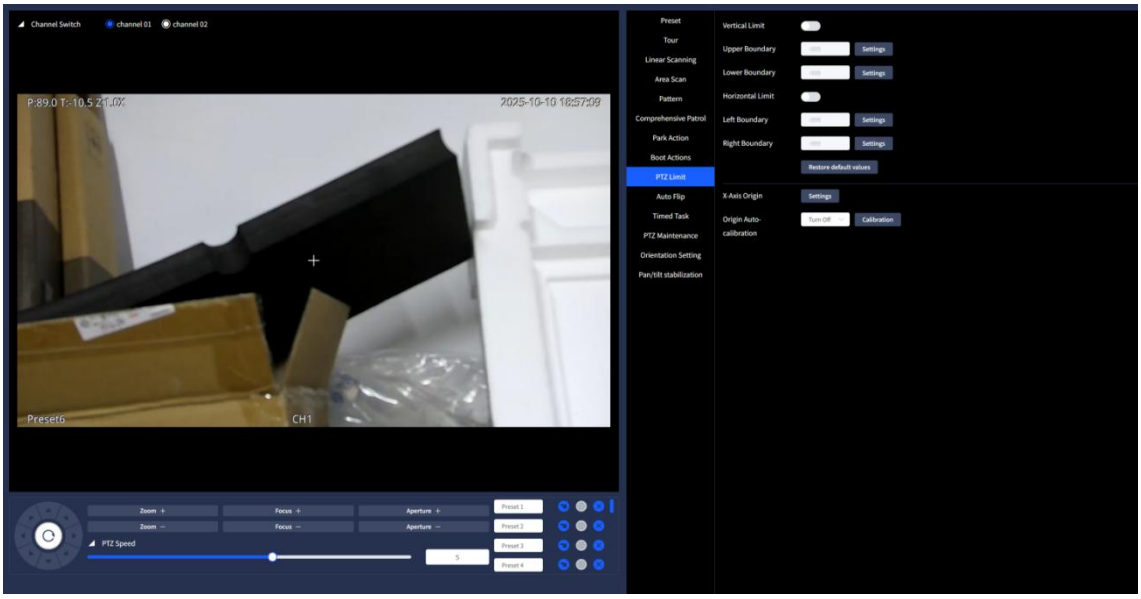


Figure 6.56 PTZ Settings-PTZ Limit Settings Interface

6.4.10 Auto Flip

When the camera tilts to the bottom, it will auto pan 180°and tilt upwards.

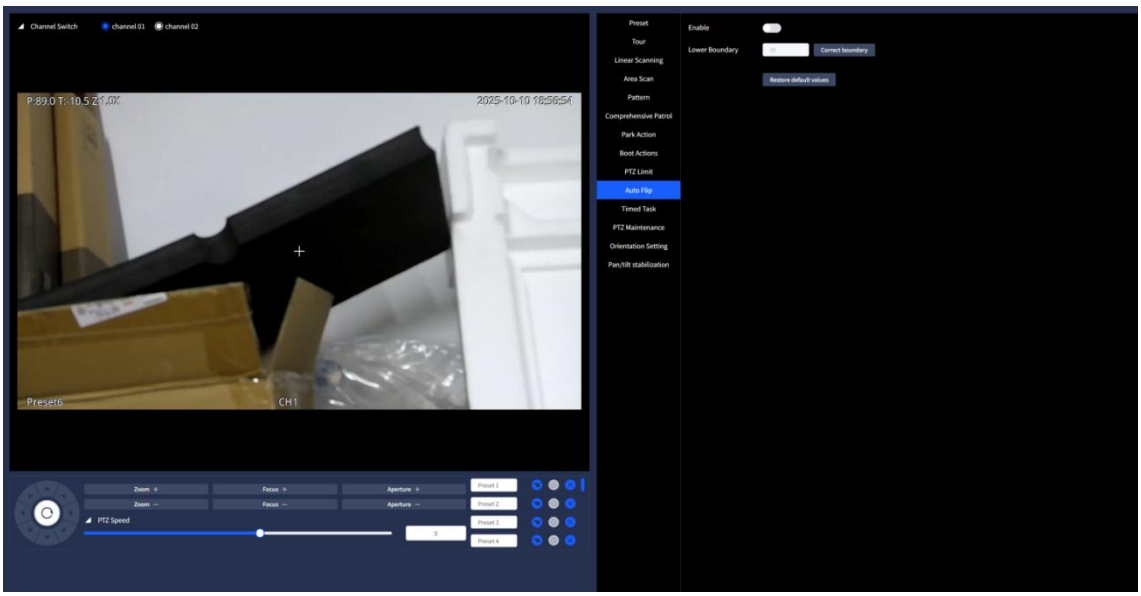


Figure 6.57 PTZ Settings-Auto Flip Settings Interface

6.4.11 Timed Task

You can configure a time task and let the camera implement certain actions within the period you have set. When the implemented task is interrupted(for example, operating PTZ rotation manually), the device will perform the scheduled task again after N seconds within the configured time period. Click the *Copy* button to copy the current task content into a certain task.

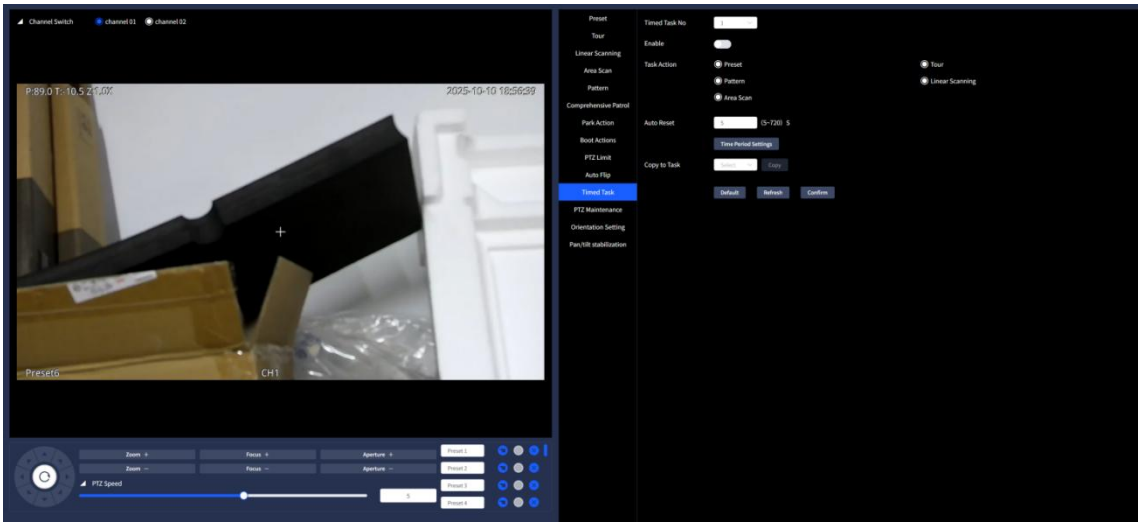


Figure 6.58 PTZ Settings-Timed Task Settings Interface

6.4.12 PTZ Maintenance

- Power Off Memory: If this function is enabled, the PTZ will return to the last position before powering off.
- Default: All the configurations will be deleted by this function; please operate with caution.
- PTZ Restart: Restart the PTZ manually.

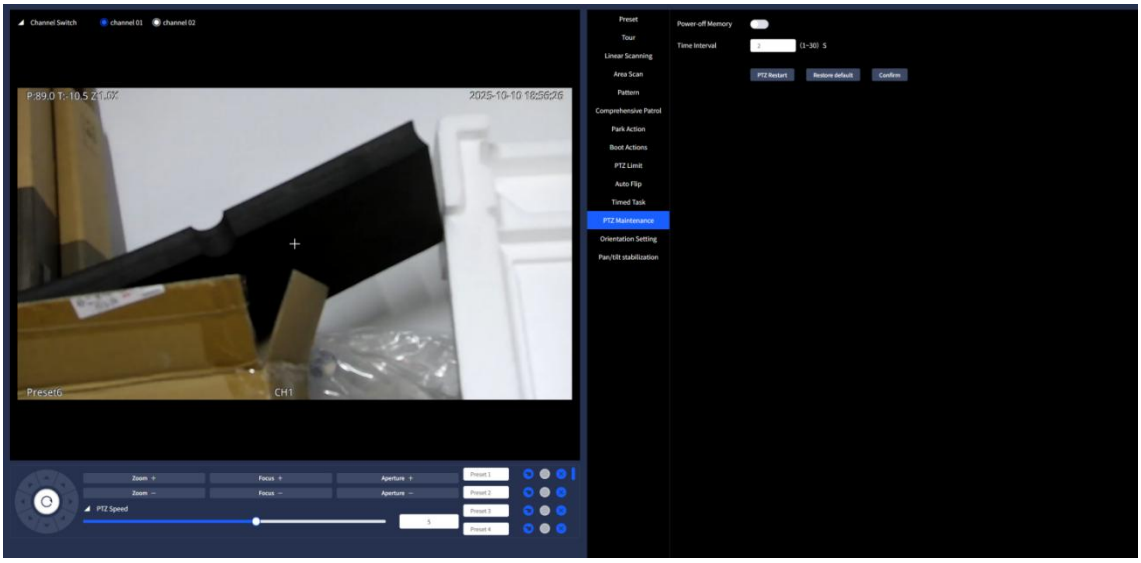


Figure 6.59 PTZ Settings-PTZ Maintenance Settings Interface

6.4.13 Orientation Setting

Azimuth Mode: Automatic, Manual

Automatic: Calibration, Point to true north

Manual: Set true north, Point to true north, Remove

Tilt Mode: Automatic, Manual

Automatic: Calibration, Set zero tilt angle, Remove, Call

Manual: zero tilt angle, Remove, Call

Lat & Long Mode: Automatic, Manual

Automatic: Only supported for PTZ devices with a physical GPS module

Manual:

- Longitude: East, West
- Latitude: North, South

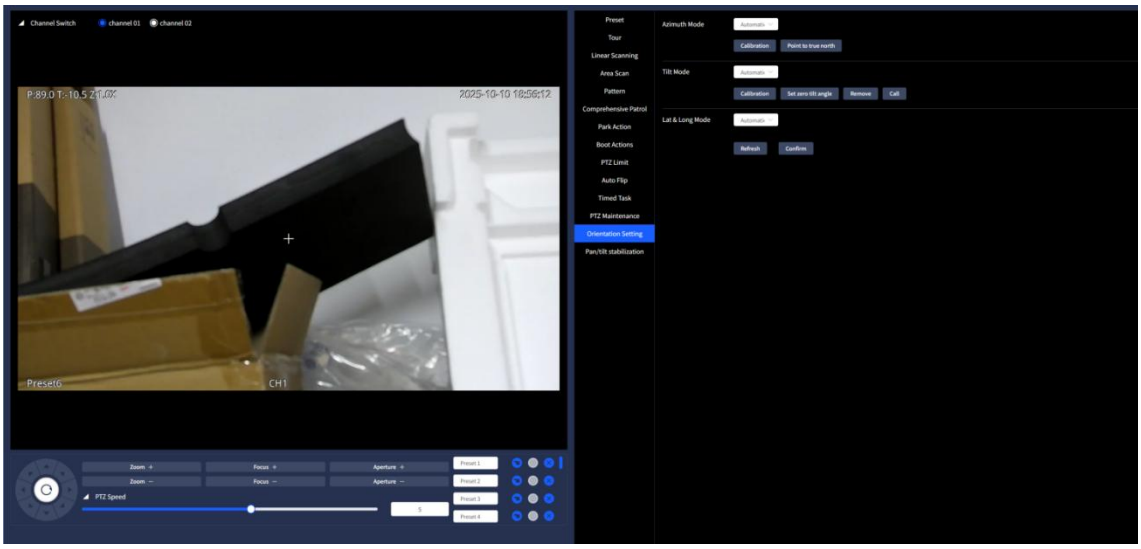


Figure 6.60 PTZ Settings-Orientation Setting Interface

6.4.14 Pan/tilt Stabilization

Enable/disable: Turn on/off the pan-tilt stabilization function.

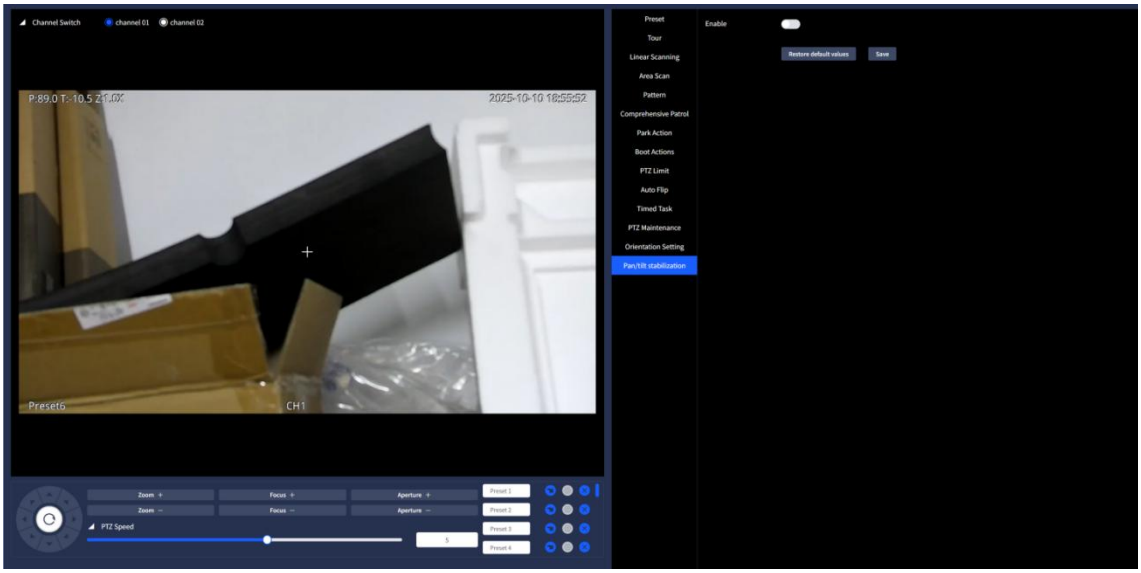


Figure 6.61 PTZ Settings-Pan/tilt Stabilization Settings Interface

6.5 Storage Management

6.5.1.1 Storage Device

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

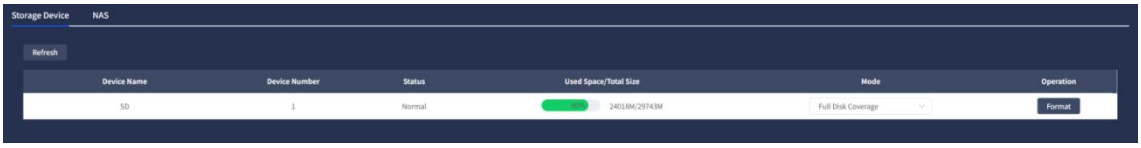


Figure 6.62 Storage Management-Storage Device

6.5.1.2 NAS

NAS configuration page.

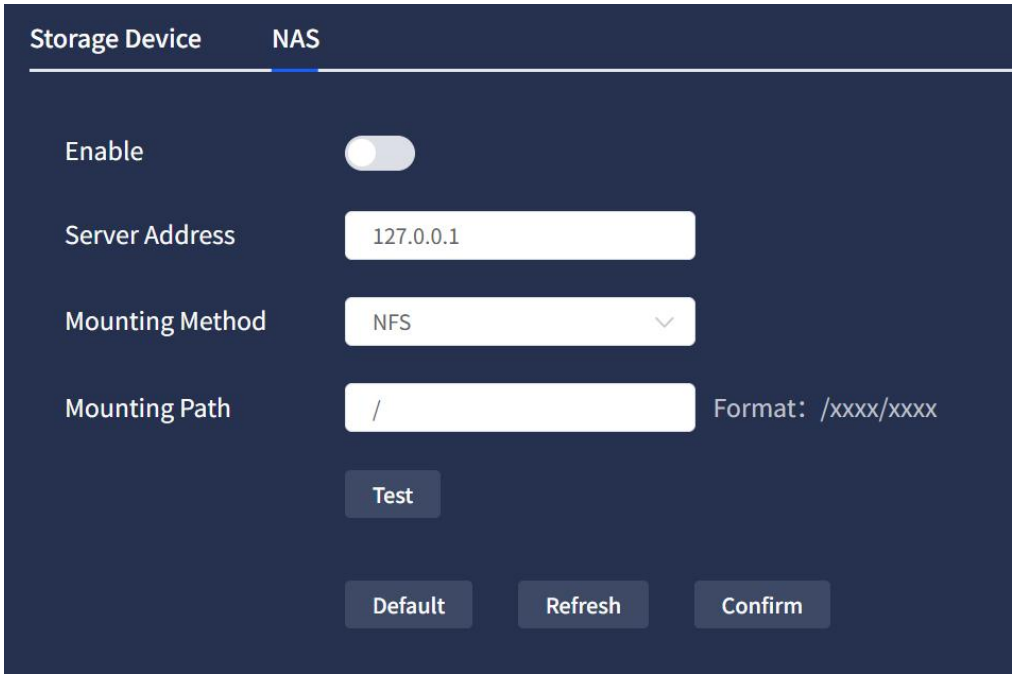


Figure 6.63 Storage Management-Storage Device Settings Interface(NAS)

6.5.2 Recording Control

Recording Duration: The duration of each video file.

Pre-recorded 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.

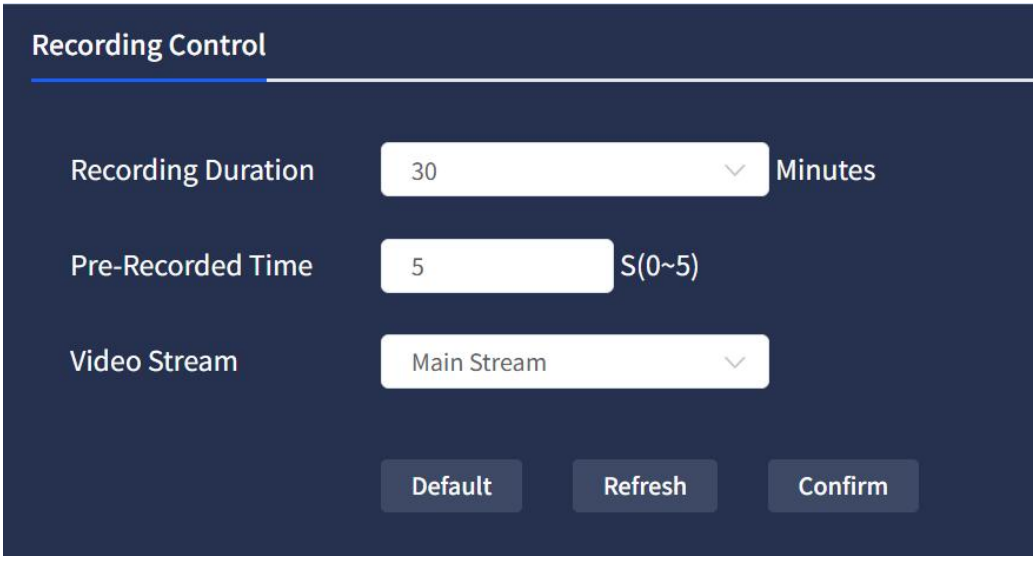


Figure 6.64 Storage Management-Recording Control

6.5.3 Recording Plan

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

Three Modes: Turn Off Recording, Alarm Linkage Recording (default), and Scheduled Recording.

■Turn Off Recording: Select to close the recording, and the channel recording will no longer be recorded in the SD card.

■Alarm Linkage Recording: Select alarm recording, check linkage recording in the alarm setting interface, and there will be alarm recording of this channel on 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.

Storage Mode: You have three options to choose from: upload to FTP, local storage device (SD card storage), and upload to NAS. You can select any one of them.

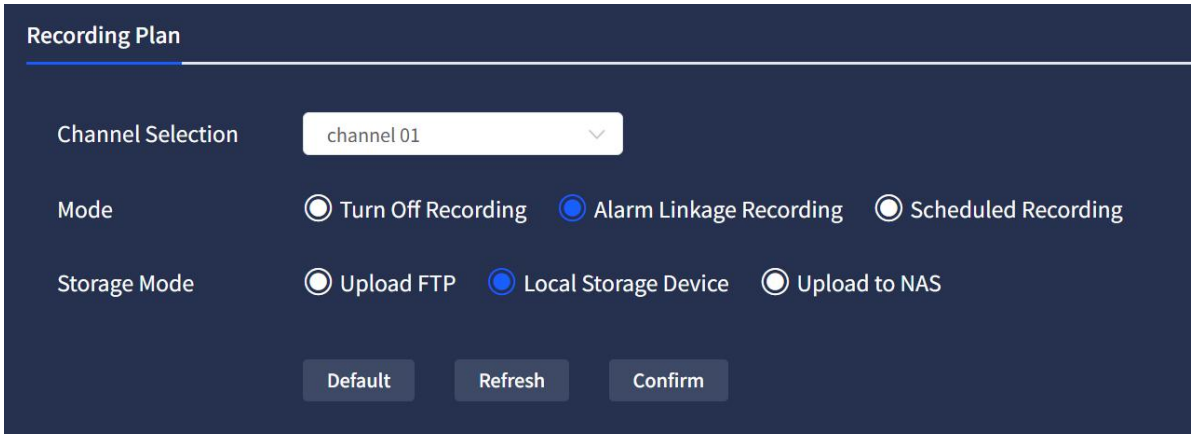


Figure 6.65 Storage Management-Recording Plan

6.5.4 Snapshot 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: Three modes are supported: Turn Off Snapshot, Alarm Linkage Snapshot, and Scheduled Snapshot. You can choose any one of them.

■Turn Off Snapshot: When Turn Off Snapshot is selected, all snapshot functions stored on the SD card or FTP will be turned off.

■Alarm Linkage Snapshot: When selecting Alarm Linkage Snapshot, you need to check the 'Linkage Snapshot' option in the alarm settings interface. Only then will alarm images from that channel be stored in the SD card or FTP storage directory.

■Scheduled Snapshot: When choosing scheduled snapshot, it will capture regular images according to the set time period and save them to the SD card or FTP storage directory.

Storage Mode: There are three options: Upload to FTP, Local Storage Device (SD card storage), and Upload to NAS. You can choose any one of them.

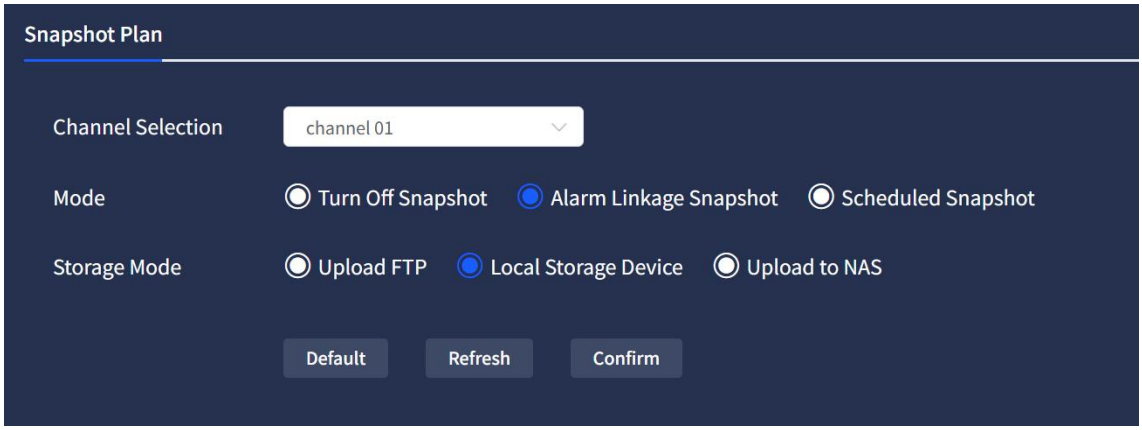


Figure 6.66 Storage Management-Capture Plan

6.6 System Management

6.6.1 Local Settings

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

6.6.1.1 Local Settings

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

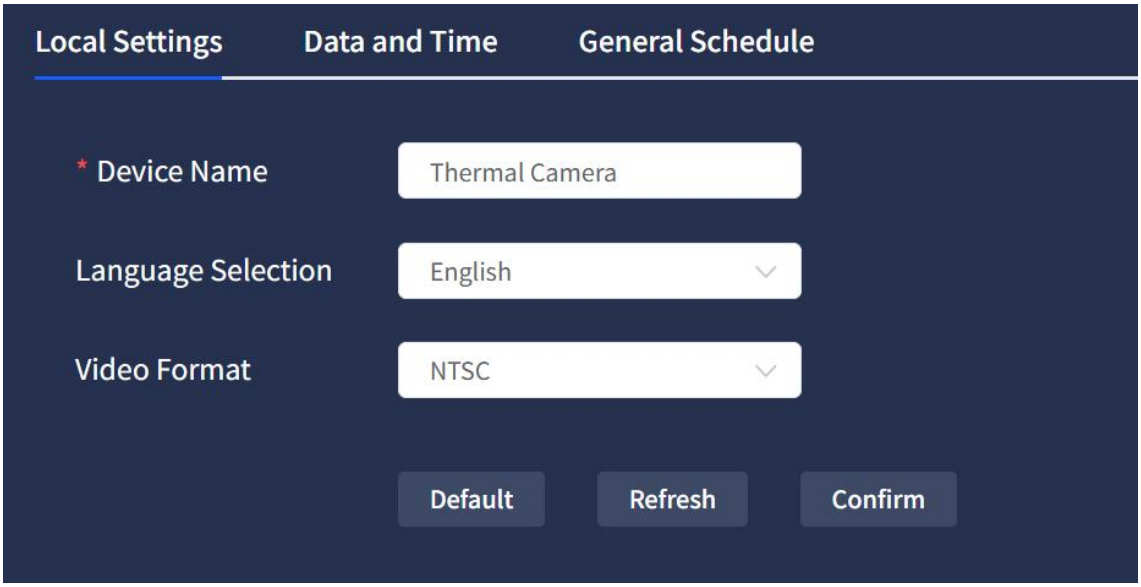


Figure 6.67 System Management-Local Settings

Table 6-1 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 50Hz and 60Hz

6.6.1.2 Date and Time

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

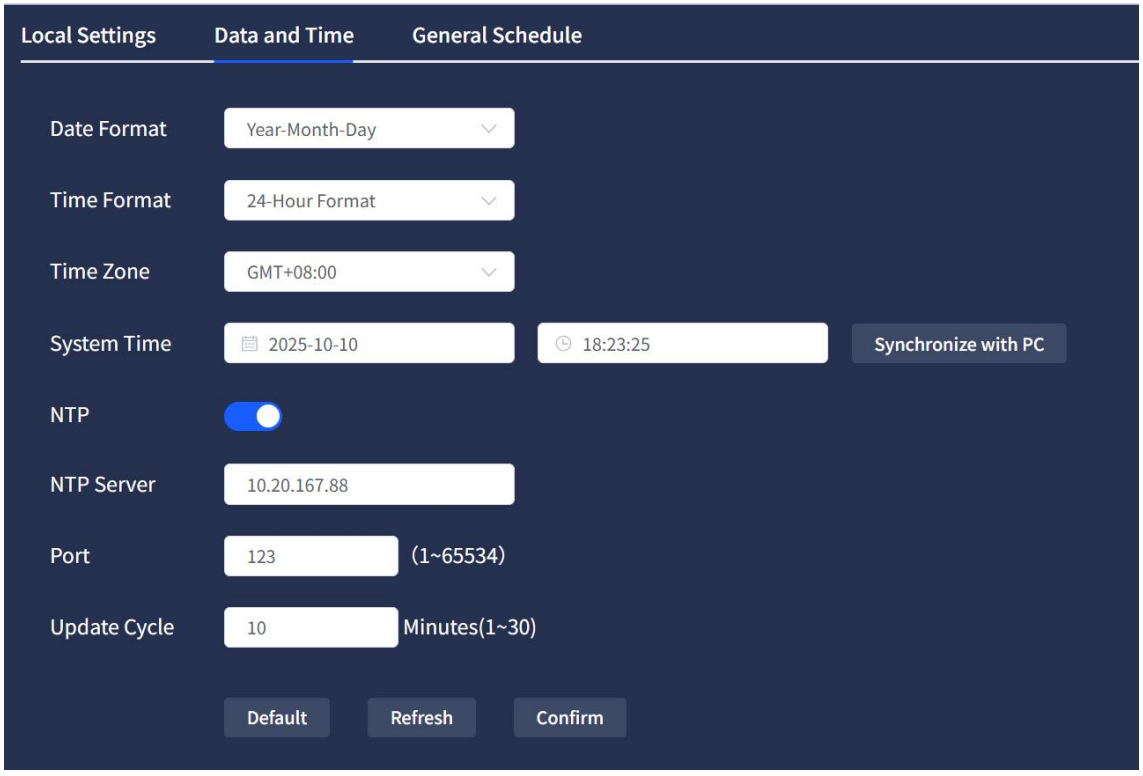


Figure 6.68 System Management-Date and Time Settings

Table 6-2 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

6.6.1.3 General Schedule

The general schedule is used to synchronize the time set in the general schedule with one click when setting the defense time and video/capture plan. The general schedule can be edited (dragging or clicking is supported) and reset with one click.

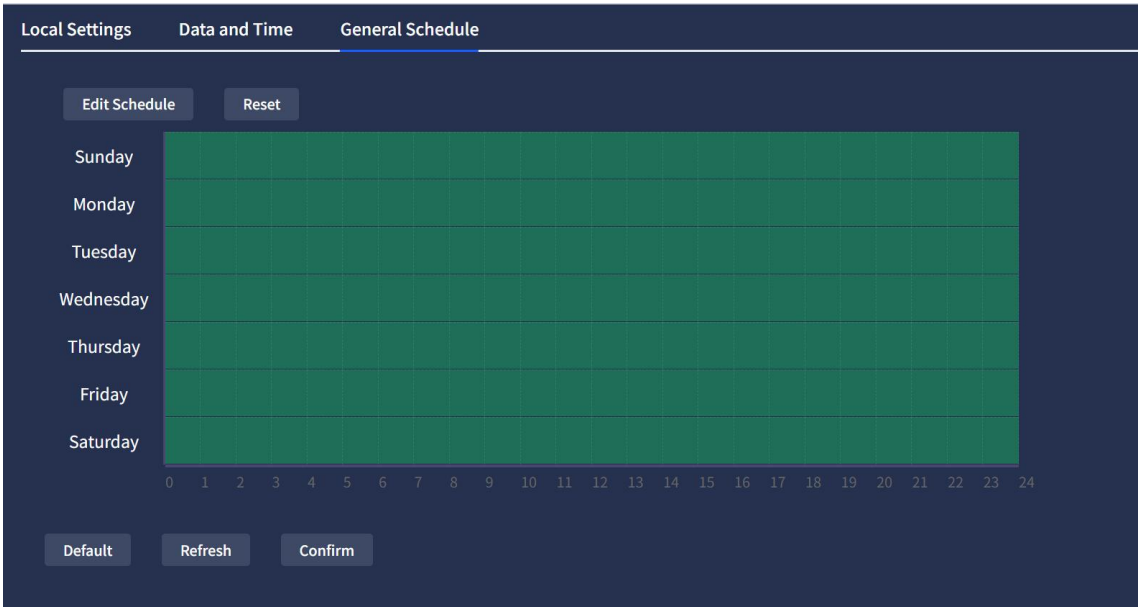


Figure 6.69 System Management-General Schedule Settings Interface

6.6.2 User Management

6.6.2.1 User Management

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

6.6.2.1.1 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 cannot add administrator.

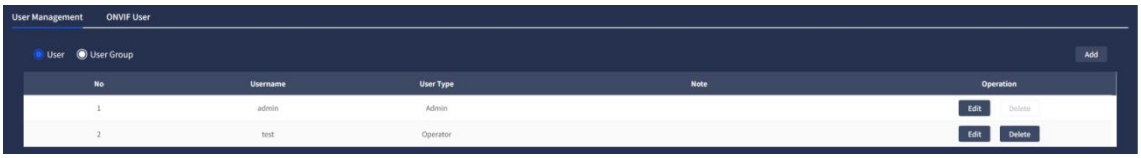


Figure 6.70 User Management-User Interface (Admin)

2) The admin user changes his/her own password and deletes or modifies 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.

6.6.2.1.2 User group:

1) There are three levels of user group: administrator, operator, and 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 cannot be changed, but can reassign the authorities to users of other levels.

As shown in the figure below.

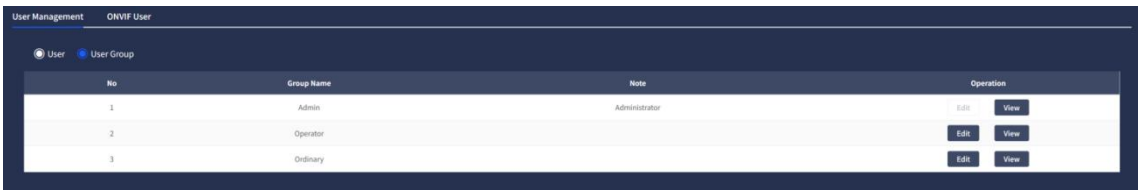


Figure 6.71 User Management-User Group Interface (Admin)

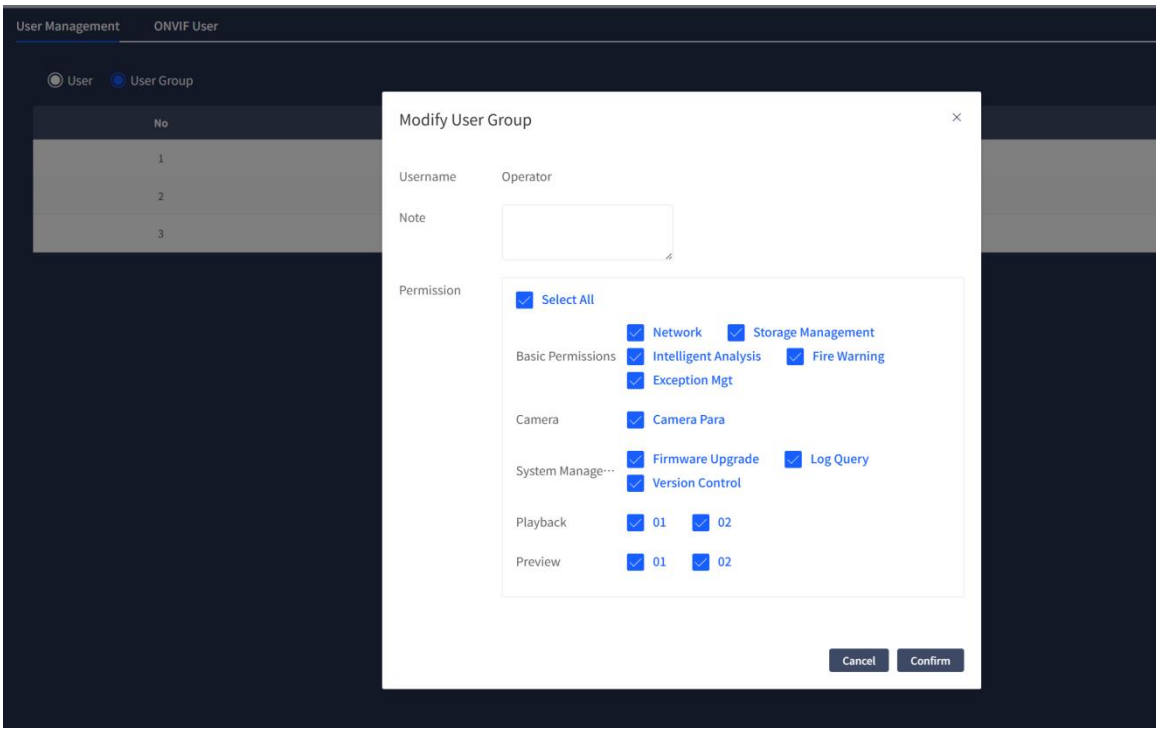


Figure 6.72 User Management-Authority Assignment (Admin)

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.*

6.6.2.2 ONVIF User:

1) The default ONVIF user is admin, who can change admin's password (password is admin by default), but cannot 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 are not needed. Turn on ONVIF authentication, the user name and password are needed when connected.



Figure 6.73 User Management-ONVIF User Interface

6.6.3 Safety Management

6.6.3.1 IP Permissions

In order to strengthen the network security of the device and protect the device data, the user who is allowed to access the device through the IP authority can be set.

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



Figure 6.74 Safety Management-IP Permission Interface

6.6.3.2 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.

Operation 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.

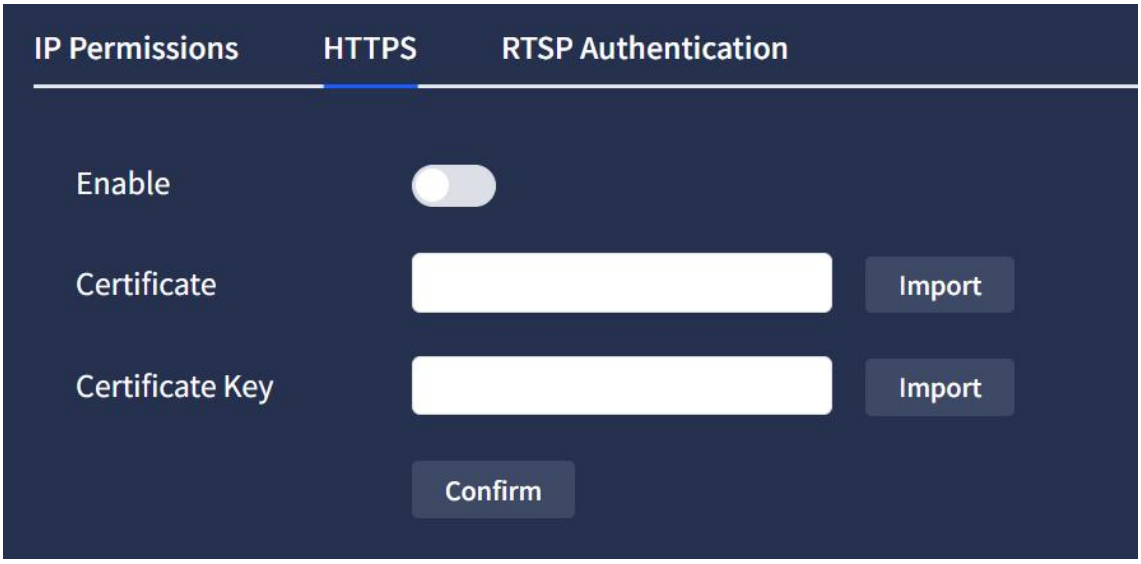


Figure 6.75 Safety Management-HTTPS Interface

6.6.3.3 RTSP Authentication

The authentication method for the media stream can be set to ensure the security of the data in the process of streaming media transmission.

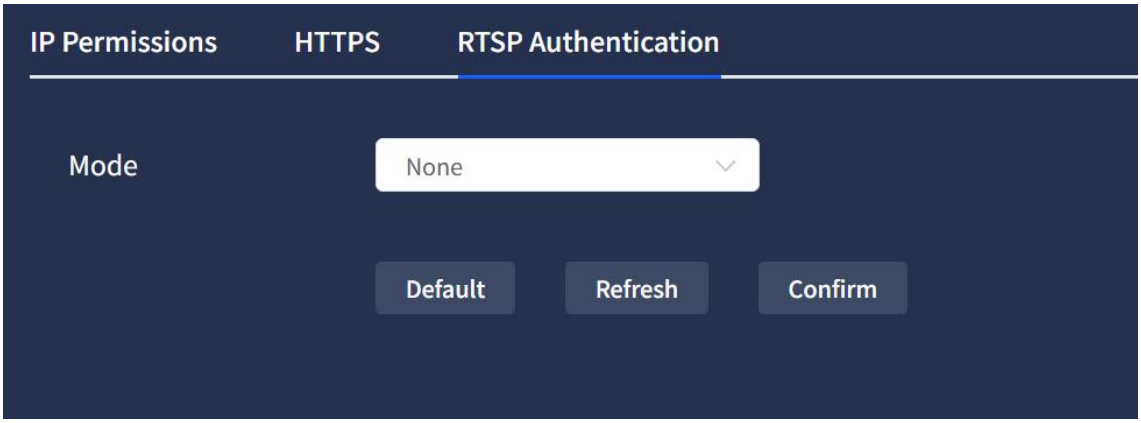


Figure 6.76 Safety Management-RTSP Authentication

Table 6-3 Descriptions on RTSP Authentication Parameters

Parameters	Descriptions
1 Mode	The device supports three kinds of authentication modes: *None: No authentication; Digest: digest authentication; Basic: basic authentication.*
2 RTSP Stream	URL format can be used when the user plays real-time videos with VLC. When requesting real-time RTSP media streaming service, the

	requested channel Number, streaming type should be indicated in URL. If authentication information is required, you also need to provide a user name and password. Stream get format: rtsp://username:password@ip:port/ live?channel=0&subtype=0 In which: Username: for example, admin; password: for example, admin. IP: device IP, such as 192.168.1.123. Port: port number, 554 by default, which can be ignored in default state, or else the changed port number should be filled in. Channel: the channel number is 0 and 1. 0 stands for visible channel (channel 1), 1 stands for thermal channel (channel 2). Subtype: streaming type, 0 stands for main stream (that is subtype=0), 1 stands for sub stream (that is subtype=1) For example, request the sub stream in channel 2, URL is as follows: rtsp://admin:admin@192.168.1.123:554/ live?channel=1&subtype=1 If the authentication is not required, then the user name and password do not need to be specified; use the following format: rtsp://ip:port/ live?channel=1&subtype=1

6.6.4 Serial Port Settings

Configure the external serial port communication.

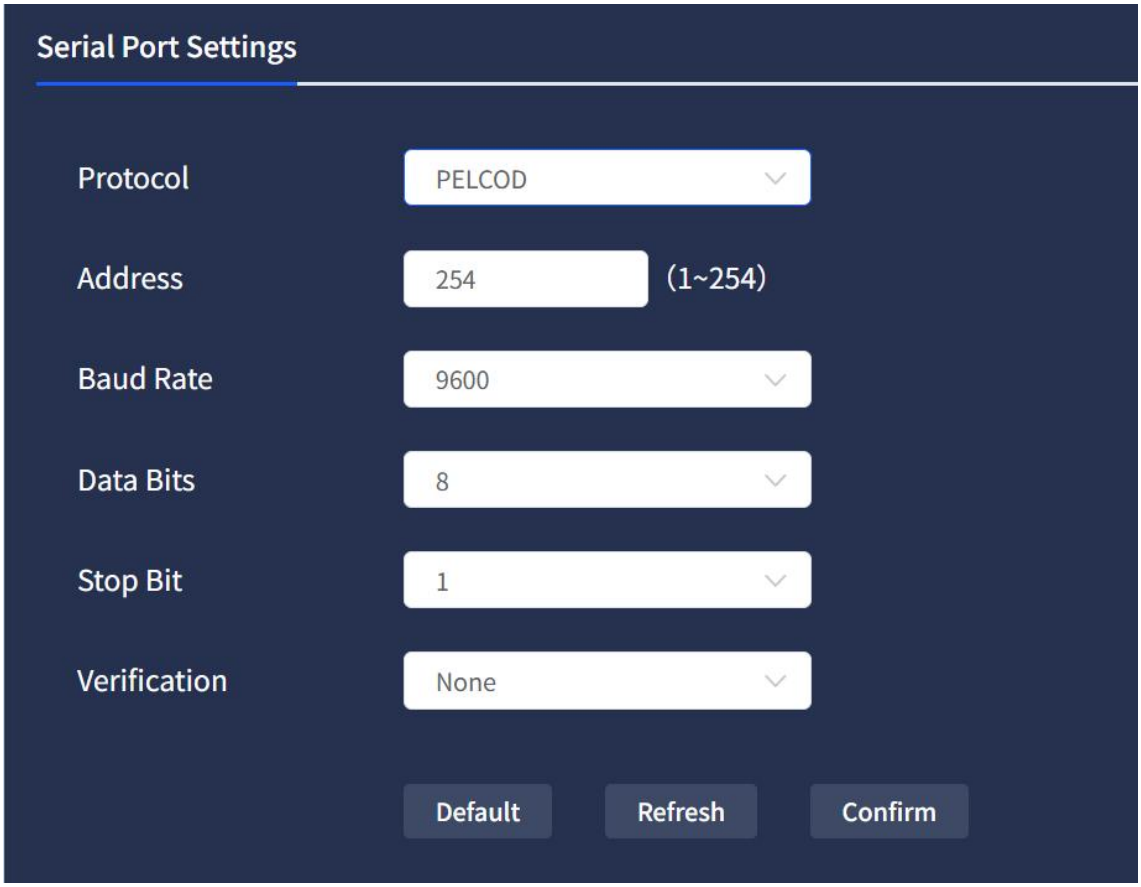


Figure 6.77 Serial Port Settings Interface

6.7 System Maintenance

6.7.1 Auto Maintenance

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

Auto Restart: Operation steps:

1) Enable the function;
2) Select the days of the week and the time;
3) Click Confirm to save the setting.

Manual Restart:

Click "Restart" to manually restart the device.

Power Restart:

Click 'Power Restart' to issue a power-off and restart command to the PTZ to remotely power off devices such as modules with network board.

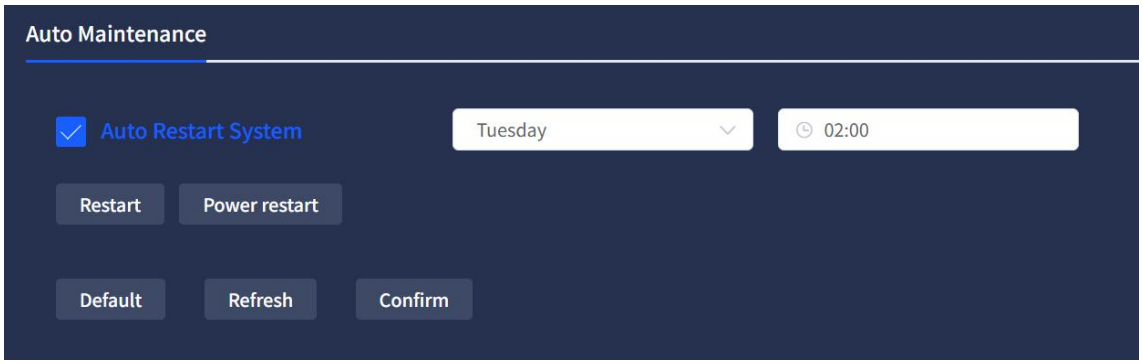


Figure 6.78 System Maintenance-Auto Maintenance

6.7.2 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.

***Note**: The default IP is 192.168.1.123.*

Import and Export:

■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.

***Note**: The default download path is the browser's download folder.*

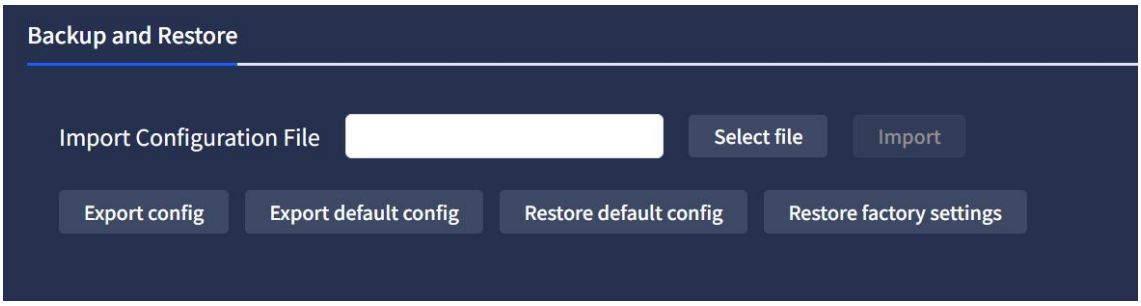


Figure 6.79 System Maintenance-Backup and Restore

6.7.3 System Upgrade

System upgrade steps:

1. Select the upgrade type. Four types of upgrades are available: System, PTZ, Thermal imaging Core, and Visible Light Core. Each upgrade type corresponds to its own file name verification and file type verification.
2. Click *Import*, select the upgrade file, and click *Upgrade*.
3. Please do not power off, disconnect the network, restart, or turn off the camera during the upgrade process.
4. Auto go to login page after the update is completed.



Figure 6.80 System Maintenance-System Update Interface

6.7.4 Version Information

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

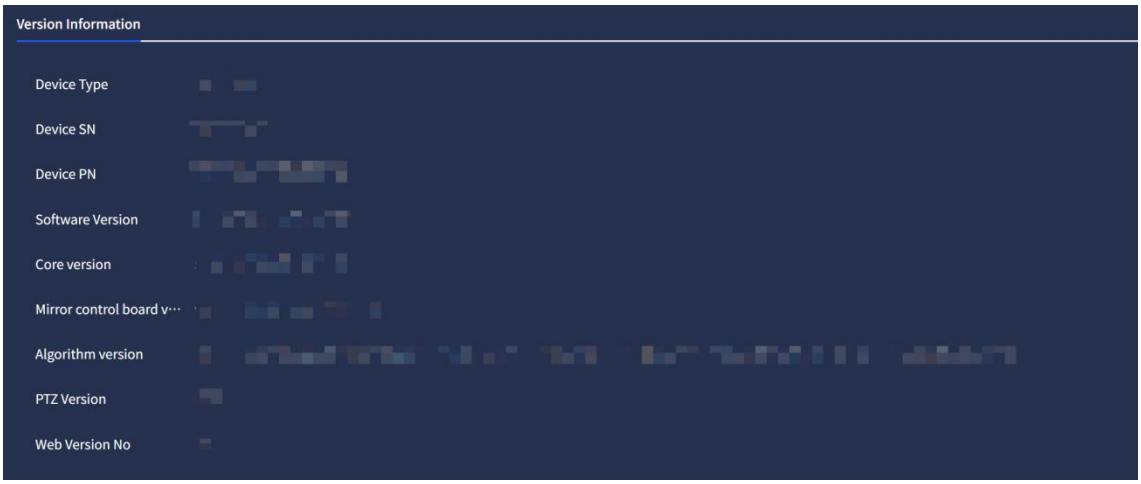


Figure 6.81 System Maintenance-Version Information

6.7.5 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:

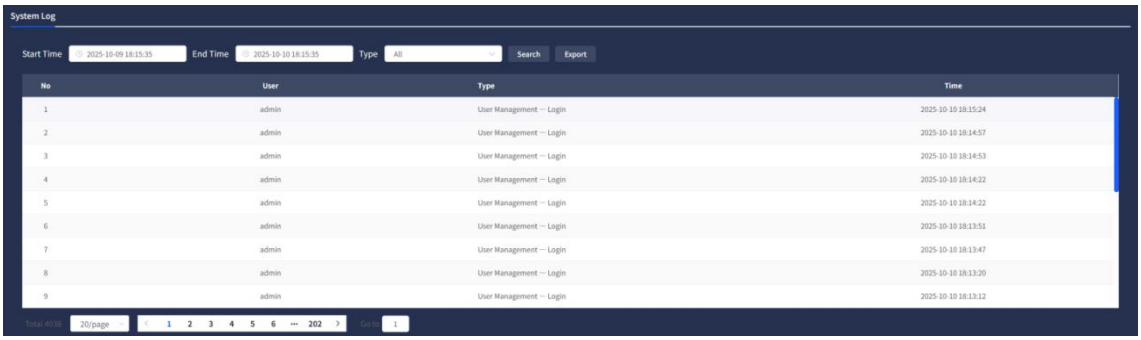


Figure 6.82 System Maintenance-System Log Interface

6.7.6 Online Users

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



Figure 6.83 System Maintenance-Online User