Hanwha Vision

Network Camera

Online help

PNM-C20000QB

Monitoring

You can check the live screen to view what is being captured by the camera and control screen capture, and other features. When you click the button on the screen, the live screen will appear.

You can move to the live screen, playback screen or setup screen by clicking the buttons at the top.

- (Monitoring): Check the live screen to view what is being captured by the camera and control a variety of camera features.
- (Playback): Search and playback a recorded image from an SD card (or microSD card) or NAS.
- (Setup): Change the camera settings.

Note

- If you click the icon at the top right of the live page, you can see the connected IP address and the authentication status. If successfully authenticated, the icon will be colored in green. If failed to be authenticated, it will be colored in red. If authentication is irrelevant due to the use of HTTP connection, dash (-) will be displayed.
- When playing a video on the live page, ghosting might occur under one of the following cases:
  - When the resolution changed after changing the profile
  - When the data transfer is delayed due to network delay after changing the profile
  - When the size or location of the web browser window changed

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Icons

The icons at the bottom of the live screen provide the following functions (Some functions may not work with a certain browsers or codecs.):

Icon	Description of function
Video setup	You can check or change the profile applied to the current live screen. You can also change the display settings of the live screen.
Status	Check the connection information for each profile and for connected users at the same time.
Lens model name	Lens types are displayed. If you select a channel in [Select channel], you can see the name of the lens installed for each channel.
Select channel	The channels supported by the camera are displayed. Select a channel to play the live feed of the selected channel. Once a channel number (or channel name) is selected, the video of the

Icon	Description of function
	channel will be displayed on the viewer.
Privacy area	The Privacy area setting window will appear. Specific functions related to privacy mask areas can be controlled, including setting the use of the privacy mask area feature or designating a privacy mask area. For more information on privacy mask areas, refer to **[Setup]**>**[Video & Audio]**>**[Video setup]**.
Full screen	View the live screen in full screen. To return to the size of the previous web browser, click the icon in full screen mode or press the **[Esc]** key on the keyboard.
Size option	The size changes to the next size each time you click it. • (Fit): Fit the camera image to the size of the web browser. • (Original Size): View the camera image at its actual resolution. • (Aspect Ratio): View the live screen in the web browser by zooming in or out, while maintaining the aspect ratio of the camera image.
Capture	Capture and save the live screen as a PNG image file. A captured image file is saved in the default recording path of each browser.
Record	You can record and save the live screen to a PC. Click the Record icon to start recording; click the icon again to stop recording. Recorded files are saved in .avi format and can be saved in the default path of the browser or a file path can be set in the 'Save as' window. To protect your video files with password, select ZIP from the list of the video recording file format and enter a password. You need to enter the password to play back downloaded videos. The password setup function for recorded videos is not available in

Icon	Description of function
	some camera models.
⬚ Pixel count	On the live screen, you can see the number of horizontal/vertical pixels in the area selected with the mouse. Click the Pixel count icon and click and drag the desired area with the mouse. The selected area will be displayed and the number of pixels in the image will be displayed. When you click the Pixel count icon again, the Pixel count function ends.
 Microphone	Use the microphone function. Microphone function can be used only when accessed in HTTPS mode.
 Alarm output	When you click a desired alarm output number, the alarm will be outputted as previously set. The alarm can be set from the **[Setup]**>**[Event]**>**[Alarm I/O]** page. The number of alarm outputs varies depending on the camera.
 Speaker	Adjust the audio volume of the live screen. Click the icon to activate the audio and adjust the volume. To use the Speaker function, the **[Audio in]** function should be activated for the relevant profile. To activate the audio input function, select **[Enable]** from **[Setup]**>**[Basic]**>**[Video profile]**>**[Audio in]**.
▷/■ Audio play/Audio stop	You can play or stop an audio clip of your choice after selecting it from the audio clip list. You can play audio of your choice while monitoring the live video. Go to **[Setup]**>**[Video & Audio]**>**[Audio setup]**>**[Audio clip]** to register an audio clip.

To change channel

- Select a channel you want. The video of the channel shows up on the viewer.

To capture image

- In the scene to capture, click the capture icon(📷).
- When the captured image is saved, a notification message will pop up. The capture image is saved to the path specified in each browser.

To record video

- Click the Record icon(⏺).
- To end the manual recording, click the Record icon(⏺) again.

The manual recording can be saved as an .avi file in your PC. Specify the path and save the video.
To protect video recordings with password

- You can select ZIP as the recording format and click the "REC" icon to set the password.

Your video recordings will be saved as .zip in your PC. You need to enter the password to play back the videos. (The password setup function for recorded videos is not available in some camera models.)

To switch to full screen

- Select the Full screen icon(⛶) to change the viewer mode to full screen.
- To exit the full screen mode, click the Full screen icon(⛶) again or the [Esc] key on the keyboard.

To use microphone

- Click the microphone icon(🎙).

If no sound is heard when connecting or disconnecting the audio jack from the PC while playing the audio, click the microphone icon(🎙) and enable it.
The sound output from the camera may be inconsistent depending on the microphone device settings. If the sound is not well heard, turn off the improvement function of the microphone properties in the PC where the web viewer is operating, or adjust the microphone device volume.

To use speaker

- Click the Speaker icon(🔊).

To count the number of pixels

- Click the Pixel count icon(⬚).
- Set the area by dragging the mouse on the image. The number of horizontal/vertical pixels of the area will be displayed on the screen.

To play an audio clip

- Click the Play icon (▷) after selecting an audio clip of your choice from the audio clip list.
- To stop playing it, click the Stop icon (■).

Video setup

Profile

The name and detailed information of the Video profile applied to the current live screen will be displayed. When you press the **[Profile]** drop-down icon, a Video profile list that can be used from the current web viewer will appear; when you select the desired Video profile, it will be applied to the live screen immediately. You can check the resolution, codec, frame rate and target bitrate of the selected Video profile.

Display

Set the contrast, brightness, sharpness, etc. of the live screen; when you enter the setting, it will be applied to the live screen immediately. Click the ↻ button if you want to reset all the display settnigs.

Status

Profile access

Check the connection status of all currently-set profiles or check the status of currently-connected users.

Current users

You can check the applied profile for each user, bitrate (kbps), network connection status and IP address of all users currently connected to the camera.

Playback

You can import and playback a recorded image from an SD card (or microSD card) or NAS.
When you click the ▶ button on the screen, the playback screen will appear. A time bar will appear at the bottom of the playback screen and an image recorded according to the set schedule or by an event is displayed on the time bar. When you click **[Refresh]**, the recorded image information in the time bar is updated to the latest.
You can search for a recorded image by event type or date, and capture or save it to a PC. Also, if the time on the camera system has been adjusted and thus resulted in overlapping time, the video recorded during that overlapping hour can be searched. If there are overlapping sections, the [Overlapped section] option will appear next to the [All] button.

You can move to the live screen, playback screen or setup screen by clicking the buttons at the top.

- 🖥(Monitoring): Check the live image being captured by the camera and control various camera functions.
- ▶(Playback): Search and playback a recorded image from an SD card (or microSD card) or NAS.
- ⚙(Setup): Change the camera settings.

> **Note**
>
> - A video needs to be recorded first on the **[Live]** page before being able to play it.
> - Connecting to the web viewer via Chrome, the record playback screen feature can be securely used.

Playback icons

The icons at the bottom of the playback screen provide the following functions:

Icon	Description of function
Select channel	After selecting your channel, you can search or play recorded videos for each channel.
▷/ II Playback/Pause	Playback or pause an image.
▷▷ Speed	Play the video at 2x speed.
🔊 Speaker	Adjust the audio volume of the playback screen. Click the button to activate the audio and adjust the volume.

Playback a recorded image through event search

You can search for a recorded image by event type.

To search by event and play back

1. Click the Show button on the Playback screen. If there is any video taken on the day of searching, it will be displayed on the time bar.
2. To search by event type, click the **[All]** button at the top of the time bar and select an event you want.
3. Click the **[OK]** button to display the searched events on the time bar.
4. Click the Playback button.
5. To stop the playback, click the Pause button.

Playback a recorded image through time search

Search for a recorded image by selecting a date and time on the calendar. When you click the **[Today]** button on the time bar, only images recorded today will be searched.

To search by time and play back

1. Click a date on the time bar, select the date you want on the calendar, and set the start and end time.
   - When you select **[All day]**, the start and end time will be set automatically from 00:00:00 to 23:59:59.
2. Click the **[Apply]** button.
3. Click the Playback button. The video of the selected time will play back.
   - If the video is already playing, the recorded time of the current video is displayed.
   - Move the button along the time bar to play back the video of the desired time.

Recorded video save

Recorded videos can be saved to files.

To save a video

1. Click the **[Export]** button.
2. In **[Time]**, set the Start time and End time for the video to save.
3. From **[Type]**, select the file type you want.
   - AVI: Saves in .avi.
   - ZIP: Saves in .zip. You can set a password for your files. You need to enter this password to unzip those files in order to play videos. (The password setup function for recorded videos is not available in some camera models.)
4. Click the **[OK]** button.

Video profile

The user can add or delete a video profile, and change the profile properties. Set the video profile, frame rate and codec as 'Video profile' in advance and later change the video profile to stream or play back an image. When you finish the setting, click **[Apply]** at the bottom of the page.

Select channel

After selecting your camera channel, you can set the details of Video profile for each channel.
Click **[Info]** to see a summary of the channel condition.

Video profile

The user can select a video profile according to the service environment and circumstances of product use. In addition to the profiles provided by default, the user can add a new profile or delete an existing one. You can set the codec, profile type, resolution, frame rate, and other settings for each profile.

Profile list

The profile list is provided by default; all profiles added by the user are also displayed.

Adding a video profile

1. Click **[Add]**. A new item will be added to the profile list.
2. Enter the name of profile in the **[Name]** field. The entered name will appear in the profile list.
3. Set the profile items, including **[Codec]**, **[Profile type]** and **[Resolution]**.
4. Click **[Apply]** at the bottom of the page.
5. When the confirm window appears, click **[OK]**. The new profile will be added.

Changing a video profile property

1. Select the profile which you wish to change from the profile list.
2. Change the relative settings, including **[Codec]**, **[Profile type]** and **[Resolution]**.
3. Click **[Apply]** at the bottom of the page.
4. When the confirm window appears, click **[OK]**. The settings of the selected profile will change.

Deleting a video profile

1. Select the profile which you wish to delete from the profile list.
2. Click **[Delete]**.
3. When the confirm window appears, click **[OK]**. The selected profile will be deleted.

Name

The name of the profile selected from the profile list will be displayed. You can enter a new profile name if creating a new profile.

Codec

Select the codec which you wish to apply to the profile. The profile properties may vary according to the selected codec type.

Profile type

Select a profile type to apply. The selected profile type will be displayed in the **[Type]** column of the profile list. The setup items may vary according to the selected codec type.

- **Default profile**: This is the default profile applied for streaming a live camera image. 'Default' is displayed in **[Type]** in the profile list.
- **Email/FTP profile**: A video profile that is used when sending a capture image of the event to email and FTP servers, or when sending video clips to the FTP server. (Video clips can be sent to FTP only if the **[Codec]** is set to [H.264] or [H.265].) [Event] will be displayed in the **[Type]** column.
- **Edge recording profile**: This profile is applied for recording an image on an SD card or NAS. 'Record' is displayed in **[Type]** in the profile list.
- **Frame Lock profile**: This is a profile applied to guarantee a certain level of video frame rate. 'FrameLock' is displayed in **[Type]** in the profile list. This 'Frame Lock profile' option appears only when **[Codec]** is set to [h.264] or [h.265].

Audio in

When the camera has an internal microphone or an external microphone is connected, you can set external sounds to be inputted in the image.
To use the Speaker function on the Live page, **[Enable]** should be selected for **[Audio in]**.

Profile properties

Set the details for the current video profile.

Resolution

Set the resolution of the camera image.

> **Note**
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> - In order to stream a high-resolution image smoothly, it is recommended to connect to the web viewer using Google Chrome.

Frame rate

Set the number of frames per second.
The range of frame rates available varies according to the frame rate value selected from **[Video & Audio]** > **[Camera setup]** > **[Sensor]**.

Maximum bitrate

Set the maximum bitrate of the image when **[Bitrate control]** is **[VBR]**.

Target bitrate

Fix the amount of image data to be sent if **[Bitrate control]** is **[CBR]**.

Advanced

If either **[H.264]** or **[H.265]** is set for **[Codec]** of the profile, all advanced setup items will be displayed. If **[MJPEG]** is selected for **[Codec]** of the profile, only the **[Encoding priority]** item will be displayed.

Bitrate control

Set how to adjust the amount of image data.

- **CBR**: Constant Bitrate is for sending full-frame data of a constant size. When CBR is selected, the size of data to be sent is set by setting the target bitrate. CBR has a constant data size, making it is easy to predict the data size for the whole system, enabling the system to be operated stably.
- **VBR**: Variable Bitrate is for sending an image within the maximum bitrate without fixing the data size of the frame. VBR can use storage space capacity or bandwidth efficiently while maintaining the quality, but if an image suddenly becomes more complex, it may cause a strain on the network.

> **Note**
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> - When the Bitrate control is set to 'CBR (fixed bitrate)' and the priority on image quality mode is selected, the actually transferred frame rate may be different from the set frame rate in order to guarantee the best image quality under the set bitrate in consideration of the complexity on screen.

Encoding priority

Set the priority between frame rate and image quality if the amount of image data exceeds the target bitrate.
If either **[H.264]** or **[H.265]** is selected for **[Codec]** of the profile, the user can select between **[Frame rate]** and **[Compression]**. If **[Frame rate]** is set as the high priority, the maximum frame rate is secured, but the image quality may be lowered. On the other hand, when **[Compression]** is set as the high priority, the image quality is secured, but some frames my be omitted, so that the image may be disconnected or seem unnatural. If either **[H.264]** or **[H.265]** is selected for **[Codec]** of the profile, **[Encoding priority]** is activated only when **[CBR]** is set for **[Bitrate control]**.
If **[Codec]** of the profile is **[MJPEG]**, you can select between **[Frame rate]** and **[Bitrate]**.

GOV length

GOV (Group of Video) is a group of image frames for H.264/H.265 video compression; it means the group of frames from one I-frame to the next I-frame. GOV contains both I-frame and P-frame. I-frame is the frame which becomes the basis of compression (also called the key frame); it has data for one complete image. P-frame has information of the changed area only, based on

the front frame. For this reason, the number of I-frames is fewer as the GOV length is longer, making the image size small, while the number of I-frames is more as the GOV length becomes shorter, making for a larger image size. The maximum value of the GOV length varies according to the **[Frame rate]** in **[Profile properties]**.

Profile

This menu becomes active only when the codec of the profile is H.264. The profile can be considered as a bundle of various compression technologies. The profiles supported in the Hanwha Vision cameras include **[Baseline]**, **[Main]** and **[High]**. The compression performance becomes higher and the quality becomes better as you move from Baseline to High, but a lot of system resources are used for compressing and decompressing and may create a strain on the playback equipment. (Supported options may vary depending on camera specifications.)

Entropy coding

Set the type to reduce compression loss.
Two entropy coding types, CAVLC (Context Adaptive Variable Length Coding) and CABAC (Context Adaptive Binary Arithmetic Coding), are provided. (Supported options may vary depending on camera specifications.) However, only CAVLC coding type is available for the Baseline profile.

- **CABAC**: The CABAC data processing procedure is more complicated than CAVLC, so that it uses more system resources, but it has an excellent compression rate.
- **CAVLC**: The data processing procedure for CAVLC is simpler than CABAC, so that it uses fewer system resources, but the compression rate is relatively low.

Smart codec

Set whether or not to use smart codec. Smart codec is a unique technology of Hanwha Vision that reduces the compression rate for an area of interest to the user (to output in high quality), while it increases the compression rate for other areas, (to output in normal quality), thereby reducing the data size of the image as a whole. Smart codec is activated only when **[Bitrate control]** is **[CBR]**.
The area for smart codec can be set from **[Video & Audio]**>**[Smart codec]**.

Dynamic GOV

To apply the Dynamic GOV function to the current profile, select **[Enable]**.
Dynamic GOV is the function whereby the GOV length is changed automatically according to the image situation. In a video where little or no motion is detected, GOV operates based on the value set for **[Dynamic GOV]** by user, decreasing the bitrate of the whole video. Once motion is detected, I-frame is displayed immediately. Then, until the motion is not detected anymore, GOV operates based on the value set for **[GOV length]**.

- Enter the maximum GOV length to apply when there is no motion in the image. The range of input value is displayed next to **[GOV length]**. The input value in **[GOV length]** becomes the minimum value, while the maximum value is 480; it varies according to the **[Frame rate]** in **[Profile properties]**.

> **Note**
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> - When the WiseStream function is used, if the dynamic GOV and dynamic FPS functions are used, the WiseStream performance is optimized. The WiseStream can be set in the **[Video & Audio]** > **[WiseStream]** menu.

Dynamic FPS

Select **[Enable]** to apply the Dynamic FPS function to the profile currently being set.
Dynamic FPS is a function that automatically changes FPS settings, from the minimum FPS setting to frame rate setting depending on the screen situation. In a nearly motionless video, FPS will function using the minimum FPS setting, which in turn reduces the overall screen bitrate. When a motion is detected, FPS will use an increased FPS value.

Minimum FPS

Enter the minimum FPS value to be applied when Dynamic FPS is enabled.
The **[Minimum FPS]** option cannot be configured if the FPS value is set as 1.

> **Note**
>
> - When the WiseStream function is used, if the dynamic GOV and dynamic FPS functions are used, the WiseStream performance is optimized. The WiseStream can be set in the **[Video & Audio]** > **[WiseStream]** menu.
> - Dynamic FPS is enabled only when **[Codec]** is set to **[H.264]** or **[H.265]** and **[Bitrate control]** is set to **[VBR]**.

Multicast

Multicast is the method used to send data in one instance from the camera to multiple pieces of equipment. Set whether or not to use RTSP (Real Time Streaming Protocol) on the current profile and enter the detailed information.

Multicast (RTSP)

To send an image by using RTSP, select **[Enable]**.

IP address

Enter an IPv4 address that can be connected from the IPv4 network. The range of multicast IP address is anywhere between 224.0.0.0 and 239.255.255.254. However, 255 cannot be used at the end.

Port

Set the port that controls sending of the image. The range of multicast RTSP ports is from 1024 to 65534, and only even numbers are allowed. (The 3702 port however, cannot be used.)

TTL

You can set the TTL of the RTSP packet. A value between 0 and 255 can be entered for the TTL value.

User

Manages the user accounts connecting to the camera. Changing of the administrator password and guest settings, authentication setup and setting of current users are all available. When you finish the setting, click the **[Apply]** button at the bottom of the page.

Change administrator info

You can change the administrator account ID and password. To reinforce security, create a password by combining random English uppercase and lowercase letters, numbers and special characters.

ID

You can view or change the administrator ID that is currently used.

> **Note**
>
> - Administrator ID must contain only alphanumeric characters with a maximum length of 8 characters.
> - The default guest ID "guest" or the default user ID "user1", "user2"..."user10" cannot be used as the administrator ID.

Current password

Enter the current password. To prevent the password from being changed by someone else, the administrator password can be changed only after entering the previous password.

New password

Enter a new password.

Confirm new password

This is the confirmation procedure to prevent incorrect input of a new password. Enter the new password again.

> **Note**
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> - It is recommended to change the password every three months.
> - The password restrictions are as follows:
>   - After the factory reset, both the admin and user passwords will reset, and you need to create them again.
>   - When you access the camera web viewer for the first time, or access it after the initialization, you will be moved to the password setting menu.
>   - To use the web viewer menu, you need to set the new password in the password change menu and log in to the web viewer again with the changed password.
>   - When changing the admin password, if the current password is not matched, then you cannot set the new password.
>   - After changing the password, if there is a camera connected to a client, such as CMS or NVR, then you need to register the changed password before use. If you

maintain the same connection, the client will use the previous password for authentication, so the account can be locked.

- When logging in to the web viewer, if you entered incorrect password more than five times, it will be locked for 30 seconds and you won't be able to access the web viewer.
- If connection is made from various places with the same ID, or the password is changed while a number of Internet browsers are open, the Internet browsers may malfunction. It is recommended that a password be changed only from one location or only through one Internet browser.

Admin login timeout

If there are no activities for a certain period of time after accessing the camera web viewer with the administrator account, the web viewer login will be disconnected. Enter the timein minutesto automatically disconnect the admin login when the administrator is not active.

Guest settings

When you select **[Allow guest access]**, a guest can connect to a web viewer screen. When you connect with a guest account, you can see only the live screen on the web viewer. Guest ID and password are 'guest/guest' and these cannot be changed.

Authentication setup

When you select **[Allow RTSP connection without authentication]**, you can access the camera video using RTSP (Real Time Streaming Protocol) without the login authentication.

Current users

You can set the connection information for user accounts other than the administrator, and set use permissions including audio in, audio out, alarm output and profile.
When a registered user logs in, only the functions set for that user are enabled.
10 current user accounts are set by default; you can add or delete an account.
Up to 10 current IP user accounts can be used.

Note

- If you want to select the configured user that can use ONVIF, the use of the function may be restricted depending on the permission level set.

Use

Select the check box to enable the selected user account.

Name

Enter the ID

Password

Enter the password. The password setting rule is same as the administrator password setting rule.

Admin privilege

Authorize the selected users with admin privileges. Normal users can use only functions that their administrator allowed, but administrators can access and set any functions they want. However, even if admin privileges are given to users, they cannot change their admin ID or password.

Profile setup

Grant access to the selected user to control the detailed settings for video profiles.

Video setup

Grant access to the selected user to control detailed settings related to a video output.

Camera setup

Grant access to the selected user to control detailed settings related to camera video.

Audio in

Grant access to the entered audio to the selected user. If users with audio input access sign in to the camera web viewer with their account, they can check the video screen along with the audio. If the user does not have access to audio input, they can see the screen only.

Audio out

Grant access to the audio output to the selected user. The users with audio output access can transmit audio through microphones and other devices.

Alarm output

Grant access to the alarm output to the selected user. The users with alarm output access can transmit alarms.

Profile access

Set the type of video profiles the selected user can choose on live mode. If set to **[Default]**, the user can only check videos through the default profile. If set to **[All]**, the user can check videos through all profiles.

Playback

Grants the selected user the right to search and play the recorded video. When a user with playback permission accesses the web viewer, the ▶(playback) icon is activated at the top.

Inputting a current user

1. Select the radio button of the current user account you wish to use. The current user account is changed to a status where input is available.
2. Select the check box in the **[Use]** column.
3. Enter the ID and password in the **[Name]** and **[Password]** columns.
4. Select a function to allow in the **[Audio in]**, **[Audio out]** and **[Alarm output]** columns respectively, and select the type of profile to allow in the **[Profile]** column. (Some cameras do not support setup of [Audio in], [Audio out], and [Alarm output].)
5. When the input of the current user account is completed, click the **[Apply]** button at the bottom of the page.
6. When the confirm window appears, click the **[OK]** button.

Note

- If the number of current user accounts is less than 10, you can add a current user account by clicking the **[Add]** button.

Modifying a current user

1. Select the radio button of the current user account you wish to modify.
2. Change the function settings and click the **[Apply]** button at the bottom of the page.
3. When the confirm window appears, click the **[OK]** button. The information of the user will be changed.

Deleting a current user

1. Select the radio button of the current user account you wish to delete and click the **[Delete]** button.
2. Click the **[Apply]** button at the bottom of the page.
3. When the confirm window appears, click the **[OK]** button. The information of the selected current user will be deleted.

Date & Time

You can check the current system time of the camera, change the time setting according to the local time zone, or set the system time through synchronization with the PC time or NTP server.

Current system time

The current system time of the camera is displayed. The previously set system time is displayed.

Time zone

The camera time is set based on standard time (GMT).

Time zone

The user can select the time zone.

Daylight saving time

When an area where daylight saving time is used is selected, the **[Daylight saving time]** menu will be displayed. The start and end time for daylight saving time in the selected time zone are displayed. When **[Enable]** is selected for **[Daylight saving time]**, a time which is one hour ahead of the standard time of the relevant zone is displayed.

> **Note**
>
> - Only when **[Daylight saving time]** is set to **[Enable]** will the time appearing on the timeline of the playback screen be displayed according to daylight saving time.
> - If the clock function of the PC is set to automatically apply daylight saving time, the daylight saving time option is automatically selected in the camera web viewer, and cannot be changed by the user.

System time setup

The user can set the camera time manually or by synchronizing it with an NTP server.

Manual

The user can enter the current time manually for the camera or synchronize it with the time of the PC with which it is currently being used.

- Set the system time by entering the time in **[Y - M - D]** and **[h: m: s]**.
- When **[Synchronize with PC viewer]** is selected, the time of the PC viewer is synchronized with the system time. When **[Synchronize with PC viewer]** is selected, the same time zone should be separately set for both the PC and the camera.

Synchronize with NTP server

The NTP (Network Time Protocol) server time is synchronized with the system time. 5 NTP server addresses are entered by default. You can change an NTP server address by clicking the address input field.

IP & Port

Enter IP address and port. You can set IPv4 and IPv6 on the **[IP address]** tab. You can set the port for each protocol on the **[Port]** tab. When you finish the setting, click the **[Apply]** button at the bottom of the page. When you click the **[Apply]** button, you will need to reconnect to the web viewer.

IPv4 setup

You can check or change the IP type, MAC address, IP address, subnet mask, gateway, and DNS information used for the network communication using the IPv4 type.

IP type

Select the IP connection type. If a fixed IP address is used, set **[Manual]** and enter the information. If a dynamic IP is used, set **[DHCP]** and enter the DNS address only.

- **Manual**: Enter and set the IP address, subnet mask, gateway, DNS1 and DNS2 directly.
- **DHCP**: Set DNS1 and DNS2.

MAC address

The MAC address of the camera is displayed.

IP address

The current IPv4 address is displayed. You can change the IP address by setting **[Manual]** for **[IP type]**.

Subnet mask

The subnet mask of the current IP address is displayed. You can change the subnet mask by setting **[Manual]** for **[IP type]**.

Gateway

The gateway of the current IP address is displayed. You can change the gateway by setting **[Manual]** for **[IP type]**.

DNS setting by DHCP

This is displayed when **[DHCP]** is set for **[IP type]**. If you select Enable, the DNS address is automatically assigned.

DNS1/DNS2

The address of the DNS (Domain Name Service) server is displayed.

Host name

Host name is the name to retrieve the host name which is used in ONVIF GetHostname command. The first character must be alphabetic and only alphabetic characters, numbers, and hyphen can be entered. Up to 63 characters can be entered. Name of the camera is input as default; does not need to be set as it is not a required value.

> **Note**
>
> - If you choose **[Change host name]** option under **[Network]**>[HTTPS]>**[Secure connection system]**>**[HTTPS (Use a secure connection)]**, the host name will be changed to the common name set in the certificate.

MTU

Set the maximum transmission unit (MTU) at which data can be transferred from the network interface. The MTU value can be set from 1280 octets to 1500 octets. If the value is set too low, the video playback may be delayed. Therefore, the MTU value should be set according to the user's network environment.

ICMP (Timestamp)

Select **[Enable]** to use the Internet Control Message Protocol (ICMP) timestamp request message. You can use the timestamp to calculate the round-trip time or time difference between the two systems. The ICMP (Timestamp) option is enabled by default.

IPv6 setup

IPv6 is a next-generation Internet address system with data processing speed, concurrent data processing capacity and Internet address system which are more expanded than IPv4. To use IPv6, select **[Enable]**. You can set the IP type, IP address, Prefix and gateway. When you select a camera model from the IP installer, you can select either IPv4 or IPv6 address and connect by entering the appropriate address directly in the web browser.

IP type

Select the IP connection type. The default value is **[Default]**. If DHCP is not detected, the value will automatically be changed to the previous setting.

- **DHCP**: The IPv6 address assigned through DHCP is displayed.
- **Manual**: The user can enter an IPv6 address of choice.
- **Default**: The current IPv6 address is displayed.

> **Note**
>
> - After changing the setting, click the **[Apply]** button to close the web browser window. After a moment, access the changed IP address again.

IP address

Enter the IPv6 address.

Prefix

This value sets the IP range. If **[IP type]** is **[Default]**, **[Prefix]** value is 64. If it is **[Manual]**, you can change the **[Prefix]** value.

Gateway

Gateway is displayed when **[Manual]** is set for **[IP type]**. The user enters the gateway address directly.

Port

A port is the location used for sending and receiving data Click **[Port]** tab, set the relevant items, and then click the **[Apply]** button at the bottom of the page. It is recommended to use HTTPS and RTSP to reinforce image security.

> **Note**
>
> - When setting the port number, you cannot use 3702, 4520, 49152 or any number between 0 and 1023.

HTTP

The HTTP port is used for connecting to the camera using a web browser. The default value is 80 (TCP). The available range is between 1024 and 65535. When the HTTP port is changed, the web browser window will be closed. Enter the new HTTP port at the end of the IP address to reconnect. If the HTTP port is 80, the port number can be omitted. (e.g.: Camera IP address: 192.168.1.100, HTTP port In case of 8080 -> http://192.168.1.100:8080)

HTTPS

HTTPS has increased security over HTTP. This can be used when HTTPS mode is set in SSL, and the default value is 443 (TCP). The available range is between 1024 and 65535.

RTSP

This is the port for sending an image in RTSP (Real Time Streaming Protocol); the default value is 554. The available range is between 1024 and 65535.

Timeout

To use the timeout, select **[Enable]**. If there is no response for a certain period of time when connection is made in RTSP, reset the port connection.

Video setup

You can set a privacy area in the camera's image or flip it in reverse directions (vertically or horizontally). In addition, you can display an analog image or change the video output type. (Depending on the camera model, privacy area, video screen flip/mirror function, or video output function might not be supported.)

Select channel

After selecting a camera channel, you can set the detailed video settings. Click **[Info]** to see the overall summary of each channel.

Privacy area

To prevent a possibility of privacy invasion in the camera's image, you can set a privacy area. To use the privacy area function, click **[Enable privacy area]**. To deactivate a privacy area, deselect **[Enable privacy area]**, then you can check the full camera's image without anything hidden due to privacy. The set privacy areas are not deleted, and they can be checked in the privacy area list.

> **Note**
>
> - When you select **[Enable privacy area]**, the LDC function is disabled. You can check the LDC function in **[Video & Audio]**>[Camera setup]>**[Special]**.

Setting a privacy area (PTZ camera)

1. Select **[Enable privacy area]** and click **[Apply]** at the bottom.
2. Click on 4 corners with the mouse on the camera video screen.
3. In the **[Privacy area]** window, set the following:
   - Drag the icon ⊕ to place the desired video screen on a privacy area by adjusting the camera pan/tilt.
   - Enter the name of the privacy area in **[Name]**, select the color to cover the image in **[Color]**.
   - Select whether to enable **[Zoom threshold]** . The function ensures that a privacy area is used only if the image is magnified to higher than a zoom ratio set in [Set zoom threshold]. In other words, if the image is reduced below the zoom ratio, the privacy area is deleted from the image.
4. In the **[Privacy area]** window, click **[OK]**.
5. In step 3, if you select **[On]** in **[Zoom threshold]**, the **[Set zoom threshold]** window will appear. After setting the desired zoom ration, click **[OK]**.
6. A new privacy area is added to the list of privacy areas. The privacy area to which zoom threshold is applied will be marked as '[Zoom]' in the list of privacy areas. The color set in the camera's image screen is used to display the privacy area.

Setting a privacy area (zoom camera)

1. Select **[Enable privacy area]** and click **[Apply]** at the bottom.
2. Drag with the mouse on the camera video screen to set the privacy area.
3. In the **[Privacy area]** window, set the following:
   - Enter the name of the privacy area in **[Name]**, select the color to cover the image in **[Color]**.
   - Select whether to enable **[Zoom threshold]** . The function ensures that a privacy area is used only if the image is magnified to higher than a zoom ratio set in [Set zoom threshold]. In other words, if the image is reduced below the zoom ratio, the privacy area is deleted from the image.
4. In the **[Privacy area]** window, click **[OK]**.

5. In step 3, if you selected **[On]** for the **[Zoom threshold]** option, then the **[Set zoom threshold]** window will appear. After setting the desired zoom ration, click **[OK]**.
6. A new privacy area is added to the list of privacy areas. The privacy area to which zoom threshold is applied will be marked as '[Zoom]' in the list of privacy areas. The color set in the camera's image screen is used to display the privacy area.

Setting a privacy area (except for a zoom or PTZ camera)

1. Select **[Enable privacy area]** and click **[Apply]** at the bottom.
2. Click on 4 corners with the mouse on the camera video screen.
3. In the **[Privacy area]** window, set the following:
   - Enter the name of the privacy area in **[Name]**, select the color to cover the image in **[Color]**.
4. In the **[Privacy area]** window, click **[OK]**.
5. A new privacy area is added to the list of privacy areas. The color set in the camera's image screen is used to display a privacy area.

Note

- When entering the name of a privacy area, you can enter only English letters, numbers, dash (-), and period (.).

Deleting a privacy area

1. Select a privacy area to delete from the list of privacy areas. The selected area is displayed on the camera's image screen.
2. Click **[Delete]** to delete the selected area.

Change the order of privacy areas

You can change the order where each privacy area is saved.

1. Click **[Order]**.
2. In the **[Order]** dialog box, select a privacy mask area to change its order, and then select an option you would like.
   - Click **[Top]** to move to the very first order.
   - Click **[Up]** to move to the previous order.
   - Click **[Down]** to move to the next order.
   - Click **[Bottom]** to move to the last order.
3. Click **[OK]** in the **[Order]** dialog.

Video rotation

If the screen is displayed upside down after installing the camera, you can correct this using the flip mode and mirror mode functions.
The **[Hallway view]** feature provides a long vertical view of the screen, which allows you to operate the surveillance area more efficiently in a corridor or alley.

Note

- If you change the video rotation setting, the video will be flipped in four directions or changed. To help you analyzing the changed video and accumulate the statistics, change the analysis and statistics setting. The settings can be changed in the [Analytics] and [Statistics] menus.

Note

- If you change the video rotation settings, the video screen will be flipped in four directions or changed. Adjust the analysis settings in the [Analytics] menu to analyze the video according to the changes.

Flip

Select **[On]** to flip the camera image upside down.

Mirror

Select **[On]** to mirror the camera image.

Hallway view

By rotating the camera image in an environment where a general camera cannot properly monitor the narrow aisles or hallways, you can magnify the vertical monitoring areas. You can rotate it 90 deg (Clockwise) or 270 deg (Clockwise) or set it to 0 deg to return to the original image.

> **Note**
>
> - In order to set the hallway view, you should set the installed camera to 0 degree, or rotate to 90 degrees clockwise or 270 degrees clockwise, and select the same angle in **[Hallway view]**.
> - When you set **[Hallway view]**, the web browser will close automatically, which requires you to reconnect to the web viewer.

Video output

You can select how to display camera video.

USB

Select **[Enable]** to display camera video using USB.
Using the Wi-Fi dongle and smartphone app from Hanwha Vision, you can access your camera over Wi-Fi. This is useful when you are trying to install a network camera for the first time or change the angular field of view or position of your camera, since you can see the camera screen on your smartphone without an additional monitor to check the installation.

HDMI

Select **[Enable]** to display video by connecting a cable to the HDMI port. It is useful to check the lens position or focus while installing the camera.

Layout

You can select the layout of the output screen to apply when outputting camera video via HDMI.

- Select **[Quad]** to split the video from the four channels and display them all on one screen.
- Select **[Single]** to display only one of the four channels of video on the screen. When selecting a **[Single]** option, you can choose which channel to display on the screen.

If you select **[Use]** in **[HDMI]**, the **[Layout]** option will be enabled.

Audio setup

You can connect a microphone and speaker to a network camera and listen to the sound at a remote location where the camera is installed, or output audio from the camera to the location. When you complete the setting, click **[Apply]** at the bottom of the page.

Select channel

After selecting a camera channel, you can set the details for audio per channel.

Audio in

You can input audio into an image through a microphone connected to the camera. Input audio by selecting a source that fits the usage environment.

Source

Select an audio input type. (Supported options may vary depending on camera specifications.)

- **Internal microphone**: This is the internal microphone included with the camera.
- **External microphone**: An external microphone can be connected to the camera and used instead of the internal microphone. When you select **[Apply power to Ext. Mic.]**, the camera supplies power to an external microphone.
- **Line**: Connect to sound equipment through a cable. For example, connect sound equipment such as an MP3 player and a camera through a cable, and select the MP3 player when you input recorded audio from it into the camera.

Codec

Select an audio codec. (Supported options may vary depending on camera specifications.)

- **G.711**: This is the standard audio codec for ITU-T, which is mainly used in telephone communication; the audio quality is low. It is also called the pulse code modulation of sound frequency; soundwaves can be delivered digitally in PSTN or through PBX.
- **G.726**: This is the standard audio codec for ITU-T, which is mainly used in telephone communication; the audio quality is low. It is possible to change and compress 64 Kbps PCM to 16, 24, 32 or 40 Kbps through Adaptive Differential Pulse Code Modulation (ADPCM).
- **AAC**: AAC (Advanced Audio Coding) is the international standard that succeeds MP3. It is more efficient than MP3 and has sound quality similar to an original copy of a CD. AAC enables the use of audio of a higher sampling rate than is the case when using the previous G.711 and G.726 codecs.

Sampling rate

This refers to the number of samplings per second when an analog sound source is converted to a digital sound source; as this value is higher, the sound quality is better. The sampling rate is fixed for each audio codec, and cannot be changed by the user. The sampling rate of the G.711 and G.726 codecs is 8 KHz, while the sampling rate of the AAC codec is 16 KHz. (Supported [Codec] options may differ depending on the camera specifications.)

Bitrate

The bitrate of the G.711 codec is 64 Kbps and cannot be changed. The bitrate of the G.726 codec is 16, 24, 32 and 40 Kbps; the compression ratio can be changed. Only 48 Kbps can be selected for the AAC codec. (Supported [Codec] options may differ depending on the camera specifications.)

Gain

Sets the amplification value of audio in. If the input sound is too low, you can increase the gain value to amplify the input audio signal. The range of gain value is from 1 to 10; a larger value means higher amplification.

Audio out

You can output audio through the built-in speaker.

Audio out

To use audio out, select **[Enable]**.

Gain

Sets the amplification value of audio out. If the output sound is too low, you can increase the gain value to amplify the output audio signal. The range of gain value is from 1 to 10; a larger value means a louder audio out.
Gain is activated only when **[Enable]** is selected for audio out.

> **Note**
>
> - If an excessive audio level or gain value is set, a deterioration of sound quality or a howling sound may occur.

Audio clip

You can register or delete an audio clip file. You can also set up the schedule to play the audio clip only at a specific time.
You can upload up to 5 audio clips. If the total number of audio files added reaches 5, or the total size of the added audio files exceeds 100 MB, the **[Upload]** and **[Record]** buttons will be deactivated.
You need to click **[Apply]** after file registration to display the audio file in the audio clip list on the **[Live]** or **[Event setup]** page.
After registering your audio clips, you can set a clip of your choice to be triggered by an event or play the clip by selecting it while monitoring camera video on the **[Live]** screen.

Upload

Register an audio file. Only .wav and .mp3 formats are supported.
Click **[Upload]** and select a file to upload. Then the file will be added to the list.

> **Note**
>
> - Sampling rate of 48,000 KHz or less is recommended.
> - For bits per sample (bps), 8/16 bit is recommended.
> - Only PCM (process control monitoring) data is supported.

Record

Recorded audio can be registered as an audio clip.

Recording audio

1. Click **[Record]**.
2. Set the **[Record]** dialog as follows:
    1. Enter a name for the audio clip file in the **[Name]** field. You can enter up to 63 characters including English letters (a-z, A-Z) and numbers (0-9). If you click **[Start]** and **[Stop]** without entering a file name, "myRecording" will be auto-filled in the box.
    2. Click **[Start]** to start audio recording.
    3. To stop recording, click **[Stop]**. Then the time available for recording and the length of the recorded audio are displayed.
    4. Click **[Play]** to listen to the recording. The audio pre-listening feature works regardless the set gain value since the pre-listening is played on the PC.
    5. Upon completion of the recording, select the audio clip file type in **[Format]**. The audio clip is generally recorded in .wav format. If you select **[MP3]**, it may take a while to convert the .wav file to .mp3 format.
3. In the **[Record]** dialog, click **[OK]**.

> **Note**
>
> If audio recording does not work, check the following:
> - Check if your camera web viewer is connected using HTTPS secure connection mode. To access using the HTTPS secure connection mode, select **[Network]** > **[HTTPS]**> **[Secure connection system]** and then select **[HTTPS (Use a secure connection)]**.
> - Check if your microphone is properly working in your PC.
> - Check if your browser allows access to the microphone.
>
> The maximum duration for recording one audio clip is 195 seconds.
> There's no session timeout during the recording of an audio clip.

Delete

After selecting the radio button of a clip to delete in the audio clip list, click **[Delete]** to delete the selected audio clip.

Audio clip list

The list of registered audio clips is displayed.
To select a clip, click its radio button.

- **Name**: The name of the audio clip is displayed.

- **Play**: Clicking the Play button (▷) allows you to play and preview the audio file.
- **Gain**: You can set the audio output amplification value. If your sound output is not loud enough, you can raise the gain value to amplify the audio signal output. The higher the value, the louder the audio output.
- **Download**: You can download an audio clip file.

Schedule

You can set the schedule for your registered audio clips to play automatically.
You can set a different schedule for each audio clip.
You need to register an audio clip first to activate the Schedule option.

Setting the schedule for audio clip playback

1. Select an audio clip from the audio clip list to play it at a specific time.
2. Check the **[Enable]** box under **[Schedule]**.
3. Specify the time to play.
    - If you want to play it daily at a specific time, select **[Daily]** and the specific time you want.
    - If you want to play it on a day of the week at a specific time, select **[Weekly]** and the specific day of the week and time you want.

Camera setup

You can change the camera settings to capture the best image in the environment where the camera is installed. Image presets suitable for various environments are provided by default; the user can also specify camera settings directly. You can check on the camera preview screen how the camera image is displayed according to the settings. When you complete the setting, click the [Apply] button at the bottom of the page. If the time-out time (240 seconds) has passed without clicking the **[Apply]** button after changing the setting, the previous setting will be restored.

Comparison view

You can see the videos of before and after changing camera video setting values all at once in the **[Before]** and **[After]** panels.

Select channel

After selecting a camera channel, you can set the details of each channel.

Sensor mode

Set how many frames per second the CMOS sensor of the camera will capture.

> **Note**
>
> - Changing the sensor mode will reset the whole camera setting.
> - Sensor mode value cannot be set differently for each image preset. Frame rate applies identical to all image presets.
> - The maximum value of **[Basic]**>**[Video profile]**>**[Frame rate]** varies according to the number of frames set for the sensor mode.
> - Any changes to the Sensor mode options are equally applied to all the other channels.

Image preset mode

Various image presets are provided for specific purposes. Select an image preset that best suits your camera environment.

- **User-defined preset 1**: Used for displaying the image as set by the user.
- **User-defined preset 2**: Used for displaying the image as set by the user.
- **Outdoor daytime**: Used to display a clear and smooth video taken outdoor in daytime.
- **Outdoor night time**: Used to reduce the level of noises for video taken outdoor at night with low brightness and lighten up dark areas.
- **Indoor backlight**: Used to display a video where indoor and outdoor are both identifiable with indoor backlight.
- **Indoor bright scenes**: Used to provide clear picture quality and reduce flickering in an illuminated indoor environment.
- **Number plates**: Used to improve the ability to identify the license plate of a car in daytime and at night.
- **Vivid video**: Used to improve color and clarity.

> **Note**
>
> - After selecting an image preset mode, change the detailed settings of camera image, such as white balance and night/day modes, and click **[Apply]** to save the changed value as the image preset value. To reset it to default, click the **[Reset]** button.

SSDR

SSDR is a function that improves the visibility of dark areas by increasing the brightness of dark areas in environments where there is significant contrast between dark and bright areas.

SSDR

To use SSDR, select **[Enable]**.

Level

Adjust the level of dynamic range. As the level goes higher, a dark area becomes brighter.

D-Range

Select the amplitude area of the dynamic range.

- **Narrow**: The camera's default mode which prioritizes image quality.
- **Wide**: A mode that improves discrimination. It darkens the bright area to visualize the saturated area clearly and brightens the dark area to improve discrimination. Setting the mode as [Wide] improves discrimination on videos with similar brightness levels, but may decrease their expressiveness.

White balance

You can make corrections to show the color white correctly and other colors normally, in any lighting environment.

Mode

Select the white balance mode according to the environment where the camera is being used. (Supported options may vary depending on camera specifications.)

- **Manual**: You can adjust red gain and blue gain manually. If more red color is shown, lower the red gain, and if more blue color is shown, lower the blue gain. If more green color is shown, raise both the red and the blue values.
- **ATW**: Corrects the camera color automatically.
- **Outdoor**: The colors of the camera are corrected to be optimized for an outdoor environment.
- **Indoor**: Correction is made to optimize colors for an indoor environment.
- **AWC**: Screen correction is made to optimize the colors for the current lighting environment. When you aim the camera at white paper and press the **[Set]** button, the red gain and blue gain will be adjusted and applied to the

image. The white balance value continues to be applied to the currently displayed video. If the environment changes, this should be adjusted again.
- **NarrowATW**: Auto-corrects camera color in 2800 K ~ 9000 K environment. **[ATW]**The color temperature range is narrower than Mode.
- **MERCURY**: Screen correction is made to optimize the colors for the mercury lighting environment.
- **SODIUM**: Screen correction is made to optimize the colors for the sodium lighting environment.

Red gain

Adjust the red gain. If the red gain is high, more red color is shown on the screen. If too much red is shown, lower the red gain.

Blue gain

Adjust the blue gain. If the blue gain is high, more blue color is shown on the screen. If too much blue is shown, lower the blue gain.

> **Note**
>
> - In any of the following cases, white balance may not operate normally. In such case, adjust the white balance through the **[AWC]** mode.
>   - If the surrounding environment exceeds the color temperature correction range, such as a clear sky or sunset
>   - If the surrounding environment is dark
>   - If the camera faces directly toward a fluorescent light or if there is a significant illumination change.

Backlight

BLC

The BLC (Back Light Compensation) mode selects and corrects a specific area on a dark image captured against the light, to show an object in a selected area more clearly.

BLC level

Move the slide bar to adjust the BLC level. The higher the level, the brighter the set area.

WDR

The WDR (Wide Dynamic Range) mode shows both a dark area and a bright area clearly in a backlight environment. This method captures once with a fast shutter to show a bright area clearly and again with a slow shutter to show a dark area clearly, using the dual shutters of the camera, and then combines only the parts shown clearly from the two images into one image. If the WDR mode is used, noise may occur between the bright area and the dark area.

WDR mode off

WDR mode on

WDR level

Adjusts the intensity of backlight correction.

> **Note**
>
> - When WDR mode is selected, the shutter value will be reset. The screen will become bright and then become dark.
> - When WDR mode is used, the frame rate is reduced by half.
> - It is recommended to use the WDR mode when a camera is installed indoor and there is very strong backlight.
> - If the WDR mode is used, noise may occur between the bright area and the dark area.
> - If the WDR mode is used, noise may occur in the motion detection area.
> - Please turn off the WDR mode because, depending on the lighting condition in WDR mode, the following problems could occur:
>   - When there are unnatural color changes and/or unnatural symptoms on the screen.
>   - When there is noise on the bright part of the screen.
> - The WDR performance may vary depending on the size of bright areas on the screen, so adjust the installation angle properly for the best WDR performance.
> - If you set the WDR level too high, the screen may exhibit unnatural symptoms.
> - For the best WDR performance, it is recommended to set the exposure iris to **[Auto]**.
> - As for some of 4-channel-camera models, if one out of 4 channels of the 4-channel camera that uses the [Turn off in B/W] mode works on the B/W mode, the [WDR] function won't work on other channels.
> - Some 4-channel camera models that use PoE+ do not support the [Always on] feature.

Exposure

Change the exposure according to the environment of the camera. If the background is darker than the subject, the subject will be shown normally only when the exposure is decreased. Conversely, if the background is brighter than the subject, the subject will be shown normally only when the exposure is increased.

Brightness

The brightness of the screen can be adjusted. The higher the number, the brighter the screen.

Minimum shutter

The shutter can set the sensor exposure automatically according to the environment; the electronic shutter operates at a range of between minimum shutter and maximum shutter. Minimum shutter means the minimum value of the possible range for exposure time and sets a long exposure time.
If the selected minimum shutter value is smaller than the fps value of **[Sensor]** mode, the frame rate can be reduced in the dark.

Maximum shutter

Maximum shutter means the maximum value of the possible range for exposure time and sets a short exposure time.

Prefer shutter

Set the proper exposure time that has a high priority in operation within the range of exposure time.
To automatically control the shutter using AI speed information, choose the **[AI-based prefer shutter control]** option. It automatically controls Prefer shutter value to slow or fast depending on the AI speed information. AI speed information is based on the motion information of [Person] and [Vehicle] among object detection types.

Anti flicker

Prevents screen flickering that occurs due to inconsistency in the lighting in the capturing environment.

SSNR

Remove noise from the image. (Supported options may vary depending on camera specifications.)

- **On/Off**: Sets whether or not to use the SSNR function. When **[On]** is selected, the SSNR level can be adjusted.
- **Wise NR**: When a moving object is in the image, the noise reduction level is adjusted automatically to improve object discrimination.
- **Wise NR Ⅱ**: When there is a movement of a person or vehicle in the image, it will automatically adjust the noise reduction level to reduce the tailing effect of moving objects to improve distinction.

SSNR level

Set the SSNR level. The level can be set when **[On]** or **[Wise NR Ⅱ]** is selected for **[SSNR]**.
The higher the level, the less the noises, but then the video might become fuzzy.

Lens

Lens types are displayed. The iris value varies by lenses.

Iris

Select the iris type. (Supported options may vary depending on camera specifications.)

- **DC (Auto)**: Automatically adjusts the iris depending on the optical intensity of the surroundings.
- **Manual**: Manually adjusts the iris's F number.
- **P-Iris**: Adjusts the iris through the step motor. A large depth of field can be secured so that a number of objects at various distances can be brought into focus at the same time.

AGC

AGC (Auto Gain Control) adjusts the brightness by controlling the sensitivity of image gain when capturing an object in dim light.

- **Low - High**: Setting to [High] increases the gain in dark environments, making the screen brighter.

> **Note**
>
> - The screen exposure can be saturated depending on the max/min range of shutter settings.
> - AGC action increases screen noise.

Day/Night

Change the image to color or b/w according to the camera's environment.
When the dwell time is set, the image can be changed to color or b/w according to preference.
When switching to Day/Night, a motion detection event or image analysis event cannot be detected.

Mode

Selects the mode which changes the camera to color or b/w. (Supported options may vary depending on camera specifications.)

- **Color**: Outputs an image in color.
- **B/W**: Outputs an image in b/w.
- **Auto**: Switch to color mode during the daytime and b/w at night or in low light.
  However, if **[AGC]** under **[Exposure]** is set to **[Off]**, [Day/Night] cannot be set to [Auto].
- **External**: When an alarm input terminal is linked with external equipment, color and b/w can be controlled.
- **Schedule**: Day/Night is changed to the schedule set from **[Activation time (Color)]**.

> **Note**
>
> - **The [External]** can be set when there is more than one alarm inputs. Select **[Event]** > **[Alarm I/O]** to set the alarm I/O.

Dwell time

Changes to color or b/w when **[Auto]** is selected for Day/Night and the brightness condition is maintained for the set dwell time.

Duration

Sets the time interval when switching to color or b/w occurs.

Alarm input

Set the image to color or b/w according to the opening and closing status of the alarm sensor.

Activation time (Color)

Sets the schedule for operation in color mode. When **[Everyday]** is selected and the time is set, color mode is activated at the relevant time every day, and b/w mode is activated at all other times. If you wish to not have color mode set for the same time every day, you can deselect **[Everyday]** and set the activation time to Mon., Tue., Wed., Thu., Fri., Sat. or Sun., respectively.

> **Note**
>
> - When switching between night and day modes, the motion detection event will not take place. In other words, even if you 'Enable' the motion detection event, it will not detect when switching between night and day modes occurs. You can enable or disable the motion detection event in **[Analytics]** > **[Motion Detection]**.

Special

You can adjust an image for sharpness, contrast, color level, etc.

DIS

When the camera is shaking due to external impacts, such as wind, DIS (Digital Image Stabilization) corrects the video automatically and stabilizes the screen.

Sharpness

Adjust the overall sharpness of the image.

Sharpness level

Adjust the overall sharpness of the image. You can set the sharpness level by setting **[On]** for **[Sharpness]**.
The higher the sharpness level is, the stronger and clearer the video sharpness is.

Gamma

Adjust the contrast of the image. This means the gap between the brightest part and the darkest part in an image; a higher gamma value means a clearer display of the difference in brightness.

Contrast

Adjust the shade contrast of the image.

Color level

Adjust the intensity of color in the image.

Defog

Correct the image when it is foggy or cloudy. When **[Auto]** is set, the surrounding environment is detected and the image is corrected automatically. When **[Manual]** is set, the user can see the surrounding environment and set the correction level directly.
The default value is set to **[Off]**.

Defog level

Activated when **[Manual]** is set for **[Defog]**; it adjusts the defog level. A higher defog level displays the image more clearly. If the fog level is low and a high defog level is set, the screen may look darker.

> **Note**
>
> - If you set the Defog mode to **[Auto]**, as the amount of fog decreases, the level of defog function is also lowered. If you want to maintain the same effect of the function despite a decrease in the fog, then set the Defog mode to **[Manual]**.
> - If the fog level is low and a manual high defog level is high, the screen may look darker.
> - If you enable the **[Defog]** option in the **[Fog detection]** settings, the [Defog] mode will be automatically switched to [Auto].

LDC

LDC (Lens Distortion Correction) corrects image distortion at the edge of a wide angle lens. (Supported options may vary depending on camera specifications.)

- **Off**: LDC (image distortion correction) function is not used.
- **Manual**: Adjusts the distortion correction level manually.
- **Auto**: Adjusts the image distortion automatically.
- **Fill mode (Manual)**: Corrects the video using the Fill mode. The correction values can be manually adjusted in [LDC level].
- **Fill (Auto)**: Corrects the video using the Fill mode. The correction values are automatically set. Since Fill mode maintains the screen's top and bottom angular fields of view, the left and right end of the video could be cropped.
- **Stretch mode (Manual)**: Corrects the video using the Stretch mode. The correction values can be manually adjusted in [LDC level].
- **Stretch (Auto)**: Corrects the video using the Stretch mode. The correction values are automatically set. Since Stretch mode maintains the screen's top/bottom/left/right angular fields of view, none of the areas in the original video recording is lost, but the aspect ratio of the video is not maintained.

LDC Level

Adjusts the distortion correction level. It is enabled by setting **[LDC]** to **[Manual]**, **[Fill mode (Manual)]**, or **[Stretch mode (Manual)]**. The higher the level value, the flatter the curved corners. The lower the level value, the less the changes to the curved corners.

OSD

Display the camera title or the date and time, and set the location, size, color and transparency of the characters.

Camera title

Sets whether or not to display the camera title. When **[Enable]** is selected, the **[Add]**/**[Delete]** buttons will be activated.
When you click the **[Add]** button, a field where a camera title can be entered will be added to the list.Enter the title of your camera, and move the cursor to set its location. (For some cameras, clicking the **[Add]** button adds a camera title field for entering a title and X,Y coordinate fields for positioning.) Up to 5 camera titles can be added.
To delete a camera title, select the title to delete and click the **[Delete]** button.
To preview how the camera title is displayed on the screen after entering it, enter the camera title and click the **[Preview]** button.

Date & Time

To display the date and time on the screen, select **[Enable]**. To display the days of the week, select the check box under **[Weekday overlay]**. Select the date format in **[Format]** and set the coordinates where the date and time are displayed in the **[X]** column and **[Y]** column.

Size

Adjust the size of OSD.

Color

Set the color of OSD.

Transparency

Set the transparency of OSD.

> **Note**
>
> - In case of the item with a location that can be adjusted (camera title, date & time, overlay image, and system info), if it overlaps with other fixed OSD items, the screen may fail to display it properly. (Some cameras do not support [Overlay image] or [System info] option.)

Activation time

The camera always operates at a specific preset time. Set and use a desired image preset at the desired time.

Off

The camera operates at the time selected in the image preset.

Only scheduled time

You can set to allow a user to execute a desired image preset at a specific time. Select an image preset and set the start and end time. Set the image preset for each hour according to the usage of the camera.
The date from Sunday to Saturday, based on the current camera time, is displayed on the time table shown when **[Only scheduled time]** is selected. You can set the time by clicking or dragging on the time table with the mouse. The set activation time is executed repeatedly on the relevant weekday and time.
You can change the time view unit by clicking the **[1 min]**, **[30 min]** or **[1 h]** button. When you click the **[Reset]** button, all set event activation times will be deleted. To confirm or change the camera time, refer to **[Basic]**>**[Date & Time]**.

Smart codec

Smart codec is a technology that reduces the size of image data by setting an area desired by the user as an area of specific quality, while managing other areas at normal quality.

Select channel

After selecting your camera channel, you can set the details of Smart codec for each channel. The channel number last selected on the Live or Playback page is automatically selected.
If you select another channel without applying the changes in the setting, an alarm message will appear.

Manual ROI area

The user can set the area on the camera image screen. When you click and drag on the screen with the mouse, a square-shaped area will be created. 5 areas can be set, but overlapping is not allowed. When you click the **[Clear]** button, all set areas will be deleted.

> **Note**
>
> - **[Bitrate control]** should be selected as the **[CBR]** mode when using the smart codec. In **[VBR]** mode, smart codec functions are not supported.
> - A smart codec can be set for each video profile. If you set **[CBR]** for **[Bitrate control]** in **[Basic]**>**[Video profile]** and set [Disable] in **[Smart codec]** then the smart codec function will not operate in the profile.

Smart codec setup

Quality

Select the quality level of an area set by the user. You can check an area in set quality level. The adjusted quality level of an area is always higher than normal quality.

WiseStream

WiseStream basically analyzes the complexity of video and effectively reduces the size of data while maintaining the video resolution.
[WiseStream] mode operates based on motion detection, which means it raises the compression ratio to reduce the size of the video data and save bandwidth if there is not much movement in the camera video. If a visible movement occurs, it returns to normal setting not to lose any video data. [WiseStream Ⅲ] mode operates based on AI object detection area, which means it raises the compression ratio to reduce the size of the video data and save bandwidth if the size of the object-detected area is small. If the size of the object-detected area increases, it returns to normal setting.

Select channel

After selecting your camera channel, you can set the details of WiseStream for each channel.

Mode

WiseStream mode can be selected.

- **WiseStream**: Operates based on motion detection. Its bit rate is saved by maintaining the quality of the movement detection areas and reducing the quality of the other areas. The benefit of bitrate reduction is great in environments of low video complexity with negligible or no motions while it is little in environments of high video complexity with many motions.
- **WiseStream Ⅲ**: Operates based on AI object detection area, which means the smaller the object detection area, the lower the bitrate, and the greater the object detection area, the higher the bitrate.

> **Note**
>
> - To use [WiseStream Ⅲ] mode, ensure the WiseAI application is installed and activated.
> - [WiseStream] and [WiseStream Ⅲ] cannot be set for each profile but the whole camera.
> - [WiseStream] and [WiseStream Ⅲ] work only when [Codec] is set to [H.264] or [H.265] or when [Bitrate control] is set to [VBR]. [Codec] and [Bitrate control] can be set in [Basic]>[Video profile] page.
> - If screen change (e.g. a dramatic movement right in front of the camera) occurs while in the [WiseStream] mode, image quality deterioration (e.g. block noise) could be worse than video to which WiseStream is not applied.
> - Any area with no object being detected in the [WiseStream Ⅲ] mode is affected by relatively worse image quality deterioration (e.g. block noise).

WiseStream/WiseStream Ⅲ

The video quality of [WiseStream] or [WiseStream Ⅲ] can be set based on the option selected in **[Mode]**.

Quality

If you do not want to use the WiseStream function, select **[Off]**. Select **[Low]**, **[Medium]**, or **[High]** for the degree of bitrate reduction to apply with WiseStream.

DDNS

If you use DDNS (Dynamic Domain Name Service), you can set the IP address of the camera to be changed to a general host name which can be easily remembered by the user. If the IP address of the camera is 198.160.0.100, you can connect to the camera by entering a host name such as http://ddns.hanwha-security.com/camera1 instead of the IP address. It is convenient since the user can connect to the camera with the DDNS address even if the IP address of the camera is changed.
The exclusive Wisenet DDNS for Hanwha Vision or public DDNS can be used for DDNS. Enter the desired DDNS information and click the **[Apply]** button at the bottom of the page. If the connection to the selected DDNS is made, 'Successful' message will be displayed, and if the connection is not made, 'Failed' message will be displayed.

Note

- To use the DDNS service, the setup of port forwarding for the DDNS and the router need to be done together.
- For the port forwarding setup method for the router, see the instruction manual shipped together with the product.
- When UPnP discovery funtion is enabled, DDNS cannot be used. UPnP discovery will be activated when the **[UPnP discovery]** option is set to **[Enable]** on **[Network]**>**[Auto IP configure]**.

DDNS

Off

Select if you wish not to use DDNS.

Wisenet DDNS

Select when you use DDNS server provided by Hanwha Vision. To use Wisenet DDNS, sign up for the membership at the Wisenet DDNS homepage (http://ddns.hanwha-security.com) and register the product at **[My DDNS]**> **[Register Product]**.

- **Server**: Enter DDNS server name which you intend to use.
- **Product ID**: Enter ID of the product registered on Wisenet DDNS server. If **[Quick connect]** is selected when a router which supports the UPnP (Universal plug and play) function is used, it supports automatic opening of the port in case of connection from the outside.

Note

- If the router does not support the UPnP function or to use DDNS server without using **[Quick connect]**, set manual for the port forwarding of the router. For the port forwarding setup method for the router, refer to the instruction manual included in the product.

Public DDNS

Select it when you use DDNS server provided by a public website. Use it after signing up for the service at the relevant website.

- **Server**: Select public DDNS server which you intend to use.
- **Host name**: Enter a host name registered on DDNS server.
- **User name**: Enter the user name for DDNS server.
- **Password**: Enter the password for DDNS server.

IP filtering

You can prepare an IP address list to allow or reject the connection for a specific IP. IP addresses are managed separately between IPv4 and IPv6. When you complete the setting, click the **[Apply]** button at the bottom of the page.

Filtering type

[Deny registered IP] and **[Allow registered IP]** filtering conditions apply to all registered IP addresses.

- **Deny registered IP**: Denies access for a registered IP.
- **Allow registered IP**: Allows access for a registered IP

> **Note**
>
> - When an access-authorized IP is registered, the IP currently connected to the camera should also be registered. Especially, when **[Enable]** is selected for **[Basic]**>**[IP & Port]**>**[IPv6 setup]**, all IPv4 and IPv6 addresses of the IP addresses currently connected should be added.
> - A currently-connected IP address cannot be registered as **[Deny registered IP]**.

IPv4

This is the address list for IPv4 types; an IP address can be added or deleted. Up to 10 IP addresses can be entered.

Adding an IPv4 address

1. Click the **[Add]** button. A field where an IPv4 address can be entered will be created.
2. Enter the IP and Prefix information. The filtering range for the entered information will be displayed. Prefix can set the IP range, and a value from 1 to 32 can be set in IPv4.
3. Filtering for the relevant range is possible only after the **[Use]** box is checked.
4. Clicking the **[Apply]** button at the bottom of the page will save all information added to the list.

Deleting an IPv4 address

1. Select an IPv4 address you wish to delete.
2. Click the **[Delete]** button.
3. Click the **[OK]** button on the delete confirm window. The IPv4 address will be deleted.

IPv6

This is the address list for IPv6 types; an IP address can be added or deleted. Up to 10 IP addresses can be entered.

Adding an IPv6 address

1. Click the **[Add]** button. A field where an IPv6 address can be entered will be created.

2. Enter the IP and Prefix information. The filtering range for the entered information will be displayed. Prefix can set the IP range, and a value from 1 to 128 can be set in IPv6.
3. Filtering for the relevant range is possible only after the **[Use]** box is checked.
4. Clicking the **[Apply]** button at the bottom of the page will save all information added to the list.

Deleting an IPv6 address

1. Select an IPv6 address you wish to delete.
2. Click the **[Delete]** button.
3. Click the **[OK]** button on the delete confirm window. The IPv6 address will be deleted.

HTTPS

You can select a secure connection system or install a public certificate.

Secure connection system

Select an appropriate secure connection system in consideration of the security level. HTTPS (Hypertext Transfer Protocol over Secure Socket Layer) sends and receives data through the process of encoding/decoding users' page requests over SSL sub layer under hypertext transport agreement layer. Therefore, this mode is safer than HTTP mode in terms of security.

HTTP (Do not use a secure connection)

Select this to send data without HTTP encryption.

HTTPS (Use a secure connection)

Select this to connect in HTTPS secure connection mode.

Certificates

A list of registered certificates is displayed. Select the certificate to use for HTTPS connection.
Certificates can be registered in **[Network]**>**[Certificate management]**, and only certificates with non-encrypted key files are displayed on the list.

Change host name

Selecting **[Change host name]** option changes the camera's host name to the common name in the certificate. Some security check tools may see that the product's security is vulnerable if the camera's host name is different from the common name set in the certificate.
You can view the host name under **[Basic]**>**[IP & Port]**>**[IP address]**>**[IPv4 setup]**>**[Host name]**.
[Change host name] can be set only when **[Device certificate]** is selected in **[Certificates]**.

Mutual authentication

To proceed with mutual authentication for enhanced security, select**[Mutual authentication]**.
As you proceed with mutual authentication, you can choose an option for allowing access.

- **[Allow all connections]**: All access attempts that tried mutual authentication are allowed for connection regardless of the success/failure of mutual authentication. This means that even without mutual authentication, camera access is granted.

- **[Allow only mutually authenticated connections]**: Camera access is granted upon the success of mutual authentication only.
- **[Allow only mutually authenticated connections (including Device ID authentication)]**: Access is allowed only when the client's device ID information is verified and certified to verify integrity of mutual authentication.

[Mutual authentication] can be set only when **[Device certificate]** is selected in **[Certificates]**.

TLS settings

Sets Cipher mode or TLS version to use for encrypted communication.

Cipher mode

Provides cipher suites by combining various algorithms to use for TLS-encrypted communications, such as key exchange, authentication, and encryption. To use only cipher suites with a high level of security, select **[Secure cipher suites only]**. To use cipher suites with backward compatibility although less secure, select **[All compatible cipher suites]**. [All compatible cipher suites] includes both secure and not secure cipher suites.

Version

Selects the TLS protocol version to use for encrypted communication.

802.1x

You can select whether or not to use the 802.1x protocol when connecting to a network, and install the certificates. When you complete the setting, click the **[Apply]** button at the bottom of the page.

IEEE 802.1x Setup

IEEE 802.1x

To use IEEE 802.1x protocol for connecting to the network, select **[Enable]**. IEEE 802.1x is a part of the network protocol group called IEEE 802.1 and is the IEEE standard regarding port-based Network Access Control (PNAC). IEEE 802.1x is mainly used for reinforcing security in a wireless LAN (Wi-Fi) environment.

EAP Type

EAP (Extensible Authentication Protocol) is a protocol that allows easier extension using the authentication method defined by wireless network and Point-to-Point Protocol. It is recommended to be used only in an environment where EAP-TLS, PEAPv0/MSCHAPv2 cannot be used since LEAP is an insecure authentication method.

- **EAP-TLS**: EAP-TLS (Transport Layer Security) carries out mutual authentication that requires a client certificate with the server; a dynamic WEP key is used for security after connection is made.
- **LEAP**: LEAP (Lightweight Extensible Authentication Protocol) does not require certificates and uses only a dynamic WEP key, so a strong password should be used.
- **PEAPv0/MSCHAPv2**: PEAP/MSCHAPv2 (Protected Extensible Authentication Protocol/Microsoft Challenge Handshake Authentication Protocol) authentication performs authentication based on the ID and password of user through an EAP-TLS session generated from the server-side authentication only.

EAPOL version

Select **[1]** or **[2]** for the version of the **[EAPOL]** (EAP over LANs) used in the network switch.

ID

Enter your client certificate ID for **[EAP-TLS]** and enter your user ID for **[LEAP]** and **[PEAPv0/MSCHAPv2]**.

Password

Enter your client private key for **[EAP-TLS]** and enter your user password for **[LEAP]** and **[PEAPv0/MSCHAPv2]**. This is not necessary if an unencrypted key is used in **[EAP-TLS]**.

> **Note**
>
> - If the connected network equipment does not support 802.1x, it may not operate properly even if **[Use]** is set for 802.1x.

Certificates

CA certificate

Select the CA certificate you want from the certificate list.
The CA certificate displayed is the one registered in **[Network]**>**[Certificate management]**>**[CA certificate]**.

Client certificate

Select the client certificate you want from the certificate list. The client certificate is a certificate created/applied and used by users.
The client certificate displayed is the one registered in **[Network]**>**[Certificate management]**>**[Client certificate]**.

QoS

QoS (Quality of Service) is the function that sets the priority of data transmission and secures the data transmission quality according to set priorities when overload (simultaneous traffic increase, network failure, etc.) occurs on the network. A QoS IP address can be entered in IPv4 or IPv6. When you finish the setting, click the **[Apply]** button at the bottom of the page.

IPv4

A QoS IP address can be added or deleted in IPv4. The default values are 32 for Prefix and 63 for DSCP.

- **Prefix**: This value can set the IP range, and a value from 1 to 32 can be set in IPv4.
- **DSCP**: The QoS priority is DSCP (Differentiated Services Code Point). A value of 0 to 63 can be set for the DSCP value; as the value gets closer to 0, the priority becomes lower.

Adding an IPv4 address

1. Click the **[Add]** button. A field where an IPv4 address can be entered will be created.
2. Enter the IP, Prefix and DSCP information.
3. QoS can be applied to the relevant IPv4 address only after the **[Use]** check box is selected.
4. Clicking the **[Apply]** button at the bottom of the page will save all information added to the list.

Deleting an IPv4 address

1. Select an IPv4 address you wish to delete.
2. Click the **[Delete]** button.
3. Click the **[OK]** button on the delete confirm window. The IPv4 address will be deleted.

IPv6

A QoS IP address can be added or deleted in IPv6. The default values are 128 for Prefix and 63 for DSCP.

- **Prefix**: This value can set the IP range; a value from 1 to 128 can be set in IPv6.
- **DSCP**: The priority for QoS is DSCP (Differentiated Services Code Point). A value of 0 to 63 can be set for the DSCP value; as the value gets closer to 0, the priority becomes lower.

Adding an IPv6 address

1. Click the **[Add]** button. A field where an IPv6 address can be entered will be created.
2. Enter the IP, Prefix and DSCP information.
3. QoS can be applied to the relevant IPv6 address only after the **[Use]** check box is selected.
4. Clicking the **[Apply]** button at the bottom of the page will save all information added to the list.

Deleting an IPv6 address

1. Select an IPv6 address you wish to delete.
2. Click the **[Delete]** button.
3. Click the **[OK]** button on the delete confirm window. The IPv6 address will be deleted.

SNMP

SNMP (Simple Network Management Protocol) is a network management protocol which can collect information from the equipment on the network, and manage the network. When you finish the setting, click the **[Apply]** button at the bottom of the page.

SNMP v1/v2c

SNMP v1 protocol is not encrypted and has almost no security function. It also tends to use excessive bandwidth, so if there is much equipment, it may be difficult to manage the network. An algorithm has been added to SNMP v2c protocol for data and authentication security, allowing for more efficient bandwidth than with SNMP v1.

SNMP v1

To use SNMP v1, select **[Enable]**.

SNMP v2c

To use SNMP v2c, select **[Enable]**. When **[SNMP v2c]** is selected, the Read community and Write community will be enabled.

Read community

Enter the read-only community name to access SNMP information.

Write community

Enter the write-only community name to access SNMP information.

SNMP v3

SNMP v3 authentication has stronger security than v1 and v2c; transmission without data transformation is possible. The packet is also encrypted to block unauthorized users from accessing data.

SNMP v3

To use SNMP v3, select **[Enable]**.

Password

Set the user password for SNMP v3. Passwords must be between 8 and 16 characters. The default password is weak, so changing it to a new password is highly recommended immediately after installing the product. Users are responsible for security and other issues due to continued use of the default password.

> **Note**
>
> - To use SNMP v3, the 'Secure connection system' needs to be set to '[HTTPS]' mode. Go to **[Network]** > **[HTTPS]**> **[Secure connection system]** and then select **[HTTPS (Secure connection mode using a unique certificate)]** or **[HTTPS (Secure connection mode using the public certificate)]**.
> - To use SNMP v3, the 'Secure connection system' needs to be set to '[HTTPS]' mode. Go to **[Network]** > **[HTTPS]**> **[Secure connection system]** and then select **[HTTPS (Use a secure connection)]**.
> - Failure to use SNMP v3 may result in security issues.

SNMP traps

The SNMP Trap is a function that delivers specific events in the equipment on the network to the management system.

SNMP traps

To use SNMP Trap, select **[Enable]**.

Community

Enter the name of the trap community that receives the message.

IP address

Enter the IP address of the user sending the message.

- **Authentication failure notification**: Set whether or not to deliver an event to the management system when community information is incorrect.
- **Network connection notification**: Set whether or not to deliver an event to the management system when the disconnected network is reconnected.

Auto IP configure

You can set the camera IP automatically. You can assign an IP address that can connect to an additional camera on the same local network or set the camera IP to check for a camera connected to the network on Windows or Mac OS. When you finish the setting, click the **[Apply]** button at the bottom of the page.

Link-Local IPv4 address

You can assign an additional IP that can connect to a camera from the same local network.

Auto configure

To use auto configuration of a Link-local IPv4 address, select **[Enable]**.

- **IP address**: The assigned IP address is displayed.
- **Subnet mask**: The subnet mask of the assigned IP address is displayed.

UPnP discovery

You can search for a camera automatically from clients and OS that support the UPnP (Universal Plug and Play) protocol.

UPnP discovery

To use UPnP discovery, select **[Enable]**.

- **Friendly name**: The camera name is displayed. The friendly name is displayed in order of WISENET - model name - MAC address.

Bonjour

You can search for a camera automatically from clients and OS that support the Bonjour protocol. Connected cameras are displayed on the Bonjour bookmark of the Safari web browser on Mac OS, which supports Bonjour by default.

Bonjour

To use Bonjour, select **[Enable]**.

- **Friendly name**: The camera name is displayed. The friendly name is displayed in order of WISENET - model name - MAC address.

Certificate management

You can add or delete certificates. You can manage CA certificate and client certificate separately.
CA certificate is signed by the Certificate Authority (CA), and client certificate is created, applied, and used by person.

Client certificate

You can install or delete a user certificate. If you have a certificate file and key file, you can register the certificate. You can also create a certificate file by filling out the certificate information.
Our [Device certificate] is provided by default, which cannot be deleted. Clicking the button ⓘ shows the certificate information.

Adding a client certificate

1. Click **[Add]**.
2. If you have a certificate file, select **[Client]** from the **[Type]** options in the **[Add certificate]** dialog, and perform the following:
   - **Name for the certificate**: Enter the certificate name. You can enter up to 31 characters long, including uppercase (A-Z), lowercase (a-z), numbers, or special characters (only _-][). A blank space cannot be used.
   - **Certificate file**: Click [...] and select the certificate file.
   - **Key file**: Click [...] and select the auth key file.
3. If you want to create a certificate manually, select **[Self-signed]** from the **[Type]** options in the **[Add certificate]** dialog box, and perform the following: A certificate can also be created simply by filling out the required fields marked with an asterisk (*).
   - **Name for the certificate**: Enter the certificate name. You can enter up to 31 characters long, including uppercase (A-Z), lowercase (a-z), numbers, or special characters (only _-][). A blank space cannot be used.
   - **Common name (CN)**: Enter the common name of the certificate. You can enter up to 63 characters long, including uppercase (A-Z), lowercase (a-z), numbers, or special characters (only *_-][.). A blank space also can be used.
   - **SAN**: Enter the certificate subject alternative name (SAN) information. You can enter up to 198 characters long, including uppercase (A-Z), lowercase (a-z), numbers, or special characters (only *_-][.,). A blank space cannot be used.
   - **Valid thru**: Select the expiry date of the certificate.
   - **Country (C)**: Enter the country information. Only two alphabet letters are allowed.
   - **State/Province (ST)**: Enter the state or province information. You can enter up to 63 characters long, including uppercase (A-Z), lowercase (a-z), numbers, or special characters (only _-][). A blank space also can be used.
   - **Organization (O)**: Enter the organization information. You can enter up to 63 characters long, including uppercase (A-Z), lowercase (a-z), numbers, or special characters (only _-][). A blank space also can be used.
   - **City/locality (L)**: Enter the locality information. You can enter up to 63 characters long, including uppercase (A-Z), lowercase (a-z), numbers, or special characters (only _-][). A blank space also can be used.
   - **Organizational unit (OU)**: Enter the information on the organization unit. You can enter up to 63 characters long, including uppercase (A-Z), lowercase (a-z), numbers, or special characters (only _-][). A blank space also can be used.
   - **E-mail**: Enter the e-mail address. You can enter up to 63 characters long, including uppercase (A-Z), lowercase (a-z), numbers, or special characters (only ~!@_-[],.?). A blank space cannot be used.
4. In the **[Add certificate]** dialog, click **[OK]** to save the entered information in the list.

Deleting a client certificate

1. Select the client certificate to delete.
2. Click **[Delete]**.

CA certificate

You can install or delete a CA certificate. CA certificate is issued by the Certificate Authority (CA).
Our [Root CA certificate] is provided by default, which cannot be deleted.
Clicking the button ⓘ shows the certificate information.

Adding a CA certificate

1. Click **[Add]**.
2. In the **[Add CA certificate]** dialog:
   - **Name for the certificate**: Enter the certificate name.
   - **Certificate file**: Click [...] and select the certificate file.
3. In the **[Add CA certificate]** dialog, click **[OK]** to save the entered information in the list.

Deleting a CA certificate

1. Select the CA certificate to delete.
2. Click **[Delete]**.

Event rule

You can create rules that make the camera perform a particular action when a specific event occurs.

Event rule

You can register detailed event rules of when the camera will perform a specific action when a specific event occurs. Also, you configure conditions for activating the event rules.

Adding event rules

After clicking the **[Add]** Button, configure the event rules in the setup window.

1. In **[Rule name]**, enter the desired name of event rules. Up to 15 characters can be entered.
2. After selecting **[Add]** in the **[Event trigger]** panel, select both the channel number where the event occurs and the trigger type to create the event.
3. Click **[Invert]** if you want the event trigger to be triggered when the event ends rather than when it occurs. For example, if you select [Invert] in [Motion detection], the event trigger will operate as soon as the camera ends detecting motion after detecting motion. A list of sub-rules will appear for a specific trigger depending on your settings. After selecting a sub-rule, you can choose an **[Invert]** option.
4. In **[Duration]**, set up the minimum time for the event to occur before performing the action. For example, if the [runtime] is set to [60], an event operation will be executed in case all the event triggers occur within 60 seconds.
5. In the **[Event action]** panel, select the desired event action to perform when an event occurs. (The supported event actions vary depending on the camera specification.)
   - **E-mail**: To capture the video screen and send it via e-mail when an event occurs, select **[Enable]**. Detailed e-mail settings can be configured in **[Event]**>**[FTP/E-mail]**.
   - **FTP**: To capture the video screen and send it via the FTP server when an event occurs, select **[Enable]**. Detailed FTP settings can be configured in **[Event]**> **[FTP/E-mail]**.
   - **Record**: To record the video when an event occurs, select **[Enable]**. Detailed record settings can be configured in **[Event]**>**[Storage]**.
   - **Handover**: The handover function is for moving the camera to the preset position of the PTZ when an event occurs. When the PTZ number is selected, the camera will move to the PTZ location in case an event occurs. When **[Off]** is selected, the handover function will not work, even when an event occurs. Detailed PTZ camera reception settings can be configured in **[Event]**> **[Handover]**.
   - **Audio clip**: To play the configured audio clip when an event occurs, select **[Enable]**. You can register an audio clip in **[Video & Audio]**>[Audio setup]> **[Audio clip]**.
   - **Alarm output**: To output an alarm when an event occurs, select the output time. If **[Always]** is selected, the alarm will continue to be output until it is stopped by the user. To disable the alarm when an event occurs, select **[Off]**. Detailed alarm output settings can be configured in **[Event]**>**[Alarm I/O]**.
   - **MQTT**: When an event occurs, it publishes a notification message to the MQTT client. If you want to add or edit the MQTT message to be published, go to the **[Event]**>**[MQTT]**>**[Publication/subscription]**>**[Publication]** tab.
6. Configure the schedule of event action from **[Activation time]**. In other words, an event action is performed only at the set time when an event occurs. It is possible to select a preset option so that an event action is performed either all the time or only during weekdays/weekends. Moreover, it is possible to configure a new event action schedule after clicking the calendar-shaped icon.
   The camera's system time can be checked in **[Basic]**>**[Date & Time]**.
7. Click **[OK]**.

Added event rules will be displayed. You can check if the event rules and their details are valid or invalid. For example, if "motion detection" is registered as an event trigger condition while the "motion detection" function of the camera is disabled, it is displayed as "invalid."

To change the event rules, double-click the rule you want from the list of event rules. When the event rules window opens, you can change the details.
To disable the event rules, select **[Off]** from the list of the event rules.

Deleting an event rule

- Select a event rule on the list and then click the **[Delete]** button.

Note

- Selecting [Network disconnection] in the event trigger options limits the options of event triggers and event actions that can be combined.

Handover

Handover is a function that the receiver camera moves to the PTZ preset position when an event occurs. On this page, you can set the camera and preset position to move to the preset position.

Receiver

You can add or delete PTZ cameras for receiving. Up to 32 receiver cameras can be registered.
Information of cameras registered as the receiver camera is displayed.

How to add a receiver camera

1. Click the **[Add]** button.
2. In the **[Add Camera]** dialog, enter the PTZ camera information to receive the handover.
   - **No.**: Set the receiver camera number. In the **[Analytics]** submenu, the receiver camera number is used when setting the handover receiver camera.
   - **IP type**: Set the IP address type between IPv4 and IPv6.
   - **Type**: Select the mode of communication among HTTP, HTTPS, and TCP.
   - **IP address**: Enter the IP address of the receiver camera.
   - **Port**: Enter the port number of the receiver camera.
   - **User**: Enter the access ID to access the receiver camera.
     This can be set only when [HTTP] or [HTTPS] is selected for [Type].
   - **Password**: Enter the password to access the receiver camera.
     This can be set only when [HTTP] or [HTTPS] is selected for [Type].
   - **Action**: Select what action the receiving camera will perform when an event occurs. Select [Preset] to move the camera view to the preset position, or [Custom] to display the query string. This can be set only when [HTTP] or [HTTPS] is selected for [Type].
   - **Preset no.**: Enter the preset position number to which the receiver camera will move. The preset number should be set in advance in the PTZ camera for reception. In the handover menu, enter the preset PTZ number.
     This can be set only when [HTTP] or [HTTPS] is selected for [Type] and [Preset] is selected for [Action].
   - **Query string**: Enter the query string of the URL. This can be set only when [HTTP] or [HTTPS] is selected for [Type] and [Custom] is selected for [Action].
   - **TCP message**: The user enters the message to send to the TCP recipient. This can be set only when [TCP] is selected for [Type].
   - **Info**: This displays URL complete with the entered information.
3. Click **[OK]**.

How to delete a receiver camera

1. Click a check box in the list of receiver cameras, and select the camera you want to delete.
2. Click the **[Delete]** button, and when the confirmation window appears, click **[OK]**.

FTP / E-mail

When an event is created while the camera is capturing an image, the captured image can be sent to an FTP server or by e-mail. Also, video files can be sent to an FTP server. Enter the appropriate FTP server and e-mail configuration information to be used.
When you enter FTP server or e-mail server information and click the **[Apply]** button at the bottom of the page, an FTP server connection test or an e-mail test will be carried out. If an incorrect FTP server address or e-mail server address is entered, a message saying 'Failed' will be displayed. If the test is succesfully done, the message saying 'Successful' will be displayed

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FTP configuration

Server address

Enter the IP address for the FTP server where an event creation image will be sent. You can enter from 1 to 64 characters.

ID

Enter the ID for the FTP server login account. Special characters such as #%&+=₩:<>"' are not allowed, and you can enter from 1 to 30 characters.

Password

Enter the password for the FTP server login account. Special characters such as #%&+=₩:<>"' are not allowed, and you can enter from 1 to 30 characters.

Upload directory

Enter the directory of the FTP server where an event creation image will be recorded. You can enter up to 60 characters using alphabets, numbers, and/or special characters (/~`!@#$%^&()_-=+{}[];',.).

Port

Enter the port value of the FTP server. The default port value of the FTP server is 21, which can be changed according to the FTP server settings. The port can be changed within a range of 1 to 65535.

Passive mode

Select **[Enable]** when connection in passive mode is necessary due to firewall or FTP server configuration.

E-mail configuration

Server address

Enter the e-mail SMTP server address for sending an event creation image by e-mail. You can enter from 1 to 64 characters.

Authentication

Select whether or not to authenticate with an ID and password each time an e-mail is sent.

Encryption

Set whether or not to use TLS. Select **[Enable]** if using an e-mail server that requires security.

ID

Enter the ID for the login account connected to the e-mail SMTP server. Special characters such as #%&+=₩:<>"' are not allowed, and you can enter from 1 to 32 characters.

Password

Enter the password for the login account connected to the e-mail SMTP server. Special characters such as #%&+=₩:<>"' are not allowed, and you can enter from 1 to 32 characters.

Port

Enter the port value of the e-mail SMTP server. The default port value of the e-mail server is 25; the port value when using TLS is 465.

Recipient

Enter the email address of the e-mail recipient. You can enter from 1 to 64 characters.

Sender

Enter the email address of the e-mail sender. If the address of the sender is not correct, the intended recipient may not receive the e-mail. You can enter from 1 to 64 characters.

Subject

Enter the subject of the e-mail to be sent when an event is created. Special character ₩ is not allowed, and you can enter from 1 to 60 characters.

Message

Enter the body information for the e-mail to be sent when an event is created. When an event is created, the captured image will be sent as an e-mail attachment. Special character ₩ is not allowed, and you can enter from 1 to 255 characters.

Storage

You can select a device to capture a camera image and set the recording conditions. When you complete the setting, click the [Apply] button at the bottom of the page.

Storage action setup

Selecting a recording device and selecting **[On]** allows you to change the setting for the relevant device.
When **[On]** is set for an SD card and NAS at the same time, NAS is processed by priority.

- **SD Card**: You can set whether or not to use an SD card. When an SD card is recognized, the free space, total capacity and status are displayed. To format the SD card, click the **[Format]** button.
- **NAS**: You can set whether or not to use NAS (Network Attached Storage). When a connection to NAS is established, the free space, total capacity and status are displayed. To format the default folder on NAS, click the **[Format]** button.

> **Note**
>
> The **[Status]** column shows the status of the recording device.
> Click the icon at the top right of the web viewer to view the status of the recording devices.
>
> - **None**: There is no recording device, or the recording feature is inactive
> - **Ready**: Waiting to record
> - **Recording**: Able to record
> - **Formatting**: The recording device is being formatted
> - **Full**: The recording device does not have enough free space
> - **Error**: A problem occurred, and further recording is not possible
> - **No profile available**: The selected edge recording profile is inactive (The edge recording profile can be selected at [Basic]>[Video profile])
> - **Profile error**: An error occurred in the selected edge recording profile (The edge recording profile can be selected in [Basic]>[Video profile])
> - **Password error**: The SD card password does not match the camera's set SD card password (The SD card password can be changed in **[Encryption]**)

Overwrite

Sets whether or not to use the overwrite function of an SD card or NAS. When the device capacity has been reached, new data will be recorded over the oldest data. When the device capacity has been reached, a message saying 'Full' is displayed in **[Status]** in the device list.

Auto delete

Sets whether or not to use the auto delete function. The most recent data for the set number of days is kept and the rest will be deleted. The number of auto delete days can be set from 1 to 180. The **[Auto delete]** function is activated only when **[Enable]** is set for **[Overwrite]**.

Note

- When 'Error' is displayed in **[Status]** in the device list, check whether the recording device is connected properly, whether the file system of the recording device is damaged or not, and whether the recording device is physically damaged. If the 'Error' message persists after checking the recording device, format or replace the device.
- When resolution, bit rate and frame rate are set at high, the amount of image data also increases. If the amount of data increases, a frame skip may occur even if set to full frame. If frame skipping occurs, then at least one image is saved per second.
- Before removing the (Micro) SD card, first switch to **[Off]**. If you remove it on your own or power up the camera with a unstable source of electricity without switching to **[Off]**, it can damage the (Micro) SD card.
- If you use the (Micro) SD memory card below the recommended speed, it can cause frame skipping. If you use the (Micro) SD memory card with too large capacity, it can slow down the format speed.
- Deleted data cannot be restored.

SD File System

This menu is displayed only when **[SD card]** is selected in the**[Device]** column of **[Storage action setup]**, allowing you to select the file system on the SD card. SD cards support VFAT and EXT4 file systems, so select the file system according to the SD card of the camera you are using. If the file system of the SD card is EXT4, Windows OS can recognize it only when a separate application is installed.

Type

Select either VFAT or EXT4 for the file system of the SD card. When the setting is changed, all existing data will be formatted. Be sure to back up data before changing the setting.

Note

- High Endurance SD Cards are recommended. For detailed information, refer to the Hanwha Vision website.
- It can take up to 10 minutes to format the (Micro) SD card with the EXT4 file system.

Encryption

SD card encryption allows you to save video data in your encrypted SD card (or microSD card). This keeps your SD card safe and secured even when you lost it. The SD card encryption option appears when you select **[SD]** for **[Device]** under the **[Storage action setup]** column.

Note

- If you change the SD card setting to encrypt or decrypt it, all of its data will be deleted and the SD card will be formatted.

SD card encryption

Selecting **[Enable]** encrypts the SD card while deselecting **[Enable]** decrypts it.

Encrypting SD card

1. Select **[Enable]** under **[Encryption]**.
2. Enter your **[New password]** in the field, and enter the same password again in the **[Confirm new password]**.
3. Click the **[Apply]** button at the bottom of the screen.
4. If SD card encryption is working properly, the 'Encrypted' message will appear.

Decrypting SD card

1. Deselect **[Enable]** under **[Encryption]**.
2. Click the **[Apply]** button at the bottom of the screen. If SD card encryption is disabled, so the SD card data is not encrypted, 'Unencrypted' message will appear.

Changing password

You can change the password for SD card encryption.
If the password of the encrypted SD card and the password entered by user do not match, 'Password error' message will appear in the **[Status]** column of **[Storage action setup]**.

1. Click the **[Change password]** button.
2. Enter the current password in the **[Current password]** field.
3. Enter the new password in the **[New password]** and **[Confirm new password]** fields.
4. Click the **[Apply]** button at the bottom of the screen.

NAS connection setup

This menu is displayed only when **[NAS]** is selected in the**[Device]** column of **[Storage action setup]** and the NAS access information is entered. Enter NAS information and click the **[Test]** button to see if the connection to NAS is established. If a connection is made, a 'Success' message is displayed. If a connection is not made, a 'Failure' message is displayed.

IP address

Enter the NAS IP address.

ID

Enter the ID for the account registered on NAS.

Password

Enter the password for the account registered on NAS.

Default folder

Designate the default folder where NAS will record image data.

Note

- If a failure message is displayed when you test after entering NAS information, check the following items:

- Check if the IP address, ID, password, and default NAS folder are entered correctly.
- Check if the IP address type of NAS and the IP address type of the camera are identical. (e.g.: The default value of NAS and the camera is 255.255.255.0. If the IP address is 192.168.20.32, the NAS IP address should be between 192.168.20.1 and 192.168.20.255.)
- For the NAS default folder, only one folder should be used in one camera, with no duplication.
- Check if the device is recommended NAS equipment. Refer to 'Recommended NAS specifications' in the user's manual.

- If **[Overwrite]** in the storage setup for NAS is not used and the free space for NAS is less than 20%, images will be recorded on the SD card.
- If an SD card which was used in another camera is inserted while data is being recorded on NAS, images may not be recorded.
- If the NAS setup is changed while data is being recorded on NAS, the change will not apply immediately.
- If NAS equipment is removed or the network connection is terminated while data is being recorded on NAS, the NAS recording action may be terminated.
- When resolution, bitrate and frame rate are set at high, the amount of image data also increases. If the amount of data increases, a frame skipping may occur even if set to full frame rate. If frame skipping occurs, then at least one image is saved per second.
- Check if you are trying to access as another user without formatting the default folder that is saved or used already.

Record

Select channel

After selecting your camera channel, you can set the details of the storage for each channel.

Record setup

Edge recording profile

The name of the video profile which will be used for recording is displayed. The profile set as 'Edge recording profile' from **[Basic]**>**[Video profile]** > **[Profile type]** is displayed.

Continuous recording

Sets for normal recording with no event; Video is saved with a fixed frame rate at all times in an ordinary situation without an event.

- **None**: No camera image is recorded.
- **I-Frame**: Records I-Frame only for continuous recording.
- **Full frame**: Records full frame for continuous recording.

Event recording

Sets the recording type when an event occurs.

- **I-Frame**: Records only I-Frame when an event occurs.
- **Full frame**: Records full frame when an event occurs.

Pre event duration

Sets the image recording time before an event occurs. An image can be recorded at 1 second, 3 seconds and 5 seconds prior to the occurrence of an event.

Post event duration

Sets the image recording time span after an event. An image can be recorded for 5 seconds, 10 seconds, 30 seconds, 60 seconds or 120 seconds after the occurrence of an event.

Record file type

Sets the file format for recording an image. When the file recording format is changed, the existing data will be erased.

- **STW**: This is the unique file type for Hanwha Vision.
- **AVI**: This is an AVI file.

> **Note**
>
> - Any changes to the Record file type options are equally applied to all the other channels.

Continuous recording schedule

You can set the time to record an image on the recording device.

Always

Always records an image on the recording device.

Only scheduled time

Records an image only at the scheduled time. The date from Sunday to Saturday, based on the current camera time, is displayed on the time table shown when **[Only scheduled time]** is selected. You can set the time for recording by clicking or dragging on the time table with the mouse. The set time is executed repeatedly on the relevant weekday and time.
You can change the time view unit by clicking the **[1 min]**, **[30 min]** or **[1 h]** button. When you click the **[Reset]** button, all set event activation times will be deleted. To confirm or change the camera time, refer to **[Basic]**>**[Date & Time]**.

Alarm I/O

The I/O port of a camera can be set either as an input or output port as desired.
After selecting it to be either an input or output port, you can set the details of each Alarm I/O.

> **Note**
>
> If you use all alarm ports as output, the [External] mode of [Day/Night] will be disabled. If it is already set to [External], it will be changed to the [Auto] mode. You can select **[Video & Audio]**>**[Camera setup]**>**[Day/Night]** to check the External mode of Day/Night.

Alarm I/O

After selecting a port number, decide whether to use the port as an input or output port. After selecting input or output, click the **[Apply]** button.
If [Input] is selected, [Input device setup] can be set. If [Output] is selected, [Alarm output] can be set.
The number of supported alarm inputs/outputs may differ by camera.

Input device setup

Sets whether or not to use an alarm input device and the type to activate an alarm event when an alarm input is given.

Input device setup

To use an alarm input device, select **[Enable]**.

Type

Select the alarm input type.

- **N.O. (Normal Open)**: The alarm input sensor is open by default; when it is closed, an alarm input event is created.
- **N.C. (Normal Close)**: The alarm input sensor is closed by default and when it is open, an alarm input event is created.

Alarm output

Sets how to control an alarm when an alarm is outputted by the user or when an event is created.
When changing the type of alarm output, the Alarm output button on the Live page and the type of alarm output in the Event setup are changed.

Type

Selects the alarm output type.

- **N.O. (Normal Open)**: The alarm output sensor is open by default and when it is closed, an alarm is outputted.
- **N.C. (Normal Close)**: The alarm output sensor is closed by default and when it is open, an alarm is outputted.

Mode

Sets the control type when an alarm is outputted.

- **Pulse**: An alarm is outputted for the time set in **[Duration]** and the alarm turns off automatically.
- **Active/Inactive**: When you press the alarm output button on the monitoring screen, an alarm will turn on; when you press the button again, the alarm will turn off.

Duration

Sets the alarm output time when **[Pulse]** is selected in **[Mode]**.

Time schedule

A time schedule event is a function for generating events at set intervals. When you complete the setting, click the **[Apply]** button at the bottom of the page.

Event setup schedule To use the event schedule, select **[Enable]**.

Transfer interval This sets the event occurrence interval. Click the drop-down menu and select a number and a unit.

> **Note**
>
> - The transfer interval should be set lower than the operation interval in the event action settings.

Device alarm

You can set alarms to go off when the network is physically disconnected.

> **Note**
>
> You can change the option settings on the [Device alarm] page only when you are logged in as an administrator.

Network disconnection	To trigger an alarm when the network is disconnected, select **[Enable]**.

MQTT

MQTT (Message Queueing Telemetry Transport) is a messaging protocol based on Publication/Subscription. As it is designed to transmit lightweight messages, it is ideal for connecting remote devices that require a small code space or minimal network bandwidth.
Communicating through the MQTT protocol enables the camera to easily send and receive data to and from multiple devices. For example, if a camera's client sends a notification of a camera event, multiple clients subscribing to that notification can receive it through a broker. Also, the camera's client can receive notifications from several clients and control the camera's motion. For example, you can receive a notification from another client and start recording with the camera, or you can send a notification back to another client that you received the notification.

MQTT

Enable MQTT

Select **[Enable MQTT]** to connect to the set broker.

Status

Shows the connection status to the broker. Click the refresh button to update the connection status to the broker.

Client setup

Set MQTT client information. Enter the MQTT broker information where the camera's client will be connected.
An MQTT broker brokers messages on the topic received from the publisher when a client sends a declaration to the broker that it will subscribe to the messages of a specific topic.

Address

Enter the broker's domain and IP address. [Address] and [Port] are required entries and are marked with an asterisk (*).

Port

Enter the port number to connect to the broker. [Address] and [Port] are required entries and are marked with an asterisk (*).

User name

Enter the client ID.

Password

Enter the client password.

Transport protocol

Choose between TCP, TLS, WebSocket, and WebSocketSecure.

Basepath

If using WebSocket and WebSocketSecure, you can set the basepath as well as the broker address and port. In this case, the URL of the final broker will be Address:port/basepath.

ALPN

Enter the ALPN supported by the broker.

Client certificate

Selects the one you want from the list of certificates installed on the camera. To add a client certificate, go to **[Network]**>**[Certificate management]**>**[Client certificate]**.

CA certificates

Selects the one you want from the list of certificates installed on the camera. To add a CA certificate, go to **[Network]**>**[Certificate management]**>**[CA certificates]**.

Verification of server certificate

If connecting via TLS or WebSocketSecure, select **[Enable]** to verify a server certificate.

Custom client ID

To use a client ID defined by the user when connecting to a broker, select **[Enable]** and enter the desired ID in the **[Client ID]** field. If there is no input entered in the [Client ID] field, it will be connected using a random ID.

Keep Alive interval

Enter the time in seconds. Checks if the broker is connected every set interval time.
If you set both [Keep Alive interval] and [Connection timeout] together, make sure to set the [Connection timeout] value higher than the [Keep Alive interval] value.

Connection timeout

Enter the time in seconds. If there is no response from the broker for the set period of time, it will be disconnected from the broker.

If you set both [Keep Alive interval] and [Connection timeout] together, make sure to set the [Connection timeout] value higher than the [Keep Alive interval] value.

Auto reconnect

If you select **[Enable]**, it will automatically try to connect every minute if the previously connected broker is disconnected.

Clean session

If **[Enable]** is selected, all information (e.g., client ID or messages designated to be retained) previously retained is to be deleted from the client and broker when connecting them. If [Enable] is not selected, the information remaining in the previous session is to be retained. For example, if there is a topic you subscribed to in the previous session, the client can receive messages on that topic even if you do not subscribe to it again.

Default topic prefix

Enter the default topic prefix. When setting the default topic prefix, the final topic is created by combining the default topic prefix and message topic. When additionally publishing MQTT, you can set whether to use the default topic prefix. For more information, refer to **[Event]**>**[MQTT]**>**[Publication/Subscription]**>**[Publication]**>**[Adding MQTT publications]**.

Connection message

This is the message a client sends to a broker when the connection is complete. Select an item to be used as a connection message. You can add messages in the **[Event]**>**[MQTT]**>**[Publication/Subscription]**>**[Publication]** tab.

LWT message

The LWT (Last Will and Testament) message is a message in which the broker declares in advance that it will send a message designated to a certain topic when the connection between the client and the broker is abnormally disconnected. Select an item to be used as the LWT message. You can add messages in the **[Event]**>**[MQTT]**>**[Publication/Subscription]**>**[Publication]** tab.

Publication/Subscription

MQTT (Message Queueing Telemetry Transport) is based on a publication and subscription protocol. When a publisher sends a topic and message to a broker, the broker sends a topic to the subscriber and the subscriber is subscribed to the message of the topic. Any client can be a publisher or a subscriber as it is not specified.
On the [Publication/Subscription] page, you can add and edit publication and subscription message items so that a MQTT client can publish and subscribe to messages on certain topics using the MQTT protocol.

Publication

Sets the MQTT topic and messages to be published. The topic and message are delivered to the client that is subscribing to a topic published.

Adding MQTT publications

1. Click the **[Add]** button.
2. Follow the steps below in the **[Add MQTT publication]** dialog box.
   - **Name**: Enter the name of the message to publish.
   - **Default topic prefix**: Select [Enable] to include the default topic prefix set when sending a message. In this case, the message is sent with the default topic prefix along with the topic. For example, if "camera" is set as the default topic prefix, and "connection" is set as the topic to publish, the message will be sent with "camera/connection" as the content. You can set the default topic prefixes in **[Event]**>**[MQTT]**>**[Client setup]**>**[Default topic prefix]**.
   - **Topic**: Enter the topic to publish.
   - **QoS**: Select the level of the desired MQTT publications.
     - 0: Clients only send a topics and messages, and clients and brokers will not proceed with any additional steps to check with the items sent from each other or to respond to them. In other words, the topic and message are sent, but the result is not guaranteed.
     - 1: A client will repeatedly send the same topic and message until a broker confirms receipt.
     - 2: It is ensured that a broker receives the same topic and message only once through the handshake between the client and the broker.
   - **Retain**: Select [Enable] to let a broker save the published message to send to a new subscriber that is subscribed to the topic later on.
   - **Payload**: Enter the message content to be published.
3. Click **[OK]**.

- To edit the set MQTT publication information, select the desired item, and click **[Modify]**.

Deleting MQTT publication messages

1. Select an item to delete from the MQTT publication list.
2. Click the **[Delete]** button.

Subscription

Sets the MQTT topic and messages to subscribe.

Adding MQTT subscriptions

1. Click the **[Add]** button.
2. Follow the steps below in the **[Add MQTT subscription]** dialog box.
   - **Name**: Enter the name of the message to subscribe to.

- **Topic**: Enter the topic to subscribe to.
- **Type**: Select the subscription method of the topic and a message.
  The MQTT topic can be organized in a hierarchy by separating it with slashes (/), such as "event/objectdetection/person."
  Also, wild cards can be used. Use a # to subscribe to all topics of lower levels. For example, you can subscribe to all lower-level topics such as A/B/a, A/B/a/D, A/B/b, and A/B/b/D by entering A/B/#.
  Use a + to comprehensively subscribe to topics of a certain level. For example, you can comprehensively subscribe to topics such as A/B/a/D, A/B/b/D, and A/B/c/D by entering A/B/+/D.
  - **Stateless**: An event occurs whenever a message is received from a topic that is subscribed to and the event occurrence status will be released immediately. If the subscribing message is received several times, an event will occur upon each receipt.
    For example, if you set an "on" message to subscribe in the "home/light" topic in order to trigger an event that turns on the light, the light will be turned on and then soon turned off by receiving the "on" message. If the same message is received several times, the light will be turned on and off whenever the message is received.
  - **Stateful**: When a message is received from a topic that has been subscribed to, an event will occur, and the event occurrence status will be maintained afterward. The status will be disabled if a message different from the subscribing message is received. Therefore, if subscribing messages are received continually, a new event will not occur even if you receive messages several times.
    For example, if you set an "on" message to subscribe in the "home/light" topic to trigger an event that turns on the light, the light will be turned on and the turned-on status will be maintained when you receive the "on" message. If it receives messages aside from "on," the light will be turned off. Afterward, the light will be turned on again if an "on" message is received.
- **QoS**: Select the desired level for the MQTT subscription.
  - 0: When a client sends a topic, the client and broker do not proceed with further steps to confirm its receipt.
  - 1: Send the same topic several times until the client who sent a topic receives the confirmation of its receipt.
  - 2: It is ensured that a broker receives the same topic only once through the handshake between the client and the broker.
- **Payload**: Enter the message content to subscribe to.

3. Click **[OK]**.

- To edit the set MQTT subscription information, select the desired item, and click **[Modify]**.

Deleting MQTT subscriptions

1. Select an item to delete from the MQTT subscription list.
2. Click the **[Delete]** button.

Shock detection

If a shock or vibration is detected on the camera or a change in physical position is detected, a shock detection event can be generated. When the setting is completed, click the [Apply] button at the bottom of the page.

Select channel

The detailed Shock detection setup for each channel can be configured after selecting a camera channel.

Shock detection

Enable shock detection

To enable shock detection events, select **[Enable shock detection]**.

Level of detection

Set the level value that is the basis of shock detection. If a shock is detected above the set level value, a shock event is generated.
When a shock or vibration is detected, a graph showing the shock or vibration value applied to the camera is displayed, and when a shock detection event occurs, the graph color changes.

Sensitivity

The higher the sensitivity, the more sensitive the detection level graph will be.

Motion detection

A motion detection event can be created when a motion detection area and the exclude area are set and a motion is detected from inside the area set by the user.

Select channel

After selecting your camera channel, you can set the details of Motion detection for each channel.

Motion detection

Enable motion detection

To use the motion detection event, select **[Enable motion detection]**.

> **Note**
>
> - The motion detection area and the exclude area are set and used according to the size range of the motion.
> - In any of the following cases, the performance of the motion detection event may deteriorate and a malfunction may occur:
>   - If an object is similar in brightness or color to the background on the screen
>   - If a small motion occurs near the edge of the screen
>   - If an overall change on the screen occurs continuously at random due to factors such as scene changes and sudden illumination changes
>   - If a moving object comes too close to the camera
>   - When one object hides another object
>   - When the motion of an object is too fast
>   - When reflection, blurring or shading occur due to strong light such as direct sunlight, high illumination or headlights from a vehicle
>   - In cases of severe snow, rain or wind, or sunset or sunrise.

Include area

The area designated by the user is set as the motion detection area.

Setting an area

When you select 4 corners of an image with the mouse, it is set as the motion detection area and the color of the number buttons in **[Area]** changes.
Up to 8 areas can be set and the level, sensitivity, and minimum duration can be set separately for each motion detection area.

Changing an area

You can change the size of a motion detection area by moving a corner of the motion detection area. To move a motion detection area, click and drag the relevant area with the mouse.
To create a polygon (N-gon), first select and create a quadrilateral. When a + sign appears, click it to add another point. You can add up to 4 additional points to create a polygon of your choice.

Deleting an area

To delete a motion detection area, click [x] at the relevant area on the screen and click the **[OK]** button on the delete confirm window.

Area

When a motion detection area is added, the color of the number buttons in [Area] will change. When you click the number button, the relevant motion detection area will appear from the preview screen.

Level of detection

This sets the standard level of motion detection. You can set the level for each motion detection area in **[Area]**, and when a motion is larger than the set level, a motion detection event will be created.
Also, as a motion in each area is detected, a motion graph will appear, and when a motion event is created, the color of the graph will change.

Sensitivity

This sets the motion detection sensitivity for each area. Set a lower sensitivity for an environment where the background and an object are clearly distinguishable and a higher sensitivity for an environment where the background and an object are not clearly distinguishable.

Minimum duration (s)

Minimum duration (s): Sets the minimum amount of time to trigger an event after detection. When the movement lasts longer than the set period of time, the event is triggered.

Exclude area

The area designated by the user is set as the exclude area.

Setting an exclude area

When you select 4 corners of an image with the mouse, it is set as the exclude area, and the color of the number buttons in **[Area]** changes. Up to 8 exclude areas can be set.

Changing an exclude area

You can change the size of an exclude area by moving a corner of the exclude area. To move an exclude area, click and drag the relevant area with the mouse.
To create a polygon (N-gon), first select and create a quadrilateral. When a + sign appears, click it to add another point. You can add up to 4 additional points to create a polygon of your choice.

Deleting an exclude area

To delete an exclude area, click [x] at the relevant area on the screen and click the **[OK]** button on the delete confirm window.

Area

When an exclude area is added, the color of number buttons in **[Area]** will change. When you click the number button, the relevant exclude area will appear from the preview screen.

Common

Sets the min and max sizes of an object to detect.

Size

Click the bottom right corner and drag the mouse to change the size. Changing the size also changes the **[Minimum]** and **[Maximum]** values under **[Size]**.

> **Note**
>
> - If the ROI and Exclude areas are identical or overlap each other, the Exclude area has priority over the other.
> - Any movement smaller than the specified minimum size or larger than the specified maximum size will not be detected. please determine the best values for the minimum/maximum detection sizes that are appropriate for the installation environment in order to avoid any false detection arising out of small and/or large noises. Remember that the same movement in the same spot does not always result in the same detection size. Therefore, it is recommended to allow small/big enough rooms for your minimum/maximum size limits in consideration of the deviation in detected sizes.

Tampering detection

A tampering detection event can be created when the screen is blocked or the camera position is changed.

Select channel

After selecting your camera channel, you can set the details of Tampering detection for each channel.

Tampering detection

Enable tampering detection

To use the tampering detection event, select **[Enable tampering detection]**.

Level of detection

This sets the standard level of tampering detection. A tampering detection event is created when a tampering of the set level is detected.
Also, when a tampering is detected, a graph showing the level of tampering will appear, and when a tampering detection event is created, the color of the graph will change.

Sensitivity

Higher sensitivity results in a more sensitive response of the detection level graph.

Minimum duration (s)

This sets the minimum time to detect a tampering and create an event. A tampering detection event is created only when tampering persists for the minimum duration.

Except dark images

To exclude a sudden decrease in brightness on the screen, as such in the case of a sudden extinction of lights or blocking of lights, from the tampering detection event, select **[Enable]**.

Note

- The detection performance may deteriorate on a uniform background, or in a night-time, low-light environment.
- If the camera shakes too much or if there is sudden change in light, the tampering detection may not function properly.
- It may take up to 5 seconds for a tampering detection event to be created after a tampering occurs.
- When a camera tampering is detected, the function will restart after stabilizing for approximately 5 seconds, and any tampering will not be detected during the stabilization process.

- When an incorrect event is repeatedly being created, errors can be minimized by gradually lowering the level.
- If you set the level of detection too low, then it is possible to trigger an alarm out of quite small changes on the screen, but it can also lead to false detection cause by objects in motion or change in brightness.

Defocus detection

A defocus detection event can be created when defocus of the camera lens is detected.

Select channel

After selecting your camera channel, you can set the details of Defocus detection for each channel.

Defocus detection

Enable defocus detection

To use the defocus detection event, select **[Enable defocus detection]**.

Level of detection

This sets the standard level of defocus detection. A defocus detection event is created when defocus beyond the set level is detected.
When defocus is detected, a graph showing the level of defocus will appear, and when a defocus event is created, the graph color will change.

Sensitivity

The higher the sensitivity, the higher the level graph is for the same image.

Minimum duration (s)

This sets the minimum length of time of defocus for an event to be created. A defocus detection event is created only when a defocus condition persists for the minimum duration.

Note

- In order to receive an alarm indicating defocus detection after it has occurred previously, the status must return to the stable status at least once. Instances of returning to the stable status are as follows.
  - When **[Enable defocus detection]** is deselected
  - When an object in the image moves to a defocus position so that it can be distinguishable
- In any of the following cases, the defocus detection performance may deteriorate, or a malfunction may occur.
  - Monitoring an environment with a monotonous background, at night time, and/or in a low light environment
  - Sudden illumination change (e.g. an indoor light is turned off)
  - Blocked lens or appearance of a large object which covers the most of the screen
  - The object of focus is changed due a change of the camera position

WiseAI

Refer to the application help.

Audio detection

An audio detection event can be created when audio above a set level is detected while the camera is capturing an image.

Select channel

After selecting a camera channel, you can specify the details of audio detection for each channel.

Audio detection

Enable audio detection

To apply the audio detection event, select **[Enable audio detection]**.

Level of detection

This sets the level standard for audio detection. An audio detection event is created when audio above the set level is detected.
When audio is detected, a graph will appear, and when an audio detection event is created, the graph color will change.

Note

- The lower the level of detection is, the smaller change in sound it can detect.
- The audio level of detection value is designed to detect a sound at the threshold level or higher by normalizing the input data to a value between 1 and 100, and it is irrelevant to the decibel (dB) values.
- Go to **[Video & Audio]**>**[Audio setup]**>[Source] to select Microphone and set the sufficient level of sound so that the audio detection function can operate properly.
- Audio gain can be set from **[Video & Audio]**>**[Audio setup]**>**[Gain]**.

Product information

Check the model name and serial number of the product and set the device name, location, description and language.

Product information

Model

The model name of the product you are currently using is displayed. Changes cannot be made to the model name.

Serial number

The serial number of the product you are currently using is displayed. Changes cannot be made to the serial number.

Device name

Enter the device name of the product you are currently using. If you have installed a number of cameras, a different device name for each camera is recommended.
Enter up to 8 characters long, including uppercase (A-Z), lowercase (a-z), numbers, or special characters (excluding #'"&+:<>=₩%*).

Location

Enter the installation location of the product you are currently using. If you have installed a number of cameras, a different location name is recommended to distinguish between them.
Enter up to 32 characters long, including uppercase (A-Z), lowercase (a-z), numbers, special characters (only ~`!@$^()_-|{}[];,./?).

Description

Enter the description of the product you are currently using. You can enter other necessary information, including the installation date and location where the screen is showing.
Enter up to 32 characters long, including uppercase (A-Z), lowercase (a-z), numbers, special characters (only ~`!@$^()_-|{}[];,./?).

Memo

Enter the description of the product you are currently using. Enter other necessary information that were not entered on the description section.
Enter up to 32 characters long, including uppercase (A-Z), lowercase (a-z), numbers, special characters (only ~`!@$^()_-|{}[];,./?).

Language

Select the language of the product you are currently using. When you select a language and click Apply, all UI will be changed to the relevant language.

Open source license

We provide open source licenses used by this product.**Click the [View]**button to see the information of the open source licenses used by this product and full license texts.

Upgrade / Restart

You can upgrade the software of the product you are currently using, perform a factory default, back up or restore the configuration, or restart.

Upgrade

Software can be upgraded as new firmware versions are released. You can also downgrade to a previous version.

Software

The software version of the product you are using is displayed. Changes cannot be made to the software version.
You can view the software details, including the ISP version applied to the software and SUNAPI version, by clicking the **[Info]** button.

Software upgrade

You can upgrade the software of the product you are using. To upgrade the software, click the **[...]** button. Select an upgrade file and click the **[Open]** button. When you click the **[Upgrade]** button, upgrading will begin. You can view the upgrading progress in %. When upgrading has ended, the camera will reboot and the connection will be terminated automatically. You will need to reconnect to the web viewer.

> **Note**
>
> - Upgrade can take up to 10 minutes. Do not terminate the program while upgrading is in progress. Doing so may result in the program failing to upgrade properly.
> - For the web viewer to work properly, you need to delete all the browser caches before connecting again after the software upgrade.
> - You can download the latest software version from Hanwha Vision's website: http://www.hanwhavision.com

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Factory default

Resets the system configuration to what it was at the time of product purchase. When you click the **[Reset]** button and then click the **[OK]** button in the confirm window, the factory default reset will be carried out. (Logs won't be reset though.)

If you wish to reset the system configuration (except for the network configuration and installed open platform configuration) to factory default, select **[Except network parameter & open platform]**. When a factory default is carried out, the connection with the camera will be terminated. When you reconnect to the web viewer for the first time, you will need to enter the password again.

If you wish to reset the system configuration except for the network configuration to factory default, select **[Except network parameter]**. When a factory default is carried out, the connection with the camera will be terminated. When you reconnect to the web viewer for the first time, you will need to enter the password again.

Configuration backup & restore

You can backup and save the current camera setup or restore a desired configuration. You can create a number of backup files for desired configurations, or restore and use a desired configuration according to the purpose or environment when using the product.

Backup

When you click the **[Backup]** button, a backup file of 'model name Config.bin' will be created.

Restore

When you click the **[Restore]** button, a window where you can select a backup file to restore will appear. When you select a backup file and press the **[Open]** button, the configuration will be restored based on the relevant backup file.

> **Note**
>
> - When you restore the configuration, the connection with the camera will be terminated automatically and you will need to reconnect to the web viewer.
> - If you use an imported backup file for a different model than the product you are currently using, the product may malfunction. Do not use a backup file for a different model or change the configuration manually.

Restart

Restart the camera system. Click the **[Restart]** button, and when the confirm window appears, click the **[OK]** button. The camera will restart and the web viewer window will close. You will need to reconnect to the web viewer.

Log

You can check camera-related logs. You can check information including camera access, system changes and events which have occurred, and backup log information for each log type.

> **Note**
>
> Logs can be checked in order of most recent log first.
> Up to 1,000 logs can be saved. By selecting [View 10 lines], [View 15 lines], or [View 20 lines], you can set how many logs will be displayed on one page.
> When the number of logs that are saved exceeds 1,000, a new log is saved after deleting the oldest log.

Access log

You can check login and logout information for each access account.

Log type

You can check accounts which have accessed the camera, login and logout date, and time information. When you select All, you can check login and logout, date & time, and detailed information for all access IDs.

Export

You can back up the selected log type as a text file. To back up the access log, click **[Export]**. The log file information is displayed as camera model name_log type_backup date, and time.

System log

You can check date & time and detailed information for system changes.

Log type

This allows you to check camera system setup change information, along with the date and time. When you select All, you can check date & time and detailed information for all system changes.

Export

You can backup the selected log type as a text file. To backup the system log, click **[Export]**. The log file information is displayed as camera model name_log type_backup date, and time.

Event log

You can check the date & time and detailed information for an event which has occurred in the system.

Log type

You can check occurrence date & time and detailed information for a selected event. When you select All, you can check the date & time and detailed information for all events occurring in the system.

Export

You can backup the selected log type as a text file. To backup the event log, click **[Export]**. The log file information is displayed as camera model name_log type_backup date, and time.

Open platform

When you install an additional application on the camera, you can use the functions of the installed application in addition to existing functions.

> **Note**
>
> You can check all the applications installed on the camera by clicking **[Apps]** at the right top of the web viewer. To customize application settings, click [Go App] in the [Apps] dialog box.

Open platform

Installing applications

1. Click the **[...]** button, select an application and then click **[Open]**.
2. Click **[Install]**. When installation of the application is complete, a message saying 'Installed' is displayed and information about the installed application is displayed in the list.

No.

A number is assigned in the installation order of application.

Application name

The application name, installed date and version are displayed.

- **Uninstall**: Deletes an installed application.
- **Go App**: Navigates to the screen provided by each application.

Status

Displays the running status of an application.
When an application is running, 'Running' is displayed, and when an application is stopped, 'Stopped' is displayed.

- **Start**: Executes the installed application.
- **Stop**: Stops a running application.
- **Health**: The resource usage rate, thread count and running time of currently-running applications are displayed. This is activated only when at least one application is running.

Setup

Set the execution priority and whether the application runs automatically. After completing the settings, click **[Apply]**.

- **Priority**: Set the priority among applications that are running. If the total resource usage of the camera (including the camera's main task and applications) increases, the running applications are forcibly terminated in the order of "Low" priority.
- **Auto start**: Select **[Enable]** in **[Auto start]** to automatically run the application when the camera is turned on and the main task is executed.

Application manager

Displays the resource usage rate of applications running in the camera.

- **Application name**: Displays the application name.
- **Memory usage (%)**: Displays the memory usage rate of each application.
- **CPU usage (%)**: Displays the CPU usage rate of each application.
- **Thread count**: Displays the number of threads created by each application.
- **Duration**: Displays the total running time of each application.
- **Action**: Displays the action status of each application. To stop the application, click **[Kill App]**.
- **Total usage**: Displays the total resource usage rate (including the main task of the camera and applications) currently used in the camera.
- **Total**: Displays the total number of applications currently running.

> **Note**
>
> - For questions regarding the installation and usage of applications, contact the developers' website of Hanwha Vision (http://step.hanwha-security.com).

Hanwha
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