

Network Camera

Online help

TNP-A6550RW/TNP-A7430RW/TNP-A9430RW

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

Icons

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

Icon	Description of function
 <u>Video setup</u>	You can check or change the profile applied to the current live screen. You can also change the display settings of the live screen.
 <u>PTZ</u>	You can control the pan/tilt/zoom motions of the camera. You can move to the preset location set on the [Setup]>[PTZ]>[PTZ setup] page or start/stop the swing, group, and tour functions. You can check the list of focus in [Focus save] .
 <u>Status</u>	Check the connection information for each profile and for connected users at the same time.
 Privacy area	The Privacy area setting window will appear. Specific functions related to privacy mask areas can be

Icon	Description of function
	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.
 Wiper	Clicking the button activates the wiper.
 Window heater	Clicking the  icon turns on the window heater, and the icon turns orange. The heater will remain active for 60 minutes before automatically turning off. If the camera temperature falls below 10°C, the heater turns on automatically. If the camera temperature rises above 15°C, the heater turns off automatically, and manual control becomes available. For 20 minutes after the camera boots up, the window heater is forcibly turned on and cannot be manually turned off during this period. If the user attempts to turn it off during this time, a popup message appears: "Window heater turns on below a certain

Icon	Description of function
	temperature; manual control is restricted." [Follow-up action] under [Setup] > [PTZ] > [PTZ setup] > [Preset] can be linked to the live page by selecting either [Window heater on] or [Window heater off]. If [Follow-up action] is set to [Window heater on] for a specific preset in the [Preset setup] page, executing the preset will turn on the heater. To confirm that the icon has changed to orange, refresh the webpage.
 Pan heater	The pan heater maintains a stable temperature inside the camera to prevent malfunctions caused by humidity. Clicking the  icon turns on the window heater, and the icon turns orange. The heater will remain active for 6 hours before automatically turning off. If the temperature falls below 15°C, the heater can only be controlled manually. If the temperature rises above 18°C, the pan heater function turns off automatically and cannot be turned on manually. If the user attempts to force it on when the temperature is above 18°C, a popup message appears: "Pan heater use is restricted above a certain temperature." If [Follow-up action] under [Setup] > [PTZ] > [PTZ setup] > [Preset] is set to [Pan heater on] for a specific preset, executing the preset will turn on the pan heater. To confirm that the icon has changed to orange, refresh the webpage.
 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

Icon	Description of function
	the password to play back downloaded videos. The password setup function for recorded videos is not available in 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.

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 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.

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 settings. (The [Display] function is not supported on some camera models.)

PTZ

You can control the Pan/Tilt/Zoom motions of the camera.

Controlling zoom motion

When you click the  icon in the zoom bar, the screen will zoom in. When you click the  icon, the screen will zoom out.

Controlling pan/tilt motions

Move the camera direction by clicking the  icon in the Pan & Tilt area.

Adjusting the focus

Adjust the camera focus by clicking the  icon or the  icon.
To adjust the camera focus automatically once, click the  icon.

Auto tracking

A moving object or person can automatically be tracked in the live view. When you click the Auto tracking icon , the auto tracking function will be executed. When you click the Auto tracking icon  again, the tracking function will stop. In addition, when you click the right mouse button on the image screen, the motion based clicked area will be analyzed, and then auto tracking will begin.

Focus save

You can check the list of focus save.

Click **[Set]** to save the screen currently being shot into a focus area. After entering **[Number]** and **[Name]**, click **[OK]** to save.

If you click **[Go]** after selecting focus save from the list, the camera focus moves to the saved focus area.

Focus save can also be set or deleted in **[Setup]>[Video & Audio]>[Camera setup]>[Focus save]**.

Using the PTZ function

You can move the camera to a position set in advance or start and stop the swing, group, and tour functions. For relevant setting, refer to **[Setup]>[PTZ]>[PTZ setup]** page.

Area zoom

The area zoom allows to zoom in and view a specified area.

When you select an area by dragging the mouse on the camera image screen after clicking the icon , the zoom function will operate based on the selected area and the camera position will move to the selected area. You can move to the previously selected area and configuration by clicking the icon . In case you have moved to the previously selected area and configuration, click the icon if you wish to move back to the previous area and configuration again. When you click the icon , the zoom magnification will change to 1x and the camera will move to its original position.

To end the area zoom setup, click the icon again. The currently set area zoom will be maintained and the area zoom setup function will end.

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
 Playback/Pause	Playback or pause an image.
 Speed	Play the video at 2x speed.

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.

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].
- **DPM profile:** A profile used exclusively for Dynamic privacy masking. In the table in [Video profile], "DPM profile" is displayed as "DPM" under **[Type]**. The [DPM profile] option can be selected only when the WiseAI app installed on the camera is running. Additionally, if the DPM feature is disabled in the WiseAI app's [Dynamic privacy masking] menu, masking will not be applied even if [DPM profile] is selected.

On some camera models, enabling [DPM profile] may limit the OSD functionality.

Profile properties

Set the details for the current video profile.

Resolution

Set the resolution of the camera image.

Note

- 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

- 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.

Video compression

You can set the video compression ratio.

The **[Compression]** option of **[Profile properties]** sets the priority of encoding when **[Bitrate control]** is set to **[CBR]**. The **[Video compression]** option sets the priority of encoding, which affects the amount of data transmission and video quality based on the video compression rate for VBR action.

The higher the value of **[Video compression]**, the better the video compression rate. As the video compression rate increases, the amount of video data transmission decreases, but the video quality might be degraded as a result. If the video compression rate is lowered by setting a low value to **[Video compression]**, the video quality improves, but the amount of video transmission could increase.

[Video compression] is activated if either **[H.264]** or **[H.265]** is selected for **[Codec]** of the profile, and **[VBR]** is set for **[Bitrate control]**.

Encoding priority

Set the priority between frame rate and image quality if the amount of image data exceeds the target bitrate. (Supported options may vary depending on camera specifications.)

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.)

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

- 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

You can manage the user accounts connecting to the camera. You can change the administrator password and guest settings, authentication setup and setting of current users. When you finish the setting, click **[Apply]** 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

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

- 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 time in minutes to automatically disconnect the admin login when the administrator is not active.

Note

- This [Admin login timeout] function is not supported in Safari.

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.

Log

Grant the selected user permission to access logs (access log, system log, event log, remote log transmission).

PTZ

Grant the selected user permission to control the PTZ in [Live] mode.

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.

Open platform

Grant the selected user permission to access the app installed on the camera and check the detailed information of the app. The installed app information can be checked in the [Open platform] menu.

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 **[Apply]** at the bottom of the page.
6. When the confirm window appears, click **[OK]**.

Note

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

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 **[Apply]** at the bottom of the page.
3. In the confirmation dialog, click **[OK]**. Then 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 **[Delete]**.
 2. Click **[Apply]** at the bottom of the page.
 3. In the confirmation dialog, click **[OK]**. Then the information of the selected current user will be deleted.
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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.

Vendor class

You can type the DHCP vendor class identifier up to 127 characters long, including uppercase (A-Z), lowercase (a-z), numbers, or special characters (-_~!@[].,?). A blank space cannot be used.

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.

PTZ setup

You can set the position of the camera PTZ preset and detailed functions including swing, group, tour, trace, and auto run. When you complete the setting, click the **[Apply]** button at the bottom of the page.

Preset

Exclusive PTZ control

If **[Exclusive PTZ control]** is selected, when multiple users are accessing the web viewer and controlling PTZ all at the same time, the specified user takes priority for the PTZ control over the others, restricting their controls.

You can set the preset position of the PTZ camera.

Setting a preset

1. Adjust the camera position as follows.
 - When you drag the  icon with the mouse, the camera moves to the pan and tilt.
 - Select an image magnification by adjusting the zoom slide bar, or by clicking the  icon to zoom the screen in or clicking the  icon to zoom the screen out.
 - Move the focus nearer by clicking the  icon or move the focus farther away by clicking the  icon.
 - To adjust the camera focus automatically for once, click the  icon.
2. Click the **[Set preset]** button.
3. Select a desired preset No. from **[Number]** on the **[Preset setup]** dialog box.
4. Enter the relevant preset name in **[Name]**. The preset name can only be entered using upper/lower case alphabets and numbers.
5. Click the **[OK]** button.

The added preset will appear on the list of **[Preset setup]**. You can set the details for the relevant preset on the preset list.

Deleting a preset

- Select the checkbox of a preset you wish to delete from the preset list of **[Preset setup]** and click the **[Delete]** button.

Navigating to home

- Click the **[Go home]** button.

Setting the home

1. Adjust the camera position you wish to set as the home as follows.
 - When you drag the  icon with the mouse, the camera moves to the pan and tilt.
 - Select an image magnification by adjusting the zoom slide bar, or by clicking the  icon to zoom the screen in or clicking the  icon to zoom the screen out.
 - Move the focus nearer by clicking the  icon or move the focus farther away by clicking the  icon.
 - To adjust the camera focus automatically once, click the  icon.
2. Click the **[Set home]** button.

Note

- i** When the camera is rebooted after setting home position, the screen is positioned at home position. If another sequence (Preset, Swing, Group, Tour, Trace) is in operation, the sequence that was active will be executed without moving to the home position when the camera is rebooted.

Preset setup

You can view the preset list and modify or delete the detailed setting of each preset.

No.

This is the preset number entered on the **[Preset setup]** dialog box.

Name

This is the preset name entered on the **[Preset setup]** dialog box.

No PTZ motion

Selecting the checkbox will enable only the [Follow-up action] option set for the appropriate preset with no PTZ motion to the specified position.

Follow-up action

You can set the camera functions that operate after the camera moves to the set PTZ preset position. (Supported options may vary depending on camera specifications.) If the swing function is operating, the follow-up action will not operate.

- **Off:** No action will be operated after the camera moves to the preset PTZ position.
- **Auto run:** An action set from the **[Auto run]** tab will be executed automatically. When **[Off]** is selected from the Auto run **[Mode]** or there is no auto run action, the preset execution status will be maintained.
- **Auto tracking:** Executes the auto tracking for a time set from the **[Tracking time]** column.
- **Auto tracking > Home:** It moves to the PTZ home position after executing the auto tracking operation. Please refer to Setting the home on how to set the home position.
- **Auto tracking > Auto run:** Automatically runs the action predetermined after auto tracking action is executed. To set an action to auto run, see Auto run.
- **Video analytics:** Video analytics action will be executed.
- **Window heater on:** Window heater turns on.
- **Window heater off:** Window heater turns off.
- **Pan heater on:** Pan heater turns on.
- **Pan heater off:** Pan heater turns off.
- **Wiper:** The wipers installed on the camera will operate 3 times back and forth.
- **Go home:** Moves the camera to its PTZ home position.
- **Day/Night mode > Day:** If the camera moves to the set PTZ preset location, all image presets' **[IR]** function (if available) will be disabled, and **[Day/Night mode]** will be set to **[Day]**. This [Day/Night mode > Day] follow-up action won't work for [Group] or [Tour] actions that contain recurring preset actions.

- **Day/Night mode > Night:** If the camera moves to the set PTZ preset location, all image presets' **[IR]** function (if available) will be enabled, and **[Day/Night mode]** will be set to **[Night]**. This [Day/Night mode > Night] follow-up action won't work for [Group] or [Tour] actions that contain recurring preset actions.

Tracking time

Sets the tracking time to execute auto tracking when **[Auto tracking]** is selected from **[Follow-up action]**.

Go to menu

You can move to the setup page and check or set a detailed option.

- **Camera setup:** Move to the **[Video & Audio] > [Camera setup]** page. You can change the camera setting to fit for the surrounding environment of the selected preset.
- **Motion detection:** Navigate to **[Analytics] > [Motion detection]** page. When **[Preset]** is selected among the **[Type]** options from the option motion detection page, you can set a different motion detection event for each preset.
- **Object detection:** Navigate to **[Analytics] > [Object detection]** page. When **[Preset]** is selected among the **[Type]** options from the Object detection page, you can set a different object detection event for each preset.
- **IVA:** Navigate to **[Analytics] > [IVA]** page. When **[Preset]** is selected among the **[Type]** options from the IVA page, you can set a different IVA (Intelligent video analytics) event for each preset.

Last position

You can set the camera to move to the last position when turning the camera on and off. Select whether or not to save the last position of the camera and select the saving interval.

Save last position

To save the last position, select **[Enable]**.

Time

Set the saving interval at which to save the current position as the last position. The unit used to measure the interval is seconds. Enter the saving interval on the field and click **[Apply]**.

Swing

Swing is the function for the camera to move 2 preset sections back and forth.

Note

- In order to use the swing function, at least 2 presets must be added. You can add or modify a preset from the **[Preset]** tab.

Swing setup

From preset no.

Select start preset No. to begin the swing action.

To preset no.

Select end preset No. to end the swing action.

Speed

This is the moving speed from the start preset and the end preset.

If you set a larger number, the camera moves from the start preset position to the end preset position faster.

Dwell time

This is the amount of time the camera will stop and stand by at the start preset position and the end preset position, respectively.

For example, if '3' is entered, the camera stays in the start preset position for 3 seconds, then moves to the exit preset position.

Swing mode

Select whether to move the camera with only the pan or tilt action of the camera or to move the camera with both pan and tilt actions when the camera moves back and forth from the start preset to the end preset.

Swing setup

1. Select preset No. to begin swing from the **[From preset no.]** column.
2. Select preset No. to end swing from the **[To preset no.]** column.
3. Enter the moving speed from the start preset to the end preset on the **[Speed]** column.
4. Enter the preset hold time on the **[Dwell time]** column to decide how long the camera stays in the start preset and then moves to the end preset.
5. Set the swing action mode from the **[Swing mode]** column. For example, if you wish to move to the camera to the preset only in the pan direction, select [Pan].

Start swing

- To start the swing action, click the **[Start]** button.

Stop swing

- To stop the swing action, click the **[Stop]** button.
-

Group

The group function is a function used to group a number of previously designated presets and access the presets placed in a group sequentially. Up to 6 groups can be set, and up to 128 presets can be saved for each group.

Note

- In order to use the group function, a preset must have been added previously. You can add a preset from the **[Preset]** tab.

Group setup

Name

Set the group name. Up to 15 characters can be entered, using only uppercase letters(A-Z), lowercase letters(a-z), and numbers(0-9). Spaces are not allowed.

Preset no.

Select a preset No. to save to a group.

Speed

Enter the moving speed between presets; that is, the moving speed of the camera to the next preset position.

If you set a larger number, the camera moves from the current preset position and the next preset position faster.

Dwell time

Enter the amount of time to stay in each preset position.

For example, if '3' is selected for dwell time in No. 1 preset, it stays in No. 1 preset position for 3 seconds and then moves to the next preset position.

Setting Group 1

1. To set Group 1, select '1' from the group drop-down list.
2. Enter the name of 'Group 1' in the **[Name]** input field. You cannot enter spaces, and you can enter a maximum of 15 characters including uppercase letters (A~Z), lowercase letters (a~z), and numbers (0~9).
3. Select preset No. to add to 'Group 1' from the **[Preset no.]** column.
4. Enter the speed of the camera to move from the preset position being set to the next preset position on the **[Speed]** column.
5. Set the amount of time to stay to decide how long the camera stays in the preset position being set from the **[Dwell time]** column to the next preset position.
6. Click the **[Apply]** button.

Deleting group setting value

1. Select a group No. to clear the value set previously from the group drop-down list.
2. Click the **[Delete]** button.

Starting group action

1. Select a group No. to run from the group drop-down list.
2. Click the **[Start]** button.

Stopping group action

1. To stop the group currently running, click the **[Stop]** button.

Tour

The **[Tour]** feature recalls groups of preset locations in a consecutive manner. This feature has two modes of operation: **[Basic]** mode, which consecutively recalls groups, sets of presets you've already specified, and **[Expanded]** mode, which consecutively recalls not only groups, but any combination of preset, swing, trace, and home operations.

Note

- To use **[Basic]** mode, be sure to set a group.
- To use **[Expanded]** mode, be sure to set the preset, group, swing, and home operations that you want to recall in a consecutive manner.

Tour setup

Under **[Mode]**, choose between **[Basic]** and **[Expanded]**. Switching between the two modes deletes all the saved tour settings.

Basic

Consecutively recalls the groups you set.

Group no.

Select the group no. to be consecutively recalled. **[Group no.]** is displayed only when you select **[Basic]** under **[Mode]**.

Dwell time

Type the camera's duration of stay at each of the groups. For example, if you type "3" in the **[Dwell time]** box for Group 1, the camera view stays in Group 1 for 3 seconds and then moves to the next group.

Setting tour

To recall Groups 1, 2, and 3 consecutively and steer the camera view to the next position:

1. Select **[1]** from the **[Group no.]** drop-down list.
2. Type the camera's duration of stay at the **[Group 1]** position in the **[Dwell time]** box.
3. Select **[2]** from the **[Group no.]** drop-down list.
4. Type the camera's duration of stay at the **[Group 2]** position in the **[Dwell time]** box.
5. Select **[3]** from the **[Group no.]** drop-down list.
6. Type the camera's duration of stay at the **[Group 3]** position in the **[Dwell time]** box.
7. Click **[Apply]**.

Expanded

Consecutively recalls the preset, group, swing, track, and home operations you previously set.

Item

Select the operations to be consecutively recalled among the operations you set on each of the **[Preset]**, **[Swing]**, **[Group]**, **[Trace]**, and **[Home]** tabs. Each of the operations is listed in the drop-down list. **[Item]** is displayed only when you select **[Expanded]** under **[Mode]**.

Detailed item

Select the detailed operation of the operation you selected under **[Item]**. Each of the operations you set on the **[Preset]**, **[Swing]**, **[Group]**, and **[Trace]** tabs is listed in the drop-down list. **[Detailed item]** is displayed only when you select **[Expanded]**.

Dwell time

Type the camera's duration of stay for each operation selected under **[Item]**. For example, if you select **[Preset]** under **[Item]**, select **[Preset 1]** under **[Detailed item]**, and type "3" in the **[Dwell time]** box, the camera view stays for three seconds at **[Preset 1]** and then performs the next operation.

Setting tour

To enable the camera to move from Preset 1 to the home position, and to perform Swing Operation 3:

1. Select **[Preset]** from the **[Item]** drop-down list; select **[1]**, from **[Detailed item]**.
2. Type the camera's duration of stay at the **[Preset 1]** position in the **[Dwell time]** box.
3. Select **[Home]** from the **[Item]** drop-down list.
4. Type the camera's duration of stay at the **[Home]** position in the **[Dwell time]** box.
5. Select **[Swing]** from the **[Item]** drop-down list; select **[3]**, from **[Detailed item]**.
6. Type the camera's duration of performance of Swing Operation 3 in the **[Dwell time]** box.
7. Click **[Apply]**.

Resetting tour settings to default

- Click **[Remove]**, and the tour settings are deleted and reset.

Starting tour

- Click **[Start]**, and the camera moves by recalling set operations consecutively.

Stopping tour

- Click **[Stop]**, and the tour stops its operation.

Trace

The trace function is a function used to save the moving path of the camera and move the camera according to the path.

Trace Setup

You can set up a trace path and start or end using the trace function. When setting up a trace path, you can include preset locations in the trace path. Preset locations can be set under the **[Preset]** tab.

Setting tracking path

1. Select a trace no. to set up.
2. Click the **[Set]** button and set the path as explained in the following:
 - Use the direction buttons on the video screen to pan, tilt, and zoom to set the path you want to save.
 - To include a preset location in the path, choose a desired preset location number from the **[Preset list]** and click **[Go]**.
3. If you click on the **[Set]** button again, the trace path will be saved in the current trace no.

Starting tracking action

1. Select the trace No. to operate.
2. Click the **[Start]** button. The camera moves according to the moving path set under the relevant trace No.

Stopping tracking action

1. To stop the tracking action currently operating, click the **[Stop]** button.

Auto run

Auto run is a function used to execute an action specified in advance automatically if the user does not operate the camera for a certain period of time.

Mode

You can select a function you wish to execute automatically and specify a detailed setting. (Supported options may vary depending on camera specifications.)

If you select **[Always enable auto-run]**, [Auto run] will run after the time set in [Dwell time] even if preset, home, trace, swing, group, tour, etc. are in operation.

- **Off:** The auto run function is not used.
- **Home:** If the PTZ action stops for the set time, the camera automatically moves to the home position. You can set the home position from the **[Preset]** tab.
 - **Time:** Set the time for which the PTZ action stops to move to the home position.
- **Preset:** If the PTZ action stops for the set time, the camera automatically moves to the preset position.
 - **Time:** Set the time for which the PTZ action stops before moving to the preset position.
 - **Preset:** Select the preset position number where the camera will move.

- **Swing:** If the PTZ action stops for the set time, the swing action will be executed automatically.
 - **Time:** Set the time for which the PTZ action stops before executing the swing action.
 - **Swing mode:** Select whether to move only to the pan or tilt action where the swing action runs, or both the pan and tilt actions.
- **Group:** If the PTZ action stops for the set time, the camera automatically executes the group action. You can set the detailed group action from the **[Group]** tab.
 - **Time:** Set the time for which the PTZ action stops before executing the group action
 - **Group:** Select a group number. You can set the group in the **[Group]** tab.
- **Tour:** If the PTZ action stops for the set time, the camera automatically executes the tour action.
 - **Time:** Set the time for which the PTZ action stops before executing the tour action.
- **Trace:** If the PTZ action stops for the set time, the camera automatically executes the trace action. Detailed trace functions can be set in the **[Trace]** tab.
 - **Time:** Set the time for which the PTZ action stops before executing the trace action.
 - **Trace:** Select a trace number. Detailed trace functions can be set in the **[Trace]** tab.
- **Schedule:** If there is no PTZ action for the set time, the specified action will be executed automatically at the designated weekday and time. The time to execute the set action can be specified down to the minute, and the default setting is the home position.
 - **Time:** Set the time for which the PTZ action stops.

Setting the camera to start automatically according to the schedule

1. Select **[Schedule]** from **[Mode]**.
2. Click a time to execute the camera automatically.
3. Select an action to be executed automatically from **[Mode]** of the **[Schedule]** dialog box. Detailed options vary depending on the selected mode. Set each option.
4. Click the **[OK]** button.

The set time for Auto run action will be displayed on the timetable. When you click the **[Clear]** button, all set times will be deleted.

PT limit

You can set the camera pan and tilt to move only within a limited range. When you complete the setting, click the **[Apply]** button at the bottom of the page.

Note

When you use the PT limit function by selecting **[Enable]** from **[Pan/Tilt limit]**, you can set a preset only within the limited range.

If there is a preset set beyond the previously set pan and tilt range before the PT limit is used, the preset will operate according to the initial setting.

Adjusting the PTZ

You can adjust the pan, tilt, and zoom actions of the camera.

Adjusting the PTZ

- When you drag the  icon with the mouse, the camera moves to the pan and tilt.
 - Select an image magnification by clicking the  icon to zoom the screen in or clicking the  icon to zoom the screen out from the zoom bar.
 - Move the focus near by clicking the  icon or move the focus far by clicking the  icon.
 - To adjust the camera focus automatically for one shot, click the  icon.
- Click **[Set Pan ground position]** to set the pan degree of the video currently shot as 0.
Click **[Set Pan/Tilt correction]** to reset the Pan/Tilt positions manually once.

Pan/Tilt limit

To limit the pan or tilt action range, select **[Enable]**. The pan and tilt operate within a set range.

Mode

Select an action to set the limited range. To limit tilt movement, select **[Tilt limit]**, and to limit pan movement, select **[Pan limit]**.

Action

Sets the maximum range of pan and tilt to move.

Setting the limited range of pan and tilt actions

1. Begin the setting by clicking the **[Start]** button.
2. When you click the **[Enter]** button, the position of the start point will be displayed on the camera image screen. Set the position of the start point for the limited range while adjusting the PTZ.
3. When you click the **[Enter]** button, the position of the end point will be displayed on the camera image screen. Set the position of the end point for the limited range while adjusting the PTZ.
4. Click the **[Enter]** button one additional time.

When you click the **[Exit]** button, all values currently being set will be deleted. You can click the **[Start]** button and set the limited range of action again.

Pan/Tilt speed

You can select the speed option for controlling the Pan/Tilt behavior of cameras. When controlling the Pan/Tilt behavior, the farther the center point, the faster the behavior speed. Select **[Exponential]** to see increase in speed in the shape of a curve (i.e. Initially slow, but getting faster with acceleration). Select **[Linear]** to see a constant increase in speed in a straight line.

Proportional Pan/Tilt

Adjusts the moving speed of pan and tilt according to the zoom magnification. If the zoom magnification increases, the moving speed of tilt will be reduced.

Mode

You can select an option to change the manual operation speed of pan and tilt according to the zoom magnification.

Pan/Tilt correction

[Pan/Tilt correction] is a function to manually reset the Pan and Tilt positions. Specifies whether or not to initialize the pan/tilt of camera as well as setting the initialization cycle and time.

For example, after selecting **[Enable]**, if you set **[Duration]** to "2 days" and **[Time]** to "9", pan/tilt position will be initialized every two days at 9 a.m. If the time is set to Jan 1, 2000, the initialization process begins at 9 a.m. on Jan 3, 2000, and then the pan/tilt position will be initialized every two days at 9 a.m. (i.e. Jan 5, Jan 7, and so on)

Duration

Set the initialization cycle. For example, if you set it to "2 days", the initialization recurs every two days.

Time

Sets the initialization time. You can select the hourly time from 0 to 23.

Note

- A deviation of ± 10 min may be expected.
 - After the action of pan/tilt initialization, the previous PTZ action state is maintained. For example, if initialization action occurs in the middle of a preset action, the preset action will resume after the completion of the initialization.
-

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.)

Adjusting the PTZ

You can adjust the pan, tilt, and zoom actions of the camera.

Adjusting the PTZ

- When you drag the  icon, the camera moves to the pan and tilt.
- Select an image magnification by clicking the  icon to zoom the screen in or clicking the  icon to zoom the screen out from the zoom bar.
- Move the focus near by clicking the  icon or move the focus far by clicking the  icon.
- To adjust the camera focus automatically for one shot, click the  icon.

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.

Pattern

Select the mosaic pattern to apply to a privacy area. Select **[Solid]** to apply the color set in the privacy area window. If you select the pattern, it will be applied to all the areas.

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. Drag 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]**.
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 (.).

Changing a privacy area

- You can change the size of a privacy area by moving a corner of the privacy area.
- 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.
- To delete a vertex, hover over the vertex you want to delete. Then the [-] sign appears on the point. Clicking the [-] sign deletes the vertex.
- To move a privacy area, click and drag the relevant area with the mouse.

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.

Changing 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.

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. (Some camera models do not support [Analytics] or [Statistics].)

Flip/Mirror

Select **[On]** to flip the camera output horizontally and vertically.

You can set the [Flip/Mirror] option when you select the **[PTZ]** channel in **[Select channel]**.

Installation direction

You can set the installation direction mode of the device.

- **Auto:** Using the gyroscope sensor enables the installation direction mode to be automatically determined and set.
- **Upright:** Select when installing in a general vertical direction. The tilt control range is between 55 and -90.
- **Inverted:** Select when installing at a specific angle. The tilt control range is between 90 and -55.
- **Canted:** Select to install by hanging upside down from a ceiling, etc. The tilt control range is between 80 and -90.

If you change the installation direction settings, all coordinate-related settings (see Help) will be reset and the camera will be rebooted.

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.

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 and OPUS codec is 16 kHz.

(Supported [Codec] options may differ depending on the camera specifications.)

Bitrate

The bitrate of the G.711 codec and OPUS 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.

Noise reduction

Select Noise Reduction if the surrounding noise is too strong to hear the sound of interest.

Noise reduction may not work properly if noise is indistinguishable from the surrounding voice sound, or if the sound pressure is high.

- **Sensitivity:** You can set the noise reduction sensitivity based on the level of ambient noise.

If **[Source]** in audio input is set to **[Line]**, the noise reduction function will be disabled.

Audio out

You can output audio through the built-in speaker.

Audio out

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

Gain

Set 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.
-

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; you 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 **[Apply]** at the bottom of the page. If the time-out time (240 seconds) has passed without clicking **[Apply]** 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.

In the case of PTZ camera, if you click **[Show]**, a PTZ adjustment panel rather than camera video screen is shown in the place of the **[Before]** panel. Also, if you click **[Refresh]**, it updates the source video in the **[Before]** panel with values most recently applied.

Adjusting the PTZ

You can adjust the pan, tilt, and zoom actions of the camera.

Adjusting the PTZ

- When you drag the icon ⊕ with the mouse, the camera moves to the pan and tilt.
- By using the zoom bar, you can adjust the video zooming ratio. Or select an image magnification by clicking the ⊕ icon to zoom in or the ⊖ icon to zoom out.
- Move the focus near by clicking the ▲ icon or move the focus far by clicking the ▼ icon.
- To adjust the camera focus automatically once, click the ∞ icon.
- Place the screen center toward the north, and click the 📍 (Set North) button to change the location to the north. (The Set North button displays when you click the **[OSD]** tab.)

Type

To apply the same camera setup for every preset, select **[Global]**. To apply a different setup for each PTZ preset, select **[Preset]**. The **[Preset]** option will be activated only when a preset is set from the [Preset setup](#) page. If you select **[Preset]** and set the camera setting for each preset, then you may not set some of the items in the detailed camera settings.

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 you set.
- **User-defined preset 2:** Used for displaying the image as you set.
- **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 **[Reset]**.

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]**.

Shadow level

You can adjust the shadow level.

Increasing the level enhances the characteristics of shadows but also increases noise in shadows of the video.

To adjust the shadow level, the SSDR feature must be enabled. Select **[Enable]** in **[SSDR]**.

Highlight level

You can adjust the highlight level.

Increasing the level enhances the characteristics of highlights but also increases noise in highlights of the video.

To adjust the highlight level, the SSDR feature must be enabled. Select **[Enable]** in **[SSDR]**.

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 click **[Set]**, 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.

i 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

An image captured against the light can be corrected. Select from among Off, BLC, HLC, or WDR in **[Mode]** and change the setting according to the selected backlight mode.

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.

HLC

The HLC (High Light Compensation) mode blocks strong lighting such as a streetlight or the headlights of a vehicle, to prevent failures to detect a neighboring object, such as a car license plate, due to saturation of strong lights.

HLC level

Set the level of exposures and adjust the highlight areas.

The higher the level, the higher the correction and the bigger the difference is for highlight-blocked area.

Mask

Select whether or not to apply the mask.

- **Off:** Does not create blocked area.
- **On:** Always blocks areas of brightness above a certain level.
- **All day:** Blocks areas except during very bright or dark time.
- **Night only:** Blocks areas until it gets really dark.

Mask color

Sets the color of the blocked area.

Mask tone

Sets the tone of the blocked area.

i Note

- At night, it only operates when the size of a highlight goes over the threshold in a dark environment.
- At night, HLC does not operate when it is overall too bright or dark. In daytime, HLC does not operate when it is too dark.
- When setting up HLC, there are minimum and maximum sizes to prevent malfunction of HLC.

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.

WDR control

Sets the WDR action option.

- **Always on:** the WDR mode is enabled at all times.
- **Turn off in low light:** The WDR mode is automatically turned off in a low-light environment.
- **Turn off in B/W:** The WDR mode is automatically turned off when the B/W mode operates.

Motion artifact reduction

If **[Enable]** is selected, motion artifacts are reduced that occur during the process of composing moving objects in WDR video.

i 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]**.

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.

Anti flicker shutter speed

Set the shutter speed to prevent flickering. The available values for the anti flicker shutter speed vary depending on the settings configured in the [Sensor mode] and [Anti flicker].

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.
- **WiseNR:** When a moving object is in the image, the noise reduction level is adjusted automatically to improve object discrimination.
- **WiseNR 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 2D level

SSNR 2D reduces noise on the image using adjacent pixels in one frame. Set the SSNR 2D level. The level can be set when **[On]** or **[WiseNR]** is selected for **[SSNR]**.

Noise will be reduced when you raise the level, but the picture may become less clear.

SSNR 3D level

SSNR 3D reduces noise on the image using the pixels of various frames. Set the SSNR 3D level. The level can be set when **[On]** or **[WiseNR]** is selected for **[SSNR]**.

The higher the level, the less the noises, but then the video might lag.

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.

Iris F-No

Activated when **[Iris]** mode is set to **[Manual]**, and it sets the iris f-number.

AGC

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

- **Off:** Disables the AGC function that brightens dark image by amplifying gain from video signal. When this option is selected, [SSNR] and [Day/Night] do not work.
- **Manual:** Manually adjusts the AGC value.
- **Max gain:** Sets the max gain that can be auto-controlled depending on the brightness of the surrounding.

Level (Manual)

Sets the AGC level value manually as desired. The higher the level value, the higher the gain value, which results in a brighter screen even in a dark environment.

If [Manual] is selected under [AGC], [Level (Manual)] is enabled.

Level (Max gain)

Sets the max gain value. : Controls the max gain that is set based on the brightness of the surrounding. The higher the level value, the higher the max gain.

[Level (Max gain)] is enabled if [Max gain] is selected under [AGC].

Note

- The screen exposure can be saturated depending on the max/min range of shutter settings.
- It may take a while until the effect is applied or canceled after setting the WiseNR mode (SSNR 2D and SSNR 3D).
- The level of noise might go up despite the improved video detection ability after setting the WiseNR mode (SSNR 2D and SSNR 3D).
- In the bright environment with less noises, the effect of WiseNR (SSNR 2D and SSNR 3D) can be little.
- Since the motion detection function is used internally when the WiseNR (SSNR 2D and SSNR 3D) is enabled to detect motion in video, it is detected according to the operational condition of motion detection event. For the detailed motion detection settings, go to **[Analysis] > [Motion Detection]**.
- As the usage of AGC increases, the SSNR 3D value for SSNR also increases, which could lead to stuttering in the video.
- AGC action increases screen noise.
- If AGC mode option is set to [Off] or [Manual], or if [Max gain] value is set to below 30 db, [Day/Night] cannot be set to [Auto].

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]** or **[Manual]**, or if **[Max gain]** is set below "below 30 dB", **[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.

When **[Customize]** is selected, you can manually set the ambient brightness level that determines the Day/Night mode switching threshold within a range of 0-100. The left slider with the Sun icon sets the threshold for switching from b/w to color, while the right slider with the Moon icon sets the threshold for switching from color to b/w. Entering a lower value in the left input field causes the image to switch to color in brighter conditions, while entering a higher value in the right input field causes the image to switch to b/w in darker conditions. The sliders are only active when **[Day/Night mode]** is set to **[Auto]**. If the **[Level(Max gain)]** value under **[Exposure]** > **[AGC]** is set below 30 dB, or if **[AGC]** is set to **[Off]** or **[Manual]**, the sliders will be disabled and **[Day/Night mode]** will automatically switch to **[Color]**.

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 control

When set to **[On]**, the brightness distribution of video is analyzed and its brightness level is adjusted.

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.

Contrast adaptive level

Adjust the contrast difference that will be applied in the video. This option enhances the contrast by preventing the distribution of specific brightness levels from being skewed in the 4x4 divided areas. In environments with many dark areas, highlights become brighter, increasing the contrast difference, while in environments with many bright areas, shadows become darker, also increasing the contrast difference. Moreover, in environments with both dark and bright areas, highlights become brighter, shadows become darker, and the contrast difference increases.

As the [Contrast adaptive level] increases, the contrast intensity increases, and as the level decreases, the contrast intensity decreases.

In low-light environments, setting the [Contrast adaptive level] value to 2 - 50 may result in less noticeable effects. Therefore, you need to be careful when adjusting settings in low-light environments.

Local contrast

Local contrast more clearly shows the subtle difference in brightness of video.

Local contrast level

This is enabled by setting [Local contrast] to [On]. The higher the level value, the higher the contrast of video, which means a clearer image. However, this also increase the level of noise on the screen, and a warped form of the duplicated image might be more visible around the edges.

Color level

Adjust the intensity of color in the image.

Chromatic aberration correction

You can enable or disable the [Chromatic aberration correction] feature. Chromatic aberration is a phenomenon where colors are separated due to differences in refractive index based on the wavelength of light through the lens, which can result in unexpected colors, such as purple, appearing along the edges of objects. If this phenomenon occurs in the lens, it can be improved through chromatic aberration correction.

Note

- Depending on the focus distance of the object being captured, the effect of chromatic aberration correction may not be noticeable in environments where chromatic aberration doesn't occur.
- When an object has thin borders in primary colors, its color may seem washed out or faded due to chromatic aberration.
- The higher the chromatic aberration correction level, the more noticeable the phenomenon of color removal may be.
- Colors may be excessively removed depending on the distribution or size of the color components. Therefore, it is not recommended to use the chromatic aberration correction function in environments with many thin borders of primary colors outdoors, such as lawns.

Correction level

You can adjust the chromatic aberration correction level. A higher value applies more correction.

This option is enabled only when you select **[Chromatic aberration correction]** > **[Enable]**.

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, you 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]**.

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 **[Add]** 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 **[Delete]**. To preview how the camera title is displayed on the screen after entering it, enter the camera title and click **[Preview]**.

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.

System info

To display the IP address of the camera and MAC information on the screen, select each corresponding item. The location of the IP address and MAC information can be moved using the cursor.

Size

Adjust the size of OSD.

Color

Set the color of OSD.

Transparency

Set the transparency of OSD.

Overlay

Display the camera's PTZ coordinates, or preset names on the screen.

- **PTZ position:** Sets whether to display the PTZ location on the screen or not.
- **Preset name:** Sets whether to display the preset name on the screen or not.
- **Azimuth:** The function is used to display the azimuth of the area that you are looking at on the screen currently. When the function is enabled, the 8 directions of E(East)/W(West)/S(South)/N(North)/NE(Northeast)/NW(Northwest)/SE(Southeast)/SW(S are displayed at the bottom right of the screen.

Overlay image

You can display the image you want on the screen. Use the **[Upload image]** menu to upload images.

Upload image

[...]button can be clicked to search files in bitmap format. Click **[Upload]** to upload image files. To delete image files applied to the screen, click **[Remove]**. Image file should be 16 bits (RGB565 not supported), 24 bits, or 32 bits bitmap file. Image size can be up to 300 x 300 px and file size should be no more than 400 KB.

For certain cameras, the image specifications may vary. The image file should be an 8-bit bitmap (RGB565 is not supported). The image size can be up to 288 x 288 pixels (width must be a multiple of 32, and height must be a multiple of 4), and the file size should not exceed 400 KB.

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.)

Focus

You can set the camera focus operation method, whether or not to use digital zoom, and reset the camera.

Mode

Set the camera focus operation method.

- Manual: Adjust the camera focus manually.
- Auto: The camera focus is adjusted automatically.
- One shot AF: In case of a user event (Auto Focus or Zoom Action), the focus will be automatically adjusted one time.

Range

Sets the applicable range when automatically adjusting the camera focus.

To automatically adjust the focus in consideration of the whole supported range for the camera, select **[Wide]**. To automatically adjust the focus in consideration of only partial range from the current location, select **[Narrow]**.

If you select **[Wide]**, the camera motion might be mildly shaky during the process of automatic focusing. If you select **[Narrow]**, there will be no such shaky motion, but the focusing might fail if the subject is located exceptionally close or far.

Digital zoom

To use digital zoom, select **[On]**.

Max digital zoom

Set the maximum range of available digital zoom. You can set the range of digital zoom by setting **[On]** for **[Digital zoom]**.

Zoom mode

Set the method to synchronize the camera focus when the zoom is operating.

- Auto: Even if the zoom magnification is changed, the zoom operates while maintaining the focus by continuously appraising and modifying the condition in focus.
- Manual: The zoom operates according to the set focus track. The image may be out of focus if the zoom magnification is changed.

Zoom speed

Set the zoom speed when the **Zoom mode** function is enabled.

Lens reset

You can reset the lens manually once or set the reset period to reset the lens automatically.

To reset the lens manually, select **[Manual]** from **[Lens reset]** option and click **[Reset]**. To set auto reset period, select a desired time between 1 and 7 days. The lens will be reset at the set period from the set time.

Note

- Since the automatic focusing function adjusts the focus based on a subject in the middle of the screen, subjects on the periphery of the screen may be out of focus.
- The automatic focusing function may not operate normally under the following conditions.
 - If there is a bright light or flashing light, such as a neon sign
 - If the illumination in the monitoring area is low

- If the illumination in the monitoring area is excessively high
- If the camera operates with a slow shutter
- If the subject is dark
- If there is no intensity difference, such as between the sky and a wall
- If the camera is aimed at a thin horizontal line
- If there are objects both far and near within the monitoring area,
- When setting as the manual focus, the focus can be changed due to the change of the surrounding environments.

Heater

Heater

Clicking the  icon turns on the heater and turns the icon orange. The heater remains active for 60 minutes before automatically turning off.

If the camera temperature falls below 10°C, the heater turns on automatically. If the camera temperature rises above 15°C, the heater turns off automatically, and manual control becomes available. For 20 minutes after the camera boots up, the window heater is forcibly turned on and cannot be manually turned off during this period. If the user attempts to turn it off during this time, a popup message appears: "Window heater turns on below a certain temperature; manual control is restricted."

IR

Enables the identification of objects at a close distance by preventing overt brightness of proximate objects on screen when IR LED is turned on.

Mode

In the B/W mode when the IR LED is turned on, the saturation at the center of screen is prevented, so it is possible to identify a nearby object.

- **Off:** Turns off IR LED.
- **On:** Turns on IR LED. This mode disables **[Day/Night]**.
- **Day/Night:** Turns on/off IR according to Day/Night. It means that, after the activation of Day/Night, LED is turned off when the video is in color mode and turned on when video is in B/W mode. If this mode is selected, **[Day/Night]** is automatically set to [Auto] and the setting cannot be changed.
- **Sensor:** IR and Day/Night changes depending on the amount of light detected by the optical sensor. This mode disables **[Day/Night]**.
- **Timed:** Sets the IR On time. This mode disables **[Day/Night]**.

LED On level

If the amount of light is below the set LED level, LED is automatically turned on. "IR On level" is enabled if you select **[Sensor]** in **[Mode]**.

LED Off level

If the amount of light is above the set LED level, LED is automatically turned off. "IR Off level" is enabled if you select **[Sensor]** in **[Mode]**.

LED On time

Sets the time during which IR is turned on. "LED On time" is enabled if you select **[Timed]** in **[Mode]**.

LED max. power

Set the maximum brightness of IR.

LED power control

Select **[Auto]** to control the state of screen saturation due to the presence of proximate objects. If **[Off]** is selected, the screen saturation won't be controlled even if it is saturated.

Note

- If LED is turned on by setting the IR mode to **[On]**, the screen goes into B/W mode. If LED is turned off by setting it to **[Off]**, **[Day/Night]** is activated.
 - If you change zoom magnification while using your infrared rheostat, the rheostat will be linked with the zoom magnification.
 - If the ambient temperature goes up too high, IR LED might be forced to terminate in order to protect the product.
-

Location setup

You can set to display direction information on the camera video.

Set up to eight directions: north, northern east, east, southern east, south, southern west, west, and northern west. Then, every time PTZ is adjusted and the location of camera pan changes, the direction information on the current video screen is updated accordingly.

Note

Changing the OSD size or language setting resets all of the direction setting values (azimuth, description, and location information). You can set the OSD size in **[Video & Audio]>[Camera setup]>[OSD]**, and the language in **[System]>[Product information]**.

Direction indicator

Enable direction indicator

To enable the direction indicator feature, select **[Enable direction indicator]**.

Every direction information set for any of the eight directions are displayed.

[Enable direction indicator] is the option that allows the use of the whole direction display function, whereas **[Indicator]** is the option to set up the display of an individual direction.

Setting up the direction indicator

1. Adjust the camera PTZ as shown below to designate a reference video screen when setting up the camera direction.
If you want to activate the PTZ jog panel, **[Enable direction indicator]** should not be selected.
 -  When you drag the icon with the mouse, the camera moves to the pan and tilt.
 - Use the zoom bar to adjust the image magnification, or select an image magnification by clicking the  icon to zoom in or the  icon to zoom out.
 -  Move the focus nearer by clicking the icon or farther by clicking the  icon.
 - To automatically adjust the camera focus once, click the  icon.
 2. Select **[Enable direction indicator]**.
 3. Select the arrow indicating direction on the camera screen.
 4. To make the direction selected in Step 3 appear on the screen, go to **[Indicator]** and select **[Enable]**.
 5. The details can be set as shown below:
 - To show the azimuth information, go to **[Azimuth]** and select **[Enable]**. Azimuth information such as N, NE, E, SE, S, SW, W or NW is displayed next to the directional arrow.
 - Enter the description of the direction in **[Text]**.
 - Set the location of direction display (directional arrow, azimuth, and text) for **[X]** and **[Y]**, respectively.
 6. To see the set direction display on the video screen, click **[Preview]**. To return to the setup screen, click **[Back]**.
 7. To apply the settings, click the **[Apply]** button at the bottom of the page.
- Whenever the direction of the camera changes due to pan adjustment after direction is set, the direction information on the current video screen is updated accordingly.

Indicator

Determines the individual display of each direction.

Select an arrow on the screen and click **[Enable]** to show the arrow image along with its direction information on the camera screen.

Azimuth

Select **[Enable]** to display azimuth information of the direction.

North is marked as N while northern east, east, southern east, south, southern west, west, and northern west as NE, E, SE, S, SW, W, and NW, respectively.

Click the  (Set North) button to set your desired direction as north.

Text

You can enter description of the direction.

Up to 12 characters are allowed, including English letters (a-z, A-Z), numbers (0-9), spaces, and the following special characters: . # * + - / () _ , .

Note

- You can enter up to 12 characters, which can contain any of the following: a to z, A to Z, 0 to 9, special characters such as . # * + - / () _ , and spaces.
- To change the size, color, and transparency of the text, go to **[Video & Audio]> [Camera setup]> [OSD]**, and change the values of [Size], [Color], and [Transparency].
- Korean or Chinese text typed in under the language preference set to Korean or Chinese will be lost when the language preference is changed.

X/Y

Set the location where the arrow indicating direction displays on the camera video.

The X/Y coordinate values are based on the current camera screen.

Preview

To see the set camera direction information displayed on the camera image, click **[Preview]**. To return to the setting, click **[Back]**.

GPS coordinates

If you select **[Enable]**, you can enter the GPS coordinate values of the camera.

Longitude

You can enter or check the longitude value.

Latitude

You can enter or check the latitude value.

WiseStream

WiseStream effectively reduces data size while maintaining video quality by analyzing the complexity of the video.

WiseStream primarily operates based on motion detection. If there is minimal motion in the camera video, it increases the compression rate to reduce the size of the video data and save bandwidth. When motion is detected again, it reverts to the original state to prevent loss of video data.

If an AI app is installed on the camera, the **[AI-based WiseStream]** option becomes available. [AI-based WiseStream] operates based on the areas for AI object detection. In short, if the size of the area with objects detected is small, it increases the compression rate to reduce the size of the video data and save bandwidth. If the size of the area increases, it reverts to the original state.

Mode

You can choose how much to compress the video with WiseStream.

- **Off:** Does not use the WiseStream feature.
- **Low to High:** Select the degree of bitrate reduction to apply using the WiseStream feature.

Note

- The [WiseStream] feature can be set for camera channels, not by profile.
 - [WiseStream] only works when [Codec] is set to [H.264] or [H.265] and [Bitrate control] is set to [VBR]. You can set the [Codec] and [Bitrate control] options in [Basic] > [Video profile].
 - When the [AI-based WiseStream] option is not used, the occurrence of a screen transition (such as large movements directly in front of the camera) may result in more severe image quality degradation (e.g., block noise) compared to video without [WiseStream] applied.
 - When the [AI-based WiseStream] option is used, areas where objects are not detected may experience relative image quality degradation (e.g., block noise).
-

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 function 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 & MAC filtering

You can allow or deny access for a specific IP and MAC and add IP and MAC addresses to give or block access. IPv4 and IPv6 addresses are managed separately.

Filtering mode

You can choose whether to block or allow access to specific IPs or MAC addresses. If you change the filtering mode, all previously registered IP or MAC addresses will be removed. For example, if you select **[Block]**, register an IP or MAC address, and then select **[Allow]**, all IP or MAC addresses previously registered for access restriction will be removed from the list.

- **Block:** Access is restricted for the registered IP or MAC. Add IP or MAC addresses for which you want to block access.
 - **Allow:** Access is only granted to the registered IP or MAC. Add IP or MAC addresses for which you want to allow access. The IP address (either IPv4 or IPv6) of the device currently accessing the camera is auto-filled, and can be removed if desired.
-

IPv4

You can add or delete IPv4 addresses. Up to 10 IP addresses can be added.

Adding IPv4 addresses

1. Click **[Add]**.
 2. In the **[Add]** dialog, enter the following details:
 - **IP:** Enter the IPv4 address. You can only enter numbers from 0 to 255 and the '.' symbol.
 - **Prefix:** A value that determines the scope of the IP. The prefix ranges from 1 to 32.
 - **Filtering range:** The filtering range is auto-filled based on the provided IP address and prefix.
 3. Click **[OK]**.
- The IPv4 type IP address is registered. Only the IP selected in the **[Use]** column will be activated.

Deleting IPv4 addresses

1. Select an IPv4 address to delete and click **[Delete]**.
 2. In the confirmation dialog, click **[OK]**. Then the IPv4 address will be deleted.
-

IPv6

You can add or delete IPv6 addresses. Up to 10 IP addresses can be added.

Adding IPv6 addresses

1. Click **[Add]**.
2. In the **[Add]** dialog, enter the following details:
 - **IP:** Enter the IPv6 address. You can only enter the hexadecimal number, ranging from 00 to FF and the ':' symbol.

- **Prefix:** A value that determines the scope of the IP. The prefix ranges from 1 to 128.
- **Filtering range:** The filtering range is auto-filled based on the provided IP address and prefix.

3. Click **[OK]**.

The IPv6 type IP address is registered. Only the IP selected in the **[Use]** column will be activated.

Deleting IPv6 addresses

1. Select an IPv6 address to delete and click **[Delete]**.
2. In the confirmation dialog, click **[OK]**. Then the IPv6 address will be deleted.

MAC

You can add or delete MAC addresses. Up to 10 IP addresses can be added.

Adding MAC addresses

1. Click **[Add]**.
2. In the **[Add]** dialog, enter the MAC address in the box. You can enter numbers (0-9), characters (a-f, A-F), and symbols (: , -). The length of a MAC address is 17 characters, and the format would be "XX:XX:XX:XX:XX:XX" or "XX-XX-XX-XX-XX-XX".
3. Click **[OK]**.

The MAC address is registered in a format of "xx:xx:xx:xx:xx:xx". Only the MAC selected in the **[Enable]** column will be activated.

Deleting MAC addresses

1. Select a MAC address to delete and click **[Delete]**.
 2. In the confirmation dialog, click **[OK]**. Then the MAC 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.

CORS policy

CORS (Cross-Origin Resource Sharing) allows web pages to access resources from different origins. By selecting **[Same origin only]** and clicking **[Apply]**, the server will only allow requests coming from the same origin and block requests from different origins. If you select **[Same origin only]**, you need to restart the web service, causing the web page to refresh in the process.

If you select **[Same origin only]** under **[CORS policy]**, the camera may not be compatible with some VMSeS.

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/v2c

To use SNMP v1/v2c, select **[Enable]**.

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 Client 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, 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. If you have a certificate file in PKCS #12 format, select **[PKCS #12]** 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, including English uppercase letters (A-Z), lowercase letters (a-z), numbers (0-9), and special characters (only _-[]), but no spaces.
 - **Certificate file:** Click [...], then select a certificate file. You can only upload a *.p12 or *.pfx extension.

- **PKCS#12 password:** Enter the password to use when decrypting files in p12 or pfx format. If it is entered incorrectly, the file will not be created. Leaving it blank will proceed without a PKCS#12 decryption key.
 - **Private key passphrase:** A password used to encrypt the private key extracted from the PKCS#12 file. If you enter no value and leave it blank, it is generated unencrypted.
5. 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]**.
-

I/O box

An external I/O device can be connected to the camera for use.

In [I/O box] page, the information of I/O box to be connected to the camera can be entered, and the connection status of the I/O box and camera can be checked.

I/O box

The IP type, protocol type, IP address, port number, etc. of an external I/O box to be connected to the camera can be set.

To connect an external I/O box to the camera and use it, select **[Enable]**.

Status

Displays the connection status between the I/O device and camera. If the camera and I/O device is properly connected, [Connected] is displayed; if they are in the process of being connected, [Connecting] is displayed.

IP type

Selects between IPv4 and IPv6 for the IP address type to use when I/O box communicates with the camera.

HTTP/HTTPS

Selects between HTTP and HTTPS for the communication method to use when I/O box communicates with the camera.

IP address

Enter the IP address of the I/O box.

HTTP port/HTTPS port

Enter the port number of the I/O box.

Depending on the value selected for **[HTTP/HTTPS]**, the option name is displayed as either [HTTP port] or [HTTPS port].

ID

Enter the ID to access the I/O device.

Password

Enter the password to access the I/O device.

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]**.
 - **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.
 - **Goto preset:** You can set the position of camera to move to a preset position when an event is created. The camera preset can be set in **[Preset]** tab of **[PTZ]>[PTZ setup]**.
 - **Tracking:** To track the object that triggered the event when the event occurs, select **[Enable]**.
 - **Virtual event trigger:** When the **[PTZ motions]** event occurs, it sends event metadata as if the configured event had occurred. Since no actual event has occurred, no log is recorded. For example, if you select **[Alarm input 1]**, the metadata for the **[Alarm input 1]** event is sent when the **[PTZ motions]** event occurs.
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. 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.

Displays the information of cameras registered as the receiver camera.

Adding a receiver camera

1. Click **[Add]**.
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:** Select the IP address type between IPv4 and IPv6 or select [Domain name] to set the camera information using a domain name.
 - **Type:** Select the mode of communication among HTTP, HTTPS, and TCP.
 - **Server address:** When you select [Domain name] in **[IP type]**, enter the domain name of the camera. You can enter up to 63 characters, including English uppercase (A-Z) and lowercase (a-z), numbers(0-9), and special characters (only.-). However, the first and last characters must be letters or numbers.
 - **IP address:** Enter the IP address of the receiver camera.
 - When you select [IPv4] in **[IP type]**, enter it in the format of four numbers separated by dots, ranging from 0 to 255. (However, addresses between 223.255.255.255 and 255.255.255.255 cannot be set, and addresses ending in 255 cannot be set.)
 - When you select [IPv6] in **[IP type]**, enter an address in the format of eight 16-bit, 4-digit hexadecimal numbers separated by a colon (:), ranging from 0 to ff (hexadecimal). Consecutive zeros can be abbreviated as a double colon (::). (The :: can only be used once in the address).
 - **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]. You must enter at least 1 character and can enter up to 255 characters.
 - **TCP message:** Enter the message to send to the TCP recipient. This can be set only when [TCP] is selected for [Type]. You must enter at least 1 character and can enter up to 255 characters.
 - **Info:** Displays URL complete with the entered information.
 - **CA certificates:** Select a desired certificate from the list of CA certificates installed on the camera. TLS/SSL connection is available only when selecting the CA certificate used to sign the certificate sent from the server. The indicated CA certificate is the one registered in **[Network]>[Certificate management]>[CA certificate]**. This can be set only when [HTTPS] is selected in [Type].
 - **Verification of server certificate:** Selecting **[Enable]** will verify the integrity and authenticity of the certificate sent from the server. A specific CA certificate to use

- for certificate verification can be selected in **[CA certificates]**.
This appears only when [HTTPS] is selected in [Type].
3. Click **[OK]**.

Modifying a receiver camera

1. In the receiving camera list, click the checkbox next to the camera you want to modify to select it.
2. Click the **[Modify]** button.
3. When the **[Add camera]** dialog box appears, modify the options and then click **[OK]**.

Deleting a receiver camera

1. Click a checkbox in the list of receiver cameras, and select the camera you want to delete.
2. Click **[Delete]**, and in the confirmation dialog, click **[OK]**.

Note

- If the type is set to [HTTP], the receiver camera will receive both HTTP and HTTPS. If the type is set to [HTTPS], the receiver camera will only receive HTTPS.
- You cannot set the same preset number, query string, TCP message, etc. for the same IP address.

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 successfully done, the message saying 'Successful' will be displayed

FTP configuration

Protocol

Select a communication protocol used for the transfer of image files when an event occurs. You can choose between the File Transfer Protocol (FTP) and the Secure File Transfer Protocol (SFTP) that is more secure than FTP.

Login type

The login-type option appears when you select **[SFTP]** in **[Protocol]**. You can choose between **[Password]** and **[Key file]** for authentication to access the server. Select **[Password]** to authenticate with your ID and password; select **[Key file]** to authenticate with a key file.

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 `#%&+=W:<>"` 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 `#%&+=W:<>"` are not allowed, and you can enter from 1 to 30 characters.

Private key file

The private-key-file option appears when you select **[SFTP]** in **[Protocol]** and then select **[Key file]** in **[Login type]**.

Click **[Import]** to import a private key file to use for authentication to access the server. In the **[Import private key file]** dialog box, type a name in the **[Key name]** box and click **[...]** to choose a key file to import. If the key file is encrypted, select **[Enable]** in the **[Key passphrase]** area and then type the Key passphrase in the box to decrypt the file. If you close the **[Import private key**

file] dialog box, the key name that you typed in the **[Key name]** box appears in the **[Private key file]** box.

You can delete the registered private key file by clicking **[Delete]**.

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.

File type

Select the file type to be sent to the FTP server when an event occurs.

If **[Image]** is selected, the camera will send the captured image to FTP when an event occurs. At this point, the image file is sent with the information set in [E-mail/FTP profile]. Detailed settings for [E-mail/FTP profile] can be viewed in [Basic]>[Video profile].

If **[Video clip]** is selected, when an event occurs, the video is sent for the set duration determined by **[Pre event duration]** and **[Post event duration]** based on the time of the event occurrence. For example, if [Pre event duration] is set to [1 sec] and [Post event duration] is set to [10 sec], the video of which range includes 1 second before the event and 10 seconds after the event is sent to the FTP server based on the time of the event occurrence. So, if an event occurs at 12:30:10 PM, the video from 12:30:09 PM to 12:30:20 PM will be sent to the FTP server.

File name

You can preset the file name format that will be used for the file transmitted via FTP when an event occurs.

Select **[IP address]** to include the IP address in the file name. If you select **[YY]**, **[MM]**, **[DD]**, **[hh]**, **[mm]**, and **[ss]**, respectively, the file name will include the date of event occurrence, including the year, month, day, hour, minute, and second information. Also, if you select **[Rule index]**, the event rule number will be included in the file name. The channel name is automatically inserted right before the file name extension.

Select **[Enable]** to generate the file name using the format you set when files are transferred via FTP.

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.

Verification of server certificate

Selecting **[Enable]** will verify the integrity and authenticity of the certificate sent from the email server. A specific CA certificate to use for certificate verification can be selected in **[CA certificates]**.

CA certificates

Install the CA certificate to use for email server authentication from the list of CA certificates installed on the camera. To establish a TLS/SSL connection, you must select the CA certificate that was used to sign the certificate sent by the server.

Authentication

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

Encryption

Choose between **[SSL]** and **[StartTLS]** for the SMTP TLS security option. If you don't want to use SMTP TLS security, select **[None]**.

ID

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

Port

Enter the port value of the email SMTP server. The default port value of the email server is 25; the port value will be automatically changed and entered based on the TLS option selected in **[Encryption]** if TLS security is not set for the email SMTP server.

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 [Apply] 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 **[Format]**.
- **NAS:** You can set whether 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 **[Format]**.

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.
- Recording may not be possible due to temporary network disconnection when NAS is used, so it is recommended to use an SD card also.
- 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.
- If you use NAS, auto deletion is supported only when the NAS capacity is above the recommended specifications.
- 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 text box, and enter the same password again in the **[Confirm new password]**.
3. Click **[Apply]** at the bottom of the page.
4. If SD card encryption is working properly, the 'Encrypted' message will appear.

Decrypting SD card

1. Deselect **[Enable]** under **[Encryption]**.
2. Click **[Apply]** at the bottom of the page. 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 you entered do not match, 'Password error' message will appear in the **[Status]** column of **[Storage action setup]**.

1. Click **[Change password]**.
2. Enter the current password in the **[Current password]** text box.
3. Enter the new password in the **[New password]** and **[Confirm new password]** text boxes.
4. Click **[Apply]** at the bottom of the page.

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 **[Test]** 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.

Server address

Enter the NAS IP address or domain name.

You can enter up to 63 characters, including English uppercase (A-Z) and lowercase (a-z), numbers (0-9), and special characters (only~.). However, the first and last characters must be English letters or numbers.

ID

Enter the ID for the account registered on NAS.

You can enter up to 31 characters, including English uppercase (A-Z) and lowercase (a-z), numbers (0-9), and special characters (only_~.).

Password

Enter the password for the account registered on NAS.

You can enter up to 31 characters, including English uppercase (A-Z) and lowercase (a-z), numbers (0-9), and special characters (only~!@^*_~[]/?).

Default folder

Designate the default folder where NAS will record image data.

You can enter up to 31 characters, including English uppercase (A-Z) and lowercase (a-z), numbers (0-9), and special characters (only/_-.). For example, you can use a special character (/) as a directory separator like "Directory1/Directory2".

SMB version

Select the version of the NAS file sharing protocol.

SMB v2.0 or v3.0 shows the capacity allocated to a specific account from the total NAS capacity. However, SMB v1.0 does not support this feature, so v1.0 shows the total NAS capacity, while v2.0 or v3.0 shows only the capacity allocated to the account.

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 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.

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 **[1 min]**, **[30 min]** or **[1 h]**. When you click **[Reset]**, 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.

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.

Verification of server certificate

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

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]**.

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.

Shock detection

Enable shock detection

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

Adjusting the PTZ

You can adjust the pan, tilt, and zoom actions of the camera.

- When you drag the  icon with the mouse, the camera will pan and tilt accordingly.
- By using the zoom bar, you can adjust the video zooming ratio. Or, click the  icon to magnify the screen or click the  icon to reduce the screen.
- Move the focus near by clicking the  icon or move the focus far by clicking the  icon.
- To adjust the camera focus automatically for one shot, click the  icon.

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.

Motion detection

Enable motion detection

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

Type

To set the same motion detection for all presets, select **[Global]**. To set a different motion detection for each PTZ preset, select **[Preset]**.

The **[Preset]** option will be activated only when a preset is set from the [\[Preset setup\]](#) page. If you select **[Preset]** and set motion detection for each preset, you may not be able to set some of the features in the detailed settings.

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.

Adjusting the PTZ

- When you drag the ⊕ icon with the mouse, the camera moves to the pan and tilt.
- Select an image magnification by adjusting the zoom slide bar, or by clicking the ⊕ icon to zoom the screen in or clicking the ⊖ icon to zoom the screen out.
- Move the focus near by clicking the 👤 icon or move the focus far by clicking the ▲ icon.
- To adjust the camera focus automatically for one shot, click the 🔍 icon.

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.
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Tampering detection

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

Tampering detection Enable tampering detection

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

Adjusting the PTZ

- When you drag the  icon with the mouse, the camera moves to the pan and tilt.
- Select an image magnification by adjusting the zoom slide bar, or by clicking the  icon to zoom the screen in or clicking the  icon to zoom the screen out.
- Move the focus near by clicking the  icon or move the focus far by clicking the  icon.
- To adjust the camera focus automatically for one shot, click the  icon.

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 caused by objects in motion or change in brightness.
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WiseAI

Refer to the application help.

Auto tracking

The Auto tracking function is used to recognize and track an object through video analytics. You can set the details for using auto tracking.

When you complete the setting, click the **[Apply]** button at the bottom of the page.

Note

The method of using camera auto tracking is as follows.

- Click the Auto tracking icon  to analyze, select, and track a tracking object from the entire area.
- When you click the right mouse button on the video screen at the [Live] page, the motion will be analyzed based on the clicked area and auto tracking will begin.
- When [Follow-up action] is set to 'Auto tracking' in the [PTZ] > [PTZ setup] > [Preset] > [Preset setup], the camera will move to the relevant preset and the auto tracking function will be executed automatically.

Adjusting the PTZ

You can adjust the pan, tilt, and zoom actions of the camera.

Adjusting the PTZ

- When you drag the  icon with the mouse, the camera will pan and tilt accordingly.
- By using the zoom bar, you can adjust the video zooming ratio. Or, click the  icon to magnify the screen or click the  icon to reduce the screen.
- Move the focus near by clicking the  icon or move the focus far by clicking the  icon.
- To start auto tracking, click the  icon. Click the  icon to stop auto tracking.
- To adjust the camera focus automatically for one shot, click the  icon.

Exclude area

The list of excluded areas from detecting a tracking object is displayed. Up to 8 areas can be set.

Setting an excluded area

1. Set an excluded area by dragging the mouse on the camera image screen.
2. Enter the name of exclude area on the **[Auto tracking]** dialog box and click the **[OK]** button.

Deleting an excluded area

1. Select a number you wish to delete from the list of excluded areas.
2. Click the **[Delete]** button.

Note

- The auto tracking exclude function operates only when **[Auto tracking setup]** > **[Area activation]** is selected.
- An auto tracking excluded area means that it is excluded from the initial object detection areas. If an object under tracking is in an excluded area, it will be tracked continuously. That is, the set areas do not stop the action of tracking when the tracking target enters into those areas.

Enable object auto tracking

Click **[Enable object auto tracking]** to automatically track the movement of selected objects when motion is detected.

Enabling the object auto tracking function

Object auto tracking is a function that automatically tracks the movement of objects when detecting objects. You can set it to detect only specified objects and automatically track them.

1. Select the object type to track movement.
2. Clicking the icon  detects the set object type and automatically tracks the object's movement.
3. Click the auto tracking icon  once more to stop auto tracking.

Configuration

Camera height

Sets the camera height. The auto tracking function operates more precisely if you enter a height closer to the actual installation height of the camera.

Zoom

Selects whether or not to use the zoom operation for auto tracking.

Maintain object size

Set the desired size of tracking target to be maintained on the screen, if zoom is enabled. The size of the auto-tracking object is adjusted in comparison to the size of the overall image screen, and auto tracking is carried out while maintaining the size of the tracking object.

It operates only when **[Enable]** is selected from **[Zoom]**.

Display indicator

Selects whether or not to use an indicator that indicates a tracking object on the image screen.

When **[Enable]** is selected for the indicator display, the indicator is also displayed on the recorded image.

Exclude area

An object detected from the set area is excluded from auto tracking. For how to set an excluded area, refer to '[Setting an excluded area](#)'.

If **[Enable]** is selected, all set excluded areas will be used.

In these areas, detection of any motion won't trigger auto tracking.

Auto release

If the target object is not detected for the set time, auto tracking function will stop. When **[Enable]** is not selected, auto tracking with tracked target search will continue. The time range that can be set is 1 to 60 minutes.

Re-detect missing objects

When a tracked object is lost, Pan/Tilt/Zoom is activated to re-detect the same tracked object for the set time. The time range that can be set is 5 to 60 seconds.

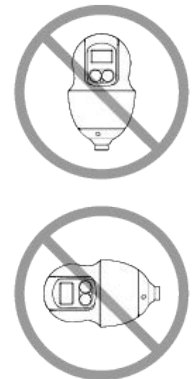
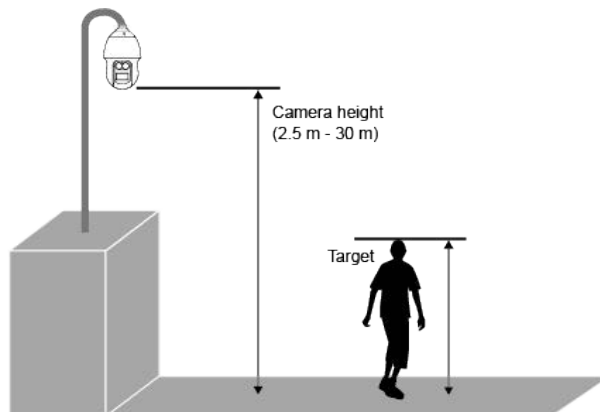
Action after auto tracking

You can set the actions to operate after auto tracking is complete.

- **None:** No action will be operated after auto tracking.
- **Go home:** Moves the camera to its PTZ home position. You can set the home position of the camera in [PTZ] > [PTZ setup].
- **Last position:** Moves the camera to its last PTZ position before auto tracking starts. You can set the camera's last position in [PTZ] > [PTZ setup].
- **Auto run:** Starts the previously set functions. The functions that start automatically can be set in [PTZ] > [PTZ setup] > [Auto run].

Note

- The following conditions are required for the auto tracking function to work.
 - Installation height: Minimum 2.5m and maximum 30m.
 - Installation type: Indoor or outdoor ceiling type with even level without tilt
 - Tracking target: A person (height of about 170cm) walking upright on a flat ground



- In any of the following cases, it is not possible to track a target or malfunction might occur:
 - If there are multiple moving objects in the recording areas,
 - If blocked by another objects in motion or facilities,
 - If the contrast between the moving object and the background is negligible
 - If the object is too small or big
 - If the movement speed is too fast or slow
 - If the moving object passes right under the installed camera
 - If the moving object's path is not a flat ground at the installation height
 - Extreme weather conditions, such as storm, snow, rain, etc.
 - If the recording area is dark
 - If there is a sudden change in light
 - If the light blinks toward the camera or in the recording area
 - If there is a strong amount of light directed toward the camera, such as reflected lights or flashlights
 - If the video is unstable due to the camera shaking
 - If the lens cover or rheostat cover is contaminated or wet
 - If the axis of camera lens changed

Audio detection

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

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]** > [\[Gain\]](#).
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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.

WisePower

You can monitor the power consumption of the camera and set Eco mode.

Note

When Eco mode is enabled, the visible range of the IR is limited to 50%.

If sufficient power consumption data has not been collected, the monitoring value may be displayed as 0 W.

If you set [Period] to [1 day] or [1 week], the minimum required collection time is 15 minutes, and if it is set to [1 month], the minimum required collection time is 60 minutes.

The results of monitoring a camera's power consumption may differ from the actual usage depending on the usage conditions.

Power monitoring

You can select the period for monitoring power. You can choose from [1 day], [1 week], or [1 month].

Only the [Max. power] and [Avg. power] values change according to the selected period, while other values display the current value. For example, if you select [1 day], the maximum value of the power consumption that occurred during the day is displayed in [Max. power], and the average value of the power consumption that occurred during the day is displayed in [Avg. power].

The sampling interval for power consumption is 15 minutes if the period is set to [1 day] or [1 week], and 60 minutes if the period is [1 month].

- **PoE class(PSE):** Displays the PoE class, which categorizes the power supplied by the switch (PSE, Power Sourcing Equipment). This class is based on the power requested by the connected device: Class 3 for 13W, Class 4 for 25.5W, and Class 5 for 40W. This helps the switch provide the correct power to the device.
- **Power requested:** Displays the LLDP value requested by the camera to the switch.
- **Current power:** Displays the current power consumption.
- **Max. power:** Displays the maximum power consumption during the set period by reflecting the power as "0" during the time the camera is off.
- **Avg. power:** Displays the average power consumption during the set period by reflecting the power as "0" during the time the camera is off.

Eco mode

Selecting **[Enable]** can activate the Eco mode and reduce camera power consumption.

Resetting the camera settings will also reset the measured and stored power consumption data.

Limit IR range (up to max. 50%): Selecting **[Enable]** will reduce the maximum visibility distance to 50% by limiting the IR (infrared) range.

Disable heater: If you select **[Enable]**, the heater function will be automatically disabled when the ambient temperature exceeds 0 degrees Celsius. It is strongly recommended for this function to be enabled only when the temperature is above 0°C.

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/downgrade

You can upgrade or downgrade the software of the product in use. To upgrade or downgrade the software, click the **[...]** button. Select the file and click the **[Open]** button. Upgrade/downgrade will start when you click the **[Upgrade]** button. When the upgrade or downgrade is complete, the camera boots and you are automatically disconnected. You need to connect to the web viewer.

Note

- The latest security patches might not be applied if you downgrade the firmware.
- 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>

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.

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.

Auxiliary control

You can control the camera's heater, fan, and wiper operations.

Heater

Window

The window heater prevents fogging and freezing on the camera lens, helping maintain optimal shooting conditions.

Clicking the  icon turns on the heater and turns the icon orange. The heater remains active for 60 minutes before automatically turning off.

If the camera temperature falls below 10°C, the heater turns on automatically. If the camera temperature rises above 15°C, the heater turns off automatically, and manual control becomes available. For 20 minutes after the camera boots up, the window heater is forcibly turned on and cannot be manually turned off during this period. If the user attempts to turn it off during this time, a message appears: "Window heater turns on below a certain temperature; manual control is restricted."

Pan

The pan heater maintains a stable temperature inside the camera to prevent malfunctions caused by humidity.

Clicking the  icon turns on the pan heater and turns the icon orange. The heater remains active for 6 hours before automatically turning off.

If the temperature is below 15°C, the pan heater can only be controlled manually. If the temperature rises above 18°C, the pan heater function turns off automatically and cannot be turned on manually. If the user attempts to force it on when the temperature is above 18°C, a popup message appears: "Pan heater use is restricted above a certain temperature."

Wiper

Wiper

Select **[Enable]** to activate the wiper function.

One time act

 Clicking on the icon will enable the wiper to make one time reciprocating act. Clicking on the icon will enable water to be sprayed for three seconds and then stop automatically. The wiper then operates for about 10 seconds, wiping away any moisture from the lens surface.

Diagnostics

Describes the functions that allow you to check and diagnose the current status and key information of the camera.

Diagnostics

Firmware version

Displays the version information of the firmware currently installed on the camera.

CPU usage

Displays the current usage of the camera's central processing unit(CPU) as a percentage (%).

Power (Watts)

Displays the power (watts) that the camera is currently consuming. The unit is expressed in watts (W).

Cumulative usage time

Displays the total usage time from when the camera was first booted to the present. You can reset the cumulative usage time via SUNAPI CGI.

Continuous operation time

Displays the time when the camera is currently running.

Cloud connection status

Displays the camera's cloud service connection status. When the cloud app is connected, it is displayed as "Connected," and when the cloud app is not connected, it is displayed as "Disconnected."

Profile access

Displays detailed information on the profile that is currently connected to the camera and being streamed. Detailed items consist of **profile**, **bitrate**, **network connection status**, and **IP address**.

Pan motor rotation count

Displays the measurement of the total camera pan motor rotation count. It is calculated as one cycle on a 360-degree rotation basis, and this value is maintained even if the camera is turned off and on.

Tilt motor rotation count

Displays the measurement of the total camera tilt motor rotation count. It is calculated as one cycle on a 360-degree rotation basis, and this value is maintained even if the camera is turned off and on.

Wiper operation count

Displays the total camera wiper operation count. Each time the wiper makes one reciprocating motion, it is counted as one cycle.

Clicking the **[Reset]** button will reset the wiper operation count. The value before reset is maintained even if the camera is turned off and on.

Temperature

Displays the current temperature measured from the temperature sensor mounted outside the camera. When the units Celsius (°C) and Fahrenheit (°F) are selected, the detailed information is displayed on the basis of the appropriate units.

- **Body:** Current temperature of the camera body.
- **Head:** Current temperature of the camera head.
- **Window:** Current temperature of the camera lens cover.

Humidity

Displays the current humidity as a percentage (%) measured by the humidity sensor mounted inside the camera.

- **Body:** Current humidity of the camera body.
- **Head:** Current humidity of the camera head.
- **Window:** Current humidity of the camera lens cover.

Recording status

You can check the status information of the camera's internal storage devices, i.e., SD card and NAS (Network Attached Storage) devices.

Here is the status of each of NAS and SD card.

- NAS
 - **Recording:** Indicates that NAS is currently recording the data.
 - **Ready:** Means that NAS is ready to operate normally and is available for use.
 - **Connected:** Indicates that NAS is successfully connected to the network.
 - **Disconnected:** Indicates that NAS is disconnected from the network.
 - **Failed:** Means that a serious error has occurred in NAS, making normal operation difficult.
 - **Formatting:** Indicates that the NAS's storage is currently being formatted.
 - **Full:** Indicates that the NAS's storage is full and no more data can be stored.
- SD card
 - **Recording:** Indicates that the SD card is currently recording the data.
 - **Ready:** Means that the SD card is ready to operate normally and is available for use.

- **Failed:** Means that a serious error has occurred in the SD card, making normal reading/writing difficult.
- **Formatting:** Indicates that the SD card is currently being formatted.
- **Full:** Indicates that the SD card's storage is full and no more data can be stored.
- **Inserted:** Indicates that the SD card is successfully inserted into the device.
- **Removed:** Indicates that the SD card is removed from the device.
- **Optimized:** Means that the performance or data management of the SD card is optimized.

App status

Displays the status information of the application that is currently installed on the camera and running. You can check the name and current status of each application.

Note

- The [Cumulative usage time], [Pan motor rotation count], [Tilt motor rotation count], and [Wiper operation count] information will not be reset even if a factory reset is proceeded.
 - If there is no profile currently connected to streaming, the [Current users] information may not be displayed.
 - If the application is not installed, the [App status] information is not displayed.
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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.

Remote log transmission

You can send logs remotely. Select **[Enable]** to send camera logs remotely.

IP type

Select the IP address type between IPv4 and IPv6.

Server address

Enter the server address of the remote system to send logs to.

Port

Enter the port information to connect to the remote system.

Type

Select the protocol that the camera uses to communicate with the server.

Format

Select the logging format of the log messages between [RFC3164] and [RFC5424].

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

You can check the information of applications installed on the camera.

Data usage

Displays the memory usage and CPU usage for each application. When you hover over the graph, detailed information appears.

Metadata generation amount

Displays the generation amount per metadata in a circular graph.
The real-time metadata generation amount per app is displayed in a bar chart.
When you hover over the graph, detailed information appears.

App list

You can check the list of applications currently installed. Up to 10 applications can be installed.

- **No.:** Applications are numbered in the order they are installed.
- **Application name:** Displays the name of the application. The name can be up to 59 characters long.
- **Model:** Displays the model name when you use paid apps; displays "-" in case of the free app WiseAI.
- **Version:** Displays the version of the application.
- **Priority:** Displays the priority of the application.
The priority can be set in **[Settings]** of **[Go App]**.
- **Status:** Displays the statuses of the application: "Running" when the application is running; "Stopped" when the application is not running.
CPU usage and metadata generation are shown as graphs. However, the metadata generation amount is only shown for BestShot and metadata.
- **Go App:** Navigates to the screen provided by each application. Click the arrow next to **[Go App]** to check or set the following details.
 - **Info:** Displays the installation date and total running time of the application.
 - **Settings:** Select **[Enable]** in **[Auto start]** to automatically run the application when the camera is turned on and the main task is executed. 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 set in **[Priority]**. If the priorities are the same, the application with higher usage is forcibly terminated.

- **License:** Displays the license information required for app installation when you use paid apps; displays "-" in case of the free app WiseAI.

Installing applications

1. Click the **[Install]** button.
2. In the **[Open]** dialog box, select the application file in cap format and click the **[Open]** button.
3. When the confirmation message appears, click **[Yes]**. The installed application will be added to the [App list].

Deleting applications

1. Select the application to delete from the **[App list]** and click **[Uninstall]**. The uninstalled application will be forcibly terminated.

Note

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