WISENET

NETWORK CAMERA

User Manual

XND-6080/6080V/6080R/6080RV/8080R/8080RV
XNV-6080/6080R/8080R

CE

Network Camera
User Manual

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Disclaimer

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❖ **Design and specifications are subject to change without prior notice.**

❖ **The initial administrator ID is "admin" and the password should be set when logging in for the first time.**
Please change your password every three months to safely protect personal information and to prevent the damage of the information theft.
Please, take note that it's a user's responsibility for the security and any other problems caused by mismanaging a password.

IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean the contaminated area on the product surface with a soft, dry cloth or a damp cloth.
   (Do not use a detergent or cosmetic products that contain alcohol, solvents or surfactants or oil constituents as they may deform or cause damage to the product.)
7. Do not block any ventilation openings, Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/ accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/ apparatus combination to avoid injury from tip-over.



13. Unplug this apparatus during lighting storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. This product is intended to be supplied by a Listed Power Supply Unit marked "Class 2" or "LPS" and rated from 12 Vdc, min.0.56 A. (XND-6080/6080V/6080R/6080RV/8080R/8080RV)
16. This product is intended to be supplied by a Listed Power Supply Unit marked "Class 2" or "LPS" and rated from 24 Vac (50/60 Hz) min.0.67 A or 12 Vdc, min.0.65 A. (XNV-6080/6080R/8080R)
17. If you use excessive force when installing the product, the camera may be damaged and malfunction.
    If you forcibly install the product using non-compliant tools, the product may be damaged.
18. Do not install the product in a place where chemical substances or oil mist exists or may be generated. As edible oils such as soybean oil may damage or warp the product, do not install the product in the kitchen or near the kitchen table.
    This may cause damage to the product.
19. When installing the product, be careful not to allow the surface of the product to be stained with chemical substance.
    Some chemical solvents such as cleaner or adhesives may cause serious damage to the product's surface.
20. If you install/disassemble the product in a manner that has not been recommended, the production functions/ performance may not be guaranteed.
    Install the product by referring to "Installation & connection" in the user manual.
21. Installing or using the product in water can cause serious damage to the product.

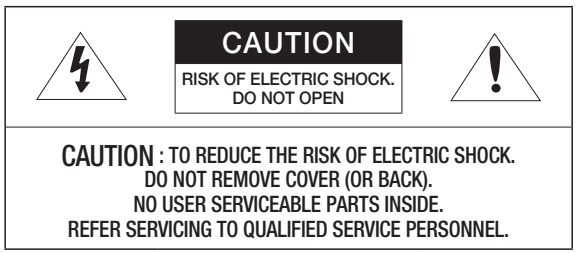
WARNING

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE. DO NOT INSERT ANY METALLIC OBJECT THROUGH THE VENTILATION GRILLS OR OTHER OPENNINGS ON THE EQUIPMENT.

Apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on the apparatus.

To prevent injury, this apparatus must be securely attached to the Wall/ceiling in accordance with the installation instructions.

CAUTION



EXPLANATION OF GRAPHICAL SYMBOLS



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

Class I construction

An apparatus with CLASS I construction shall be connected to a MAINS socket outlet with a protective earthing connection.

Battery

Batteries(battery pack or batteries installed) shall not be exposed to excessive heat such as sunshine, fire or the like.

Disconnection Device

Disconnect the main plug from the apparatus, if it's defected. And please call a repair man in your location.

When used outside of the U.S., it may be used HAR code with fittings of an approved agency is employed.

CAUTION

Risk of explosion if battery is replaced by an incorrect type.
Dispose of used batteries according to the instructions.

These servicing instructions are for use by qualified service personnel only.
To reduce the risk of electric shock do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

The CVBS out terminal of the product is provided for easier installation, and is not recommended for monitoring purposes.

Please use the input power with just one camera and other devices must not be connected.

The ITE is to be connected only to PoE networks without routing to the outside plant.

The wired LAN hub providing power over the Ethernet (PoE) in accordance with IEEE 802-3af shall be a UL Listed device with the output evaluated as a Limited Power Source as defined in UL60950-1.

Unit is intended for installation in a Network Environment 0 as defined in IEC TR 62102. As such, associated Ethernet wiring shall be limited to inside the building.

Please read the following recommended safety precautions carefully.

- Do not place this apparatus on an uneven surface.
- Do not install on a surface where it is exposed to direct sunlight, near heating equipment or heavy cold area.
- Do not place this apparatus near conductive material.
- Do not attempt to service this apparatus yourself.
- Do not place a glass of water on the product.
- Do not install near any magnetic sources.
- Do not block any ventilation openings.
- Do not place heavy items on the product.
- Please wear protective gloves when installing/removing the camera.
  The high temperature of the product surface may cause a burn.

User's Manual is a guidance book for how to use the products.

The meaning of the symbols are shown below.

- Reference : In case of providing information for helping of product's usages
- Notice : If there's any possibility to occur any damages for the goods and human caused by not following the instruction

※ Please read this manual for the safety before using of goods and keep it in the safe place.

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PRODUCT FEATURES

- **Dustproof/Waterproof (IP67, IP66) (XNV-6080/6080R/8080R)**
  The dustproof and waterproof design makes you feel at ease when installing the product outdoors or exposing it to rain.
- **IR mode (XND-6080R/6080RV/8080R/8080RV, XNV-6080R/8080R)**
  If the IR indicator turns on, the product switches to the IR mode for preventing an object from being too bright, which helps you identify the object in near distance.
- **Supports 2M pixel resolution videos (XND-6080/6080V/6080R/6080RV, XNV-6080/6080R)**
- **Supports 5M pixel resolution videos (XNV-8080R, XND-8080R/8080RV)**
- **Multi-Streaming**
  This network camera can display videos in different resolutions and qualities simultaneously using different CODECs.
- **Web Browser-based Monitoring**
  Using the Internet web browser to display the image in a local network environment.
- **Alarm**
  When an event occurs, video is either sent to the email address registered by the user, sent to the FTP server, saved in a Micro SD card or NAS, or a signal is sent to the alert output terminal.
- **Tampering Detection**
  Detects tempering attempts on video monitoring.
- **Defocus detection function**
  Detects the defocus phenomenon of the camera lens.
- **Motion Detection**
  Detects motion from the camera's video input.
- **Audio Detection**
  Detects sound louder than a certain level specified by user.
- **Smart Codec**
  Adaptively applies codecs for a portion of the camera's field of view to improve the quality of such area specified by user.
- **Auto Detection of Disconnected Network**
  Detects network disconnection before triggering an event.
- **Fog detection**
  Detects fog that is heavier than the detection level.
- **Face Detection**
  Detects faces in the specified area from the camera's video input.
- **IVA (Intelligent Video Analysis) function**
  Detects a motion or situation that meets the configured event rules.
- **Sound source classification**
  Detects a sound source specified by the user.
- **ONVIF Compliance**
  This product supports ONVIF Profile S&G.
  For more information, refer to www.onvif.org.

ONVIF
Driving network video through global standardization

RECOMMENDED PC SPECIFICATIONS

- CPU : Intel(R) Core(TM) i7 3.4 GHz or higher
- RAM : 8G or higher
- Supported OS : Windows 7, 8.1, 10, Mac OS X 10.10, 10.11, 10.12
- **Plug-in free web viewer**
  Supported web browsers : Google Chrome, MS Edge, Mozilla Firefox(Windows 64bit only), Apple Safari 10 (Mac OS X only)
- **Plug-in Webviewer**
  Supported web browsers : MS Explorer, Apple Safari 10 (Mac OS X only)

RECOMMENDED MICRO SD/SDHC/SDXC MEMORY CARD SPECIFICATIONS

- Recommended capacity : 16GB to 256GB (MLC type)
- The following types of memory cards from the following manufacturers are recommended for this camera.
  - Manufacturer : SanDisk, Transcend
  - Product family : High endurance

NAS RECOMMENDED SPECS

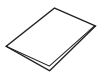
- Recommended capacity : 200GB or higher is recommended.
- Simultaneous access : One unit of NAS can accept a maximum of sixteen camera accesses.
- For this camera, you are recommended to use a NAS with the following manufacturer's specs.

Recommended products	Available sizes
QNAP NAS	A maximum of 16 cameras can access simultaneously.
Synology NAS	A maximum of 16 cameras can access simultaneously.

▪ If you use NAS equipment for purposes other than video saving, the number of accessible cameras may be reduced.

WHAT'S INCLUDED

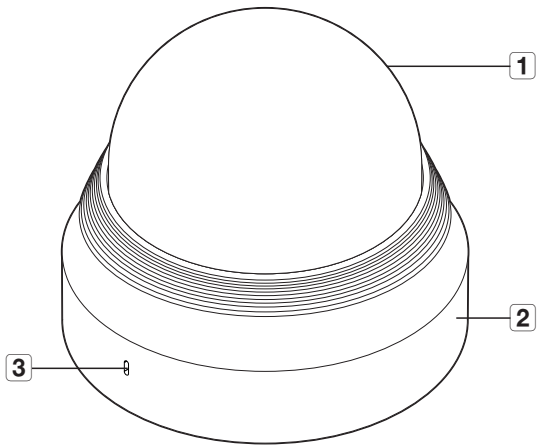
Please check if your camera and accessories are all included in the product package.
(As for each sales country, accessories are not the same.)

Appearance	Item Name	Quantity	Description	Model Name
	Camera	1		XND-6080/ 6080R/8080R
		1		XND-6080V/ 6080RV/8080RV
		1		XNV-6080/ 6080R/8080R
	Quick Guide (Optional)	1		Use for all models
	Warranty card (Optional)	1		Use for all models
	Cable for the testing monitor	1	Used to test the camera connection to a portable display device	Use for all models
	Template	1	Product installation guide	Use for all models
	Power Terminal Block	1	Plugged in the power plug	Use for all models
	Alarm cable	1	Used when connecting to an alarm	XND-6080/6080V/ 6080R/6080RV/ 8080R/8080RV

Appearance	Item Name	Quantity	Description	Model Name
	Tapping Screw	2	Used for installation on the wall or ceiling	XND-6080/6080V/ 6080R/6080RV/ 8080R/8080RV
		3		XNV-6080/ 6080R/8080R
	L Wrench	1	Used to remove and replace the dome cover	XND-6080V/ 6080RV/8080RV/ XNV-6080/ 6080R/8080R
	Power Cable	1	Used to plug into the power port	XNV-6080/ 6080R/8080R
	Audio/alarm cable	1	Used to connect with the audio and alarm port	XNV-6080/ 6080R/8080R
	Cable bush	1	Used to connect the LAN cable with a diameter of Ø7~8.5.	XNV-6080/ 6080R/8080R
	Plastic Anchor	3	For fixing a screw, Inserted in a hole (reinforced anchoring force)	XNV-6080/ 6080R/8080R
	Machine Screws	3	Used for assembling the dome case when installing the product on the pipe, wall mount, etc. or blocking a hole.	XNV-6080/ 6080R/8080R
	Card-type moisture absorbent	1	Attached when installed.	XNV-6080/ 6080R/8080R
Options (not included)				
	Indoor Buried Housing		Housing for installing indoor buried type cameras	Use for all models

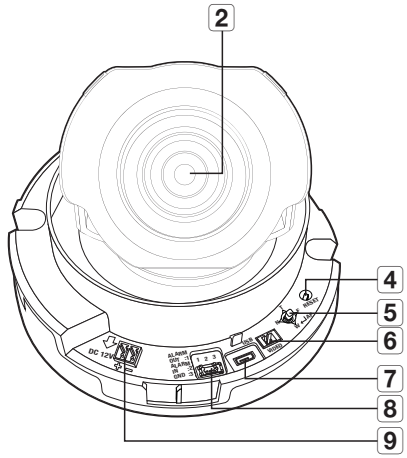
AT A GLANCE (XND-6080/6080R/8080R)

Appearance

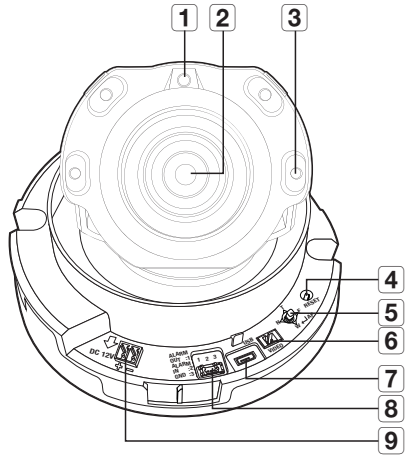


Item	Description
1 Dome cover	Case cover used to protect the lens and the main unit.
2 Camera Case	Housing part that covers the camera body.
3 Microphone hole	Microphone is embedded.

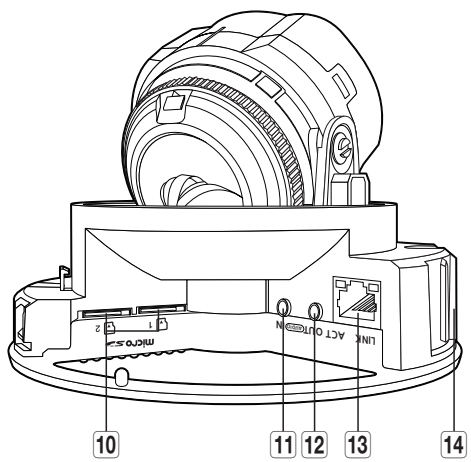
Components

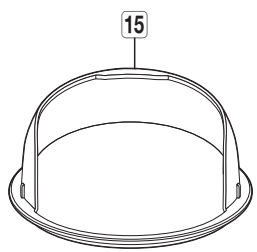


<XND-6080>



<XND-6080R/8080R>



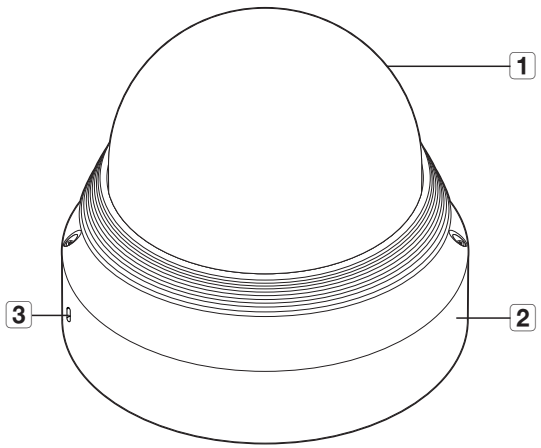


Item	Description	
1 Illumination Sensor	Detects incoming light to control the IR LED.	
2 Lens	Lens for the camera.	
3 IR LED	These infrared LED's are controlled by the illumination sensor.	
4 Reset Button	The button restores all camera settings to the factory default. Press and hold for about 5 seconds to reboot the system. ! If you reset the camera, the network settings will be adjusted so that DHCP can be enabled. If there is no DHCP server in the network, you must run the Device Manager program to change the basic network settings such as IP address, Subnet mask, Gateway, etc., before you can connect to the network.	
5 Zoom/Focus Control Button	T	Zoom in (Tele)
	W	Zoom out (Wide)
	N	Focusing on a near object (Near)
	F	Focusing on a far object (Far)
	Focus Control	Press this button for automatic focus control.
6 Test Monitor Out	Output port for test monitoring the video output. Use the test monitor cable to connect to a mobile display and check the test video.	
7 MICRO USB port	Port to connect the Wi-Fi dongle. You can check the installation video through the applications installed in the smartphone. Refer to "**Connect to WiFi dongle**" on page 21. ■ WiFi dongle and OTG adapter are sold separately.	
8 Alarm I/O Port	ARM-IN	Used to connect the alarm input sensor or external day/night sensor.
	ARM-OUT	Used to connect the alarm output signal.
	GND	These are common ports to connect alarm input/output signals.
9 Power Port	Port for power terminal block.	
10 Micro SD Memory Card Compartment	Compartment for the Micro SD memory card.	
11 Audio In Jack	Used to connect to a microphone.	

Item	Description
12 Audio Out Jack	Used to connect to speakers.
13 Network Port	Used to connect the PoE or Ethernet cable for network connection.
14 Microphone hole	Microphone is embedded.
15 Inside cover	Protective cover for the main body.

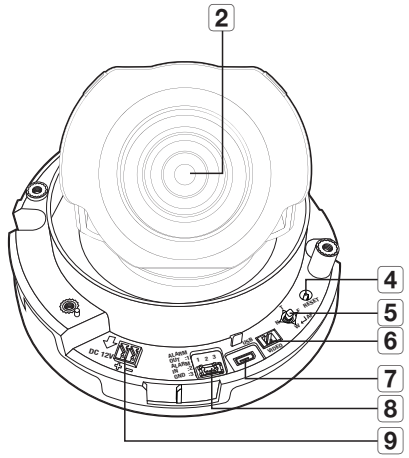
AT A GLANCE (XND-6080V/6080RV/8080RV)

Appearance

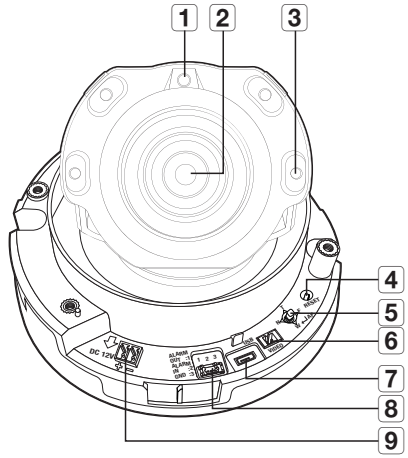


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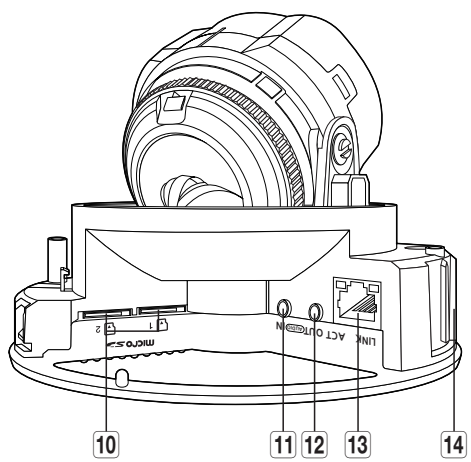
Components

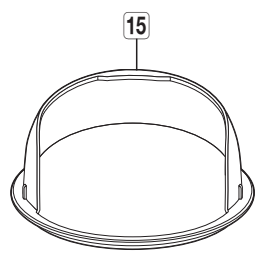


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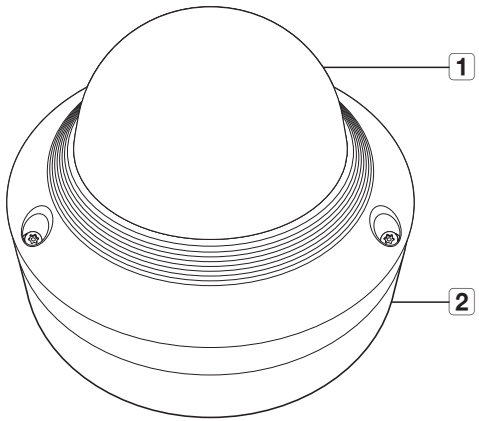


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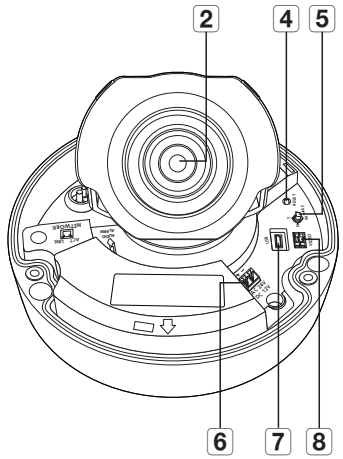
AT A GLANCE (XNV-6080/6080R/8080R)

Appearance

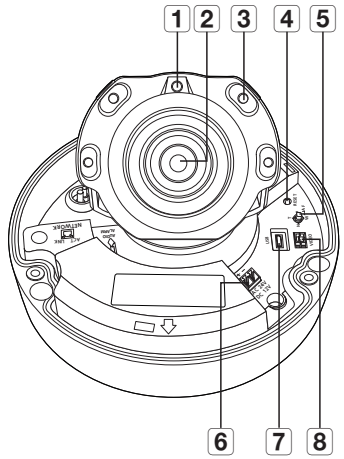


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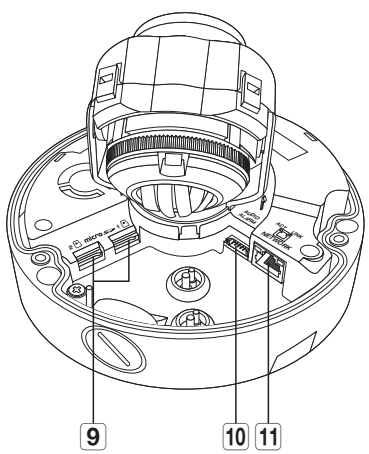
Components



<XNV-6080>



<XNV-6080R/8080R>



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8 Test Monitor Out	Output port for test monitoring the video output. Use the test monitor cable to connect to a mobile display and check the test video.	
9 Micro SD Memory Card Compartment	Compartment for the Micro SD memory card.	
10 Audio and alarm cable port	Plug in the audio and alarm cable to this port to connect with external alarm device/ microphone/speaker.	
11 Network Port	Used to connect the PoE or Ethernet cable for network connection.	

INSTALLATION (XND-6080/6080R/8080R)

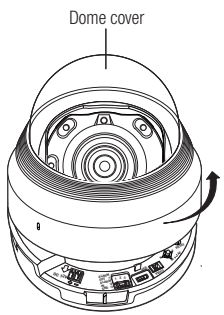
Precautions before installation

Ensure you read out the following instructions before installing the camera:

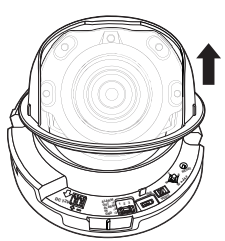
- It must be installed on the area (ceiling or wall) that can withstand 5 times the weight of the camera including the installation bracket.
- Stuck-in or peeled-off cables can cause damage to the product or a fire.
- For safety purposes, keep anyone else away from the installation site. And put aside personal belongings from the site, just in case.

Disassembling

1. Use one hand to hold the camera's bottom part and turn the cover counterclockwise with another hand to separate it.



2. Lift up the inner cover to separate it.

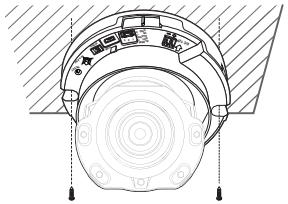


Installation

1. Attach the installation template to the selected area and punch 3 holes as shown in the figure.

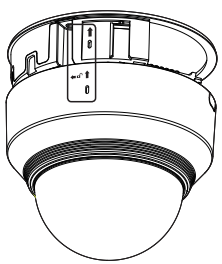


2. Using 2 tapping screws provided, fix the camera at 2 holes drilled with a template.
   - Set the < ⇧ > mark imprinted on the camera to face the direction of camera monitoring.
3. Connect the camera internal terminal with the corresponding cable.
4. Adjust the lens in a desired direction by referring to the "**Adjusting the monitoring direction for the camera**" section. (page 18)

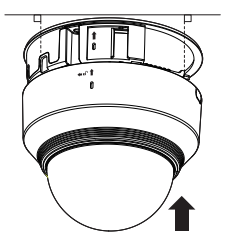


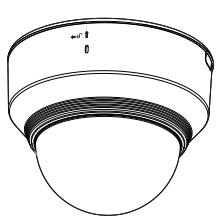
- We recommend you not to touch the lens as the camera lens has been properly focused in the final process of manufacturing. If so, the lens may be out of focus or stained by alien substances.

5. Please connect the inner cover to the main body.
6. While grabbing the bottom side of the camera with your hand, please grab and push its cover with the other hand to align the two arrow signs, as shown in the figure.



- When connecting the dome cover, align the arrows and connect it perpendicularly to the main body.
  If the dome cover is not connected properly, it can result in a distortion of the hood around the lens, causing scattered reflection.
  Secure the dome cover firmly. If the dome cover has not been turned or is not assembled properly, it could cause scattered reflection, or the parts around the lens could move and cause a change in the shooting range.
- Make sure that the dome cover is correctly connected to the bottom part as shown in the figure.
  If the snap-fit is not connected correctly, the dome cover may fall, which may cause injury.





INSTALLATION (XND-6080V/6080RV/8080RV)

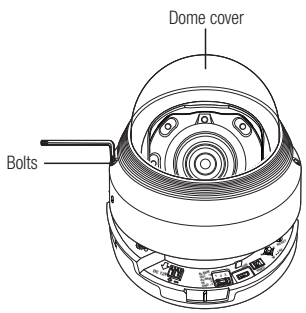
Precautions before installation

Ensure you read out the following instructions before installing the camera:

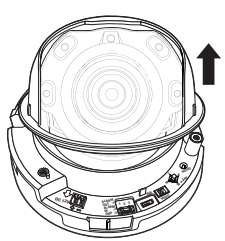
- It must be installed on the area (ceiling or wall) that can withstand 5 times the weight of the camera including the installation bracket.
- Stuck-in or peeled-off cables can cause damage to the product or a fire.
- For safety purposes, keep anyone else away from the installation site. And put aside personal belongings from the site, just in case.

Disassembling

1. Use the hex key in the package to separate the dome cover by unscrewing the three (3) locking bolts of the dome cover, turning them counterclockwise.



2. Lift up the inner cover to separate it.

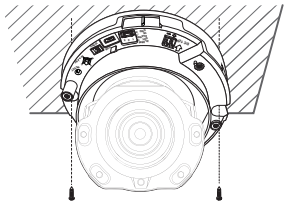


Installation

1. Attach the installation template to the selected area and punch 3 holes as shown in the figure.

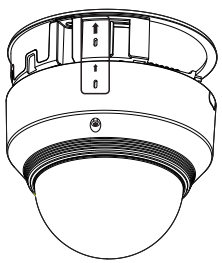


2. Using 2 tapping screws provided, fix the camera at 2 holes drilled with a template.
   - Set the < ⇧ > mark imprinted on the camera to face the direction of camera monitoring.
3. Connect the camera internal terminal with the corresponding cable.
4. Adjust the lens in a desired direction by referring to the "**Adjusting the monitoring direction for the camera**" section. (page 18)

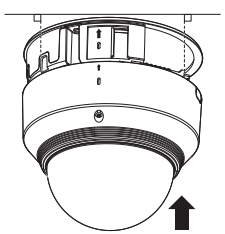


- We recommend you not to touch the lens as the camera lens has been properly focused in the final process of manufacturing. If so, the lens may be out of focus or stained by alien substances.

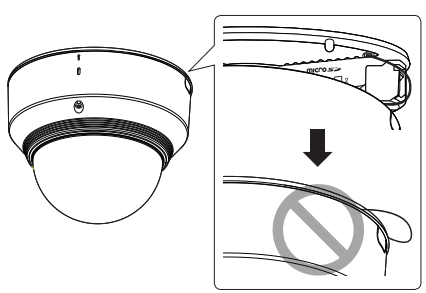
5. Please connect the inner cover to the main body.
6. Grab the bottom part of the camera with one hand and the cover with the other hand, align the arrows and assemble them using the hex key.

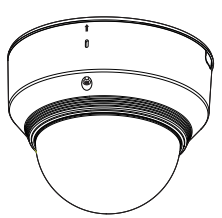


- When connecting the dome cover, align the arrows and connect it perpendicularly to the main body.
  If the dome cover is not connected properly, it can result in a distortion of the hood around the lens, causing scattered reflection.
  Make sure that the dome cover is connected firmly to the other part. If the dome cover is not correctly connected to the bottom of the main body, scattered reflection might occur.
- Make sure that the dome cover is correctly connected to the bottom part as shown in the figure.
  If the snap-fit is not connected correctly, the dome cover may fall, which may cause injury.



- When assembling the dome cover to the camera, make sure not to let the safety wire get stuck between the dome cover and the camera. This will cause IR scattered reflection.





INSTALLATION (XNV-6080/6080R/8080R)

- This camera is waterproof and in compliance with the IP66 spec, but the jack connected to the external cable is not. You are recommended to install this product below the edge of eaves to prevent the cable from being externally exposed.

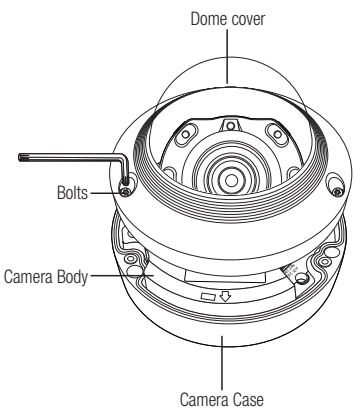
Precautions before installation

Ensure you read out the following instructions before installing the camera:

- It must be installed on the area (ceiling or wall) that can withstand 5 times the weight of the camera including the installation bracket.
- Stuck-in or peeled-off cables can cause damage to the product or a fire.
- For safety purposes, keep anyone else away from the installation site. And put aside personal belongings from the site, just in case.

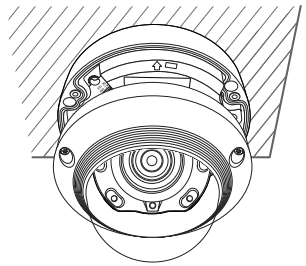
Disassembling

1. Using the L wrench provided, turn the 3 fastening bolts on the dome cover counter clockwise to remove the cover.



Installation

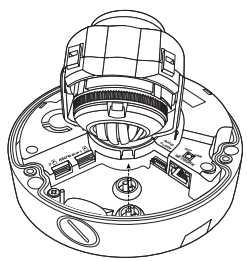
1. Drill a hole (diameter : 6mm, depth : min 55mm) of the case bottom and insert the provided plastic anchor to the end.
2. Fit the bottom hole to the anchor hole and insert and fix the taping screw (M4.5xL50).
3. Connect and arrange the necessary cables lest that they should be damaged or twisted while installing the camera.
4. Adjust the lens in a desired direction by referring to the "**Adjusting the monitoring direction for the camera**" section. (page 18)
5. Close the dome cover.
   - Securely fasten the fastening bolt using an L wrench to prevent water from leaking.



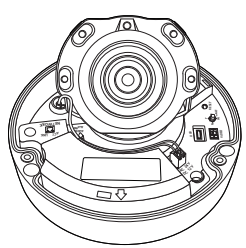
Connecting waterproof power cable and LAN cable

1. Remove the dome cover and the case.
2. Pull out the long projected part of the rubber plug on the bottom and remove it as shown in the figure.

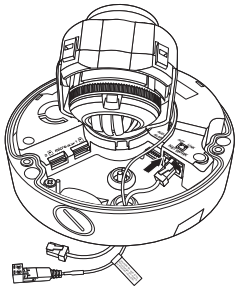
- Use an appropriate cable bush for the LAN cable to be connected.
  - Basic camera : Use the cable with a diameter of Ø5~6.5.
  - Components provided : Use the cable with a diameter of Ø7~8.5.



3. Insert the power cable into the small hole made by removing the projected part of the rubber plug in step 2 above, and lay the cable along the long groove.
4. Connect the power cable with the power terminal block.

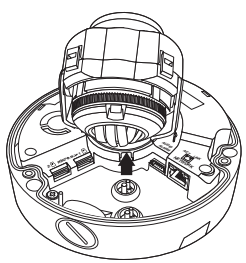


5. Insert the LAN cable into the large hole made by removing the projected part of the rubber plug in step 2 above.
6. Remove the sheath with a cable cutter, and align the cables.
7. Connect the LAN cable with a LAN connector, and insert it into the LAN tool.
8. Connect the finished cable to the Ethernet port.

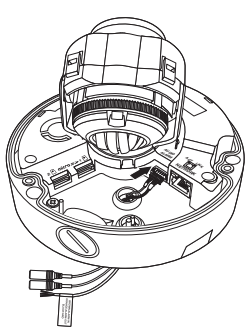


Connecting the alarm and audio cable

1. Remove the dome cover and the case.
2. Pull out the rubber plug on the bottom as shown in the figure.



3. Insert the alarm/audio cable through the hole created by removing the rubber cap in No. 2, and connect the cable to the alarm terminal.
4. Align the cable so that it should not be damaged or jammed when installing the camera.
5. Put the rubber cap located on the alarm/audio cable in the hole.
6. Adjust the lens in a desired direction by referring to the "**Adjusting the monitoring direction for the camera**" section. (page 18)
7. Attach the dome cover.



Attaching to the unbundled adapter

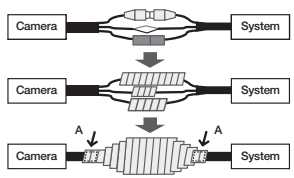
Choose and purchase a necessary one of the following options (unbundled) that is suitable to the installation site or for your convenience.

1. Remove the dome cover from the case by referring to the "**Disassembling**" section. (page 16)
2. Use the provided machine screw to fix the camera case to the unbundled adapter.
3. Connect and arrange the necessary cables lest that they should be damaged or twisted while installing the camera.
4. Install the camera body in the reverse order of "**Disassembling**".
5. Adjust the lens in a desired direction by referring to the "**Adjusting the monitoring direction for the camera**" section. (page 18)
6. Close the dome cover.
   - Securely fasten the fastening bolt using an L wrench to prevent water from leaking.

Outdoor installation

When you install it outside of the building, please waterproof it with waterproof butyl rubber tape (can be purchased in stores) so that water does not leak from the gap of the cable connected to the outside.

1. Connect the power, I/O, BNC, and LAN cables.
2. Wrap the black cable jacket (Area A) and the cable connection area with waterproof (butyl rubber) tape so that more than half of the butyl rubber tape is overlapped.

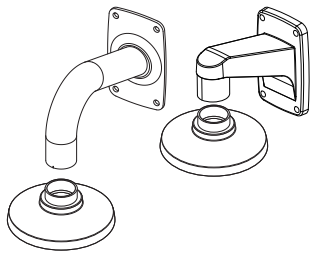


- If the cable jacket is not waterproofed properly, then it can directly cause leakage. Make sure to protect the cable with a dense layer of taping.
- Waterproof butyl tape is made of butyl rubber that can be stretched to twice its normal length.

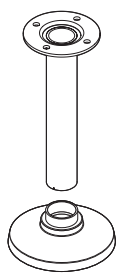
Optional Accessories for Installation

For your easier installation, you can purchase appropriate optional accessories available.

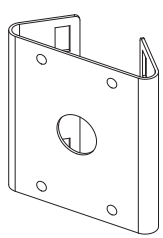
1. WALL MOUNT ADAPTOR(SBP-300WM or SBP-300WM1)/ HANGING MOUNT(XND-6080/6080V/6080R/6080RV/8080R/ 8080RV : SBP-300HM8, XNV-6080/6080R/8080R : SBP-300HM6)
   This adaptor is used when installing the dome camera onto a wall.



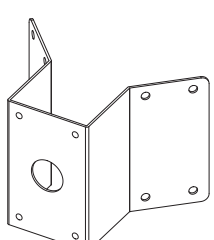
2. CEILING MOUNT ADAPTOR(SBP-300CM)/HANGING MOUNT(XND-6080/6080V/6080R/6080RV/8080R/8080RV : SBP-300HM8, XNV-6080/6080R/8080R : SBP-300HM6)
   This adaptor is used when installing the dome camera on a concrete ceiling.



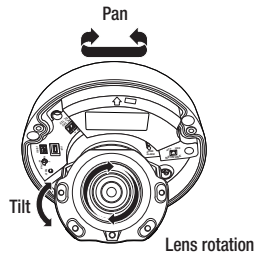
3. POLE MOUNT ADAPTOR(SBP-300PM)
   This is an adaptor for WALL MOUNT ADAPTOR (SBP-300WM or SBP-300WM1) installation on a pole whose diameter is bigger than 80mm.



4. CORNER MOUNT ADAPTOR (SBP-300KM)
   This is an adaptor for WALL MOUNT ADAPTOR (SBP-300WM or SBP-300WM1) installation on the corner of wall joint.



Adjusting the monitoring direction for the camera



▪ Adjusting the monitoring direction

You can adjust the camera direction only when the camera is fixed on the ceiling.
Where, rotating the camera unit to the left or right is called Pan, adjusting the tilt is called Tilt, and turning the lens on its axis is called Rotation.

- The effective range of pan is a total of 354 degrees.
- The effective range of rotation is a total of 355 degrees.
- The effective range of tilt is a total of 67 degrees.

▪ The image can be covered up by the camera case depending on the angle.

▪ Do not forcefully turn the focus/zoom lens after the dome case is disassembled. Otherwise, it may cause an incorrect focus due to a motor failure.

▪ Methods of adjustment

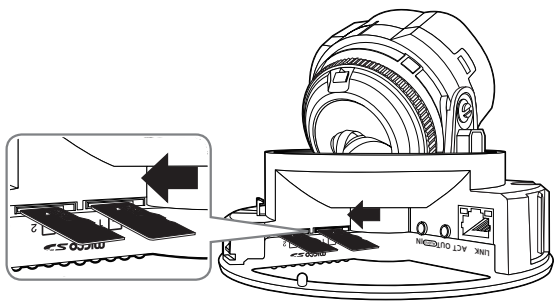
1. After installing the camera, adjust the panning angle in consideration of the monitoring direction.
2. Set the horizontal angle so that the image is not reversed.
3. Adjust the tilt angle so that the camera faces toward the monitoring object.

INSERTING/REMOVING A MICRO SD MEMORY CARD

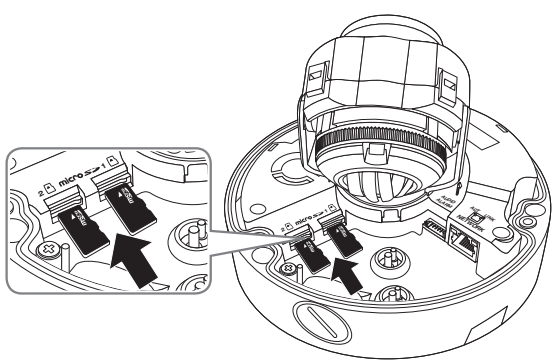
- Disconnect the power cable from the camera before inserting the Micro SD memory card.
- Do not insert the Micro SD memory card while it's upside down by force.
  Otherwise, it may damage the Micro SD memory card.
- When it rains or the humidity is high, insertion or ejection of a Micro SD card is not recommended.
- Disassembly of the product cover should be finished within 5 minutes, or there will be the risk of internal dew condensation.

Inserting a Micro SD Memory Card

1. Separate the Dome cover of the camera.
2. Insert a Micro SD card in the arrow direction shown in the figure.



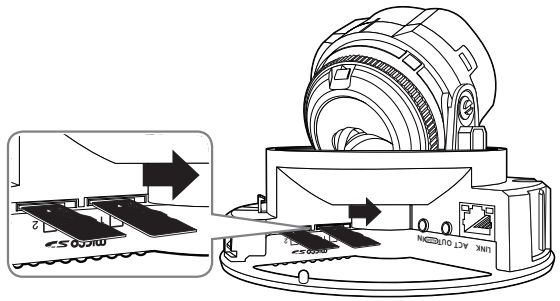
<XND-6080/6080V/6080R/6080RV/8080R/8080RV>



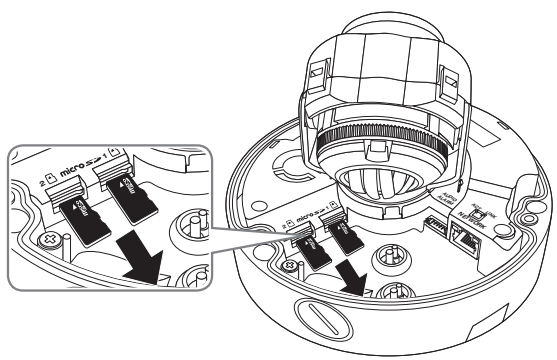
<XNV-6080/6080R/8080R>

Removing a Micro SD Memory Card

Gently press down on the exposed end of the memory card as shown in the diagram to eject the memory card from the slot.



<XND-6080/6080V/6080R/6080RV/8080R/8080RV>



<XNV-6080/6080R/8080R>

- Pressing too hard on the Micro SD memory card can cause the card to shoot out uncontrollably from the slot when released.
- Before removing the Micro SD memory card, in <**Storage**>, set the device to <**Off**> and press the [**Apply**] button and turn the camera off. (Page 52)
- If you turn off the camera or remove the Micro SD memory card that contains data from the product, the data may be lost or damaged.

MEMORY CARD INFORMATION (NOT INCLUDED)

What is a memory card?

The memory card is an external data storage device that has been developed to offer an entirely new way to record and share video, audio, and text data using digital devices.

Selecting a memory card that's suitable for you

Your camera supports Micro SD/SDHC/SDXC memory cards.
You may, however, experience compatibility issues depending on the model and make of the memory card.

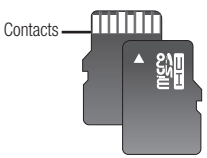
The following types of memory cards from the following manufacturers are recommended for this camera.

- Manufacturer : SanDisk, Transcend
- Product family : High endurance

It is recommended to use a 16GB to 256GB (MLC type) memory card for this camera.

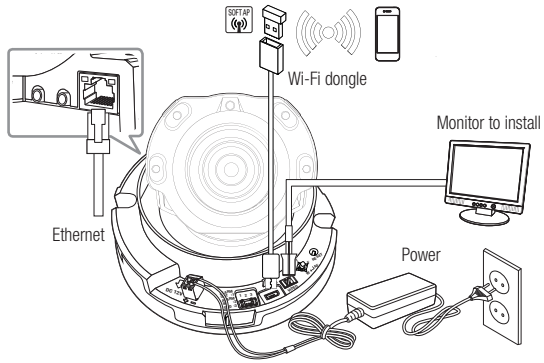
Playback performance can be affected depending on the speed of memory card.

Memory Card Components

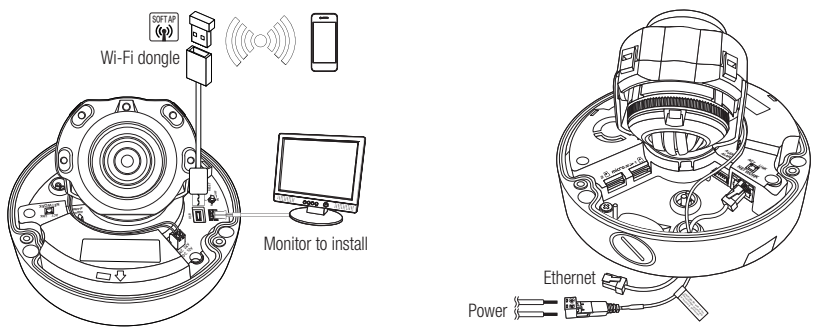


Micro SD/SDHC/SDXC

CONNECTING WITH OTHER DEVICE



<XND-6080/6080V/6080R/6080RV/8080R/8080RV>



<XNV-6080/6080R/8080R>

- The CVBS out terminal of the product is provided for easier installation, and is not recommended for monitoring purposes.
- The Micro USB out terminal of the product is provided for easier installation, and is not recommended for monitoring purposes.

Ethernet Connection

Connect the Ethernet cable to the local network or to the Internet.

Connecting Wi-Fi

Camera Setup

1. Connect OTG adapter (5-pin) and WiFi dongle to the micro USB terminal.

Smartphone Setup

1. Install the Wisenet Installation application.
2. Select the camera SSID after turning on the WiFi.
3. Run the Wisenet Installation application.
4. When you log in to the camera, the video will be connected. (initial password: 4321)
   - The video will be played without being logged in during the initial connection.
5. You can adjust angle of view while watching the video through smartphone.

Recommended dongle manufacturer

Manufacturer	Model
NETIS	WF2123 n300
EDIMAX	EW-7811Un
IP Time	N100mini
TP-LINK	TL-WN823N V1
ASUS	USB-N13
NETGEAR	WNA3100M

Power Supply (XND-6080/6080V/6080R/6080RV/8080R/8080RV)

Use the screwdriver to connect each line (+, –) of the power cable to the corresponding power port of the camera.

- If both PoE and DC 12V are applied simultaneously, the product will be supplied with power from DC 12V.
  - You can also use a router featuring PoE to supply power to the camera.
  - Use PoE that is compliant with the IEEE 802.3af protocols.
  - It is advisable to use only one power source from PoE and DC 12V.
- Be careful not to reverse the polarity when you connect the power cable.
- If you want to connect an external device, you must turn off the external device before proceeding.
- Connect the set and the adapter power line first, and then connect the power cable to the outlet on the wall.

Power Supply (XNV-6080/6080R/8080R)

Use the screwdriver to connect each line (+, –) of the power cable to the corresponding power port of the camera.

- When supplying PoE and DC 12V or PoE and AC 24V power at the same time, the equipment is powered by the external source (AC 24V, DC 12V).
  - You can also use a router featuring PoE to supply power to the camera.
  - Use PoE that is compliant with the IEEE 802.3af protocols.
  - It is recommended to use a single source for powering the equipment among PoE, DC 12V and AC 24V.
- Be careful not to reverse the polarity when you connect the power cable.
- AC 24V can be connected in non-polar union.
- If you want to connect an external device, you must turn off the external device before proceeding.
- Connect the set and the adapter power line first, and then connect the power cable to the outlet on the wall.

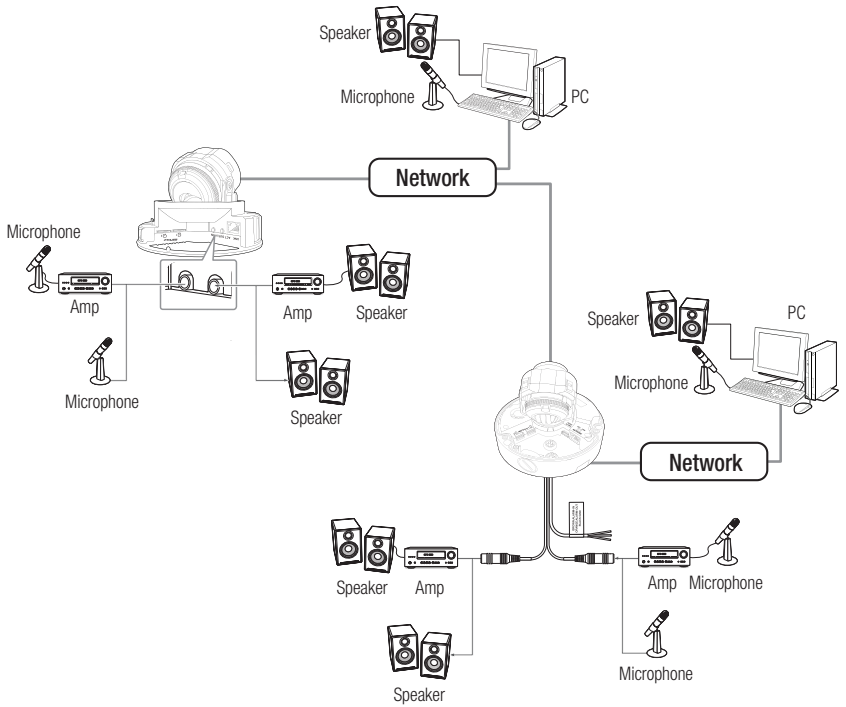
Power Cable Specification for Each Model

Model	Input power	Wire Type (AWG)	Cable Length (Max.)
XND-6080/6080V	DC 12V	#22	15m
		#20	24m
XND-6080R/8080R/ 6080RV/8080RV	DC 12V	#20	17m
		#18	27m
XNV-6080	DC 12V	#22	15m
		#20	24m
	AC 24V	#22	25m
		#20	40m
XNV-6080R/8080R	DC 12V	#18	19m
		#16	30m
	AC 24V	#20	26m
		#18	40m

Network Cable Specification

Item	Contents	Remark
Connector	RJ45 (10/100/1000BASE-T)	
Ethernet	10/100/1000BASE-T	To operate with 1000BASE-T, a cable of UTP-6 or higher should be used for the Giga hub.
Cable	Category 6	
Max Distance	100M	
PoE Support	IEEE 802.3af	

Connecting to Audio Input/Output



1. Connect the AUDIO IN port of the camera with the microphone or LINE OUT port of the amplifier that the microphone is connected to.

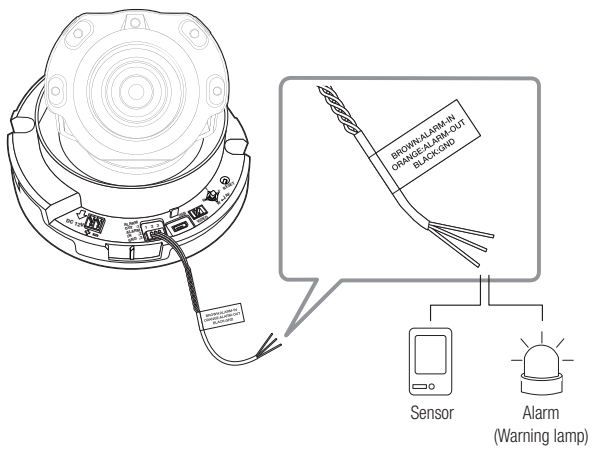
   ▪ You can use the built-in microphone in the camera without connecting an external microphone. (only available in XND-6080/6080V/6080R/6080RV/8080R/8080RV)

2. Connect the AUDIO OUT port of the camera with the speaker or LINE IN port of the amplifier that the speaker is connected to.
3. Check the specifications for audio input.

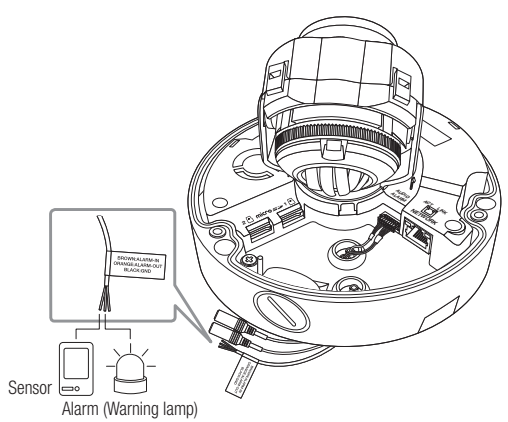
- **Audio Codec**
  - Audio In : G.711 PCM (Bit Rate: 64kbps / Sampling Frequency: 8kHz), G.726 ADPCM (Bit Rate: 16Kbps, 24Kbps, 32Kbps, 40Kbps / Sampling Frequency: 8kHz), AAC (Bit Rate: 48Kbps / Sampling Frequency: 16kHz)
  - Audio Out : G.711 PCM (Bit Rate: 64kbps / Sampling Frequency: 8kHz)
- **Full duplex Audio**
- **Audio in (XND-6080/6080V/6080R/6080RV/8080R/8080RV)** : Selectable (microphone/Line-in/Built-in microphone), Supported voltage: 2.5VDC (4mA), Input impedance: 2K Ohm
- **Audio in (XNV-6080/6080R/8080R)** : Selectable (microphone/Line-in), Supported voltage: 2.5VDC (4mA), Input impedance: 2K Ohm
- **Audio out** : Line-out (3.5mm mono jack), Maximum output: 1Vms
- **Line out impedance** : 600Ω

Connecting to the I/O port box

Connect the Alarm I/O cable to the corresponding port of the port box.



<XND-6080/6080V/6080R/6080RV/8080R/8080RV>



<XNV-6080/6080R/8080R>

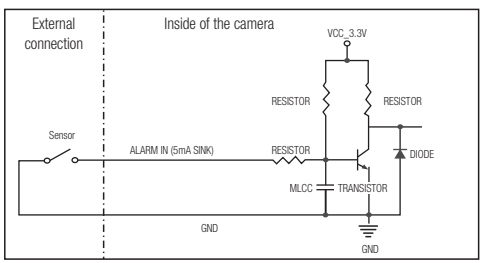
- ALARM-IN : Used to connect the alarm input sensor or external day/night sensor.
- ALARM-OUT : Used to connect the alarm output signal.
- GND : Common port for alarm in/output signal.

▪ If devices (e.g., flashing light and siren) that exceed the voltage and current specifications are connected by using the open collector method, it may cause malfunction.
Refer to the "**Alarm Out Wiring Diagram**" when connecting devices that exceed the voltage and current specifications. (page 23)

To connect the external sensor

Connect one strand of each signal line (2-strand) of the sensors to the [**ALARM IN**] port, and connect the other strand to the [**GND**] port.

Alarm In Wiring Diagram

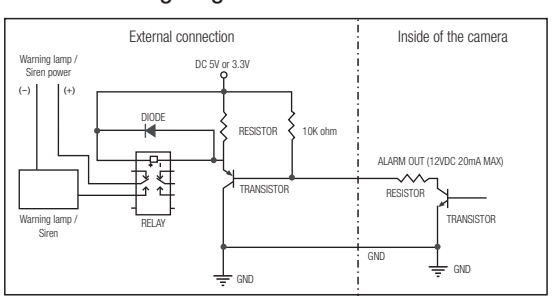


To connect the alarm out

If devices (e.g., flashing light and siren) that exceed the voltage and current specifications are connected by using the open collector method, it may cause malfunction.

Refer to the alarm out connection diagram below when connecting devices that exceed the voltage and current specifications.

Alarm Out Wiring Diagram

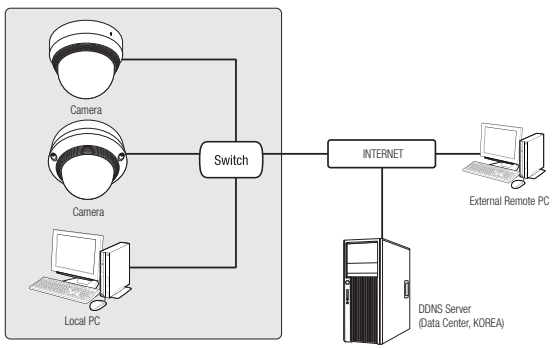


You can set up the network settings according to your network configurations.

CONNECTING THE CAMERA DIRECTLY TO LOCAL AREA NETWORKING

Connecting to the camera from a local PC in the LAN

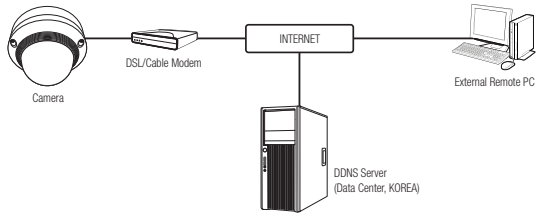
1. Launch an Internet browser on the local PC.
2. Enter the IP address of the camera in the address bar of the browser.



<Local Network>

- A remote PC in an external Internet out of the LAN network may not be able to connect to the camera installed in the intranet if the port-forwarding is not properly set or a firewall is set.
  In this case, to resolve the problem, contact your network administrator.
- In the Device Manager, you can use the initial password, "**4321**" to set IP Address, Subnet Mask, Gateway, HTTP Port, VNP Port, IP type. After changing the network interface, for better security, access the web viewer and change the password.
- By factory default, the IP address will be assigned from the DHCP server automatically.
  If there is no DHCP server available, the IP address will be set to 192.168.1.100.
  To change the IP address, use the Device Manager.
  For further details on Device Manager use, refer to "**Using Device Manager**". (Page 26)

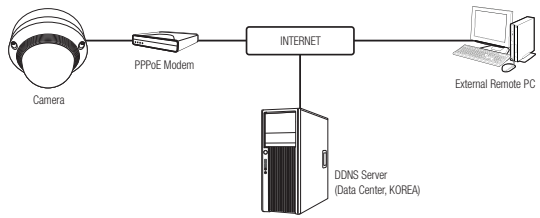
CONNECTING THE CAMERA DIRECTLY TO A DHCP BASED DSL/CABLE MODEM



1. Connect the user PC directly with the network camera.
2. Run the Device Manager and change the IP address of the camera so that you can use the web browser on your desktop to connect to the Internet.
3. Use the Internet browser to connect to the web viewer.
4. Move to [**Setup**] page.
5. Move to [**Network**] – [**DDNS**] and configure the DDNS settings.
6. Move to [**Basic**] – [**IP & Port**], and set the IP type to [**DHCP**].
7. Connect the camera, which was removed from your PC, directly to the modem.
8. Restart the camera.

- For configuring the DDNS settings, refer to "**DDNS**". (page 48)
- For registering the DDNS settings, refer to "**Registering with DDNS**". (page 48)
- Refer to "**IP & Port**" for how to setup IP. (page 40)

CONNECTING THE CAMERA DIRECTLY TO A PPPoE MODEM

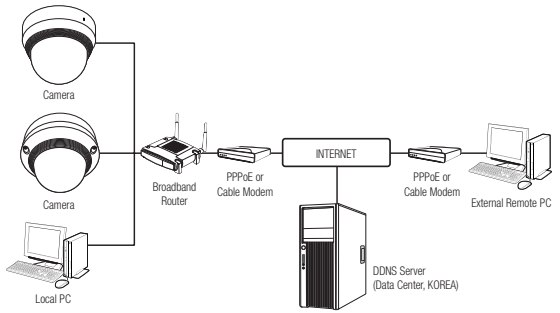


1. Connect the user PC directly with the network camera.
2. Run the Device Manager and change the IP address of the camera so that you can use the web browser on your desktop to connect to the Internet.
3. Use the Internet browser to connect to the web viewer.
4. Move to [**Setup**] page.
5. Move to [**Network**] – [**DDNS**] and configure the DDNS settings.
6. Move to [**Basic**] – [**IP & Port**] Setup Page, set the IP type to [**PPPoE**], and enter the network service's ID and password.
7. Connect the camera, which was removed from your PC, directly to the modem.
8. Restart the camera.

- For configuring the DDNS settings, refer to "**DDNS**". (page 48)
- For registering the DDNS settings, refer to "**Registering with DDNS**". (page 48)
- Refer to "**IP & Port**" for how to setup IP. (page 40)

CONNECTING THE CAMERA TO A BROADBAND ROUTER WITH THE PPPoE/CABLE MODEM

This is for a small network environment such as homes, SOHO and ordinary shops.



Configuring the network settings of the local PC connected to a Broadband Router

Configuring the network settings of the local PC connected to a Broadband Router, follow the instructions below.

- Select : <**Network**> → <**Properties**> → <**Local Area Connection**> → <**General**> → <**Properties**> → <**Internet Protocol (TCP/IP)**> → <**Properties**> → <**Obtain an IP address automatically**> or <**Use the following IP address**>.
- Follow the instructions below if you select <**Use the following IP address**>:

ex1) If the address (LAN IP) of the Broadband Router is 192.168.1.1
IP address : 192.168.1.100
Subnet Mask : 255.255.255.0
Default Gateway : 192.168.1.1

ex2) If the address (LAN IP) of the Broadband Router is 192.168.0.1
IP address : 192.168.0.100
Subnet Mask : 255.255.255.0
Default Gateway : 192.168.0.1

ex3) If the address (LAN IP) of the Broadband Router is 192.168.xxx.1
IP address : 192.168.xxx.100
Subnet Mask : 255.255.255.0
Default Gateway : 192.168.xxx.1

- For the address of the Broadband Router, refer to the product's documentation.
- For more information about port forwarding of the broadband router, refer to "**Port Range Forward (Port Mapping) Setup**". (Page 28)

USING DEVICE MANAGER

- Device manager program can be downloaded from <**Technical Guides**>-<**Online Tool**> menu at Hanwha Techwin website (http://www.hanwha-security.com).
- More instructions of Device Manager can be found at <**Help**> menu of the main page.

AUTOMATICALLY SEARCHING CAMERA

If a camera is connected to the same network of the PC where device manager is installed, you can find network camera by using search function.

1. Click <**Search**> at the main page of device manager.
2. Check the camera from the list.
   - Check MAC address at the sticker attached to the camera.

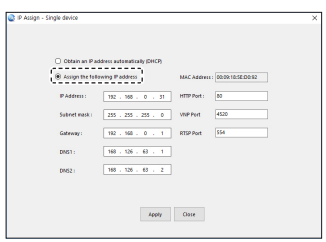
CONFIGURING IP ADDRESS

If you want to change camera network setting, <**Login OK**> sign must be displayed at <**Status**>. Click <**Authentication**> at the main page to log in.

Configuring Static IP

Manually insert and configure IP address & port information.

1. Click the camera from the list that you want the change the IP setting.
2. Click <**IP Assign**> at the main page of device manager.
3. Select <**Assign the following IP address**>.
   - IP information of the camera will be displayed as previously set.
4. Fill in IP & Port related categories.



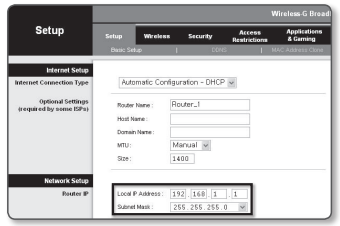
If not using a Broadband Router

For setting <**IP Address**>, <**Subnet Mask**>, and <**Gateway**>, contact your network administrator.

- HTTP Port : Used to access the camera using the Internet browser, defaulted to 80.
- VNP Port : Used to control the video signal transfer, defaulted to 4520.
- RTSP Port: A port that controls real-time streaming. The initial value is 554.

If using a Broadband Router

- IP Address : Enter an address falling in the IP range provided by the Broadband Router.
  ex) 192.168.1.2~254, 192.168.0.2~254,
  192.168.XXX.2~254
- Subnet Mask : The <**Subnet Mask**> of the Broadband Router will be the <**Subnet Mask**> of the camera.
- Gateway : The <**Local IP Address**> of the Broadband Router will be the <**Gateway**> of the camera.



- The settings may differ depending on the connected Broadband Router model. For more information, refer to the user manual of the applicable router.
- For more information about port forwarding of the broadband router, refer to "**Port Range Forward (Port Mapping) Setup**". (Page 28)

If the Broadband Router has more than one camera connected

Configure the IP related settings and the Port related settings distinctly with each other.

ex)

Category		Camera #1	Camera #2
IP related settings	IP Address Subnet Mask Gateway	192.168.1.100 255.255.255.0 192.168.1.1	192.168.1.101 255.255.255.0 192.168.1.1
Port related settings	HTTP Port VNP Port RTSP Port	8080 4520 554	8081 4521 555

- If the <**HTTP Port**> is set other than 80, you must provide the <**Port**> number in the address bar of the Internet browser before you can access the camera.
  ex) http://IP address : HTTP Port
  http://192.168.1.100:8080

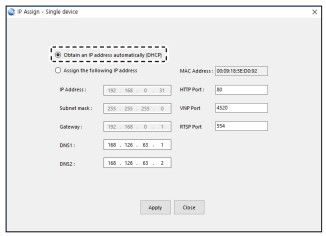
5. Click [**Apply**] Button.
6. If the success message is displayed, click [**OK**].

Configuring Dynamic IP

Receive IP address from DHCP

- Example of the Dynamic IP environment
  - If a Broadband Router, with cameras connected, is assigned an IP address by the DHCP server
  - If connecting the camera directly to modem using the DHCP protocols
  - If IPs are assigned by the internal DHCP server via the LAN

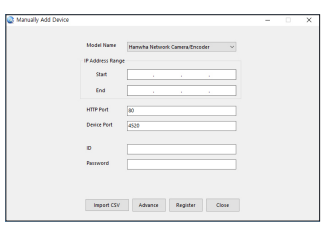
1. Click the camera from the list that you want to change the IP setting.
2. Click <**IP Assign**> at the main page of device manager.
3. Select <**Obtain an IP address automatically (DHCP)**>.
4. Click [**Apply**] button.
5. If the success message is displayed, click [**OK**].



MANUALLY REGISTERING CAMERA

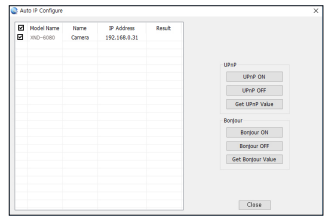
If the camera cannot be found using search function, the camera can be registered remotely by manually inserting IP information, if the camera is connected to external network.

1. Click <**Add Devices**> - <**Manually Add Device**> at the main page of device manager.
2. Insert the range of IP address that you search.
3. Select the <**Model Name**> of the camera that you register, and insert HTTP port, VNP port, ID, and password.
4. Click [**Register**] button.
5. Check if camera is registered.
   - Check MAC address at the sticker attached to the camera.



AUTOMATICALLY CONFIGURING IP

1. Click the camera from the list that you want to automatically configure the IP.
2. Click < **+** > at the main page of device manager.
   - Equipment Setting menu appears.
3. At the menu, click <**Auto IP Configure**>.
4. Click [**Close**] button.

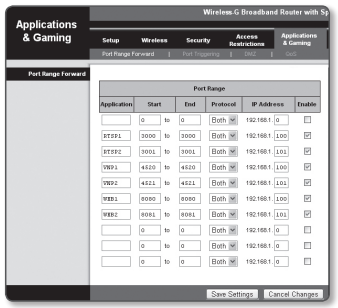


PORT RANGE FORWARD (PORT MAPPING) SETUP

If you have installed a Broadband Router with a camera connected, you must set the port range forwarding on the Broadband Router so that a remote PC can access the camera in it.

Manual Port Range Forwarding

1. From the Setup menu of the Broadband Router, select <**Applications & Gaming**> - <**Port Range Forward**>.
   For setting the port range forward for a third-party Broadband Router, refer to the user guide of that Broadband Router.
2. Select <**TCP**> and <**UDP Port**> for each connected camera to the Broadband Router.
   The number of each port to be configured to the IP router should be set according to the port number designated in <**Setup**> - <**Basic**> - <**IP & Port**> on the camera web viewer.
3. When done, click [**Save Settings**].
   Your settings will be saved.

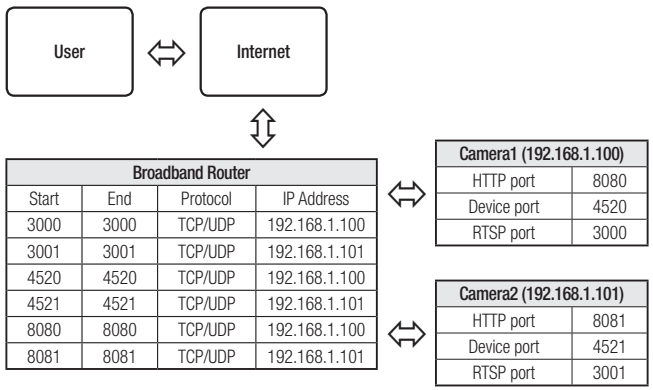


- Port forwarding setting is an example of setting CISCO IP router.
- The settings may differ depending on the connected Broadband Router model.
  For more information, refer to the user manual of the applicable router.

Setting up Port Range Forward for several network cameras

- You can set a rule of Port Forwarding on the Broadband Router device through its configuration web page.
- A user can change each port using the camera setting screen.

When Camera1 and Camera2 are connected to a router :



Broadband Router			
Start	End	Protocol	IP Address
3000	3000	TCP/UDP	192.168.1.100
3001	3001	TCP/UDP	192.168.1.101
4520	4520	TCP/UDP	192.168.1.100
4521	4521	TCP/UDP	192.168.1.101
8080	8080	TCP/UDP	192.168.1.100
8081	8081	TCP/UDP	192.168.1.101

Camera1 (192.168.1.100)	
HTTP port	8080
Device port	4520
RTSP port	3000

Camera2 (192.168.1.101)	
HTTP port	8081
Device port	4521
RTSP port	3001

- Port forwarding can be done without additional router setup if the router supports the UPnP (Universal Plug and Play) function. After connecting the network camera, select the checkbox from the menu <**Quick connect**> in <**Wisenet DDNS**> in "**Settings** -> **Network** -> **DDNS**".

CONNECTING TO THE CAMERA FROM A SHARED LOCAL PC

1. Run device manager.
   It will scan for connected cameras and display them as a list.
2. Double-click a camera to access.
   The Internet browser starts and connects to the camera.

▪ Access to the camera can also be gained by typing the camera's IP address in the address bar of the Internet browser.

CONNECTING TO THE CAMERA FROM A REMOTE PC VIA THE INTERNET

On a remote computer that is not in the Broadband Router's network cluster is not allowed, users can access cameras within a Broadband Router's network by using the camera's DDNS URL.

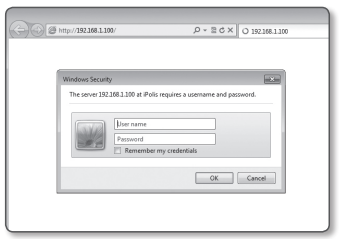
1. Before you can access a camera in the Broadband Router network, you should have set the port range forward for the Broadband Router.
2. From the remote PC, launch the Internet browser and type the DDNS URL address of the camera, or the IP address of the Broadband Router in the address bar.
   ex) http://ddns.hanwha-security.com/ID

▪ For registering the DDNS settings, refer to "**Registering with DDNS**". (page 48)

CONNECTING TO THE CAMERA

Normally, you would

1. Launch the Internet browser.
2. Type the IP address of the camera in the address bar.
   ex) • IP address (IPv4) : 192.168.1.100 ➞ http://192.168.1.100
   - the Login dialog should appear.
   • IP address (IPv6) : 2001:230:abcd: ffff:0000:0000:ffff:1111 ➞ http://[2001:230:abcd:ffff:0000:0000:ffff:1111] - the Login dialog should appear.



If the HTTP port is other than 80

1. Launch the Internet browser.
2. Type the IP address and HTTP port number of the camera in the address bar.
   ex) IP address : 192.168.1.100:HTTP Port number(8080)
   ➞ http://192.168.1.100:8080 - the Login dialog should appear.

Using URL

1. Launch the Internet browser.
2. Type the DDNS URL of the camera in the address bar.
   ex) URL address : http://ddns.hanwha-security.com/ID
   - the Login dialog should appear.

▪ Network connection is disabled in the LAN only environment.

Connecting via UPnP

1. Run the client or operating system in support of the UPnP protocol.
2. Click the camera name for search.
   In the Windows operating system, click the camera name searched from the network menu.
   - The login window is displayed.

Connecting via Bonjour

1. Run the client or operating system in support of the Bonjour protocol.
2. Click the camera name for search.
   In the Mac operating system, click the camera name searched from the Bonjour tab of Safari.
   - The login window is displayed.

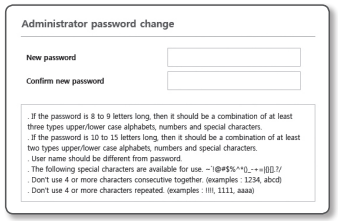
To check the DDNS address

If the camera is connected directly to the DHCP cable modem, DSL modem, or PPPoE modem, the IP address of your network will be changed each time you try to connect to the ISP (Internet Service Provider) server.
If this is the case, you will not be informed of the IP address changed by DDNS.

Once you register a dynamic IP-based device with the DDNS server, you can easily check the changed IP when you try to access the device.
To register your device to the <**DDNS**> server, visit http://ddns.hanwha-security.com and register your device first, and then set the Web Viewer's <**Network**> - <**DDNS**> to <**Wisenet DDNS**>, as well as providing <**Product ID**> that had been used for DDNS registration.

PASSWORD SETTING

When you access the product for the first time, you must register the login password.
When the "**Password change**" window appears, enter the new password.

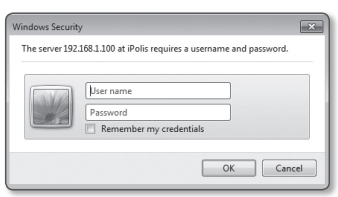


- For a new password with 8 to 9 digits, you must use at least 3 of the following: uppercase/lowercase letters, numbers and special characters. For a password with 10 to 15 digits, you must use at least 2 types of those mentioned.
  - Special characters that are allowed. : ~`!@#$%^*()_-+={}[].?/
- For higher security, you are not recommended to repeat the same characters or consecutive keyboard inputs for your passwords.
- If you lost your password, you can press the [**RESET**] button to initialize the product. So, don't lose your password by using a memo pad or memorizing it.

LOGIN

Whenever you access the camera, the login window appears.
Enter the User ID and password to access the camera.

1. Enter "**admin**" in the <**User name**> input box.
   The administrator ID, "**admin**", is fixed and can not be changed.
2. Enter the password in the <**Password**> input field.
3. Click [**OK**].
   If you have logged in successfully, you will the Live Viewer screen.



- When you access the camera web viewer, pay special attention to the security by checking whether the image data is encrypted.

- If you check the "**Remember my credentials**" option when your input is done, in future you will be logged in automatically without being prompted to enter the login information.
- You will experience the best video quality if the screen size is 100%. Reducing the ratio may cut the image on the borders.

PLUG-IN SUPPORT SPECIFICATIONS FOR EACH BROWSER

The existing plug-in web viewer and a new plug-in free web view is embedded together.
This allows you to use the web viewer in newer browser environments that do not support plug-ins, such as Chrome, EDGE and FireFox (Windows 64-bit only). For browsers that allow the installation of plug-ins, such as IE and Safari, installing the plug-in is recommended.
According to the browser environment, the following differences may be observed.

- **Chrome, FireFox(Windows 64bit only), EDGE browser** : Although they don't support plug-ins, you can use a web viewer as a plug-in free web viewer is embedded.

- As the plug-in free webviewer has lower performance than the plug-in webviewer, it has a limit on the monitoring of high quality profiles and playback of saved videos.
  To monitor high quality profiles and play saved videos, use either a plug-in webviewer or SmartViewer.
  - Plugin-free webviewer creation conditions: The selected profile exceeds MJPEG Full HD 10fps H.264 (Chrome : full screen resolution supported / Edge, Firefox, Safari : Full HD 30 fps or higher) H.265 FullHD 10fps 2Mbps or higher
  - Plugin-free playback conditions: MJPEG/H.264 full screen resolution, H.265 HD or below
- The plug-in free feature has been optimized for the Chrome browser.
- Supports Adaptive Streaming
  - This is the feature that automatically lowers the profile if there is a delay of more than 5 seconds. It was made to prevent issues such as increased latency and no response from the browser when playing the video on a system with lower hardware specifications than recommended.
    The video profile is reduced in the following sequence: 1920X1080(20fps) -> 1280X720(20fps) -> 640X480(20fps).

- **IE, Safari browser** : You can use a web viewer even if you don't install the existing plug-in web viewer.

- To monitor/play saved video seamlessly, you are required to install a plug-in.

INSTALLING WebViewer PLUGIN

To access to the plug-in webviewer and play a live video (H.264/H.265) or a recorded video, an installation message will be prompted. At this time you need to install the webviewer plug-in to use the function properly.

1. When the monitoring page is accessed for the very first time, the installation page is displayed. Click [**Download plugin**] to begin installation.

> ▪ If the plug-in installation file download status is suspended at 99% in the Internet Explorer browser, retry it after selecting "Release SmartScreen filter" in "Tool → SmartScreen filter".

2. Click [**Run**] in the message window.
3. Click [**Yes**] when the notice window saying that all browser windows will be closed.

> ▪ Steps 4 and 5 will be skipped if no Web Viewer Plug-in is installed.

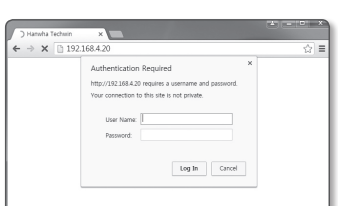
4. When the old version of the Web Viewer Plug-in is installed, a notice window saying the old version will be deleted is displayed.
   Click [**Yes**] when the notice window is displayed.
5. Click [**OK**].
   The old version of Web Viewer Plug-in is deleted.
6. Click [**Install**] to begin installation of the Web Viewer Plug-in.
7. Click [**Finish**].
   Web Viewer Plug-in installation is completed.

> ▪ In your internet explorer, if you need to move to the installation screen after installing the webviewer plugin, check whether webviewer_activexplugin_lib.control in the "Tool → Additional Function Management" menu is "Activated". If not, and if there is a persisting problem, then select "Tools → Internet Options → General" and delete all the search records.
> If the problem persists, please register the IP or Domain of your camera in "Tools → Internet Options → Security → Trusted sites".

USING A PLUG-IN FREE WEBVIEWER

Although it is not possible to install plug-ins separately If you access the camera from Google Chrome, Mozilla Firefox, or the MS Edge web browser, you can view and control the camera video without installing plug-ins.

1. Enter your username and password to log in.
2. When you are logged in, a camera live view screen appears.



USING THE LIVE SCREEN



Item	Description
1 **Live**	Moves to the Live screen.
2 **Playback**	Move to the screen where you can search for the video recording saved in your Micro SD memory card or NAS.
3 **Setup**	Move to the Setup screen.
4 **Viewer Screen**	Displays the Live video on the screen. ▪ You can use the mouse wheel to activate the digital zooming in Viewer screen.
5 **Webviewer plug-in installation**	You can install webviewer plug-ins to play live or recorded videos (only available in IE and Safari).
6 **Online help**	The Online help provides detailed descriptions for each function.

Item	Description	
7 Profile type	You can select a profile type in <**Video profile**> under the <**Basic**> setup menu. ▪ Click the icon to display the name of the current profile. ▪ Afterimages can be displayed on the screen under the following conditions if the video is played in the monitoring page: - The resolution is changed due to a profile change. - Incoming data is being slowed due to a network delay when the profile is changed. - The web browser window size and location is changed.	
8 PTZ	Controls the PAN/TILT/ZOOM motion.	
	Zoom In (⊕)	Drag the bar on the right side of the UI up, or click the [⊕] button to zoom in the screen. The farther the bar position is from the center, the faster the screen will be zoomed in.
	Zoom Out (⊖)	Drag the bar on the right side of the UI down or click the [⊖] button to zoom out the screen. The farther the bar position is from the center, the faster the screen will be zoomed out.
	Move screen (✥)	Moves in the direction where the cursor is located.
	Auto tracking ( )	Click the icon to turn it ON, and the camera will track a moving person or object automatically.
9 Profile access information	You can read the profile information.	
10 Switch View Mode	Full Screen (⛶)	Double click on the video screen, and the current video will be played in the full screen of the monitor.
	Fit to screen (▣)	A view mode in which the size of the camera video automatically fits to the web browser size.
	Size of the original file (1:1)	View mode in which the video is played in the actual resolution.
	Maintain Aspect Ratio ( )	View mode that adjusts the aspect ratio to best fit the resolution.
11 Capture	Save the current image as an image file.	
12 Record	The user can save the video on the PC.	
13 Pixel Counter	Checks the number of pixels in the selected area on the video screen.	
14 Microphone control	Activates the microphone.	
15 Alarm output	Activate the Alarm Out port.	
16 Audio control	Activates audio and adjusts the volume.	

▪ Some functions may not work on a specific browser or codec.

To capture the snapshot

1. Click [**Capture (** 📷 **)**] on the scene to capture.
2. When a captured video is saved, a notification message appears.
   The captured image is saved in the designated folder for each browser.

▪ If the screen is not captured by IE browser in Windows 7 or higher, run the IE Browser with the Admin privilege.

To save

1. Click the [**Record (** REC **)**] icon.
2. To end the recording, press [**Record (** REC **)**] again.

▪ You can save the recorded file on the PC in an avi file format. Designate a path and save the video.

To fit the full screen

1. Click the [**Full Screen (** ⛶ **)**] icon.
2. This will fit the Viewer to the full screen.
3. To leave full screen mode, click the [**Full Screen (** ⛶ **)**] button again or press the [**Esc**] key on the keyboard.

To Use Audio

1. Click [**Audio (** 🔊 **)**] icon to activate audio communication.
2. Use [●———] bar to control the volume.

▪ If there is no sound from pulling in and out the audio jack while it is in operation, click the [**Audio (** 🔊 **)**] icon to enable it again.

▪ To use audio, you need to set <**Audio in**> in "**Video Profile**" to <**Enable**> (page 37).

To Use Microphone

Click [**Mic (** **)**] icon to activate the microphone.

■ If you are using IE or the Safari browser, you will need to install plug-in.

To count the number of pixels

1. Click the [**Pixel count (** **)**] icon to activate it.
2. Drag the mouse on the video to select an area.
3. The number of pixels in the selected area is displayed on the screen.

To control PTZ

1. Click the [**PTZ (** **)**] icon.
2. Move the cursor of the Move Screen pad [ ] to move the camera direction or adjust the zoom or focus.

To check the profile status

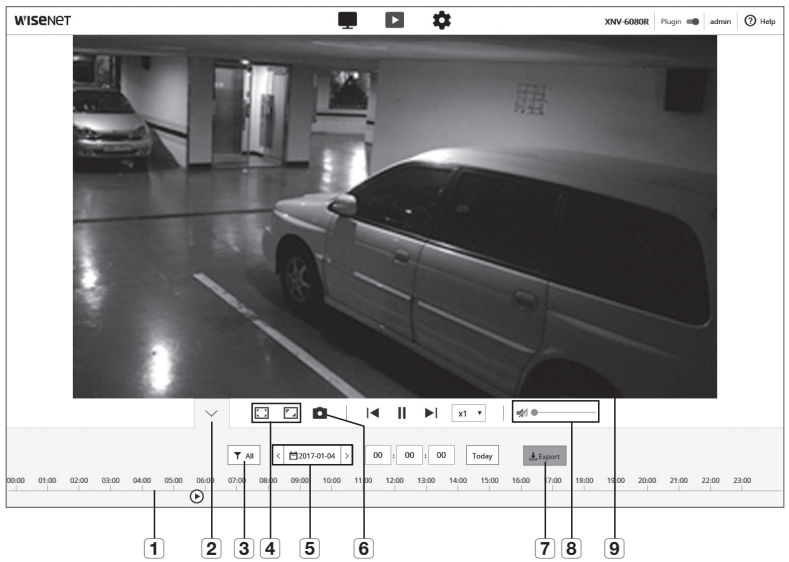
You can check the profile information.

1. Click the [**Status (** **)**] icon.
2. The profile access information screen is updated whenever the screen is enabled.
   - Profile access : Show the information of the newly added profile.
     - Profile : Show the information of the newly added codec.
     - Bitrate(kbps) : Show both the actual bit rate and the set bit rate.
     - Framerate(fps) : Show both the actual frame rate and the set frame rate.
     - ATC(%) : Show the ATC status.
     - Concurrent users count : Show the number of concurrent users who access the profile.
   - Current users : Shows information on users accessing web viewer and displaying monitoring video.
     - Profile : Show the name of the profile accessed by the user.
     - Bitrate(kbps) : Show the current bit rate.
     - Network connection status : It shows whether the network is working fine.
     - IP address : Show the IP address of the current user.

PLAYING THE RECORDED VIDEO

■ Before you can play the video, you must configure the record settings. For details on record settings, refer to "**Storage**". (page 52)

Playback Screen Name and Features



Item		Description
1 Time Bar		Move the time bar to play the video at a desired time.
2 Hide the context menu		The contextual menu screen at the bottom will disappear, and only the menu icon will be displayed.
3 Search event setting		Set the event type to search within the search period.
4 Switch View Mode	Full Screen ( )	Double click on the video screen, and the current video will be played in the full screen of the monitor.
	Fit to screen ( )	A view mode in which the size of the camera video automatically fits to the web browser size.
	Size of the original file ( )	View mode in which the video is played in the actual resolution.
	Maintain Aspect Ratio ( )	View mode that adjusts the aspect ratio to best fit the resolution.

Item	Description
5 Search range setting	Set the search date and time range for data saved in your Micro SD memory card or NAS.
6 Capture	Saves the current video screen in an image file format (format may vary depending on the browser).
7 Export	Set the desired date to make a backup copy of video data saved in your Micro SD memory card or NAS. ▪ You can set up to 5 minutes for the backup of a saved video.
8 Audio	To listen to a voice signal (if present) in the recorded video, then activate the voice signal icon when you play it.
9 Viewer Screen	The recorded video will appear.

To play the content after searching by event

1. On the Playback screen, click the [**Show (** ﹀ **)**] button.
2. If there is a video recorded on the date of search, the applicable video is displayed on the time bar.
3. To perform a search by event type, click the [**All**] button at the top of the time bar and select an event type.
4. When done, click [**Apply**].
   Event searched is displayed on the time bar.
5. Click the [**Play (** ▷ **)**] button.
6. To pause the video, click the [**Pause (** ⏸ **)**] button.

To play after searching by time

1. Click the [2016-12-15] icon.
2. On the calendar, set the search date, start time and end time.
   The event searched is displayed on the time bar.
3. Click the [**Play (** ▷ **)**] button.
   The video at the selected time will be played.
4. When a video is played, the recording time of the video currently being played is displayed.
5. Search the video forward and backward and adjust the playback speed.
   - How to Move Playback Interval
     When [⏮, ⏭] button is selected, it moves 1 frame forward / i frame backward.
   - How to Control Playback Speed
     Click the [x1] button and you can select a speed of either 1x, 2x, 4x and 8x or -1x, -2x, -4x and -8x, and you can set the playback speed as desired.
6. Move the position of the [**Time Bar (** ▶ **)**] to play the video at a desired time.

To back up the searched video

1. During playback, click [**Export**] on the scene to back up.
   The data in the applicable section will be backed up.
2. Click [**Apply**] button.
   The Save As window appears.
3. Confirm the save path and click [**Save**] button.
   The screenshot will be backed up to the specified path.

To play the backup video

The backed up images are saved in an .avi format. Installing the media player that supports the format for the user PC is recommended.

▪ If playback does not run smoothly due to the user environment, optimizing by installing the latest codec and other methods are required.

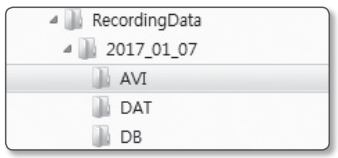
To Play an AVI File

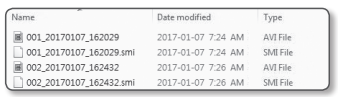
(1) Micro SD memory card

1. Separate the Micro SD memory card from the camera.

- Before separating the Micro SD memory card, set the <**Device**> to <**Off**> in the "**Setup → Event → Storage**" menu.

2. Insert the Micro SD memory card into the PC.
3. Play the AVI file in the "**₩RecordingData₩YYYY_mm_DD₩AVI**" directory, using a media player.

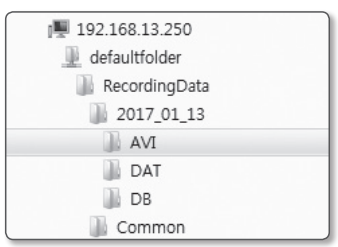


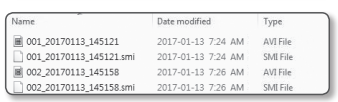


- A filename starts with the format "**001_YYYYMMDD_HHMMSS.avi**" and the file number is incremented by one.
  YYYYMMDD_HHMMSS indicates the start time of data saving.
- "**001_YYYYMMDD_HHMMSS.smi**" file is a caption file, and you can view it if it exists in the same directory as its related AVI file.
- Once corrupted, the data in the Micro SD memory card cannot be replayed in the Web Viewer's [**Playback**].

(2) NAS (Network-Attached Storage)

1. In Windows browser, use \\<ip address>\ to access.
   ex)₩₩192.168.13.250₩defaultfolder₩2017_01_13₩AVI
2. Go to <**Computer**> → <**Network drive connection**> → Enter 1.
3. Connected to the NAS.
   The directory structure is same as the directory structure for a Micro SD memory card.





- A filename starts with the format "**001_YYYYMMDD_HHMMSS.avi**" and the file number is incremented by one.
  YYYYMMDD_HHMMSS indicates the start time of data saving.
- "**001_YYYYMMDD_HHMMSS.smi**" file is a caption file, and you can view it if it exists in the same directory as its related AVI file.
- If you change or damage the saved data on your own, it will not play back or save properly.

SETUP

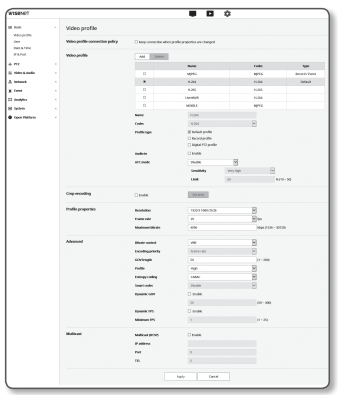
You can configure the basic camera information, PTZ, video and audio, network, event, analyze, system and open platform settings.

1. On the live screen, click the [**Setup ( )**] button.
2. The Setup screen appears.

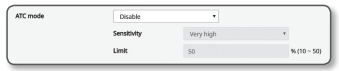
BASIC SETUP

Video profile

1. From the Setup menu, select the <**Basic ( )**> tab.
2. Click <**Video profile**>.
3. Set the <**Video profile connection policy**>.
   - Keep connection when profile setting is changed : Output uses the same settings even when the settings of the active profile are changed.
     If not selected, changing a profile used by an existing connection resets such connection.
4. Select each profile properties.
   For more details, refer to "**To Add/Change the Video Profile**". (Page 38)
5. Select a type of profile.
   - The context menu may differ depending on the selected codec type.
   - Default profile : If no profile is selected when using the Web Viewer, the default video profile is applied.
   - E-mail/FTP profile : Video profile to be transferred to the specified email or FTP site.
     - Only the MJPEG codec can be set as the E-mail/FTP profile.
   - Record profile : This is the profile that is applied to video recording.
   - Digital PTZ profile : Profile applied when using the PTZ.
     - To use PTZ, add a Digital PTZ profile.
6. Select whether or not to input audio in the video.
   Select the <**Audio In**> check box and you can input audio in the video.



7. According to your situation, set ATC (Auto Transmit Control) mode.
   - ATC mode : It adjusts the video properties according to the variance in the network bandwidth, controlling the bit rate.
     Adjusting the bit rate depends on the ATC mode.
     - Control framerate : Reduce the frame rate if the network bandwidth drops down.
     - Control compression : Control the compression rate if the network bandwidth drops down.
       Compression adjustment can cause deterioration of the image quality.
     - Event(MD) : Activated when the motion detection (MD) event is set. Frame rate is adjusted when an event occurs.
       If no motion is detected in the surrounding area, the minimum amount of frames is output to save the bandwidth use.
     - If <**Bitrate control**> is set to <**CBR**>, the encoding priority according to the ATC mode will be fixed as below:



Bitrate control / ATC mode	Control framerate	Control compression	Event(MD)
CBR	Compression	Framerate	Framerate

   - Sensitivity : Affect the transfer rate according to the variance in the network bandwidth.
     The transfer rate will be adjusted to the fastest if the bandwidth is <**Very high**>, and adjusted to the latest if the bandwidth is <**Very low**>.
   - Limit : If the quality or frame rate is adjusted, the property will be changed to the applied value (%) against the previous setting value (100%).
     Note that if you reduce the property value too much, you may encounter flickering on the screen. So it is advisable to adjust the value within the threshold.

   - It is recommended to apply ATC control only for cameras supporting ATC.
   - Set the ATC sensitivity to <**Very low**> in a network environment with high variance in the network bandwidth.
   - If the network connection is unstable, you may encounter flickering on the screen.

8. Select Able or Disable for the Crop Encoding function.
   For more details, refer to "**To Use Crop Encoding**". (Page 39)
   - Crop encoding : It cuts only the selected area out of the full screen and outputs it at the resolution specified in <**Profile setting**>.
     The resolution should be less than the Crop Encoding setting area.
9. When done, click [**Apply**].

To Add/Change the Video Profile

The profile setup can be added or modified to accommodate various profiles depending on the recording conditions.

1. In <**Video profile**>, click the <**Add**> button.
2. Provide the name and select a codec.
3. Specify the conditions under which the codec will be applied.
4. Specify the details of the selected codec including resolution and frame rate.
   - Resolution : Set the video size of the H.264/H.265 and MJPEG files.
   - Framerate : Set the max number of video frames per sec.

   ▪ The Sensor mode setup in Camera Setup changes the maximum configurable framerate.

Sensor	25 fps	30 fps	50 fps	60 fps
Framerate	1~25 fps	1~30 fps	1~50 fps	1~60 fps

   - Maximum bitrate : Set the max bit rate of video when the bit rate control is set to VBR.

   ▪ As the bit rate can be adjusted limitedly according to the resolution, frame rate and screen complexity, the actual bit rate can be greater than the maximum bit rate. So you must consider the use conditions when setting the value.

   - Target bitrate : Set the target bit rate when the bit rate control is set to CBR.
   - Bitrate control : You can select one from constant bit rate and variable bit rate for compression. Fixed bitrate means that the network transmission bitrate is fixed while varying the video quality or frame rate, variable bitrate means that a higher priority is placed on the video quality while varying the bitrate.

   ▪ After setting the fixed bit rate for bit control, if you select the video quality priority mode, depending on the complexity of the screen, the actual transmitted frame rate may differ from the frame rate setup in order to guarantee the optimal video quality for the given bit rate.

   - Encoding priority : You can set the priority of video transmission to frame rate or compression.
   - GOV length : It specifies the distance (in terms of number of frames) between two consecutive I-Frames in a video sequence when H.264/H.265 codec was selected. (One I-Frame + 0~Several P-Frames)
   - Profile : You can select the profile of H.264 codec.
   - Entropy coding : This is variable length coding using syntax statistics. It uses lossless compression techniques. You can set the entropy coding method. The compression rate of CABAC is better than CAVLC.
   - Smart codec : Specify the use of Smart codec.

   ▪ You can use this when the bit rate control value is CBR. Detailed settings are configured in the Smart Codec on the Audio & Video tab. (Page 47)

   - Dynamic GOV : When the bit rate control is VBR in H.264/H.265 codec, it makes the GOV length automatically change to the set value of the maximum dynamic GOV.
   - Dynamic FPS : Set the FPS value to automatically change the setting of the FPS value to the maximum dynamic value when the bit rate control is VBR between H.264/H.265 codec.
   - Minimum FPS : Set the minimum value for dynamic FPS.
   - Multicast(RTSP) : Specify the use of the RTSP protocol.
     - IP address : Enter an IPv4 address with which you can connect to the IPv4 network.
     - Port : Specify the video communication port.
     - TTL : You can set the TTL for the RTP packet.

   ▪ If you set the Multicast address to 224.0.0.0~224.0.0.255, multicast may not work properly in all environments. In that case, we recommend you change the multicast address.

What is GOV length?

GOV(Group of Video object planes) is a set of video frames for H.264/H.265 compression, indicating a collection of frames from the initial I-Frame to the next I-Frame. GOV consists of 2 kinds of frames: I-Frame and P-Frame.

I-Frame is the basis frame of compression, and contains data for a completed single image. P-Frame contains only the data that has changed from the preceding I-Frame.

For H.264/H.265 codec, you can determine the GOV length.
If you set a recording profile with H.264/H.265 codec, the GOV length will be framerate/2.

What is dynamic GOV?

Dynamic GOV is a function that enables the GOV to automatically change in a range from the set value of the minimum GOV length to the maximum dynamic GOV set value according to the situation of the video.

In a video with almost no motion, GOV operates with the dynamic GOV settings, which makes the bit rate of the entire video reduced. The I-frame is output right after a motion is detected and GOV operates with the GOV length settings until the motion disappears.

If you use this function, the GOV of a video operates with the minimum GOV length settings.

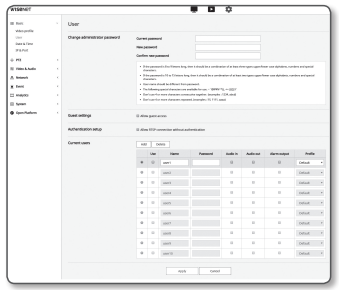
To Use Crop Encoding

1. Select <**Enable**>.
2. Click <**Set area**>.
   The Crop Encoding Area Setup window will pop up.
   - 16:9 : The aspect ratio shall be set to 16:9 as close as to the user specified area.
     The supporting size ranges from 640X360 to 1280X720 and supporting output resolutions are 640X360, 800X448, 1280X720.
   - 4:3 : The aspect ratio shall be set to 4:3 as close as to the user specified area.
     The supporting size ranges from 320X240 to 1280X960 and supporting output resolutions are 320X240, 640X480, 800X600, 1024X768, and 1280X960.
   - Manual : It sets up the aspect ratio of the user specified area.
     The supporting size ranges from XND-6080/6080V/6080R/6080RV, XNV-6080/6080R: 320X240 ~ 1280X1024 / XNV-8080R, XND-8080R/8080RV: 320x240 ~ 1600x1200 and all supporting output resolutions are available except 1920X1080.
3. Drag the mouse on the screen to specify the Crop Encoding area at your discretion.

- If you set output as <**Manual**>, you can specify a desired range. However, if output is only available at a supported resolution, the image will be output at the resolution that is closest to the range that you specified.
- The Crop Encoding area setup can change depending on the DIS setup. Reset the Crop Encoding area when the DIS setup is changed.

User

1. From the Setup menu, select the <**Basic ( )**> tab.
2. Click <**User**>.
3. Provide the necessary user information.
   - Administrator password change : Change the password for the administrator.



- For the security purposes, you are recommended to use a combination of numbers, alphabets uppercase and lowercase and special characters for your password.
- It is recommended to change your password once every three months.
- The password length and limits are shown as follows.
  - A combination of at least three types of upper case, lower case, numeric, and special characters: 8 to 9 characters.
  - A combination of at least two types of upper case, lower case, numeric, and special characters: 10 to 15 characters.
  - Should be different from the ID.
  - Don't use 4 or more characters consecutive together. (examples : 1234, abcd)
  - Don't use 4 or more characters repeated. (examples : !!!!, 1111, aaaa)
  - Special characters that are allowed. : ~`!@#$%^*()_-+=|{}[].?/
  - After the factory setting, the admin and user passwords are initialized. You need to reset the password.
  - When you access the camera web page for the first time or access it after the initialization, you will be moved to the admin password setting menu.
  - In this menu, you need to login again with the new password before using the camera web page menus.
  - If the existing password is not matched, when you change the admin password, you cannot change the password.
  - After changing your password, if there is a camera connected to a CMS or NVR client, then you need to re-register it with the newly changed password. If the camera is still connected with the same password, then the account may be locked because a client uses the previous password.
- If you try to login with the registered account, 5 or more consecutive password authentication has failed, and then the account may be locked for thirty seconds.
- When the password is changed while multiple connections are active from a PC, the browser may malfunction. In that case, reconnect to the server.

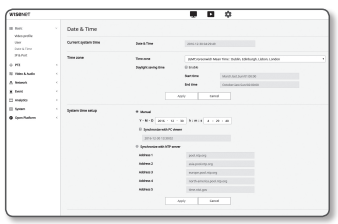
- Guest setup : If you select <**Enable guest access**>, the guest account can access the Web viewer screen but can only view the live Viewer screen.
  - The ID/password for the guest account is <**guest/guest**>, which cannot be changed.
- Authentication setup : If you select <**Enable RTSP connection without authentication**>, you can access RTSP without logging in and view the video.

- Current users : If you select <**Use**>, you can set or change the user permissions.
  - The administrator can set the audio input, audio output, alarm output permissions.
  - Audio input/Audio output/Alarm output : You can enable/disable Audio input/Audio output/Alarm output in the live mode on the current user account.
  - Profile : If you select <**Default**>, you can only see the default profile video; if selecting <**All**>, you can see the full profile videos.

- ONVIF functions available to a registered user allowed to use ONVIF functions are limited to those of granted with permission.

4. When done, click [**Apply**].

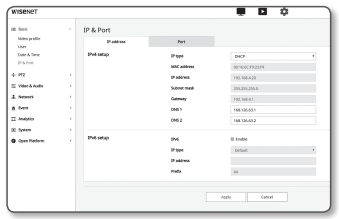
Date & Time



1. From the Setup menu, select the <**Basic ( )**> tab.
2. Click <**Date & Time**>.
3. Specify the time and date that will be applied to the camera.
   - Current system time : Displays the current time settings of your system.
   - Timezone : Specify the local time zone based on the GMT.
   - Daylight saving time : If checked, the time will be set one hour before the local time zone for the specified time period.
     This option will be displayed only in areas where DST is applied.
   - System time setup : Specify the time and date that will be applied to your system.
     - Manual : Sets the current time of the camera manually.
       When you select the <**Synchronize with PC viewer**> check box, the time of the webviewer is set to the time displayed on the PC that runs the webviewer.
     - Synchronize with NTP server : Sync with the time of the specified server address.
4. When done, click [**Apply**].

- If you select the <**Synchronize with PC viewer**>, the standard timezone should be set the same as the current timezone in PC.

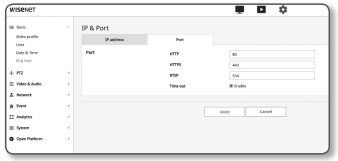
IP & Port



1. From the Setup menu, select the <**Basic ( )**> tab.
2. Click <**IP & Port**>.
3. Click <**IP address**>.
4. Set the <**IPv4 setup**>.
   - IP type : Select an IP connection type.
     - Manual : Specify the IP address, Subnet mask, Gateway, DNS1, and DNS2.
     - DHCP : Specify the DNS1 and DNS2.
     - PPPoE : Specify the DNS1, DNS2, ID and Password.
       - If you set it to <**Manual**>, you should specify the IP, Subnet mask, Gateway, DNS 1 & 2 manually.
   - MAC address : Shows the MAC address.
   - IP address : Displays the current IP address.
   - Subnet mask : Displays the <**Subnet mask**> for the set IP.
   - Gateway : Displays the <**Gateway**> for the set IP.
   - DNS1/DNS2 : Displays the DNS(Domain Name Service) server address.
5. Set the <**IPv6 setup**>.
   - Set to <**Use**> to use IPv6 address.
   - Default : Use the default IPv6 address.
   - DHCP : Display and use the IPv6 address obtained from the DHCP server.
   - Manual : Enter IP address and gateway manually and use it.

- The IP addressing system will be defaulted to DHCP. If no DHCP server is found, the previous settings will be restored automatically.
- Once completed with editing, click [**Apply**] to apply changes and the browser exits. After a while, connect again with the changed IP.

6. Click <**Port**>.



7. Type in each item in the Port menu as necessary.
   - Neither the port range between 0 and 1023 nor port 3702 is available.
   - HTTP : HTTP port used to access the camera via the web browser.
     The default is 80(TCP).
     - Setting the HTTP port for Safari and Google Chrome browsers to 65535 is not allowed by security policy.
   - HTTPS : In this version, the security of the web communication protocol HTTP is strengthened. It can be used when you set HTTPS mode in SSL.
     The initial value is set to 443(TCP).
     - The available setting range is 1024~65535. (For security reasons, in your Safari or Google Chrome browser, you may not use 65535 as your HTTPS port.)
   - RTSP : Used to transfer videos in the RTSP mode; the default is 554.
   - Timeout : When connecting to RTSP, this function resets the connection if there's no response for a certain time.

- If changed the HTTP port, the browser exits.
  Afterwards, address should contain the newly assigned HTTP port trailing the IP.
  ex) IP address: 192.168.1.100, HTTP port : Assigned 8080 → http://192.168.1.100:8080
  (If HTTP port is set to 80, no need to specify the port number)
- Using RTSP and HTTPS is recommended in order to prevent the image information from being restored.

8. When done, click [**Apply**].

PTZ SETUP

Digital PTZ

Use this settings page to move the camera view and perform the digital zoom.

- <**Digital PTZ Profile**> from <**Video profile**> should be selected for the setting.

1. From the Setup menu, select the <**PTZ ( )**> tab.
2. Click <**Digital PTZ**>.

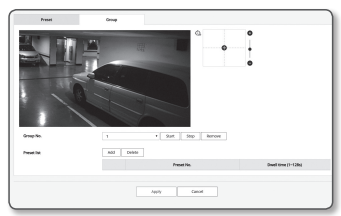


To add a preset

1. Select the preset number to add.
2. Set the name for the preset.
3. Press the [**Add**] button.

To delete a preset

1. Select the preset number to delete.
2. Press the [**Remove**] button.



To move to a desired preset

1. Select a preset number that you want to move.
2. Press the [**Go**] button.

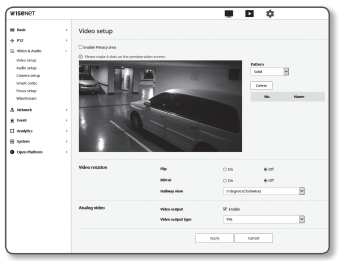
To set a group

The group function enables you to group various presets before calling them in sequence. Six groups can save a total of 128 presets each.

1. Select a group setting mode.
2. Press the [**Add**] button.
   Entered in the bottom list.
3. If you want to delete a preset added, select it and press the [**Delete**] button.
4. Press the [**Start**] button.
   It performs the group operation.
5. Press the [**Stop**] button.
   The running group will be stop.
6. Press the [**Remove**] button.
   Selected group data will be deleted.

VIDEO & AUDIO SETUP

Video setup



1. From the Setup menu, select the <**Video & Audio ( )**> tab.
2. Click <**Video setup**>.
3. Select a <**Video rotation**> mode.
   - Flip : Turn upside down the image that is captured by the camera.
   - Mirror : Flip horizontal the image that is captured by the camera.
   - Hallway view : Rotates the video captured by the camera according to the set angle.
     You can rotate the video 0, 90 or 270 degrees.
     - If you change settings, the browser window will be closed and the camera restarted. Please access again later.
4. Specify whether to use the analog video output function.
   - To decrease the performance reduction, the usage should only be unlocked after installation.
5. Select the video type.
6. Specify the privacy zone.
   - You can set the pattern of the privacy area either to Opaque or Mosaic.
7. When done, click [**Apply**].

To set the privacy zone

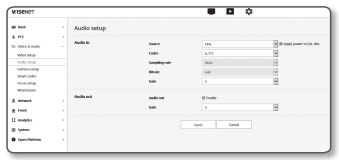
You can specify a certain area of the camera video to be protected for your privacy.



1. Set it to <**Enable Privacy area**>.
2. Click [**Apply**].
3. Select 4 vertices on the screen with your mouse to specify the area.
4. Enter the name and select the color, and then click [**OK**].
5. If you want to delete a name in the list, select it and click [**Delete**].
6. To change the pattern of the configure privacy area, select the pattern from the pattern list and click the [**Apply**] button.

Audio setup

You can configure the I/O settings of the audio source from the camera.



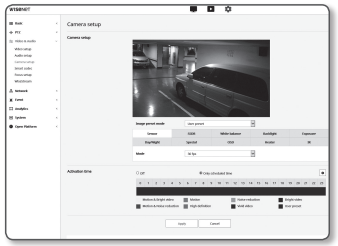
1. From the Setup menu, select the <**Video & Audio ( )**> tab.
2. Click <**Audio setup**>.
3. Set the audio input value.
   - Source : Sets the audio input.
     - Internal microphone : Built-in microphone embedded in the camera.
       (only available in XND-6080/6080V/6080R/6080RV/8080R/8080RV)
     - Line : Connect the cable to the audio device.
     - External microphone : Uses an external microphone.
   - Apply power to Ext. Mic. : Select this check box when the external microphone is not powered, and the power will be supplied from the camera to the microphone. You can configure settings when selecting <**External microphone**>.
   - Codec : Specify the audio codec.
     - G.711 : A audio codec standard, it uses 64 Kbps PCM (Pulse Code Modulation) encoding. ITU standard audio codec that is adequate for digital voice transfer in PSTN network or through a PBX.
     - G.726 : ITU standard audio codec applying ADPCM (Adaptive Differential Pulse Code Modulation) for variable bit rates of 40/32/24/16 Kbps to 64 Kbps PCM encoding.
     - AAC : Acronym of Advanced Audio Coding, which is an international standard designed to be the successor of the MP3 format. You can use audio at a higher sampling rate than when you use the existing G.711 or G.726 codec.
   - Sampling rate : Refers to the number of times of sampling when digitalizing an analog soundtrack. The higher this value is, the better the sound quality is.
   - Bitrate : Set the bit rate to differentiate compression ratio if using G.726 codec.
   - Gain : Specify the audio input amplification.

   - Sound quality deterioration or howling may occur if the loudness of the sound source or gain value were set excessively.
4. Set the audio output level.
   - Enable : Sets whether to use audio output.
   - Gain : Specify the audio output amplification.
5. When done, click [**Apply**].

Camera setup

You can change the camera settings according to the environment where the camera is located.

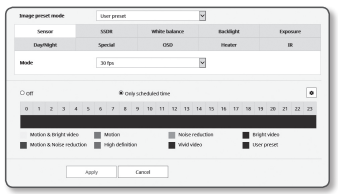
1. From the Setup menu, select the <**Video & Audio ( )**> tab.
2. Click <**Camera setup**>.
3. Configure the settings as necessary of : Image preset mode, Sensor, SSDR, White balance, Back light, Exposure, Day/ Night, Special, OSD, Heater, IR
4. When done, click [**Apply**].
   - If a certain time (timeout: 240s) is elapsed with your not pressing the [**Apply**] button after changing the settings, your changes will not be applied.



If you want to set an image preset

Users can set presets easily.
The selected image preset mode will be in operation during the configured period, but at other times the values configured in the user preset mode are reflected.

1. Select a desired mode from the image presets.
   - High definition : This is the factory setting for your camera. Select it for video recording, focusing on reproducibility.
   - Motion : Record a moving object clearly. If there are many moving objects, such as on a road or in a crowded place like a museum, select this option.



   - Noise level can increase in a low illumination environment, and sensitivity can go down.
   - Noise reduction : Select this when you need a video with low noise in the low illumination environment.
   - Bright video : This makes the dark area in a full video brighter.
   - Video contracts effects are reduced.
   - Motion & Noise reduction : Use this when there are many moving objects, such as on a road or in a crowded place like a museum, or when you need a video with low noise in a low illumination environment.
   - Motion & Bright video : Use it when there are many moving objects, such as on a road or in a crowded place like a museum, or when you need to make a dark area in full video brighter.
   - Vivid video : Makes the entire video displayed in vivid colors.
   - The contrast of the video reduces and the color reproducibility becomes low.
   - User preset : Select it if you want to display video with settings chosen by you.
   - When selecting a mode other than the preset mode, you can't set the shutter speed, AGC, SSDR, SSNR and color.
2. Set the camera item for each image preset mode.
3. Set the <**Activation time**>.
   - Off : Your camera will execute a specific image preset operation at all times.
   - Only scheduled time : Your camera will execute a specific image preset operation for the time period set by you on each date.
4. Click the [⚙] button.
5. Set the <**Mode**> and <**Time**>.
6. When done, click [**Apply**].

Initial setting for each image preset mode

Image preset	Minimum shutter	Maximum shutter	Prefer shutter	AGC	SSDR	SSNR 2D	SSNR 3D	COLOR
High definition	1/5	1/12000	1/60(1/50)	Default (High)	Default (12)	Default (12)	Default (12)	Default (50)
Motion	1/30	1/12000	1/200	Default (High)	Default (12)	4	4	Default (50)
Noise reduction	1/15	1/12000	1/60(1/50)	Middle	Default (12)	Default (12)	Default (12)	Default (50)
Bright video	1/5	1/12000	1/60(1/50)	Default (High)	18	Default (12)	Default (12)	Default (50)
Motion & Noise reduction	1/30	1/12000	1/200	Middle	Default (12)	4	4	Default (50)
Motion & Bright video	1/30	1/12000	1/200	Default (High)	18	4	4	Default (50)
Vivid video	1/5	1/12000	1/60(1/50)	Default (High)	18	Default (12)	Default (12)	90
User preset	Manual	Manual	Manual	Manual	Manual	Manual	Manual	Manual

- The preset setup functions as an aid to users to configure setup. If you don't want the preset function, deactivate it before use.
- If you change the image preset, only shutter/AGC/SSDR/SSNR/COLOR are reset to the default value for each model.
- The "**Camera Setting**" value does not change between presets.

To Set the Sensor

It specifies how many frames the camera CMOS sensor will capture per second.

1. Select <**Sensor**>.
2. Select <**Mode**>.



■ Refer to "**Video profile**" for the framerate setup range of the <**Video profile**> according to mode setup. (Page 37)

To Set SSDR

In a scene where the difference between bright and dark is severe, you can increase the brightness of the dark area alone to regulate the overall brightness.

1. Select <**SSDR**>.
2. Set the SSDR use option to <**Enable**>.
3. Configure the <**Level**> and <**D-Range**> settings as necessary.
   - Level : Adjust the level of the dynamic range.
   - D-Range : Select the amplitude area of the dynamic range.



To Set White Balance

You can correct the image colors based on white under any lighting conditions.

1. Select <**White balance**>.
2. Select <**Mode**>.
   - ATW : Corrects the colors of the camera video automatically.
   - Manual : You can adjust the red and blue gains of the camera video manually.
   - Outdoor : Automatically corrects the video colors of the camera to be optimized to the outdoor environment.
   - Indoor : Automatically corrects the video colors of the camera to be optimized to the indoor environment.
   - AWC : Corrects the colors of the camera video to be optimized to the current lighting condition and screen mode.
     To obtain the optimal condition for the current lighting, put the focus of the camera to a white paper and press the [**Set**] button. If the lighting environment is changed, you should readjust the settings accordingly.



■ In AWC mode, click the [**Set**] button if you want to keep the white balance level of the current image.

■ The white balancing may not work properly in the following conditions:
If this is the case, switch to AWC mode.
- If the surrounding condition of the object is out of the temperature correction range
  ex) Clear sky, sunset
- If the surrounding of the object is dark
- If the focus of the camera directly faces the florescent lighting or if the camera is installed in a place of variable illumination, the white balancing operation may be unstable.

To Set BLC

You can specify a desired area on the video manually and set the area to be displayed more clearly.

1. Select <**Back light**>.
2. Set <**Mode**> to <**BLC**>.
3. Set <**BLC level**>.
   You can change the level to adjust the brightness of the monitoring area.
4. Set the <**Top, Bottom, Left, Right**> levels to specify the target area.



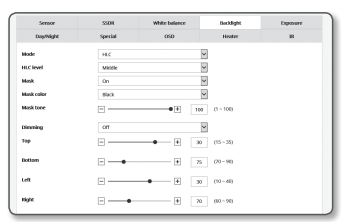
■ When setting BLC, a green box is displayed on the screen for 15 seconds.

■ To prevent malfunction at the time of BLC setup, the vertical space of the BLC area should be over 40 and below 60 while the horizontal space over 30 and below 60.

HLC (Highlight Compensation) Setup

If a strong light like a streetlamp or vehicle headlight points toward the camera, the area can be set to be cut off to prevent a saturated area on the monitor.

1. Select <**Back light**>.
2. Set <**Mode**> to <**HLC**>.
   - HLC level : This adjusts the brightness level to cut off the highlighted area.
   - Mask
     - Off : Does not block an area with a brightness that is a certain level or higher.
     - On : Always blocks an area with a brightness that is a certain level or higher.
     - Night only : No blocked area is generated if the surrounding environment becomes dark to a certain level.
     - All day : No blocked area is generated if the surrounding environment becomes dark or bright to a certain level.
   - Mask color : You can select the color of the blocked area.
   - Mask tone : You can adjust the brightness of the color in the blocked area.
   - Dimming : Detects an area on the screen with strong light, and adjusts the brightness and reduces the saturated area.
3. Set the <**Top, Bottom, Left, Right**> levels to specify the target area.



■ When setting HLC, a green box is displayed on the screen for 15 seconds.

■ To prevent malfunction at the time of HLC setup, the vertical space of the HLC area should be over 40 and below 60 while the horizontal space over 30 and below 60.

■ At night operation, this function will be activated only if the incoming highlight exceeds a certain area in a low contrast environment.

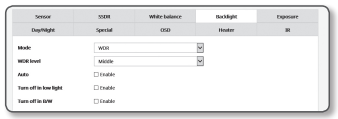
■ At night operation, HLC will not function in too a bright or too a dark scene.

■ During daytime operation, HLC will not work in dark condition.

To Set WDR

It displays a sharp image of the objects in a scene where both bright and dark areas exist.

1. Select <**Back light**>.
2. Set <**Mode**> to <**WDR**>.
3. Select each item and set it properly.
   - WDR level : Adjusts the intensity of backlight compensation.
   - Auto : Detects the surrounding environment and automatically uses backlight compensation.
   - Turn off in low light : Does not use automatic backlight compensation when detecting a dark environment.
   - Turn off in B/W : Does not use backlight compensation when switching to B/W mode.

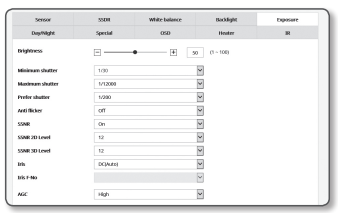


- It is recommended to use WDR in the indoor environment.
- Noise may exist between the dark area and the bright area in the WDR mode.
- With WDR mode On or Off, the minimum, maximum and user-preferred shutter value will be reset.
- If you use the P aperture lens manually or a shaking preventive shutter, the WDR performance is partially limited.
- In WDR mode, noise may occur in the motion area.

To Set Exposure

You can adjust the exposure level of the camera.

1. Select <**Exposure**>.
2. Select each item and set it properly.
   - Brightness : Adjust the screen brightness.
   - Minimum shutter : The limit of the longest exposure time.
     - Shutter is the mode to set up the range of the sensor exposure time which will specify the upper and lower limits for the electronic shutter movement.
     - The framerate may be reduced in the dark condition if Shutter has a lower value than specified in the Sensor mode.
   - Maximum shutter : The limit of the shortest exposure time.
   - Prefer shutter : Sets an appropriate exposure duration that is preferentially applied within the exposure duration range.
   - Anti flicker : It prevents screen flickering incurring from the dissonance between the surrounding lighting and the frequency.
   - SSNR
     - On : Noise of the video is removed.
     - Wise NR : Automatically adjusts the nose reduction level when there is a moving object in the video to increase the identifiability.



   - SSNR 2D Level : Adjusts the 2DNR level.
     - 2DNR : This is a method of reducing the noise by using the adjacent pixel information on a single video frame.
       If you increase the level, the noise will be reduced but the video may be blurred.
   - SSNR 3D Level : Adjusts the 3DNR level.
     - 3DNR : This is a method of reducing the noise by using multiple video frames.
       If you increase the level, the noise will be reduced but the video may drag.
   - Iris : Select it to set the camera lens to auto or manual.
     - DC(Auto) : The iris is automatically adjusted to the amount of the surrounding light.
     - Manual : Sets the iris F-No to manual.
     - P-Iris : This is the depth priority mode. You can close the shutter during the day to get good depths and in the nighttime, you can open the shutter to get more lights.
   - Iris F-No : Set up the F value of the iris.
   - AGC : Select AGC Control mode.
     Adjust the gain value of the video (that, in particular, was recorded at a low contrast scene and had a lower brightness level than normal) to control the video brightness.

- The image exposure can be saturated depending on the Shutter setup range.
- It may take some time from the point when you enable the WiseNR mode to the point when the effect is actually applied/released.
- When the WiseNR mode is enabled, the identifiability of the video will be improved, but the noise may be increased as well.
- In a bright environment with less noise, WiseNR may not be so effective.
- With intelligent NR enabled, the motion detection in the video will be performed according to the operation conditions of the motion detection event, as motion detection uses the motion detection function internally. For more information, please refer to "**Motion detection**" (page 57).

To Set Day/Night

1. Select <**Day/Night**>.
2. Select each item and set it properly.
   - Mode : Mode is used to adjust the color of Color or Black and White.
     - Color : The video is always output in color.
     - B/W : The video is always output in black and white.
     - Auto : Normally, it is set to Color but to B&W under low luminance at night.
       - If AGC of the <**Exposure**> menu is set to <**Off**>, the day/night mode cannot be set to <**Auto**>.



- External : It controls the color of the video when the alarm input terminal is synchronized with an external device.
- Schedule : Set the time during which the camera is operated in the color mode.

- Dwell Time : It specifies the period for which the selected brightness condition must be maintained to switch the lighting mode from Day to Night or vice versa.
- Duration : It specifies the interval of lighting mode conversion.
- Alarm in : The video is set to Color or B/W as the alarm sensor is open or closed.
  - If the Day/Night mode is set to External Input, the alarm input function of the Event-Alarm Input page is disabled.
- Activation time(Color) : It specifies the schedule for color mode operation.
  - If it is set, the Color mode is maintained from 00 second of the starting time to 59 second of the ending time.

- When you switch to day/night mode, motion detection mode does not work.

To Setup Special

1. Select <**Special**>.
2. Select each item and set it properly.
   - DIS : Compensates the image automatically when it is seen to shake for stable image output.
     - Mitigate the degree of image vibration when the camera vibrates due to the external factors such as wind.
   - Sharpness : Adjust the overall sharpness of the image. If selecting <**On**>, you can adjust the sharpness of the image.
   - Sharpness level : The higher the level is, the sharper and clearer the outline of the image becomes.
   - Gamma : Adjust the contrast of the image.
   - Contrast : Adjusts the difference between the darkest area and the brightest area in the video.
   - Color level : Adjust the strength of video color.
   - Defog : Compensate the video in the foggy or cloudy weather. It is set to <**Off**> as a default. Specials are used when the video looks blurry in the foggy weather.
     - Off : Disable the fog elimination function.
     - Auto : The image is automatically compensated according to the foggy level. Adjust <**Defog level**> to be more effective.
     - Manual : The user manually sets the amount of compensation for each image.

     - If the defog mode is set to <**Auto**>, the performance is proportional to the fog level. To keep the set defog level without regard to the fog level, set the defog mode to <**Manual**>.
     - If the manual defog level is high in a thin fog, the image may become too dark.
   - Defog level : Control the defog level.
   - LDC : To determine whether or not to use the image distortion correction.
   - LDC Level : To adjust the level of the distortion correction factor.



To Set OSD

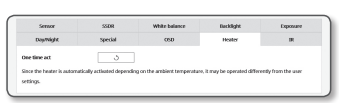
1. Select <**OSD**>.
2. Select each item and set it properly.
   - Camera title : It specifies the name of the camera to be displayed on the screen. Select the <**Use**> check box to add a camera name.
     - Add : Click the <**Add**> button and you can add a total of 5 lines, 17 characters per line and a total of 85 characters.
     - Preview : Click the <**Preview**> button to check the name of camera that will be displayed on the screen.
   - Camera title X, Y : It specifies the position of the camera name on the screen.
   - Date & time : Set the time display and date formats on the screen.
   - Date & Time X, Y : Specify the position of time display on the screen.
   - Weekday overlay : Specify the use of date display date on the screen.
   - Size : Sets the size of OSD to small/medium/large.
   - Color : Sets the color of the OSD to white/red/blue/green/black/gray.
   - Transparency : Sets the transparency of OSD to opaque / low / middle / high.



- A position-adjustable item (Camera title, Date & Time) may not be displayed normally if it overlaps with another fixed OSD item.
- Multilingual other than English: Input only in the selected language is available.

To set the heater

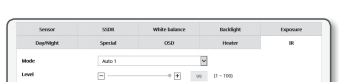
1. Select <**Heater**>.
   When frost forms, the user can click the button and turn on the heater for 30 minutes to remove the frost.



- At low temperature when frost is likely to form, the heater is always on; at a high temperature where the product can be affected by it, it does not operate, even when the request to operate has been sent.

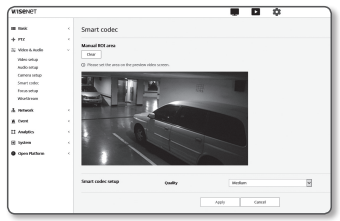
To Set IR

1. Select <**IR**>.
2. Select each item and set it properly.
   - Mode : When the IR indicator turns on in B/W mode, the screen will be protected from saturation on the center area so that you can identify a short-distant object.
     - Off : IR mode will be disabled.
     - Auto1 : Adjust the IR brightness according to the brightness of the object on the center screen.
     - Auto2 : The brightness of the IR is automatically adjusted according to the brightness of the object located in the middle or periphery of the screen.
     - Manual : Adjust the IR brightness manually.
   - Level : Adjust the level of IR in manual mode.



Smart codec

Set a desired area of the video incoming from the camera as ROI area and specify the detection sensitivity for the area.



1. From the Setup menu, select the <**Video & Audio ( )**> tab.
2. Click <**Smart codec**>.
3. Set the image quality.
   The ROI area will be displayed in the specified quality.
4. Specify an area of interest to monitor manually.
5. Select a desired area with the mouse pointer, and drag it as much as you want.
   - You can specify up to 5 distinct areas.
6. To cancel all the settings for the area, click the [**Clear**] button.
7. When done, click [**Apply**].

- The Smart codec will not be active if it is set to <**Off**> in <**Video profile**>. (page 37)

Focus setup

You can adjust the focus and zoom ratio of video image.

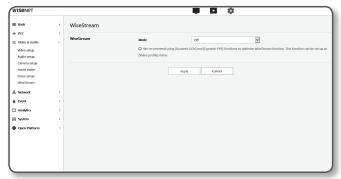


1. From the Setup menu, select the <**Video & Audio ( )**> tab.
2. Click <**Focus setup**>.
3. Set the focus according to the following procedures.
   1) Initialize focus : Click the [**Initialize focus**] button to return focus to the default position(x1).
   2) Focus (lens adjustment) : Adjusts the lens focus (Far ↔ Near) and sharpens the image.
   3) Zoom (lens adjustment) : Manually adjusts the magnifications (Wide ↔ Tele).
   4) Simple Focus : Drags the mouse on the screen to designate a position on which to set the auto focus. Press the [ ] button to automatically focus the video.

- The Simple focus mode may not fit correctly in the following cases:
  - Sudden change to the object in Simple focus mode (sudden movement, appearance or disappearance)
  - Radical change to the brightness in Simple focus mode
  - Image of a low contrast
  - If the camera is exposed to a strong light source in the front or surroundings
- In case the focus is inappropriate apart from mentioned above, use [-100 , -10 , -1 , 1 , 10 , 100] button to manually adjust the focus.
- In a situation where Simple focus is hardly applied, try to use the manual focus mode.

WiseStream

This is the feature that optimizes the size of the video data by reducing the bit rate through increasing the compression of the parts where there is no movement after detecting the complexity in the image.



1. From the Setup menu, select the <**Video & Audio ( )**> tab.
2. Click <**WiseStream**>.
3. Select wise stream mode.
   - Off : Wise Stream function will be disabled.
   - Low ~ High : use the wise stream to select the bit rate reduction level.
4. When done, click [**Apply**].

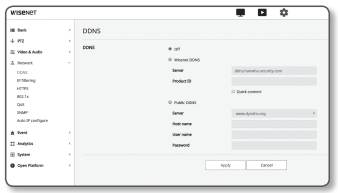
- In the following cases, the WiseStream function may malfunction.
  - Sudden screen switch may cause distortion of the video.
  - It is not appropriate to use in an environment with too much movement and motion on the screen.

NETWORK SETUP

DDNS

DDNS is an abbreviation of Dynamic Domain Name Service that converts the IP address of a camera into a general Host Name so that the user can easily remember it.

- You can use the DDNS service only if the internet is connected.



1. From the Setup menu, select the <**Network ( )**> tab.
2. Click <**DDNS**>.
3. Select the <**DDNS**> connection type.
4. Type in the DDNS items according to the selected type.
   - Wisenet DDNS : Select this if you use the DDNS server provided by Hanwha Techwin.
     - Product ID : Enter the product ID that is registered with the Wisenet DDNS service.
     - Quick connect : It sets port forwarding automatically when used with a UPnP (Universal Plug and Play) supporting router.

       - If you want to use the DDNS service without using a hub that supports the UPnP function, click Quick connect, then go to the hub menu and activate port forwarding for your hub.
         For more on how to set port forwarding for your hub, refer to "**Port Range Forward (Port Mapping) Setup**". (page 28)

   - Public DDNS : Select one of provided public DDNS servers when you use a public DDNS server.
     - Server : Select desired public DDNS service server.
     - Host name : Enter the name of the host that is registered with the DDNS server.
     - User name : Enter the user name for the DDNS service.
     - Password : Enter the password for the DDNS service.
5. When done, click [**Apply**].

- If selected <**Quick connect**>, be sure to select Wisenet DDNS service.

Registering with DDNS

To register your product with the Wisenet DDNS

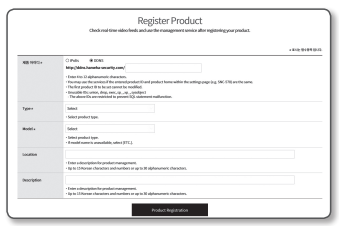
1. Visit the Wisenet DDNS web site (http://ddns.hanwha-security.com) and sign in with a registered account.



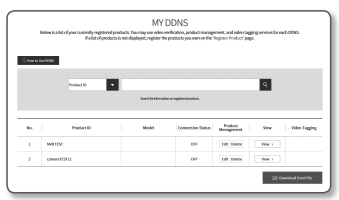
2. From the top menu bar, select <**MY DDNS**>.



3. Click the [**Register Product**] tab.
4. Enter the product ID.

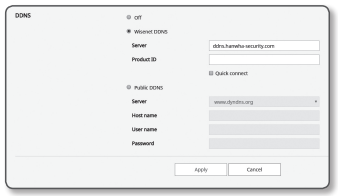


5. Select a <**Type**> and specify the <**Model**>.
6. Specify the product location with a description if necessary.
7. Click [**Product Registration**].
   The product will be added to the product list that you can check.



To connect to the Wisenet DDNS in camera setup

1. From the DDNS setup page, set <**DDNS**> to <**Wisenet DDNS**>.
2. Provide the <**Product ID**> that you registered product ID with the DDNS site.
3. Click [**Apply**].
   When the connection is successfully made, you will see the message of <**(Success)**> on the screen.



Configuring public DDNS in Camera Settings

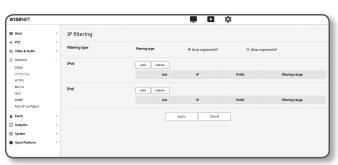
1. Open the DDNS settings page and select <**Public DDNS**> for <**DDNS**>.
2. Enter the corresponding site's host name, user name and password.
3. Click [**Apply**] button.
   If the connection properly establishes, <**(Success)**> appears.
4. When done, click [**Apply**].

- To use DDNS service properly, both DDNS setup and the router's port forwarding setup are required.
  For port forwarding setup, refer to "**Port Range Forward (Port Mapping) Setup**". (page 28)

IP filtering

You can create a list of IPs that you want to grant or deny access to them.

1. From the Setup menu, select the <**Network ( )**> tab.
2. Click <**IP filtering**>.
3. Select <**Filtering type**>.
   - Deny registered IP : If selecting this, access from those IPs that are added to the filtering will be restricted.
   - Allow registered IP : If selecting this, access from only those IPs that are added to the filtering will be accepted.
4. Click the [**Add**] button.
   The IP list will be created.
5. Provide the IP that you want to grant or deny access from.
   When you enter an IP address and a Prefix, the list of IP addresses available will appear in the right-side filter range column.



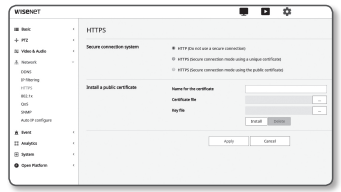
- If selected <**Allow registered IP**> for IP Filtering and <**IPv6 setup**> of <**IP & Port**> is set to <**Use**>, both IPv4 and IPv6 addresses of the computer currently configuring should be assigned.
- The IP address of the computer used for the current setup cannot be added to <**Deny registered IP**>, it should be added to <**Allow registered IP**>.
- Only the IP addresses that are set to <**Use**> will be displayed in the filter column.

6. Select an IP to delete from the list.
   Click the [**Delete**] button.
7. When done, click [**Apply**].

HTTPS

You can select a secure connection system or install the public certificate for this purpose.

1. From the Setup menu, select the <**Network ( )**> tab.
2. Click <**HTTPS**>.
3. Select a secure connection system.
   - To access the camera using HTTPS mode, you have to type the IP address for the camera in the form of "https://<Camera_IP>".
     If you failed to configure the Web viewer settings in HTTPS mode with Internet Explorer, edit the Internet options as follows: <Menu → Tools → Internet Options → Advanced → Security → Uncheck TLS 1.0, and check TLS 1.1, TLS 1.2>



4. Search for the public certificate that you want to install on the camera.
   To install the certificate on the camera, you need to provide a certificate name (it can be arbitrarily assigned by the user), certificate file issued from the certification authority and a key file.
   - The <**HTTPS (Secure connection mode using the public certificate)**> item will be active only if there exists a public certificate installed.
5. When done, click [**Apply**].

Installing the certificate

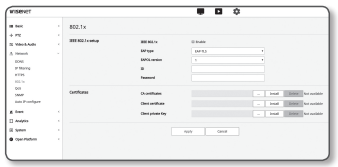
1. Enter the certificate name.
2. Click the [**Browse ( )**] button, select the public certificate file and key file to be installed, and then click the [**Install**] button.

Deleting the certificate

1. Click [**Delete**] button.
2. To delete a public certificate, you should access the network video decoder in the mode of <**HTTP (Do not use secure connection)**> or <**HTTPS (Secure connection mode using a unique certificate)**>.

802.1x

When connecting network, you can choose whether using 802.1x protocol, and then install the certification.



1. From the Setup menu, select the <**Network ( )**> tab.
2. Click <**802.1x**>.
3. Set the <**IEEE 802.1x setting**>.
   - IEEE 802.1x : Specify the use of the 802.1x protocol.
   - EAP type : Select EAP-TLS or LEAP.
   - EAPOL version : Select version 1 or 2.
   - ID : Enter the client certificate ID in EAP-TLS and the user ID in LEAP.
   - Password : Enter the client private key password in EAP-TLS and the user password in LEAP. You do not have to enter the password in EAP-TLS if it uses a key file that is not encrypted.

- If the connected network device does not support the 802.1x protocol, the protocol will not operate properly even if you set it.
- LEAP is an authentication method with poor security. Use it only in an environment where EAP-TLS is not available.

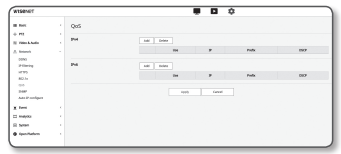
4. Install/remove the certificate.
   The certificate is needed only for EAP-TLS.
   - CA certificates : Select a public certificate that contains the public key.
   - Client certificate : Select a public certificate that contains the client certificate key.
   - Client private Key : Select a public certificate that contains the client private key.
5. When done, click [**Apply**].

To install/remove 802.1x related certificates

1. Press the [**Browse (...)**] button for each item and select a certificate to install.
2. If no certificate is installed, you will see “Not Available” appearing next to the selected item.
3. Press the [**Install**] button to start installation with a message of “Installed” next to the item.
4. Press the [**Delete**] button to remove the certificate.

QoS

You can specify the priority to secure a stable transfer rate for a specific IP.



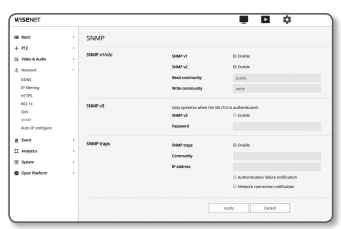
1. From the Setup menu, select the <**Network ( )**> tab.
2. Click <**QoS**>.
3. Click the [**Add**] button.
   The IP list will be created.
4. Enter an IP address to which you will apply QoS.

- The default prefix for IPv4 is 32;
  For DSCP, the default is set to 63.
- Only the IP addresses that are set to <**Use**> can be prioritized.

5. Select an IP to delete from the list.
   Click the [**Delete**] button.
6. When done, click [**Apply**].

SNMP

With the SNMP protocols, the system or network admin can monitor the network devices on a remote site, and configure the environment settings.



1. From the Setup menu, select the <**Network ( )**> tab.
2. Click <**SNMP**>.
3. Specify the <**SNMP**>.
   - Enable SNMP v1 : SNMP version 1 will be active.
   - Enable SNMP v2c : SNMP version 2 will be active.
     - Read community : Provide the name of the read community where you can access to the SNMP information.
       The default name is <**public**>.
     - Write community : Provide the name of the write community where you can access to the SNMP information. The default name is <**write**>.
   - Enable SNMP v3 : SNMP version 3 will be active.
     - Password : Specify the default password for SNMP version 3.
       - The default password can be exposed to a hacking thread so it is recommended to change the password after installing the product.
         Note that the security and other related issues caused by the unchanged password shall be responsible for the user.
       - Password should be longer than 8 characters, no more than 16 characters.

- Enable SNMP Trap : SNMP trap is used to send important events and conditions to the Admin.
  - Community : Enter the trap community name to receive messages.
  - IP address : Enter the IP address to which messages will be sent.
  - Authentication failure notification : It specifies whether an event shall be generated when the community information is invalid.
  - Network connection notification : It specifies whether an event shall be generated when the network disconnection is restored.

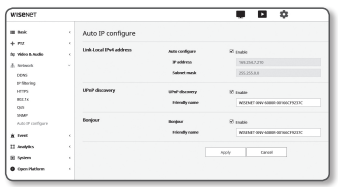
4. When done, click [**Apply**].

- SNMP v3 is only able to be set when the secure connection mode is HTTPS.
  Refer to "**HTTPS**". (page 49)
- If you don't use SNMP v3, there may be a security issue.

Auto IP configure

You can set the IP available for access and camera searching automatically.

1. From the Setup menu, select the <**Network ( )**> tab.
2. Click <**Auto IP configure**>.
3. Set the <**Link-Local IPv4 address**>.
   An additional IP address may be assigned to assess the camera from the Link-Local network.
   - Auto configure : It specifies Able or Disable for the Link-Local IPv4 address.
   - IP address : Display the assigned IP address.
   - Subnet mask : Display the subnet mask of the assigned IP.



4. Set the <**UPnP discovery**>.
   Cameras can be automatically searched in the client and operating system in support of the UPnP protocol.
   - UPnP discovery : It specifies Able or Disable for UPnP Discovery.
   - Friendly name : Display the camera name.
     Friendly name is displayed in the format of WISENET-<Model Name>-<MAC Address>.

- In the Windows operating system which basically supports UPnP, the cameras connected to the network are displayed.

5. Set the <**Bonjour**>.
   Cameras can be automatically searched in the client and operating system in support of the Bonjour protocol.
   - Bonjour : It specifies Able or Disable for Bonjour.
   - Friendly name : Display the camera name.
     Friendly name is displayed in the format of WISENET-<Model Name>-<MAC Address>.

- In the Mac operating system, which support Bonjour by default, the connected cameras are automatically displayed in the Bonjour bookmark of the Safari web browser.
  If the Bonjour bookmark is not displayed, check Bookmarks Setup in the "Preference" menu.

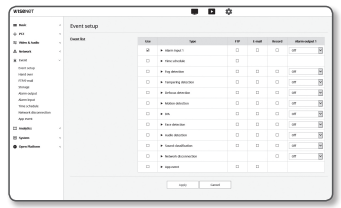
6. When done, click [**Apply**].

EVENT SETUP

Event setup

You can easily set the event detection items, and move to the detailed setting.

1. From the Setup menu, select the <**Event ( )**> tab.
2. Click <**Event setup**>.
3. Activate desired items on the Event list.
4. When done, click [**Apply**].

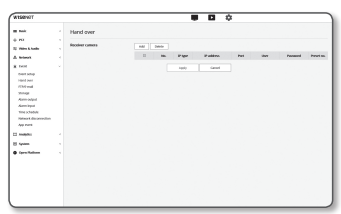


- To configure detailed event settings, click a desired type. You will be redirected to the detailed settings.

Hand over

Event detection can be used in conjunction with an additional network camera with a PTZ preset function. When an event is detected, the interworking PTZ camera moves to the preset position and can perform monitoring.

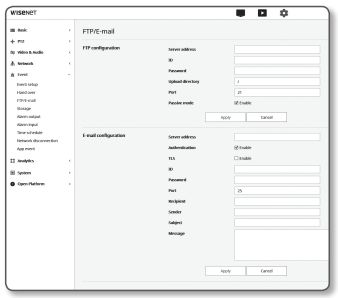
1. From the Setup menu, select the <**Event ( )**> tab.
2. Click <**Hand over**>.
   - Receiver camera : Register the camera that is to be interworking with event detection. Click [**Add**] at the top of the menu to enter the IP, port, ID, password of the camera to be interworked, and the preset number to move to when detecting an event.
     - Hand over can be used for motion detection/tamper detection/sound classification/IVA event detection.
     - Only operates normally if the preset set in the receiver camera is specified.
     - Hand over supports only one preset per area.



3. When done, click [**Apply**].

FTP / E-mail

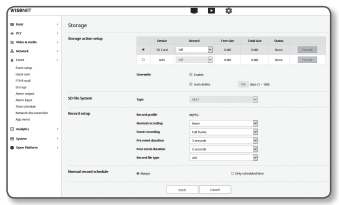
You can configure the FTP/E-mail server settings so that you can transfer the images taken with camera to your PC if an event occurs.



1. From the Setup menu, select the <**Event ( )**> tab.
2. Click <**FTP / E-mail**>.
3. Select <**FTP configuration**> or <**E-mail configuration**> and enter / select a desired value.
   - FTP configuration
     - Server address : Enter the IP address of the FTP server that you transfer the alarm or event images to.
     - ID : Enter the user ID with which you will log in to the FTP server.
     - Password : Enter the user account password for logging into the FTP server.
     - Upload directory : Specify the FTP path where you will transfer the alarm or event images.
     - Port : The default port of the FTP server is 21; however, you can use a different port number according to the FTP server settings.
     - Passive mode : Select <**On**> if you need to connect in passive mode due to the firewall or the FTP server settings.
   - E-mail configuration
     - Server address : Enter the SMTP address of the email server that you transfer the alarm or event images to.
     - Authentication : Select whether to use authorization.
     - TLS : Specify the use of TLS.
     - ID : Enter the user ID for logging into the email server.
     - Password : Enter the user account password for logging into the email server.
     - Port : The default port of the email server is 25; however, you can use a different port number according to the email server settings.
     - Recipient : Enter the address of the email recipient.
     - Sender : Enter the address of the email sender. If the sender address is incorrect, the email from the sender may be classified as SPAM by the email server and thus may not be sent.
     - Subject : Enter a subject for your email.
     - Body : Provide the text for the massage. Attach the alarm or event images to the email that you are preparing.
4. When done, click [**Apply**].

Storage

You can activate recording on your device, set the recording conditions, check the saved data capacity and format the device itself.



1. From the Setup menu, select the <**Event ( )**> tab.
2. Click <**Storage**>.
3. Select a device to save data in.

- If your device is properly recording data, it will display "**Recording**".
- If you see an "Error" message, check the following:
  - Check the storage to see if it is connected to the device.
  - Check the files in the storage to see if they are damaged.
  - Check the storage to see if they are physically damaged.
- If the "Error" message does not disappear after following the instructions, format the Micro SD card. After formatting, if the error message still remains, replace the Micro SD card.
- If you remove the Micro SD card without changing a button to 'off' position in settings or if you connect a camera to an unstable power source, the Micro SD card may be damaged.

To make recording on the Micro SD memory

1. Set the SD card unit to <**On**>.
2. Click the [**Apply**] button.
3. Check the memory card's <**Free size**> and <**Total size**>.
   You can format the Micro SD card by clicking the <**Format**> button.
   - Some frames may be skipped if the Micro SD memory card operates at the lower speed than recommended. For more details, refer to "**Recommended Micro SD/SDHC/SDXC Memory Card Specifications**". (Page 6)
   - For a Micro SD memory card with a large capacity, the formatting will be slowed down accordingly.
   - The data traffic will increase when the camera is set to higher resolution, higher bit rate, and/or higher framerate. If there is too much data traffic, some frame may be skipped although it is stored in a full frame.
   - When a frame skip occurs, images are saved at the rate of min. one image per sec.
4. Specify the storage action.
   - Overwrite : If the Micro SD memory is full, this will delete old data and store new data in replacement.
   - Auto delete : Data for a certain period is deleted, while other data is not deleted. This can be set within the range of one day to 180 days.

- If the storage period is expired, data is automatically deleted and new data will be recorded. Once deleted, it cannot be recovered.

5. Set <**SD File System**>.
   - Type : Camera supports VFAT and ext4 as an SD card file system, which can be configured by the user. (However, in case of ext4 file system, an additional application is required to recognize the Windows operating system)

   ▪ If the settings are changed, the existing data will be formatted.

   ▪ It may take up to 10 minutes to format an SD card in the ext4 file system.

6. Set up items to be saved.
   - Record profile : The name of profile to be recorded is displayed.
   - Normal recording : Make recording at a certain frame rate.
   - Event recording : Set the recording type for a certain event that occurs.
   - Pre event duration : Specify the time point before the occurrence of the alarm; starting from the time point, the images will be transferred. You can specify up to 5 seconds before the occurrence of the alarm.
   - Post event duration : Specify the time point after the occurrence of the alarm; to the specified time point, the images will be transferred. You can specify up to 120 seconds after the occurrence of the alarm.
   - Record file type : It specifies the file format of the recorded images.
     - STW : It is Hanwha Techwin's unique file format.
     - AVI : It is the conventional avi format.

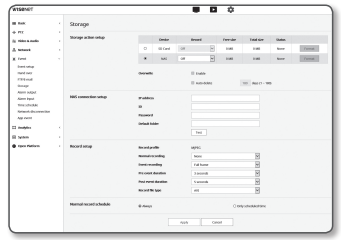
   ▪ If the Record file type is changed, the existing data is formatted.

7. Specify the <**Normal record schedule**>.
   - Always : Always save recorded video in the Micro SD memory card.
     ▪ If set to Always, the activation time cannot be changed.
   - Only scheduled time : Records only on the specified time of the specified day of week.
8. When done, click [**Apply**].

If you want to record in your NAS

1. Set the saving operation and basic recording.

   ▪ Auto deletion is supported only if your NAS meets the recommended specifications.



2. Enter the information registered in your NAS.
   - IP address : Unique IP address assigned to the NAS.
   - ID : An ID registered in the NAS.
   - Password : Password registered in the NAS.
   - Default folder : Designate the NAS user folder to save data in.
3. Click the [**Test**] button to see if you can successfully connect to the NAS.

   ▪ If the success message is displayed, it means that you can successfully save data in the NAS.

   ▪ If the fail message is displayed, check the following.
     - Confirm that the IP address of the NAS is valid.
     - Confirm that the ID/password of the NAS is valid.
     - Confirm that you can access the folder designated as the default folder using the ID of the NAS.
     - Confirm that the NAS SMB/CIFS items are unchecked.
     - Confirm that the NAS IP address and the camera IP address are in the same format.
       ex) The NAS & camera subnet mask initial value is 255.255.255.0.
       If the IP address is 192.168.20.32 then the NAS IP address should be in the range of 192.168.20.1~192.168.20.255.
     - Check whether you tried to access as another user without formatting the default folder saved or used.
     - Confirm that you used recommended NAS equipment.
4. After the settings are completed, set the NAS unit to <**On**>.
5. Click the [**Apply**] button.
6. Log in the NAS and check the <**Free size**> and <**Total size**>.
   You can format the default folder specified in the NAS connection setting by clicking the <**Format**> button.
   ▪ Since data may not be saved after a temporary network interruption when using NAS, it is recommended that you use SD at the same time to prevent loss of recorded images.
   ▪ The data traffic will increase when the camera is set to higher resolution, higher bit rate, and/or higher framerate. If there is too much data traffic, some frame may be skipped although it is stored in a full frame.
   ▪ When a frame skip occurs, images are saved at the rate of min. one image per sec.

NAS (Network Attached Storage) guide

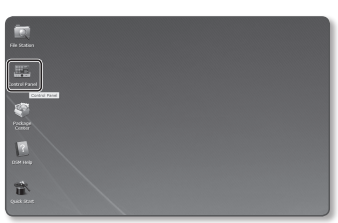
- Since data may not be saved after a temporary network interruption when using NAS, it is recommended that you use SD at the same time to prevent loss of recorded images.
- If the setting allows a Micro SD memory card and the NAS to be simultaneously connected for use, the higher priority for recording goes to the NAS.
- If you activate Overwrite to the NAS by setting it to <**Off**> and the available capacity is below 20%, it will be saved in the Micro SD card.
- If you are saving data in the NAS, you might be unable to save it when you insert a Micro SD memory card used by another camera.
- NAS recommended specs : Refer to "**NAS recommended specs**". (Page 6)
- If you change the NAS saving while saving data in the NAS, it will not be reflected in the system immediately.
- If you remove NAS equipment on your own while saving data, or if the network is disconnected, NAS saving operation will be terminated abnormally.
- NAS saving allows only one camera to a folder. Logging in with another camera is not allowed, and the images will not be saved.

The following is a description of how to save data using the NAS according to the Synology NAS method, which is one of the recommended products.

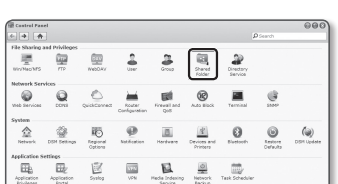
1. Access the Synology NAS as an admin.
   In this example, the NAS IP Address is set to [**192.168.20.253**].



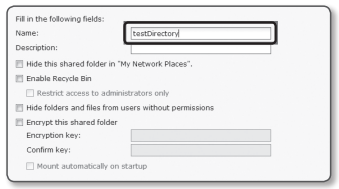
2. If you access it as an admin, the following screen will be displayed. Click the [**Control Panel**].



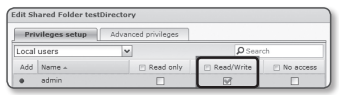
3. Click the <**Shared Folder**> in the file sharing and privilege menu.



4. Click the [**Create**] button.
5. After entering the shared folder name(ID), click the [**OK**] button to create a shared folder.
   In this example, the shared folder name is [**testDirectory**].



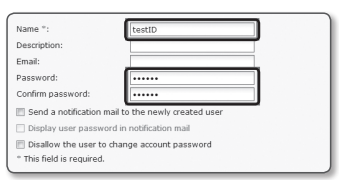
6. In Windows, for NAS access, set the privilege for the shared folder as follows.
   Check the admin's [**Read/Write**].



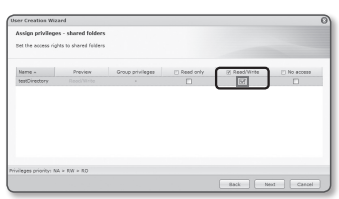
7. Click on the <**User**> in the file sharing and privilege menu.



8. After clicking the [**Create**] button, enter name(ID) and password.
   In this example, name(ID) is set to [**testID**] and password is also set to [**testID**].



9. In Windows, set the privilege for NAS access.
   For the shared folder created in step 4 called "testDirectory" check [**Read/Write**].



10. Basic setting in the NAS is completed.
Connect your camera to the actual NAS.
As shown below, enter the NAS connection setting items.



11. After entering item 10, check <**On**>.

12. Click the [**Apply**] button.
Finish saving by using the NAS.



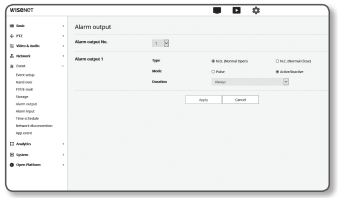
Alarm output

1. From the Setup menu, select the <**Event ( )**> tab.

2. Click <**Alarm output**>.

3. Configure the camera alarm output settings.

- If you change the alarm output type, the alarm out button on the monitoring page and alarm output type displayed on Event Setup page will be changed accordingly.



- Type
  - N.O. (Normal Open) : Considers “Open circuit” status of the sensor or alarm input device as normal, and triggers alarm event if becomes “Closed circuit” status.
  - N.C. (Normal Close) : Considers “Closed circuit” status of the sensor or alarm input device as normal, and triggers alarm event if becomes “Open circuit” status.
- Mode : Sets the alarm output method.
  - There is difference between operations when clicked alarm output button while disabled.
  - Pulse : It is activated during the time period specified by the duration (switching interval) and then becomes inactive automatically.
  - Active/Inactive : It maintains as activated until the user clicks the button again to make it inactive.
- Duration : Set the alarm duration that maintains activated if the mode is set to pulse, from 1 to 15 seconds.

4. When done, click [**Apply**].

Alarm input

You can set the alarm input type, activation time, and operation mode.

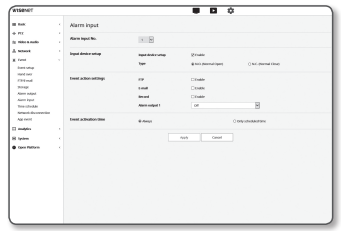
1. From the Setup menu, select the <**Event ( )**> tab.

2. Click <**Alarm input**>.

3. Set whether or not to <**Enable**>.

4. Select the type.

- N.O. (Normal Open) : It is normally open, but if it is closed, an alarm will be triggered.
- N.C. (Normal Close) : It is normally closed, but if it is open, an alarm will be triggered.



5. Specify the <**Event activation time**>.

- Always : Always check if an alarm occurs. It activates in operated mode when the alarm occurs.
  - If set to <**Always**>, the activation time cannot be changed.
- Only scheduled time : Check if an alarm occurs at a specified day of the week for a specified time period. It activates in operated mode when the alarm occurs.
  - [1 min | 30 min | 1 h] : Sets the time display format on the vertical axis.
  - [Reset] : Reset all settings.

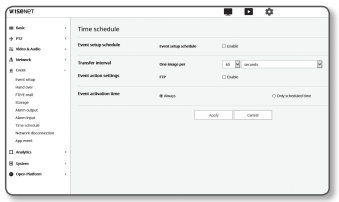
6. Specify an operation that will perform if an alarm occurs.

- FTP : Specify the use of FTP transfer in the alarm input setup.
  - Refer to “**FTP / E-mail**” for more details. (page 52)
- E-mail : Specify the use of email transfer in the alarm input setup.
  - Refer to “**FTP / E-mail**” for more details. (page 52)
- Record : You can set up the alarm to record to a Micro SD card or an NAS when operating.
  - Set <**Device**> to <**On**> in <**Storage**>. (page 52)
- Alarm output1 : Select whether to set the alarm output if an alarm is incoming, and specify the alarm output time.

7. When done, click [**Apply**].

Time schedule

You can configure settings to transmit images at regular intervals at a scheduled operation time regardless of the occurrence of an event.



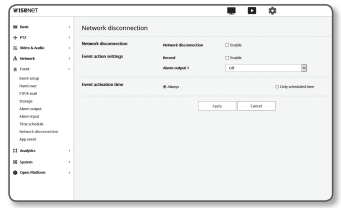
1. From the Setup menu, select the <**Event ( )**> tab.
2. Click <**Time schedule**>.
3. Set whether or not to <**Enable**>.
4. Specify the <**Transfer interval**>.
5. Specify the <**Event activation time**>.
   - Always : Always activates in operated mode at the set interval.
   - Only scheduled time : Periodically activates in operated mode at a specified time and date.

> ■ The transfer interval setting value must be smaller than the preset activation interval to succeed in image transmission.

6. Specify the activation conditions.
   - FTP : Specify the use of the FTP transfer if an event occurs.
     - ■ Refer to "**FTP / E-mail**" for more details. (page 52)
7. When done, click [**Apply**].

Network disconnection

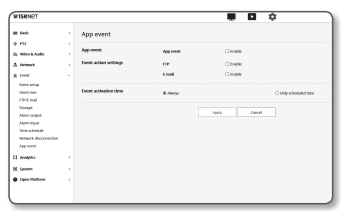
When the network is physically disconnected, it is considered as an event to be saved.



1. From the Setup menu, select the <**Event ( )**> tab.
2. Click <**Network disconnection**>.
3. Set whether or not to <**Enable**>.
4. Configure the event motion schedule and event motion conditions.
   - ■ For more information about <**Event activation time**> and <**Event action settings**>, refer to "**Alarm input**". (page 55)
5. When done, click [**Apply**].

App event

You can set the system to generate signals for the events defined on the application. The event signals provided vary depending on the application function.

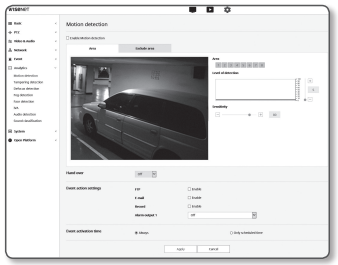


1. From the Setup menu, select the <**Event ( )**> tab.
2. Click <**App event**>.
3. Set whether or not to <**Enable**>.
4. Configure the event motion schedule and event motion conditions.
   - ■ For more information about <**Event activation time**> and <**Event action settings**>, refer to "**Alarm input**". (page 55)
5. When done, click [**Apply**].

CONFIGURE ANALYSIS SETTINGS

Motion detection

You can configure settings to generate an event signal when a motion is detected.

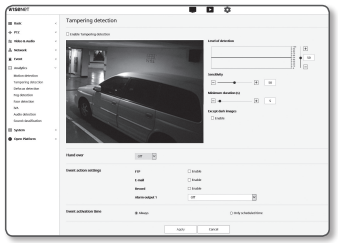


1. From the Setup menu, select the <**Analytics ( )**> tab.
2. Click <**Motion detection**>.
3. Set whether or not to <**Enable Motion detection**>.
4. Set an <**Area**> and <**Exclude area**>.
   You can set up to 8 areas.
   You can specify level and sensitivity settings separately for each area.
   A single area supports a shape with up to 8 vertexes.
   Select 4 vertexes on the video using the mouse to create a rectangle, and select each line of the rectangle and add up to 4 more points to create a desired shape.
5. Configure settings for each item.
   - Level of detection : If the motion is greater than the level configured, a motion detection event is generated.
     Even on the chart, if the motion is greater than the boundary of the level configured, the color is displayed differently.
   - Sensitivity : Sets the sensitivity of motion detection for each area. Decrease the sensitivity in an environment where the background and the object are clearly distinguished, and increase the sensitivity in a dark environment where the background and the object cannot be clearly distinguished.
6. Select whether or not to use the hand over.
   When a motion is detected in the set detection area, a specific camera moves to a specific PTZ preset position.
   - You can specify cameras by detection area.
7. Configure the event motion schedule and event motion conditions.
   - For more information about <**Event activation time**> and <**Event action settings**>, refer to "**Alarm input**". (page 55)
8. When done, click [**Apply**].

- Use continuous recording rather than motion detection event recording in areas where motion detection is frequent.
- Since the log is recorded once every 5 minutes, the buffered motion detection log data may be damaged when the power is turned off.
- Detected size of an object may have difference with the actual size according to its shape.
- In the following cases, motion detection performance may be impaired or a malfunction may occur.
  - The object color or brightness is similar to the background.
  - Small activities around the border area of the camera's field of view.
  - Multiple movements continue occurring at random due to a scene change, rapid lighting changes or other reasons.
  - A fixed object continues moving in the same position.
  - Motions of less position changing such as approaching to the camera or fading away from the camera.
  - Moving object approaches to the camera too close
  - An object hides other objects behind.
  - Too fast object (for a proper detection, one object should be found overlapping between contiguous frames).
  - Reflection / blur / shadow due to a strong light such as direct sunlight, illumination, or headlamp.
  - In severe snow, rain, wind or in dawn / dusk.

Tampering detection

You can set to detect tampering attempts and trigger events, such as sudden change of camera's framing direction, blocked lens and other overall change of scenes from the video.

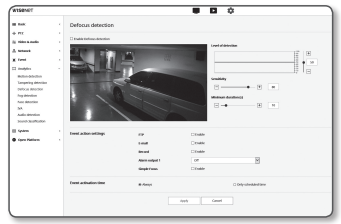


1. From the Setup menu, select the <**Analytics ( )**> tab.
2. Click <**Tampering detection**>.
3. Set whether or not to <**Enable Tampering detection**>.
4. The chart represents the degree of tempering. Set the level sensitivity of tempering to detect (range: 1 to 100).
5. Set the sensitivity.
   The higher the set value, the more sensitive the camera reaction (range: 1 to 100).
6. Specify the minimum monitoring duration.
   An event signal is generated if a state higher than the detection level remains for the minimum monitoring duration (unit: seconds)
7. Specify whether to exclude dark areas.
   This function makes it difficult to distinguish darkness due to de-illumination from darkness due to being blocked by an object. Despite this property, if you want to exclude an alarm for sudden changes in screen brightness such as de-illumination, you should enable this function.
8. Select whether or not to use the hand over.
9. Configure the event motion schedule and event motion conditions.
   - For more information about <**Event activation time**> and <**Event action settings**>, refer to "**Alarm input**". (page 55)
10. When done, click [**Apply**].

- The detection will be restarted after stabilization for a certain period of time (about 5 seconds). During stabilization, detection is not available.
- If false alarms are frequently generated, you should gradually decrease the sensitivity to minimize false alarms.
- If you use a low sensitivity, alarms may be generated even by very small changes on the screen, but false detection may occur in response to changes in moving objects or brightness.
- In the following cases, the tempering detection function may malfunction.
  - Monitoring environment with simple background, night and low light level environment.
  - Severe camera vibration or sudden lighting changes

Defocus detection

You can configure settings to generate an alarm signal when a defocus of the camera lens is detected.

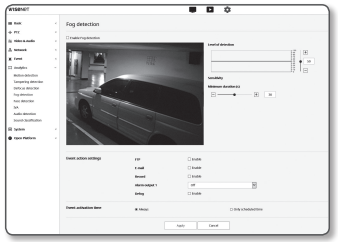


1. From the Setup menu, select the <**Analytics ( )**> tab.
2. Click <**Defocus detection**>.
3. Set whether or not to <**Enable Defocus detection**>.
4. Configure settings for each item.
   - Level of detection : An alarm is generated if the current level is higher than the detection level configured.
   - Sensitivity : The higher the intensity is, the higher the level of the chart that is output for the same video.
   - Minimum duration (s) : An alarm is generated if the level state higher than the detection level remains continuously for the minimum monitoring duration configured.
5. Configure the event motion schedule and event motion conditions.
   - Simple Focus : Specifies whether to use the simple defocus function when defocus is detected.
   - For more information about <**Event activation time**> and <**Event action settings**>, refer to "**Alarm input**". (page 55)
6. When done, click [**Apply**].

- After an alarm for defocus detection is generated, if you want to receive an alarm for defocus detection again, you need to return to a stable state at least once. Examples of returning to a stable state are as follows.
  - Use Defocus Detection check box is deselected
  - Video identification is available, as simple focus is activated
  - If an object in the video moves to a position at which good focus is ensured and thus an identifiable tempering is detected
- In the following cases, the defocus detection performance may be impaired or a malfunction may occur.
  - Monotonous monitoring environment, night or low illumination environment
  - Sudden changes in the illumination (e.g. indoor light shutting off)
  - Lens blocked by a large object that covers almost all of the screen
  - Changes the focus object by changing the camera position.

Fog detection

You can configure settings to generate an event signal when fog is detected.

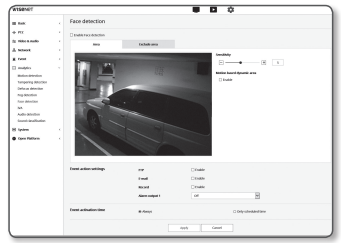


1. From the Setup menu, select the <**Analytics ( )**> tab.
2. Click <**Fog detection**>.
3. Set whether or not to <**Enable Fog detection**>.
4. Configure settings for each item.
   - Level of detection : An alarm is generated if the current level is higher than the detection level configured.
   - Sensitivity : The higher the intensity is, the higher the level of the chart that is output for the same video.
   - Minimum duration (s) : An alarm is generated if the level state higher than the detection level remains continuously for the minimum monitoring duration configured.
5. Configure the event motion schedule and event motion conditions.
   - Defog : Specifies whether to use the fog removal function when fog is detected.
   - For more information about <**Event activation time**> and <**Event action settings**>, refer to "**Alarm input**". (page 55)
6. When done, click [**Apply**].

- After an alarm for the fog detection is generated, if you want to receive an alarm for fog detection again, you will need to return to a stable state at least once. Video improvement after fog removal is not recognized as a stable state. Examples of returning to a stable state are as follows.
  - Use Fog Detection check box is deselected.
  - Video is identifiable as fog or smoke disappears.
- In the following cases, fog detection performance may be impaired or a malfunction may occur.
  - Monotonous monitoring environment, night or low illumination environment
  - Sudden changes in the illumination (e.g. indoor light shutting off)
  - Lens blocked by a large object that covers almost all of the screen
  - Changes the focus object by changing the camera position.

Face detection

You can configure the settings to generate an event signal in response to the detection of a face in the specified area.

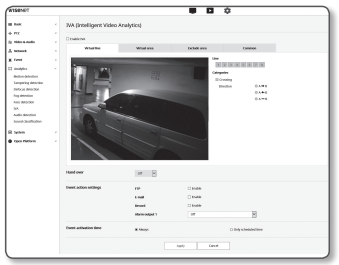


1. From the Setup menu, select the <**Analytics ( )**> tab.
2. Click <**Face detection**>.
3. Set whether or not to <**Enable Face detection**>.
4. Set an <**Area**> and <**Exclude area**>.
   - You can set an area of interest only in a rectangular shape.
   - A face that is smaller than the circle marked in the center of the area of interest is not detected.
5. Set the sensitivity level.
   - The higher the sensitivity, the more detailed and precise face detection is available.
6. If you use <**Motion based dynamic area**>, the position and size of the ROI area are automatically adjusted according to the location where the motion occurred on the monitoring screen.
7. Configure the event motion schedule and event motion conditions.
   - For more information about <**Event activation time**> and <**Event action settings**>, refer to "**Alarm input**". (page 55)
8. When done, click [**Apply**].

- In the following cases, face detection performance may be impaired or a malfunction may occur.
  - The angle or slope of the face is different from the imaging direction (e.g. handstand)
  - The person is wearing any accessories that cover the face such as glasses, sunglasses, hat or mask
  - The face is blurred as the camera is not focused
  - At night or in a low luminance environment
  - The brightness of the face is abnormal due to the lighting direction such as backlight

IVA (Intelligent Video Analysis)

You can configure settings to generate an event signal when a motion or situation meeting the specified event rules is detected.



1. From the Setup menu, select the <**Analytics ( )**> tab.
2. Click <**IVA**>.
3. Set whether or not to <**Enable IVA**>.
4. Configure rules to detect. For more information about settings, refer to "**IVA rule settings**".
   Configurable rules are as follows.
   - Crossing : You can detect an object passing in the selected direction on a specified virtual line.
   - Intrusion : You can detect the emergence of a moving object within a virtual area.
   - Enter : Detects an object entering from the outside to the inside of the virtual area.
   - Exit : Detects an object exiting from the inside to the outside of the virtual area.
   - Appear(Disappear) : Detects a new object appearing inside a virtual area, which is monitored for a specified period of time after its position is fixed, or detects a fixed object that disappears and is not monitored for the monitoring duration.
   - Loitering : Detects an object wandering inside the virtual area for longer than the monitoring duration.
5. Select whether or not to use the hand over.
6. Select area(s) that you don't want to include in the analysis, and excluded area(s).
7. Set the sensitivity level and a size of interest (if necessary).
   For more information about settings, refer to "**IVA general setting**".
8. Configure the event motion schedule and event motion conditions.
   - For more information about <**Event activation time**> and <**Event action settings**>, refer to "**Alarm input**". (page 55)
9. When done, click [**Apply**].

IVA rule settings

You can configure individual analysis rules as follows.

- **Crossing**

1. Select the <**Virtual line**> tab.
2. Left-click on the screen to specify the start and end of the line at a desired position to detect.
3. Select a direction of interest.
4. When done, click [**Apply**].
5. To remove the rules that have been configured, right-click on the line and click the [**OK**] button in the pop-up window that appears.

- **Intrusion, Enter, Exit, Appear(Disappear), Loitering**

1. Click on the <**Virtual area**> tab.
2. Left click on the screen to specify 4 vertexes at desired positions.
3. From the virtual area that has been configured, select an analysis category.
4. When done, click [**Apply**].
5. To remove the rules that have been configured, right-click on the line and click the [**OK**] button on the pop-up window that appears.

IVA general setting

Common settings are settings to increase the detection accuracy and minimize false positives, based on the use environment.

- **Sensitivity**

1. Select the <**Common**> tab.
   - You can change the sensitivity of distinguishing the screen background from motions.
     In a situation in which objects can be clearly distinguished from backgrounds, set this to a low sensitivity level. For the opposite scenario, in which it is hard to distinguish objects, such as in a low illumination situation, set this to a high level.
2. When done, click [**Apply**].

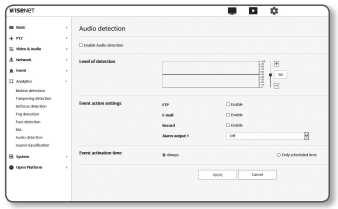
- **Size**

1. Select the <**Common**> tab.
2. For each rectangle that represents the minimum size and the maximum size, right-click on the vertex at the bottom-right to move and resize it.
   - Motions smaller than the specified minimum size or bigger than the maximum size are not detected. To avoid unintended detections caused by great and small noises, set minimum/maximum motion sizes appropriately in accordance with your environment. Note that the same motions on the same location can be detected differently in terms of their detection size; it is recommended to consider and include the tolerable difference when setting the minimum/maximum detection sizes.
3. When done, click [**Apply**].

Audio detection

You can set to detect sound over the specified level and trigger an event accordingly.

1. From the Setup menu, select the <**Analytics ( )**> tab.
2. Click <**Audio detection**>.
3. Set whether or not to <**Enable Audio detection**>.
4. Set the audio detection's sound level.
   The lower the level, the smaller the sound change is detected.



- The audio detection level is designed to normalize the input data to a value between 1 and 100 and detect the signal larger than threshold level. It is unrelated to the decibel (dB) level.

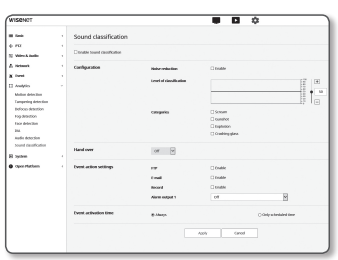
5. Configure the event motion schedule and event motion conditions.
   - For more information about <**Event activation time**> and <**Event action settings**>, refer to "**Alarm input**". (page 55)
6. When done, click [**Apply**].

- Select <**Video & Audio**> - <**Audio setup**> and set the proper volume for your MIC as an audio input source, so that the audio detection function can work properly.
- If detected audio level is too low, set the audio input gain to a higher level in <**Audio setup**>.
- You can use the audio detection function when the camera is connected with an audio input device.

Sound classification

You can configure settings to generate an event signal in response to the detection of a specified sound source.

1. From the Setup menu, select the <**Analytics ( )**> tab.
2. Click <**Sound classification**>.
3. Set whether or not to <**Enable Sound classification**>.
4. Set the level of audio energy for the sound source to classify. The energy level value for the input audio is updated periodically from right to left, and is drawn on the area. Sound source classification is only applied to audio at a level higher than the specified value.

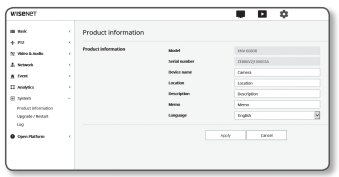


5. Configure settings for each item.
   - Noise reduction : Specify the <**Enable**> status.
     - If the noise in the surrounding environment is too loud, exceeding 55 to 60dB, use the noise reduction function.
       If the noise reduction function is used, the sound classification function may be degraded or may malfunction depending on the environment, as the original sound source is reduced. If you use the noise reduction filter in a quiet environment, the sound source classification function may be impaired.
   - Categories : Select a sound source to classify.
     - Sound source definition
       - Scream : Loud sound generated by humans, such as a scream or shout by a male/female adult or children
       - Gunshot : Gunshot sound (excluding rapidly-generated, consecutive gunshot sounds)
       - Explosion : Sound of sudden explosion that is the result of a destructive action
       - Crashing glass : Sound of glass breakage
6. Select whether or not to use the hand over.
7. Configure the event motion schedule and event motion conditions.
   - For more information about <**Event activation time**> and <**Event action settings**>, refer to "**Alarm input**". (page 55)
8. When done, click [**Apply**].

- In <**Video & Audio**> - <**Audio setup**>, it is recommended to set the audio input gain to a value ranging from 4 to 6.
- In <**Video & Audio**> - <**Audio setup**>, if you set the audio input source to an external microphone, the recommended microphone specifications are as follows.
  - Frequency range: 40 to 16,000Hz
  - Impedance: 1,500Ω
  - Sensitivity: -40±3 dB (7.1~14.1 mV)
- In the following cases, sound source classification performance may be impaired or malfunction.
  - Gunshot sounds are generated consecutively, such as the sound made by a machine gun rather than a one-shot sound.
  - Noise is too loud to distinguish from the target sound source.
  - 2 or more sound sources are input simultaneously.
  - Sound source classification is applied in a quiet environment using the noise removal function
  - Sound of applause or scream is heard from a close distance (within 1m) from the camera
  - A loud sound source that does not belong to any of the sound source categories such as aircraft sound or siren sound is suddenly generated
  - The external microphone does not conform to the recommended specifications

SYSTEM SETUP

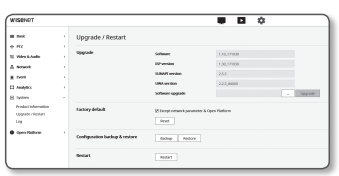
Product information



1. From the Setup menu, select the <**System ( )**> tab.
2. Click <**Product information**>.
3. Check the camera information, or provide details according to your network environment.
   - Model : Model name of the product.
   - Serial number : Product serial number.
   - Device name : Provide a device name that will be displayed on the Live screen.
   - Location : Specify the location where the camera is installed.
   - Description : Provide detailed information about the camera location.
   - Memo : Provide an explanation about the camera for better understanding.
   - Language : Select a preferred language for the Web Viewer OSD.

   ▪ The default language is set to <**English**>.
4. When done, click [**Apply**].

Upgrade / Restart



1. From the Setup menu, select the <**System ( )**> tab.
2. Click <**Upgrade / Restart**>.
3. Select a desired item and set it appropriately.
   - Upgrade : Performs upgrading the system.
     When reconnecting, the web viewer will not run normally if the browser cache is not completely clear.
   - Factory default : Initializes all setting information including the camera settings to the factory reset state. (however, logs are not initialized)
     - Select the <**Except network parameter & Open Platform**> check box and settings other than network settings and open platform settings will be reset.

       ▪ The IP addressing system will be defaulted to DHCP if you reset the camera. If no DHCP server is found, the previous settings will be restored automatically.
   - Configuration backup & Restore : Backs up the current system settings before performing the restoration process. The system is automatically restarts after backup or restoration.
   - Restart : Restarts the system.

To perform the upgrade

1. Click [**Browse (...)**] and specify a file to upgrade.
2. Click [**Upgrade**].
3. An "**Upgrade**" progress bar is prompted to show the upgrading status.
4. Once completed upgrading, the browser exits and the camera restarts.

▪ It may take a max of 10 minutes for the upgrade process.
If you forcibly terminate the upgrade process, upgrade will not be completed properly.

▪ During restarting the system, accessing with web viewer will not be made.

▪ You can download the latest version from the Hanwha Techwin web site.

To back up the current settings

1. Click [**Backup**].
2. A file in a "**.bin**" file format is saved in "**Library**" -> "**Document**" -> " **Downloads**".

To restore the backup settings

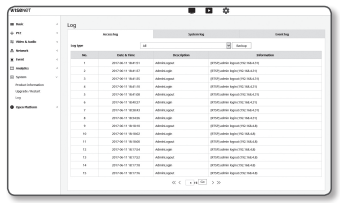
1. To restore the backup settings, click [**Restore**].
2. Select a desired backup file.

▪ If you perform the backup or restoration, the web browser will be closed and the camera will reboots.

▪ If you try to recover the config file backed up in other model, some functions may malfunction and you need to change the setting manually.

Log

You can check the system log or event log.



1. From the Setup menu, select the <**System ( )**> tab.
2. Click <**Log**>.
3. Select a log type.
   - Access Log : You can check the log information that contains the user's access and the access time.
   - System log : You can check the system logs where any system changes are recorded including the time information.
   - Event log : You can check the event logs including the time information.
4. From the right log list, select an item to search for.
   - If you select <**All**> in the top left dropdown list, all logs for the applicable log type will be displayed.
5. If one page can not display all the logs available, use the bottom buttons to move to the previous, next, or the last item.
6. Click on the <**Backup**> button to save all the log data for the currently selected mode in the "time stamp value create by camera in modelname-mode-camera.txt file" in the download folder for the browser.

- Each page displays 15 logs with the latest one displayed at the top.
- Each log contains up to 1,000 records and after 1,000 records are saved, the oldest log is deleted when a new record is generated.

OPEN PLATFORM SETUP

Open Platform

A user can install an application on their camera to execute additional functions.



1. From the Setup menu, select the <**Open Platform ( )**> tab.
2. Click <**Open Platform**>.
3. Click the [**Browse ( )**] button to select the *.cap file from the user folder.
4. Click the [**Install**] button to install your application.
5. The information of the installed application is displayed in the list.
   - Uninstall : Deletes installed or operating applications.
   - Go App : You will be redirected to the app page of each application.
   - Start : Execute an installed application.
   - Stop : Terminates a running application.
   - Health : Displays the currently running application's resource occupation rate, thread counts and execution time, etc.
   - Priority : Sets the priority of running applications.
     If the total resource utilization rate of the camera (including main tasks and applications) exceeds 80%, an ongoing application will be forced to stop. In this case, the priority set by the user is used to determine which application should be stopped first.
   - Auto start : When the camera's power supply or main task is running, a certain application for which auto execution has been activated will run automatically.
   - Application manager : This displays the resource occupation rate of an application currently running in your camera.
     - Memory Usage (%) : This is the memory utilization rate for each application.
     - CPU Usage (%) : This is the CPU utilization rate for each application.
     - Thread count : This is the number of threads created by each application.
     - Duration : This is the total execution time of each application.
     - Kill Task : Terminates an application.
     - Total Usage : This is the total resource occupation rate of the camera (including main tasks and applications).

- For questions about application use or installation, check the Techwin developer website.

TROUBLESHOOTING

PROBLEM	SOLUTION
When an Windows 10 user accesses the web viewer through Chrome or Firefox, the sound volume of microphone changes periodically.	• This is what happens when microphone driver has been set to Realtek driver. Install the High Definition Audio device (Windows Default Driver) or the third party driver as the microphone driver.
No video is displayed when accessing the plug-in free webviewer on Safari via HTTPS.	• On the authentication popup window prompted when initially accessing https, click "View Authentication Certificate" and select the "Always trust when connecting to the designated webviewer IP" check box. • If the webviewer continues failing to display a video after you select "Next" on the message window below, press the command key + Q to exit the Safari browser, access again and follow the procedures stated above.
I can't access the camera from a web browser.	• Check to make sure that the camera's Network settings are appropriate. • Check to make sure that all network cables have been connected properly. • If connected using DHCP, verify that the camera is able to acquire dynamic IP addresses without any problem. • If the camera is connected to a Broadband Router, verify that port forwarding is properly configured.
Viewer got disconnected during monitoring.	• Connected Viewers become disconnected upon any change to camera or network configurations. • Check all network connections. • If the camera is connected over an PPPoE network, it' s possible for Viewer to disconnect under poor network conditions.
The camera connected to the network is not detected in the Device Manager program.	• Turn off the firewall settings on your PC and then search the camera again.
Images overlap.	• Check whether two or more cameras are set to a single multicast address instead of different addresses. If a single address is used for multiple cameras, the images may overlap.
No image appears.	• If the transmission method is set to multicast, check whether there is a router that supports multicast in the LAN the camera is connected to.

PROBLEM	SOLUTION
Voice is not recorded even though audio input settings are configured.	• You must enable the <Audio In> check box in <Basic> - <Video Profile>.
<Motion detection> of <Analytics> is set to <Enable>, but no notification e-mail reaches me even when an analysis event had occurred.	• Verify the settings in the following sequence: A. Check <Data & Time> settings. B. The <Motion detection> should be set to <Enable>. C. Check if the <E-mail> option of <Event setup> menu is checked to use.
No signal is found at the Alarm Output port even when an intelligent video analysis event is generated.	• Check alarm output port settings.
Cannot record into the Micro SD memory card.	• Check if the memory card is defective.
Micro SD memory card is inserted but the camera does not operate properly.	• Check if the memory card is inserted in the proper direction. Operation of memory card that is formatted by other devices is not guaranteed with this camera unit • Format the memory card again in <Setup> → <Event> → <Storage> menu.
Cannot record in the NAS.	• Confirm that the information registered in the NAS is correct.
It reports that NAS setting has failed.	• Confirm that the IP address of the NAS is valid. • Confirm that the ID/password of the NAS is valid. • Confirm that you can access the folder designated as the default folder using the ID of the NAS. • Confirm that the NAS SMB/CIFS items are unchecked. • Confirm that the NAS IP address and the camera IP address are in the same format. ex) The NAS & camera subnet mask initial value is 255.255.255.0. If the IP address is 192.168.20.32 then the NAS IP address should be in the range of 192.168.20.1~192.168.20.255. • Check whether you tried to access as another user without formatting the default folder saved or used. • Confirm that you used recommended NAS equipment.

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GPL SW

Component Name	License	URL
Base Kernel	GPL 2.0	
Busybox	GPL 2.0	http://www.busybox.net/downloads/snapshots
iproute2-4.3.0	GPL 2.0	
iptables-1.4.21	GPL 2.0	http://ftp.netfilter.org/pub/iptables
ethtool-4.2	GPL 2.0	
mtd-1.5.2	GPL 2.0	ftp://ftp.infradead.org/pub/mtd-utils
mii-diag-2.11	GPL 2.0	
rp-pppoe-3.11	GPL 2.0	http://www.roaringpenguin.com/pppoe/
wpa_supplicant-2.5	GPL 2.0	
bash-4.3.30	GPL 3.0	
zeroconf	GPL 2.0	

LGPL SW

Component Name	License	URL
gLibc	LGPL 2.0	
Inetutils	LGPL 3.0	
neon-0.29.6	LGPL 2.0	http://www.webdav.org/neon/

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lighttpd is a secure, fast, compliant, and very flexible webserver that has been optimized for high-performance environments. It has a very low memory footprint compared to other webservers and takes care of cpuload. Its advanced feature-set (FastCGI, CGI, Auth, Output-Compression, URL-Rewriting and many more) make lighttpd the perfect webserver-software for every server that suffers load problems. Simple Network Management Protocol (SNMP) is an Internetstandard protocol for managing devices on IP networks. It is used mostly in network management systems to monitor the devices attached to the network for conditions that need administrative attention. Net-SNMP is a suite of applications used to implement SNMP v1, SNMP v2c and SNMP v3 using both IPv4 and IPv6. For more additional information, send email to help.cctv@hanwha.com.

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- Version 1.1

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It appears that the arithmetic coding option of the JPEG spec is covered by patents owned by IBM, AT&T, and Mitsubishi. Hence arithmetic coding cannot legally be used without obtaining one or more licenses. For this reason, support for arithmetic coding has been removed from the free JPEG software. (Since arithmetic coding provides only a marginal gain over the unpatented Huffman mode, it is unlikely that very many implementations will support it.) So far as we are aware, there are no patent restrictions on the remaining code.

The IJG distribution formerly included code to read and write GIF files. To avoid entanglement with the Unisys LZW patent, GIF reading support has been removed altogether, and the GIF writer has been simplified to produce "uncompressed GIFs". This technique does not use the LZW algorithm; the resulting GIF files are larger than usual, but are readable by all standard GIF decoders.

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T-License [License Agreement for Source Code of T-Kernel]

established by T-Engine Forum
on January 23, 2004
revised on June 17, 2004
revised on December 21, 2006
revised on March 24, 2009

Article 1. Scope of License Agreement

1. This License Agreement sets forth copyrights and the terms and conditions of use applicable to the source code of T-Kernel distributed by T-Engine Forum and any derivative work created therefrom.

Article 2. Definition

1. "T-Kernel" means a real-time operating system controlled and distributed by T-Engine Forum on behalf of the copyright holder thereof.

2. "Source Code" means a source program, including related comments and documentations, for the T-Kernel and the Ported Source Code defined in Article 2.8 which is registered with T-Engine Forum.

3. "Hardware-dependent Part" means the part of the Source Code which depends on hardware and needs to be changed when the Source Code is ported and operated on the target hardware, and is designated and separated as such part.

4. "Compiler-dependent Part" means the part of the Source Code which depends on compiler and needs to be changed when the Source Code is ported and operated on the target hardware, and is designated and separated as such part.

5. "Header File" means the part of the Source Code which contains definitions necessary to develop application programs.

6. "T-Engine Hardware" means the hardware which is manufactured in accordance with the T-Engine Hardware specifications or the µT-Engine Hardware specifications issued by T-Engine Forum, and registered with T-Engine Forum.

7. "Similar Hardware to T-Engine Hardware" means any hardware (including software which emulates hardware) other than that defined in Article 2.6 above, on which the T-Kernel can be operated.

8. "Ported Source Code" means a source program produced from the Source Code by modifying only its Hardwaredependent Part and/or Compiler-dependent Part to enable it to be operated on the T-Engine Hardware or the Similar Hardware to T-Engine Hardware. The Ported Source Code which is registered with T-Engine Forum shall be included in the Source Code.

9. "Modified Source Code" means a source program modified from the Source Code for the purpose of improving its performance, increasing or decreasing its function, and the like. The Ported Source Code shall not be included in the Modified Source Code.

10. "Binary Code" means an executable code form which is created by compiling programs, which include all or part of the Source Code or the Modified Source Code.

11. "Derivative Work" means the Modified Source Code or the Binary Code.

12. "Embedded Product" means any product which operates with executable code form of the Source Code, the Modified Source Code or the Binary Code loaded on its hardware.

13. "End User" means a consumer who uses the Embedded Product.

14. "System Developer" means any person who develops the Embedded Product by itself or has a third party develop the same, and provides, whether with or without payment, the End User with the Embedded Product.

15. "Distributor of Modification" means any person who produces the Modified Source Code and, whether with or without payment, distributes the same to any third party.

16. "Patch for Modification" means a difference, program, system, or the like in order to create the Modified Source Code from the Source Code or the Binary Code thereof.

17. "Vicarious Execution of Patch Processing" means vicarious execution service to create the Modified Source Code applying the Patch for Modification to the Source Code or the Binary Code thereof.

18. "Source Code User" means a person who uses the Source Code.

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2. to transmit a work to the general public through the Internet communication, broadcasting, and the like automatically in response to a request from the public; and

3. to distribute a copy of a work to the general public or a large number of specific persons.

Article 3. Copyright

1. The copyrights of the Source Code shall be owned by Ken Sakamura.

Article 4. License of Source Code

1. As provided for in this Article, T-Engine Forum shall provide, and grant a license to use, the Source Code free of charge to any person who has taken the necessary procedure for registration as prescribed by T-Engine Forum and agreed to the T-License.

2. The Source Code shall be distributed exclusively by T-Engine Forum. Any person who obtains the Source Code under Article 4.1 above shall not make any re-Distribution of the Source Code.

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1. to copy and/or modify the Source Code provided by T-Engine Forum hereunder for its own research, development and the like.

2. to run the Source Code provided by T-Engine Forum hereunder for its own research, development and the like.

3. to run the Source Code modified in accordance with the provision of Article 4.3 (1) above for its own research, development and the like.

4. to distribute the Binary Code created from the Source Code provided by T-Engine Forum hereunder or from the Source Code modified in accordance with the provision of Article 4.3 (1) above.

4. In accordance with the license granted under Article 4.1 above, the System Developer may perform the following acts:

1. to perform any and all acts set forth in the Article 4.3 above.

2. to develop and manufacture the Embedded Product containing the Binary Code, and, whether with or without payment, provide the End User with the same and make the Binary Code available to the End User on the Embedded Product.

5. The Source Code User and the System Developer shall be obligated to give a notice that the Source Code is used, in such a way as separately specified by T-Engine Forum, when they use the Source Code or the Binary Code, or make the Binary Code available for the End User on the Embedded Product.

Article 5. Distribution of Modified Source Code

1. Any of A- members of T-Engine Forum may become the Distributor of Modification by obtaining the approval of T-Engine Forum through the registration procedure as prescribed by the Forum provided that only the department of the A- member which has taken the registration procedure may distribute the Modified Source Code in such a way as provided for in this Article as long as it holds the Amembership.

2. The Distributor of Modification may create the Modified Source Code based on the Source Code provided by T-Engine Forum and the Patch for Modification to be applied to create such Modified Source Code from the Source Code.

3. The Distributor of Modification shall, prior to the distribution, inform T-Engine Forum of and register a name and description of the Modified Source Code in such a way as specified by T-Engine Forum.

4. The Distributor of Modification shall determine the name of the Modified Source Code subject to the rules separately established by T-Engine Forum and publish an appropriate notice as required by the rules on the Patch for Modification and the Modified Source Code.

5. The Distributor of Modification may distribute the Modified Source Code to a third party, whether with or without payment, provided that the Distributor of Modification shall take the necessary measures to prohibit the third party from making the re-Distribution of the Modified Source Code.

6. Developer with the Patch for Modification. Provided, however, that the Distributor of Modification shall be obligated to confirm that the System Developer is the Source Code User duly licensed under Article 4.1.

7. The Distributor of Modification may perform the Vicarious Execution of Patch Processing for the System Developer.

8. The System Developer shall not distribute the Modified Source Code in further modified form to any third party as a stand-alone software product.

9. The System Developer may, under the same obligation as imposed in Article 4.5, make the Embedded Product available for the End User through use of the Patch for Modification distributed by the Distributor of Modification or the Derivative Works obtained through the Vicarious Execution of Patch Processing.

Article 6. Distribution and Registration of the Ported Source Code

1. The Source Code User and the System Developer may, whether with or without charge, distribute to any third party only the following parts of the Ported Source Code on the T-Engine Hardware or the Similar Hardware to T-Engine Hardware:

1. The Hardware-dependent Part and/or Compiler-dependent Part; provided that the Source Code User and the System Developer shall inform T-Engine Forum of, and T-Engine Forum may publish, a method for distributing said Part(s) to third parties.

2. The Header File; provided that the Header File shall be distributed together with the Binary Code of the Ported Source Code.

2. Any member of T-Engine Forum may request T-Engine Forum to register and distribute, as an original source code for T-Kernel, the Ported Source Code on the T-Engine Hardware or the Similar Hardware to T-Engine Hardware.

3. Any member of T-Engine Forum who requests the distribution mentioned in the preceding paragraph shall accede to the following conditions:

1. The member shall confirm that the object hardware is the T-Engine Hardware or the Similar Hardware to T-Engine Hardware.

2. The member shall provide T-Engine Forum with a complete set of operational environment for the object hardware and T-Kernel free of charge when requesting the distribution.

3. The member shall submit test results of the Ported Source Code to T-Engine Forum when requesting the distribution.

4. In the event that T-Engine Forum accepts the request mentioned in Article 6.2, T-Engine Forum shall register and distribute the Ported Source Code as the Source Code for T-Kernel. Provided, however, that the Ported Source Code may be treated in the same way as the Modified Source Code until the time of registration hereunder.

5. The provision set forth in Article 3 shall apply to the Ported Source Code registered in accordance with this Article.

Article 7. Use for Other Purpose

1. Any use of the Source Code, the Modified Source Code or the Ported Source Code other than those stipulated in Articles 4, 5 and 6 shall be subject to the prior approval of T-Engine Forum.

Article 8. Limited Warranty

1. T-Engine Forum and the copyright holder of the Source Code warrant that the Source Code does not infringe third party's copyrights. Provided, however, that T-Engine Forum and the copyright holder of the Source Code make no warranty as to the Hardware-dependent Part and/or Compiler- dependent Part set forth in Article 6.2 in the Ported Source Code by any third party.

2. Neither T-Engine Forum nor the copyright holder of the Source Code warrants that the Source Code will fit for any particular purpose of the Source Code User.

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2. In case of breach of this License Agreement by a member of T-Engine Forum, T-Engine Forum may take appropriate measures against the member; for example, the member is disqualified from membership, depending on what kind of breach has been committed by it.

3. Any legal dispute which may arise in relation to any breach of this License Agreement shall be subject to the exclusive jurisdiction of the Tokyo District Court.

Article 11. Governing Law and Language

1. This License Agreement shall be governed by and interpreted under the laws of Japan.

2. This License Agreement is executed in both Japanese text and English text provided that the Japanese text shall govern the interpretation and performance of this License Agreement.

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Iperf performance test

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The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files http://www.ietf.org/rfc/rfc1950.txt (zlib format), rfc1951.txt (deflate format) and rfc1952.txt (gzip format).

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