

**WISENET**

# **NETWORK CAMERA**

User Manual

TNB-9000



# Network Camera

## User Manual

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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, 2.2 A / PoE (55 Vdc), 0.55A.
16. This product is intended to be supplied by isolation power.
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 OPENINGS 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.

The battery cannot be replaced.

## 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.

## ATTENTION

IL Y A RISQUE D'EXPLOSION SI LA BATTERIE EST REMPLACÉE PAR UNE BATTERIE DE TYPE INCORRECT.

METTRE AU REBUT LES BATTERIES USAGÉES CONFORMÉMENT AUX 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 802.3.bt 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.

We do not guarantee the quality of third-party products (e.g. lenses, accessories) that you separately purchase.

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## RECOMMENDED PC SPECIFICATIONS


- CPU : Intel(R) Core(TM) i9-7920X 2.9GHz or higher
  - RAM : 64G or higher
  - Supported OS : Windows 8.1, 10, Mac OS X 10.12, 10.13, 10.14
  - Recommended browser : Google Chrome
  - Supported browsers : MS Explore11, MS Edge, Mozilla Firefox(Window 64bit only), Apple Safari(Mac OS X only)
  - VGA : GTX 1080, 11GB graphics card or higher
- ※ Please see the appendix for detailed information on verified OS and browsers.

## RECOMMENDED MICRO SD/SDHC/SDXC MEMORY CARD SPECIFICATIONS

- Recommended capacity : 16GB to 256GB (MLC type)
- Recommended Manufacturers : SanDisk, Transcend
- Product Type : High endurance
- The compatibility varies depending on the card manufacturers and types.
- For the recording of MJPEG SD, we recommend the recording resolution of MJPEG to be 4K or less.
- Regarding multi-profile specifications, TNB-9000 supports a total of three profiles. CH1 supports two profiles, DPTZ CH2 supports one profile. Therefore, if you are using all three profiles, you cannot additionally set and use a record profile, such as an SD card. In this case, to keep using the recording function, set up the record profile exactly the same as a profile currently being used.






## NAS RECOMMENDED SPECS

- Recommended capacity : 200GB or higher is recommended.
- For this camera, you are recommended to use a NAS with the following manufacturer's specs.  
Recommended products : QNAP NAS, Synology NAS

- 
  - While using the NAS auto recording, if you reboot your camera, the NW connection may be deferred and the behavior of NAS auto recording might fail depending on the attributes of your external NW devices.

## 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
	Camera	1	
	Quick Guide (Optional)	1	
	HPoE injector	1	Connects power supply and network
	6-position Terminal Block	1	Used for alarm in/out terminals
	Power Terminal Block	1	Plugged in the power plug



- SFP modules and fiber optic converters are separately sold. Please select and purchase an SFP of 100/1000 Base-FX and a fiber optic converter.

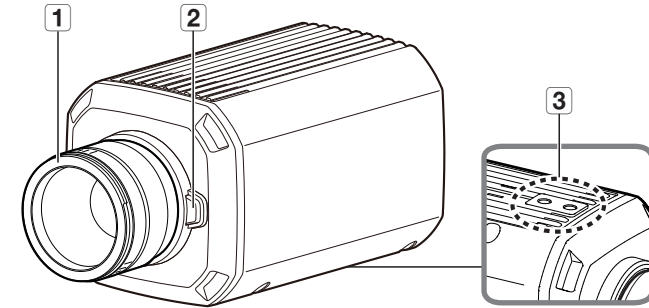
## MOUNT LENS - OPTIONAL


Appearance	Item Name	Description	Model Name
	mount Lens	Optional lens to be inserted in a camera	Canon 24mm f1.4L, Auto-Iris (EF 24mm f/1.4L II USM) Canon 35mm f1.4L, Auto-Iris (EF 35mm f/1.4L II USM) Canon 50mm f1.4, Auto-Iris (EF 50mm f/1.4 USM) Canon 85mm f1.2L, Auto-Iris (EF 85mm f/1.2L II USM) Canon 100mm f2.0, Auto-Iris (EF 100mm f/2 USM) Canon 70-200mm f2.8L, Auto-Iris, Vari Focal (EF 70–200mm f/2.8L USM)

-  ■ The product image is different for each lens model.
-  ■ When using Canon 70-200mm f2.8L, Auto-Iris, Vari Focal (EF 70–200mm f/2.8L USM) mount lens, housing accessory components must be used.

## AT A GLANCE

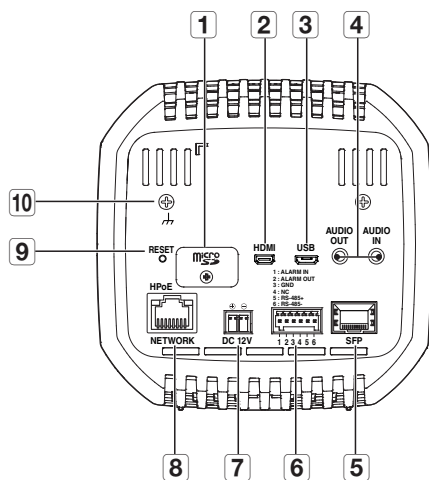
### Front Side



Item	Description
<b>1</b> Mount Lens	This lens is to be installed in a camera. It is separately sold.
<b>2</b> Lens release button	Used for releasing a mounted lens.
<b>3</b> Screw hole for installation	Used to fix the camera on a housing. <ul style="list-style-type: none"> <li>■ The screw size : It is the specification for the screws used to fasten the camera to the support.                1/4" -20 UNC                L: 4.5mm±0.2mm (ISO Standard), or 0.197" (ASA Standard)</li> </ul> 

-  ■ Housing is not included. For more information to use housing, refer to the product's documentation.

Rear Side



Item	Description
<b>1</b> Micro SD Memory Card Compartment	Compartment for the Micro SD memory card.
<b>2</b> Micro HDMI port	Connect to a monitor by using an HDMI gender cable to view the camera feed.
<b>3</b> 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 11. ▪ Wifi dongle and OTG adapter are sold separately.
<b>4</b> Audio terminal	AUDIO OUT Used to connect to speakers. AUDIO IN Used to connect to a microphone.
<b>5</b> SFP module slot	The terminal that makes fiber optic connection through SFP module (LC type). (100/1000Base-FX)
<b>6</b> Alarm I/O Port	ALARM IN Used to connect the alarm input sensor or external day/night sensor. ALARM OUT Used to connect the alarm output signal. GND Used for earth-grounding. RS-485+ RS-485 Data line RS-485- RS-485 Data line

Item	Description
<b>7</b> Power Port	Used to plug the power cable.
<b>8</b> HPoE Connection port	Terminal that connects power and network through an HPoE injector.
<b>9</b> Reset Button	The button restores all camera settings to the factory default. Press and hold for about 5 seconds to reboot the system. <b>!</b> 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.
<b>10</b> Lightning protective grounding port	Used to discharge the lightning current safely outside in order to protect the camera.

**!** ▪ RS-485 port only supports direct connection with pan/tilt driver and external connections of the RS-485 controller is not supported.



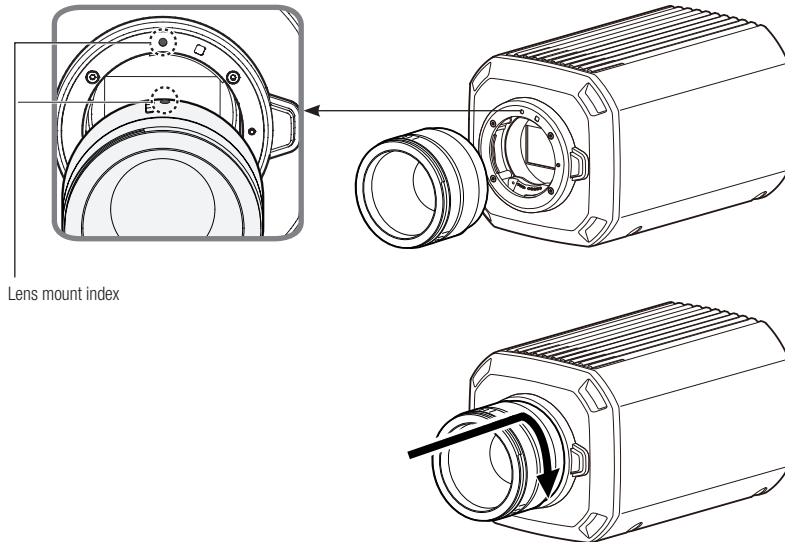
## MOUNTING THE LENS

Disconnect the power before proceeding.

- ☑ Mount lenses are sold separately. For the list of compatible lenses, see page 7.
- ☑ The camera power must be turned off when installing/removing a compatible lens.

### Mounting the lens on a camera

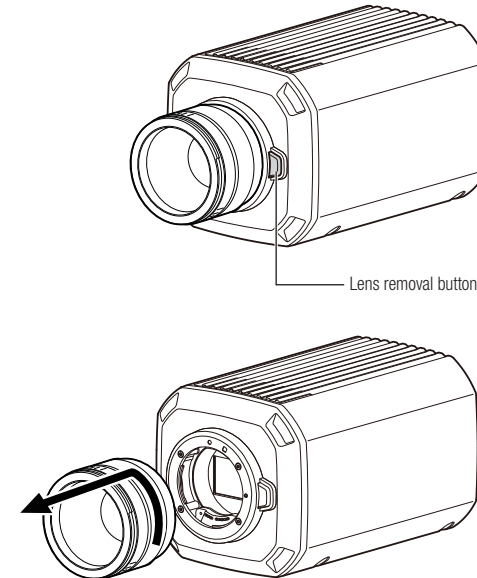
After aligning and inserting the lens mount index, turn it clockwise to mount it.



- ☑ The color of the lens mount index varies depending on the mount lens model.
- ☑ For more information on the lens to be mounted, see the user manual for the lens.

### Release lens

While pressing and holding the lens release button on the camera, turn the lens clockwise to release it from the camera.

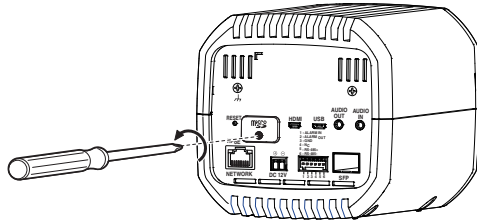


## INSERTING/REMOVING A MICRO SD MEMORY CARD

- ! ■ 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.

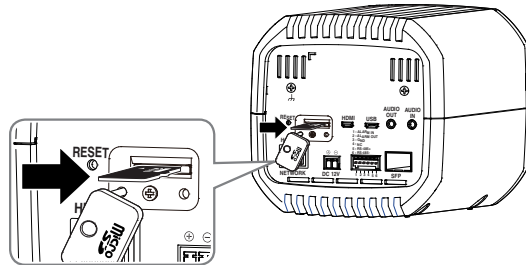
### Remove memory slot cover

Using the driver, remove the screws that fasten the dust-resistant cover to the memory slot, and then remove the cover so you can insert the memory card.



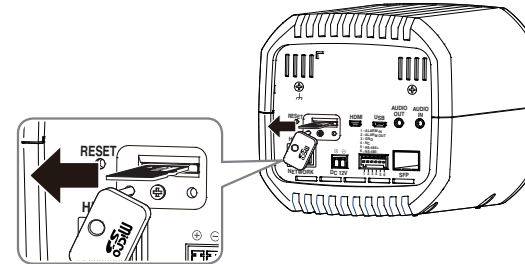
### Inserting a Micro SD Memory Card

Push the Micro SD memory card in the direction of the arrow shown in the diagram.



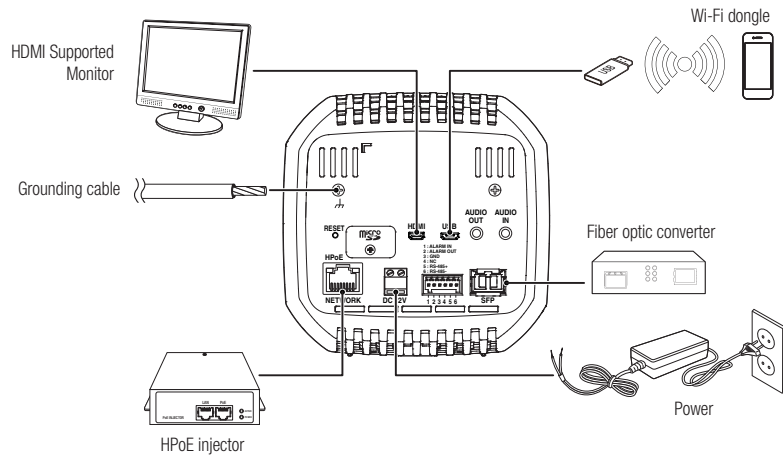
### Removing a Micro SD Memory Card

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



- ! ■ 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 **<Setup (⚙)>** **<Event>** **<Storage>**, set the device to **<Off>** and press the **[Apply]** button and turn the camera off.
- 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.

## CONNECTING WITH OTHER DEVICE



- ! ■ Connect and use a HPoE-enabled router.
- The Micro USB out terminal of the product is provided for easier installation, and is not recommended for monitoring purposes.

## Connecting Wi-Fi

### Camera Setup

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

### Smartphone Setup

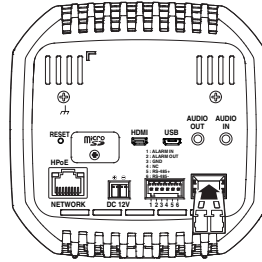
1. Install the Wisenet Installation application.
2. Select the camera SSID after turning on the WiFi.
3. Run the Wisenet Installation application.
4. When you log in to the camera, the video will be connected. (initial password: 4321)
  - The video will be played without being logged in during the initial 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

## Connecting the SFP module

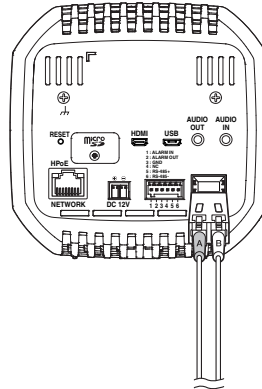
1. Insert the SFP module.



2. Connect the optical cable (AB) of the LC type to the SFP module.
3. Connect the other end of the optical cable (BA) to the fiber optic converter that pairs with the SFP module.

- SFP modules and fiber optic converters are separately sold.
- SFP modules of the following manufacturers are recommended :
  - Comnet, IFS, Skylane, AVAGO, CISCO
- Connect the SFP module and fiber optic converter by cross-connecting the optical cable (AB/BA).

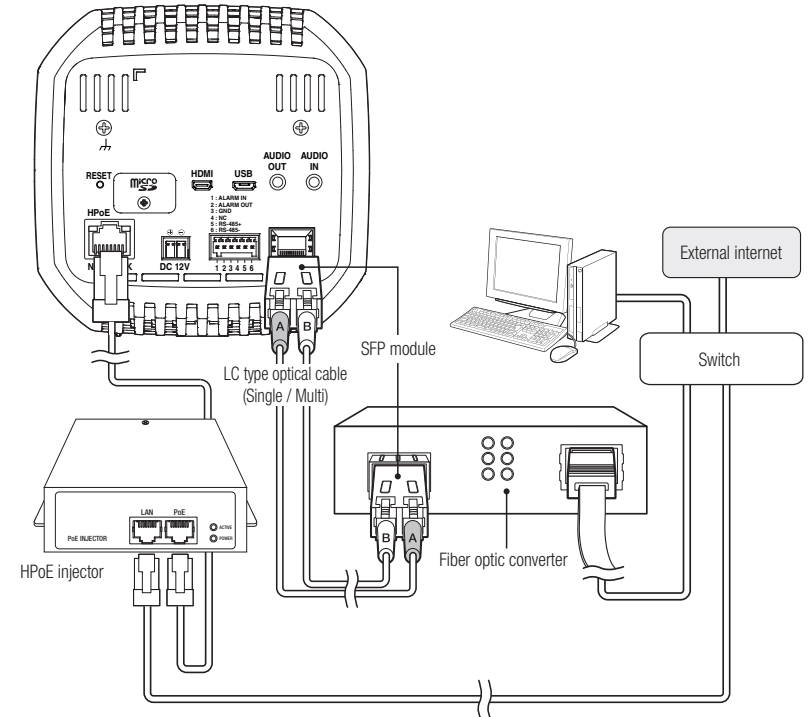
- The connection of the SFP module must be made after the connected camera is turned off.
- Do not install/remove the SFP module while the camera is on.
- A kink in the optical cable may disrupt the connection for communication.
- Do not directly look at the optical cable. It can damage your eyes.



## Ethernet Connection

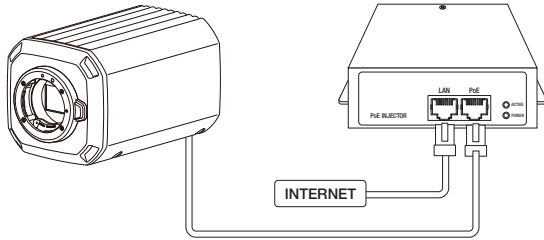
Connect to your local network or internet by connecting your ethernet cable or SFP Optical Link. The ethernet link on this product supports redundant link between RJ-45 and SFP, and SFP takes priority. Behavior example :

- If SFP port is linked up during the use of RJ-45, SFP is activated for the ethernet link while RJ-45 is deactivated.
- If the SFP link is suddenly down during the use of SFP, the RJ-45 link is automatically activated.



## Powering and networking

Connect the HPoE device with the HPoE terminal of the camera.



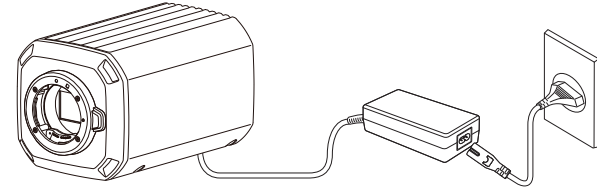
- ! ■ Connect and use a HPoE-enabled router.
- Use a HPoE device that complies with the IEEE802.3bt(PSE TYPE 3 or 4) standard.
- If you connect using an HPoE-enabled router, you don't need a separate power supply cable to power it on.

## 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 SSTP-Category 7 or higher should be used for the Giga hub.
Cable	SSTP-Category 7	
Max Distance	100M	DC Resistance ≤ 0.188 Ω/m
HPoE	HPoE	

## Power Supply

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



- ! ■ If the power sources for PoE and DC 12 V are simultaneously turned on, the device power will be supplied by both of PoE and DC 12 V.
- It is recommended to use a single source for powering the equipment among PoE, DC 12V.
- Adapter with DC 12V 3A higher is recommended.
- We recommend using HPoE injectors for powering the unit.
- 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.
- The product shall be connected using a shielded network cable (STP) that is properly grounded.

## Power Cable Specification for Each Model

In case of DC 12V Input:

Wire Type (AWG)	#14	#16
Cable Length (Max.)	24m	15m

## Optical communication ethernet standard

Item	Contents
Ethernet : Optical communication	SFP (LC Type)
Optical communication : Ethernet physical tier	10/100/1000BASE-T
Optical communication : Default speed	100/1000Mbps
Optical communication : Ethernet standard	IEEE 802.3ab, IEEE 802.3z

## Grounding the Product

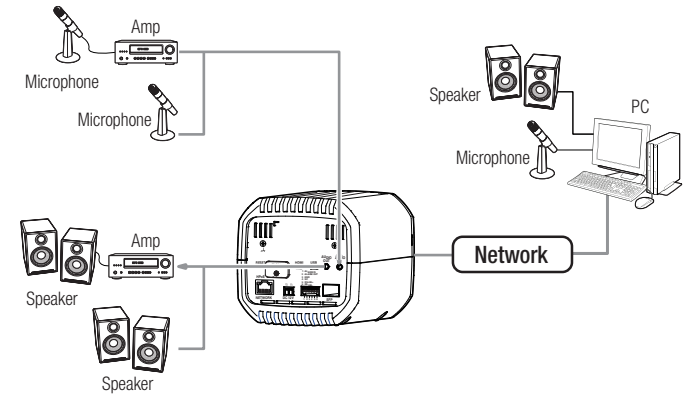
Connect the ground wire to the ground terminal which is located above the power input terminal by using a screwdriver.

- ! Grounding protects the product from a surge or lightning.
- When grounding, make sure to turn the product's power off.

## Recommended Grounding Cable

- Length : Less than 3M
- Gauge : 18 AWG or bigger  
Ex) UL1007 AWG 18/16, UL1015 AWG18/16/14/12, UL2468 AWG18/16/14

## 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.
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

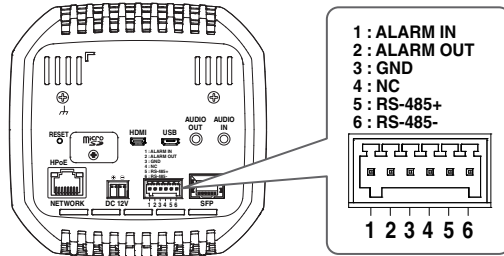
- Audio In : G.711 PCM (Bit Rate: 64kbps / Sampling Frequency: 8kHz), G.726 ADPCM (Bit Rate: 16Kbps, 24Kbps, 32Kbps, 40Kbps / Sampling Frequency: 8kHz), AAC (Bit Rate: 48Kbps / Sampling Frequency: 16kHz)
- Audio Out : G.711 PCM (Bit Rate: 64kbps / Sampling Frequency: 8kHz)

### • Full duplex Audio

- Audio in : Mono signal line input (Max.2.4 Vpp)
- Audio out : Mono signal line output (Max.2.4 Vpp)
- Line out impedance : 600Ω

## Connecting to the I/O port box

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



- ALARM IN : Used to connect the alarm input sensor or external day/night sensor.
- ALARM OUT : Used to connect the alarm output signal.
- GND : Used for earth-grounding.
- RS-485+ : Communication port for RS-485 receiver (+).
- RS-485- : Communication port for RS-485 receiver (-).

## Connecting an external RS-485 device

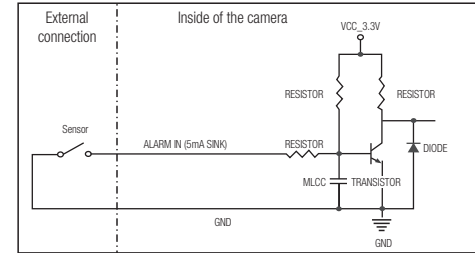
Connect the camera with an external device using the [RS-485 +, -] ports. You can control the pan/tilt operations of the camera via RS-485 communications.

- The GND connection is recommended for RS-485 communications. If you encounter a communication failure, connect the GND pin as appropriate to correct the GND level between camera and external device.

## 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

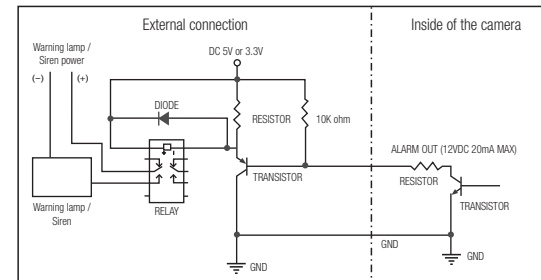


## To connect the alarm out

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



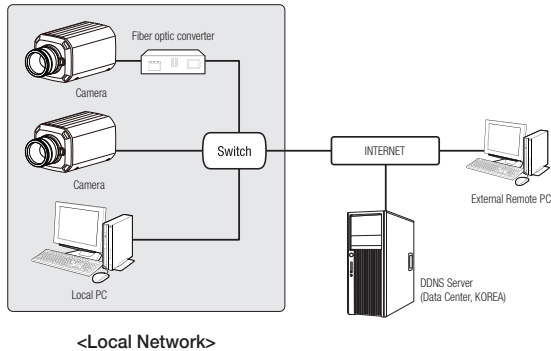
# network connection and setup

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

## CONNECTING THE CAMERA DIRECTLY TO LOCAL AREA NETWORKING

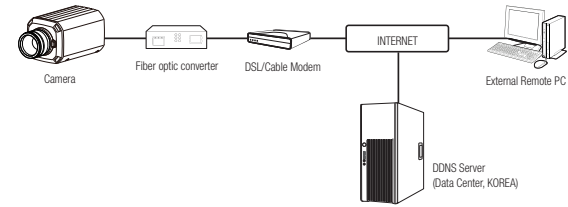
### Connecting to the camera from a local PC in the LAN

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



- 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.
- 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 17)

## 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 information on how to set DDNS, refer to the online help of Web Viewer.
- For information on how to set the IP format, refer to the online help of Web Viewer.



## 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.

- Click <Search> at the main page of device manager.
- 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.

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

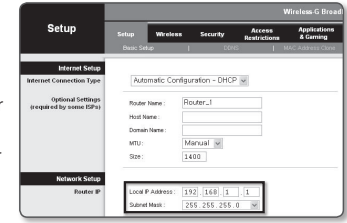
### If not using a Broadband Router

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.
- 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 19)

### 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	192.168.1.100	192.168.1.101
	Subnet Mask	255.255.255.0	255.255.255.0
	Gateway	192.168.1.1	192.168.1.1
Port related settings	HTTP Port	8080	8081
	RTSP Port	554	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

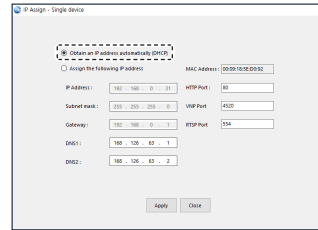
- Click [Apply] Button.
- If the success message is displayed, click [OK].

## Configuring Dynamic IP

Receive IP address from DHCP

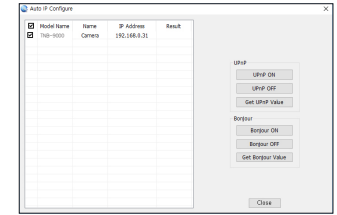
- Example of the Dynamic IP environment
  - If a Broadband Router, with cameras connected, is assigned an IP address by the DHCP server
  - If connecting the camera directly to modem using the DHCP protocols
  - If IPs are assigned by the internal DHCP server via the LAN

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].



## AUTOMATICALLY CONFIGURING IP

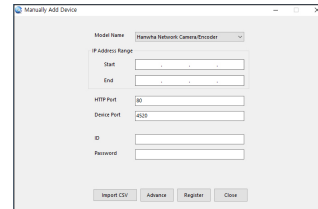
1. Click the camera from the list that you want to automatically configure the IP.
2. Click <+> at the main page of device manager.
  - Equipment Setting menu appears.
3. At the menu, click <Auto IP Configure>.
4. Click [Close] button.



## 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, ID, and password.
4. Click [Register] button.
5. Check if camera is registered.
  - Check MAC address at the sticker attached to the camera.

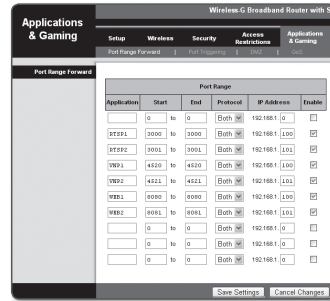


## PORT RANGE FORWARD (PORT MAPPING) SETUP

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

- 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.
- 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.
- When done, click **[Save Settings]**.  
Your settings will be saved.

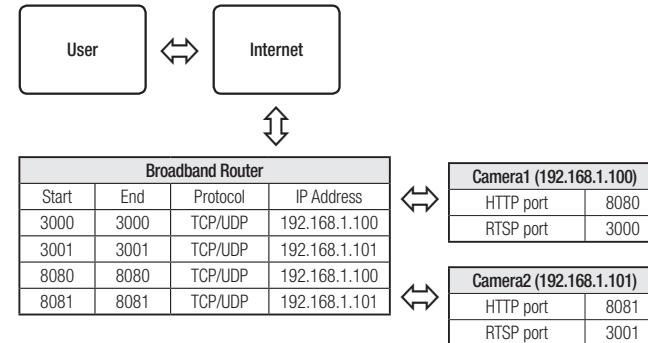


- Port forwarding setting is an example of setting CISCO IP router.
- The settings may differ depending on the connected Broadband Router model.  
For more information, refer to the user manual of the applicable router.

### 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 :




- 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

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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

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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.

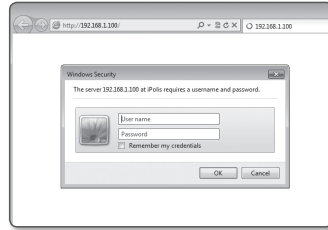
1. Before you can access a camera in the Broadband Router network, you should have set the port range forward for the Broadband Router.
2. From the remote PC, launch the Internet browser and type the DDNS URL address of the camera, or the IP address of the Broadband Router in the address bar.  
ex) 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

 ■ To use Wisenet DDNS, sign up at the Wisenet DDNS homepage (<http://ddns.hanwha-security.com>) and register the product at **[My DDNS]>[Register Product]**.

## 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.

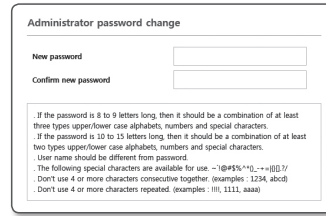
Once you register a dynamic IP-based device with the DDNS server, you can easily check the changed IP when you try to access the device.

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.

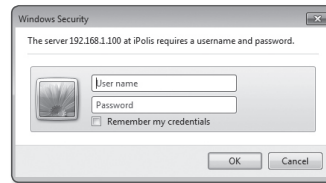
- !
  - For a new password with 8 to 9 digits, you must use at least 3 of the following: uppercase/lowercase letters, numbers and special characters. For a password with 10 to 15 digits, you must use at least 2 types of those mentioned.
    - Special characters that are allowed: ~!@#\$\$%^&\*()-+=!{}[]?/
  - 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.

## CAMERA WEB VIEWER SETUP

1. Click the **[Setup ( ⚙ )]** icon.
  2. The Settings window appears.
  3. You can configure settings for the camera's basic information, video, audio, network, event, analysis, and system over the network.
  4. Click **<Help ( ? )>** to view detailed descriptions of each function.
- ✍
    - Due to PC performance issues, a high resolution video (above 4K) will be switched to Plug-in free profile in the web viewer. For optimal live monitoring, please use a high performance monitoring service, such as SSM.

**SPECIFICATION**

Items		Description
		TNB-9000
Video	Imaging Device	43.3mm Full-frame CMOS
	Effective Pixels	7680(H)x4320(V)
	Min. Illumination	Color : 0.015Lux(F1.4, 1/30sec) B/W : 0.0015Lux(F1.4, 1/30sec)
	Video Out	HDMI: 1080p@30fps
Lens	Angular Field of View	Canon 24mm f1.4L, Auto-Iris (EF 24mm f/1.4L II USM) : Horizontal field of view: 8K 62.1° Canon 35mm f1.4L, Auto-Iris (EF 35mm f/1.4L II USM) : Horizontal field of view: 8K 44.5° Canon 50mm f1.4, Auto-Iris (EF 50mm f/1.4 USM) : Horizontal field of view: 8K 31.6° Canon 85mm f1.2L, Auto-Iris (EF 85mm f/1.2L II USM) : Horizontal field of view: 8K 19.2° Canon 100mm f2.0, Auto-Iris (EF 100mm f/2 USM) : Horizontal field of view: 8K 16.1° Canon 70-200mm f2.8L, Auto-Iris, Vari Focal (EF 70–200mm f/2.8L USM) : Horizontal field of view: 8K 23.2° ~ 8.3°
	Focus Control	Autofocus
	Lens Type	Canon EF mount Lens
	Mount Type	Canon EF mount
	Optional Lens	Canon 24mm f1.4L, Auto-Iris (EF 24mm f/1.4L II USM) Canon 35mm f1.4L, Auto-Iris (EF 35mm f/1.4L II USM) Canon 50mm f1.4, Auto-Iris (EF 50mm f/1.4 USM) Canon 85mm f1.2L, Auto-Iris (EF 85mm f/1.2L II USM) Canon 100mm f2.0, Auto-Iris (EF 100mm f/2 USM) Canon 70-200mm f2.8L, Auto-Iris, Vari Focal (EF 70–200mm f/2.8L USM)
Operational	Camera Title	Displayed up to 75 characters
	Day & Night	Auto(ICR)
	Backlight Compensation	BLC / DWDR
	Digital Noise Reduction	SSNRV
	Motion Detection	8ea, 8point polygonal zones (in 8K resolution only)
	Privacy Masking	6ea, Rectangular - Color: Grey/Black/White
	Gain Control	Low / Middle / High
	White Balance	ATW / AWC / Manual / Indoor / Outdoor
	Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1/5 ~ 1/12,000sec)
	Digital PTZ	Support

Items		Description
		TNB-9000
Operational	Analytics	- Classified object type : Person/Face/Vehicle/License plate with attributes, BestShot per object - Analytics events based on AI engine : object detection, Directional detection, Enter/Exit, Loitering, Virtual line - Analytics events : Defocus detection, Motion detection, Appear/Disappear, Tampering, Audio detection, Sound classification
	Serial Interface	RS-485(Samsung-T, Pelco-D/P)
	Alarm I/O	Input 1ea / Output 1ea
	Alarm Triggers	Analytics, Network disconnect, Alarm input
	Alarm events	<ul style="list-style-type: none"> <li>• File upload via FTP and e-mail</li> <li>• Notification via e-mail</li> <li>• SD/SDHC/SDXC or NAS recording at event triggers</li> <li>• Alarm output</li> <li>• Handover</li> </ul>
	Audio In	Selectable (mic in/line in) Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm
	Audio out	Line out, Max output level: 1 Vrms
	Ethernet	RJ-45(10/100/1000 BASE-T), SFP slot(100/1000Mbps)
	Video Compression	H.265/H.264: Main/High, MJPEG
	Resolution	7680x4320, 7360x4128, 6016x3384, 6016x4008, 5472x3648, 4768x3184, 4608x2592, 3840x2160, 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360
Network	Max. Framerate	H.265/H.264: 8K @ Max. 15fps (Mode 0) : Available in Jan. 2020 H.265/H.264: 24MP @ Max. 20fps (Mode 1) : Available in May. 2020 H.265/H.264: 15MP @ Max. 30fps (Mode 2) : Available in May. 2020 H.265/H.264: 4K @ Max. 60fps (Mode 3) : Available in May. 2020
	Smart Codec	WiseStream II
	Video Quality Adjustment	H.264/H.265 : Target Bitrate Level Control MJPEG : Target Bitrate Level Control
	Bitrate Control	H.264/H.265 : CBR or VBR Motion JPEG : VBR
	Streaming	Unicast(10 users) / Multicast Multiple Streaming (Up to 3 Profiles)

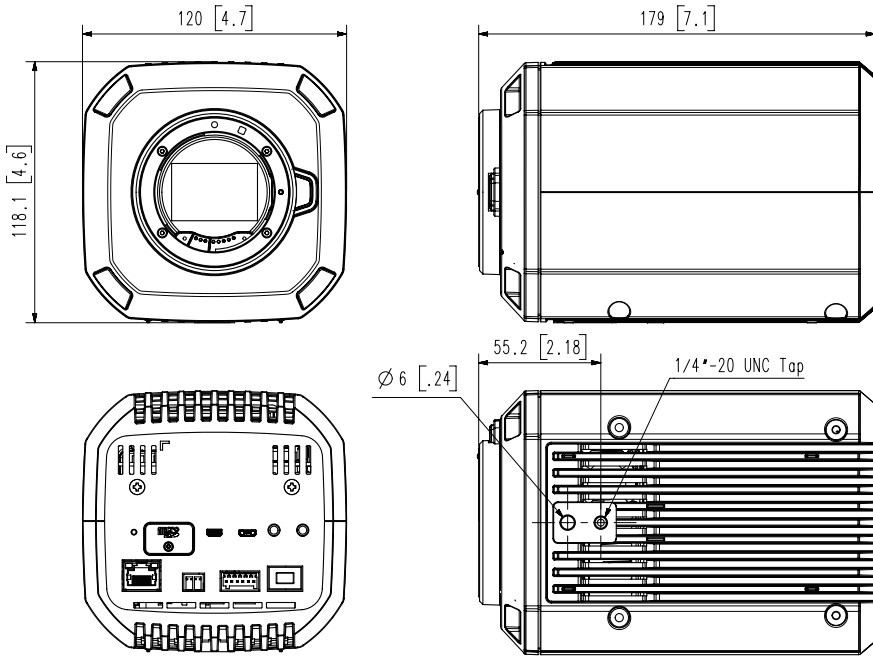
Items		Description	
		TNB-9000	
Network	Audio Compression	G.711 μ-law /G.726 Selectable G.726 (ADPCM) 8KHz, G.711 8KHz G.726 : 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC : 48Kbps at 16KHz	
	Protocol	IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,RTSP, NTP, HTTP, HTTPS, SSL/ TLS, DHCP, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, UPnP, Bonjour, LLDP	
	Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access Log 802.1x Authentication (EAP-TLS, EAP-LEAP) Device Certificate(Hanwha Techwin Root CA)	
	Edge Storage	Micro SD/SDHC/SDXC 1slot 256GB	
	Application Programming Interface	ONVIF Profile S/G/T SUNAPI(HTTP API)	
	Webpage Language	English, Korean, French, German, Spanish, Italian, Chinese, Russian, Japanese, Swedish, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek	
	Web Viewer	Supported OS : Windows 8.1, 10, MAC OS X 10.12, 10.13, 10.14 Recommended Browser: Google Chrome Supported Browser: MS Explore11, MS Edge, Mozilla Firefox(Window 64bit only), Apple Safari(Mac OS X only)	
	Memory	4096MB RAM, 512MB Flash	
	Environmental	Operating Temperature / Humidity	0°C ~ +45°C(32°F ~ +122°F) / Less than 90% RH
		Storage Temperature / Humidity	-40°C ~ +65°C(-40°F ~ +149°F) / Less than 90% RH
Certification		EMC EN 50130-4, EN 55032 Class A, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3, EN 61000-6-1, FCC Part 15 Subpart B Class A, IC ICES-003 Class A, Safety UL 60950-1	

Items		Description
		TNB-9000
Electrical	Input Voltage	HPoE(IEEE802.3bt, Class5), 12VDC
	Power Consumption	PoE : Max 30W, typical 20W 12VDC : Max 26W, typical 18W
Mechanical	Color / Material	Black / Aluminum
	Product dimensions / weight	120(W)x118.1(H)x179(D) mm, 2.1 kg(4.55 lb)
	Package dimensions / weight	250(W)x250(D)x323(H) mm, 3.8 kg(8.38 lb)



# PRODUCT OVERVIEW

Unit : mm [inch]



## TROUBLESHOOTING

PROBLEM	SOLUTION
When an Windows 10 user accesses the web viewer through Chrome or Firefox, the sound volume of microphone changes periodically.	<ul style="list-style-type: none"> <li>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.</li> </ul>
No video is displayed when accessing the plug-in free webviewer on Safari via HTTPS.	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>
I can't access the camera from a web browser.	<ul style="list-style-type: none"> <li>Check to make sure that the camera's Network settings are appropriate.</li> <li>Check to make sure that all network cables have been connected properly.</li> <li>If connected using DHCP, verify that the camera is able to acquire dynamic IP addresses without any problem.</li> <li>If the camera is connected to a Broadband Router, verify that port forwarding is properly configured.</li> </ul>
Viewer got disconnected during monitoring.	<ul style="list-style-type: none"> <li>Connected Viewers become disconnected upon any change to camera or network configurations.</li> <li>Check all network connections.</li> </ul>
The camera connected to the network is not detected in the Device Manager program.	<ul style="list-style-type: none"> <li>Turn off the firewall settings on your PC and then search the camera again.</li> </ul>
Images overlap.	<ul style="list-style-type: none"> <li>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.</li> </ul>
No image appears.	<ul style="list-style-type: none"> <li>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.</li> </ul>
Voice is not recorded even though audio input settings are configured.	<ul style="list-style-type: none"> <li>You must enable the &lt;Audio In&gt; check box in &lt;Basic&gt; - &lt;Video Profile&gt;.</li> </ul>

PROBLEM	SOLUTION
<Motion detection> of <Analytics> is set to <Enable>, but no notification e-mail reaches me even when an analysis event had occurred.	<ul style="list-style-type: none"> <li>Verify the settings in the following sequence:                             <ol style="list-style-type: none"> <li>Check &lt;Data &amp; Time&gt; settings.</li> <li>The &lt;Motion detection&gt; should be set to &lt;Enable&gt;.</li> <li>Check if the &lt;E-mail&gt; option of &lt;Event setup&gt; menu is checked to use.</li> </ol> </li> </ul>
No signal is found at the Alarm Output port even when an intelligent video analysis event is generated.	<ul style="list-style-type: none"> <li>Check alarm output port settings.</li> </ul>
Cannot record into the Micro SD memory card.	<ul style="list-style-type: none"> <li>Check if the memory card is defective.</li> </ul>
Micro SD memory card is inserted but the camera does not operate properly.	<ul style="list-style-type: none"> <li>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</li> <li>Format the memory card again in &lt;Setup&gt; → &lt;Event&gt; → &lt;Storage&gt; menu.</li> </ul>
Cannot record in the NAS.	<ul style="list-style-type: none"> <li>Confirm that the information registered in the NAS is correct.</li> </ul>
It reports that NAS setting has failed.	<ul style="list-style-type: none"> <li>Confirm that the IP address of the NAS is valid.</li> <li>Confirm that the ID/password of the NAS is valid.</li> <li>Confirm that you can access the folder designated as the default folder using the ID of the NAS.</li> <li>Confirm that the NAS SMB/CIFS items are unchecked.</li> <li>Confirm that the NAS IP address and the camera IP address are in the same format. ex) The NAS &amp; 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.</li> <li>Check whether you tried to access as another user without formatting the default folder saved or used.</li> <li>Confirm that you used recommended NAS equipment.</li> </ul>

# OPEN SOURCE ANNOUNCEMENT

## GPL/LGPL software license

The software included in this product contains copyrighted software that is licensed under the GPL/LGPL. You may obtain the complete Corresponding Source code from us for a period of three years after our last shipment of this product by sending email to [help.cctv@hanwha.com](mailto:help.cctv@hanwha.com)

If you want to obtain the complete Corresponding Source code in the physical medium such as CD-ROM, the cost of physically performing source distribution might be charged.

## GPL SW

Component Name	License	URL
Base Kernel	GPL 2.0	
Busybox	GPL 2.0	<a href="http://www.busybox.net/downloads/snapshots">http://www.busybox.net/downloads/snapshots</a>
iproute2-4.3.0	GPL 2.0	
iptables-1.4.21	GPL 2.0	<a href="http://ftp.netfilter.org/pub/iptables">http://ftp.netfilter.org/pub/iptables</a>
ethtool-4.2	GPL 2.0	
mtid-1.5.2	GPL 2.0	<a href="ftp://ftp.infradead.org/pub/mtid-utils">ftp://ftp.infradead.org/pub/mtid-utils</a>
mi-diag-2.11	GPL 2.0	
rp-pppoe-3.11	GPL 2.0	<a href="http://www.roaringpenguin.com/pppoe/">http://www.roaringpenguin.com/pppoe/</a>
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	<a href="http://www.webdav.org/neon/">http://www.webdav.org/neon/</a>

## GNU GENERAL PUBLIC LICENSE

Version 2, June 1991

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**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.

**19.** "Distribution" means any of the following acts:

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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.

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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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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 A-membership.

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.

3. 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.

4. 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.

5. 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.

6. 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.

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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.

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Julian Seward, [jseward@bzip.org](mailto:jseward@bzip.org)

bzip2/libbzip2 version 1.0.5 of 10 December 2007

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Jean-loup Gailly Mark Adler

[jloup@gzip.org](mailto:jloup@gzip.org) [madler@alumni.caltech.edu](mailto:madler@alumni.caltech.edu)

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](http://www.ietf.org/rfc/rfc1951.txt) (deflate format) and [rfc1952.txt](http://www.ietf.org/rfc/rfc1952.txt) (gzip format).

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