

**WISENET**

# **NETWORK CAMERA**

User Manual

TNO-6010M



# 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 PoE (48V), 0.17A.
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.



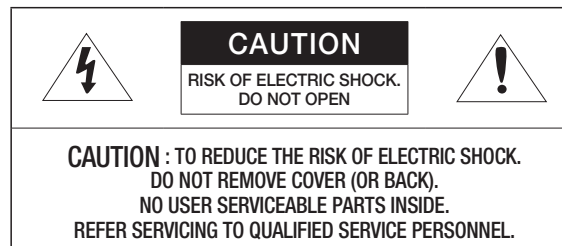
## WARNING

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.

## 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.

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

- **Surveillance camera for car**  
Enables monitoring of a running train or vehicle without camera shake.
- **Dustproof/waterproof (IP66)**  
The dustproof/waterproof design protects the product from rain and dust when installed outdoors.
- **Supports 2M pixel resolution videos**
- **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.
- **Tampering Detection**  
Detects tampering 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.
- **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.
- **ONVIF Compliance**  
This product supports ONVIF Profile S/G/T.  
For more information, refer to [www.onvif.org](http://www.onvif.org).



## RECOMMENDED PC SPECIFICATIONS

- CPU : Intel(R) Core(TM) i7 3.4 GHz or higher
  - RAM : 8G or higher
  - Supported OS : Windows, Mac OS X
  - **Plug-in free web viewer**  
Supported web browsers : Google Chrome, MS Edge, Mozilla Firefox(Windows 64bit only), Apple Safari (Mac OS X only)
  - **Plug-in Webviewer**  
Supported web browsers : MS Explorer, Apple Safari (Mac OS X only)
- ※ Refer to the appendix for detailed OS and browser version information.

## 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.







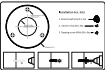




Recommended products	Available sizes
QNAP NAS	A maximum of 16 cameras can access simultaneously.
Synology NAS	A maximum of 16 cameras can access simultaneously.



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

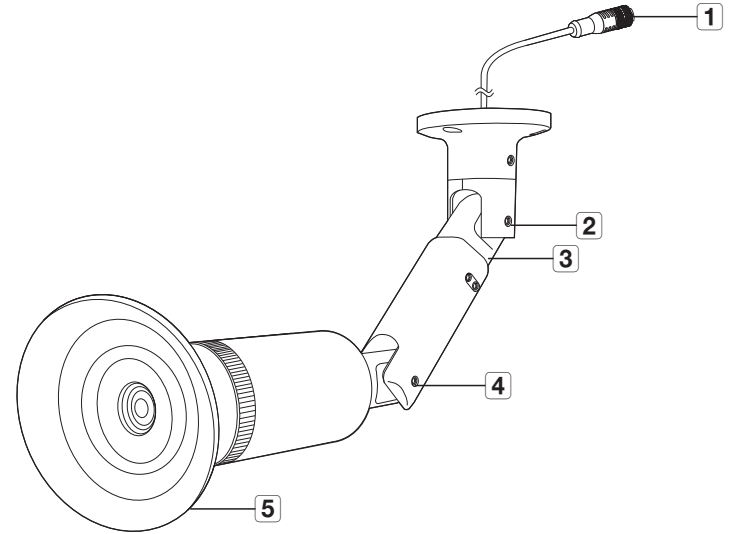
## WHAT'S INCLUDED

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
	Camera	1	
	Quick Guide	1	
	Warranty card	1	
	L Wrench	1	Used for opening/closing the Micro SD Card cover or moving/ fastening the bracket part.
	Tapping Screw (M5xL30)	3	Used for fixing the bracket wall mount to the wall or ceiling.
	Plastic Anchor (Ø6xL30)	3	For fixing a screw, Inserted in a hole (reinforced anchoring force)
	Label Template	1	Used when installing the camera.
	Bracket wall mount	1	Used for installing the camera on the ceiling or wall.
	Set Screw	2	Used for fastening the camera to the Bracket wall mount.
	Cable for the testing monitor	1	Used to test the camera connection to a portable display device.
	Hood	1	

## AT A GLANCE

### Appearance



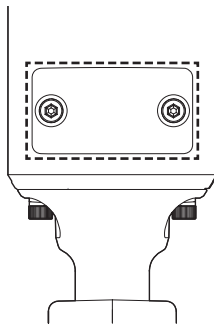
Item	Description
<b>1</b> M12 Female connector cable	Connect to the M12 Male connector cable for power supply and network connections.
<b>2</b> 2nd Tilting Joint	
<b>3</b> Sliding Body	
<b>4</b> 1st Tilting Joint	
<b>5</b> Rubber Hood	

### Disassembling the interface cover

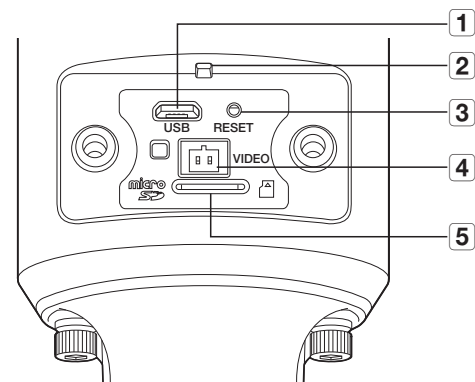
Use the hexa wrench and loosen the two screws shown in the figure below by turning 4 to 5 times to open the cover.

The location and function of the main interface part is described in the figure on the right. After completing the setup and closing the cover, assemble the cover to fit the bump that guides the assembly orientation while making sure that the orange wire string does not interfere with the cover, and then fasten the two screws.

- The camera supports IP66 specification. Please tighten the screws firmly to avoid water leak and dust inflow.



### Inside



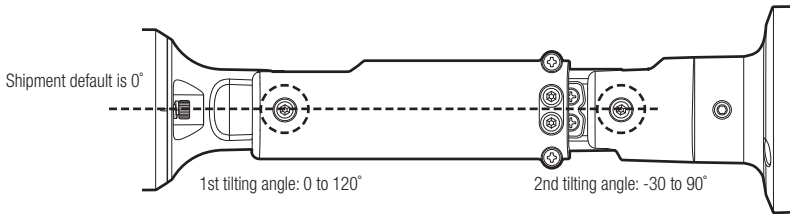
Item	Description
<b>1</b> MICRO USB Port	Port to connect the Wi-Fi dongle. You can check the installation video through the applications installed in the smartphone. (for installation) Refer to " <b>Connect to WiFi dongle</b> " on page 15. <ul style="list-style-type: none"> <li>■ WiFi dongle and OTG adapter are sold separately.</li> </ul>
<b>2</b> Bump that guides the cover's assembly orientation	
<b>3</b> Reset Button	Resets the camera settings to the default. Press and hold for about 5 seconds to reboot the system. <ul style="list-style-type: none"> <li>■ 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.</li> </ul>
<b>4</b> 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.
<b>5</b> Micro SD Memory Card Compartment	Compartment for the Micro SD memory card.



### Bracket - Tilting

You can loosen the screws in the two joints of the bracket instruction part by about two turns to adjust the tilting angle of the camera. The following is the moving angle supported by the two tilting joints:

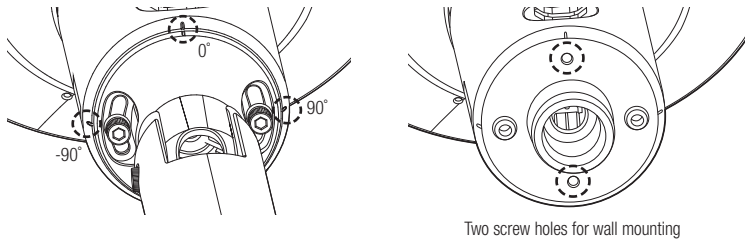
- 1st tilting, 0 to 120 degree movement
- 2nd tilting, -30 to 90 degree movement
  - Shipment default is 0 degree for the 1st & 2nd tilting angles
  - After adjusting the tilting angle appropriately, fasten the two screws, and make sure that they are firmly fastened.



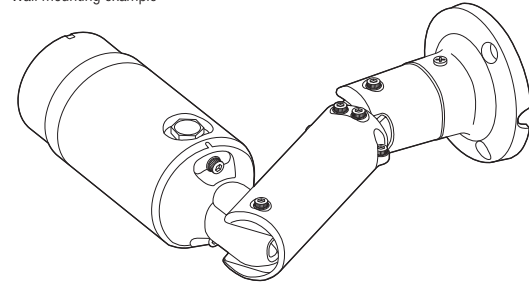
### Bracket - Rotate

When installing on the wall surface, completely loosen the screws of the two joints from the bracket instruction part, and rotate the bracket 90 or -90 degrees to fasten the screw again.

- Shipment default is 0 degree of rotate angle
- After adjusting the rotate angle appropriately, fasten the two screws, and make sure that they are firmly fastened.



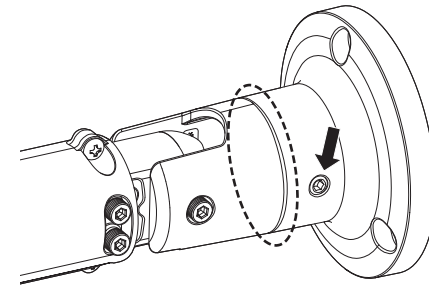
Wall mounting example



### Bracket - Panning

Before completely fastening the set screws (including the opposite side of the direction arrow in the below figure) of the two joints to the bracket instruction part, panning of 360 degrees is supported.

- After adjusting the panning angle appropriately, fasten the two screws, and make sure that they are firmly fastened. Since the two set screws are covered with a hardening agent, it would require much stronger force to remove the screw after fastening it due to the agent's hardening property. To easily remove the screws, use a soldering iron to partially heat up the screws (about 450°F) and remove them.



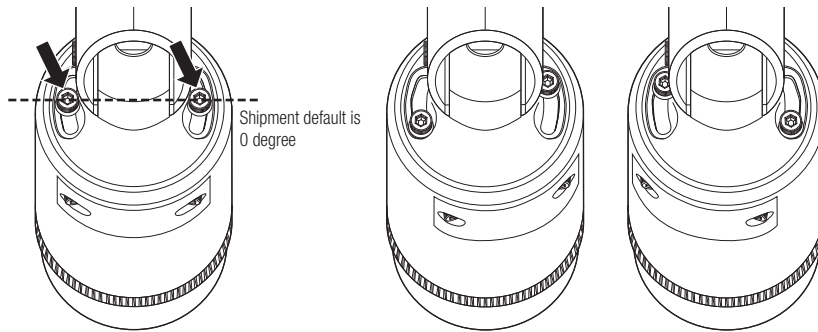
### Bracket - Panning for Horizontal Calibration of Video

Depending on the tilt of the wall surface or ceiling for installation, the horizontal level of the video output may be inclined after installation.

In this case, the video horizontal level can be calibrated by loosening the instruction part screw by about a half turn, rotating the camera part to level it, and fastening the two screws. The supported moving angle is as follows:

- Angle allowed for horizontal calibration: -20 to 20 degrees
  - Shipment default is 0 degree
  - After adjusting the panning angle appropriately, fasten the two screws, and make sure that they are firmly fastened.
  - The warranty does not cover any paint abrasion or peel on the part's external surface caused by repetitive panning movement for horizontal calibration.

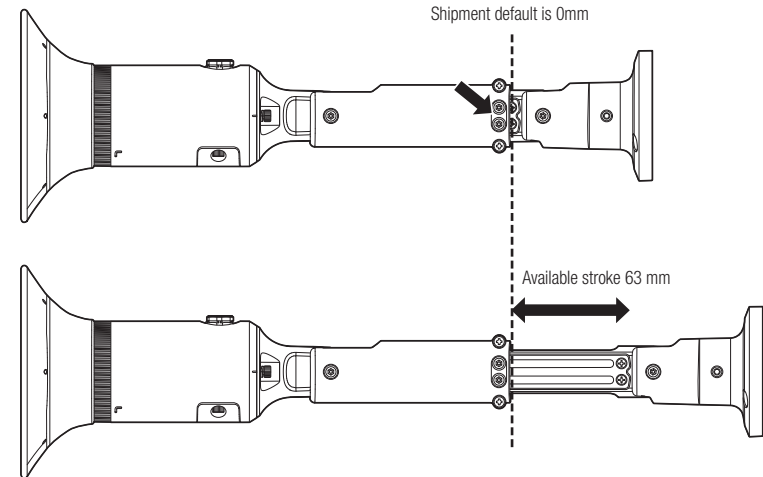
Panning for horizontal calibration of video: -20 to 20°



### Bracket - Sliding

The bracket length can be adjusted by loosening the two screws of the instruction part by about one turn. After adjusting it to an appropriate length, please re-fasten the screw. The following operational stroke is supported:

- Operational stroke: 0 to 63 mm
  - Shipment default is 0 mm
  - After adjusting the length appropriately, fasten the two screws, and make sure that they are firmly fastened.
  - The warranty does not cover any paint abrasion or peel on the corresponding part's external surface caused by repetitive sliding movement.



## INSTALLATION

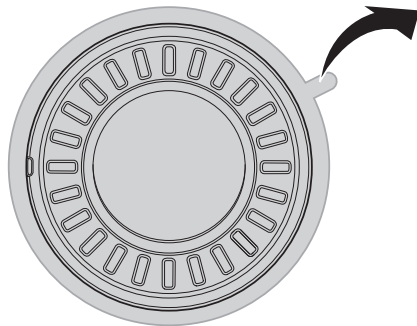
### Precautions before installation

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

- When installing on a ceiling, desired spot must be capable of supporting at least 5 times of the camera's weight.
- 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.
- This camera is a waterproof product that meets IP66 standards. However, if the M12 standard connector and cable are not used, the jack part will not be waterproof. It is recommended to use an M12 standard external cable when installing this product.
- When installing the camera on the outside of the vehicle, be sure to install it on a flat surface. If the mounting surface is curved, it may not properly adhere to the rubber, and may not be waterproofed.
- Depending on the shape and tilt of the vehicle windshield in front of the camera, the night conditions and specific camera installation angle could cause reflection of external lights. If this kind of problem occurs, readjust the camera installation angle to avoid such a problem.
- Since this product is equipped with a waterproof ventilation system, avoid installing it in a place that exhibits a sudden artificial change in temperature.
- To prevent condensation, this product has a separate damp-proof component and heater attached to it. Due to the nature of the product, dew may be formed after initially energizing the product, but they will disappear within an hour. If they still remain or reappear during the use, manually turn on the heater. Refer to "**Troubleshooting**". (Page 26)

### Remove protective film

As you can see in the figure, a protective film is attached to the front side of the camera window. If you see any fingerprints or dust in the window, please use a soft cloth such as fine fiber to clean it off. Since the window is made of Polycarbonate (PC), you are allowed to use a cleaning agent which doesn't affect the material.

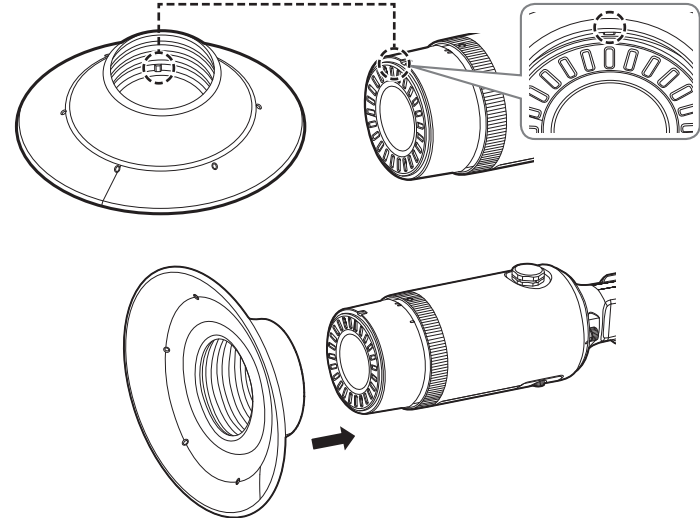


### Hood assembly

Align the hood with the bump inside the hood and instruction groove of the camera part to assemble.

As described in the figure, it is much easier to align if you keep checking the positions of the bump and the corresponding groove from the front when assembling.

- Remove the protective film from the window surface before assembling the hood. After it is removed, avoid contamination or scratch on the window surface.



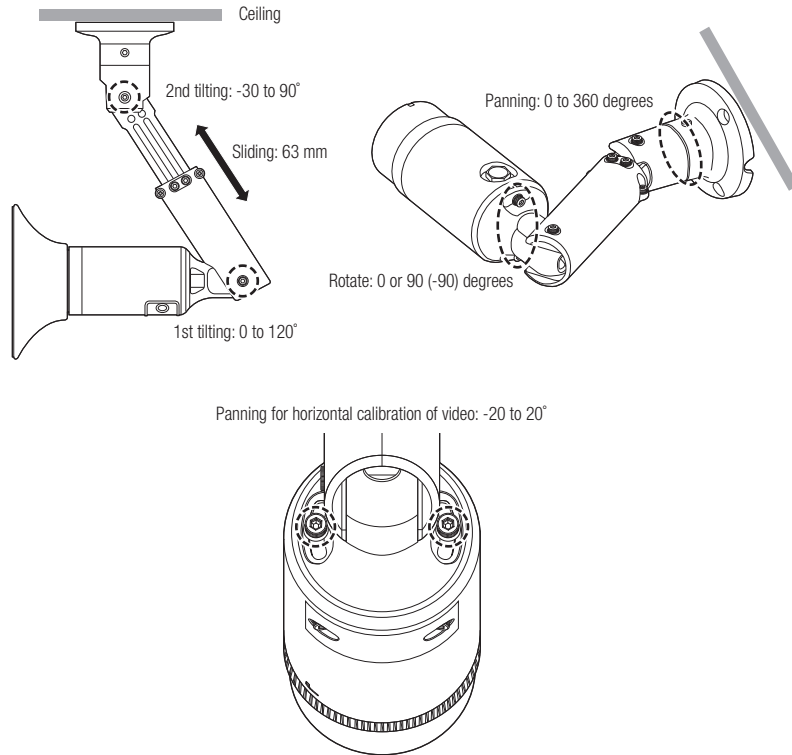
## How to install

TNO-6010M camera is to be installed inside a vehicle for recording outside scene from the front windshield.

To minimize any negative effect on the video caused by internal light sources in vehicles near the camera, we recommend you to install the hood on the camera as close to the windshield as possible. (Camera view could be blocked if the hood is deformed depending on the installation location.)

For optimal installation, the following is supported for the bracket part: 1st tilting, 0 to 120 degrees & 2nd tilting -30 to 90 degrees / Rotate 0 degree or 90 (-90) degrees / Panning 360 degrees / Panning for horizontal calibration of video -20 to 20 degrees / Sliding 0 to 63 mm stroke movement.

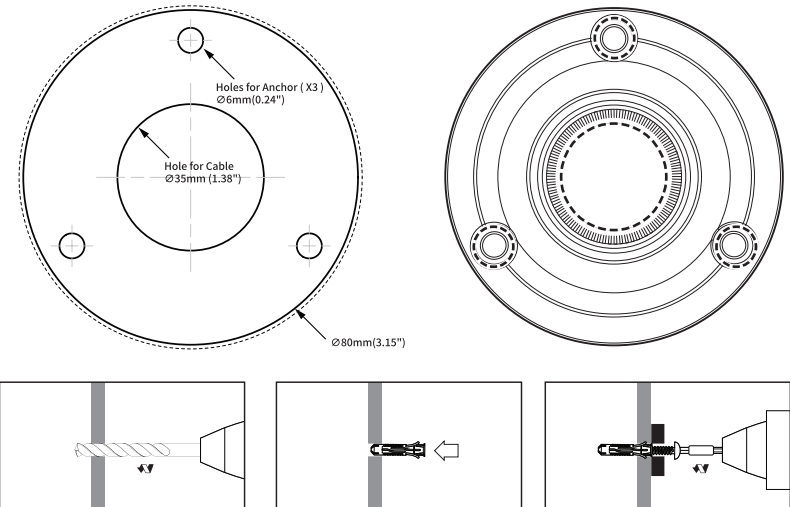
- The factory default is as follows: 1st & 2nd tiling 0 degree / rotate 0 degree / panning for horizontal calibration of video 0 degree / Sliding 0 mm. (\* See the exterior diagram in the back.)



After considering the ceiling or wall surface for camera installation, required shooting range, etc., attach the camera to the hood. Consider the appropriate orientation, bending, and length of the bracket in advance, and roughly mark the installation location of the bracket wall mount on the ceiling or wall surface.

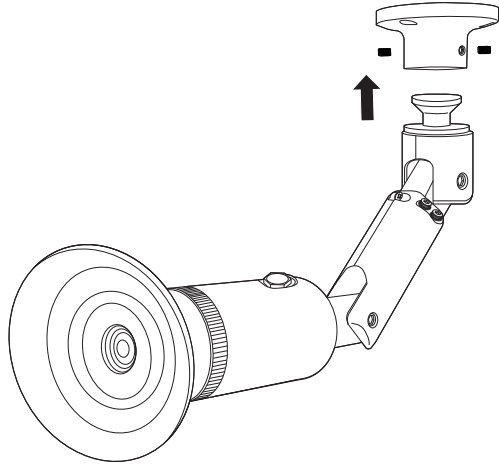
Then, take off the installation guide part (Ø80mm(3.15")) from the label template and attach it to the wall surface or ceiling marked for the installation of the bracket wall mount.

- Use a drill to make three holes for the anchor and one hole for the cable, and remove the attached installation guide part.
- Insert the anchors in the three holes for the anchors. (To insert them easily, lightly hammer the anchors.)
- Align the three holes for screws created in the bracket wall mount with the three installed holes for anchors, and use the appropriate driver or power tool to fasten the tapping screws (+).
- Pick up the corresponding cable for connection with the camera, and pull it out or push it into the center hole of the bracket wall mount.



After connecting the M12 cable connector to the corresponding cable connector, push the cable into the center hole of the bracket wall mount to assemble it in the direction of the arrow on the bracket wall mount. Then, adjust the camera towards the location intended for monitoring, and use the hexa wrench to fasten the two set screws to the bracket wall mount.

- ! ■ The camera is heavy, so please be careful not to drop it before fastening the set screws.
- When the installation is complete, make sure that the hexa screws in 10 joints (silver / refer to the screw location described in each functioning part section) are firmly fastened to the camera. If the fastening is incomplete, it may lead to the loosening of screws or water leak caused by vehicle's vibration.

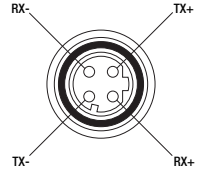


### Connecting a connector cable

Connect the M12 male connector into the hole of the M12 Female connector of the camera.

- ⚡ ■ This camera uses Female, D-coded types.
- PoE (Power over Ethernet) is supported.
- You are recommended to use a shielded network connector.

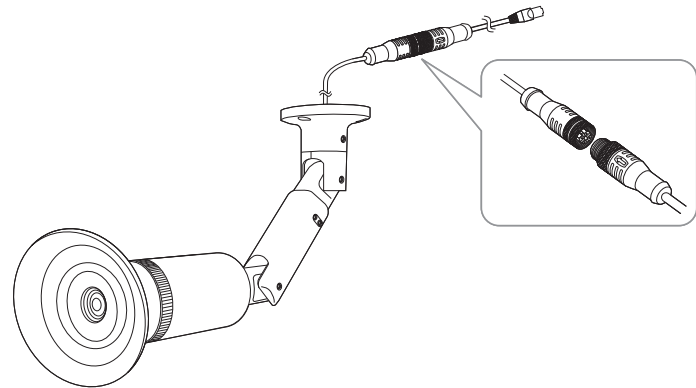
- ! ■ Connect this camera to a shielded network cable (STP).
- Please, use 4 poles, Male, D-coded type external cables that meet the M12 specification.
- Check whether the PoE device is properly connected to the ground.



### Making a connection using the M12-RJ45 conversion cable

Connect the M12 male connector for the conversion cable to the groove of the M12 Female connector for your camera.

- ⚡ ■ M12-RJ45 cable is sold separately.



## Powering and networking

Connect a camera to a PoE equipment or connect the M12-RJ45 connector for the conversion cable of your camera to a PoE equipment.

- ! A connection method may vary depending on the installation environment of a user.
- Connect to a PoE (Power over Ethernet) enabled router's PoE connector.
- Use PoE (Power over Ethernet) that is compliant with the IEEE802.3af protocols.  
You can only use a Mode A PoE device that supplies power through data pin pair 1, 2, 3, 6.
- Even if you use the M12-RJ45 conversion cable, you can only use a mode A type PoE equipment that supplies power to data pair pins 1, 2, 3, 6.

## Network Cable Specification

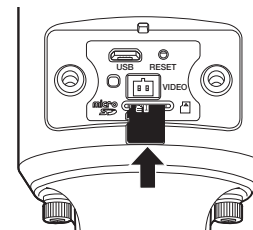
Item	Contents	Remark
Connector	RJ45	
Ethernet	10/100Base-T	10/100 Mbps
Cable	Category 5e	
Max Distance	100M	DC resistance ≤ 0.125 Ω/m
PoE Support	IEEE 802.3af	

## 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.

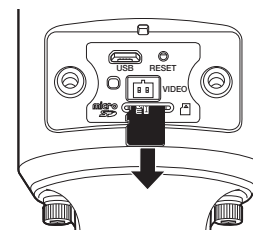
### Inserting a Micro SD Memory Card

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



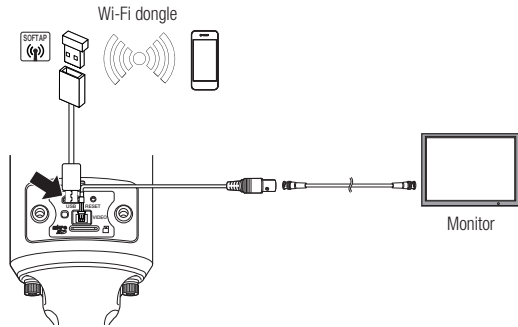
### Removing a Micro SD Memory Card

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



- !
  - Be careful, as the Micro SD memory card may pop out when it is ejected if you firmly push and release it.
  - Before removing the Micro SD memory card, in <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



- ! The Micro USB out terminal of the product is provided for easier installation, and is not recommended for monitoring purposes.
- To remove the connected CVBS cable, unplug it while pressing the part marked by the arrow with your finger.

### 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

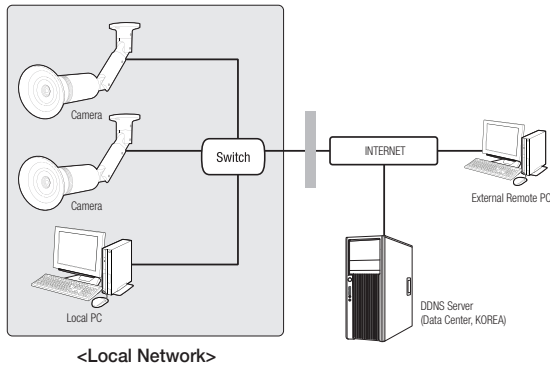
# network connection and setup

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

## CONNECTING THE CAMERA DIRECTLY TO LOCAL AREA NETWORKING

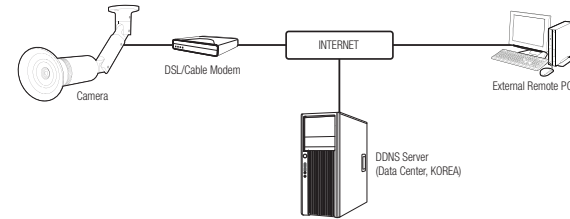
### Connecting to the camera from a local PC in the LAN

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.
- 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 18)

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

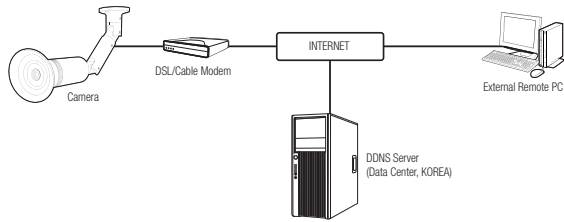


1. Connect the user PC directly with the network camera.
2. Run the Device Manager and change the IP address of the camera so that you can use the web browser on your desktop to connect to the Internet.
3. Use the Internet browser to connect to the web viewer.
4. Move to [Setup] page.
5. Move to [Network] – [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.



## CONNECTING THE CAMERA DIRECTLY TO A PPPoE MODEM

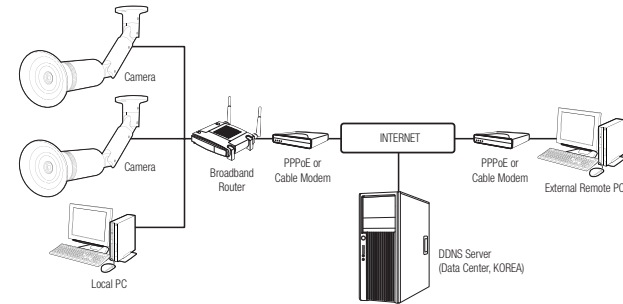


1. Connect the user PC directly with the network camera.
2. Run the Device Manager and change the IP address of the camera so that you can use the web browser on your desktop to connect to the Internet.
3. Use the Internet browser to connect to the web viewer.
4. Move to **[Setup]** page.
5. Move to **[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 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.

## 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 20)

## 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.

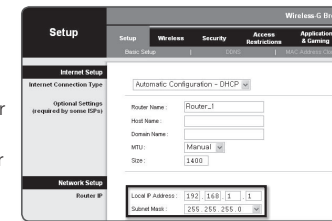
### If not using a Broadband Router

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 20)

### 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
	VNP Port	4520	4521
	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

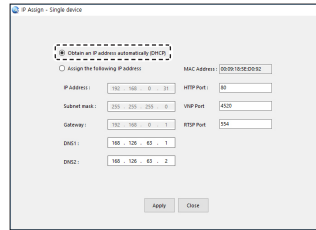
5. Click [Apply] Button.
6. If the success message is displayed, click [OK].

## Configuring Dynamic IP

Receive IP address from DHCP

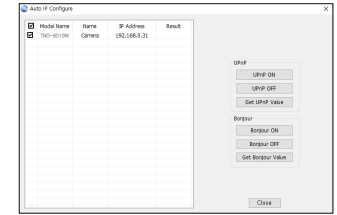
- Example of the Dynamic IP environment
  - If a Broadband Router, with cameras connected, is assigned an IP address by the DHCP server
  - If connecting the camera directly to modem using the DHCP protocols
  - If IPs are assigned by the internal DHCP server via the LAN

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]**.



## AUTOMATICALLY CONFIGURING IP

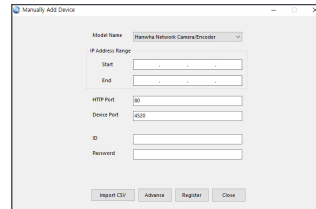
1. Click the camera from the list that you want to automatically configure the IP.
2. Click **< + >** at the main page of device manager.
  - Equipment Setting menu appears.
3. At the menu, click **<Auto IP Configure>**.
4. Click **[Close]** button.



## 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, 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.

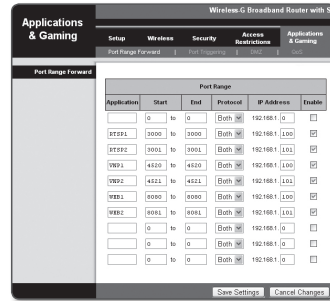


## PORT RANGE FORWARD (PORT MAPPING) SETUP

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.

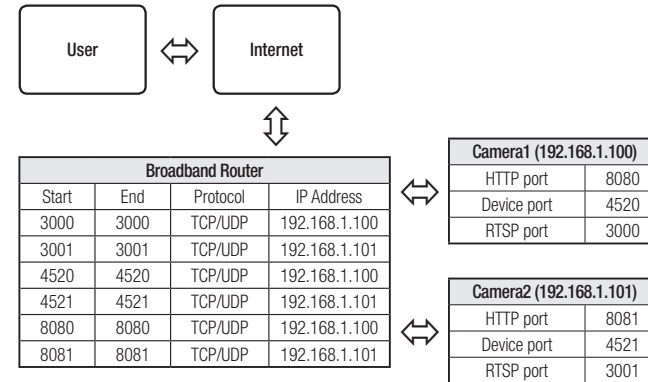


- Port forwarding setting is an example of setting CISCO IP router.
- The settings may differ depending on the connected Broadband Router model.  
For more information, refer to the user manual of the applicable router.

### 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

---

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>

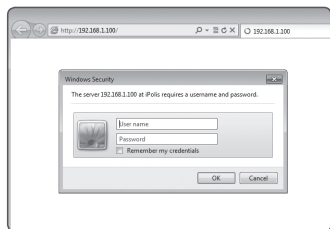


- To use Wisenet DDNS, sign up at the Wisenet DDNS homepage (<http://ddns.hanwha-security.com>) and register the product at **[My DDNS]>[Register Product]**.

## 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.

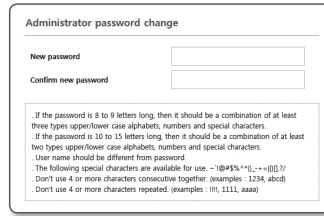
To register your device to the <DDNS> server, visit <http://ddns.hanwha-security.com> and register your device first, and then set the Web Viewer's <Network> - <DDNS> to <Wisenet DDNS>, as well as providing <Product ID> that had been used for DDNS registration.

## PASSWORD SETTING

When you access the product for the first time, you must register the login password.

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.



The image shows a window titled "Administrator password change". It contains two input fields: "New password" and "Confirm new password". Below the fields is a list of password requirements:

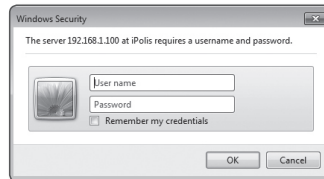
- . If the password is 8 to 9 letters long, then it should be a combination of at least three types uppercase/lower case alphabets, numbers and special characters.
- . If the password is 10 to 15 letters long, then it should be a combination of at least two types uppercase/lower case alphabets, numbers and special characters.
- . User name should be different from password
- . The following special characters are available for use: ~!@#%&^\*\_-+=|[]{}?/
- . Don't use 4 or more characters consecutive together. (examples: 1234, abcd)
- . Don't use 4 or more characters repeated. (examples: !!!!!, 1111, aaaa)

## 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.



The image shows a "Windows Security" dialog box. The title bar says "Windows Security". The main text reads: "The server 192.168.1.100 at ipolis requires a username and password." Below this text are two input fields: "User name" and "Password". There is a checkbox labeled "Remember my credentials" which is currently unchecked. At the bottom of the dialog are "OK" and "Cancel" buttons.

## 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.

**SPECIFICATION**

	Items	Description
Video	Imaging Device	1/2.8" 2MP CMOS
	Effective Pixels	1945(H) x 1097(V)
	Min. Illumination	Color : 0.04 Lux (F2.0, 1/30sec) BW : 0.004 Lux (F2.0, 1/30sec)
	Video Out	CVBS : 1.0 Vpp / 75Ω composite, 720 x 480(N), 720 x 576(P), for installation USB : micro USB type B, 1280 x 720 for installation
Lens	Focal Length (Zoom Ratio)	2.8mm fixed focal
	Max. Aperture Ratio	F2.0
	Angular Field of View	H : 113.7°, V : 61.5°, D : 134.5°
	Min. Object Distance	0.4m(1.31ft)
	Focus Control	Manual
Operational	Camera Title	Displayed up to 85 character
	Day & Night	Auto(ICR)
	Backlight Compensation	BLC, HLC, SSCR
	Wide Dynamic Range	150dB
	Digital Noise Reduction	SSNR V
	Digital Image Stabilization	Support (built-in gyro sensor)
	Defog	Support
	Motion Detection	8ea, 8point polygonal zones
	Privacy Masking	32ea, polygonal zones - Color : Gray, Green, Red, Blue, Black, White - Mosaic
	Gain Control	Low / Middle / High
	White Balance	ATW / AWC / Manual / Indoor / Outdoor
	LDC	Support
	Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec)
	Digital PTZ	Support (Preset, Group)

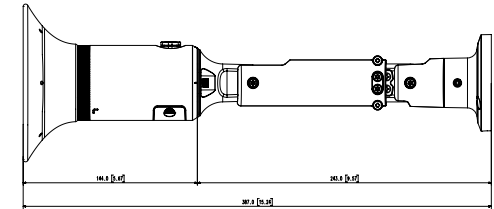
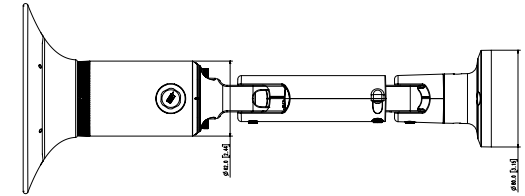
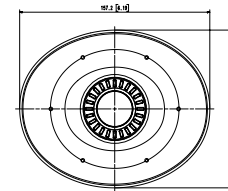
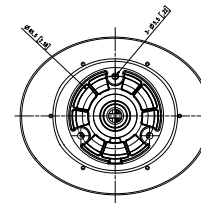
	Items	Description	
Operational	Video Rotation	Flip, Mirror, Hallway view	
	Analytics	Defocus detection, Directional detection, Fog detection, Face detection, Motion detection, Digital auto tracking, Appear/Disappear, Enter/Exit, Loitering, Tampering, Virtual line, Shock detection	
	Business Intelligence	People counting, Queue management, Heatmap	
	Alarm Triggers	Analytics, Network disconnect	
	Alarm Events	<ul style="list-style-type: none"> <li>File upload via FTP, E-Mail</li> <li>Notification via E-Mail</li> <li>SD/SDHC/SDXC or NAS recording at event triggers</li> </ul>	
Network	Ethernet	M12	
	Video Compression Format	H.265/H.264: Main/Baseline/High MJPEG	
	Resolution	1920x1080 / 1280x1024 / 1280x960 / 1280x720 / 1024x768 / 800x600 / 800x448 / 720x576 / 720x480 / 640x480 / 640x360 / 320x240	
	Max. Framerate	H.265/H.264 : Max. 60fps MJPEG: Max. 30fps	
	Smart Codec	<b>WiseStream II</b>	
	Video Quality Adjustment	H.264/H.265 : Target Bitrate Level Control MJPEG : Target Bitrate Level Control	
	Bitrate Control Method	H.264/H.265 : CBR or VBR MJPEG: VBR	
	Streaming Capability	Multiple Streaming (Up to 10 Profiles)	
	Protocol	IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour	
	Security		HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access Log 802.1x Authentication (EAP-TLS, EAP-LEAP)



Items	Description	
Network	Edge Storage	Micro SD/SDHC/SDXC 1slot 256GB
	Application Programming Interface	ONVIF Profile S/G/T SUNAPI(HTTP API) Wisenet open platform
	Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
	Web Viewer	Supported OS : Windows 7 / 8.1 / 10, MAC OS X 10.10, 10.11, 10.12 Recommended Browser: Google Chrome Supported Browser: MS Explore11, MS Edge, Mozilla Firefox(Window 64bit only), Apple Safari(Mac OS X only)
	Memory	1024MB RAM, 256MB Flash
Environmental	Operating Temperature / Humidity	-30°C ~ +55°C(-22°F ~ +131°F) / Less than 90% RH
	Storage Temperature / Humidity	-50°C ~ +60°C(-58°F ~ +140°F) / Less than 90% RH
	Certification	IP66, NEMA4X, IK10 EN55011:2009+A1:2010, EN50581:2012, EN50121-3-2:2015, EN61000-4-2:2009, EN61000-4-3:2006+A2:2010, EN61000-4-4:2012, EN61000-4-5:2014, EN61000-4-6:2009, EN50155:2007, NEMA 4X, EN-45545-2, NEPA 130, BSS 7239
Electrical	Input Voltage	M12 with PoE(IEEE802.3af, Class3)
	Power Consumption	PoE : Max. 8W, Typ. 4.3W
Mechanical	Color / Material	Black / Aluminum (Hood : Silicone rubber)
	Dimension (WxHxD)	Except hood, $\Phi 62 \times 372\text{mm}$ (* See the exterior diagram for the dimension including the hood.)
	Weight	1170g

## PRODUCT OVERVIEW

Unit : mm [inch]



## TROUBLESHOOTING

PROBLEM	SOLUTION
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> <li>If the camera is connected over an PPPoE network, it's possible for Viewer to disconnect under poor network conditions.</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>
<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>
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>

PROBLEM	SOLUTION
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>
I see condensation formed on the screen.	<ul style="list-style-type: none"> <li>It will disappear within an hour from the initial energization of the product.</li> <li>If it still remains after an hour, follow these steps to turn on the heater: After connecting to the web viewer, go to &lt;Setup&gt; → &lt;Video &amp; Audio&gt; → &lt;Camera setup&gt; → &lt;Heater&gt; and click &lt;One time act&gt;.</li> <li>The heater is automatically turned off after 30 minutes.</li> </ul>

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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	
mtd-1.5.2	GPL 2.0	<a href="ftp://ftp.infradead.org/pub/mtd-utils">ftp://ftp.infradead.org/pub/mtd-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>

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- Version 1.1

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

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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.

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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

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

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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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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](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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Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



Hanwha Techwin cares for the environment at all product manufacturing stages, and is taking measures to provide customers with more environmentally friendly products.

The Eco mark represents Hanwha Techwin's devotion to creating environmentally friendly products, and indicates that the product satisfies the EU RoHS Directive.



### Correct Disposal of This Product (Waste Electrical & Electronic Equipment)

(Applicable in the European Union and other European countries with separate collection systems)

This marking on the product, accessories or literature indicates that the product and its electronic accessories (e.g. charger, headset, USB cable) should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.



### Correct disposal of batteries in this product

(Applicable in the European Union and other European countries with separate battery return systems.)

This marking on the battery, manual or packaging indicates that the batteries in this product should not be disposed of with other household waste at the end of their working life. Where marked, the chemical symbols Hg, Cd or Pb indicate that the battery contains mercury, cadmium or lead above the reference levels in EC Directive 2006/66. If batteries are not properly disposed of, these substances can cause harm to human health or the environment.

To protect natural resources and to promote material reuse, please separate batteries from other types of waste and recycle them through your local, free battery return system.

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