

**WISENET**

# **THERMAL POSITIONING CAMERA**

User Manual

TNU-4041T

TNU-4051T



# Thermal Positioning 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 lightning 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 24 V AC(50 or 60 Hz) min.6 A.
16. 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.
17. 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.
18. 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.
19. 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.
20. Installing or using the product in water can cause serious damage to the product.



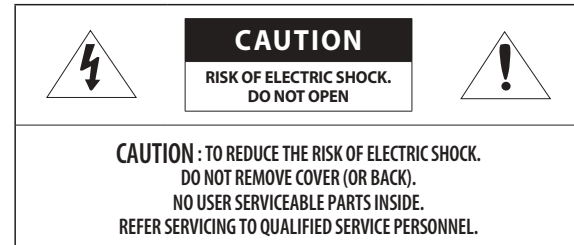
## WARNING

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.

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.

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

Please read the following recommended safety precautions carefully.

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

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

The meaning of the symbols are shown below.

- Reference : In case of providing information for helping of product's usages
  - Notice : If there's any possibility to occur any damages for the goods and human caused by not following the instruction
- ※ Please read this manual for the safety before using of goods and keep it in the safe place.

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## PRODUCT FEATURES

- **Dustproof/Waterproof (IP66)**

The dustproof and waterproof design makes you feel at ease when installing the product outdoors or exposing it to rain.

- **Temperature change detection**

An event is generated when the temperature value of the camera input image is analyzed and is larger or smaller than the threshold value.

- **Supports VGA pixel resolution videos**

VGA-resolution (640x480 pixels) thermal camera: The thermal camera is a device that displays the temperature distribution in a VGA-resolution (640x480) thermal image by sensing the surface temperature of the object in a noncontact manner.

- **Multi-Streaming**

This network camera can display videos in different resolutions and qualities simultaneously using different CODECs.

- **Web Browser-based Monitoring**

Using the Internet web browser to display the image in a local network environment.

- **Alarm**

When an event occurs, video is either sent to the email address registered by the user, sent to the FTP server, saved in a Micro SD card or NAS, or a signal is sent to the alert output terminal.

- **Motion Detection**

Detects motion from the camera's video input.

- **Audio Detection**

Detects sound louder than a certain level specified by user.

- **Auto Detection of Disconnected Network**

Detects network disconnection before triggering an event.

- **Shock Detection**

An alarm is generated when a shock is applied.

- **IVA (Intelligent Video Analysis) function**

Detects a motion or situation that meets the configured event rules.

- **Sound source classification**

Detects a sound source specified by the user.

- **ONVIF Compliance**

This product supports ONVIF Profile S&G.  
For more information, refer to [www.onvif.org](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 7, 8.1, 10, Mac OS X 10.10, 10.11, 10.12

- **Webviewer**

Recommended browser: Google Chrome 63

Supported browsers: IE11, MS Edge 41, Mozilla Firefox 57(Windows 64bit only), Apple Safari 11 (Mac OS X only)

## RECOMENDED 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.

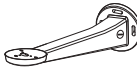





▪ If you use NAS equipment for purposes other than video saving, the number of accessible cameras may be reduced.

## WHAT'S INCLUDED

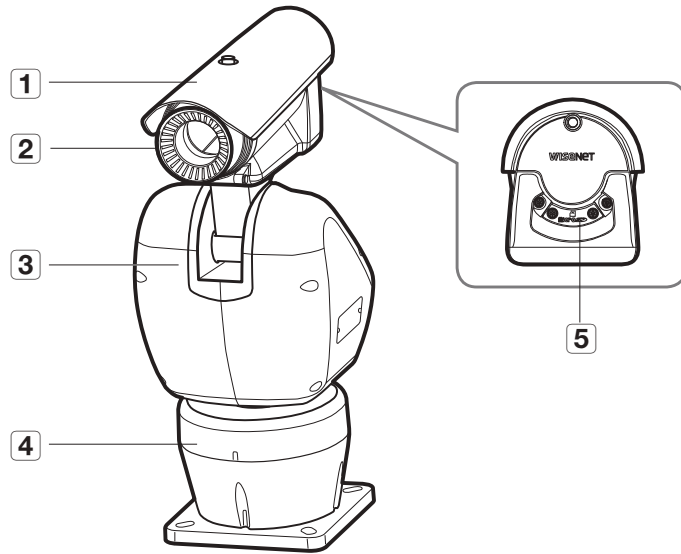
Please check if your camera and accessories are all included in the product package.  
(As for each sales country, accessories are not the same.)

Appearance	Item Name	Quantity	Description
	Camera body	1	-
	Quick Guide (Optional)	1	-
	Warranty card (Optional)	1	-
	Sunshield	1	It protects the camera from the direct sunlight.
	Sunshield Hold	1	It fixes the sunshield with the camera.
	Star-Shape wrench	1	For attaching the memory slot cover
	RJ45 waterproof accessory	1	Used to install in humid places

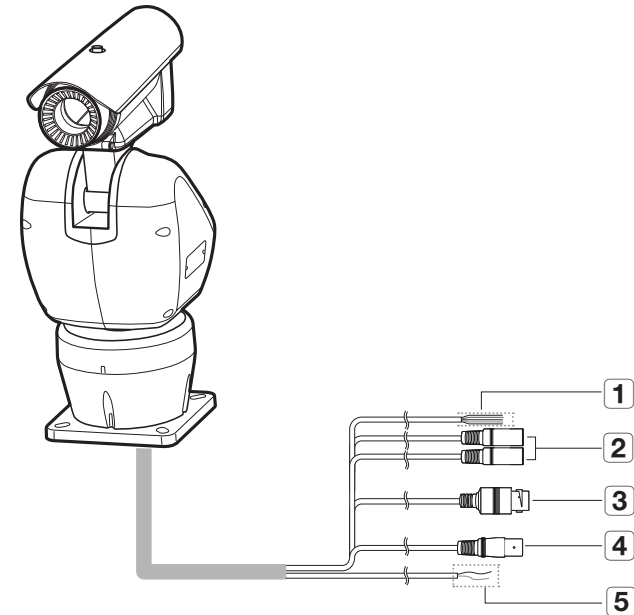
Appearance	Item Name	Quantity	Description
<b>Wall Mount Bracket (not included)</b>			
	Wall Mount Bracket	1	Used when installing the camera on a wall
	Wrench bolts(M5 X 20) / flat washers	3/3	for connecting the main body and bracket
	Bolts(M3 x 8)	8	for connecting the cable wiring cover
	O-ring	1	for connecting the main body and bracket

## AT A GLANCE

### Appearance



### Cables



Item	
1	Sunshield
2	Camera
3	Main body
4	Base housing
5	Micro SD card slot

Item	Description
1 Alarm cable	Alarm I/O cable. (Black/Brown/Red/Yellow/Orange)
2 Audio cable	Audio I/O cable.
3 Ethernet	Connects the Ethernet cable.
4 Video output cable	Outputs the video.
5 Power cable	Cables for the camera power . (Brown/Blue)



## INSTALLATION

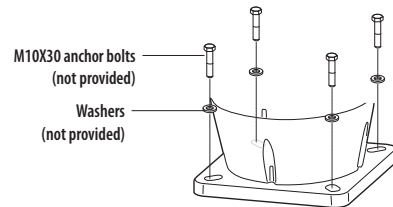
### Precautions before installation

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

- Install the system based on the following directions. If you want to install using a different method, you should confirm the safety recommendations by making a request to the manufacturer in advance.
- The gross weight of the system is 11.7 kg. A pair of anti-slip gloves must be worn. When you lift your device, do not grab the camera but the body.
- It must be installed on the area (ceiling or wall) that can withstand 4 times the weight of the camera including the installation bracket.
- Stuck-in or peeled-off cables can cause damage to the product or a fire.
- For safety purposes, keep anyone else away from the installation site. And put aside personal belongings from the site, just in case.

### Install the device on the floor

1. Install the pedestal on the floor.



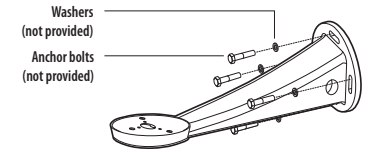
- ! We recommend using M10X30 anchor bolts or better to install the camera on concrete.
- Use screws that can withstand more than four times the weight of the equipment.

### Optional Accessories for Installation

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

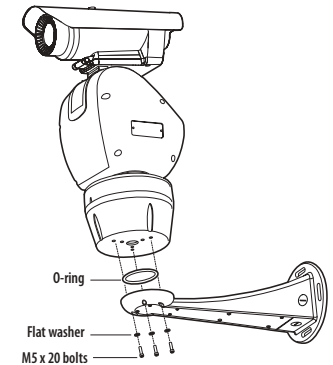
#### ■ Mounting on wall using bracket

1. Connect the side of the bracket to the wall using 4 anchor bolts (not supplied).

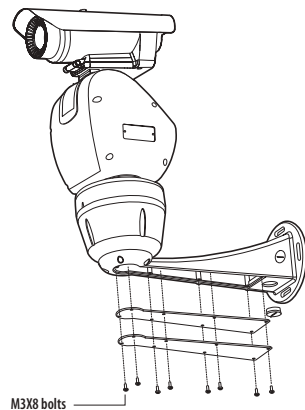


- ! We recommend using M10X30 anchor bolts or better to install the camera on concrete.
- Use screws that can withstand more than four times the weight of the equipment.

2. Assemble the main body and bracket using 3 Wrench bolts.



3. After organizing the cables as shown, assemble the cover.

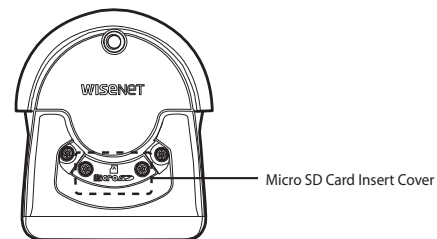


## INSERTING/REMOVING A MICRO SD MEMORY CARD

- ! ■ 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.

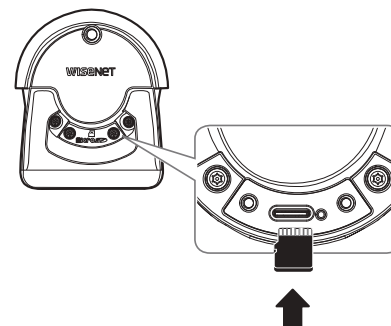
### Separating the Micro SD card insert cover

Use the star key to remove the Micro SD card insert cover.



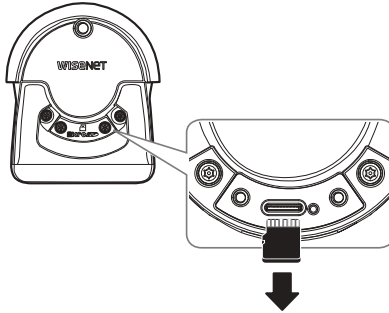
### Inserting a Micro SD Memory Card

Insert a Micro SD card in the arrow direction shown in the figure.



## 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 <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.

## MEMORY CARD INFORMATION (NOT INCLUDED)

### What is a memory card?

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

### Selecting a memory card that's suitable for you

Your camera supports Micro SD/SDHC/SDXC memory cards.

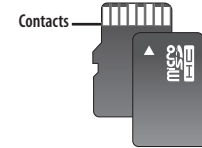
You may, however, experience compatibility issues depending on the model and make of the memory card.

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

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

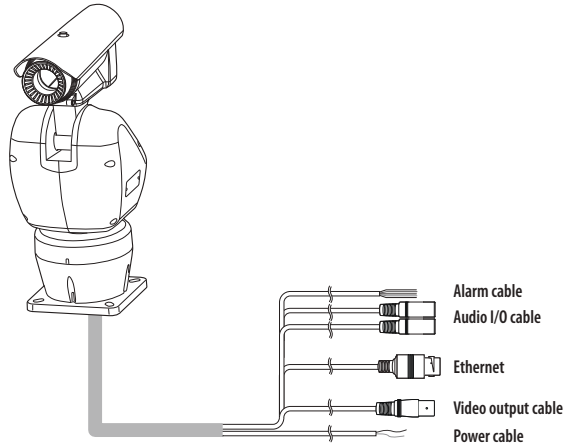
It is recommended to use a 16GB to 256GB (MLC type) memory card for this camera.

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

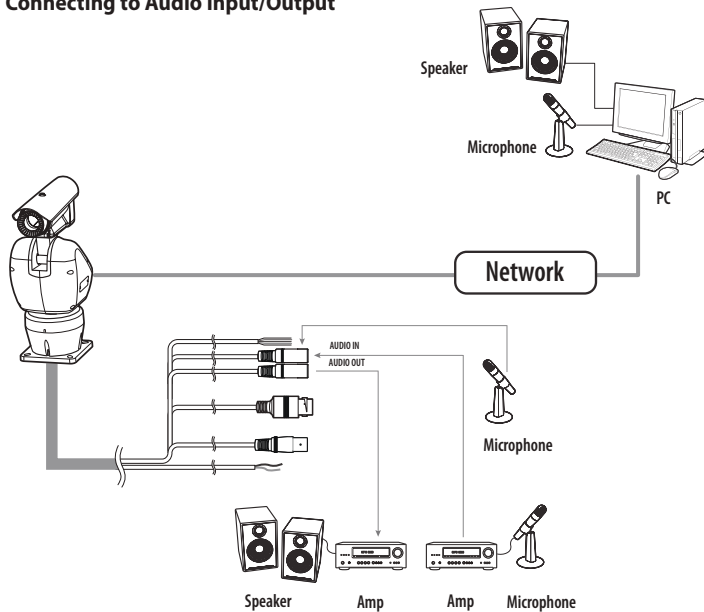


Micro SD/SDHC/SDXC

## CONNECTING WITH OTHER DEVICE



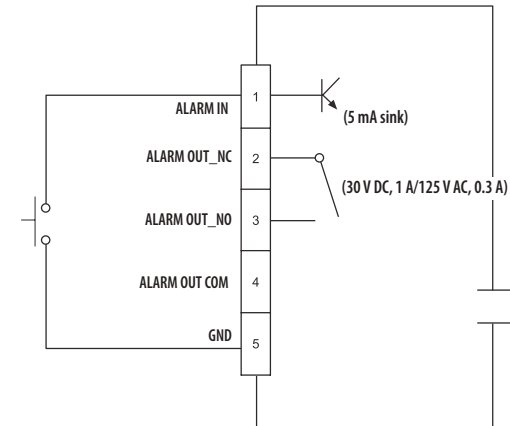
### Connecting to Audio Input/Output



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

- **Audio Codec** : G.711 PCM,  $\mu$ -law 64kbps 8kHz sampling
- **Full duplex Audio**
- **Audio in** : Used for mono signal line input (Max.2.4 Vpp)
- **Audio out** : Used for mono signal line output (Max.2.4 Vpp)
- **Line out impedance** : 600 $\Omega$

### Alarm I/O Wiring Diagram



## How to connect external cables

Connect external cables by referring the table below.

- Connect alarm input/output cables for each terminals one by one.

Label print	COLOR	Description	Remarks
ALARM_IN	Black	Terminal for connecting external alarm input signal	
GND	Brown	Common terminal (GND) for connecting external alarm input signal	
ALARM OUT NO	Red	Terminal (NO) for connecting the Relay output signal	
ALARM OUT COM	Yellow	Terminal (GND) for connecting the Relay output signal	
ALARM OUT NC	Orange	Terminal (NC) for connecting the Relay output signal	

## Ethernet Connection

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

## Power Supply

Connect the line of the power adapter to the power input terminal of the camera.

Item	COLOR
Main power	BROWN
	BLUE

- Be sure to connect the AC24V power supply (non-polar) while the power is shut off.

## AC 24 V power supply wire specification

Wire Type (AWG)	#22	#20	#18
Cable Length (Max.)	34 m	55 m	88 m

## Network Cable Specification

Item	Contents	Remark
Connector	RJ45	
Ethernet	10/100Base-T	10/100 Mbps
Cable	UTP Category 5e	
Max Distance	100M	

## Electrical Resistance of Copper Wire at [20°C (68°F)]

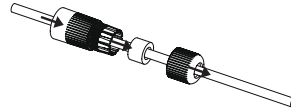
Copper Wire Gauge (AWG)	#24(0.22 mm <sup>2</sup> )	#22(0.33 mm <sup>2</sup> )	#20(0.52 mm <sup>2</sup> )	#18(0.83 mm <sup>2</sup> )
Resistance (Ω/m)	0.078	0.050	0.030	0.018
Drop Voltage (V/m)	0.028	0.018	0.011	0.006
Recommended Distance (m)	Less than 20	Less than 30	Less than 30	Less than 30

- As shown in the table above, you may encounter a voltage-sag depending on the wire length. If you use an excessively long wire for camera connection, the camera may not work properly.
  - Camera Operating Voltage: AC 24V ± 10%
  - Voltage drop measurements on the chart above may vary depending on the type and manufacture of the copper cable.

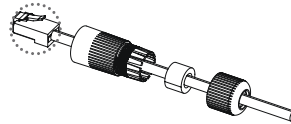
# installation & connection

## How to connect the RJ45 waterproof cable to a LAN cable

1. Insert it through the arrow direction.

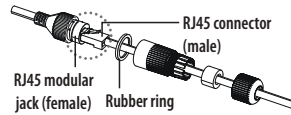


2. Connect the LAN connector (male) to the cable.

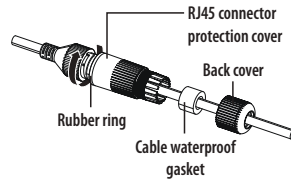


3. Connect the RJ45 modular jack (female) to the RJ45 connector (male).

! Please, keep each of the parts separated.



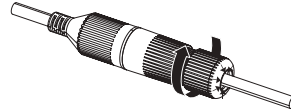
4. Assemble by rotating the RJ45 modular jack (female) and the RJ45 protection cover clockwise (Follow the arrow).



5. Assemble by rotating RJ45 protection cover and back cover clockwise (Follow the arrow).

When the back cover is assembled, the cable waterproof gasket is tightly attached to the cable to make it waterproof.

! You must fully assemble it to rotate the back cover up to the end of the screw thread of the RJ45 connector.

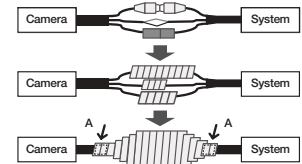


## Outdoor installation

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

1. Connect the power, I/O, AUDIO, and LAN cables.

2. Wrap the black cable jacket (Area A) and the cable connection area with waterproof (butyl rubber) tape so that more than half of the butyl rubber tape is overlapped.



- ! If the cable jacket is not waterproofed properly, then it can directly cause leakage. Make sure to protect the cable with a dense layer of taping.
- Waterproof butyl tape is made of butyl rubber that can be stretched to twice its normal length.
- You do not need to wrap butyl rubber tape separately since LAN connector cable is waterproof.

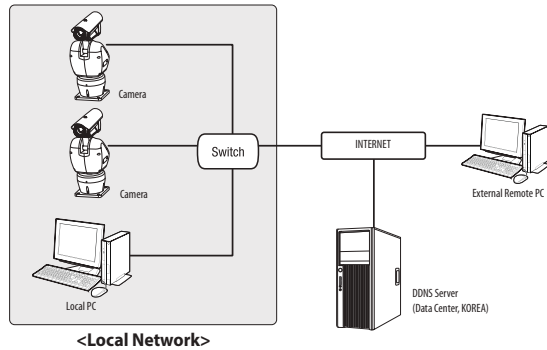
# network connection and setup

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

## CONNECTING THE CAMERA DIRECTLY TO LOCAL AREA NETWORKING

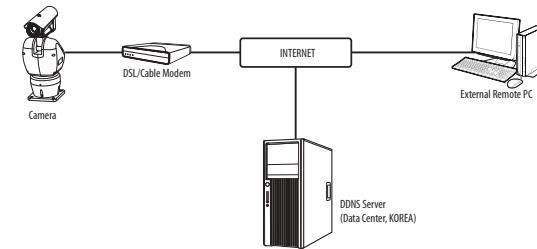
### Connecting to the camera from a local PC in the LAN

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 17)

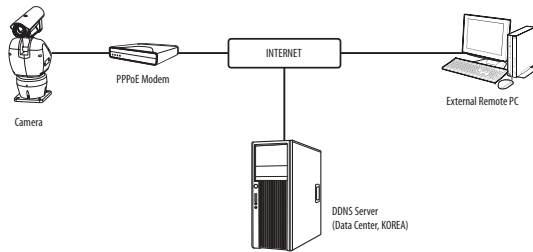
## CONNECTING THE CAMERA DIRECTLY TO A DHCP BASED DSL/CABLE MODEM



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, refer to the online help of Web Viewer.

## CONNECTING THE CAMERA DIRECTLY TO A PPPoE MODEM

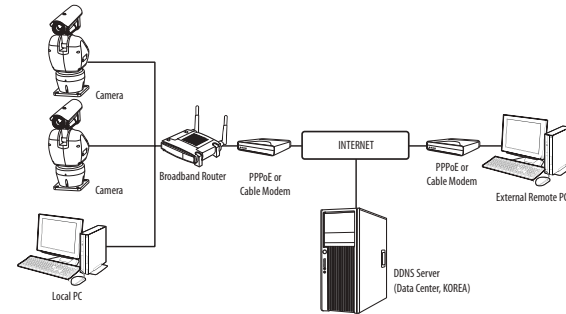


1. Connect the user PC directly with the network camera.
2. Run the Device Manager and change the IP address of the camera so that you can use the web browser on your desktop to connect to the Internet.
3. Use the Internet browser to connect to the web viewer.
4. Move to **[Setup]** page.
5. Move to **[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, 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 19)



## 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.

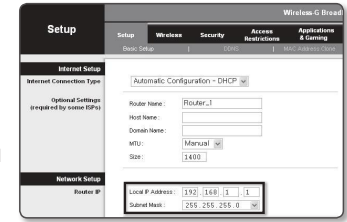
### If not using a Broadband Router

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.
- 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 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
	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>

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

# network connection and setup

## Configuring Dynamic IP

Receive IP address from DHCP

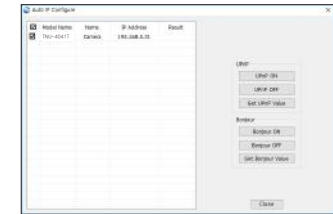
- Example of the Dynamic IP environment
  - If a Broadband Router, with cameras connected, is assigned an IP address by the DHCP server
  - If connecting the camera directly to modem using the DHCP protocols
  - If IPs are assigned by the internal DHCP server via the LAN

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

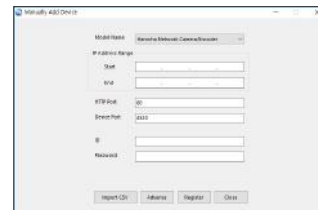
1. Click the camera from the list that you want to automatically configure the IP.
2. Click **<+>** at the main page of device manager.
  - Equipment Setting menu appears.
3. At the menu, click **<Auto IP Configure>**.
4. Click **[Close]** button.



## 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.

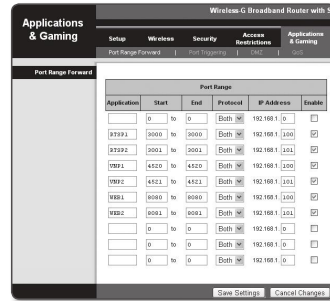


## PORT RANGE FORWARD (PORT MAPPING) SETUP

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.

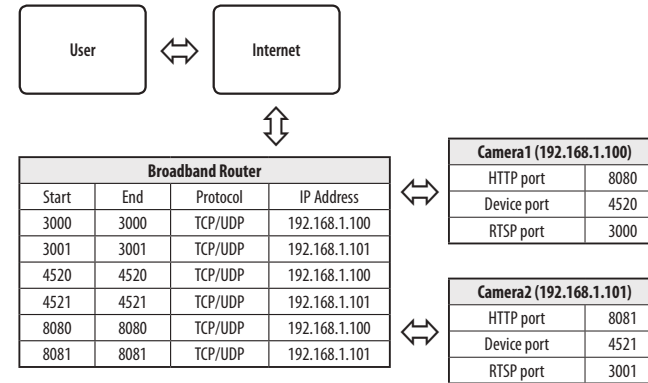


- Port forwarding setting is an example of setting CISCO IP router.
- The settings may differ depending on the connected Broadband Router model.  
For more information, refer to the user manual of the applicable router.

### 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 **<Wisetet DDNS>** in "Settings -> Network -> DDNS".

# network connection and setup

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## 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>

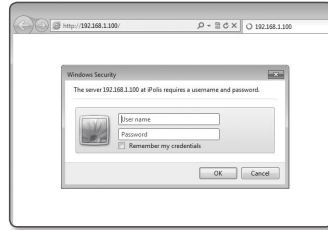


- To use Wisenet DDNS, sign up at the Wisenet DDNS homepage (<http://ddns.hanwha-security.com>) and register the product at **[My DDNS]>[Register Product]**.

## 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 : https://ddns.hanwha-security.com/Product 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.

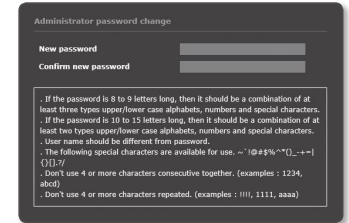
Once you register a dynamic IP-based device with the DDNS server, you can easily check the changed IP when you try to access the device. To register your device to the <DDNS> server, visit <https://ddns.hanwha-security.com> and register your device first, and then set the Web Viewer's <Network> - <DDNS>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

## PASSWORD SETTING

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

When the "Password change" window appears, enter the new password.

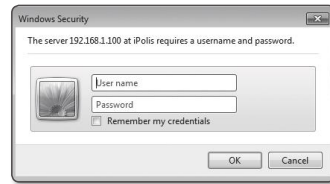
-  For a new password with 8 to 9 digits, you must use at least 3 of the following: uppercase/lowercase letters, numbers and special characters. For a password with 10 to 15 digits, you must use at least 2 types of those mentioned.
  - Special characters that are allowed: ~ !@#\$\$%^&\*()\_+={}|~?/
-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



## LOGIN

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

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



- ! When you access the camera web viewer, pay special attention to the security by checking whether the image data is encrypted.
- 🔒 If you check the "**Remember my credentials**" option when your input is done, in future you will be logged in automatically without being prompted to enter the login information.
- You will experience the best video quality if the screen size is 100%. Reducing the ratio may cut the image on the borders.

## PLUG-IN SUPPORT SPECIFICATIONS FOR EACH BROWSER

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

According to the browser environment, the following differences may be observed.

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

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

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

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

## INSTALLING WebViewer PLUGIN

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

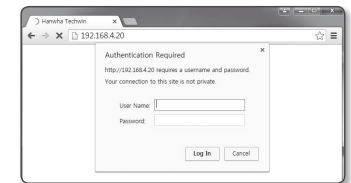
1. When the monitoring page is accessed for the very first time, the installation page is displayed. Click **[Download plugin]** to begin installation.
  - ! If the plug-in installation file download status is suspended at 99% in the Internet Explorer browser, retry it after selecting "Release SmartScreen filter" in "Tool → SmartScreen filter".
2. Click **[Run]** in the message window.
3. Click **[Yes]** when the notice window saying that all browser windows will be closed.
  - 🗑️ Steps 4 and 5 will be skipped if no Web Viewer Plug-in is installed.
4. When the old version of the Web Viewer Plug-in is installed, a notice window saying the old version will be deleted is displayed.  
Click **[Yes]** when the notice window is displayed.
5. Click **[OK]**.  
The old version of Web Viewer Plug-in is deleted.
6. Click **[Install]** to begin installation of the Web Viewer Plug-in.
7. Click **[Finish]**.  
Web Viewer Plug-in installation is completed.

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

## USING A PLUG-IN FREE WEBVIEWER

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

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



### To set the camera

1. Click the **[Setup (⚙️)]** icon.
2. The Settings window appears.
3. It is possible to manage the settings of the camera's basic information, PTZ, video and audio, network, event, analysis, system, and open platform via the network.
4. Click **<Help (🔍)>** to view detailed descriptions of each function.

**SPECIFICATION**

	Items	Description	
		TNU-4041T	TNU-4051T
Video	Imaging Device	Uncooled Micro bolometer	
	Pixel size	17µm	
	Effective Pixels	640x480	
	NETD	<50mK	
	Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for installation	
Lens	Focal Length (Zoom Ratio)	19 mm fixed	35 mm fixed
	Max. Aperture Ratio	F1.0	
	Angular Field of View	H:32°/V:24.3°/D:39.2°	H:17.2°/V:13°/D:22°
	Focus control	Fixed	
	Min. Object Distance	11 m	36 m
	Mount Type	Board-in type	
Pan / Tilt / Rotate	Pan Range	360° Endless	
	Pan Speed	0.025°~120°/sec	
	Tilt Range	-90° ~40°	
	Tilt Speed	0.025°~40°/sec	
	Sequence	Preset (300 ea), Group (6 ea)	
	Preset Accuracy	0.3°	
	Azimuth	Yes (E/W/S/N/NE/NW/SE/SW)	
Operational	Camera Title	Off / On - W/W : English/Numeric/Special Characters - Common : Multi-line (Max 5), Color (Grey/Green/Red/Blue/Black/White), Transparency, Auto Scale by Resolution	
	Digital Image Stabilization	Off / On(with Gyro)	
	Motion Detection	Off / On(8ea, 8point Polygonal zones), Handover	

	Items	Description		
		TNU-4041T	TNU-4051T	
Operational	Video & Audio Analytics	Tampering, Loitering, Directional Detection, Virtual Line, Fence detection, Enter/Exit, Appear / Disappear, Audio Detection, Motion Detection, Sound Classification, Shock detection, Temperature change detection		
	Alarm I/O	Input 1ea / Output 1ea		
	Alarm Triggers	Alarm Input, Motion Detection, Video & Audio 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>• local storage(Micro SD/SDHC/SDXC) or NAS recording at Event Triggers</li> <li>• External output</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		
	Pixel count	support		
	Network	Ethernet	RJ-45 (10/100BASE-T)	
		Video Compression	H.265/H.264 (MPEG-4 Part 10/AVC) : Main/Baseline/High, Motion JPEG	
		Resolution	640x480, 640x360, 320x240	
Max. Framerate		H.265/H.264 : Max. 30fps at all resolutions Motion JPEG : Max. 30fps		
WiseStream II		Support		
	Video Quality Adjustment	H.264/H.265 : Target Bitrate Level Control MJPEG : Target Bitrate Level Control		

# appendix

Items	Description	
	TNU-4041T	TNU-4051T
<b>Bitrate Control Method</b>	H.264/H.265 : CBR or VBR MJPEG : VBR	
<b>Streaming Capability</b>	Multiple Streaming (Up to 10 Profiles)	
<b>Audio Compression Format</b>	G.711 u-law /G.726 Selectable G.726 (ADPCM) 8KHz, G.711 8KHz G.726 : 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC : 48Kbps at 8/16/32/48KHz	
<b>Audio Communication</b>	Bi-directional (2-Way)	
<b>IP</b>	IPv4, IPv6	
<b>Protocol</b>	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, PIM-SM, UPnP, Bonjour	
<b>Security</b>	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access Log 802.1X Authentication (EAP-TLS, EAP-LEAP)	
<b>Streaming Method</b>	Unicast / Multicast	
<b>Max. User Access</b>	20 users at Unicast Mode	
<b>Edge Storage</b>	Micro SD/SDHC/SDXC (up to 256 GB) - Motion Images recorded in the Micro SD/SDHC/SDXC memory card can be downloaded. NAS(Network Attached Storage) Local PC for Instant Recording	
<b>Application Programming Interface</b>	ONVIF Profile S/G SUNAPI(HTTP API) Open Platform	
<b>Webpage Multi Langu</b>	English, French, German, Italian, Spanish, Russian, Turkish, Polish, Dutch, Swedish, Czech, Portuguese, Japanese, Chinese, Korean	

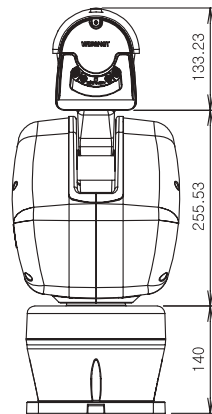
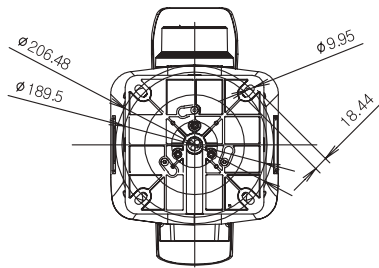
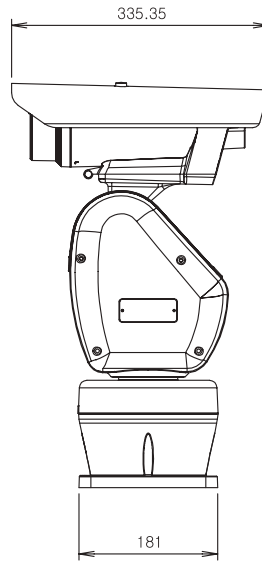
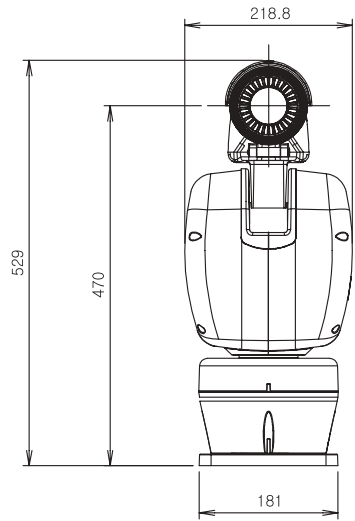
Network

Items	Description	
	TNU-4041T	TNU-4051T
<b>Network</b>	<b>Web Viewer</b>	Supported OS : Windows 7, 8.1, 10, Mac OS X 10.10, 10.11, 10.12 <b>Webviewer</b> Recommended browser: Google Chrome 63 Supported browsers: IE11, MS Edge 41, Mozilla Firefox 57(Windows 64bit only), Apple Safari 11 (Mac OS X only)
	<b>Central Management Software</b>	SmartViewer, SSM
<b>Environmental</b>	<b>Operating Temperature / Humidity</b>	-40 °C ~ +60 °C (-40 °F ~ +140 °F) / Less than 90% RH
	<b>Storage Temperature / Humidity</b>	-50 °C ~ +60 °C (-58 °F ~ +140 °F) / Less than 90% RH
	<b>Ingress protect</b>	IP66, NEMA 4X
	<b>Vandal Resistance</b>	IK10
<b>Electrical</b>	<b>Input Voltage/Current</b>	24 V AC(± 10%) / 6 A(MAX)
	<b>Power Consumption</b>	84 W(Heater On), 62 W(Heater Off)
<b>Mechanical</b>	<b>Color / Material</b>	White / Aluminum
	<b>Dimension (WxHxD)</b>	(W)219 × (H)528 × (D)335
	<b>Weight</b>	11.7 kg



## 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>
Cannot control the system.	<ul style="list-style-type: none"> <li>Check the power. Confirm that the power is on.</li> <li>Check whether the communication cable is connected.</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>
I cannot connect to the system using a tab browser of Internet Explorer 7.0.	<ul style="list-style-type: none"> <li>An error may be generated when connecting with a new window or tab since the cookie data are shared. Do not use a new window or tab, select "File → New session".</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>

PROBLEM	SOLUTION
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>
<MD / VA> of <Event> 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;MD / VA&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;Record&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.               <ul style="list-style-type: none"> <li>ex) The NAS &amp; camera subnet mask initial value is 255.255.255.0.</li> <li>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> </ul> </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>

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iproute2-3.1.0	GPL 2.0	
alsa-utils-1.0.24.2	GPL 2.0	
alsa-lib-1.0.24.1	GPL 2.0	
iptables-1.4.12.2	GPL 2.0	<a href="http://ftp.netfilter.org/pub/iptables">http://ftp.netfilter.org/pub/iptables</a>
ethtool-3.2	GPL 2.0	
mtd-1.4.1	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	
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wpa_supplicant-0.7.3	GPL 2.0	
bash-4.2	GPL 3.0	
zeroconf	GPL 2.0	

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Component Name	License	URL
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Inetutils	LGPL 3.0	
neon-0.29.6	LGPL 2.0 (The Manual and test suite are GPL)	<a href="http://www.webdav.org/neon/">http://www.webdav.org/neon/</a>

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This package is an SSL implementation written by Eric Young ([ey@cryptsoft.com](mailto:ey@cryptsoft.com)).

The implementation was written so as to conform with Netscapes SSL.

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

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established by T-Engine Forum  
on January 23, 2004  
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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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.

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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.

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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

Mark Gates

Ajay Tirumala

Jim Ferguson

Jon Dugan

Feng Qin

Kevin Gibbs

John Estabrook

National Laboratory for Applied Network Research

National Center for Supercomputing Applications

University of Illinois at Urbana-Champaign

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Jean-loup Gailly Mark Adler

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



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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**Head Office**

6, Pangyo-ro 319 beon-gil, Bundang-gu, Seongnam-si,  
Gyeonggi-do, 463-400 Rep. of KOREA  
Tel : +82.70.7147.8753 Fax : +82.31.8018.3740  
<http://hanwha-security.com>

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**Hanwha Techwin America**

500 Frank W. Burr Blvd. Suite 43 Teaneck, NJ 07666  
Toll Free : +1.877.213.1222 Direct : +1.201.325.6920  
Fax : +1.201.373.0124  
[www.hanwhasecurity.com](http://www.hanwhasecurity.com)

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**Hanwha Techwin Europe**

Heriot House, Heriot Road, Chertsey, Surrey, KT16 9DT, United Kingdom  
Tel : +44.1932.57.8100 Fax : +44.1932.57.8101  
[www.hanwha-security.eu](http://www.hanwha-security.eu)

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**Hanwha Techwin(Tianjin) Co.Ltd**

No.11, Weiliu Rd., Micro-Electronic Industrial Park, Jingang Road Tianjin 300385, China  
Tel : +86.22.2388.7788  
[www.hanwha-security.cn](http://www.hanwha-security.cn)

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**Hanwha Techwin Middle East FZE**

JAFZA View 18, 20th floor, office 2001, 2002, 2003, Downtown Jebel Ali,  
Dubai, United Arab Emirates  
<http://hanwha-security.com>

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