

**WISENET**

# **NETWORK CAMERA**

User Manual

XNP-6550RH



# Network Camera

## User Manual

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### Disclaimer

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

❖ The initial administrator ID is "admin" and the password should be set when logging in for the first time.

Please change your password every three months to safely protect personal information and to prevent the damage of the information theft.

Please, take note that it's a user's responsibility for the security and any other problems caused by mismanaging a password.

## IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean the contaminated area on the product surface with a soft, dry cloth or a damp cloth. (Do not use a detergent or cosmetic products that contain alcohol, solvents or surfactants or oil constituents as they may deform or cause damage to the product.)
7. Do not block any ventilation openings, Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/ accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/ apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during 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 Vac (50/60 Hz) min.4.9 A or PoE, 1.15A.
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.
21. If your product works normal, the degree of preset precision is 0.2°. In the case of reboot due to outage, firmware upgrade, etc., its tolerance might have to be adjusted after checking for any changes in Preset setup.



## WARNING

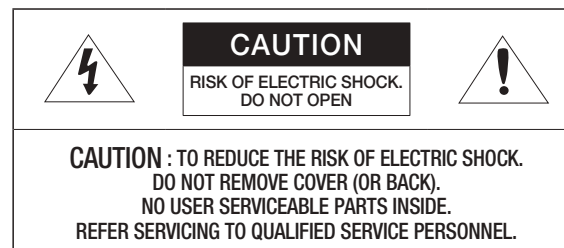
TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE. DO NOT INSERT ANY METALLIC OBJECT THROUGH THE VENTILATION GRILLS OR OTHER OPENINGS ON THE EQUIPMENT.

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.

**Pan/Tilt/Zoom motors and slip ring are warranted for one year under continuous operation.**

## CAUTION



## EXPLANATION OF GRAPHICAL SYMBOLS



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



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

## Class I construction

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

## Battery

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

The battery cannot be replaced.

## Disconnection Device

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

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

## CAUTION

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

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

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

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

**The wired LAN hub providing power over the Ethernet (PoE) 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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## RECOMMENDED PC SPECIFICATIONS

- CPU : Intel(R) Core(TM) i7 3.4 GHz or higher
  - RAM : 8G or higher
  - Supported OS : MS Windows, Mac OS X
  - Recommended browser: Google Chrome  
Supported browsers: MS Explorer, MS Edge, Mozilla Firefox (Window 64bit only), Apple Safari (Mac OSX only)
- ※ Please see the appendix for detailed information on verified OS and browsers.

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

- Recommended capacity : 16GB to 256GB (MLC type)
- 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
Netgear NAS	A maximum of 16 cameras can access simultaneously.
Synology NAS	A maximum of 16 cameras can access simultaneously.






- When you use Netgear's NAS equipment, do not allocate the capacity for use.
- If you use NAS equipment for purposes other than video saving, the number of accessible cameras may be reduced.

## WHAT'S INCLUDED

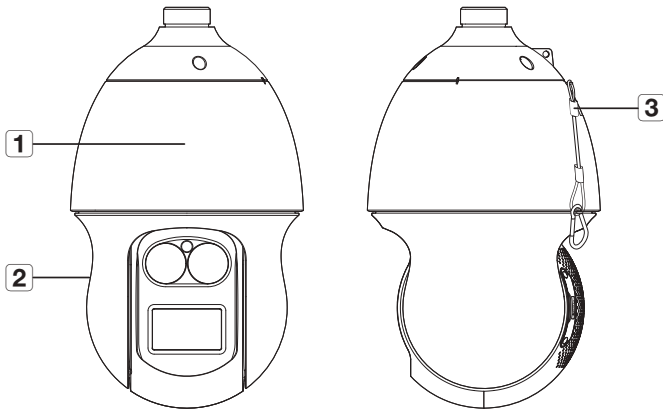
Please check if your camera and accessories are all included in the product package.  
(As for each sales country, accessories are not the same.)

Appearance	Item Name	Quantity	Description
	Main Body	1	
	Instruction book, Installer S/W CD	1	
	Quick Guide (Optional)	1	
	Warranty card (Optional)	1	
	HPoE injector	1	Connects power supply and network
	Cable for the testing monitor	1	Used to test the camera connection to a portable display device
	Power cord	1	Connects to HPoE
	Audio/RS-485 cable	1	Used for audio and RS-485 connection
	Hexagon screw	3	Used for attaching the installation base to the camera

Appearance	Item Name	Quantity	Description
	L Wrench	1	Used for fixing the installation base after attaching it to the camera
	Installation base	1	Bracket for product installation
	Waterproofing accessory	1	Install and use where there is high humidity.

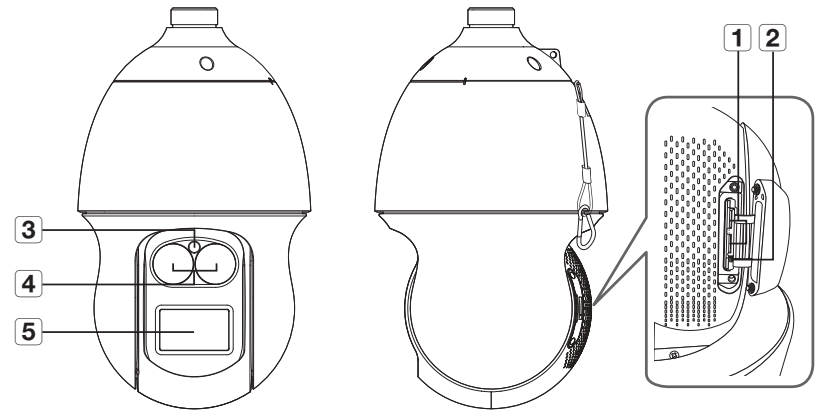
AT A GLANCE

Appearance



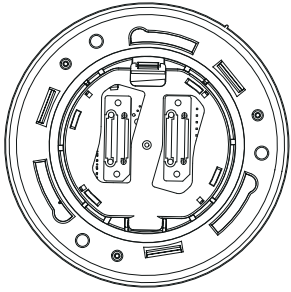
Item	Description
<b>1</b> Main unit	Protects the internal PTZ mechanism from the direct sunlight, rain or external impact.
<b>2</b> Shield cover	Shield cover for the lens and unit protection.
<b>3</b> Safety Cable	The cable prevents the product from dropping during installation.

Inside

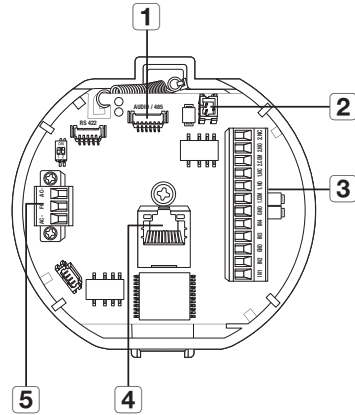


Item	Description
<b>1</b> Micro SD memory Card Compartment	Compartment for the Micro SD memory card. ☑ Refer to <Inserting/Removing a Micro SD memory Card> for the Micro SD memory card insertion position. (page 10)
<b>2</b> Reset Button	The button restores all camera settings to the factory default. Press and hold for about 5 seconds to reboot the system. ❗ If you reset the camera, the network settings will be adjusted so that DHCP can be enabled. If there is no DHCP server in the network, you must run the IP Installer program to change the basic network settings such as IP address, Subnet mask, Gateway, etc., before you can connect to the network.
<b>3</b> Illumination Sensor	Detects incoming light to control the IR LED.
<b>4</b> IR LED	These infrared LED's are controlled by the illumination sensor.
<b>5</b> Lens	Lens for the camera.

**Bottom View of Installation Base**



**Inner View of Installation Base**



Item	Description
<b>1</b> Audio/RS-485 connector	This is a terminal to connect audio and RS-485 cables.
<b>2</b> Video Out Port	Analog video output port. (for installation)
<b>3</b> Alarm I/O Port	Used to connect the alarm I/O cable.
<b>4</b> Network Connections	Port for connection with the network using an Ethernet cable.
<b>5</b> Power Port	Used to connect the power.

## INSTALLATION

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

### Precautions before installation

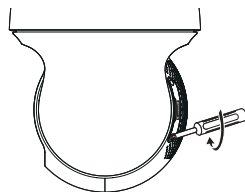
Ensure you read out the following instructions before installing the camera:

- Select an installation site that can hold at least 5 times 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.
- If the product is installed with excessive force, it may cause damage to the camera due to malfunction. Forcing assembly using non-compliant tools may damage the product.

### Inserting the Micro SD memory card

1. Unfasten two screws on the SD holder bracket by turning them counterclockwise using the driver.

- !
  - Disconnect the power cable from the camera before inserting the Micro SD memory card.
  - When it rains or the humidity is high, insertion or ejection of a Micro SD card is not recommended.
  - When installing/removing the Micro SD memory card, make sure you put the product body on a flat ground before working on it in order to prevent accidents due to loss or drop of any parts.
  - Do not remove the screws.

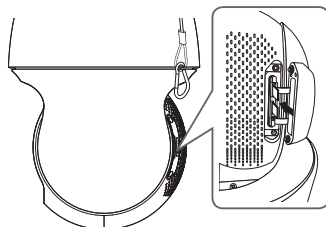


2. Pull up the SD holder bracket and push the Micro SD memory card to the arrow direction as shown in the figure.

- !
  - Do not forcefully insert it in the reverse direction. It might damage your Micro SD memory card and your product.

3. Assemble the camera in the reverse order of disassembly after the Micro SD memory card is inserted.

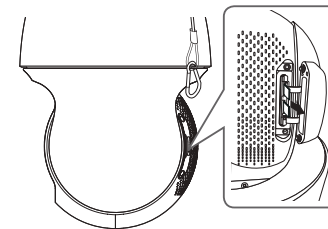
- !
  - Tighten the screws when assembling the camera body, shield cover and SD holder bracket to prevent moisture penetration.



### Removing the 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.

- !
  - Please note that if you firmly push and release the Micro SD memory card when it is ejected, it may pop out.
  - 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.



### Preparing & Installing Camera Bracket

For installation guidelines for brackets and housings, refer to the installation manual that is enclosed with the bracket or housing.

#### Available Bracket Models

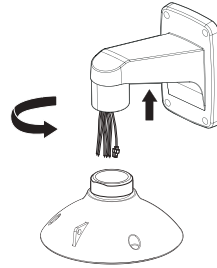
Model	Item
SBP-300WM1	Wall Mount
SBP-300WM	
SBP-300CM	Ceiling Mount
SBP-300LM	Parapet Mount
SBP-300KM	Corner Mount
SBP-300PM	Pole Mount

- 📄 See "Optional Accessories for Installation" for the appearance of each bracket (unbundled). (page 13)

## Installing by wall mount

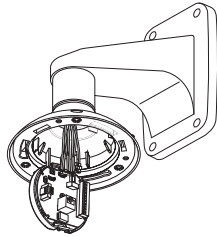
### Fix the installation base with the bracket

1. Fix the base with the bracket by turning it clockwise.



2. As shown in the picture below, gently press and lift up the handle of the hinged door on the bottom of the installation base. Please refer to the "Camera Wiring Interface Board" on page 14, connect the wires.

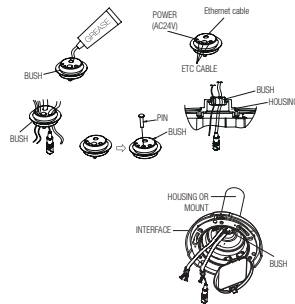
- Do not connect the camera to a power outlet until the installation is complete. Supplying power while the installation is in progress may cause fire or damage the product.



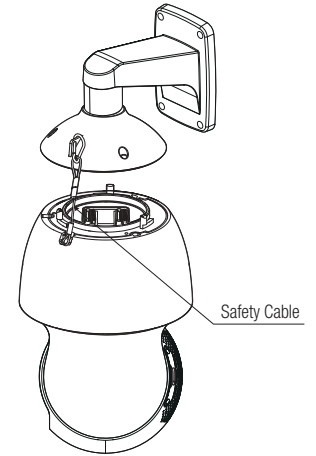
- Check cable connection method and install.

- Note that **BUSHINGS** are provided for outdoor installations where exposed to a moisture condition through the **PIPE** or **MOUNT**, install the **HOUSING** using the **BUSHING** to prevent moisture entering.

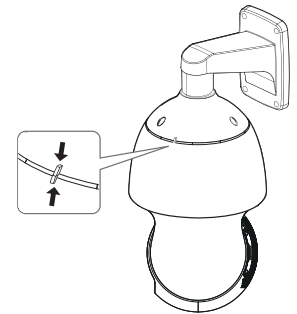
- Apply grease of proper dose on the **BUSHING** before assembling, and run cables through each hole of the bushings. Use **PINS** to stop up empty holes having no cable running.
- Assemble the **BUSHING** to the top side of **HOUSING's** inside as shown in the diagram below. At the moment, apply pressure evenly on the **BUSHING** to secure it tightly to the **HOUSING** as shown in the diagram.



3. Connect the camera safety wire to the installation base.

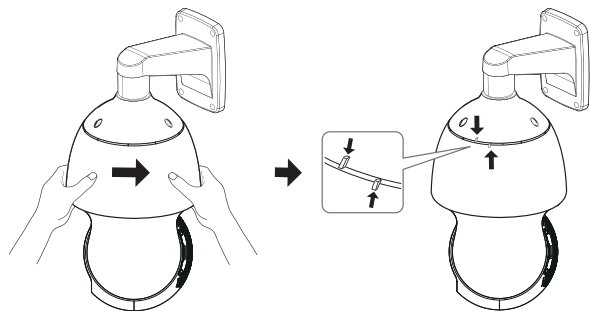


4. Assemble Camera and Installation Base  
Assemble the installation base and camera by matching the installation direction guides.



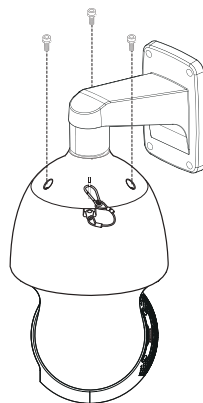
## 5. Attach Camera

Rotate the main body of the camera clockwise to position the reference mark in the upper section and the lower section as shown in the figure.



## 6. Secure Camera and Installation Base

As shown in the picture below, secure the installation base and camera using 3 hexagon screws.



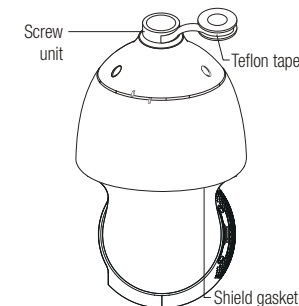
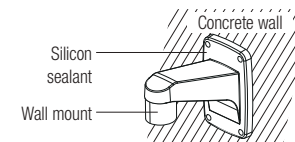
## Notes for Waterproofing

This model is an integrated housing product for outdoor installation.

### ■ When combining the main body and the wall mount for installation on the wall

1. Install the wall mount on the vertical wall. When it is installed on an inclined wall, moisture may permeate into the main body through the external cable.
2. Wrap the screw part of the housing with a sufficient amount of Teflon tape for assembly.
3. Please make sure that the gasket is not disassembled from the shield cover when the shield cover is separated and mounted on the housing body.
4. Install the wall mount adapter for waterproofing, and apply the silicon sealant between and around the wall and wall mount for sealing.

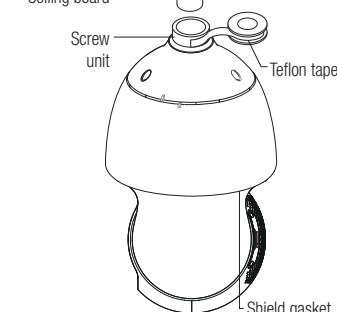
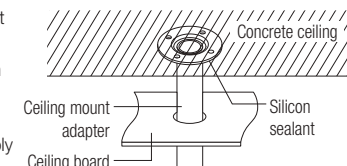
! ■ Take particular caution to ensure that there is proper sealing if the installed side is not flat.



### ■ When combining the main body and the ceiling mounting adaptor for installation on the wall

1. Wrap the screw part of the housing with a sufficient amount of Teflon tape for assembly.
2. Please make sure that the gasket is not disassembled from the shield cover when the shield cover is separated and mounted on the housing body.
3. Install the ceiling mount adaptor for waterproofing, and apply the silicon sealant between and around the wall and ceiling mount for sealing.

! ■ Take particular caution to ensure that there is proper sealing if the installed side is not flat.



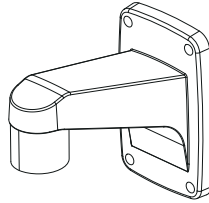


## Optional Accessories for Installation

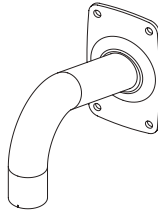
For your easier installation, you can purchase appropriate optional accessories available.

### 1. If installing the camera on the wall

- Wall mount (SBP-300WM1)

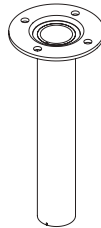


- Wall mount (SBP-300WM)



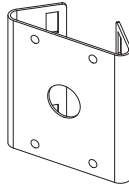
### 2. If installing the camera on the ceiling

- Ceiling Mount (SBP-300CM)



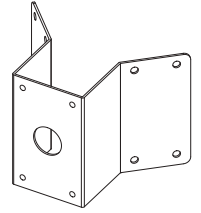
### 3. If installing the wall mount (SBP-300WM/SBP-300WM1) on an at least 80mm-long cylinder

- Pole Mount (SBP-300PM)



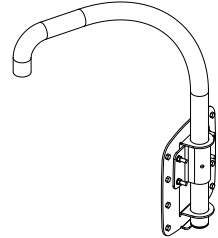
### 4. If installing the wall mount (SBP-300WM/SBP-300WM1) on a corner of the wall

- Corner Mount (SBP-300KM)

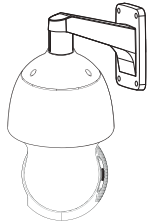


### 5. If installing on a building rooftop

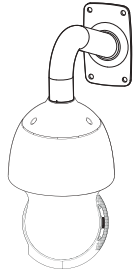
- Parapet Mount (SBP-300LM)



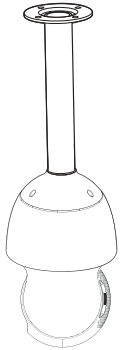
## ▪ Mount Joint



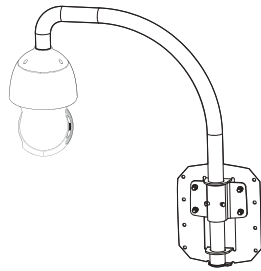
Wall mount (SBP-300WM1)



Wall mount (SBP-300WM)



Ceiling Mount (SBP-300CM)

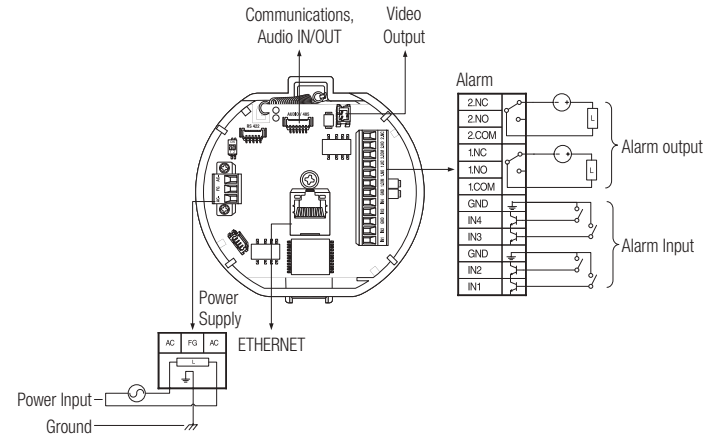


Parapet Mount (SBP-300LM)

## CONNECTING WITH OTHER DEVICE

### Camera Wiring Interface Board

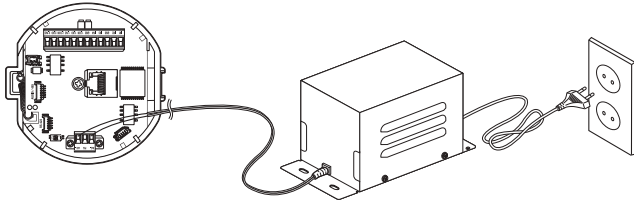
For the camera wiring, please refer to the picture below.



- ! Select Normal Open in the setup menu.
  - The sensor input is activated during a short for contact type, or when it is at "Low" level for the active type.
- Select Normal Close from the Setup menu.
  - The sensor input is activated when open for the contact type or when in high impedance state (open collector) for the active type.
- The maximum capacity of the alarm output terminal is 30V DC/2A, 125V AC/0.5A and 250V AC/0.25A.
- When connecting alarm input and output cables, be sure to connect one cable to each terminal respectively.
- To connect products over the camera's capacity, please use an additional relay device.
- If power and GND cables are connected inappropriately to the NC/NO or COM port, a fire or breakdown of equipment may occur.

## Preparing Adapter and Cable

- ! Connect the camera to the power adaptor. Then, plug the power cord of the adaptor to the wall outlet.



Check out the rated voltage and current before making connections.

Rated Power	Allowable Input Voltage	Current Consumption
AC 24V	AC 22V ~ 26V	6 A

- ! The product cannot be used at -50°C or below ambient temperature.
- The product may not be defrosted depending on the installation area at -50°C.
- After the product is left alone under a low temperature environment, it will take up to 2 hours to normally operate.
- The zooming speed of the IR dimmer may slow down at -40°C or lower environment.
- If the product is turned on after being exposed to -20°C or below environment for some time, reset the time.
- If you want to connect an external device, you must turn off the external device before proceeding.

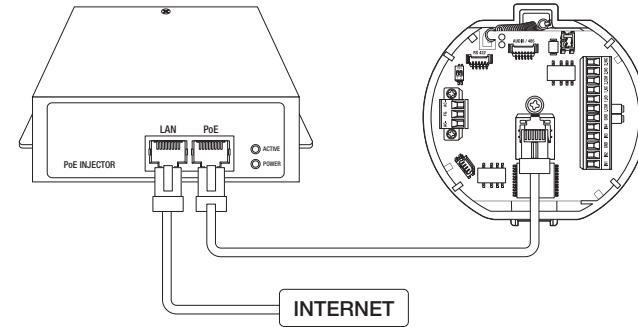
## Power Cable Specification

In case of AC 24V Input:

Wire Type (AWG)	#16	#14
Cable Length (Max.)	14m	23m

## Ethernet Connection

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



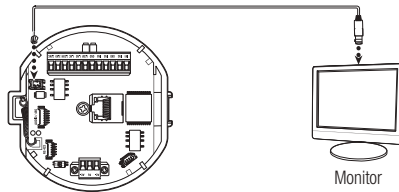
- ! Please use a compliant adaptor appropriate for the device power.

## Network Cable Specification

Item	Contents	Remark
Connector	RJ45 (10/100BASE-T)	
Ethernet	10/100BASE-T	
Cable	UTP Category 5e	
Max Distance	100M	DC Resistance $\leq 0.125 \Omega/m$
HPoE Support	HPoE	

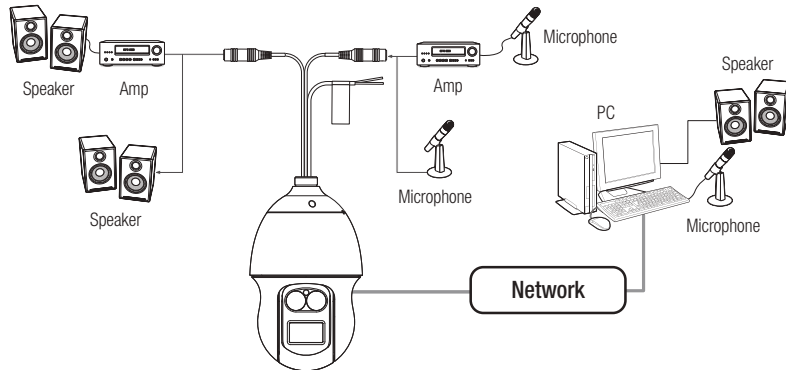
## Connecting the installation monitor

Connect the cable to the camera's rear video output terminal and the installation monitor's video input terminal.



- The wiring varies depending on your monitor type and peripheral devices; please refer to the user manual for each device.
  - Please make sure the monitor and camera are turned off when connecting them.
- !**
- This product is a network camera that transfers video over a network; the video output terminal is used to set the imaging range of the camera at installation.
  - Using the terminal for monitoring purposes may cause problems such as degradation in video quality.
  - It is not suitable for 24-hour monitoring using professional CRT monitors or TFT/LCD portable monitors.
  - Use the network transfer screen for 24-hour monitoring and storage.

## Connecting to Audio Input/Output



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

### • Audio Codec

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

### • Full duplex Audio

- **Audio in** : Selectable (microphone/Line-in), Supported voltage: 2.5VDC (4mA), Input impedance: 2K Ohm
- **Audio out** : Line-out (3.5mm mono jack), Maximum output: 1Vrms
- **Line out impedance** : 600Ω

## Camera Wiring

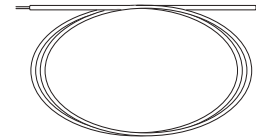
### Control Signal Connection

- RS-485 Communications



### Communications Cable

For the camera to communicate with the controller, a RS-485 communications line is required.



- !**
- A 30m or shorter length is recommended for the connection.
  - The communication cable is not enclosed with the camera.

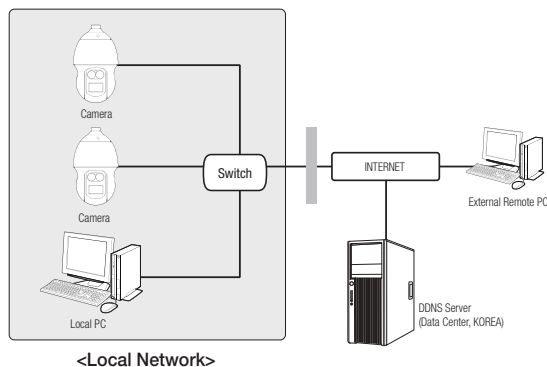
# network connection and setup

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

## CONNECTING THE CAMERA DIRECTLY TO LOCAL AREA NETWORKING

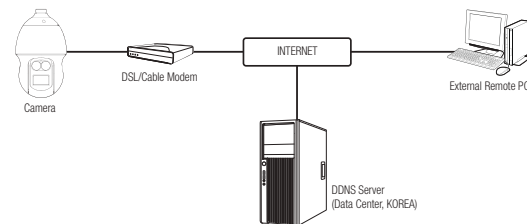
### Connecting to the camera from a local PC in the LAN

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 IP installer, 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 IP Installer. For further details on IP Installer use, refer to "Static IP Setup". (Page 18)

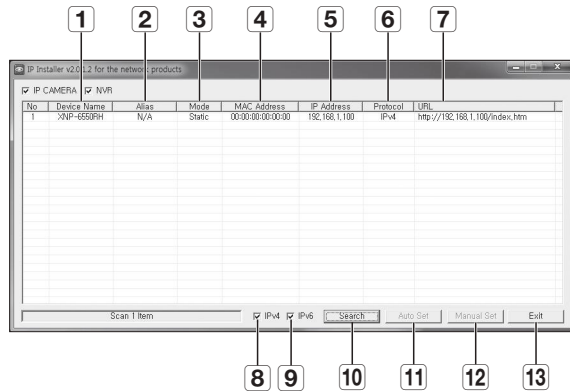
## CONNECTING THE CAMERA DIRECTLY TO A DHCP BASED DSL/CABLE MODEM



1. Connect the user PC directly with the network camera.
2. Run the IP Installer 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.

## BUTTONS USED IN IP INSTALLER



Item	Description
<b>1</b> Device Name	Model name of the connected camera. Click the column to sort the list by model name. However, search will be stopped if clicked during the search.
<b>2</b> Alias	This function is not currently implemented.
<b>3</b> Mode	Displays either <Static>, <Dynamic> or <PPPoE> for the current network connection status.
<b>4</b> MAC(Ethernet) Address	Ethernet address for the connected camera. Click the column to sort the list by Ethernet address. However, search will be stopped if clicked during the search.
<b>5</b> IP Address	IP address. Click the column to sort the list by IP address. However, search will be stopped if clicked during the search.
<b>6</b> Protocol	Network setting for the camera. The factory default is "IPv4". Cameras with the IPv6 setting will be displayed "IPv6".
<b>7</b> URL	DDNS URL address enabling access from the external Internet. However, this will be replaced with the <IP Address> of the camera if DDNS registration has failed.
<b>8</b> IPv4	Scans for cameras with the IPv4 setting.

Item	Description
<b>9</b> IPv6	Scans for cameras with the IPv6 setting. Activated in an IPv6 compliant environment only.
<b>10</b> Search	Scans for cameras that are currently connected to the network. However, this button will be grayed out if neither IPv4 nor IPv6 is checked.
<b>11</b> Auto Set	The IP Installer automatically configures the network settings.
<b>12</b> Manual Set	You should configure the network settings manually.
<b>13</b> Exit	Exits the IP Installer program.

- For the IP installer, use only the installer version provided in the installation CD or use the latest one if available. You can download the latest version from the Hanwha Techwin web site.
- If the supporting OS is Windows 8.1, it is recommended that you use the Wisenet Device Manager instead of the IP Wisenet. The Wisenet Device Manager Program can be downloaded by visiting the Hanwha Techwin website (<http://www.hanwha-security.com>) under the menu <Technical Guides> - <Online Tool>.

## STATIC IP SETUP

### Manual Network Setup

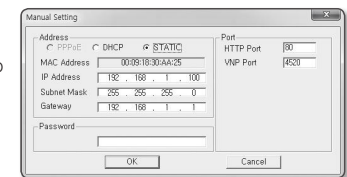
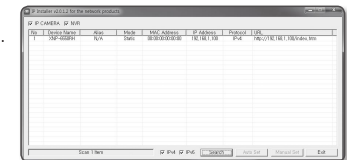
Run <IP Installer\_v2.XX.exe> to display the camera search list.  
At the initial startup, both [Auto Set] and [Manual Set] will be grayed out.

- For cameras found with the IPv6 setting, these buttons will be grayed out as the cameras do not support this function.

- Select a camera in the search list.  
Check the MAC address of the camera on the camera's label.  
Both the [Auto Set] and [Manual Set] buttons will be activated.
- Click [Manual Set].  
The Manual Setting dialog appears.  
<IP Address>, <Subnet Mask>, <Gateway>, <HTTP Port>, and <VNP Port> of the camera are displayed in the preset values.
- In the <Address> pane, provide the necessary information.

- MAC (Ethernet) Address : The MAC address imprinted on the camera label is automatically displayed and requires no user setting.

- IP related parameters can be set only when DHCP is not checked.



### If not using a Broadband Router

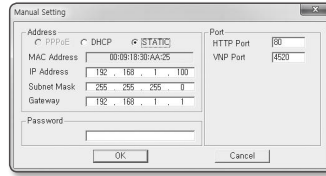
For setting <IP Address>, <Subnet Mask>, and <Gateway>, contact your network administrator.

#### 4. In the <Port> pane, provide necessary information.

- 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.

#### 5. Enter the password.

Enter the password of “admin” account, which was used to access the camera.



- ! For the security purposes, you are recommended to use a combination of numbers, alphabets uppercase and lowercase and special characters for your password.
- For information on how to change the password, refer to the online help of Web Viewer.

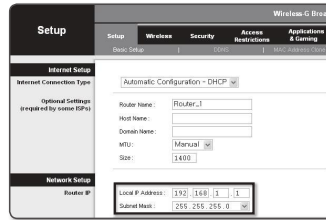
#### 6. Click [OK].

Manual network setup will be completed.

### 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

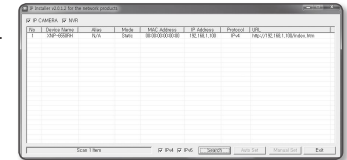
- ✎ If the <HTTP Port> is set other than 80, you must provide the <Port> number in the address bar of the Internet browser before you can access the camera.  
ex) http://IP address : HTTP Port  
http://192.168.1.100:8080

### Auto Network Setup

Run <IP Installer\_v2.XX.exe> to display the camera search list.  
At the initial startup, both [Auto Set] and [Manual Set] will be grayed out.

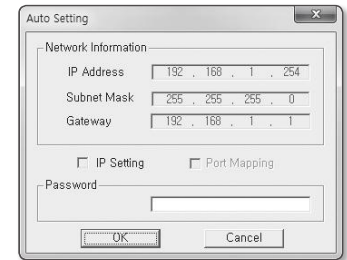
- ✎ For cameras found with the IPv6 setting, these buttons will be grayed out as the cameras do not support this function.

- Select a camera in the search list.  
Check the MAC address of the camera on the camera's label.  
Both the [Auto Set] and [Manual Set] buttons will be activated.
- Click [Auto Set].  
The Auto Setting dialog appears.  
The <IP Address>, <Subnet Mask>, and <Gateway> will be set automatically.
- Enter the password.  
Enter the password of “admin” account, which was used to access the camera.



- ! For the security purposes, you are recommended to use a combination of numbers, alphabets uppercase and lowercase and special characters for your password.
- For information on how to change the password, refer to the online help of Web Viewer.

- Click [OK].  
Auto network setup will be completed.



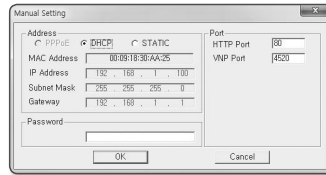
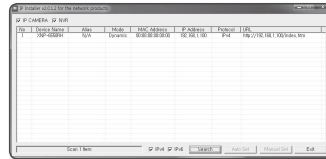
## DYNAMIC IP SETUP

### Dynamic IP Environment Setup

- 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

### Checking the Dynamic IP

1. Run the IP Installer on the user's local computer.  
Cameras allocated with <Dynamic IP> address are shown in the list.
2. Select a camera from the search result.
3. Click the [Manual Set] button and check the camera's <Dynamic IP> address.  
If you uncheck <DHCP>, you can change IP to <Static>.

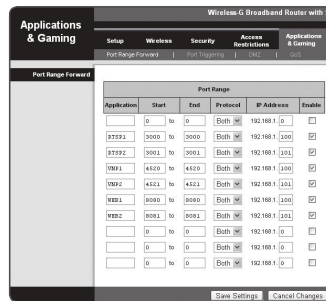


## PORT RANGE FORWARD (PORT MAPPING) SETUP

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

### Manual Port Range Forwarding

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



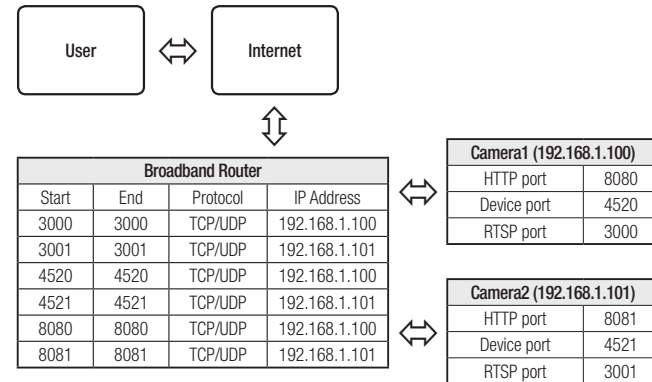
3. When done, click [Save Settings].  
Your settings will be saved.

- ☑ Above sample instructions are based on the CISCO's Broadband 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 :



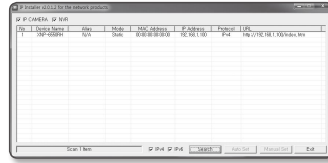
- ☑ Port forwarding can be done without additional router setup if the router supports the UPnP (Universal Plug and Play) function.  
After connecting the network camera, select the checkbox from the menu <Quick connect> in <Wisenet DDNS> in "Setup → Network → DDNS".



## CONNECTING TO THE CAMERA FROM A SHARED LOCAL PC

1. Run the IP Installer.  
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

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

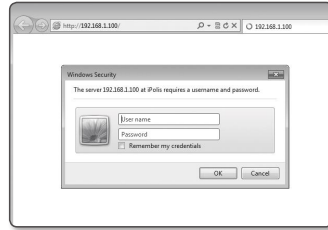
1. Before you can access a camera in the Broadband Router network, you should have set the port range forward for the Broadband Router.
2. From the remote PC, launch the Internet browser and type the DDNS URL address of the camera, or the IP address of the Broadband Router in the address bar.  
ex) 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

- For information on how to register DDNS, refer to the network setup guide.

## 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.

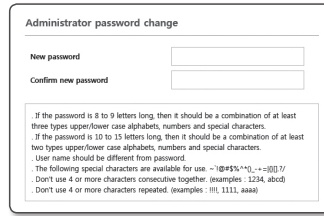
To register your device to the <DDNS> server, visit <http://ddns.hanwha-security.com> and register your device first, and then set the Web Viewer's <Network> - <DDNS> to <Wisenet DDNS>, as well as providing <Product ID> that had been used for DDNS registration.

## 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 web-based form titled "Administrator password change". It contains two input fields: "New password" and "Confirm new password". Below the fields, there are several lines of small text providing password requirements: ". If the password is 8 to 9 letters long, then it should be a combination of at least three types upper/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 upper/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.

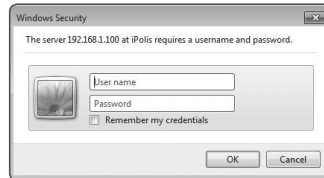
1. Enter “**admin**” in the <User name> input box.  
The administrator ID, “**admin**”, is fixed and can not be changed.

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, there are two input fields: "User name" and "Password". There is a checkbox labeled "Remember my credentials" which is currently unchecked. At the bottom, there 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" 2.16M CMOS
	Total Pixels	1945(H) X 1109(V) approx 2.16M pixels
	Effective Pixels	1945(H) X 1097(V) approx 2.13M pixels
	Scanning System	Progressive Scan
	Min. Illumination	Color : 0.02 lux (1/30sec, F1.6) B/W : 0.002 lux (1/30sec, F1.6) 0 Lux (IR LED On)
	S / N Ratio	50dB
	Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for installation
Lens	Focal Length (Zoom Ratio)	4.75mm ~ 261.4mm (55x)
	Max. Aperture Ratio	F1.6 (Wide) ~ F6.5 (Tele)
	Angular Field of View	H : 58.6°(Wide) ~ 1.23°(Tele) / V : 34.8°(Wide) ~ 0.71°(Tele)
	Min. Object Distance	5m
	Focus Control	AF / One-Shot AF / Manual
	Lens Type	DC Auto Iris
	Mount Type	Board-in type
	Zoom Movement Speed	Approx. 5 sec (wide to tele)
	Pan / Tilt / Rotate	Pan Range
Pan Speed		Preset : 400°/sec, Manual : 0.024°/sec ~250°/sec
Tilt Range		95°(-5° ~ 90°)
Tilt Speed		Preset : 250°/sec, Manual : 0.024°/sec ~250°/sec
Sequence		Preset (300ea), Swing, Group (6ea), Trace, Tour, Auto Run, Schedule
Preset Accuracy		±0.2°
Azimuth		Yes (E/W/S/N/NE/NW/SE/SW OSD)
Auto Tracking		Off / On

Items	Description	
Operational	Viewable Length	500m
	Camera Title	Off / On (Displayed up to 85 characters per line) - W/W : English/Numeric/Special Characters - Common : Multi-line (Max 5), Color (Grey/Green/Red/Blue/Black/White), Transparency, Auto Scale by Resolution
	Day & Night	Auto (ICR) / Color / B/W
	Backlight Compensation	Off / BLC / HLC / WDR
	Wide Dynamic Range	120dB
	Contrast Enhancement	SSDR (Off / On)
	Digital Noise Reduction	SSNR5 (2D+3D Noise Filter) (Off / On)
	Digital Image Stabilization	Off / On (built-in Gyro)
	Defog (Optical)	Auto / Manual / Off
	Motion Detection	Yes (8ea, Polygonal zones)
	Privacy Masking	Off / On (24 Zones of Rectangle zone) - Color : Gray/Green/Red/Blue/Black/White - Zoom ratio option for mask mode - Mosaic option
	Gain Control	Off / Low / Medium / High
	White Balance	ATW / AWC / Manual / Indoor / Outdoor / Mercury / Sodium
	Electronic Shutter Speed	Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec)
	Digital Zoom	32x, area zoom function support digital zoom 2x
	Rotate Image	Flip : On/Off Mirror : On/Off
	Intelligent Video Analytics	Tampering, Loitering, Directional Detection, Fog Detection, Virtual Line, Enter/Exit, Appear/Disappear, Audio Detection, Face Detection, Motion Detection, Sound Classification
	Alarm I/O	Input 4ea / Output 2ea (Relay type)
	Remote Control Interface	RS-485
	RS-485 Protocol	Samsung-T, Pelco-D/P, Panasonic, Honeywell, AD, Vicon, GE, BOSCH
Alarm Triggers	Alarm Input, Motion Detection, Intelligent Video Analytics, Network Disconnect	

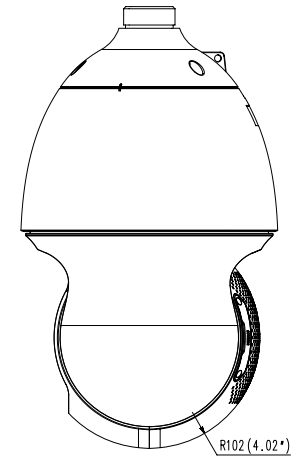
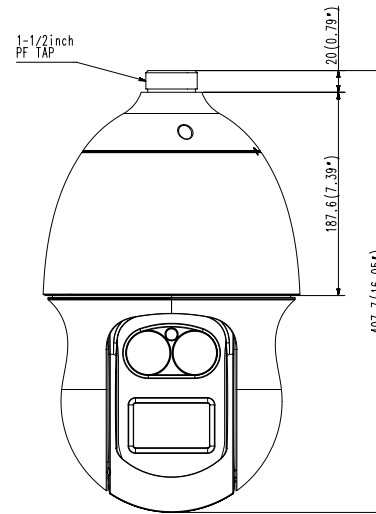
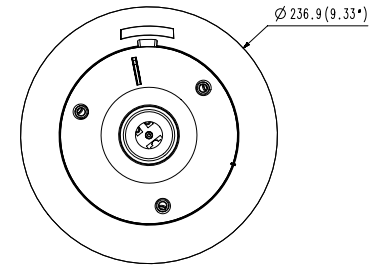
	Items	Description
Operational	Alarm events	<ul style="list-style-type: none"> <li>• File upload via FTP, E-Mail</li> <li>• Notification via E-Mail</li> <li>• Local storage(SD/SDHC/SDXC) or NAS recording at Event Triggers</li> <li>• External output</li> <li>• PTZ preset</li> </ul>
	Audio In	Selectable (Mic IN/Line IN), Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm
	Audio out	Line out (3.5mm stereo mini jack), Max output Level : 1Vrms
	Pixel Counter	support
Network	Ethernet	RJ-45 (10/100BASE-T) SFP (*only using SBP-303HF)
	Video Compression Format	H.265/H.264 (MPEG-4 Part 10/AVC) : Main/Baseline/High, Motion JPEG
	Resolution	1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
	Max. Framerate	H.265/H.264 : Max. 60fps at all resolutions Motion JPEG : Max. 30fps at all resolutions
	Smart Codec	Manual Mode (area-based : 5EA)
	WiseStream II	Support
	Video Quality Adjustment	H.264/H.265/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)
	Audio Compression Format	G.711 $\mu$ -law /G.726 Selectable G.726 (ADPCM) 8KHz, G.711 8KHz G.726 : 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC : 48Kbps at 16KHz
	Audio Communication	Bi-directional (2-Way)

	Items	Description
Network	IP	IPv4, IPv6
	Protocol	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), 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)
	Streaming Method	Unicast / Multicast
	Max. User Access	20 users at Unicast Mode
	Edge Storage	Micro SD/SDHC/SDXC 2slot (up to 512 GB) - Continuous recording (1'st slot to 2'nd slot) - Motion Images recorded in the Micro SD/SDHC/SDXC memory card can be downloaded. NAS(Network Attached Storage) Local PC for Instant Recording
	Application Programming Interface	ONVIF Profile S/G SUNAPI 2.0(HTTP API) WiseNet Open Platform
	Webpage Language	English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, 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 : IE11, MS Edge, Mozilla Firefox (Window 64bit only), Apple Safari 10 (Mac OS X only)
	Central Management Software	SmartViewer

Items	Description
Environmental	Operating Temperature / Humidity AC24V : -50°C ~ +55°C (-58°F ~ +131°F) / Less than 90% RH HPoE : -40°C ~ +55°C (-40°F ~ +131°F) / Less than 90% RH * Start up should be done at above -30°C (HPoE Mode)
	Storage Temperature / Humidity -50°C ~ +60°C (-58°F ~ +140°F) / Less than 90% RH
	Ingress Protection IP66
	Vandal Resistance IK10
Electrical	Input Voltage / Current AC24V / HPoE
	Power Consumption AC24V : 92W HPoE : 60W
Mechanical	Color / Material Black(head) + Ivory(body) / Aluminum, Plastic
	Dimension (Ø x H) Ø236.9 x H407.7 mm
	Weight 7.2 Kg

## 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 IP installer 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
<Motion detection> of <Analytics> is set to <Enable>, but no notification e-mail reaches me even when an analysis event had occurred.	<ul style="list-style-type: none"> <li>Verify the settings in the following sequence:               <ol style="list-style-type: none"> <li>Check &lt;Data &amp; Time&gt; settings.</li> <li>The &lt;Motion detection&gt; should be set to &lt;Enable&gt;.</li> <li>Check if the &lt;E-mail&gt; option of &lt;Event setup&gt; menu is checked to use.</li> </ol> </li> </ul>
No signal is found at the Alarm Output port even when an intelligent video analysis event is generated.	<ul style="list-style-type: none"> <li>Check alarm output port settings.</li> </ul>
Cannot record into the Micro SD memory card.	<ul style="list-style-type: none"> <li>Check if the memory card is defective.</li> </ul>
Micro SD memory card is inserted but the camera does not operate properly.	<ul style="list-style-type: none"> <li>Check if the memory card is inserted in the proper direction. Operation of memory card that is formatted by other devices is not guaranteed with this camera unit</li> <li>Format the memory card again in &lt;Setup&gt; → &lt;Event&gt; → &lt;Storage&gt; menu.</li> </ul>
Cannot record in the NAS.	<ul style="list-style-type: none"> <li>Confirm that the information registered in the NAS is correct.</li> </ul>
It reports that NAS setting has failed.	<ul style="list-style-type: none"> <li>Confirm that the IP address of the NAS is valid.</li> <li>Confirm that the ID/password of the NAS is valid.</li> <li>Confirm that you can access the folder designated as the default folder using the ID of the NAS.</li> <li>Confirm that the NAS SMB/CIFS items are unchecked.</li> <li>Confirm that the NAS IP address and the camera IP address are in the same format.               <p>ex) The NAS &amp; camera subnet mask initial value is 255.255.255.0.</p>               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>

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

## LGPL SW

Component Name	License	URL
glibc	LGPL 2.0	
inetutils	LGPL 3.0	
neon-0.29.6	LGPL 2.0	<a href="http://www.webdav.org/neon/">http://www.webdav.org/neon/</a>

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

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

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

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

### Article 1. Scope of License Agreement

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

### Article 2. Definition

1. "T-Kernel" means a real-time operating system controlled and distributed by T-Engine Forum on behalf of the copyright holder thereof.
2. "Source Code" means a source program, including related comments and documentations, for the T-Kernel and the Ported Source Code defined in Article 2.8 which is registered with T-Engine Forum.
3. "Hardware-dependent Part" means the part of the Source Code which depends on hardware and needs to be changed when the Source Code is ported and operated on the target hardware, and is designated and separated as such part.
4. "Compiler-dependent Part" means the part of the Source Code which depends on compiler and needs to be changed when the Source Code is ported and operated on the target hardware, and is designated and separated as such part.
5. "Header File" means the part of the Source Code which contains definitions necessary to develop application programs.
6. "T-Engine Hardware" means the hardware which is manufactured in accordance with the T-Engine Hardware specifications or the  $\mu$ T-Engine Hardware specifications issued by T-Engine Forum, and registered with T-Engine Forum.
7. "Similar Hardware to T-Engine Hardware" means any hardware (including software which emulates hardware) other than that defined in Article 2.6 above, on which the T-Kernel can be operated.
8. "Ported Source Code" means a source program produced from the Source Code by modifying only its Hardwaredependent Part and/or Compiler-dependent Part to enable it to be operated on the T-Engine Hardware or the Similar Hardware to T-Engine Hardware. The Ported Source Code which is registered with T-Engine Forum shall be included in the Source Code.
9. "Modified Source Code" means a source program modified from the Source Code for the purpose of improving its performance, increasing or decreasing its function, and the like. The Ported Source Code shall not be included in the Modified Source Code.
10. "Binary Code" means an executable code form which is created by compiling programs, which include all or part of the Source Code or the Modified Source Code.
11. "Derivative Work" means the Modified Source Code or the Binary Code.
12. "Embedded Product" means any product which operates with executable code form of the Source Code, the Modified Source Code or the Binary Code loaded on its hardware.
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14. "System Developer" means any person who develops the Embedded Product by itself or has a third party develop the same, and provides, whether with or without payment, the End User with the Embedded Product.
15. "Distributor of Modification" means any person who produces the Modified Source Code and, whether with or without payment, distributes the same to any third party.

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

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

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

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2. to transmit a work to the general public through the Internet communication, broadcasting, and the like automatically in response to a request from the public; and
3. to distribute a copy of a work to the general public or a large number of specific persons.

#### **Article 3. Copyright**

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

#### **Article 4. License of Source Code**

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

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

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  2. to run the Source Code provided by T-Engine Forum hereunder for its own research, development and the like.
  3. to run the Source Code modified in accordance with the provision of Article 4.3 (1) above for its own research, development and the like.
  4. to distribute the Binary Code created from the Source Code provided by T-Engine Forum hereunder or from the Source Code modified in accordance with the provision of Article 4.3 (1) above.
4. In accordance with the license granted under Article 4.1 above, the System Developer may perform the following acts:

1. to perform any and all acts set forth in the Article 4.3 above.
2. to develop and manufacture the Embedded Product containing the Binary Code, and, whether with or without payment, provide the End User with the same and make the Binary Code available to the End User on the Embedded Product.

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

#### **Article 5. Distribution of Modified Source Code**

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

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

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

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

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

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

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

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

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

#### **Article 6. Distribution and Registration of the Ported Source Code**

1. The Source Code User and the System Developer may, whether with or without charge, distribute to any third party only the following parts of the Ported

Source Code on the T-Engine Hardware or the Similar Hardware to T-Engine Hardware:

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

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

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

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

1. The member shall confirm that the object hardware is the T-Engine Hardware or the Similar Hardware to T-Engine Hardware.
2. The member shall provide T-Engine Forum with a complete set of operational environment for the object hardware and T-Kernel free of charge when requesting the distribution.
3. The member shall submit test results of the Ported Source Code to T-Engine Forum when requesting the distribution.

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

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

#### **Article 7. Use for Other Purpose**

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

#### **Article 8. Limited Warranty**

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

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

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

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

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

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Component Name	License	URL
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Component Name	License	URL
zlib-1.2.8	zlib / libpng	<a href="http://zlib.net/">http://zlib.net/</a>

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Jean-loup Gailly Mark Adler

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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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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.

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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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