

# **Thermal High-Speed Hybrid PTZ Camera**

## **Quick Start Guide**

**Version 1.0.1**

## **Welcome**

Thank you for purchasing our network cameras.

This user's manual is designed to be a reference tool for using your product.

Please read the following safeguards and warnings carefully before you use this series product.

Please keep this user's manual well for future reference.

# Cybersecurity Recommendations

## Mandatory actions to be taken towards cybersecurity

### 1. Change Passwords and Use Strong Passwords:

The number one reason systems get “hacked” is due to having weak or default passwords. It is recommended to change default passwords immediately and choose a strong password whenever possible. A strong password should be made up of at least 8 characters and a combination of special characters, numbers, and upper and lower case letters.

### 2. Update Firmware

As is standard procedure in the tech-industry, we recommend keeping NVR, DVR, and IP camera firmware up-to-date to ensure the system is current with the latest security patches and fixes.

## “Nice to have” recommendations to improve your network security

### 1. Change Passwords Regularly

Regularly change the credentials to your devices to help ensure that only authorized users are able to access the system.

### 2. Change Default HTTP and TCP Ports:

- Change default HTTP and TCP ports for systems. These are the two ports used to communicate and to view video feeds remotely.
- These ports can be changed to any set of numbers between 1025-65535. Avoiding the default ports reduces the risk of outsiders being able to guess which ports you are using.

### 3. Enable HTTPS/SSL:

Set up an SSL Certificate to enable HTTPS. This will encrypt all communication between your devices and recorder.

### 4. Enable IP Filter:

Enabling your IP filter will prevent everyone, except those with specified IP addresses, from accessing the system.

### 5. Change ONVIF Password:

On older IP Camera firmware, the ONVIF password does not change when you change the system’s credentials. You will need to either update the camera’s firmware to the latest revision or manually change the ONVIF password.

### 6. Forward Only Ports You Need:

- Only forward the HTTP and TCP ports that you need to use. Do not forward a huge range of numbers to the device. Do not DMZ the device's IP address.

- You do not need to forward any ports for individual cameras if they are all connected to a recorder on site; just the NVR is needed.

#### **7. Disable Auto-Login on SmartPSS:**

Those using SmartPSS to view their system and on a computer that is used by multiple people should disable auto-login. This adds a layer of security to prevent users without the appropriate credentials from accessing the system.

#### **8. Use a Different Username and Password for SmartPSS:**

In the event that your social media, bank, email, etc. account is compromised, you would not want someone collecting those passwords and trying them out on your video surveillance system. Using a different username and password for your security system will make it more difficult for someone to guess their way into your system.

#### **9. Limit Features of Guest Accounts:**

If your system is set up for multiple users, ensure that each user only has rights to features and functions they need to use to perform their job.

#### **10. UPnP:**

- UPnP will automatically try to forward ports in your router or modem. Normally this would be a good thing. However, if your system automatically forwards the ports and you leave the credentials defaulted, you may end up with unwanted visitors.
- If you manually forwarded the HTTP and TCP ports in your router/modem, this feature should be turned off regardless. Disabling UPnP is recommended when the function is not used in real applications.

#### **11. SNMP:**

Disable SNMP if you are not using it. If you are using SNMP, you should do so only temporarily, for tracing and testing purposes only.

#### **12. Multicast:**

Multicast is used to share video streams between two recorders. Currently there are no known issues involving Multicast, but if you are not using this feature, deactivation can enhance your network security.

#### **13. Check the Log:**

If you suspect that someone has gained unauthorized access to your system, you can check the system log. The system log will show you which IP addresses were used to login to your system and what was accessed.

#### **14. Physically Lock Down the Device:**

Ideally, you want to prevent any unauthorized physical access to your system. The best way to achieve this is to install the recorder in a lockbox, locking server rack, or in a room that is behind a lock and key.

**15. Connect IP Cameras to the PoE Ports on the Back of an NVR:**

Cameras connected to the PoE ports on the back of an NVR are isolated from the outside world and cannot be accessed directly.

**16. Isolate NVR and IP Camera Network**

The network your NVR and IP camera resides on should not be the same network as your public computer network. This will prevent any visitors or unwanted guests from getting access to the same network the security system needs in order to function properly.

# Important Safeguards and Warnings

## Electrical safety

- All installation and operation should conform to your local electrical safety codes.
- The power source shall conform to the requirement of the Safety Extra Low Voltage (SELV) standard, and supply power according to the Limited Power Source requirement of IEC60950-1. Please note that the power supply requirement is subject to the device label.
- Make sure the power supply is correct before operating the device.
- A readily accessible disconnect device shall be incorporated in the building installation wiring
- Prevent the power cable from being trampled or pressed, especially the plug, power socket and the junction extruded from the device.
- We assume no liability or responsibility for all the fires or electrical shock caused by improper handling or installation.

## Environment

- Do not aim the device at strong light to focus, such as lamp light and sun light, otherwise it might cause over brightness or light marks, which are not the device malfunction, and affect the longevity of Charge Coupled Device (CCD) or Complementary Metal-Oxide Semiconductor (CMOS).
- Do not place the device in a damp or dusty environment, extremely hot or cold temperatures, or the locations with strong electromagnetic radiation or unstable lighting.
- Keep the camera away from water or other liquid to avoid damages to the internal components.
- Keep the indoor device away from rain or damp to avoid fire or lightning.
- Keep sound ventilation to avoid heat accumulation.
- Transport, use and store the device within the range of allowed humidity and temperature.
- Heavy stress, violent vibration or water splash are not allowed during transportation, storage and installation.
- Pack the device with standard factory packaging or the equivalent material when transporting the device.

## Operation and Daily Maintenance

- Do not directly touch the heat dissipation component of the device to avoid scald.
- Do not dismantle the device because there is no component that can be fixed by users themselves. Otherwise, it might cause water leakage or bad image due to unprofessional dismantling.
- Please contact after-sale service to replace desiccant when it becomes green.
- It is recommended to use the device together with lightning arrester to improve lightning protection effect.
- It is recommended to get the grounding holes to be grounded to enhance the reliability of the device.
- Do not directly touch the optic component CCD or CMOS. You can use the air blower to blow away the dust or dirt on the lens surface. Please use a dry cloth wetted by alcohol to wipe away the dust gently if necessary.

- Use the dry soft cloth to clean the device. If the dust is difficult to be removed, please wipe it away with a clean cloth wetted slightly by the mild detergent, and then use the dry cloth to clean the device. Do not use volatile solvents like alcohol, benzene, thinner, or strong detergent with abrasiveness, otherwise it will damage the surface coating or reduce the working performance of the device.
- When installing or using the device, do not directly touch or wipe the surface of the dome cover because it is an optical device. If stained with dirt, use oil-free soft brush or air blower to gently wipe it away. If stained with grease or fingerprint, use soft cloth to gently wipe the water drop or oil and wait till it is dry, and then use oil-free cotton cloth or lens cleaning paper soaked with alcohol or detergent to wipe from the lens center outward till it is clean.
- We are not liable for any problems caused by unauthorized modification or attempted repair.

## Warnings

- Please modify the default password after login to avoid being stolen.
- Use the standard components provided by manufacturer and make sure the device is installed and fixed by professional engineers.
- The surface of the image sensor should not be exposed to laser beam radiation in an environment where a laser beam device is used.
- Do not provide two or more power supply sources for the device, otherwise it might damage the device.

## Disclaimer

- This manual is for reference only. Please refer to the actual product for more details.
- Minor differences might be found in user interface, and there might be deviation between the actual value of some data and the value provided in the manual due to the reasons such as the real environment is not stable. Please refer to the final explanation of the company if there is any doubt or dispute.
- All the designs and software are subject to change without prior written notice. The manual will be regularly updated according to the product upgrade without prior announcement.
- Please contact the supplier or customer service if there is any problem occurred when using the device.
- Please contact the customer service for the latest procedure and supplementary documentation.
- Please visit our website or contact your local service engineer for more information.
- The company is not liable for any loss caused by the operation that does not comply with the manual.
- If there is any uncertainty or controversy, please refer to our final explanation.

## Regulatory Information

### FCC Information

#### 1.1 FCC conditions:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference
- This device must accept any interference received, including interference that may cause undesired operation.

**1.2 FCC compliance:**

This equipment has been tested and found to comply with the limits for a digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference. This equipment generate, 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 communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**Note**

- Please refer to the disk for more details, check and download the corresponding user’s manual and tool.
- Before installation, please open the package and check all the components are included.
- Contact your local retailer as soon as possible if something is broken in your package.

Component list	Quantity
Thermal Hybrid PTZ	1
Power Adapter	1
Quick Start Guide	1
Installation Accessories Bag	1

# Table of Contents

<b>Cybersecurity Recommendations</b> .....	<b>ii</b>
<b>1 Device Framework</b> .....	<b>9</b>
1.1 Device External Cable .....	9
1.2 Dimension .....	11
<b>2 Device Installation</b> .....	<b>12</b>
2.1 Preparation before Installation .....	12
2.1.1 Check Installation Space and Intensity.....	12
2.1.2 Cable Preparation.....	12
2.2 Install Micro SD Card (Optional) .....	12
2.3 Device Installation .....	13
2.3.1 Side Cable Exit .....	13
2.3.2 Bottom Cable Exit.....	15
<b>3 Device Configuration</b> .....	<b>17</b>
3.1 Device Initialization .....	17
3.2 Modify IP Address .....	18
3.3 Live Video.....	18
3.4 Alarm Setup.....	19
<b>4 Appendix I Lightning Protection and Surge Protection</b> .....	<b>22</b>

# 1 Device Framework

## 1.1 Device External Cable

### Note

- The following structure figure is for reference only. It is only used to know the functions of cable ports.
- There might be some minor differences between different devices, so please refer to the actual products you purchased.

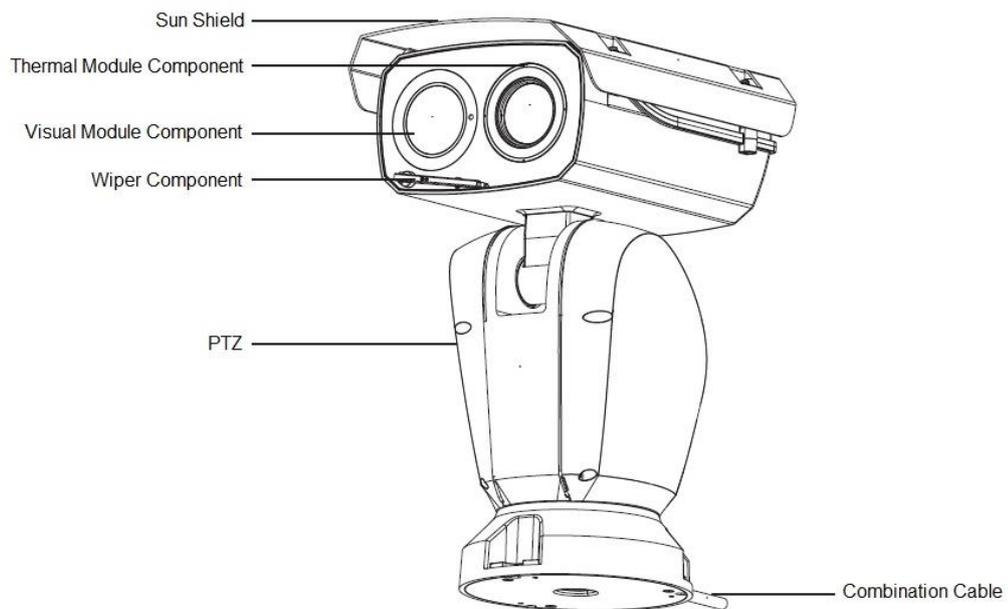


Figure 1-1

Thermal hybrid PTZ camera is equipped with a multifunctional combination cable, which is shown in Figure 1-2

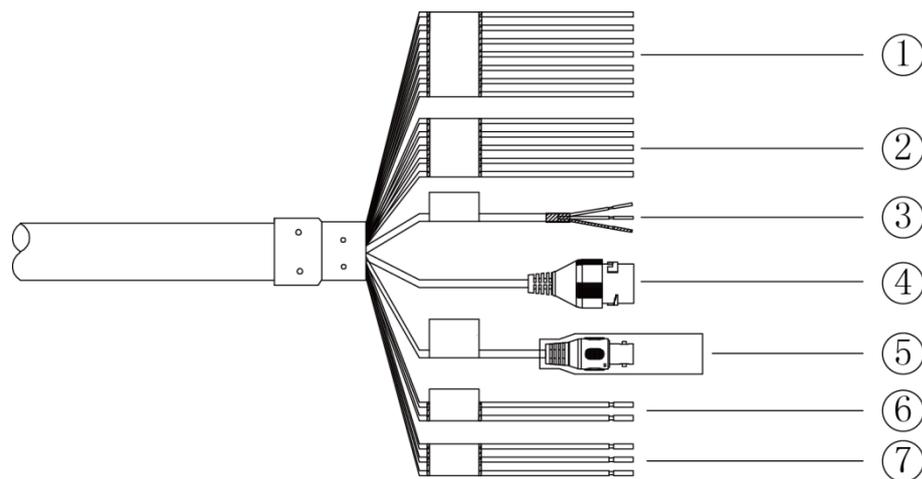


Figure 1-2

Please refer to Table 1-1 and Table 1-2 for the functions of external cable and I/O port.

SN	Port	Port name	Connector	Function description
1	I/O	I/O port	Various external alarm devices	Include alarm input and output, please refer to Table 1-2 for more details.
2				

SN	Port	Port name	Connector	Function description
3	AUDIO IN	Audio input port	RCA	Input audio signal, receive analog audio signal from pickup and other devices.
	AUDIO OUT	Audio output port	RCA	Output audio signal to speaker and other devices.
	AUDIO GND	Audio grounding terminal	-	GND
4	LAN	Network port	Ethernet port	Connect to standard Ethernet cable. <b>Note</b> Take out the connector from accessory bag and insert it into the network port before device power on, and then BNC outputs HDCVI signal.
5	VIDEO OUT	Analog video output	BNC	<ul style="list-style-type: none"> <li>● Generally, it outputs analog video signal, it can connect to TV monitor to check image.</li> <li>● <b>Plug the connector into the network port before powering up the device, then the device is powered on, at this moment, BNC outputs HDCVI signal.</b></li> </ul>
6	RS485	RS485 port	-	RS485 port, control PTZ and so on.
7	POWER	Power input port	-	Input AC 24V, please be sure to supply power to the device according to the device label instruction. <b>Caution</b> It may cause damage to the device if it fails to power the device according to label instruction.

Table 1-1

Port name	Cable name	port	Function description
I/O port	ALARM_OUT1		Alarm output port 1, output alarm signal to alarm device. <b>Note</b>
	ALARM_COM1		ALARM_OUT1 can only be used together with ALARM_COM1 when connecting to alarm device.
	ALARM_OUT2		Alarm output port 2, output alarm signal to alarm device. <b>Note</b>
	ALARM_COM2		ALARM_OUT2 can only be used together with ALARM_COM2 when connecting to alarm device.
	ALARM_IN1~ALARM_IN7		Alarm input port 1~alarm input port 7, receive on-off signal from external alarm source.
	ALM_IN_GND		GND terminal.

Table 1-2

**Note**

Restore factory default parameters:

After the device is powered on (the connector is not plugged into the network port), plug the connector into the network port when the device starts normally and it has access to visit WEB interface, plug out the connector after waiting for about 5 seconds, the device will reboot automatically and restore factory default setting (including IP, user password and etc.).

## 1.2 Dimension

### Note

The following figures are for reference only, which are only used to know the device dimension.

Refer to Figure 1-3 and Figure 1-4 for the device dimension and pole-mounted chassis respectively. The unit is mm (inch).

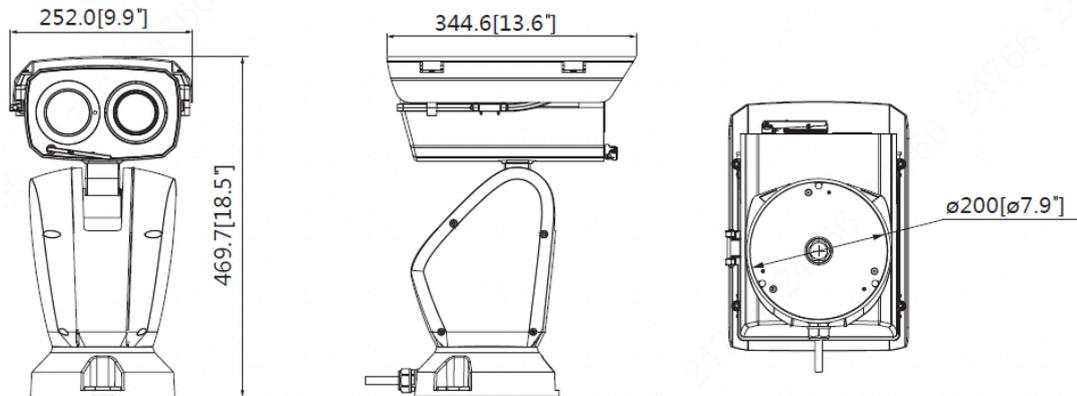


Figure 1-3

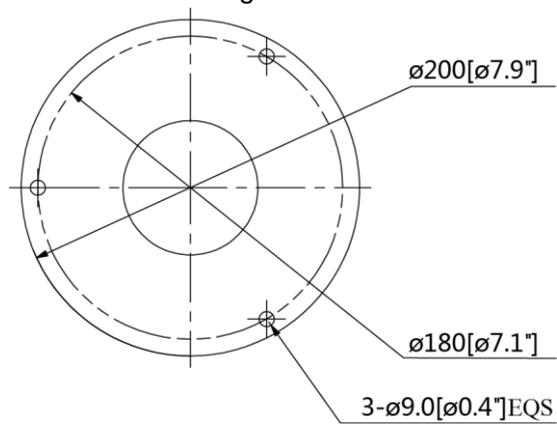


Figure 1-4

## 2 Device Installation

### 2.1 Preparation before Installation

#### 2.1.1 Check Installation Space and Intensity

Make sure the installation site has enough space to hold the device and its mounting structural components. Please make sure the ceiling and wall where the bullet is installed can sustain at least 8x weight of bullet and its mounting structural components.

#### 2.1.2 Cable Preparation

Select Needed Video Cable

- 75 ohm.
- Full cable with copper conductor.
- 95% knitted copper shield.

International Model	Max Transmission Distance (Ft/M)
RG59/U	750Ft/229M
RG6/U	1,000Ft/305M
RG11/U	1,500Ft/457M

Table 2-1

Select Needed Power Cable

It is recommended to implement according to the following requirements when the users need to lengthen the power cable.

Max. Transmission distance is recommended when the size of wire diameter is fixed and DC 12V (or AC 24V) voltage transmission power is 10W. Please refer to the following table for more details.

Wire Diameter (mm)	Max. Distance (Feet/M)
0.800	61.06 (18.61)
1.000	95.41 (29.08)
1.250	149.08 (45.44)
2.000	381.66 (116.33)

Table 2-2

Select Needed Signal Cable

All signal cables (audio, alarm input and output and RS485 etc.) are recommended to use 0.56mm (24AWG) and above cable as lengthened wire signal cable.

### 2.2 Install Micro SD Card (Optional)

#### Caution

- Micro SD card installation needs to be operated by professional technician; the company is not liable to the device malfunction if it is operated unprofessionally.
- Make sure the sealing gasket is located in the sealing slot when locking it firmly, and then lock four M5 screws firmly to make sure the housing is waterproof.

**Step 1** Loosen the screws on the lower cover. You can see the SD card slot and reset button after opening the lower cover, which is shown in Figure 2-1.

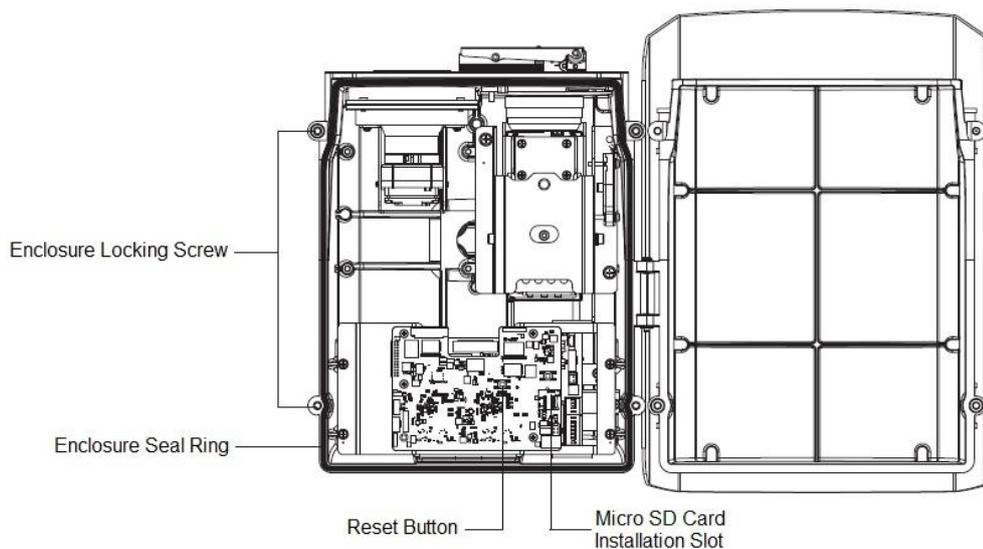


Figure 2-1

**Note**

Long press the reset button for 4 to 5 seconds to restore device factory default setting.

**Step 2** Insert the SD card into the slot, the card slot is elastic, so it only needs to press the SD card slightly to make it inserted.

**Step 3** Install the lower cover back to place, twist back the screws and lock them firmly.

## 2.3 Device Installation

### 2.3.1 Side Cable Exit

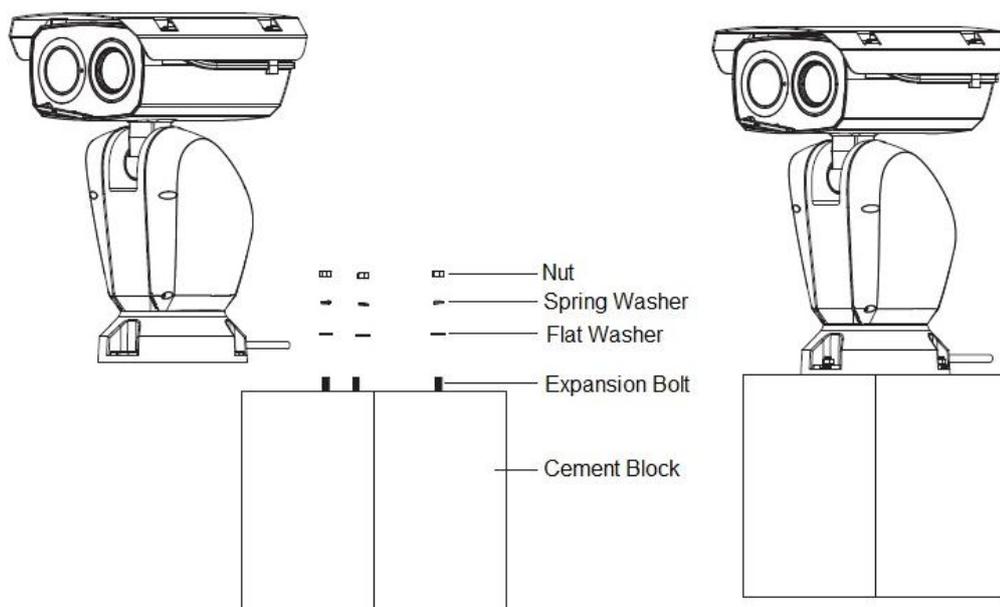


Figure 2-2

**Step 1** Fix the device onto the mounting surface.

- 1) Dig three mounting hole sites on the cement block according to the mounting holes, Make sure the size of hole diameter needs to be in accordance with expansion bolt, and there shall be no deviation for hole site.
- 2) Use a small hammer to knock the expansion bolts into the holes you just dug, bury the expansion tube of expansion bolts into the wall and make it flat with the installation surface.
- 3) Insert the three mounting holes of camera through expansion bolts, cover it with flat washer and spring washer successively, use nut to lock it firmly and fix the device on the cement block stably.

**Step 2** Connect the external cable well according to the use requirement.

- 1) Connect the corresponding power, video output and other ports well according to requirements, and then use insulated rubber tape to twine the connection joint well to make it waterproof.

**Note**

- The video port is covered with heat-shrinkable tube with high shrinkage ratio, it needs to heat and shrink the tubes on both sides after the video port is well connected, which is to make sure the video port is moistureproof and waterproof.
  - The grounding hole is recommended to be grounded, which is to enhance device reliability.
- 2) It is to install waterproof cover for network port according to actual implementation by referring to step 3 (optional).
  - 3) Please refer to 3.4 Alarm Setup for alarm input and output cable connection and config.
  - 4) It can properly lengthen device cable according to actual construction requirements.

**Step 3** Install waterproof connector for network port, which is shown in Figure 2-3.

**Note**

It needs to implement the following operation when the device is equipped with waterproof connector and it is used outdoors.

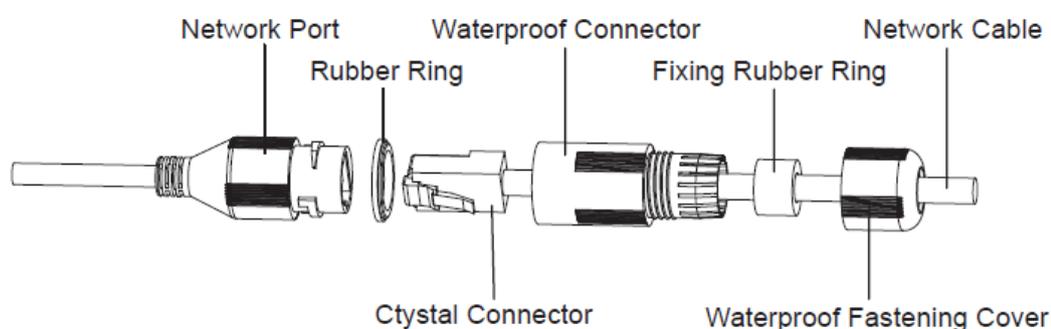


Figure 2-3

- 1) Keep the convex groove outward and install the rubber ring into the network port, and keep the smaller hole of the rubber ring outward and install the fixing rubber ring into the main body of the waterproof connector.

- 2) After pulling the network cable without crystal head through main body of waterproof connector, fixing rubber ring and waterproof fastening cover, make the crystal connector of network cable and then insert it into the network cable.
- 3) Put the main body of waterproof connector on the network port and rotate it clockwise to lock the network port and waterproof connector firmly.
- 4) Put the waterproof fastening cover on the main body of waterproof connector and rotate it clockwise to lock the waterproof connector and waterproof fastening cover firmly.

### 2.3.2 Bottom Cable Exit

Pole-mounted PTZ can be used for pole-mounted bracket structure both indoors and outdoors. The hole sites of pole-mounted bracket should be matched with corresponding hole sites of PTZ pedestal.

#### Note

- Please make sure there is enough space in the bracket for pulling cables when it adopts bottom cable exit.
- Pole-mounted bracket should sustain at least 8 times weight of PTZ.
- Pole-mounted bracket has to be stable and reliable; it can't be installed in the application environment which is not stable.

Step 1 Replace cable exit location.

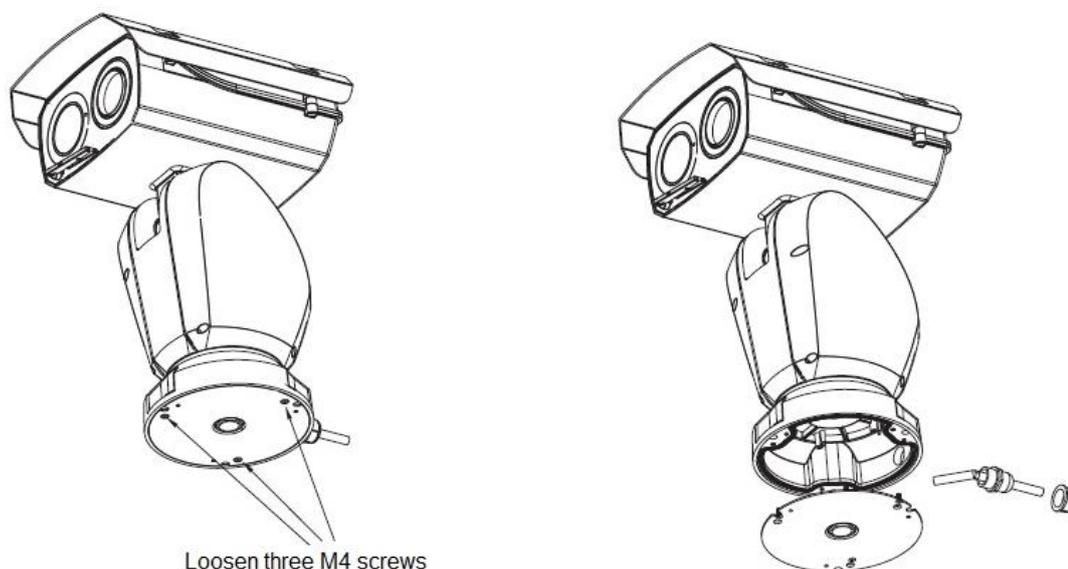


Figure 2-4

- 1) Use inner hex wrench to loosen three screws on the bottom.
- 2) Open white plug of combination cable, loosen the connector of combination cable and bottom cover respectively, and then pull the cable for replacement.
- 3) Install back three chassis screws and cover, and then lock them firmly.

#### Caution

It needs to make sure that the sealing gasket is located in the sealing slot, which is to avoid water leaking and causing damage to the device.

Step 2 Fix the device on the pole-mounted bracket.

- 1) Pull the cable through the pole-mounted bracket.

- 2) Align the screw holes of PTZ bottom with the mounting hole sites of pole-mounted bracket, and then use fixing bolt to fix the device on the pole-mounted bracket.

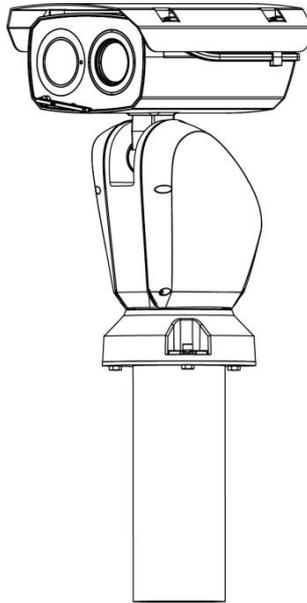


Figure 2-5

Step 3 Connect the external cable well according to the use requirement.  
Please refer to step 2 in 2.3.1 Side Cable Exit for more details.

Step 4 Install waterproof connector for network port.  
Please refer to Step 3 in 2.3.1 Side Cable Exit for more details.

## 3 Device Configuration

### 3.1 Device Initialization

It needs to set the user password when logging in for the first time (the username is admin by default). The figures listed in the following chapter are for reference only. There is difference about interface between different devices, please refer to the actual device for more details.

#### Caution

- It fails to use device if the device is not initialized.
- In order to make sure the device is safe, please keep admin user password well after initialization and modify it regularly.
- It can implement device initialization only when the device IP address (192.168.1.108 by default) and the PC IP address are in the same network segment.

#### Step 1

Open IE browser, input camera default IP address in the address bar, and then press **Enter**.

#### Note

The factory default IP address is: 192.168.1.108.

The system will display the interface of *Device Initialization* after it is successfully connected, which is shown in Figure 3-1.

The screenshot shows a web interface titled "Device Initialization". It features a form with the following elements:

- Username:** A text field containing the value "admin".
- Password:** An empty text input field.
- Confirm Password:** An empty text input field.
- Weak/Middle/Strong:** Three buttons for password strength selection.
- Instructions:** A paragraph of text: "Use a password that has 8 to 32 characters, it can be a combination of letter(s), number(s) and symbol(s) with at least two kinds of them.(please do not use special symbols like \* ; : & )".
- Email Address:** A checkbox labeled "Email Address" which is checked, followed by an empty text input field.
- Note:** A text label below the email field: "To reset password, please input properly or update in time."
- Save:** A button at the bottom center of the form.

Figure 3-1

#### Step 2

Set the login password of admin; please refer to Table 3-1 for more details about the parameters.

Parameter	Note
Password	The password can be set as 8 to 32 nonblank characters, which can be made up of number, letter and special character (except “'” , “'” , “;” , “:” and “&” ), and it has to contain at least two types of characters. Please set the password with high security according to the password intensity prompt.
Confirm Password	
Email Address	In order to reset password, please input email address properly or update in time

Table 3-1

### Step 3

Click **Save** to complete initialization.

## 3.2 Modify IP Address

In order to make the camera get access to network smoothly, please plan IP address reasonably according to the actual network environment.

### Step 1

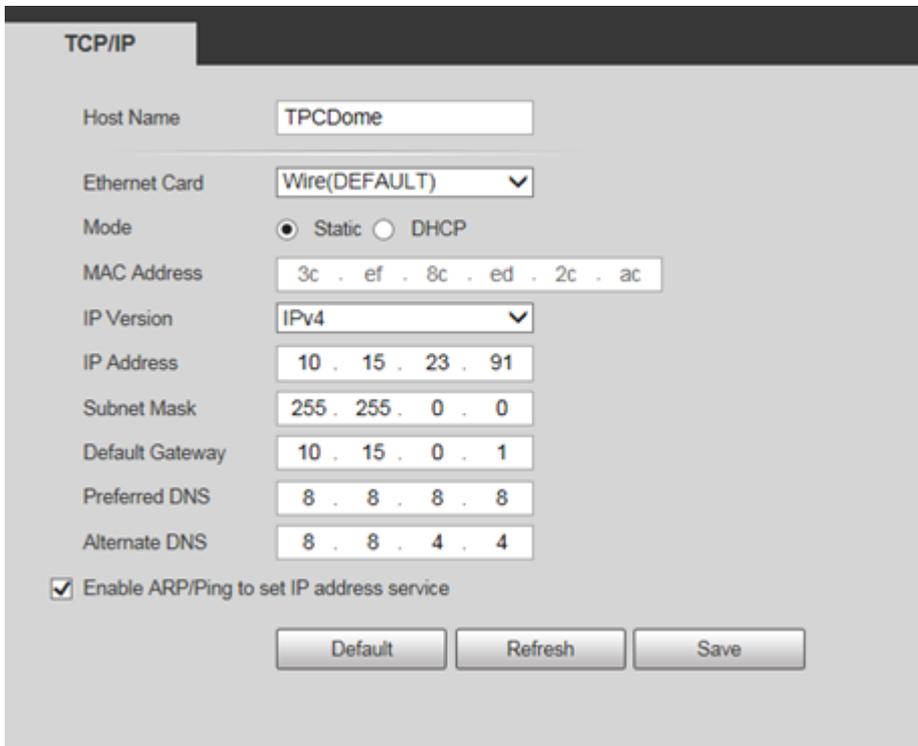
Log in camera WEB interface in the IE browser.

### Note

- The factory default IP address is: 192.168.1.108.
- The default user is admin; the password is set during device initialization.

### Step 2

Select “Setup > Network > TCP/IP” and the system will display the interface of “TCP/IP”, which is shown in Figure 3-2.



The screenshot shows the 'TCP/IP' configuration page. The fields are as follows:

Field	Value
Host Name	TPCDome
Ethernet Card	Wire(DEFAULT)
Mode	Static
MAC Address	3c . ef . 8c . ed . 2c . ac
IP Version	IPv4
IP Address	10 . 15 . 23 . 91
Subnet Mask	255 . 255 . 0 . 0
Default Gateway	10 . 15 . 0 . 1
Preferred DNS	8 . 8 . 8 . 8
Alternate DNS	8 . 8 . 4 . 4

Additional options:  Enable ARP/Ping to set IP address service

Buttons: Default, Refresh, Save

Figure 3-2

### Step 3

Configure relevant info of IP address, click **Save**.

## 3.3 Live Video

### Note

Different devices might have different WEB interfaces, the figure in this document is just for reference, please refer to the document *WEB Operation Manual* in the disk and the actual interface for more details.

### Step 1

Log in camera WEB interface in the IE browser.

### Note

- IP address is the one which has been modified.
- Default user is admin; the password has been set during device initialization.

### Step 2

Click **Login** and the system will display the WEB main interface, which is shown in Figure 3-3.

### Note

It will prompt you to install plug-in for the first system login, please save and install plug-in according to prompt. The WEB interface will refresh automatically after plug-in installation is completed, then live video will show up.

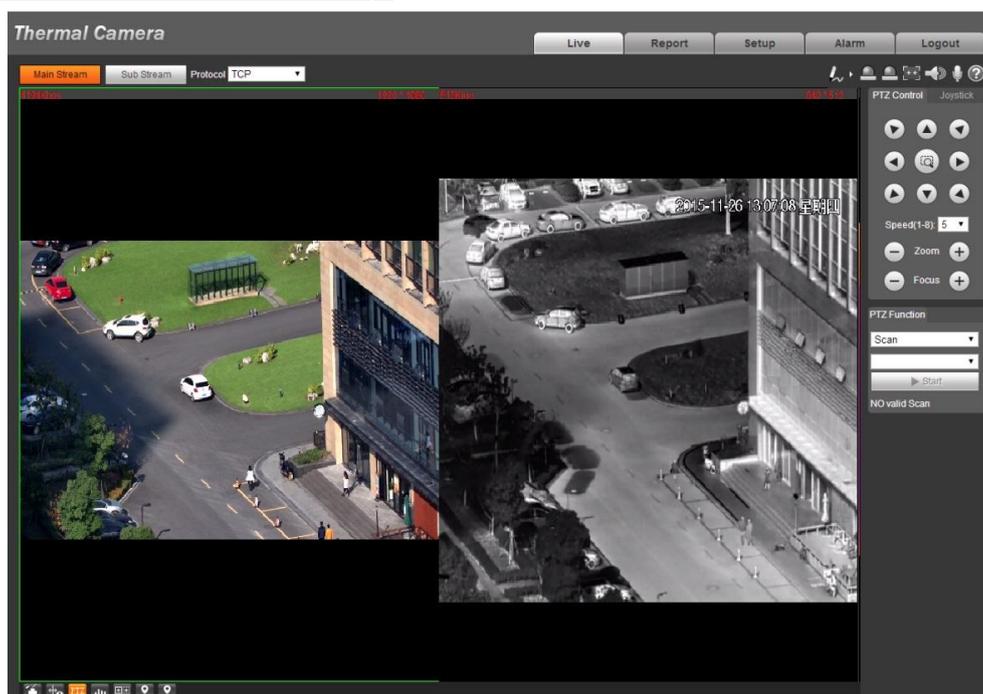


Figure 3-3

## 3.4 Alarm Setup

### Note

- Some devices do not support alarm function, the chapter cannot be applied.
- It has to cut off power first when connecting cables.

### Alarm input and output connection description

#### Step 1

Connect alarm input device to alarm input port of I/O cable.

#### Step 2

Connect alarm output device to alarm output port of I/O cable, alarm output is relay switch output, the alarm output port can only be connected to NO alarm device.

#### Step 3

Open WEB interface, select "Setup > Event > Alarm".

#### Step 4

Make corresponding settings upon alarm input and output in the alarm setup interface, and then

click **Save**.

The interface of alarm setup is shown in Figure 3-4.

- Alarm input is corresponding to the alarm input port of device I/O cable. It is to set corresponding NO and NC according to the high and low level signal generated by alarm input device when alarm occurs.
- Alarm output is corresponding to the alarm output port of device I/O cable.

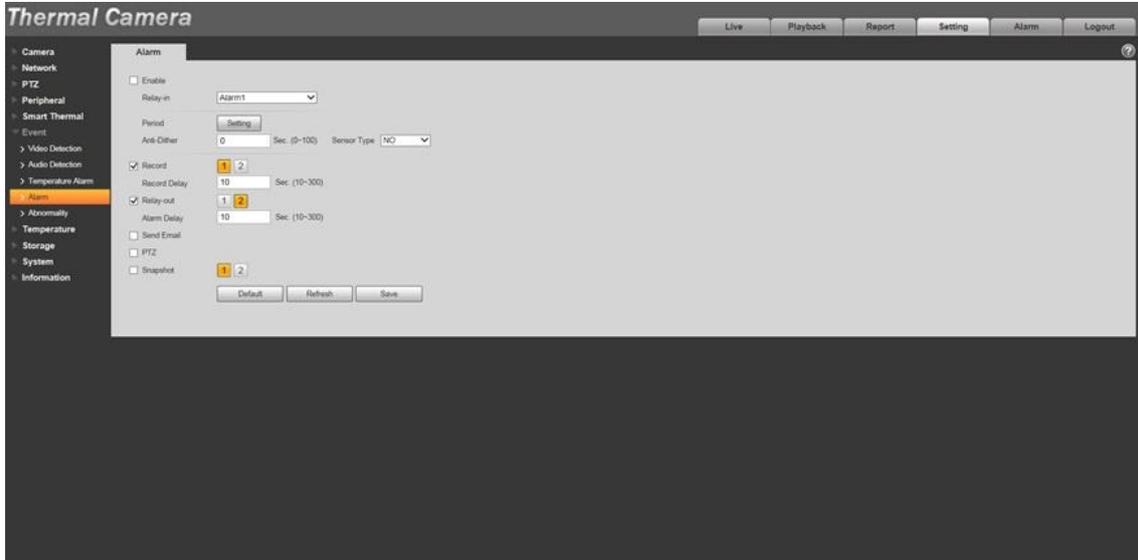


Figure 3-4

Alarm input and output figures

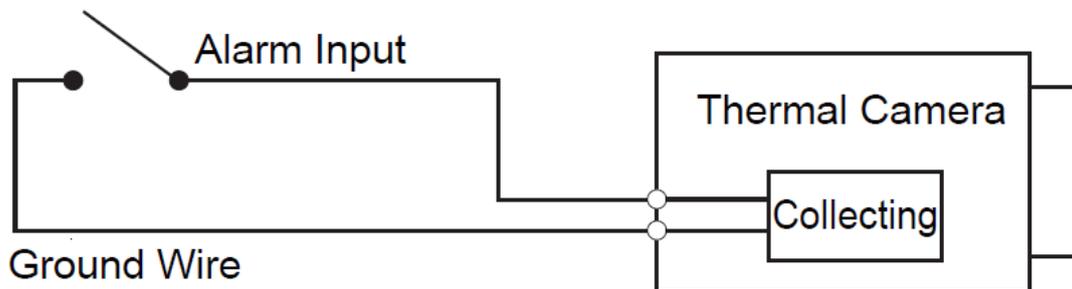


Figure 3-5

Alarm input: input signal is idle or grounded; the device can collect different states of alarm input port. Input signal is connected to 3.3V or idle, device collects logic "1"; input signal is grounded, the device collects logic "0".

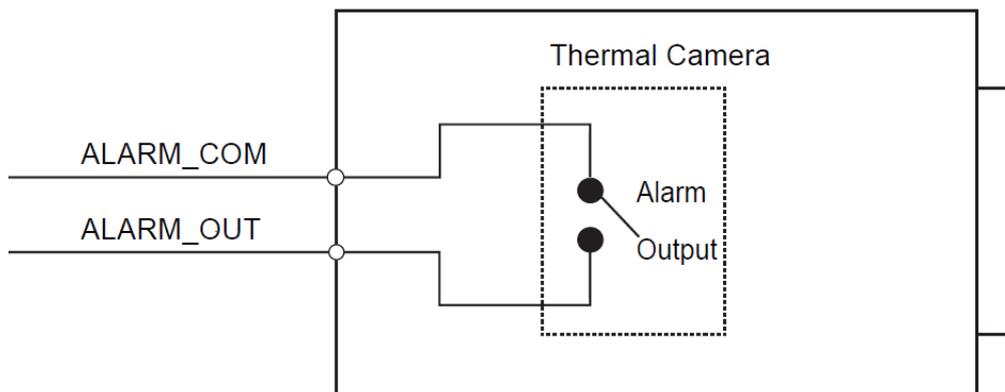


Figure 3-6

Alarm output: port ALARM\_OUT and ALARM\_COM form a switch, which can be used to provide alarm output. Normally the switch is on, the switch will be off when there is alarm output.

## 4 Appendix I Lightning Protection and Surge Protection

This series speed dome adopts TVS lightning protection technology. It can effectively prevent damages from various pulse signals below 6000W, such as sudden lightning and surge. While maintaining your local electrical safety code, you still need to take necessary precaution measures when installing the speed dome in the outdoor environment.

- The distance between the signal transmission cable and high-voltage device (or high-voltage cable) shall be at least 50 meters.
- Outdoor cable layout shall go under the penthouse if possible.
- For vast land, please use sealing steel tube under the land to implement cable layout and connects one point to the earth. Open floor cable layout is forbidden.
- In area of strong thunderstorm hit or near high sensitive voltage (such as near high-voltage transformer substation), you need to install additional high-power thunder protection device or lightning rod.
- The thunder protection and earth of the outdoor device and cable shall be considered in the building whole thunder protection and conform to your local national or industry standard.
- System shall adopt equal-potential wiring. The earth device shall meet anti-jamming and at the same time conforms to your local electrical safety code. The earth device shall not short circuit to N (neutral) line of high voltage power grid or mixed with other wires. When connect the system to the earth alone, the earth resistance shall not be more than  $4\ \Omega$  and earth cable cross-sectional area shall be more than  $25\ \text{mm}^2$ . See Figure 4-1.

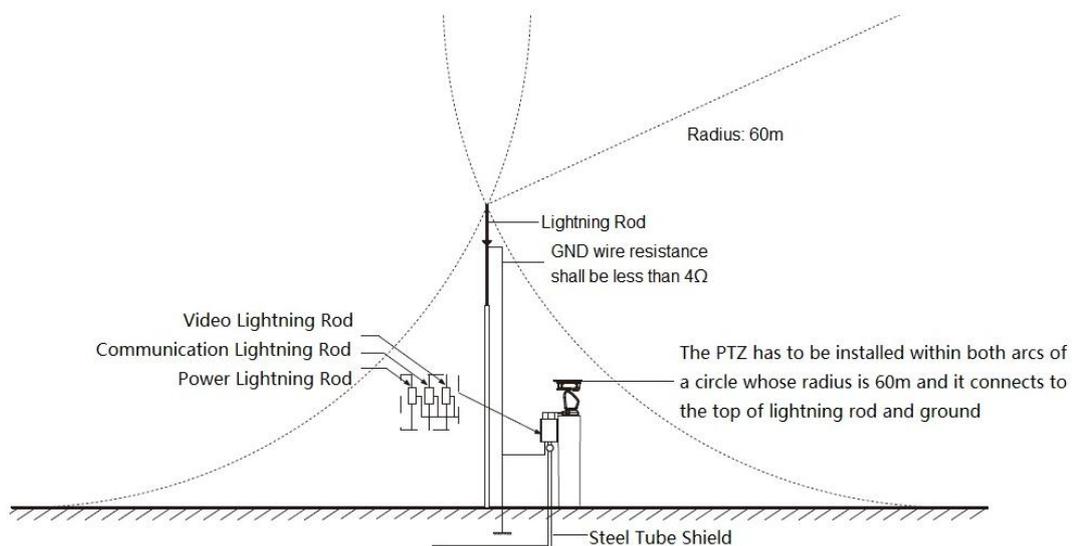


Figure 4-1