

# **Thermal Explosion-proof Bullet Camera**

## **Quick Start Guide**



V1.0.0

# Foreword

## General

This manual introduces the installation, functions and operations of the thermal explosion-proof bullet camera (hereinafter referred to as "the Camera"). Read carefully before using the device, and keep the manual safe for future reference.

## Safety Instructions

The following signal words might appear in the manual.

| Signal Words                                                                                     | Meaning                                                                                                                                            |
|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>DANGER</b>  | Indicates a high potential hazard which, if not avoided, will result in death or serious injury.                                                   |
|  <b>WARNING</b> | Indicates a medium or low potential hazard which, if not avoided, could result in slight or moderate injury.                                       |
|  <b>CAUTION</b> | Indicates a potential risk which, if not avoided, could result in property damage, data loss, reductions in performance, or unpredictable results. |
|  <b>TIPS</b>   | Provides methods to help you solve a problem or save time.                                                                                         |
|  <b>NOTE</b>  | Provides additional information as a supplement to the text.                                                                                       |

## Revision History

| Version | Revision Content | Release Time  |
|---------|------------------|---------------|
| V1.0.0  | First release.   | February 2022 |

## Privacy Protection Notice

As the device user or data controller, you might collect the personal data of others such as their face, fingerprints, and license plate number. You need to be in compliance with your local privacy protection laws and regulations to protect the legitimate rights and interests of other people by implementing measures which include but are not limited: Providing clear and visible identification to inform people of the existence of the surveillance area and provide required contact information.

## About the Manual

- The manual is for reference only. Slight differences might be found between the manual and the product.
- We are not liable for losses incurred due to operating the product in ways that are not in compliance with the manual.
- The manual will be updated according to the latest laws and regulations of related jurisdictions. For detailed information, see the paper user's manual, use our CD-ROM, scan the QR code or visit our official website. The manual is for reference only. Slight differences might be found between the electronic version and the paper version.
- All designs and software are subject to change without prior written notice. Product updates might result in some differences appearing between the actual product and the manual. Please

contact customer service for the latest program and supplementary documentation.

- There might be errors in the print or deviations in the description of the functions, operations and technical data. If there is any doubt or dispute, we reserve the right of final explanation.
- Upgrade the reader software or try other mainstream reader software if the manual (in PDF format) cannot be opened.
- All trademarks, registered trademarks and company names in the manual are properties of their respective owners.
- Please visit our website, contact the supplier or customer service if any problems occur while using the device.
- If there is any uncertainty or controversy, we reserve the right of final explanation.

# Important Safeguards and Warnings

This section introduces content covering the proper handling of the device, hazard prevention, and prevention of property damage. Read carefully before using the device, and comply with the guidelines when using it.

## Transportation Requirements



- Transport the device under allowed humidity and temperature conditions.
- Pack the device with packaging provided by its manufacturer or packaging of the same quality before transporting it.
- Do not place heavy stress on the device, violently vibrate or immerse it in liquid during transportation.



- During transportation and installation, do not expose the device to mechanical vibrations, and do not allow it to receive impacts.
- The complete package is necessary for transportation and storage. Whether it is delivered by the contractor or returned to the factory for repair, we will assume no responsibility for any damage or problems caused during transportation due to the incomplete package being sent.

## Storage Requirements



- Store the device under allowed humidity and temperature conditions.
- Do not place the device in a humid, dusty, extremely hot or cold site that has strong electromagnetic radiation or unstable illumination.
- During storage, do not expose the device to mechanical vibrations, and do not allow it to receive impacts.
- Do not place heavy stress on the device, violently vibrate or immerse it in liquid during storage.



Store the device in a well-ventilated place, and do not block its ventilation. Also, do not expose the device to strong magnetic fields.

## Installation Requirements



- Installation personnel must have required certification or qualified training for performing installation on electric apparatuses and on explosion-proof equipment in environments that have explosive gas.
- All the installation professionals must have required certification or qualified training for performing installations and maintenance of electric apparatuses in environments that have explosive gas. They must also be trained and certified to work at heights, and must have knowledge and skills in the following areas:

- ◇ Basic knowledge and skills in installing CCTV system and components.
- ◇ Basic knowledge and skills in low-voltage wiring and in connecting low-voltage electronic circuits.
- ◇ Basic knowledge and skills in operating electric apparatuses and installing them in hazardous sites.
- All installation and operations must conform to the local electrical safety code and standards.
- If the device is being installed in a dangerous, explosive environment, the power supply must conform to the local explosion-proof requirements.
- Strictly comply with the local electrical safety code and standards, and check whether the power supply is correct before operating the device.
  - ◇ When selecting the power adapter, the power supply requirements (such as rated voltage) are subject to the device label.
  - ◇ We recommend using the power adapter provided with the device.
  - ◇ The power supply must conform to the requirements of ES1 in IEC 62368-1 standard and be no higher than PS2. Please note that the power supply requirements are subject to the device label.
- An emergency disconnect device must be installed during installation and wiring at a readily accessible location for emergency power cut-off.
- Protect the power cord and wires from being walked on or squeezed particularly at plugs, power sockets, and the point where they exit from the device.
- Do not expose the device to heat sources such as a radiator, heater, stove or other types of heating equipment. This is to avoid the risk of fire.
- Use the accessories suggested by the manufacturer. Installation and maintenance must be performed by qualified professionals.
- Apply the following information when the device is being used in the environment of area 21 and 22 with explosive dust, and area 1 and 2 with explosive air. Applicable air pressure: 80 kPa–110 kPa; ambient temperature: –40 °C to +60 °C; relative humidity: No more than 95% (+25 °C).
- Internal and external ground connection must be stable.
- A control cable around 2.5 m long is provided with the device in the delivery. When connecting the cable to an explosion-proof control cabinet, pass it through an explosion-proof flexible tube or armored cable.
- Make sure the explosion-proof components are complete without any cracks or defects.

 **WARNING**

- Do not place the device in an environment that has strong vibrations, such as in a vehicle or ship.
- Do not block the ventilation opening near the device to avoid heat accumulation.
- Do not connect the device to two or more kinds of power supplies, to avoid safety risks and damage to the device.
- Do not place heavy stress on the device, violently vibrate or immerse it in liquid during installation.
- Waterproof the cable connections of the device to prevent water ingress.
- Do not expose the device to environments with strong magnetic fields to avoid damage to the device.



- Do not use the device outside its specified temperature range.
- Do not expose the device to corrosive environments such as coastal areas, sea areas with thick

salt fog, environments with acid gas, chemical plants and the seaside.

- Do not aim the lens at intense radiation sources (such as the sun, lasers and molten steel) to avoid damaging the thermal detector.
- During transportation and installation, do not expose the device to mechanical vibrations, and do not allow it to receive impacts.
- We recommend you use the device with a lightning protection device for stronger protection against lightning. For outdoor scenarios, strictly comply with the lightning protection regulations.
- Do not place the device in environments with smoke, vapor, heavy dust, or that have high temperatures to avoid damage to the device.
- Protect the accessories that come with the device for future maintenance and debugging.



After unpacking, even if the packing bag is damaged or leaking air, and the desiccant particles are different colors, the normal use of the device will not be affected.

## Operation Requirements



- Prevent liquid from flowing into the device to avoid damage to its internal components.
- Do not insert foreign matter into the device to avoid the risk of short circuits, damaging the device and injuring people.



- Do not touch the heat dissipation component of the device to avoid getting burnt.
- Do not dismantle the device, it can only be repaired by qualified professionals. Non-professionals dismantling the device can result in it leaking water or producing poor quality images.



- Do not stain or damage optical components such as the lens and glass.
- To ensure the fragile components of the device have a long service life (such as the lens motor and potentiometer), do not continuously focus and defocus the device for long periods of time.
- Prevent liquid from flowing into the device to avoid damage to its internal components.
- Do not block the ventilation opening near the device to avoid heat accumulation.
- Do not aim the lens at intense radiation sources (such as the sun, lasers and molten steel) to avoid damage to the thermal detector.
- Do not directly touch the photosensitive module. Use an air blower to clean the dust or dirt on the lens. When it is necessary to clean the device, slightly wet a soft cloth with alcohol, and gently wipe away the dirt.
- Modify the default password of the device after first-time login to prevent the device from being stolen.

## Maintenance Requirements



- Installation personnel must have required certification or qualified training for performing installation and maintenance of electric apparatuses in environments that have explosive gas.
- All service personnel must have required certification or qualified training for performing

installations and maintenance of electric apparatuses in environments that have explosive gas. They must also be trained and certified to work at heights, and must have knowledge and skills in the following areas:

- ◇ Basic knowledge and skills in installing CCTV systems and components.
- ◇ Basic knowledge and skills in low-voltage wiring and in connecting low-voltage electronic circuits.
- ◇ Basic knowledge and skills in operating electric apparatuses and performing maintenance on them in hazardous sites.
- Do not allow liquid to get into the device to avoid damage to the internal components. If any liquid flows into the device, immediately disconnect the power supply, unplug all the cables connected to the device, and contact after-sales service.
- Cut off the power before cleaning the device to avoid the risk of electrocution.
- Cut off the power before device maintenance and overhaul. It is strictly prohibited to open the cover with the power on, or in an explosive environment.
- Use the accessories suggested by the manufacturer. Installation and maintenance must be performed by qualified professionals.



Contact your local dealer or the service center nearest to you if the device fails to work normally. Do not dismantle or modify the device without a qualified professional present.



#### **DANGER**

Clean the device body with a soft dry cloth. If there are any stubborn stains, clean them away with a soft cloth dipped in a neutral detergent, and then wipe the surface dry. Do not use volatile solvents such as ethyl alcohol, benzene, diluent, or abrasive detergents on the device to avoid damaging the coating and degrading the performance of the device.

## Explosion-Proof Structure Declarations

- The casing is designed to not cause external explosions due to the operation of its internal electric apparatus even if an explosive gas mixture were to enter the device. Several factors were considered in designing the camera to guarantee that it is explosion-proof, such as the maximum surface temperature of the casing, casing intensity, the length between the components and the junction surface gap.
- Due to its welding and the finish machining of the casing, the device passed the hydrostatic test in IEC 60079-1:2007. The test pressure was 2 MPa, lasting 10 s–12 s, and the result was no water leakage or deformation.
- When the device is working normally, the maximum surface temperature of the casing cannot exceed 80 °C.
- The casing is IP68 rated.
- Setting compound has been applied to the cable entry to securely seal it in, preventing it from being loose.

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# 1 Packing List

Check the package according to the following checklist. If you find something has been damaged or is missing, contact customer service.



Keep accessories safe for future use.

Table 1-1 Packing list

| No. | Name                                  | Quantity |
|-----|---------------------------------------|----------|
| 1   | Thermal explosion-proof bullet camera | 1        |
| 2   | Accessory bag                         | 1        |
| 3   | Quick start guide                     | 1        |
| 4   | Legal and regulatory information      | 1        |

# 2 Component Structure

## 2.1 Dimensions



- The figure is for reference only, and might differ from the actual product.
- The mounting bracket and universal joint do not come with the delivery. Please buy them if they are needed.

Figure 2-1 Component dimensions (unit: mm [inch])

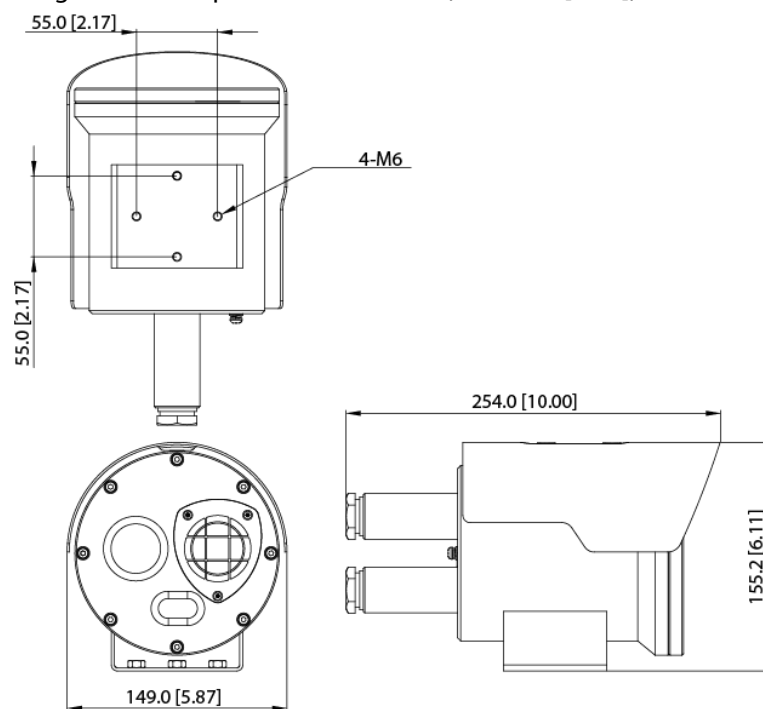


Figure 2-2 Dimensions of bracket (unit: mm [inch])

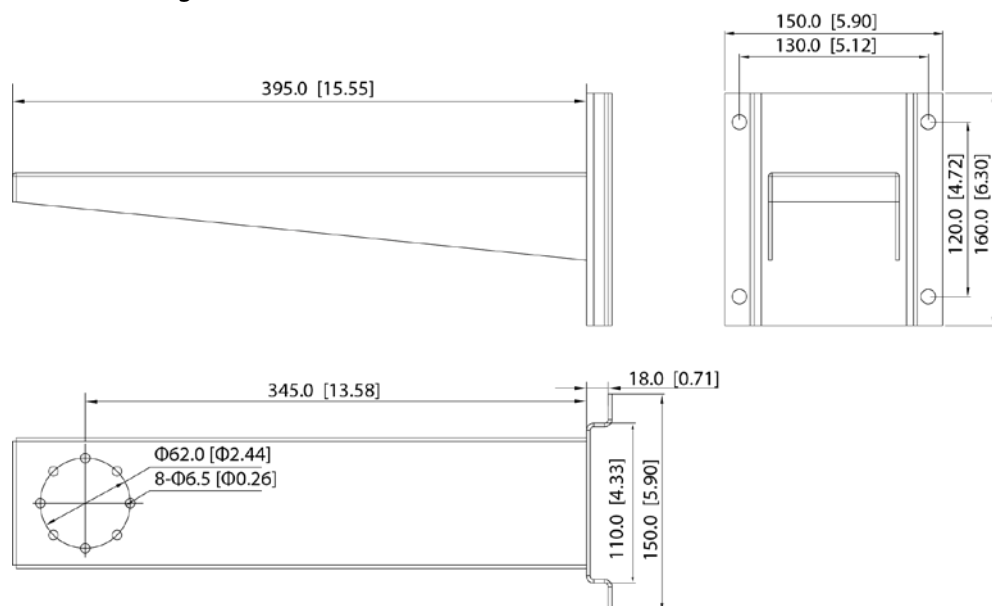
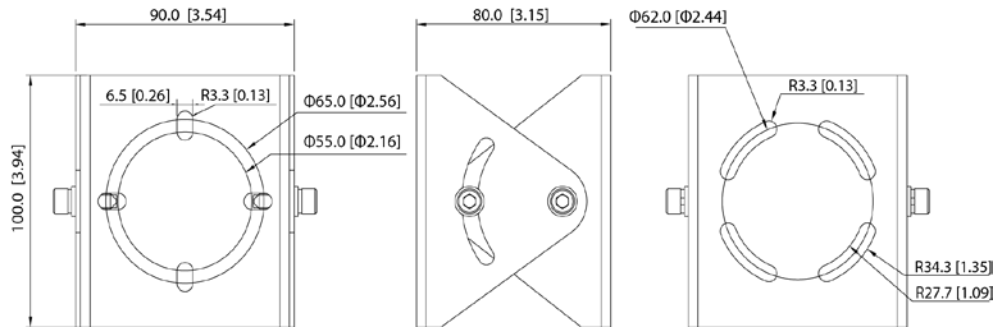


Figure 2-3 Dimensions of universal joint (mm [inch])



## 2.2 Cables

Figure 2-4 External cables

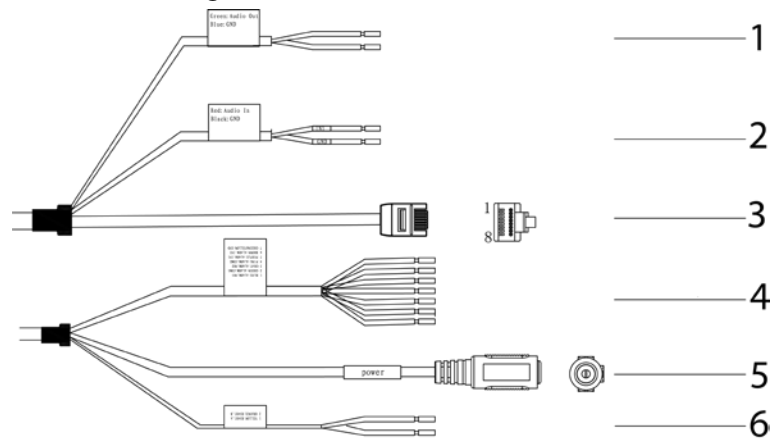


Table 2-1 Cable description

| No. | Port      | Port Name         | Connector     | Description                                                                                                                                                                                |
|-----|-----------|-------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | AUDIO OUT | Audio output port | —             | Outputs audio signals to external devices, such as speakers.                                                                                                                               |
| 2   | AUDIO IN  | Audio input port  | —             | Inputs audio signals and receives analog audio signal from external devices, such as sound pick-ups.                                                                                       |
| 3   | LAN       | Network port      | Ethernet port | Connects to standard Ethernet cable.                                                                                                                                                       |
| 4   | I/O       | I/O port          | —             | Inputs and outputs alarm signals. For details, see Table 2-2.                                                                                                                              |
| 5   | POWER     | Power input port  | —             | Power input port. Inputs 12 VDC.<br><br>Supply power to the Camera according to the label description. |
| 6   | RS-485    | RS-485_A          | —             | RS-485 port, controls external PTZs.                                                                                                                                                       |
|     |           | RS-485_B          |               |                                                                                                                                                                                            |

Table 2-2 I/O port description

| No. | Port Name | Cable port name | Description                                                                                                                                      |
|-----|-----------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | I/O port  | ALARM_NO1       | Alarm output port1, outputs alarm signals to alarm devices.<br> |
| 2   |           | ALARM_COM1      | ALARM_NO1 can only be used together with ALARM_COM1 when connecting to alarm devices.                                                            |
| 3   |           | ALARM_NO2       | Alarm output port2, outputs alarm signals to alarm devices.<br> |
| 4   |           | ALARM_COM2      | ALARM_NO2 can only be used together with ALARM_COM2 when connecting to alarm devices.                                                            |
| 5   |           | ALARM_IN1       | Alarm input port1, receives on-off signals from the external alarm devices.                                                                      |
| 6   |           | ALARM_IN2       | Alarm input port2, receives on-off signals from the external alarm devices.                                                                      |
| 7   |           | GND             | Grounding terminal.                                                                                                                              |

## 3 Installing Cameras



The figures are for reference only, and might differ from the actual product.

### 3.1 Selecting Cables

#### Power Cord

To extend the power cord you have received, evaluate the distance you want to extend to and select the appropriate cord diameter.

Table 3-1 Power cord description

| Cord Diameter [inch (mm)] | Distance [ft (m)] |
|---------------------------|-------------------|
| 0.031 (0.80)              | 32.81 (10.00)     |
| 0.039 (1.00)              | 55.77 (17.00)     |
| 0.049 (1.25)              | 91.86 (28.00)     |
| 0.079 (2.00)              | 249.34 (76.00)    |
| 0.098 (2.50)              | 390.42 (119.00)   |

#### RS-485 Cable

When using a twisted pair that has a diameter of 0.56 mm (24AWG) as the communication cable, the value of the maximum transmission distance is different depending on the baud rate.

Table 3-2 Maximum transmission distance

| Baud Rate (bps) | Maximum Transmission Distance [ft (m)] |
|-----------------|----------------------------------------|
| 2400            | 5905.51 (1800)                         |
| 4800            | 3937.01 (1200)                         |
| 9600            | 2624.67 (800)                          |

The maximum transmission distance will be reduced in the following conditions: When thinner communication cables are used; when the Camera is used in places with intense electromagnetic interference; when many devices are connected to the RS-485 cable.

#### Video Cable

- 75  $\Omega$  impedance.
- Full cable with copper conductor.
- 95% knitted copper shield.

Table 3-3 Video cable description

| International Model | Maximum Transmission Distance [ft (m)] |
|---------------------|----------------------------------------|
| RG59/U              | 750 (229)                              |
| RG6/U               | 1000 (305)                             |

| International Model | Maximum Transmission Distance [ft (m)] |
|---------------------|----------------------------------------|
| RG11/U              | 1500 (457)                             |

## 3.2 Installation Site



### WARNING

- Make sure the mounting platform can sustain at least 8 times the weight of the Camera and its mounting structural components. The load bearing is at least 80 kg.
- Avoid dropping objects such as parts and tools of the Camera from high altitudes during installation to avoid people getting hurt and the Camera being damaged.
- For the explosion-proof products, power on the Camera indoor firstly and get familiar with the operation, and then install the Camera.

Figure 3-1 Installation site

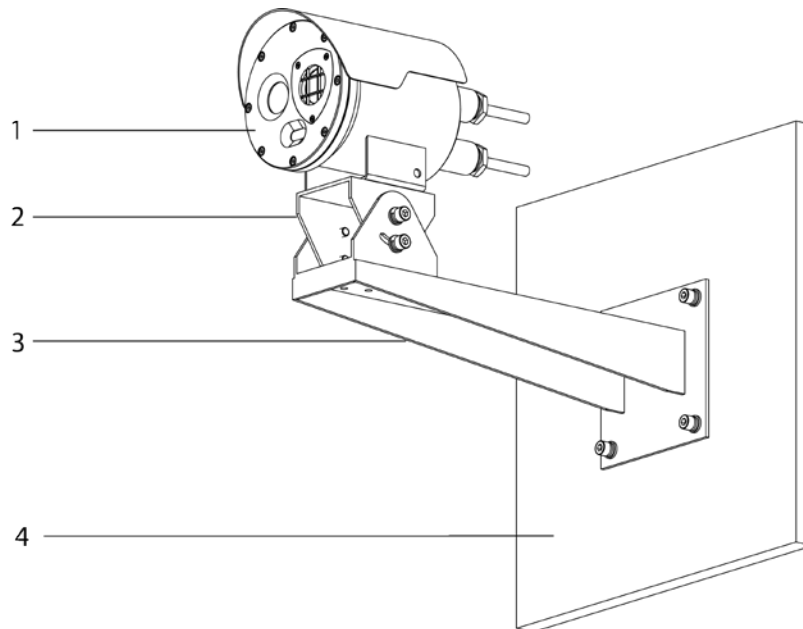


Table 3-4 Component description

| No. | Name                                  |
|-----|---------------------------------------|
| 1   | Thermal explosion-proof bullet camera |
| 2   | Universal joint                       |
| 3   | Mounting bracket                      |
| 4   | Installation surface                  |

## 3.3 Installation Procedures

Step 1 Use the explosion-proof flexible tube to wrap the cable.



- Choose between the explosion-proof flexible tube and the armored cable depending on the actual situation.
  - Both methods are required with proper cables. The diameter of the lead-in cable needs to match that of the rubber sealing ring. You need to select a lead-in cable with the minimum diameter according to the label of the rubber sealing ring. The thread specification of the outlet hole in the lead-in device is G-3/4. After tightening the compression nut, make sure that the gap between the rubber sealing ring and cable, and the gap between rubber sealing ring and lead-in device meet the explosion-proof requirements.
- 1) Wrap the cable with the explosion-proof flexible tube, remove the compression nut, and save the gasket and the rubber ring.

Figure 3-2 Install explosion-proof flexible tube (1)

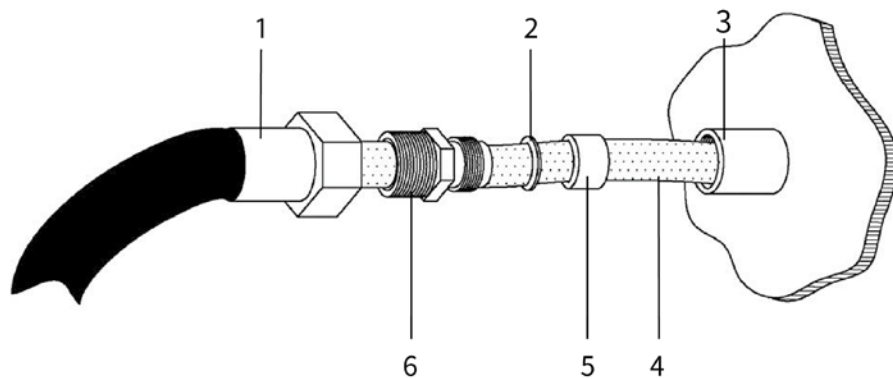


Table 3-5 Component description (1)

| No. | Name                          |
|-----|-------------------------------|
| 1   | Explosion-proof flexible tube |
| 2   | Gasket                        |
| 3   | Cable outlet hole             |
| 4   | Outgoing cable                |
| 5   | Rubber sealing ring           |
| 6   | Threaded connector            |

- 2) Tighten the thread connector and then the explosion-proof flexible tube.

Figure 3-3 Install explosion-proof flexible tube (2)

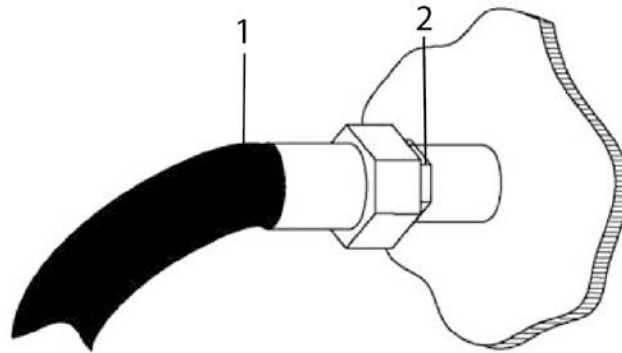


Table 3-6 Component description (2)

| No. | Name                          |
|-----|-------------------------------|
| 1   | Explosion-proof flexible tube |
| 2   | Cable outlet hole             |

**Step 2** (Optional) Use the armored cable.



You can directly connect the armored cable with explosion-proof gran to various explosion-proof devices firmly.

- 1) You need to peel off the protective cover for a proper length to expose the armored cable (steel band). Then, you need to save a certain length of the steel band and remove the excessive part.

Figure 3-4 Install armored cable (1)

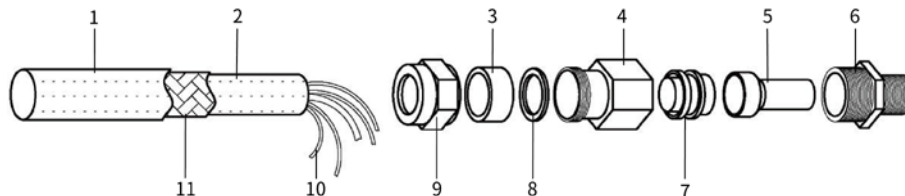


Table 3-7 Component description (3)

| No. | Name                              |
|-----|-----------------------------------|
| 1   | Protective cover of armored cable |
| 2   | Cable internal part               |
| 3   | Rubber sealing ring               |
| 4   | Stuffing box                      |
| 5   | Stuffing bush                     |
| 6   | Mount adapter                     |
| 7   | Cone and shrink ring              |
| 8   | Gasket                            |
| 9   | Nut                               |
| 10  | Cable core                        |
| 11  | Steel band                        |

- 2) Install the explosion-proof gran to the armored cable.

Figure 3-5 Install armored cable (2)

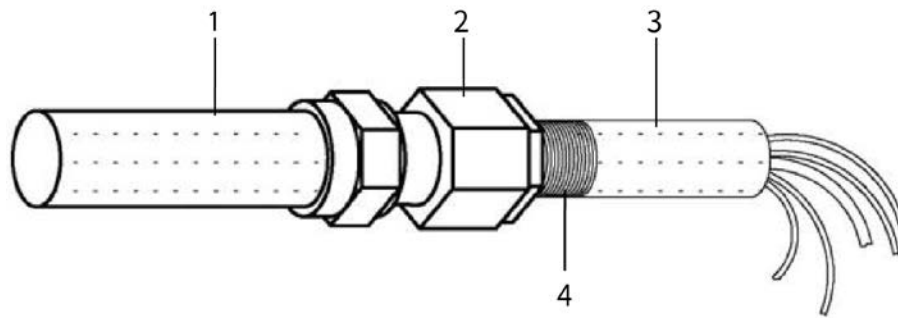


Table 3-8 Component description (4)

| No. | Name                                  |
|-----|---------------------------------------|
| 1   | Protective cover of the armored cable |
| 2   | Explosion-proof gran                  |
| 3   | Cable internal part                   |
| 4   | Thread                                |

**Step 3** Fix the Camera onto the bracket.

- 1) Fix the universal joint onto the bracket after adjusting to the right angle, and then tighten it with screws.
- 2) Install the Camera onto the universal joint, adjust the angle and then tighten the screws.

**Step 4** Fix the bracket onto the installation surface.

- 1) Drill holes in the installation surface (wall or ceiling) according to the bottom holes of the installation bracket.



The size and depth of the holes must match those of the expansion bolts. Make sure that there is no deviation.

- 2) Open the accessory bag, take out the expansion bolts and hammer them into the holes. Make sure the external terminals of the expansion bolts and the installation surface are parallel and level.
- 3) Open the accessory bag and take out the installation screws. Align the four holes from the installation bracket and four expansion bolts. Pass the screws through the bottom holes of bracket and screw them into the holes of the expansion bolts. Firmly tighten the four screws and fix the installation bracket onto the installation surface.

**Step 5** Connect the external cables of the Camera as required.

**Step 6** Slightly adjust the angle of the Camera.

- 1) Slightly loosen the fixing screws or the adjusting screws on the both sides of the universal joint, to adjust the Camera from four directions (up, down, left, right). Set the shooting direction as required.
- 2) Tighten the fixing screws or the adjusting screws.

## 4 Basic Configuration

Set login password when logging in for the first time (the username is admin by default).



The figures in this manual are for reference only, and might differ from the actual page. For more details, see *Thermal Hybrid Camera\_Web Operation Manual*.

### 4.1 Initializing the Camera

Step 1 Open IE browser, enter the Camera default IP address in the address bar, and then press the **Enter** key.



The default IP address is 192.168.1.108.

Step 2 Set the login password of admin.



- The email address is for password reset.
- We recommend entering the email address in case you forget the password and reset the password.

Step 3 Click **Save** to complete initialization.

### 4.2 Modifying IP Address

Step 1 Log in to the Camera web page.

Step 2 Select **Setup > Network > TCP/IP**.

Figure 4-1 TCP/IP

The screenshot shows the 'TCP/IP' configuration page. It includes fields for Host Name (TPCDome), Ethernet Card (Wire(Default)), Mode (Static selected, DHCP unselected), MAC Address (a series of boxes for hexadecimal digits), IP Version (IPv4), IP Address (a series of boxes for decimal digits), Subnet Mask (a series of boxes for decimal digits), Default Gateway (a series of boxes for decimal digits), Preferred DNS (a series of boxes for decimal digits), and Alternate DNS (a series of boxes for decimal digits). There is a checkbox for 'Enable ARP/Ping to set IP address service' which is checked. At the bottom, there are three buttons: 'Default', 'Refresh', and 'Save'.

Step 3    Configure IP related parameters.

Step 4    Click **Save**.

## 4.3 Live Video



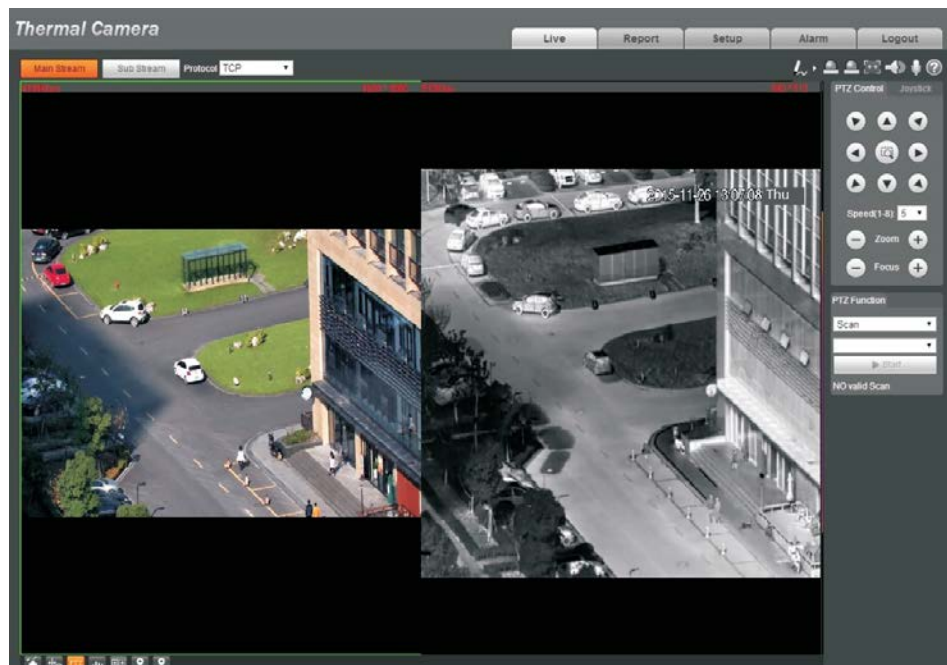
The web page might differ depending on devices, and the figures in this document are just for reference.

Log in to the web page of the Camera, and then the system will display the web main page.



You will be prompted to install a plug-in for first-time system login. Please download and install the plug-in. The web page will refresh automatically after the plug-in is installed, and then the live video will be displayed.

Figure 4-2 Live video



# 5 Alarm Configuration



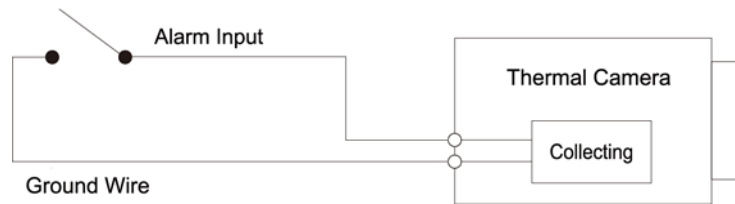
Cut off power before connecting cables.

**Step 1** Connect the alarm input device to the alarm input port of I/O cable.

Alarm input: input signal is idle or grounded and the device can collect different states of alarm input port.

- When input signal is 3.3 V or idle, the Camera collects logic "1".
- When input signal is grounded, the Camera collects logic "0."

Figure 5-1 Alarm input



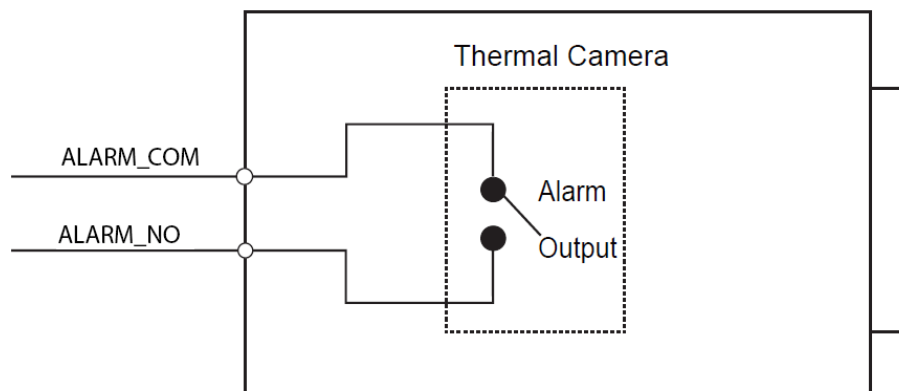
**Step 2** Connect alarm output device to alarm output port of I/O cable. Alarm output is a relay switch output. The alarm output port can only be connected to NO alarm device.

Alarm output: Port ALARM\_NO and ALARM\_COM form a switch to provide alarm output. Normally the switch is on. The switch will be turned off when there is an alarm output.



ALARM\_NO1 can only be used together with ALARM\_COM1 while ALARM\_NO2 can only be used together with ALARM\_COM2 when connecting to alarm devices.

Figure 5-2 Alarm output



**Step 3** Open web client, select **Setting > Event > Alarm**.

**Step 4** Configure the settings for alarm input and output in the **Alarm** page, and then click **Save**.

- 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 devices when an alarm is triggered.
- The alarm output corresponds to the alarm output port of device I/O cable.

Figure 5-3 Alarm settings

**Alarm**

☐ Enable

Relay-in

Alarm1

Period

Setting

Anti-Dither

0

 s (0~100) Sensor Type

NO

☒ Record

12

Record Delay

10

 s (10~300)

☒ Relay-out

Alarm Delay

3

 s (3~300)

☐ Send Email

☐ PTZ

☐ Warning Light

Mode

Flicker

Flicker Frequency

Medium

Duration

10

 s (5~30)

Period

Setting

☐ Snapshot

12

Default

Refresh

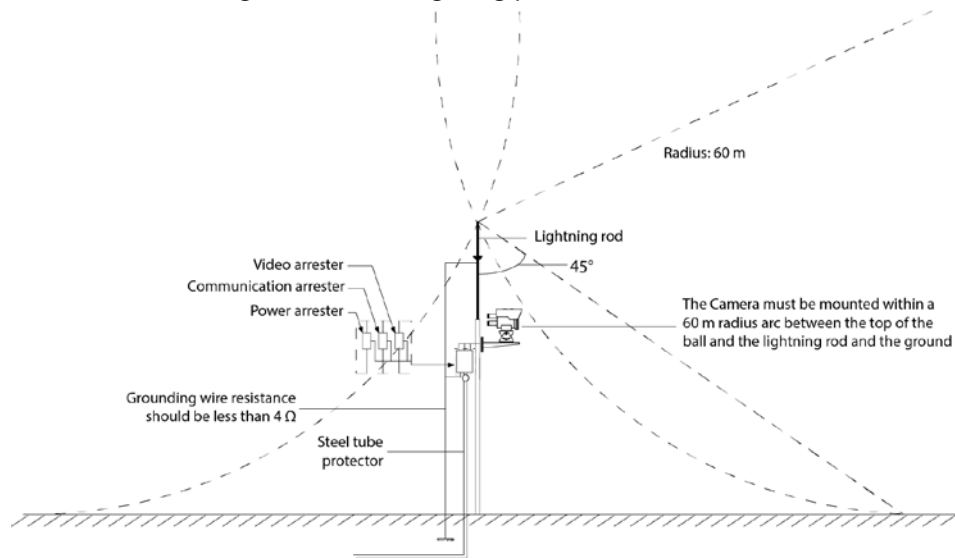
Save

# Appendix 1 Lightning and Surge Protection

The Camera adopts TVS lightning protection technology. It can effectively prevent damage from various pulse signals below 6000 V, such as a sudden lightning and surge. However, you still need to take necessary precaution measures in accordance with your local electrical safety code when installing the Camera in outdoor environment.

- The distance between the signal transmission cable and high-voltage device (or high-voltage cable) shall be at least 50 m.
- Outdoor cable layout shall go under the penthouse if possible.
- For vast land, use sealing steel tube under the land to implement cable layout and make sure that both ends of the tube are equipotentially grounded. Open floor cable layout is forbidden.
- For vast land, install a 10 KA lightning rod near the Camera's power input port and Ethernet port. For Camera with AC to DC power adapter, install a 10 KA lightning rod near the output port of the adapter.
- For Camera installed on iron tower, if there is a high-performance grounding bar on the tower, connect the Camera grounding wire to the bar. If there is no grounding bar, use multiple copper cable whose cross-sectional area are not less than 16 mm<sup>2</sup> to connect the Camera grounding wire into the ground.
- Make sure that the Camera is over 3 m away from the top point of tower lightning rod and within protection area against direct lighting.
- In area of strong thunderstorm or near high sensitive voltage (such as near high-voltage transformer substation), install additional high-power thunder protection device or lightning rod.
- The thunder protection and earth grounding of the outdoor devices and cables shall be considered based on the whole thunder protection of the building and conform to your local or industry standards.
- The system shall adopt equal-potential wiring. The grounding devices shall meet anti-jamming requirements and at the same time conforms to your local electrical safety code.
- The grounding devices shall not be connected to N (neutral) line of high voltage power grid or mixed with other wires. When you connect the system to the ground alone, the grounding resistance shall not be more than 4Ω and the cross-sectional area of grounding cable shall be no less than 25 mm<sup>2</sup>.

Figure 1-1 Install lightning protection



# Appendix 2 Cybersecurity Recommendations

## **Mandatory actions to be taken for basic device network security:**

### **1. Use Strong Passwords**

Please refer to the following suggestions to set passwords:

- The length should not be less than 8 characters.
- Include at least two types of characters; character types include upper and lower case letters, numbers and symbols.
- Do not contain the account name or the account name in reverse order.
- Do not use continuous characters, such as 123, abc, etc.
- Do not use overlapped characters, such as 111, aaa, etc.

### **2. Update Firmware and Client Software in Time**

- According to the standard procedure in Tech-industry, we recommend to keep your device (such as NVR, DVR, IP camera, etc.) firmware up-to-date to ensure the system is equipped with the latest security patches and fixes. When the device is connected to the public network, it is recommended to enable the "auto-check for updates" function to obtain timely information of firmware updates released by the manufacturer.
- We suggest that you download and use the latest version of client software.

## **"Nice to have" recommendations to improve your device network security:**

### **1. Physical Protection**

We suggest that you perform physical protection to device, especially storage devices. For example, place the device in a special computer room and cabinet, and implement well-done access control permission and key management to prevent unauthorized personnel from carrying out physical contacts such as damaging hardware, unauthorized connection of removable device (such as USB flash disk, serial port), etc.

### **2. Change Passwords Regularly**

We suggest that you change passwords regularly to reduce the risk of being guessed or cracked.

### **3. Set and Update Passwords Reset Information Timely**

The device supports password reset function. Please set up related information for password reset in time, including the end user's mailbox and password protection questions. If the information changes, please modify it in time. When setting password protection questions, it is suggested not to use those that can be easily guessed.

### **4. Enable Account Lock**

The account lock feature is enabled by default, and we recommend you to keep it on to guarantee the account security. If an attacker attempts to log in with the wrong password several times, the corresponding account and the source IP address will be locked.

### **5. Change Default HTTP and Other Service Ports**

We suggest you to change default HTTP and other service ports into any set of numbers between 1024–65535, reducing the risk of outsiders being able to guess which ports you are using.

### **6. Enable HTTPS**

We suggest you to enable HTTPS, so that you visit Web service through a secure communication channel.

### **7. MAC Address Binding**

We recommend you bind the IP and MAC address of the gateway to the device, thus reducing

the risk of ARP spoofing.

#### **8. Assign Accounts and Privileges Reasonably**

According to business and management requirements, reasonably add users and assign a minimum set of permissions to them.

#### **9. Disable Unnecessary Services and Choose Secure Modes**

If not needed, it is recommended to turn off some services such as SNMP, SMTP, UPnP, etc., to reduce risks.

If necessary, it is highly recommended that you use safe modes, including but not limited to the following services:

- SNMP: Choose SNMP v3, and set up strong encryption passwords and authentication passwords.
- SMTP: Choose TLS to access mailbox server.
- FTP: Choose SFTP, and set up strong passwords.
- AP hotspot: Choose WPA2-PSK encryption mode, and set up strong passwords.

#### **10. Audio and Video Encrypted Transmission**

If your audio and video data contents are very important or sensitive, we recommend that you use encrypted transmission function, to reduce the risk of audio and video data being stolen during transmission.

Reminder: encrypted transmission will cause some loss in transmission efficiency.

#### **11. Secure Auditing**

- Check online users: we suggest that you check online users regularly to see if the device is logged in without authorization.
- Check device log: By viewing the logs, you can know the IP addresses that were used to log in to your devices and their key operations.

#### **12. Network Log**

Due to the limited storage capacity of the device, the stored log is limited. If you need to save the log for a long time, it is recommended that you enable the network log function to ensure that the critical logs are synchronized to the network log server for tracing.

#### **13. Construct a Safe Network Environment**

In order to better ensure the safety of device and reduce potential cyber risks, we recommend:

- Disable the port mapping function of the router to avoid direct access to the intranet devices from external network.
- The network should be partitioned and isolated according to the actual network needs. If there are no communication requirements between two sub networks, it is suggested to use VLAN, network GAP and other technologies to partition the network, so as to achieve the network isolation effect.
- Establish the 802.1x access authentication system to reduce the risk of unauthorized access to private networks.
- Enable IP/MAC address filtering function to limit the range of hosts allowed to access the device.