



Thermal & Optical Bi-spectrum Network  
Positioning System  
Quick Start Guide

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Please use this Manual with the guidance and assistance of professionals trained in supporting the Product.

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### FCC Information

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Note: Due to the device size limit, the above statement may not be disclaimed on the device.

### EU Conformity Statement



This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable harmonized European standards listed under the Directive

2014/30/EU (EMCD) and Directive 2011/65/EU (RoHS).

Note: The products with the input voltage of within 50 to 1000 VAC or 75 to 1500 VDC comply with Directive 2014/35/EU (LVD), and the rest products comply with Directive 2001/95/EC (GPSD). Please check the specific power supply information for reference.



Directive 2012/19/EU (WEEE Directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: [www.recyclethis.info](http://www.recyclethis.info)



Directive 2006/66/EC and its amendment 2013/56/EU (Battery Directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: [www.recyclethis.info](http://www.recyclethis.info).

**Industry Canada ICES-003 Compliance**

This device meets the CAN ICES-003 (A)/NMB-003(A) standards requirements.

**Symbol Convention**

The symbols that may be found in this document are defined as follows.

| Symbol         | Description   |
|----------------|---|
| <b>Danger</b>  | Indicates a hazardous situation which, if not avoided, will or could result in death or serious injury.   |
| <b>Caution</b> | Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results. |
| <b>Note</b>    | Provides additional information to emphasize or supplement important points of the main text.   |

**Safety Instruction**

These instructions are intended to ensure that user can use the product correctly to avoid danger or property loss.

**Laws and Regulations**

In the use of the product, you must be in strict compliance with the electrical safety regulations of the nation and region.

**Transportation**

- Keep the device in original or similar packaging while transporting it.
- Keep all wrappers after unpacking them for future use. In case of any failure occurred, you need to return the device to the factory with the original wrapper. Transportation without the original wrapper may result in damage on the device and the company shall not take any responsibilities.
- Do not drop the product or subject it to physical shock. Keep the device

away from magnetic interference.

### **Power Supply**

- Input voltage should meet the Limited Power Source (VAC  $24 \pm 25\%$ , VDC  $36 \pm 10\%$ , or VDC  $48 \pm 10\%$ ) according to the IEC62368 standard. Please refer to technical specifications for detailed information.
- Make sure the plug is properly connected to the power socket.
- The socket-outlet shall be installed near the equipment and shall be easily accessible.
- DO NOT connect multiple devices to one power adapter, to avoid overheating or fire hazards caused by overload.
- DO NOT touch the bare metal contacts of the inlets after the circuit breaker is turned off. Electricity still exists.
- + identifies the positive terminal(s) of equipment which is used with, or generates direct current. - identifies the negative terminal(s) of equipment which is used with, or generates direct current.
- Ensure correct wiring of the terminals for connection to an AC mains supply.
- Use the power adapter provided by qualified manufacturer. Refer to the product specification for detailed power requirements.

### **Battery**

- Risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to the instructions. Il y a risque d'explosion si la batterie est remplacée par une batterie de type incorrect. Mettre au rebut les batteries usagées conformément aux instructions.
- The built-in battery cannot be dismantled. Please contact the manufacture for repair if necessary.
- For long-term storage of the battery, make sure it is fully charged every half year to ensure the battery quality. Otherwise, damage may occur.
- This equipment is not suitable for use in locations where children are likely to be present.
- Improper replacement of the battery with an incorrect type may defeat a safeguard (for example, in the case of some lithium battery types).
- DO NOT dispose of the battery into fire or a hot oven, or mechanically crush or cut the battery, which may result in an explosion.
- DO NOT leave the battery in an extremely high temperature surrounding environment, which may result in an explosion or the leakage of flammable liquid or gas.
- DO NOT subject the battery to extremely low air pressure, which may result in an explosion or the leakage of flammable liquid or gas.

### **Installation**

- Never place the equipment in an unstable location. The equipment may fall, causing serious personal injury or death.
- This equipment is for use only with corresponding brackets. Use with other (carts, stands, or carriers) may result in instability causing injury.

### **System Security**

- You acknowledge that the nature of Internet provides for inherent security risks, and our company shall not take any responsibilities for abnormal operation, privacy leakage or other damages resulting from cyber attack, hacker attack, however, our company will provide timely technical support if required.
- Please enforce the protection for the personal information and the data

security as the device may be confronted with the network security problems when it is connected to the Internet. Please contact us when the device might exist network security risks.

- Please understand that you have the responsibility to configure all the passwords and other security settings about the device, and keep your user name and password.

### **Maintenance**

- If the product does not work properly, please contact your dealer or the nearest service center. We shall not assume any responsibility for problems caused by unauthorized repair or maintenance.
- A few device components (e.g., electrolytic capacitor) require regular replacement. The average lifespan varies, so periodic checking is recommended. Contact your dealer for details.
- Wipe the device gently with a clean cloth and a small quantity of ethanol, if necessary.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the device may be impaired.
- To reduce the risk of fire, replace only with the same type and rating of fuse.
- The serial port of the equipment is used for debugging only.
- Disconnect the power source during servicing.

### **Using Environment**

- Make sure the running environment meets the requirement of the device. The operating temperature shall be -40 °C to 60 °C (-40 °F to 140 °F), and the operating humidity shall be 95% or less, no condensing.
- DO NOT expose the device to high electromagnetic radiation or dusty environments.
- DO NOT aim the lens at the sun or any other bright light.
- The equipment shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on the equipment.
- No naked flame sources, such as lighted candles, should be placed on the equipment.
- Provide a surge suppressor at the inlet opening of the equipment under special conditions such as the mountain top, iron tower, and forest.
- Burned fingers when handling the parts with symbol . Wait one-half hour after switching off before handling the parts.

### **Emergency**

If smoke, odor, or noise arises from the device, immediately turn off the power, unplug the power cable, and contact the service center.

### **User Manual of Device**

Scan the QR code to view the latest user manual of device on your mobile phone. Note that mobile data charges may apply if Wi-Fi is unavailable.



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# 1 Preparation

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## Basic Requirement

- All the electronic operation should be strictly compliance with the electrical safety regulations, fire prevention regulations and other related regulations in your local region.
- Check the package contents and make sure that the device in the package is in good condition and all the assembly parts are included.
- Use the system according to the working environment requirement.
- Make sure the max. voltage output is in the range of VDC  $48 \pm 10\%$ .

## Check Installing Environment

- Be sure that there is enough space to install the positioning system and accessories.
- Make sure that the wall is strong enough to withstand at least 8 times the weight of the system and the mount.

## Prepare Cables

- According to the actual network bandwidth, the Cat5 (in 100 M) or Cat6 (100 M above) is needed.
- When the Positioning System uses standard VAC  $24 \pm 25\%$ , VDC  $36 \pm 10\%$ , or VDC  $48 \pm 10\%$  power supply, the power cable should be American wire gauge 18 or above. The formula of the cross-section  $S$  ( $\text{mm}^2$ ) and the maximum transmission distance  $L$  (m) of the bare wire is  $L=50*S$ .
- Choose the video cable according to the transmission length. The video should meet the least demands as:  $75\Omega$  resistance; 100% copper core conducting wire; 95% weaving copper shield.

## Prepare Tools

Before installation, please prepare the tools needed, such as the expansion screws, electric hammer, electric drill, wrench, screwdriver, electroprobe and network cable.

## Original Packaging

When you unpack the positioning system, please keep the original package properly, in case of returning or repairing the positioning system, you can pack the positioning system with the package.



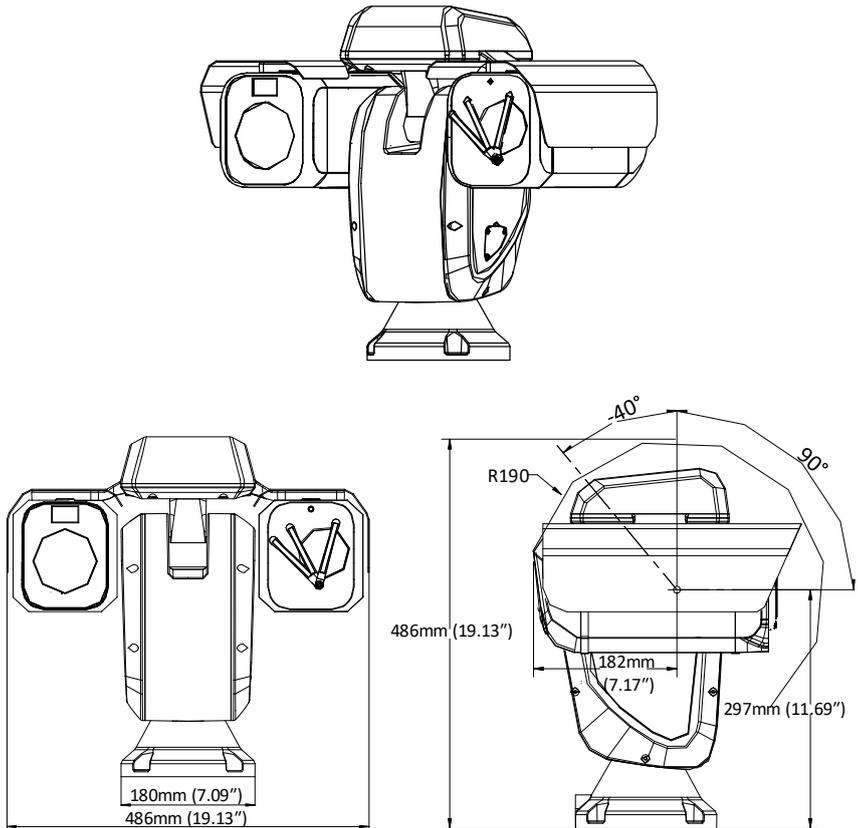
The user should be responsible for any damage caused when transporting with unoriginal package.

## 2 Appearance Description

There are three kinds of thermal network positioning systems: Type I positioning system, Type II positioning system, and Type III positioning system. The appearance description of two cameras are shown below.

### 2.1 Type I Positioning System Appearance

Refer to the following figures for Type I thermal positioning system overview and dimensions.



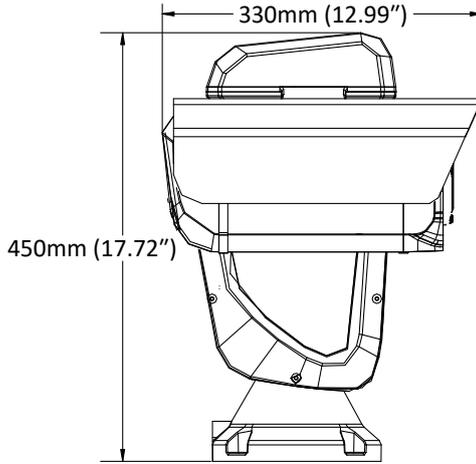
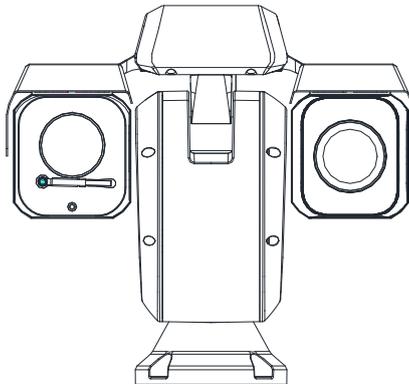


Figure 2-1 Type I Thermal Positioning System Overview and Dimensions

## 2.2 Type II Positioning System Appearance

Refer to the following figures for Type II thermal positioning system overview and dimensions.



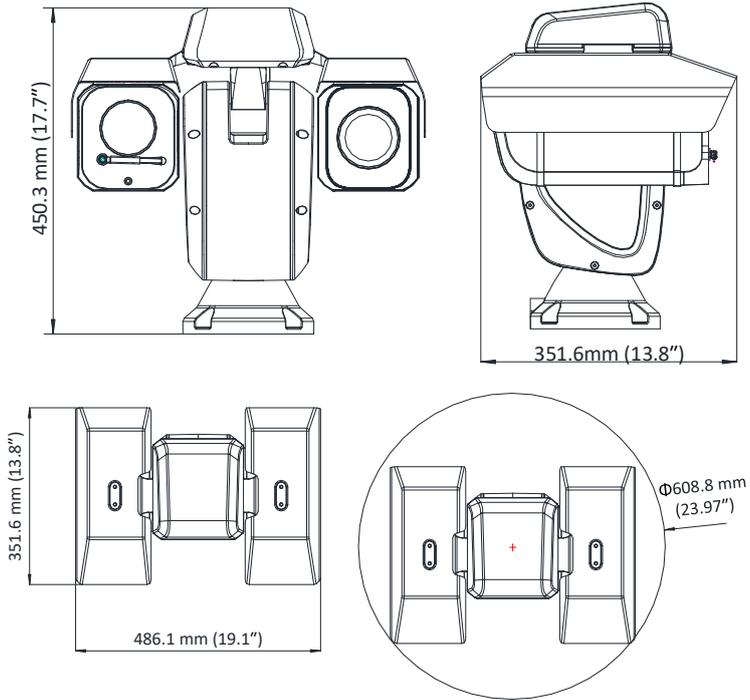
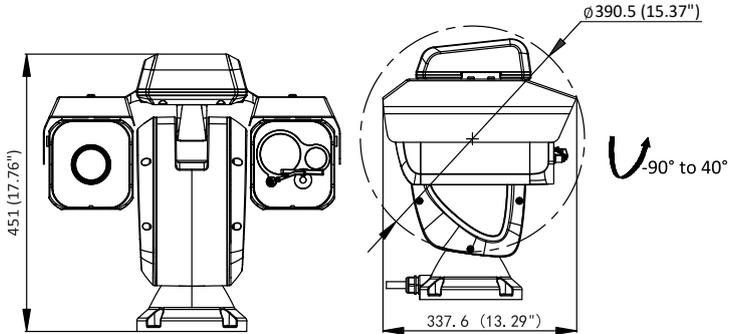
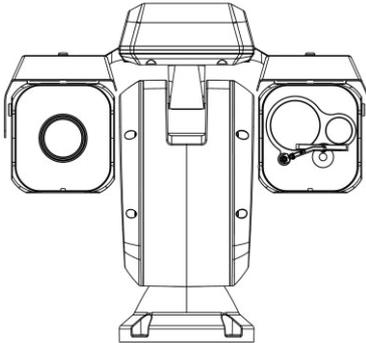


Figure 2-2 Type II Thermal Positioning System Overview and Dimensions

## 2.3 Type III Positioning System Appearance

Refer to the following figures for Type III thermal positioning system overview and dimensions.



Unit: mm (inch)

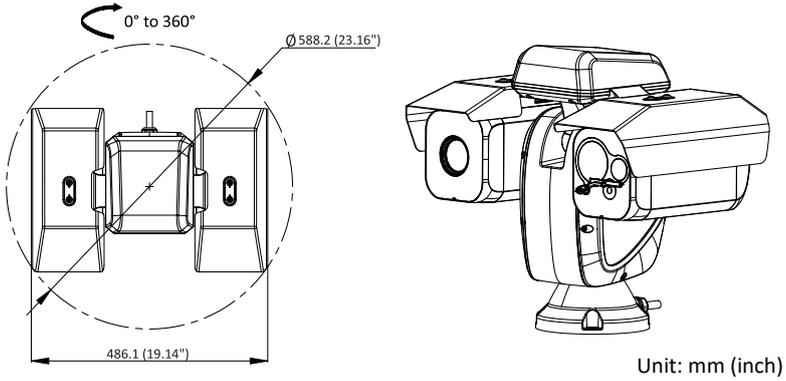


Figure 2-3 Type III Thermal Positioning System Overview and Dimensions

## 2.4 Cable Descriptions

The cable interfaces of positioning system are shown in Figure 2-4. The cables of RS-485, power supply, network, etc. are distinguished by different colors. Please refer to the labels attached on the cables for identification.

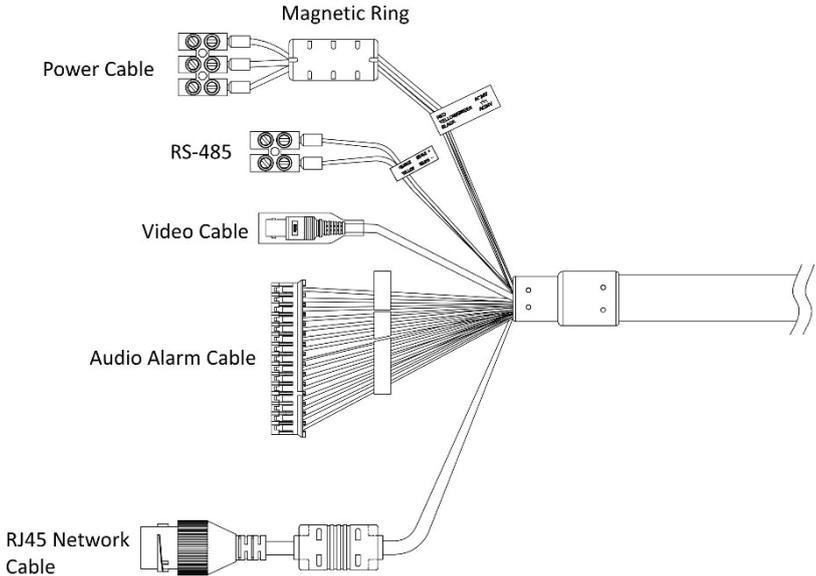
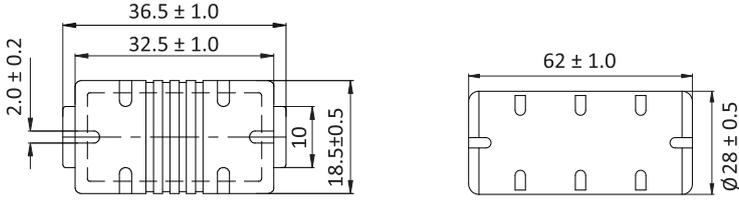


Figure 2-4 Cables of Positioning Systems



Unit: mm

Figure 2-5 Magnetic Ring Dimensions

## 2.5 Alarm In/Out Connections

**NOTE**

This section is only for the positioning system with alarm in/out functions.

The positioning system can be connected with alarm inputs (0 to 5VDC) and alarm outputs. Refer to the following diagrams for alarm output:

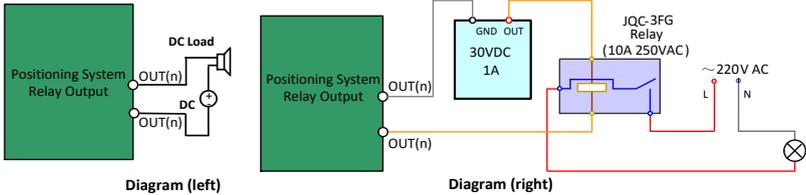


Figure 2-6 Alarm Out Connections

The alarm provides the relay output (no voltage), and the external power supply is required when it connects to the alarm device.

- For DC power supply (left diagram), the input voltage must be no more than 30 VDC, 1 A.
- For AC power supply, the external relay must be used (right diagram) to prevent damages to the positioning system and avoid risk of electric shock.

## 3 Install the Positioning System

### 3.1 Monitor Distance Range

Electric lens is adopted for the thermal channel of positioning system. It supports auto-focus function and remote focus function. For different lens focal length, the monitoring range is shown in the table below:

Table 3-1 Monitoring Range (Pixel Interval: 17 um)

| Lens Focal Length/mm             | 25   | 50   | 75   | 100  |
|----------------------------------|------|------|------|------|
| MRAD                             | 0.68 | 0.34 | 0.23 | 0.17 |
| Detection Range (Vehicle)/m      | 2255 | 4510 | 6765 | 9020 |
| Detection Range (Human)/m        | 735  | 1471 | 2206 | 2941 |
| Recognition Range (Vehicle)/m    | 564  | 1127 | 1691 | 2255 |
| Recognition Range (Human)/m      | 184  | 368  | 551  | 735  |
| Identification Range (Vehicle)/m | 282  | 564  | 846  | 1127 |
| Identification Range (Human)/m   | 92   | 184  | 276  | 368  |

Table 3-2 Monitoring Range (Pixel Interval: 25 um)

| Lens Focal Length/mm          | 25   | 50   | 75   | 100  |
|-------------------------------|------|------|------|------|
| MRAD                          | 1.00 | 0.50 | 0.33 | 0.25 |
| Detection Range (Vehicle)/m   | 1533 | 3067 | 4600 | 6133 |
| Detection Range (Human)/m     | 500  | 1000 | 1500 | 2000 |
| Recognition Range (Vehicle)/m | 383  | 767  | 1150 | 1533 |

| Lens Focal Length/mm             | 25  | 50  | 75  | 100 |
|----------------------------------|-----|-----|-----|-----|
| Recognition Range (Human)/m      | 125 | 250 | 375 | 500 |
| Identification Range (Vehicle)/m | 192 | 383 | 575 | 767 |
| Identification Range (Human)/m   | 63  | 125 | 188 | 250 |

 **NOTE**

- This table is for reference only, and the actual detection range may vary according to different camera settings, mounting condition, monitor and so on.
- When the weather is fine and the atmospheric visibility is normal, the probability of detecting/recognizing/identifying target is 50%.
- The human width is presumed as 0.5 m (human width cannot exceed 0.75 m), the human height is presumed as 1.8 m, and the vehicle width cannot exceed 2.3 m.

### 3.2 Wiring

Please fully take the installation environment and position of the positioning system into consideration when you plan for the wiring. In order to ensure the stable power supply and signal transmission, please closely follow the rules below:

- Keep a necessary distance between the device and high-voltage installations. Refer to the table below.

| Voltage Level        | 1000 kV | 750 kV | 500 kV | 220 kV | ≤110 kV |
|----------------------|---------|--------|--------|--------|---------|
| Recommended Distance | 15 m    | 10 m   | 10 m   | 5 m    | 5 m     |
| Distance Threshold   | 10 m    | 8 m    | 8 m    | 4 m    | 4 m     |

- Confirm the installation environment before wiring, including the wiring distance, wiring environment, magnetic-field interference, etc.
- The rated voltage of the wire should be higher than that the device requires, so the device can work normally when the voltage instability occurs.

- It's recommended to use a single complete cable for wiring; if not, reinforcement measures should be taken to protect the wiring point between two cables, or the device may work abnormally due to the circuit aging.
- Make sure the device cables are well protected, and take reinforcement and protective measures during wiring.
- Avoid bumping the cables and damaging the magnetic ring, or the device may work abnormally.
- Make sure the cables are not too redundant or stretched too tight.

The wiring should be completed by professional technicians. When the device cannot work normally, you can check the above information for troubleshooting.

### Waterproof Measures (Optional)

#### *Purpose:*

If the camera is installed outdoor, you should use the waterproof accessory or tapes to waterproof the cables. Otherwise the cables might get wet or a short circuit might occur.

#### Install Network Cable Waterproof Jacket

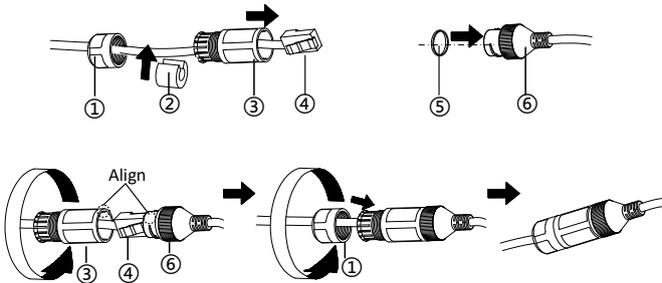


Figure 3-1 Install Waterproof Jacket

#### *Steps:*

1. Feed the network cable through ① and ③ in order.
2. Fix ② on the network cable between ① and ③.
3. Place ⑤ onto the end of ⑥, and plug the RJ45 male connector into RJ45 female connector.
4. Screw ③ to ⑥ clockwise.
5. Push ② into ③.
6. Secure ① with the ③ in clockwise direction.

#### Waterproof Other Cables

After routing and connecting the cables, use the waterproof tapes to wrap up the cables. Connected cables and spare cables both should be wrapped up as the figures below.

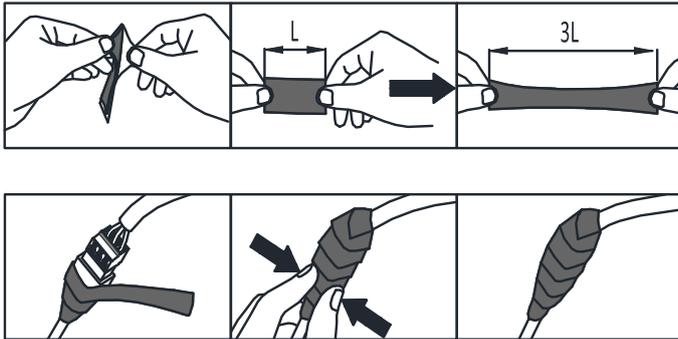


Figure 3-2 Waterproof Cable

### 3.3 Install Memory Card

#### 3.3.1 Install Type I and Type II Camera Memory Card

The memory cards of Type II and Type II camera are installed in the same way. Here is an example of memory card installation for type I camera.

**Steps:**

1. Open the memory card cover of the right side of the positioning system with cross screwdriver.
2. Insert the memory card into the card slot until it clicks, as shown in Figure 3-3.

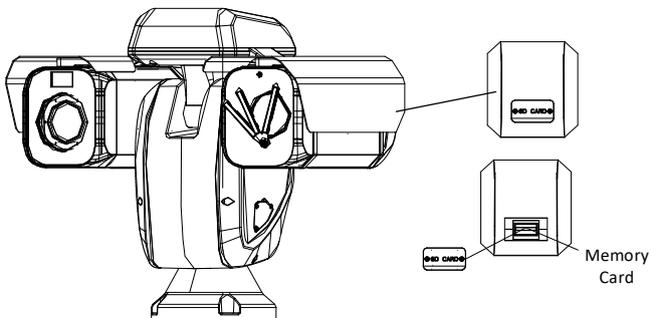


Figure 3-3 Memory Card Installation

3. Cover the memory card slot and tighten two screws.

### 3.3.2 Install Type III Camera Memory Card and SIM Card

**Steps:**

1. Open the card cover behind the optical lens of the positioning system with cross screwdriver.
2. Insert the memory card and SIM card into the card slot until it clicks.

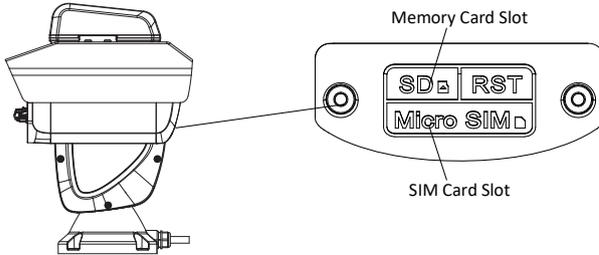


Figure 3-4 Memory Card and SIM Card Installation

3. Cover the card slot and tighten two screws.

**NOTE**

Tighten the screws of memory card cover to avoid poor airtightness. The screws cannot be embossed after the memory card is installed.

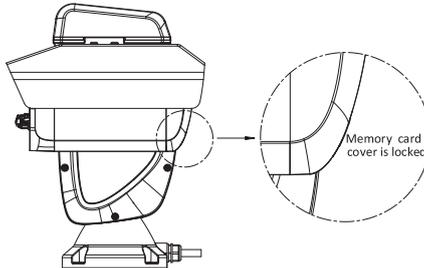


Figure 3-5 Correct Memory Card Installation

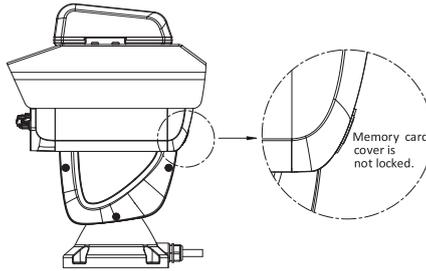


Figure 3-6 Incorrect Memory Card Installation

### 3.4 Install Positioning System

Type I, Type II, and Type III cameras are installed in the same way. Here is an example of installation for type I camera.

**Steps:**

1. Drill four screw holes on the bracket according to the base dimensions of the figure below with four screws.

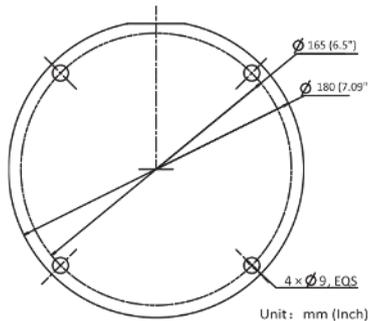


Figure 3-7 Base Dimensions

2. Fix the positioning system onto the bracket base, as shown in Figure 3-8.

**NOTE**

- If no screw thread is found on the screw holes of the bracket base, lock the screw nut. The length of the screws should be 30 mm and the diameter of screws should be 8 mm. The thickness of bracket base should be at least 5 mm.

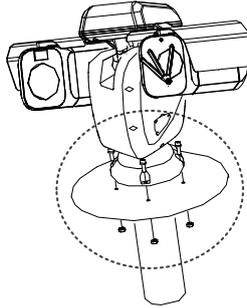


Figure 3-8 Install the Positioning System

- The correct installation direction of positioning system is shown as Figure 3-9 below.

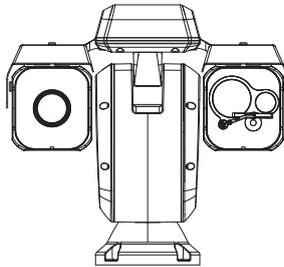
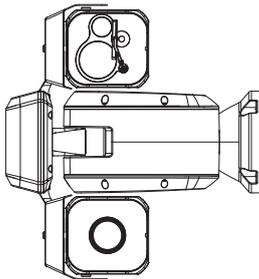


Figure 3-9 Correct Installation Direction of Positioning System

- Side installation or upside-down installation may affect the lifespan and lead to unexpected damage.

Incorrect Installation 1:



Incorrect Installation 2:

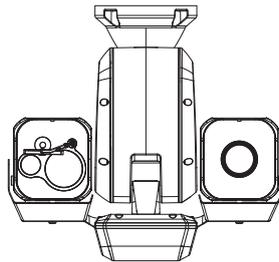


Figure 3-10 Incorrect Installation Direction of Positioning System Examples

3. Connect the corresponding required cables and power on. Make sure the system functions, e.g. live view and control operations can work normally.

## 3.5 Finish Installing

Connect the corresponding cables and turn the power on; the system will do the self-test automatically. Make sure the live view image and the PTZ control work normally and then finish the installation.

## 4 Set the System over the LAN

### NOTE

- You shall acknowledge that the use of the product with Internet access might be under network security risks. For avoidance of any network attacks and information leakage, please strengthen your own protection. If the product does not work properly, please contact with your dealer or the nearest service center.
- To ensure the network security of the positioning system, we recommend you to have the system assessed and maintained termly. You can contact us if you need such service.

### 4.1 Wiring

To view and configure the system via LAN (Local Area Network), you need to connect the network system in the same subnet with your PC. Then, install the SADP or client software to search and change the IP of network system.

The following figure shows the cable connection of network system.

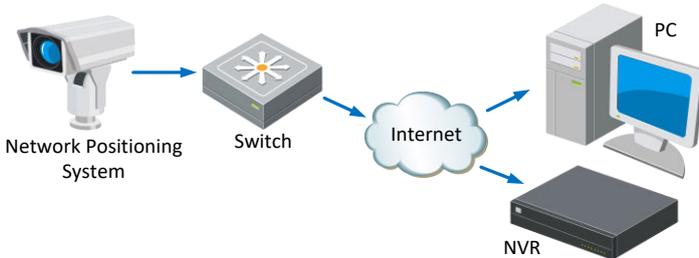


Figure 4-1 Wiring over LAN

### 4.2 Activate the System

#### *Purpose:*

You are required to activate the system first by setting a strong password for it before you can use the system.

Activation via Web Browser, Activation via SADP, and Activation via client software are supported. In the following sections, activation via web browser and SADP will be taken as examples. You may refer to the user manual of the system for the details of activation via client software.

#### 4.2.1 Activation via Web Browser

##### *Steps:*

1. Power on the system, and connect the system to the network.
2. Input the IP address into the address bar of the web browser, and click Enter to enter the activation interface.



**NOTE** The default IP address of the system is 192.168.1.64.

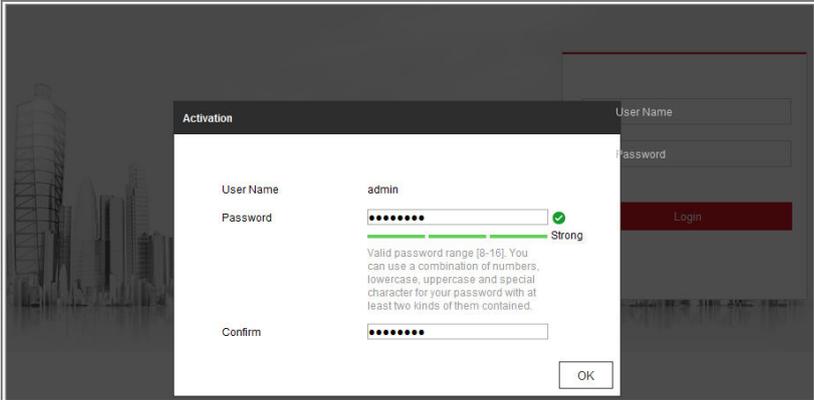


Figure 4-2 Activation Interface(Web)

3. Create a password and input the password into the password field.



**STRONG PASSWORD RECOMMENDED** – *We highly recommend you create a strong password of your own choosing (using a minimum of 8 characters, including upper case letters, lower case letters, numbers, and special characters) in order to increase the security of your product. And we recommend you reset your password regularly, especially in the high security system, resetting the password monthly or weekly can better protect your product.*

4. Confirm the password.
5. Click **OK** to activate the system and enter the live view interface.

#### 4.2.2 Activation via SADP Software

SADP software is used for detecting the online device, activating the device, and resetting the password.

Get the SADP software from the supplied disk or the official website, and install the SADP according to the prompts. Follow the steps to activate the system.

**Steps:**

1. Run the SADP software to search the online devices.
2. Check the device status from the device list, and select an inactive device.

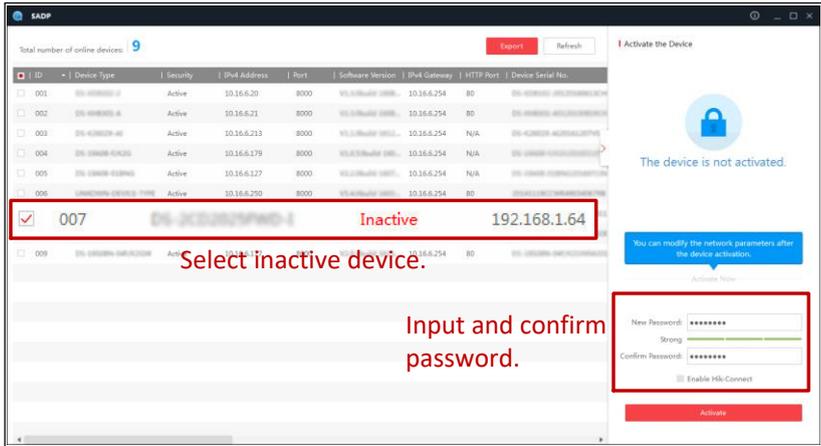


Figure 4-3 SADP Interface

3. Create a password and input the password in the password field, and confirm the password.



**STRONG PASSWORD RECOMMENDED** – We highly recommend you create a strong password of your own choosing (using a minimum of 8 characters, including upper case letters, lower case letters, numbers, and special characters) in order to increase the security of your product. And we recommend you reset your password regularly, especially in the high security system, resetting the password monthly or weekly can better protect your product.

4. Click **OK** to save the password.

You can check whether the activation is completed on the popup window. If activation failed, please make sure that the password meets the requirement and then try again.

## 4.3 Modify the IP Address

### *Purpose:*

To view and configure the system via LAN (Local Area Network), you need to connect the network system in the same subnet with your PC. Then, install the SADP software or client software to search and change the IP of network system. We will take modifying the IP Address via SADP software as an example to introduce the IP address modification.

### *Steps:*

1. Run the SADP software.
2. Click to select an active device.



**NOTE** Please refer to section 3.2 to activate the system if it is inactive.

3. Change the device IP address to the same subnet with your computer by either modifying the IP address manually or checking the checkbox of Enable DHCP.

**Modify Network Parameters**

Enable DHCP  
 Enable Hik-Connect

Device Serial No.:

IP Address:

Port:

Subnet Mask:

Gateway:

IPv6 Address:

IPv6 Gateway:

IPv6 Prefix Length:

HTTP Port:

Security Verification

Admin Password:

[Modify](#) [Forgot Password](#)

Figure 4-4 Modify the IP Address

4. Input the password and click **Save** to activate your IP address modification.

# 5 Operate via Web browser

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## 5.1 Access the System

**System Requirement:**

Operating System: Microsoft Windows XP SP1 and above version/Vista/Win7/Server 2003/Server 2008 32bits

RAM: 1G or higher

Display: 1024 × 768 resolution or higher

Web Browser: Internet Explorer 7.0 and above version, Apple Safari 5.02 and above version, Mozilla Firefox 5 and above version and Google Chrome8 and above version

**Steps:**

1. Open the web browser.
2. In the browser address bar, input the IP address of the network positioning system, e.g., 192.168.1.64 and press the Enter key to enter the login interface.
3. Activate the positioning system for the first time using, refer to the section **4.2**

**Activate the System.**

4. Input the user name and password and click .

The admin user should configure the device accounts and user/operator permissions properly. Delete the unnecessary accounts and user/operator permissions.

 **NOTE**

The device IP address gets locked if the admin user performs 7 failed password attempts (5 attempts for the user/operator).



Figure 5-1 Login Interface

5. Install the plug-in before viewing the live video and managing the network positioning system. Please follow the installation prompts to install the plug-in.



You may have to close the web browser to finish the installation of the plug-in.

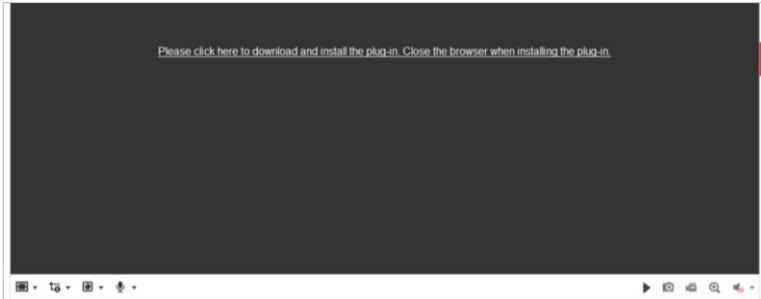


Figure 5-2 Download Plug-in

6. Reopen the web browser after the installation of the plug-in and repeat the above steps 2 to 4 to login.



For detailed instructions of further configuration, please refer to the user manual of network positioning system.

## 5.2 Live View Page

The live video page allows you to view live video, capture images, realize PTZ control, set/call presets and configure video parameters.

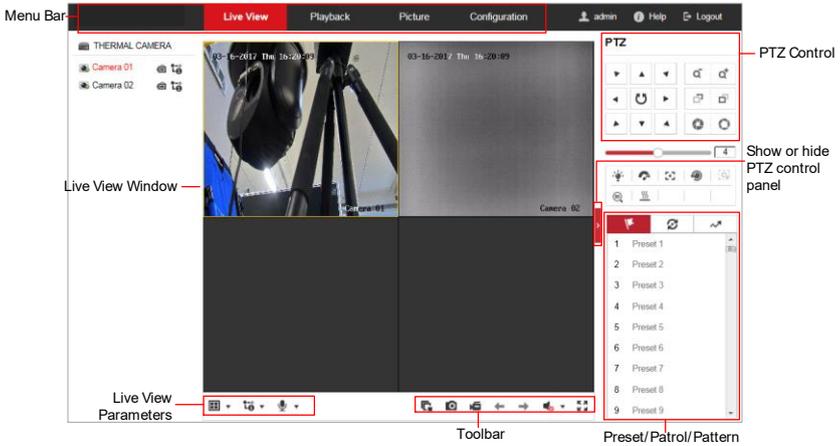


Figure 5-3 Live View Page

**Menu Bar:**

Click each tab to enter Live View, Playback, Picture, and Configuration page respectively.

Click  to display the help file of the positioning system.

Click  to logout the system.

**Live View Window:**

Display the live video.

**Toolbar:**

Operations on the live view page, e.g., live view, capture, record, audio on/off, regional exposure, regional focus, etc.

**PTZ Control:**

Panning, tilting, focusing and zooming actions of the positioning system. The lighter, wiper, one-touch focus and lens initialization control.

**Preset/patrol/pattern:**

Set and call the preset/patrol/pattern for the positioning system.

# Appendix

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## Frequently Asked Questions (FAQ)

### Device Running Error

Question:

- The device fails to start up or reboots repeatedly.
- The device constantly powers off unexpectedly when you pan/tilt the device or call preset.
- The device fails to zoom in/out or pan/tilt.

Answer:

- Examine the power supply of the positioning system and see whether it meets the requirements.
- Select the power supply as close as possible.
- Examine the power cord and see whether it meets the requirements.

### Device Upgrading

Question:

Device fails to upgrade.

Answer:

- Examine if the device upgrading fails because of the poor network.
- Examine if the upgrading program matches with the device type.

### Others

Question:

The device live view is vague.

Answer:

- Examine if you removed the protective film.
- Examine if the lens is dirty or not.
- Examine if any obstruction is nearby, e.g. spider web.

Question:

Live view fails with good network connection.

Answer:

- Examine if the IE plug-in is well installed. Change the Website Blocker settings if necessary.
- For cross-domain routing, enable the UPnP of device, or set manual mapping to port No. 80, 8000, or 554.
- Examine if the live view channel amount exceeds the upper limit.
- Examine the network bandwidth.

Question:

Focus fails when you test outdoor device in indoor situation.

Answer:

- Restore the device to default settings.
- Adjust the **Min. Focusing Distance** in **Configuration > Image > Display Settings > Focus**

## Common Material Emissivity Reference

| Material        | Emissivity |
|-----------------|------------|
| Human Skin      | 0.98       |
| PCB             | 0.91       |
| Cement Concrete | 0.95       |
| Ceramics        | 0.92       |
| Rubber          | 0.95       |
| Paint           | 0.93       |
| Wood            | 0.85       |
| Asphalt         | 0.96       |
| Brick           | 0.95       |
| Sand            | 0.90       |
| Soil            | 0.92       |
| Cotton          | 0.98       |
| Cardboard       | 0.90       |
| White Paper     | 0.90       |
| Water           | 0.96       |

