

IR Intelligent Speed Dome

Installation Manual

V1.0.1

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.

Foreword

General

This Installation Manual (hereinafter referred to be "the Manual") introduces installation preparation, speed dome installation, bracket dimension, and bracket installation including wall-mounted bracket installation, hang-mounted bracket installation, corner-mounted bracket installation, and pole-mounted bracket installation.

Safety Instructions

The following categorized signal words with defined meaning might appear in the Manual.

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

Revision History

No.	Version	Revision Content	Release Time
1	V1.0.0	First Release.	August 2, 2018

Privacy Protection Notice

As the device user or data controller, you might collect personal data of other such as face, fingerprints, car plate number, Email address, phone number, GPS and so on. You need to be in compliance with the local privacy protection laws and regulations to protect the legitimate rights and interests of other people by implementing measures include but not limited to: providing clear and visible identification to inform data subject the existence of surveillance area and providing related contact.

About this Manual

- The Manual is for reference only. If there is inconsistency between the Manual and the

actual product, the actual product shall prevail.

- We are not liable for any loss caused by the operations that do not comply with the Manual.
- The Manual would be updated according to the latest laws and regulations of related regions. For detailed information, see the paper manual, CD-ROM, QR code or our official website. If there is inconsistency between paper manual and the electronic version, the electronic version shall prevail.
- All the designs and software are subject to change without prior written notice. The product updates might cause some differences between the actual product and the Manual. Please contact the customer service for the latest program and supplementary documentation.
- There still might be deviation in technical data, functions and operations description, or errors in print. If there is any doubt or dispute, please refer to our 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 the company names in the Manual are the properties of their respective owners.
- Please visit our website, contact the supplier or customer service if there is any problem occurred when using the device.
- If there is any uncertainty or controversy, please refer to our final explanation.

Important Safeguards and Warnings

The Manual helps you to use our product properly. Read the Manual carefully before installing and using the product, and we highly recommend you to keep it well for future reference.

CAUTION

- Avoid heavy stress, violent vibration, and water splash during transportation, storage, and installation.
- Complete package is necessary during the transportation. We will assume no responsibility for any damage or problem caused by the incomplete package during the transportation.
- Avoid the product falling down or heavy vibration.
- Buckle the safety hook before installing the product if it is included.
- Keep the product away from devices that might produce strong electromagnetism radiant, including wireless power, TV transmitter, transformer, and loudspeaker.
- Keep the product away from smoke, vapor, dust, and heat. Do not install the speed dome near the heating furnace, spotlight, and other heat source.
- Do not dissemble the product. A failure to follow this instruction might result in personal injury or device damage. Contact your local retailer or customer service center for internal setup or maintenance requirement.
- Make sure there is no metal or inflammable in the product. A failure to follow this instruction might result in fire, short-circuit, or other damage.
- Turn off the power and disconnect the power cable immediately if there is water or liquid falling into the product. And contact your local retailer or customer service center.
- Avoid the sea water or rain eroding the camera.
- Avoid the lens aiming at intense light source, including sunlight and incandescent light.
- Clean the enclosure with the soft cloth or soft cloth with proper cleaning liquid, and then dry it with soft cloth. Do not use gasoline, dope thinner, or other chemicals to clean the enclosure. A failure to follow this instruction might result in enclosure transfiguration or paint flake.
- Read all the Manuals included before you use chemical cloth.
- Avoid long time touch between the plastic or rubber material and the enclosure. A failure to follow this instruction might result in paint flake.
- It is highly recommended to use the product with a lightning-proof device for better lightning-proof effect.

Qualified Engineer Needed

The installation engineer or maintenance engineer shall have corresponding CCTV system installation certificate or maintenance qualification certificate, including qualification certificate for work at height.

- The installation engineer or maintenance engineer shall have the basic knowledge and installation technique for CCTV system.

- The installation engineer or maintenance engineer shall have the basic knowledge and operation technique for low-voltage cable wiring and low-voltage electronic cable connection.
- The installation engineer or maintenance engineer shall be able to read and understand the Manual.

Lifting Appliance Requirements

- Select the lifting appliances applicable for the speed dome installation environment and installation method.
- The lifting appliances shall have the enough capacity to reach the installation height.
- The lifting appliances shall have high security performance.



WARNING

- All installation and operation here should conform to your local electrical safety regulations. We will assume no responsibility for all the fires or electrical shock caused by improper handling or installation.
- The power supply shall meet the SELV requirement. Use the power supply that conforms to Limited Power Source, according to IEC60950-1.
- Use the power adapter recommended by manufacturer.
- For the product that supports laser, do not aim the laser directly to eyes. And keep a proper distance from the flammable to avoid fire.
- Do not connect several speed domes to one power adapter. A failure to follow this instruction might result in overheat or fire if it exceeds the rated load.
- Make sure the power is off when you connect the cables, install or uninstall the speed dome.
- Turn off the power and disconnect the power cable immediately if there is any smoke, disgusting smell, or noise from the speed dome. And contact your local retailer or customer service center.
- Contact your local retailer or customer service center if the product is abnormal. Do not disassemble or repair the product by yourself. We will assume no responsibility for any problems caused by unauthorized modifications or repair.
- We will assume no responsibility for any problems caused by incorrect installation or use.
- We will assume no responsibility for any problems caused by overuse of the certain component.

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1 Installation Preparation

1.1 Basic Requirements

- All installation and operation here should conform to your local electrical safety regulations, fire protection regulations, and relevant regulations.
- Make sure the application scenarios conform to the installation requirements. Contact your local retailer or customer service center if there is any problem.
- Use the product according to the operating environment.
- Keep the original packing material well, you might need it to pack the speed dome and send it back for repair.

1.2 Installation Check

- Make sure the installation environment has enough space to install the speed dome and its mounting accessories.
- Make sure the ceiling and wall can sustain at least eight times the weight of the speed dome and its mounting accessories.
- Make sure the wall is thick enough to install expansion bolts (The expansion bolts should be purchased separately).
- For intelligent tracking speed dome, traffic speed dome, or laser speed dome, make sure the mounting height is over 6 m.

1.3 Cable Preparation

Select the video cable and video coaxial cable according to the transmission distance.

1.3.1 Minimum Specification Requirements for Cables

- 75 ohm
- Full copper-cored cables
- 95% knitted copper shield
- RS-485 communication cable. See Appendix 2.

Model	Maximum Transmission Distance (ft/m)
RG59/U	750 ft/229 m
RG6/U	1,000 ft/305 m
RG11/U	1,500 ft/457 m



The above can be applied to both analog speed domes and network speed domes.

Model	Maximum Transmission Distance (ft/m)
SYV-75-3	720P (25 fps/30 fps): 1640 ft/500 m
	720P (50 fps/60 fps): 984 ft/300 m

Model	Maximum Transmission Distance (ft/m)
	1080P (25 fps/30 fps): 984 ft/300 m



The above can be applied to HDCVI speed domes.

1.3.2 Selecting the Power Cable

See Appendix 3 for 24V AC power supply.

See Appendix 4 for 12V DC power supply.

See Appendix 5 for 24V DC power supply.

See Appendix 6 for 36V DC power supply.

See Appendix 7 for 48V DC power supply.

2

IR Speed Dome Installation

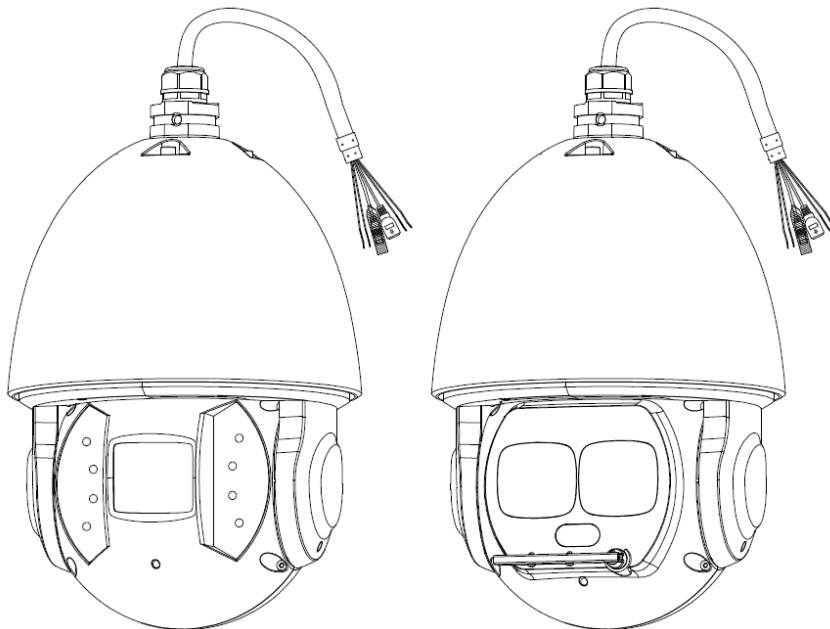
2.1 Checking Accessories

Before installation, check the accessories according to the packing list, and make sure all the components listed are included.

2.2 Opening the Package

Open the package, and take out the speed dome. See Figure 2-1.

Figure 2-1 IR Speed Dome



- The speed dome appearances might be different depending on the model you purchased, and the actual product shall prevail.
- For laser speed dome, there is the laser light and IR light on the speed dome. The laser light is for light supplement, and the IR light is for indicating whether the laser light is on or off.

2.3 DIP Switch Setup

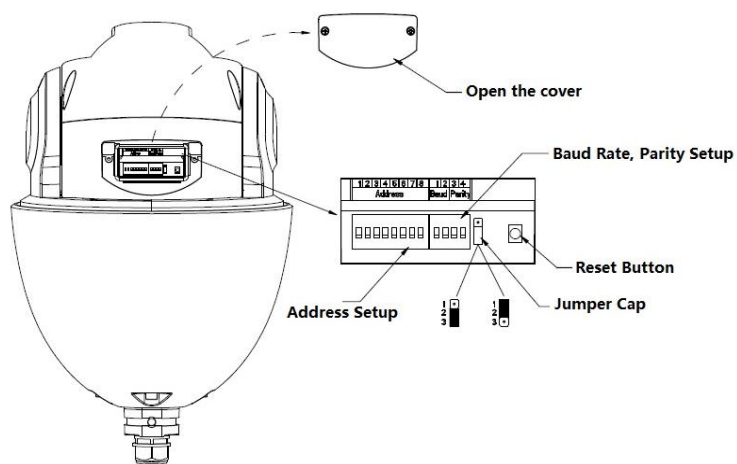
2.3.1 DIP Switch Location and Function

The corresponding functions of DIP switch for analog speed domes and HDCVI speed domes are different, which will be introduced respectively.

2.3.1.1 Analog Speed Dome

Open the cover, and there are two DIP switches on the PTZ mainboard for setting the speed dome address, baud rate, and parity. See Figure 2-2 for the location of DIP switch.

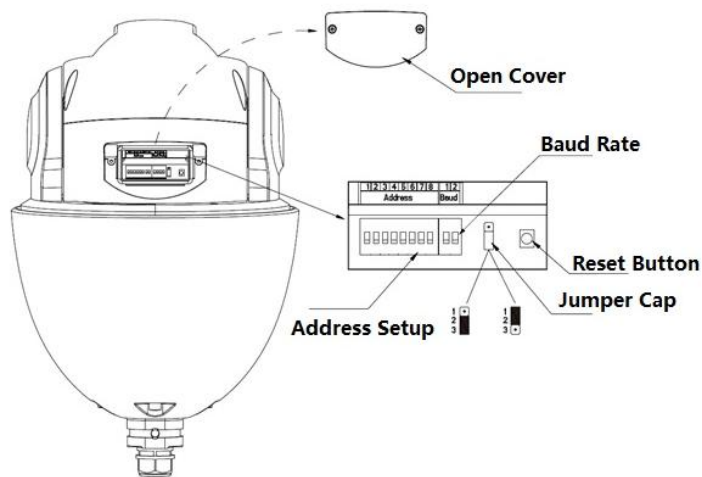
Figure 2-2 DIP switch for analog speed dome



2.3.1.2 HDCVI Speed Dome

Open the cover, and there are two DIP switches on the PTZ mainboard for setting the speed dome address and baud rate. See Figure 2-3 for the location of DIP switch.

Figure 2-3 DIP switch for HDCVI speed dome



2.3.2 DIP Switch Setup

Set the address, baud rate, and parity parameters of speed dome before controlling it. Otherwise, the speed dome cannot respond to the control commands.



- For the wall-mounted speed dome, you need to install the bubble back after taking out the EPE and setting DIP switch address.
- Power off the speed dome and reboot it, and the new settings will take effect.

There are two DIP switches on the speed dome PTZ mainboard which are used to confirm the speed dome address, baud rate, and parity. It is 1 when you set the button as ON. For address setup DIP, 1 is the lowest bit, and 8 is the highest bit; for baud rate and parity setup DIP, 1 is the lowest bit, and 4 is the highest bit. (Intelligent speed dome is self-adaptive to PELCO-D, PELCO-P, and industrial standard protocol. You do not need to set DIP for control protocol.)

2.3.3 Address Setup

The speed dome adopts DIP switch to set address, and the encoding mode adopts binary system. The 1–8 is the valid bit, and the highest address bit is 255. See Figure 2-4 and Table 2-1 for address bit setup.

Figure 2-4 Speed dome address bit label

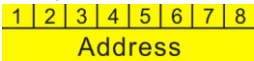


Table 2-1 Address bit setup

Address	1	2	3	4	5	6	7	8
1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF

Address	1	2	3	4	5	6	7	8
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
8	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
.....								
254	OFF	ON	ON	ON	ON	ON	ON	ON
255	ON	ON	ON	ON	ON	ON	ON	ON

2.3.4 Baud Rate and Parity Setup

The corresponding functions for analog speed domes and HDCVI speed domes are different, which will be introduced respectively.

2.3.4.1 Analog Speed Dome

Set the baud rate and parity for the analog speed dome. 1 and 2 are for setting baud rate, and 3 and 4 are for setting parity. See Figure 2-5, Table 2-2, and Table 2-3 for setup.

Figure 2-5 Speed dome baud rate and parity label

1	2	3	4
Baud	Parity		

Table 2-2 Baud rate setup

1	2	Baud rate
OFF	OFF	9600 bps
ON	OFF	4800 bps
OFF	ON	2400 bps
ON	ON	1200 bps

Table 2-3 Parity setup

3	4	Parity
OFF	OFF	NONE
ON	OFF	EVEN
OFF	ON	ODD
ON	ON	NONE

2.3.4.2 HDCVI Speed Dome

Set the baud rate for the HDCVI speed dome. 1 and 2 are for setting baud rate, and 3 and 4 are for setting HD/SD video mode. See Figure 2-6, Table 2-4, and Figure 2-5 for baud rate setup.

Figure 2-6 Speed dome baud rate label

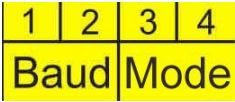


Table 2-4 Baud rate setup

1	2	Baud rate
OFF	OFF	9600 bps
ON	OFF	4800 bps
OFF	ON	2400 bps
ON	ON	1200 bps

Table 2-5

3	4	HD/SD video mode
OFF	OFF	HD
ON	OFF	SD
OFF	ON	Self-adaptive
ON	ON	HD

2.4 Terminal Matching Resistance Setup

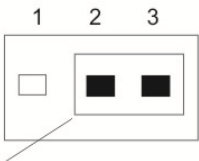
The device terminal 120 Ω resistance is equipped on the power board, and there are two connection methods. See Figure 2-7.

Figure 2-7 Connection methods of device terminal 120 Ω resistance

	1-2	2-3
120 Ω	ON	OFF

See Figure 2-8 for the default connection method. The jumper (connection board) is plugged into pin 2 and pin 3, and the 120 Ω resistance is not connected to the device.

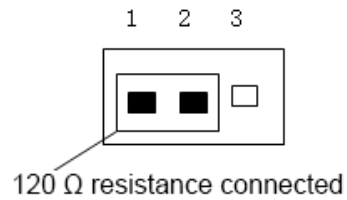
Figure 2-8 Default connection method



Default Jumper Setup (120Ω resistance is not connected)

If you need to connect the 120 Ω resistance, pull the jumper out of pin 2 and pin 3, and connect to pin 1 and pin 2. Then the 120 Ω resistance is connected. See Figure 2-9.

Figure 2-9 Connection method with 120 Ω resistance is connected



2.5 Reset Button and Micro SD Card

Open the cover on the speed dome and you can see the Reset button on the PTZ mainboard. See Figure 2-10. Open the front dome component and you can see the Micro SD card slot on the ISP board of speed dome module. See Figure 2-11.

Reset button is for resetting network system, and Micro SD card is for data storage.

Figure 2-10 Reset button

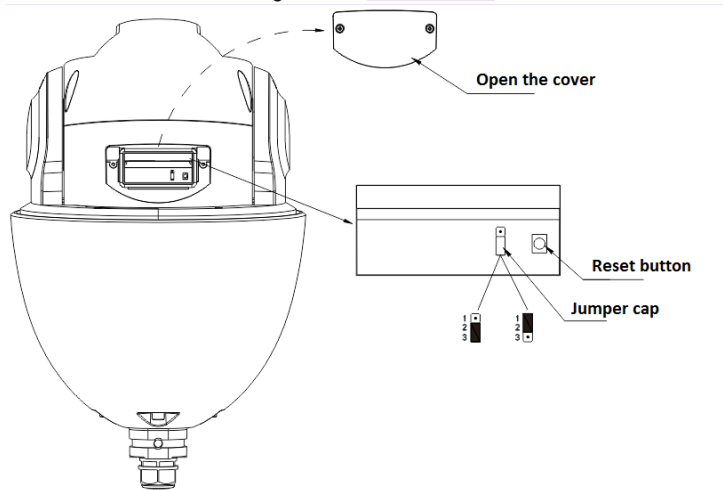
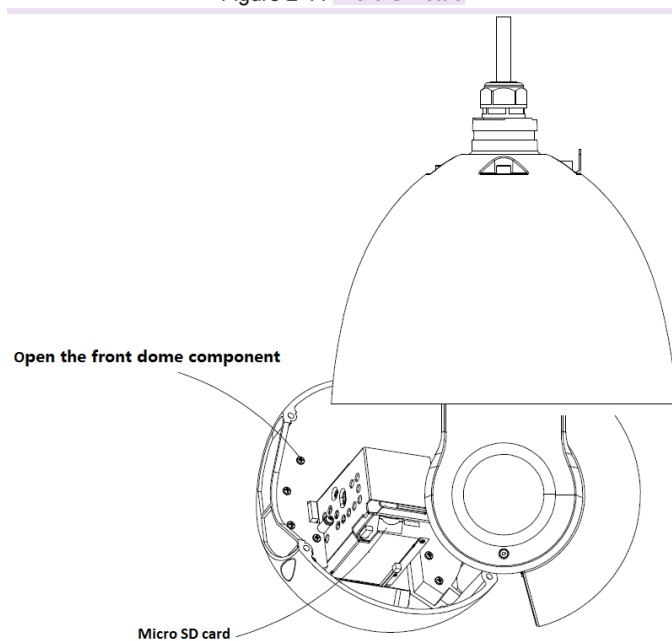


Figure 2-11 Micro SD card



批注 [c1]: 2.5 这一小节与 1.2.51.32.12122-001 是不一样的，可以在 1.2.51.32.12122-001 上替换。

2.6 Speed Dome Installation



The installation steps are applicable for both analog speed domes and network speed domes.

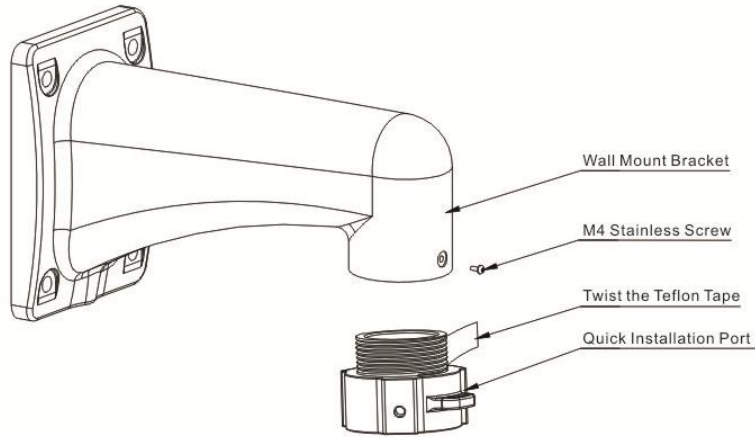
Various types of brackets are supported for the speed domes in different installation conditions. For details about speed dome installation, see "3 Wall-mounted Bracket Installation" to "6 Pole-Mounted Bracket Installation".

The Manual takes analog speed dome installation with wall-mounted bracket as the example.

2.6.1 Installing Quick Mounting Connector

Twine Teflon tape around the screw thread of the quick mounting connector, and rotate it into the screw thread of the wall-mounted bracket. Secure it firmly with an M4 stainless screw. See Figure 2-12. The thread standard is G1 1/2 pipe thread.

Figure 2-12 Installing quick mounting connector

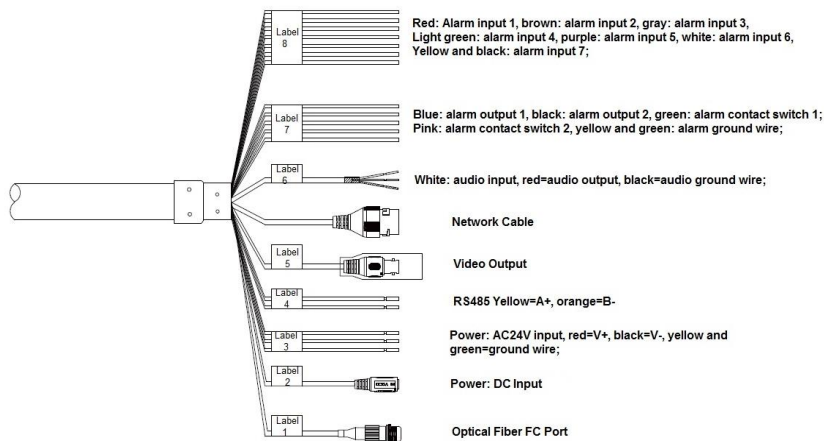


2.6.2 Speed Dome Cable

2.6.2.1 Cable Description

The speed dome is equipped with a composite cable by default, including power cable, video cable, audio cable, RS-485 control cable, alarm cable, network cable, high-frequency cable, and optical fiber cable. See Figure 2-13.

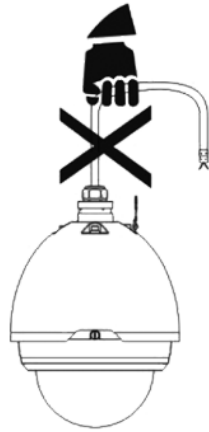
Figure 2-13 Cables



Speed dome cables might vary depending on the model you purchased, and the actual product shall prevail. The Manual introduces the complete cables for you.

Do not drag or pull the cables to lift the speed dome when moving it. See Figure 2-14 for wrong way.

Figure 2-14 Wrong way for moving the speed dome



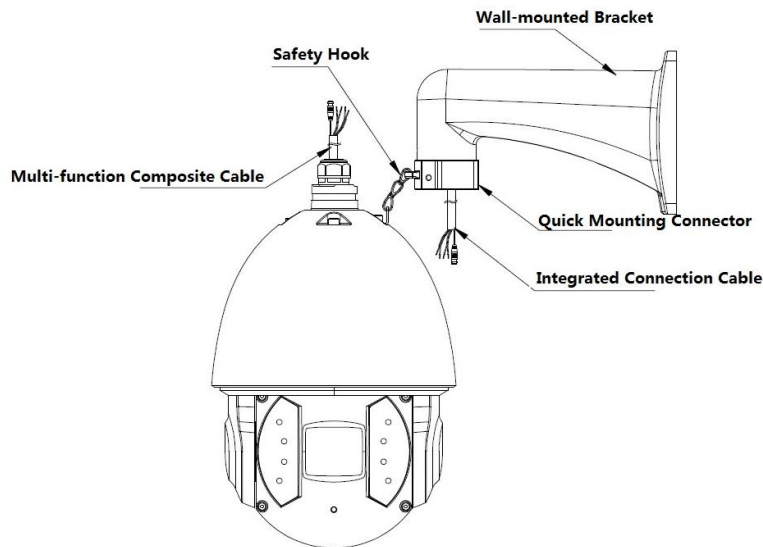
2.6.2.2 Cable Connection

Buckle the safety hook of the speed dome on the quick mounting connector, and connect the cables reserved on the wall-mounted bracket with the corresponding cables of the speed dome as you need. Then twine the cable connection with insulated rubber tape to ensure waterproof. See Figure 2-15.



Make sure the wire diameter of the cable connected to RS-485 control cable is not too big. Otherwise, the control effect might be bad. See Appendix 2 for details about RS-485 cable.

Figure 2-15 Cable connection



2.6.2.3 Alarm Cable Connection

To connect alarm cables and configure alarm settings, do the following:

Step 1 Connect alarm input device to the ALARM_IN and ALARM_GND of the cables.

Step 2 Connect alarm output device to the ALARM_OUT and ALARM_COM of the cables.
Alarm output is the relay switch output.

Step 3 Enter the web interface of the speed dome, and set the corresponding alarm input and output by selecting **Setting > Event > Alarm Setup**. The alarm input on web interface is corresponding to the alarm input of the cables. Set the corresponding NO and NC output according to the high/low level signal generated by alarm input device when alarm triggers.

Step 4 Set the alarm output of cables on web interface.

2.6.2.4 Speed Dome GND Cable Connection

Connect the YELLOW/GREEN power cable to the lightning protection device, and make sure the lightning protection device is well grounded.

2.6.3 Installing the Speed Dome

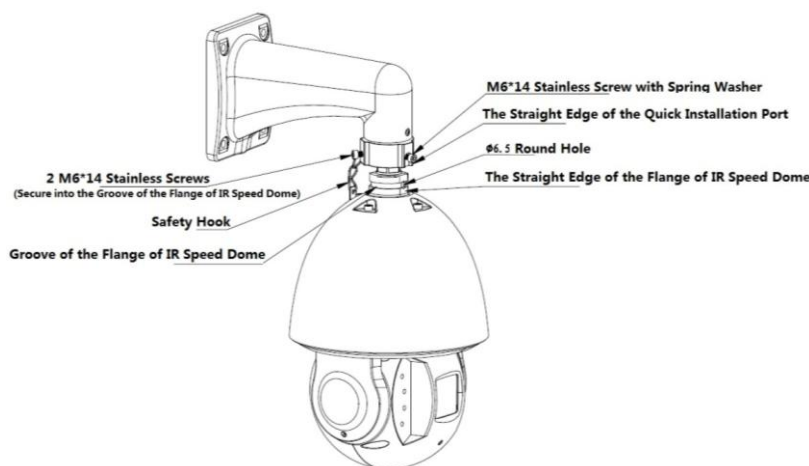
To install the speed dome, do the following:

Step 1 Buckle the safety hook, and route the cables into the wall-mounted bracket.

Step 2 Align the speed dome flange with that on the quick mounting connector, and push the speed dome to the quick mounting connector.

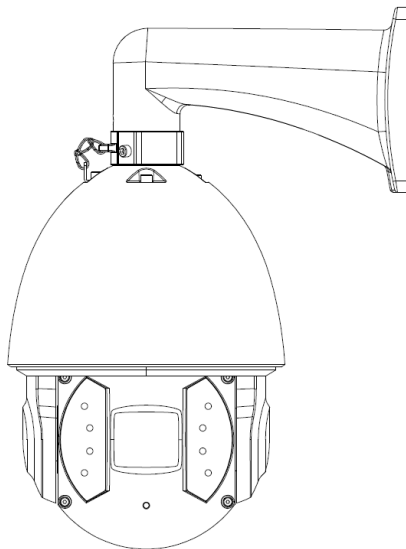
Step 3 Screw the M6*14 stainless screw with spring washer on the quick mounting connector into the Φ 6.5 hole on the speed dome flange, and screw another two M6*14 stainless screws on the speed dome flange. Secure the three screws with the Allen wrench. See Figure 2-16.

Figure 2-16 Installing the speed dome



Step 4 Make sure three M6*14 stainless screws are firmly screwed, and the speed dome is firmly secured. See Figure 2-17.

Figure 2-17 Installation finished



3

Wall-mounted Bracket Installation

3.1 Dimension

See Figure 3-1 for wall-mounted bracket, and see Figure 3-2 and Figure 3-3 for dimension of the bracket and the quick mounting connector.

Figure 3-1 Wall-mounted bracket

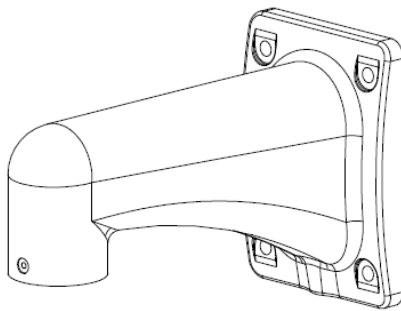


Figure 3-2 Dimension of wall-mounted bracket (mm)

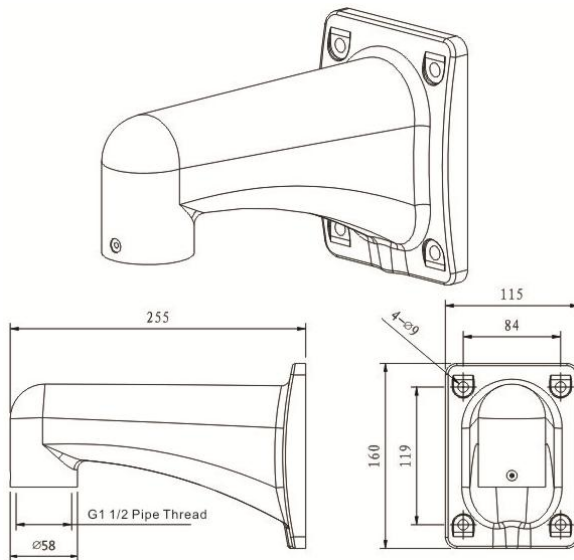
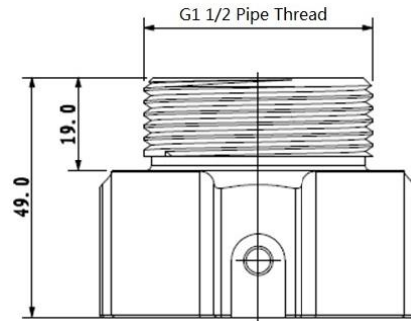


Figure 3-3 Dimension of quick mounting connector (mm)



3.2 Installing Wall-mounted Bracket

3.2.1 Installation Conditions

The wall-mounted bracket is applicable to hard wall in both indoor and outdoor environments.

Make sure:

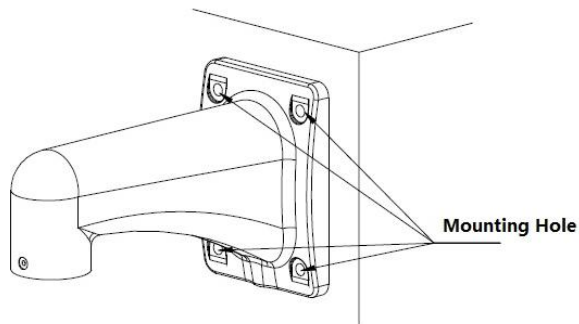
- The wall shall be thick enough to install expansion bolts.
- The wall shall sustain at least eight times the weight of the speed dome and its mounting accessories.

3.2.2 Installation Procedure

Step 1 Draw and drill four screw holes on the wall according to the bracket pedestal. Insert four expansion bolts (not supplied) into the screw holes. See Figure 3-4.

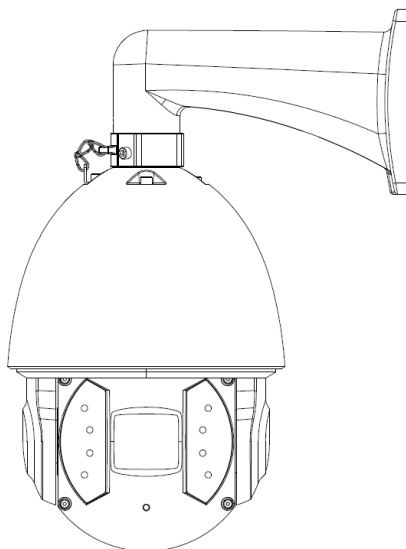
Step 2 Fix the wall-mounted bracket with four hex nuts and four flat gaskets on the wall.

Figure 3-4 Install wall-mounted bracket



Step 3 Install the speed dome on the wall-mounted bracket. See Figure 3-5. For details about speed dome installation, see "2.6 Speed Dome Installation".

Figure 3-5 Installing the speed dome with wall-mounted bracket



4 Hang-mounted Bracket Installation

4.1 Dimension

See Figure 4-1 for hang-mounted bracket, and see Figure 4-2 for dimension of the bracket.

Figure 4-1 Hang-mounted bracket

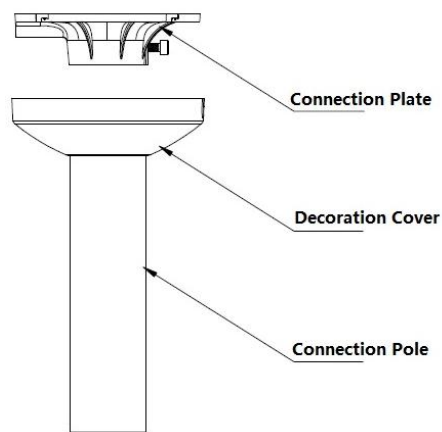
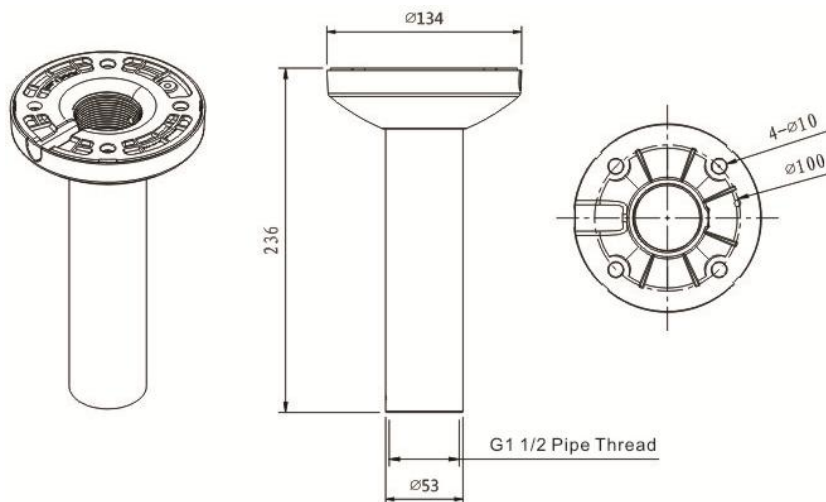


Figure 4-2 Dimension of hang-mounted bracket (mm)



The length of the hang-mounted bracket is 200 mm by default, and 400 mm optional. Select different sizes of the connection poles as you need.

4.2 Installing Hang-mounted Bracket

4.2.1 Installation Conditions

The hang-mounted bracket is applicable to hard wall in both indoor and outdoor environments.

Make sure:

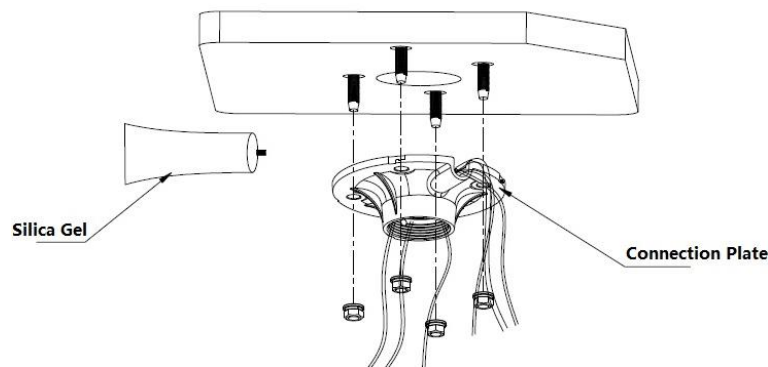
- The wall shall be thick enough to install expansion bolts.
- The wall shall sustain at least eight times the weight of the speed dome and its mounting accessories.

4.2.2 Installation Procedure

Step 1 Loosen the M4 screw, and separate the connection plate and the connection pole of the bracket.

Step 2 Route the cables through the groove to the flange of the connection plate. Fix the connection plate on the ceiling with four screws. See Figure 4-3.

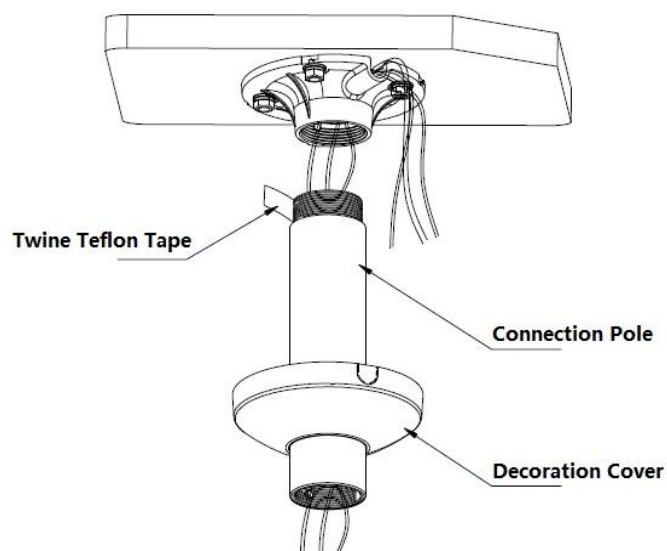
Figure 4-3 Installing hang-mounted bracket (1)



For outdoor environment, apply silica gel to cover the contact surface between connection plate and ceiling, and cable outlet area for waterproof.

Step 3 Route the cables through the connection pole, and fix the connection pole on the connection plate with the M4 screw. Push the decorative cover to the bottom of the connection pole. See Figure 4-4.

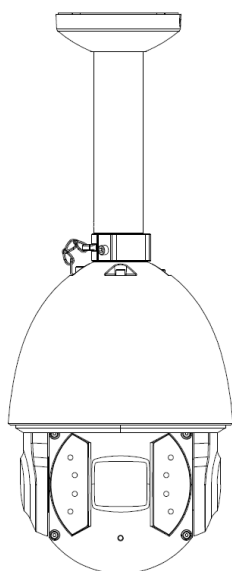
Figure 4-4 Installing hang-mounted bracket (2)



For outdoor environment, twine Teflon tape on the thread of the connection pole first, and then fix the connection pole on the connection plate.

Step 4 Install the speed dome on the hang-mounted bracket, see Figure 4-5. For details about speed dome installation, see "2.6 Speed Dome Installation".

Figure 4-5 Installing the speed dome with hang-mounted bracket



5 Corner-mounted Bracket Installation

5.1 Dimension

See Figure 5-1 for corner-mounted bracket, and see Figure 5-2 for dimension of the bracket.

Figure 5-1 Corner-mounted bracket

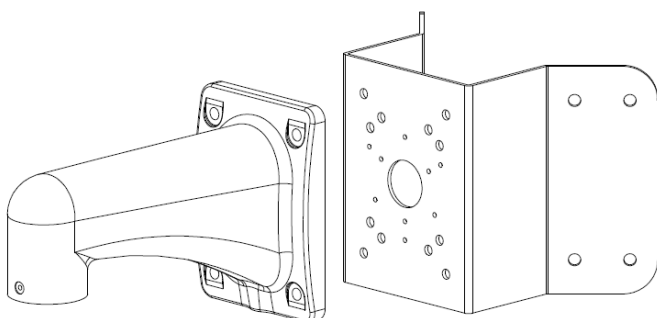
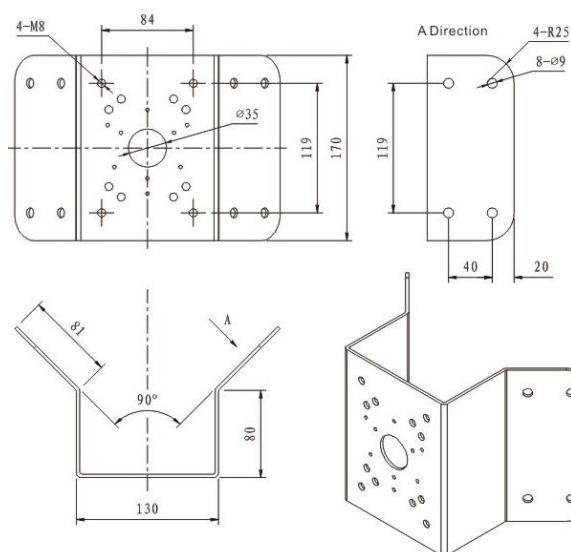


Figure 5-2 Dimension of corner-mounted bracket (mm)



5.2 Installing Corner-mounted Bracket

5.2.1 Installation Conditions

The corner-mounted bracket is applicable to hard wall which forms an included angle of 90° in both indoor and outdoor environments.

Make sure:

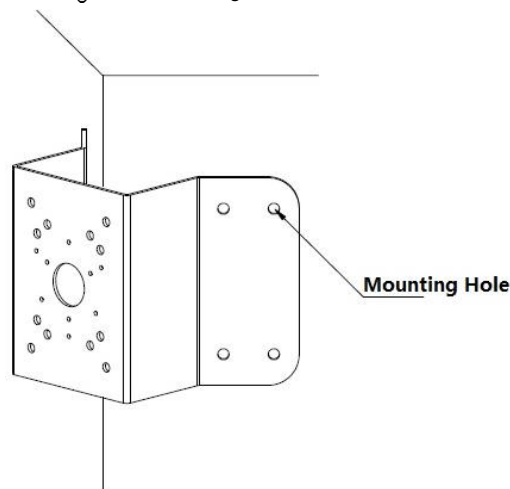
- The wall shall be thick enough to install expansion bolts.
- The wall shall sustain at least eight times the weight of the speed dome and its mounting accessories.

5.2.2 Installation Procedure

Step 1 Draw and drill the screw holes on the wall where there is the 90° included angle according to the mounting hole on the corner-mounted bracket pedestal, and insert M8 expansion screws. See Figure 5-3.

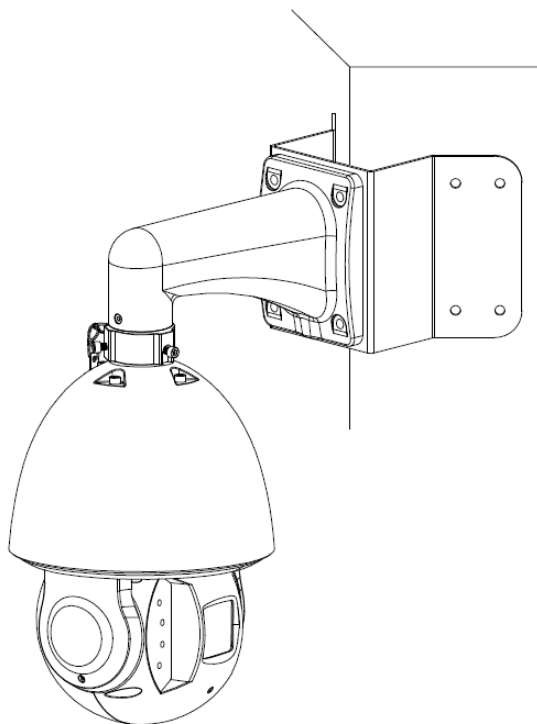
Step 2 Route the cables through the corner-mounting bracket pedestal (reserve enough length of the cables), and fix the pedestal on the wall with the M8 screws. Apply silicon sealant to cover the cable outlet for waterproof.

Figure 5-3 Installing corner-mounted bracket



Step 3 Install the speed dome on the corner-mounted bracket, see [错误!未找到引用源。](#). For details about speed dome installation, see "2.6 Speed Dome Installation" and "3.2 Installing Wall-mounted Bracket".

Figure 5-4 Installing the speed dome with corner-mounted bracket



6

Pole-Mounted Bracket Installation

6.1 Dimension

See Figure 6-1 for pole-mounted bracket, and see Figure 6-2 for dimension of the bracket.

Figure 6-1 Pole-mounted bracket

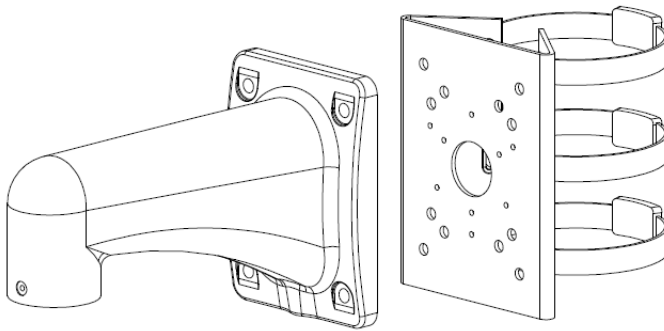
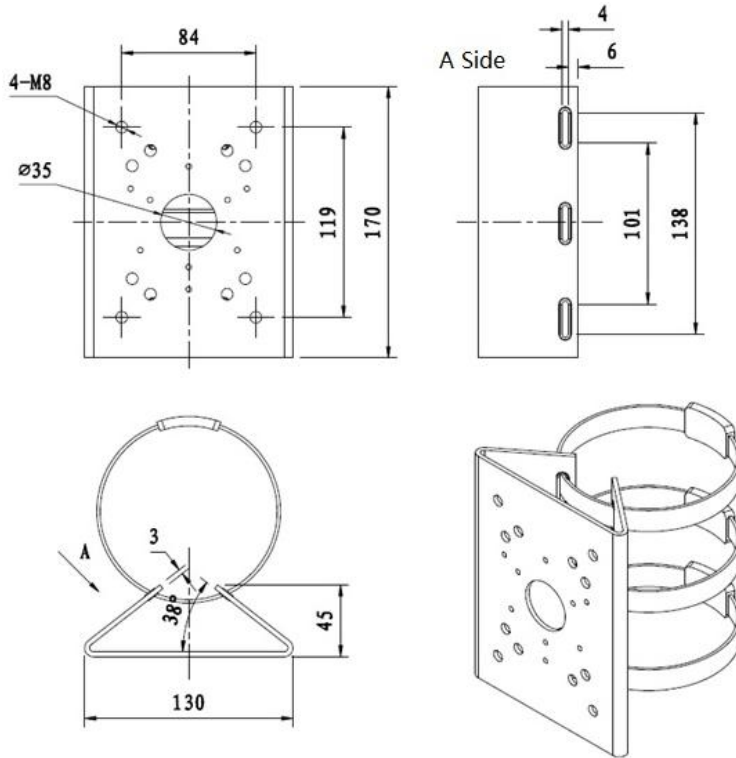


Figure 6-2 Dimension of pole-mounted bracket (mm)



6.2 Installing Pole-mounted Bracket

6.2.1 Installation Conditions

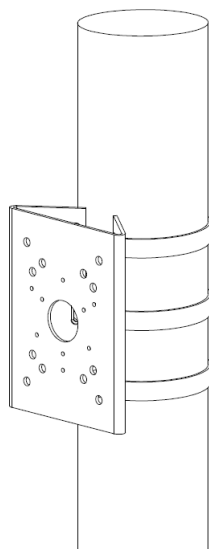
The pole-mounted bracket is applicable to hard wall in both indoor and outdoor environments. Make sure:

- The diameter of the pole where you want to install the speed dome shall match with the dimension of the clamp. The default clamp is the 5 inch clamp matches with the pole of Φ 80–130 mm. The clamp shall work with the pole-mounted bracket, and the diameter of the clamp is adjustable according to the hoop specification. We provide clamps of different dimension: Φ 59–82mm, Φ 84–108 mm, Φ 80–130 mm, Φ 130–152 mm, Φ 155–178 mm, Φ 180–203 mm, and Φ 194–216 mm. We also provide customized clamps of special dimensions.
- The wall shall sustain at least eight times the weight of the speed dome and its mounting accessories.

6.2.2 Installation Procedure

Step 1 Route the cables through the pole-mounted bracket pedestal. Install the clamp on the pole where you want to install the speed dome, and adjust the diameter of the clamp to fix it on the pole. See Figure 6-3.

Figure 6-3 Pole-mounted bracket

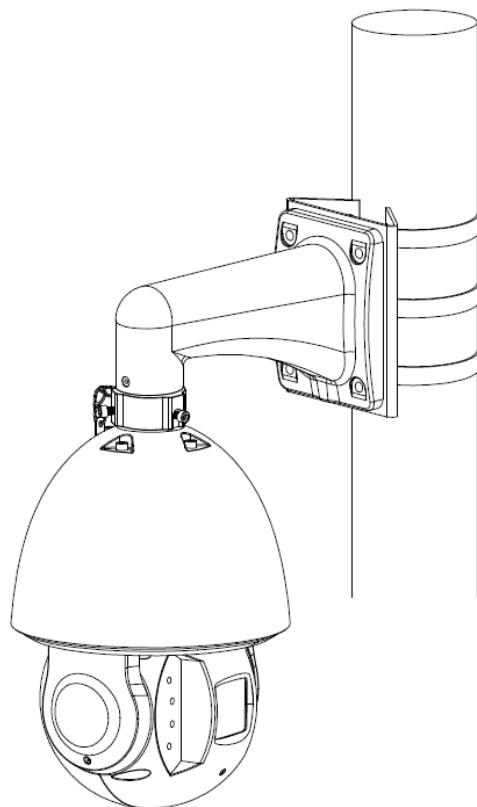


CAUTION

Make sure the clamp is firmly fixed on the pole.

Step 2 Install the speed dome on the pole-mounted bracket, see [错误!未找到引用源。](#). For details about speed dome installation, see "2.6 Speed Dome Installation" and "3.2 Installing Wall-mounted Bracket".

Figure 6-4 Installing the speed dome with pole-mounted bracket



Appendix 1 Lightning Proof and Surge

Protection

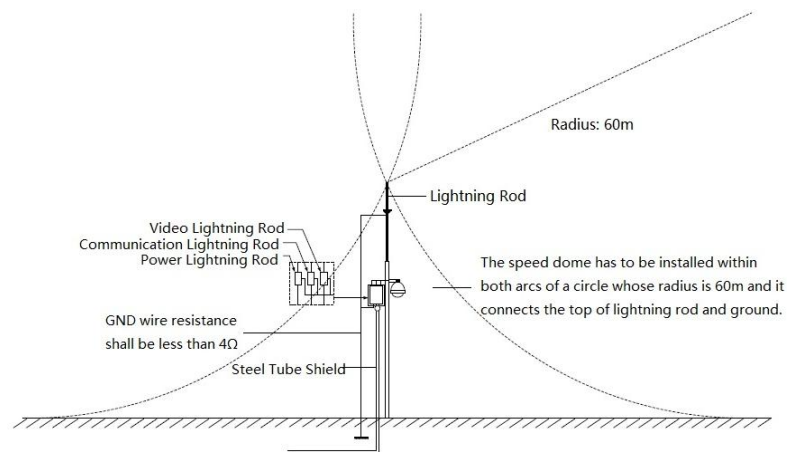
Appendix 1.1 Outdoor

This series of speed domes adopt TVS lightning protection technology. It can effectively prevent damages from various pulse signals below 8000V, such as sudden lightning. Take necessary safeguard measures when installing the speed dome in the outdoor environment according to your local electrical safety regulations.

- 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 no less than $25\ \text{mm}^2$.

See Appendix figure 1-1 for outdoor installation.

Appendix figure 1-1 Outdoor installation for lightning proof

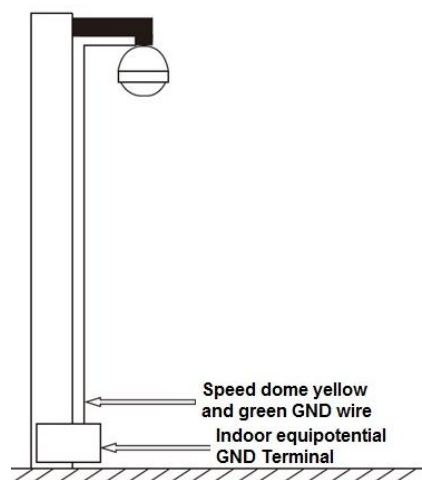


Appendix 1.2 Indoor

The yellow and green GND wire or GND screw of the speed dome should be reliably connected by several strands of copper wire with no less than 25mm^2 and indoor equipotential GND terminal.

See Appendix figure 1-2 for indoor installation.

Appendix figure 1-2 Indoor installation for lightning proof



Appendix 2 RS-485 Cable

Appendix 2.1 About RS-485 Cable

RS-485 cable is the half-duplex communication cable of impedance $120\ \Omega$ with the Maximum 32 effective loads (including main control devices and devices to be charged).

Appendix 2.2 RS-485 Cable Transmission Distance

When we take 0.56 mm (24 AWG) twisted-pair as the communication cable, the Maximum transmission distances are listed below (according to different baud rates). See Appendix table 2-1.

Appendix table 2-1 Max. transmission distance

Baud rate	Maximum transmission distance
2400 bps	1800 m
4800 bps	1200 m
9600 bps	800 m

In the following situations, the Maximum transmission distance might become shorter:

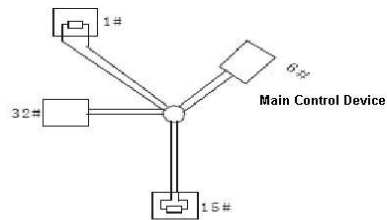
- The communication cable is thin.
- There is strong electromagnetic interference in the environment.
- There are too many devices connected to the RS-485 cable.

Otherwise, the Maximum transmission distance might become longer.

Appendix 2.3 The Problems in Practical Application

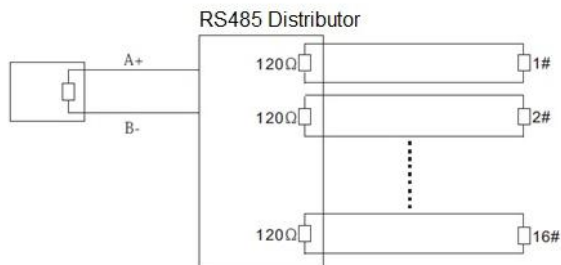
In practical application, we usually adopt star type connection. See Appendix figure 2-1. The terminal resistance shall connect to the furthest two devices, such as device 1# and device 15#. But this connection method does not conform to RS-485 standard, and when the distances between devices are too long, the signal reflection and decreased anti-jamming capability might result in low signal reliability. And the speed dome is out of control.

Appendix figure 2-1 Star type connection



We highly recommend RS-485 distributor which can avoid the problems and improve the signal reliability by turning the connection to conform to RS-485 standard. See Appendix figure 2-2.

Appendix figure 2-2 RS-485 distributor adopted



Appendix 2.4 FAQ for RS-485

Problems	Possible reasons	Solutions
The speed dome can perform self-check but out of control.	Baud rate and address of the host and speed dome are not matched.	Modify the baud rate and address of the host or speed dome.
	Positive and negative polarities of RS485 cable are misconnected.	Switch the positive and negative polarities of RS485 cable.
	Connection cable is loose.	Connect the cables firmly.
	RS-485 cable is cut off.	Replace the RS-485 cable.
You can control the speed dome but it is not smooth.	RS-485 cable is in poor contact.	Connect the RS-485 cable firmly.
	RS-485 cable is cut off.	Replace the RS-485 cable.
	The distance between the host and speed dome is too long.	Add terminal matched resistance.
	Too many speed domes are connected parallelly.	Add RS-485 distributor

Appendix 3 Cable Diameter (24V AC) and

Transmission Distance

It is the recommended transmission distance for the fixed-sized cable with attrition rate lower than 10% of 24V AC. The Maximum attrition rate of voltage allowed for AC power supply is 10%. For example, when a device of rated power 20 W is installed from the transformer at the distance of 141 inches (42 m), then the Min. cable diameter is 0.8000 mm.

Transmission Power Consumption (W)	Cable Diameter (mm)			
	0.8000	1.000	1.250	2.000
	Transmission Distance Feet (m)			
5	488.52 (148.90)	763.31 (232.66)	1192.67 (363.53)	3053.25 (930.63)
10	244.26 (74.45)	381.66 (116.33)	596.34 (181.76)	1526.62 (465.31)
15	162.84 (49.63)	254.44 (77.55)	397.56 (121.18)	1017.75 (310.21)
20	122.13 (37.23)	190.83 (58.16)	298.17 (90.88)	763.31 (232.66)
25	97.70 (29.78)	152.66 (46.53)	238.53 (72.71)	610.65 (186.13)
30	81.42 (24.82)	127.22 (38.78)	198.78 (60.59)	508.87 (155.10)
35	69.79 (21.27)	109.04 (33.24)	170.38 (51.93)	436.18 (132.95)
40	61.06 (18.61)	95.41 (29.08)	149.08 (45.44)	381.66 (116.33)
45	54.28 (16.54)	84.81 (25.85)	132.52 (40.39)	339.25 (103.40)
50	48.85 (14.89)	76.33 (23.27)	119.27 (36.35)	305.32 (93.06)
55	44.41 (13.54)	69.39 (21.15)	108.42 (33.05)	277.57 (84.60)
60	40.71 (12.41)	63.61 (19.39)	99.39 (30.29)	254.44 (77.55)
65	37.58 (11.45)	58.72 (17.90)	91.74 (27.96)	234.87 (71.59)
70	34.89 (10.64)	54.52 (16.62)	85.19 (25.97)	218.09 (66.47)
75	32.57 (9.93)	50.89 (15.51)	79.51 (24.24)	203.55 (62.04)
80	30.53 (9.31)	47.71 (14.54)	74.54 (22.72)	190.83 (58.16)
85	28.74 (8.76)	44.90 (13.69)	70.16 (21.38)	179.60 (54.74)
90	27.14 (8.27)	42.41 (12.93)	66.26 (20.20)	169.62 (51.70)
95	25.71 (7.84)	40.17 (12.25)	62.77 (19.13)	160.70 (48.98)
100	24.43 (7.45)	38.17 (11.63)	59.63 (18.18)	152.66 (46.53)

Appendix 4 Cable Diameter (12V DC) and

Transmission Distance

It is the recommended transmission distance for the fixed-sized cable with attrition rate lower than 10% of 12V DC. The Max. attrition rate of voltage allowed for DC power supply is 10%. The cables in the following table are all copper cables with electrical resistivity $\rho = 0.0175\Omega \cdot \text{mm}^2/\text{m}$.

Transmission Power Consumption (W)	Cable Diameter (mm)			
	0.8000	1.000	1.250	2.000
	Transmission Distance Feet (m)			
5	122.13 (37.23)	190.83 (58.16)	298.17 (90.88)	763.31 (232.66)
10	61.06 (18.61)	95.41 (29.08)	149.08 (45.44)	381.66 (116.33)
15	40.71 (12.41)	63.61 (19.39)	99.39 (30.29)	254.44 (77.55)
20	30.53 (9.31)	47.71 (14.54)	74.54 (22.72)	190.83 (58.16)
25	24.43 (7.45)	38.17 (11.63)	59.63 (18.18)	152.66 (46.53)
30	20.35 (6.20)	31.80 (9.69)	49.69 (15.15)	127.22 (38.78)
35	17.45 (5.32)	27.26 (8.31)	42.60 (12.98)	109.04 (33.24)
40	15.27 (4.65)	23.85 (7.27)	37.27 (11.36)	95.41 (29.08)
45	13.57 (4.14)	21.20 (6.46)	33.13 (10.10)	84.81 (28.85)
50	12.21 (3.72)	19.08 (5.82)	29.82 (9.09)	76.33 (23.27)
55	11.10 (3.38)	17.35 (5.29)	27.11 (8.26)	69.39 (21.15)
60	10.18 (3.10)	15.90 (4.85)	24.85 (7.57)	63.61 (19.39)
65	9.39 (2.86)	14.68 (4.47)	22.94 (6.99)	58.72 (17.90)
70	8.72 (2.66)	13.63 (4.15)	21.30 (6.49)	54.52 (16.62)
75	8.14 (2.48)	12.72 (3.88)	19.88 (6.06)	50.89 (15.51)
80	7.63 (2.33)	11.93 (3.64)	18.64 (5.68)	47.71 (14.54)
85	7.18 (2.19)	11.23 (3.42)	17.54 (5.35)	44.90 (13.69)
90	6.78 (2.07)	10.60 (3.23)	16.56 (5.05)	42.41 (12.93)
95	6.43 (1.96)	10.04 (3.06)	15.69 (4.78)	40.17 (12.25)
100	6.11 (1.86)	9.54 (2.91)	14.91 (4.54)	38.17 (11.63)

Appendix 5 Cable Diameter (24V DC) and

Transmission Distance

It is the recommended transmission distance for the fixed-sized cable with attrition rate lower than 10% of 24V DC.

The Max. attrition rate of voltage allowed for DC power supply is 10%. The cables in the following table are all copper cables with electrical resistivity $\rho = 0.0175\Omega \cdot \text{mm}^2/\text{m}$.

Transmission Power Consumption (W)	Cable Diameter (mm)			
	0.8000	1.000	1.250	2.000
	Transmission Distance Feet (m)			
5	148.90	232.66	363.53	930.63
10	74.45	116.33	181.76	465.31
15	49.63	77.55	121.18	310.21
20	37.23	58.16	90.88	232.66
25	29.78	46.53	72.71	186.13
30	24.82	38.78	60.59	155.10
35	21.27	33.24	51.93	132.95
40	18.61	29.08	45.44	116.33
45	16.54	25.85	40.39	103.40
50	14.89	23.27	36.35	93.06
55	13.54	21.15	33.05	84.60
60	12.41	19.39	30.29	77.55
65	11.45	17.90	27.96	71.59
70	10.64	16.62	25.97	66.47
75	9.93	15.51	24.24	62.04
80	9.31	14.54	22.72	58.16
85	8.76	13.69	21.38	54.74
90	8.27	12.93	20.20	51.70
95	7.84	12.25	19.13	48.98
100	7.45	11.63	18.18	46.53

Appendix 6 Cable Diameter (36V DC) and

Transmission Distance

It is the recommended transmission distance for the fixed-sized cable with attrition rate lower than 10% of 36V DC.

The Max. attrition rate of voltage allowed for DC power supply is 10%. The cables in the following table are all copper cables with electrical resistivity $\rho = 0.0175\Omega \cdot \text{mm}^2/\text{m}$.

Transmission Power Consumption (W)	Cable Diameter (mm)			
	0.8000	1.000	1.250	2.000
	Transmission Distance Feet (m)			
5	335.03	523.48	817.94	2093.92
10	167.51	261.74	408.97	1046.96
15	111.68	174.49	272.65	697.97
20	83.76	130.87	204.48	523.48
25	67.01	104.70	163.59	418.78
30	55.84	87.25	136.32	348.99
35	47.86	74.78	116.85	299.13
40	41.88	65.43	102.24	261.74
45	37.23	58.16	90.88	232.66
50	33.50	52.35	81.79	209.39
55	30.46	47.59	74.36	190.36
60	27.92	43.62	68.16	174.49
65	25.77	40.27	62.92	161.07
70	23.93	37.39	58.42	149.57
75	22.34	34.90	54.53	139.59
80	20.94	32.72	51.12	130.87
85	19.71	30.79	48.11	123.17
90	18.61	29.08	45.44	116.33
95	17.63	27.55	43.05	110.21
100	16.75	26.17	40.90	104.70

Appendix 7 Cable Diameter (48V DC) and

Transmission Distance

It is the recommended transmission distance for the fixed-sized cable with attrition rate lower than 10% of 48V DC.

The Max. attrition rate of voltage allowed for DC power supply is 10%. The cables in the following table are all copper cables with electrical resistivity $\rho = 0.0175\Omega \cdot \text{mm}^2/\text{m}$.

Transmission Power Consumption (W)	Cable Diameter (mm)			
	0.8000	1.000	1.250	2.000
	Transmission Distance Feet (m)			
5	595.60	930.63	1454.11	3722.52
10	297.80	465.31	727.05	1861.26
15	198.53	310.21	484.70	1240.84
20	148.90	232.66	363.53	930.63
25	119.12	186.13	290.82	744.50
30	99.27	155.10	242.35	620.42
35	85.09	132.95	207.73	531.79
40	74.45	116.33	181.76	465.31
45	66.18	103.40	161.57	413.61
50	59.56	93.06	145.41	372.25
55	54.15	84.60	132.19	338.41
60	49.63	77.55	121.18	310.21
65	45.82	71.59	111.85	286.35
70	42.54	66.47	103.86	265.89
75	39.71	62.04	96.94	248.17
80	37.23	58.16	90.88	232.66
85	35.04	54.74	85.54	218.97
90	33.09	51.70	80.78	206.81
95	31.35	48.98	76.53	195.92
100	29.78	46.53	72.71	186.13

Appendix 8 Wire Gauge Reference Sheet

Metric bare wire diameter (mm)	AWG	SWG	Bare wire cross section (mm ²)
0.050	43	47	0.00196
0.060	42	46	0.00283
0.070	41	45	0.00385
0.080	40	44	0.00503
0.090	39	43	0.00636
0.100	38	42	0.00785
0.110	37	41	0.00950
0.130	36	39	0.01327
0.140	35	/	0.01539
0.160	34	37	0.02011
0.180	33	/	0.02545
0.200	32	35	0.03142
0.230	31	/	0.04115
0.250	30	33	0.04909
0.290	29	31	0.06605
0.330	28	30	0.08553
0.350	27	29	0.09621
0.400	26	28	0.1257
0.450	25	/	0.1602
0.560	24	24	0.2463
0.600	23	23	0.2827
0.710	22	22	0.3958
0.750	21	/	0.4417
0.800	20	21	0.5027
0.900	19	20	0.6362
1.000	18	19	0.7854
1.250	16	18	1.2266
1.500	15	/	1.7663
2.000	12	14	3.1420
2.500	/	/	4.9080
3.000	/	/	7.0683