



Ex-mark: Ex db IIC T6 Gb / Ex tb IIIC T80°C Db

Explosion-Proof Camera (ECA7A1)

Installation Manual



Foreword

General





This manual introduces the installation of Explosion-Proof Camera (hereinafter referred to as "the Camera").



Figures in this manual are only for reference, and the actual product appearance shall prevail.

Safety Instructions

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

Signal Words	Meaning
 WARNING	Indicates a high potential hazard which, if not avoided, will result in death or serious 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

Version	Revision Content	Release Time
V1.0.2	Updated some specifications	November 2020
V1.0.1	Deleted the manufacturer note.	June 2020
V1.0.0	First release.	May 2020

About the 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 will help you to use the Camera properly. Read the manual carefully before using the Camera, and keep it well for future reference.

Explosion-Proof Structure Description

- When designing the enclosure, we have fully considered that it won't cause external explosion due to internal electric apparatus operation even if there is explosive gas mixture enters into the Camera. We have considered several factors to guarantee the explosion-proof performance, such as enclosure intensity, junction surface gap and length among components, and maximum surface temperature of the enclosure.
- After the welding and finish machining, the enclosure can sustain the severe hydrostatic test. With test pressure 2Mpa and the duration 10 seconds to 12 seconds, there is no water dripping and transformed structure.
- When the Camera is working normally, the maximum surface temperature of the enclosure is no more than 80°C.
- The observation window is made of tempered glass, and it has passed impulse test and thermal shock test.
- IP68 (2 m/2 h).
- The Camera adopts compression nut equipment to lead the cable in, which makes the cable fully compressed without being loose.

Safety Instructions

- Make sure that the power supply conforms to the requirements on the nameplate before powering the Camera.
- Provide stable long-time power supply.
- A control cable around two meters is reserved when the Camera is delivered out of factory. When connected to the explosion-proof control cabinet, the control cable shall be protected by explosion-proof flexible tube.
- Make sure that all the explosion-proof components are complete without any cracks and defects.
- Make sure that the Camera is properly grounded.
- If the Camera will not be used for a long time, unplug the power cable.
- Cut off the power before camera maintenance and overhaul, and consult after-sale service.
- Make sure that the power is off when you connect the cables, install or uninstall the Camera.
- Keep the packing box well for future transportation.



- Avoid heavy stress, violent vibration, and water splash during transportation, storage, and installation. Complete package is necessary during the transportation when the Camera is delivered or is returned to the manufacturer for repair. We will assume no responsibility for any damage or problem caused by the incomplete package during the transportation.

- Protect the Camera from falling down or heavy vibration.
- Buckle the safety hook before installing the Camera if it is included.
- To avoid damage, keep the Camera away from televisions, radio transmitters, electromagnetic devices, electric machine, transformers, and speakers; do not install the Camera in places with smoke or vapor, high temperature, and lots of dust; do not install the Camera near the heating furnace and other heat sources, such as spotlight, kitchen, and boiler room.
- Do not disassemble the Camera; otherwise it might cause dangers or device damage. Contact your local retailer or customer service center for internal setup or maintenance requirement.
- Make sure that there is no metal, or inflammable, explosive substance in the Camera; otherwise it might cause fire, short-circuit, or other damage. Power off the Camera and disconnect the power cable immediately if there is water or other liquid falling into the Camera. And contact your local retailer or after-sale service center. Avoid sea water or rain eroding the Camera.
- Avoid the lens aiming at intense light source, including sunlight, and incandescent light; otherwise the lens might be damaged.
- Clean the enclosure with soft cloth. To remove the dirt, you can dip the soft cloth in proper detergent, wring the soft cloth out, and then dry the enclosure with soft cloth. Do not use gasoline, paint thinner, or other chemicals to clean the enclosure; otherwise it might result in enclosure transfiguration or paint flake. Avoid long time touch between the plastic or rubber material and the enclosure; otherwise it might result in device damage and paint flake.
- It is recommended to use the Camera with a lightning-proof device for better lightning-proof effect.
- Before installing the Camera, you need to confirm the salt spray tolerance level. Do not install the Camera in an environment with higher salt spray level than the Camera can tolerate. There are three salt spray tolerance levels of cameras.
 - ◇ Cameras with higher salt spray tolerance level can be installed in an area within 1500 meters by the sea, or offshore platform.
 - ◇ Cameras with medium salt spray tolerance level can be installed in an area 1500 meters away from the sea.
 - ◇ Cameras not salt spray tolerant can only be installed in an area 3000 m away from the sea.



WARNING

- All installation and operations shall conform to local electrical safety regulations.
- The power source shall conform to the requirements of the Safety Extra Low Voltage (SELV) standard, and supply power with rated voltage which conforms to Limited power Source requirement according to IEC60950-1. Note that the power supply requirement is subject to the device label.
- Use the power adapter recommended by the manufacturer.
- For the Camera that supports laser, do not aim the laser directly at eyes. And keep a proper distance from the flammable to avoid fire.
- Do not connect several cameras to one power adapter; otherwise it might result in overheat or fire if it exceeds the rated load.
- Power off the Camera and disconnect the power cord immediately if there is any smoke, disgusting smell, or noise from the Camera. And contact your local retailer or customer service center.

- We will assume no responsibility for any problems (such as water intrusion or loose cables) caused by unauthorized modifications, disassembly or repair, incorrect installation or use, and overuse of certain components.

Requirements for Installation and Maintenance Personnel

- Have certificates or experiences related to installation and maintenance of the closed-circuit television (CCTV), and have certificates related to working at height.
- Have basic knowledge and installation skills of CCTV system.
- Have basic knowledge and operation technique for low-voltage wiring and low-voltage electronic circuit connection.
- Have the ability to read and understand the manual.
- Have explosion-proof related certificates.

Requirements for Lifting the Camera

- Select appropriate tools to lift the Camera.
- Make sure that the selected tools reach the installation height.
- Make sure that the selected tools have high safety performance.

Storage Requirements

- The warehouse should be well ventilated and free from corrosive gases; the ambient temperature should be -40°C to 55°C; the relative humidity should be no more than 85%; there should be no strong mechanical vibration, impact or strong magnetic field.
- Keep the Camera away from fire source, and do not store it with corrosive, inflammable and explosive materials.
- If the Camera has been stored in the company for more than 18 months, it should be resubmitted for inspection and confirmation.

Transportation Requirements

- Handle the Camera with care, and do not throw, roll or trample it.
- Avoid damp, extrusion and rain during transportation.
- Shipping the Camera with corrosive, inflammable and explosive materials is strictly prohibited.

Special Condition of Use for Ex

- Special guidance noted to contact the original manufacturer for information on the dimensions of the flameproof joints.
- CAUTION—USE FASTENERS WITH YIELD STRESS $\geq 260\text{Mpa}$.

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1 Overview

1.1 Introduction

As a new generation of explosion-proof monitoring device, the Camera uses more advanced manufacturing technology, so that the quality, performance and appearance outperform the competitors. It adopts new design in structure and the engineering construction is simple. Moreover, the installation will not affect the overall aesthetic look of the monitoring site. The Camera has features such as clear image, digitization, intelligence, and easy installation.

The Camera is designed and manufactured in strict accordance with standards such as EN 60079-0, EN 60079-1, EN 60079-31, IEC60079-0 *EXPLOSIVE ATMOSPHERES Part 0: Equipment General Requirements* and IEC60079-1 *Explosive Atmospheres, Part 1: Equipment Protection by Flameproof Enclosures 'd'*. The enclosure is rust-proof and it is rated IP68. The Camera can be widely used in oil, chemical engineering, wharf, port, mine, aerospace, military, food processing, and other sites.

1.2 Application

The Camera is suitable for Zone 1 and Zone 2 combustible gas environment, and Zone 21 and Zone 22 combustible dust environment.

1.3 Mechanical Specification

Table 1-1 Mechanical specification

Parameter	Description
Material	Stainless steel 304 by default; stainless steel 316L customizable
IP rating	IP68
Cable outlet hole	1
Cable outlet hole thread	Provides one M26*1.5 cable entry for end user to connect Ex certified cable fittings. And the other one is G3/4 for connecting the composite cable assembly.

1.4 Electric Specification

Table 1-2 Electric specification

Parameter	Description
Input voltage	100-240V~
Maximum current	≤ 0.5A
Power consumption	≤ 25W
Electrical connection	There are power supply, Ethernet and audio ports on the control cable by default.

1.5 Environment Requirements

Table 1-3 Environment requirements

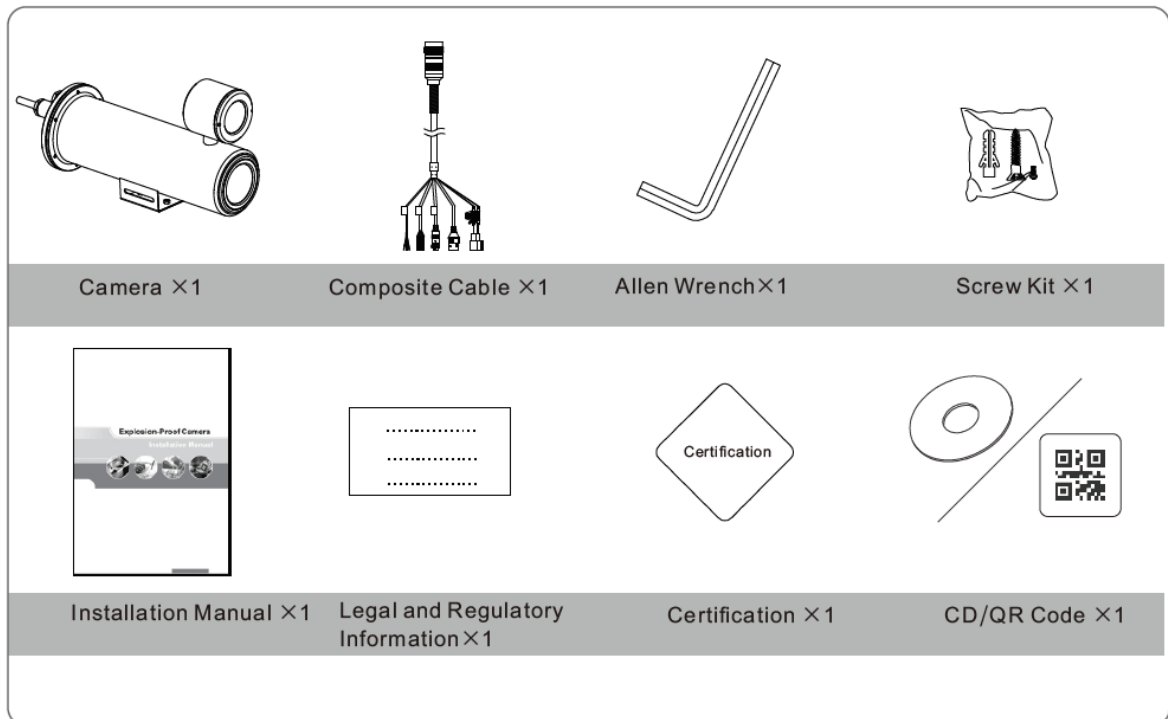
Parameter	Description
Air pressure	80 kPa–110 kPa
Operating temperature	-40°C to +60°C
Operating humidity	≤ 95% RH (+25°C)

2 Installation Preparation

2.1 Packing List

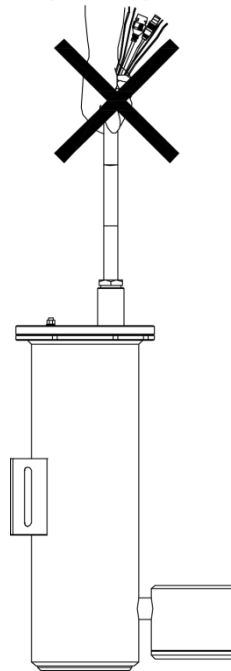
After unpacking, check whether there is obvious damage to the appearance, and check whether the accessories are complete against the packing list. If everything is fine, you can start to install the Camera.

Figure 2-1 Packing list



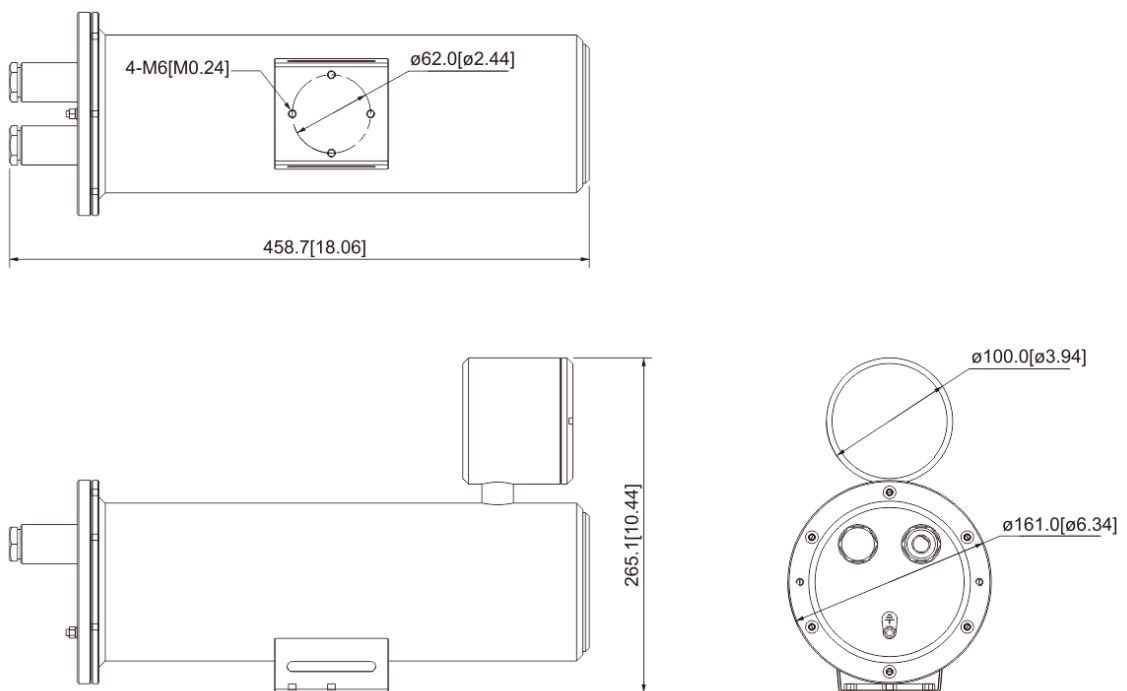
Do not drag or pull the cables to lift the Camera when carrying it. See Figure 2-2 for the wrong way.

Figure 2-2 Wrong way of carrying the camera



2.2 Dimensions

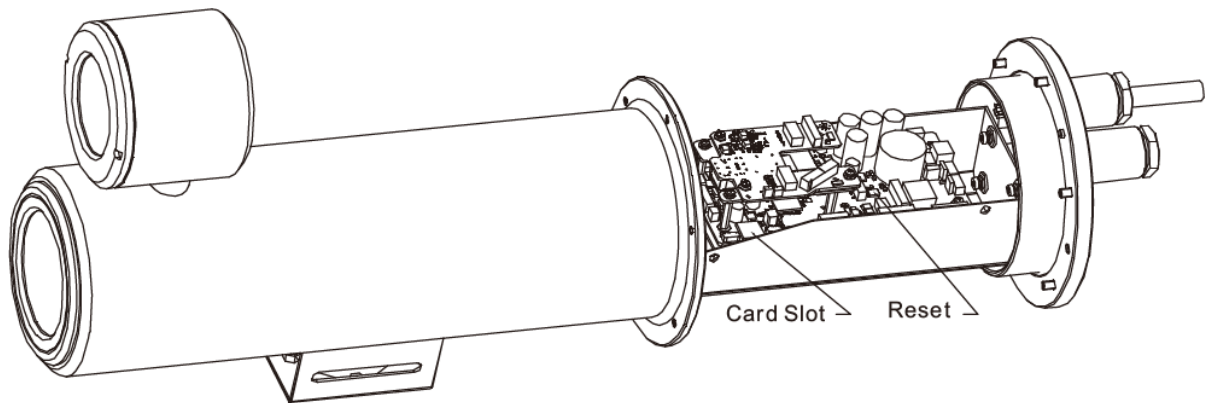
Figure 2-3 Dimensions (mm [inch])



2.3 Reset Button and Memory Card

Loosen the screws on the back of the Camera with a screwdriver, and pull out the module. You can see the memory card slot and the reset button.

Figure 2-4 Reset button and memory card



2.3.1 Using the Reset Button

The reset button is for resetting network system.

Press and hold the reset button for over 10 s to reset the Camera.

2.3.2 Installing the Memory Card

The memory card is for data storage.

Make sure that the metal contact of the memory card is facing downwards, and push the card into the slot.



Push the memory card in the direction of card insertion, and the card will be ejected automatically.

2.4 Cable Connection

2.4.1 Cable Description

When delivered out of factory, the Camera is connected with a composite cable. The cable threads out from the outlet hole at the Camera rear, and it is 2 m by default. For the cables, see Figure 2-5.



The cables vary with the product models, and the actual cables shall prevail. The manual will introduce the cables as complete as possible.

Figure 2-5 Cables

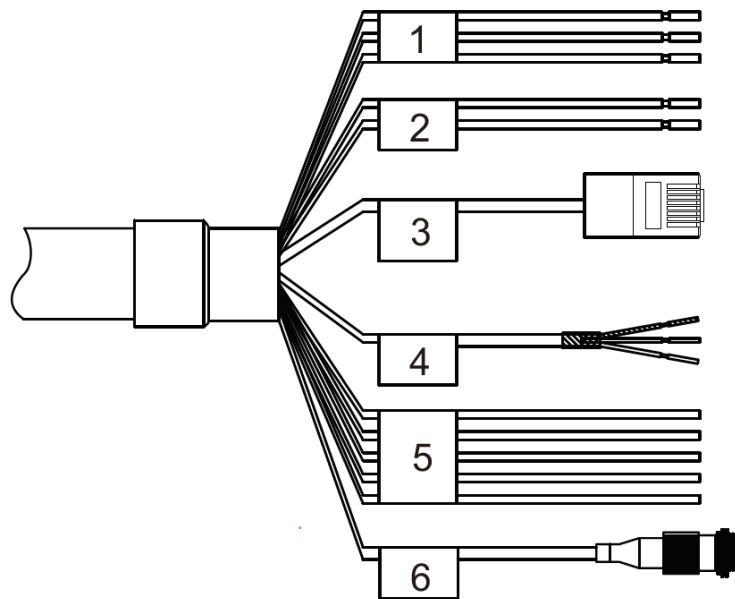


Table 2-1 Cable description

No.	Description
1	Power port: 220V AC. <ul style="list-style-type: none"> ● Brown: Live wire ● Blue: Neutral wire ● Yellow-green: Grounding wire
2	RS-485 port. <ul style="list-style-type: none"> ● Yellow: A+ ● Orange: B-
3	Ethernet port.
4	Audio port. <ul style="list-style-type: none"> ● Red: Audio output ● White: Audio input ● Black: Audio grounding wire
5	Alarm port <ul style="list-style-type: none"> ● Blue: Alarm output 1 ● Green: Contact switch ● Yellow-green: Alarm grounding wire ● Red: Alarm input 1 ● Brown: Alarm input 2
6	Optical fiber FC port

2.4.2 Connecting the Alarm Cable

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

Step 2 Connect the alarm output device to ALARM_OUT and ALARM_COM of the camera cable. The alarm output is relay switch output.

Step 3 Go to the web interface of the Camera, and finish settings for alarm input and output devices. The alarm input on the Web interface is corresponding to the alarm input of the camera cable. Set the corresponding NO and NC output according to the high and low level signal generated by alarm input devices when alarms are triggered.

Step 4 Set the alarm output of camera cable on the Web interface.

2.4.3 Connecting the Explosion-Proof Flexible Tube

Before connecting the composite cable, you need to make it explosion-proof. The common method is to cover the cable with an explosion-proof flexible tube.

Step 1 Cover the cable with the explosion-proof flexible tube, remove the compression nut, and reserve the sealing ring at the rear (spare part in the packing box can also be used).

Figure 2-6 Installation of explosion-proof flexible tube (1)

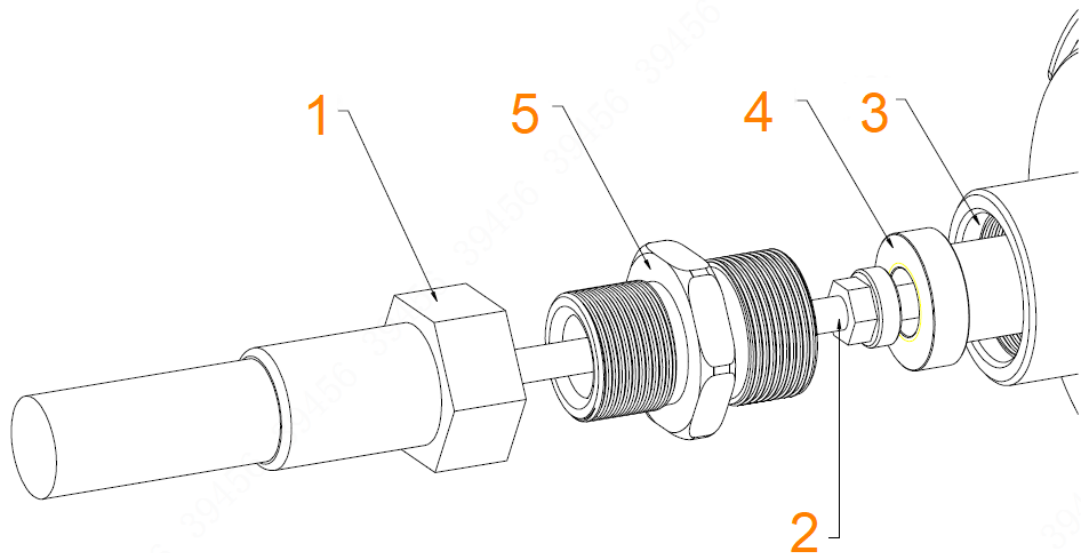


Table 2-2 Flexible tube installation (1)

No.	Description
1	Explosion-proof flexible tube
2	Composite cable
3	Outlet hole
4	Sealing ring
5	Ex certified compression nut

Step 2 Tighten the thread connector and then the explosion flexible tube.

Figure 2-7 Installation of explosion-proof flexible tube (2)

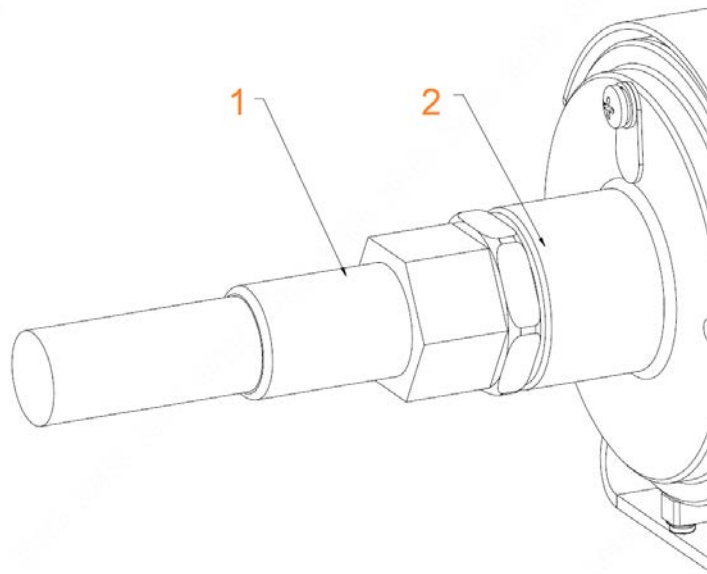


Table 2-3 Flexible tube installation (2)

No.	Description
1	Explosion-proof flexible tube
2	Outlet hole

2.5 Cable Preparation

Select the cables depending on the transmission distance.

2.5.1 Minimum Requirements for the Video Cable

- 75Ω impedance.
- Pure copper cored cables.
- 95% braided copper shielding.

For the cables and their maximum transmission distance, see Table 2-4.

Table 2-4 Cables and the maximum transmission distance

Model	Maximum Transmission Distance (m\ft)
RG59/U	229/750
RG6/U	305/1000
RG11/U	457/1500

2.5.2 RS-485 Cable Requirement

When using the 0.56 mm (24AWG) twisted-pair line, depending on different baud rates, the theoretical maximum transmission distance is different. For details, see Table 2-5.

Table 2-5 Theoretical maximum transmission distance

Baud Rate	Maximum Transmission Distance
2400 bps	1800 m
4800 bps	1200 m
9600 bps	800 m

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

3 Device Installation

3.1 Installation Conditions

3.1.1 Installation Accessories and Tools

For the installation accessories and tools, see Figure 3-1. For the wall mount bracket and universal joint, see Figure 3-2 and Figure 3-3.

Figure 3-1 Accessories and tools

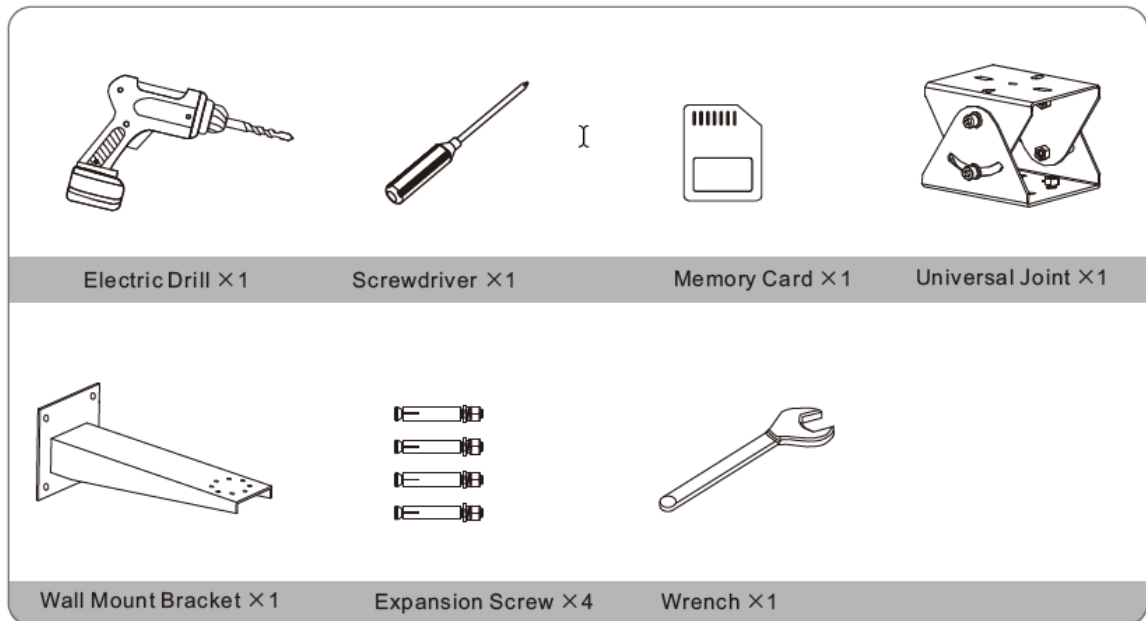


Figure 3-2 Wall mount bracket (mm [inch])

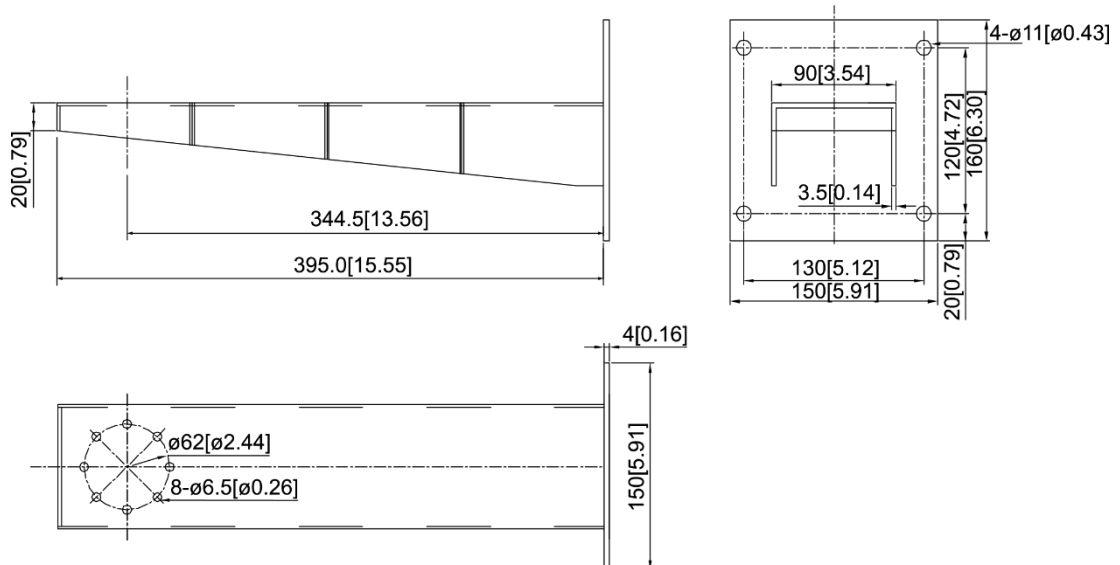
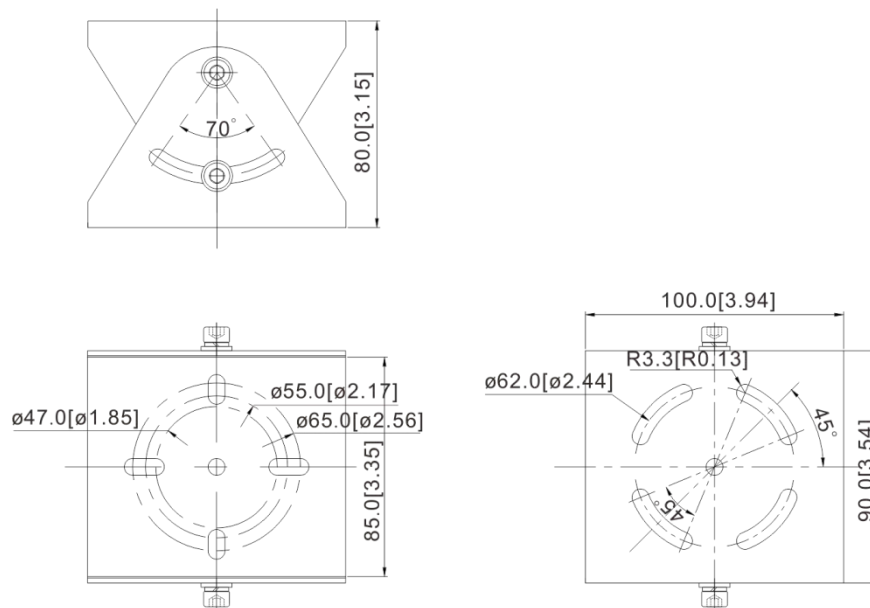


Figure 3-3 Universal joint (mm [inch])



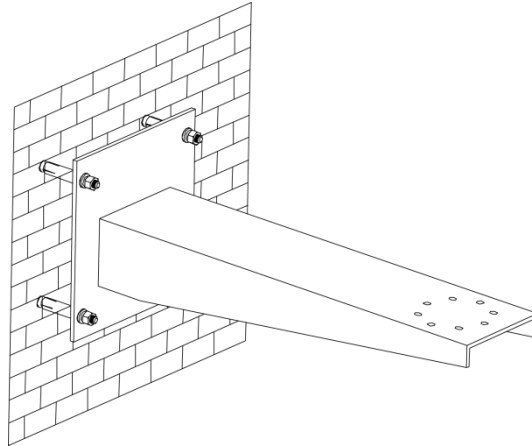
3.1.2 Precautions before Installation

- Use the power supply specified in "1.4 Electric Specification."
- Always use the Camera under the air pressure, operating temperature and operating humidity specified in "1.5 Environment Requirements."
- Explosion-proof cameras are special. Power and debug them indoors, and familiarize the features of them before installation.
- Keep the original packing material well because you might need it to pack the Camera and send it back for repair if any problem arise.
- Make sure that the place where the Camera is installed has enough space to hold the Camera and its mounting accessories.
- Make sure that the ceiling and wall can sustain 8 times the weight of the Camera and its mounting accessories.
- Make sure that the wall is thick enough to install expansion bolts (Users need to buy expansion bolts separately).

3.2 Installation Procedure

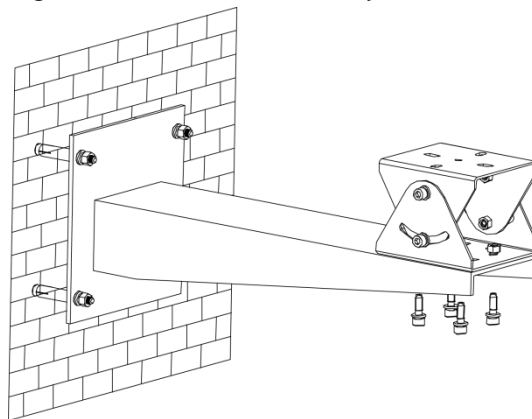
Step 1 Fix the wall mount bracket on the wall through 4 expansion screws.

Figure 3-4 Install the wall mount bracket



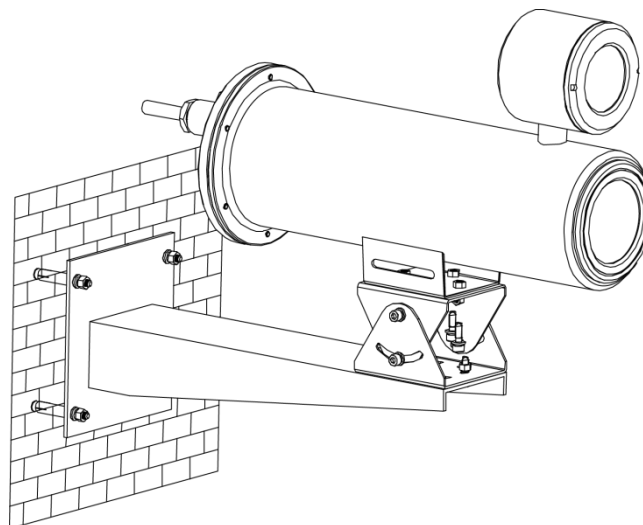
Step 2 Use 4 M6×20 inner hexagon screws and nuts to fix the universal joint on the bracket (optional).

Figure 3-5 Install the universal joint



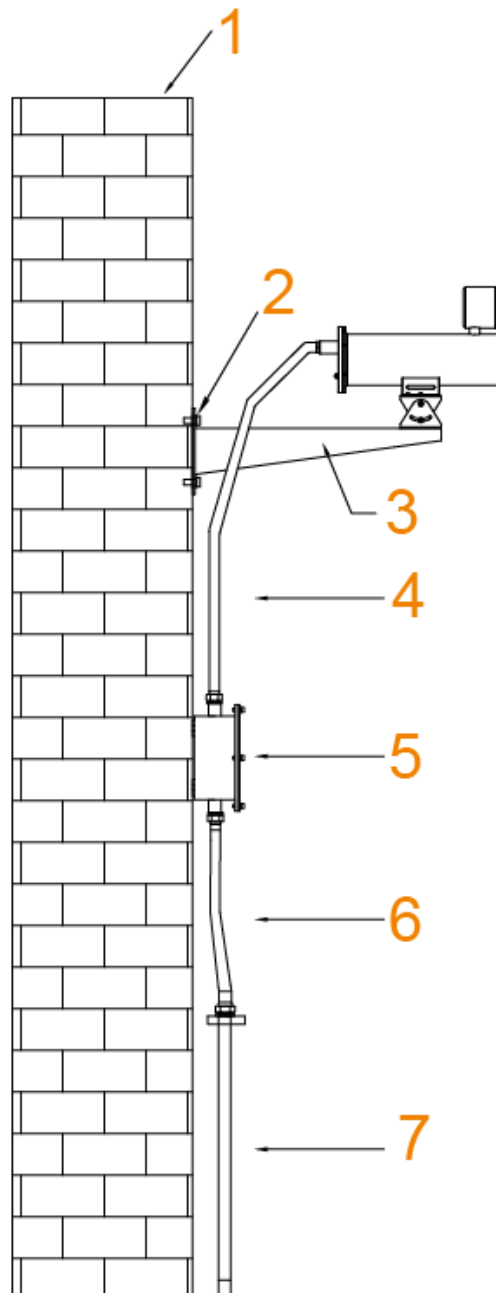
Step 3 Use 4 M6×20 inner hexagon screws and nuts to fix the Camera on the bracket or universal joint.

Figure 3-6 Fix the camera



Step 4 Connect the cables among the Camera, bracket, flexible tube, and control cabinet.

Figure 3-7 Cable layout



For the details of connecting explosion-proof flexible tube, see "2.4.3 Connecting the Explosion-Proof Flexible Tube". For the cable connection, see "2.4.1 Cable Description."

Table 3-1 Cable layout description

No.	Description
1	Wall
2	4 screws used to fix the bracket on the wall
3	Wall mount bracket
4	Flexible tube
5	Junction box

No.	Description
6	Flexible tube
7	Galvanized steel pipe connected to the terminal

4 Troubleshooting

For the malfunctions, possible reasons and solutions, see Table 4-1.

Table 4-1 Troubleshooting

Malfunction	Possible Reason	Solution
After being powered on, the Camera does not perform self-check, and there is no image.	If the red LED light on power board is off: The power supply is not connected to the socket of the power board or the contact is poor. Mains electricity is cut off or there is transformer failure.	Check whether the power supply is connected, and make sure that the socket body is in good contact. Check whether the mains electricity is normal, and whether the transformer is working normally.
	If the red LED light on the power board is on: The Camera is damaged. There is power board failure.	Use another camera. Contact the supplier to replace the power board.
Self-check cannot be performed, or there is noise when the self-check is performed.	Insufficient power supply.	Use the power supply meeting requirement.
	There is mechanical fault.	Contact after-sales service for overhaul.
Unstable image.	Poor contact between the cables.	Connect the cables again.
Blurry video	The focus is in manual status.	Operate the Camera and adjust the focus.
	The glass is dirty.	Clean the glass.

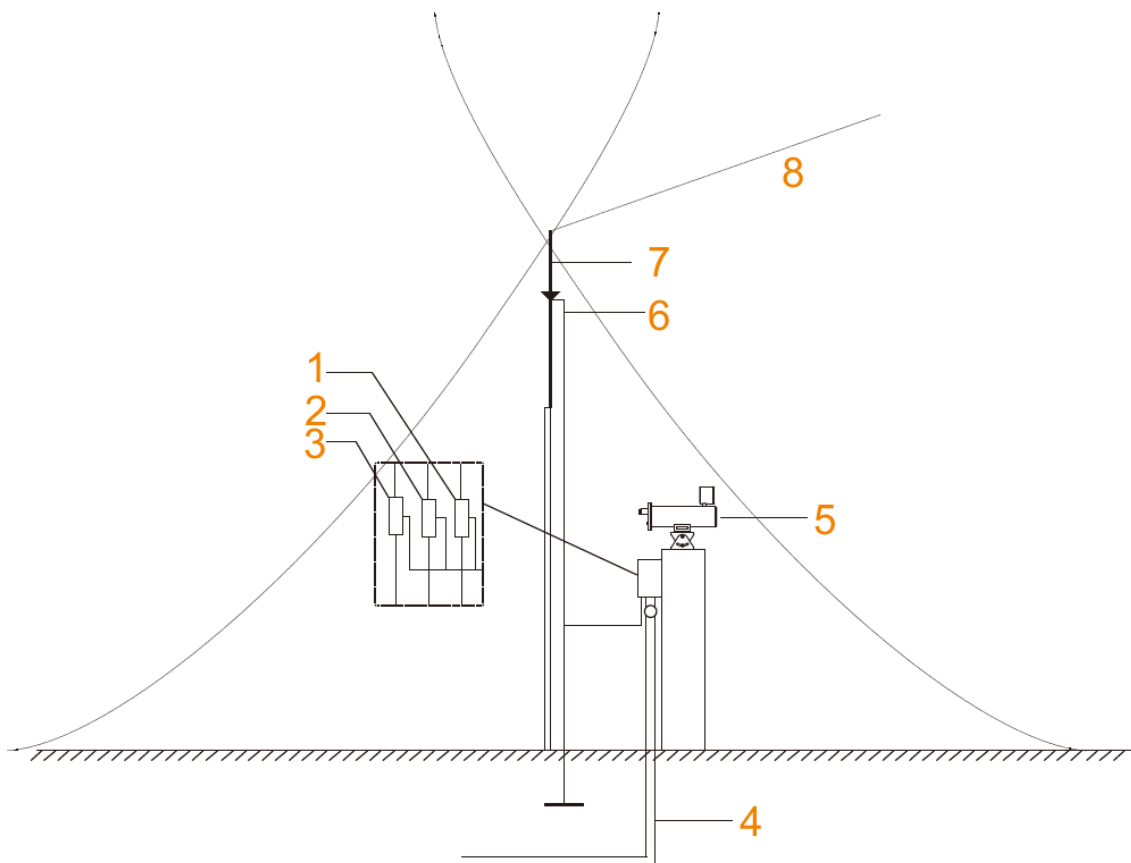
Appendix 1 Thunder-Poof and Surge Protection

Transient voltage suppressor (TVS) is applied to protect the Camera against voltage spikes and overvoltage below 6000V. However, it is still necessary to do operations to protect the Camera depending on local electrical safety regulations.

- The signal transmission cable must stay at least 50 m away from high voltage devices and high voltage wire.
- When laying cables outdoors, try to lay them under the eaves.
- At open places, lay cables underground by means of hermetic steel tube, and then do equipotential grounding to both ends of steel tubes. Laying overhead power cables is prohibited.
- At places with severe thunderstorms and induced voltage (like substation), you need to prepare high-powered lightning protection devices and lightning conductors.
- 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 local or industry standards.
- You must do equipotential grounding to the electric system. The grounding device must meet the demand of anti-jamming and also conforms to your local electrical safety code. The grounding device shall not form short circuit to N (neutral) line of high voltage power grid or be mixed with other wires. When the electrical system is connected to the ground cable, the impedance cannot exceed 4Ω , and the cross-sectional area of the earth lead cannot exceed 25 mm^2 .

For the installation of lightning protection devices outdoors, see Appendix Figure 1-1.

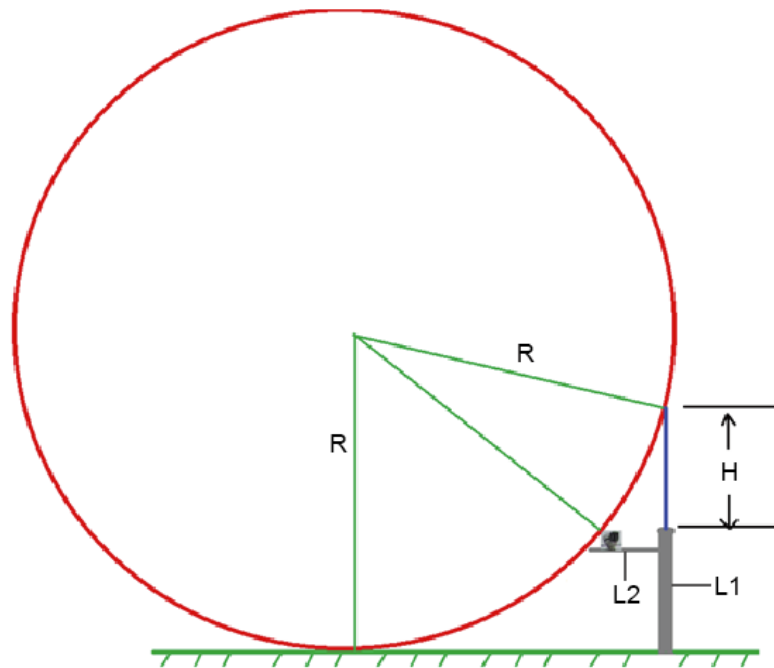
Appendix Figure 1-1 Install lightning protection devices outdoors (1)



Appendix Table 1-1 Installing lightning protection devices outdoors

No.	Description
1	Video lightning conductor.
2	Communication lightning conductor.
3	Power supply lightning conductor.
4	Steel tube.
5	Explosion-proof camera: Must be installed in the arc formed by the 60-m circle, the lightning conductor top and the ground.
6	Impedance of the cable connected to the grounding wire should be less than 4Ω .
7	Lightning conductor.
8	The radius is 60 m.

Appendix Figure 1-2 Installing lightning protection devices outdoors (2)



- R: The radius of the circle, and R=60 m.
- L1: The length of the pole that holds the lightning conductor.
- L2: The length of the rail that holds the Camera.
- H: The length of the lightning conductor.

To get the value of L1, you need to use the formula:

$$\left(\sqrt{R^2 - [R - (L1 + H)]^2} - L2\right)^2 + (R - L1)^2 = R^2$$

Appendix 2 RS-485 Cable

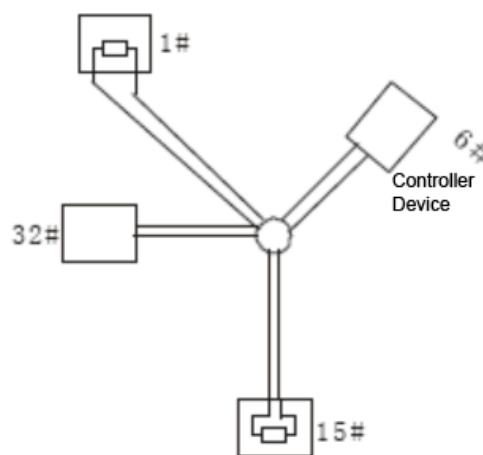
Appendix 2.1 Basic Features

RS-485 industrial buses are half-duplex communication buses whose characteristic impedance is 120Ω . Its maximum load is 32 payloads (including controller devices and controlled devices).

Appendix 2.2 Common Issues in Use

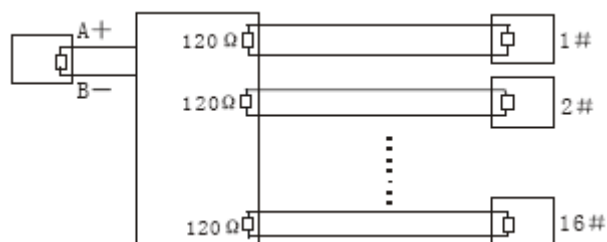
Users tend to connect devices in the way displayed in Appendix Figure 2-1. In this case, the terminal resistance must be connected to the two devices whose cable length is the longest among all the devices (in Appendix Figure 2-1, cable length between 1# and 15# is the longest). However, this connection does not comply with the RS-485 industry standard. As a result, common issues like signal reflection and anti-interference capability reduction will occur. And the reliability of the control signal will decrease. Therefore, the Camera will be out of control or cannot stop.

Appendix Figure 2-1 Common method to connect devices



To fix the issues, it is recommended to use RS-485 distributors. The RS-485 distributor can help avoid the common connection method to improve transmission reliability. See Appendix Figure 2-2.

Appendix Figure 2-2 Connecting method with RS-485 distributors



Appendix 2.3 FAQ on RS-485 Cable

Appendix Table 2-1 Malfunction, possible reason and solution

Malfunction	Possible Reason	Solution
The Camera can perform self-check, but is out of control.	Baud rate/address of the host and Camera are not matched.	Modify the baud rate/address of the host or Camera to be matched.
	Positive electrode and negative electrode of RS-485 cable are misconnected.	Connect cables to the positive electrode and negative electrode correctly.
	Loose connection.	Connect the cables firmly.
	RS-485 cable is broken.	Replace RS-485 cable.
The Camera can be controlled, but the operation is not smooth.	RS-485 cable is in poor contact.	Connect the RS-485 cable firmly.
	A RS-485 cable is broken.	Replace RS-485 cable.
	The distance between the host and Camera is too long.	Install terminal resistance.
	Too many cameras are connected parallelly.	Install RS-485 distributors.

Appendix 3 Wire Gauge Reference Sheet

Appendix Table 3-1 Wire gauge reference sheet

Metric Bare Wire Diameter (mm)	AWG	SWG	Bare Wire Cross Section Area (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

Appendix 4 Cybersecurity Recommendations

Cybersecurity is more than just a buzzword: it's something that pertains to every device that is connected to the internet. IP video surveillance is not immune to cyber risks, but taking basic steps toward protecting and strengthening networks and networked appliances will make them less susceptible to attacks. Below are some tips and recommendations on how to create a more secured security system.

Mandatory actions to be taken for basic equipment 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 equipment (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 equipment 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 equipment network security:

1. Physical Protection

We suggest that you perform physical protection to equipment, especially storage devices. For example, place the equipment 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 equipment (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 equipment 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. Enable Whitelist

We suggest you to enable whitelist function to prevent everyone, except those with specified IP addresses, from accessing the system. Therefore, please be sure to add your computer's IP address and the accompanying equipment's IP address to the whitelist.

8. MAC Address Binding

We recommend you to bind the IP and MAC address of the gateway to the equipment, thus reducing the risk of ARP spoofing.

9. Assign Accounts and Privileges Reasonably

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

10. 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.

11. 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.

12. Secure Auditing

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

13. Network Log

Due to the limited storage capacity of the equipment, 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.

14. Construct a Safe Network Environment

In order to better ensure the safety of equipment 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.

ENABLING A SAFER SOCIETY AND SMARTER LIVING

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