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ALFATRON ELECTRONICS GmbH GERMANY

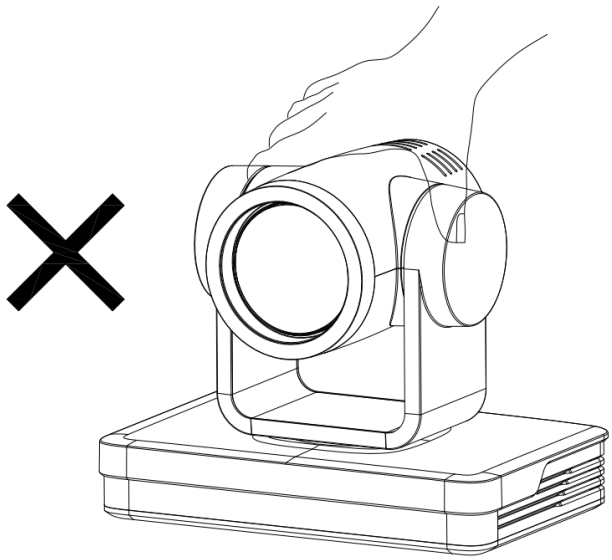
4K PTZ CAMERA

ALF-5X / 12X-4KCAM



⚠ Warning

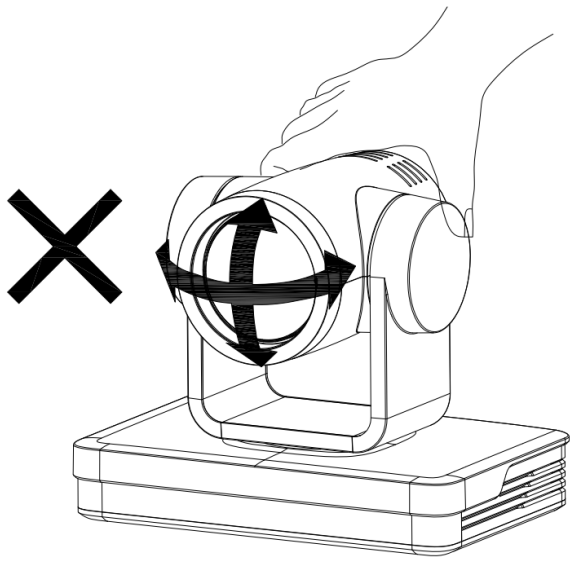
Improper operations may damage the product structure and result in mechanical failure. Please note the following tips.



⚠ Do not move the camera by grabbing the head.

Move the camera by holding the bottom with one or both hands.

⚠ Please do not rotate the lens and holder manually no matter the camera is power on or off; otherwise it may damage the camera structure and result in failure of camera self-check and unable to start the camera.



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Attention

CE FC CAN ICES-3 (B)/NMB-3(B)

NOTE: This equipment has been tested and was found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment can generate and radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference through one or more of the following measures:

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

WARNING: Changes or modifications not expressly approved by the party responsible for compliance, could void the user's authority to operate the equipment.

Radiation Exposure
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.



Do not dispose of this product with the normal household waste at the end of its life cycle. Return it to a collection point for the recycling of electrical and electronic devices. This is indicated by the symbol on the product, user manual or packaging

The materials are reusable according to their markings. By reusing, recycling or other forms of utilization of old devices you make an important contribution to the protection of our environment.

Please contact your local authorities for details about collection points.

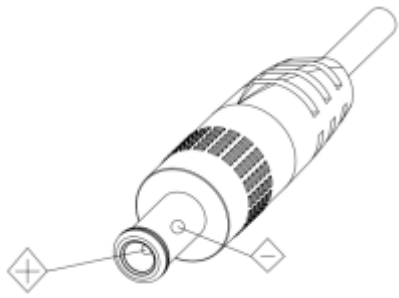
This manual introduces in detail the functions, installation and operation for this PTZ camera. Please read this manual carefully before installation and use.

1. Cautions

1.1 Avoid damage to product caused by heavy pressure, strong vibration or immersion during transportation, storage and installation.
1.2 Housing of this product is made of organic materials. Do not expose it to any liquid, gas or solids which may corrode the shell.
1.3 Do not expose the product to rain or moisture.
1.4 To prevent the risk of electric shock, do not open the case. Installation and maintenance should only be carried out by qualified technicians.
1.5 Do not use the product beyond the specified temperature, humidity or power supply specifications.
1.6 Wipe it with a soft, dry cloth when cleaning the camera lens. Wipe it gently with a mild detergent if needed. Do not use strong or corrosive detergents to avoid scratching the lens and affecting the image.
1.7 This product contains no parts which can be maintained by users themselves. Any damage caused by dismantling the product by user without permission is not covered by warranty.

2. Electrical Safety

Installation and use of this product must strictly comply with local electrical safety standards.
The power supply of the product is ±12V, the max electrical current is 2A .



3. Install

3.1 Do not rotate the camera head violently, otherwise it may cause mechanical failure.
3.2 This product should be placed on a stable desktop or other horizontal surface. Do not install the product obliquely, otherwise it may display inclined image.
3.3 Ensure there are no obstacles within rotation range of the holder.
3.4 Do not power on before completely installation.

4. Magnetic Interference

Electromagnetic fields at specific frequencies may affect the video image. This product is Class A. It may cause radio interference in household application. Appropriate measure is required.

1. Camera Installation

1.1 Camera Introduction

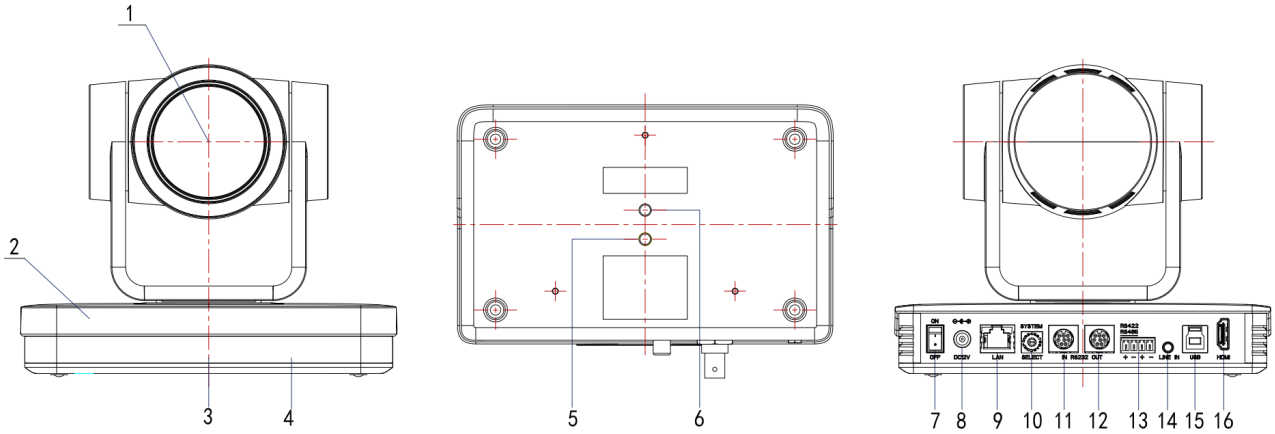


Figure 1.1 Product Interface

1.Camera Lens	*7.Power Switch*	*13.RS422/RS485 Interface*
2.Camera Base	*8.DC12V Input Power Supply Socket*	*14.Audio Input Interface（LINE-IN）*
3.Indicator Light	*9.LAN Port*	*15.USB3.0 Interface*
4.Infrared Receiver	*10.Rotary DIP Switch*	*16.HDMI Output Interface*
5.Tripod Screw Hole	*11.RS232 Control Interface(input)*	
6.Tripod Screw Hole	*12.RS232 Control Interface(output)*	

The default address selected by the remote control is 1. When the remote control transmits a signal to the camera, the status indicator light on the camera flashes green;

If the remote-control address selection is wrong, the indicator light does not flash and the remote control address is invalid.

1.2 Interfaces and Connection

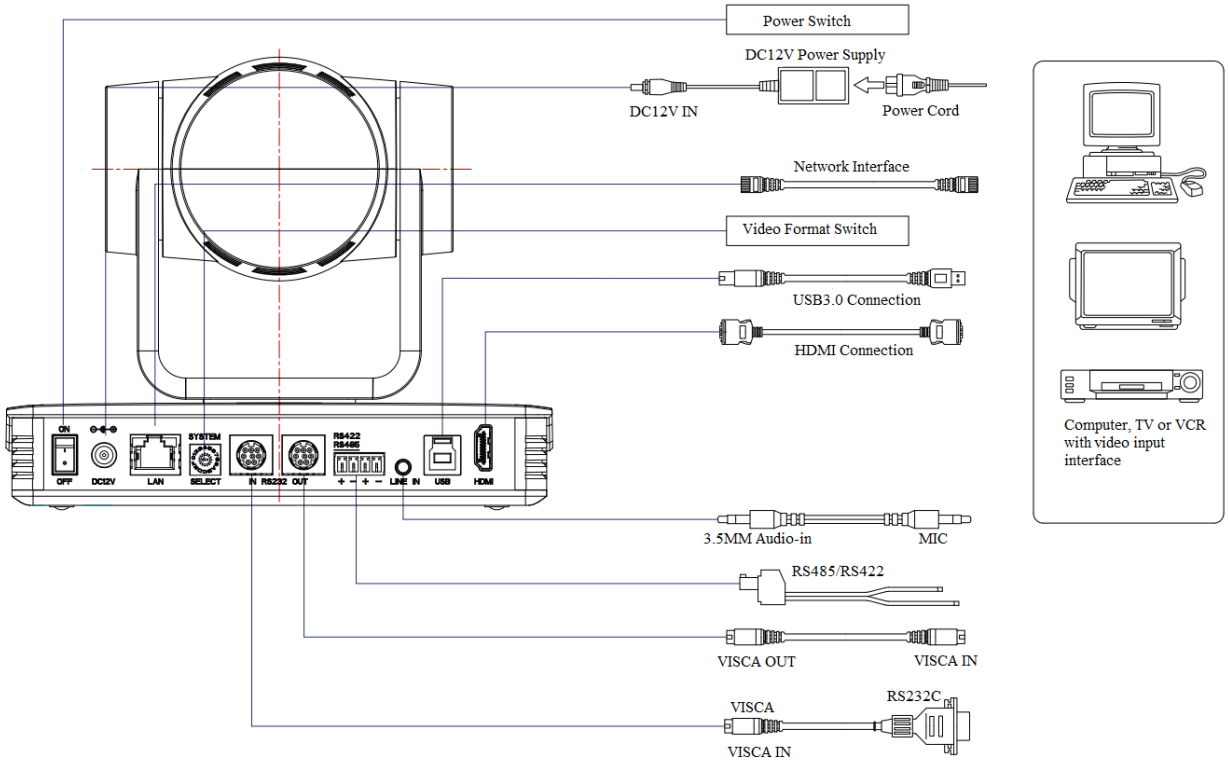


Figure 1.3 Wiring Diagram

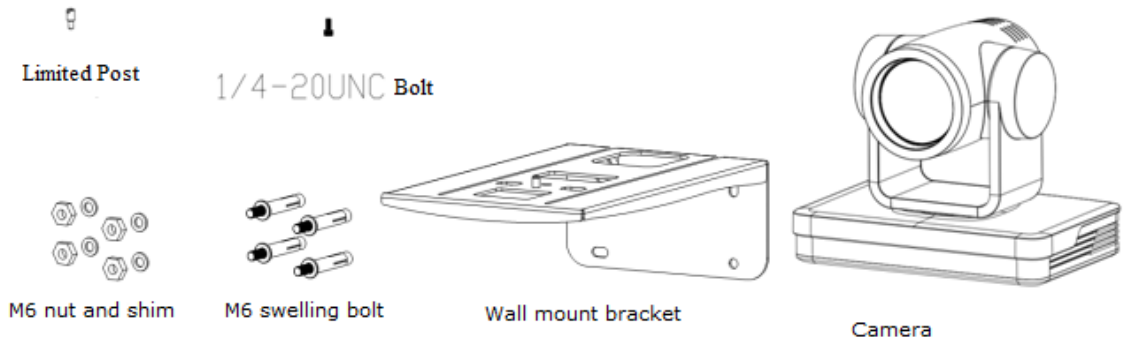
1) After power on and self-warming, the camera will automatically return to the preset 0 position if it's pre-set.

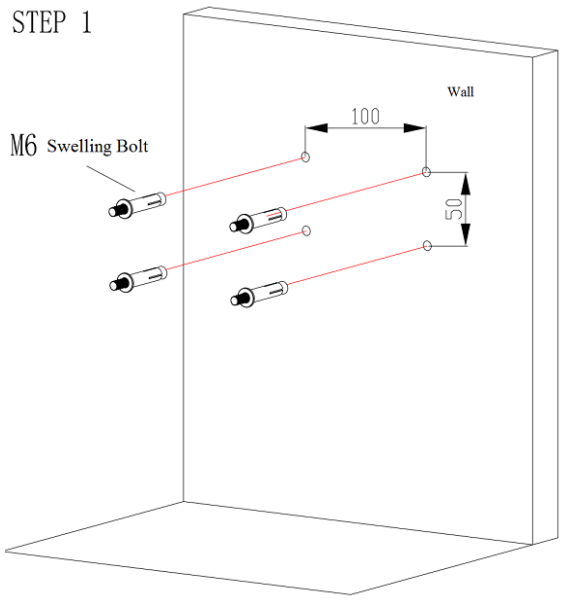
2) The default address for the IR remote control is 1#. If the menu restored to factory defaults, the remote-control default address will restore to 1#.

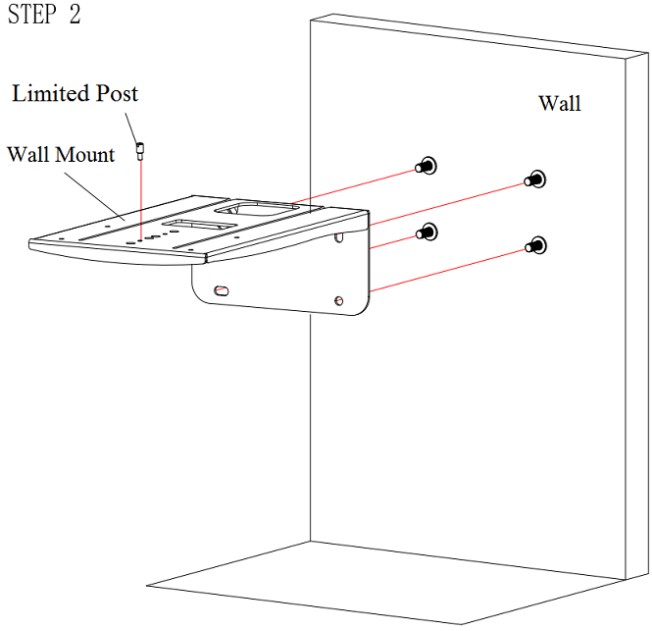
1.3 Mounting Brackets

Notes:
Ceiling or wall mounting brackets can only be mounted on a concrete wall.
For safety reason, plasterboard is not recommended.

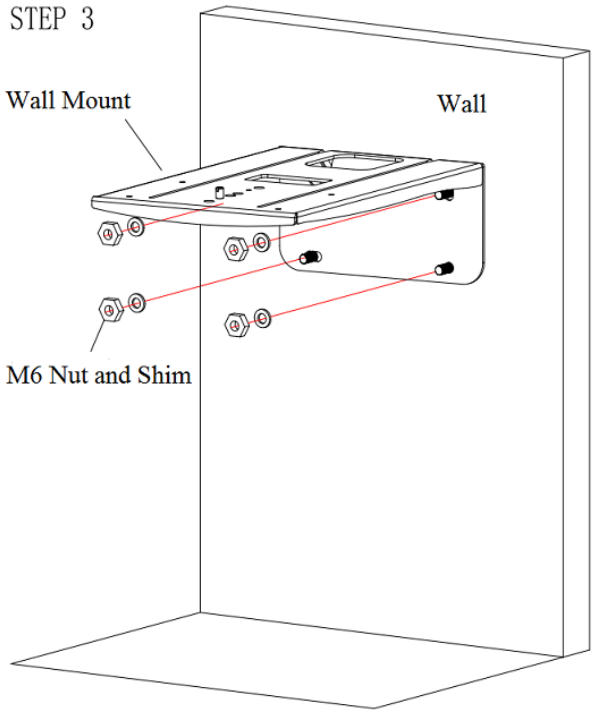
1）Wall Mounting



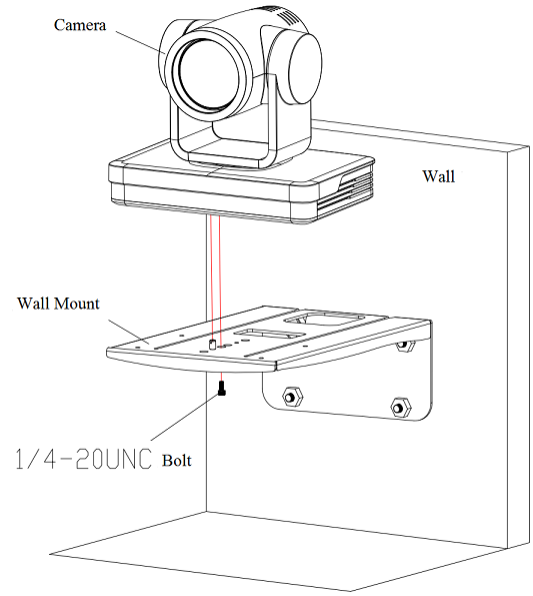




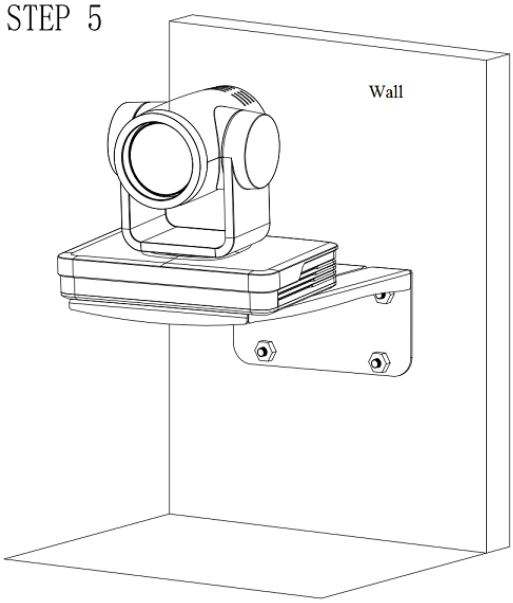
STEP 3



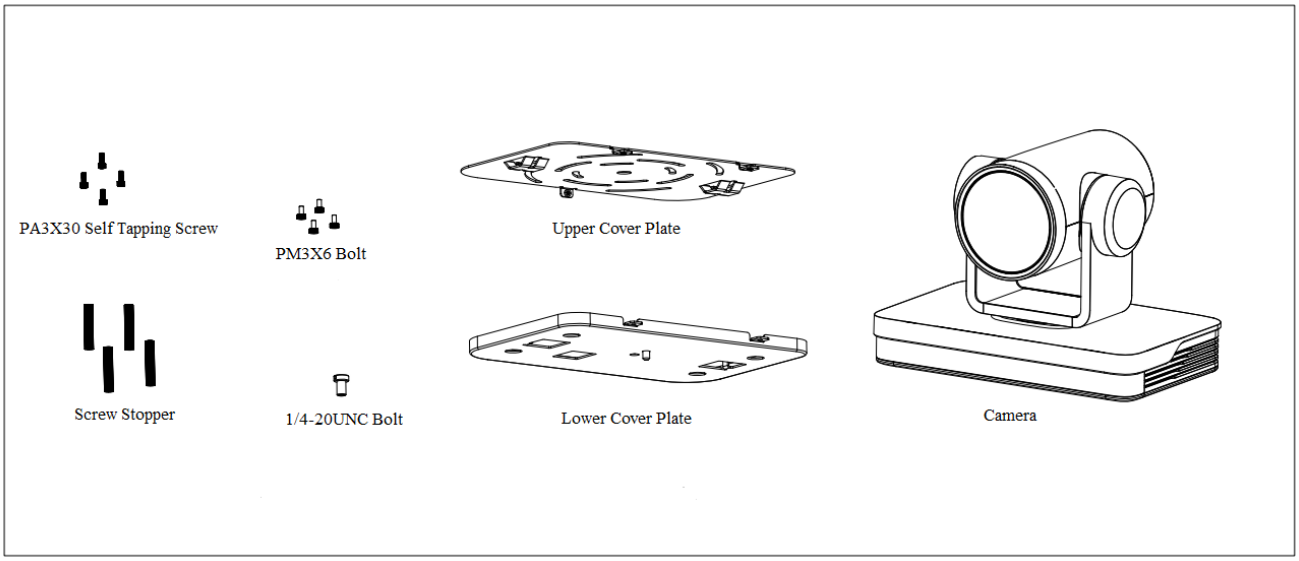
STEP 4

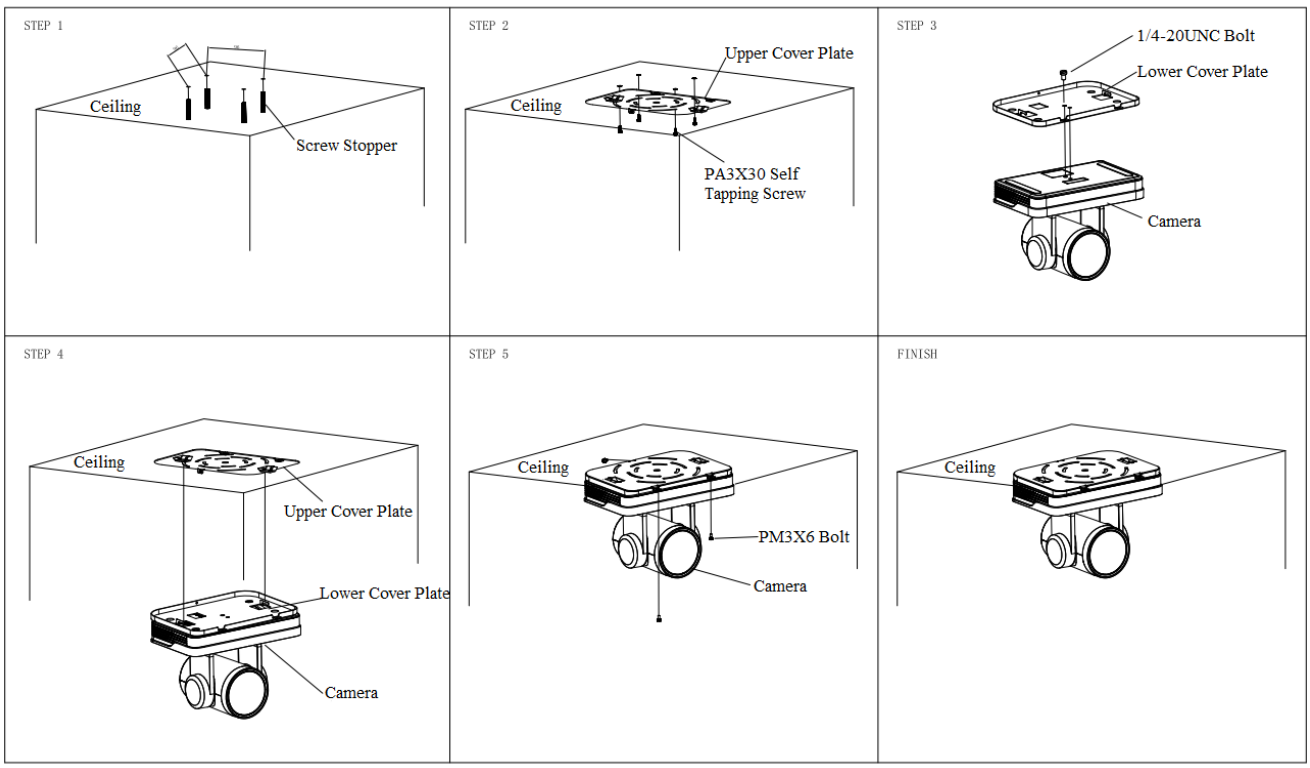


STEP 5



2）Ceiling Mounting





2. Product Overview

2.1 Dimension

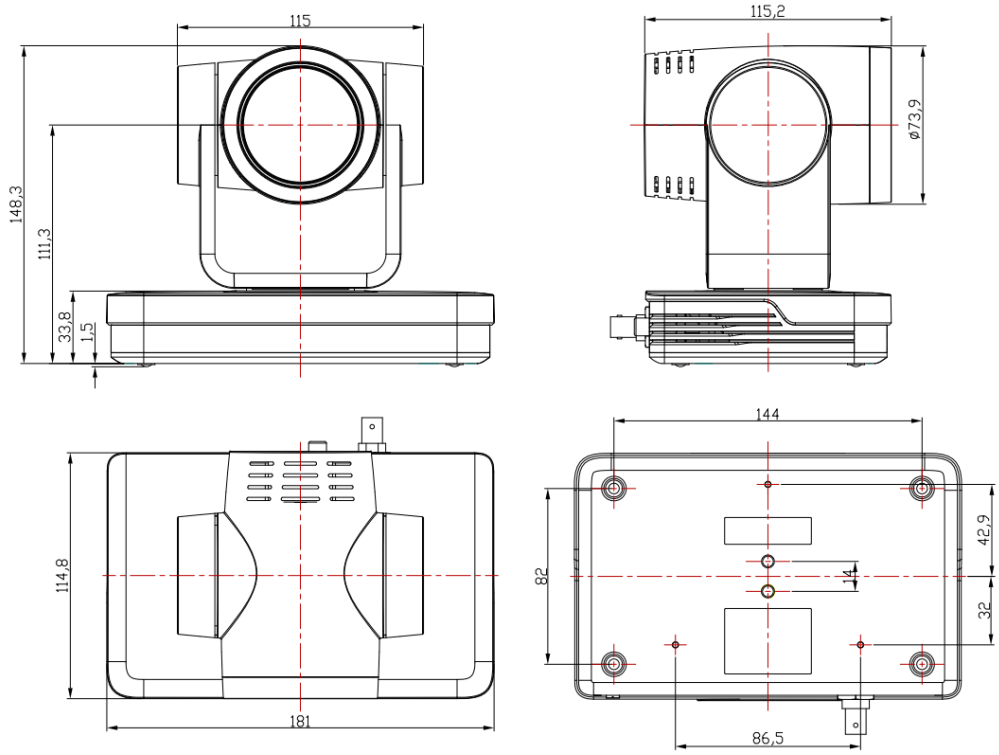


Figure 2.2 Product Dimension

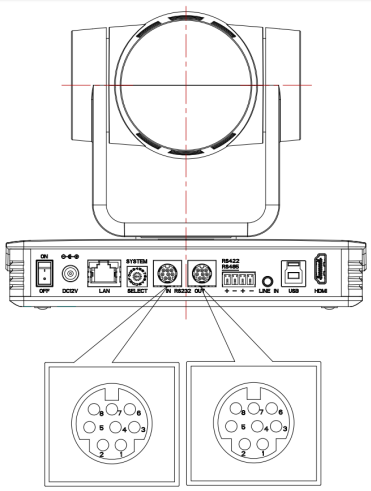
2.2 Accessory

Please see below standard and optional accessories when unpacking the box.

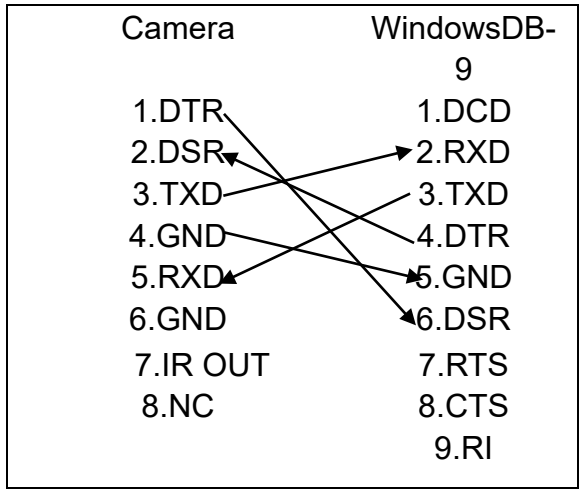
Standard Accessories
Power adapter
IR Remote Control
RS232 Cable
User Manual
USB3.0 Cable
Wall or Ceiling Mount Bracket

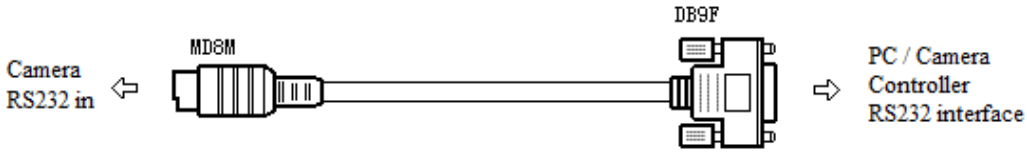
2.3 RS-232 Interface

1）RS-232 Interface Definition



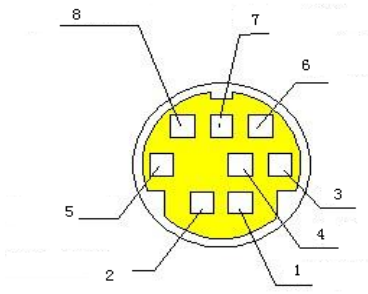
Connection to PC or Camera Controller





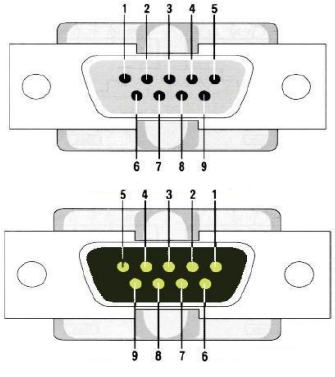
2）Mini-DIN8-pin Port Definition

3)



NO.	Port	Definition
1	DTR	Data Terminal Ready
2	DSR	Data Set Ready
3	TXD	Transmit Data
4	GND	Signal Ground
5	RXD	Receive Data
6	GND	Signal Ground
7	IR OUT	IR Commander Signal
8	NC	No Connection

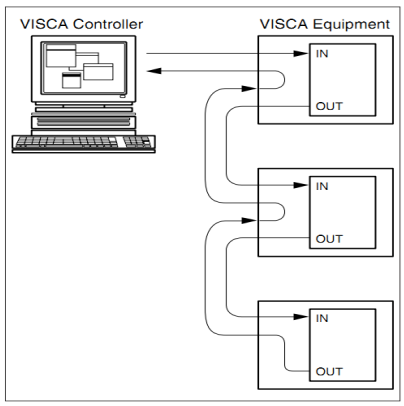
RS232(DB9) Port Definition



NO.	Port	Definition
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	System Ground
6	DSR	Data Set Ready

7	RTS	Request to Send
8	CTS	Clear to Send
9	RI	Ring Indicator

VISCA serial network as shown below

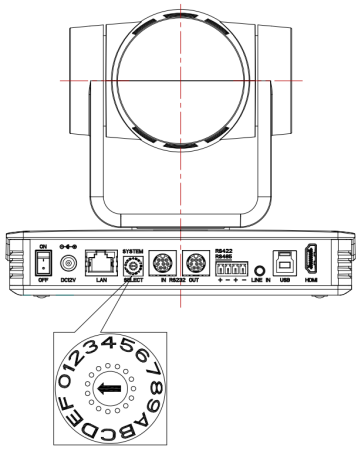


Camera cascade connection

Camera 1	Camera 2
1.DTR	1.DTR
2.DSR	2.DSR
3.TXD	3.TXD
4.GND	4.GND
5.RXD	5.RXD
6.GND	6.GND
7.IR OUT	7.OPEN
8. NC	8.OPEN

Note: Camera has an RS232 input and output interfaces, which can be cascaded according to the above diagram;

2.4 Rotary DIP Switch



Dial-up	video format	Dial-up	video format
0	4KP60	8	1080P30
1	4KP50	9	1080P25
2	4KP30	A	720P60
3	4K25	B	720P50
4	1080P60	C	video format to be set on the menu
5	1080P50	D	video format to be set on the menu
6	1080I60	E	video format to be set on the menu
7	1080I50	F	video format to be set on the menu

Note: After the video format is modified by the rotating encoder, a full power cycle is required.
Example: Turn the dial to C, D, E or F, power off the and restart it after a few seconds, the On-Camera Display menu will now reflect the new video format selected.

2.5 Main Features

This series camera has multiple functions, superior performance and a rich video output interface; Featuring advanced ISP processing algorithms, offering vivid and high resolution video with a strong sense of depth and fantastic color rendition. It supports H.264 and H.265 encoding which makes motion video more fluent and clear under low bandwidth conditions.

- **4K UHD Resolution**: 8.51M megapixel high quality SONY CMOS sensor. Resolution is up to 4K with frame rate up to 60fps.
- **Optical Zoom Lens**: 12X optical zoom lens and 70° wide angle lens, 5X optical zoom lens and 80° wide angle lens for options.
- **Leading Auto Focus Technology:** Fast, accurate and stable auto focusing technology.
- **Low Noise and High SNR**: Super high Signal-to-Noise Ratio is achieved with a low noise CMOS sensor. Advanced 2D/3D noise reduction technology further reduces the noise while ensuring high image clarity.
- **Multiple video output interfaces:** HDMI, USB3.0, LAN.
- **Multiple Audio/Video Compression Standards**: USB3.0 interface supports MJPEG, H264, YUY2, NV12, H265; supporta AAC, MP3 and G.711A audio compression, 8000, 16000, 32000, 44100, 48000 sampling frequency.
- **Multiple Network Protocols**: Supports ONVIF, RTSP, RTMP protocols; Support RTMP push mode, easy to be connected to streaming servers; Support RTP multicast mode; Support network full command for VISCA control protocols.
- **Control Interface:** RS422 input (compatible with RS485), RS232 input/output (cascade connection)
- **Multiple Control Protocols**: Support VISCA, PELCO-D and PELCO-P protocols; Support automatic identification protocols.
- **Built-in gravity sensor:** Built-in gravity sensor, Support PTZ automatic flip function, convenient for installation.

- **Quiet Pan / Tilt Movement**: With high accuracy step driving motor, the camera pan and tilt is extremely quiet and smooth.
- **Multiple presets**: Up to 255 presets (10 presets via remote control).
- **IR / Wireless Remote Control:** Users can choose IR remote control or wireless remote control according to different conditions. 2.4G wireless remote control is not affected by the angle, distance or infrared interference. Far-end-control is also available.
- **Multiple Applications**: Online-education, Lecture Capture, Webcasting, Video conferencing, Tele-medicine, Unified Communication, Emergency command and control systems, etc.

2.6 Technical Parameters

Camera Parameter		
Model	**A**	**B**
Optical Zoom	12X	5X
View Angle	Parallel：6.55°（N）～69.4°（W） Vertical：3.66°（N）～42.8°（W）	Parallel：26.51°（N）～79.18°（W） Vertical：15.29°（N）～49.22°（W）
AV	F1.6 ～ F2.8±5%	F2.0 ～ F2.8±5%
Sensor	1/2.8 inch SONY CMOS sensor	1/2.5 inch SONY CMOS sensor
Effective Pixels	8.51M megapixel 16:9	
Video Format	**HDMI video format** 4KP60, 4KP50, 4KP30, 4KP25, 1080P60, 1080P50, 1080I60, 1080I50, 1080P30, 1080P25, 720P60, 720P50 **USB3.0 interface video format** YUY2/NV12: 1920×1080P30, 1280×720P30, 960×540P30, 640×360P30, 640×480P30, 320×176P30 MJPEG/ H.264/ H.265: 3840×2160P30, 1920×1080P30, 1280×720P30, 1024×576P30, 960×540P30, 800×448P30, 640×360P30, 640×480P30, 320×176P30 **USB3.0 is compatible with USB2.0 video format** YUY2/NV12: 640×360P30, 640×480P30, 320×176P30 MJPEG/ H.264/ H.265: 3840×2160P30,1920×1080P30, 1280×720P30, 1024×576P30, 960×540P30, 800×448P30, 640×360P30, 640×480P30, 320×176P30	
Minimum Illumination	0.05Lux (F1.8, AGC ON)	
DNR	2D & 3D DNR	
White Balance	Auto / Manual/ One Push/ Specify color temperature	
Focus	Auto/ Manual/ One Push Focus	
Exposure Mode	Auto/ Manual/ Shutter priority/ Aperture priority/ brightness priority	
Aperture	F1.8 ～ F11 CLOSE	
Shutter Speed	1/25～1/10000	
BLC	ON/ OFF	
WDR	OFF/ Dynamic level adjustment	
Video Adjustment	Brightness, Color, Saturation, Contrast, Sharpness, B/W mode, Gamma curve	
SNR	≥50dB	

Input/Output Interface	
Video Interfaces	HDMI, USB3.0（Type B compatible with USB2.0, LAN (POE), A-IN, RS232-IN, RS232-OUT, RS422（compatible with RS485, Rotary DIP switch, DC12V Power Supply, Power Switch
Video Compression Format	LAN Interface: H.265, H.264 USB 3.0 Interface: YUY2, MJPEG, H.264, H265, NV12
Audio Input Interface	Double track 3.5mm linear input
Audio Output Interface	HDMI, LAN, USB3.0
Audio Compression Format	AAC, MP3, G.711A
Network Interface	10M/ 100M/ 1000M Adaptive Ethernet port, support POE power supply, support audio and video output
Network Protocols	RTSP, RTMP, ONVIF, Network VISCA control protocol； Support remote upgrade, reboot and reset
Control Interface	RS232-IN, RS232-OUT, RS422 compatible with RS485
Serial Communication protocol	VISCA/ Pelco-D/ Pelco-P Baud Rate: 115200/ 38400/ 9600/ 4800/ 2400
USB Communication Protocol	UVC（Video，UAC（Audio）
Power Interface	HEC3800 outlet (DC12V)
Supply Adapter	AC110V-AC220V to DC12V/2.5A
Input Voltage	DC12V±10%
Input Current	<1A
Power Consumption	<12W

PTZ Parameter	
Pan Rotation	-170°～+170°
Tilt Rotation	-30°～+90°
Pan Control Speed	0.1°/s～100°/s
Tilt Control Speed	0.1°/s～45°/s
Preset Speed	Pan: 100°/s, Tilt: 45°/s
Preset Number	255 presets (10 presets via remote control)

Other Parameter	
Stored Temperature	-10℃～+60℃
Stored Humidity	20%～95%
Working Temperature	-10℃～+50℃
Working Humidity	20%～80%
Dimension	181mm（L）×115mm（W）×149mm（H）
Weight	1.15kg
Application	Indoor

Accessory	
Package	Power Supply, RS232 Control Cable, USB3.0 Cable, IR Remote Control, User Manual
Optional Accessories	Ceiling / Wall Mount (Extra Cost)

3. Remote Control

Remote control instructions: remote control is divided into two types: infrared remote control and wireless remote control. Please read the following contents according to the actual remote-control type.

3.1 Code Matching for Wireless Remote Control



One to One Code Matching:

Press the "set" button and "[CAMERA NUMBER]" keys combined for 3 seconds, LED indicator starts flashing. When the camera receives the signal the power on LED indicator will go off if the code matching was successful. The camera can then be controlled by this remote control after one to one code pairing. Otherwise please clear the code matching of this remote control or use another remote control to pair with the camera again.

If one to one code matching failed, the red LED light flashes for 20 seconds and then goes off, the camera will stop code match and turn on sleep mode; Press any key to wake up the camera and restart code matching procedure.

Note: After code matching is successful, please select the camera address to control it.

Clearing Code:

Press the "set" button and "[CAMERA NUMBER]" keys combined for 3 seconds, the LED indicator starts flashing. The camera will power off and on, the LED indicator will go off if code clearing successfully.

Sleep Mode and Wake Up:

Press any key to wake up the camera from sleep mode.

3.2 Keys Introduction for IR Remote Control

1) In this manual, “press the key” means a click rather than a long-press, and a special note will be given if a long-press for more than one second is required.
2) When a key-combination is required, do it in sequence. For example, “【*】+【#】+【F1】” means press“【*】”first and then press“【#】” and last press“【F1】”.

1. Standby Key

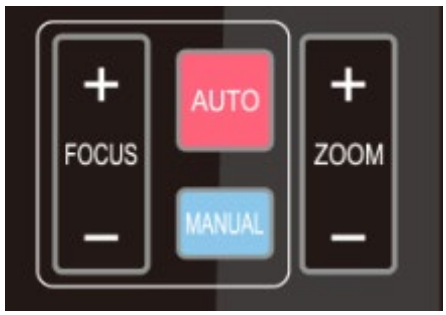
The camera enters standby mode if long pressed for 3s on standby key;
Long press 3s again on the standby key, the camera will self-check again and return to HOME position (If preset 0 position is set, the camera will return to preset 0 position).

2. Camera Selection



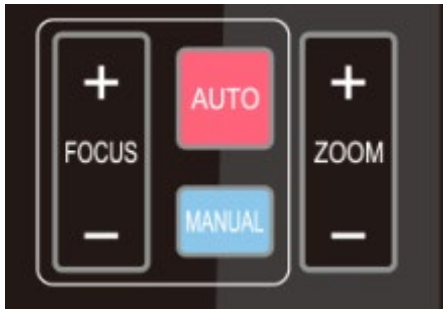
Select the camera address to control.

3. Focus Control



Auto: auto focus mode
Manual: manual focus mode
Focus + (near)**:** Press【FOCUS +】 key (Valid only in manual focus mode)
Focus - (far)**:** Press【FOCUS -】 key (Valid only in manual focus mode)
Press and hold the keys, the action of focus will keep continue and stop as soon as the key is released.

4. Zoom Control



ZOOM +: press【ZOOM +】key to zoom in
ZOOM -: press 【ZOOM -】key to zoom out
Press and hold the keys, the action of focus will keep continue and stop as soon as the key is released.

5. Set and Clear Presets





Set Preset: press 【SET PRESET】 button, and then press the number key 0-9 to set preset positions.
Note: 10 presets via remote control.

Call Preset: Press a number key 0-9 directly to call a preset position.

Clear Preset: press 【CLEAR PRESET】 button, and then press the number key 0-9 to clear preset positions.

Note : press the【#】 key three times continually to clear all presets.

6. Pan/Tilt Control



Up: press ◄ **Down**: press ▲
Left: press ▼ **Right**: press ◄
Back to middle position: press "【HOME】"

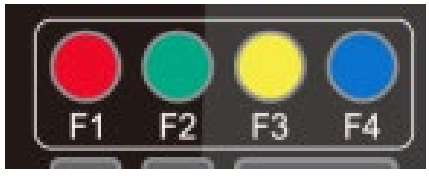
Press and hold the up/ down/ left/ right key, the pan/ tilt movements will keep running, from slow to fast, until it runs to the endpoint; movement stops as soon as the key is released.

7. Menu Setting



【MENU】: Open / close the OSD menu
【HOME】: Camera lens back to the middle position; Confirm button; Enter next menu
【↑】【↓】: Choose item
【←】【→】: Modify values
【BLC ON/OFF】: Turn on or off the back light compensation

8. Camera Remote Control Address Setting



【*】+【＃】+【F1】: Camera Address No.1
【*】+【＃】+【F2】: Camera Address No. 2
【*】+【＃】+【F3】: Camera Address No. 3
【*】+【＃】+【F4】: Camera Address No. 4



9. Key Combination

1) 【#】+【#】+【#】: Clear all presets
2) 【*】+【#】+【6】: Restore factory defaults
3) 【*】+【#】+【3】: Menu set to Chinese
4) 【*】+【#】+【4】: Menu set to English
5) 【*】+【#】+【9】: Flip switch
6) 【*】+【#】+ Auto: Enter aging mode
7) 【#】+【*】+ Auto: Exit aging mode
8) 【*】+【#】+Manual: Restore the default username, password, and IP address
9) 【#】+【#】+【0】: Switch the video format to 4KP60
10) 【#】+【#】+【1】: Switch the video format to 4KP50
11) 【#】+【#】+【2】: Switch the video format to 4KP30
12) 【#】+【#】+【3】: Switch the video format to 4KP25
13) 【#】+【#】+【4】: Switch the video format to 1080P60
14) 【#】+【#】+【5】: Switch the video format to 1080P50
15) 【#】+【#】+【6】: Switch the video format to 1080I60
16) 【#】+【#】+【7】: Switch the video format to 1080I50
17) 【#】+【#】+【8】: Switch the video format to 1080P30
18) 【#】+【#】+【9】: Switch the video format to 1080P25

Note: If the address of former remote control is not addressed to 1 but another one from 2, 3 or 4, the corresponding camera address will restore to address 1 when all parameters are restored to factory default. User should change the remote control address to address 1.

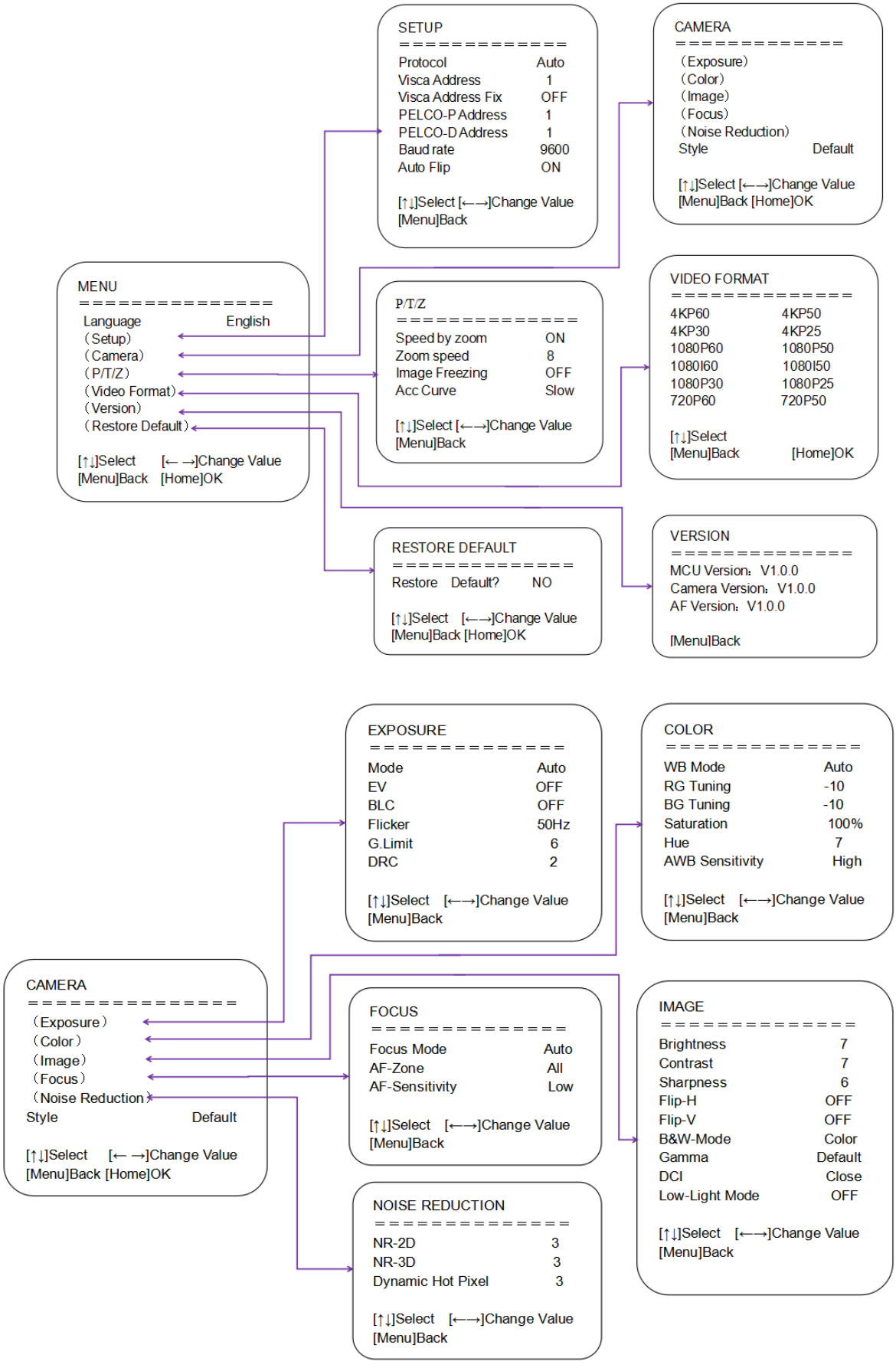
3.3 Menu Introduction

Note: The settings modified are only valid if saved before the menu is exited and/ or camera powered off.

1) Menu Control

【MENU】: Enter / exit the OSD menu or return to the previous menu
【HOME】: Enter next menu
【↑】【↓】: Choose item
【←】【→】: Modify values

2) Menu Layout



4. Network Configuration

4.1 Network Connection

Direct connection: Connect the camera and computer with standard network cable.
Internet connection mode: Connect the camera to Internet by Router or Switch, user can log in to the device by the on-board web browser page.

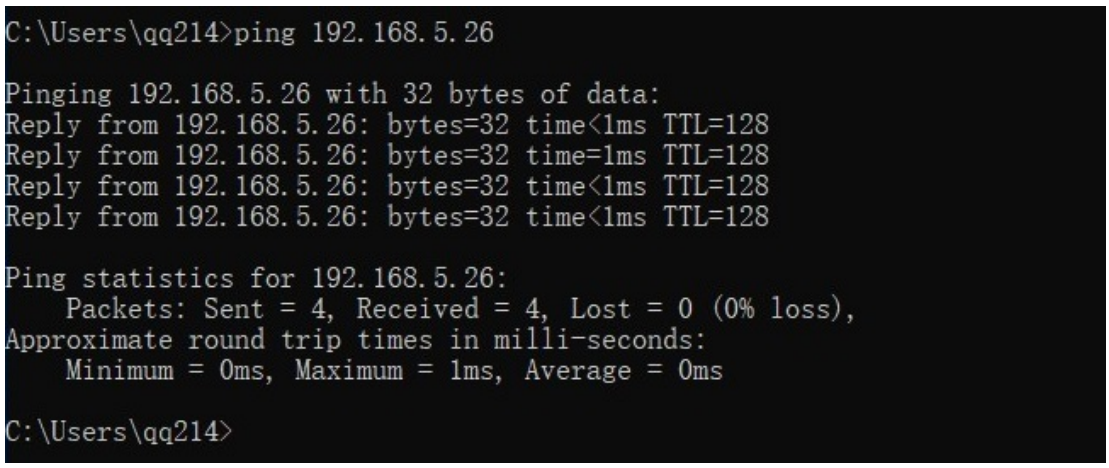
Static IP/ Network address mode:
The computer must be in the same network segment as the camera. The device will not be accessible if the network segments do not match.

The camera's default IP address is **192.168.5.163**, subnet **255.255.255.0**

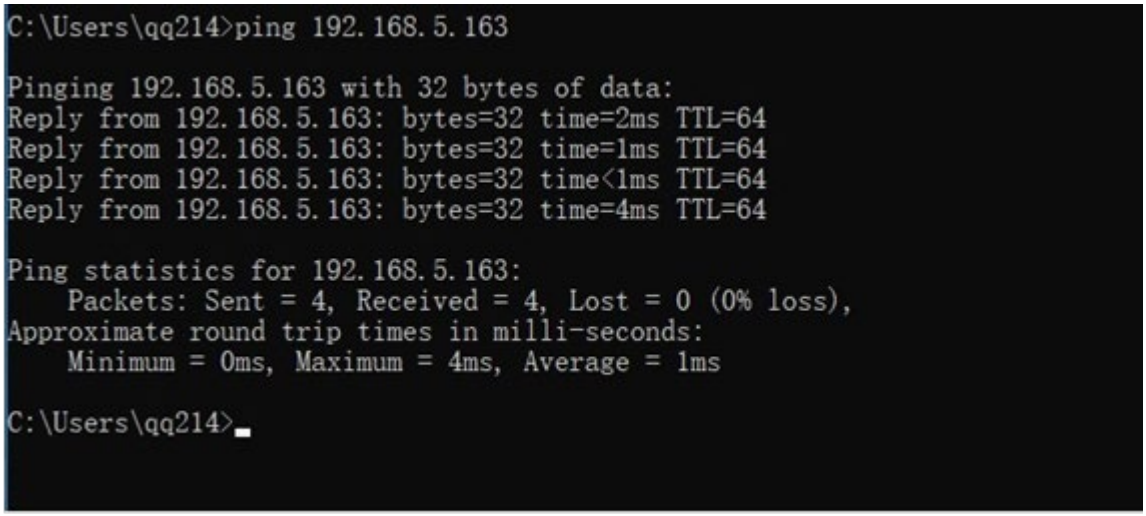
To set computer to static IP:
Open the "Network and Internet Settings" window of your computer. Navigate to the Local Area Network Connection Properties, select the "Internet protocol version 4(TCP/IPv4)". Double click or click the property "Internet" protocol version 4 (TCP/IPv4) to enter into the Internet Protocol Version 4(TCP/IPv4) Properties window; select "Advanced" to enter TCP/IP Settings window and set a static IP and subnet mask to match the camera's default IP range. Click "Confirm" to apply the changes.

Note: The IP address of the computer cannot be same as that of other computers or devices. The availability of the IP address to be used must be verified to be available before setting the computer to the static IP address.

To verify whether the network segment has been successfully added, click the "Start" menu button and type cmd in the search bar, then click CONFIRM and open DOS command prompt window; e.g. type 'ping 192.168.5.26' and press enter to display information as shown below:



User can also verify network connection to the camera as per the steps above. If IP is default, open DOS command window and input 192.168.5.163, then press enter; It will show the message as below, which means the network connection to the camera is normal.



4.2.1 Web Client

1）Web Client Login

To Access the Web Client Interface, type the device's IP address (default = 192.168.5.163) in the address field of your internet browser and press enter to access the Web Client login page as pictured below. You can log in as a standard or as an administrator.

When logging in as an administrator (Default User name: **admin** ; Password: **admin**), users can preview the camera image, playback and configure the camera settings; If loging in as 'standard user' (Default User name and Password: **user1** or **user2**), users can only access the preview and playback functions, no options for the camera configuration is accessible as 'user' log-in.

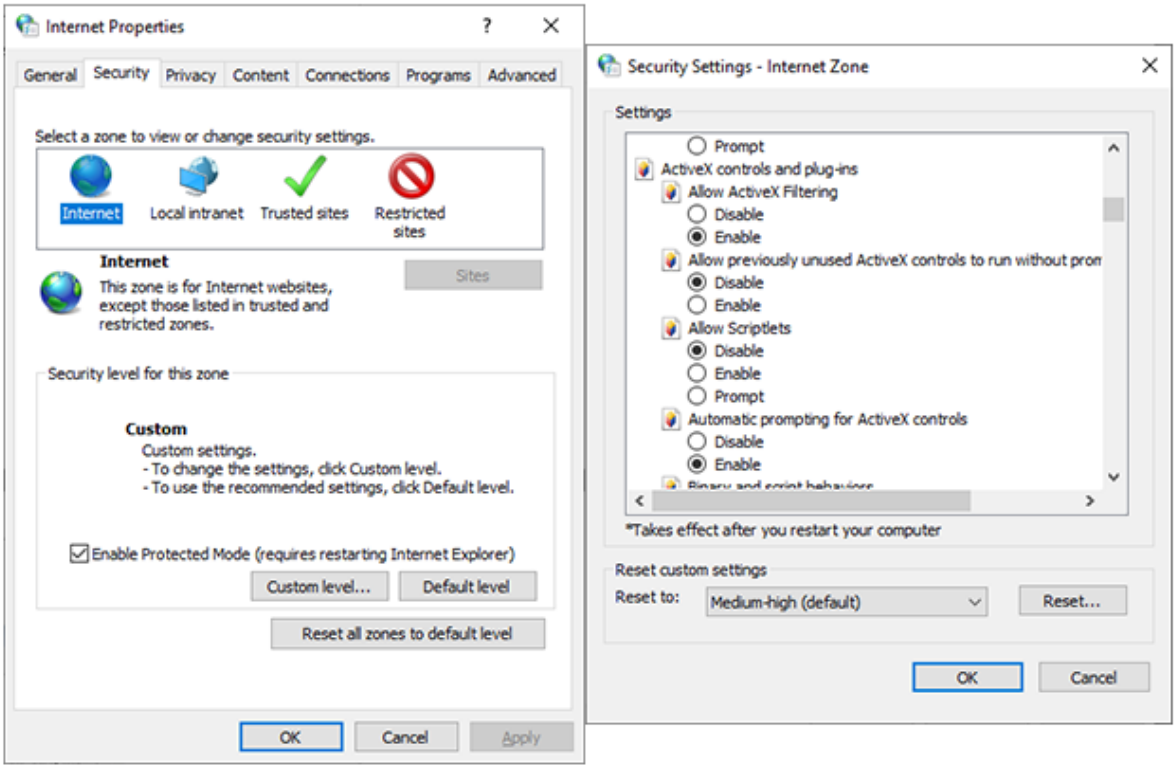
Note: Web access supported browsers: Internet Explorer is preferred, but other web browsers can also be used.

Language Selection: Click and select "Chinese/ English" in the upper right corner of the login page to select the language of the web interface.

2）Download/ Install Plug in

At first launch of Internet Explorer to access the web interface, the login page will display "Playback plug-in is not installed, please download and install!" Click on the pop-up message to download and install "MRWebXinstall.exe" and follow the prompts.

If there is a warning message and you cannot download the file, navigate on the menu bar to: Browser > Tools > Internet Options > Security > Custom level > security settings - Internet zone; check "enable" or "prompt" in the directory of ActiveX control and plug-in.



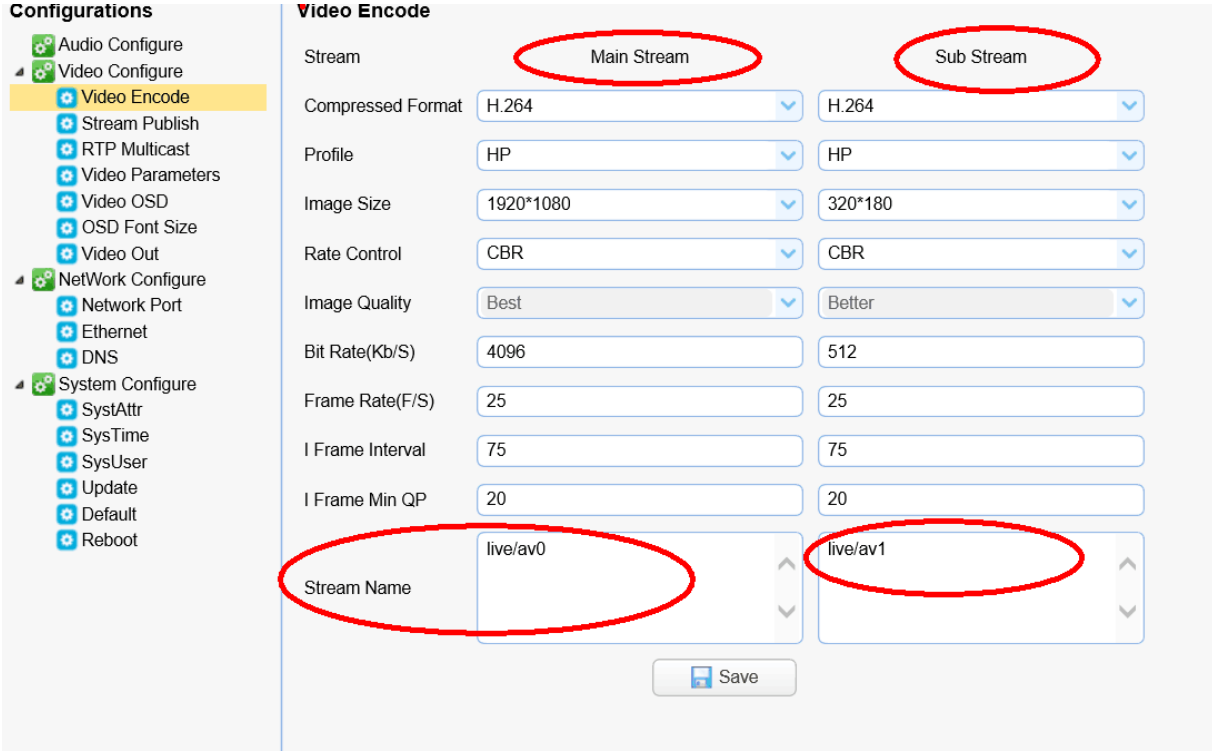
3) Web login

After installation of the plugin, enter user name and password and click and Sign-in (default user name and password: "admin/ admin") users can change the username and password on their own in the Web client management interface.

4.3 Streaming

1) Video Stream Capture

Configurations -> Video Configure-> Video Encode



For example:

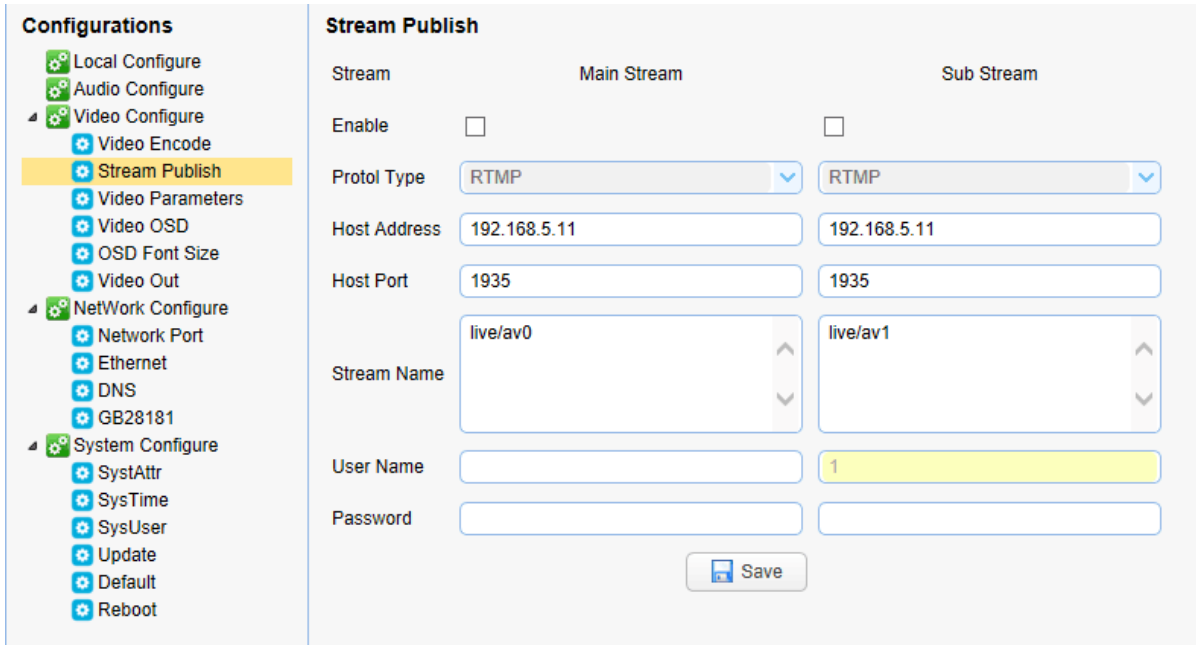
The default IP address of the camera is 192.168.5.163. The way to obtain the RTSP video stream is as below:

rtsp://192.168.5.163:554/live/av0（av0 main stream）
rtsp://192.168.5.163:554/live/av1（av1 sub stream）

The default IP address of the camera is 192.168.5.163. the way to obtain RTMP video stream is as below
rtmp://192.168.5.163:1935/live/av0（av0 main stream）
rtmp://192.168.5.163:1935/live/av1（av1 sub stream）

2) Push Video Stream

Configurations -> Video Configure-> Stream Publish



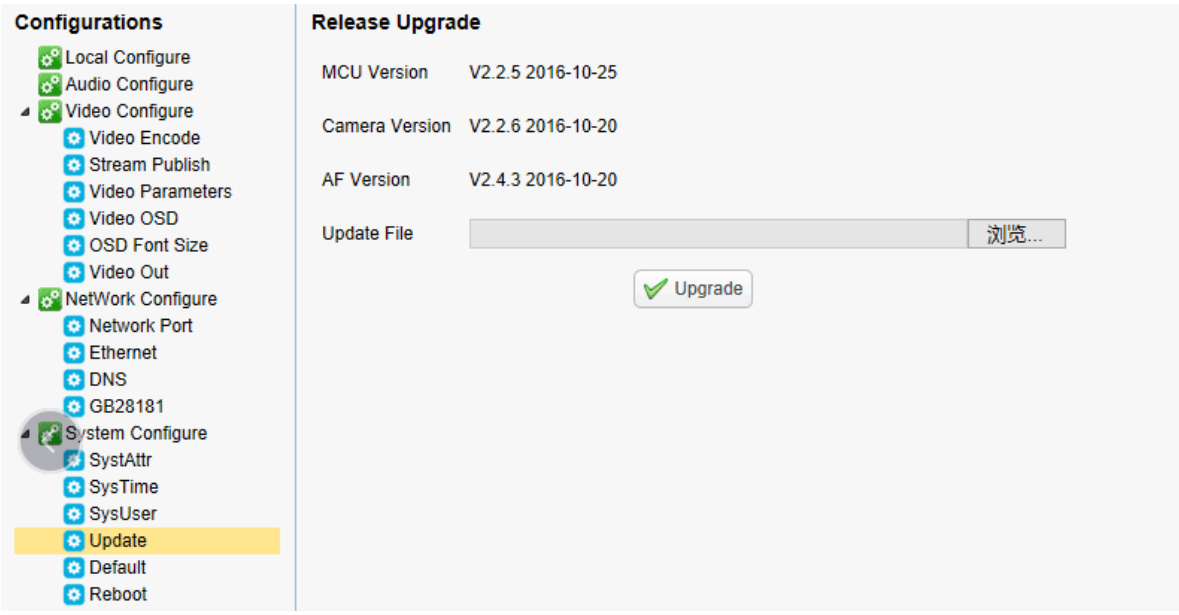
When pushing RTMP streams to public network servers or streaming clients, the streaming camera must have access and rights to connect to the internet, otherwise it will fail to connect to the required server.

Host address: server address, which can be either a domain name or an IP address
Host port: server default port number
Stream name: live/test (live/ XXX)
Username and password: the username and password set by the server, or leave it empty
Access url：rtmp://host domain name: host port/live/xxx
Or (rtmp: //host IP address: host port/live/xxx)
Note: Consult your streaming service provider's user guides for more information on correct stream setup

4.4 Firmware Update

1) Log in to the web page and manage camera settings as described above.

2) Click on Configuration tab and navigate to; Configurations -> System Configure-> Update



3) Click "browse" to select the “xxxxx.mrg” update file, then click the upgrade button to finish the firmware update.

4) The camera will reboot after completion of the firmware update. It prompts with "successful upgrade". Log back in to check the firmware version to ensure firmware update was successful.

5) Optionally; click ‘Default’ and then on "restore factory default" to restore parameters to factory default if required, and follow prompts to log back into the web interface after successful reboot.

5. Serial Port Communication and Control

The camera can be controlled through RS232/ RS485 interface; the RS232C serial parameters are as follows:
Baud rate: 2400/ 4800/ 9600/ 115200 bits / sec; Start bit: 1; data bits: 8; Stop bit: 1; Parity: None.

After power on, the camera performs a self-test. The self-test is finished when the camera zoom lens is moved to the farthest and then back to the nearest position. If the camera has a saved 0/ Home preset, it will revert to the 'Home" position after initialization. At this point, the user can control the camera via the serial commands.

5.1 VISCA Protocol Return Command

Ack/Completion Message		
	Command packet	**Note**
ACK	z0 41 FF	Returned when the command is accepted.
Completion	z0 51 FF	Returned when the command has been executed.

z = camera address + 8

Error Messages		
	Command packet	**Note**
Syntax Error	z0 60 02 FF	Returned when the command format is different or when a command with illegal command parameters is accepted
Command Not Executable	z0 61 41 FF	Returned when a command cannot be executed due to current conditions. For example, when commands controlling the focus manually are received during auto focus.

5.2 VISCA Protocol Control Command

Command	**Function**	**Command packet**	**Note**
AddressSet	Broadcast	88 30 0p FF	p：Address setting
IF_Clear	Broadcast	88 01 00 01 FF	I/F Clear
CommandCancel		8x 21 FF	
CAM_Power	On	8x 01 04 00 02 FF	Power ON/OFF
	Off	8x 01 04 00 03 FF	
CAM_Zoom	Stop	8x 01 04 07 00 FF	
	Tele(Standard)	8x 01 04 07 02 FF	
	Wide(Standard)	8x 01 04 07 03 FF	
	Tele(Variable)	8x 01 04 07 2p FF	p = 0(low) - F(high)
	Wide(Variable)	8x 01 04 07 3p FF	
	Direct	8x 01 04 47 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM _Focus	Stop	8x 01 04 08 00 FF	
	Far(Standard)	8x 01 04 08 02 FF	
	Near(Standard)	8x 01 04 08 03 FF	
	Far(Variable)	8x 01 04 08 2p FF	p = 0(low) - F(high)
	Near (Variable)	8x 01 04 08 3p FF	
	Direct	8x 01 04 48 0p 0q 0r 0s FF	pqrs: Focus Position

Command	Function	Command packet	Note
	Auto Focus	8x 01 04 38 02 FF	
	Manual Focus	8x 01 04 38 03 FF	
	One Push mode	8x 01 04 38 04 FF	
CAM _Zoom Focus	Direct	8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF	pqrs: Zoom Position tuvw: Focus Position
CAM_AFSensitivity	High	8x 01 04 58 01 FF	Focus sensitivity Setting
	Normal	8x 01 04 58 02 FF	
	Low	8x 01 04 58 03 FF	
CAM_AFZone	Top	8x 01 04 AA 00 FF	Focus Region Setting
	Center	8x 01 04 AA 01 FF	
	Bottom	8x 01 04 AA 02 FF	
	ALL	8x1 01 04 AA 03 FF	
CAM_WB	One Push mode	8x 01 04 35 03 FF	
	One Push Trigger	8x 01 04 10 05 FF	One Push WB Trigger(Enabled during One Push WB mode)
	CAM_WB Mode	8x 01 04 35 pq FF	pq = 00--33 WBMode
CAM_AWBSensitivity	Low	8x 01 04 A9 00 FF	WB Sensitivity Setting
	Normal	8x 01 04 A9 01 FF	
	High	8x 01 04 A9 02 FF	
CAM _RGain	Reset	8x 01 04 03 00 FF	Manual Control of R Gain
	Up	8x 01 04 03 02 FF	
	Down	8x 01 04 03 03 FF	
	Direct	8x 01 04 43 00 00 0p 0q FF	pq: R Gain
CAM_ Bgain	Reset	8x 01 04 04 00 FF	Manual Control of B Gain
	Up	8x 01 04 04 02 FF	
	Down	8x 01 04 04 03 FF	
	Direct	8x 01 04 44 00 00 0p 0q FF	pq: B Gain
CAM_AE	Full Auto	8x 01 04 39 00 FF	Automatic Exposure mode
	Manual	8x 01 04 39 03 FF	Manual Control mode
	Shutter priority	8x 01 04 39 0A FF	Shutter Priority Automatic Exposure mode
	Iris priority	8x 01 04 39 0B FF	Iris Priority Automatic Exposure mode
	Bright	8x 01 04 39 0D FF	Bright mode
CAM_Shutter	Reset	8x 01 04 0A 00 FF	Shutter Setting
	Up	8x 01 04 0A 02 FF	
	Down	8x 01 04 0A 03 FF	
	Direct	8x 01 04 4A 00 00 0p 0q FF	pq: Shutter Position
CAM_Iris	Reset	8x 01 04 0B 00 FF	Iris Setting
	Up	8x 01 04 0B 02 FF	
	Down	8x 01 04 0B 03 FF	
	Direct	8x 01 04 4B 00 00 0p 0q FF	pq: Iris Position
CAM_Gain Limit	Reset	8x 01 04 0C 00 FF	Gain Limit Setting
	Up	8x 01 04 0C 02 FF	
	Down	8x 01 04 0C 03 FF	
	Gain Limit	8x 01 04 2C 0p FF	p: Gain Positon
CAM_Bright	Reset	8x 01 04 0D 00 FF	Bright Setting
	Up	8x 01 04 0D 02 FF	
	Down	8x 01 04 0D 03 FF	

Command	Function	Command packet	Note
	Direct	8x 01 04 4D 00 00 0p 0q FF	pq: Bright Positon
CAM_ExpComp	On	8x 01 04 3E 02 FF	Exposure Compensation ON/OFF
	Off	8x 01 04 3E 03 FF	
	Reset	8x 01 04 0E 00 FF	Exposure Compensation Amount Setting
	Up	8x 01 04 0E 02 FF	
	Down	8x 01 04 0E 03 FF	
	Direct	8x 01 04 4E 00 00 0p 0q FF	pq: ExpComp Position
CAM_Back Light	On	8x 01 04 33 02 FF	Back Light Compensation
	Off	8x 01 04 33 03 FF	
CAM_WDRStrength	Reset	8x 01 04 21 00 FF	WDR Level Setting
	Up	8x 01 04 21 02 FF	
	Down	8x 01 04 21 03 FF	
	Direct	8x 01 04 51 00 00 00 0p FF	p: WDR Level Positon
CAM_NR	2D	8x 01 04 53 0p FF	P=0-7 0:OFF
	3D	8x 01 04 54 0p FF	P=0-8 0:OFF
CAM_Gamma		8x 01 04 5B 0p FF	p = 0 – 4 0：Default 1：0.45 2：0.50 3：0.55 4：0.63
CAM_Low-Light Mode	ON	8x 01 04 2D 01 FF	Low-Light Mode Setting
	OFF	8x 01 04 2D 00 FF	
CAM_Flicker	OFF	8x 01 04 23 00 FF	OFF
	50HZ	8x 01 04 23 01 FF	50HZ
	60HZ	8x 01 04 23 02 FF	60HZ
CAM_Aperture	Reset	8x 01 04 02 00 FF	Aperture Control
	Up	8x 01 04 02 02 FF	
	Down	8x 01 04 02 03 FF	
	Direct	8x 01 04 42 00 00 0p 0q FF	pq: Aperture Gain
CAM_PictureEffect	B&W-Mode	8x 01 04 63 04 FF	PictureEffect Setting
	OFF	8x 01 04 63 00 FF	
CAM_Memory	Reset	8x 01 04 3F 00 pq FF	pq: Memory Number(=0 to 254) Corresponds to 0 to 9 on the Remote Commander
	Set	8x 01 04 3F 01 pq FF	
	Recall	8x 01 04 3F 02 pq FF	
CAM_LR_Reverse	On	8x 01 04 61 02 FF	Image Flip Horizontal ON/OFF
	Off	8x 01 04 61 03 FF	
CAM_PictureFlip	On	8x 01 04 66 02 FF	Image Flip Vertical ON/OFF
	Off	8x 01 04 66 03 FF	
CAM_ColorSaturation	Direct	8x 01 04 49 00 00 00 0p FF	P=0-E 0:60% 1:70% 2:80% 3:90% 4:100% 5:110% 6:120% 7:130% 8:140% 9:150% 10:160% 11:160% 12:180% 13:190% 14:200%
CAM_IDWrite		8x 01 04 22 0p 0q 0r 0s FF	pqrs: Camera ID (=0000 to FFFF)
SYS_Menu	ON	8x 01 04 06 06 02 FF	Turn on the menu screen
	OFF	8x 01 04 06 06 03 FF	Turn off the menu screen
IR_Receive	ON	8x 01 06 08 02 FF	IR(remote commander)receive On/Off
	OFF	8x 01 06 08 03 FF	
IR_ReceiveReturn	On	8x 01 7D 01 03 00 00 FF	IR(remote commander)receive message via the VISCA communication ON/OFF
	Off	8x 01 7D 01 13 00 00 FF	

Command	Function	Command packet	Note
CAM_SettingReset	Reset	8x 01 04 A0 10 FF	Reset Factory Setting
CAM_Brightness	Direct	8x 01 04 A1 00 00 0p 0q FF	pq: Brightness Position
CAM_Contrast	Direct	8x 01 04 A2 00 00 0p 0q FF	pq: Contrast Position
CAM_Flip	OFF	8x 01 04 A4 00 FF	Single Command For Video Flip
	Flip-H	8x 01 04 A4 01 FF	
	Flip-V	8x 01 04 A4 02 FF	
	Flip-HV	8x 01 04 A4 03 FF	
CAM_VideoSystem	Set camera video system	8x 01 06 35 00 0p FF	P: 0~E Video format 0:4KP60 6:1080I60 1:4KP50 7:1080I50 2:4KP30 8:1080P30 3:4KP25 9:1080P25 4:1080P60 A:720P60 5:1080P50 B:720P50
Pan_tiltDrive	Up	8x 01 06 01 VV WW 03 01 FF	VV: Pan speed 0x01 (low speed) to 0x18 (high speed) WW: Tilt speed 0x01 (low speed) to 0x14 (high speed) YYYY: Pan Position ZZZZ: Tilt Position
	Down	8x 01 06 01 VV WW 03 02 FF	
	Left	8x 01 06 01 VV WW 01 03 FF	
	Right	8x 01 06 01 VV WW 02 03 FF	
	Upleft	8x 01 06 01 VV WW 01 01 FF	
	Upright	8x 01 06 01 VV WW 02 01 FF	
	DownLeft	8x 01 06 01 VV WW 01 02 FF	
	DownRight	8x 01 06 01 VV WW 02 02 FF	
	Stop	8x 01 06 01 VV WW 03 03 FF	
	AbsolutePosition	8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	RelativePosition	8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	Home	8x 01 06 04 FF	
	Reset	8x 01 06 05 FF	
Pan-tiltLimitSet	Set	8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	W:1 UpRight 0:DownLeft YYYY: Pan Limit Position(TBD) ZZZZ: Tilt Limit Position(TBD)
	Clear	8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF	

5.3 VISCA Protocol Inquiry Command

Command	Command Packet	Return Packet	Note
CAM_PowerInq	8x 09 04 00 FF	y0 50 02 FF	On
		y0 50 03 FF	Off(Standby)
CAM_ZoomPosInq	8x 09 04 47 FF	y0 50 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM_FocusAFModeInq	8x 09 04 38 FF	y0 50 02 FF	Auto Focus
		y0 50 03 FF	Manual Focus
		y0 50 04 FF	One Push mode
CAM_FocusPosInq	8x 09 04 48 FF	y0 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_AFSensitivityInq	8x 09 04 58 FF	y0 50 01 FF	High
		y0 50 02 FF	Normal
		y0 50 03 FF	Low
CAM_AFZoneInq	8x 09 04 AA FF	y0 01 04 AA 00 FF	Top
		y0 01 04 AA 01 FF	Center
		y0 01 04 AA 02 FF	Bottom
		y0 01 04 AA 03 FF	All
CAM_WBModeInq	8x 09 04 35 FF	y0 50 pq FF	Auto
			pq =WBMode
CAM_AWBSensitivityInq	8x 09 04 A9 FF	y0 50 00 FF	Low
		y0 50 01 FF	Normal
		y0 50 02 FF	High

CAM_RGainInq	8x 09 04 43 FF	y0 50 0B FF	7000K
CAM_BGainInq	8x 09 04 44 FF	y0 50 00 00 0p 0q FF	pq: B Gain
CAM_AEModeInq	8x 09 04 39 FF	y0 50 00 FF	Full Auto
		y0 50 03 FF	Manual
		y0 50 0A FF	Shutter priority
		y0 50 0B FF	Iris priority
		y0 50 0D FF	Bright
CAM_ShutterPosInq	8x 09 04 4A FF	y0 50 00 00 0p 0q FF	pq: Shutter Position
CAM_IrisPosInq	8x 09 04 4B FF	y0 50 00 00 0p 0q FF	pq: Iris Position
CAM_Gain LimitInq	8x 09 04 2C FF	y0 50 0p FF	p: Gain Positon
CAM_ BrightPosiInq	8x 09 04 4D FF	y0 50 00 00 0p 0q FF	pq: Bright Position
CAM_ExpCompModeInq	8x 09 04 3E FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ExpCompPosInq	8x 09 04 4E FF	y0 50 00 00 0p 0q FF	pq: ExpComp Position
CAM_BacklightModeInq	8x 09 04 33 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_WDRStrengthInq	8x 09 04 51 FF	y0 50 00 00 00 0p FF	p: WDR Strength
CAM_NRLevel(2D) Inq	8x 09 04 53 FF	y0 50 0p FF	P: 2DNRLevel
CAM_NRLevel(3D) Inq	8x 09 04 54 FF	y0 50 0p FF	P:3D NRLevel
CAM_FlickerModeInq	8x 09 04 55 FF	y0 50 0p FF	p: Flicker Settings(0: OFF, 1: 50Hz, 2:60Hz)
CAM_ApertureInq	8x 09 04 42 FF	y0 50 00 00 0p 0q FF	pq: Aperture Gain
CAM_PictureEffectModeInq	8x 09 04 63 FF	y0 50 00 FF	Off
		y0 50 04 FF	B&W
CAM_MemoryInq	8x 09 04 3F FF	y0 50 0p FF	p: Memory number last operated.
SYS_MenuModeInq	8x 09 06 06 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_LR_ReverseInq	8x 09 04 61 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_PictureFlipInq	8x 09 04 66 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ColorSaturationInq	8x 09 04 49 FF	y0 50 00 00 00 0p FF	p: Color Gain setting 0h (60%) to Eh (130%)
CAM_IDInq	8x 09 04 22 FF	y0 50 0p FF	p: Gamma ID
IR_ReceiveInq	8x 09 06 08 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
IR_ReceiveReturn		y0 07 7D 01 04 00 FF	Power ON/OFF
		y0 07 7D 01 04 07 FF	Zoom tele/wide
		y0 07 7D 01 04 38 FF	AF ON/OFF
		y0 07 7D 01 04 33 FF	Camera _Backlight
		y0 07 7D 01 04 3F FF	Camera _Memery
		y0 07 7D 01 06 01 FF	Pan_titleDriver
CAM_BrightnessInq	8x 09 04 A1 FF	y0 50 00 00 0p 0q FF	pq: Brightness Position
CAM_ContrastInq	8x 09 04 A2 FF	y0 50 00 00 0p 0q FF	pq: Contrast Position
CAM_FlipInq	8x 09 04 A4 FF	y0 50 00 FF	Off
		y0 50 01 FF	Flip-H
		y0 50 02 FF	Flip-V
		y0 50 03 FF	Flip-HV
CAM_GammaInq	8x 09 04 5B FF	y0 50 0p FF	p: Gamma setting
CAM_Low-LightModeInq	8x 09 04 2D FF	y0 50 00 FF	OFF
		y0 50 01 FF	ON
CAM_VersionInq	8x 09 00 02 FF	y0 50 ab cd mn pq rs tu vw FF	ab cd : vender ID (0220) mn pq : model ID rs tu : ARM Version vw : reserve
VideoSystemInq	8x 09 06 23 FF	y0 50 0p FF	P: 0~E Video format 0:4KP60 6:1080I60 1:4KP50 7:1080I50 2:4KP30 8:1080P30 3:4KP25 9:1080P25 4:1080P60 A:720P60 5:1080P50 B:720P50
Pan-tiltMaxSpeedInq	8x 09 06 11 FF	y0 50 ww zz FF	ww: Pan Max Speed zz: Tilt

			Max Speed
Pan-tiltPosInq	8x 09 06 12 FF	y0 50 0w 0w 0w 0w 0z 0z 0z 0z FF	wwww: Pan Position zzzz: Tilt Position

Note: [X] in the above table indicates the camera address to be operated,【y】=【x + 8】.

5.4 Pelco-D Protocol Command List

Function	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte 7
Up	0xFF	Address	0x00	0x08	Pan Speed	Tilt Speed	SUM
Down	0xFF	Address	0x00	0x10	Pan Speed	Tilt Speed	SUM
Left	0xFF	Address	0x00	0x04	Pan Speed	Tilt Speed	SUM
Right	0xFF	Address	0x00	0x02	Pan Speed	Tilt Speed	SUM
Upleft	0xFF	Address	0x00	0x0C	Pan Speed	Tilt Speed	SUM
Upright	0xFF	Address	0x00	0x0A	Pan Speed	Tilt Speed	SUM
DownLeft	0xFF	Address	0x00	0x14	Pan Speed	Tilt Speed	SUM
DownRight	0xFF	Address	0x00	0x12	Pan Speed	Tilt Speed	SUM
Zoom In	0xFF	Address	0x00	0x20	0x00	0x00	SUM
Zoom Out	0xFF	Address	0x00	0x40	0x00	0x00	SUM
Focus Far	0xFF	Address	0x00	0x80	0x00	0x00	SUM
Focus Near	0xFF	Address	0x01	0x00	0x00	0x00	SUM
Stop	0xFF	Address	0x00	0x00	0x00	0x00	SUM
Set Preset	0xFF	Address	0x00	0x03	0x00	Preset ID	SUM
Clear Preset	0xFF	Address	0x00	0x05	0x00	Preset ID	SUM
Call Preset	0xFF	Address	0x00	0x07	0x00	Preset ID	SUM
Query Pan Position	0xFF	Address	0x00	0x51	0x00	0x00	SUM
Query Pan Position Response	0xFF	Address	0x00	0x59	Value High Byte	Value Low Byte	SUM
Query Tilt Position	0xFF	Address	0x00	0x53	0x00	0x00	SUM
Query Tilt Position Response	0xFF	Address	0x00	0x5B	Value High Byte	Value Low Byte	SUM
Query Zoom Position	0xFF	Address	0x00	0x55	0x00	0x00	SUM
Query Zoom Position Response	0xFF	Address	0x00	0x5D	Value High Byte	Value Low Byte	SUM

5.5 Pelco-P Protocol Command List

Function	Byte1	Byte2	Byte3	Byte 4	Byte5	Byte6	Byte7	Byte 8
Up	0xA0	Address	0x00	0x08	Pan Speed	Tilt Speed	0xAF	XOR
Down	0xA0	Address	0x00	0x10	Pan Speed	Tilt Speed	0xAF	XOR
Left	0xA0	Address	0x00	0x04	Pan Speed	Tilt Speed	0xAF	XOR

Right	0xA0	Address	0x00	0x02	Pan Speed	Tilt Speed	0xAF	XOR
Upleft	0xA0	Address	0x00	0x0C	Pan Speed	Tilt Speed	0xAF	XOR
Upright	0xA0	Address	0x00	0x0A	Pan Speed	Tilt Speed	0xAF	XOR
DownLeft	0xA0	Address	0x00	0x14	Pan Speed	Tilt Speed	0xAF	XOR
DownRight	0xA0	Address	0x00	0x12	Pan Speed	Tilt Speed	0xAF	XOR
Zoom In	0xA0	Address	0x00	0x20	0x00	0x00	0xAF	XOR
Zoom Out	0xA0	Address	0x00	0x40	0x00	0x00	0xAF	XOR
Stop	0xA0	Address	0x00	0x00	0x00	0x00	0xAF	XOR
Focus Far	0xA0	Address	0x01	0x00	0x00	0x00	0xAF	XOR
Focus Near	0xA0	Address	0x02	0x00	0x00	0x00	0xAF	XOR
Set Preset	0xA0	Address	0x00	0x03	0x00	Preset ID	0xAF	XOR
Clear Preset	0xA0	Address	0x00	0x05	0x00	Preset ID	0xAF	XOR
Call Preset	0xA0	Address	0x00	0x07	0x00	Preset ID	0xAF	XOR
Query Pan Position	0xA0	Address	0x00	0x51	0x00	0x00	0xAF	XOR
Query Pan Position Response	0xA0	Address	0x00	0x59	Value High Byte	Value Low Byte	0xAF	XOR
Query Tilt Position	0xA0	Address	0x00	0x53	0x00	0x00	0xAF	XOR
Query Tilt Position Response	0xA0	Address	0x00	0x5B	Value High Byte	Value Low Byte	0xAF	XOR
Query Zoom Position	0xA0	Address	0x00	0x55	0x00	0x00	0xAF	XOR
Query Zoom Position Response	0xA0	Address	0x00	0x5D	Value High Byte	Value Low Byte	0xAF	XOR

6. Maintenance and Troubleshooting

6.1 Camera Maintenance

1) Please power off the camera and disconnect the power adapter and socket if the device is not used for a long period of time.
2) Use a soft cloth or lint free cloth to clean the camera outer housings.
3) Wipe with a soft, dry cloth when cleaning the camera lens. Wipe it gently with a mild detergent if needed. Do not use strong or corrosive detergents to avoid scratching the lens and affecting the video quality.

6.2 Troubleshooting

1) No video output

a. Check whether the camera power supply is connected, the voltage output of the PSU is normal, and/ or that the power indicator LED is lit.
b. Check that the device performed a successful self-check after restarted.
c. Check whether the DIP switches are set to the normal operating mode.
(see Table 2.2 and Table 2.3)
d. Check whether the video output cable is correctly connected and that the display is switched on and set to the right source selection.

2) No image sometimes

a. Check whether the video output cable is correctly connected and that the display is switched on and set to the right source selection.

3) Video dithering when zoom-in or zoom-out

a. Check whether the camera installation position is solid.
b. Whether there is shaking machine or objects around the camera.

4) Remote control does not work

a. Check that the remote control address is set to 1.
(If the machine is set back to the factory defaults, the remote control address needs to be set back to 1 as well.)
b. Check whether batteries are installed on the remote controller and are not low.
c, Check that the camera working mode is set to the normal operating mode. (see Table 2.2 and Table 2.3)
d. Check that the on-screen menu is closed, camera control through remote controller is only available after exiting the menu. If video output from LAN, the menu will not be displayed, menu will automatically exist after 30s.

5) Serial port not working

a. Check whether the camera serial device protocol, baud rate and camera address is set correctly.

b. Check whether the control cable is connected correctly.

c. Check that the camera working mode is set to the normal operating mode.

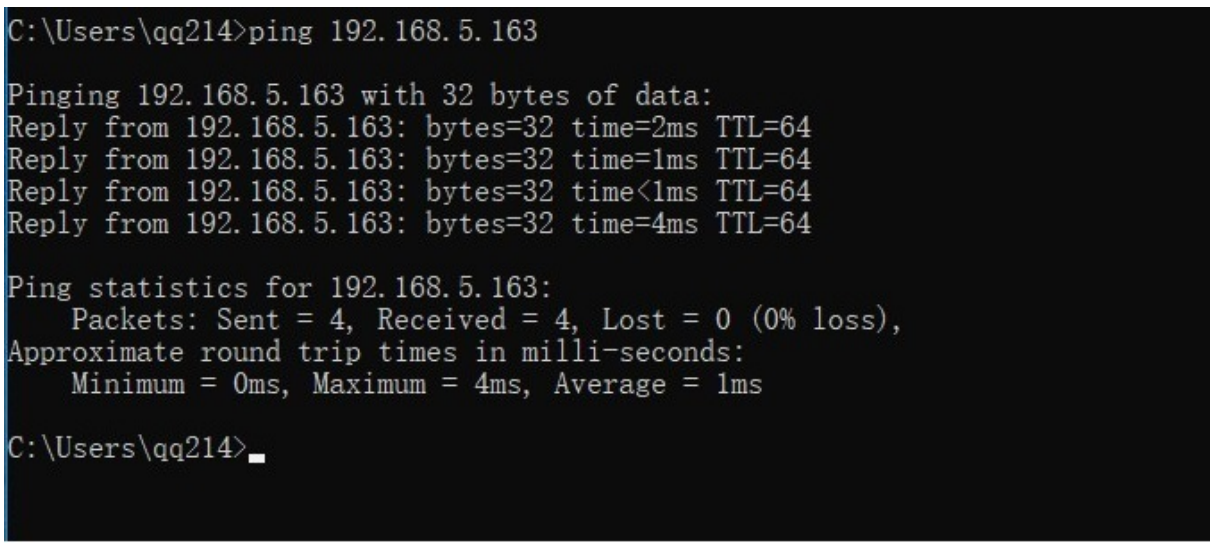
6) Web pages cannot log in

a. Check if the camera outputs video normally by connecting directly to the screen.

b. Check whether the network cable is connected. (Ethernet port light flashes yellow to indicate normal network cable connection)

c. Check whether your computer is added the segment and the segment is consistent with the IP address of the camera.

d. Click "Start" and select "Run", then type “cmd” and press ‘enter’ or click "OK". In the DOS command window type ‘ping 192.168.5.163’ (substitute with relevant IP address if different from default IP) and press the Enter key to initiate network ping. If the message appears as indicated below, the network connection is normal.



7. Warranty

1.1 This limited warranty covers defects in materials and workmanship in this product.

1.2 Should warranty service be required, proof of purchase must be presented to the Company. The serial number on the product must be clearly visible and not have been tampered with in any way whatsoever.

1.3 This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by the Company to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover equipment enclosures, cables or accessories used in conjunction with this product.

This limited warranty does not cover the cost of normal maintenance. Failure of the product due to insufficient or improper maintenance is not covered.

1.4 The Company does not warrant that the product covered hereby, including, without limitation, the technology and/or integrated circuit(s) included in the product, will not become obsolete or that such items are or will remain compatible with any other product or technology with which the product may be used.

1.5 Only the original purchaser of this product is covered under this limited warranty. This limited warranty is not transferable to subsequent purchasers or owners of this product.

1.6 Unless otherwise specified, the goods are warranted in accordance with the manufacturer’s product specific warranties against any defect attributable to faulty workmanship or materials, fair wear and tear being excluded.

1.7 This limited warranty only covers the cost of faulty goods and does not include the cost of labor and travel to return the goods to the Company’s premises.

1.8 In the event of any improper maintenance, repair or service being carried out by any third persons during the warranty period without the Company’s written authorization, the limited warranty shall be void.

1.9 A 7 (seven) year limited warranty is given on the aforesaid product where used correctly according to the Company’s instructions, and only with the use of the Company’s components.

1.10 The Company will, at its sole option, provide one of the following three remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1.10.1 Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition.; or

1.10.2 Replace this product with a direct replacement or with a similar product deemed by the Company to perform substantially the same function as the original product; or

1.10.3 Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

1.11 The Company is not obligated to provide the Customer with a substitute unit during the limited warranty period or at any time thereafter.

1.12 If this product is returned to the Company this product must be insured during shipment, with the insurance and shipping charges prepaid by the Customer. If this product is returned uninsured, the Customer assumes all risks of loss or damage during shipment. The Company will not be responsible for any costs related to the removal or reinstallation of this product from or into any installation. The Company will not be responsible for any costs related to any setting up this product, any adjustment of user controls or any programming required for a specific installation of this product.

1.13 Please be aware that the Company's products and components have not been tested with competitor's products and therefore the Company cannot warrant products and/or components used in conjunction with competitor's products.

1.14 The appropriateness of the goods for the purpose intended is only warranted to the extent that the goods are used in accordance with the Company's installation, classification and usage instructions.

1.15 Any claim by the Customer which is based on any defect in the quality or condition of the goods or their failure to correspond with specification shall be notified in writing to the Company within 7 days of delivery or (where the defect or failure was not apparent on reasonable inspection by the Customer) within a reasonable time after discovery of the defect or failure, but, in any event, within 6 months of delivery.

1.16 If delivery is not refused, and the Customer does not notify the Company accordingly, the Customer may not reject the goods and the Company shall have no liability and the Customer shall pay the price as if the goods had been delivered in accordance with the Agreement.

1.17 THE MAXIMUM LIABILITY OF THE COMPANY UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT.