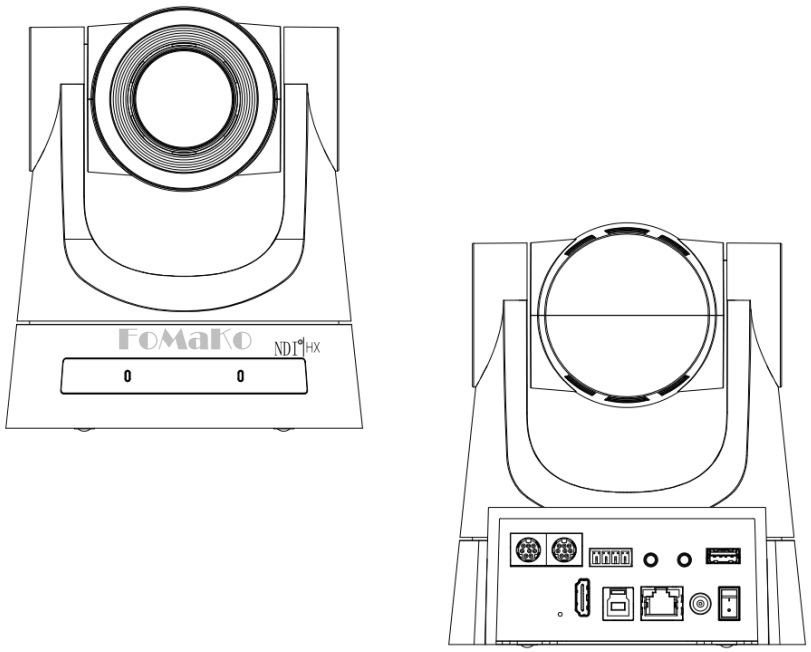
FoMaKo

# NDI /HDMI/USB PTZ IP CAMERA

## User Manual

## （V1.0）



FoMaKo

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**Please feel free to contact us if you have any questions.**

**Please Note:** Only NDi version cameras have NDi function, other version cameras don’t have NDi function.

# FoMaKo IP Streaming Camera Quick Start

Dear Friend,

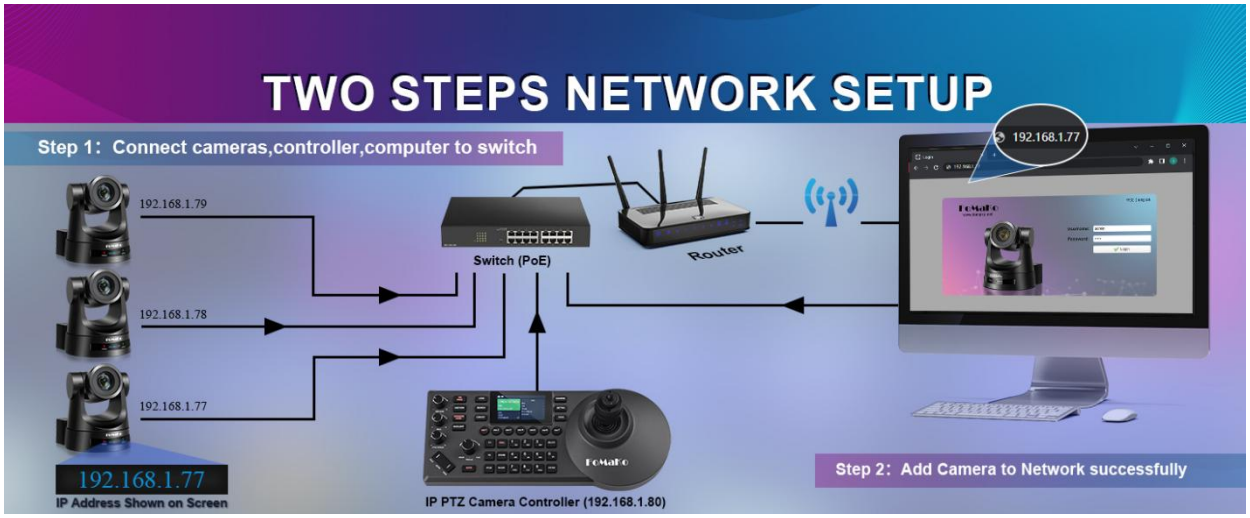
Thanks for ordering FoMaKo cameras. To setup your streaming system easier, please read this quick start instruction first.

**Video Out Methods:**

(1) HDMI video output:
- HDMI port to HDMI TV/monitor, to preview video and change camera setting by press "menu" on remote control
- HDMI port to HDMI video switch/mixer
- Use HDMI to USB video capture card converting HDMI signal to USB signal, then, you can use this camera as normal USB camera

(2) 3G-SDI Video output : 3G-SDI video out is similar as HDMI, the only difference is your device should support SDI .
(3) LAN Video output: Before using "LAN Video Out" , we should add the camera to your network.
(4) USB Video out, you can use the camera as an USB webcam

***(FoMaKo cameras come with LCD Screen and DHCP enabled, network settings is much easier than other cameras.)***




Please do the connections as above, you'd better has a router in the network, then, router will assign IP address for all the devices. It will save 20+ steps settings on computer.

Camera's LCD screen will show camera's ip address, you can use web browser to visit camera's webpage by the ip address.
username: admin password: admin

(Important: When added the cameras to the network successfully, you'd better turn off DHCP , otherwise, when camera or router rebooted, the IP address maybe changed.)

If router can't assign IP address for camera successfully, camera's LCD will show default IP address: 192.168.5.163

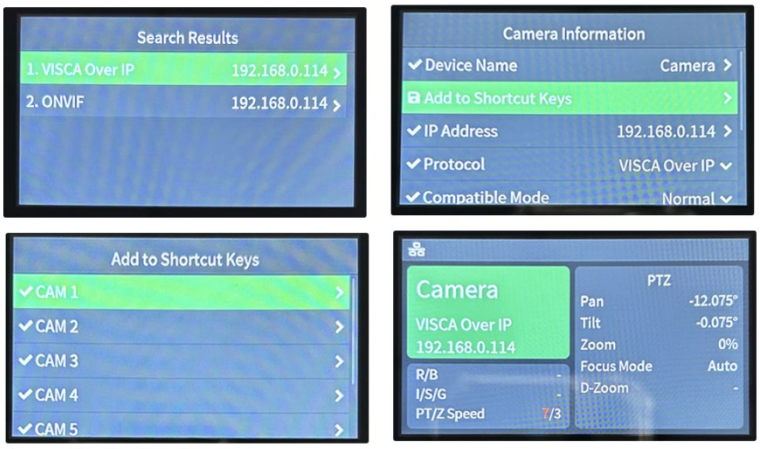
**Add Camera to IP PTZ Controller:**

Some information you need:
IP Visca port: 5678 Sony Visca port: 52381 Onvif Port: 2000 User Name: admin Password: admin

We recommend to use Sony Visca or IP Visca control protocol, the two protocols are more steady and work better.

Let's use FoMaKo KC608 Pro IP controller for example:
FoMaKo KC608 Pro controllers are optimized for FoMaKo cameras, it is very easy to let them work together.

(1) Add the controller to the same LAN as camera, the router will assign an IP address for IP controller
(2) Press “search” button on controller, it will show camera’s IP address
(3) Choose “VISCA Over IP” and press “Enter”
(4) Add to Shortcut Keys, you can assign 7 cameras to shortcut keys CAM1~CAM7
(5) Press CAM1~CAM7 to control the camera

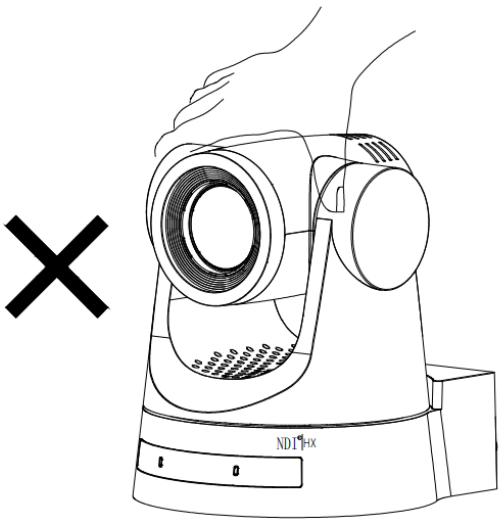



If you need more supports, please contact us at: ivan@fomako.net, normally, we can reply you within 12hours.

FoMaKo Supports Team

# ⚠Attentions

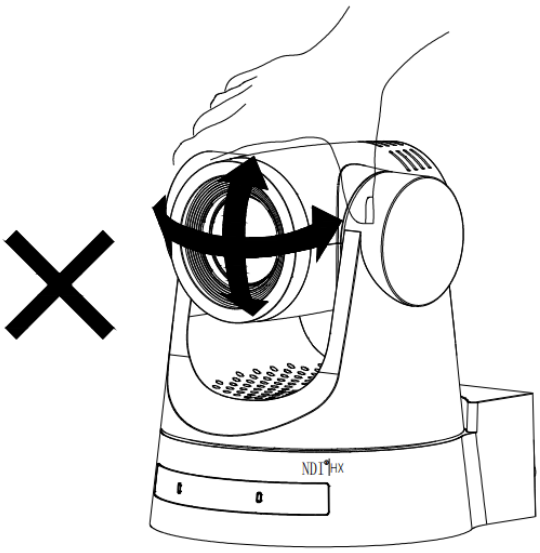
Improper operations may damage the product structure and result in mechanical failure. Please note the following tips:



⚠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.



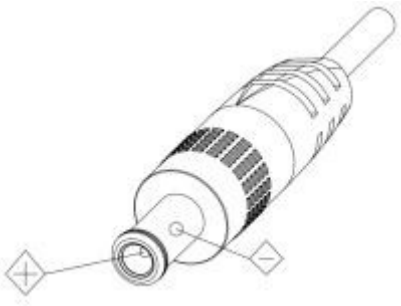
**This manual introduces functions, installations and operations for this PTZ camera in details. Please read this manual carefully before installation and use.**

**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.

**5. Requirements for NDI Computer Equipment:**

NDI HX3 has HEVC encoding, high-resolution support, and low latency characteristics, and significantly higher computer hardware requirements than HX2. There is the basic computer performance:
Processor: 11th Generation Intel® Core™ i7-11800H (24 MB cache, eight cores, 16 threads, up to 4.60 GHz Turbo)
Operating System: Windows 10 Professional
Graphics Card: NVIDIA® GeForce RTX™ 3050 Ti, 4 GB GDDR6
Display: 15.6", FHD 1920x1080, 60Hz, Non-touch, 3 millisecond
Memory: 16 GB DDR4, 3200 MHz
Hard Drive: 256 GB, SSD

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# 1. Camera Installation

## 1.1 Camera Introduction

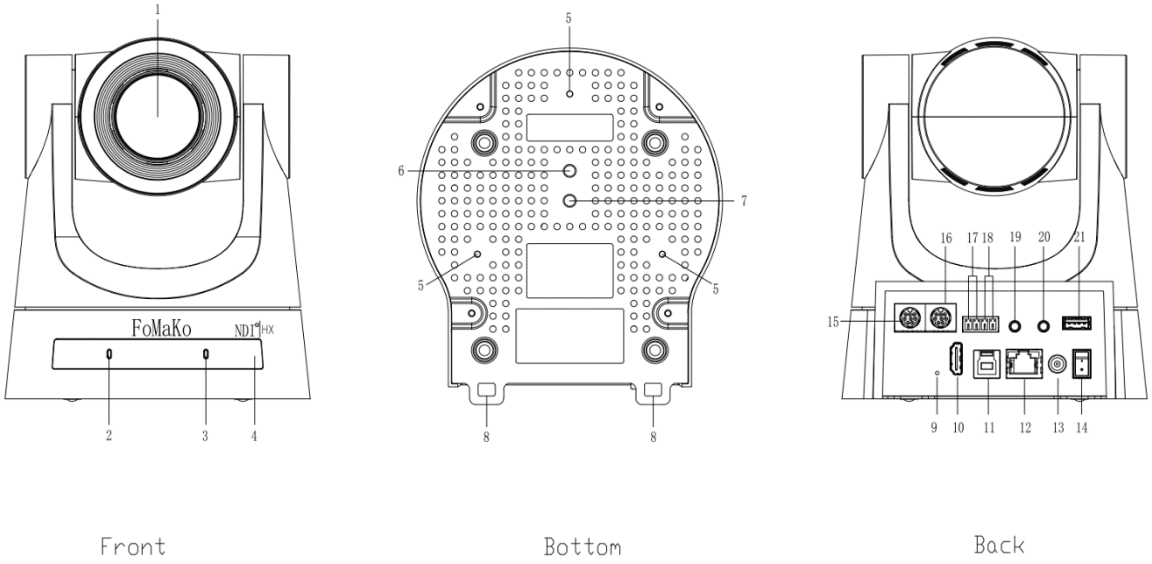



Figure 1.1 Interface of ST (standard) Model

1. Camera Lens
2. Power Light
3. Status Light
4. Infrared Receiver
5. Reserved Mounting Hole
6. Tripod Screw Hole
7. Screw Hole for Tripod
8. Safe Lock
9. RST Button
10. HDMI Output Interface
11. USB3.0 Interface
12. LAN（NDI） Port
13. DC12V Input Power Supply Socket
14. Power Switch
15. RS232 Control Interface (input )
16. RS232 Control Interface (output )
17. RS485 Input (left +, right-)
18. RS422 Input
19. Audio Input Interface (Line-in)
20. Audio Input Interface (MIC)
21. USB2.0 Interface

## 1.2 Interfaces and Connection

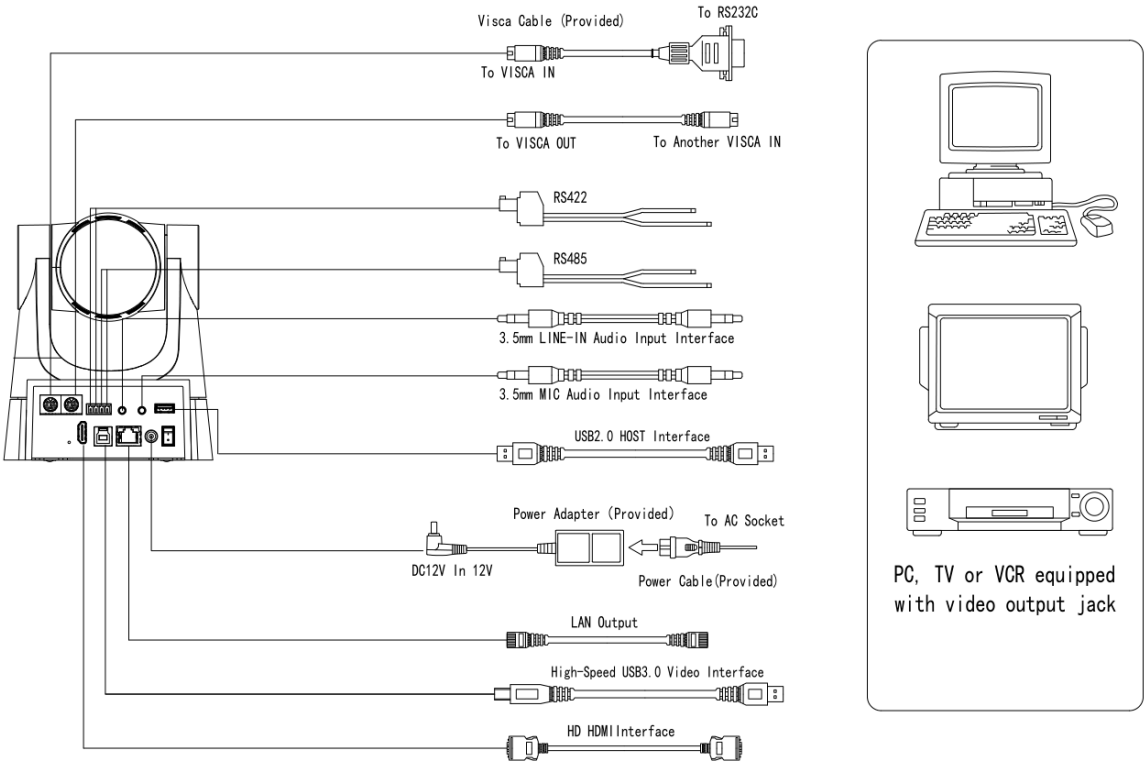



Figure 1.2 Wiring Diagram

1) After power on and self-checking, 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 restore the menu to factory defaults, the remote control address will restore to 1#.

# 1.3 Work mode

Here is the max output of the camera.
1)Under USB 4K mode:
①HDMI:
MAX output:3840x2160p30 or 1920x1080p60
②USB：USB can output 4K only when the HDMI outputs 4K
MAX output
MJPG/H264:3840×2160@30fps or YUY2/NV12: 1920x1080@30fps
③LAN：
Main Stream max output:
H264/H265：3840×2160@30fps
④NDI:
Max output:1080@30fps

Under WEB 4K mode:
①HDMI:
MAX output:3840x2160p30 or 1920x1080p60
②USB：
MAX output
MJPG/H264:1920x1080@30fps or YUY2/NV12: 1920x1080@30fps
③LAN：Network can output 4K only when the HDMI output 4K
Main Stream max output:
H264/H265：3840×2160@30fps
④NDI:
Max output:1080@30fps
By the way,after you enabling NDI mode, the webpage will not support the 3840x2160 format.

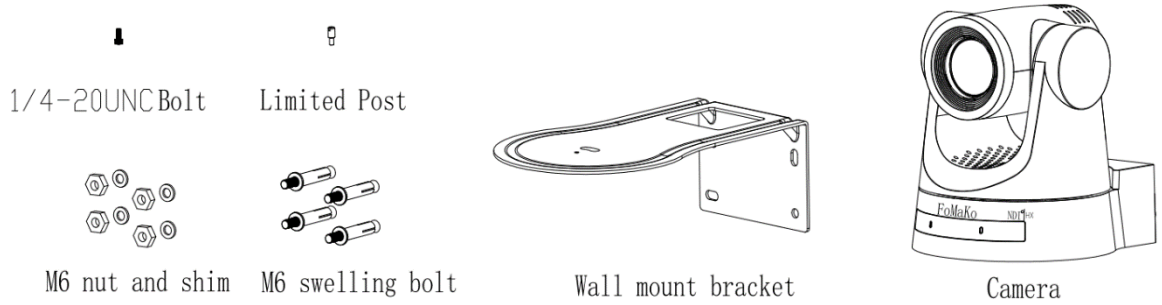
# 1.4 Mounting Brackets

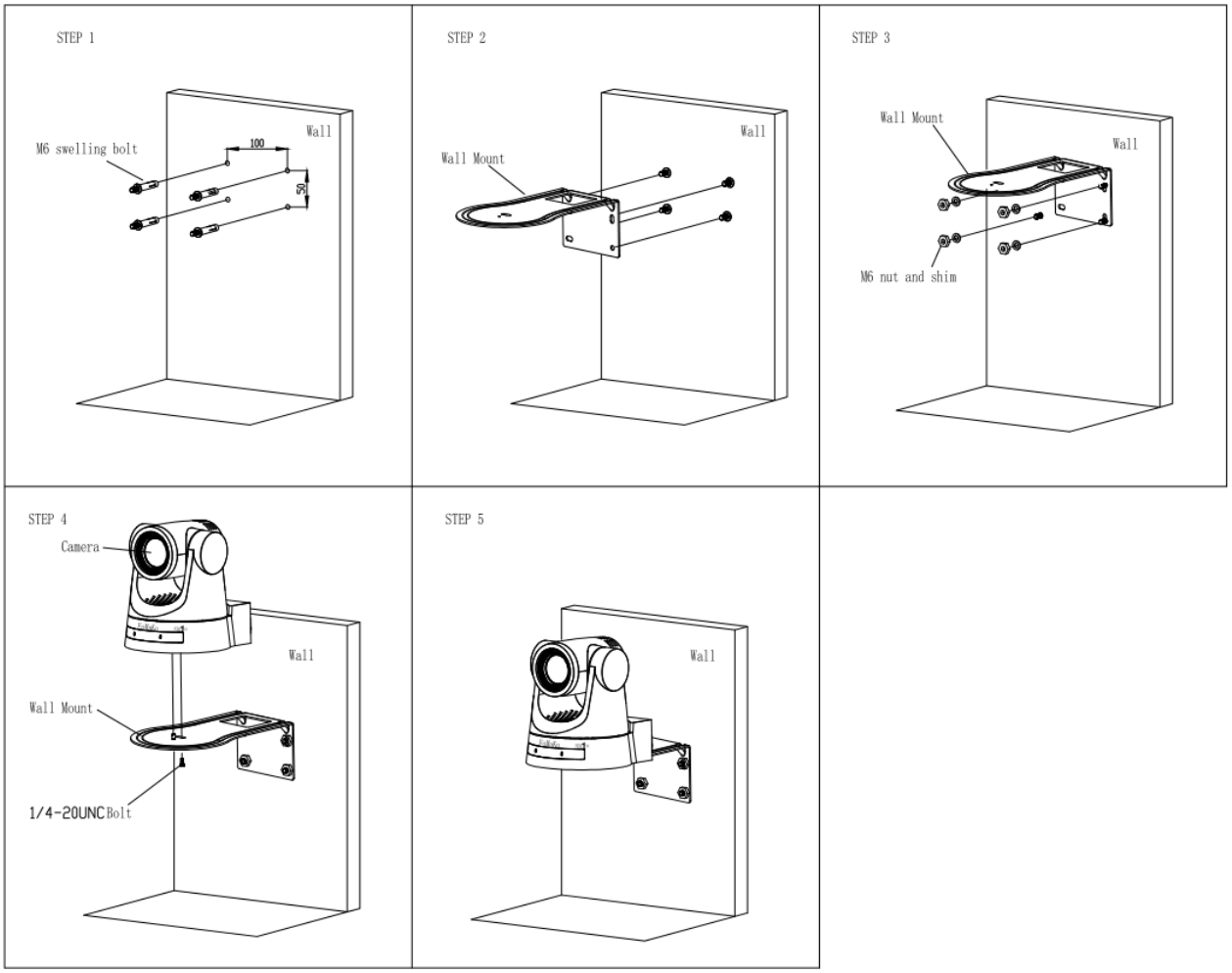
Notes:

Ceiling or wall mounting brackets can only be mounted on template and concrete wall.

For safety reason, plasterboard is not recommended.

### 1) Wall Mounting



**2) Ceiling Mounting**



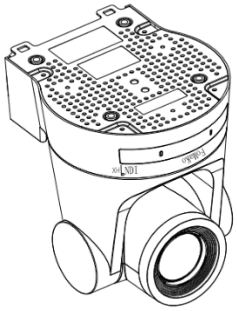
1/4-20UNC Bolt



Limited Post



Upper Cover Plate

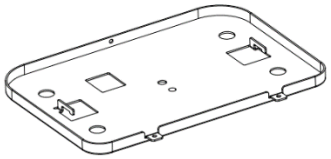




PA3X30 Self Tapping Screw(4PCS)

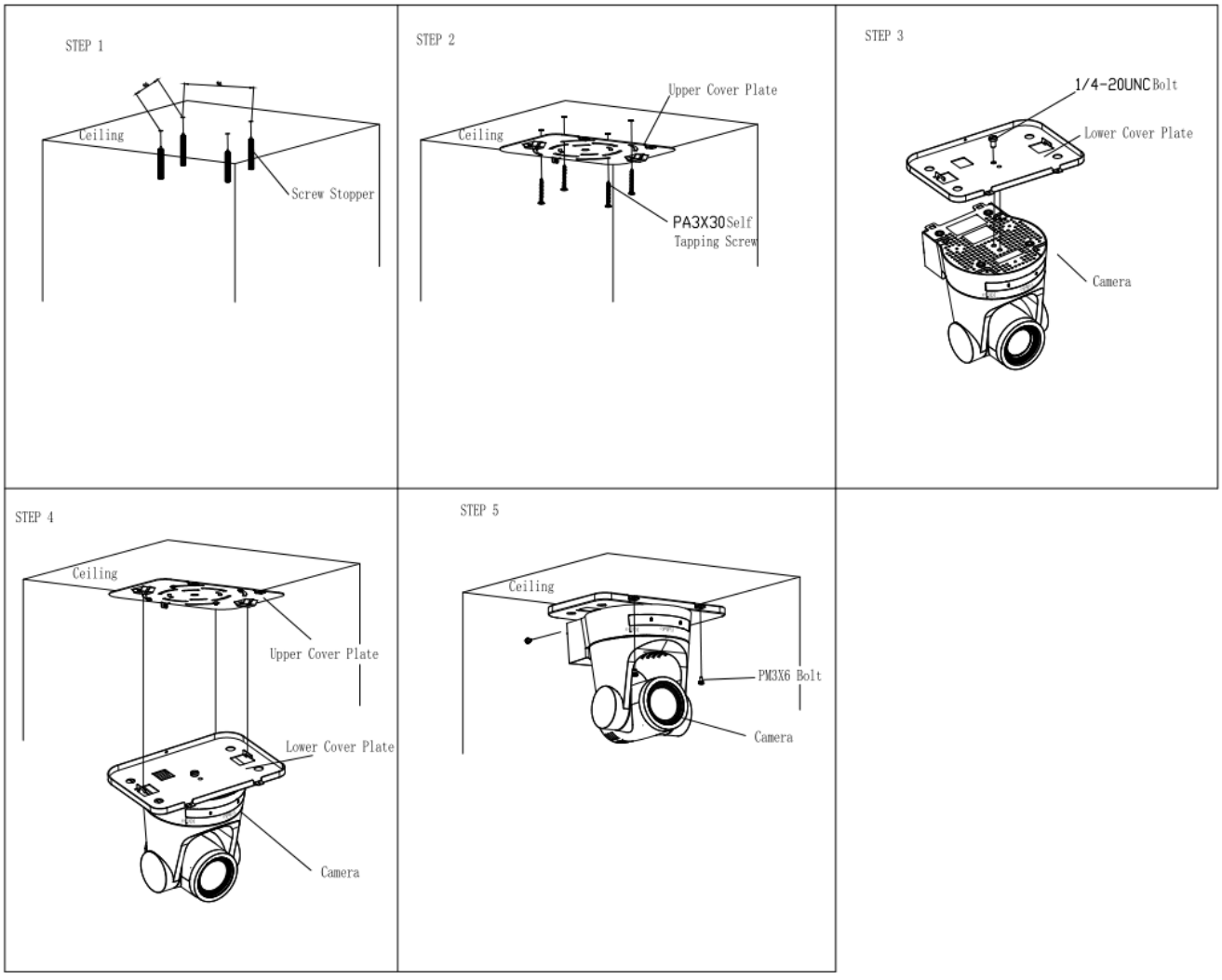


PA3 Plastic Expansion Nail(4PCS)



Lower Cover Plate

Camera



# 2. Product Overview

## 2.1 Dimension

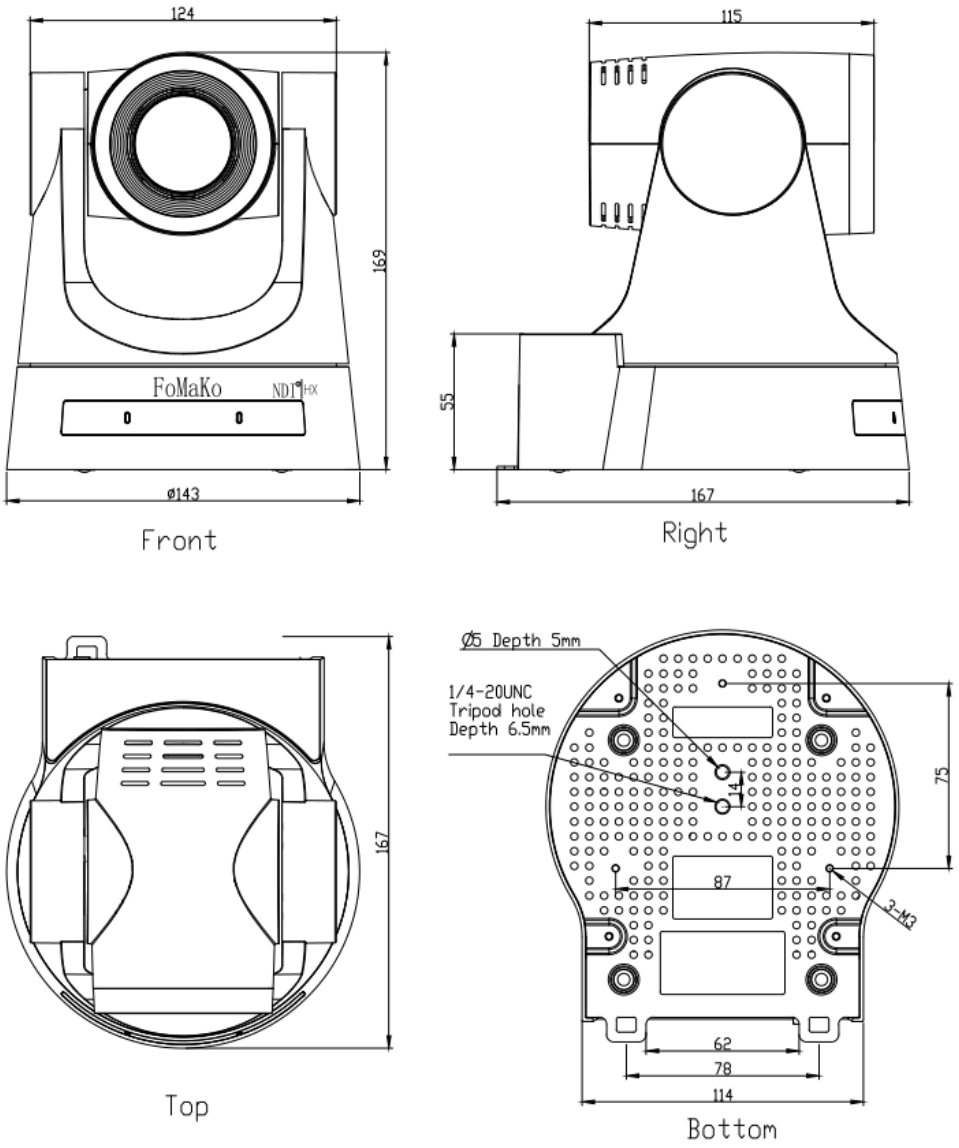



Figure 2.2 Product Dimension

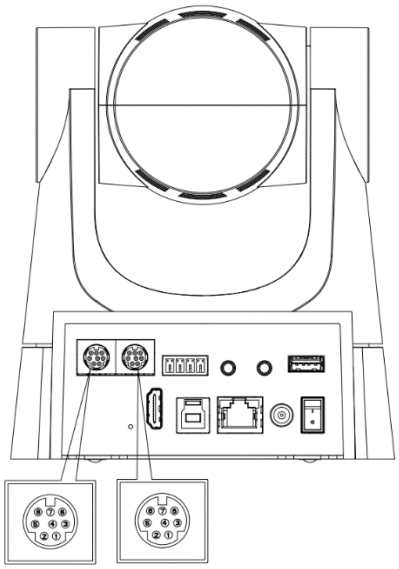
## 2.2 Accessory

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

| Standard Accessory | Optional Accessory |
|---|---|
| Power adapter | Wall Mount |
| IR Remote Control | Ceiling Mount |
| RS232 Cable | USB3.0 Cable |
| User Manual | |

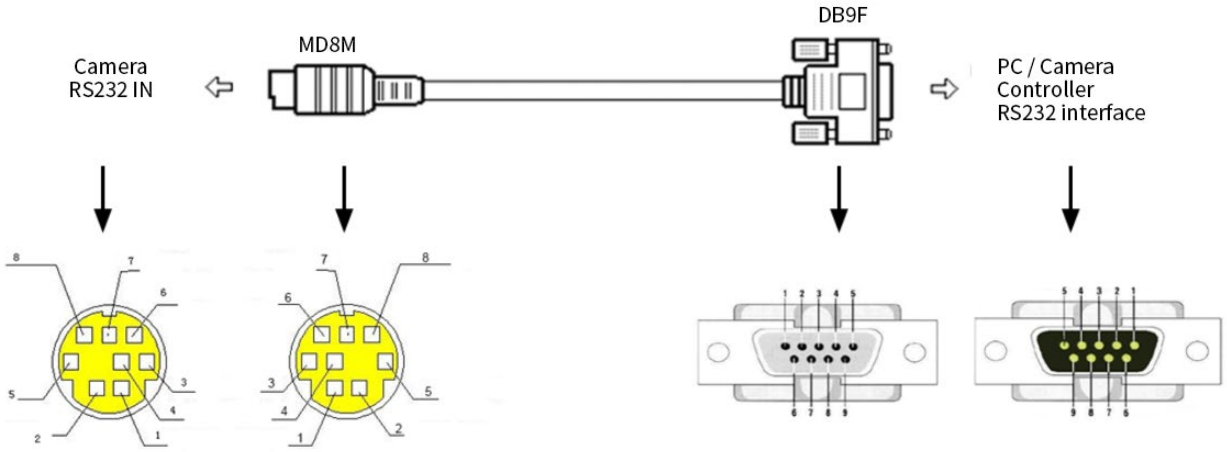
## 2.3 RS-232 Interface

1). RS-232 Interface Definition

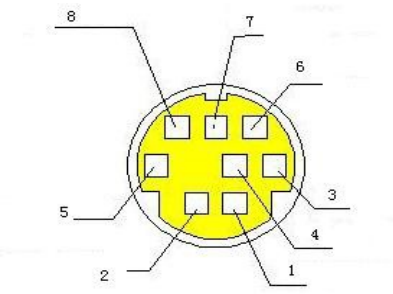


Connection to PC or Camera Controller

| Camera | WindowsDB-9 |
|---|---|
| 1. DTR | 1. DCD |
| 2. DSR | 2. RXD |
| 3. TXD | 3. TXD |
| 4. GND | 4. DTR |
| 5. RXD | 5. GND |
| 6. GND | 6. DSR |
| 7. IR OUT | 7. RTS |
| 8. NC | 8. CTS |
| | 9. RI |

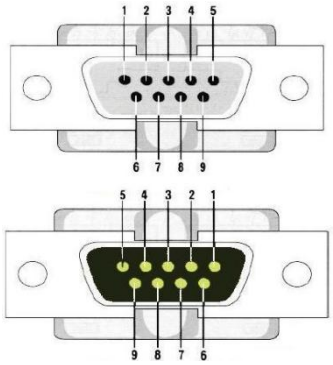



2). RS232 Mini-DIN 8-pin Port Definition



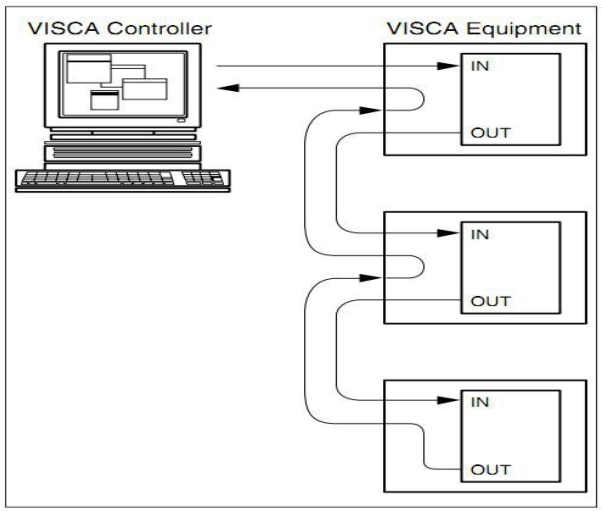

| NO. | Port | Definition |
|---|---|---|
| 1 | DTR | Data Terminal Ready |
| 2 | DSR | Data Set Ready |
| 3 | TXD | Transmit Data |
| 4 | GND | Signal Ground |
| 5 | RXD | Receive Data |
| 6 | GND | Signal Ground |
| 7 | IR OUT | IR Commander Signal |
| 8 | NC | No Connection |

3). 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 |

4). VISCA networking 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 RS232 input and output interfaces, which can be cascaded according to the above methods.

## 2.4 Main Features

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

- **UHD Resolution:** 1/2.8 inch high quality CMOS sensor. Resolution is up to 3840x2160 with frame rateup to 30fps.
- **Multiple Optical Zoom Lens:** 20X、30X optical zoom lens.
- **Leading Auto Focus Technology:** Fast, accurate and stable auto focusing technology.
- **Low Noise and High SNR:** Super high SNR image is achieved with low noise CMOS. Advanced 2D/3D noise reduction technology further reduces the noise while ensuring high image clarity.
- **Multiple Video Output Interfaces:** HDMI, LAN、USB3.0; Simultaneously output audio and video signal via HDMI, LAN;
- **Multiple Audio/Video Compression Standards:** Support H.264/H.265 video compression, up to 3840×2160 resolution 30fps; support AAC, audio compression, 48000 sampling frequency
- **Built-in Gravity Sensor:** Support PTZ auto-flip function and easy installation.
- **Multiple Network Protocol:** Support ONVIF, GB28181, RTSP, RTMP,VISCA OVER IP, IP VISCA, RTMPS, SRT, NDI protocols; Support RTMP push mode, easy to be connected to streaming server (Wowza, FMS); Support RTP multicast mode; Support network full command VISCA control protocol.
- **Control Interface:** RS422, RS485**,** RS232 (cascade connection)
- **Multiple Control Protocol:** Support VISCA, PELCO-D, PELCO-P protocols; Support automatic identification protocols.
- **Quiet Pan / Tilt Movement**: With high accuracy step driving motor, camera can pan / tilt extremely quiet and smooth.

- **Sleep function with low power**: Support sleep/wake up function with low power consumption, less than 400mw.
- **Multiple Presets:** Up to 255 presets (10 presets via remote control).
- **IR Remote Control:** Users can use IR remote control to control the camera, can also do menu settings by HDMI and SDI Connection to display device.(LAN connection can't use menu setting by IR Remote Contol)
- **OLED display:** It can display the states and parameters of the camera and convenient for the user to view and adjust, can check the IP address of the camera, real-time information display such as resolution, frame rate, easy to monitor and control
- **Multiple Application:** Online-education, Lecture Capture, Webcasting, Video conferencing, Tele-medicine,
- **AI humanoid tracking:** built-in high-speed processor and the use of exclusive advanced image processing and analysis algorithms, users can choose real-time tracking and regional tracking according to the use of the environment, you can click the person object box through the web page to switch tracking objects.

## 2.5 Technical Parameter

| Model | 20X | 30 X |
|---|---|---|
| **Camera Parameter** | | |
| Optical Zoom | f＝5.1–91.49mm | f＝5.2–148.4mm |
| Sensor | 1/2.8 inch high quality UHD CMOS sensor | |
| Effective Pixels | 16: 9, 2.07 megapixel | |
| Video Format | **HDMI:** 4KP30、4KP25、1080P60、1080P50、1080P30、1080P25、720P60、720P50、1080P59.94、1080P29.97、720P59.94<br>**USB3.0:**<br>YUY2/NV12:<br>1920×1080/1280×720/1024×576/800×600/800×448/640×360/640×480/480×270/320×180@30/30/25/20/15/10/5fps;<br>MJPG/H264/H265:<br>3840×2160/2560×1440/1920×1080/1600×896/1280×720/1024×576/960×540/800×600/800×448/720×576/720×480/640×360/640×480/480×270/352×288/320×240@30/25/20/15/10/5fps<br>**LAN:**<br>Main Stream:<br>H264/H265:<br>3840×2160/1920×1080/1280×720/640×360/640×480@30/25/20/15/10/5fps<br>Sub-stream:<br>H264/H265:<br>1920×1080/1280×720/640×360/640×480/320×240/320×180@30/25/20/15/10/5fps | |
| View Angle | (D) 67.45°- 3.94°<br>(H) 60.4°- 3.45°<br>(V) 1.97° - 35.31° | (D) 65.4°- 2.48°<br>(H) 2.14°- 58.1°<br>(V) 33.8°- 1.2° |
| AV | F1.8 – F2.9 | F1.3 – F4.8 |
| Digital Zoom | 16X | |
| Minimum Illumination | 0.5 Lux (F1.8, AGC ON) | |
| DNR | 2D & 3D DNR | |
| White Balance | Auto/Manual/One-push/VAR(2400K-7100K) | |
| Focus Mode | Auto/Manual/One Push Focus | |
| Exposure Mode | Auto/Manual/Shutter Priority, Aperture Priority, Brightness Priority | |
| Iris | Auto/Manual | |
| Electronic Shutter | Auto/Manual | |
| BLC | ON/OFF | |
| Video Adjustment | Brightness, Color, Saturation, Contrast, Sharpness, B/W mode, Gamma curve | |
| SNR | >50 dB | |
| **Input/Output Interfacen** | | |
| Video Interfaces | HDMI、LAN(POE)、USB3.0、LINE IN、MIC IN、RS232-IN、RS232-OUT、RS422(compatible with RS485)、DC12V Power Supply、Rotary Dip Switch、Power Switch | |

| | |
|---|---|
| Video Output | HDMI, LAN, USB3.0 |
| Video Stream | Dual stream output |
| Video Bitrate | 64Kbps～40960Kbps |
| Video Compression Format | LAN：H.264、H.265<br>USB 3.0：MJPG、H264、H.265、YUY2、NV12 |
| Audio Input Interface | 3.5mm Line input and 3.5mm MIC input |
| Audio Output Interface | HDMI, LAN, USB3.0 |
| Audio Compression Format | AAC |
| Audio Bitrate | 32Kbps, 48Kbps, 64Kbps, 96Kbps, 128Kbps |
| Network Interface | 1000M Ethernet port（10/100/1000BASE-TX） |
| Control Interface | RS232 (IN/OUT), RS485, RS422 |
| Control Protocol | VISCA/Pelco-D/Pelco-P, Baud Rate: 115200/38400/9600/4800/2400bps |
| Power Interface | HEC3800 outlet (DC12V) |
| Power Supply | Input AC110V-AC220V; Output DC12V/2.0A |
| Input Voltage | DC12V±10% |
| Input Current | Maximum: 1A |
| Power Consumption | Maximum: 12W |
| Network Protocols | HTTP,RTSP, RTMP, ONVIF,STR, GB/T28181； Support network VISCA control protocols, NDI\|HX optional (supported by some models, consult the dealer for specific support models)，remote upgrade, remote restart, and remote reset. |
| **PTZ Parameter** | |
| Pan/Tilt Rotation | ±170°, -30°～+90° |
| Pan Control Speed | 1.4 - 40°/sec |
| Tilt Control Speed | 2.9 - 30°/sec |
| Preset Speed | Pan: 40°/sec, Tilt: 30°/sec |
| Preset Accuracy | ±0.1° |
| Preset Number | 255 presets (10 presets via remote control) |
| **Other Parameter** | |
| Stored Temperature | -10℃～+70℃ |
| Stored Humidity | 20%~90% |
| Working Temperature | -10℃～+50℃ |
| Working Humidity | 20%~80% |
| Dimension | 143mm×167mm×167mm |
| Weight | 1.26kg |
| **Accessory** | |
| Package | Power Supply, RS232 Control Cable, IR Remote Control, User Manual |
| Optional Accessories | Ceiling / wall Mount (Extra Cost) |

# 3. Remote Control

## 3.1 Keys Introduction for IR Remote Control

After camera starts normally, it receives and executes the infrared command, press the button of the remote control, the remote control receiving indicator light flashes green, release the button, the indicator light stops flashing. You can use the infrared remote control to perform operations such as preset position setting, positioning, leveling, and tilting.

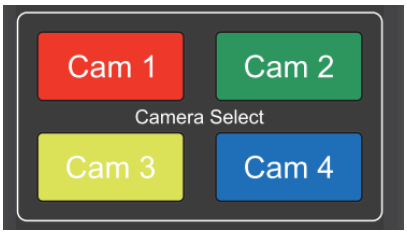
1). In this manual, "press the key" means a click rather than a long-press, and a special note will be given if a long-press for more than one second is required.

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 press 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 without operation within 12s).

### 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 【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.
**Note**: If the number key is not preset, it is invalid.

**Clear Preset:** press 【CLEAR】 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; stop 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**】: Turn on or off the back light compensation

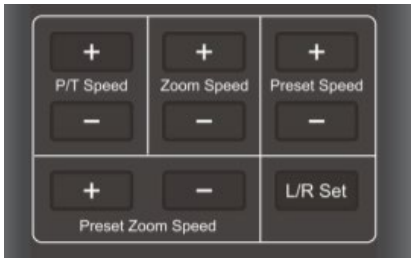
### 8.F1~F4 Buttons




**AI Tracking Control:**
**F1:** Turn off Single Target Tracking
**F2:** Turn on Single Target Tracking
**F3:** Switch to Area/Real-time Tracking
**F4:** Switch Tracking Target

**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.P/T/Z /Preset Speed Setting




P/T Speed + :Remote Control Pan/Tilt Speed +
P/T Speed - :Remote Control Pan/Tilt Speed -
Zoom Speed + :Remote Control Zoom Speed +
Zoom Speed - :Remote Control Zoom Speed -
Preset Speed + :Remote Control Preset Speed +
Preset Speed - :Remote Control Preset Speed -
Preset Zoom Speed + :Remote Control Preset Zoom Speed +
Preset Zoom Speed - :Remote Control Preset Zoom Speed -
L/R Set: Control the forward and reverse rotation of P/T




**10. Key Combination**

1) 【#】+【#】+【#】: Clear all presets
2) 【*】+【#】+【6】: Restore factory defaults
3) 【*】+【#】+【3】: Menu set to Chinese
4) 【*】+【#】+【4】: Menu set to English
5) 【*】+【#】+【7】: Show Camera's current IP address
6) 【*】+【#】+【9】: Flip switch
7) 【*】+【#】+Auto: Enter aging mode
8) 【#】+【*】+Auto: Exit aging mode
9) 【*】+【#】+Manual: Restore the default user name, password, and enable DHCP
10) 【#】+【#】+【0】: Switch the video format to 1080P60
11) 【#】+【#】+【1】: Switch the video format to 1080P50
12) 【#】+【#】+【2】: Switch the video format to 1080P30
13) 【#】+【#】+【3】:Switch the video format to 1080P25
14) 【#】+【#】+【4】: Switch the video format to 720P60
15) 【#】+【#】+【5】:Switch the video format to 720P50
16) 【#】+【#】+【6】:Switch the video format to 1080P59.94
17) 【#】+【#】+【7】:Switch the video format to 1080P29.97
18) 【#】+【#】+【8】:Switch the video format to 720P59.94
19) 【#】+【#】+【9】:Switch the video format to 4KP30

Note: If the address of former remote control is not address 1 but another one from 2, 3, 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.

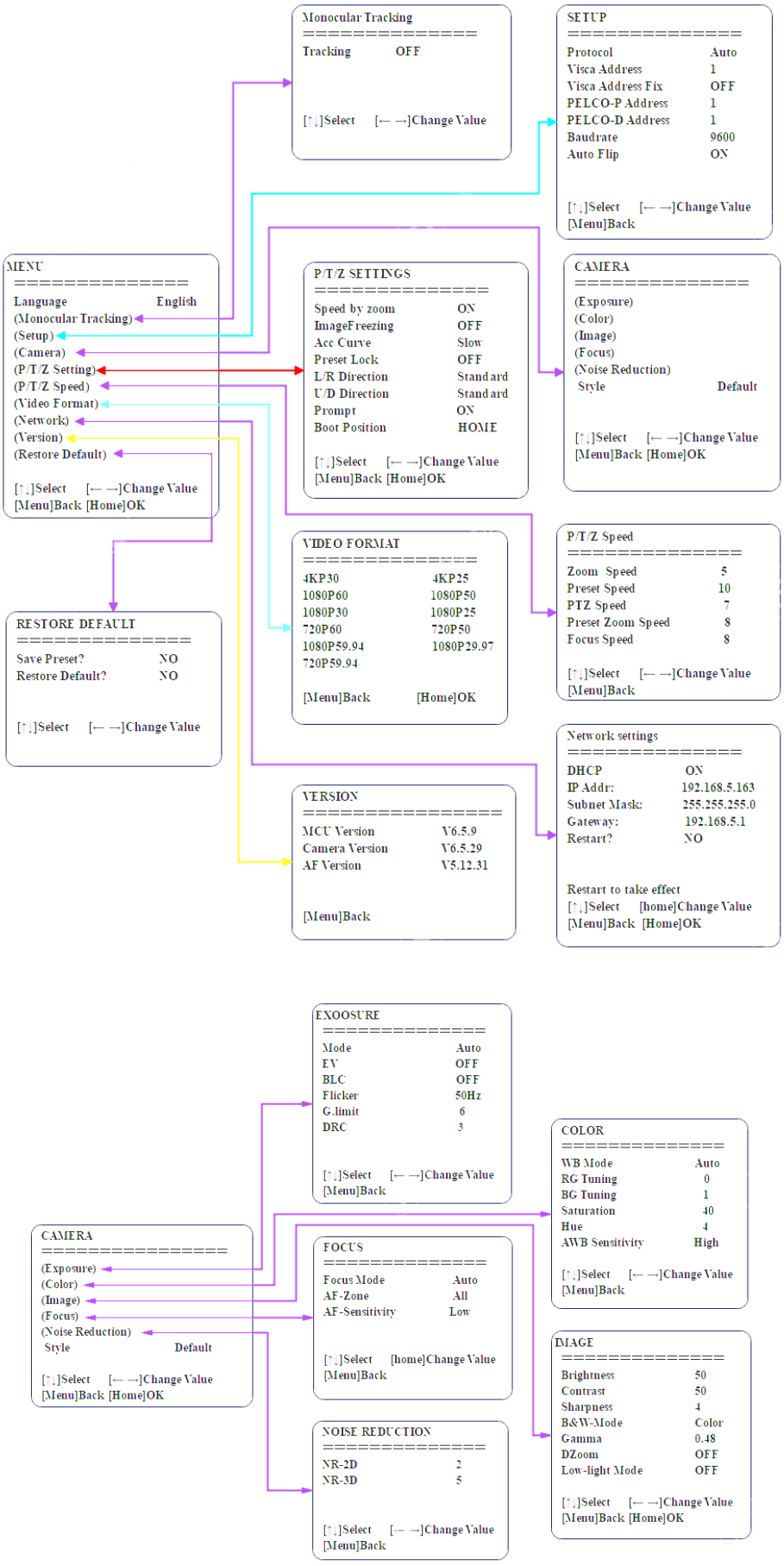
## 3.2 Menu Introduction

Note: The modification valid only if exit the menu before save and power 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) English Menu


MENU
Language English
(Monocular Tracking)
(Setup)
(Camera)
(P/T/Z Setting)
(P/T/Z Speed)
(Video Format)
(Network)
(Version)
(Restore Default)
[↑↓]Select [← →]Change Value
[Menu]Back [Home]OK
Monocular Tracking
Tracking OFF
[↑↓]Select [← →]Change Value
SETUP
Protocol Auto
Visca Address 1
Visca Address Fix OFF
PELCO-P Address 1
PELCO-D Address 1
Baudrate 9600
Auto Flip ON
[↑↓]Select [← →]Change Value
[Menu]Back
P/T/Z SETTINGS
Speed by zoom ON
ImageFreezing OFF
Acc Curve Slow
Preset Lock OFF
L/R Direction Standard
U/D Direction Standard
Prompt ON
Boot Position HOME
[↑↓]Select [← →]Change Value
[Menu]Back [Home]OK
CAMERA
(Exposure)
(Color)
(Image)
(Focus)
(Noise Reduction)
Style Default
[↑↓]Select [← →]Change Value
[Menu]Back [Home]OK
VIDEO FORMAT
4KP30 4KP25
1080P60 1080P50
1080P30 1080P25
720P60 720P50
1080P59.94 1080P29.97
720P59.94
[Menu]Back [Home]OK
P/T/Z Speed
Zoom Speed 5
Preset Speed 10
PTZ Speed 7
Preset Zoom Speed 8
Focus Speed 8
[↑↓]Select [← →]Change Value
[Menu]Back
RESTORE DEFAULT
Save Preset? NO
Restore Default? NO
[↑↓]Select [← →]Change Value
VERSION
MCU Version V6.5.9
Camera Version V6.5.29
AF Version V5.12.31
[Menu]Back
Network settings
DHCP ON
IP Addr: 192.168.5.163
Subnet Mask: 255.255.255.0
Gateway: 192.168.5.1
Restart? NO
Restart to take effect
[↑↓]Select [home]Change Value
[Menu]Back [Home]OK
EXOOSURE
Mode Auto
EV OFF
BLC OFF
Flicker 50Hz
G.limit 6
DRC 3
[↑↓]Select [← →]Change Value
[Menu]Back
CAMERA
(Exposure)
(Color)
(Image)
(Focus)
(Noise Reduction)
Style Default
[↑↓]Select [← →]Change Value
[Menu]Back [Home]OK
FOCUS
Focus Mode Auto
AF-Zone All
AF-Sensitivity Low
[↑↓]Select [home]Change Value
[Menu]Back
NOISE REDUCTION
NR-2D 2
NR-3D 5
[↑↓]Select [← →]Change Value
[Menu]Back
COLOR
WB Mode Auto
RG Tuning 0
BG Tuning 1
Saturation 40
Hue 4
AWB Sensitivity High
[↑↓]Select [← →]Change Value
[Menu]Back
IMAGE
Brightness 50
Contrast 50
Sharpness 4
B&W-Mode Color
Gamma 0.48
DZoom OFF
Low-light Mode OFF
[↑↓]Select [← →]Change Value
[Menu]Back [Home]OK

# 4. Network Configuration

## 4.1 Network Connection

When you powered on the camera for the first time, please press "* # Manual" one by one on the remote control to restore the camera, it will be more easier to do the following settings.




If you have more than one camera, please restore the cameras one by one:

Power on Cam1, restore Cam1, power off Cam1;
Power on Cam2, restore Cam2, power off Cam2;
Power on Cam3, restore Cam3, power off Cam3;
.....

Now, Please follow the steps to add the camera to your network:

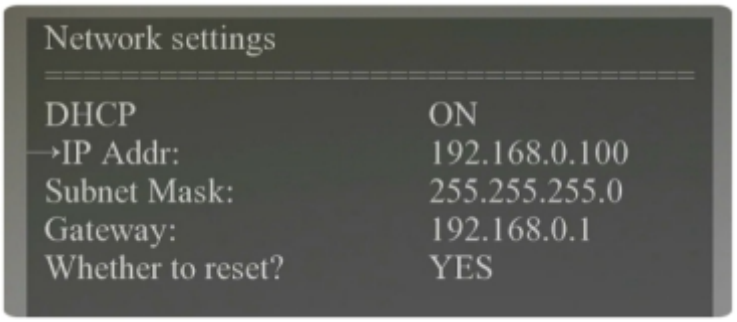
Step 1: Power on the camera

Step 2: Camera HDMI port ->HDMI Cable->TV/monitor-> Camera's video come out on your screen

Step 3: Camera LAN port -> Network Cable- > Router/switch (**which your PC connected to**)

Step 4: Go to camera's menu by press "menu" button on remote control -> Network-> IP Addr.
you can see camera's IP address which assigned by your router. Please check the picture, this camera's IP is 192.168.0.100 (Camea's LCD screen will show the IP address too)

Step 5: Turn "DHCP" to "OFF" , "whether to reset": YES,
Press "Home" button to confirm the settings on remote control, the camera will reboot.
(Important: turn off DHCP, the camera will keep currently IP address, or when camera reboot, the IP address will be changed.)

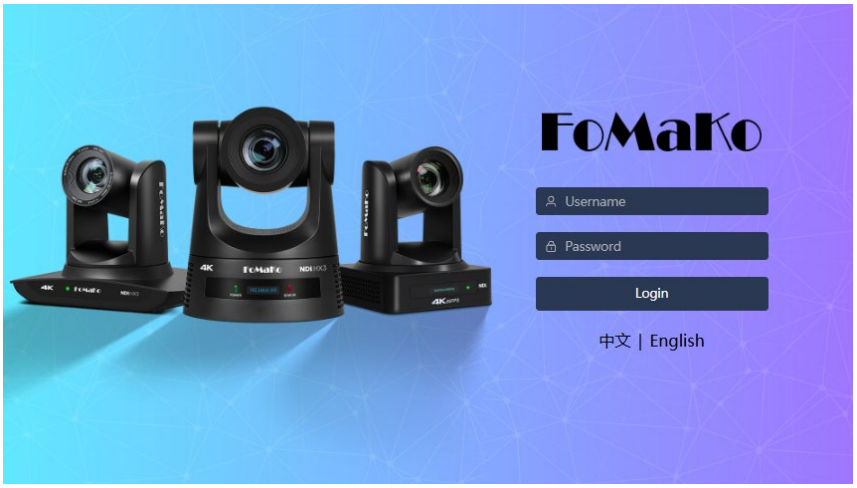



## 4.2 Web Login

Input the Camera's IP address(example IP: 192.168.0.100) in the browser (Google Chrome recommend) and click Enter button to enter into Web Client login page. User can login as administrator and normal user. If login as

administrator (Default User name/Password: admin), users can preview, playback, and set configuration in the Web Client; If login in as normal user (Default User name/Password: user1 or user2), users can only preview, playback and logout, no option for configuration.

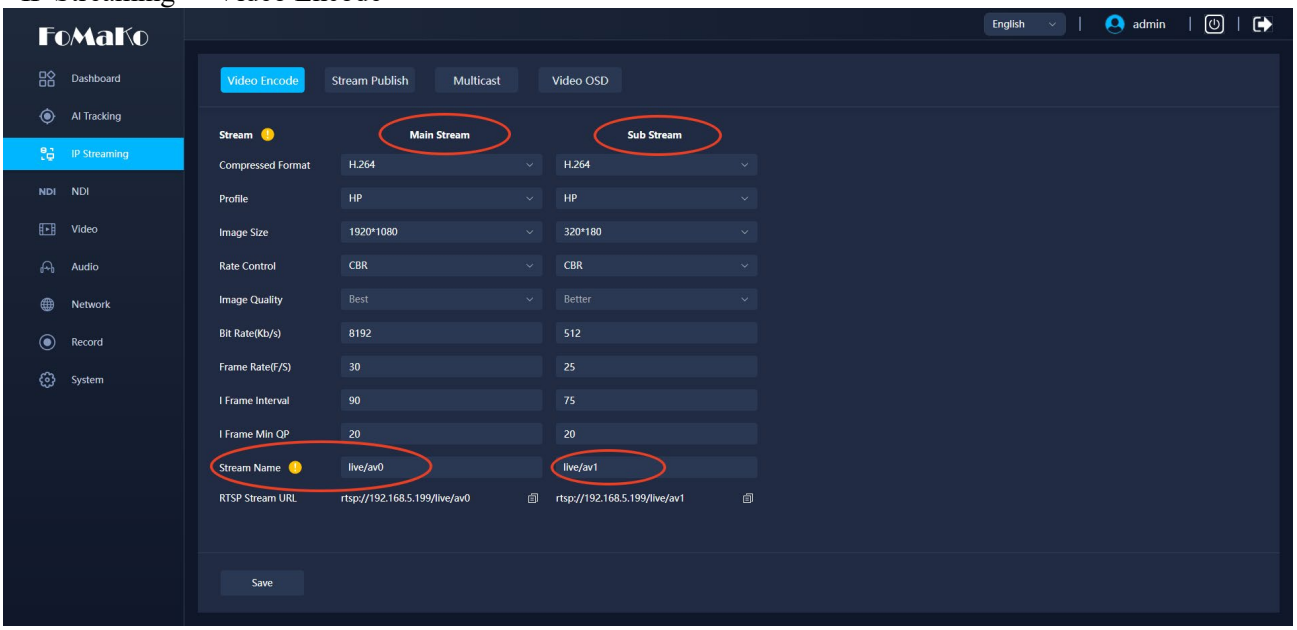
Language Selection: click Chinese/English in the upper right corner of the login page to select the language type of the web interface.




# 4.3 Streaming

## 1. Video Stream Capture

1） IP Streaming -> Video Encode

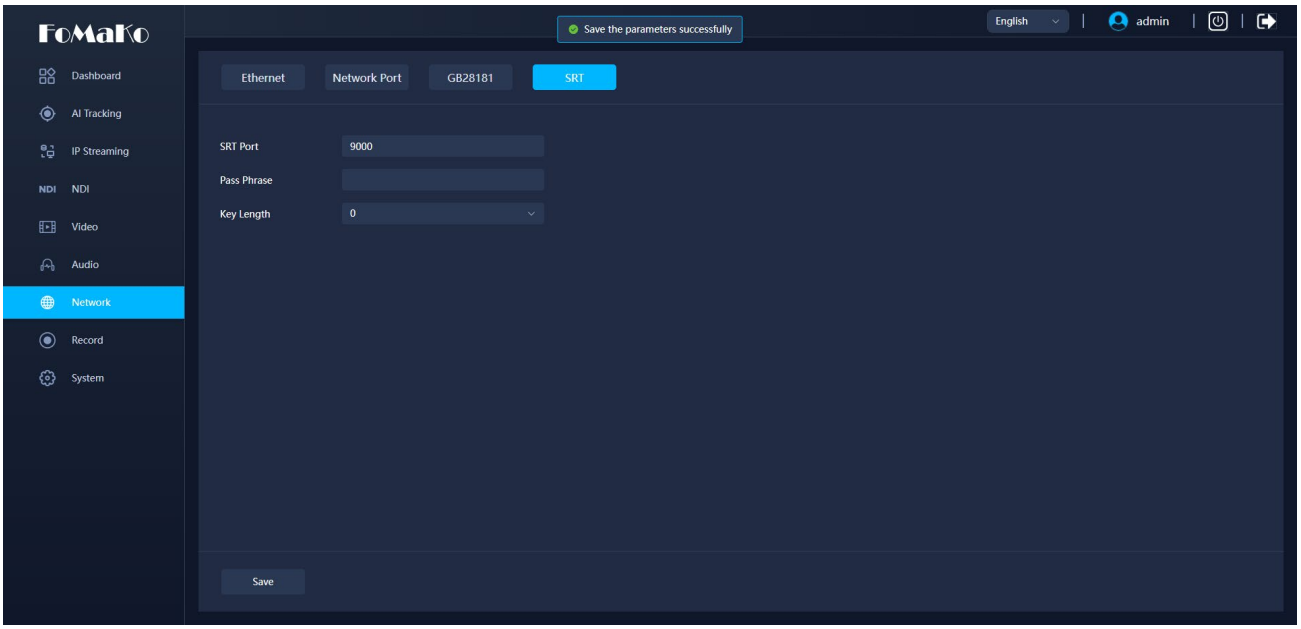



Configure the parameters according to the network environment. Note: stream name live/av0 (live/ XXX)

For example:
Camera's example IP is 192.168.0.100. The way to obtain the RTSP video stream is as below
**rtsp://192.168.0.100:554/live/av0（av0 main stream）**
**rtsp://192.168.0.100:554/live/av1（av1 sub stream）**

Camera's example IP is 192.168.0.100. the way to obtain RTMP video stream is as below
rtmp://192.168.0.100:1935/live/av0（av0 main stream）
rtmp://192.168.0.100:1935/live/av1（av1 sub stream）

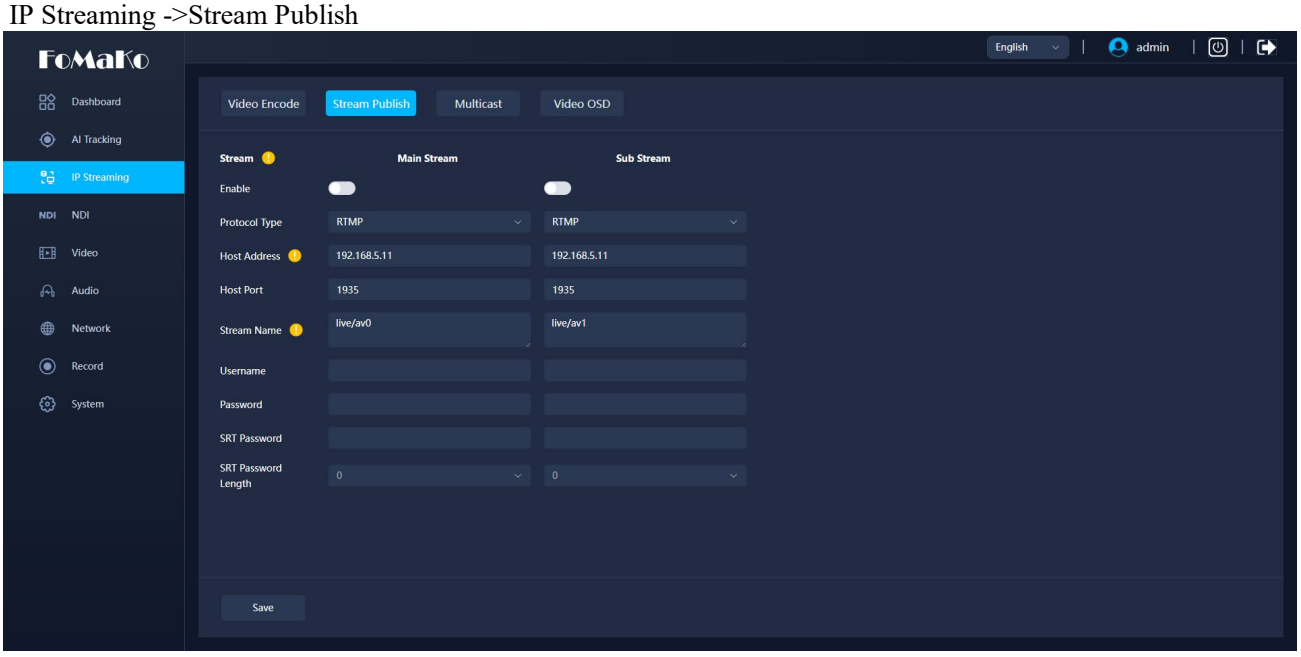
2） Network -> SRT




Configure the parameters according to the network environment; Camera's example IP is 192.168.0.100, and the way to obtain the SRT video stream is as follows: **srt://192.168.0.100:9000**

## 2. Push Video Stream

IP Streaming ->Stream Publish




Push RTMP stream to public network server, the stream camera IP must be on the public network, otherwise it will fail to connect to 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)

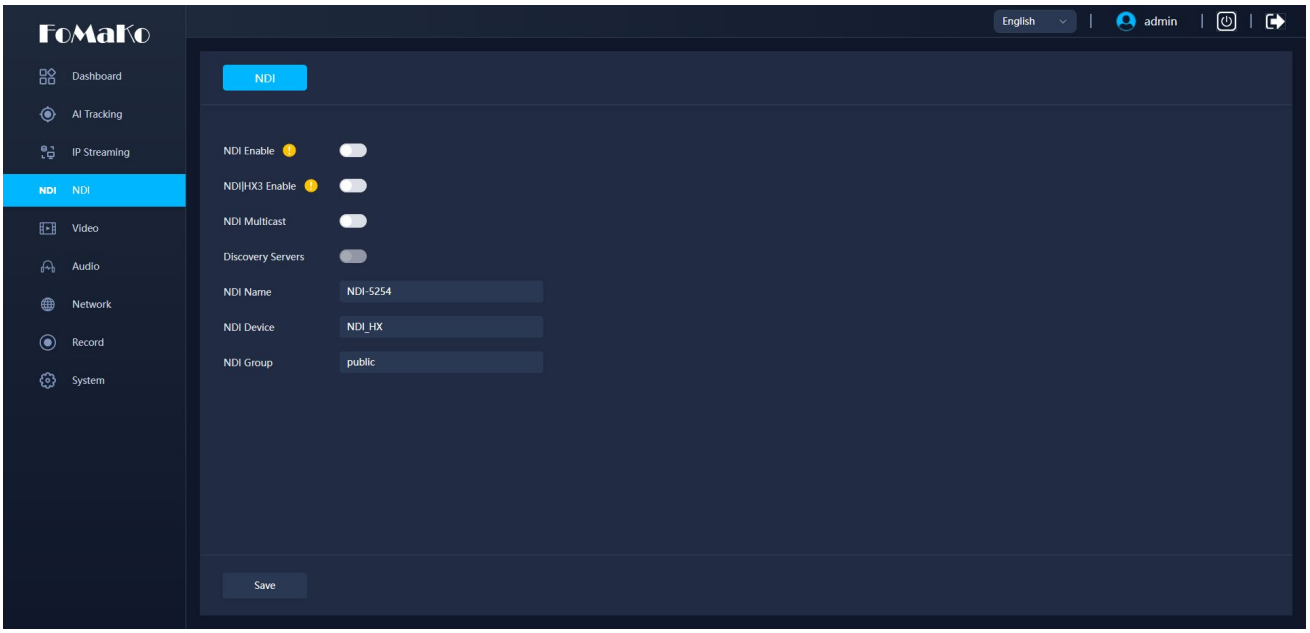
Username and password: the username and password set by the server, or leave it empty

**Access url: rtmp://host domain name: host port/live/xxx**

**Or (rtmp: //host IP address: host port/live/xxx)**

## 3. NDI Configuration (for NDI camera only)

NDI



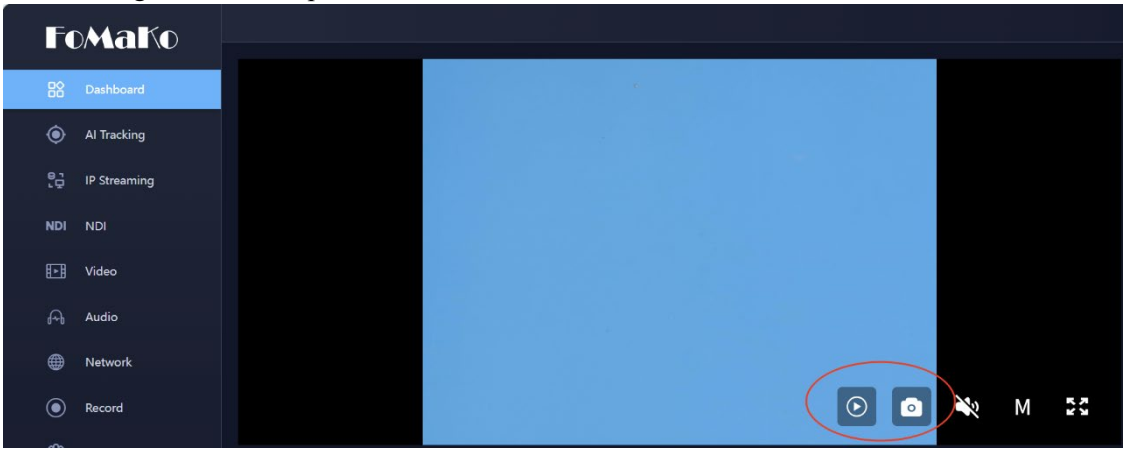

Click the NDI enable switch and restart the camera to use the NDI function.

## 4.4 USB Recording

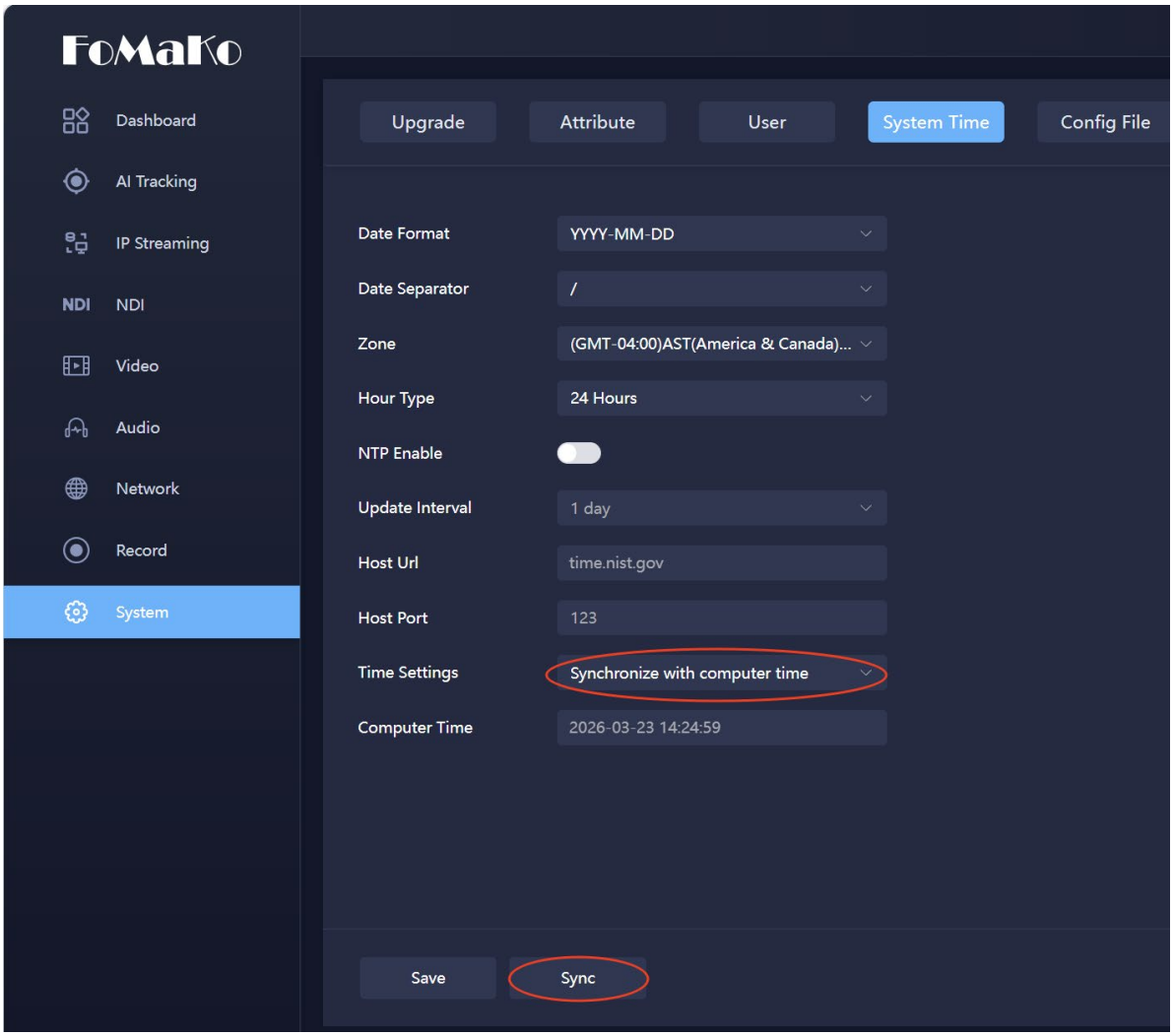
（To use the USB recording function, follow these steps:）

① : Connect a USB storage device to the camera's USB 2.0 port. Please note that only ExFAT and FAT32 formats are supported and you need to format the storage device to FAT32 if it is NTFS. Otherwise, all recording-related functions on the webpage will be unavailable.

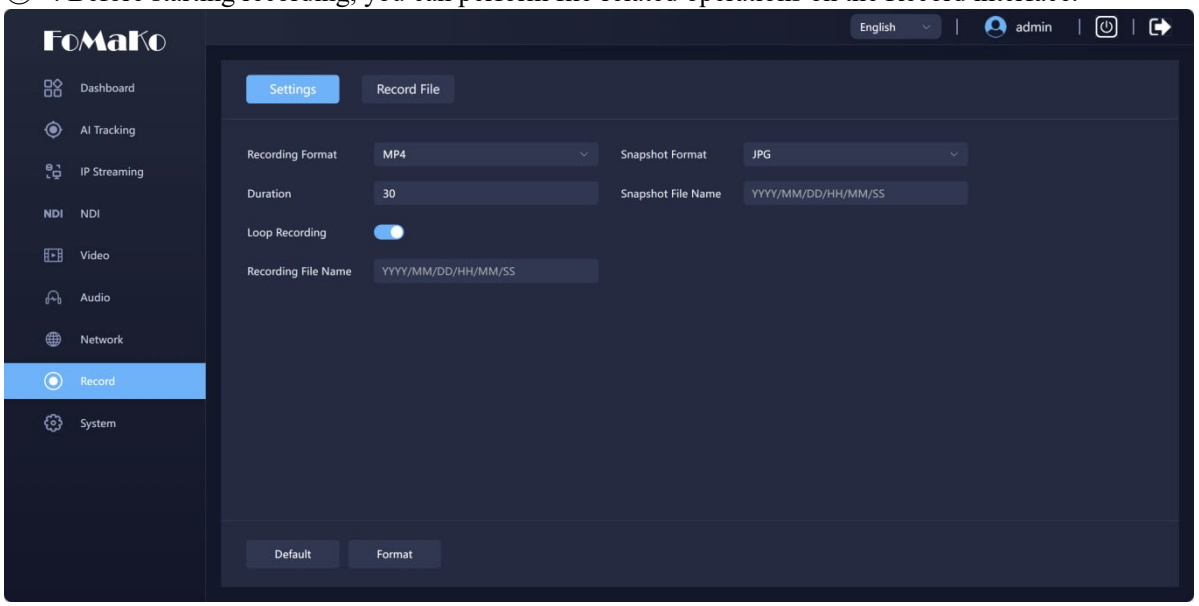
② : Then the recording and snapshot icons will appear in the lower right corner of Web preview. Click it to start/stop recording or use the snapshot function, as shown below.



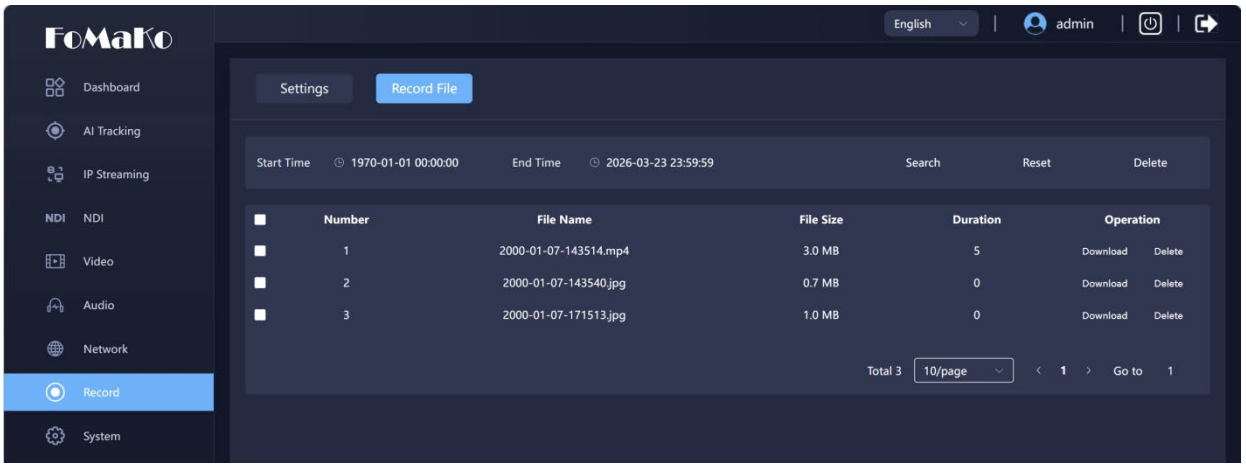

③ : Before starting recording, it is recommended to select Synchronize with computer time on the Web System Time interface and click Sync to complete time




④ : Before starting recording, you can perform file-related operations on the Record interface.




**Recording Format:** Supports recording in MP4 or TS format, with MP4 as the default.
**Duration:** The recording time can be set from 1 to 240 minutes, the default is 30 minutes.
**Loop recording:** When the recording duration reaches the limit, the system will automatically end the current segment and start the next recording.
**Snapshot Format:** Supports snapshot in JPG, JPEG or PNG format, the default is JPG
**Recording/Snapshot File Name:** Shows the files' name

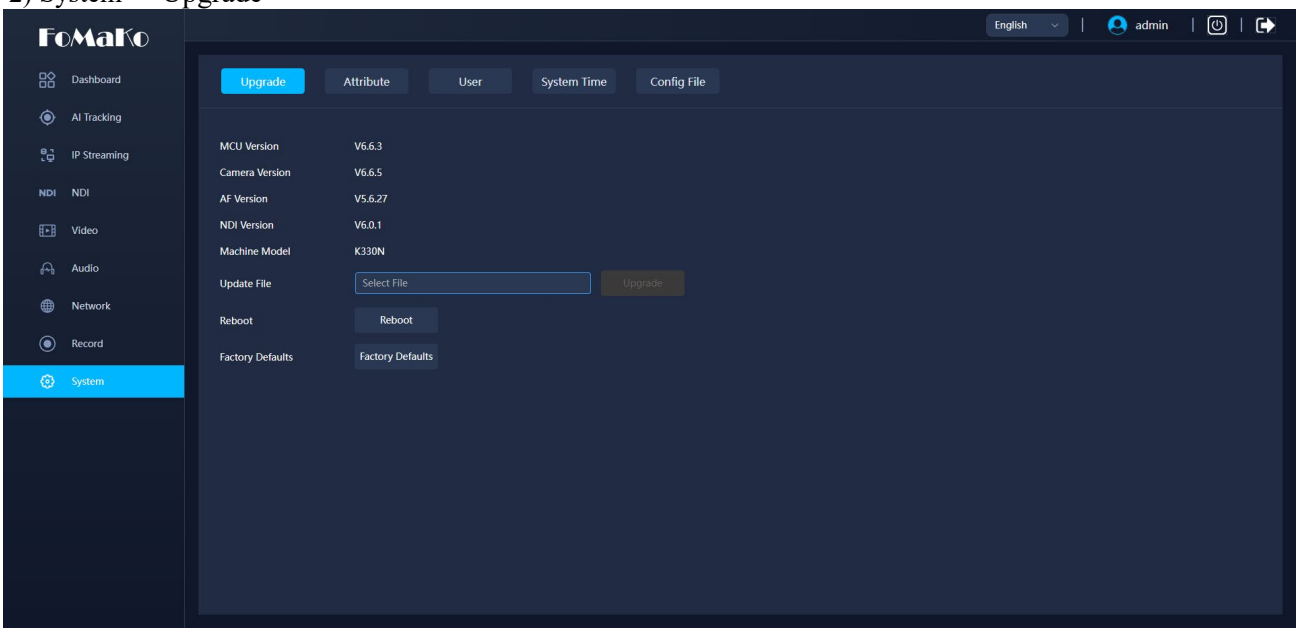



In this interface, you can view all recorded files within a specified time range, and perform operations such as downloading them to your local device or deleting them. Please note that the file download path is the browser's default download directory.

## 4.5 Software Upgrading

1) Log in to the web page and manage camera settings. The default page is preview interface, where users cam PTZ control, record video, preset camera positions and etc.

2) System -> Upgrade




3) Click " Select File " to select .mrg update file, then click upgrade button to finish software upgrading.

4) Camera reboot after completion of firmware update. It prompts with "successful upgrade".

Log in to check the firmware version to make sure software upgrade successful.

Then click " Factory Default ", reboot and restore parameters to factory default ( user name: admin; password admin).

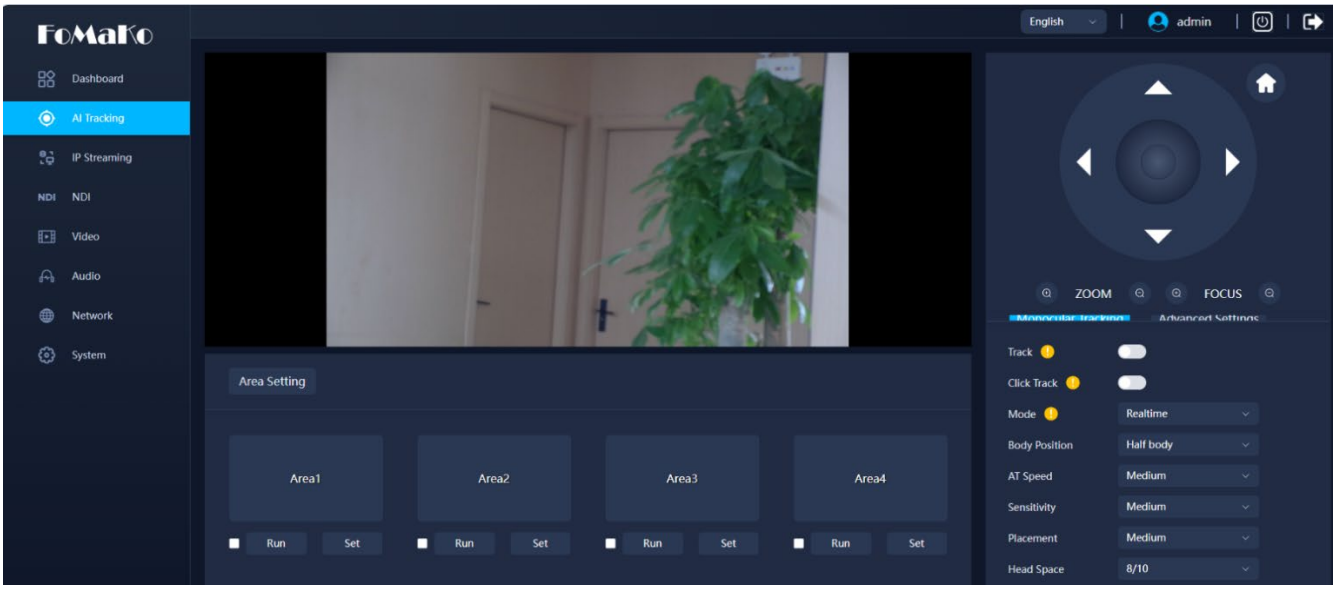
## 4.6 Monocular Tracking:

**Tracking shortcut keys:**




**F1:** Turn off Single Target Tracking
**F2:** Turn on Single Target Tracking
**F3:** Switch to Area/Real-time Tracking
**F4:** Switch Tracking Target

**Web:**




reset Prompt：After turning on, the upper left corner of the television screen will display information such as settings, deletion, and calling of preset positions.

**1.Real-time Tracking"：**

Tracing：Switch

Mode：Area Tracking and Real-time Tracking Switching

Click Track：During the tracking process, the tracking target can be switched by pressing the F4 key on the remote control; available in real-time tracking mode.

Body position: Indicates the position of the tracked target's head in the frame; available in real-time tracking mode.

Tracking Tips：When enabled, tracking information is displayed in the upper left corner of the TV screen, such as switching tracking targets, tracking modes, and enabling/disabling tracking; available in area tracking and real-time tracking modes.

Human frame：When enabled, a bounding box appears around the tracked target in the frame; available in area tracking and real-time tracking modes.

Auto zoom：When enabled, limits the lens zoom; available in real-time tracking mode.

Auto Tilt：When enabled, restricts the vertical movement of the pan-tilt unit; available in real-time tracking mode.

Lost reaction:stay/home, Determines the camera's action when the tracked target is lost.

**2.Area Tracking:**

Area Tracking Mode: Enable area tracking mode to perform area tracking

Setting up the Area: To set up area tracking (using Area 1 as an example), navigate to the pan-tilt control interface and adjust the frame to select the desired tracking area for Area 1. Press the setup button to complete the configuration for tracking Area 1. Repeat the same process for other tracking areas.

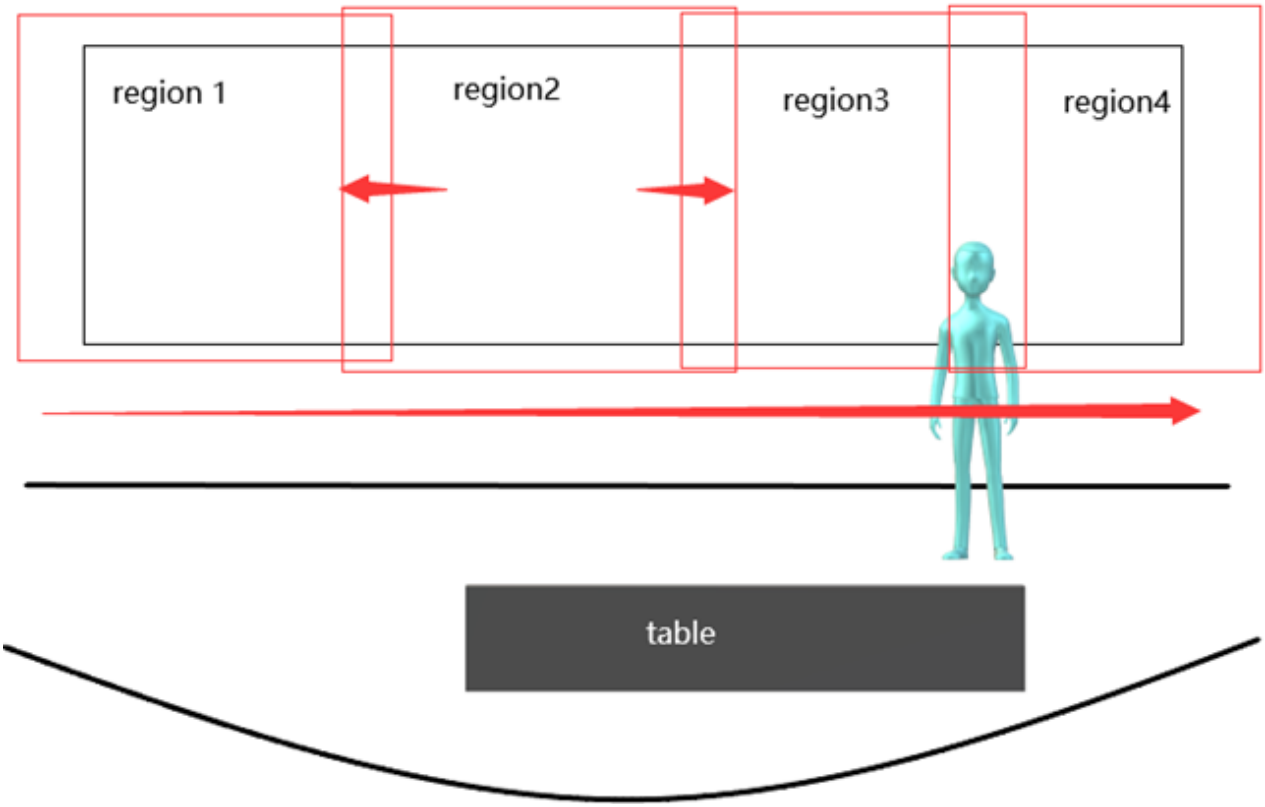
You can set up to 4 different tracking areas, with a minimum of 2 areas required. Area tracking settings can only be configured through the web interface.

Using Area Tracking Presets: Click on the preset area number to preview and activate the pre-set tracking area for monitoring.

**⚠ Caution**

- When tracking is enabled, the pan-tilt becomes uncontrollable. Each preset view in area tracking must be continuous from left to right and overlap when setting presets.

1.Each preset preview image must be continuous from left to right and overlap when setting the tracking regions.
2.You need to tick next to the region number to save the setting location when you setting the region.




Area Tracking Setup Guide

# 5. Serial Port Communication and Control

The camera could be controlled through RS232/RS485/RS422 interface; RS232 serial parameter 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 first goes left, then back to the middle position. Self-test is finished after the zoom moved to the farthest and then back to the nearest position. If the camera saved 0 preset before, it will be back to that position after initialization. At this point, the user can control the camera by 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 |
| 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) - 7(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 |
| | 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<br>tuvw: Focus Position |
| | High | 8x 01 04 58 01 FF | |

| | | | |
|---|---|---|---|
| CAM_AFSensitivity | Normal | 8x 01 04 58 02 FF | Focus sensitivity Setting |
| | 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 | 8x 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 | |
| | 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=0-8 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 0：0.48 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 pp FF | PP=00 – 7F |
| CAM_IDWrite | | 8x 01 04 22 0p 0q 0r 0s FF | pqrs: Camera ID (=0000 to FFFF) |
| Preset Lock | ON | 8x 01 03 02 FF | Preset Lock ON/OFF |
| | OFF | 8x 01 03 03 FF | |
| Pan Tilt Speed | Set Pan Tilt Speed | 8x 01 02 0p FF | P:1-8 |
| | 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 | |
| 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 pp FF | PP: 00~19<br>Video format<br>00:1080P60<br>01:1080P50<br>04:720P60<br>05:720P50<br>06:1080P30<br>07:1080P25<br>0A:1080P59.94 |

| | | | |
|---|---|---|---|
| | | | 0D:1080P29.97<br>0C:720P59.94<br>19: 4KP30<br>1A: 4KP25 |
| Pan_tiltDrive | Up | 8x 01 06 01 VV WW 03 01 FF | VV: Pan speed 0x01 (low speed) to 0x18 (high speed)<br>WW: Tilt speed 0x01 (low speed) to 0x14 (high speed)<br>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<br>0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | |
| | RelativePosition | 8x 01 06 03 VV WW<br>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<br>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<br>07 0F 0F 0F 07 0F 0F 0F FF | |
| Tracking | | 8x 0A 01 32 00 00 0X 0Y FF | X:0x02-ON；0x03-OFF<br>Y:0x00- Real-time tracking；0x01- Area tracking |

# 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 50 00 FF | Top |
| | | y0 50 01 FF | Center |
| | | y0 50 02 FF | Bottom |
| | | y0 50 03 FF | All |
| CAM_WBModeInq | 8x 09 04 35 FF | y0 50 00 FF | Auto |
| | | y0 50 0C FF | 2400K |
| | | y0 50 0D FF | 2500K |
| | | y0 50 0E FF | 2600K |
| | | y0 50 0F FF | 2700K |
| | | y0 50 10 FF | 2800K |
| | | y0 50 11 FF | 2900K |
| | | y0 50 01 FF | 3000K |
| | | y0 50 12 FF | 3100K |
| | | y0 50 13 FF | 3200K |
| | | y0 50 14 FF | 3300K |

| | | | |
|---|---|---|---|
| | | y0 50 15 FF | 3400K |
| | | y0 50 07 FF | 3500K |
| | | y0 50 16 FF | 3600K |
| | | y0 50 17 FF | 3700K |
| | | y0 50 18 FF | 3800K |
| | | y0 50 19 FF | 3900K |
| | | y0 50 02 FF | 4000K |
| | | y0 50 1A FF | 4100K |
| | | y0 50 1B FF | 4200K |
| | | y0 50 1C FF | 4300K |
| | | y0 50 1D FF | 4400K |
| | | y0 50 08 FF | 4500K |
| | | y0 50 1E FF | 4600K |
| | | y0 50 1F FF | 4700K |
| | | y0 50 21 FF | 4800K |
| | | y0 50 22 FF | 4900K |
| | | y0 50 03 FF | One Push Mode |
| | | y0 50 04 FF | 5000K |
| | | y0 50 23 FF | 5100K |
| | | y0 50 24 FF | 5200K |
| | | y0 50 25 FF | 5300K |
| | | y0 50 26 FF | 5400K |
| | | y0 50 09 FF | 5500K |
| | | y0 50 27 FF | 5600K |
| | | y0 50 28 FF | 5700K |
| | | y0 50 29 FF | 5800K |
| | | y0 50 2A FF | 5900K |
| | | y0 50 0A FF | 6000K |
| | | y0 50 2B FF | 6100K |
| | | y0 50 2C FF | 6200K |
| | | y0 50 2D FF | 6300K |
| | | y0 50 2E FF | 6400K |
| | | y0 50 05 FF | Manual |
| | | y0 50 06 FF | 6500K |
| | | y0 50 2F FF | 6600K |
| | | y0 50 30 FF | 6700K |
| | | y0 50 31 FF | 6800K |
| | | y0 50 32 FF | 6900K |
| | | y0 50 0B FF | 7000K |
| | | y0 50 33 FF | 7100K |
| 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 00 00 0p 0q FF | pq: R Gain |
| 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 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 |
| | | y0 50 00 FF | Off |

| | | | |
|---|---|---|---|
| CAM_PictureEffectModeInq | 8x 09 04 63 FF | y0 50 04 FF | B&W |
| CAM_MemoryInq | 8x 09 04 3F FF | y0 50 0p FF | p: Memory number last operated. |
| Pan Tilt SpeedInq | 8x 09 01 01 FF | y0 50 0p FF | P:1-8 |
| 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 pp FF | PP: Color Gain setting 00 – 7F |
| CAM_IDInq | 8x 09 04 22 FF | y0 50 00 00 00 0p FF | p: Gamma ID |
| IR_ReceiveInq | 8x 09 06 08 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| 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<br>mn pq rs tu vw FF | ab cd :vender ID ( 0220 )<br>mn pq : model ID( 0430 )<br>rs tu : ARM Version<br>vw :reserve |
| VideoSystemInq | 8x 09 06 23 FF | y0 50 pp FF | PP: 00~19<br>Video format<br>00:1080P60<br>01:1080P50<br>04:720P60<br>05:720P50<br>06:1080P30<br>07:1080P25<br>0A:1080P59.94<br>0D:1080P29.97<br>0C:720P59.94<br>19: 4KP30<br>1A: 4KP25 |
| Pan-tiltMaxSpeedInq | 8x 09 06 11 FF | y0 50 ww zz FF | ww: Pan Max Speed<br>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<br>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 | Byte7 |
|---|---|---|---|---|---|---|---|
| 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 | Byte4 | 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 it's not used for a long run.
2) Use soft cloth or tissue to clean the camera cover.
3) 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 video quality.

## 6.2 Troubleshooting

**1)No video output**

a. Check whether the camera power supply is connected, the voltage is normal, the power indicator is lit.
b. Whether the machine could do self-check after restarted.
c. Check whether the bottom of the DIP switch is the normal operating mode (see Table 2.2 and Table 2.3)
d. Check whether the video output cable or video display is normal

**2)No image sometimes**

a. Check whether the video output cable or video display is normal

**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 not works**

a. Remote control address is set to 1 (if the machine is set back to the factory defaults, remote control addresses need to be back to 1 too)
b. Check whether the battery is installed on the remote controller or low.
c. Check the menu whether is closed, camera control through remote controller is only available after exiting the menu. If video output from LAN, menu will not be displayed, menu will automatically exists 30s later, and then it can be controlled by remote controller.

**5)Serial port not works**

a. Check whether the camera serial device protocol, baud rate, address is consistent
b. Check whether the control cable is connected properly
c. Check whether the camera working mode is the normal operating mode

**6)Web pages cannot log in**

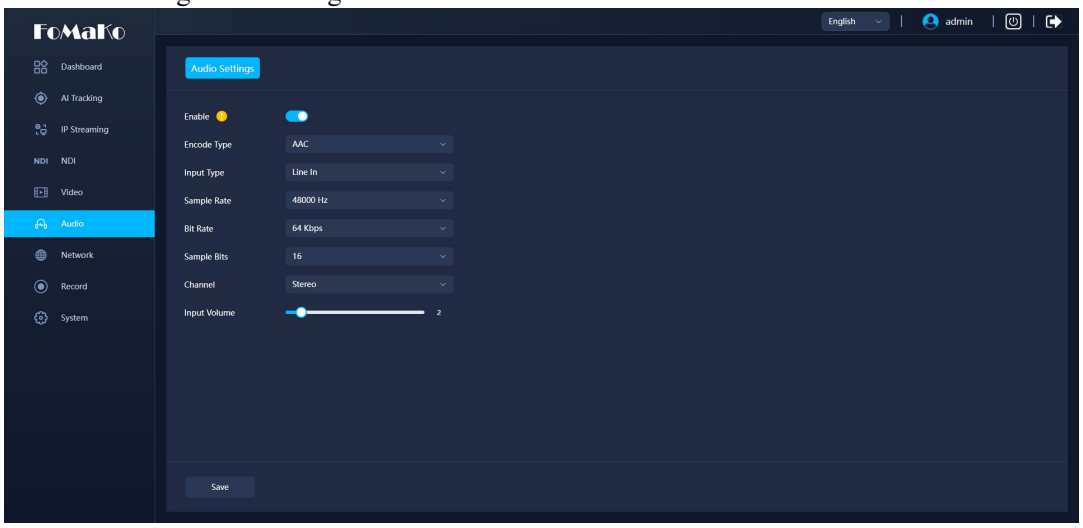
a. Check if the camera outputs video normally by connecting directly to the screen.
b. Check whether the network cable is connected properly (Ethernet port yellow light flashes to indicate normal network cable connection)
c. Check camera's currently IP Address
d. Check if camera and PC are connected to the same router/

**7)How to use the camera as USB camera for skype/zoom**

Method One: Use camera's USB port
Method Two: Use HDMI to USB video capture card

**8)Can't transmit audio**

Please login the camera's webpage -> Configuration-> Audio configure -> Enable
then Reboot the camera.
you can also do something audio settings here.




**9)Other unknown problems , please email us at: ivan@fomako.net**

We will help you to solve all the problems.

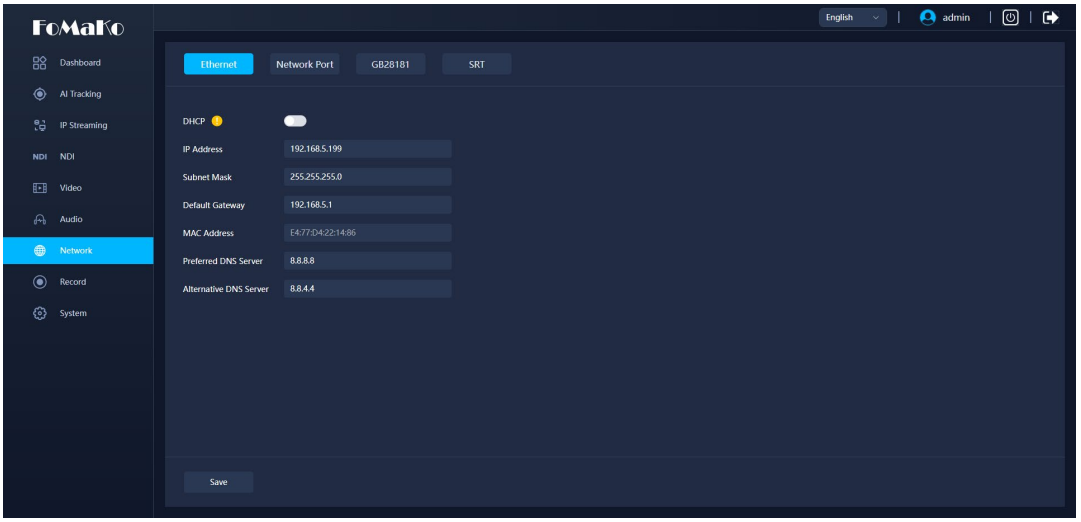
# 7. Example: Streaming to Facebook

**Step 1:**

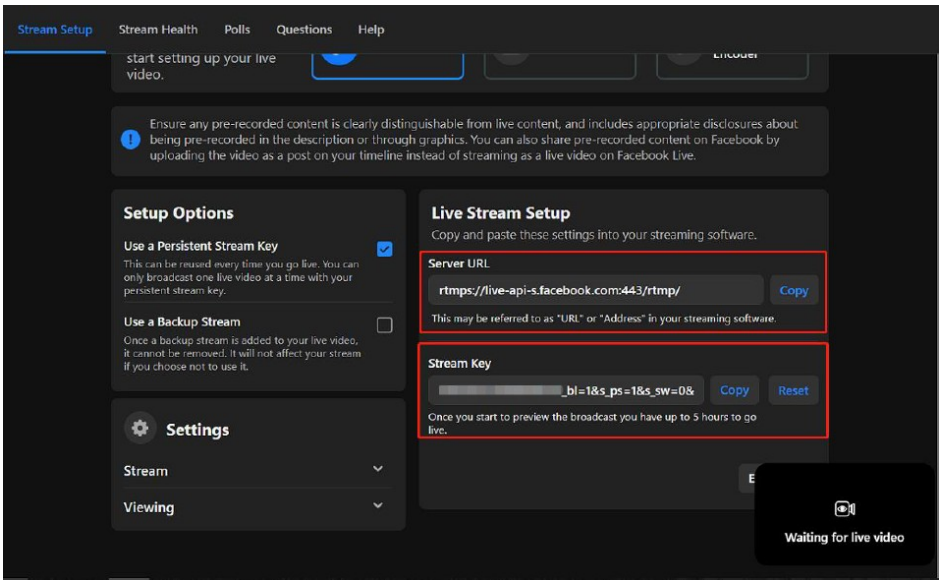
First of all, please make sure the camera's IP address is assigned by router, and input your PC's DNS, if you don't your pc's DNS, you can also use Google NDS:

8.8.8.8

8.8.4.4

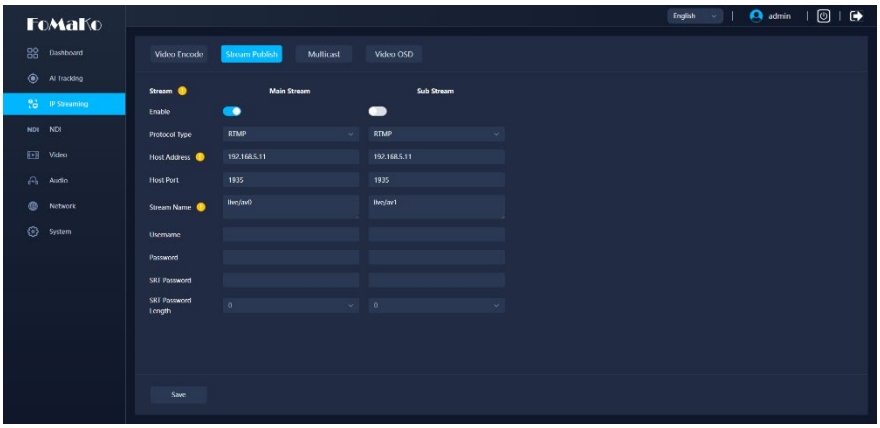



**Step 2:**
Create an event on Facebook and get the following info from Facebook.




Facebook will give you two parameters, "stream key" and "server URL"

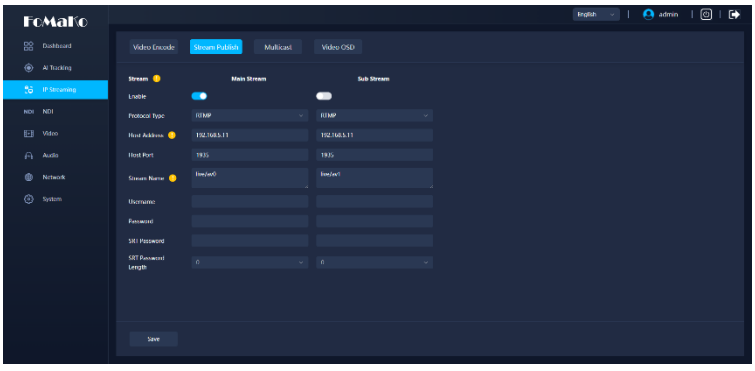
**Step 3:**
Fill these two parameters into the "host address" and "stream name" of the camera, and change the port to 443




# 8. Example:Streaming to Youtube

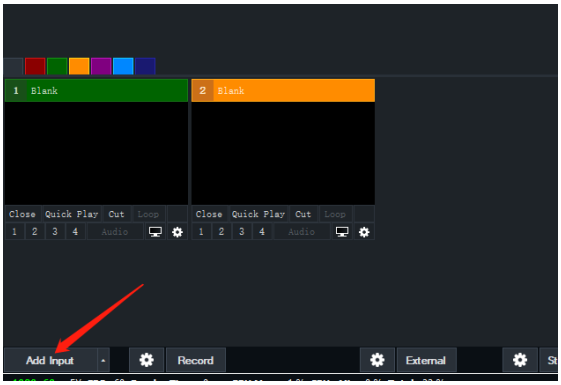
Streaming to Youtube is similar as streaming to Facebook.

**Port Type:** RTMP
**Host Port:** 1935
**Host Address** = Youtube “Stream URL”
**Stream Name** = Youtube “Stream Key”

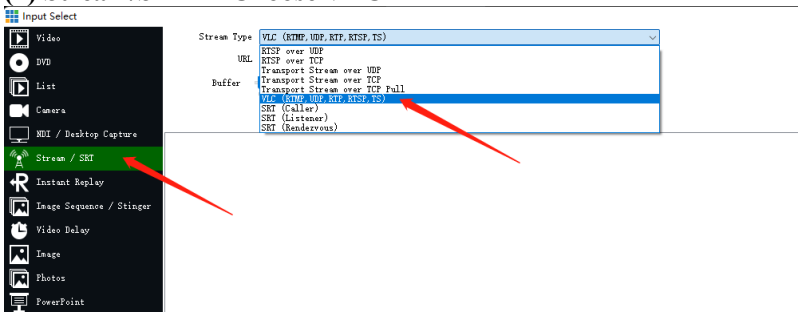


# 9. Example: Streaming to Vmix

**（1）Click “Add Input”**



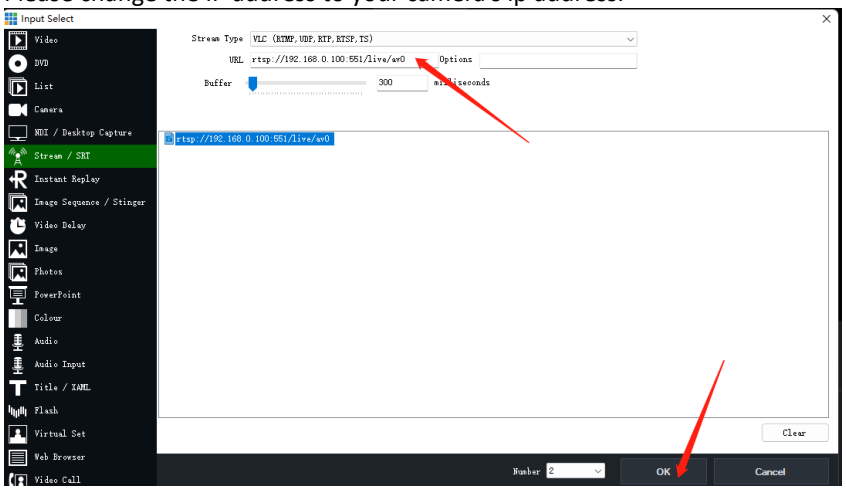

**(2) Stream/SRT -> Choose VLC**




**(3) Input camera’s RTSP URL:**

rtsp://192.168.0.100:554/live/av0

Please change the IP address to your camera’s ip address.




**Then,press “OK”, it will stream to Vmix successfully.**

**And it is similar method to stream to other live streaming software.**

# 10. Copyright Statement

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