FoMaKo

12G-SDI HDMI NDI USB 4K PTZ 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.

Copyright

Notice

Product specifications and information which were referred to in this document are for reference only. We may change, delete, or update any content at any time and without prior notice.

FCC NOTICE (Class A)

This product complies with Part 15 of the FCC Rules. The operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note

This product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can 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 by one or more of the following measures:

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

Class A ITE

Class A ITE is a category of all other ITE which satisfies the class A ITE limits but not the class B ITE limits. Such equipment should not be restricted in its sale but the following warning shall be included in the instructions for use:

Warning

Operating this equipment in a residential environment may cause radio interference.

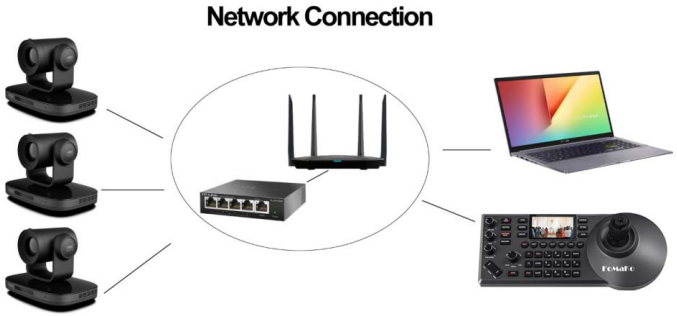
European Community Compliance Statement (Class A)

This product is herewith confirmed to comply with the requirements set out in the Council Directives on the Approximation of the laws of the Member States relating to Electromagnetic Compatibility Directive 2014/30/EU.

Quick Start

◆ Add Cameras to Your Network

Please do the connections as the following. You must have a router in your network, then router will assign IP address for the cameras automatic. If you don't have router in your network, cameras can't get IP address from your network.



Camera's screen will show its IP address, you can visit camera's webpage by camera's IP address.

Tips: When you login the camera's webpage, you'd better change the IP from "Dynamic IP Address" to "Fixed IP Address", then camera will keep currently IP, otherwise when camera rebooted , router rebooted, router will assign a new IP address for the camera.

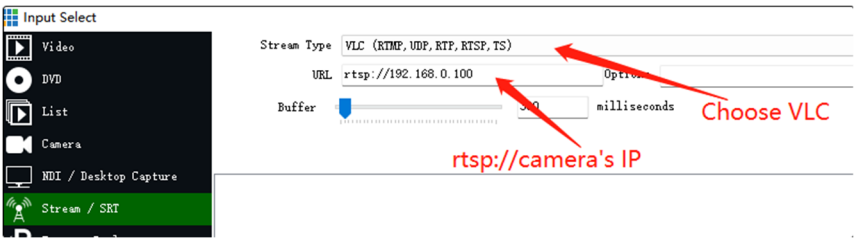
◆ Visit Camera's Webpage

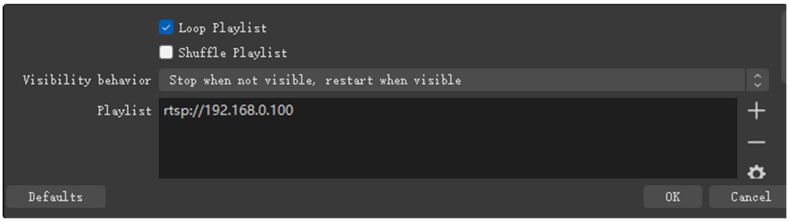
Please use web browser such as: Google Chrome, Firefox or Safari to Visit camera's IP address

User name: admin **Password:** admin

◆ IP Streaming to Vmix or OBS

Tips: recommend to use VLC streaming in Vmix and OBS, it has lower latency.





If you want to use normal RTSP stream:

RTSP UDP Stream URL: rtsp://192.168.0.100:554/1

Please note, you need change the IP address to your camera's IP address.

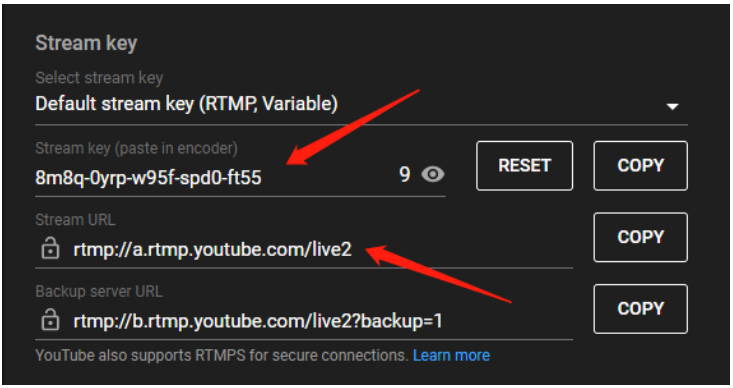
◆ IP Steam to Youtube or Facebook

Youtube, Facebook or other live broadcast platforms will supply Stream URL (server URL) and stream key for you.

Example for Youtube:

Stream URL: rtmp://a.rtmp.youtube.com/live2/

Stream Key: 8m8q-0yrp-w95f-spd0-ft55



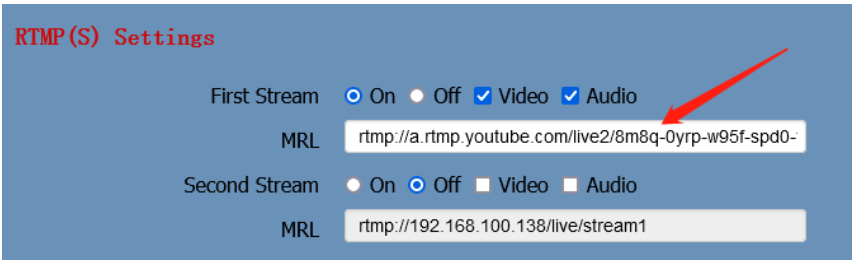
Now go to camera's webpage ->network->RTMP Settings.

input the RTMP stream URL:

rtmp://a.rtmp.youtube.com/live2/8m8q-0yrp-w95f-spd0-ft55

(Format: Stream URL/Stream Key)

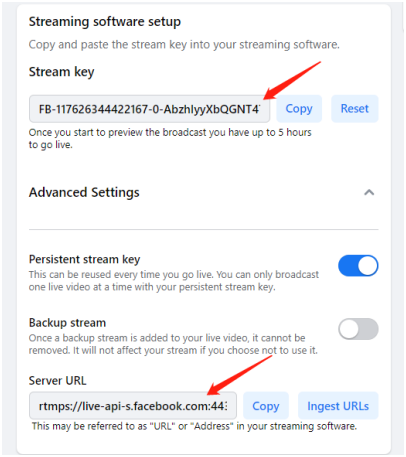
Save and reboot the camera, camera will stream to Youtube.



Example for Facebook:

Server URL: rtmps://live-api-s.facebook.com:443/rtmp/

Stream Key: FB-117626344422167-0-AbzhIyyXbQGNT47w

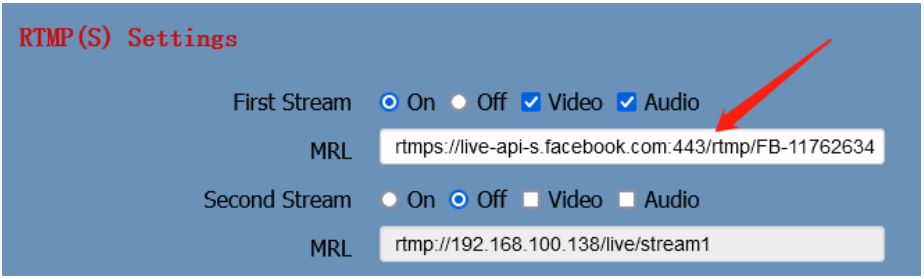


Now go to camera's webpage ->network->RTMP Settings.

input the RTMP stream URL:

rtmps://live-api-s.facebook.com:443/rtmp/FB-117626344422167-0-AbzhIyyXbQGNT47w

(Format: Stream URL/Stream Key)



Save and reboot the camera, it will stream to Facebook.

◆ Connect Camera to PTZ Controller

Some information you need:

User Name: admin **Password:** admin

Sony Visca port: 52381 **IP Visca UDP port:** 1259

IP Visca TCP port: 5678 **Onvif Port:** 2000

We recommend to use Sony Visca (Visca over IP) control protocol, it is more steady and work better.

Let's use FoMaKo KC608 Pro IP PTZ controller for example:

FoMaKo KC608 Pro controllers are optimized for FoMaKo cameras, it is very easy to let them work together.

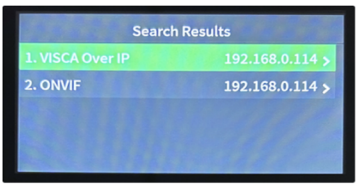
(1) Add the controller to the same LAN as camera, the router will assign an IP address for the PTZ controller

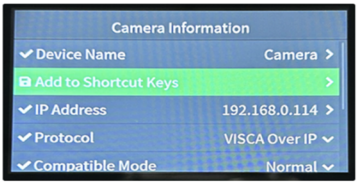
(2) Press "search" button on controller, it will show camera's IP address

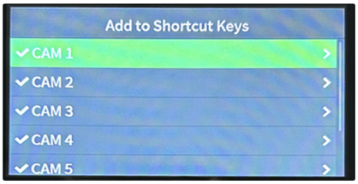
(3) Choose "VISCA Over IP" and press "Enter"

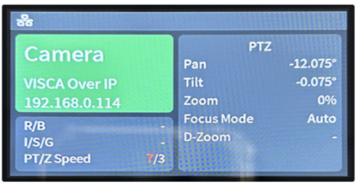
(4) Add to Shortcut Keys, you can assign 7 cameras to shortcut keys CAM1~CAM7

(5) Press CAM1~CAM7 to control the camera









◆ AI Auto Tracking

AI auto tracking operating instructions by remote control:

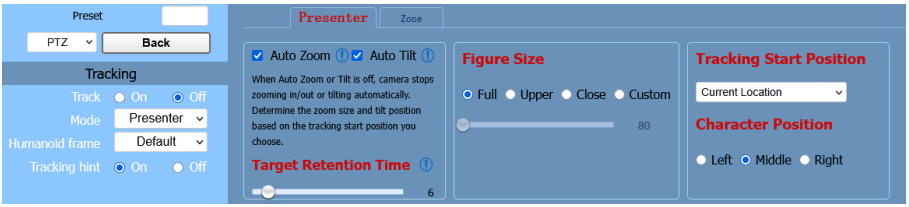
F4: Turn off AI auto tracking

F3: Turn on AI tracking

F2: Reserved key

F1: Turn on auto frame

Please login camera's webpage to check more AI auto tracking settings.



Important Note: When you enabled AI auto tracking, the camera will be controlled by AI algorithm, you can't control camera's PTZ by remote control or other control devices.

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

FoMaKo Supports Team

Contents

1 Safety Precautions

- During the installation and use of the equipment, all electrical safety regulations of the country and region of use must be strictly observed.
- Please use the power adapter that comes standard with this product.
- Please do not connect multiple devices to the same power adapter (exceeding the capacity of the adapter may generate excessive heat or cause a fire).
- Do not rotate head of the camera by hand, otherwise it may cause mechanical failure.
- When installing this product on a wall or ceiling, secure the device securely. When installing, make sure that there are no obstacles within the rotation range of the gimbal; do not turn on the power until all installations are completed.
- To avoid heat build-up, keep ventilation around the device smooth.
- If the device emits smoke, smells, or makes noises, please turn off the power immediately and unplug the power cord, and contact the dealer in time.
- This device is not waterproof, please keep the device dry.
- This product has no user serviceable parts, damage caused by disassembly by the user is not covered by the warranty.

Notice

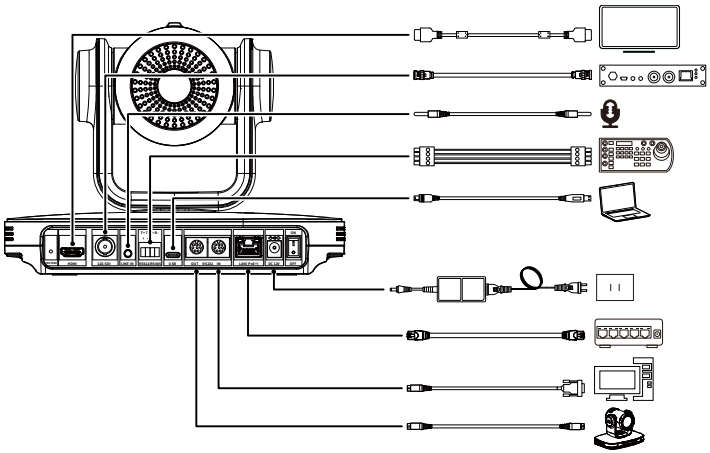
Specific frequencies of electromagnetic field may affect the image of the camera!

2 Pack List

Name	Quantity
Camera	1
Remote Control	1
Power Adapter	1
Power Cable	1
RS232 Cable	1
USB Cable	1
Wall Mount Bracket (with screws)	1
Ceiling Mount Bracket (with screws)	1
User Manual	1

3 Product Connection

1) Please check connections are correct before starting.



Note The schematic diagram is for reference only. Please refer to the actual application scenario for product connection.

2) After the camera is powered on, it starts to initialize, right up to the limit position, and then both horizontal and vertical go to the middle position, the motor stops running, and the initialization is completed.
(Note: If preset 0 is saved, PTZ will be move to preset 0)

4 About Product

4.1 Features

- **AI Tracking**

With the help of the AI computing power of the chip, the camera is equipped with advanced AI algorithms to realize monocular humanoid tracking, which can realize automatic tracking of scenes such as education, conferences and live broadcasts.

- **NDI|HX2**

NDI|HX2 has the characteristics of low delay and plug and play, which is convenient for project implementation and deployment. It has good ecology and supports the simultaneous transmission of audio, video and control commands. It is a new generation of network video transmission mode.

- **4K UHD**

Use 1/1.8-inch high-quality UHD CMOS sensor with a maximum of 8.42 million pixels can realize 4K (3840x2160) ultra-high-resolution high-quality images. And downward compatible with 1080P, 720P and other resolutions.

- **20x Optical Zoom**

It adopts 4K ultra long focal lens with high quality and 8 million ultra-high resolution, 20x optical zoom, and the maximum field angle is 60°.

- **12G-SDI**

The maximum support is 2160P60 YUV422 10BIT video output, and 12G-SDI can solve the problem of 4K long-distance transmission with one cable.

- **HDMI 2. 0**

Support HDMI 2.0 interface, which can directly output 4KP60 uncompressed digital video.

- **Low Light**

The application of 3D noise reduction algorithm greatly reduces image noise. Even under the condition of ultra-low illumination, it still keep the picture clean and clear, and the SNR of image is as high as 55dB.

- **Multiple Interfaces**

Support HDMI 2.0 and 12G-SDI HD output interfaces. HDMI, 12G-SDI, USB, and LAN can simultaneously output four HD digital signals.

- **Multiple Control Methods**

The camera can be controlled using RS232, RS422/RS485, network, and USB.

- **Gravity Sensor**

It supports automatic image flipping function, which is convenient for engineering installation and use.

4.2 Specifications

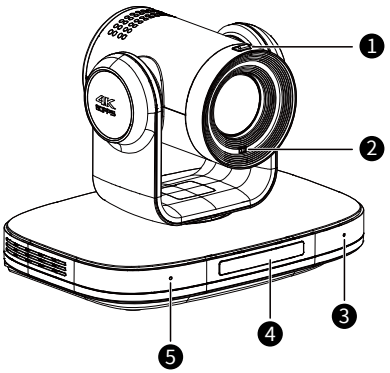
Camera	
Signal System	4KP60, 4KP59.94, 4KP50, 4KP30, 4KP25, 4KP29.97, 1080P60, 1080P50, 1080160, 1080150, 1080P30, 1080P25, 1080P59.94, 1080159.94, 1080P29.97, 720P60, 720P50, 720P59.94
Sensor	1/1.8 inch, CMOS, Effective pixels: 8.42M
Scanning Mode	Progressive
Lens	20x, f = 6.25mm ~ 125mm, F1.58 ~ F3.95
Digital Zoom	16x
Minimum Illumination	0.5 Lux @ (F1.8, AGC ON)
Shutter	1/30s ~ 1/10000s
White Balance	Auto, Indoor, Outdoor, One Push, Manual, VAR
Backlight Compensation	Support
Digital Noise Reduction	3D Digital Noise Reduction
SNR	≥55dB
Horizontal FOV	60° ~ 3.5°
Vertical FOV	35.7° ~ 2.0°

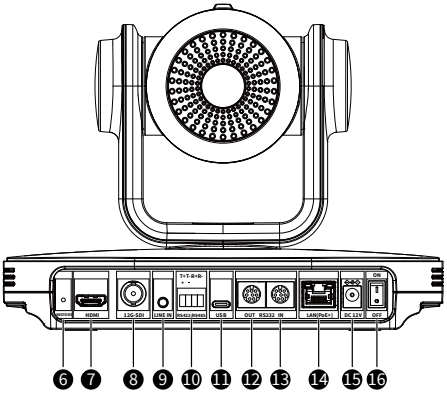
Pan Angle	±162.5°
Tilt Angle	-30° ~ +90°
Pan Speed	1.8°/s ~ 80°/s
Tilt Speed	1.5°/s ~ 49°/s
H & V Flip	Support
Image Freeze	Support
PoE+	Support
Preset Position	255
Preset Accuracy	0.1°
USB Features	
Operate System	Windows 7/8/10, Mac OS X, Linux, Android
Color System/ Compression	H.264/H.265/MJPEG
Video Format	● H.264 AVC: max to 2160P@30fps ● H.265 HEVC: max to 2160P@30fps ● MJPEG: max to 2160P@30fps ● YUV: 1920x1080
USB Audio	Support
USB Video Protocol	UVC 1.1 ~ 1.5
UVC PTZ	Support
Network Features	
Video Compression	H.264/H.265/MJPEG
Video Stream	First Stream, Second Stream
First Stream Resolution	3840x2160, 1920x1080, 1280x720, 1024x576, 720x480, 720x408, 640x480, 640x360
Second Stream Resolution	720x480, 720x408, 640x480, 640x360, 480x320, 320x240
Video Bit Rate	32kbps ~ 51200kbps
Bit Rate Control	CBR, VBR
Frame Rate	50Hz: 1fps ~ 50fps 60Hz: 1fps ~ 60fps
Audio Compression	AAC, G711A
Audio Bit Rate	96Kbps, 128Kbps
Protocols	NDI®|HX2, TCP/IP, HTTP, RTSP, RTMP/RTMPS, ONVIF, DHCP, SRT, Multicast
Interfaces	
HDMI Interface	1 x HDMI: Version 2.0
12G-SDI Interface	1 x 12G-SDI: BNC type, 800mVp-p, 75Ω. Along to SMPTE 2082 standard
LINE IN Interface	1 x LINE IN: 3.5mm Audio Interface
Communication Interface	1 x RS422/RS485: 4/2 pin phoenix port, Max Distance: 1200m, Protocol: VISCA/ Pelco-D/Pelco-P
	1 x RS232 IN: 8pin Min DIN, Max Distance: 30m, Protocol: VISCA/Pelco-D/ Pelco-P
	1 x RS232 OUT: 8pin Min DIN, Max Distance: 30m, Protocol: VISCA network use
USB Interface	1 x USB: Type-C
LAN(PoE+) Interface	1 x LAN: 10M/100M/1000M Adaptive Ethernet Port, support PoE+
Power Jack	JEITA type (DC IN 12V)
Maximum Resolution	
HDMI+SDI+USB+ LAN	HDMI [4KP60] + SDI [4KP60] + USB [4KP30] + LAN[4KP30]
HDMI+SDI	HDMI [4KP60] + SDI [4KP60]
USB	USB [4KP30]
HDMI+LAN	● HDMI [4KP60] + LAN [1080P60] ● HDMI [1080P60] + LAN [4KP60] ● HDMI [4KP30] + LAN [4KP30]
SDI+LAN	● SDI [4KP60] +LAN [1080P60] ● SDI [1080P60] + LAN [4KP60] ● SDI [4KP30] + LAN [4KP30]

HDMI+SDI+LAN	• HDMI [4KP60] + SDI [4KP60] + LAN [1080P60] • HDMI [1080P60] + SDI [1080P60] + LAN [4KP60] • HDMI [4KP30] + SDI [4KP30] + LAN [4KP30]
General Specifications	
Tally Indicator	1
Restore Key	1
Power Switch	1
Input Voltage	DC 12V/PoE+(802.3at)
Input Current	Max. 2A
Operating Temperature	0°C ~ 40°C
Storage Temperature	-40°C ~ 60°C
Power Consumption	Max. 18W
Dimension	223mm x 163mm x 166mm
Net Weight	About 1.8Kg

Note Product features and specifications are subject to change without notice.

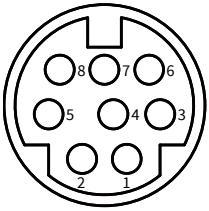
4.3 Interface and Switch





No.	Name
1	TALLY Indicator
2	ToF
3	Built-in Microphone
4	Display Screen
5	Built-in Microphone
6	RESTORE Key
7	HDMI Interface
8	12G-SDI Interface
9	LINE IN Interface
10	RS422/RS485 Interface
11	USB Interface
12	RS232 OUT Interface
13	RS232 IN Interface
14	LAN(PoE+) Interface
15	DC 12V Interface
16	Power Switch

4.4 RS232 Interface



No.	Function	No.	Function
1	DTR	5	RXD
2	DSR	6	GND
3	TXD	7	IR OUT
4	GND	8	NC

Correspondence between RS232 and DB-9:

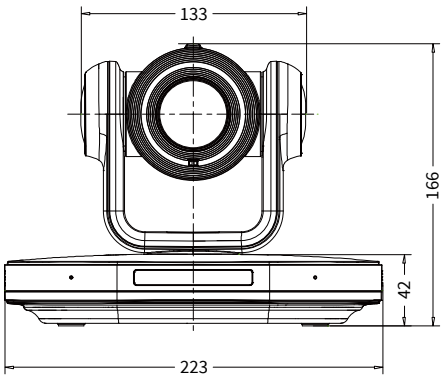
RS232	DB-9
1.DTR	1.CD
2.DSR	2.RXD
3.TXD	3.TXD
4.GND	4.DTR
5.RXD	5.GND
6.GND	6.DSR
7.IR OUT	7.RTS
8.NC	8.CTS
-	9.RI

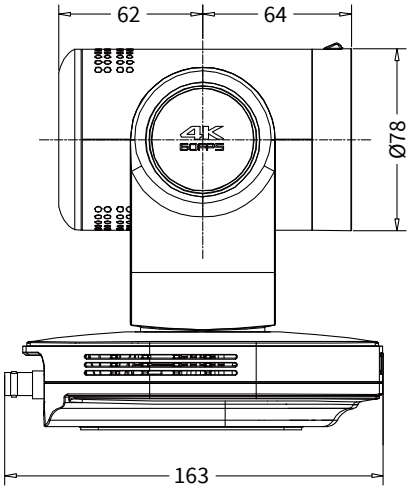
Correspondence between RS232 and Mini DIN:

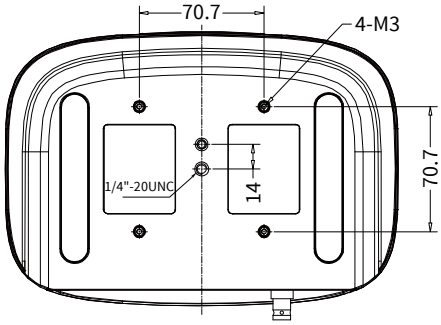
RS232	Mini DIN
1.DTR	1.DTR
2.DSR	2.DSR
3.TXD	3.TXD
4.GND	4.GND
5.RXD	5.RXD
6.GND	6.GND
7.IR OUT	7.NC
8.NC	8.NC

4.5 Dimension

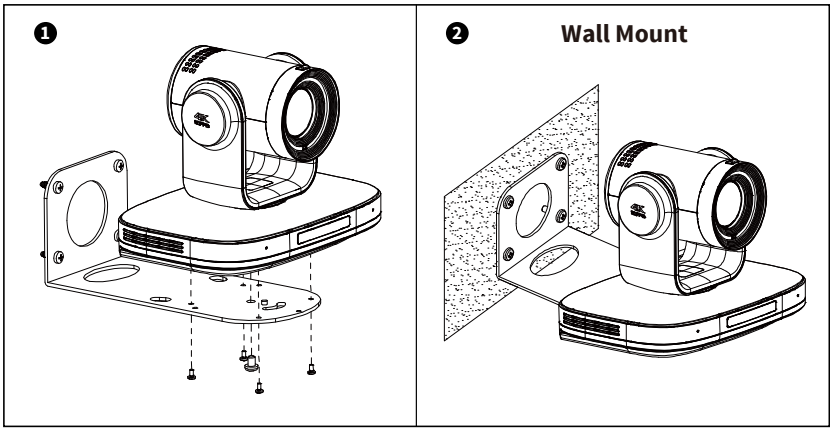
Unit: mm

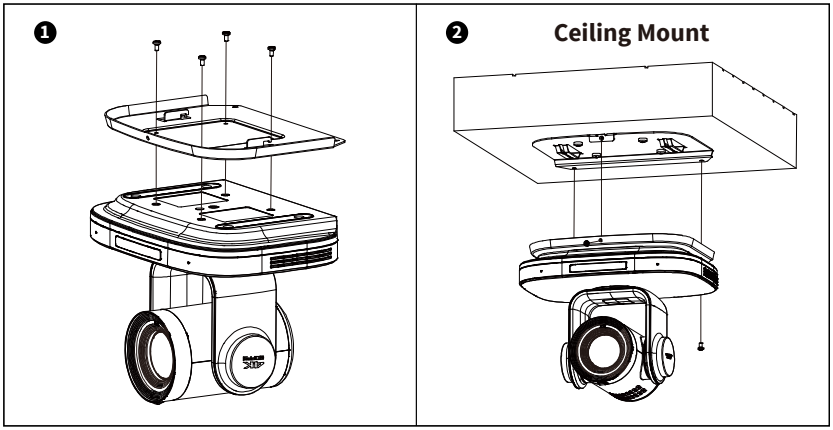






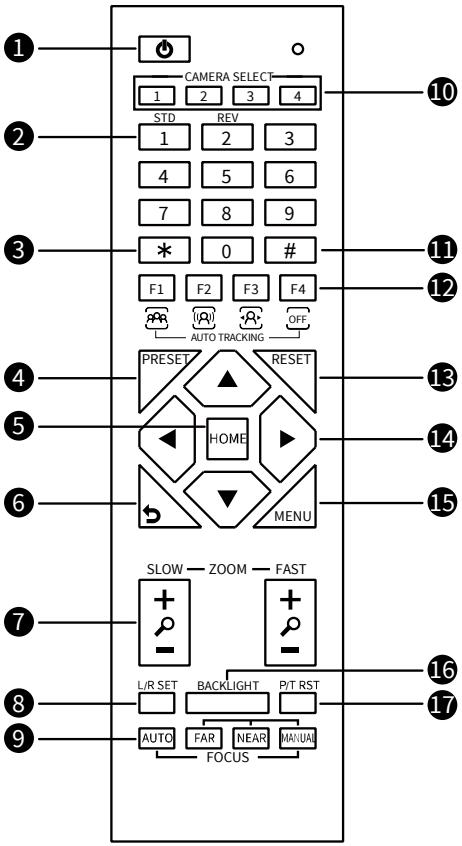
4.6 Installation





Note The above installation diagram is for reference only, please refer to actual product for the installation accessories.

4.7 Remote Control



Key Description
1. ⏻ (Standby) Key
Press to enter standby mode
2. Number Keys
To set preset or call preset
3. * Key
Use with other keys
4. PRESET Key
Set preset: Successively press [PRESET] + Number key (0-9)
5. HOME Key
Confirm selection or press to turn PTZ back to the middle position
6. ⮌ (Return) Key
Press to return to the previous menu

7. ZOOM Keys
● SLOW: Zoom In [+] or Zoom Out [-] slowly ● FAST: Zoom In [+] or Zoom Out [-] fast
8. L/R SET Key
● Standard: Simultaneously press [L/R SET] + [1] ● Reverse: Simultaneously press [L/R SET] + [2]
9. FOCUS Keys
Auto/Manual/Far-end/Near-end focus
10. CAMERA SELECT Keys
Press to select and control the camera
11. # Key
Use with other keys
12. Auto Tracking Keys
[F1]: Reserved Key [F2]: Reserved Key [F3]: Enable AI Tracking [F4]: Disable AI Tracking
13. RESET Key
Clear preset position: Successively press [RESET] + Number key (0-9)
14. PTZ Control Keys
PTZ moved according to the arrow indicates
15. MENU Key
Enter OSD menu or back to the previous menu
16. BACKLIGHT Key
Backlight ON/OFF: Press repeatedly to enable or disable the backlight compensation ● Effective only in auto exposure mode ● If there is a light behind the subject, the subject will become dark, press the backlight key to enable the backlight compensation. Press again to disable this function.
17. P/T RST (PTZ Reset) Key
Press to preset Pan/Tilt self-test
Shortcut Set
Successively press [#] + [*] + [F4]: Enable or disable the Image Freeze Successively press [*] + [#] + [1]: OSD menu default English Successively press [*] + [#] + [3]: OSD menu default Chinese Successively press [*] + [#] + [4]: Display current IP address Successively press [*] + [#] + [6]: Quickly recover the default Successively press [*] + [#] + [8]: Check the camera version Successively press [*] + [#] + [9]: Quickly set up inversion Successively press [*] + [#] + [MANUAL]: Restore to default IP address

5 AI Tracking

5.1 Web Control

- **Speaker (Presenter)/Human Tracking**

By modifying web interface parameters, different close-up ratios can be obtained, and tracking can be set on/off, so as to display areas and character positions. If necessary, you can also choose whether to display tracking related prompt information.

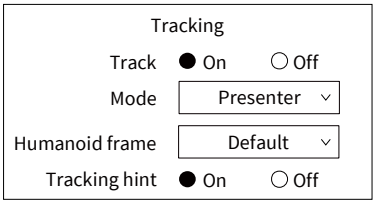
The operation steps are as follows:

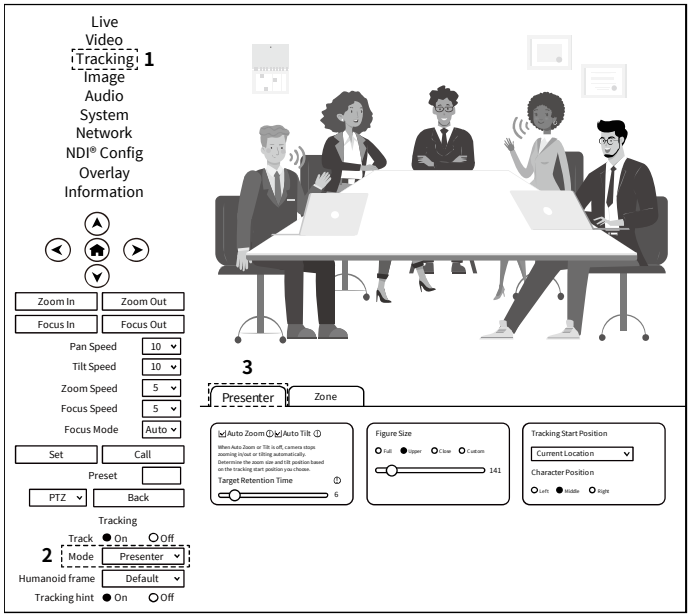
Step 1 Entering the camera IP address (192.168.100.88) in the browser prompts a login interface. Input the username (admin) and password (admin) to access the camera WEB interface.

http://192.168.100.88

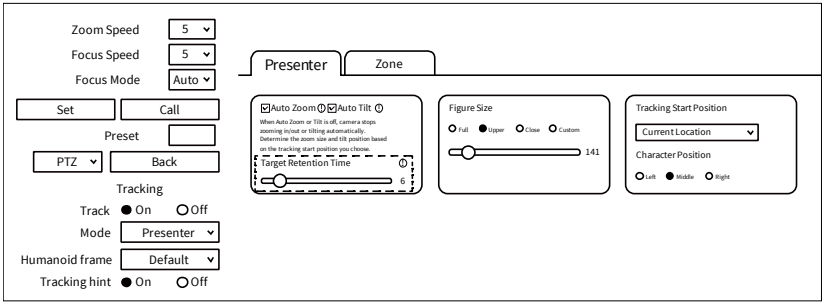
Step 2 Enter the “Tracking” option, select speaker mode “Presenter”, and set the tracking parameters in the “Track Off” state.

Tracking Mode: Speaker (Presenter)/Area (Zone). The default is Presenter Mode.





Step 3 Set the Target Retention Time, the default value is 6 seconds.



Auto Zoom: Usually remains the default. When “Auto Zoom” is turned off, the camera lens can still move, but can only maintain the current magnification and cannot zoom.

Auto Tilt: Usually remains default. When “Auto Tilt” is turned off, the camera lens can only move horizontally.

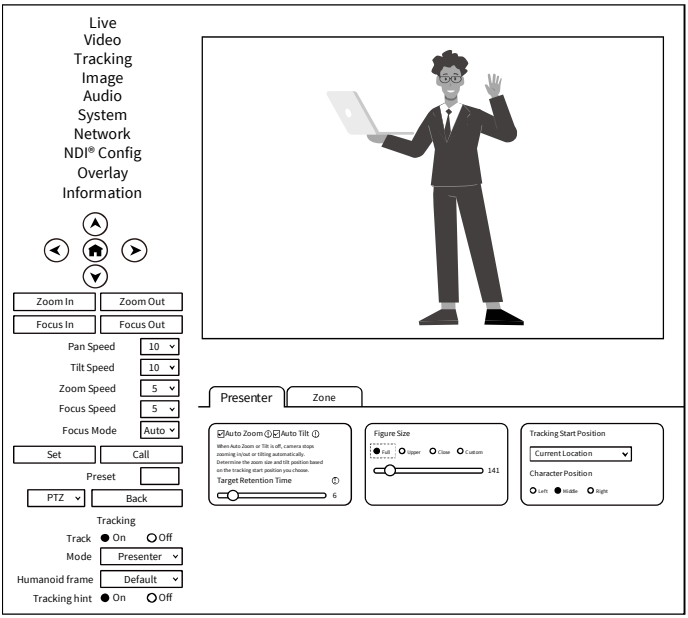
Target Retention Time: can remain default. It is an important function to set how long it takes for the camera lens to stay at current position or return to preset position 1 after the tracking target is lost. The modification here takes effect immediately.

Step 4 Select the desired close-up effect.

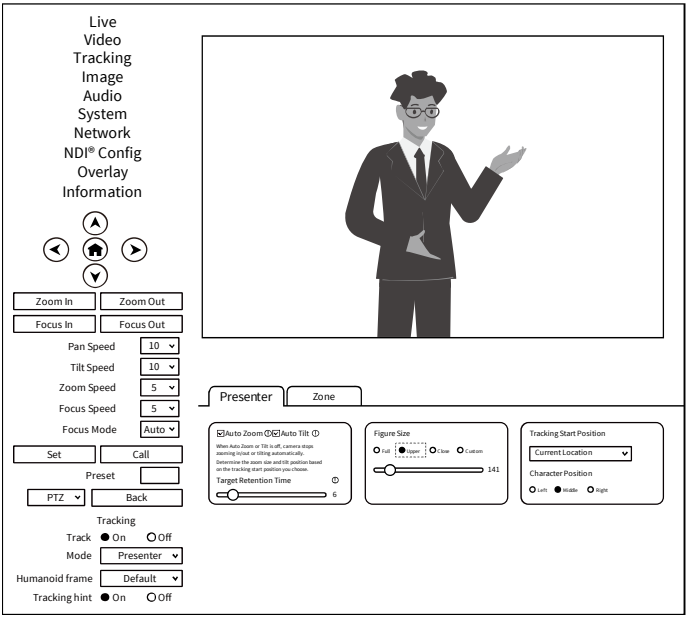
- **Figure Size**

By selecting different modes, users can customize the proportion of characters in the close-up screen, which is a very important feature. The modification here takes effect immediately.

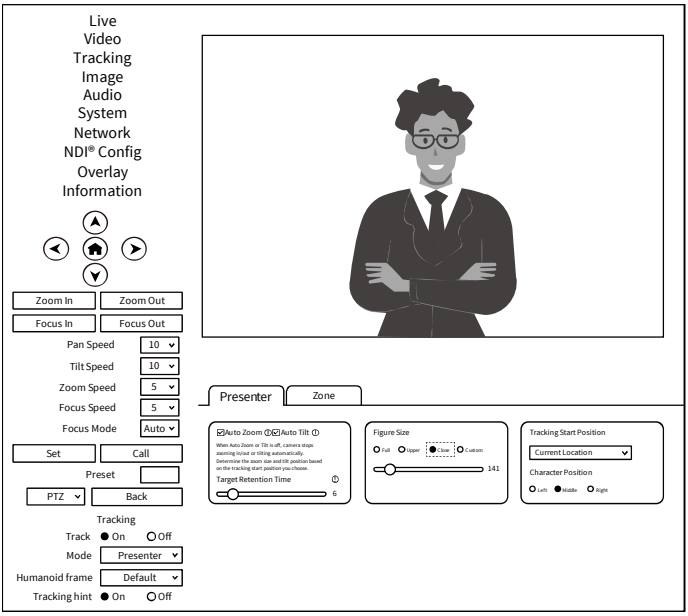
Full: The close-up image includes tracking the entire body of the target, as shown in the following figure.



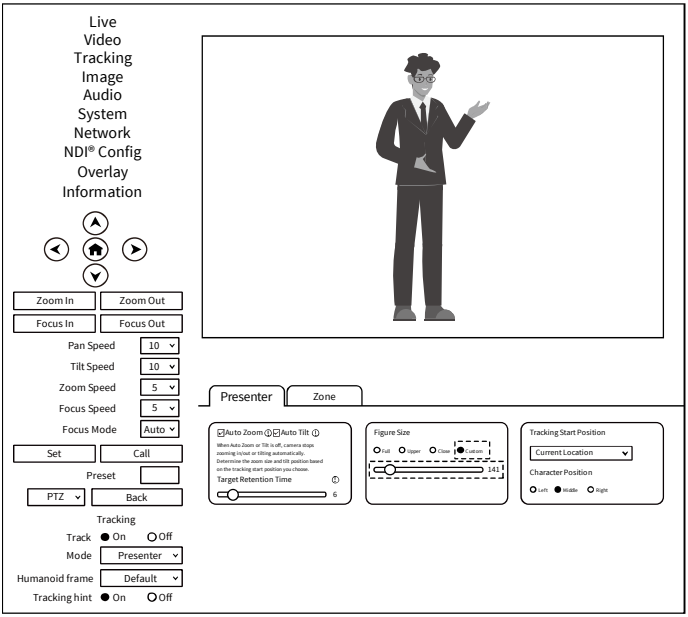
Upper: The close-up image includes tracking the target above the knee, as shown in the following figure.



Close: The close-up image includes tracking the target above the waist, as shown in the following figure.



Custom: Adjust the tracking target proportion size.



Note

If the proportion set is large, the proportion of the tracking target in the camera screen will also increase. When the tracking target moves rapidly, the camera may not keep up.

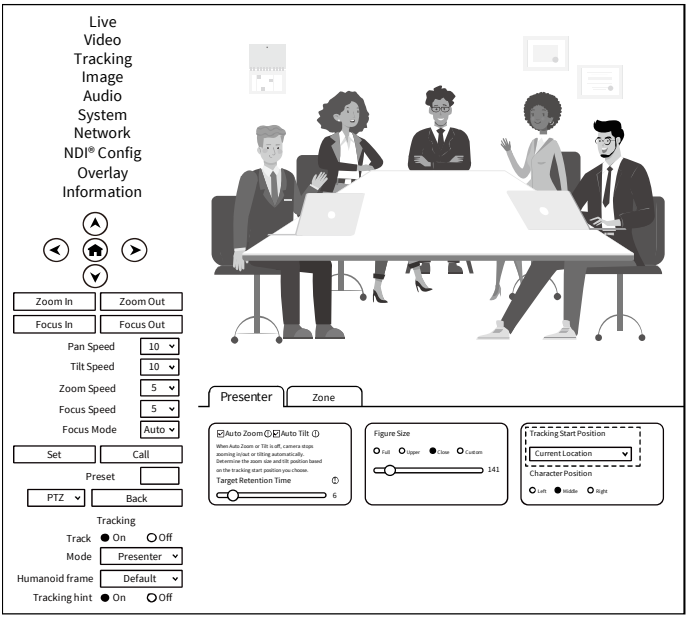
- **Tracking Start Position**

The user can choose the position of the camera lens when starting and stopping tracking.

Two Mode: Current Location/Preset 1

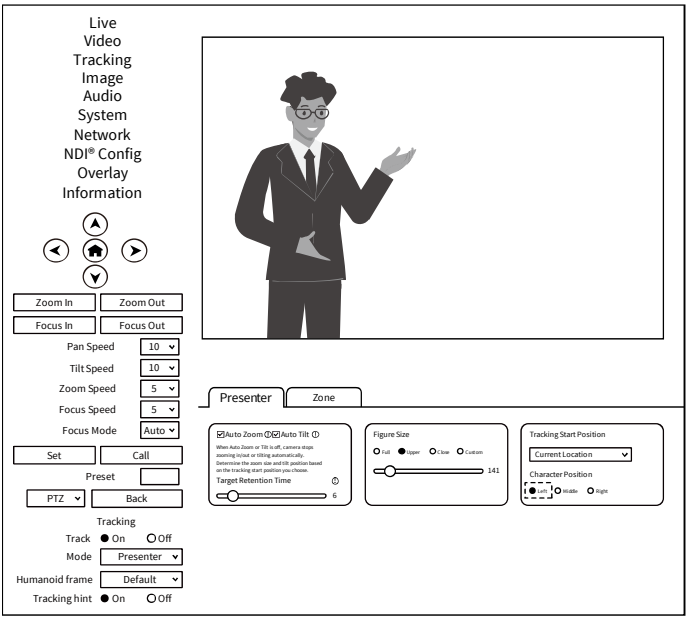
If you choose “Current Location”, the camera position when tracking is turned on is the current position; Similarly, the camera position when stopping tracking will also stop at the current position.

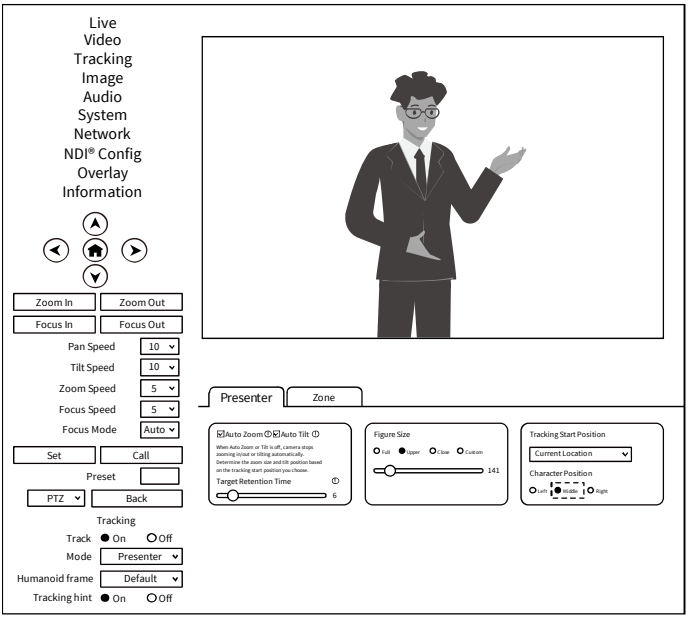
If you choose “Preset 1”, you need to set an additional preset position for the camera. When tracking is turned on, the camera will first move to Preset 1. If someone enters the video screen at this time, the camera will automatically track. When the tracking target is lost (exceeding the timeout), the camera will automatically move to Preset 1.

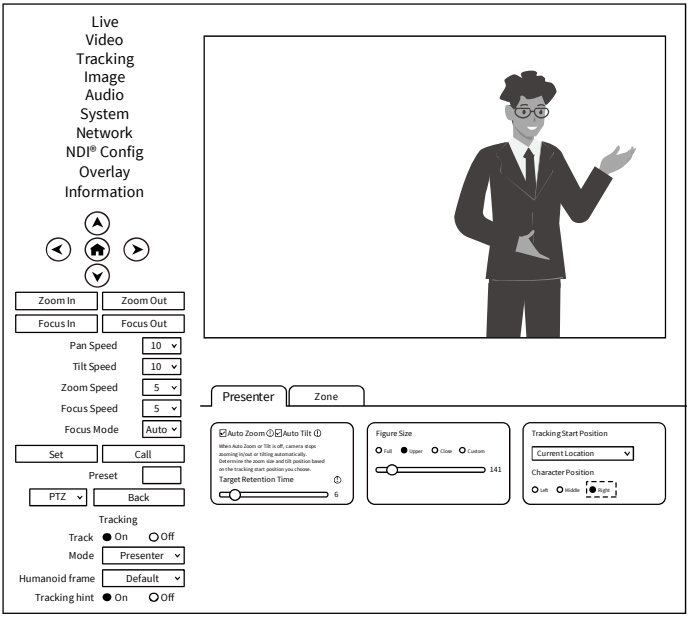


- **Character Position**

Character Position: defaults to median. Left or right can be selected by oneself, and this function is mostly used for live streaming scenes.







Step 5 According to the requirements of the application scenario, you can choose whether to require "Humanoid frame" and "Tracking hint".

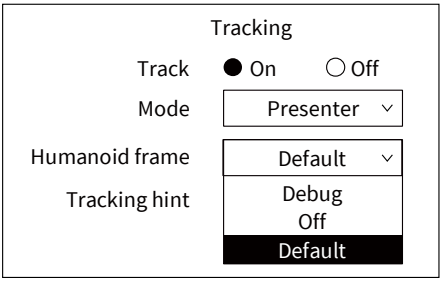
Used in live streaming scenarios, it is often not opened for temporary adjustments during live streaming.

Humanoid frame: Debug/Off/Default

Debug: Turn on tracking, and the humanoid box will always appear on the tracking target. This feature is only applicable for debugging or demonstration.

Off: When selecting a tracking target, the humanoid box is not displayed at all. This feature is suitable for live streaming scenarios.

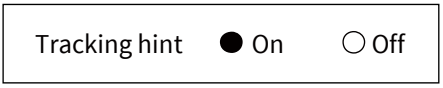
Default: After turning on tracking, if there are multiple people in front of the camera and pressing the direction key to select the tracking target, this box will automatically appear. After pressing the HOME key to confirm tracking, this box will disappear and the camera will start tracking.

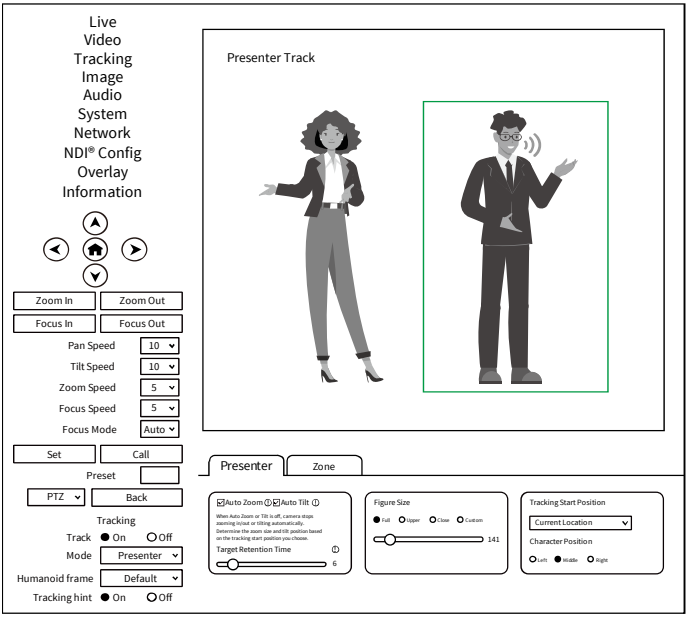


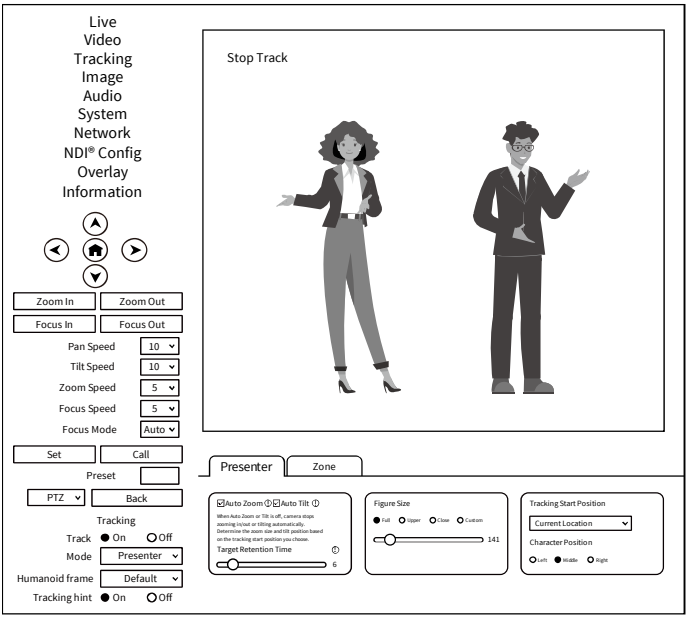
Tracking hint: On/Off

On: There will be a prompt in the upper left corner of the video during switch tracking.

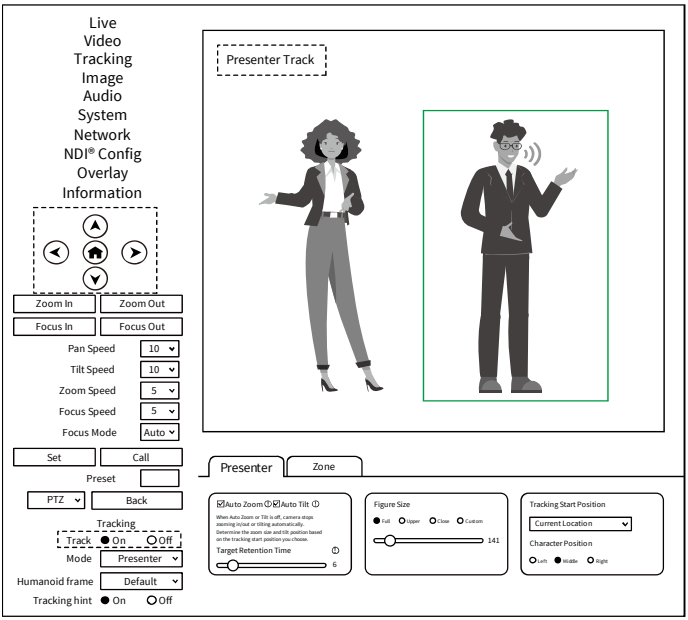
Off: There is no prompt in the upper left corner of the video during switch tracking. This function is also applicable to live streaming scenarios.







Step 6 Turn on tracking, press the arrow keys to select the tracking target, and then press Home to confirm.



- **Area Tracking (Zone)**

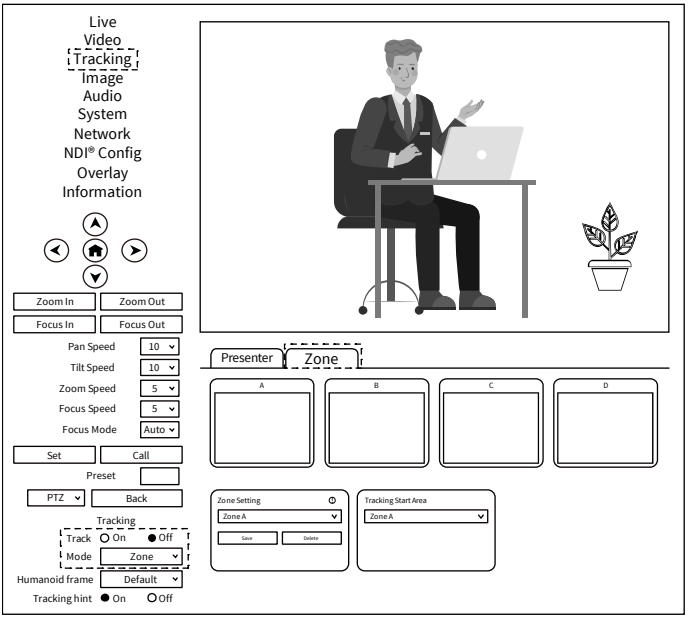
Function: Divide the frequently active areas of the tracking target into several areas (A, B, C, D) as needed, and set corresponding preset positions and save them. When the tracking target enters this area, the camera will automatically call the preset position corresponding to the area to achieve tracking.

Operation Method:

Step 1 Entering the camera IP address (192.168.100.88) in the browser prompts a login interface.
Input the username (admin) and password (admin) to access the camera WEB interface.

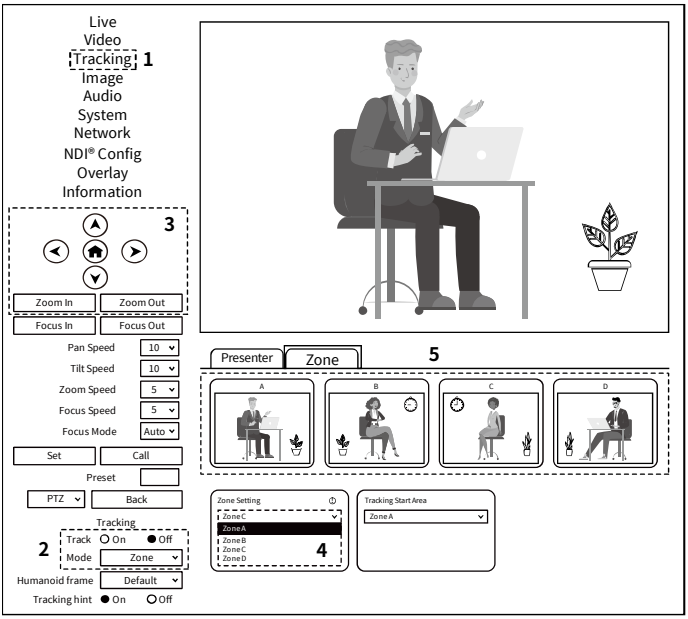
http://192.168.100.88

Step 2 Enter the “Tracking” page and select “Zone”. In the track off state, set the tracking parameters.



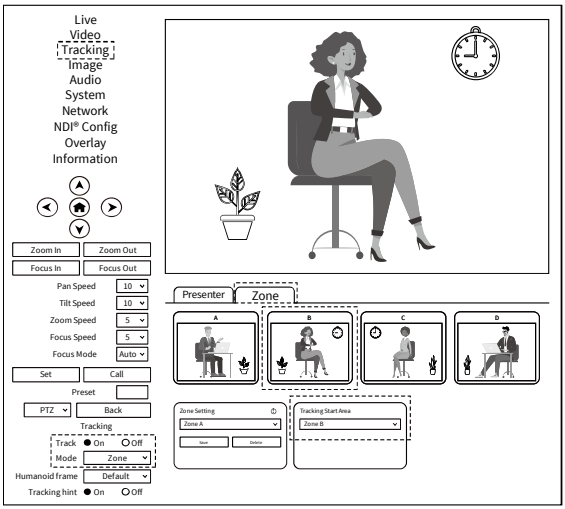
Step 3 Use the web interface's directional keys and Zoom In/Out to adjust the lens position, and set multiple preset positions such as Zone A successively, and click “Save”.

The number of preset positions to be used in actual application scenarios can be considered by users themselves, but currently the maximum is 4. If the settings are incorrect, you can delete or reset them.



- **Tracking Start Area**

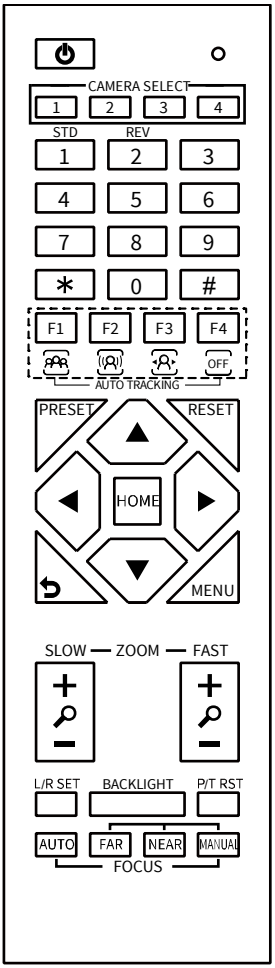
Tracking Start Area: You can select any Zone position as the tracking start or end position. When tracking is turned on, the camera will first move to this Zone position. If someone enters the video screen at this time, the camera will automatically track. When the tracking target is lost, the camera will automatically move to this Zone position.



5.2 Remote Control

[F1]: Reserved Key **[F2]: Reserved Key**

[F3]: Enable AI Tracking **[F4]: Disable AI Tracking**



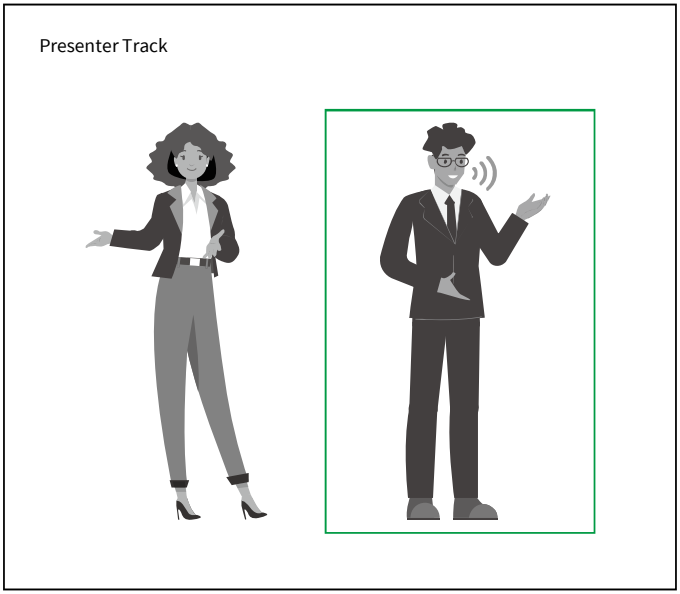
5.3 Target Selection

- **Single Person Scenario**

When there is only one person in the scene, enabling tracking through the web or remote control will directly enable tracking and track the target.

- **Multi Person Scenario**

If there are multiple people in the scene, after turning on tracking, you need to manually select the tracking target. You can use the left and right keys on the remote control or WEB to select the tracking target, and then press the HOME key on the remote control or WEB to turn on tracking and select the target. If the tracking target is not selected, the camera will automatically select the person closest to the center of the image as the tracking target.



6 Troubleshooting

Image

- The monitor shows no image

1) Ensure that the camera power supply is connected, the voltage is normal, and the power indicator is always on.
2) Turn off the power switch to check that the camera is self-testing.
3) Ensure the cable of video platform and TV that in correct connection.

- Image jitters after the camera is properly connected

1) Ensure that the camera installation is in stable position.
2) Check that any vibrating machinery or object near the camera.

- There is no video image in browser

That do not support IE browser and IE core browser, it is recommended to use Google, Firefox and Edge browsers. The camera video image will be displayed normally.

- Unable to access camera through the browser

1) Using PC to access the network to test that the network access can work properly to eliminate the network fault caused by cable and PC virus until the PC and camera can ping each other.
2) Disconnect the network, connect camera with PC separately and reset the IP address of PC if necessary.
3) Ensure that the IP address, subnet mask and gateway settings is correct.
4) Check that the MAC address is conflicts.
5) Check that the web port is modified, the default setting is 80.

- Forget the IP address or login password

The default IP address: 192.168.100.88;

The default username and password are: admin.

Control

- Remote control does not work

1) Check and replace with new batteries.
2) Ensure that the camera working mode is correct.
3) Ensure that the address key of remote control can match the camera.

- Serial port cannot control

1) Ensure that the protocol, address and bit rate of the camera are consistent.
2) Ensure that the control cable is properly connected.

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