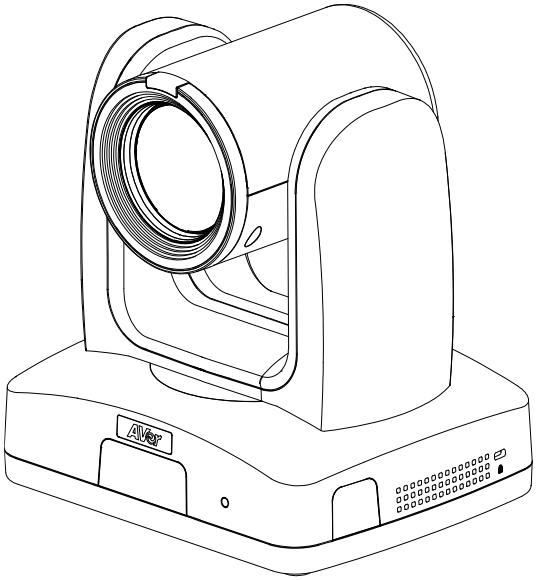
www.aver.com



# AI Auto Tracking PTZ Camera

## — User Manual —

TR335 / TR335N / TR315 / TR315N / TR325 / TR325N / TR211 / TR311V3

## Federal Communications Commission

NOTE: This equipment 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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radiofrequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with part 15 of the FCC Rules.

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.

## Warning

This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

## Caution

Risk of Explosion if Battery is replaced by an Incorrect Type.

Dispose of Used Batteries According to the Instructions.

## Remote Control Battery Safety Information

- Store batteries in a cool and dry place.
- Do not throw away used batteries in the trash. Properly dispose of used batteries through specially approved disposal methods.
- Remove the batteries if they are not in use for long periods of time. Battery leakage and corrosion can damage the remote control. Dispose of batteries safely and through approved disposal methods.
- Do not use old batteries with new batteries.
- Do not mix and use different types of batteries: alkaline, standard (carbon-zinc) or rechargeable (nickel-cadmium).
- Do not dispose of batteries in a fire.
- Do not attempt to short-circuit the battery terminals.

## DISCLAIMER

No warranty or representation, either expressed or implied, is made with respect to the contents of this documentation, its quality, performance, merchantability, or fitness for a particular purpose. Information presented in this documentation has been carefully checked for reliability; however, no responsibility is assumed for inaccuracies. The information contained in this documentation is subject to change without notice.

In no event will AVer Information Inc. be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use this product or documentation, even if advised of the possibility of such damages.

## TRADEMARKS

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## COPYRIGHT

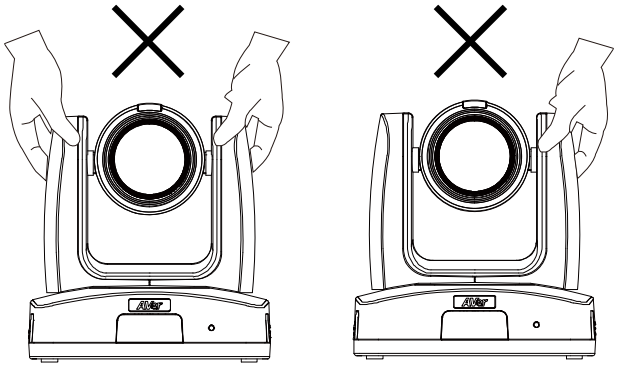


## NOTICE

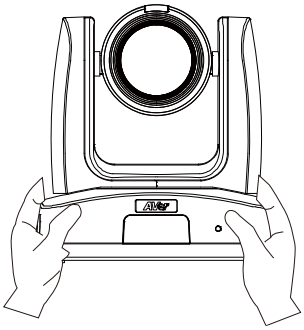
Specifications Are Subject to Change without Prior Notice. The Information Contained Herein Is to Be Considered for Reference Only.

# WARNING

- To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture. Warranty will be void if any unauthorized modifications are done to the product.
- Do not drop the camera or subject it to physical shock.
- Use the correct power supply voltage to avoid the damaging camera.
- Do not place the camera where the cord can be stepped on as this may result in fraying or damage to the lead or the plug.
- Hold the bottom of the camera with both hands to move the camera. Do not grab the lens or lens holder to move the camera.



**OK**



## More Help

For FAQs, technical support, software and user manual download, please visit:

**Non-USA**
Download Center: https://www.aver.com/download-center
Technical Support: https://www.aver.com/technical-support

**USA**
Download Center: https://www.averusa.com/pro-av/support/
Technical Support: https://averusa.force.com/support/s/contactsupport

## Contact Information


**Headquarters**
AVer Information Inc.
8F, No.157, Da-An Rd., Tucheng Dist.,
New Taipei City 23673, Taiwan
Tel: +886 (2) 2269 8535

**USA Branch Office**
AVer Information Inc., Americas
44061 Nobel Drive, Fremont, CA 94538, USA
Tel: +1 (408) 263 3828
Toll-free: +1 (877) 528 7824

**Europe Branch Office**
AVer Information Europe B.V.
Westblaak 134, 3012 KM, Rotterdam, The Netherlands
Tel: +31 (0) 10 7600 550

**Japan Branch Office**
アバー・インフォメーション株式会社
〒160-0023 日本東京都新宿区西新宿 3-2-26 立花新宿ビル 7 階
Tel: +81 (0) 3 5989 0290
お客様サポートセンター（固定電話のみ）: +81 (0) 120 008 382

**Vietnam Branch Office**
Công ty TNHH AVer Information (Việt Nam)
Tầng 5, 596 Nguyễn Đình Chiểu,
P.3, Quận 3,
Thành phố Hồ Chí Minh 700000, Việt Nam
Tel: +84 (0) 28 22 539 211
Hỗ trợ kỹ thuật: +84 (0) 90 70 080 77

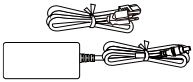
**Korea Office**
한국 에버 인포메이션 (주)
서울시 종로구 새문안로 92
(신문로 1가, 광화문오피시아빌딩) 1831, 1832 호
Tel: +82 (0) 2 722 8535

# Contents

# Overview

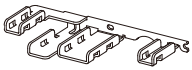
## Package Contents

Camera Unit

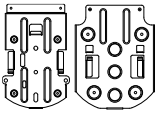


Power Adapter & Power Cord

Remote Control



Cable Fixing Plate

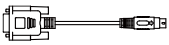


Ceiling Mount Bracket (x2)

M2 x 4mm Screw (x3)

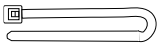
1/4”-20, L=6.5mm Screw (x2)

M3 x 6mm Screw (x3)

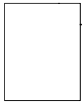


DIN8 to D-Sub9 Cable

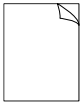
RS-232 In/Out Y Cable



Cable Ties (x4)



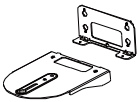
Drill Template



Quick Start Guide

*****The power cord may vary based on the country where sold.

## Optional Accessories

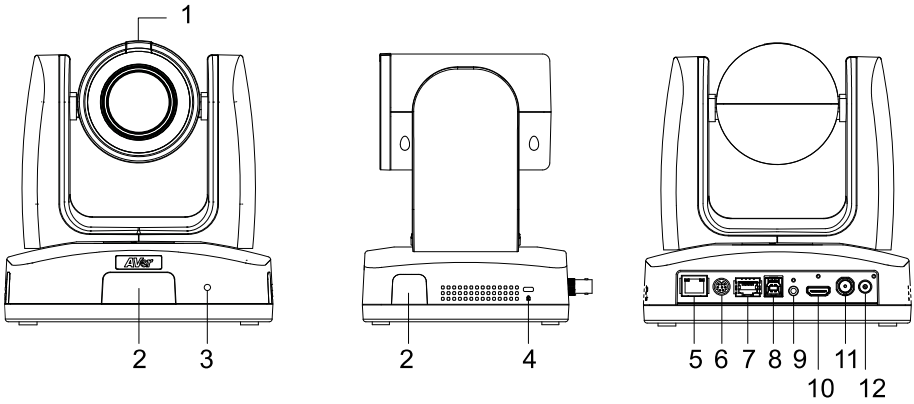


Wall Mount Bracket

Camera Controller (CL01)

For details on optional accessories, please consult with your local dealer.

## Parts Info




1. Tally Lamp
2. IR Sensor
3. LED Indicator

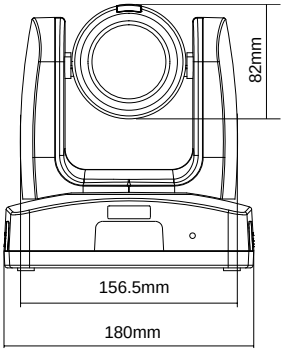
4. Kensington Lock

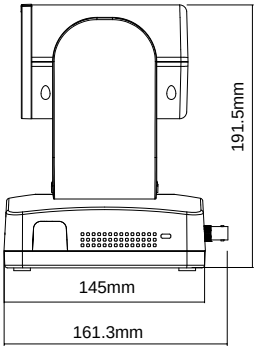
5. PoE+ IEEE 802.3AT
6. RS-232 Port
7. RS-422 Port
8. USB 3.0 Type-B Port
9. Audio In*
10. HDMI Port
11. 3G-SDI (unavailable for model names with H)
12. DC Power Jack

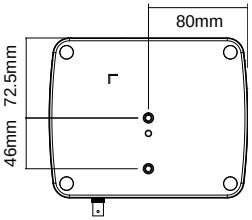
*Line input level: 1Vrms (max.).

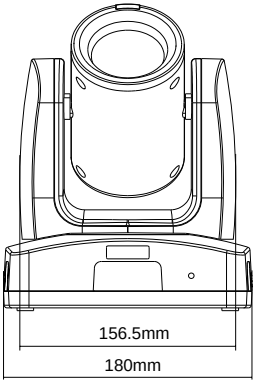
*Mic input level: 50mVrms (max.); Supplied voltage: 2.5V.

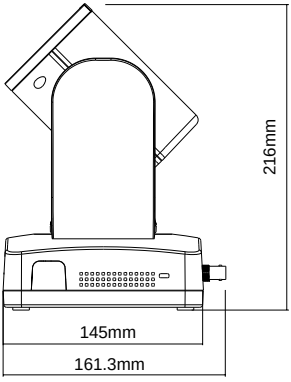
# Dimensions


82mm
156.5mm
180mm

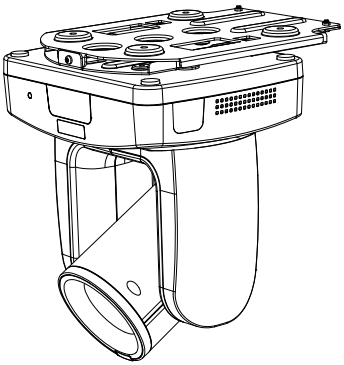

191.5mm
145mm
161.3mm

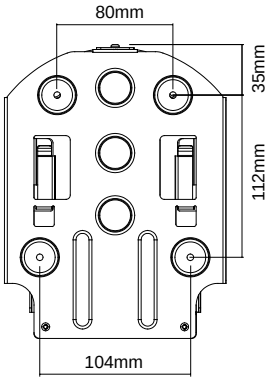

80mm
72.5mm
46mm

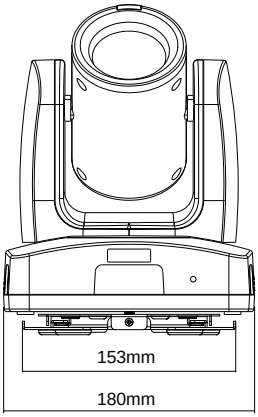

156.5mm
180mm

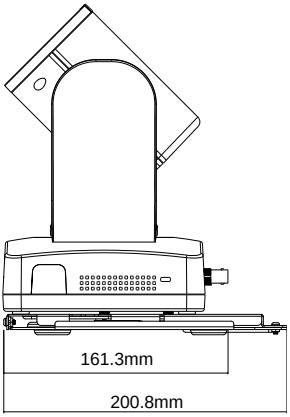

216mm
145mm
161.3mm

## Ceiling Mount

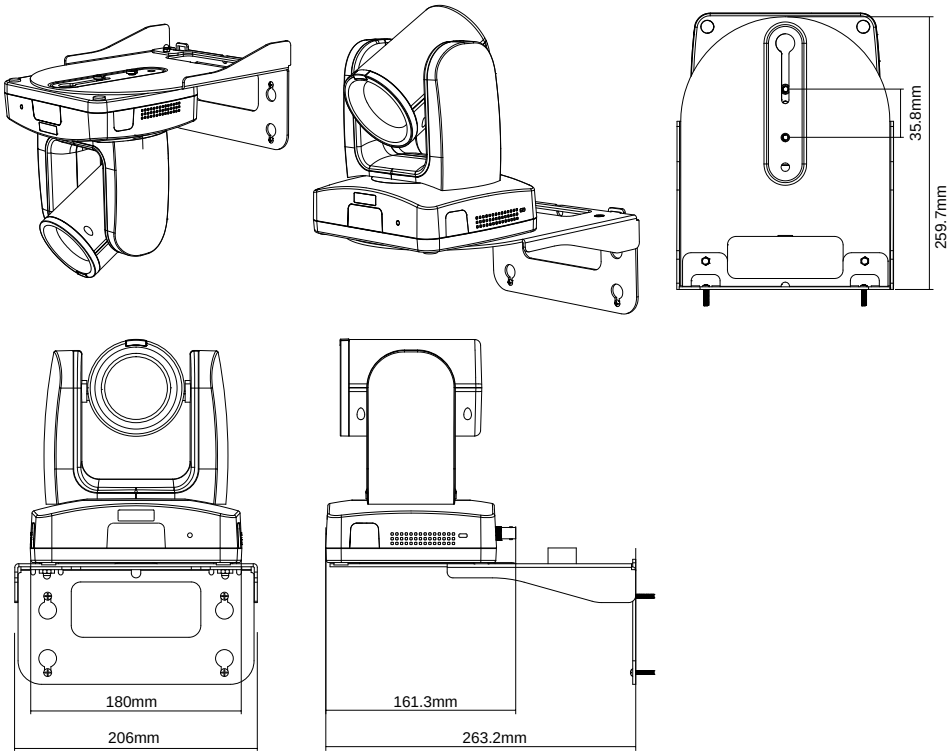




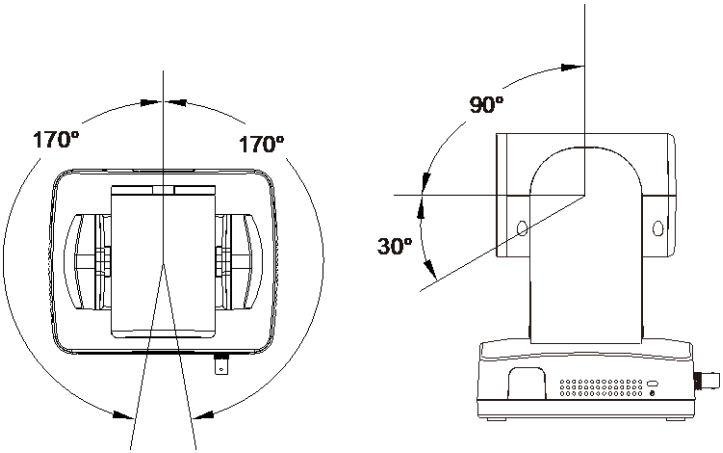



Wall Mount



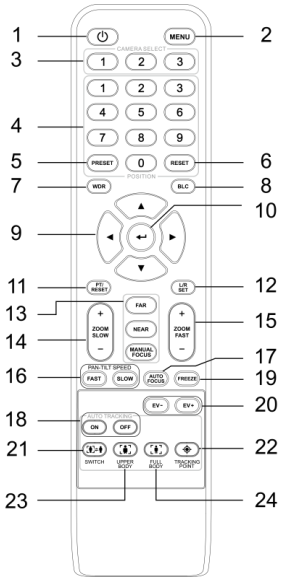
## Pan and Tilt Angle



## LED Indicators

| LED | Status |
|---|---|
| Flashing blue | Auto Tracking On |
| Solid blue | Normal |
| Flashing red | Firmware update |
| Solid orange | Standby |
| Flashing orange | Start-up |
| Flashing purple | Gesture recognition |

## Remote Control

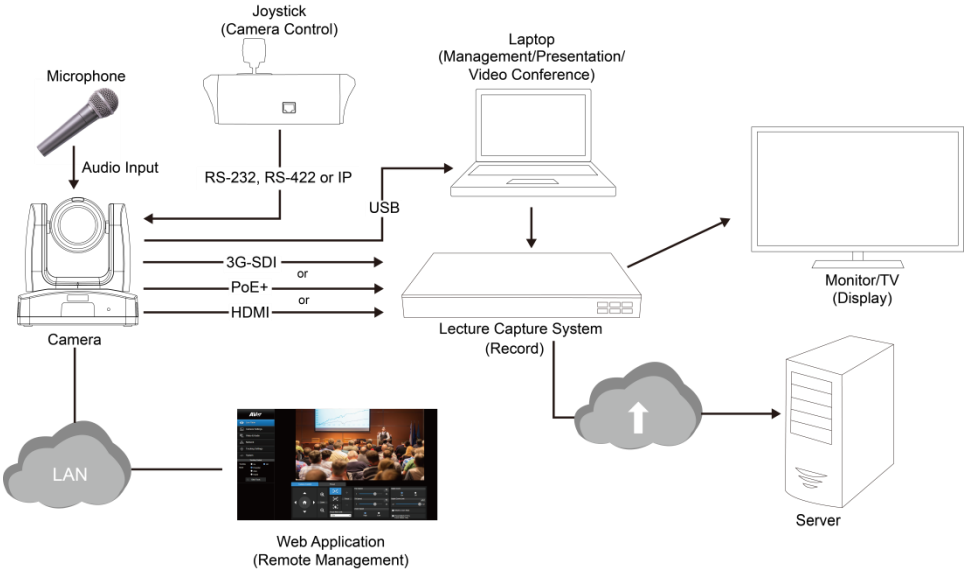



| Name | Function |
|---|---|
| 1. Power | Power on or enter standby mode. |
| 2. Menu | Open and close the OSD menu during HDMI output. |
| 3. Camera Select | No selection is required by default to operate the camera.<br>● Both camera and remote control have been set to 1.<br>● Assign a number to the camera in the OSD menu: **System** > **Camera Selector**. |
| 4. Number Pad | ● Set the preset position 0-9.<br>● Press number button (0-9) to move the camera to defined preset position 0-9. |
| 5. Preset | Press and hold **Preset**, then press **Number button (0-9)** to save the preset position. |
| 6. Reset | Press and hold **Reset**, then press **Number button (0-9)** to reset preset position. |
| 7. WDR | Turn Wide Dynamic Range on or off. |
| 8. BLC | Turn Backlight Compensation on or off. |
| 9. Directional Pad | Press once for incremental movement or press and hold for continuous pan or tilt. |
| 10. Enter | ● Confirm a selection in the OSD menu.<br>● Press and hold to One Push Focus.<br>● Press and hold to frame entire group on screen when SmartFrame has been turned on in the OSD menu or on the web interface. |

| | |
|---|---|
| 11. PT Reset | Return the pan-tilt position to the center. |
| 12. L/R SET | • **Invert L/R Pan Direction**: Press and hold **L/R SET**, then press Position **2**.<br>• **Reset L/R Pan Direction**: Press and hold **L/R SET**, then press Position **1**. |
| 13. Far / Near / Manual Focus | Turn on manual focus. Use Far/Near to adjust the focus. |
| 14. Zoom Slow +/- | Zoom in or out slowly. |
| 15. Zoom Fast +/- | Zoom in or out fast. |
| 16. Pan-Tilt Speed Fast / Slow | Adjust pan-tilt speed. |
| 17. Auto Focus | Auto focus. |
| 18. Auto Tracking | Turn Auto Tracking on or off. |
| 19. Freeze | Freeze the live view. |
| 20. EV +/- | • Press to adjust EV level.<br>• Press and hold EV+ to turn on RTMP.<br>• Press and hold EV- to turn off RTMP. |
| 21. Switch | Change presenter. |
| 22. Tracking Point | Enter tracking point (Preset 1). |
| 23. Upper Body | Focus on the upper body of the presenter. |
| 24. Full Body | Focus on the full body of the presenter. |

# Connection

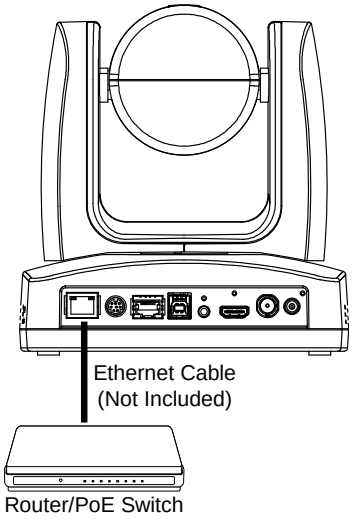
## Device Connection



## PoE Connection

Connect the camera to the router or switch through the PoE+ port.

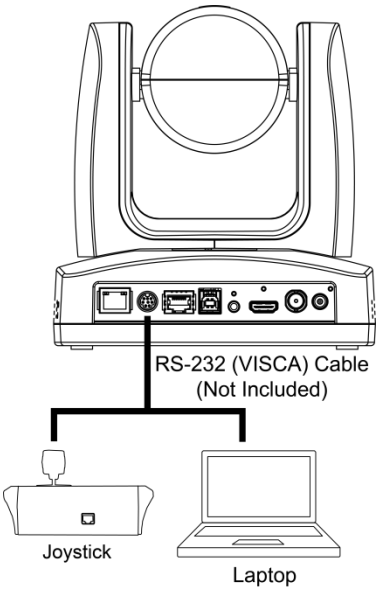
**[Note]** Only support IEEE 802.3AT PoE+ standard.



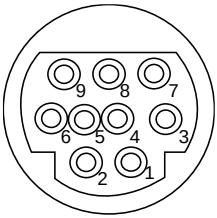
# RS-232 and RS-422 Connection

Connect through the RS-232 or RS-422 for camera control.

- **RS-232**

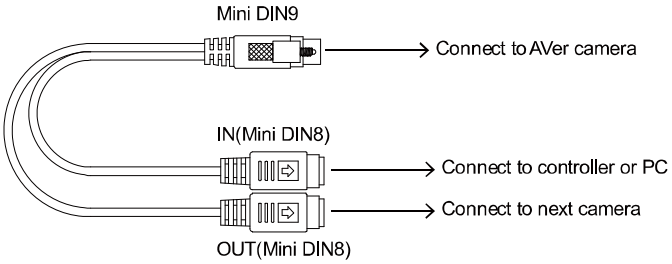


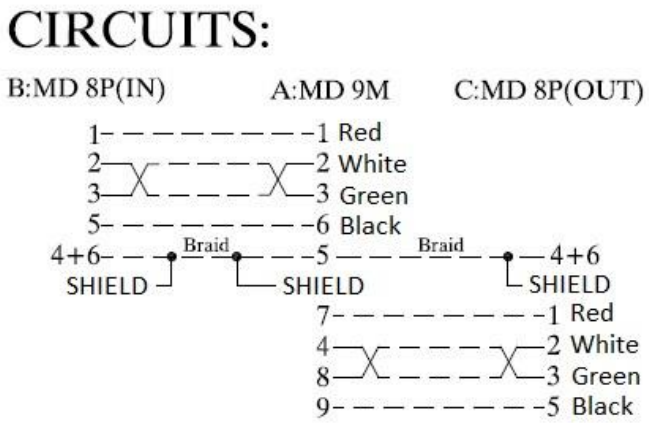
● **RS-232 Port Pin Definition**



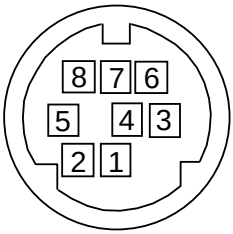

| Function | Mini DIN9 PIN # | I/O Type | Signal | Description |
|---|---|---|---|---|
| VISCA IN | 1 | Output | DTR | Data Terminal Ready |
| | 2 | Input | DSR | Data Set Ready |
| | 3 | Output | TXD | Transmit Data |
| | 6 | Input | RXD | Receiver Data |
| VISCA OUT | 7 | Output | DTR | Data Terminal Ready |
| | 4 | Input | DSR | Data Set Ready |
| | 8 | Output | TXD | Transmit Data |
| | 9 | Input | RXD | Receiver Data |
| | 5 | Input | I/O | Detect DIN8/DIN9 |
| --- | Shield | --- | GND | Ground |

● **RS-232 mini DIN9 to mini DIN8 Cable Pin Definition**



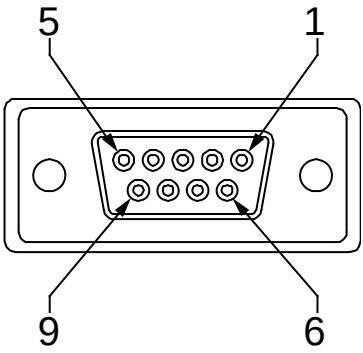



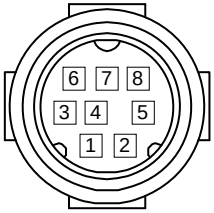

**Mini DIN8 Cable Pin Definition**

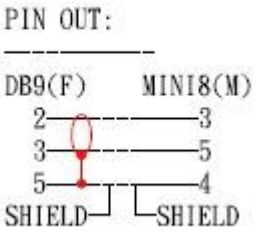



| No. | Signal |
|---|---|
| 1 | DTR |
| 2 | DSR |
| 3 | TXD |
| 4 | GND |
| 5 | RXD |
| 6 | GND |
| 7 | NC |
| 8 | NC |

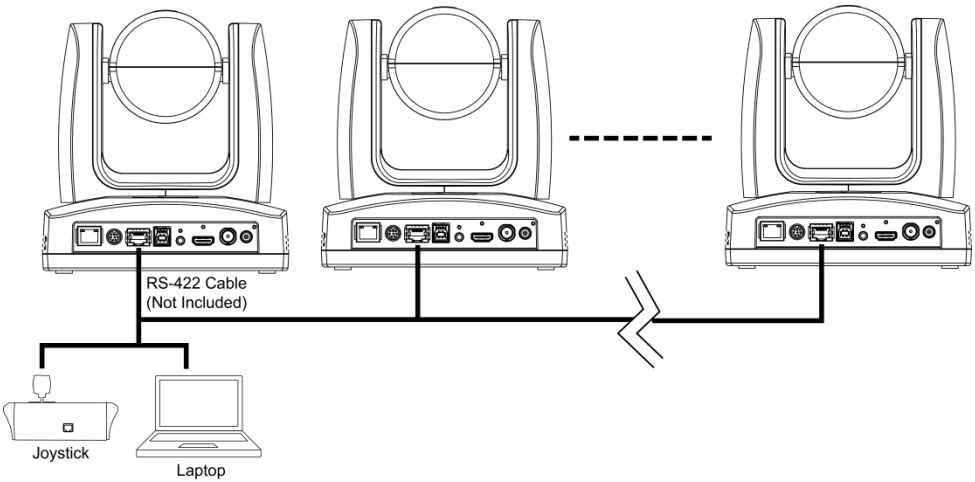
● **Din8 to D-Sub9 Cable Pin Definition**



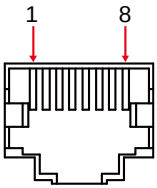



● **RS-422**

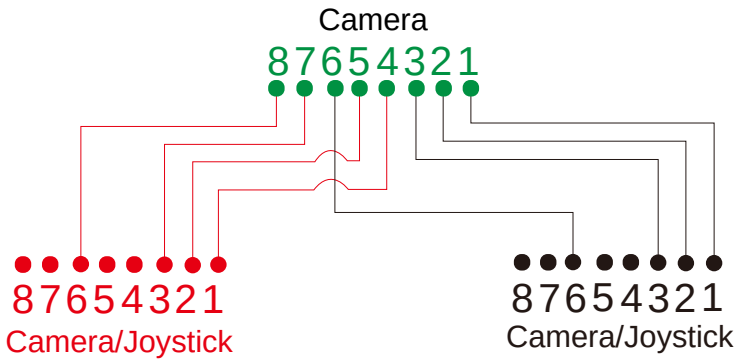



**[Notes]** Use cat5e splitter for multi-camera connection.




| RS-422 Pin | | | |
|---|---|---|---|
| **No.** | **Pin** | **No.** | **Pin** |
| 1 | TX- | 5 | TX+ |
| 2 | TX+ | 6 | RX+ |
| 3 | RX- | 7 | RX- |
| 4 | TX- | 8 | RX+ |

Cat5e splitter pin assignment:

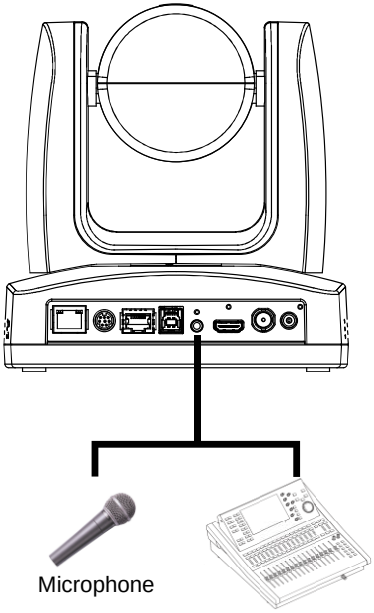


## Audio Input Connection

Connect the audio device for audio receiving.

**[Notes]**

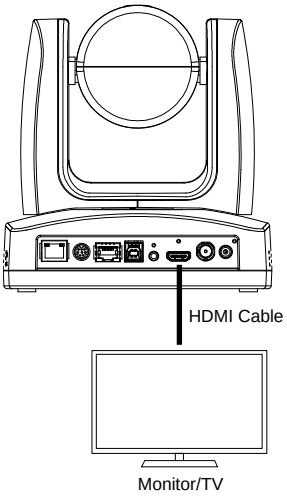
- Line input level: 1Vrms (max.).
- Mic input level: 50mVrms (max.); Supplied voltage: 2.5V.



# Video Output Connection

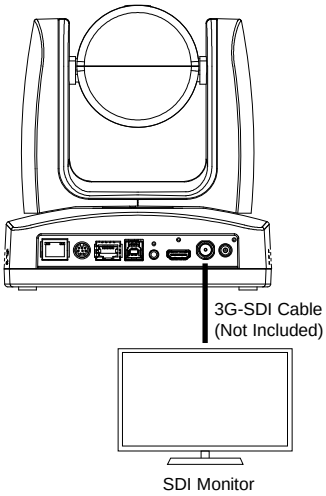
- **HDMI**

Use the HDMI cable to connect with monitor or TV for video output.




- **3G-SDI**

Connect to 3G-SDI monitor for video output.



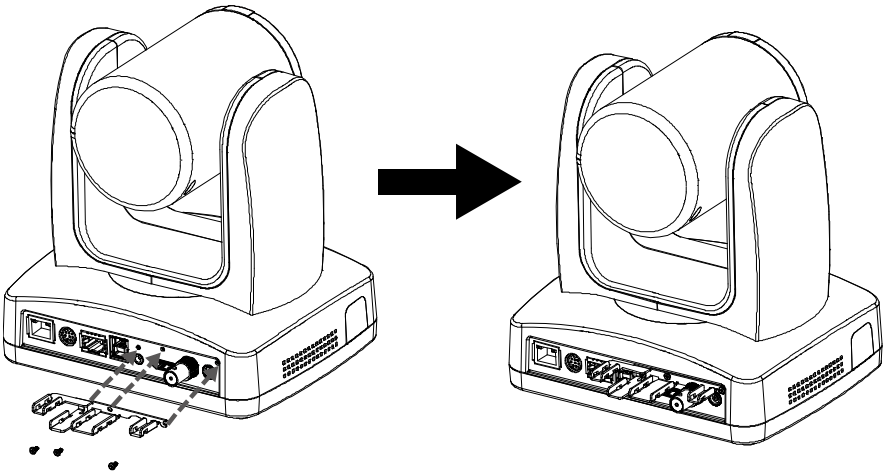

**[Notes]**

- HDMI and 3G-SDI monitors can be connected to camera and output live video simultaneously. When the HDMI monitor is well connected before the camera is turned on, the OSD menu will be displayed on HDMI monitor as default.
- The model name with “H” do not have 3G-SDI.

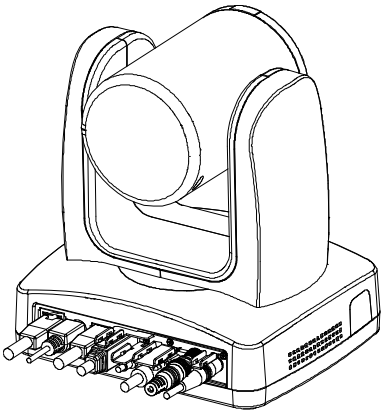
# Installation

## Cable Fixing Plate Installation

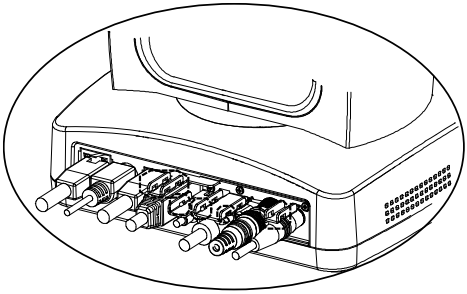
1. Secure the cable fixing plate to the camera with 3 M2 x 4mm screws (included).



2. Plug in cables.

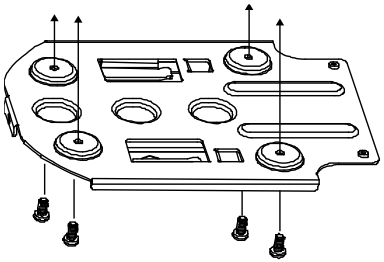


3. Use 4 cable ties to secure the cables and cable fixing plate.

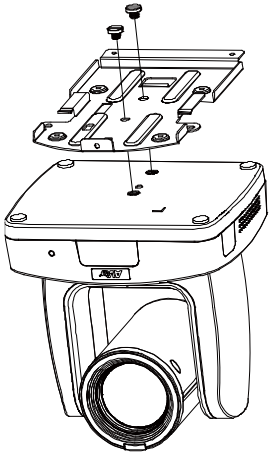


# Ceiling Mount Installation

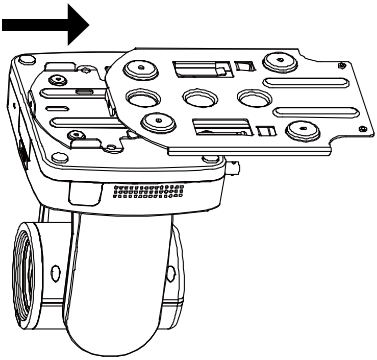
1. Secure the mount bracket on the ceiling.
   Screw: 4 screws, M4 x 10mm (Not Included in the package)



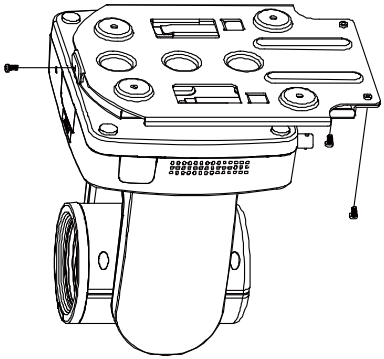
2. Install the mount bracket on the camera.
   Screw: 2 screws, 1/4"-20 L=6.5mm (Included in the package)



3. Slide the mount bracket with the camera into the mount bracket which secured on the ceiling.



4. Secure the camera with screws.
   Screw: 3 screws, M3 x 6mm (Included in the package)

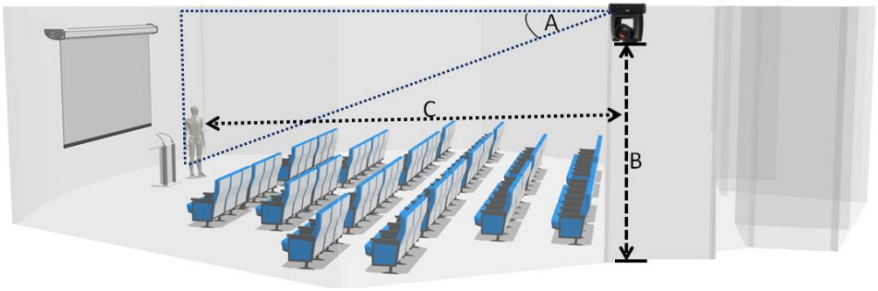


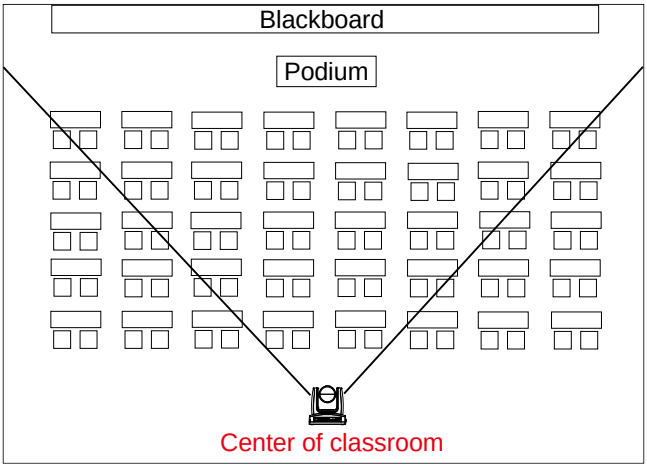
**[Notes]** Connect necessary cables after sliding the camera into the mount bracket.

# Camera Installation

- **Angle A**: less than 30˚
- **Height B**: 2~3m from floor
- **Distance C**: longer than 3m away from podium
- **Position**: center of classroom
- **Distance between the camera and tracking target (presenter):**

| Optical zoom ratio ability | Upper body size | Full body size |
|---|---|---|
| 12X | 3~16m | 3~28m |
| 16X | 3~30m | 4~55m |
| 21X | 3~40m | 4~65m |
| 30X | 3~44m | 3~76m |



# Set Up the Camera

## OSD Menu

You can use the supplied Remote Control to operate the OSD Menu during HDMI output. Press the (MENU) button to call out the On-Screen Display (OSD) menu and use the ▲, ▼, ◄, ► and ↵ buttons to operate the OSD menu.


## IP Address Setup

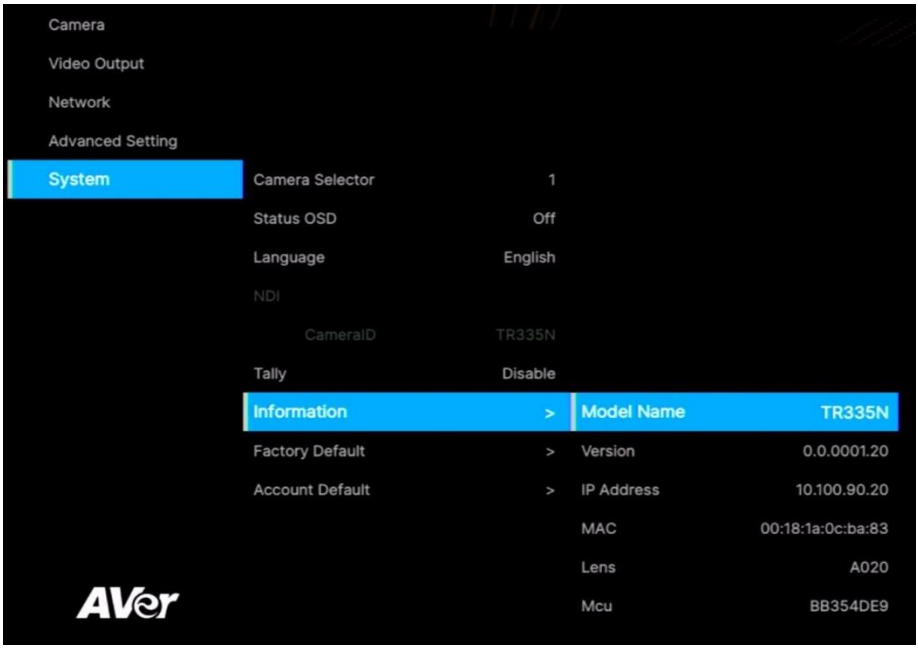
### Static IP

1. Press the (MENU) button on the remote control to call out the OSD menu.
2. Go to **Network** > **Static IP**.
   **[Notes]** Turn the DHCP off before setting up static IP (**Network** > **DHCP** > **Off**).
3. Select the **IP Address**, **Gateway**, **Netmask** and **DNS** to configure. Press (↵) and use ◄, ► and Number Pad to enter the data.

## DHCP

1. Press the MENU button on the remote control to call out the OSD menu.
2. Go to **Network** > **DHCP** > **On**.


3. After turning the DHCP on, the user can view IP address in **System** > **Information.**



# OSD Menu Tree

## Camera

Set up camera parameters: Exposure Mode, White Balance, Pan Tilt Zoom, Noise Reduction, Saturation, Contrast, Sharpness, Mirror and Flip.

| 1st Layer | 2nd Layer | 3rd Layer | 4th Layer | 5th Layer |
|---|---|---|---|---|
| Camera | Exposure Mode | Full Auto | Exposure Value | -4/-3/-2/-1/0/1/2/3/4 |
| | | | Gain Limit Level | 24dB/27dB/30dB/33dB/36dB /39dB/42dB |
| | | | Slow Shutter | Off/On |
| | | Shutter Priority | Exposure Value | -4/-3/-2/-1/0/1/2/3/4 |
| | | | Shutter Speed | 1/1, 1/2, 1/4, 1/8, 1/15, 1/30, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000 |
| | | | Gain Limit Level | 24dB/27dB/30dB/33dB/36dB /39dB/42dB |
| | | Iris Priority | Exposure Value | -4/-3/-2/-1/0/1/2/3/4 |
| | | | Iris Level | F1.6/F2.0/F2.4/F2.8/ F3.4/F4.0/F4.8/F5.6/F6.8/ F8.0/F9.6/F11/F14/Close |
| | | | Gain Limit Level | 24dB/27dB/30dB/33dB/36d B/39dB/42dB |
| | | | Slow Shutter | On/Off |
| | | Manual | Shutter Speed | 1/1, 1/2, 1/4, 1/8, 1/15, 1/30, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000 |
| | | | Iris Level | F1.6/F2.0/F2.4/F2.8/ F3.4/F4.0/F4.8/F5.6/F6.8/ F8.0/F9.6/F11/F14/Close |
| | | | Gain Level | 0dB/3dB/6dB/9dB/12dB /15dB/18dB/21dB/24dB/ 27dB/30dB/33dB/36dB/39dB /42dB |
| | | Bright | 0, 5-31 | - |

| 1st Layer | 2nd Layer | 3rd Layer | 4th Layer | 5th Layer |
|---|---|---|---|---|
| Camera | White Balance | Auto | - | - |
| | | ATW | - | - |
| | | Indoor | - | - |
| | | Outdoor | - | - |
| | | One push | - | - |
| | | Manual | R Gain (0-255) | - |
| | | | B Gain (0-255) | - |
| | Pan Tilt Zoom | Preset Speed | 5/25/50/100/ 150/200 | - |
| | | Digital Zoom | Off/On | - |
| | | Digital Zoom Limit | x2-x12 | - |
| | | Pan/Tilt Slow | Off/On | - |
| | Noise Reduction | Off/Low/ Medium/High | - | - |
| | Saturation | 0-10 | - | - |
| | Contrast | 0-4 | - | - |
| | Sharpness | 0-3 | - | - |
| | Mirror | Off/On | - | - |
| | Flip | Off/On | - | - |
| | LDC* | Off/On | - | - |

*Only certain camera models support LDC function, please refer to the table below.

**Supported AVer Cameras:**

| PTC300V2 Series | PTC500 Series | PTC330 Series | PTC310 Series | PTC115 Series |
|---|---|---|---|---|
| PTC330UV2<br>*TR333V2* | PTC500S<br>*TR530* | PTC330<br>*TR331* | PTC310<br>*TR311* | PTC115<br>*TR320* |
| PTC320UNV2<br>*TR323NV2* | PTC500+<br>*TR530+* | PTC330N<br>*TR331N* | PTC310U<br>*TR313* | PTC115+<br>*TR320+* |
| PTC320UV2 | | PTC330U<br>*TR333* | PTC310H | |
| | | | PTC310N<br>*TR311N* | |
| | | | PTC310UN<br>*TR313N* | |
| | | | PTC310HN | |

| V3 Series |
|---|
| TR335 |
| TR335N |

*US model name in italics.

## Video Output

Select video resolution (2160p is only supported on certain models).

| 1st Layer | 2nd Layer | 3rd Layer |
|---|---|---|
| Video Output | Theme Mode | Standard/Zoom/Teams/(NDI) |
| | Frequency | 50Hz/59.94Hz/60Hz |
| | Resolution | 2160P/30, 2160P/60, 1080P/60, 1080P/30, 1080I/60, 720P/60 |

## Network

Set up IP mode – DHCP or Static IP.

| 1st Layer | 2nd Layer | 3rd Layer |
|---|---|---|
| Network | DHCP | Off/On |
| | Static IP | IP Address, Gateway, Mask, DNS |

## Advanced Setting

| 1st Layer | 2nd Layer | 3rd Layer | 4th Layer |
|---|---|---|---|
| Advanced Setting | Audio | Input Type | Line In/Mic In |
| | | Audio Volume | 0-10 |
| | Control | Serial Port | RS-232/RS-422 |
| | | Protocol | VISCA/PELCO D/PELCO P |
| | | Camera Address | 1-7 |
| | | Baud Rate | 4800/9600/38400 |
| | Tracking | Off/On | - |
| | Tracking Mode | Presenter | - |
| | | Zone | - |
| | | Hybrid | - |

## System

- **Status OSD:** Enable/disable Preset status (Save Preset, Call Preset, Cancel Preset) display on the screen.
- **Camera Selector:** Set the camera ID 1~3 for using remote control on multiple cameras control (also see No.3 Camera Select in Remote Control chapter).
- **NDI:** Enable/disable NDI function.
- **Tally:** Enable tally function.

| 1st Layer | 2nd Layer | 3rd Layer |
|---|---|---|
| System | Camera Selector | 1-3 |

| | | |
|---|---|---|
| | Status OSD | Off/On |
| | Language | English/繁體中文/日本語/简体中文/한국어/ Tiếng Việt |
| | NDI | Off/On |
| | Tally | Disable/Enable |
| | Information | Model Name/Version/IP Address/MAC/Lens/Mcu |
| | Factory Default | Off/On |
| | Account Default | Off/On |

# Get Started

## Access the Web Interface

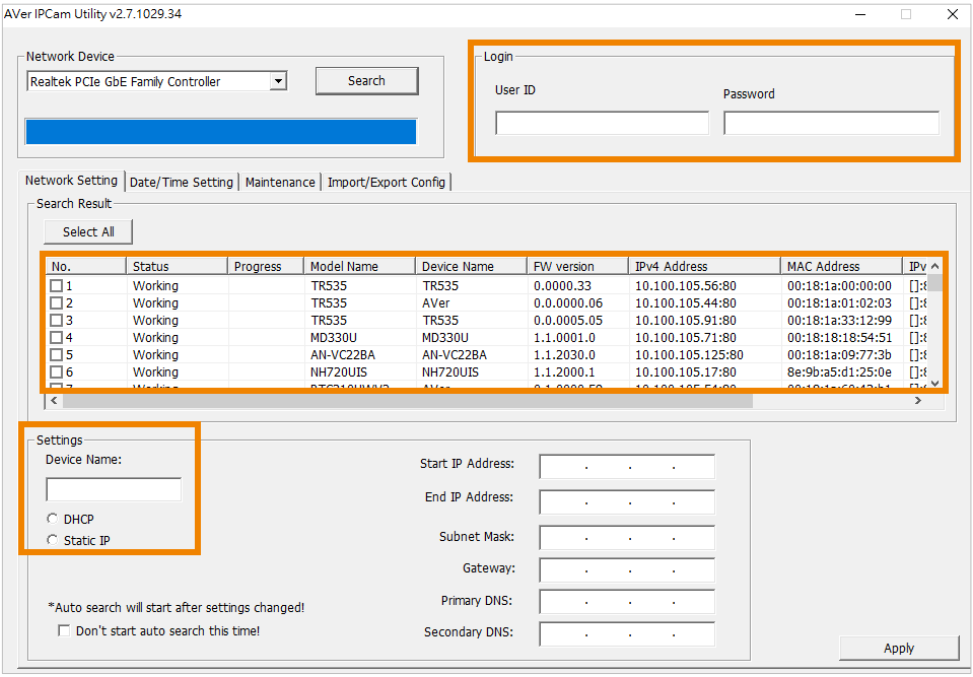
To access the web interface of your camera, you can use any of the following software to find its IP address:

- AVer IPCam Utility
- AVer PTZ Management

**Note:**

- The PoE+ port defaults to a static IP address of 192.168.1.168, while the Ethernet port uses DHCP.
- The camera default username and password is **admin**/**admin**.

### AVer IPCam Utility



**To access the web interface:**

1. Download IPCam Utility from AVer Download Center (https://www.aver.com/download-center) and launch the software.
2. Click **Search** to see available devices on the same local area network (LAN).

> **Note:**
> - Make sure your MT300 is connected to the internet.
> - IPCam Utility and camera must be on the same LAN.

3. Double-click on your MT300's IP address in the **IPv4 Address** column to open the web interface in your browser.

**When you log in for the first time:**

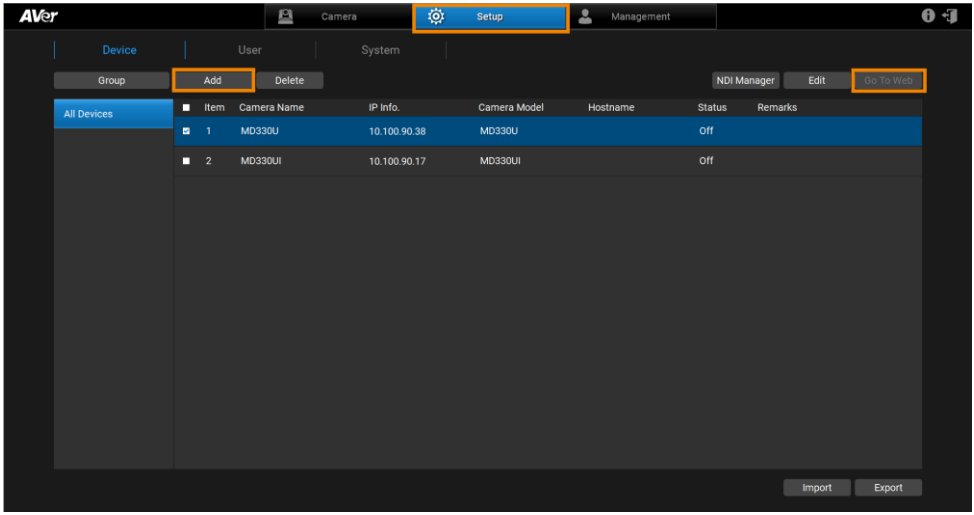
Change the username and password before logging in to the web interface.

- Username: Use 1-32 characters.
- Password: Use 8-32 characters and a combination of uppercase letters, lowercase letters, numbers, and symbols (%+=,-_^/@.~). The password cannot be the same as the username.

**To change your network to DHCP or static IP:**

1. Select the checkbox of your camera.
2. Enter the default or changed username and password in the **Login** field.
3. Select **DHCP** or **Static IP**, then enter your network settings if applicable in the **Settings** section.
4. Click **Apply**.

## AVer PTZ Management




**Note:** The PTZ Management default username and password is **admin**/**admin**.

1. Download PTZ Management from AVer Download Center (https://www.aver.com/download-center) and launch the software.

2. Log in with the PTZ Management default username and password **admin**/**admin**.

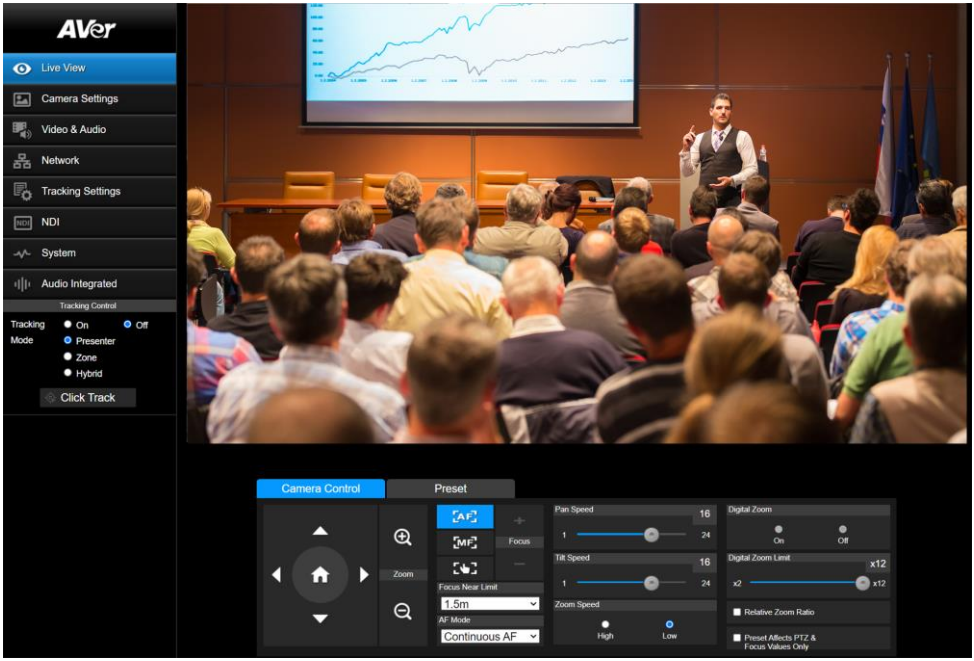
3. Go to **Setup** > **Add**, then click **Auto Search** to see available devices on the same local area network (LAN).

4. Click to select your camera, enter the default or changed camera username and password, then click **Save** to add the camera to the device list.

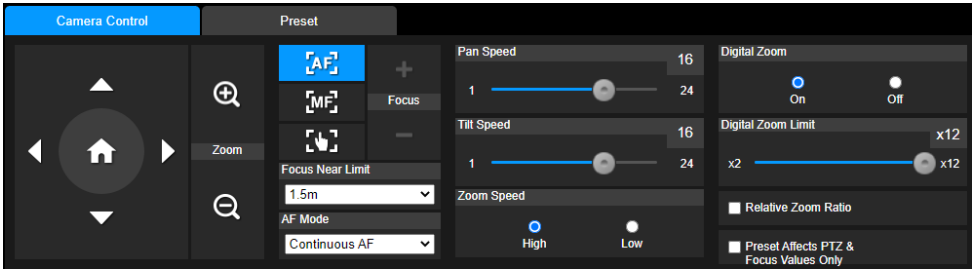
5. Select the checkbox of your camera, then click **Go to Web** button to open the web interface in your browser.

# Web Interface

## Live View



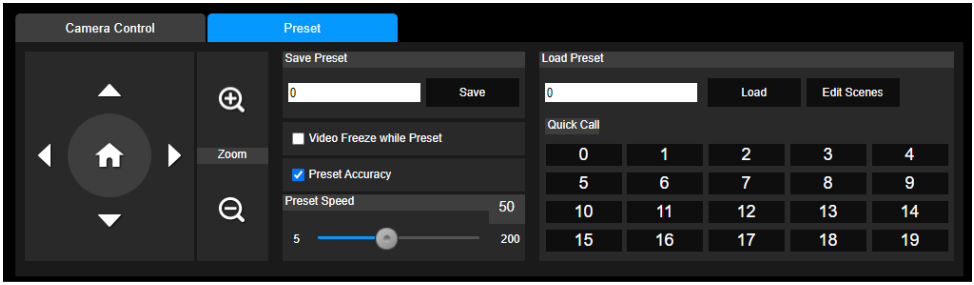

### Camera Control




| Item | Description |
|---|---|
| Pan and Tilt Controls | Position the camera.<br>Drag the slider to adjust **Pan Speed** and **Tilt Speed**. |
| Home Position | Move the camera to the Home position. |
| Zoom | Zoom in or zoom out the live view and select **Zoom Speed**. |
| Auto Focus | Select **Auto Focus** and then choose an **AF mode**:<br>● **AF Trigger after PTZ:** Automatically focus after each pan, tilt or zoom. |

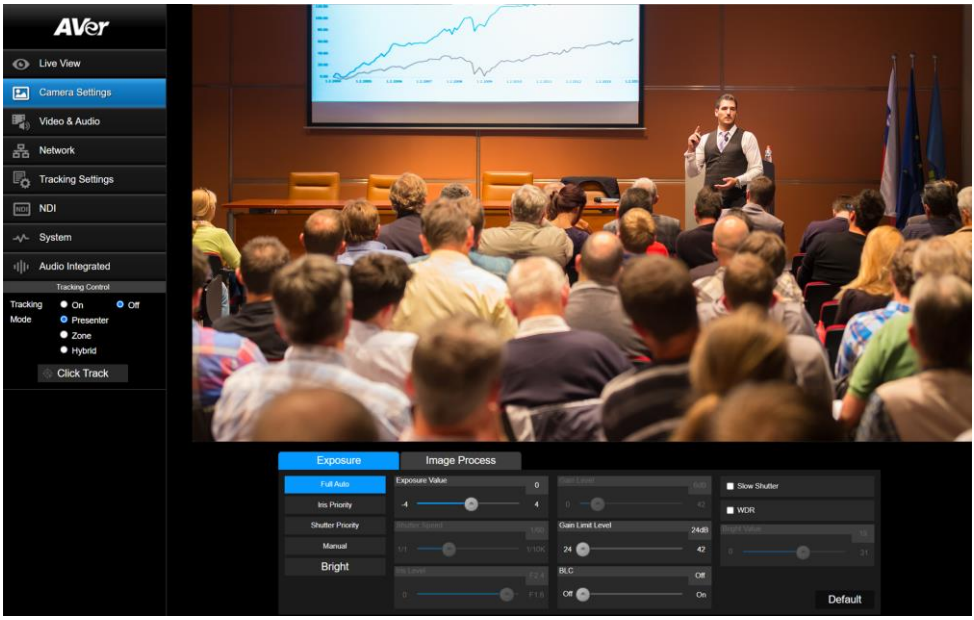
| | |
|---|---|
| | ● **Continuous AF:** Automatically focus continuously. |
| Manual Focus | Click to manually focus. Adjust the focus with + - buttons. |
| One Push Focus | Click to automatically focus once. |
| Focus Near Limit | Set up the nearest focus limit. |
| Digital Zoom | Turn digital zoom on or off. |
| Digital Zoom Limit | Adjust the digital zoom. |
| Relative Zoom Ratio | Select to automatically adjust pan and tilt speeds based on the zoom ratio. |
| Preset Affects PTZ & Focus Values Only | A preset typically includes pan, tilt, zoom, focus, and 3A (autofocus, autoexposure, auto white balance) values.<br>Select to save only pan, tilt, zoom and focus values for presets. |

## Preset

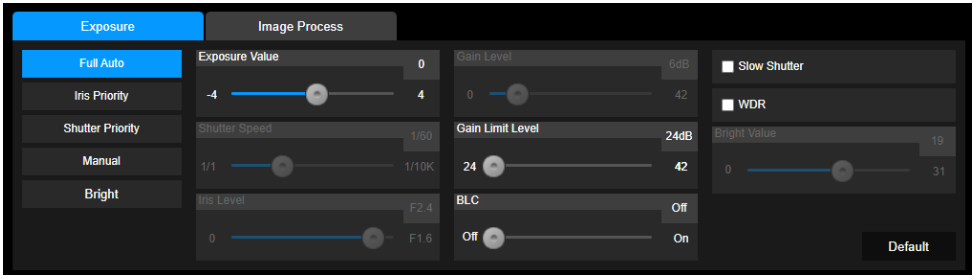



| Item | Description |
|---|---|
| Save Preset | 1. Position the camera using pan, tilt and zoom controls.<br>2. Enter a preset number (0–255) in the **Save Preset** field and click **Save**. |
| Load Preset | 1. Enter a preset number (0–255) in the **Load Preset** field and click **Load**.<br>2. Or click a preset number (0–19) in the **Quick Call** section. |
| Video Freeze while Preset | Select to display only the live view from presets. The live view from the moving path will not be displayed. |
| Preset Accuracy | Select to improve the accuracy of moving to presets. |
| Preset Speed | Adjust the camera speed when moving to presets. |
| Edit Scenes | To customize camera functions for preset 0–9:<br>1. Click **Edit Scenes**.<br>2. Select **Scenes 0–9** from the **Scenes List** to add up to 10 CGI commands.<br>3. Select a scene from the **Set Scenes** drop-down list for each preset. |

# Camera Settings




## Exposure

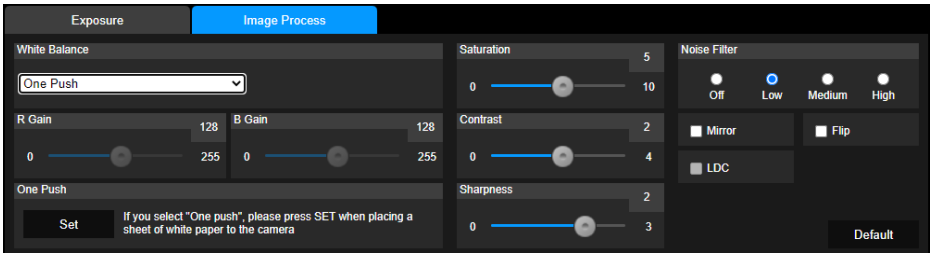



**Note:** Click **Default** to reset Exposure to factory default settings.

| Item | Description |
|---|---|
| Exposure Mode | Choose an exposure mode. |
| Exposure Value | Adjust exposure, shutter, iris and gain. |
| Shutter Speed | |
| Iris Level | |
| Gain Level | |

| | |
|---|---|
| Gain Limit Level | |
| BLC | Turn backlight compensation (BLC), slow shutter, wide dynamic range (WDR) on or off. |
| Slow Shutter | |
| WDR | |
| Bright Value | Drag the slider to adjust the brightness value. |

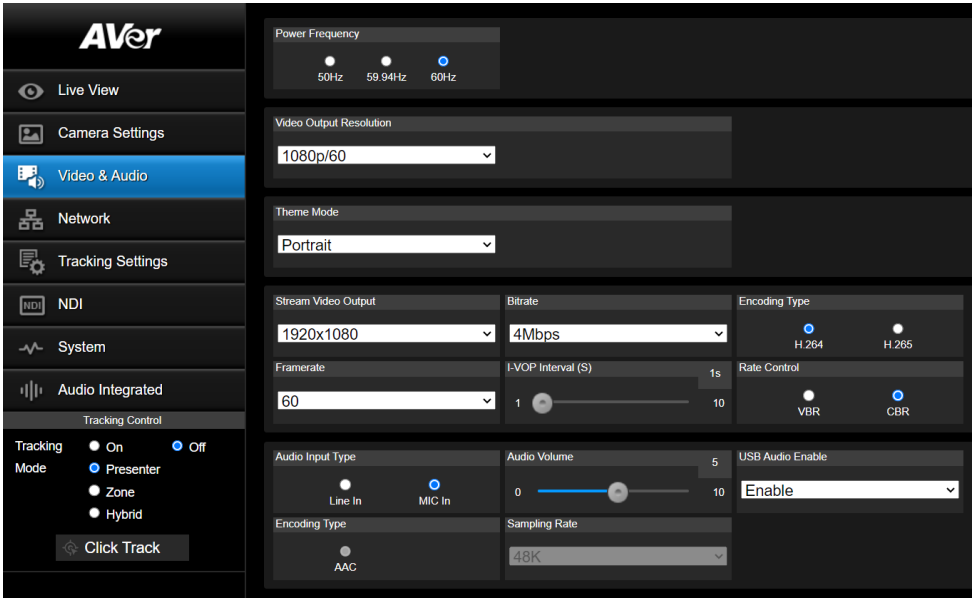
## Image Process




**Note:** Click **Default** to reset Image Process to factory default settings.

| Item | Description |
|---|---|
| White Balance | Choose a white balance mode<br>● In **Manual** mode, you can also adjust the **R Gain** and **B Gain**.<br>● In **One Push** mode, place a piece of white paper in front of the camera lens and click **Set** to calibrate white balance. |
| Saturation | Adjust saturation, contrast and sharpness. |
| Contrast | |
| Sharpness | |
| Noise Filter | Select a noise filtering level. |
| Mirror | Select the checkbox to flip the image horizontally. |
| Flip | Select the checkbox to flip the image vertically. |

# Video & Audio



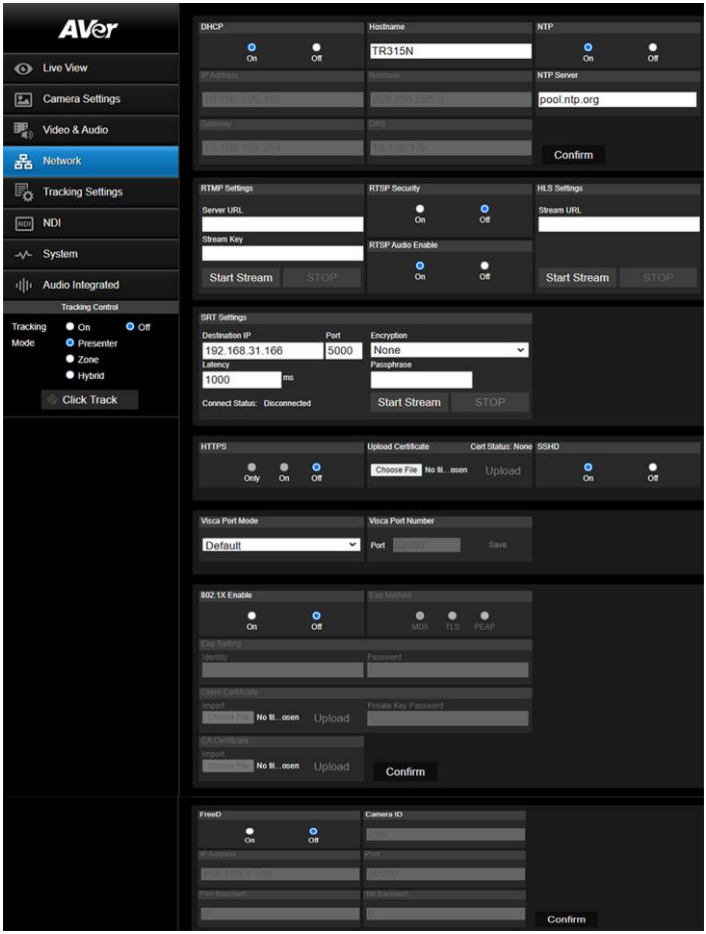

## Video and Audio Settings

| Item | Description |
|---|---|
| Power Frequency | Select **50Hz**, **59.94Hz** or **60Hz** based on your country and region. |
| Video Output Resolution | Select a resolution to display on your video output device. |
| Theme Mode | Select a video mode based on your output interface.<br><br>● NDI is available for model names with N only.<br>● To stream with NDI HX3, select NDI as the theme mode. |

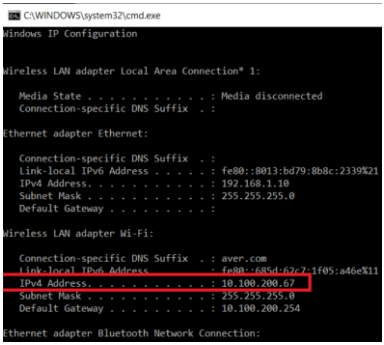
| Mode | Video Quality | Output Interface | Sleep Mode |
|---|---|---|---|
| Standard | Standard | HDMI, SDI, IP, USB, NDI HX2* | N/A |
| Teams | Teams certified | HDMI, SDI, IP, USB | Rotate towards the I/O ports (preset 20)* when not streaming over USB. |
| Zoom | Zoom certified | HDMI, SDI, IP, USB | Rotate towards the I/O ports (preset 20)* when not streaming over USB. |

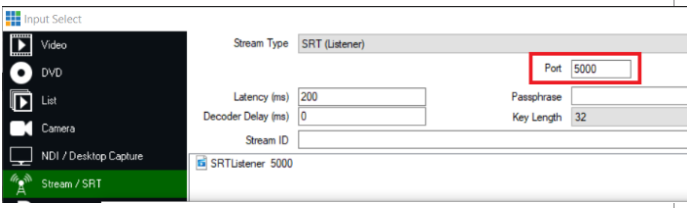
| | |
|---|---|
| | <table><tr><td>NDI*</td><td>Standard</td><td>HDMI, SDI, IP,<br>NDI HX3</td><td>N/A</td></tr></table><br>*To change the sleep mode position, go to **System** > **Sleep to Preset** on the web application. |
| Stream Video Output | Select a stream resolution on live view from the drop-down list. |
| Bitrate | Select a bitrate from the drop-down list. |
| Framerate | Select a framerate for live stream – **1**, **5**, **15**, **20** or **30** for power frequency **59.94Hz** or **60Hz**; **1**, **5**, **15**, **20** or **25** for power frequency **50Hz**. |
| I-VOP Interval (S) | Drag the slider to set the value from **1s** to **10s**. |
| Encoding Type (video) | Select **H.264** or **H.265** to encode streaming video. |
| Rate Control | Select **VBR** or **CBR**. |
| Audio Input Type | Select to input audio by **Line in** or **Mic in**. |
| Audio Volume | Drag the slider to set the volume from **0** to **10**. |
| Encoding Type (audio) | Select to encode audio. |
| Sampling Rate | Select a sampling rate from the drop-down list. |
| USB Audio Enable | Select from the drop-down list to turn on or off the setting. |

# Network

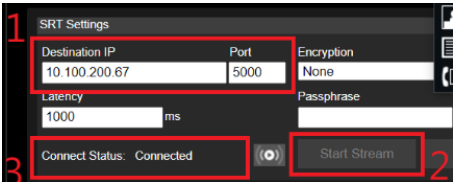



| Item | Description |
|---|---|
| DHCP | Set up the network to DHCP or Static IP.<br>● **DHCP**: Select **On** to assign the related IP settings with the camera automatically. Click **Confirm** to save the settings.<br>● **Static IP**: Select **Off** to manually enter the **IP Address**, **Netmask**, **Gateway** and **DNS**. Click **Confirm** to save the settings. |
| Hostname | Enter a hostname that is displayed on devices such as an IP router.<br>● The default is your model name. |
| NTP | Turn Network Time Protocol (NTP) on or off. |

| | |
|---|---|
| RTMP Settings | Stream camera live video to a video platform such as YouTube.<br>1. Enter the **Server URL** and **Stream Key** of the platform. Please refer to the instruction of the platform you use to obtain the server URL and stream key.<br>2. Click **Start Stream** to start streaming, **Stop** to stop streaming. |
| RTSP Security | Protect your video stream on media players such as VLC, PotPlayer and QuickTime by ensuring that only authorized users can access it.<br>● When **Security** is turned off:<br>1. Enter your camera's RTSP URL into the media player.<br>2. RTSP URL: rtsp://[camera IP address]/live_st1<br>Example: rtsp://192.168.1.100/live_st1<br>● When **Security** is turned on:<br>1. Enter your camera's RTSP URL, username and password into the media player.<br>2. RTSP URL: rtsp://[username:password]@[camera IP address]/live_st1<br>Example: rtsp://1:1@192.168.1.100/live_st1<br>Username and password: camera's web interface login. |
| HLS Settings | Configure HTTP Live Streaming (HLS) settings to provide adaptive bitrate streaming, which ensures smooth playback and minimizes buffering.<br>1. Enter the stream URL obtained from the streaming service or server.<br>2. Click **Start Stream** to start streaming, **Stop** to stop streaming. |
| SRT Settings | ● vMix<br>1. Make sure the vMix workstation and your camera are on same network. Copy the workstation's IP address.<br>  <br>2. Go to **Stream** tab > select **SRT (Listener)** from the **Stream Type** drop-down list. Copy the **Port** value. |

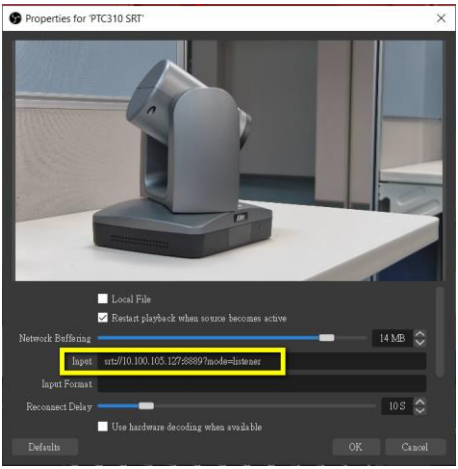



3. Paste the IP address and Port value into **SRT Settings** fields and click **Start Stream**. **Connect Status** will change to **Connected**.




- OBS (Open Broadcaster Software)
  1. Make sure the OBS workstation and your camera are on same network. Copy the workstation's IP address.


  2. Open OBS. Add a scene and a source.
  3. Enter "srt://[Workstation IP]:[port]?mode=listener" in the **Input** field.
     Example: srt://10.100.105.127:8889?mode=listener




If there is no image, right-click on the source > **Transform** > **Fit to screen** to re-scale image.

| | |
|---|---|
| HTTPS | Enable HTTPS to establish a secure connection between your browser and your camera. To enable HTTPS access on your camera:<br>1. Obtain a SSL certificate for encryption and decryption in base-64 encoded format and use a private key in PKCS#8 format (unencrypted).<br>2. Package the required certificate content into PEM format. The SSL certificate uploaded to the camera must be in PEM format.<br>3. Click **Choose File** to select the certificate file, and then click **Upload**.<br>4. Turn on HTTPS. |
| SSHD | Turn remote debugging from AVer on or off. |
| Visca Port Mode | Select a VISCA port mode.<br>After selected, enter **Visca Port Number**. |
| 802.1x Enable | Turn 802.1x Enable on or off. |
| Eap Method | When **802.1x Enable** is turned on, select an Eap method. |
| Eap Setting | Based on your Eap method, complete the authentication and click **Confirm**. |
| FreeD | Turn the FreeD protocol on to send camera positioning data to a virtual reality production system.<br>When FreeD is turned on, enter the following information:<br>● Your **Camera ID.**<br>● The **IP Address** and **Port** of the device receiving your camera's positioning data.<br>● Manually enter pan and tilt backlash amount to ensure accurate aiming. |

# Tracking Settings

## Tracking Modes Overview

For details on settings, please refer to their respective chapters.

**Presenter Mode**

Frames and follows the presenter on screen.

**Zone Mode**


Frames and follows the presenter on screen using up to four presets. When the presenter exits the previous preset, the camera will follow and move to the next preset.

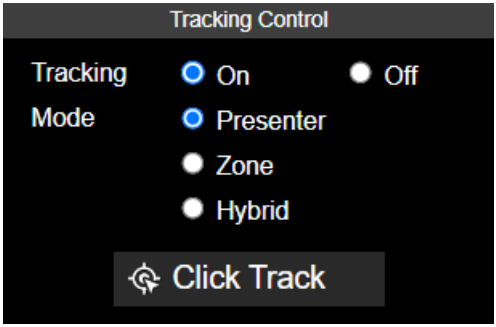
**Hybrid Mode**

Hyrbid Mode combines Presenter Mode and Zone Mode, and lets you define a detection area for each preset. When the presenter enters the detection area, the camera will move to the corresponding preset. When the presenter leaves the detection area, the camera frames and follows the presenter.

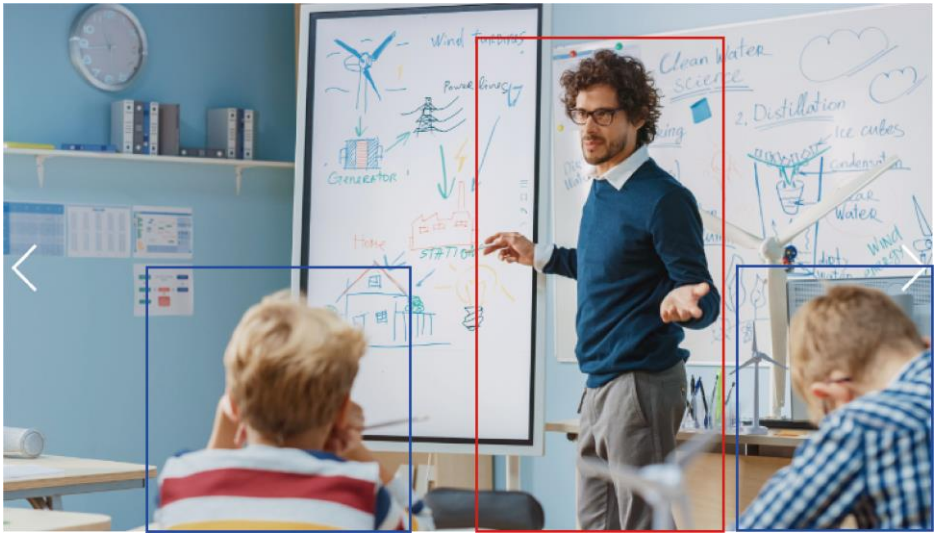
## Compare Tracking Modes

| | Presenter Mode | Zone Mode | Hybrid Mode (Presenter +Zone) |
|---|---|---|---|
| Use case | Performance arts | Keynotes, presentations | All of the above |
| Perfect for | Movements | Content | Movements and content |
| Available presets | Preset 1 | Presets 6–9 | Presets 10–13 |
| Presets can have a detection area | ✓ | - | ✓ Presenter |
| Facial recognition | ✓ | - | ✓ Presenter |
| Click Track | ✓ | - | ✓ Presenter |

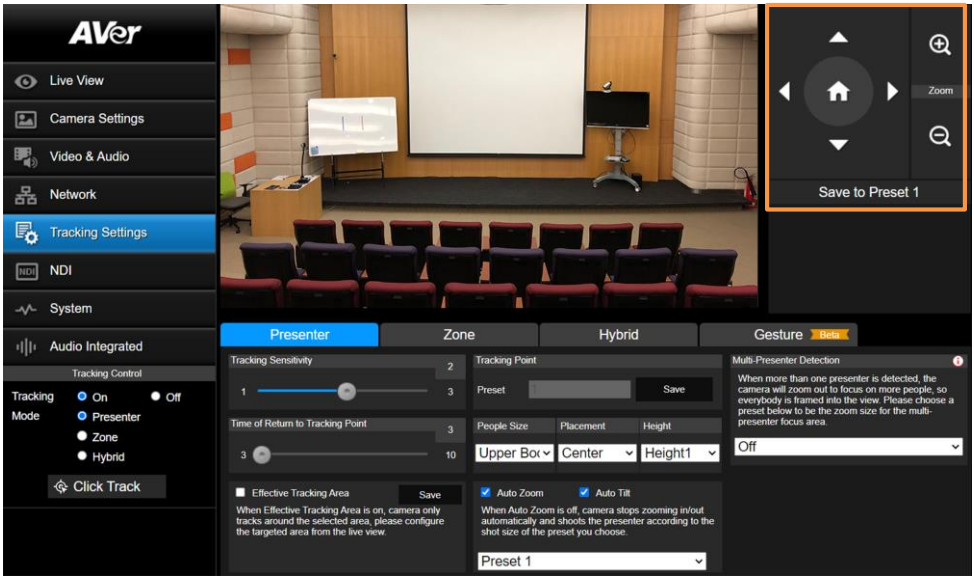
## Tracking Control Panel




- **Tracking:** Turn tracking on or off.
- **Mode:** Select a tracking mode to frame and follow the presenter in real time as they move. For details on tracking settings, please refer to respective chapters.
- **Click Track:** Presenter Mode uses facial recognition and lets you switch the presenter you want to track. Click the **Click Track** button to frame everyone on screen in bounding boxes and click to select the presenter you want to track. Selected presenter will be in a red frame.



## Presenter Mode




Presenter Mode frames and follows the presenter on screen, and returns to the tracking point (Preset 1) when no one is on screen.

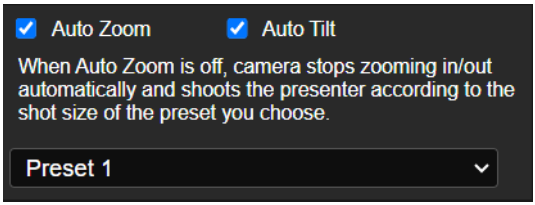
**To set up Presenter Mode:**

1. Go to **Tracking Settings** > **Presenter**.

2. Use pan, tilt and zoom controls to position your camera and click **Save to Preset 1** to save the **Tracking Point**.

3. Configure additional settings:

| Item | Description |
|---|---|
| Tracking Sensitivity | Drag the slider to adjust tracking sensitivity. |
| Time of Return to Tracking Point | Drag the slider to set an idle time (second) before the camera return to the tracking point. |
| Effective Tracking Area | Define an effective tracking area. The camera only tracks the presenter inside that area.<br>1. Select the checkbox and click **Set**.<br>2. Drag the upper-left or the lower-right corner of the red square to adjust the size of the tracking area. |

<table>
<tr><td>Tracking Point</td><td>If no one is on screen, the camera will return to the tracking point (Preset 1).</td></tr>
<tr><td>People Size, Placement, Height</td><td>• Frame the presenter's full body or upper body.<br>• Horizontally align the presenter to the left, center or right.<br>• Vertically align the presenter to the center or bottom.</td></tr>
<tr><td>Auto Zoom<br><br>Auto Tilt</td><td>• When Auto Zoom is off, the zoom ratio will be based on your selected preset from the drop-down list.<br>• When Auto Tilt is turned off, the tilt angle will be based on your selected preset from the drop-down list.<br><br>  </td></tr>
<tr><td>Multi-Presenter Detection</td><td>When multiple presenters are detected, the camera will go to your selected Multi-Presenter Detection preset and frame entire group on screen.<br><br>1. Go to Tracking Settings > Presenter.<br><br>2. Make sure Auto Zoom is turned on.<br><br>3. Select a preset from the Multi-Presenter Detection drop-down list to turn on Multi-Presenter Detection.<br><br>Note:<br>• Make sure you have defined the required preset.<br>• The preset should cover a wide area where multiple presenters may appear.<br><br>4. You can also define an exclusion zone in Set Shield Zone to avoid unwanted multi-presenter detection, such as when you have audience in the front row.</td></tr>
</table>

4. Turn on **Tracking** and select **Presenter Mode** on the tracking control panel.

**Note:** Presenter Mode uses facial recognition and lets you switch the presenter you want to track. Click the **Click Track** button to frame everyone on screen in bounding boxes and click to select the presenter you want to track. Selected presenter will be in a red frame.

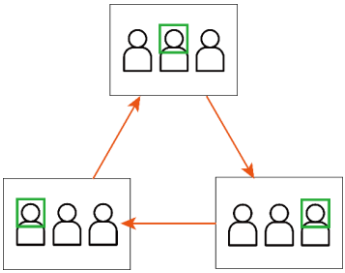
**To set up Presenter Mode with the remote control:**

1. Use directional buttons to position your camera. Press and hold **Preset**, then press **Number button 1** to save the tracking point (Preset 1).

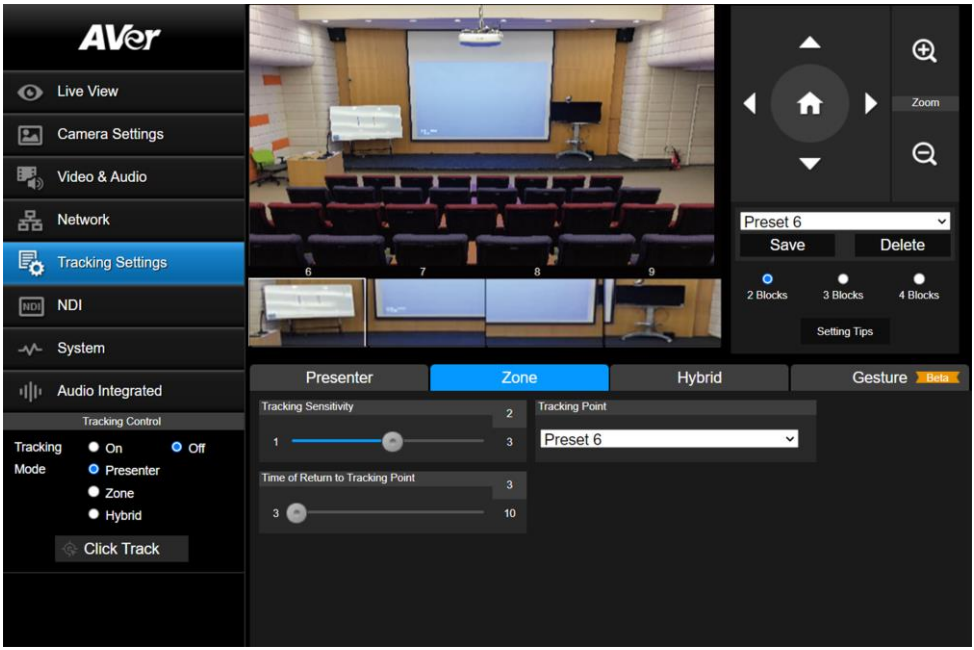
2. Press **Auto Tracking ON** to turn on Presenter Mode.

3. Press **Upper Body** or **Full body**.

4. To switch presenters, press **Switch**. With each press, cycle through presenters clockwise, starting from the center.



## Zone Mode




Zone Mode uses up to 4 presets to frame and follow the presenter on screen. When the presenter exits the previous preset, the camera will follow and move to the next preset.

When no one is in the presets, the camera returns to the tracking point (Preset 6 or selected preset).

**Note:**

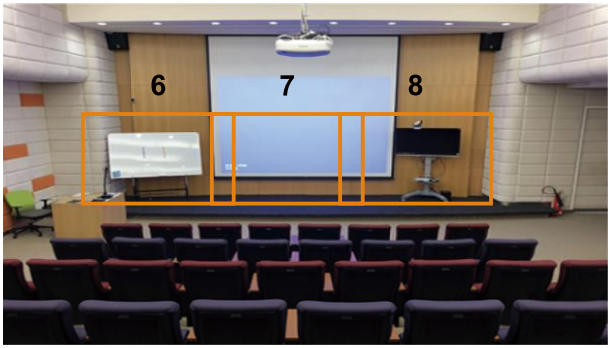
- Zone Mode detects all faces or human silhouettes entering the presets. Beside the presenter, make sure there are no other faces or human silhouettes on a poster in the presets to avoid interference.

**To set up Zone Mode:**

1. Go to **Tracking Settings** > **Zone**.
2. Select the number of **Blocks** (presets) you want to track.
3. Select the presets you want to save from the drop-down list. Presets 6–9 are available.

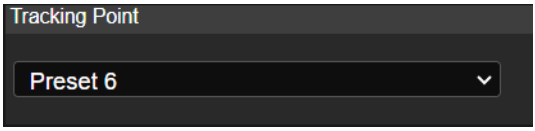
| 2 Blocks | 3 Blocks | 4 Blocks |
|---|---|---|
| Preset 6、7 | Preset 6、7、8 | Preset 6、7、8、9 |

4. Use pan, tilt and zoom controls to position your camera and click **Save** to save that position. A thumbnail will appear in the preview. Repeat these steps for all presets.




**Note:** Define overlapping presets from left to right for a smooth transition. When the presenter exits the previous preset, the camera will follow and move to the next preset.

5. Configure additional settings:

| Item | Description |
|---|---|
| Tracking Sensitivity | Drag the slider to adjust tracking sensitivity. |
| Time of Return to Tracking Point | Drag the slider to set an idle time (second) before the camera return to the tracking point. |
| Tracking Point | If no one is in the presets, the camera will return to the tracking point (Preset 6 or selected preset).<br>  |



6. Turn on **Tracking** and select **Zone Mode** on the tracking control panel.

**To set up Zone Mode with the remote control:**

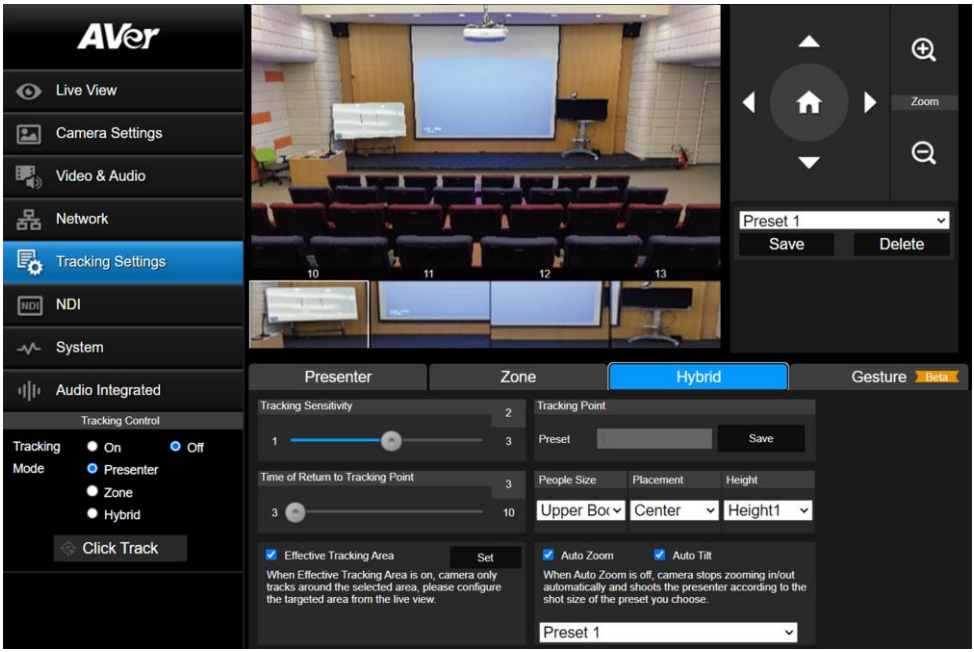
1. Use directional buttons to position your camera. Press and hold **Preset**, then press **Number button 6** to save Preset 6. Repeat these steps for Preset 7.

   **Note:** Zone Mode has 2 blocks by default. To select more blocks, access the web interface.

2. Press **Auto Tracking ON** to turn on Presenter Mode

3. Then press and hold **Tracking Point** to switch tracking mode from Presenter Mode to Zone Mode.

## Hybrid Mode




Hybrid Mode combines Preseter Mode and Zone Mode, and lets you define a detection area for each preset. Defining a detection area will allow a smoother transition, but ou can also define a preset without one.

When the presenter enters the detection area, the camera will move to the corresponding preset.
When the presenter leaves the detection area, the camera frames and follows the presenter.
When no one is on screen, the camera returns to the tracking point (Preset 1).

**To set up Hybrid Mode:**

1. Go to **Tracking Settings** > **Hybrid**.
2. First, define detection areas. Detection areas are saved individually for each preset.
   From the **Effective Detection Area** drop-down menu, select a preset you want to save the detection area for. Presets 10–13 are available.
3. Click **Set**. Then drag a square over the area you want the camera to detect on the wide-angle live view.
4. Click **Save**. The camera will automatically switch to the PTZ live view around that detection area.

5. Then, define presets. Use pan, tilt and zoom controls to position your camera and click **Save** to save that position. A thumbnail will appear in the preview. Repeat steps 2–5 for all presets.

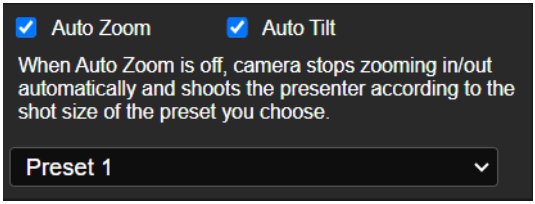

**Note:**

- Do not overlap presets. Leave ample room between presets for a smooth transition.
- The preset must be larger and covers the detection area.

6. Select **Preset 1** from the drop-down list to save the tracking point. Use pan, tilt and zoom controls to position your camera and click **Save** to save that position

7. Configure additional settings:

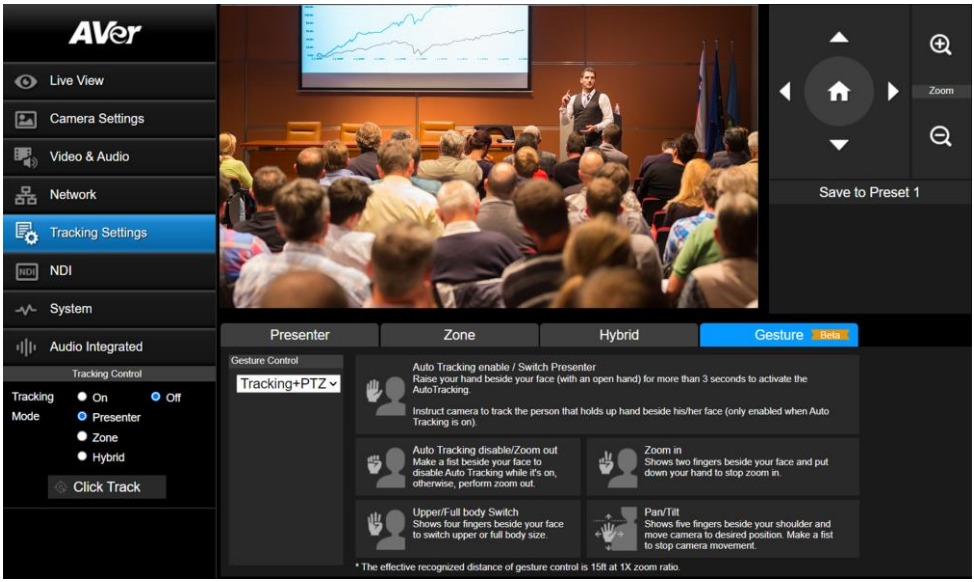
| Item | Description |
|---|---|
| Tracking Sensitivity | Drag the slider to adjust tracking sensitivity. |
| Time of Return to Tracking Point | Drag the slider to set an idle time (second) before the camera returns to the tracking point. |
| Effective Tracking Area | Define an effective tracking area. Only presenters inside the area will be tracked.<br>1. Select the checkbox and click **Set**.<br>2. Drag the upper-left or the lower-right corner of the red frame to adjust the size of the tracking area.<br><br>**Note:** During HDMI output, press and hold the **Freeze** button on the remote control for 2 seconds to see the effective tracking area in a green frame. To remove the green frame, press and hold for 2 seconds again. |
| Tracking Point | If no one is on screen, the camera will return to the tracking point (Preset 1). |
| People Size, Placement, Height | ● Frame the presenter's full body or upper body.<br>● Horizontally align the presenter to the left, center or right.<br>● Vertically align the presenter to the center or bottom. |

| | |
|---|---|
| Auto Zoom | • When **Auto Zoom** is turned off, the zoom ratio will be based on your selected present from the drop-down list.<br>• When **Auto Tilt is** turned off, the tilt angle will be based on your selected present from the drop-down list. |
| Auto Tilt |  |

8. Turn on **Tracking** and select **Hyrbid Mode** on the tracking control panel.

**Note:** Presenter Mode uses facial recognition and lets you switch the presenter you want to track. Click the **Click Track** button to frame everyone on screen in bounding boxes and click to select the presenter you want to track. Selected presenter will be in a red frame.

## Gesture




**Notes:**

- The effective distance is 15 feet at 1X zoom ratio.
- When a gesture is recognized, the LED indicator will flash purple.

**To set up gesture control:**

1. Turn the Tracking off.
2. Select an option from the **Gesture Control** drop-down list.

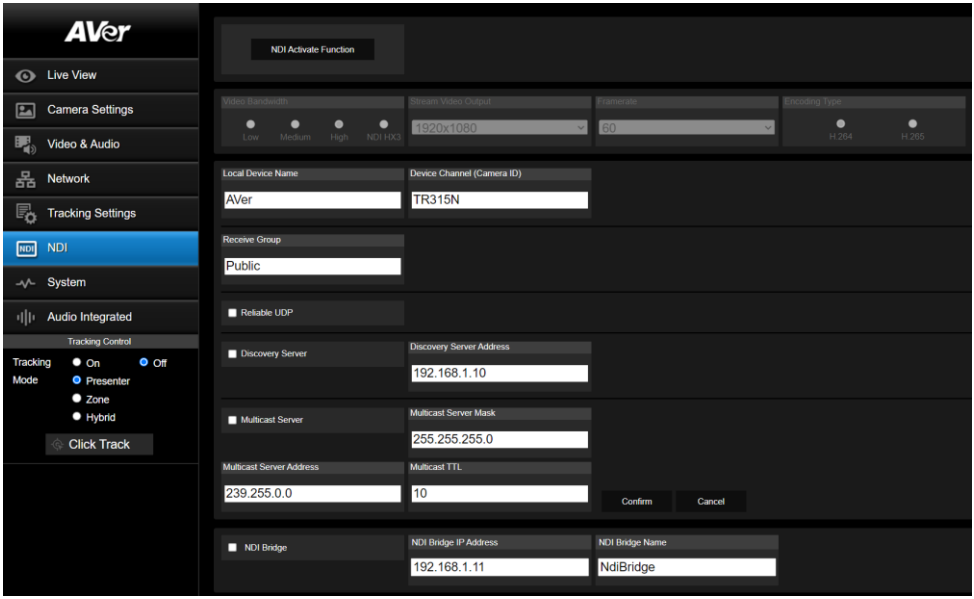
| Item | Description |
|---|---|
| Off | Turn Gesture Control off. |
| Tracking | Enable gesture control for auto tracking and body size switch. |
| PTZ | Enable gesture control for zoom, pan and tilt. |
| Tracking + PTZ | Enable all gesture control. |

**Gesture Control List:**

| Gesture | Description |
|---|---|
|  | **Auto Tracking enable / Switch Presenter**<br>Raise your hand beside your face (with an open hand) for more than 3 seconds to activate the Auto Tracking.<br>Instruct camera to track the person that holds up beside his/her face (only enabled when Auto Tracking is on). |
|  | **Auto Tracking disable/ Zoom out**<br>Make a fist beside your face to disable Auto Tracking while it's on; otherwise perform zoom out. |
|  | **Upper/Full Body Switch**<br>Shows four fingers beside your face to switch upper or full body size. |
|  | **Zoom In**<br>Shows two fingers beside your face and put down your hand to stop zoom in. |
|  | **Pan/Tilt**<br>Shows five fingers beside your shoulder and move camera to desired position.<br>Make a fist to stop camera movement. |

# NDI

**Note:** NDI is available for model names with N only.

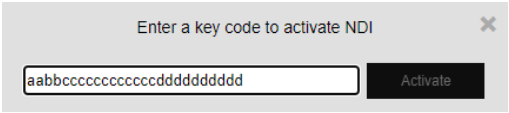



**To set up the NDI function:**

This camera is compatible with **NDI** | **HX3** of NewTek, Inc. To use **NDI** | **HX3**, you are required to purchase the license key from the URL of NewTek, Inc.
https://www.newtek.com/ndihx/products/upgrade/

**To activate the NDI license key:**

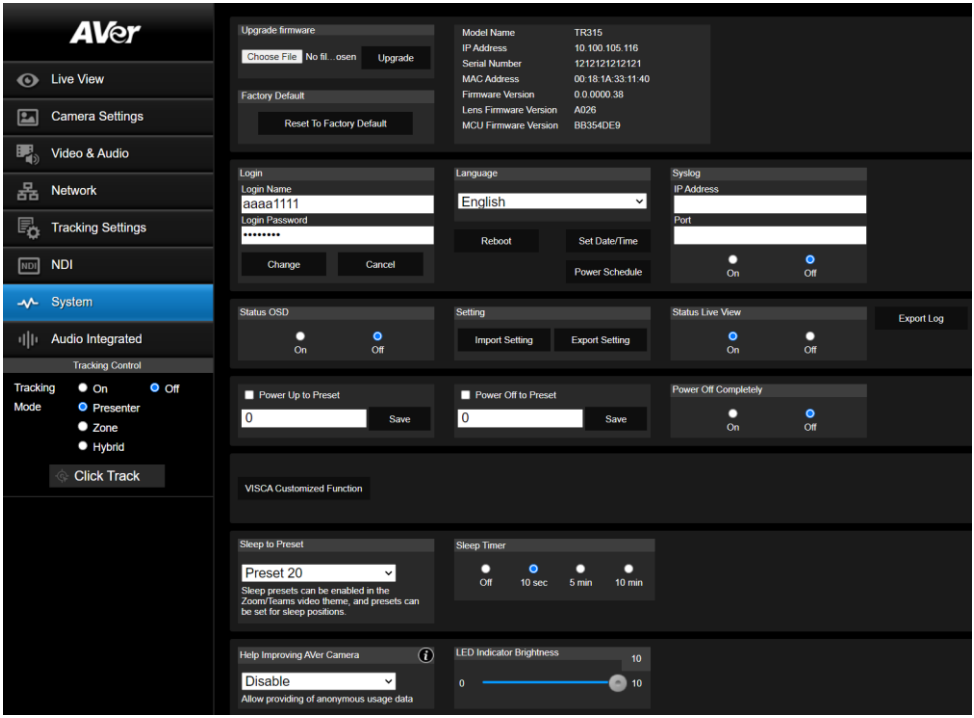
1. Connect your camera to the Internet for NDI license activation. The NDI supported camera firmware version is v31 or later.
2. Go to **NDI**, click **NDI Activate Function** to enter the license key. When finished, click **Activate**, and follow the on-screen instruction to reboot your camera.




3. If success, go to **Video & Audio** > **Theme Mode**, you will see **NDI** option on the drop-down list. Select **NDI** to turn on the **NDI** function. Please refer to **Theme Mode** in <**Video & Audio**>.

| Item | Description |
|---|---|
| Video Bandwidth | Select a bandwidth. NDI HX3 is a protocol that enables high-quality video streaming over IP networks. |
| Stream Video Output | Choose a streaming output resolution for the live view. |
| Framerate | Choose a framerate. |
| Encoding Type | Select **H.264** or **H.265**. |
| Local Device Name | Enter a name that identifies your camera group on the NDI software.<br>● The default is AVer. |
| Device Channel (Camera ID) | Enter a name that identifies your camera on the NDI software.<br>● The default is your model name.<br>● A name must have no more than 10 characters. Use number, upper and lower case letter, or special character (! @ % ^ , . / : + ? [ ] { } - _ ~). |
| Receive Group | Enter a name for a receive group.<br>● All devices in the receive group receive the same NDI streams.<br>● The receive group should remain **public**. If this is changed, you will need to join the group through NDI® Access Manager. |
| Reliable UDP | Select the checkbox to enable Reliable User Datagram Protocol (RUDP). |
| Discovery Server | Select the checkbox to enable discovery server to allow devices to discover and connect to each other on a network automatically. |
| Discovery Server Address | Enter the IP address of a server running a discovery server application. |
| Multicast Server | Select the checkbox to enable multicast server to allow efficient distribution of NDI streams to multiple receivers without overwhelming the network. |
| Multicast Server Mask | Enter the network mask to specify the range of IP addresses that are eligible to receive NDI streams. |
| Multicast Server Address | Enter the IP address of a group of recipients that receive NDI streams from a multicast server. |
| Multicast TTL | Enter a multicast time to live (TTL) value between 1-255 to control the distance multicast packets can travel. |

# System

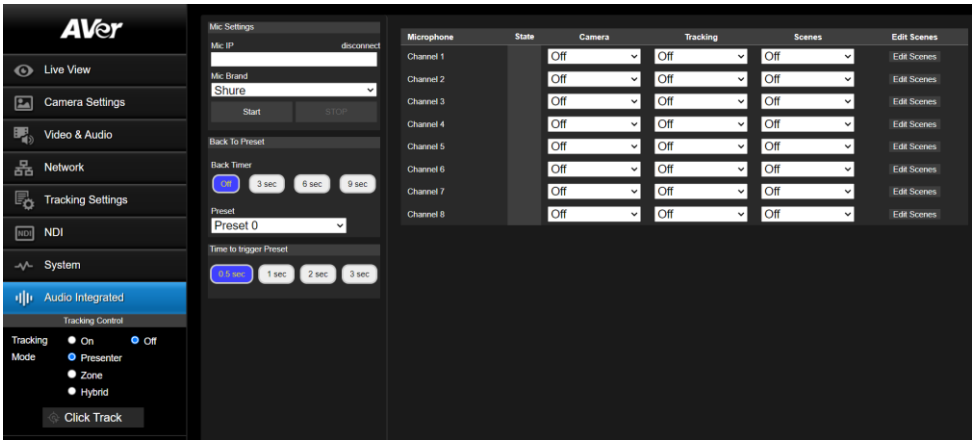



| Item | Description |
|---|---|
| Upgrade firmware | To upgrade the firmware:<br>1. Download the newest firmware from AVer Download Center (https://www.aver.com/Download-Center/professional-ptz-camera)<br>2. On the web interface, go to **System** > **Upgrade firmware**.<br>3. Click **Choose File** to select the firmware.<br>4. Click **Upgrade**.<br>5. Refresh the browser after the upgrade is complete.<br>**Note:** Keep your camera connected to a power source during firmware upgrade. Network connection will be lost during the process and camera will reboot automatically after upgrading. |
| Factory Default | Reset the camera to factory default settings. |
| Login | For first-time login, you'll be prompted to change the username and Password:<br>● Username: Use 1-32 characters. |

| | |
|---|---|
| | • Password: Use 8-32 characters and a combination of uppercase letters, lowercase letters, numbers, and symbols (%+=,-_^/@.~). The password cannot be the same as the username. |
| Language | Change the web interface language. |
| Reboot | Restart your camera. |
| Set Date/Time | Set the camera date and time. |
| Power Schedule | Schedule specific times for the camera to reboot or shut down. |
| Syslog | Turn on to receive technical supports.<br>Enter the **IP Address** and **Port** of the receiving device for debug and problem analysis. |
| Status OSD | Turn on to display preset and zoom ratio on HDMI output. |
| Setting | Import or export your camera settings |
| Status Live View | Turn the camera live view on or off. |
| Export Log | Export system log. |
| Power Up to Preset | Move the camera to the defined preset after powering on.<br>To enable:<br>1. Make sure the preset has been defined.<br>2. Select **Power Up to Preset** > enter a preset number > click **Save**. |
| Power Off to Preset | Move the camera to the defined preset before powering off.<br>To enable:<br>1. Make sure the preset has been defined.<br>2. Select **Power Off to Preset** > enter a preset number > click **Save**. |
| VISCA Customized Function | Set VISCA customized functions and click **OK**. |
| Sleep to Preset<br><br>Sleep Timer | When no video is transmitted over USB on Zoom or Teams, set up **Sleep to Preset** and **Sleep Timer** to move the camera to a defined preset after a period of time for enhanced privacy.<br>• To enable:<br>1. Make sure the preset has been defined.<br>2. Go to **Video & Audio** > **Theme Mode** > choose **Zoom** or **Teams**.<br>3. Go to **Systems** > **Sleep to Preset** > choose a preset.<br>4. Go to **Systems** > **Sleep Timer** > select a duration.<br>• To disable, choose **Off** from the **Sleep to Preset** drop-down list or select **Off** in **Sleep Timer**. |

| | |
|---|---|
| Help Improving AVer Camera | Opt-in or opt-out of providing anonymous usage data. |
| LED Indicator Brightness | Drag the slider to adjust the brightness. |

# Audio Integrated




| Item | Description |
|---|---|
| Mic Settings | Enter the microphone IP you want to connect. Click Start to connect and Stop to disconnect. |
| Back to Preset | Select an idle time before the camera goes to your selected preset. |
| Time to trigger Preset | Select an idle time for the camera to move to the preset when the microphone detects sound. |
| Mic Manager | ● Pair microphone channels with presets.<br>● Turn tracking on or off for each channel.<br>● Customize camera functions and add up to 10 CGI commands for each channel. |

# Appendix

## VISCA RS-232 Command Table

| Command Set | Command | Command Packet | Comments |
|---|---|---|---|
| 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(Variable) | 8x 01 04 07 2p FF | p=0 (Low) to 7 (High) |
| | Wide(Variable) | 8x 01 04 07 3p FF | |
| | Direct | 8x 01 04 47 0p 0q 0r 0s FF | pqrs: Zoom Position，<br>PTC310: 0x0000~0x6f20<br>PTC330: 0x0110~0x5490 |
| CAM_Focus | Stop | 8x 01 04 08 00 FF | |
| | Far (Standard) | 8x 01 04 08 02 FF | Each 'Far/Near' needs a 'stop' |
| | Near (Standard) | 8x 01 04 08 03 FF | |
| | Auto Focus | 8x 01 04 38 02 FF | |
| | Manual Focus | 8x 01 04 38 03 FF | |
| | One Push | 8x 01 04 18 01 FF | |
| | Direct | 8x 01 04 47 0p 0q 0r 0s FF | pqrs: Zoom Position |
| CAM_WB | Auto | 8x 01 04 35 00 FF | Normal Auto |
| | ATW | 8x 01 04 35 04 FF | |
| | Indoor | 8x 01 04 35 01 FF | |
| | Outdoor | 8x 01 04 35 02 FF | |
| | One Push WB | 8x 01 04 35 03 FF | One Push WB mode |
| | Manual | 8x 01 04 35 05 FF | Manual Control mode |
| | One Push | 8x 01 04 10 05 FF | One Push WB Trigger |
| CAM_RGain | Up | 8x 01 04 03 02 FF | Manual Control of R Gain |
| | Down | 8x 01 04 03 03 FF | |
| CAM_Bgain | Up | 8x 01 04 04 02 FF | Manual Control of B Gain |
| | Down | 8x 01 04 04 03 FF | |
| 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 (Manual control) |
| CAM_Shutter | Up | 8x 01 04 0A 02 FF | Shutter Setting |
| | Down | 8x 01 04 0A 03 FF | |
| CAM_Iris | Up | 8x 01 04 0B 02 FF | Iris Setting |
| | Down | 8x 01 04 0B 03 FF | |
| CAM_Gain | Up | 8x 01 04 0C 02 FF | Gain Setting |
| | Down | 8x 01 04 0C 03 FF | |
| CAM_Bright | Up | 8x 01 04 0D 02 FF | Bright Setting |
| | Down | 8x 01 04 0D 03 FF | |

| | | | |
|---|---|---|---|
| CAM_Exposure Compensation | Up | 8x 01 04 0E 02 FF | Exposure Compensation Amount Setting |
| | Down | 8x 01 04 0E 03 FF | |
| CAM_Backlight | On | 8x 01 04 33 02 FF | Back Light Compensation ON/OFF |
| | Off | 8x 01 04 33 03 FF | |
| CAM_Preset | Reset | 8x 01 04 3F 00 pp FF | pp: Preset Number 0x00~0xFF |
| | Set | 8x 01 04 3F 01 pp FF | |
| | Recall | 8x 01 04 3F 02 pp FF | |
| CAM_Menu | On/Off | 8x 01 06 06 10 FF | Display ON/OFF |
| Pan-tilt Drive | Up | 8x 01 06 01 VV WW 03 01 FF | VV: Pan speed setting 0x01 (low speed) to 0x18 (high speed)<br>WW: Tilt speed setting 0x01 (low speed) to 0x18 (high speed) |
| | 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 | |
| | Home | 8x 01 06 04 FF | |
| | Reset | 8x 01 06 05 FF | |
| CAM_WDR | On | 8x 01 04 3D 02 FF | Wdr ON/OFF |
| | Off | 8x 01 04 3D 03 FF | |
| CAM_MenuEnter | | 8x 01 7E 01 02 00 01 FF | Enter Submenu |
| Tally Lamp | ON (Red) | 8x 01 7E 01 0A 00 02 FF | |
| | OFF | 8x 01 7E 01 0A 00 03 FF | |
| | ON (Amber) | 8x 01 7E 01 0A 00 04 FF | |
| | ON (Green) | 8x 01 7E 01 0A 00 05 FF | |
| Freeze | Freeze On | 81 01 04 62 02 FF | Freeze On Immediately |
| | Freeze Off | 81 01 04 62 03 FF | Freeze Off Immediately |
| | Preset Freeze On | 81 01 04 62 22 FF | Freeze On When Running Preset |
| | Preset Freeze Off | 81 01 04 62 23 FF | Freeze Off When Running Preset |
| Auto Tracking | On | 8x 01 04 7D 02 FF | Auto tracking ON/OFF |
| | Off | 8x 01 04 7D 03 FF | |

| | | | |
|---|---|---|---|
| CAM_Memory Special | Set | 8x 01 04 3F 01 pp FF | **These are changeable depending on VISCA Customized Functions web setting:**<br>pp: 0x00 To 0xFF normal preset<br>pp: 0x5F => Turn on OSD menu<br>pp: 0xA0 => Full Body<br>pp: 0xA1 => Upper Body<br>pp: 0xA2 => Tracking Point<br>pp: 0xA3 => Switch<br>pp: 0xA4 => Presenter mode (supported in FW v25 or newer)<br>pp: 0xA5 => Zone mode (supported in FW v25 or newer)<br>pp: 0xA6 => Hybrid mode (supported in FW v35 or newer) |
| Absolute Position | Set | 8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | VV: Pan speed setting 0x01 (low speed) to 0x18 (high speed)<br>WW: Tilt speed setting 0x01 (low speed) to 0x18 (high speed)<br>YYYY: Pan Position<br>ZZZZ: Tilt Position |
| Absolute Position | Set | 8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | VV: Pan speed setting 0x01 (low speed) to 0x18 (high speed)<br>WW: Tilt speed setting 0x01 (low speed) to 0x18 (high speed)<br>YYYY: Pan Position<br>ZZZZ: Tilt Position |
| Auto zoom | On | 8x 01 04 A0 02 FF | |
| | Off | 8x 01 04 A0 03 FF | |
| Effective Tracking area | On | 8x 01 04 A1 02 FF | |
| | Off | 8x 01 04 A1 03 FF | |
| RTMP | On | 8x 01 04 A2 02 FF | |
| | Off | 8x 01 04 A2 03 FF | |
| Video Mode | Standard | 8x 01 04 A3 00 FF | |
| | ZOOM | 8x 01 04 A3 01 FF | |
| | Teams | 8x 01 04 A3 02 FF | |
| | NDI | 8x 01 04 A3 03 FF | |
| Reboot | On | 8x 01 04 A4 FF | |
| Preset Affects PTZ & Focus Values Only | On | 8x 01 04 A5 02 FF | |
| | Off | 8x 01 04 A5 03 FF | |
| Relative Zoom Ratio | On | 8x 01 04 A6 02 FF | |
| | Off | 8x 01 04 A6 03 FF | |
| Auto Tilt | On | 8x 01 04 A7 02 FF | |
| | Off | 8x 01 04 A7 03 FF | |
| Auto Zoom/Title preset | Set | 8x 01 04 A8 pp FF | pp: 0x00 To 0xFF normal preset |
| Multi presenter | On | 8x 01 04 A9 02 FF | |
| | Off | 8x 01 04 A9 03 FF | |
| Multi presenter preset | Set | 8x 01 04 AA pp FF | pp: 0x00 To 0xFF normal preset |

| Inquiry Command | Command Packet | Reply Packet | Comments |
|---|---|---|---|
| CAM_PowerInq | 8x 09 04 00 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_WBModeInq | 8x 09 04 35 FF | y0 50 00 FF | Auto |
| | | y0 50 01 FF | In Door |
| | | y0 50 02 FF | Out Door |
| | | y0 50 03 FF | One Push WB |
| | | y0 50 04 FF | ATW |
| | | y0 50 05 FF | Manual |
| 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_GainPosInq | 8x 09 04 4C FF | y0 50 00 00 0p 0q FF | pq: Gain Position |
| CAM_BrightPosInq | 8x 09 04 4D FF | y0 50 00 00 0p 0q FF | pq: Bright Position |
| CAM_ExpCompPosInq | 8x 09 04 4E FF | y0 50 00 00 0p 0q FF | pq: ExpComp Position |
| CAM_FocusModeInq | 8x 09 04 38 FF | y0 50 02 FF | Auto Focus |
| | | y0 50 03 FF | Manual Focus |
| CAM_FocusPosInq | 8x 09 04 48 FF | y0 50 0p 0q 0r 0s FF | pqrs: Focus Position |
| zoom_Pos_Inq | 8x 09 04 47 FF | y0 50 0p 0q 0r 0s FF | pqrs: Zoom Position |
| PT_Pos_Inq | 8x 09 06 12 FF | y0 50 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF | YYYY: Pan Position 8A14 to 762C (CENTER 0000)<br>ZZZZ: Tilt Position 468B to E898 (Image Flip: OFF) (CENTER 0000) |
| CAM_Preset Inq | 8x 09 04 3F FF | y0 50 pp FF | Return the last preset number which has been operated pp:01-FF |
| CAM_Tracking status | 8x 09 36 69 02 FF | y0 50 01 FF | On |
| | | y0 50 00 FF | Off |
| CAM_Tracking_mode | 8x 09 36 69 01 FF | y0 50 01 FF | Presenter |
| | | y0 50 02 FF | Zone |
| | | y0 50 03 FF | Hybrid |
| CAM_Tracking body size | 8x 09 36 69 03 FF | y0 50 01 FF | Full body |
| | | y0 50 02 FF | Upper body |
| CAM_OSD MENU on/off | 8x 09 7E 04 76 01 FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_Tally | 8x 09 7E 01 0A FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_WDR mode | 8x 09 04 3D FF | y0 50 02 FF | On |
| | | y0 50 03 FF | Off |
| CAM_BLC mode | 8x 09 04 33 FF | y0 50 02 FF | On |

| | | | |
|---|---|---|---|
| | | y0 50 03 FF | Off |
| CAM_Live Freeze | 8x 09 04 62 01 FF | y0 50 02 FF | Freeze On |
| | | y0 50 03 FF | Freeze Off |
| CAM_Preset Freeze | 8x 09 04 62 02 FF | y0 50 02 FF | Preset Freeze On |
| | | y0 50 03 FF | Preset Freeze Off |
| Firmware version | 8x 09 36 69 04 FF | y0 50 0p 0q 0r 0s 0t 0u 0v 0w FF | fw_ver: p.q.rstu.vw |
| USB Status | 8x 09 36 69 05 FF | y0 50 00 FF | USB cable plug out |
| | | y0 50 01 FF | USB cable plug in |
| UVC Status | 8x 09 36 69 06 FF | y0 50 00 FF | UVC stream off |
| | | y0 50 01 FF | UVC stream on |

# Visca over IP Settings

VISCA over IP

PORT

| | |
|---|---|
| Internet protocol | IPv4 |
| Transport protocol | UDP |
| Port address | 52381 |

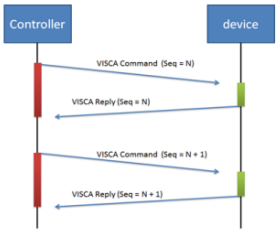
FORMAT

| | byte 0 | byte 1 | byte 2 | byte 3 | byte 4 | byte 5 | byte 6 | byte 7 | byte8 ~~~~ byte23 |
|---|---|---|---|---|---|---|---|---|---|
| func | Payload type | | Payload length | | Sequence number | | | | Payload (1 to 16 bytes) |
| data | Value1 | Value2 | 1~16 (0x0001~0x0010) | | 0X00000000 ~ 0XFFFFFFFF | | | | VISCA Packet (see page VISCA) |

Payload type

| Name | Value1 | Value2 | Description |
|---|---|---|---|
| VISCA command | 0x01 | 0x00 | Stores the VISCA command. |
| VISCA inquiry | 0x01 | 0x10 | Stores the VISCA inquiry. |
| VISCA reply | 0x01 | 0x11 | Stores the reply for the VISCA command or VISCA inquiry |

Sequence number




Sequence number = N

# CGI Command

| CGI List for Video Transmission | | | | | |
|---|---|---|---|---|---|
| CGI Item name | URL | Command | Parameter Name | Parameter value | Description |
| Get JPEG | /snapshot | | | | 1280x720 jpg |
| Get RTSP stream | rtsp://ip/live_st1 | | | | |
| CGI List for Camera Control | | | | | |
| CGI item name | URL | Command | Parameter Name | Parameter value | Description |
| up start | /cgi-bin?SetPtzf= | 1,0,1&(random) | | | |
| up end | /cgi-bin?SetPtzf= | 1,0,2&(random) | | | |
| down start | /cgi-bin?SetPtzf= | 1,1,1&(random) | | | |
| down end | /cgi-bin?SetPtzf= | 1,1,2&(random) | | | |
| left start | /cgi-bin?SetPtzf= | 0,1,1&(random) | | | |
| left end | /cgi-bin?SetPtzf= | 0,1,2&(random) | | | |
| right start | /cgi-bin?SetPtzf= | 0,0,1&(random) | | | |
| right end | /cgi-bin?SetPtzf= | 0,0,2&(random) | | | |
| zoom_in start | /cgi-bin?SetPtzf= | 2,0,1&(random) | | | |
| zoom_in end | /cgi-bin?SetPtzf= | 2,0,2&(random) | | | |
| zoom_out start | /cgi-bin?SetPtzf= | 2,1,1&(random) | | | |
| zoom_out end | /cgi-bin?SetPtzf= | 2,1,2&(random) | | | |
| set preset: | /cgi-bin?ActPreset= | 1,N&(random) | | | N : position |
| load preset: | /cgi-bin?ActPreset= | 0,N&(random) | | | N : position |
| set preset speed | /cgi-bin?Set=preset_speed,3,val | val: {min: 1, max: 6} | | | |
| Absolute Position (Pan) | /cgi-bin?Set=ptz_p,3,val | val: {min: 2048, mid: 962944, max: 1925888} | | | Follows CGI preset speed |
| Absolute Position (Tilt) | /cgi-bin?Set=ptz_t,3,val | val: {min: 2048, mid: 165696, max: 662784} | | | Follows CGI preset speed |
| Absolute Position (Zoom) | /cgi-bin?Set=ptz_z,3,val | val: {min: 2048, mid: 14224, max: 28448} | | | Follows CGI preset speed |
| Flip on | /cgi-bin?Set=img_flip,3,1 | | | | |
| Flip off | /cgi-bin?Set=img_flip,3,0 | | | | |
| Set video mode | /cgi -bin?Set=sys_vdo_mode,3,val | val: { 0 : usb + stream 1 : usb only 2 : stream only 3 : NDI } | | | |
| CGI List for Various Settings | | | | | |
| exposure value | /cgi-bin?Set= | img_expo_expo,3,N&(random) | value | 1 ~ 9 | N : value |

| | | | | | |
|---|---|---|---|---|---|
| saturation | /cgi-bin?Set= | img_saturation,3,N&(random) | value | 0 ~ 10 | N : value |
| contrast | /cgi-bin?Set= | img_contrast,3,N&(random) | value | 0 ~ 4 | N : value |
| Tracking on: | /cgi-bin?Set= | trk_tracking_on,3,1 | | | |
| Tracking off: | /cgi-bin?Set= | trk_tracking_on,3,0 | | | |
| Reboot | GET(Basic Authentication) | /cgi-bin?OnePush=! | | | |
| Factory Reset | GET(Basic Authentication) | /cgi-bin?OnePush=d | | | |
| Mode Presenter | | /cgi-bin?Set=trk_mode,3,1&X | value | random number | X : value |
| Mode Zone | | /cgi-bin?Set=trk_mode,3,2&X | value | random number | X : value |
| Mode Hybrid | | /cgi-bin?Set=trk_mode,3,3&X | | | |
| Mode Get | GET(Basic Authentication) | /cgi-bin?Get=trk_mode,3&_=X | - Reply | Presenter<br>trk_mode,3=1<br>Zone<br>trk_mode,3=2<br>Hybrid<br>trk_mode,3=3 | X : value |
| Click Track ON | GET(Basic Authentication) | /cgi-bin?Set=trk_update_detect,3,1 | | | |
| Click Track OFF | GET(Basic Authentication) | /cgi-bin?Set=trk_update_detect,3,0 | | | |
| Click Track<br>Get detect zone (Humanoid outlines) number | GET(Basic Authentication) | /cgi-bin?Get=trk_detect_num,3 | | | Need to be sent along with Click Track ON command |
| | - Reply | "trk_detect_num,3=X\r\n" | X: The amount of humanoid outlines, maximum: 50 | | |
| Click Track<br>Get detect zone (Humanoid outlines) info | GET(Basic Authentication) | /cgi-bin?GetTrackingDetectZone=X | X: The amount of humanoid outlines, maximum: 50 | | |
| | - Reply | "focus:-1\nzone[00]:00,119,720,960\nzone[01]:-1502615204,-1366225632,01,-1366223544" | focus - The number of humanoid outline being tracked.<br>zone[NN]:x,y,w,h - based on 1080P resolution | The upper left corner of the screen is the coordinate reference (0,0), x-coordinate/y-coordinate/w width/h height, based on the upper left corner of the humanoid outline.<br>The number following indicates the number of the tracked person, for example, -1 means that no one is being tracked. | |

| | | | | | |
|---|---|---|---|---|---|
| | | | | If one of the three is being tracked, one of 0, 1 and 2 will appear after the 'focus'. | |
| Click Track<br>Set target zone | GET(Basic Authentication) | /cgi-bin?Set=trk_assign_zone,3,X | X: The number of the human outlines | | |
| | - Reply | http response: ok | | | |
| | GET(Basic Authentication) | /cgi-bin?SetString=TrackingFocusZone,[x,y,w,h] | | | |
| | - Reply | http response: ok | | | |
| Tracking On/Off Get | GET(Basic Authentication) | /cgi-bin?Get=trk_tracking_on,3&_=X | - Reply | On<br>trk_tracking_on,3=1<br>Off<br>trk_tracking_on,3=0" | X : value |
| RTMP Start streamming | /cgi-bin?Set= | vdo_rtmp_enable,3,1 | | | |
| RTMP Stop streamming | /cgi-bin?Set= | vdo_rtmp_enable,3,0 | | | |
| USB status | GET(Basic Authentication) | /cgi-bin?Get=usb_status_inquire,3 | | | |
| | - Reply | "usb_status_inquire,3=X\r\n" | X: 0(plug out), 1(plug in) | | |
| UVC status | GET(Basic Authentication) | /cgi-bin?Get=uvc_status_inquire,3 | | | |
| | - Reply | "uvc_status_inquire,3=X\r\n" | X: 0(stream off), 1(stream on) | | |
| Status get (Modle name & mac & FW_VER) | | /cgi-bin?GetString=sys_name&net_mac&sys_fw_version&_=1635216271678 | | http://10.100.105.110/cgi-bin?GetString=sys_name&net_mac&sys_fw_version&_=1635216271678 | |
| Serial No. get | | /cgi-bin?GetSerialNumber&_=1635216271680 | | http://10.100.105.110/cgi-bin?GetSerialNumber&_=1635216271680 | |
| script<br>(Using cURL to update firmware) | curl.exe -X POST --user NAME:PASSWORD -F file1=@./ISP_FILE "http://IP_ADDRESS/system/" | | | Please download curl (curl for Windows), this is a command line tool for network transferring. Put curl.exe and ISP file in the same folder. and then execute the script to upgrade camera.<br><br>For example, ISP file is 0. 0.0000.29.dat , IP address is 10.100.105.109 and username:password is 1:1 , you can enter this script to execute ISP process. | |

| | | | | | |
|---|---|---|---|---|---|
| | | | | curl.exe -X POST --user 1:1 -F file1=@./0.0.0000.29.dat "http://10.100.105.109/system/" | |

# Pelco P Command

PTC300V2 Pelco-P command

| PAN AND TILT COMMANDS | P/T bit(byte4.0) = 0 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | byte 1 | byte 2 | byte 3 | byte 4 | byte 5 | byte 6 | byte 7 | byte 8 |
| func | STX | ADDR | data1 | data2 | data3 | data4 | ETX | checksum |
| data | 0xA0 | 0~7F | cmd 1 | cmd 2 | Pan speed | Tilt speed | 0xAF | 1~7 XOR |
| | | | | | | note : speed = 0x00~0x30 | | |

byte3 : command 1

| bit 7 | bit 6 | bit 5 | bit 4 | bit 3 | bit 2 | bit 1 | bit 0 |
|---|---|---|---|---|---|---|---|
| NA | CAM ON | NA | CAM ON/OFF | NA | NA | NA | NA |
| | | | | note : power off : byte3.6 = 0 & byte3.4 = 1 | | | |

byte4: command 2

| bit 7 | bit 6 | bit 5 | bit 4 | bit 3 | bit 2 | bit 1 | bit 0 |
|---|---|---|---|---|---|---|---|
| NA | ZOOM Wide | ZOOM Tele | TILT Down | TILT Up | PAN Left | PAN Right | P/T bit 0(always) |

| EXTENDED COMMAND SET | P/T bit(byte4.0) = 1 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | byte 1 | byte 2 | byte 3 | byte 4 | byte 5 | byte 6 | byte 7 | byte 8 |
| func | STX | ADDR | data1 | data2 | data3 | data4 | ETX | checksum |
| Set Preset XX | 0xA0 | 0~7 | 0x00 | 0x03 | 0x00 | Preset # | 0xAF | 1~7 XOR |
| Go To Preset XX | 0xA0 | 0~7 | 0x00 | 0x07 | 0x00 | Preset # | 0xAF | 1~7 XOR |
| Track ON | 0xA0 | 0~7 | 0x00 | 0x65 | 0x00 | 0x00 | 0xAF | 1~7 XOR |
| Track OFF | 0xA0 | 0~7 | 0x00 | 0x67 | 0x00 | 0x00 | 0xAF | 1~7 XOR |
| | | | | | | note : Preset # : 0x01 ~ 0xFF<br>Profile # : 0x01 ~ 0x05 | | |

# Pelco D Command

pelco d command

PAN AND TILT COMMANDS — P/T bit(byte4.0) = 0

| | byte 1 | byte 2 | byte 3 | byte 4 | byte 5 | byte 6 | byte 7 |
|---|---|---|---|---|---|---|---|
| func | SYNC | ADDR | cmd 1 | cmd 2 | data1 | data2 | checksum |
| data | 0xFF | 1~80 | cmd 1 | cmd 2 | Pan speed | Tilt speed | 2~6 SUM |

note : speed = 0x00~0x30

byte3 : command 1

| bit 7 | bit 6 | bit 5 | bit 4 | bit 3 | bit 2 | bit 1 | bit 0 |
|---|---|---|---|---|---|---|---|
| SENSE ON | NA | NA | NA | CAM ON/OFF | NA | NA | NA |

note : power off : byte3.7 = 0 & byte3.3 = 1

byte4: command 2

| bit 7 | bit 6 | bit 5 | bit 4 | bit 3 | bit 2 | bit 1 | bit 0 |
|---|---|---|---|---|---|---|---|
| NA | ZOOM Wide | ZOOM Tele | TILT Down | TILT Up | PAN Left | PAN Right | P/T bit 0(always) |

EXTENDED COMMAND SET — P/T bit(byte4.0) = 1

| | byte 1 | byte 2 | byte 3 | byte 4 | byte 5 | byte 6 | byte 7 |
|---|---|---|---|---|---|---|---|
| func | SYNC | ADDR | data1 | data2 | data3 | data4 | checksum |
| Set Preset XX | 0xFF | 1~8 | 0x00 | 0x03 | 0x00 | Preset # | 2~6 SUM |
| Go To Preset XX | 0xFF | 1~8 | 0x00 | 0x07 | 0x00 | Preset # | 2~6 SUM |
| Track ON | 0xFF | 1~8 | 0x00 | 0x65 | 0x00 | 0x00 | 2~6 SUM |
| Track OFF | 0xFF | 1~8 | 0x00 | 0x67 | 0x00 | 0x00 | 2~6 SUM |

note : Preset # : 0x01 ~ 0xFF

Example:
Camera Address: 1
Pan Left at high speed: FF 01 00 04 3F 00 44
Pan Right at medium speed: FF 01 00 02 20 00 23
Tilt Up at high speed: FF 01 00 08 00 3F 48
Tilt Down at medium speed: FF 01 00 10 20 00 31
Stop all actions (Pan / Tilt / Zoom / Iris etc.): FF 01 00 00 00 00 01