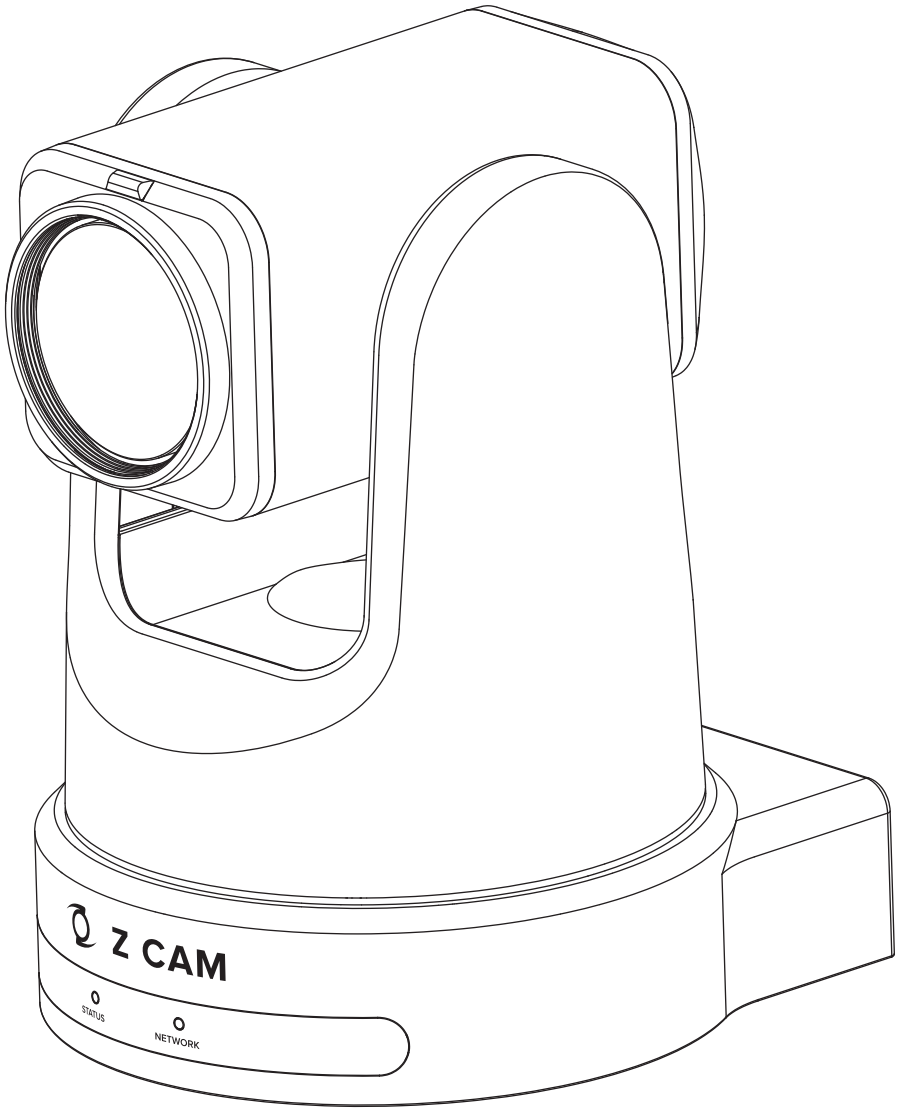
Z CAM®



Z CAM P2-R1

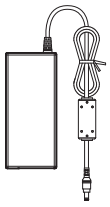
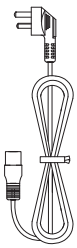
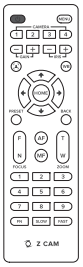
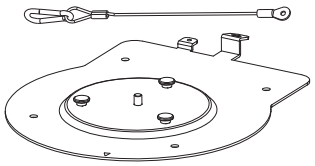
Professional PTZ Camera

User Manual

DRAFT

For the purpose of simplifying the explanation, this manual will refer to both the Z CAM P2-R1 and the Z CAM P2-R1N (version with NDI HX3 license) collectively as the Z CAM P2-R1.

In Box Accessories

AC-DC Power Adapter	AC Cable	IR Remote Controller	Ceiling Mount Bracket
			

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Preface

Please read this document carefully in order to understand the Z CAM P2-R1 (hereinafter referred to as Product) and use it reasonably. Refer to the official website (www.z-cam.com) for the latest version of this document and updated product information.
Please contact Shenzhen ImagineVision Technology Limited (hereinafter referred to as ImagineVision) or its authorized distributor/resellers, in case of any product queries about installation or operation.

Safety Guideline

Please read and follow this Safety Guideline and all the terms associated to this Product carefully, to know your legal rights, responsibilities, and safety instructions, otherwise, it may result in product damages, safety accidents and personal injuries. By using this Product, you hereby signify that you have read, understood, acknowledged and accepted this Safety Guideline and all the terms and conditions associated with this Product, and assume responsibility for any behaviors or consequences. You undertake to use this Product on normal and reasonable purpose, and agree to this Guide-line and all the terms and conditions associated with this Product, as added, reduced, amended, modified made by ImagineVision from time to time.
ImagineVision provides no expressed or implied guarantee in relation to this Product, assumes no loss or legal responsibility raised from misuse of this Product contrary to this Safety Guideline and the terms associated to this Product, accepts no indirect, consequent, punitive, occasional, special, criminal-punitive loss or legal responsibility. Under any circumstances, the total liability of ImagineVision shall NOT exceed the price paid by you to ImagineVision for the product.

⚠ Safety Warning

1. Always ensure that the product is installed and stored out of reach of children.
2. To prevent injury, please securely fasten this device to the ceiling or wall according to the installation instructions.
3. This camera is intended for use only with the mounting bracket included with the device. Using other brackets may lead to instability and potential injury.
4. Installation should be carried out only by qualified personnel. Improper installation could result in the device falling and causing injury.
5. To reduce the risk of fire or electric shock, ensure that the mounting screws do not come into contact with electrical wiring within the wall during installation.
6. Do not install the unit in areas with prolonged direct sunlight or near cooling or heating devices to prevent deformation, discoloration, malfunction, or operational issues.
7. Ensure the unit is not subjected to water splashes or sprays to avoid damage.
8. Avoid installing the camera in corrosive environments.
9. Use the unit only in an upright position, avoid placing it on its side or at an angle.

Disclaimer

All product features and technical specifications stated are subject to the sole interpretation and explanation of Shenzhen ImagineVision Technology Limited, and subject to change without notice.

Contents

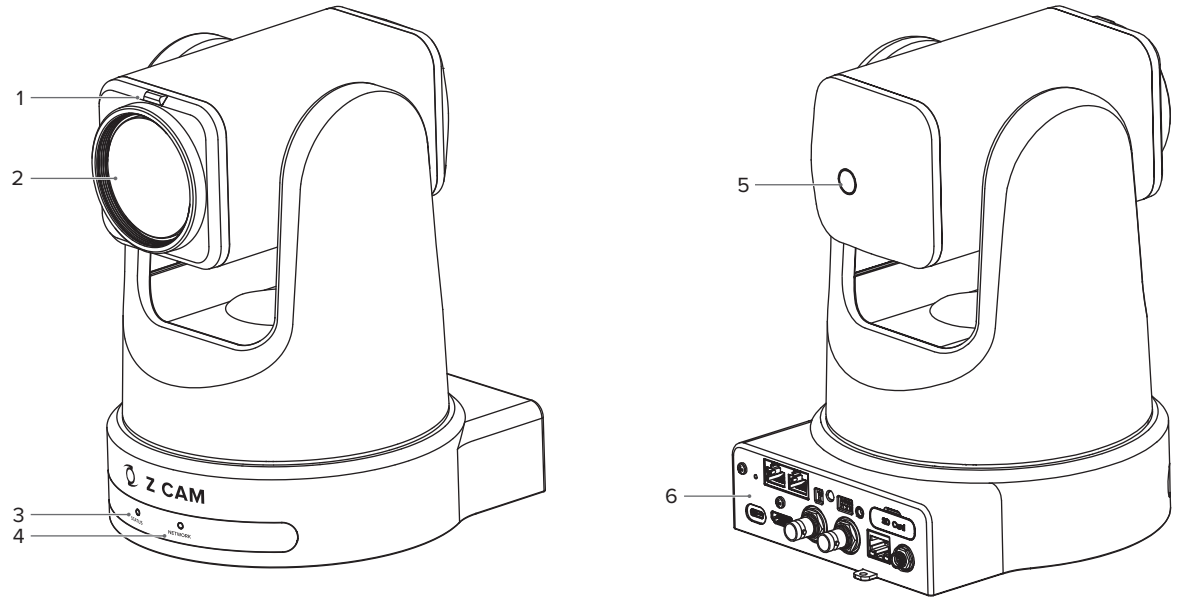
Key Specs

Image Sensor	1/1.3" CMOS sensor
Sensor Resolution	Effective: 48 MP
Shutter Speed	1/8000 ~ 1 second
Optical Zoom Ratio	18x
Max Digital Zoom	36x (in 1080p)
External Recording Modes	HDMI UHD 4K (3840 x 2160) at 23.98/24/25/29.97/50/59.94 fps HD (1920 x 1080p) at 23.98/24/25/29.97/50/59.94 fps HD (1920 x 1080i) at 50/59.94 fps SDI / BNC HD (1920 x 1080p) at 23.98/24/25/29.97/50/59.94 fps HD (1920 x 1080i) at 50/59.94 fps RJ45 / USB UHD 4K (3840 x 2160) at 24/25/29.97/50/59.94 fps HD (1920 x 1080p) at 24/25/29.97/50/59.94 fps
Audio Recording	3.5 mm TRS (Mic in / Line in)
Broadcast Output	NTSC / PAL
IP Streaming	H.264, H.265, RTMP, RTMPS, RTSP, SRT, SSP, UVC, NDI_HX3* UHD 4K (3840 x 2160) at 24/25/29.97/50/59.94 fps HD (1920 x 1080p) at 24/25/29.97/50/59.94 fps
Supported Control Protocols	IR, NDI HX3*, VISCA over RS-422, VISCA over IP, Web Client, UVC
PoE Support	PoE+ 802.3at
FreeD	Yes
AI Auto-Framing	Yes

** NDI HX3 require the selection of the Z CAM P2-R1N model.*

Overview

Z CAM P2-R1 camera body



1. Front Tally Light

The Auto Framing function and external control (via HTTP, NDI, or VISCA protocols) can change the status of the front and rear Tally lights.

After enabling Auto Framing, the status of the front and rear Tally lights is as follows:

· When the camera is in the "Detecting" or "Lost" state, the front and rear Tally lights will flash green.

· When the camera "Tracking" the target, the front and rear Tally lights will stay on with a green light. During the activation of the auto-tracking function, it will have exclusive control over the green lights, and at this time, external control (HTTP, NDI, or VISCA) will not be able to affect the status of the green lights.

2. Lens

18x optical zoom lens, with maximum digital zoom up to 36x (in 1080p).

3. Status Indicator

4. Network Indicator

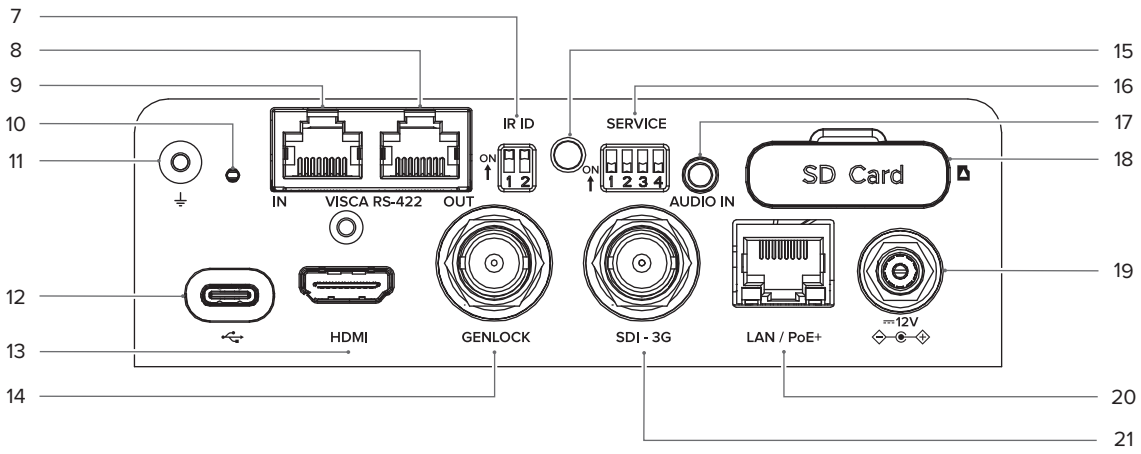
Status Indicator [3]	**Network Indicator [4]**	**Describe**
Green (breathing)	Off	Booting Up
Green (constant on)	-	Fully Booted
-	Green (flash twice)	Received Corresponding ID IR Command
-	Orange (flash twice)	Received Non-Corresponding ID IR Command
Orange (constant on)	Off	Standby
Red (rapid flash)	-	Exception
Green (flashing)	Off	Upgrading
-	Green	Network Connected
-	Orange	No Network
Red (constant on)	-	Recording
Red (slow flash)	-	SD Card Full/SD Card Exception

5. Rear Tally Light

Synchronize with [1] Front Tally Light.

6. Interfaces

Z CAM P2-R1 camera interfaces [6]



7. Infrared ID Switch

When operating multiple camera units with one IR remote controller, set the camera IR ID.

CAM 1	CAM 2	CAM 3	CAM 4
IR ID	IR ID	IR ID	IR ID
			

8. VISCA RS-422 Output

Use the joystick controller (not supplied) for connection.
When connecting multiple camera units, please connect it to the VISCA RS-422 Input terminal of the next camera unit in the daisy chain connection.

9. VISCA RS-422 Input

Use the joystick controller (not supplied) for connection.
When connecting multiple camera units, please connect it to the VISCA RS-422 Output terminal of the previous camera unit in the daisy chain connection.

10. Reset

Initialize network settings.
Press and hold this button with a pen point or similar tool for 5 seconds or longer to complete the reset.

11. Ground Screw Hole

12. USB Type-C

USB 3.0 Type C for mass storage or USB camera.

13. HDMI Output

HDMI video output port.

14. Genlock Input

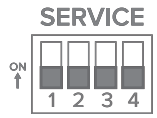
Synchronize video signals with other video sources or display devices.

15. Infrared Receiver

IR remote controller signal receiver.

16. Service Switch (currently unavailable)

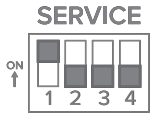
Configure the switch settings before powering up the camera unit.



Switch	Function	Factory settings
SW 1	Initialize and set the initial switch (refer to the instructions in "Initialization 1", "Initialization 2", and "Direct Start Mode").	OFF
SW 2		OFF
SW 3		OFF
SW 4		OFF

Initialization 1

- Reset the network connection's user authentication settings and host authentication settings. This will delete all registered user information (ID/password) and host information (IP address).
- Set the service switch according to the diagram below, and then power on the camera unit.



- Once the initialization is complete, the [3] status indicator light of the camera units will flash green. Return the service switch to its original position (set all SW1-4 to Off), and then restart the camera unit.

Initialization 2

- The camera units will be reset to their factory settings as when they were purchased. All camera menu settings and network settings will be reset.
- Set the service switch according to the diagram below, and then power on the camera unit.

- Once the initialization is complete, the [3] status indicator light of the camera units will flash green. Return the service switch to its original position (set all SW1-4 to Off), and then restart the camera unit.

Direct Start Mode

- When powering on the camera unit, the pan-tilt head will not return to the horizontal position as part of the lens initialization process. This feature is used when the camera unit is installed in a confined space where the tilt cannot be returned to the horizontal position.

- This may result in slight changes to the tracking performance.

17. Audio Input

3.5mm TRS stereo mic/line input.

18. SD Card

SD (4K 60fps max, H.265, 8-bit color)

19. DC 12V Input

Connect the AC - DC power adapter.

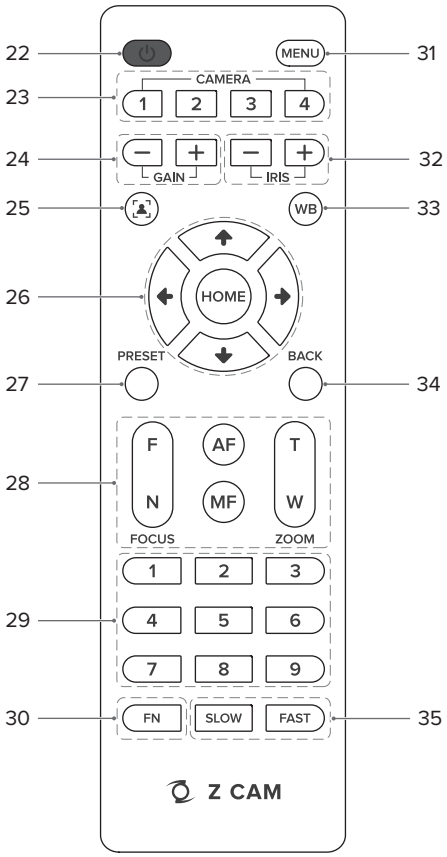
20. LAN/PoE+

Network communication and PoE+* power supply are provided through the network cable (Category 5e or higher, shielded twisted pair).
For more information on connections, please refer to the instruction manual of the PoE power supply device.
(*PoE+: Acronym for Power over Ethernet Plus, compliant with IEEE802.3at)

21. 3G SDI Output

3G-SDI video signal output port.

IR remote controller (supplied)



22. Power Button

Pressing the Power button can turn on the power or put the camera into standby mode.

23. Camera Select Buttons

Press the button corresponding to the camera unit you wish to operate with the IR remote controller. You can set the camera unit number using the IR ID switch located on the back of the camera.

<Note>
- If two or more camera units are adjacent and have the same IR ID, you can operate them simultaneously using the infrared remote control. Otherwise, when cameras are installed close to each other, please set different IR IDs.

24. Gain Buttons

Use for sensitivity adjustment.

25. Auto Tracking Button

Enable/Disable Auto-Tracking Feature.

26. Pan-Tilt Buttons

Pressing the arrow buttons allows the camera unit to pan or tilt, pressing the HOME button allows the camera unit to return to facing forward.

When the menu is displayed, use ↑ or ↓ to select menu items, and use ← or → to change setting values, use the HOME button to display the menu for the selected item.

When the main menu is displayed, you can press the HOME button to display the menu for the selected settings.

27. Preset Button

Hold down the PRESET button and press position buttons 1 to 9 to save the pan/tilt angles, zoom, focus, and other settings of the camera unit.

28. Focus & Zoom Buttons

Press the F side (Far) of the Focus button to focus on distant objects, and press the N side (Near) to focus on nearby objects.
Press the AF button (Auto Focus) to activate the autofocus function, and press the MF button (Manual Focus) to activate the manual focus function.
Press the T side (Telephoto) of the Zoom button to zoom in, and press the W side (Wide) to zoom out.

29. Position Buttons

Used in conjunction with the PRESET button for preset position storage.

30. FN Button

Custom fuction button, set in the menu.

31. Menu Button

Long press to enter the menu.

32. IRIS Button

Use for aperture adjustment.

33. WB Button

Use for white balance adjustment.

34. Back Button

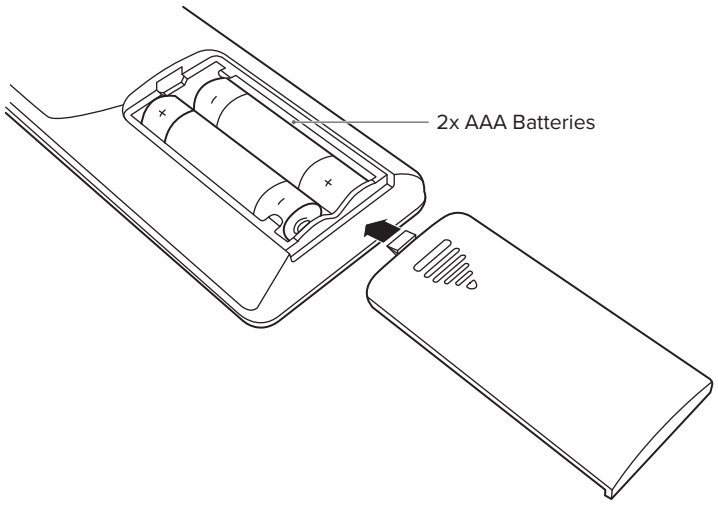
Use for navigate back in the menu.

35. Zoom Speed Button

Press the SLOW button to zoom slowly, and press the FAST button to zoom quickly.

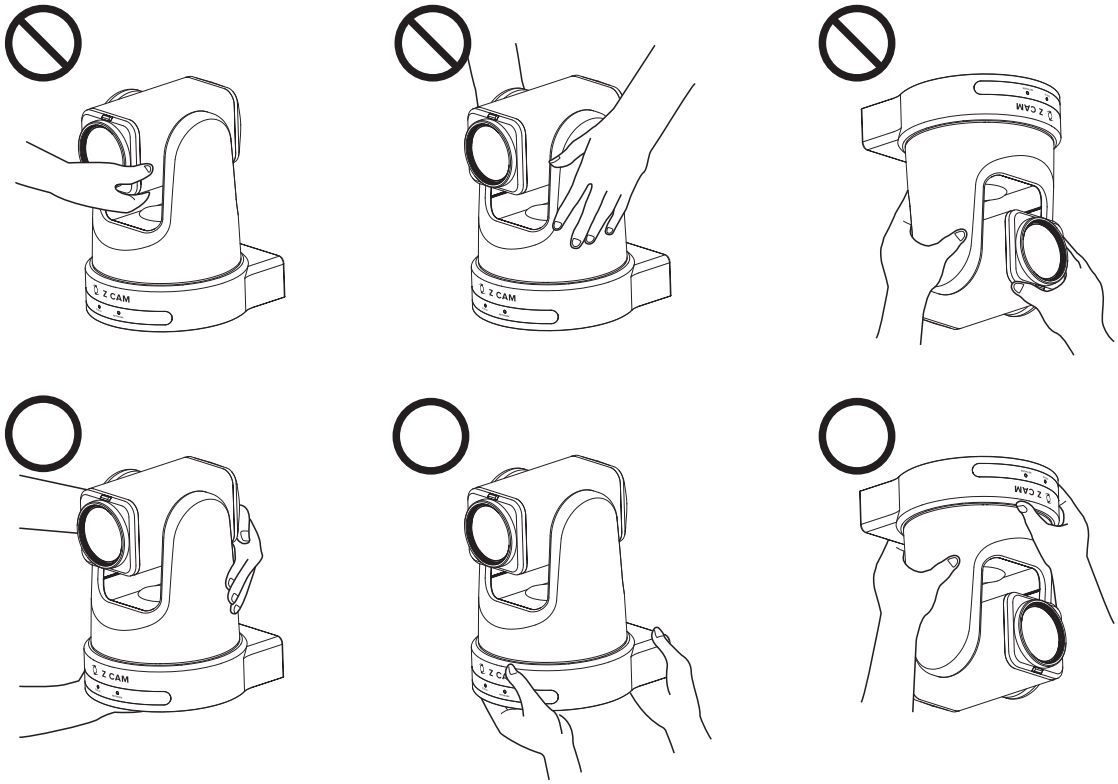
Installing Batteries

- IR Remote Controller requires two AAA batteries.
- Batteries are not supplied.
- When handling batteries, must comply with the laws of the relevant region or country.



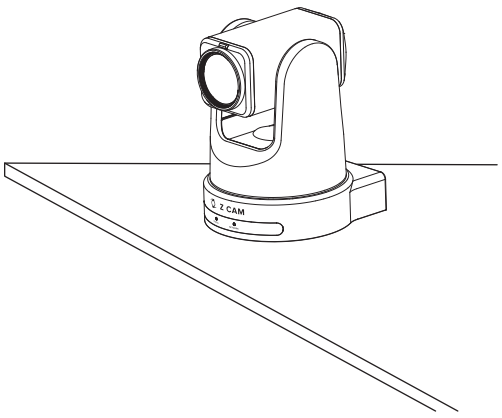
Installtion

<Note>
- Do not directly grasp the camera head when carrying the camera.
- During installation, refrain from holding the camera head to prevent potential malfunctions.



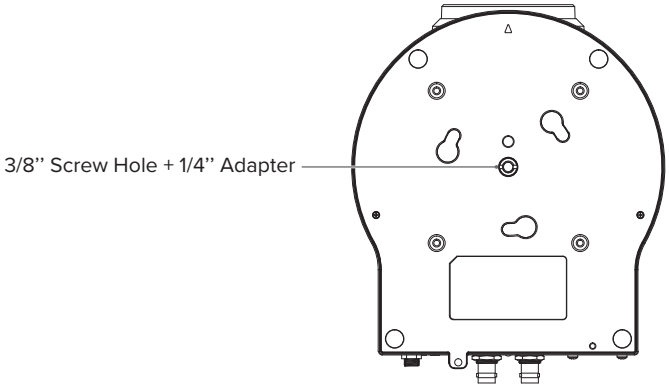
Placing the camera on a desk

<Note>
- Ensure the camera is placed on a flat and stable surface.
- If the camera must be placed on a slope, make sure the angle of inclination is no more than ±15 degrees and take appropriate measures to secure it to maintain its pan/tilt capabilities.
- Avoid pulling on the connected cables to prevent equipment from falling or causing personal injury.

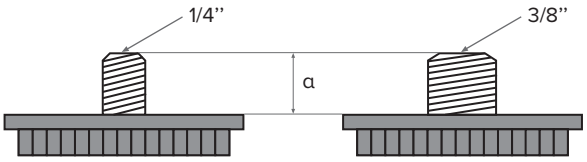


Mounting the camera on a tripod

The camera bottom is equipped with a 3/8 inch screw hole and a 1/4 inch adapter, which can seamlessly fit a 1/4 inch tripod screw. If you need to adapt to a tripod screw of 3/8 inch size, simply unscrew the 1/4 inch adapter with a flathead screwdriver.



The tripod screw should be compliant with the following standards.



a = 4.5 to 8 mm / 0.18 to 0.32 inch

<Caution>

- The tripod should be placed on a flat surface, and should not be installed on ceilings, shelves, or other high places to prevent the risk of falling.

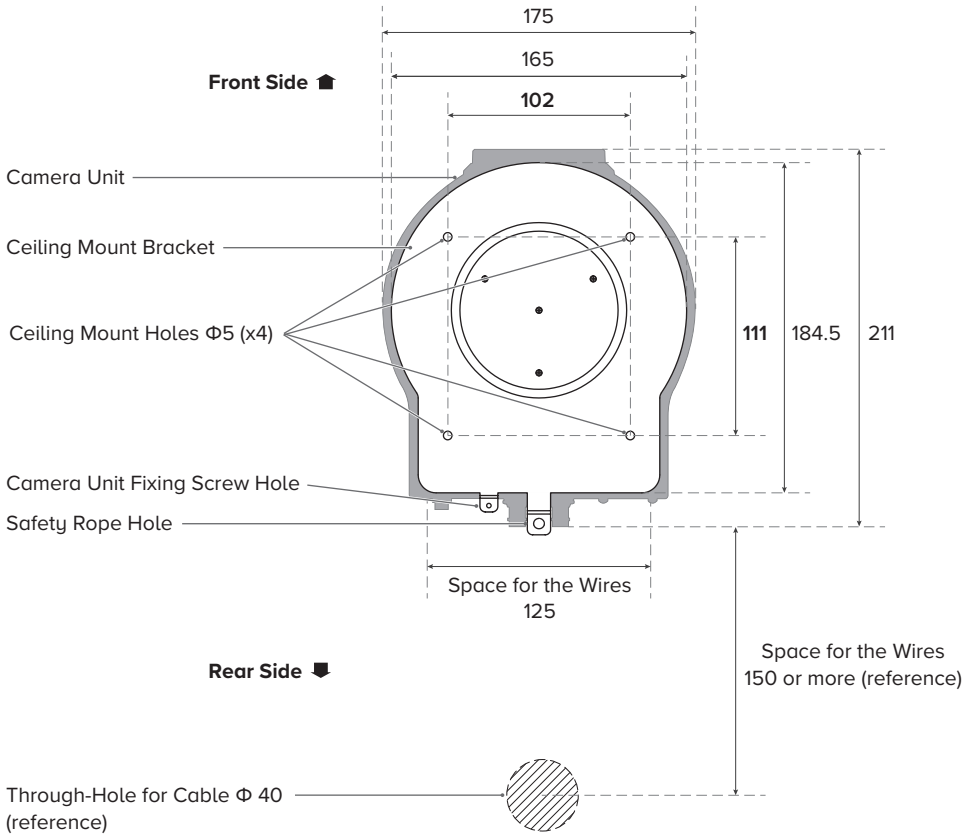
Installing the camera on the ceiling

Use the included Ceiling Mount Bracket to install the camera to the ceiling or other overhead surface.

<Note>
- For installations at high locations such as ceilings, it is recommended to have professional installers perform the task.
- Ensure that the surface where the camera is installed remains horizontal. If it is necessary to mount the camera on an inclined surface, make sure the angle does not exceed 15 degrees.
- Verify that the ceiling's strength is sufficient to support a weight significantly greater than that of the camera.

1. Check the installing space.

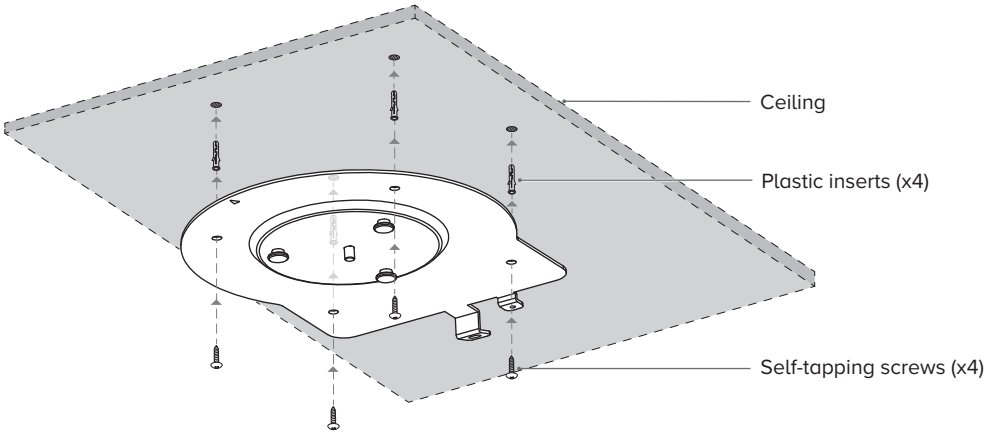
Refer to the diagram to determine the installation location of the device, taking into account the required space for the device itself as well as the necessary clearance for cable management.



Unit: mm

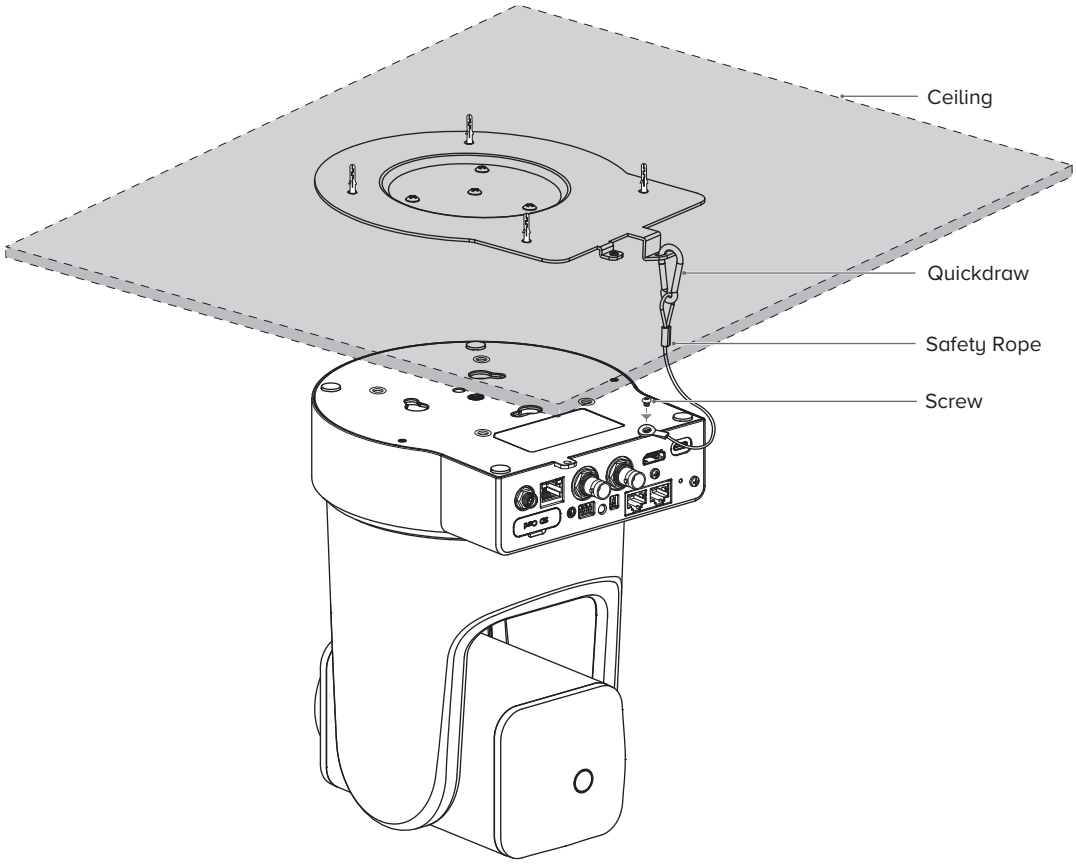
<Note>
- Inspect the installation space. Refer to the illustration to determine the installation location and direction of the device. Consider the area where the device will be installed and allow space for the wires extending from its rear panel.
- Before proceeding with the installation and connecting the host, first connect the LAN cable, HDMI cable, etc., in the space above the ceiling panel, and then thread the cables through the cable hole.

2. Mount the ceiling mount bracket.
After drilling four holes in the ceiling, knock the plastic inserts (not supplied) into the holes, then fix the bracket to the ceiling with self-tapping screws (not supplied) and make sure the screws are securely tightened.



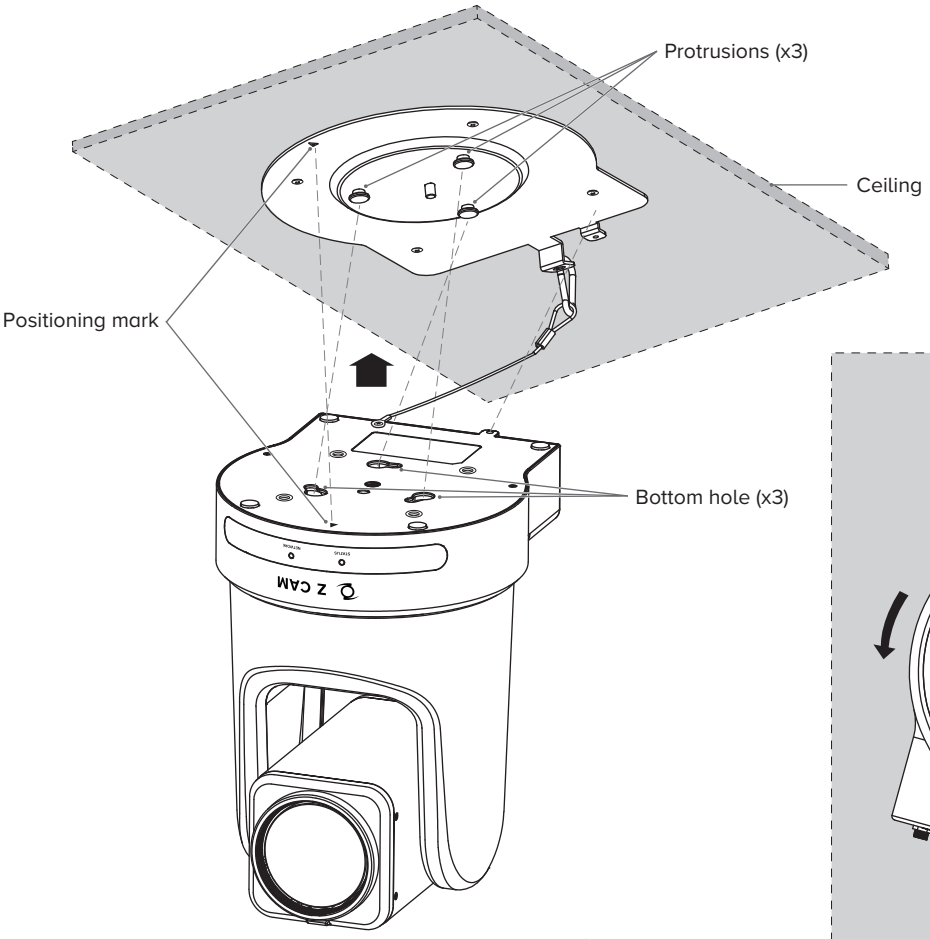
<Note>
Ceiling mount brackets come with only small cross-head screws and nuts. When installing, consult with professional installers to ensure the correct choice of connectors and adherence to proper installation procedures.

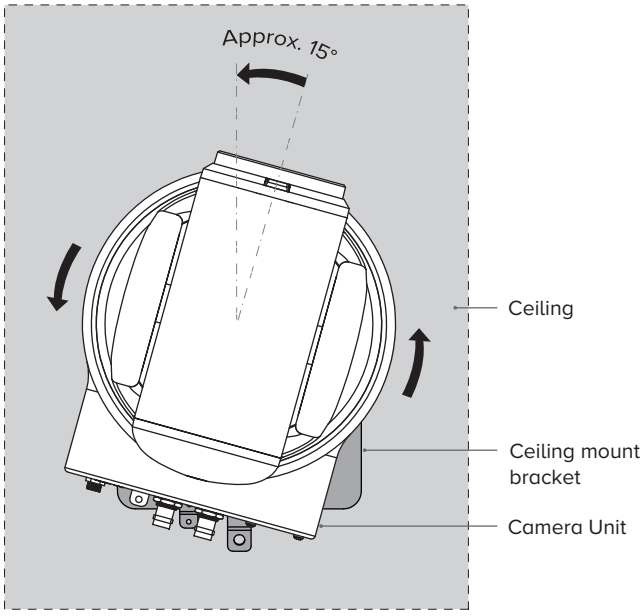
3. Attach the safety rope.
Screw one end of the safety rope (supplied) to the camera unit and connect the other end to the ceiling mount bracket via quickdraw, making sure both ends of the safety wire are securely connected.



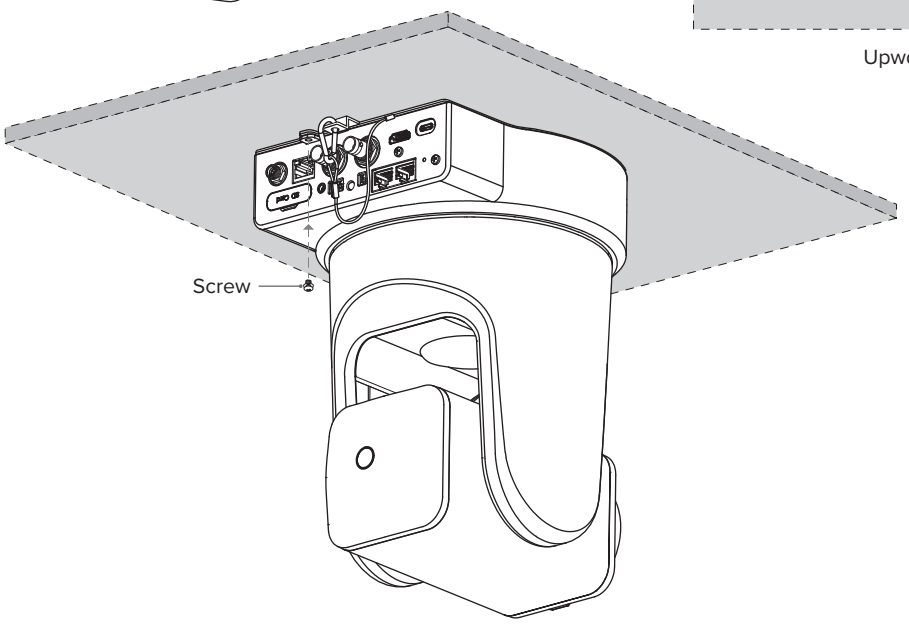
4. Mount the camera unit.

- Align the ▲ mark on the bottom of the camera unit with the ▲ mark on the Ceiling Mount Bracket.
- Align the holes on the bottom of the camera unit with the protrusions on the ceiling mount bracket.
- Gently push the camera unit upwards until you feel it snap into place.
- Rotate the camera unit counterclockwise by approximately 15 degrees; at this point, the camera unit should be locked in place.
- Use the included screws to secure the camera unit to the Ceiling Mount Bracket.



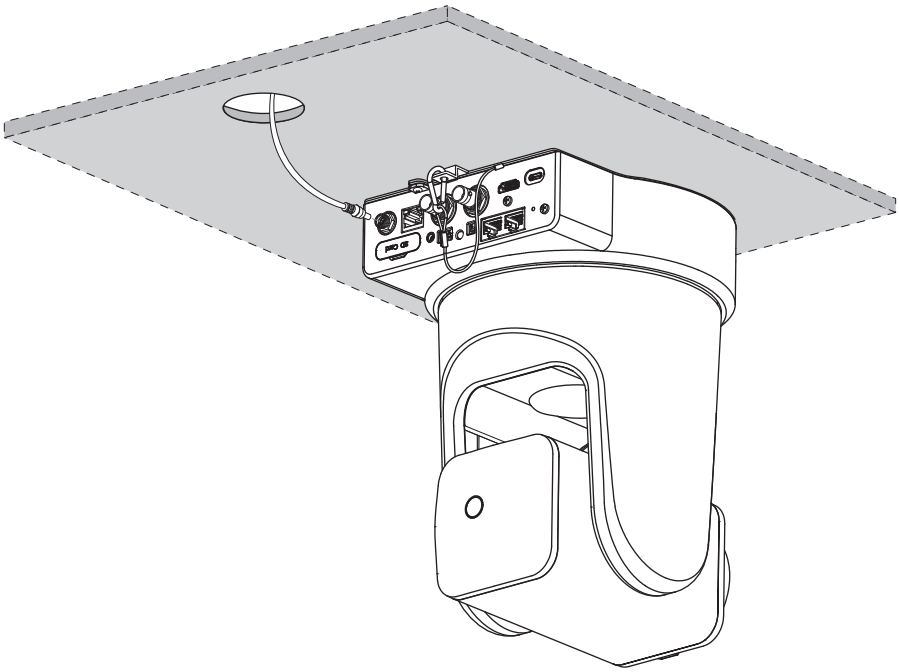


Upward View



5. Cable connection.

<Note>
- Do not connect PoE cables to RS422 ports.
- Always disconnect the power supply when connecting or disconnecting cables to avoid malfunctions.



6. How to remove the camera.
- Please ensure that the camera unit is powered off to ensure safety.
- Disconnect all cables connected to the camera.
- Detach the quickdraw of the safety rope from the wall mount bracket.
- Remove the screws that secure the camera unit to the ceiling mount bracket as described in step 4.
- After completing the above steps, hold the base of the camera unit and rotate it clockwise by 15° to remove it.

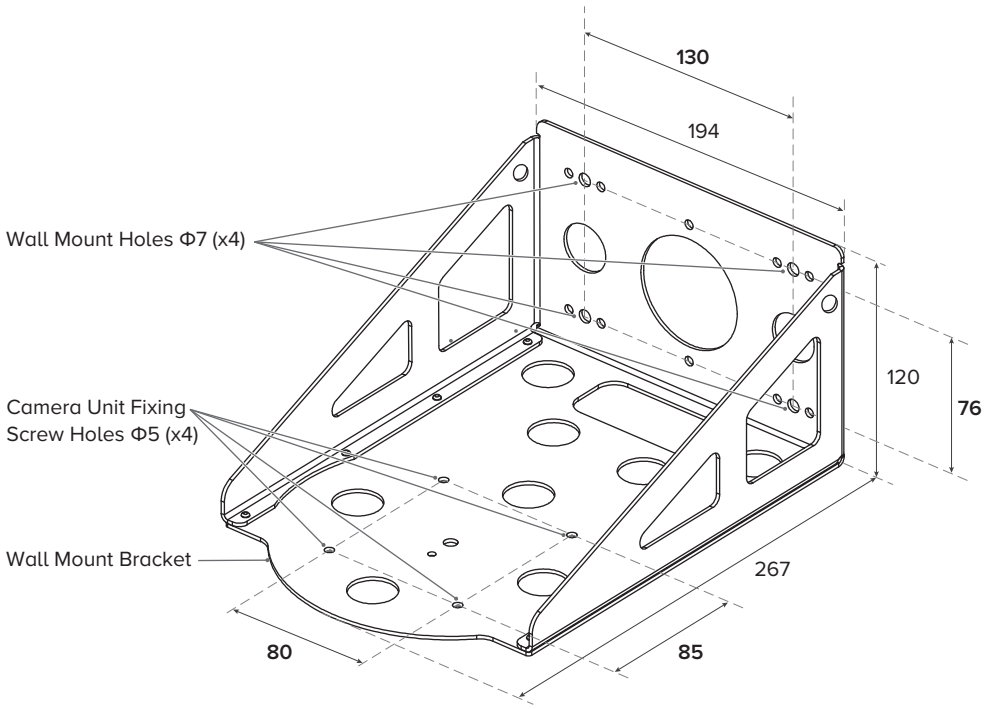
Installing the camera on the wall

Install the camera unit on walls or other vertical surfaces using the wall mount bracket (optional accessory).

<Note>
- For installations at high locations, it is recommended to have professional installers perform the task.
- The accessories include self-tapping screws and plastic inserts. However, please select the appropriate screws based on the actual wall material to ensure the camera is securely installed.

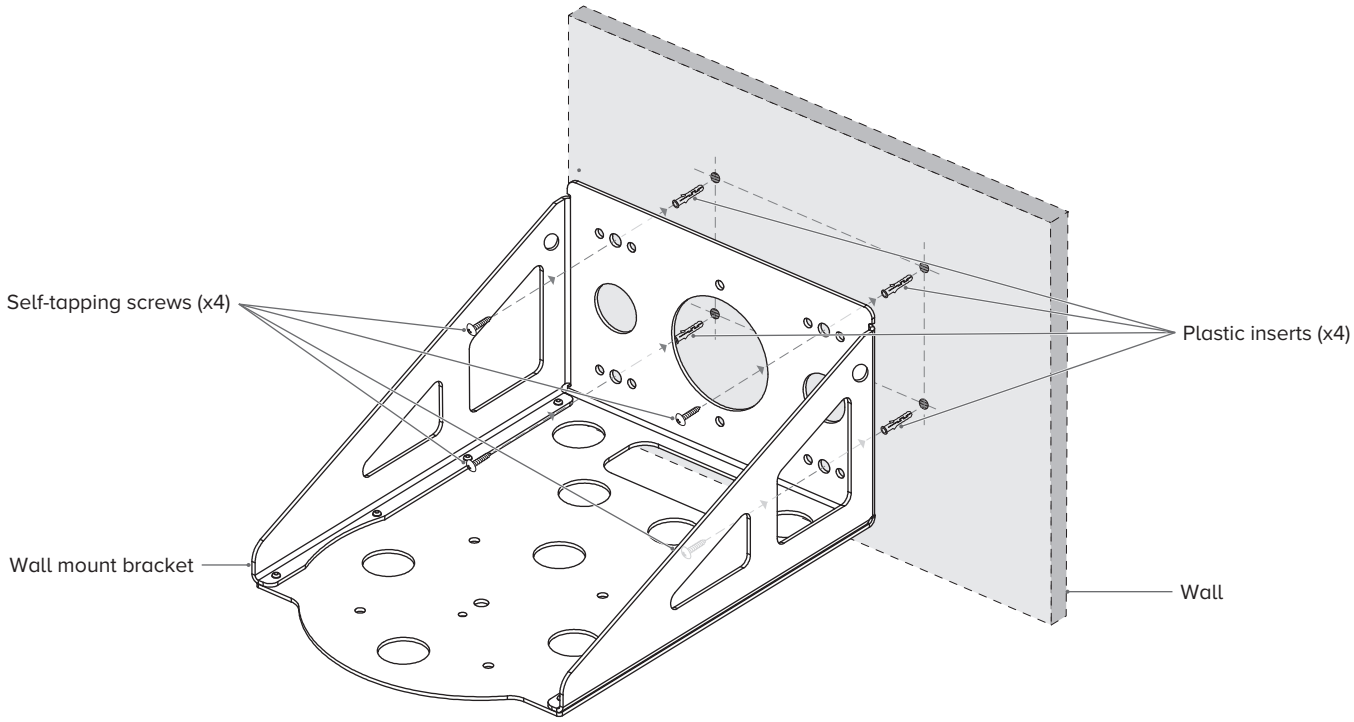
1. Check the installing space.

Refer to the diagram to determine the installation location of the device, taking into account the required space for the device itself as well as the necessary clearance for cable management.

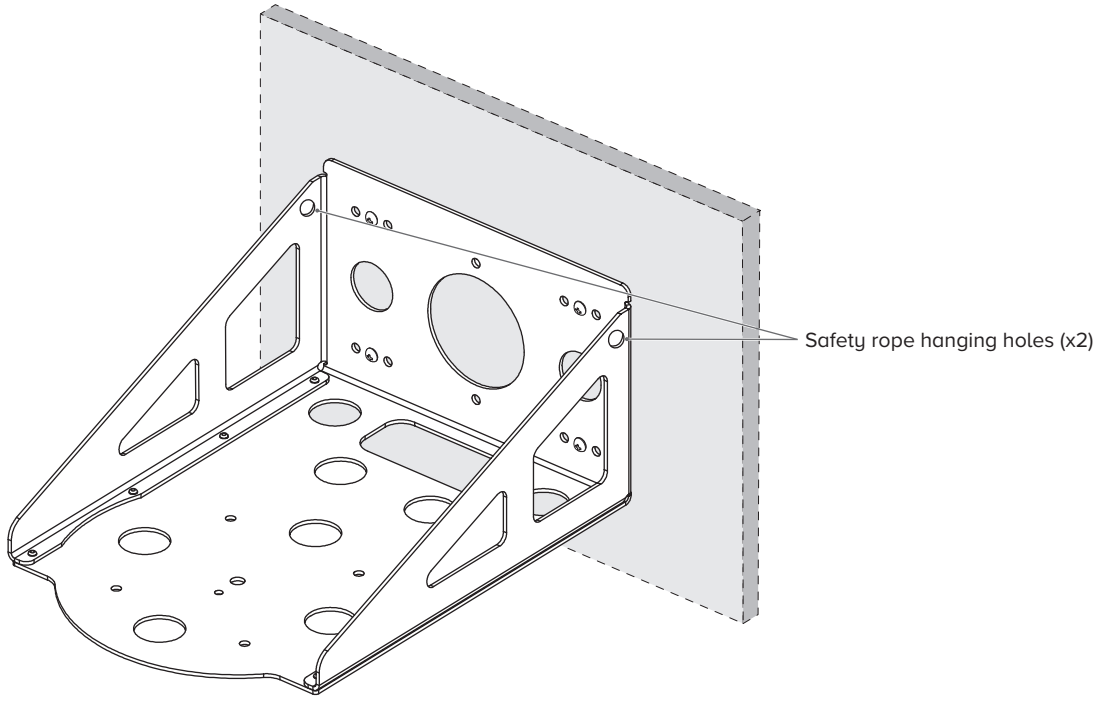


Unit: mm

2. Mount the wall mount bracket.
After drilling four holes in the wall, knock the included plastic inserts (not supplied) into the holes, then fix the bracket to the wall with self-tapping screws (not supplied) and make sure the screws are securely tightened.



3. Attach the safety rope.
Use the safety rope to connect camera unit and wall mount bracket (please refer to page 12 for "attach the safety rope").

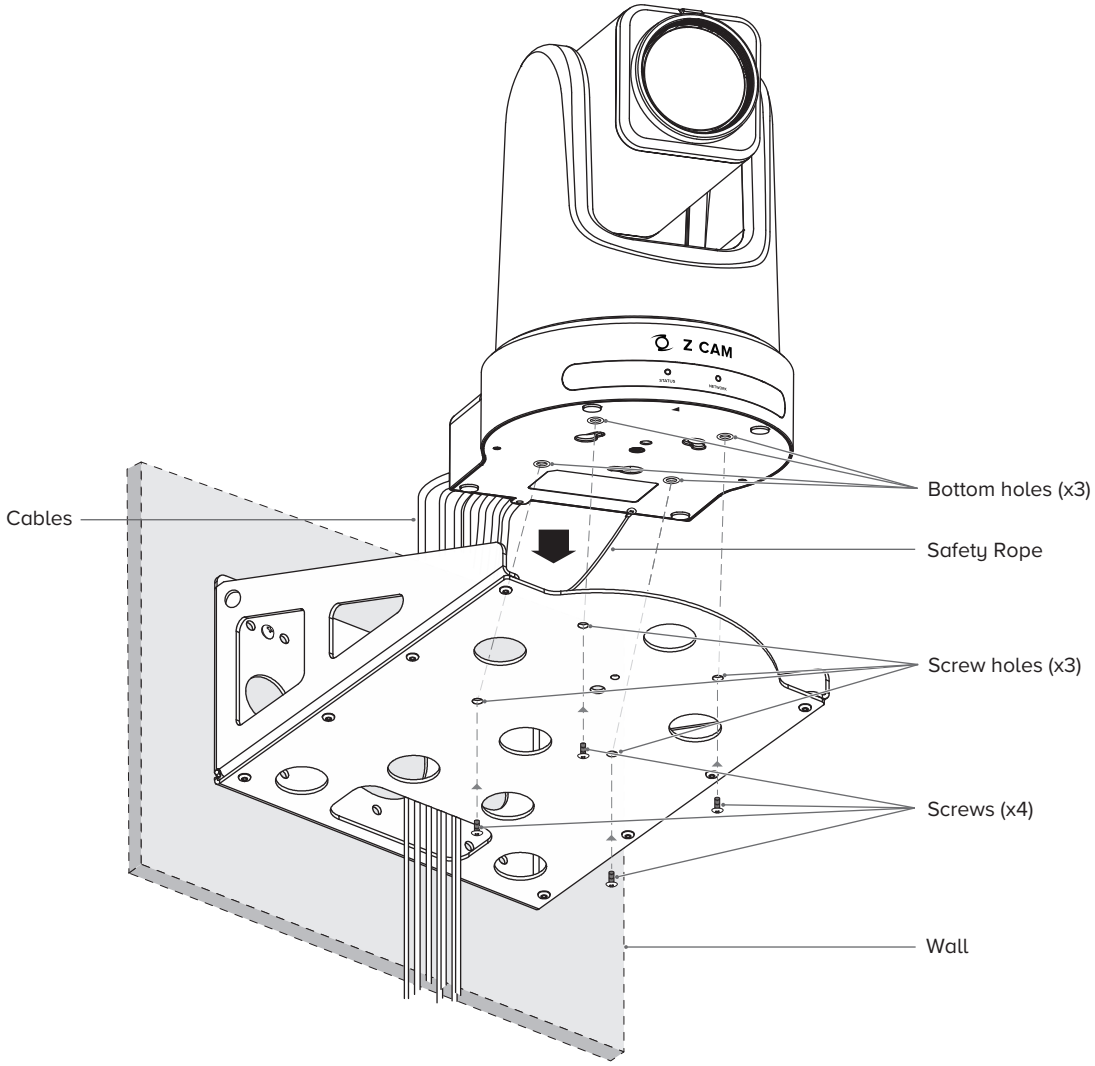


4. Cable connection.

Before mounting the camera, please ensure that the cable connections are completed to avoid insufficient space after mounting.(cable connection please refer to "Connecting the Camera" (page xx).)

5. Mount the camera unit.

Place the camera unit on the wall mount bracket, align the four screw holes on the bottom of the camera unit with the four corresponding holes on the wall mount bracket, tighten the screws.



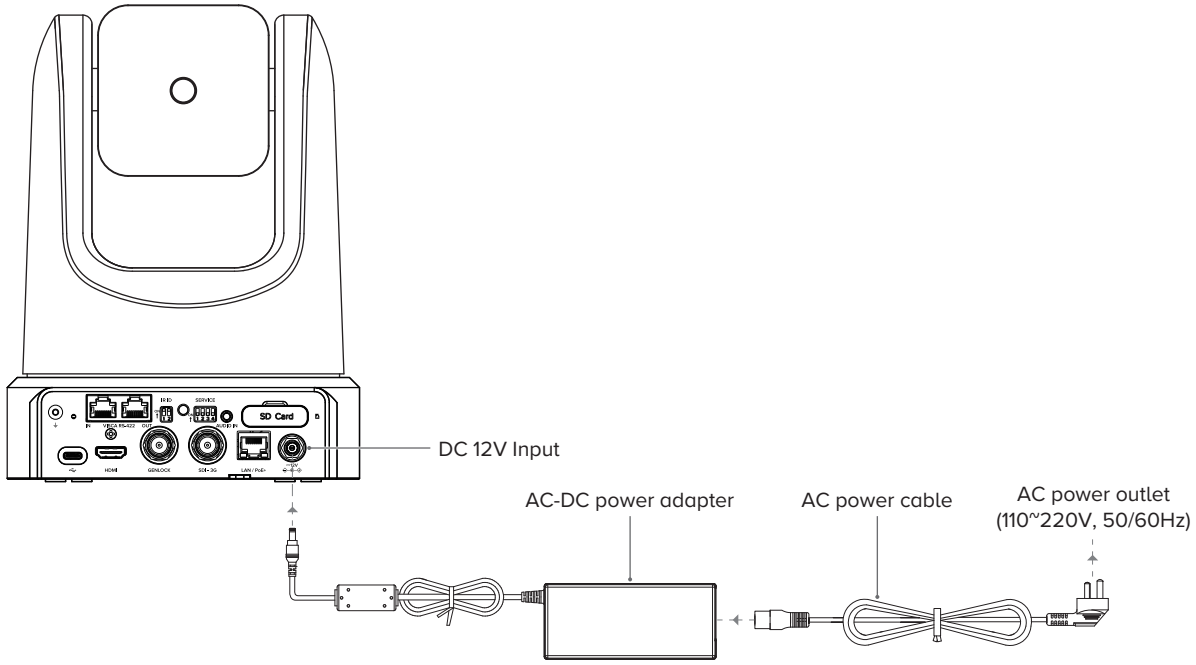
6. How to remove the camera.

- Please ensure that the camera unit is powered off to ensure safety.
- Remove the screws that secure the camera unit to the wall mount bracket as described in step 5.
- Detach the quickdraw of the safety rope from the wall mount bracket.
- Disconnect all cables connected to the camera.
- After completing the above steps, carefully remove the camera unit.

Connection

Connecting to AC power supply

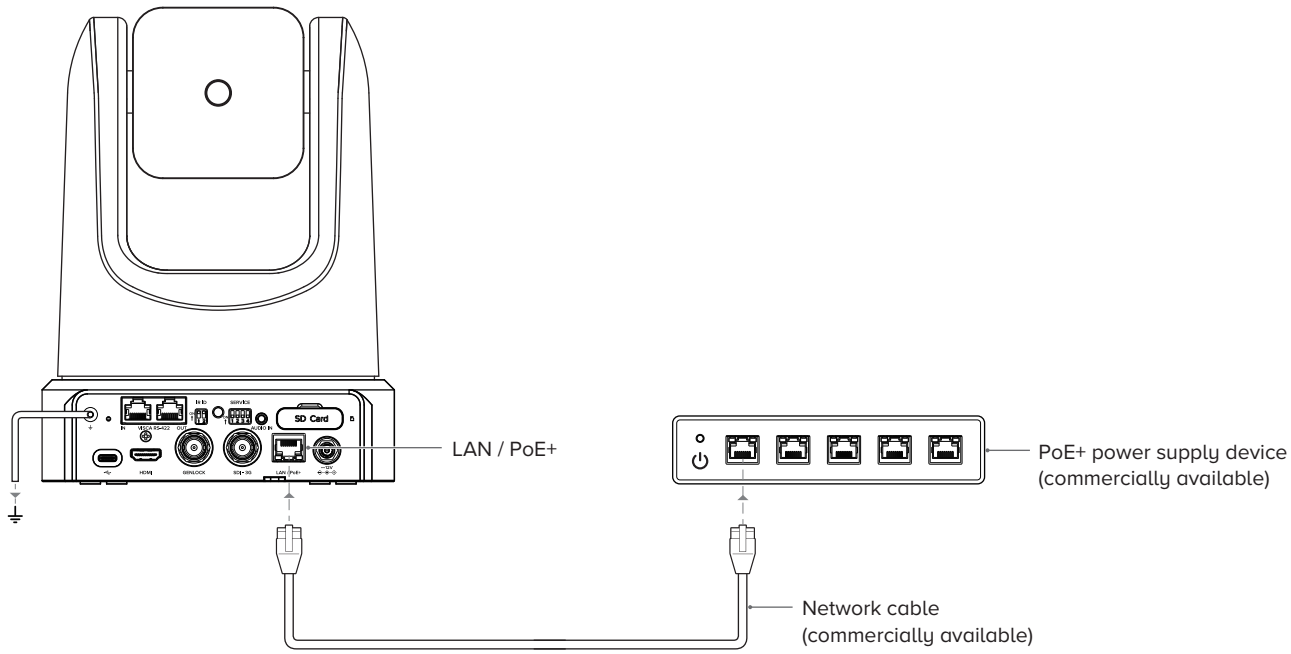
- Connect DC plug of AC-DC power adapter (supplied) to DC 12V Input of the camera unit.
- Connect AC plug of AC power cable (supplied) to AC power outlet (110~220V, 50/60Hz).



<Note>
- Do not use any AC power adapter other than the specified one. Otherwise, it may cause a fire or malfunction.

Connecting to PoE+ power supply device

- Connect a network cable (category 5e or higher, shielded twisted pair) from the PoE+ power supply device (Compliant with the IEEE802.3at, not supplied) to the LAN/PoE+ port.
- For more information on the connection, refer to the instruction manual of the PoE+ power supply device.

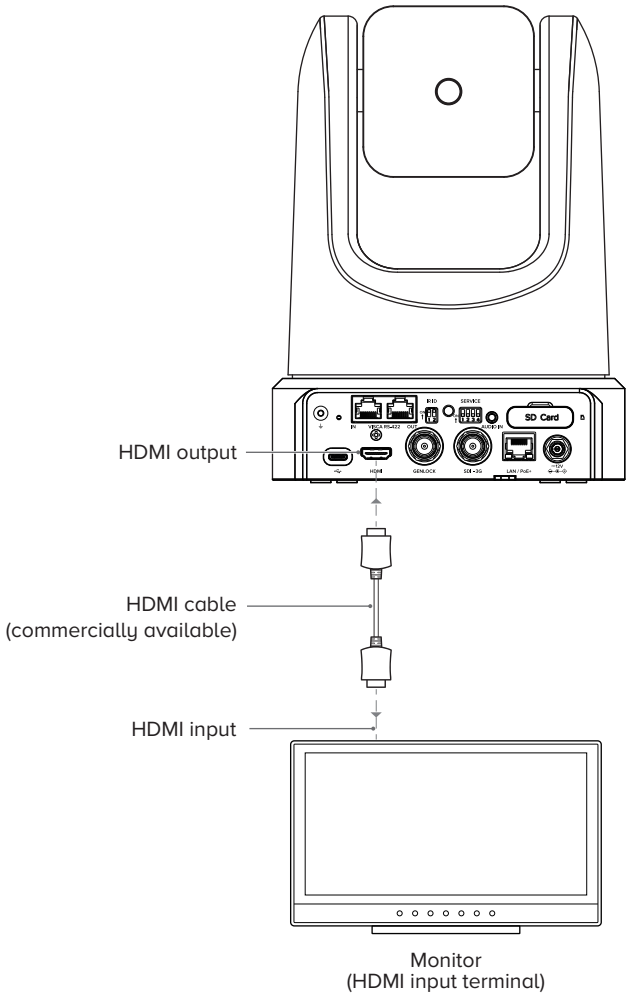


<Note>

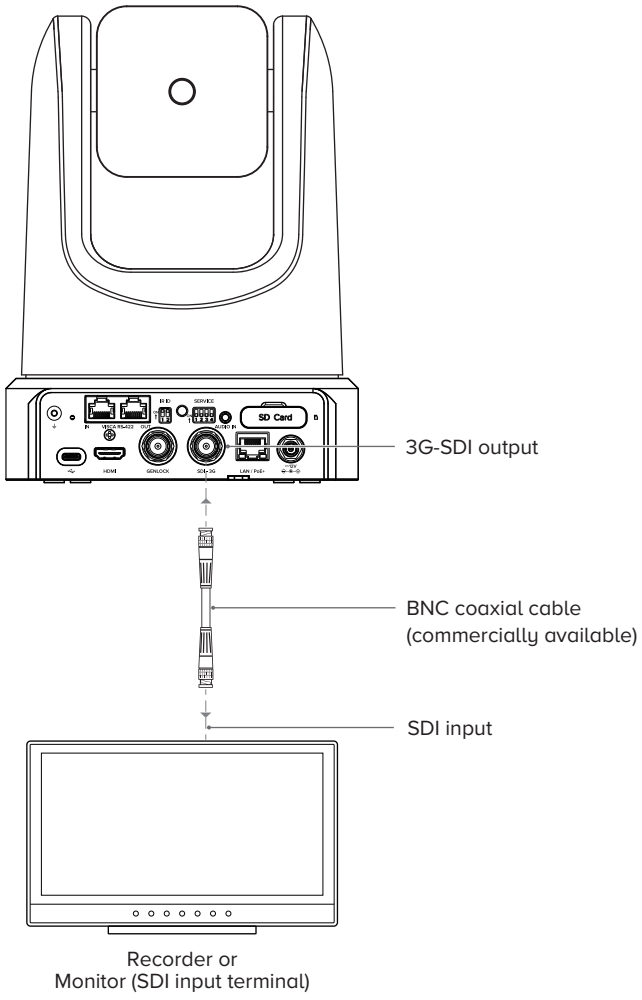
- When both the AC-DC power adapter and PoE+ power supply are connected, the device will be powered through the AC-DC power adapter.
- When the camera unit is powered by PoE+, please connect the ground wire.
- When powered by PoE+, the STATUS indicator (green) and the NETWORK indicator (green) will both flash until the initialization verification process is complete (approximately one minute, depending on the power equipment).
- If an incompatible PoE+ device is connected, the STATUS indicator (green) and the NETWORK indicator (green) will both flash, and the camera unit will not start.
- For the connection to PoE+ device, please refer to the user guide of the device.

Connecting to recorder and monitor (not supplied)

HDMI input device

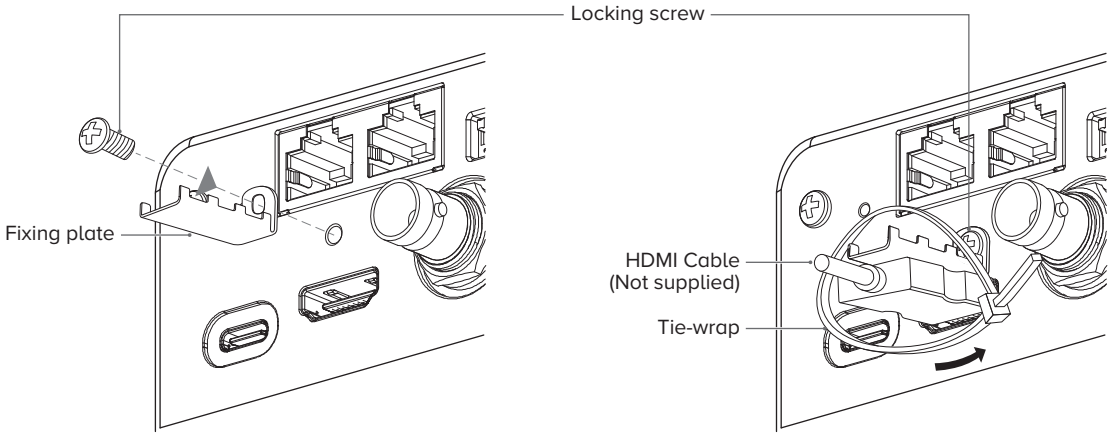


SDI input device



<Note>

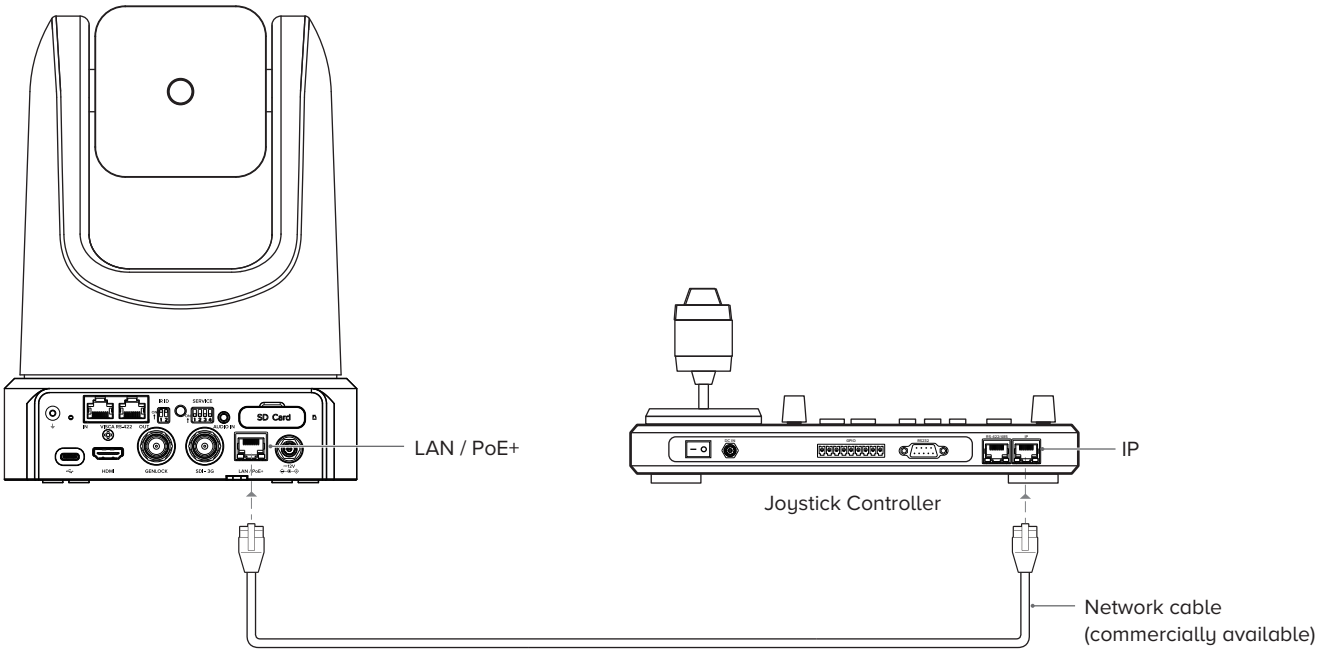
- To prevent the HDMI cable from being pulled out, first remove the HDMI cable locking screw, then secure the fixing plate (supplied) in place, and finally use a tie-wrap (supplied) to securely bind the HDMI cable to the metal plate.



- For the connection to Monitor, please refer to the user guide of the device.

Connecting to joystick controller (not supplied) via VISCA over IP (LAN)

Single camera unit to single joystick controller



VISCA over IP communication specifications

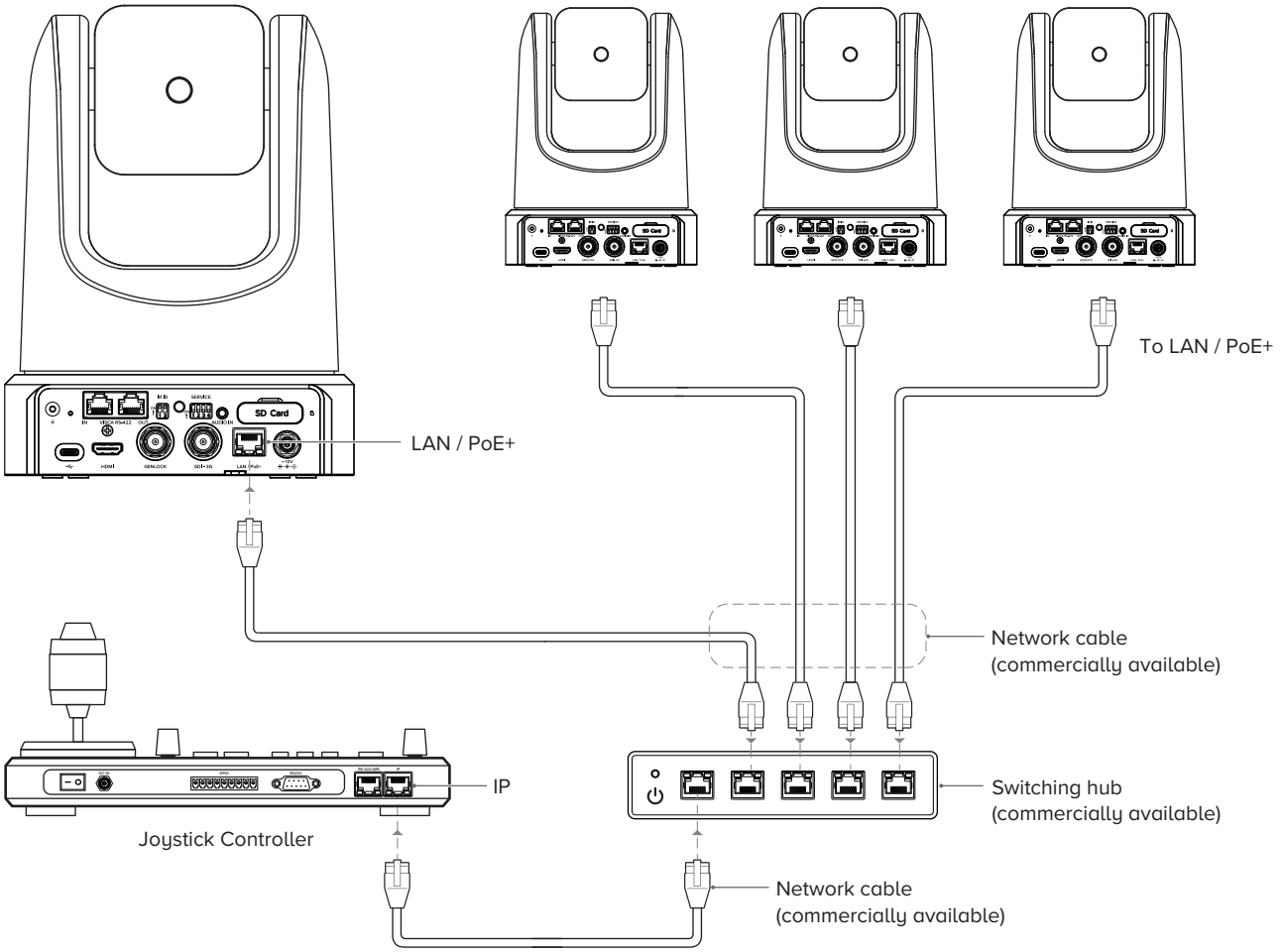
- Interface protocol: IPv4
- Transport protocol: UDP
- IP address: 10.98.32.1 by default
- Port: 52381

Controlling via VISCA over IP

1. Connect the LAN port on the camera to the network switch.
2. Set the IP address and other network information appropriately to communicate on your network.
3. Connect the VISCA over IP compatible joystick controller to the network.
4. Configure the joystick controller to access the camera’ s IP address and VISCA over the IP port.
5. The IP port within on your control must be set to 52381 to communicate with the camera.
6. Select the VISCA protocol on your IP control device.

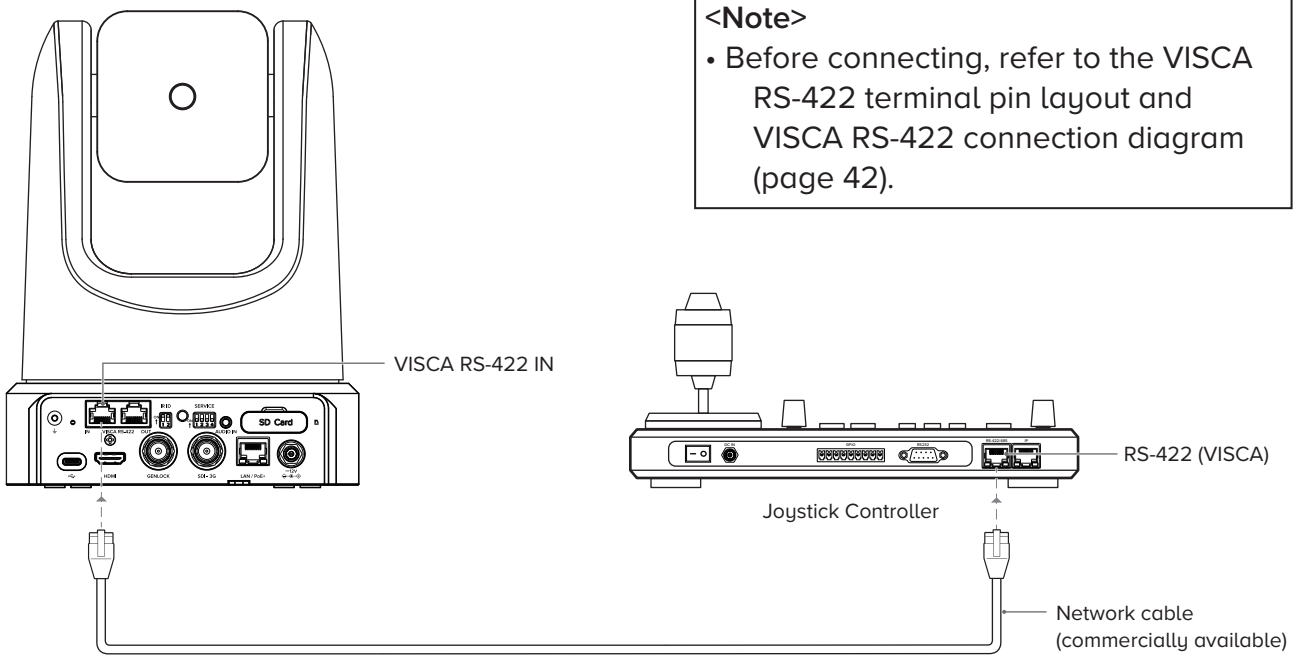
<Note>
For the connection to Joystick controller, please refer to the user guide of the device.

Multi camera units to single joystick controller



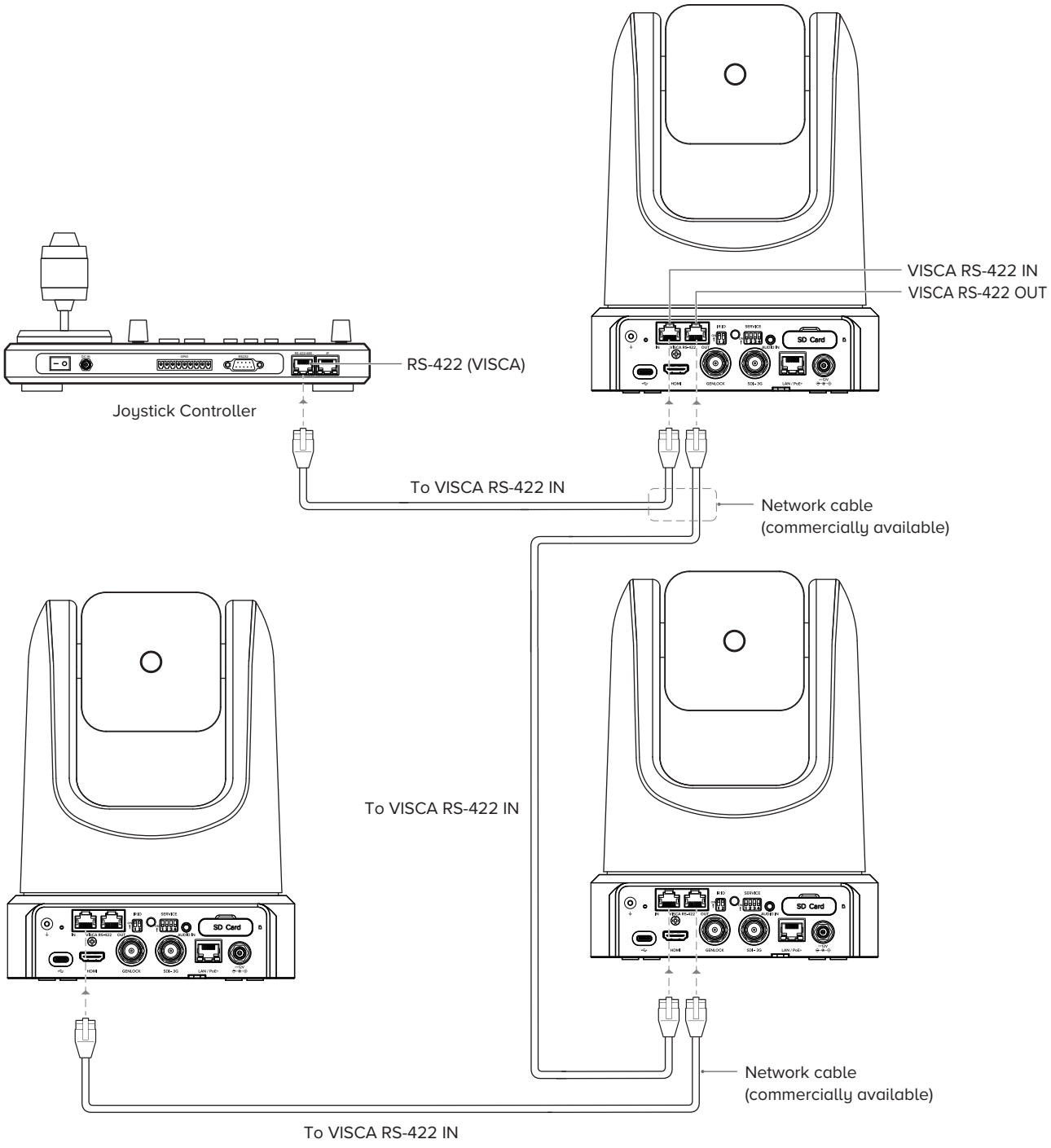
Connecting to joystick controller (not supplied) via VISCA RS-422

Single camera unit to single joystick controller



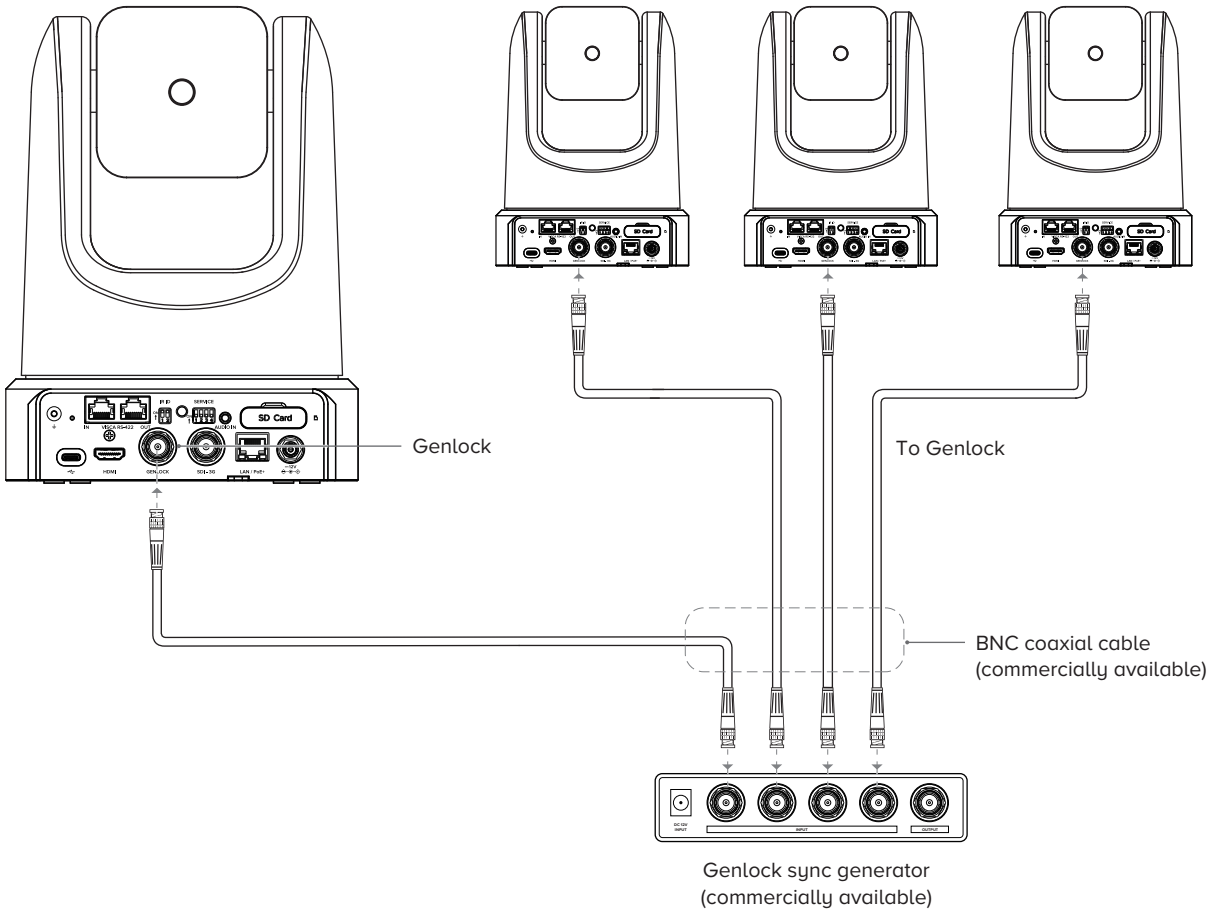
<Note>
• Before connecting, refer to the VISCA RS-422 terminal pin layout and VISCA RS-422 connection diagram (page 42).

Multi camera units to single joystick controller



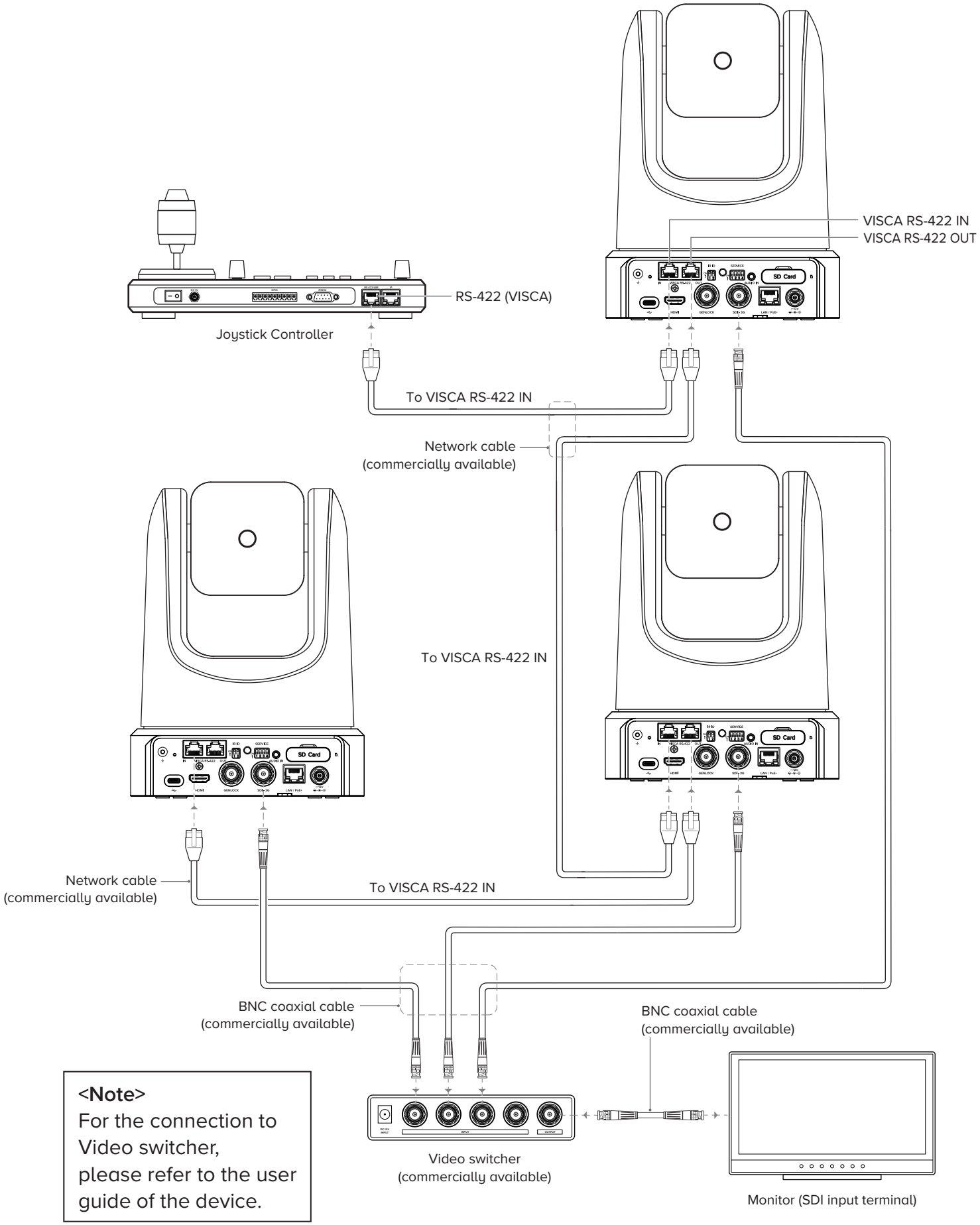
Connecting to Genlock sync generator (not supplied)

Multi camera unit to Genlock sync generator



<Note>
For the connection to Genlock sync generator, please refer to the user guide of the device.

Connecting to video switcher (not supplied)

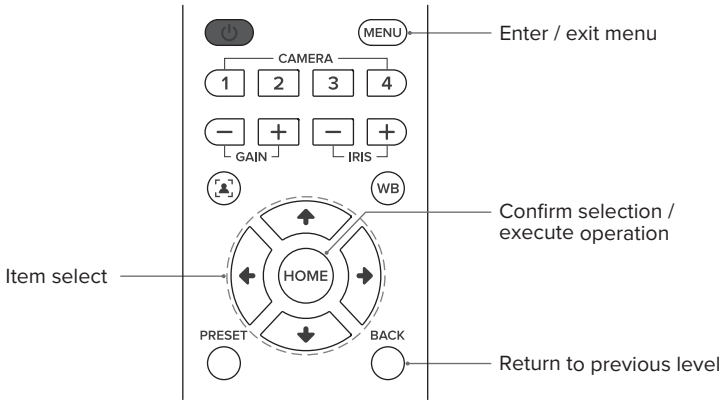


<Note>
For the connection to Video switcher, please refer to the user guide of the device.

On-Screen Menus

Menu operations

First, connect the Camera unit to the external monitor using an HDMI cable. After the connection is completed, you can operate the menu on the external monitor via the included IR Remote Control. Additionally, you can also connect it to the SDI input monitor through a BNC coaxial cable. For specific operation instructions, please refer to the section "Connecting to recorder and monitor" on page 22.



Basic operations:
· Long press the MENU button to enter the menu, short press to exit the menu.
· Press the ↑ or ↓ button to move the cursor.
· Press the HOME button to confirm the selection.
· Press the ← or → button to change setting values.
· Press the BACK button to return to the previous level.

<Note>
For further information on button functions, please refer to the “IR Remote Controller” (page 9).

Menu configuration

Main menu

Menu
Record ···
Video ···
Audio ···
Exposure ···
White Balance ···
Zoom / Focus ···
Image ···
Connection ···
Pan-Tilt ···
System ···
Maintenance ···

Record menu

Record	
Resolution	1920x1080
Project FPS	59.94
Variable Framerate	120
File Format	MOV
Split Duration	5min
Time Code	...
Playback Famrerate	VFR
Meta Setup	...
Pre Roll	Off

- **Resolution:** 4K / 1920x1080.
- **Project FPS:** Frame rate of the video project. It will be different when the resolutionis set to different values.
  - 4K (3840x2160): 23.98 / 24 / 25 / 29.97 / 50 / 59.94 fps.
  - HD (1920x1080): 23.98 / 24 / 25 / 29.97 / 50 / 59.94 / 120 fps.
- **Variable Framerate:** With VFR you can set a different frame rate for capturingbased on the Project FPS for recording, in this way you can get a slow-motionor fast-motion footage. VFR options are related to the “Resolution” and “Project FPS” in Record setting.
  - Variable Framerate: Off / 1 / 5 / 10 / 15 / 20 / 21 / 22 / 23 / 24 / 25 / 30 / 45 / 48 / 50 / 60 / 72 / 75 / 84 / 90 / 96 / 100 / 105 / 108 / 120.
  - VFR Control: Coarse / Fine.
    Coarse: Adjust based on the camera’s preset value within the range of VFR.
    Fine: VFR fine control within the range of VFR, 1 frame per step.
- **File Format:** MOV / MP4.
- **Split Duration:** 5 / 10 / 15 / 20 / 30 / 60 / 120 min. The camera unit will split the video with the length set here automatically.

> **<Note>**
> After the first section via camera automatically splitting, the out of sync problembetween audio and video will happen. You need to use “Z CAM Video Concatenator” to merge the video section before the post editing and processing.

- **Time Code:** Set the time code.
  - Source: Internal.
  - Value: Reset / Manual Input / Current Time.
    Reset: Reset the time code value to 0.
    Manual Input: Set the time code value manually 00:00:00:00.
    (hour:minute:second:frame).
    Current Time: Set time according to the camera system setting time.
  - Count Up: Rec Run / Free Run.
    Rec Run: Counts the time code only when recording video.
    Free Run: Counts the time code even when not recording video (including when the camera is power off).

- Mode: DF / NDF

  DF: The camera modifies the difference between recorded time and timecode. Seconds and frames are separated by "." (Example: 00:00:00.00).

  NDF: Records the time code without drop frame. Seconds and frames are separated by ":" (Example: 00:00:00:00).
- HDMI Display: Off / On. To enable / disable the display of time code through HDMI output.

• **Playback Framerate:** Default / VFR. When it is set to Default, the frame rate of playback will be the same as set in Project FPS, when it is set to VFR, the frame rate of playback will be the same as set in Variable Frame Rate (Record – Variable Framerate).
For example: Set "Record - Project FPS" to 29.97, and "Record - Variable Framerate" to 120. If the Playback FR is set to "Default", the playback frame rate of the video is 29.97 fps (4-fold slow motion). If the Playback FR is set to "VFR", the playback frame rate of the video is 120fps (normal speed).

• **Meta Setup**
  - Camera ID: A to Z.
  - Reel Name: 001 to 999.

• **Pre Roll**
  - Status: Off / On. Set Pre Roll to On, there would appear one red flashing circle onthe left of remaining recording time. To press Record button to start recording, the camera will automatically save the first 5 seconds before pressing recordbutton.
  - Duration: 1 / 3 / 5 / 7 / 10s.

Video menu

Video	
Encoder	H.265
Bitrate	High
Image Stabilizer	Off
Timelapse	Off
Photo Quality	JPEG

• **Encoder:** H.264 / H.265.
• **Bitrate:** Low / Medium / High
• **Image Stabilizer:** Off / On
• **Timelapse:** Off (1 frame) / Manual. When it is Off, the camera unit is in normal record mode. When it is set to a specific value, the camera unit is in time lapse video mode.
• **Photo Quality:** JPEG / RAW.

Audio menu

Audio	
Encoder	AAC
Input	Microphone
Input Level	Mic Level
Level Display	Enable
Noise Reduction	Off
Input Gain	...

- **Encoder:** None / AAC / PCM.
- **Input:** Off / Microphone.
- **Input Level:** Mic Level / Line Level.
- **Level Display:** Disable / Enable.
- **Noise Reduction:** Off / On.
- **Input Gain**
    - Control: Manual / Auto.
    - Left Gain: -10 to 12 dB.
    - Right Gain: -10 to 12 dB.

Exposure menu

Exposure	
Flicker Reduction	60Hz
Metering Mode	Center
EV	0
Shutter Speed	Auto
Aperture	F1.6
ISO	Auto
Min ISO	Auto
Max ISO	25600
Max Shutter Speed	Auto
Shutter Operation	Speed
Shutter Angle Control	Coarse
AE Speed	Normal
Backlight Compensation	Off
Lock In Record	Off

- **Flicker Reduction:** 60Hz / 50Hz.
- **Metering Mode:** Center / Average / Spot.
- **EV:** -3.0 to 3.0.
- **Shutter Speed:** This setting depends on whether “Shutter Speed” or “Shutter Angle” is selected in “Exposure - Shutter Operation”.
    - Shutter Speed: Auto / Manual (1/8000” to 1s).
    - Shutter Angle: Auto / Manual (1° to 360°).
- **Aperture:** F1.6 (W) / F3.5 (T) to F11.

- **ISO:** Auto / Manual (800 to 25600).
- **Min ISO:** Auto / Manual (800 to 3200). This setting will only be enabled when ISO is set to "Auto" .
- **Max ISO:** Manual (1600 to 25600). This setting will only be enabled when ISO is set to "Auto".
- **Max Shutter Speed / Max Shutter Angle:** This setting will be activated if "Shutter Speed / Shutter Angle" is in "Auto" mode.
    - Max Shutter Speed: Auto / Manual (1/60" to 1/1600").
    - Max Shutter Angle: Auto / Manual (1° to 360°).

    * Minimum shutter speed "1" is optional only when "variable frame rate" is set to "1" .
- **Shutter Operation:** Speed / Angle.
- **Shutter Angle Control:** Coarse / Fine. This setting will only be enabled when "Shutter Operation" is set to "Angle".
- **AE Speed:** Slow / Normal / Fast.
- **Backlight Compensation:** Off / On. This settings can disable/enable the compensation function for optimized exposure of the backlight.
- **Lock In Record:** Off / On. Enable this function, it will automatically lock the exposureduring recording.

White Balance menu

White Balance	
Mode	Auto
Kelvin	5200
Tint	6
Priority	Ambiance
Lock In Record	Off

- **Mode:** Auto / Incandescent / Cloudy / D10000 / Fluorescent / Indoor / Daylight / Shade / Manual / Expert.
- **Kelvin:** When White Balance Mode is set to "Auto" or "Preset Value", it shows the current color temperature, when White Balance Mode is set to "Manual", it can be adjusted manually (2300K to 30000K).
- **Tint:** When White Balance Mode is set to "Auto" or "Preset Value", it shows the current tint, when White Balance Mode is set to "Manual", it can be adjusted manually (-100 to 100).
- **Priority:** Ambiance / White.
    - Ambiance: To increase the intensity of the image's warm color cast when shooting a tungsten-light scene.
    - White: : To reduce the intensity of the image's warm color cast when shooting a tungsten-light scene.
- **Lock In Record:** Off / On. Enable this function, it will automatically lock the exposureduring recording.

Zoom / Focus menu

Zoom / Focus	
Zoom Mode	Optical
Focus Mode	AF
Focus Area	Center
Focus Area Size	Medium
Change Focus Area	...
Sensitivity	Medium
AF Speed	Normal
Focus Adjust With PTZ	Off

- Zoom **Mode:** Optical / Digital.
- **Focus:** MF / AF.
- **Focus Area:** Flexible Zone / Top / Center / Bottom / Face.
- **Focus Area Size:** Small / Medium / Large. This setting will only be enabled when Focus Area is set to “Flexible Zone”.
- **Change Focus Area:** Use ↑/↓/←/→ button on IR Remote Controller to reposition the focus area, and press the HOME button to confirm. This setting will only be enabled when Focus Area is set to “Flexible Zone”.
- **Sensitivity:** Low / Medium / High.
- **AF Speed:** Slow / Normal / Fast.
- **Focus Adjust With PTZ:** Off

Image menu

Image	
Basic	...
Gamma Setting	...
Matrix	...
Color Correction	...

- Basic
  - Image Profile: Rec.709 / Cine / High Contrast / Vivid / Concert / HLG / HLG Vivid / Gamma.
    Rec.709: Image configuration based on the high-definition television standard.
    Cine: Image configuration with a cinematic texture.
    High Contrast: Image configuration with high contrast.
    Vivid: Image configuration that is vivid and lively.
    Concert: Image configuration suitable for concert scenes.
    HLG: Hybrid Log-Gamma, image configuration for high dynamic range video transmission and display.
    HLG Vivid: Image configuration with more vivid colors based on HLG.
    Gamma: Image configuration with a custom gamma curve for adjusting the nonlinear relationship between brightness and contrast.
  - Sharpness: Strong / Medium / None.
  - Noise Reduction: Medium / Weak / Off.
  - Brightness / Contrast / Saturation / Hue: 0 to 100.

- **Gamma Setting:** This setting will only be enabled when “Basic - Image Profile” is set to “Gamma”.
  - Gamma: It is used to adjust the nonlinear relationship between the brightness and contrast of the image.
    - Type: Rec.709 / sRGB / Power.
      - Rec.709: The gamma curve of the high-definition television standard.
      - sRGB: The gamma curve corresponding to the standard RGB color space.
      - Power: The gamma curve based on the power function.
    - Power: 150 to 260. This setting will only be enabled when “Gamma - Type” is set to “Power” .
  - Black Level:
    - Status: Off / On. When set to “On” , it can set the reference brightness of the black parts of the image.
    - The following setting will only be enabled when this setting is set to “on” .
    - Level: -100 to 100. Set the adjustment degree of the black level for precise control.
  - Black Gamma:
    - Status: Off / On. When set to “On” , it can adjust the brightness and contrast of the dark areas of the image, helping to improve the visibility of details in the dark areas.
    - The following settings will only be enabled when this setting is set to “on” .
    - Range: Narrow / Middle / Wide. Set the range of action of the Black Gamma adjustment in the dark areas.
    - Level: -100 to 100. Set the intensity of the Black Gamma adjustment.
  - Knee:
    - Status: Off / On. When set to “On” , it can control the brightness response curve of the highlight parts (brighter areas) of the image.
    - The following settings will only be enabled when this setting is set to “on” .
    - Point: 50 to 100. Set the starting point for highlight compression or expansion.
    - Slope: -100 to 100. Set the slope of the change in the brightness response curve of the highlight parts.
- **Matrix**
  - Status: Off / On. When set to “On”, specific color areas can be emphasized or de-emphasized while keeping the white intersection point unchanged.
  - The following settings will only be enabled when this setting is set to “on” .
  - Reset: Reset matrix value.
  - R-G / R-B / G-R / G-B / B-R / B-G: -100 to 100. Set a coefficient for each combination of RGB on an individual basis in order to adjust the hue of the whole image.
- **Color Correction**
  - Status: Off / On. The following settings will only be enabled when this setting is set to “on” .
  - Hue:
    - Reset: Reset Hue value.
    - R / R_Y / Y / Y_G / G / G_C / C / C_B / B / B_M / M / M_R: -100 to 100. Set a coefficient for each combination of a series of colors in Hue and their transition colors to adjust the hue of the corresponding color areas in the image.

- Saturation:

  Reset: Reset saturation value.

  R / R_Y / Y / Y_G / G / G_C / C / C_B / B / B_M / M / M_R: -100 to 100. Set a coefficient for each combination of a series of colors in Saturation and their transition colors to adjust the hue of the corresponding color areas in the image.

Connection menu

Connection	
Network	...
USB	USB Camera
HDMI	...
SDI	...
Genlock	Off

- Network
  - Ethernet Mode: DHCP / Direct / Static.

    DHCP: Camera unit is connected to the computer through a router, IP address will be assigned by the router.

    Direct: Camera unit is connected to the computer directly through Ethernet cable, camera will generate the IP address. The default is: 10.98.32.1.

    Static: to set the IP address manually.
  - Ethernet IP: IP address of the Ethernet when it's connected.
  - Ethernet Netmask: Ethernet netmask currently set up for the camera.
  - Ethernet Gateway: Ethernet gateway currently set up for the camera.
  - Ethernet DNS: DNS server address for domain name resolution.
- USB: Mass Storage / USB Camera.
- HDMI:
  - Format: Auto / 1080P60 / 1080I60.
  - Display Info.: Off / On.
  - OSD Layout:
  - Use EDID: Disable / Enable.
- SDI:
  - Output: Off / On.
  - 3G SDI: Level-A / Level-B.

- Genlock:
    - Enable: Off / On.
    - Phase Adj:
        Phase Coarse: -5 to 5.
        Phase Fine: -100 to 100.
- HTTP:
    - HTTPS: Off / On.
    - Authentication: Off / On.
    - Load Certificate:
- IR Receive:
    - Status: Off / On.
    - ID:
- VISCA:
    - Status: Off / On.
    - ID: 1 to 7.
    - Baud Rate: 9600 / 19200 / 38400.
- Free-D: Off / On.

Pan-Tilt menu

Pan-Tilt	
Speed Mode	Low
Speed With Zoom Position	On
Flip	Off
Power On Position	Standby
Privacy Mode	Off
Range Limit	...
Preset	...

- Speed Mode: Low / Medium / High.
- Speed With Zoom Position: Off / On.
- Flip: Off / On.
- Power On Position: None / Standby / Home / Preset 1.
- Privacy Mode: Off / On.
- Range Limit:
    - Status: Off / On.
    - Up:
        Up: -29 to 210.
        Current: Set current position as up limit.
        Reset: Reset up limit.
    - Down:
        Down: -30 to 209.
        Current: Set current position as down limit.
        Reset: Reset down limit.
    - Left:
        Left: -175 to 174.
        Current: Set current position as left limit.
        Reset: Reset left limit.

- Down:
  Down: -174 to 175.
  Current: Set current position as right limit.
  Reset: Reset right limit.

- Preset:
  - Recall Mode: PTZF + Image / PTZF Only / PTZF + Iris.
  - Speed Mode: Common / Separate.
  - Common Speed Unit: Index / Time.
  - Common Speed: 1 to 40. This setting will only be enabled when “Common Speed Unit” is set to “Index” .
  - Common Time: 1000 to 60000. This setting will only be enabled when Common Speed Unit is set to “Time” .
  - Freeze During Preset: Off / On.

System menu

System	
Assist Tools	...
User Profile	...
User Button	...
Tally	High
Record Frame Indicator	Off
Color Bar	Off
Language	...
Camera Status	...

- Assist Tools:
  - Display: Off / On.
  - Frame Line:
    Ratio: None / 2.4:1 / 2.35:1 / 1.9:1 / 1.85:1 / 16:9 / 4:3.
    Color: Red / Green / Blue / Orange / White.
  - Center Mark:
    Enable: Off / On.
  - Grid Line: Off / On.
  - Safe Area: Off / On.
  - Focus Area: Off / On.
- User Profile:
  - Save Profile: Export current camera settings to a file and save it in the memory of the camera.
  - Load Profile: Select the saved configuration in the camera, import and apply it to the camera settings.
  - Save To Card: Export the current camera settings as a configuration file and save in storage of the camera (save in /MISC/profile/ directory, with file name suffix.prf)
  - Load From Card: Import the configuration file from the storage, and apply it to the camera settings.
- User Button:
  - Fn Button: None / Record.
- Tally: Off / Low / High.
- Record Frame Indicator: Off / On.

- **Color Bar:** Off / On.
- **Language:** English / 简体中文 .
- **Camera Status:** : Displays the current status of the camera, including storage capacity (used and remaining space), temperature (inside the camera) and camera S/N etc.

Maintenance menu

Maintenance
CLear Settings
Format Card
Power
Date / Time
Time Zone
Version

- **Clear Settings:** Clear all the Settings in the camera and set them to default values.
- **Format Card:** Format the SD card. **Please note that formatting will erase ALL DATA in the storage!**
- **Power:**
    - Auto Power Off: Off / 30s / 1min / 2mins / 4mins / 8mins / 15mins.
    - Auto Power Standby: Off / 1min / 5mins / 15mins.
- **Date / Time:** Set the date and time of the camera.
- **Time Zone:** Set the time zone of the camera.
- **Version:** : Firmware version of the camera.

Accessing from a Web Brower

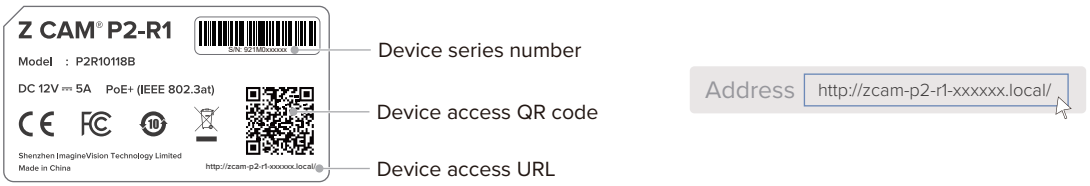
You can access the camera unit through a web browser on your PC to achieve functions such as previewing, controlling, changing settings, and upgrading the firmware.

Access mode

Access in DHCP mode (default)

Connect the camera unit to the PC via the router, and its IP address will be automatically assigned by the router.

1. Connect the camera unit to the router using an Ethernet cable (category 5e or higher, shielded twist pair) , and make sure that your PC and the camera are within the same local area network.
2. Open the browser and enter http://zcam-p2-r1-xxxxxx.local/ in the address bar (this URL can be found on the nameplate at the bottom of the camera).



3. Alternatively, use smart devices such as mobile phones or tablets (same local area network) to scan the QR code on the nameplate at the bottom of the camera for access.

Access in Direct mode

Connect the camera unit directly to the PC with an Ethernet cable (category 5e or higher, shielded twist pair) , the default IP address is 10.98.32.1.

1. Change the network mode
   - Change via the web browser: Access the camera unit in DHCP mode. change the network mode from DHCP to Direct (Settings - Network - Ethernet - IP Mode).
   - Change via an external monitor: Connect an external monitor (either HDMI or SDI) to the camera unit. Use the IR Remote controller to enter the on-screen menu, change the ethernet mode to Direct (Connection - Network - Ethernet Mode).
2. Connect the camera unit directly to the PC using an Ethernet cable.
3. Open the browser and enter the default IP address 10.98.32.1 or http://zcam-p2-r1-xxxxxx.local/ (Device access URL) in the address bar to access the camera unit.

User management

Enable or Disable Login Authentication

You can enable or disable the login authentication function as needed. The specific operation steps are as follows:

1. Navigate to the "Settings" page.
2. Click on the "Security" option.
3. Under the "User Management" option, select to turn on or turn off user authentication.

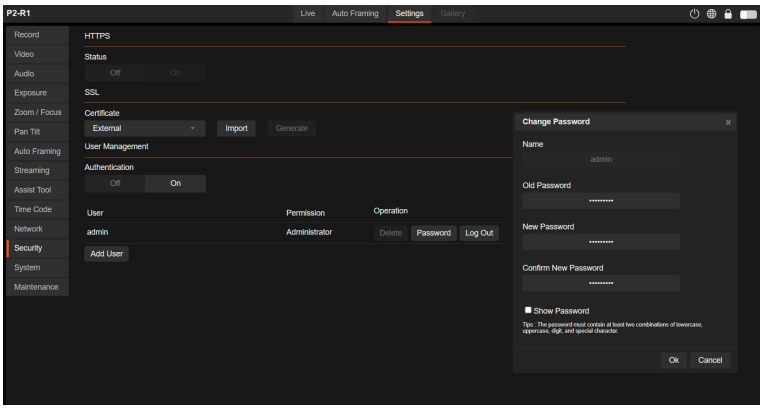
The default account password is as follows:

Account: admin
Password: Admin_123

Change the password

You can change the password. The password length should be more than 8 characters, and the password must contain at least two combinations of lowercase letters, uppercase, digits, and special characters. The specific steps are as follows:

1. On the "Settings" - "Security" - "Users" page, click the "Password" option.
2. After entering the old password and the new password, click the "OK" button, and the password change will be completed.



> **<Note>**
> The administrator username cannot be changeed.

Add user

You can add user. The password length should be more than 8 characters, and the password must contain at least two combinations of lowercase letters, uppercase, digits, and special characters. The specific steps are as follows:

1. On the "Settings" - "Security" - "Users" page, click the "Add User" option.
2. Enter the user name, old password, and new password in sequence.
3. Set permission for the new user, with options of "Camera Controller" or "Administrator".
4. Click the "OK" button to complete the user addition operation.

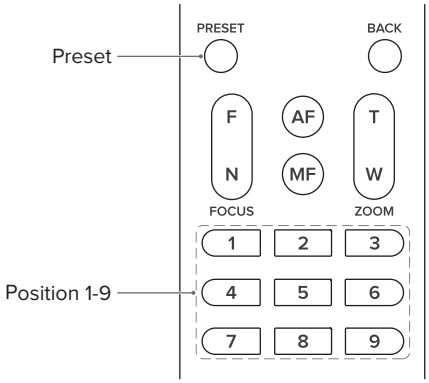
Preset

You can use the Preset funtion to save the pan/tilt angles, zoom, focus, and other settings of the camera unit.

<Note>
· Camera unit supports a maximum of 100 preset positions.
· For the IR Remote Controller (supplied), a maximum of 9 preset positions can be set.

Storing Presets Using the IR Remote Control

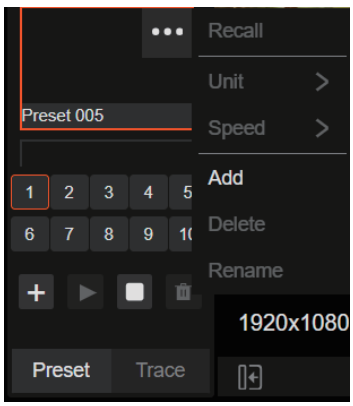
1. Adjust the camera unit to the desired pan/tilt positions, and set the zoom and focus parameters, etc.
2. Press and hold the "PRESET" button on the IR Remote Controler, at the same time, press any of the position button (1 to 9) which you want to save the current settings.

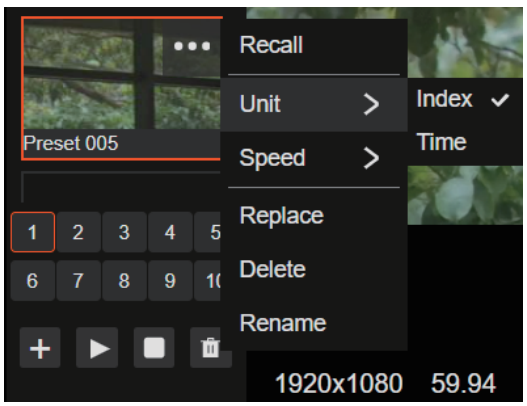


<Note>
· If you repeat the above preset storage operation again, the new preset will replace the previously saved preset.
· The IR Remote Controller can only be used to store and replace presets, and it cannot clear presets. To clear presets, please operate through the web control interface.

Storing Presets in the web control interface

1. Adjust the camera unit to the desired pan/tilt positions, and set the zoom and focus parameters, etc.
2. In the preset column on the left side of the web control interface, click any blank preset position, and then click the "add" button or the "+" sign to save the current settings.





Explanation:

- **Recall:** Execute the preset operation to make the camera move to the corresponding preset position and apply the corresponding settings.
- **Unit**: Index / Time.
  - Index: The index unit is a relative speed setting, and its value ranges from 1 to 40. The larger the value, the faster the camera moves; conversely, the slower it moves.
  - Time: The time unit represents the time required for the camera to move from the current position to the preset position, in seconds, with a range of 1 to 60 seconds. For example, if it is set to 5 seconds, the camera unit will smoothly move from the current position to the preset position within 5 seconds.
- **Replace**: Overwrite the existing preset with the current position and settings.
- **Delete**: Delete the selected preset.
- **Rename**: Rename the selected preset.

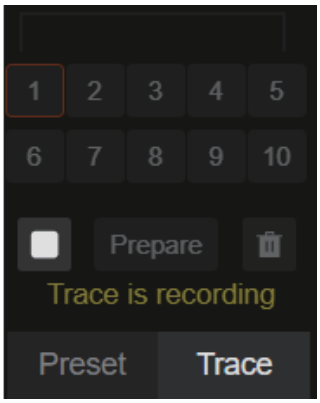
Trace Recording Function

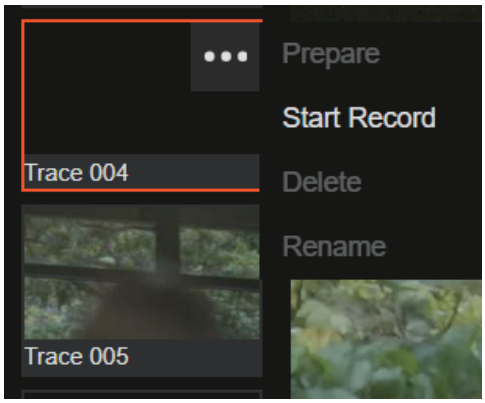
You can use Trace function to record up to 100 operation paths of pan, tilt, and zoom. The IR Remote controller cannot record or playback Trace presets.

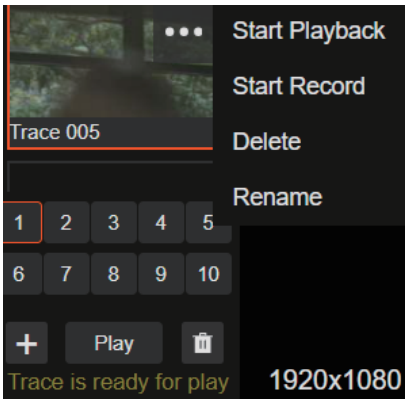
1. At the bottom of the preset column on the left side of the web control interface, select the "Trace" mode.
2. Click any blank Trace position, and then click the "Start Recording" button. At this time, a yellow text prompt "Trace is Recording" will appear in the lower left corner of the interface.
3. Freely perform pan, tilt, and zoom operations. After finishing the operations, click the " ■" button to complete the recording.

Explanation:

- **Prepare:** Make the camera unit return to the starting point of the Trace and get ready for playback the Trace.
- **Start Playback:** Invoke the Trace preset.
- **Start Recording:** Used to record a new Trace or replace an existing Trace.
- **Delete:** Delete the selected Trace.
- **Rename:** Rename the selected Trace.







Upgrading the firmware

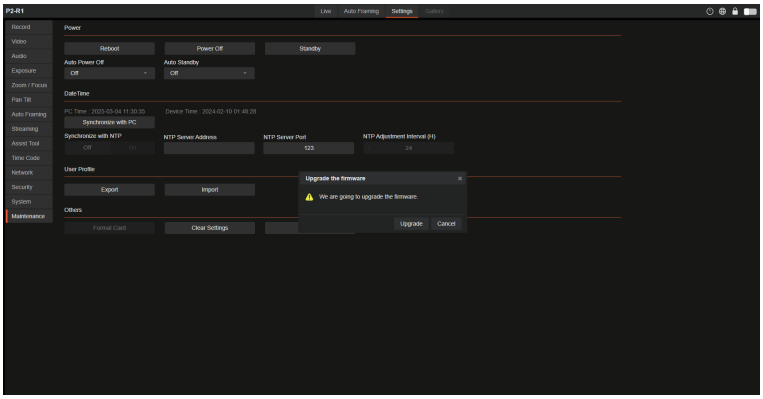
Download the Latest Firmware

You can upgrade the firmware through the Update tab. The specific operation steps are as follows:

1. Visit the *z-cam.com*, click "Support" - "Firmware Update"; or directly enter "*https://www.z-cam.com/support/firmware-update/*" in the address bar of your browser.
2. Download the latest version of the P2-R1 / P2-R1N firmware to your computer.

Firmware upgrade steps

1. Access the camera unit via a web browser, and click the options “Settings” - “Maintenance” - “Others” - “Upgrade” in sequence.
2. In the pop-up tab, click the "Select File" button, and then select the firmware file that has just been downloaded.
3. After the firmware is uploaded successfully, click the "Upgrade" button.
4. After the upgrade is completed, the camera unit will automatically start with the newly upgraded version.



<Note>
· Do not turn off the camera unit during the firmware upgrade.
· The firmware upgrade process takes approximately 5 minutes.
· The camera cannot be accessed during the upgrade process.
· No image will be displayed during the upgrade process.

Check the Firmware Version

1. Click the options “Settings” - “System” .
2. Under the “Information” tab, the current firmware version information will be displayed.

Technical Specifications

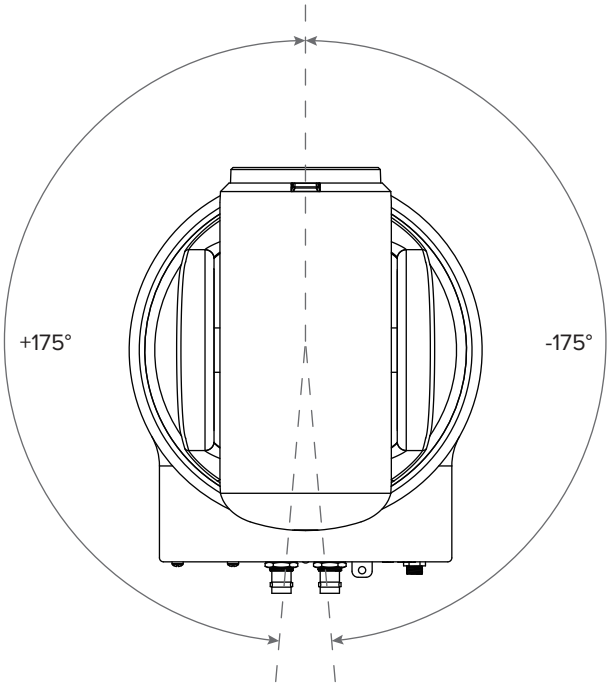
Imaging	
Sensor Type	1/1.3" CMOS sensor
Horizontal Resolution (TV Lines)	2160 TV Lines
Built-in ND Filter	No
Image Stabilization	E.I.S.
Focus Control	PDAF (Phase Detection Auto Focus), Manual Focus
Image Profile	Rec.709 / Cine / High Contrast / Vivid / Concert / Gamma
Exposure Control	
Shutter Speed	Auto / Manual (1/8000" to 1s)
Gain	0 to 24 dB (ISO 800 to 25600)
White Balance	Auto / Incandescent / Cloudy / D10000 / Fluorescent /
	Indoor / Daylight / Shade / Manual / Expert
Lens	
Focal Length	36mm to 648mm (35mm equivalent)
Optical Zoom Ratio	18x
Max Digital Zoom	36x (in 1080p)
Field of View	Horizontal: 53° to 3.6°
Maximum Aperture	f/1.6 (W) / f/3.5 (T) to f/11
Minimum Focus Distance	Wide: 3.94" /10 cm, Tele: 78.7" / 220 cm
ND	No
OLPF	No
Video Capture	
External Recording Modes	HDMI UHD 4K (3840 x 2160) at 23.98/24/25/29.97/50/59.94 fps HD (1920 x 1080p) at 23.98/24/25/29.97/50/59.94 fps HD (1920 x 1080i) at 50/59.94 fps SDI / BNC HD (1920 x 1080p) at 23.98/24/25/29.97/50/59.94 fps HD (1920 x 1080i) at 50/59.94 fps RJ45 / USB
Internal Recording Modes	UHD 4K (3840 x 2160) at 24/25/29.97/50/59.94 fps HD (1920 x 1080p) at 24/25/29.97/50/59.94 fps UHD 4K (3840 x 2160) at 23.98/24/25/29.97/50/59.94 fps HD (1920 x 1080p) at 23.98/24/25/29.97/50/59.94 fps
Audio Recording	3.5 mm TRS (Mic in / Line in)
Broadcast Output	NTSC / PAL
IP Streaming	H.264, H.265, RTMP, RTMPS, RTSP, SRT, SSP, UVC, NDI HX3* UHD 4K (3840 x 2160) at 24/25/29.97/50/59.94 fps HD (1920 x 1080p) at 24/25/29.97/50/59.94 fps

Control	
Presets	256 via CGI 100 via VISCA 9 via IR
Move Speed	Pan: 0.1 to 180°/sec Tilt: 0.1 to 180°/sec
Movement Range	Pan: 350° (-175° to +175°) Tilt: 240° (-30° to +210°)
Movement Accuracy	0.01°
Tally Light	Yes
Supported Control Protocols	IR / NDI HX3* / VISCA over RS-422 / VISCA over IP / Web Client / UVC
FreeD	Yes
Interface	
Media / Memory Card Slot	SD (4K 60fps max, H.265, 8-bit color)
Video I/O	1x BNC (3G-SDI) Output 1x RJ45 (IP) Output 1x HDMI Output 1x USB-C 3.0 Gen 1 Output
Audio I/O	1x 1/8" / 3.5 mm TRS Stereo Mic/Line Input
Other I/O	1x BNC (Genlock) Input 1x RJ45 (VISCA / RS-422) Input 1x RJ45 (VISCA / RS-422) Output
Power	
PoE Support	PoE+ 802.3at
DC Power	1x Barrel (12V DC) Input
Power Consumption	18W maximum
General	
Mounting	3/8" Screw Hole + 1/4" Adapter Desktop / Ceiling / Wall Mount (optional accessory)
Certifications	CE, FCC, RoHS
Dimensions (W x H x D)	6.8 x 9.3 x 7.7" / 175.0 x 235.5 x 195.5mm
Weight (Camera Unit only)	7.4 lb / 3.35 kg
Weight (Full Package)	12.0 lb / 5.45 kg
Operating Temperature	0 °C to 40 °C (32 °F to 104 °F)
Environmental Resistance	No
Color	Black
Fanless Design	Yes

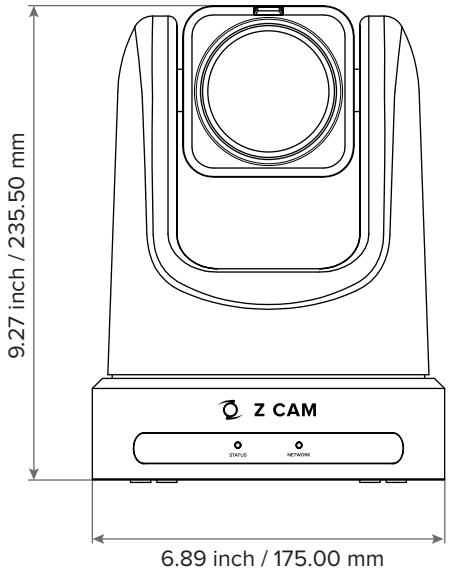
** NDI HX3 require the selection of the Z CAM P2-R1N model.*
Note: All weight and dimensions are rounded values. Dimensions do not include projecting object and rubber feet.
Disclaimer: All product features and technical specifications stated are subjected to Z CAM's sole interpretation and explanation. Specifications are subject to change without notice.

Dimensions

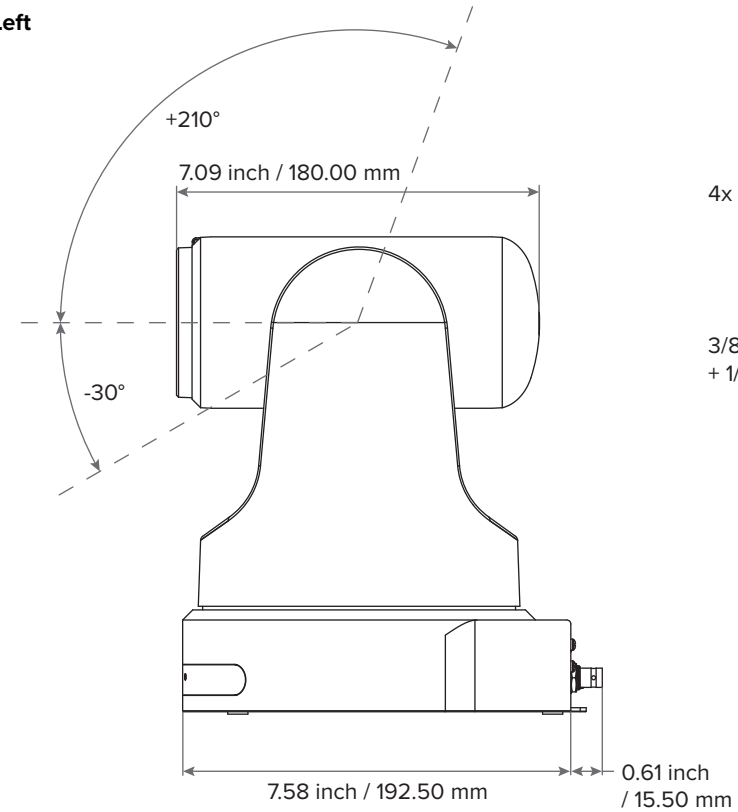
Top



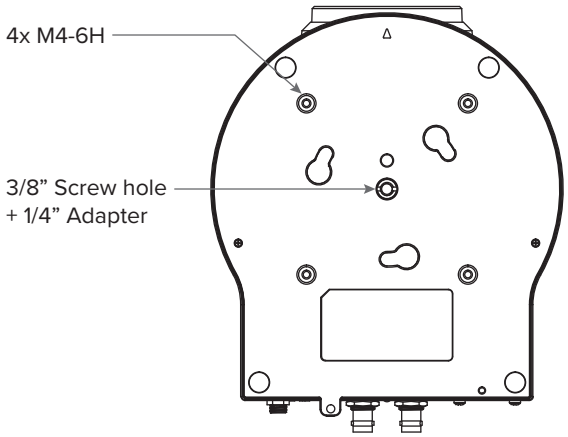
Front



Left



Bottom



Pin array of the VISCA RS-422 port

VISCA RS-422 IN

VISCA RS-422 OUT

Pin No.	VISCA RS-422 IN	VISCA RS-422 OUT
1	TX-	RX-
2	TX+	RX+
3	RX-	TX-
4	GND	GND
5	GND	GND
6	RX+	TX+
7	N.C.	N.C.
8	N.C.	N.C.