



# BG-ND-20XHSRP / BG-ND-30XHSRP

HD Color Video Camera

User Manual



# Warnings

---

## Electrical Safety

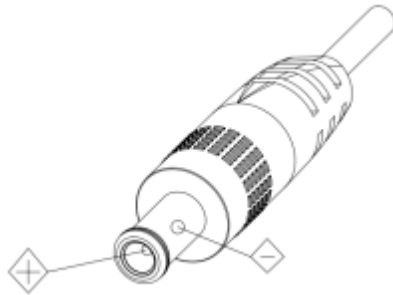
Installation and operation must conform with local electric safety standards.

### Use care when moving

Avoid stress, vibration and moisture in transportation, storage and installation.

### Polarity of power supply

The power supply of the product is  $\pm 12V$ , the max electrical current is 2A. Polarity of the power supply drawing.



## Use Caution During Installation

**Never** move the camera by seizing the camera head. **Never** rotate the camera head by hand as mechanical damage may occur. Damage due to mishandling will void your warranty.

This unit must be installed on a smooth and level surface. Unit will not display level image if installed in a non-level position.

Ensure the base is solidly secured to the mounting surface.

Avoid using corrosive or abrasive materials to clean the camera as these may damage the finish.

Ensure that the camera is free of obstacles throughout its range of rotation.

Never power on before installation is completed.

### **Do not disassemble or open the housing. This will void your warranty!**

To prevent the risk of electric shock, do not open the case. Installation and maintenance should only be carried out by qualified technicians. There are no serviceable parts inside the camera. BZB Gear is not responsible for any damage due to unauthorized disassembly.

# Content

---

1. Quick Installation .....	4
1.1 Camera Overview .....	4
1.2 Power on initial configuration .....	0
1.3 Video Output .....	0
2. Product overview .....	2
2.1 Product Introduction .....	2
2.1.1 Dimensions .....	3
2.1.2 Accessories .....	3
2.2 Main Features .....	4
2.2.1 Camera Performance .....	4
2.2.2 Network performance .....	4
2.3 Technical Specification .....	4
2.4 Connections Overview .....	5
2.4.1 External Connections .....	5
2.4.2 Bottom Dial Switch .....	6
2.4.3 RS-232 Interface .....	6
3. Operating Instructions .....	8
3.1 Video Output .....	8
3.1.1 Power-On Initial Configuration .....	8
3.1.2 Video Output .....	8
3.2 Remote Control .....	9
3.2.1 Key Description .....	9
3.2.2 Remote Control Operation .....	9
3.3 MENU SETTINGS .....	11
3.3.1 Main Menu .....	11
3.3.2 System Setting .....	12
3.3.3 Camera Setting .....	12
3.3.4 P/T/Z .....	15
3.3.5 Video Format .....	15
3.3.6 Version .....	16
3.3.7 Restore Defaults .....	16
4. Network Connection .....	17
4.1 Connection Mode .....	17
4.2 Web Browser Login .....	18
4.2.1 Web client .....	18
2)Download/Install Plug in .....	18
4.2.2 Preview .....	19
4.2.4 Configuration .....	19
4.2.5 Audio Configuration .....	19
4.2.6 Video configuration .....	19
4.2.7 Network configuration .....	20
4.2.8 System configuration .....	21

4.2.9 Logout .....	22
4.2.10 Wireless network .....	22
5. Serial Communication Control .....	22
5.1 VISCA protocol list .....	23
5.1.1 Camera return command .....	23
5.1.2 Camera control command .....	23
5.1.3, Inquiry command .....	26
5.2, Pelco-D protocol command list .....	27
5.3 Pelco-P protocol command list .....	28
6. Camera Maintenance and Troubleshooting .....	28
6.1 Camera Maintenance .....	28
6.2 Troubleshooting .....	28
7. Warranty .....	29
8. Mission Statement .....	29
9. Copyright Notice .....	30



**NDI (Network Device Interface)** technology provides the ability for multiple video systems to communicate via the Local Area Network by eliminating the requirement for Video cables like HDMI, DVI and SDI for streaming providing convenience and versatility. The technology was developed by NewTek to simplify remote connections and streaming, capture/playback, replay and production.

NDI cameras support bi-directional communication featuring ultra-low latency and ultra-high video streams on shared connections. Network requirements include 1GB Network using CAT5/6 cables for connectivity. Software programs offering NDI capturing will typically require NDI plugging be installed.

Note – NDI streaming uses more bandwidth than most streaming devices using standard video cables and capture devices. For this reason, it is recommended when using more than (2) NDI camera simultaneously it is a good idea to implement VLAN's. VLANS provide the ability to divide and segment Network bandwidth to optimize streaming without sacrificing quality of the stream or possible streaming interruptions from other devices connecting to the network. If you are having issues with streaming smoothly, this may be caused by Network traffic and a lack of bandwidth on the LAN.

EXAMPLES of standard NDI Versus NDI | HX Streaming Bandwidth Usage:

- 1920×1080@30 fps NDI stream requires minimum of 125 Mbps of dedicated bandwidth.
- 1920×1080@30 fps NDI | HX stream requires minimum of 8 to 20 Mbps of dedicated bandwidth.

Common Software Programs supporting NDI Plugins: (These plugins will need to be download for your program)

vMix / OBS Studio's / VLC / Wirecast / Epiphan / ProPresenter

# 1. Quick Installation

---

## 1.1 Camera Overview

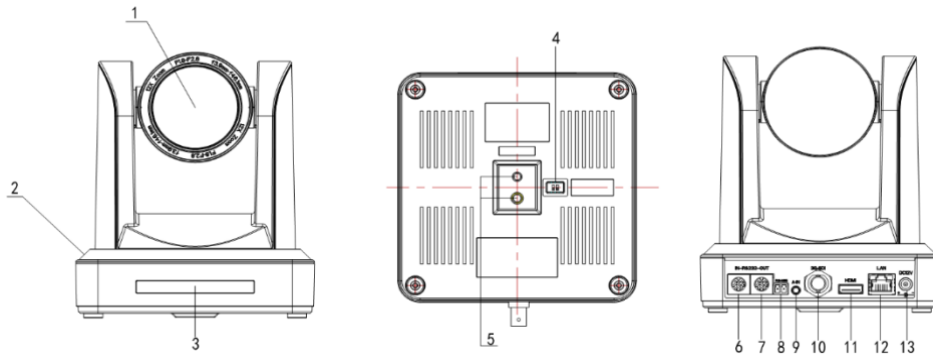


Figure 1.1 Interface

1. Camera Lens
2. Camera Base
3. Remote Controller Receiver Light
4. Bottom Dial Switch
5. Tripod Screw Hole
6. RS232 Control Interface (input)
7. RS232 Control Interface (output)
8. RS485 Input (left +, right-)
9. Audio Input Interface
10. 3G-SDI interface
11. HDMI Interface
12. 10/100M NDI/LAN Network Interface
13. DC12V Input Power Supply Socket

## 1.2 Power on initial configuration

1) Power on: Connect DC12V power supply adapter with power supply socket.

2) Initial configuration: Power on with power indicator light on and remote control receiver light blinking, camera head moves from bottom left to the bottom, and then goes to the HOME position (intermediate position of both horizontal and vertical), while the camera module stretches. When remote control receiver light stops blinking, the self-checking is finished

Note: If you set preset 0, when Power on self-test is completed, the camera automatically moves to the preset 0 position.

## 1.3 Video Output

This model has video outputs from NDI-LAN, HDMI and 3G-SDI.

1) Video Output from NDI | HX LAN

a. Network Cable Connection Port: No.12 in Figure1.1

b. Webpage Login: Open your browser and enter 192.168.5.163 in the address bar (factory default); press Enter to reach the login page; click on "player is not installed, please download and install!" and follow the steps to install the plugin. When complete enter the username *admin* and password *admin* (factory default) and press Enter to reach the preview page. From here users can carry out PTZ control, system configuration and other operations.

2) HDMI Video Output

a. HDMI Video Cable Connection: refer to No.11 in Figure1.1.

b. Connect the camera and the monitor via HDMI video cable; video output is available after camera self-test.

3) 3G-SDI Video Output

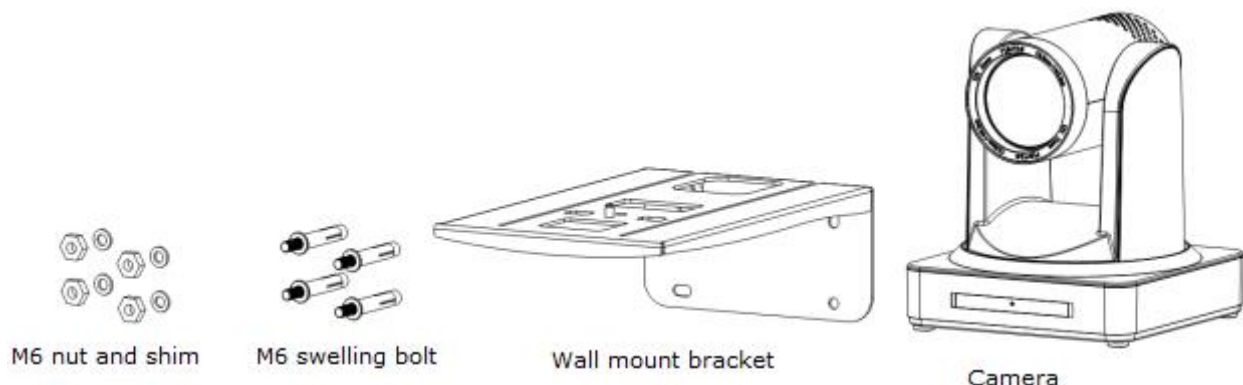
a. 3G-SDI video cable connection: refer to No.10 in Figure1.1

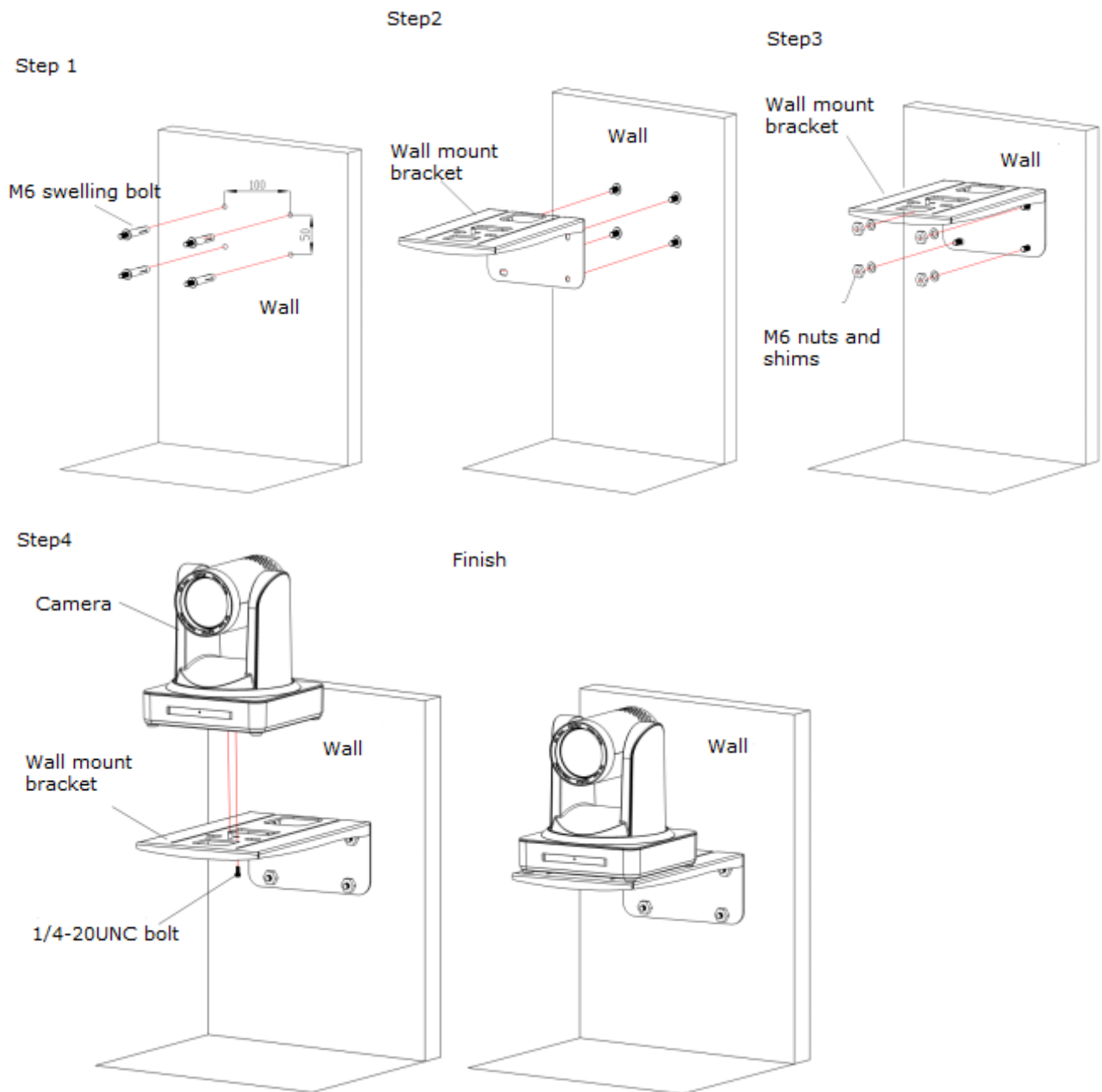
b. Connect the camera and the monitor via 3G-SDI video cable; video output is available after camera self-test.

## 1.4 Bracket mount

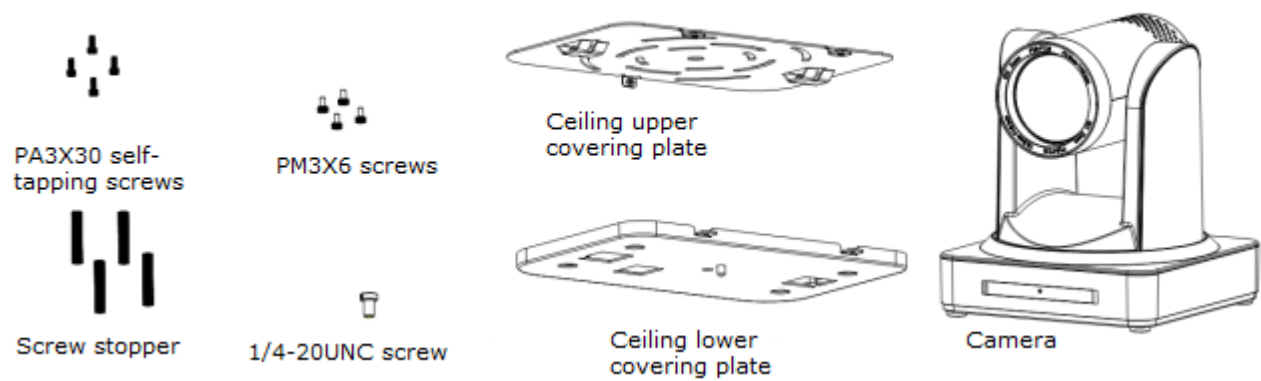
Note: Bracket can be wall or ceiling mounted. Ensure bracket is securely fastened to a solid surface such as wood or concrete. **Do not fasten to drywall** or bracket may come loose and damage or destroy the camera.

1) Wall mount guide

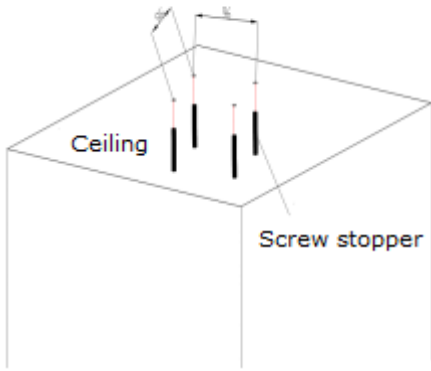




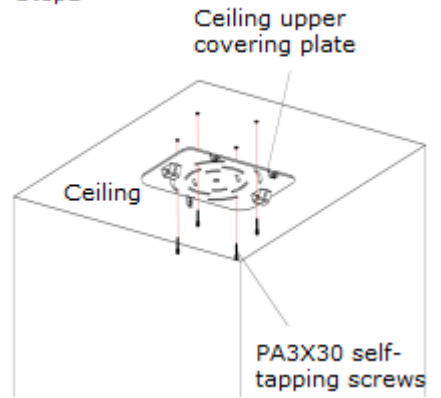
2. Ceiling mount guide



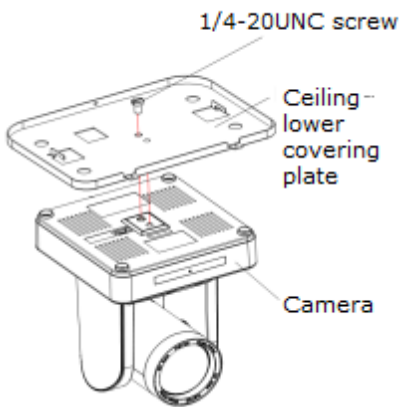
Step1



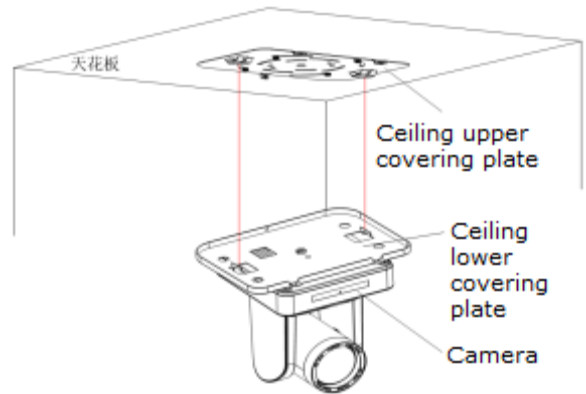
Step2



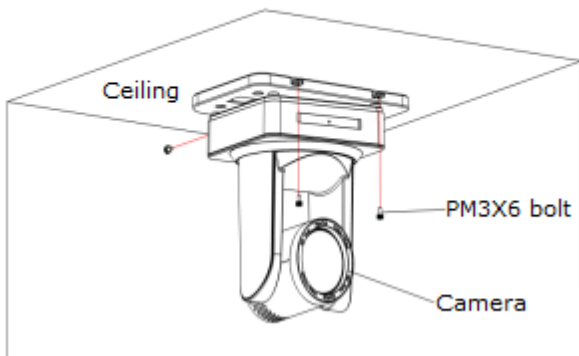
Step3



Step4



Step5



## 2. Product overview

### 2.1 Product Introduction



### 2.1.1 Dimensions

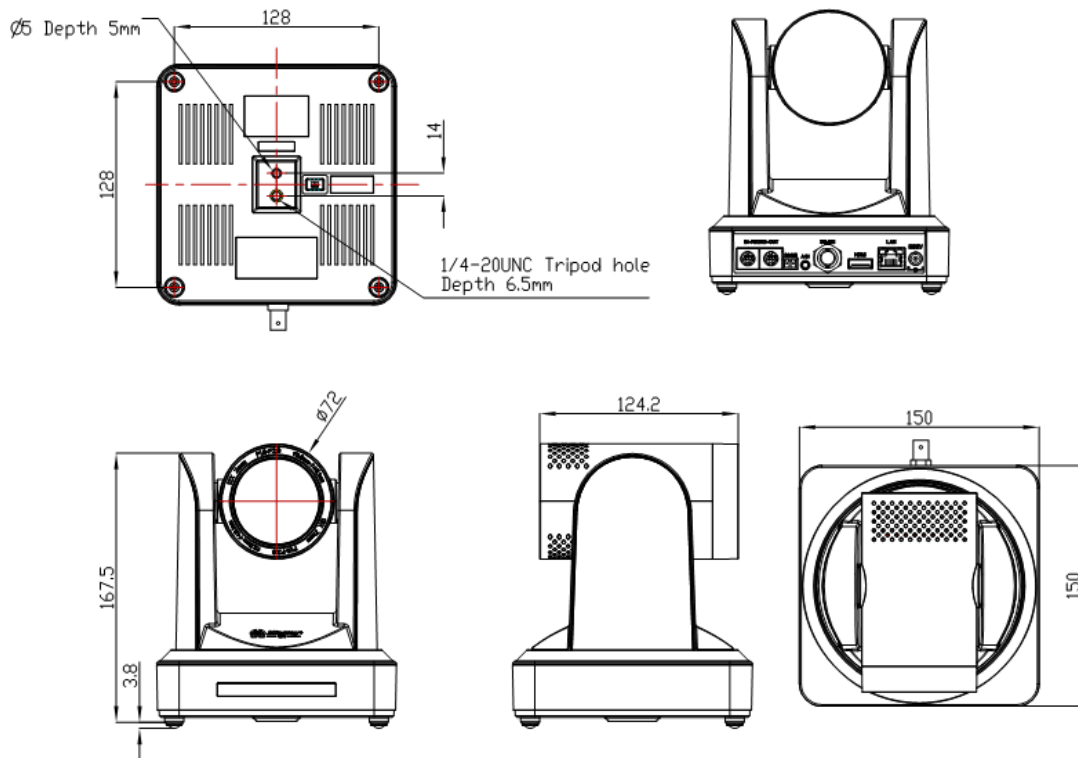


Figure 2.2 Camera Dimensions

### 2.1.2 Accessories

When you unpack, check that all the supplied accessories are included:

Model NO.	Configuration	Accessories
BG-ND-20XHSRP BG-ND-30XHSRP	Standard	Power adapter 1piece
		RS232 cable 1 piece
		User manual 1
		Double-side glue shim 4pcs
		Warranty card 1 piece
	Optional	IR Remote controller 1 piece
		Wireless controller 1 piece
		Wall mounting bracket
		Upside-down mounting bracket(optional)
		Cascade cable

USB2.0 Video cable: If need USB2.0 cable to provide power but not a power adapter, USB2.0 Video cable with two ports is needed, among which red port is for power supply and black port for transmitting USB video signals. If using a power adapter, the general USB2.0 video cable without power supply function is ok.

## 2.2 Main Features

### 2.2.1 Camera Performance

This camera offers superior performance and rich interfaces. Featuring NDI technology for Local Area Network broadcasting along with advanced ISP processing algorithms to provide vivid images with a strong sense of depth, high resolution and accurate color rendition. It supports H.265/H.264 encoding which makes motion video fluent and clear even with less than ideal bandwidth conditions.

1. **Superb High-definition Image:** It employs a 1/2.8 inch high quality CMOS sensor. Resolution is up to 1920x1080 with frame rate up to 60 fps.
2. **Variable Optical Zoom Lens:** It has 20X/30X optical zoom lens for options.
3. **Auto Focus Technology:** Auto focus algorithm makes allows for fast, accurate, and stable auto-focusing.
4. **Low Noise and High SNR:** Low Noise CMOS effectively ensures high SNR of camera video.  
Advanced 2D/3D noise reduction technology is also used to further reduce the noise, while ensuring image sharpness.
5. **Quiet PTZ:** By adopting a high accuracy step driving motor mechanism, it works extremely quietly while moving smoothly and quickly to the designated position.
6. **Multi-Format Video Outputs:** Supports HDMI, 3G-SDI, wired NDI | HX LAN, and wireless LAN interfaces. 3G-SDI provides a 1080p60 signal up to 100m.
7. **Multiple Remote Controls:** Included IR and optional 2.4G wireless remote controls. The 2.4G wireless remote controller will not be affected by angle, distance or IR interference. Supports transparent transmission function.
8. **Low-power Sleep Function:** Supports low-power sleep/wake up, consumption is lower than 500mW under sleep mode
9. **Support Multiple Control Protocol:** Supports VISCA, PELCO-D, and PELCO-P protocols which can be automatically recognized. Supports VISCA control protocol through IP port.
10. **RS-232 Cascade Function:** supports RS-232 cascade function which is convenient for installing.
11. **255 Presets Positions:** Up to 255 presets (10 presets by remoter).

### 2.2.2 Network performance

1. **Audio Input Interface:** Supports 16000, 32000, 44100, 48000 sampling frequency and AAC, MP3, PCM audio coding.
2. **Multiple Audio/Video Compression:** Support H.264/H.265 video compression; AAC, MP3 and PCM audio compression; Support compression of resolution up to 1920x1080 with frame rates up to 60 fps and 2 channel 1920x1080p with 30 fps compression.
3. **Multiple network protocol:** Supports ONVIF, RTSP, and RTMP protocols as well as RTMP push mode making it easy to link streaming media servers. (Wowza, FMS)
4. **5G WIFI function:** If the product contains the 5G module, you can connect and transmit via WiFi.

## 2.3 Technical Specification

Model	20X	30X
<b>Camera Parameter</b>		
Sensor	1/2.8 inch high quality HD CMOS sensor	
Effective Pixels	16: 9 2.07 megapixel	
Video Format	<b>HDMI/SDI/NDI video format</b> 1080P60/50/30/25/59.94/29.97;1080I60/50/59.94;720P60/50/30/25/59.94/29.97	
Optical Zoom	20X f=5.5~110mm	30X f=4.3~129mm
View Angle	3.3° (tele) 54.7° (wide)	2.34° (tele) 65.1° (wide)

AV	F1.6 – F3.5	F1.6– F4.7
Digital Zoom	20X/30X	
Minimum Illumination	0.5Lux (F1.8, AGC ON)	
DNR	2D & 3D DNR	
White Balance	Auto / Manual/ One Push/ 3000K/ 4000K/5000K/6500K	
Focus	Auto/Manual	
Aperture	Auto/Manual	
Electronic Shutter	Auto/Manual	
BLC	ON/OFF	
WDR	OFF/ Dynamic level adjustment	
Video adjustment	Brightness, Color, Saturation, Contrast, Sharpness, B/W mode, Gamma curve	
SNR	>55dB	

Input/Output Interface	
Video Interfaces	BG-ND-20XHSRP / BG-ND-30XHSRP: HDMI, 3G-SDI, NDI-LAN.
Image code stream	Double streams outputs simultaneously
Video Compression format	H.264, H.265
Control Signal Interface	RS-232 Ring through RS232 output, RS-485
Control Protocol	VISCA/Pelco-D/Pelco-P; Baud Rate: 115200/9600/4800/2400bps
Audio input Interface	Double track 3.5mm linear input;
Audio Compression Format	AAC/MP3/PMC Audio compression
HD IP Interface	100M IP port(100BASE-TX); 5G WiFi (optional), support NDI & IP Visca control protocol
Network Protocol	NDI, RTSP/RTMP, ONVIF
Power Interface	HEC3800 outlet (DC12V)

PTZ Parameter	
Pan Rotation	±170°
Tilt Rotation	-30°~+90°
Pan Control Speed	0.1 -180°/sec
Tilt Control Speed	0.1-80°/sec
Preset Speed	Pan: 60°/sec, Tilt: 30°/sec
Preset Number	255 presets (10 presets by remote controller)

Other Parameters	
Supply Adapter	AC110V-AC220V to DC12V/2A
Input Voltage	DC12V±10%
Input Current	1A(Max)
Consumption	12W (Max)
Store Temperature	-10°C to +60°C
Store Humidity	20% - 95%
Working Temperature	-10°C to +50°C
Working Humidity	20%--80%
Dimension	150mmX150mmX167.5mm
Weight	1.4KG
Working Environment	Indoor
Remote Operation (IP)	Remote Upgrade, Reboot and Reset
Accessory	Power Supply, RS232 Control Cable, Remoter, Manual, Warranty card
Optional Accessory	Bracket

## 2.4 Connections Overview

### 2.4.1 External Connections

- 1) External interface: RS232 Input /Output, RS485 Input, Audio Input,3G-SDI Output, HDMI Output, NDI|HX LAN, DC12V Power Interface.

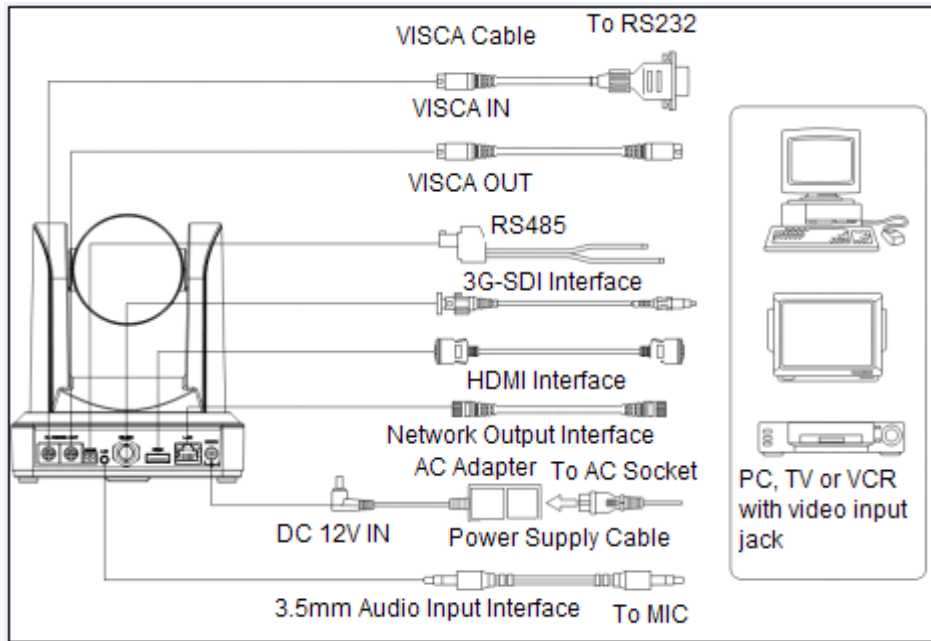


Figure 2.3 external interface diagram

### 2.4.2 Bottom Dial Switch

Bottom Dial Switch diagram shown in Figure 2.6 and 2.7:

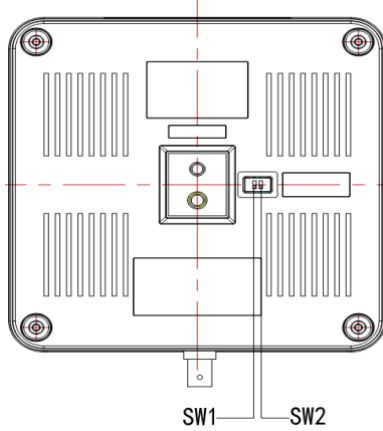


Figure 2.6 Bottom Dial Switch Diagram

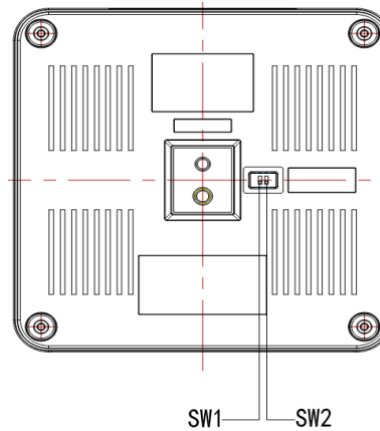


Figure 2.7 Bottom Dial Switch diagram

Two DIP switches are set to ON or OFF to select different modes of operation as shown in Table 2.2

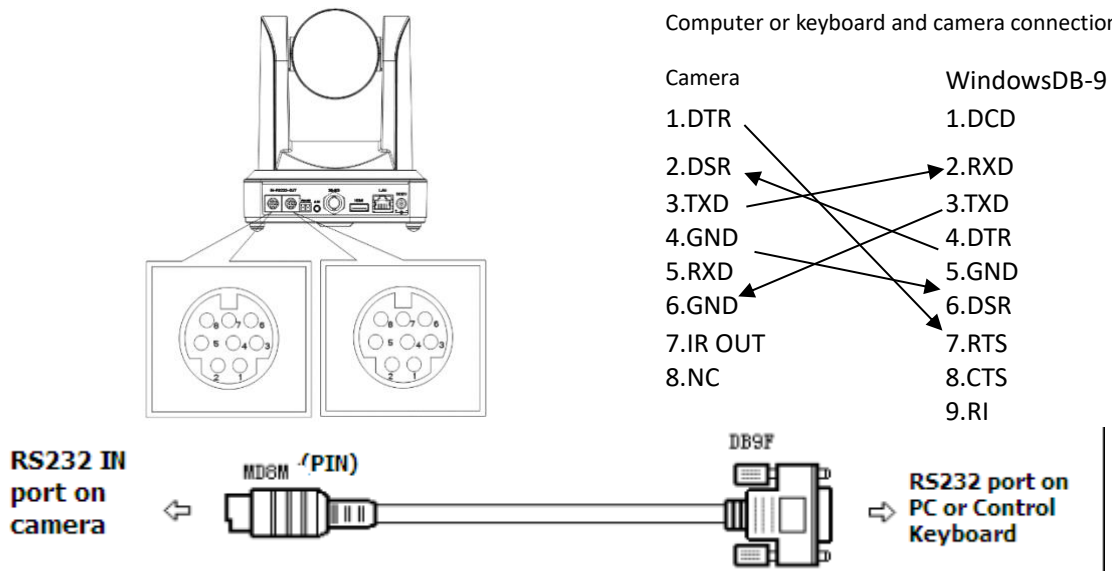
Table 2.2 Dial Switch setting

No.	SW1	SW2	Explanation
1	OFF	ON	Working mode
2	ON	OFF	Updating mode

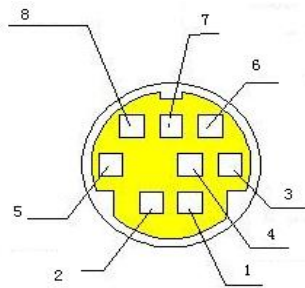
### 2.4.3 RS-232 Interface

1) RS-232C interface specification as shown below

Computer or keyboard and camera connection method

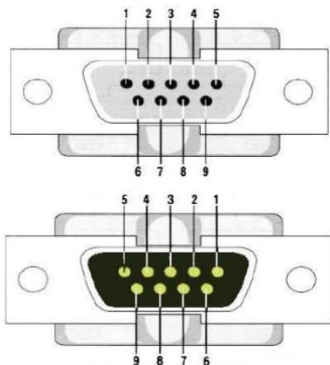


2) RS-232 Mini-DIN 8-pin Port Definition



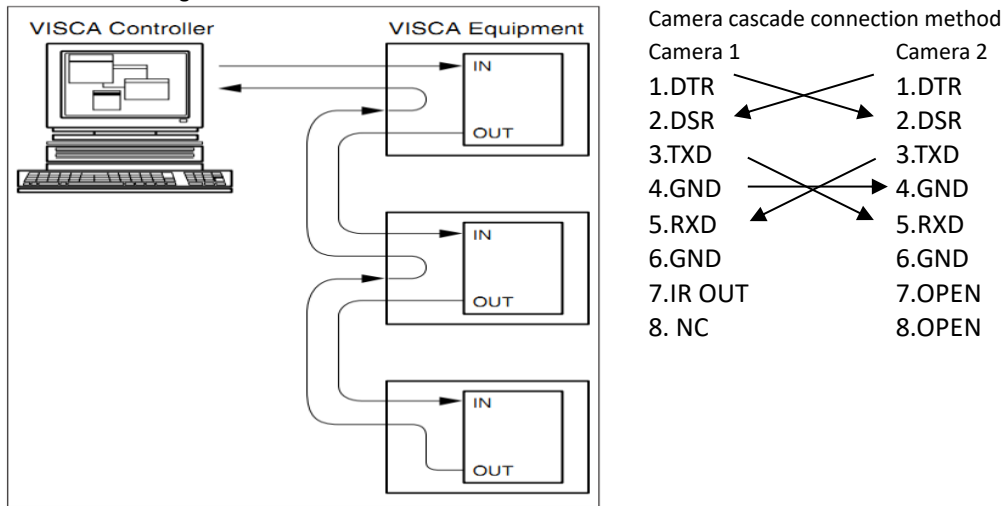
NO.	Port	Definition
1	DTR	Data Terminal Ready
2	DSR	Data Set Ready
3	TXD	Transmit Data
4	GND	System Ground
5	RXD	Receive Data
6	GND	System Ground
7	IR OUT	IR Commander Signal
8	NC	No Connection

3) RS232 (DB9) Port Definition



NO.	Port	Definition
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	System Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	RI	Ring Indicator

2) VISCA networking as shown below:



Note: Has RS232 input and output interface allowing for cascading inputs.

## 3. Operating Instructions

### 3.1 Video Output

#### 3.1.1 Power-On Initial Configuration

After connecting the power, the camera will initiate self-test mode. The IR indicator light will start flashing. When the camera returns to the HOME position (middle position for P/T) and lens finishes zoom in/out, the self-testing is finished. The IR led will stop flashing. If the preset 0 is set, the camera will rotate to the (0) preset position after initial configuration.

#### 3.1.2 Video Output

Connect the video output cable; this may vary based on camera model and application.

Figure 1.4.1 is for your reference (output interface introduction for each product)

- 1) NDI Network Output: Connect this product and your computer via network cable. Open the browser and enter the camera IP address (factory default 192.168.5.163) in the address bar. On the login page enter username and password - factory default is "admin" for both. Once logged in you will be prompted to download and/or enable manage the plugin, click allow and video will be displayed.

(Note: If you forget your username, password, IP address, you can manually restore the default by the remote controller key combination \* #)

- 2) 3G-SDI output or DVI (HDMI) output: Connect the monitor with the corresponding video output interface and the image will be displayed after initial power-on.

## 3.2 Remote Control



### 3.2.1 Key Description

#### 1. Power/Standby Key

Press and hold for 3 seconds to place the camera into standby mode. Press and hold for 3 seconds a second time and the camera will self-test again and return to the HOME position. Note: Camera will default to preset 0 if no command is sent within 12 seconds of power on.

#### 2. Camera Select

Select the ID of the camera you wish to control.

#### 3. Number Key

Set or run preset 0-9.

#### 4. \* # Key

Used for command modifiers – See tables in sections 11 and 12 below.

#### 5. Focus Control Key

Auto: Activate auto focus mode.

Manual: Activate manual focus mode.

+/-: Adjust focus in manual focus mode.

#### 6. Zoom Control Key

Zoom +: Zoom In

Zoom -: Zoom Out

#### 7. Set or Clear Preset key:

Set Preset: Press and hold while selecting desired number key to record a preset.

Clear Preset key: Press and hold while selecting desired number key to clear a preset.

#### 8. Pan/Tilt Control Key

▲ Tilt camera up

▼ Tilt camera down

◀ Pan camera left

▶ Pan camera right

HOME: Return to the middle position/ confirm on-screen menu selection.

#### 9. BLC ON/OFF

Turn on or off remote control button backlighting.

#### 10. MENU

Enter or exit on-screen menu/previous menu.

### 11. Camera IR Remote Control Address Setting

【\*】 + 【#】 + 【F1】 :Camera Address No.1

【\*】 + 【#】 + 【F2】 :Camera Address No. 2

【\*】 + 【#】 + 【F3】 :Camera Address No. 3

【\*】 + 【#】 + 【F4】 :Camera Address No. 4

### 12. Key Combination Functions

1) 【#】 + 【#】 + 【#】 : Clear all camera presets

3) 【\*】 + 【#】 + 【9】 : Flip image

5) 【\*】 + 【#】 + Manual: Restore default IP address and login

7) 【#】 + 【#】 + 【1】 : Switch the video format to 1080P50

9) 【#】 + 【#】 + 【3】 : Switch the video format to 1080I50

11) 【#】 + 【#】 + 【5】 : Switch the video format to 720P50

13) 【#】 + 【#】 + 【7】 : Switch the video format to 1080P25

15) 【#】 + 【#】 + 【9】 :Switch the video format to 720P25

2) 【\*】 + 【#】 + 【6】 :Restore factory defaults

4) 【\*】 + 【#】 + 【3】 : Menu set to Chinese

6) 【\*】 + 【#】 + 【4】 :Menu set to English

8) 【#】 + 【#】 + 【0】 :Switch the video format to 1080P60

10) 【#】 + 【#】 + 【2】 :Switch the video format to 1080I60

12) 【#】 + 【#】 + 【4】 :Switch the video format to 720P60

14) 【#】 + 【#】 + 【6】 :Switch the video format to 1080P30

16) 【#】 + 【#】 + 【8】 :Switch the video format to 720P30

### 3.2.2 Remote Control Operation

Following initialization, the camera can receive and execute the IR commands. The indicator will flash when the camera receives a command. Users can control the pan/tilt/zoom, settings, and run preset positions via the IR remote controller.

Key Instruction:

1. In this instruction, “press the key” means a click rather than a long-press, and a special note will be given if a long-press for more

than one second is required.

2. When a key-combination is required, do it in sequence. For example, “【\*】+【#】+【F1】” means press “【\*】” first, then press “【#】” and last press “【F1】”.





### 1) Camera Selection



Select the camera address to control.

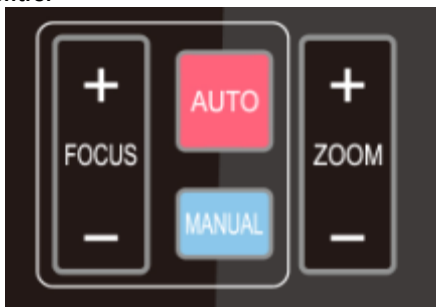
### 2) Pan/Tilt Control





Up: press  Down: press   
Left: press  Right: press   
Back to middle position: press “【HOME】”

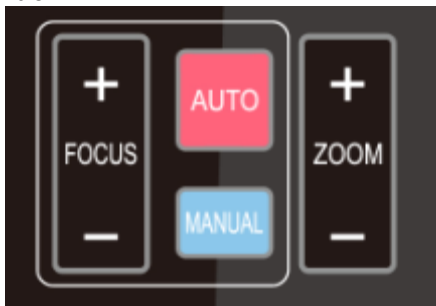
Press and hold the up/down/left/right key, the pan/tilt will keep running, from slow to fast, until it runs to the endpoint; the pan/tilt running stops as soon as the key is released.

### 3) Zoom Control



ZOOM IN: press “ZOOM  ” key  
ZOOM OUT: press “ZOOM  ” key  
Press and hold the key, the camera will keep zooming in or zooming out and stop as soon as the key is released.

### 4) Focus Control



Focus (near): Press “【focus+】” key (Valid only in manual focus mode)  
Focus (far): Press “【focus-】” key (Valid only in manual focus mode)  
Auto Focus: Support  
Manual Focus: Support  
Press and hold the key, the action of focus will keep continue and stops as soon as the key is released.

### 5) BLC Setting



BLC ON / OFF: support

### 6) Presets - Setting, Running, Clearing





1. **Preset setting:** to set a preset position, the users should press the “【SET PRESET】” key first and then press the number key 0-9 to record a preset.

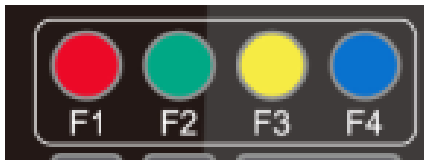
**Note:** 10 preset positions in total are available by remote controller.

2. **Preset Running:** Press a number key 0-9 to run a preset.

3. **Preset Clearing:** To clear a preset position, the user can press the “【CLEAR PRESET】” key first and then press the number key 0-9 to clear the preset.

**Note:** press the “【#】” key three times to erase all presets.

### 7) Camera Remote Controller Address Setting

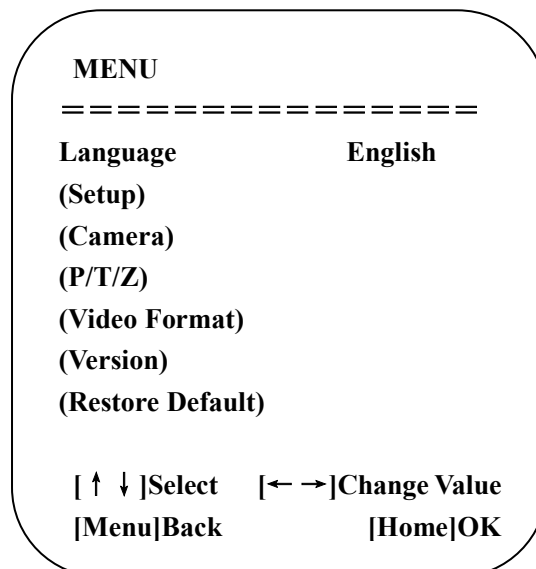


- 【\*】 + 【#】 + 【F1】 :Camera Address No.1
- 【\*】 + 【#】 + 【F2】 :Camera Address No. 2
- 【\*】 + 【#】 + 【F3】 :Camera Address No. 3
- 【\*】 + 【#】 + 【F4】 :Camera Address No. 4

## 3.3 MENU SETTINGS

### 3.3.1 Main Menu

In normal working mode, press 【MENU】 key to display the menu and use the arrow keys to navigate the options.



**LANGUAGE:** Language setting, Chinese / English

**SETUP:** System setting

**CAMERA OPTION:** Camera setting

**PTZ OPTION:** Pan tilt setting

**VERSON:** camera version setting

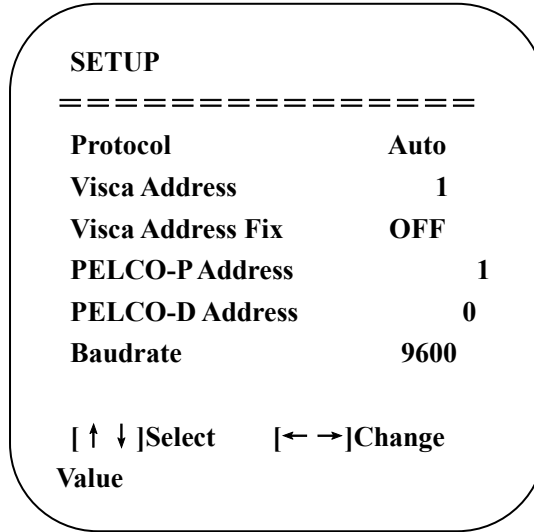
**Restore Default:** Reset setting

**[↑↓] Select:** for selecting menu

[← →] **Change Value:** for modify parameters  
 [MENU] **Back:** Press [MENU] to return  
 [Home] **OK:** Press [Home] to confirm

### 3.3.2 System Setting

Move the pointer to the (Setup) in the Main Menu, click the 【HOME】 key and enter the (System Setting) as shown below.



**PROTOCOL:** VISCA/Pelco-P/Pelco-D/Auto

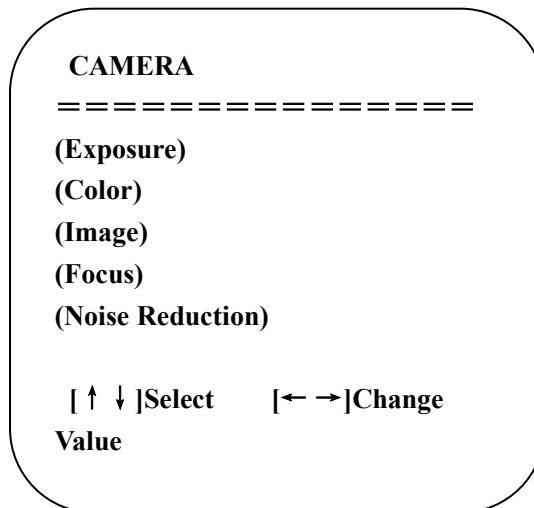
**Visca ADDR:** VISCA=1~7 Pelco-P=1~255 Pelco-D = 1~255

**Baud rate:** 2400/4800/9600/115200

**Visca Address Fix:** On/Off

### 3.3.3 Camera Setting

Highlight (CAMERA) in the Main Menu, click the 【HOME】 key to enter camera settings.



**EXPOSURE:** Enter Exposure setting

**COLOR:** Enter color setting

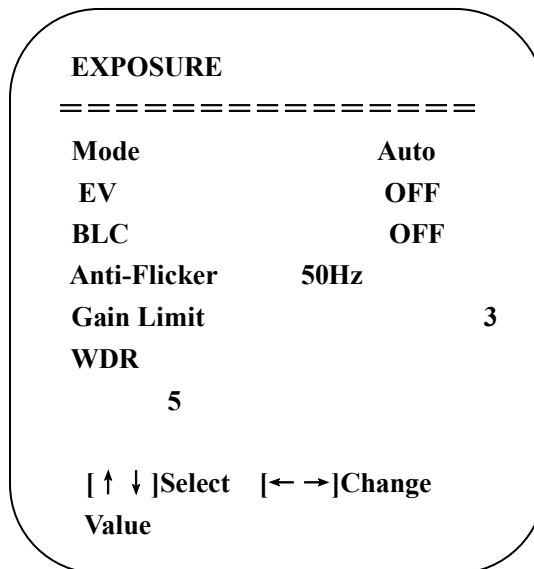
**Image:** Enter into image setting

**Focus:** Enter into focus setting

**Noise Reduction:** Enter noise reduction

#### 1) EXPOSURE SETTING

Highlight (EXPOSURE) in the Main Menu, click the 【HOME】 key to enter exposure settings.



**Mode:** Auto, Manual, Shutter priority, Iris priority and Brightness priority.

**EV:** On/Off (only available in auto mode)

**Compensation Level:** -7~7 (only available in auto mode when EV is ON)

**BLC:** ON/OFF for options (only available in auto mode)

**Anti-Flicker:** OFF/50Hz/60Hz for options (only available in Auto/Iris **priority**/Brightness **priority** modes)

**Gain Limit:** 0~15 (only available in Auto/ Iris **priority** /Brightness **priority** mode)

**WDR:** Off,1~8

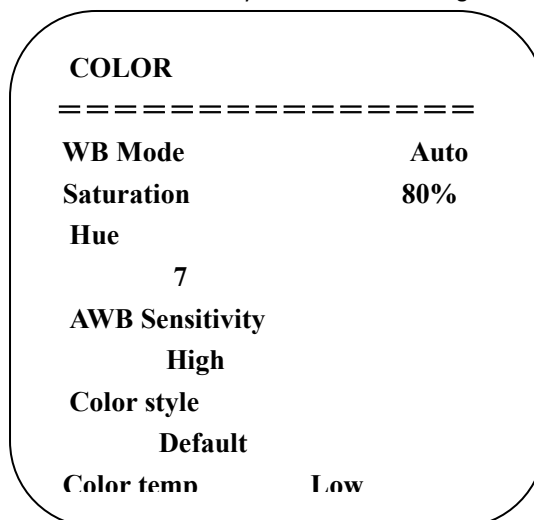
**Shutter Priority:** 1/25,1/30,1/50,1/60,1/90,1/100,1/120,1/180,1/250,1/350,1/500,1/1000,1/2000,1/3000,1/4000,1/6000,1/10000 (only available in Manual and Shutter priority mode)

**IRIS Priority:** OFF,F11.0,F9.6,F8.0,F6.8,F5.6,F4.8,F4.0,F3.4,F2.8,F2.4,F2.0,F1.8 (only available in Manual and Iris priority mode)

**Brightness:** 0~23 (only available in Brightness **priority** mode)

## 2) COLOR SETTING

Highlight (COLOR) in the Main Menu and click the **【HOME】** key to enter Color Settings.



**WB Mode:** Auto, Manual, One Push

**Red Gain:** 0~255(only available in Manual mode)

**Blue Gain:** 0~255(only available in Manual mode)

**Saturation:** 60%,70%,80%,90%,100%,110%,120%,130%

Hue: 0~14

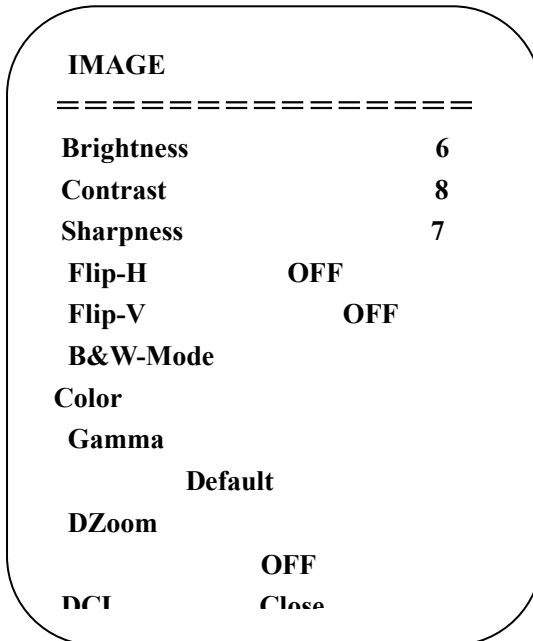
AWB Sensitivity: high/middle/low

Color Style: Default, style1~4.

Color Temp: high/middle/low

### 3) IMAGE

Highlight (IMAGE) in the Menu and click the **【HOME】** key to enter Image Settings.



Brightness: 0~14

Contrast: 0~14

Sharpness: 0~15

Flip-H: On/Off

Flip-V: On/Off

B&W Mode: color, black/white

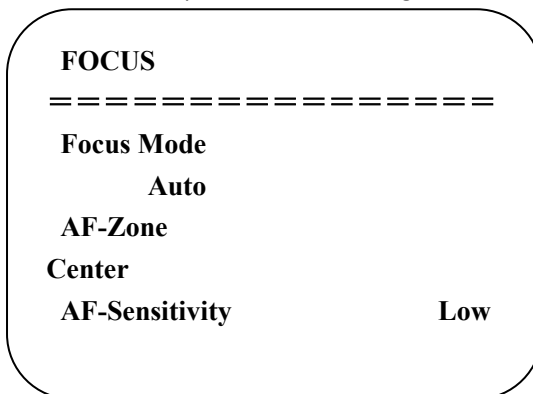
Gamma: default, 0.47, 0.50, 0.52, 0.55

DZoom: digital zoom options: On/Off

DCI: Dynamic Contrast: Off,1~8

### 4) FOCUS

Highlight (FOCUS) in the Menu and click the **【HOME】** key to enter Focus Settings.



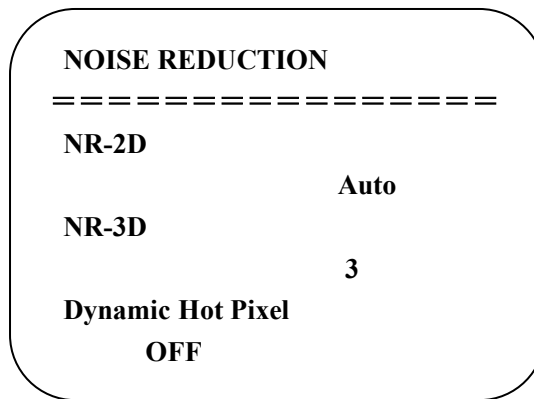
Focus Mode: Auto, manual

AF-Zone: Up, middle, down

AF-Sensitivity: High, middle, low

### 5) NOISE REDUCTION

Highlight (NOISE REDUCTION) in the Menu and click the **【HOME】** key to enter Noise Reduction Settings.



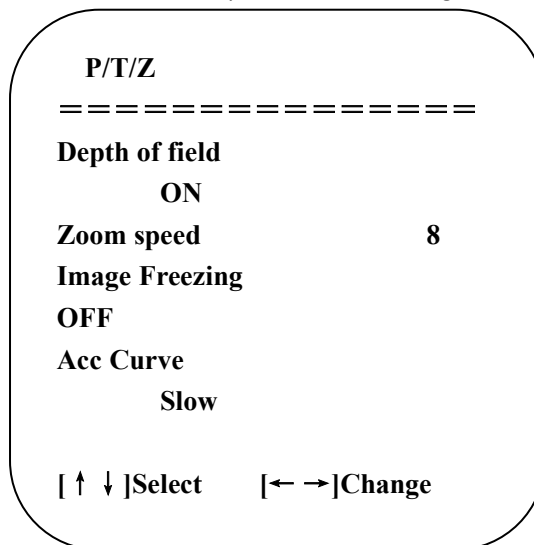
**2D Noise Reduction:** Auto, close, 1~7

**3D Noise Reduction:** Close, 1~8

**Dynamic Hot Pixel:** Close, 1~5

**3.3.4 P/T/Z**

Highlight (P/T/Z) in the Main Menu and click the **【HOME】** key to enter P/T/Z Settings.



**Depth of Field:** Only effective for remote controller, On/ Off

\*When zoomed in the PT control speed by remote will slow down.

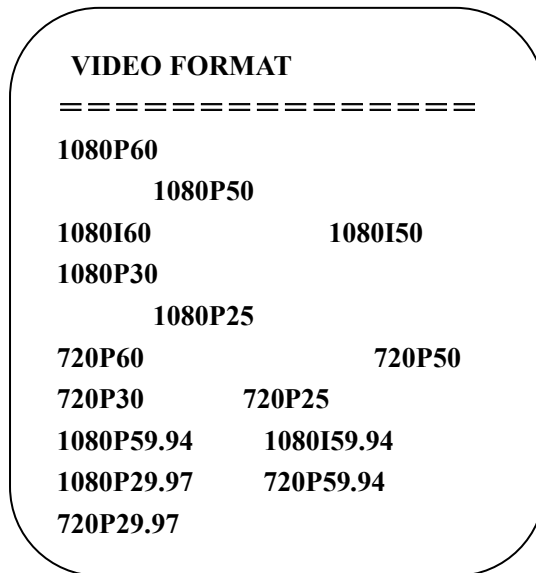
**Zoom Speed:** Set the zoom speed for remote controller,1~8

**Image Freezing:** On/Off

**Accelerating Curve:** Fast/slow

**3.3.5 Video Format**

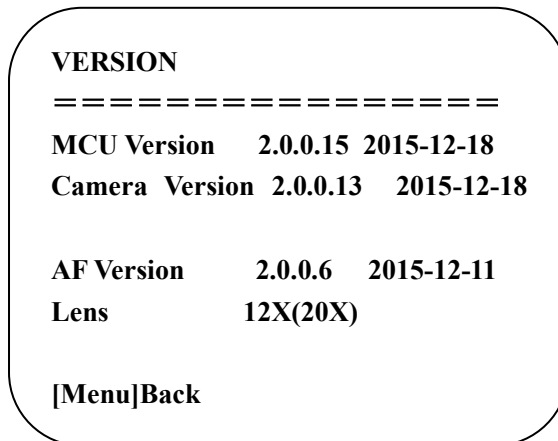
Highlight (**Video Format**) in the Menu and click the **【HOME】** key to enter Video Format Settings



**Note:** 1. S: 1080P60 Downward Compatibility; M: 1080P30 Downward Compatibility  
2. Exit menu after modifying parameter to save it after powered off

### 3.3.6 Version

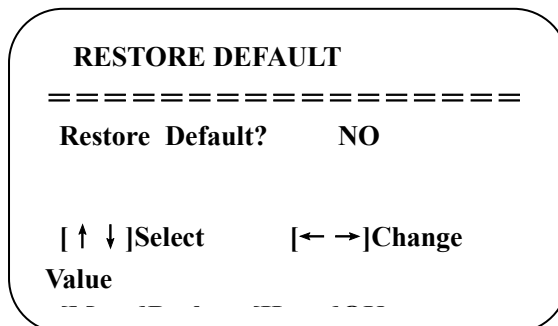
Highlight (VERSION) in the Main Menu and click the **【HOME】** key to enter Version Information.



**MCU Version:** Display MCU version information  
**Camera Version:** Display camera version information  
**AF Version:** Display the focus version information  
**Lens:** Display the lens zoom

### 3.3.7 Restore Defaults

Highlight (RESTORE DEFAULT) in the Main Menu and click the **【HOME】** key to enter Restore Default Settings.



**Restore default:** options: yes/no; after restoring default, the video format will not be restored.

## 4. Network Connection

### 4.1 Connection Mode

**Direct connection:** Connect the camera directly to the computer by using an ethernet cable.

**Internet connection mode:** Connect the camera and computer to a router or switch and access via the local area network (LAN).

**Note: Ensure power and network connections are secured to prevent video issues caused by poor connection quality.**

The computer must be on the same subnet as the camera to connect successfully. The device will not be accessible otherwise. The camera default IP address is 192.168.5.163, therefore the computer must be connected to the 192.168.5.x subnet.

To connect to the camera, open the Local Area Connection Properties on the computer.

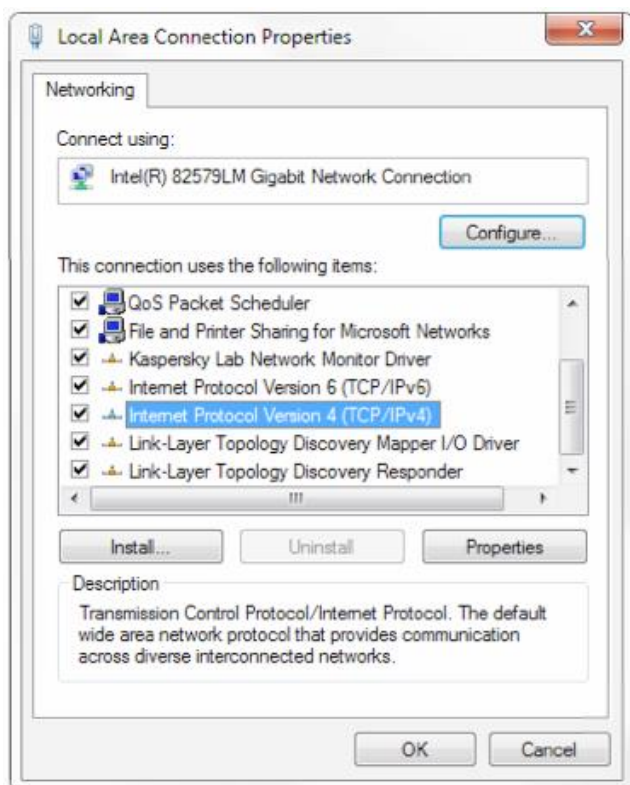
For Windows users right-click on the internet connection in the lower right corner of the desktop.

Select **“Open Network & Internet Settings”**.

Select **“Change Adapter Options”**.

Right-click on your connection (Wi-Fi or Ethernet) and select **“Properties”**.

Select **“Internet protocol version 4 (TCP/IPv4)”** as shown below and click **“Properties”**.



For the following steps refer to the diagram below.

Click on the bubble for “Use the following IP address”

In the **IP address** field enter a non-conflicting IP address on the same subnet as the camera. If there is another device with the same IP address you will not be able to connect. In the example below we are using 192.168.5.200

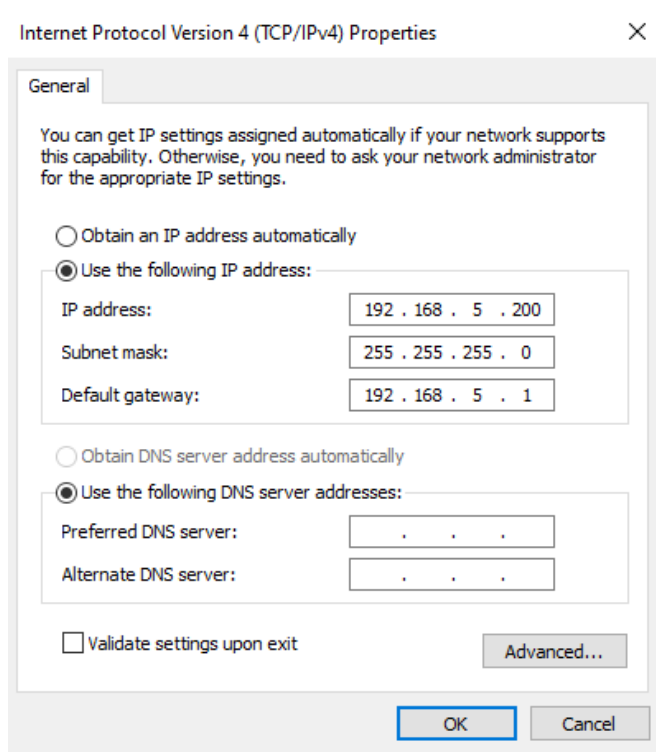
In the **Subnet mask** field enter 255.255.255.0

In the **Default gateway** field type 192.168.5.1

You can leave the DNS fields blank.

Click **OK** to apply your settings.

**NOTE:** When you are finished configuring the camera you will need to return to this screen and click the bubbles for “**Obtain an IP address automatically**” and “**Obtain DNS server automatically**” to restore internet connectivity to your computer. Also make sure to reconnect any ethernet cables you may have unplugged.



## 4.2 Web Browser Login

### 4.2.1 Web client

#### 1) Web client Log In

Enter 192.168.5.163 in the address bar of your internet browser and click Enter. If logged in as administrator (Default Username/Password: admin), users can preview and configure in the Web Client. If logged in as a normal user (Default Username/Password:user1 or user2), users can only preview with no options for configuration.

#### 2)Download/Install Plug in

The first time you connect to the camera you will receive a prompt to allow the Flash player to run. This is required to display the image in your web browser.



#### 4.2.2 Preview

After successful login into the web UI you will see the video preview interface. From the preview screen users can control PTZ, zoom, focus, sound and screen size. Additionally, run and delete preset positions and perform other operations.

#### 4.2.4 Configuration

Click **Configuration** access the following settings.

Menu	Explanation
Audio configure	Including audio compressing format,sampling frequency,sampling precision,compressing code rate settings etc.
Video configure	Including video encoding,video parameters,character-overlapping,character size,video output setting etc.
Network configure	Including basic parameters,Ethernet,DNS,wireless network setting, GB28181 etc.
System configure	Including equipment property,system time,user management,version update,Reset,Reboot device settings etc.

#### 4.2.5 Audio Configuration

**Checkbox:** Select to enable audio.  
**Encode Type:** Set audio compression format  
**Sample Rate:** Set sampling rate  
**Sample Bits:** Set sampling precision  
**Bit rate:** Set audio compression bit rate

**Note:** After clicking “**SAVE**” you will be prompted to reboot the camera. This is required to apply changes.

#### 4.2.6 Video configuration

##### 1) Video encoding

**Stream:** Designates which stream the settings apply to.  
**Compression Format:** Set the video compression format; reboot required to apply changes.  
**Profile:** Profile Mode Setting  
**Image Size:** Set video image resolution; reboot required to apply changes.  
**Stream Rate control:** Set rate control mode; reboot required to apply changes.  
**Image Quality:** Set image quality - Can be changed only when rate control is set to variable bit rate (VBR)  
**Bit Rate (Kb / s):** Set the video bit rate  
**Frame rate (F / S):** Set the video frame rate  
**I frame interval:** Set the key frame interval  
**Stream Name:** When streaming via RTSP or RTMP, user can modify stream name.  
Click **SAVE** to apply changes.

##### 2) Stream Publish

**Checkbox:** To turn enable/disable main or secondary stream.  
**Protocol Type:** Primary and secondary streams use RTMP protocol.  
**Host Port :** Server port number.  
**Host Address:** Server IP addresses  
**Stream Key:** Copy Paste a Stream Key  
**Username:** Set the username  
**Password:** Set the password  
Click **SAVE** to apply changes.

\*To use RTSP use the following string in “**Stream Name**”: rtsp:// device IP address: 554 / live / av0 (av0 main stream; av1 secondary stream)

##### 3) RTP Multicast

**Checkbox:** Click to enable/disable main or secondary stream.  
**Protocol Type:** Select protocol type  
**Multicast Address:** Server IP address

**Multicast Port:** Server port number

#### 4) Video Parameters

**Focus:** Focus mode, focus range, focus sensitivity can be set.

**Focus Mode:** set the focus mode

**Focus Range:** set the focus range

**Focus Sensitivity:** Set the focus sensitivity

**Exposure:** Mode, compensation, back light compensation, anti-flicker, gain limit, and dynamic range compression can be set.

**Exposure Mode:** Set the exposure mode

**Exposure compensation:** Enable exposure compensation

**BLC:** Enable back light compensation

**Anti-flicker:** Set anti-flicker mode

**Gain limit:** Set the gain

**DRC:** Set the dynamic range compression

**Color:** White balance, saturation, color, sensitivity, color temperature, red and blue gain can be set.

**White balance mode:** Set the white balance

**Red Gain:** Set the red gain

**Blue Gain:** Set the blue gain

**Saturation:** Set the saturation

**Auto white balance sensitivity:** Auto white balance settings

**Image:** Brightness, contrast, sharpness, gamma curve, black and white mode, horizontal/vertical flip can be set.

**Brightness:** Set the brightness

**Contrast:** Set the contrast

**Sharpness:** Set the sharpness

**Gamma:** Gamma value setting

**DCI:** Set the DCI level

**Black and white mode:** Set black and white mode

**Flip Horizontal:** Set Flip Horizontal

**Flip Vertical:** Set vertical flip

**Noise Reduction:** 2D noise reduction, 3D noise reduction and dynamic dead pixel correction available.

**2D Noise Reduction:** Set 2D noise reduction level

**3D Noise Reduction:** Set 3D noise reduction level

**Dynamic hot pixel correction:** Set Dynamic hot pixel correction

**Style:** Image style preset can be selected

**Video OSD:** Video overlay information can be set

**Display date and time:** Set whether to display the time and date

**Display Title:** Set whether to display the title

**Time Font Color:** Set font color of time and date

**Title Font Color:** Set font color of

**Moving characters:** Set the display position of date, time, and title

**Title Content:** Set title content

**Time Content:** Set time content

#### OSD Font Size

**Main stream OSD font size:** Set the character size of the display

**Secondary stream character size:** Set the character size of the display

Click "Save" to apply changes.

#### Video output

**Video Out Format:** Set the video output

Click "Save" to apply changes.

#### 4.2.7 Network configuration

### 1) Network port

**Port Data:** Set the data port

**Port Web:** Set the web port

**Port Onvif:** Set Onvif port

**Port Soap:** Set Soap port

**Port RTMP:** Set RTMP port

**Port Rtsps:** Set RTSP port

**Port Visca:** Set Visca

Click "Save" to apply changes.

RTMP access: RTMP: // equipment IP address: 1935 / live/av0 (av0 main stream; av1 second stream)

### 2) Ethernet

**DHCP:** Enable or disable obtain IP automatically

**IP Address:** Set the camera IP address

**Subnet Mask:** Set the subnet mask

**Default Gateway:** Set the default gateway

**MAC Address:** Displays the camera's MAC address.

Click "Save" to apply changes.

### 3) DNS parameters

**Preferred DNS server:** set the preferred DNS server

**Alternate DNS server:** Alternate DNS server settings

Click "Save" to apply changes.

### 4) GB28181

**Checkbox:** Enable/Disable GB28181

**Clock Sync:** Enable/Disable clock synchronization

**Video Type:** Stream type setting

**Registration Valid Time (seconds):** 3600 Range 5-65535

**Heartbeat time (seconds):** 60 Range 1-65535

**Register ID:** 34020000001320000001

**Register Name:** IPC

**Register Password:** 12345678

**Equipment ownership:** Users can add their own

**Administrative regions:** Users can add their own

**Alarm Areas:** Users can add their own

**Device Address:** Users can add their own

**Local SIP Port:** 5060 Range 0-65535

**GB28181 Server Address:** IP address of the computer

**Server SIP Port:** 5060 Range 0-65535

**Server ID:** 34020000002000000001

Click "Save" to apply changes.

## 4.2.8 System configuration

### 1) System Attributes

**Device Name:** Set the device name

**Device ID:** Shows the device ID

**System Language:** Set the system language

Click "Save" to apply changes.

### 2) System Time

**Date Format:** Set the date format

**Date separator:** Set the date separator

**Time Zone:** Set the time zone

**Hour Type:** Set the clock type

**NTP Enable:** Enable automatic time sync

**Update interval:** Set the NTP server automatic time update interval

**Host URL:** Set NTP server address or domain name

**Host Port:** Sets the NTP server

Click "Save" to apply changes.

### 3) User Management

**Authority:** Set the user type (Administrator, Common User 1, Common User 2)

**Username:** Set the username  
**Password:** Set a password  
**Password confirmation:** Confirm the password  
Click "Save" to apply changes.

#### 4) Update

**MCU version:** Displays current firmware version  
**Camera version:** Displays current firmware version  
**Focus version:** Displays current firmware  
**Update file:** Click choose file to browse for firmware update file. Click Upgrade when file is selected.

**\* Make sure power and network remain connected during process or the upgrade will fail!**

#### 5) Default

Click on "Restore Factory Defaults" button and choose "yes" or "no"

#### 6) Reboot

Click on the pop-up "Reboot" button and choose "yes" or "no"

#### 4.2.9 Logout

Click "Logout" button; select "Yes" or "No"

#### 4.2.10 Wireless network

If the user's equipment has a wireless network module, the specific configuration is as follows:

##### 1) Network settings

Wireless network configuration:

**Network interface enable:** Select to enable wireless interface  
**DHCP:** Select to enable DHCP (default is disabled with a static address of 192.168.1.250)  
**\*Note:** Wireless IP address cannot be in the same subnet as wired IP address!

**Subnet Mask:** Set the wireless IP subnet mask (default 255.255.255.0)  
**Default Gateway:** Set the wireless IP default gateway (default 192.168.1.1)  
**SSID:** The user can modify their own (the default test)  
**Encryption:** Select to enable password entry  
**Password:** Enter Wifi password  
Click "Save" to apply changes.

##### 2) WiFi hot link

Click on the "search" button to scan for WIFI hotspots.  
Double-click the dialog box after selecting Wifi hotspot, then input password to connect to Wifi.

##### 3) Wireless WiFi login page

Enter IP address of camera to login via browser. Default is 192.168.1.250. Use a network scanning tool to locate your IP address if DHCP was enabled in setup.

## 5. Serial Communication Control

---

Under common working conditions the camera can be controlled through RS232/RS485 interface (VISCA), RS232C serial parameter are as follows:

Baud rate: 2400/4800/9600/115200 bits / sec; Start bit: 1; data bits: 8; Stop bit: 1; Parity: None.

After powering on, the camera will perform a self-test. Self-test is finished after the zoom moves to the farthest and then back to the nearest position. If the camera has a "0" preset stored it will return to that position after initialization. At this point, the user can control the camera by the serial commands.

## 5.1 VISCA protocol list

### 5.1.1 Camera return command

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

z = camera address + 8

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

### 5.1.2 Camera control command

Command	Function	Command packet	Note
AddressSet	Broadcast	88 30 0p FF	p: Address setting
IF_Clear	Broadcast	88 01 00 01 FF	I/F Clear
CommandCancel		8x 21 FF	
CAM_Power	On	8x 01 04 00 02 FF	Power ON/OFF
	Off	8x 01 04 00 03 FF	
CAM_Zoom	Stop	8x 01 04 07 00 FF	p = 0(low) - F(high) pqrs: Zoom Position
	Tele(Standard)	8x 01 04 07 02 FF	
	Wide(Standard)	8x 01 04 07 03 FF	
	Tele(Variable)	8x 01 04 07 2p FF	
	Wide(Variable)	8x 01 04 07 3p FF	
	Direct	8x 01 04 47 0p 0q 0r 0s FF	
CAM_Focus	Stop	8x 01 04 08 00 FF	p = 0(low) - F(high) pqrs: Focus Position
	Far(Standard)	8x 01 04 08 02 FF	
	Near(Standard)	8x 01 04 08 03 FF	
	Far(Variable)	8x 01 04 08 2p FF	
	Near (Variable)	8x 01 04 08 3p FF	
	Direct	8x 01 04 48 0p 0q 0r 0s FF	
	Auto Focus	8x 01 04 38 02 FF	
	Manual Focus	8x 01 04 38 03 FF	
CAM_Zoom Focus	Direct	8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF	pqrs: Zoom Position tuvw: Focus Position
CAM_WB	Auto	8x 01 04 35 00 FF	
	3000K	8x 01 04 35 01 FF	
	4000k	8x 01 04 35 02 FF	
	One Push mode	8x 01 04 35 03 FF	
	5000k	8x 01 04 35 04 FF	
	Manual	8x 01 04 35 05 FF	
	6500k	8x 01 04 35 06 FF	

Command	Function	Command packet	Note
CAM_RGain	Reset	8x 01 04 03 00 FF	Manual Control of R Gain
	Up	8x 01 04 03 02 FF	
	Down	8x 01 04 03 03 FF	
	Direct	8x 01 04 43 00 00 0p 0q FF	pq: R Gain
CAM_Bgain	Reset	8x 01 04 04 00 FF	Manual Control of B Gain
	Up	8x 01 04 04 02 FF	
	Down	8x 01 04 04 03 FF	
	Direct	8x 01 04 44 00 00 0p 0q FF	pq: B Gain
CAM_AE	Full Auto	8x 01 04 39 00 FF	Automatic Exposure mode
	Manual	8x 01 04 39 03 FF	Manual Control mode
	Shutter priority	8x 01 04 39 0A FF	Shutter Priority Automatic Exposure mode
	Iris priority	8x 01 04 39 0B FF	Iris Priority Automatic Exposure mode
	Bright	8x 01 04 39 0D FF	Bright mode
CAM_Shutter	Reset	8x 01 04 0A 00 FF	Shutter Setting
	Up	8x 01 04 0A 02 FF	
	Down	8x 01 04 0A 03 FF	
	Direct	8x 01 04 4A 00 00 0p 0q FF	pq: Shutter Position
CAM_Iris	Reset	8x 01 04 0B 00 FF	Iris Setting
	Up	8x 01 04 0B 02 FF	
	Down	8x 01 04 0B 03 FF	
	Direct	8x 01 04 4B 00 00 0p 0q FF	pq: Iris Position
CAM_Gain Limit	Gain Limit	8x 01 04 2C 0p FF	p: Gain Position
CAM_Bright	Reset	8x 01 04 0D 00 FF	Bright Setting
	Up	8x 01 04 0D 02 FF	
	Down	8x 01 04 0D 03 FF	
	Direct	8x 01 04 4D 00 00 0p 0q FF	pq: Bright Position
CAM_ExpComp	On	8x 01 04 3E 02 FF	Exposure Compensation ON/OFF
	Off	8x 01 04 3E 03 FF	
	Reset	8x 01 04 0E 00 FF	Exposure Compensation Amount Setting
	Up	8x 01 04 0E 02 FF	
	Down	8x 01 04 0E 03 FF	
	Direct	8x 01 04 4E 00 00 0p 0q FF	pq: ExpComp Position
CAM_Back Light	On	8x 01 04 33 02 FF	Back Light Compensation
	Off	8x 01 04 33 03 FF	
CAM_WDR Strength	Reset	8x 01 04 21 00 FF	WDR Level Setting
	Up	8x 01 04 21 02 FF	
	Down	8x 01 04 21 03 FF	
	Direct	8x 01 04 51 00 00 00 0p FF	p: WDR Level Position
CAM_NR (2D)		8x 01 04 53 0p FF	P=0-7 0:OFF
CAM_NR (3D)		8x 01 04 54 0p FF	P=0-8 0:OFF
CAM_Gamma		8x 01 04 5B 0p FF	p = 0 – 4 0: Default 1: 0.47 2: 0.50 3: 0.52 4: 0.55
CAM_Flicker	OFF	8x 01 04 23 00 FF	OFF
	50HZ	8x 01 04 23 01 FF	50HZ
	60HZ	8x 01 04 23 02 FF	60HZ

Command	Function	Command packet	Note
CAM_Aperture	Reset	8x 01 04 02 00 FF	Aperture Control
	Up	8x 01 04 02 02 FF	
	Down	8x 01 04 02 03 FF	
	Direct	8x 01 04 42 00 00 0p 0q FF	pq: Aperture Gain
CAM_Memory	Reset	8x 01 04 3F 00 pq FF	pq: Memory Number (=0 to 254) Corresponds to 0 to 9 on the Remote Commander
	Set	8x 01 04 3F 01 pq FF	
	Recall	8x 01 04 3F 02 pq FF	
CAM_LR_Reverse	On	8x 01 04 61 02 FF	Image Flip Horizontal ON/OFF
	Off	8x 01 04 61 03 FF	
CAM_PictureFlip	On	8x 01 04 66 02 FF	Image Flip Vertical ON/OFF
	Off	8x 01 04 66 03 FF	
CAM_ColorSaturation	Direct	8x 01 04 49 00 00 00 0p FF	P=0-7 0:60% 1:70% 2:80% 3:90% 4:100% 5:110% 6:120% 7:130%
CAM_IDWrite		8x 01 04 22 0p 0q 0r 0s FF	pqrs: Camera ID (=0000 to FFFF)
SYS_Menu	ON	8x 01 04 06 06 02 FF	Turn on the menu screen
	OFF	8x 01 04 06 06 03 FF	Turn off the menu screen
IR_Receive	ON	8x 01 06 08 02 FF	IR (remote commander) receive On/Off
	OFF	8x 01 06 08 03 FF	
IR_ReceiveReturn	On	8x 01 7D 01 03 00 00 FF	IR (remote commander) receive message via the VISCA communication ON/OFF
	Off	8x 01 7D 01 13 00 00 FF	
CAM_SettingReset	Reset	8x 01 04 A0 10 FF	Reset Factory Setting
CAM_Brightness	Direct	8x 01 04 A1 00 00 0p 0q FF	pq: Brightness Position
CAM_Contrast	Direct	8x 01 04 A2 00 00 0p 0q FF	pq: Contrast Position
CAM_Flip	OFF	8x 01 04 A4 00 FF	Single Command For Video Flip
	Flip-H	8x 01 04 A4 01 FF	
	Flip-V	8x 01 04 A4 02 FF	
	Flip-HV	8x 01 04 A4 03 FF	
CAM_VideoSystem	Set camera video system	8x 01 06 35 00 0p FF	P: 0~E Video format 0:1080P60           8:720P30 1:1080P50           9:720P25 2:1080i60           A: 1080P59.94 3:1080i50           B: 1080i59.94 4:720P60            C: 720P59.94 5:720P50            D: 1080P29.97 6:1080P30           E: 720P29.97 7:1080P25
Pan_tiltDrive	Up	8x 01 06 01 VV WW 03 01 FF	VV: Pan speed 0x01 (low speed) to 0x18 (high speed) WW: Tilt speed 0x01 (low speed) to 0x14 (high speed) YYYY: Pan Position ZZZZ: Tilt Position
	Down	8x 01 06 01 VV WW 03 02 FF	
	Left	8x 01 06 01 VV WW 01 03 FF	
	Right	8x 01 06 01 VV WW 02 03 FF	
	Upleft	8x 01 06 01 VV WW 01 01 FF	
	Upright	8x 01 06 01 VV WW 02 01 FF	
	DownLeft	8x 01 06 01 VV WW 01 02 FF	
	DownRight	8x 01 06 01 VV WW 02 02 FF	
	Stop	8x 01 06 01 VV WW 03 03 FF	
	AbsolutePosition	8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	RelativePosition	8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	
	Home	8x 01 06 04 FF	
	Reset	8x 01 06 05 FF	
Pan-tiltLimitSet	Set	8x 01 06 07 00 0W 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	W:1 UpRight 0:DownLeft YYYY: Pan Limit Position (TBD) ZZZZ: Tilt Limit Position (TBD)
	Clear	8x 01 06 07 01 0W 07 0F 0F 0F 07 0F 0F 0F FF	

### 5.1.3, Inquiry command

Command	Function	Command packet	Note
CAM_PowerInq	8x 09 04 00 FF	y0 50 02 FF	On
		y0 50 03 FF	Off(Standby)
CAM_ZoomPosInq	8x 09 04 47 FF	y0 50 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM_FocusAFModelInq	8x 09 04 38 FF	y0 50 02 FF	Auto Focus
		y0 50 03 FF	Manual Focus
		y0 50 04 FF	One Push Mode
CAM_FocusPosInq	8x 09 04 48 FF	y0 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_WBModelInq	8x 09 04 35 FF	y0 50 00 FF	Auto
		y0 50 01 FF	3000K
		y0 50 02 FF	4000K
		y0 50 03 FF	One Push Mode
		y0 50 04 FF	5000K
		y0 50 05 FF	Manual
		y0 50 00 FF	6500K
			6500K
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_AEModelInq	8x 09 04 39 FF	y0 50 00 FF	Full Auto
		y0 50 03 FF	Manual
		y0 50 0A FF	Shutter priority
		y0 50 0B FF	Iris priority
		y0 50 0D FF	Bright
CAM_ShutterPosInq	8x 09 04 4A FF	y0 50 00 00 0p 0q FF	pq: Shutter Position
CAM_IrisPosInq	8x 09 04 4B FF	y0 50 00 00 0p 0q FF	pq: Iris Position
CAM_Gain LimitInq	8x 09 04 2C FF	y0 50 0p FF	p: Gain Positon
CAM_BrightPosInq	8x 09 04 4D FF	y0 50 00 00 0p 0q FF	pq: Bright Position
CAM_ExpCompModelInq	8x 09 04 3E FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ExpCompPosInq	8x 09 04 4E FF	y0 50 00 00 0p 0q FF	pq: ExpComp Position
CAM_BacklightModelInq	8x 09 04 33 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_WDRStrengthInq	8x 09 04 51 FF	y0 50 00 00 00 0p FF	p: WDR Strength
CAM_NRLevel(2D) Inq	8x 09 04 53 FF	y0 50 0p FF	P: 2DNRLevel
CAM_NRLevel(3D) Inq	8x 09 04 54 FF	y0 50 0p FF	P:3D NRLevel
CAM_FlickerModelInq	8x 09 04 55 FF	y0 50 0p FF	p: Flicker Settings(0: OFF,1: 50Hz,2:60Hz)
CAM_ApertureInq	8x 09 04 42 FF	y0 50 00 00 0p 0q FF	pq: Aperture Gain
CAM_PictureEffectModelInq	8x 09 04 63 FF	y0 50 00 FF	Off
		y0 50 04 FF	B&W
CAM_MemoryInq	8x 09 04 3F FF	y0 50 0p FF	p: Memory number last operated.
SYS_MenuModelInq	8x 09 06 06 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_LR_ReverselInq	8x 09 04 61 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_PictureFlipInq	8x 09 04 66 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ColorSaturationInq	8x 09 04 49 FF	y0 50 00 00 00 0p FF	p: Color Gain setting 0h (60%) to Eh (130%)
CAM_IDInq	8x 09 04 22 FF	y0 50 0p FF	p: Gamma ID
IR_ReceiveInq	8x 09 06 08 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
IR_ReceiveReturn		y0 07 7D 01 04 00 FF	Power ON/OFF
		y0 07 7D 01 04 07 FF	Zoom tele/wide
		y0 07 7D 01 04 38 FF	AF ON/OFF



		y0 07 7D 01 04 33 FF	Camera_Backlight
		y0 07 7D 01 04 3F FF	Camera_Memery
		y0 07 7D 01 06 01 FF	Pan_titleDriver
CAM_BrightnessInq	8x 09 04 A1 FF	y0 50 00 00 0p 0q FF	pq: Brightness Position
CAM_ContrastInq	8x 09 04 A2 FF	y0 50 00 00 0p 0q FF	pq: Contrast Position
CAM_FlipInq	8x 09 04 A4 FF	y0 50 00 FF	Off
		y0 50 01 FF	Flip-H
		y0 50 02 FF	Flip-V
		y0 50 03 FF	Flip-HV
CAM_GammaInq	8x 09 04 5B FF	y0 50 0p FF	p: Gamma setting
CAM_VersionInq	8x 09 00 02 FF	y0 50 ab cd	ab cd : vender ID ( 0220 )
		mn pq rs tu vw FF	mn pq : 0950 rs tu : ARM Version vw : reserve
VideoSystemInq	8x 09 06 23 FF	y0 50 0p FF	P: 0~E Video format
			0:1080P60           8:720P30
			1:1080P50           9:720P25
			2:1080i60           A:
			1080P59.94
			3:1080i50           B: 1080i59.94
			4:720P60           C: 720P59.94
			5:720P50           D: 1080P29.97
6:1080P30          E: 720P29.97			
7:1080P25			
Pan-tiltMaxSpeedInq	8x 09 06 11 FF	y0 50 ww zz FF	ww: Pan Max Speed   zz: Tilt Max Speed
Pan-tiltPosInq	8x 09 06 12 FF	y0 50 0w 0w 0w 0w Oz 0z Oz Oz FF	www: Pan Position   zzzz: Tilt Position

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

## 5.2, Pelco-D protocol command list

Function	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Up	0xFF	Address	0x00	0x08	Pan Speed	Tilt Speed	SUM
Down	0xFF	Address	0x00	0x10	Pan Speed	Tilt Speed	SUM
Left	0xFF	Address	0x00	0x04	Pan Speed	Tilt Speed	SUM
Right	0xFF	Address	0x00	0x02	Pan Speed	Tilt Speed	SUM
Upleft	0xFF	Address	0x00	0x0C	Pan Speed	Tilt Speed	SUM
Upright	0xFF	Address	0x00	0x0A	Pan Speed	Tilt Speed	SUM
DownLeft	0xFF	Address	0x00	0x14	Pan Speed	Tilt Speed	SUM
DownRight	0xFF	Address	0x00	0x12	Pan Speed	Tilt Speed	SUM
Zoom In	0xFF	Address	0x00	0x20	0x00	0x00	SUM
Zoom Out	0xFF	Address	0x00	0x40	0x00	0x00	SUM
Focus Far	0xFF	Address	0x00	0x80	0x00	0x00	SUM
Focus Near	0xFF	Address	0x01	0x00	0x00	0x00	SUM
Set Preset	0xFF	Address	0x00	0x03	0x00	Preset ID	SUM
Clear Preset	0xFF	Address	0x00	0x05	0x00	Preset ID	SUM
Call Preset	0xFF	Address	0x00	0x07	0x00	Preset ID	SUM
Query Pan Position	0xFF	Address	0x00	0x51	0x00	0x00	SUM
Query Pan Position Response	0xFF	Address	0x00	0x59	Value High Byte	Value Low Byte	SUM
Query Tilt Position	0xFF	Address	0x00	0x53	0x00	0x00	SUM
Query Tilt Position Response	0xFF	Address	0x00	0x5B	Value High Byte	Value Low Byte	SUM
Query Zoom Position	0xFF	Address	0x00	0x55	0x00	0x00	SUM

Query Zoom Position Response	0xFF	Address	0x00	0x5D	Value High Byte	Value Low Byte	SUM
------------------------------	------	---------	------	------	-----------------	----------------	-----

## 5.3 Pelco-P protocol command list

Function	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Up	0xA0	Address	0x00	0x08	Pan Speed	Tilt Speed	0xAF	XOR
Down	0xA0	Address	0x00	0x10	Pan Speed	Tilt Speed	0xAF	XOR
Left	0xA0	Address	0x00	0x04	Pan Speed	Tilt Speed	0xAF	XOR
Right	0xA0	Address	0x00	0x02	Pan Speed	Tilt Speed	0xAF	XOR
Upleft	0xA0	Address	0x00	0x0C	Pan Speed	Tilt Speed	0xAF	XOR
Upright	0xA0	Address	0x00	0x0A	Pan Speed	Tilt Speed	0xAF	XOR
DownLeft	0xA0	Address	0x00	0x14	Pan Speed	Tilt Speed	0xAF	XOR
DownRight	0xA0	Address	0x00	0x12	Pan Speed	Tilt Speed	0xAF	XOR
Zoom In	0xA0	Address	0x00	0x20	0x00	0x00	0xAF	XOR
Zoom Out	0xA0	Address	0x00	0x40	0x00	0x00	0xAF	XOR
Focus Far	0xA0	Address	0x01	0x00	0x00	0x00	0xAF	XOR
Focus Near	0xA0	Address	0x02	0x00	0x00	0x00	0xAF	XOR
Set Preset	0xA0	Address	0x00	0x03	0x00	Preset ID	0xAF	XOR
Clear Preset	0xA0	Address	0x00	0x05	0x00	Preset ID	0xAF	XOR
Call Preset	0xA0	Address	0x00	0x07	0x00	Preset ID	0xAF	XOR
Query Pan Position	0xA0	Address	0x00	0x51	0x00	0x00	0xAF	XOR
Query Pan Position Response	0xA0	Address	0x00	0x59	Value High Byte	Value Low Byte	0xAF	XOR
Query Tilt Position	0xA0	Address	0x00	0x53	0x00	0x00	0xAF	XOR
Query Tilt Position Response	0xA0	Address	0x00	0x5B	Value High Byte	Value Low Byte	0xAF	XOR
Query Zoom Position	0xA0	Address	0x00	0x55	0x00	0x00	0xAF	XOR
Query Zoom Position Response	0xA0	Address	0x00	0x5D	Value High Byte	Value Low Byte	0xAF	XOR

# 6. Camera Maintenance and Troubleshooting

## 6.1 Camera Maintenance

- 1) If camera is not used for long time, please turn off power adapter switch and AC plug.
- 2) Use soft cloth or tissue to clean the camera cover.
- 3) Use soft cloth to clean the lens; Use neuter cleanser if bad smeared. No use strong or corrosive cleanser or corrosive cleanser avoiding scuffing.

## 6.2 Troubleshooting

### 1) No video output-

- Check whether the camera power supply is connected, the voltage is normal, and the power indicator is lit.
- Check whether the camera performed a self-test after restart.
- Check whether the bottom of the DIP switch is the normal operating mode.

Verify that output cable and display monitor are working properly.

#### **2) Image cuts out-**

Verify that output cable and video display are working properly.

#### **3) Image distorts when camera is moving-**

Check whether the camera installation position is solid.

Check whether there is machinery or objects nearby that could be transmitting vibration to the camera.

#### **4) Remote control does not work-**

Verify remote control address is set to 1.

Check remote control batteries.

Verify the camera is in the normal operating mode.

Verify the OSD has been exited. Camera cannot be controlled while the menu is being displayed.

#### **5) Serial port not working-**

Verify that camera serial device protocol, baud rate, address is correct.

Check whether the control cable is connected properly.

Check whether the camera working mode is the normal operating mode.

#### **6) Cannot connect to Web UI**

Check whether the camera output is being displayed normally.

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

Verify your computer is connected to the same subnet as the camera.

## **7. Warranty**

---

BZBGear wants to assure you peace of mind. All BZBGear cameras and camera-related products include our Stress-Free Three-Year Warranty.

For complete warranty information, please visit [BZBGear.com/warranty](http://BZBGear.com/warranty).

For questions, please call 1.888.499.9906 or email [support@bzbgear.com](mailto:support@bzbgear.com).

## **8. Mission Statement**

---

BZBGear manifests from the competitive nature of the audiovisual industry to innovate while keeping the customer in mind. AV solutions can cost a pretty penny, and new technology only adds to it. We believe everyone deserves to see, hear, and feel the advancements made in today's AV world without having to break the bank. BZBGear is the solution for small to medium-sized applications requiring the latest professional products in AV.

We live in a DIY era where resources are abundant on the internet. With that in mind, our team offers system design consultation and expert tech support seven days a week for the products in our BZBGear catalog. You will notice comparably lower prices with BZBGear solutions, but the quality of the products is on par with the top brands in the industry. The unparalleled support from our team is our way of showing we care for every one of our customers. Whether you are an integrator, home theater enthusiast, or a do-it-yourselfer, BZBGear offers the solutions to allow you to focus on your project and not your budget.

## 9. Copyright Notice

---

All the contents in this manual and its copyright are owned by BZBGear. No one is permitted to imitate, copy, or translate this manual without BZBGear's permission. This manual contains no guarantee, standpoint expression or other implies in any form. Product specification and information in this manual is for reference only and subject to change without notice.

All rights reserved. No reproducing is allowed without acknowledgement.