Z
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User Manual [V1.0]

FULL HD PTZ USB CAMERA w/ 10x Zoom

Zenty 153 | ZT-PTZU10

RoHS compliant C E FC

⚠️ Attention!

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

1. Caution

1.1 – Avoid damage to product caused by heavy pressure, strong vibration or immersion during transportation, storage, and installation.

1.2 – Housing of this product is made of organic materials. Do not expose it to any liquid, gas, or solids which may corrode the shell.

1.3 – Do not expose the product to rain or moisture.

1.4 – To prevent the risk of electrical shock, do not open the case. Installation and maintenance should only be carried out by qualified technicians.

1.5 – Do not use the product beyond the specified temperature, humidity, or power supply specifications.

1.6 – Wipe it with a soft, dry cloth when cleaning the camera lens. Wipe it gently with a mild detergent if needed. Do not use strong or corrosive detergents to avoid scratching the lens and affecting the image.

1.7 – This product contains no parts which can be maintained by users themselves. Any damage caused by dismantling the product by user without permission is not covered by warranty.

2. Electrical Safety

Installation and use of this product must strictly comply with local electrical safety standards. The power supply of the product is 12V, the max electrical current is 2A.

3. Install

3.1 – Do not rotate the camera head violently, otherwise it may cause mechanical failure.

3.2 – This product should be placed on a stable desktop or other horizontal surface. Do not   install the product obliquely, otherwise it may display inclined image.

3.3 – Ensure there are no obstacles within rotation range of the holder.

3.4 – Do not power on before complete installation.

4. Magnetic Interference

Electromagnetic fields at specific frequencies may affect the video image. This product is Class A. It may cause radio interference in household application. Appropriate measure is required.

Table of Contents

1. Camera Installation

1.1 – Camera Introduction
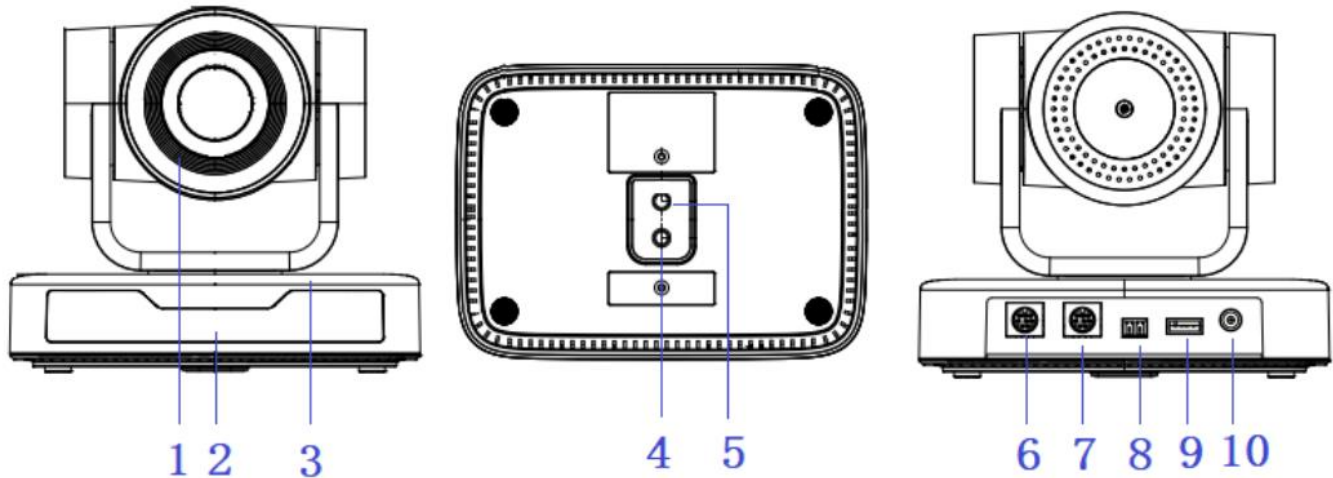
Figure 1.1 Product Interfaces

1. Camera Lens
2. Remote Control Receiving Indicator
3. Camera Base
4. Tripod Screw Hole

5. Screw Hole for Tripod
6. RS232 Control Interface（Input）
7. RS232 Control Interface（Output）
8. RS485 Input (left +, right-)

9. USB 2.0 Interface
10. DC12V Input Power Supply Socket

1.2 – Power-on Initial Configuration

1. Power-on: Connect DC 12V power supply adapter with power supply socket

2. Initial Configuration: The remote-control receiving indicator flashes after power on, the pan-tilt turns left to the lowest left to the lowest, and then turns to the HOME position (both horizontal and vertical positions are in the middle), while the movement first shrinks and then stretches. When remote-control receiving indicator stops flashing, the self-checking is complete.

Notes:

1. After power on and self-checking, the camera will automatically return to the preset 0 position if it's pre-set.

2. The default address for the IR remote control is 1#. If the menu restored to factory defaults, the remote-control default address will restore to 1#.

1.3 – Video Output

USB 2.0 Video Output

A. USB 2.0 video cable connection: as shown in Figure 1.1 label 9

B. Connect the camera and the computer via USB2.0 video cable, open the video software and select the image device to output the video.

1.4 – Mounting Brackets

Notes: Ceiling or wall mounting brackets can only be mounted on template and concrete wall. For safety reasons, plasterboard is not recommended.

1.4.1 – Wall Mounting
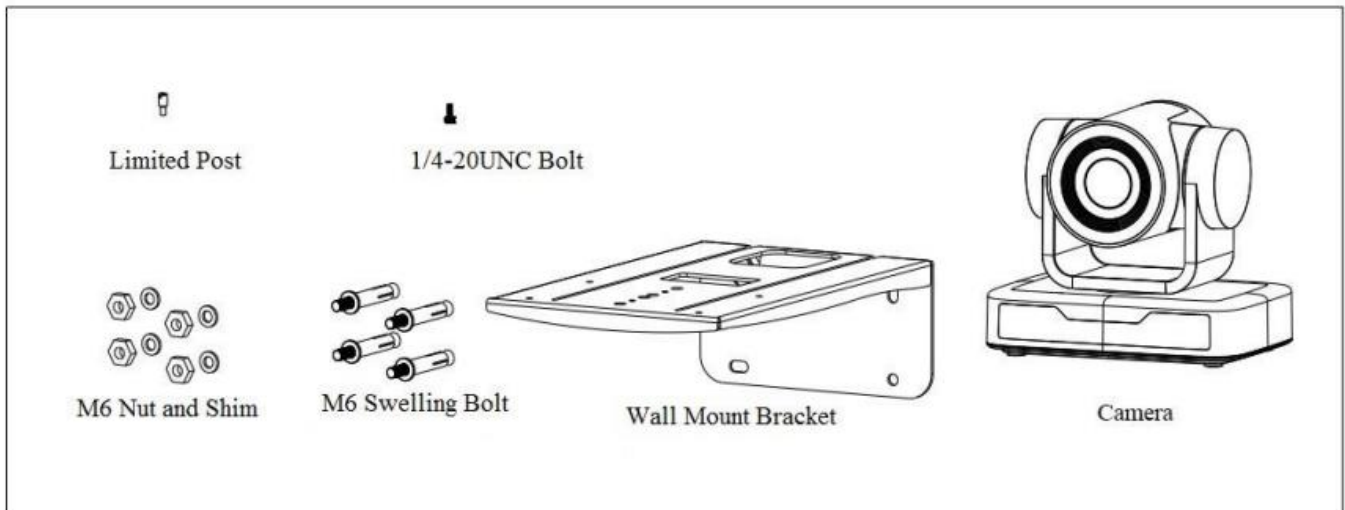
STEP 3
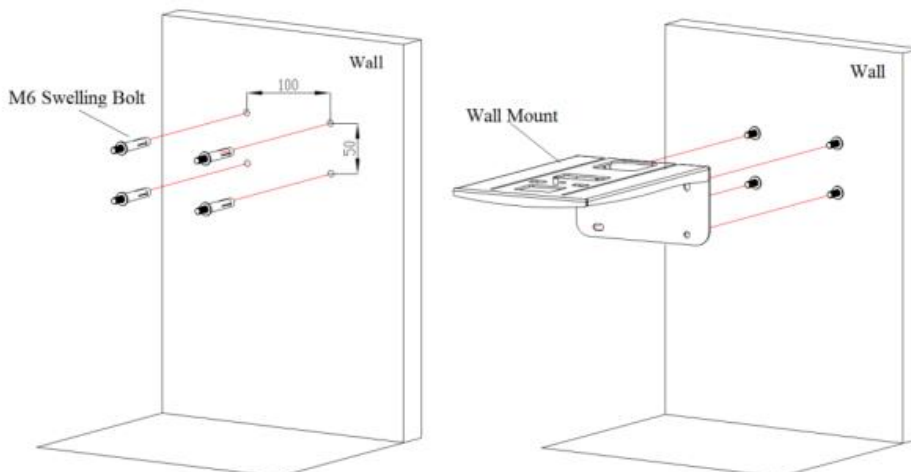
Wall Mount

Wall

M6 Nut and Shim

STEP 4

Camera

Wall

Wall Monut

1/4-20UNC Bolt

FINISH

Wall

1.4.2 – Ceiling Mounting

PA3X30 Self Tapping Screw

PM3X6 Bolt

Upper Cover Plate

Screw Stopper

1/4-20UNC Bolt

Lower Cover Plate

Camera

STEP 1

Ceiling

Screw Stopper

STEP 2

Upper Cover Plate

Ceiling

PA3X30 Self
Tapping Screw
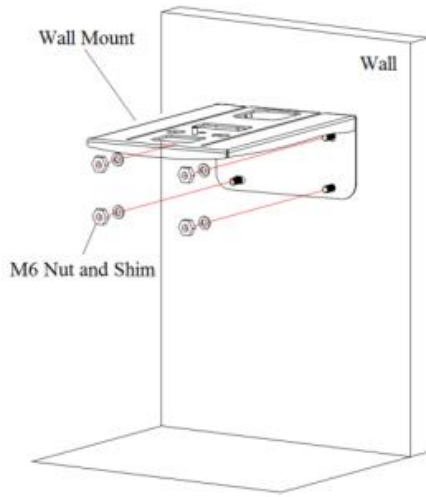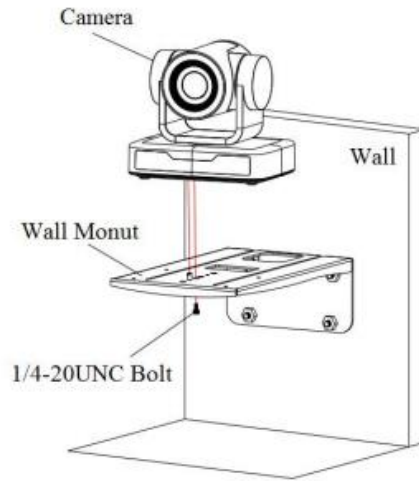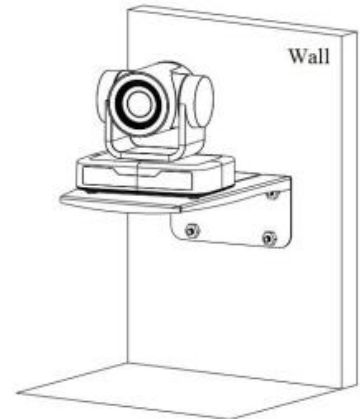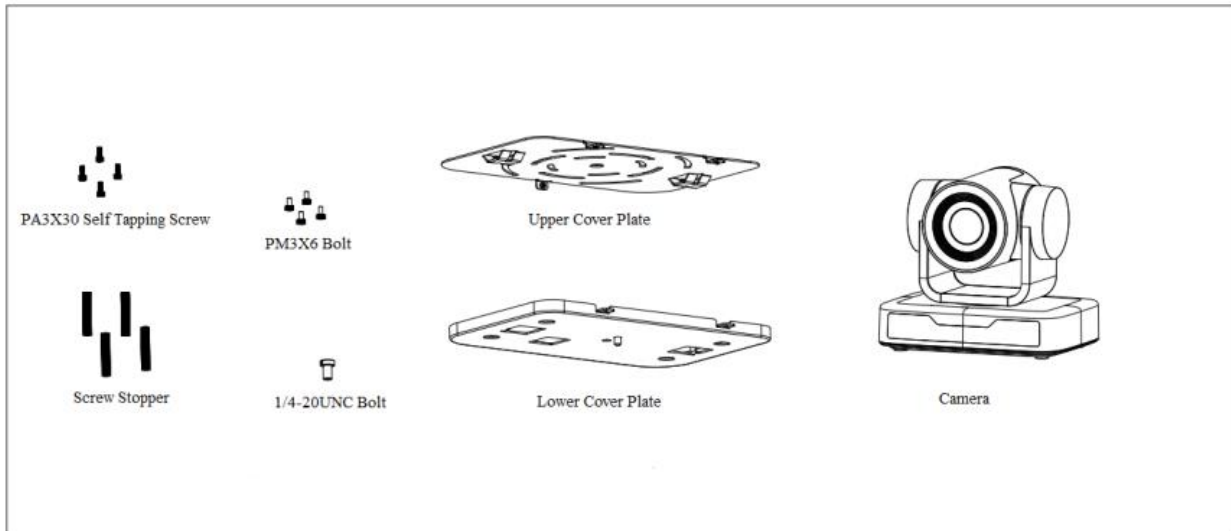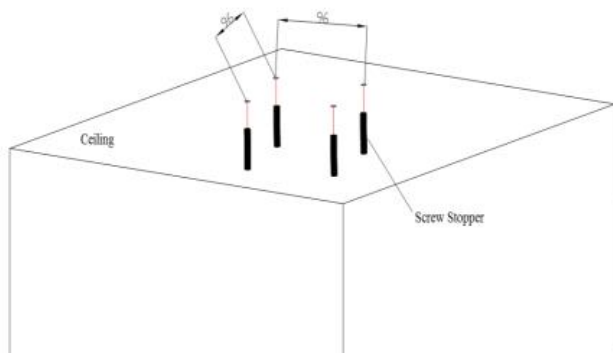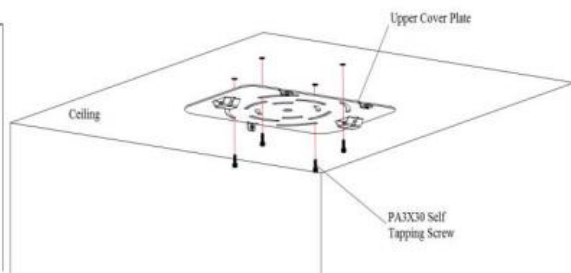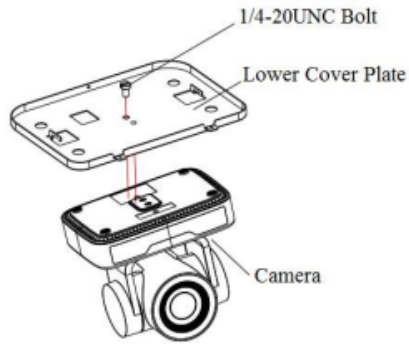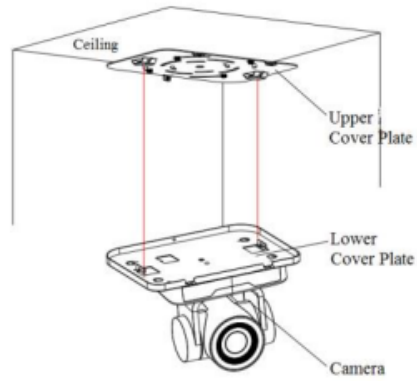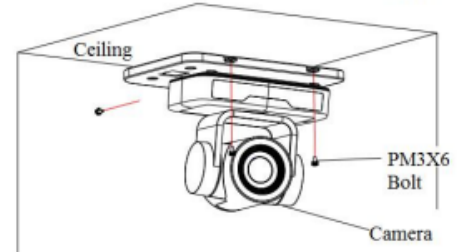
2. Product Overview

2.1 – Product Introduction

2.1.1 - Dimensions
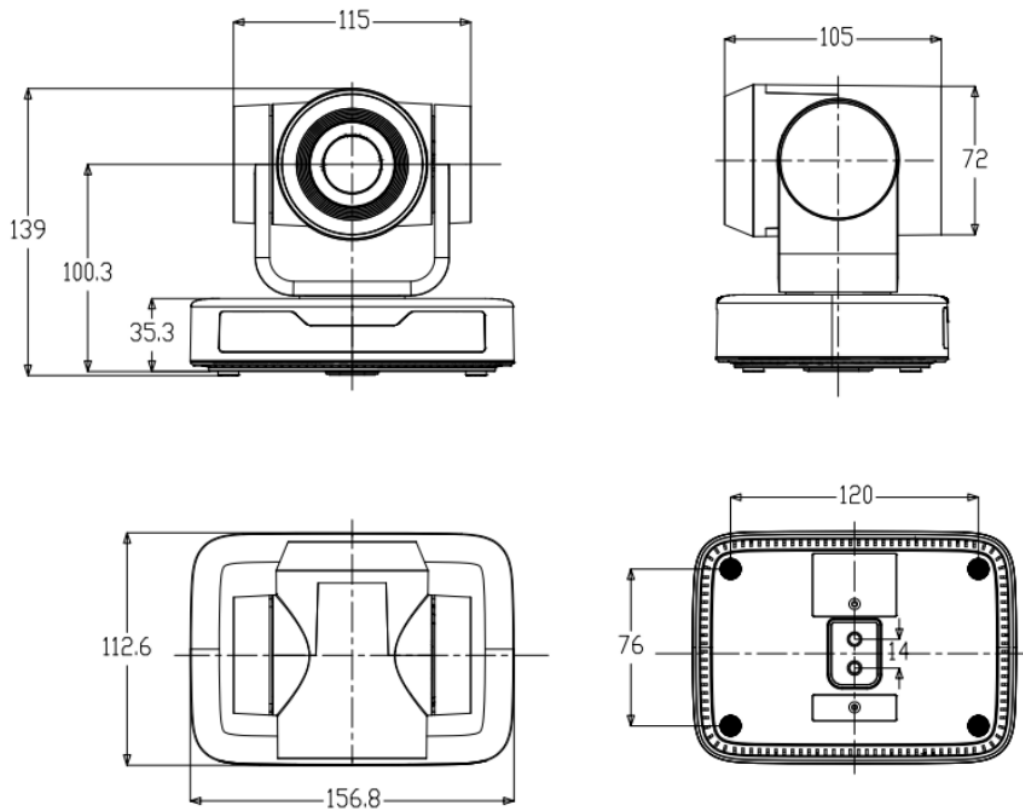
Figure 2.2 Product Dimension

2.1.2 – Accessories

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

Standard Accessories	Optical Accessories
Power Adapter	Wall Mount
IR Remote Control	Ceiling Mount
RS232 Cable	
User Manual	
USB2.0 Cable	

2.2 – Main Features

This series camera has perfect functions, superior performance, and rich video output interfaces. Featuring advanced ISP processing algorithms, offering vivid and high-resolution video with a strong sense of depth and fantastic color rendition.

- **Full HD Resolution:** 1/2.9 inch high quality CMOS sensor. Resolution is up to 1920x1080 with frame rate up to 30 fps
- **Multiple Optical Zoom Lens:** 3x/10x optical zoom lens
- **Leading Auto Focus Technology:** Fast, accurate, and stable auto focusing technology
- **Low Noise and High SNR:** Super high SNR image is achieved with low noise CMOS. Advanced 2D/3D noise reduction technology further reduces the noise while ensuring high image clarity
- **Control Interface:** RS485, RS232 (cascade connection)
- **Multiple Control Protocols:** Supports VISCA, PELCO-D, PELCO-P protocols; Supports automatic identification protocols
- **Quiet Pan / Tilt Movement:** With high accuracy step driving motor, camera can pan / tilt extremely quiet and smoothly
- **Multiple Presets:** Up to 255 presets (10 presets via remote control)
- **Multiple Applications:** Online-education, Lecture capture, Webcasting, Video conferencing, Tele-medicine, Unified Communication, Emergency command and control systems, etc.

2.3 – Technical Parameters

Model	ZT-PTZU10
Sensor	1/2.9 inch high-quality CMOS sensor
Effective Pixels	2.07 megapixels, 16:9
Video Format	**H264/H265/MJPG:** 1920*1080P@30/25/20/15/10/5fps | 1280*720P@30/25/20/15/10/5fps | 960*540@30/25/20/15/10/5fps | 800*600@30/25/20/15/10/5fps | 720*576@30/25/20/15/10/5fps | 720*480@30/25/20/15/10/5fps | 640*480@30/25/20/15/10/5fps | 340*360@30/25/20/15/10/5fps | 352*288@30/25/20/15/10/5fps | 320*240@30/25/20/15/10/5fps
View Angle	8.8° ~ 68.8°
Focus Length	f=4.34mm ~ 35.17mm
AV	f1.85 – f2.63
Optical Zoom	10x
Digital Zoom	10x
Minimum Illumination	0.5Lux(F1.8, AGC ON)
DNR	2d & 3D DNR
White Balance	Auto / Manual / One Push//3000K/3500K/4000K/4500K/5000K/5500K/6000K/6500K/7000K
Focus	Auto / Manual / One Push Focus
Exposure	Auto / Manual
BLC	On / Off
Video Adjustment	Brightness, Color, Saturation, Contrast, Sharpness, B/W mode, Gamma curve
SNR	>50dB

Input/Output Interface

Video Output	USB2.0 Interface, A Type Interface
Video Compression Format	MJPG, H.264, H.265
Control Interface	RS232 (In/Out), RS485
Control Protocol	VISCA/Pelco-D/Peclo-P
Power Interface	HEC3800 Outlet (DC12V)

USB Features	
Operating Systems	Windows 7/8/10, Mac OSX, Linux
Video Compression Format	MJPG/H264/H265
USB Communication Protocol	UVC

PTZ Parameters	
Pan Rotation	-170° ~ +170°
Tilt Rotation	-30° ~ +30°
Pan Control Speed	0.1 ~ 60°/sec
Tilt Control Speed	0.1 ~ 40°/sec
Preset Speed	Pan: 60°/sec, Tilt: 40°/sec
Preset Number	255 Presets (10 presets via remote control)

Other Parameters	
Input Voltage	12V
Input Current	Maximum: 4.98A
Power Consumption	Maximum: 2.5W
Stored Temperature	-40°C ~ +70°C
Storage Humidity	20% ~ 90%
Working Temperature	-10°C ~ +50°C
Working Humidity	20% ~ 80%
Dimensions (W*H*D)	156.8mm x 112.6mm x 139.5mm
Weight	2.20lbs
Application	Indoors

Package Contents	Power Supply, RS232 Control Cable, IR Remote Control, User Manual, Warranty Card, USB2.0 Cable
Optional Accessories	Ceiling / Wall Mount (Not Included)

2.4 – Interface Instructions

2.4.1 External Interface
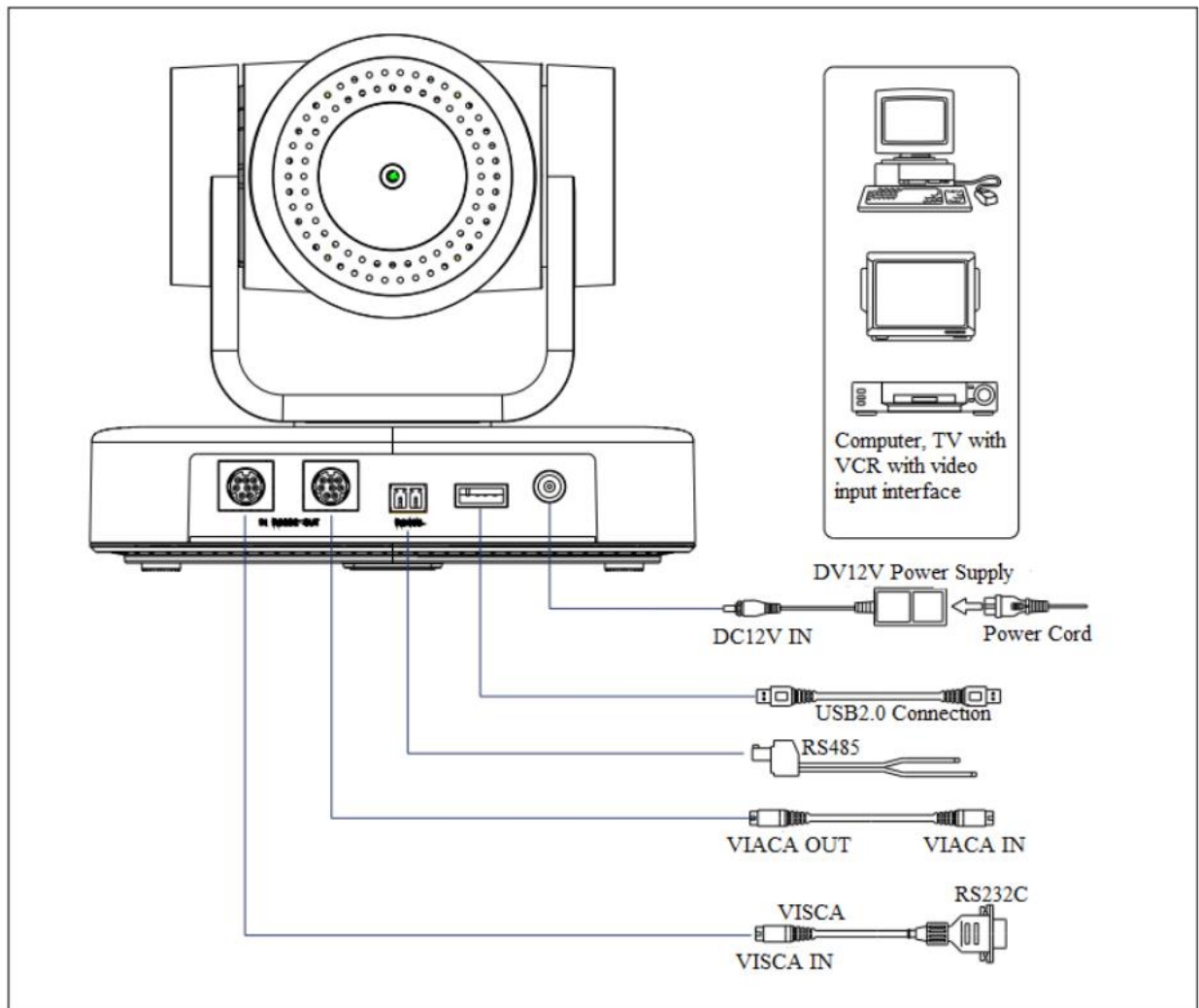
Figure2.4 Wiring Diagram

2.4.2 RS-232 Interface

RS-232 Interface Definition:
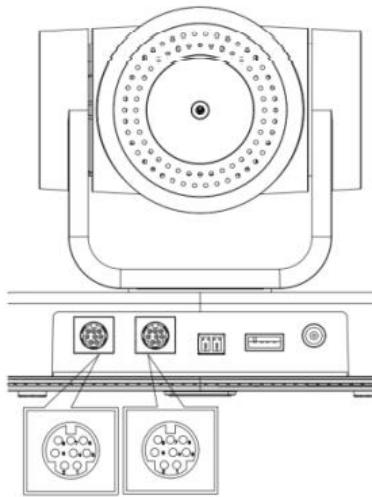
Connection to PC or Camera Controller

Camera	WindowsDB-9
1.DTR	1.DCD
2.DSR	2.RXD
3.TXD	3.TXD
4.GND	4.DTR
5.RXD	5.GND
6.GND	6.DSR
7.IR OUT	7.RTS
8.NC	8.CTS
	9.RI
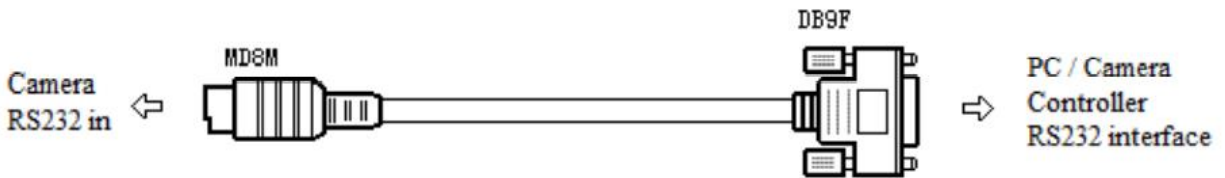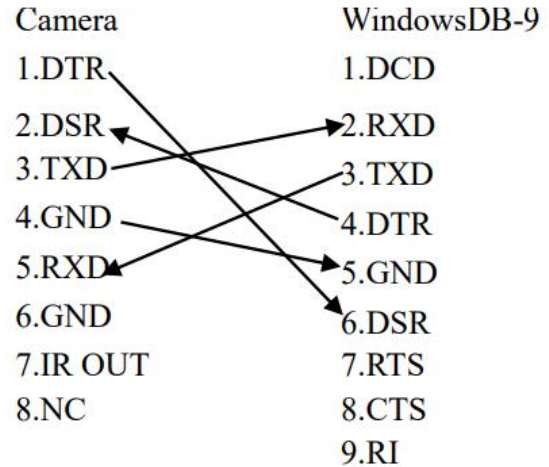
RS-232 Mini-DIN 8-pin Port Definition:
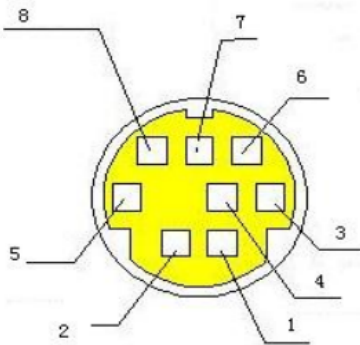
NO.	Port	Definition
1	DTR	Data Terminal Ready
2	DSR	Data Set Ready
3	TXD	Transmit Data
4	GND	Signal Ground
5	RXD	Receive Data
6	GND	Signal Ground
7	IR OUT	IR Commander Signal
8	NC	No Connection

RS232(DB9) Port Definition:
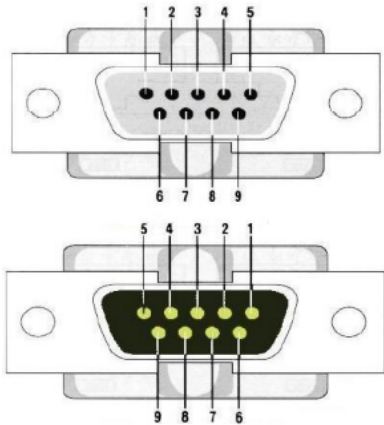
NO.	Port	Definition
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	System Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	RI	Ring Indicator

VISCA Networking as shown below:
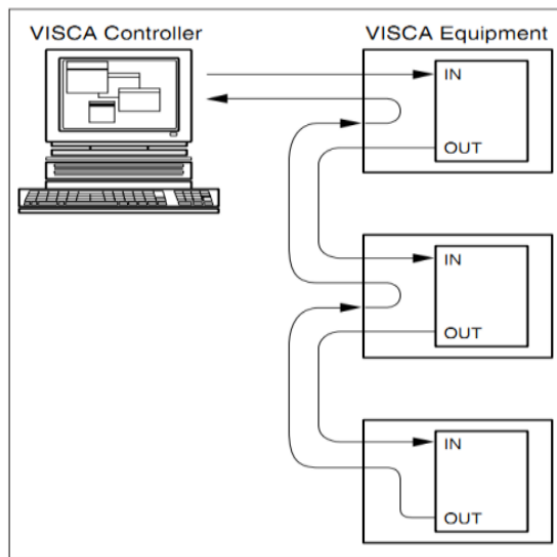
Camera cascade connection

Camera 1	Camera 2
1.DTR	1.DTR
2.DSR	2.DSR
3.TXD	3.TXD
4.GND	4.GND
5.RXD	5.RXD
6.GND	6.GND
7.IR OUT	7.OPEN
8. NC	8.OPEN
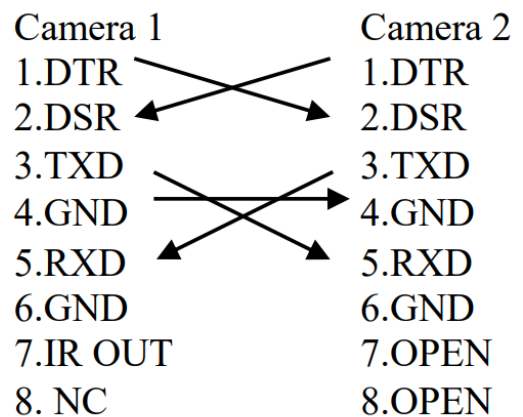
3. Video Output

3.1 Video Output

3.1.1 Power-On Initial Configuration

The remote-control receiving indicator flashes after power-on, the pan-tilt turns left to the lowest left to the lowest, and then turns to HOME positions (both the horizontal and vertical positions are in the middle), while the movement first shrinks and then stretches. When remote control receiving adapter indicator stops flashing, the self-check is complete. After power-on and self-checking, the camera will automatically return to the preset 0 position it it's pre-set.

3.1.2 Video Output

Connect the video output cable; users can refer to Figure 1.1 regarding product interface.

USB2.0 Output: Connect the camera with the computer USB2.0 interface (black), open the Device Manager to see whether there is an imaging device and whether the USB controllers recognize the USB2.0 device. After properly identified, open the software, choose the imaging device, and then it will output the image.

3.2 Remote Control

3.2.1 Keys Introduction

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

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

1. Standby Key

The camera enters standby mode if long press 3s on standby key;
Long press 3s again on the standby key, the camera will self-check again and return to HOME position (If preset 0 position is set, the camera will return to preset 0 position).

2. Camera Selection

Select the camera address to control.

3. Focus Control
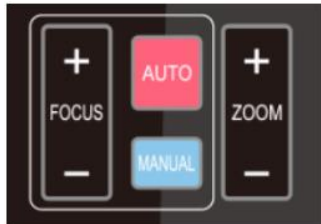
Auto: auto focus mode
Manual: manual focus mode
Focus + (near):Press【FOCUS +】 key (Valid only in manual focus mode)
Focus - (far): Press【FOCUS -】 key (Valid only in manual focus mode)
Press and hold the keys, the action of focus will keep continue and stop as soon as the key is released.

4. Zoom Control

ZOOM +: press【ZOOM +】key to zoom in
ZOOM - : press 【ZOOM -】key to zoom out
Press and hold the keys, the action of focus will keep continue and stop as soon as the key is released.

5. Set and Clear Presets
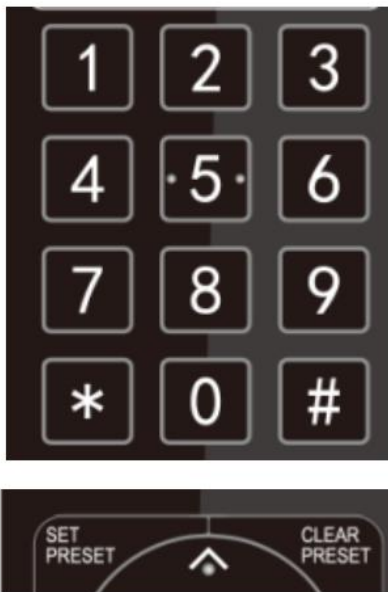
Set Preset: press 【SET PRESET】 button, and then press the number key 0-9 to set preset positions.
Note: 10 presets via remote control.

Call Preset: Press a number key 0-9 directly to call a preset position.

Clear Preset: press 【CLEAR PRESET】 button, and then press the number key 0-9 to clear preset positions.

Note : press the【#】 key three times continually to clear all presets.

6. Pan/Tilt Control

Up: press ▲   Down: press ▼
Left: press ◄   Right: press ►
Back to middle position: press "【HOME】"

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

7. Menu Setting

【MENU】: Open / close the OSD menu
【HOME】: Camera lens back to the middle position; Confirm button; Enter next menu
【↑】【↓】: Choose item
【←】【→】: Modify values
【BLC ON/OFF】: Turn on or off the back light compensation

8. Camera Remote Control Address Setting
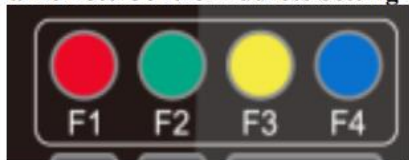
【*】+【#】+【F1】:Camera Address No.1
【*】+【#】+【F2】:Camera Address No. 2
【*】+【#】+【F3】:Camera Address No. 3
【*】+【#】+【F4】:Camera Address No. 4

3.3 Menu Introduction

3.3.1 Main Menu

In normal working mode, press "Menu" key to display the menu, using scroll arrow to point at or highlight the selected items.

```
MENU
================
（Setup）
（Camera）
（P/T/Z）
（Version）
（Restore Default）


| ↑ ↓ |Select |←  →|Change Value
[Menu]Back[Home]OK
```
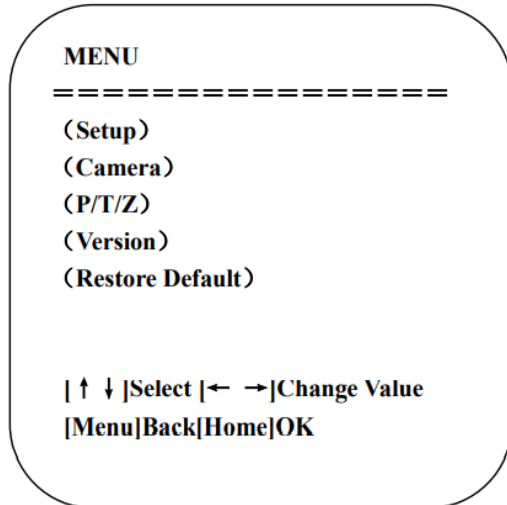
Setup: System parameter setting

Camera: Camera parameter setting

P/T/Z: Enter into sub menu

Version: Enter into sub menu

Restore Default: Enter into reset setting, select YES or NO to confirm

|↑↓| Select: For selecting menu

|← →| Change Value: For modifying parameters

|MENU| Back: Press [Menu] to return

|Home| OK: Press [Home] to confirm

3.3.2 System Settings

Move the pointer to the (Setup) in the Main Menu, click the [Home] key and enter in to the (System Setting) as shown below:

```
SETUP
================
Protocol              Auto
Visca Address         1
Visca Address Fix     OFF
PELCO-P Address       1
PELCO-D Address       1
Baudrate              9600
Auto Filp             ON
Sleep                 OFF

| ↑ ↓ |Select  |←  →|Change Value
[Menu]Back
```
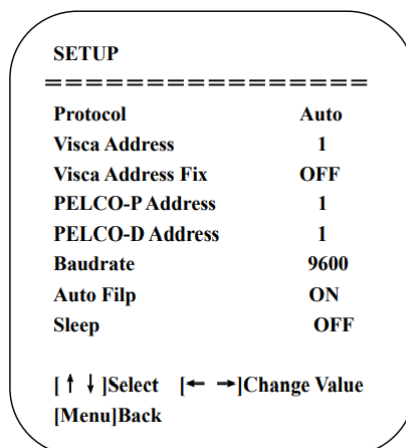
Protocol: VISCA/Pelco-P/Pelco-D/Auto

VISCA Address: VISCA = 1~7 | Pelco-P = 1~255 | Pelco-D = 1~255

Baudrate: 2400/4800/9600/115200

VISCA Address Fix: On/Off

Auto Flip: On/Off

Sleep: On/Off

3.3.3 Camera Settings

Move the pointer to the (CAMERA) in the Main Menu, click the [Home] key and enter the (CAMERA) as follow:

```
CAMERA
=================
(Exposure)
(Color)
(Image)
(Focus)
(Noise Reduction)
 Style                 Default
[↑ ↓]Select     [←  →]Change Value
[Menu]Back        [Home]OK
```
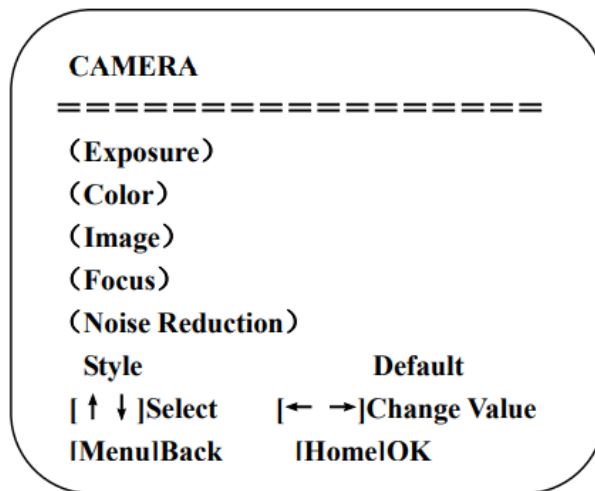
Exposure: Enter into Exposure setting

Color: Enter into color setting

Image: Enter into image setting

Focus: Enter into focus setting

Noise Reduction: Enter into noise reduction setting

- **Exposure Setting**

Move the pointer to the (EXPOSURE) in the Main Menu, click the [Home] key and enter into the (Exposure sub menu) as shown below:

```
EXPOSURE
==================
Mode            Auto
EV              OFF
BLC             OFF
Flicker         50Hz
G.Limit         3
DRC             2

[↑ ↓]Select    [← →]Change Value
[Menu]Back
```

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: 0~20 (only available in Auto/Shutter 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 modes)

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 modes)

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

- **Color**

Move the pointer to the (COLOR) in the Main Menu, click the [HOME[and the (COLOR sub menu) as follow:

```
COLOR
=================
WB Mode              Auto
RG Tuning            -10
BG Tuning            -10
Saturation           100%
Hue                  7
AWB Sensitivity      High


[ ↑ ↓ ]Select   [← →]Change Value
[Menu]Back
```

WB Mode: Auto, Manual, One Push, 3000K, 3500K, 4000K, 4500K, 5000K, 5500K, 6000K, 6500K, 7000K

Saturation: 60%, 70%, 80%, 90%, 100%, 110%, 120%, 130%, 140%, 150%, 160%, 170%, 180%, 190%, 200%

Red Fine-Tuning: -10~10 (only available in automatic mode)

Blue Fine-Tuning: -10~10 (only available in automatic mode)

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

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

AWB Sensitivity: high/middle/low

Chroma: 0~14

- **Image**

Move the pointer to the (IMAGE) in the Menu, click the [Home] key and enter in to the (IMAGE sub menu) as follow:

```
IMAGE
================
Brightness          7
Contrast            8
Sharpness           3
Flip-H              OFF
B&W-Mode            Color
Gamma               Default
DCI                 Close
[ ↑ ↓ ]Select    [← →]Change Value
[Menu]Back
```
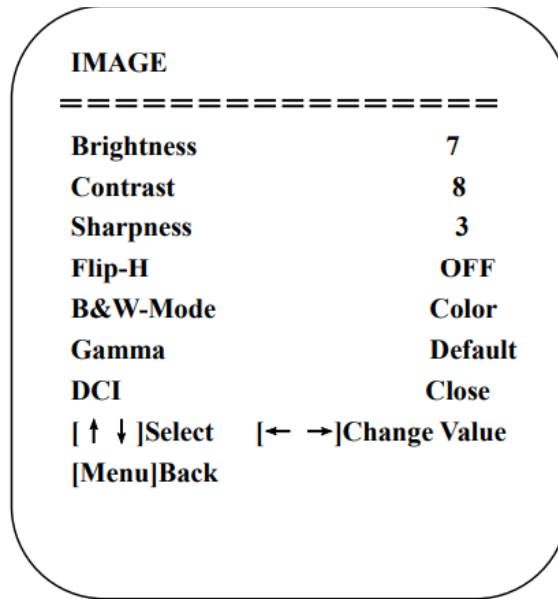
Brightness: 0~14

Contrast: 0~14

Sharpness: 0-15

Flip-H: On/Off

B&W Mode: Color, Black/White

Gamma: Default/0.45/0.50/0.5/0.63

DCI: Dynamic Contrast: Off/1~8

- **Focus**

Move the pointer to the (FOCUS) in the Menu, click the [Home] key and enter the (FOCUS sub menu) as follow:

```
┌─────────────────────────────────────┐
│                                     │
│   FOCUS                             │
│   ================                  │
│   Focus Mode              Auto      │
│   AF-Zone                 All       │
│   AF-Sensitivity          Low       │
│                                     │
│   [ ↑ ↓ ]Select    [← →]Change Value │
│   [Menu]Back                        │
│                                     │
└─────────────────────────────────────┘
```

Focus Mode: Auto/Manual/One Push

AF-Zone: Up/Middle/Down

AF-Sensitivity: High/Middle/Low

- **Noise Reduction**

Move the pointer to the (NOISE REDUCTION) in the Menu, click the [Home] key and enter the (NOICE REDUCTION sub menu) as follow:

```
┌─────────────────────────────────────┐
│                                     │
│   NOISE REDUCTION                   │
│   ================                  │
│   NR-2D                    4        │
│   NR-3D                    2        │
│   Dynamic Hot Pixel        OFF      │
│                                     │
│   [ ↑ ↓ ]Select    [← →]Change Value │
│   [Menu]Back                        │
│                                     │
└─────────────────────────────────────┘
```

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 Settings

Move the pointer to the (P/T/Z) in the Main Menu, click the [Home] key and enter the (P/T/Z) as follow:

Depth of Field: Only effective for the remote controller, On/Off (When zooming in, the PT control speed

```
   P/T/Z
   ==================
   Speed by zoom              ON
   Zoom speed                 8
   Acc Curve                  Slow
   Preset Speed               1


   [ ↑ ↓ ]Select    [← →]Change Value
```
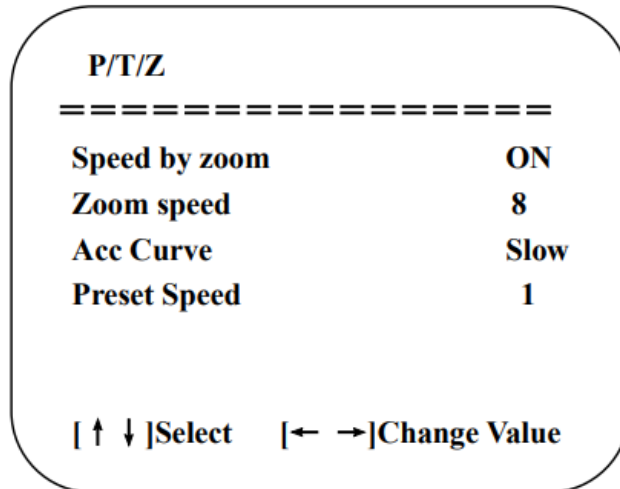
by remote will become slow)

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

Image Freezing: On/Off

Accelerating Curve: Fast/Slow

Preset Speed: 1~10

3.3.5 Version

Move the pointer to the (VERSION) in the Main Menu, click the [Home] key and enter the (VERSION sub menu) as follow:

```
   VERSION
   ==================
   MCU Version      3.1.0   2019-09-26
   Camera Version   1.0.5   2019-09-27
   AF Version       1.0.0   2019-09-07


   [ ↑ ↓ ]Select      [← →]Change Value
   [Menu]Back         [Home]OK
```
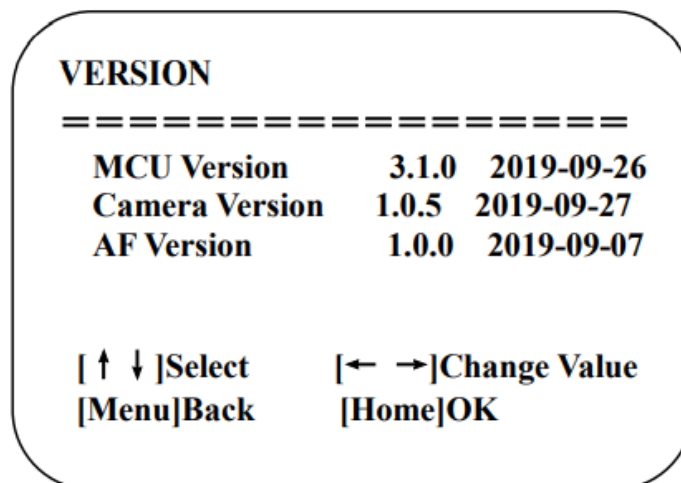
MCU Version: Display MCU version information

Camera Version: Display camera version information

AF Version: Display the focus version information

3.3.6 Restore Default

Move the pointer to the (RESTORE DEFAULT) in the Main Menu, click the [Home] key and enter the (RESTORE DEFAULT sub menu) as follow:

```
RESTORE DEFAULT
==================
Restore  Default?        NO


[ ↑ ↓ ]Select      [← →]Change Value
[Menu]Back        [Home]OK
```
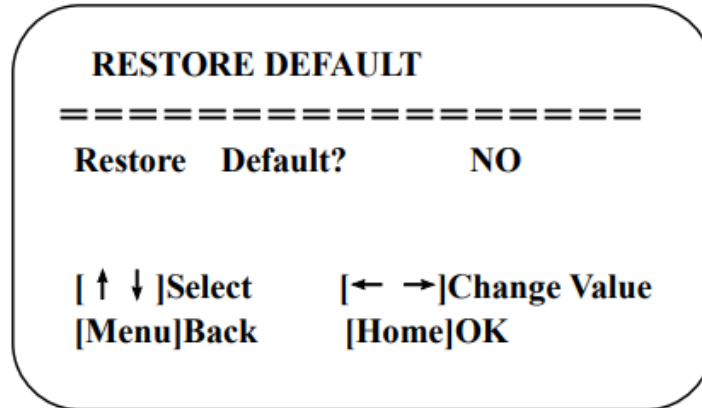
Restore Default: YES/NO. Color style and video format cannot be restored to factory default

*NOTE: If the address of the former remoter is not 1 but another one from 2, 3, 4, the corresponding camera address will restore to 1 when all parameters or system parameters are restored. User should change the remote address to be 1 (press No. 1 according to the camera to get normal operation).

4. Serial Port Communication and Control

The camera could be controlled through RS232/RS485 interface, RS232C serial parameters 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 first goes left, then back to the middle position. Self-test is finished after the zoom moves to the farthest and then back to the nearest position. If the camera saved 0 preset before, it will revert to that position after initialization. At this point, the user can control the camera by the serial commands.

4.1 VISCA Protocol List

4.1.1 VISCA Protocol Return Command

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

Z = camera address + 8

Error Messages		
	Command Packet	Note
Syntax Error	z0 60 02 FF	Returned when the command format is different or when a command with illegal command parameters is accepted
Command Not Executable	z0 61 41 FF	Returned when a command cannot be executed due to current conditions. For example, when commands controlling the focus manually are received during auto focus
Command Canceled	z0 6y 04 FF (y: Socket No.)	Returned when a command which is being executed in a socket specified by the cancel command is canceled. The completion message for the command is not returned
No Socket	z0 6y 05 FF (y: Socket No.)	Returned when no command is executed in a socket specified by the cancel command, or when an invalid socket number is specified
Command Not Executable	z0 6y 41 FF (y: Socket No.)	Returned when a command cannot be executed due to current condition. For example, when commands controlling the focus manually are received during auto focus

4.1.2 VISCA Protocol Control Command

Command	Function	Command packet	Note
AddressSet	Broadcast	88 30 0p FF	p: Address setting
IF_Clear	Broadcast	88 01 00 01 FF	I/F Clear
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	
	Tele(Standard)	8x 01 04 07 02 FF	
	Wide(Standard)	8x 01 04 07 03 FF	
	Tele(Variable)	8x 01 04 07 2p FF	p = 0(low) - F(high)
	Wide(Variable)	8x 01 04 07 3p FF	
	Direct	8x 01 04 47 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM_Focus	Stop	8x 01 04 08 00 FF	
	Far(Standard)	8x 01 04 08 02 FF	
	Near(Standard)	8x 01 04 08 03 FF	
	Far(Variable)	8x 01 04 08 2p FF	p = 0(low) - F(high)
	Near (Variable)	8x 01 04 08 3p FF	
	Direct	8x 01 04 48 0p 0q 0r 0s FF	pqrs: Focus Position
	Auto Focus	8x 01 04 38 02 FF	
	Manual Focus	8x 01 04 38 03 FF	
	One Push mode	8x 01 04 38 04 FF	
CAM _Zoom Focus	Direct	8x 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF	pqrs: Zoom Position tuvw: Focus Position
	One Push Trigger	8x 01 04 10 05 FF	One Push WB Trigger(Enabled during One Push WB mode)
	Manual	8x 01 04 35 05 FF	
	Auto	8x 01 04 35 00 FF	
	2400K	8x 01 04 35 0C FF	
	2500K	8x 01 04 35 0D FF	
	2600K	8x 01 04 35 0E FF	
	2700K	8x 01 04 35 0F FF	
	2800K	8x 01 04 35 10 FF	
	2900K	8x 01 04 35 11 FF	
	3000K	8x 01 04 35 01 FF	

Command	Function	Command packet	Note
	3100K	8x 01 04 35 12 FF	
	3200K	8x 01 04 35 13 FF	
	3300K	8x 01 04 35 14 FF	
	3400K	8x 01 04 35 15 FF	
	3500K	8x 01 04 35 07 FF	
	3600K	8x 01 04 35 16 FF	
	3700K	8x 01 04 35 17 FF	
	3800k	8x 01 04 35 18 FF	
	3900K	8x 01 04 35 19 FF	
	4000K	8x 01 04 35 02 FF	
	4100K	8x 01 04 35 1A FF	
	4200K	8x 01 04 35 1B FF	
	4300K	8x 01 04 35 1C FF	
	4400K	8x 01 04 35 1D FF	
	4500K	8x 01 04 35 08 FF	
	4600K	8x 01 04 35 1E FF	
	4700K	8x 01 04 35 1F FF	
	4800K	8x 01 04 35 21 FF	
	4900K	8x 01 04 35 22 FF	
	5000K	8x 01 04 35 04 FF	
	5100K	8x 01 04 35 23 FF	
	5200K	8x 01 04 35 24 FF	
	5300K	8x 01 04 35 25 FF	
	5400K	8x 01 04 35 26 FF	
	5500K	8x 01 04 35 09 FF	
	5600K	8x 01 04 35 27 FF	
	5700K	8x 01 04 35 28 FF	
	5800K	8x 01 04 35 29 FF	
	5900K	8x 01 04 35 2A FF	
	6000K	8x 01 04 35 0A FF	
	6100K	8x 01 04 35 2B FF	
	6200K	8x 01 04 35 2C FF	
	6300K	8x 01 04 35 2D FF	
	6400K	8x 01 04 35 2E FF	
	6500K	8x 01 04 35 06 FF	
	6600K	8x 01 04 35 2F FF	
	6700K	8x 01 04 35 30 FF	
	6800K	8x 01 04 35 31 FF	
	6900K	8x 01 04 35 32 FF	
	7000K	8x 01 04 35 0B FF	
	7100K	8x 01 04 35 33 FF	
	One Push mode	8x 01 04 35 03 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 Positon
CAM_Bright	Reset	8x 01 04 0D 00 FF	Bright Setting
	Up	8x 01 04 0D 02 FF	
	Down	8x 01 04 0D 03 FF	
	Direct	8x 01 04 4D 00 00 0p 0q FF	pq: Bright Positon
CAM_ExpComp	On	8x 01 04 3E 02 FF	Exposure Compensation ON/OFF
	Off	8x 01 04 3E 03 FF	
	Reset	8x 01 04 0E 00 FF	Exposure Compensation Amount Setting
	Up	8x 01 04 0E 02 FF	
	Down	8x 01 04 0E 03 FF	
	Direct	8x 01 04 4E 00 00 0p 0q FF	pq: ExpComp Position
CAM_Back Light	On	8x 01 04 33 02 FF	Back Light Compensation
	Off	8x 01 04 33 03 FF	
CAM_WDRStrength	Reset	8x 01 04 21 00 FF	WDR Level Setting
	Up	8x 01 04 21 02 FF	
	Down	8x 01 04 21 03 FF	
	Direct	8x 01 04 51 00 00 00 0p FF	p: WDR Level Positon
CAM_NR（2D）		8x 01 04 53 0p FF	P=0-7 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: 0.45 2: 0.50 3: 0.55 4: 0.63
CAM_Gain		8x 01 04 4C 00 00 0p 0q FF	pq: 0-20
CAM PresetSpeed		8x 01 01 0p FF	p: 1-10
CAM_Flicker	OFF	8x 01 04 23 00 FF	OFF
	50HZ	8x 01 04 23 01 FF	50HZ

Command	Function	Command packet	Note
	60HZ	8x 01 04 23 02 FF	60HZ
CAM_Aperture	Reset	8x 01 04 02 00 FF	Aperture Control
	Up	8x 01 04 02 02 FF	
	Down	8x 01 04 02 03 FF	
	Direct	8x 01 04 42 00 00 0p 0q FF	pq: Aperture Gain
CAM_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-E 0:60% 1:70% 2:80% 3:90% 4:100% 5:110% 6:120% 7:130% 8:140% 9:150% 10:160% 11:160% 12:180% 13:190% 14:200%
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	

Command	Function	Command packet	Note
	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	

4.1.3 VISCA Protocol Inquiry Command

Command	Command Packet	Return Packet	Note
CAM_PowerInq	8x 09 04 00 FF	y0 50 02 FF	On
		y0 50 03 FF	Off(Standby)
CAM_ZoomPosInq	8x 09 04 47 FF	y0 50 0p 0q 0r 0s FF	pqrs: Zoom Position
CAM_FocusAFModeInq	8x 09 04 38 FF	y0 50 02 FF	Auto Focus
		y0 50 03 FF	Manual Focus
		y0 50 04 FF	One Push mode
CAM_FocusPosInq	8x 09 04 48 FF	y0 50 0p 0q 0r 0s FF	pqrs: Focus Position
CAM_WBModeInq	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
		y0 50 06 FF	6500K
		y0 50 07 FF	3500K
		y0 50 08 FF	4500K
		y0 50 09 FF	5500K
		y0 50 0A FF	6000K
CAM_RGainInq	8x 09 04 43 FF	y0 50 0B FF	7000K
CAM_BGainInq	8x 09 04 44 FF	y0 50 00 00 0p 0q FF	pq: B Gain
CAM_AEModeInq	8x 09 04 39 FF	y0 50 00 FF	Full Auto
		y0 50 03 FF	Manual
		y0 50 0A FF	Shutter priority
		y0 50 0B FF	Iris priority
		y0 50 0D FF	Bright
CAM_ShutterPosInq	8x 09 04 4A FF	y0 50 00 00 0p 0q FF	pq: Shutter Position
CAM_IrisPosInq	8x 09 04 4B FF	y0 50 00 00 0p 0q FF	pq: Iris Position
CAM_Gain LimitInq	8x 09 04 2C FF	y0 50 0p FF	p: Gain Positon
CAM_BrightPosiInq	8x 09 04 4D FF	y0 50 00 00 0p 0q FF	pq: Bright Position
CAM_ExpCompModeInq	8x 09 04 3E FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_ExpCompPosInq	8x 09 04 4E FF	y0 50 00 00 0p 0q FF	pq: ExpComp Position
CAM_BacklightModeInq	8x 09 04 33 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_WDRStrengthInq	8x 09 04 51 FF	y0 50 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_FlickerModeInq	8x 09 04 55 FF	y0 50 0p FF	p: Flicker Settings(0: OFF, 1: 50Hz, 2:60Hz)
CAM_ApertureInq	8x 09 04 42 FF	y0 50 00 00 0p 0q FF	pq: Aperture Gain
CAM_PictureEffectModeInq	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_MenuModeInq	8x 09 06 06 FF	y0 50 02 FF	On
		y0 50 03 FF	Off
CAM_LR_ReverseInq	8x 09 04 61 FF	y0 50 02 FF	On
		y0 50 03 FF	Off

		y0 50 02 FF	On
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 mn pq rs tu vw FF	ab cd : vender ID (0220) mn pq : model ID ST (0510)、U2(0512)、U3 (0513) 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 0z 0z 0z 0z FF	wwww: Pan Position zzzz: Tilt Position

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

4.2 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
Stop	0xFF	Address	0x00	0x00	0x00	0x00	SUM
Set Preset	0xFF	Address	0x00	0x03	0x00	Preset ID	SUM
Clear Preset	0xFF	Address	0x00	0x05	0x00	Preset ID	SUM
Call Preset	0xFF	Address	0x00	0x07	0x00	Preset ID	SUM
Query Pan Position	0xFF	Address	0x00	0x51	0x00	0x00	SUM
Query Pan Position Response	0xFF	Address	0x00	0x59	Value High Byte	Value Low Byte	SUM
Query Tilt Position	0xFF	Address	0x00	0x53	0x00	0x00	SUM
Query Tilt Position Response	0xFF	Address	0x00	0x5B	Value High Byte	Value Low Byte	SUM
Query Zoom Position	0xFF	Address	0x00	0x55	0x00	0x00	SUM
Query Zoom Position Response	0xFF	Address	0x00	0x5D	Value High Byte	Value Low Byte	SUM

4.3 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
Stop	0xA0	Address	0x00	0x00	0x00	0x00	0xAF	XOR
Focus Far	0xA0	Address	0x01	0x00	0x00	0x00	0xAF	XOR
Focus Near	0xA0	Address	0x02	0x00	0x00	0x00	0xAF	XOR
Set Preset	0xA0	Address	0x00	0x03	0x00	Preset ID	0xAF	XOR
Clear Preset	0xA0	Address	0x00	0x05	0x00	Preset ID	0xAF	XOR
Call Preset	0xA0	Address	0x00	0x07	0x00	Preset ID	0xAF	XOR
Query Pan Position	0xA0	Address	0x00	0x51	0x00	0x00	0xAF	XOR
Query Pan Position Response	0xA0	Address	0x00	0x59	Value High Byte	Value Low Byte	0xAF	XOR
Query Tilt Position	0xA0	Address	0x00	0x53	0x00	0x00	0xAF	XOR
Query Tilt Position Response	0xA0	Address	0x00	0x5B	Value High Byte	Value Low Byte	0xAF	XOR

Query Zoom Position	0xA0	Address	0x00	0x55	0x00	0x00	0xAF	XOR
Query Zoom Position Response	0xA0	Address	0x00	0x5D	Value High Byte	Value Low Byte	0xAF	XOR

5. Maintenance & Troubleshooting

5.1 Camera Maintenance

- Please power off the camera and disconnect the power adapter and socket if it's not used for a long period of time

- Use soft cloth or tissue to clean the camera cover

- Wipe it with a soft, dry cloth when cleaning the camera lens. Wipe it gently with a mild detergent if needed. Do not use strong or corrosive detergents to avoid scratching the lens and affecting the video quality

5.2 Troubleshooting

No Video Output

- Check whether the camera power supply is connected, the voltage is normal, and the power indicator is lit

- Check whether the machine could do a self-check after restarting

- Check whether the video output cable or video display is normal

Video Dithering When Zooming In or Out

- Check whether the camera installation position is solid

- Whether there is any vibration caused by surrounded objects

Remote Control Not Working

- Remote control address is set to 1 (if the machine is set back to factory default, remote control address needs to be set back to 1 as well)

- Check whether the battery is installed correctly on the remote. Change the batteries if needed

- Check the menu whether it's closed. Camera control through remote control is only available after exiting the menu

Serial Port Not Working

- Check whether the camera serial device protocol, baud rate, address is consistent

- Check whether the control cable is connected properly

6. Warranty

If your product does not work properly because of a defect in materials of workmanship, our company (referred to as "the warrantor") will, for the length of the period indicated as below, "Parts and Labor (5) Years", which starts with the date of original purchase ("Limited Warranty period"), at its option either (a) repair your product with new or refurbished parts, or (b) replace it with a new or a refurbished product. The decision to repair or replace will be made by the warrantor.

During the "Labor" limited warranty period, there will be no charge for labor. During the "Parts" warranty period, there will be no charge for parts. You must mail-in your product during the warranty period. This Limited Warranty is extended only to the original purchaser and only covers products purchased as new. A purchase receipt or other proof of original purchase date is required for Limited Warranty service.

7. Mail-In Service

When shipping the unit, carefully pack and send it prepaid, adequately insured, and preferably in the original carton. Include a letter detailing the complaint and provide a day time phone and/or email address where you can be reached.

8. Limited Warranty Limits and Exclusions

This Limited Warranty ONLY COVERS failures due to defects in material or workmanship, and DOES NOT COVER normal wear and tear or cosmetic damage. The Limited Warranty ALSO DOES NOT COVER damages which occurred in shipment, or failures which are caused by products not supplied by warrantor, or failures which result from accidents, misuse, abuse, neglect, mishandling, misapplication, alteration, faulty installation, set-up adjustments, mis-adjustment of consumer controls, improper maintenance, power line surge, lightning damage, modification, or service by anyone other than a Factory Service center or other Authorized Servicer, or damage that is attributed to acts of God.

THERE ARE NO EXPRESS WARRANTIES EXCEPT AS LISTED UNDER "LIMITED WARRANTY COVERAGE". THE WARRANTOR IS NOT LIABLE FOR INCIDENTAL OR CONSEQUENTAIL DAMAGES RESULTING FROM THE USE OF THIS PRODUCT, OR ARISING OUT OF ANY BREACH OF THIS WARRANTY. (As examples, this excludes damages for lost time, cost of having someone remove or re-install an installed unit if applicable, travel to and from the service, loss of or damage to media or images, data or other recorded content. The items listed are not exclusive, but are for illustration only.) PARTS AND SERVICE, WHICH ARE NOT COVERED BY THIS LIMITED WARRANTY, ARE YOUR RESPONSIBILITY.

Z

ZENTY

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