



HCS-3316HDN Videoconference Camera

Excellent solutions for conferences



Installation and Operating Manual

V 1.0

Safeguard

1. Before installing the camera, please read this manual carefully, please follow this manual during installation and operation, and keep this manual for future reference.
2. Power adapter of camera can transfer external AC 110 – 240 V to DC 12 V with 2.5 A in maximum, please follow local electric safety regulation strictly during installation and operation.
3. Heavy stress, strong vibration and soaking shall be avoided during transportation, storage and installation, which will make damage to camera.
4. Please operate the camera within temperature and humidity range as described in this manual, foreign bodies shall be prevented from camera, and do not spill corrosive liquid to camera surface.
5. Don't disassemble the camera by yourself, please turn to professional and qualified personnel for help when necessary.
6. When installing and moving camera, please hold camera main body, not head, please pay attention to handle with care, and do not squeeze the camera avoiding damage internal structure. Please keep camera un-plugged before all installation procedure completed.
7. When cleaning the camera, please use soft cloth. If the camera is very dirty, wipe it off gently with a soft cloth moistened with a weak solution of water and a neutral kitchen detergent. Wring all excess liquid from the cloth before wiping the camera. Next, wipe off all remaining solution with a soft, dry cloth. Use lens cleaning paper to clean the lens.

8. Video and control cables should be well-shielded to keep stable signal transporting.
9. Please set the cables (power/video/control) to safe place to avoid trampling, do not pile up sundries over cables. Cables shall be protected well especially the connection part.

Contents

1. Overview -----	1
1.1 Introduction	1
1.2 Features	2
1.3 Specifications	3
1.4 Product and Accessories	5
2. Connection-----	7
3. Panels and Interfaces -----	8
3.1 Front panel	8
3.2 Back panel	8
3.3 Interfaces	9
3.4 RS-232 interface pin definition.....	10
3.5 RS-485 interface pin definition.....	10
3.6 RS-232 cable connection.....	11
3.7 COM connection methods	12
4. IR Remote Controller and DIP Switch-----	13
4.1 IR Remote Controller – Key Layout	13
4.2 IR Remote Controller – Operation	15
4.3 IR Remote Controller – Menu Operation	18
4.4 DIP Switch	23
5. Network Operation -----	24
5.1 Installation and Environment	24
5.2 Access camera.....	25
5.3 VLC Streaming Media Player Monitor.....	31
5.4 Instructions for controlling cameras through TCP	31
6. Installation and dimensions -----	36
6.1 Attention	36
6.2 Installation method.....	36
6.3 Product dimension	40
7. Troubleshooting-----	41

1. Overview

1.1 Introduction

The product is an industry's leading high-definition conference room camera; it uses a powerful 1/2.8 inch HD image processor with 5 million pixels, built-in high-performance optical zoom lens, powerful high-definition image engine, image imaging algorithm with wide dynamic range and high S/N ratio, combined with the unique 2D/3D denoising algorithm, provides 1080P60 full HD broadcast level image experience for users.

This product can realize quiet and high speed pan/tilt operation and can save up to 255 presets at the same time. Combined with excellent dome design, the camera provides excellent external/remote control features.

This product can not only output digital high-definition image through HD-SDI and HDMI interface, but also build in video and audio coding engine, support the industry leading video coding H.265, and output multi-channel video and audio code stream through network interface. And compatible with all kinds of mainstream network communication protocols, it perfectly combines the high-definition conference camera and the network camera. It is the ideal choice for professional video conference room integration, video conference, remote teaching and the application of industry recording and broadcasting.

1.2 Features

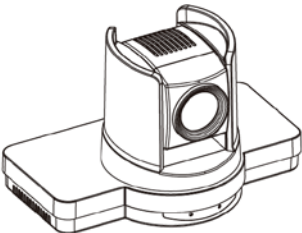
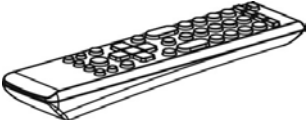
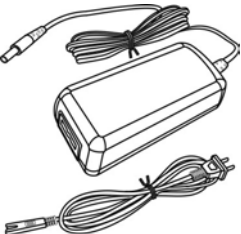
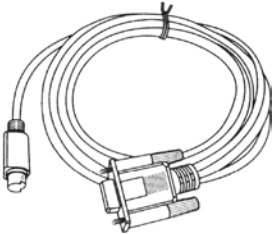
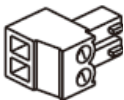

1. Equipped with 1/2.8-inch HD CMOS sensor, with powerful image engine and imaging algorithm, provides full HD broadcast image experience up to 1080P60.
2. Equipped with high-performance electric zoom lens with a zoom effect of up to 240 times (20 times optical 12 times digital).
3. Reliable, quiet and quick Pan/Tilt camera positioning.
4. Wide dynamic range, high SNR image effect, with a unique 2D/3D noise reduction algorithm, significantly reduce the image noise, still keep the picture clean and clear in low-light environment.
5. New generation H.265 coding: built-in video and audio coding capabilities, support H.265/H.264 video coding and G.711/G.726 audio coding to achieve 1080p full HD ultra-low bandwidth transmission.
6. High speed and accurate dome positioning: using a new stepping motor, the dome runs quietly and smoothly, positioning accurately and quickly, and the highest horizontal speed can reach 200 degrees / s.
7. Multiple video outputs: 2-ways HD video and 1-way IP video can be outputted simultaneously in high quality.
8. Multiple control interfaces and multiple protocol support, achieves full camera control, can work perfectly with other video system (codec, video endpoints, and video tracing system).
9. Multiple installation methods (ceiling and walling), video can be vertically flipped easily by operating OSD menu.
10. Built-in OSD menu, multi-functional IR remote, ease-to-use operating.


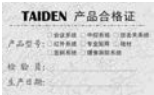
1.3 Specifications

Items	Specifications
Image sensor	1/2.8-type HD CMOS sensor, 5 mega pixels
Video format (HD)	1080p60, 1080p50, 1080p30, 1080p25, 1080i60, 1080i50, 720p60, 720p50
Lens	20x optical zoom lens, f=4.7-94mm, Fw/1.6-Ft/3.5
Zoom ratio	20x optical zoom, 12x digital zoom
Minimum object distance	0.5 m (wide) - 1.5 m (tele)
Horizontal viewing angel	61° (wide) - 3.3° (tele)
Focus	Auto / Manual / One-push
Minimum Illumination	0.5Lx (50IRE, F1.6)
Exposure	Auto / Manual / Shutter priority / Iris priority / Exposure control/ brightness control
Shutter speed	1/60 to 1/10,000s (60 Hz) 1/50 to 1/10,000s (50 Hz)
Gain	Auto / Manual
White balance	Auto / Indoor / Outdoor / One-push / Manual
Video effect	Backlight compensation, horizontal mirror image, vertical flip
Digital noise reduction	2D&3D digital noise reduction
S/N ratio	>55dB
Synchronization	Internal
Backlight Compensation	On / Off
Pan/Tilt Speed	Pan: 0.1°~200°/sec, Tilt: 0.1°~150°/sec
Pan/Tilt range	Pan: ±170°, Tilt: -30°~90°
Preset	255 (TAIDEN conference management software can preset, clear and recall 64 preset positions)
Preset precision	0.1°
Multiple video output	1-way 3G HD-SDI, 1-way HDMI and 1-way IP video
Ethernet interface	10M/100M adaptive Ethernet port

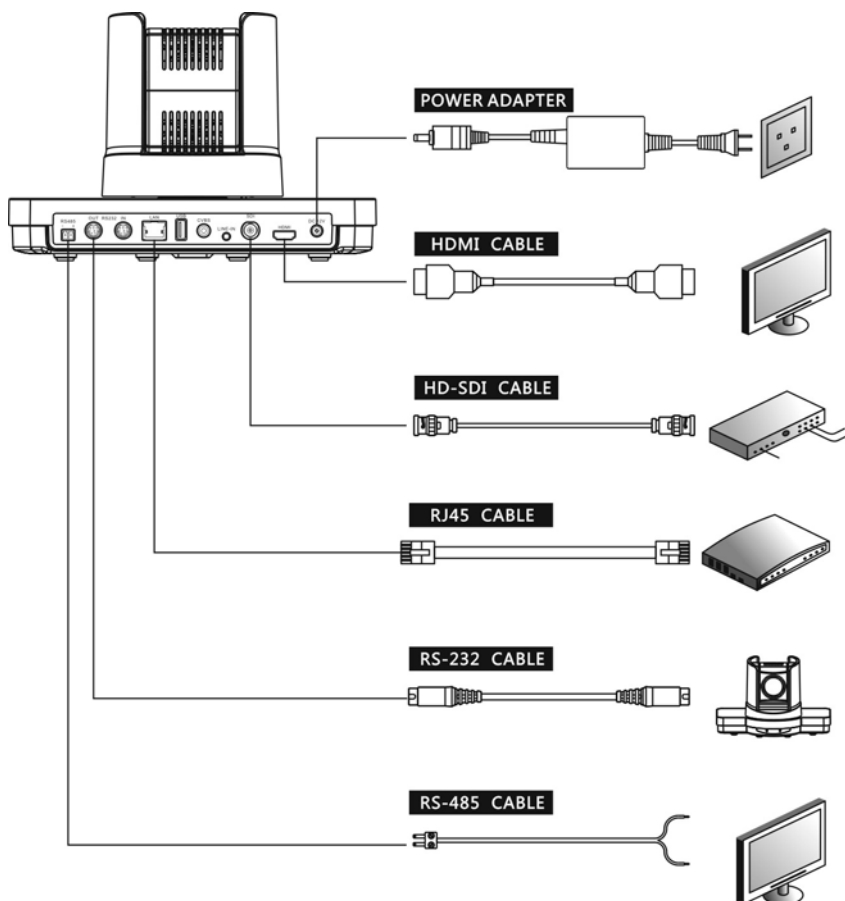
Items	Specifications
Control Interface	RS-485, RS-232
Control Protocol	PELCO-D、VISCA
Baud Rate	2400/4800/9600/19200/38400 bps
Video coding standard	H.265, H.264
Main stream resolution	1920x1080, 1280x720
Sub stream resolution	720x576, 720x480, 960x540
Bitrate	Variable (128k-8192kbps) / fixed
Frame rate	50Hz: 1-50fps, 60Hz: 1-60fps
OSD Menu	Chinese / English
Address	0~255
Temperature	Operating temperature: 0°C~+50°C Storage temperature: -20°C~+70°C
Relative Humidity	0~95% (not condensing)
Power Requirements	DC 12 V
Power Consumption	<10W
Dimensions (mm)	170(H)x260(W)x163(D) mm

1.4 Product and Accessories

1	Camera	
2	Remote controller	
3	Power adaptor	
4	RS-232 cable	
5	RS-485 converter plug	
6	User manual	

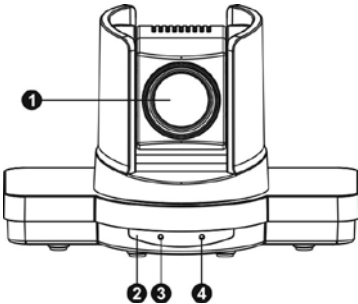
7	Warranty card	 <p>The image shows two versions of a TAIDEN Warranty Card. The top version is a full-page card with the TAIDEN logo, 'WARRANTY CARD' in English and Chinese, and a section for 'WARRANTY TERMS' in small print. The bottom version is a smaller, simplified version of the same card, also featuring the TAIDEN logo and 'WARRANTY CARD' in English and Chinese.</p>
8	Certificate	 <p>The image shows a TAIDEN Product Certificate. It features the TAIDEN logo and the title 'TAIDEN 产品合格证' (TAIDEN Product Certificate). Below the title, there are fields for '产品型号:' (Product Model), '检验员:' (Inspector), and '生产日期:' (Production Date). To the right of these fields, there are checkboxes for '检验合格' (Inspected and Passed), '检验不合格' (Inspected and Failed), and '检验日期' (Inspection Date).</p>

2. Connection

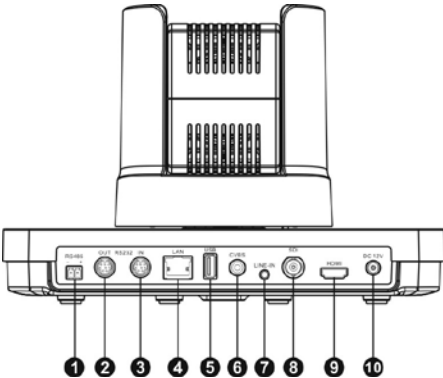


3. Panels and Interfaces

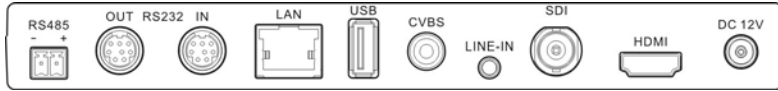
3.1 Front panel

<ul style="list-style-type: none">❶ Lens❷ Sensor for remote controller❸ Power indicator❹ COM indicator	
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3.2 Back panel

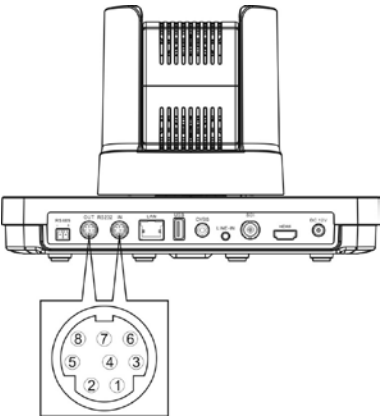
<ul style="list-style-type: none">❶ RS-485 interface❷ RS-232 OUT interface❸ RS-232 IN interface❹ RJ-45 interface❺ USB2.0 interface❻ CVBS composite video interface❼ LINE-IN 3.5 mm interface❽ HD-SDI interface❾ HDMI interface❿ DV-12V power interface	
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3.3 Interfaces



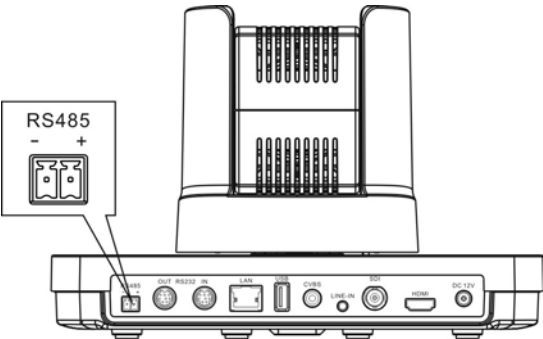
1. HD-SDI interface: BNC connector, carrying HD video, maximum transmission distance is usually 100 meters using standard 75 ohm coaxial cable.
2. HDMI interface: standard HDMI connector, carrying HD video, maximum transmission distance is usually 15 meters.
3. CVBS interface: reserve.
4. RJ-45 interface: standard RJ45 socket, 10M/100M adaptive Ethernet port, carrying IP HD video encoding stream.
5. LINE-IN 3.5 mm interface: reserve.
6. Control interfaces: one RS-485 connector, two RS-232 connectors, and all support protocols including VISCA and PELCO-D
7. USB interface: reserve.

3.4 RS-232 interface pin definition



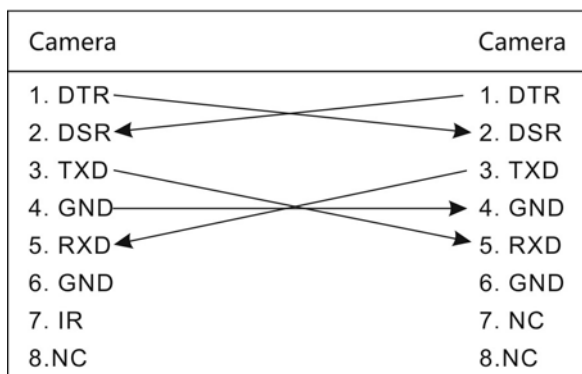
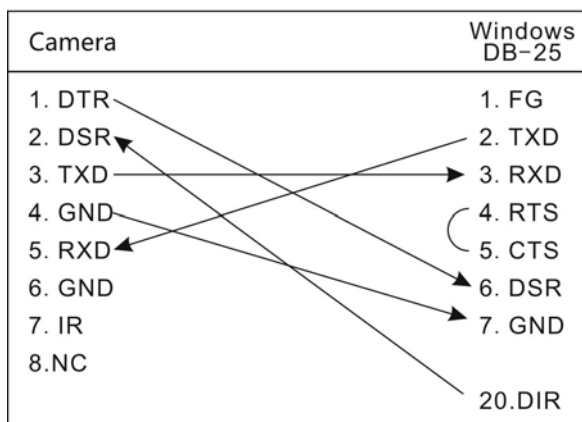
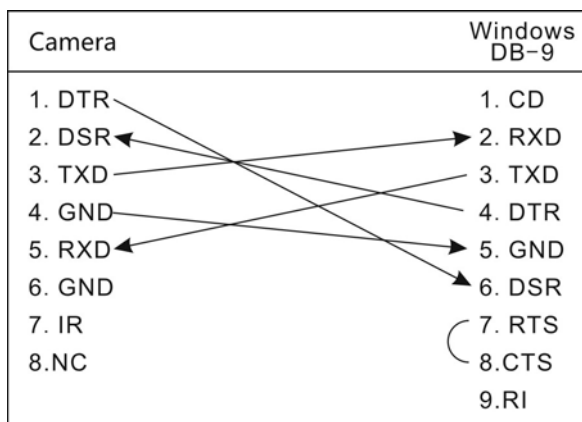
NO.	Pin	RS-232Cable DB9 pin definition
1	DTR	
2	DSR	
3	TXD	2
4	GND	5
5	RXD	3
6	GND	
7	IR	9
8	NC	

3.5 RS-485 interface pin definition



NO.	Pin definition
+	DATA+
-	DATA-

3.6 RS-232 cable connection

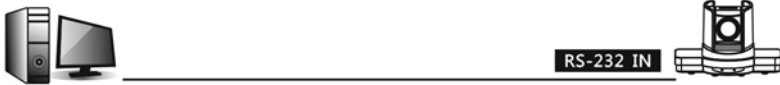


3.7 COM connection methods

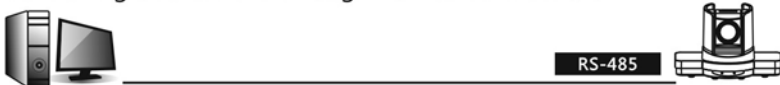
Open OSD menu, enter <system> sub menu, configure COM setting such as protocol, baud rate and control port in related menu items.

Note: reboot of power off takes effect after configuration.

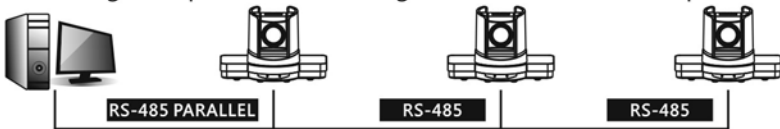
Method 1:
Controlling one camera through RS-232 connection.



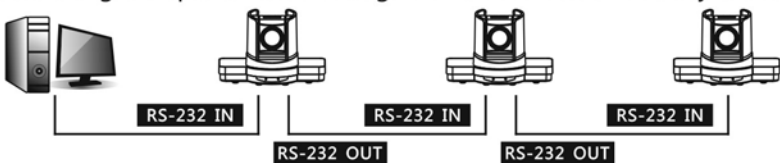
Method 2:
Controlling one camera through RS-485 connection.



Method 3:
Controlling multiple cameras through RS-485 connection in parallel.



Method 4:
Controlling multiple cameras through RS-232 connection in daisy chain.

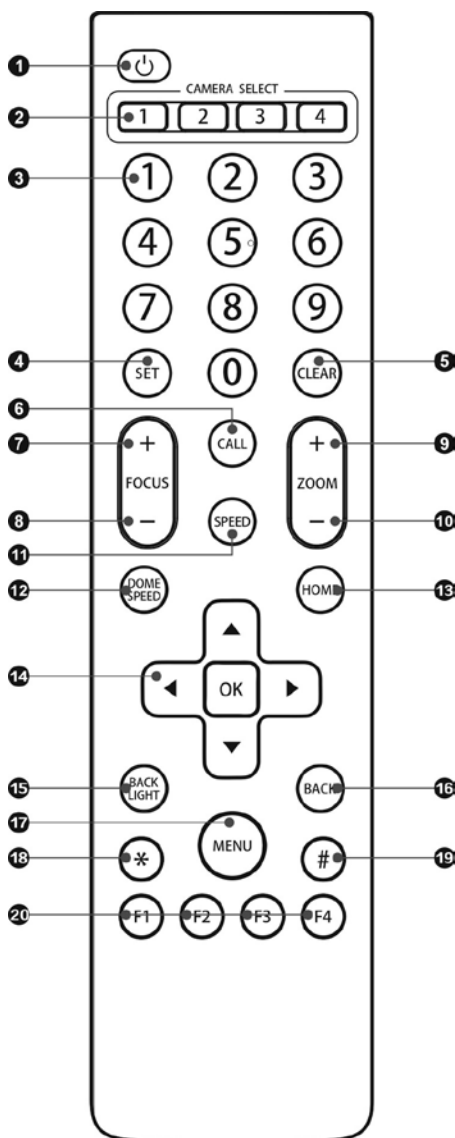


Note:

In RS-232 daisy chain connection, cameras shall be connected one by one with increased address started from 1, maximum is 7, please configure correct camera address before installation.

4. IR Remote Controller and DIP Switch

4.1 IR Remote Controller – Key Layout



1. [POWER]: power on/off
2. [CAMERA SELECT]: select the camera address for controlling
3. [0-9]: number key
4. [SET]: set preset
5. [CLEAR]: clear preset
6. [CALL]: call preset
7. [FOCUS +]: focus to far direction
8. [FOCUS -]: focus to near direction
9. [ZOOM +]: zoom to tele direction
10. [ZOOM -]: zoom to wide direction
11. [SPEED]: switch zoom/focus speed between fast and slow mode
12. [DOME SPEED] switch pan/tilt speed between fast and slow mode
13. [HOME]: back to home position
14. DIRECTION KEY: pan/tilt direction/menu operation
15. [BACK LIGHT]: backlight compensation on/off
16. [BACK]: back to previous menu
17. [MENU]: OSD menu on/off
18. [*]: switch to auto focus mode
19. [#]: switch to manual focus mode
20. [F1] [F2] [F3] [F4]: reserved

Note:

- If the remote controller doesn't work properly, try replacing the battery;
- There should be no visible object between the remote controller and the camera;
- The distance between the remote controller and the camera is recommended to be within 10 meters.

4.2 IR Remote Controller – Operation

1. Power-on initialization

When camera is powered on, power indicator is on, camera head will rotate in horizontal and vertical direction automatically, and camera lens will be zoomed to tele and wide direction simultaneously. After pan/tilt/zoom self-checking completed, COM indicator will flash and keep lighting finally, camera will be positioned to HOME position, COM indicator keep lighting before the first command arrives from IR remote controller or COM ports, after then, each flashing means one command received.

If preset 1 is set, camera will be positioned to this preset automatically after initialization.

2. Pan/Tilt control

Press arrow buttons to change camera position, pressing arrow buttons will make a small change in camera position, to make a quick or big change in camera position, press and hold down those buttons.

3. Focus control

Auto-focus is factory default, but user can change to manual-focus easily by pressing [FOCUS+] or [FOCUS-] key, which will make focusing operation. If user wants to back to auto-focus, press [*] key; if user wants to back to manual-focus, press [#] key.

4. Zoom control

Pressing [ZOOM-] or [ZOOM+] key will make zoom operation in wide or tele direction, zoom in (tele) will get a close-up scene, and zoom out (wide) will get a wider view.

5. Change camera speed

The camera's pan/tilt speed can be switched between fast and slow mode, when fast mode is on, press [DOME SPEED] button to switch to slow mode, and vice versa.

The camera's zoom/focus speed can be switched between fast and slow mode, when fast mode is on, press [SPEED] button to switch to slow mode, and vice versa.

6. Camera reset

Pressing [HOME] key will make camera back to HOME position.

7. Backlight compensation ON/OFF control

When one portion of an image is brilliantly bright while other portions are dark, video will become dark; user can improve video quality by turning on the backlight compensation function. Press [BACKLIGHT] will make camera switch to Backlight compensation ON/OFF mode.

8. Preset control

Through the remote controller, you can set / clear / call preset positions.

Set preset: [Number keys] (input the preset number) + [SET button];

Call preset: [Number keys] (input the preset number) + [CALL button];

Clear preset: [Number keys] (input the preset number) + [CLEAR button].

Note:

Definition of preset number is compatible with SONY camera, preset ID set by IR remote (such as 9) will be decreased by 1 (such as 8) and stored in camera memory, if user want to operate that preset through VISCA/PELCO command through COM port, internal preset ID (such as 8) shall be used.

9. Special Preset

Some special presets are defined inside camera; calling of these presets will achieves some camera operation such as video format switching, and etc. User shall not save positions to these special presets.

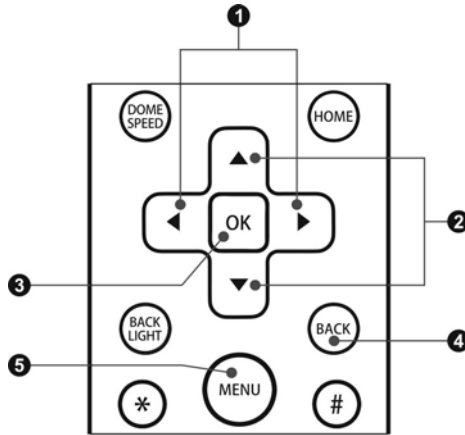
Definition of special presets

As shown below:

Preset for COM command	Description	
0-34	Common preset	
35	Clear all presets	
36-38	Reserved	
39	1080p60	Take effect by restart
40	1080p50	
41	1080p30	
42	1080p25	
43	1080i60	
44	1080i50	
45	720p60	
46	720p50	
47-48	Reserved	
49-254	Common preset	

4.3 IR Remote Controller – Menu Operation

OSD menu can be displayed and operated using IR remote controller, as shown below.



- ❶ Change menu item ◀ ▶
- ❷ Select menu item ▲ ▼
- ❸ Enter sub menu OK
- ❹ Back to previous menu BACK
- ❺ Menu on/off MENU

If menu is displayed, camera will not respond to operations other than menu navigation from IR remote controller or COM port, OSD menu will not be displayed in SD video output.

Note:

Any change made in OSD menu will be saved after menu turn off normally.

Main Menu	Sub Menu	Option	Description
VIDEO	VIDEO FORMAT	1080P60	Set video format
		1080P50	
		1080P30	
		1080P25	
		1080I60	
		1080I50	
		720P60	
		720P50	
	NOISE FILTER	0-15	1-15:3D/2D NR level 0: Off
	PICTURE FLIP	ON	Picture flip on/off
		OFF	
	VIDEO STYLE	Real	Set video style
		Custom	
		Default	
		Standard	
		Soft	
		Bright	
		Colorful	
		Clear	
		True Color	
		Xylink	
		User Custom	
	ANTI FLICKER	OFF	Set anti flicker mode
		50 Hz	
		60 Hz	
		60+ Hz	
	HUE	25-75	Set hue

Main Menu	Sub Menu	Option	Description
VIDEO	ADVANCED SETTING	BRIGHTNESS	Set brightness (0-99)
		GAMMA	Set GAMMA (0-31)
		CONTRAST	Set contrast (0-100)
		SATURATION	Set saturation (72-172)
		OVERALL SHARPNESS	Set overall sharpness (0-15)
		DETAIL SHARPNESS	Set detail sharpness (0-15)
		VIDEO ENHANCEMENT	Set video enhancement (Auto/0-16)
PAN TILT ZOOM	FOCUS MODE	AUTO	Set focus mode
		MANUAL	
	DIGITAL ZOOM	OFF/1.5X/2X/4X/ 8X/10X/12X	Set digital zoom
	PRESET FOCUS	AUTO	Set digital room
		MANUAL	After call preset, Auto focus again
	PAN/TILT RATE MODE	AUTO	Change Pan/tilt rate by zoom position
		FIXED	Fix on Pan/tilt rate
	PRESET VIDEO FREEZE	OFF	Not freeze video by call preset
		ON	Freeze video by call preset

Main Menu	Sub Menu	Option	Description
SYSTEM	CONTROL BAUDRATE	2400/4800/9600/ 19200/38400	Set control baud rate
	CONTROL PROTOCOL	VISCA	Set control protocol
		PELCO-D	
	CONTROL ADDRESS	(1-7) or (1-254)	Set control address, (1-7) for VISCA (1-254) for PELCO-D
	MENU LANGUAGE	ENGLISH	Set menu language
		CHINESE	
	IP ADDRESS	DHCP	Set IP address mode
		STATIC	
EXPOSURE	MODE	AUTO	Set exposure mode
		IRIS PRIORITY	
		SHUTTER PRIORITY	
		EXPOSURE SET	
	IRIS	F1.6/F2/F2.4/F2.8/F3.4/ F4/F4.8/F5.6/F6.8/F8/ F9.6/F11/F14	Valid when exposure mode is "IRIS PRIORITY", set iris
	SHUTTER	SLOW, 1/10000-1/30	Valid when exposure mode is "SHUTTER PRIORITY", set shutter
	EXPOSURE VALUE	0-40	Valid when exposure mode is "EXPOSURE SET", set exposure
	WDR	OFF	Set WAD mode
		ON	
	STRONG LIGHT CONTROL	DEFAULT	Set strong light control
		STANDARD	
		2-8	

Main Menu	Sub Menu	Option	Description
EXPOSURE	STARLIGHT MODE	AUTO	Set starlight mode
		OFF	
		STARLIGHT	
		SUPER STARLIGHT	
	GAIN MAX LIMIT	0 dB-160 dB	Set gain max limit
	BACKLIGHT	AUTO	Open/Close backlight mode
ON			
WHITE BALANCE	MODE	AUTO	Set white balance mode
		INDOOR	
		OUTDOOR	
		ATW	
		MANUAL	
	WB PARAMETER	250-750	Set white balance value
	RESTORE DEFAULT PARAMETERS		
	RED GAIN	0-1000	Valid when WB mode is “Manual”, set red gain
	BLUE GAIN	0-1000	Valid when WB mode is “Manual”, set blue gain
RESTORE DEFAULT PARAMETERS			Restore all settings to factory default
ABOUT	CONTROL VERSION		Display control version
	SYSTEM VERSION		Display system version
	MODE		Display model type
	SN		Display product SN
	STATIC IP		Display IP address

4.4 DIP Switch

1. DIP switch

In camera's back panel, there are one DIP switch marked, this switch has 4 sets which can be configured to ON or OFF, as shown below.



2. Switch configuration

Set switch to configure camera video format

Video format	Setting			
	1	2	3	4
Can Change Video Format by Menu	OFF	OFF	OFF	OFF
720P50	ON	OFF	OFF	OFF
720P60	OFF	ON	OFF	OFF
1080I50	ON	ON	OFF	OFF
1080I60	OFF	OFF	ON	OFF
1080P25	ON	OFF	ON	OFF
1080P30	OFF	ON	ON	OFF
1080P50	ON	ON	ON	OFF
1080P60	OFF	OFF	OFF	ON
Reserved	Others			

Note:

If the DIP switch is set to full OFF, the video format of the camera is set by the user in the OSD menu ("Main menu-Video settings-Video format"). If the video format is set through other definitions of the DIP switch, the user can check the current video format in the OSD menu, but cannot modify it.

5. Network Operation

5.1 Installation and Environment

1. Running environment

Operating system: Windows 7/8/10

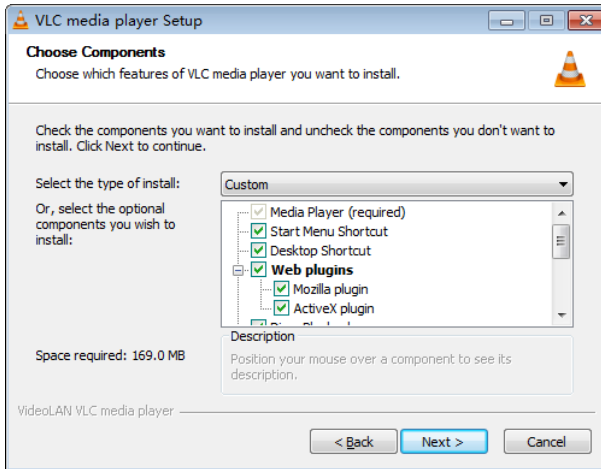
Network Protocol: TCP/IP

Client PC: P4/128M RAM/40G HD/Scalable graphics card, DirectX 8.0

2. Installation

- 1) Connecting the network camera to the network or directly to a PC with crossover twisted-pair cable;
- 2) Connect DC 12V power;
- 3) Under normal circumstances, the connection indicator (green) at the network interface will turn on and the data indicator (orange) will blink within 5 seconds, when the physical connection of the network camera accomplished.

Note: When the user uses the device for the first time, they need to install VLC Media Player software (VLC Streaming Media Player) (which can be downloaded and installed through searching from internet). The software version should be V3.0.3 or higher. When installing, the web plug-in should be checked, as shown in the following figure:



5.2 Access camera

1. Get camera IP address

Default camera IP address is 192.168.1.88, with mask 255.255.255.0.

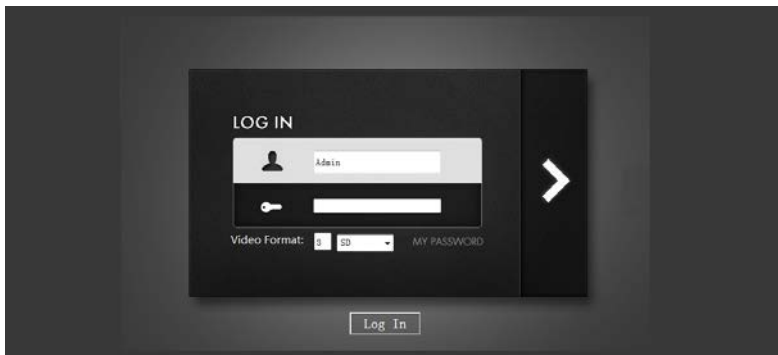
Watch the video output of the camera, open the camera menu by remote control or other means, and you can see the IP address of the current camera in the sub-menu "About", as shown in the figure:



2. Access IP Camera

Under the condition of the connection between client PC and IP camera:

- 1) Enter 'http://192.168.1.88' in the web browser to access the IP camera login interface. As shown in the figure, the default user name and password are "Admin" and "888888".



- 2) Enter the username and password and click "Log in" to access the camera operation interface as shown in the figure.



Doom, zoom, focus, menu and preset position can be realized. If you need to adjust the video effect parameters, please go to the camera menu.

If you need to adjust the user management, IP address and coding parameters of the IP camera, you can click the "Display/Hide Configuration Interface" button to open the IP camera configuration interface (as shown in the figure) and perform the corresponding operation.



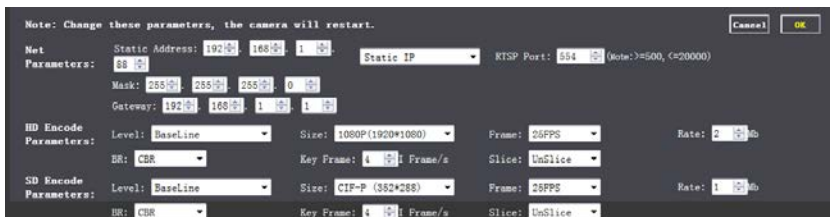
3. Camera control



4. User management

A login form with a dark background. It has a title 'Login Parameters:' on the left. To its right are three input fields: 'User:' with the text 'Admin', 'Password:' with five black dots, and 'Password confirm:' with five black dots. On the far right are two buttons: 'Cancel' and 'OK'.

5. User name and password are composed of letters (case-sensitive) and digitals. Press the "OK" button to validate and press the "Cancel" button to restore the relevant parameters of the current camera.

A configuration interface with a dark background. At the top, a note says 'Note: Change these parameters, the camera will restart.' with 'Cancel' and 'OK' buttons. Below is the 'Net Parameters' section with fields for 'Static Address' (192.168.1.68), 'Static IP' (dropdown), 'RTSP Port' (554), and a note '(Note)=500, <20000'. There are also fields for 'Mask' (255.255.255.0) and 'Gateway' (192.168.1.1). Below that is the 'HD Encode Parameters' section with fields for 'Level' (Baseline), 'Size' (1080P(1920*1080)), 'Frame' (25FPS), 'Rate' (2Mbps), 'DR' (CBR), 'Key Frame' (4 Frame/s), and 'Slice' (UnSlice). At the bottom is the 'SD Encode Parameters' section with fields for 'Level' (Baseline), 'Size' (CIF-P (352*288)), 'Frame' (25FPS), 'Rate' (1Mbps), 'DR' (CBR), 'Key Frame' (4 Frame/s), and 'Slice' (UnSlice).

IP address and RTSP monitoring port (default is 554) can be modified, the system will automatically check the validity of the IP address.

Description of coding parameters:

- 1) Coding level: Baseline/MainProfile/HighProfile;
- 2) Video size (resolution)

Main stream (HD) supports: XGA (1024*768), WSXGA (1680*1050), 720P (1280*720) and 1080P (1920*1080);

Auxiliary Stream (SD) supports: QCIF-P (176*144), QCIF-N (176*120), CIF-P (352*288), CIF-N (352*240), D1-P (720*576), D1-N (720*480), 960H-P (960*576), 960H-N (960*480), QVGA (320*240), VGA (640*480) and WVGA (854*480); The higher the resolution, the clearer the image, but the larger the bit stream, the higher the network bandwidth required, and the higher the decoding capability required. It should be chosen according to the actual situation.

- 3) Frame rate

Users can specify the frame rate. Generally speaking, the higher the frame rate, the smoother the picture is, but the higher the decoding ability is required. With lower frame rate, the picture may have a

sense of flicker.

4) Bit rate

Users can specify the bit rate. Generally speaking, the higher the bit rate, the clearer the image. But the bit rate configuration needs to be combined with network bandwidth and decoding ability. When the network bandwidth is narrow or decoding ability is insufficient, and the allocated bit rate is too high, the video stream will not be able to transmit normally and the video effect will be poor.

5) Rate control

There are two ways of rate control: fixed bit rate (CBR) and variable bit rate (VBR). When choosing CBR, video coding is coded according to the bit rate setting. In VBR mode, video coding takes into account the image quality, based on the setup bit rate, but not completely according to this bit rate, which also leads to the fluctuation of network bandwidth. CBR is generally adopted as default.

6) I frame interval

Set the interval between two I frames. Because the camera will produce an I frame by default when there is a new client connection, it is recommended that the I frame interval be increased when the known client is connected by TCP. When the user modifies the above parameters, press the "OK" key to take effect, and press the "Cancel" key to restore the relevant parameters of the current camera.

6. Modify video effect

Users can open the camera menu through web browser and directly adjust the video parameters in the menu, such as video style, saturation, contrast and so on. What You See Is What You Get. As shown in the figure (see the camera menu for details).



5.3 VLC Streaming Media Player Monitor

1. Open the VLC player, click "Media" - "Open Network Stream", or press the combination key "Ctrl+N".
2. Input URL address: `rtsp://ip: port/1` (main stream); `rtsp://ip: port/2` (auxiliary stream). RTSP port defaults to 554 and can be omitted.

5.4 Instructions for controlling cameras through TCP

The camera currently supports a variety of methods to control the camera, including RS232, RS485, infrared remote control, HTTP web browser, and TCP protocol.

The following is a detailed description of the TCP protocol:

A TCP server is built in this camera, which receives the connection of PC client on TCP port (currently port number is 5678). When the client establishes a TCP connection with the camera, the client sends standard VISCA protocol commands to the camera through the connection. The camera will perform the corresponding actions and return the execution results (returning the same standard of VISCA protocol). These commands are not only PTZ commands, but almost

compatible with all VISCA protocols.

Here are some commonly used commands:

1. Action command

	Action	Format	Description
Zoom	Stop	81 01 04 07 00 FF	Stop zooming
	Tele (Standard)	81 01 04 07 02 FF	Zoom at standard speed
	Wide (Standard)	81 01 04 07 03 FF	
	Tele (Variable)	81 01 04 07 2p FF	Variable-speed zoom
	Wide (Variable)	81 01 04 07 3p FF	P as speed: from 0 (low) to 7 (high)
	Direct	81 01 04 47 0p 0q 0r 0s FF	pqrs: zoom position Range: 0x0000-0x4000
Digital zoom	D-Zoom Limit	81 01 04 26 0p FF	p: digital zoom range: 0 (x1), 1(x1.5), 2(x2), 3(x4), 4(x8), 5(x10), 6(x12)
	Direct (Variable)	81 01 04 46 0p 0q 0r 0s FF	pq: digital zoom position, rs reserved, for example: pq=01, maintain the existing optical zoom unchanged; for other values, first set optical zoom to maximum, then to the desired digital zoom position.
Focus	Stop	81 01 04 08 00 FF	Stop focusing
	Far (Standard)	81 01 04 08 02 FF	Focusing at standard speed
	Near (Standard)	81 01 04 08 03 FF	
Focus	Far (Variable)	81 01 04 08 2p FF	Variable-speed focus
	Near (Variable)	81 01 04 08 3p FF	P as speed: from 0 (low) to 7 (high)
	Direct	81 01 04 48 0p 0q 0r 0s FF	pqrs: Focusing position
	Auto Focus	81 01 04 38 02 FF	Auto Focus
	Manual Focus	81 01 04 38 03 FF	Manual Focus
	Auto/Manual	81 01 04 38 10 FF	Auto/Manual switch
	NearLimit	81 01 04 28 0p 0q 0r 0s FF	Setup 'Near Limit' value
	OnePushTrigger	81 01 04 18 01 FF	Trigger one auto-focus, stop auto-focus

			after completion, and keep the last focus position.
Zoom focus	Direct	81 01 04 47 0p 0q 0r 0s 0t 0u 0v 0w FF	pqrs: zoom position tuvw: focus position
white balance	Auto	81 01 04 35 00 FF	Automatic white balance
	Indoor	81 01 04 35 01 FF	Indoor white balance
	Outdoor	81 01 04 35 02 FF	Outdoor white balance
	One Push WB	81 01 04 35 03 FF	One-push white balance
	ATW	81 01 04 35 04 FF	Automatic tracking white balance
	Manual	81 01 04 35 05 FF	Manual white balance
	OnePushTrigger	81 01 04 10 05 FF	One-push trigger white balance
Exposure	Full Auto	81 01 04 39 00 FF	Automatic exposure
	Manual	81 01 04 39 03 FF	Manual exposure
	Shutter	81 01 04 39 0A FF	Shutter priority exposure
	Iris	81 01 04 39 0B FF	Iris priority exposure
	Bright	81 01 04 39 0D FF	Exposure control
Menu	Menu	81 01 10 01 FF	Menu key value
	OK	81 01 10 02 FF	
	Up	81 01 10 03 FF	
	Down	81 01 10 04 FF	
	Left	81 01 10 05 FF	
	Right	81 01 10 06 FF	
	Return	81 01 10 07 FF	
Preset position	Reset	8x 01 04 3F 00 pq FF	Preset position control, pq range: 0-254
	Set	8x 01 04 3F 01 pq FF	
	Recall	8x 01 04 3F 02 pq FF	

Doom	Up	8x 01 06 01 VV WW 03 01 FF	<p>1. VV: horizontal speed 0x01-0x18 (low-high)</p> <p>2. WW: vertical speed 0x01-0x14 (low-high)</p> <p>3. YYYY: horizontal range 0xF95B-0x06A4 (-1700-1700), center position is 0</p> <p>4. WWW: vertical range 0xFED3-0x0384 (-300-900), center position is 0</p>
	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	

etc...

2. Query commands

	Command	Response	Description
Query zoom position	81 09 04 47 FF	90 50 0p 0q 0r 0s FF	pqrs: zoom position, range is: 0x0000-0x4000
Digital zoom query	81 09 04 26 FF	90 50 0p FF	p: digital zoom range, p=0 (x1), 1(x1.5), 2(x2), 3(x4), 4(x8), 5(x10), 6(x12)
Digital zoom position query	81 09 04 46 FF	90 50 00 00 0p 0q FF	pq: digital zoom position
Focus mode query	81 09 04 38 FF	90 50 02 FF	Auto
		90 50 03 FF	Manual
Focus position query	81 09 04 48 FF	90 50 0p 0q 0r 0s FF	pqrs: focus position
White balance query	81 09 04 35 FF	90 50 00 FF	Automatic white balance
		90 50 01 FF	Indoor white balance
		90 50 02 FF	Outdoor white balance
		90 50 03 FF	One-push white balance
		90 50 05 FF	Manual white balance
Doom	8x 09 06 12 FF	y0 50 0w 0w 0w 0w 0z 0z 0z 0z FF	www/zzzz=horizontal position/vertical position, refer to the define above

etc...

6. Installation and dimensions

6.1 Attention

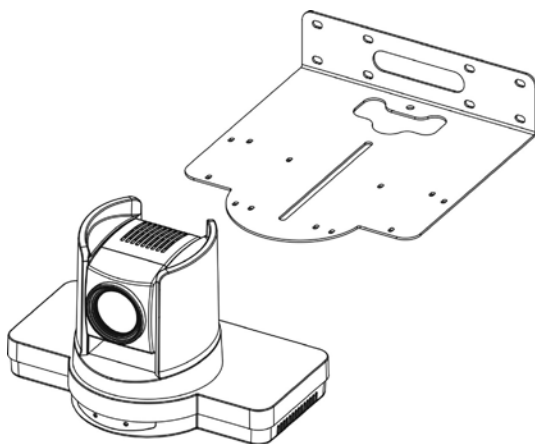
Before camera installation, please read safeguard in the beginning of this user manual carefully, and pay attention to the followings.

1. Camera installation shall be done by qualified technician or personnel.
2. Before installation, please check camera's DIP switch SW1 and SW2, make sure camera's address and other settings configured correctly.
3. Weight of camera will not be over 2.0kg, but for safety, all mechanical structure and connections holding camera should be able to bear weight 5 times the weight of camera.

6.2 Installation method

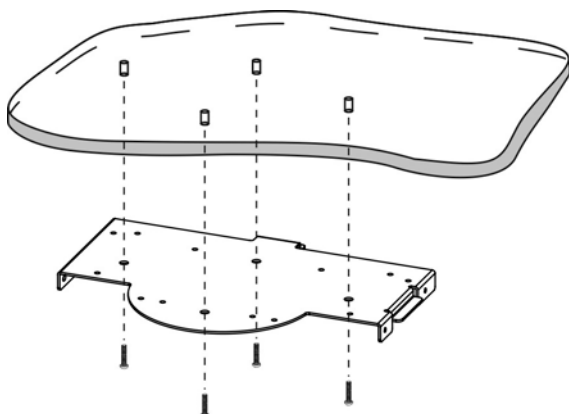
There are two methods to install camera, desktop installation and ceiling installation.

Desktop installation: installation surface shall be kept level; camera shall be fixed to installation surface with firm connection, so to avoid falling.

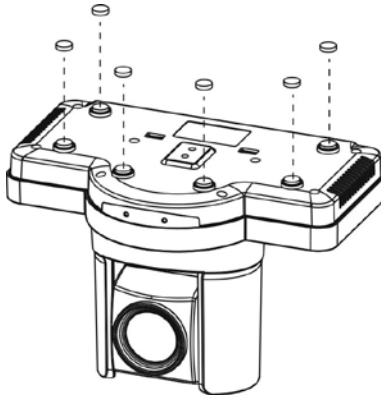


Ceiling installation: must choose strong ceiling or room roof to hold camera in this installation method.

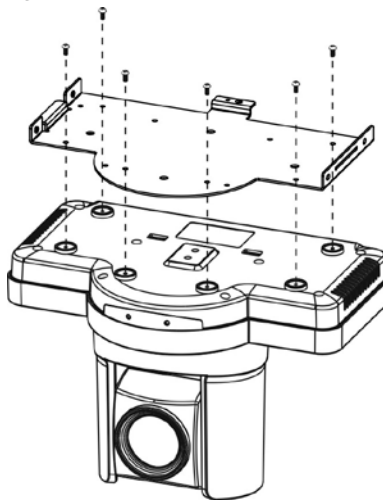
- 1) Refer to dimension and position of four holes in camera's ceiling holder, four holes shall be made in right place of ceiling or roof, then use three M5X40 screws to connect ceiling holder and ceiling or roof together firmly; an alternative way is to install four M5 expansion bolts in ceiling or roof, then fix ceiling holder using four M5X40 screws.



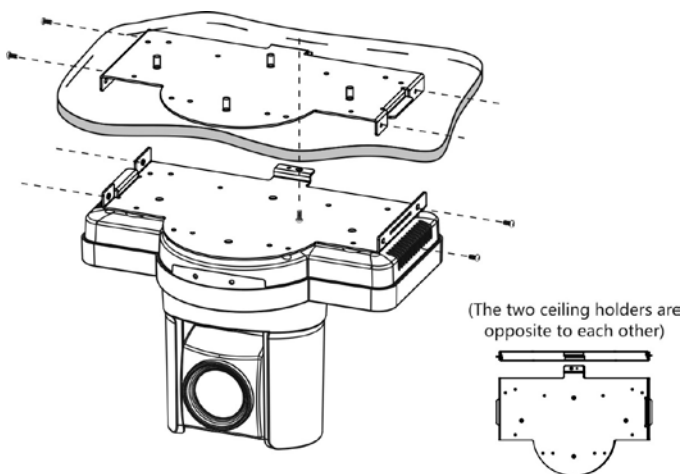
- 2) Check camera's DIP switch, make sure camera's address and other settings configured correctly.
- 3) Take down six foot pads in from camera bottom.



- 4) Fix another ceiling holder to camera bottom with six PM3X6 screws.

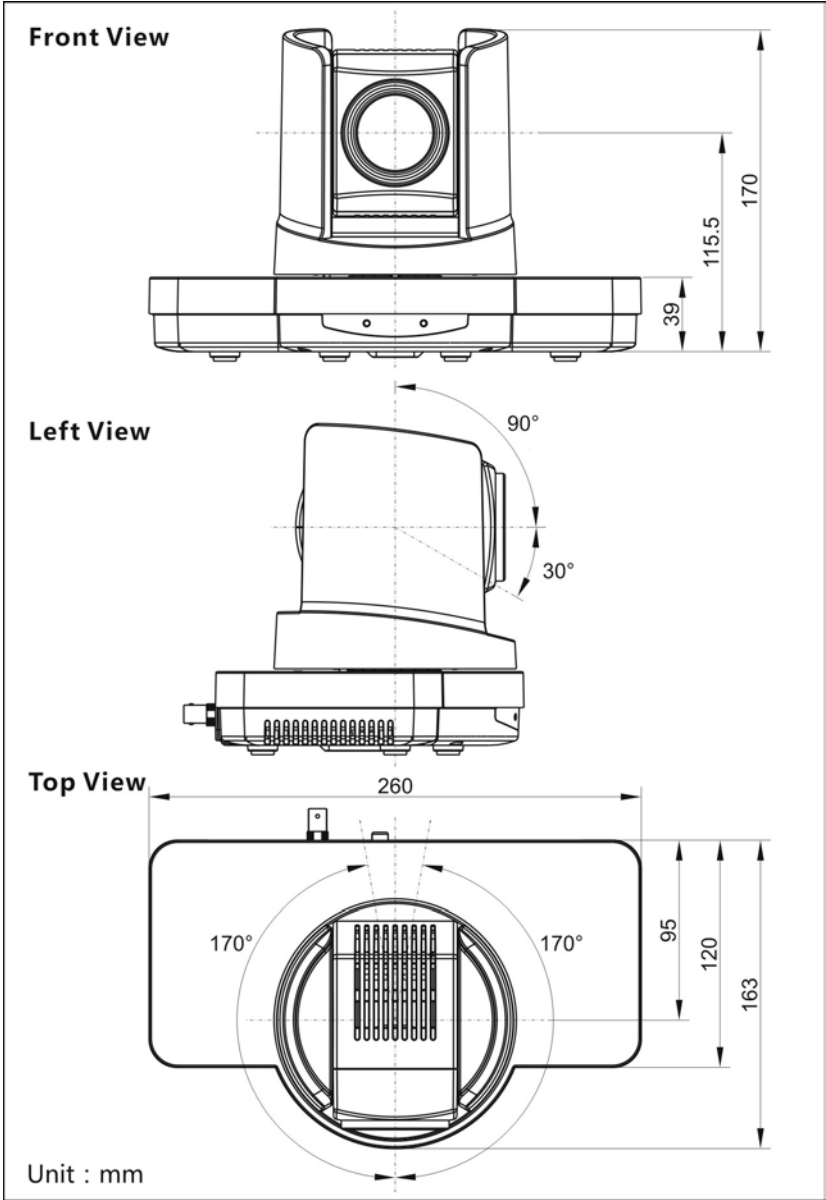


- 5) Lock the two ceiling holders, and fix them with five PM3X8 screws.



- 6) Connect camera cables including power, video and control.

6.3 Product dimension



7. Troubleshooting

1. Unable to complete self-checking during camera starting-up, with abnormal pan/tilt sound

Please check whether standard power adapter be used, (KTEC, input: 110-240 V, 50/60 Hz, 0.8 A; output: 12 V, 2.5 A), if not, please check whether power output is compatible with output of standard power adapter.

2. No video display when camera is connected to displayer or codec
Please refer to following procedures:

- 1) Make sure camera starting-up completed successfully, can do pan/tilt/zoom operation normally.
- 2) Make sure camera configured with correct video format supported by camera interface in use, to change video format, please operate OSD menu or call specialreset using IR remote controller.
- 3) Make sure camera configured with correct video format supported by external device, if not sure, may try 1080p25 format which is usually supported by most devices, and then try other format.
- 4) Make sure video cable connected well, no poor contact happens.
- 5) Try connecting camera to HDTV or displayer directly, so to bypass complicated connections and locate real cause.

3. Serious color shifting when camera is connected to displayer or codec

Please refer to following procedures:

- 1) Make sure video cable connected well, no poor contact

happens.

- 2) Make sure camera configured with correct video format supported by external device, if not sure, may try 1080p25 format which is usually supported by most devices, and then try other format.
- 3) Try connecting camera to HDTV or displayer directly, so to bypass complicated connections and locate real cause.
4. Changes of camera configurations lost after camera rebooting
If changes made through menu operation, menu must be turned off normally before camera rebooting, so to save related changes.
5. Camera turn to a special pan/tilt/zoom position other than HOME position after rebooting
After rebooting, camera will call preset 1 automatically, only when preset 1 isn't configured, camera will keep in HOME position.
6. Camera can only do pan/tilt operation within a limited range
Normal range for pan operation is -170 degree to 170 degree, normal range for tilt operation is -30 degree to 90 degree, if camera cannot reach such range, the most possibility is someone or devices such as video tracking system changed pan/tilt range using VISCA command.

Please contact us for further assistance.

7. Camera is not controllable through COM port

Please refer to following procedures:

- 1) Enter to <Main menu><System>, check whether COM parameters including COM port, baud rate and protocol are consistent with those of controller.

Note: If protocol is VISCA, camera address shall be within 1 to 7, if protocol is PELCO, camera address shall be within 1 to 255.

- 2) If using VISCA daisy chain connection for multiple cameras, please check whether cameras are connected one by one with increased address started from 1.
 - 3) Check whether COM cables connected well, and no poor contact happen.
8. Preset set by IR remote controller is not consistent with preset set by COM command

Preset set by IR remote controller use ID defined from 1 to 128, which is mapped to a camera internal definition from 0 to 127; this internal definition is used in COM command, for example, preset 1 set by IR remote controller can be called by COM command using preset ID 0.

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