

User's Manual for IR Intelligent Ball Video Camera



.....Please read the manual carefully prior to installation of the device

Notes for attention

Important safety precaution

1. Please read the manual carefully prior to operation.
2. Please refer to the instructions for all operations.
3. Do not put the device on an unstable desktop or rack.
4. Do not put any foreign matter or fluid into the device to prevent from damaging the device.
5. For wiring, various electrical safety standards shall be observed, and dedicated power source attached with the device shall be used. TVS anti-lightning technology is used for RS-485 and video signals of the product to prevent various pulse signals such as lightning and surge below 1500W from damaging on the device effectively. RS-485 and video signals shall be kept away from high voltage devices or cables appropriately in their transmission process, and protective measures against lightning and surge shall be taken as required.
6. Do not point the camera at the sun or other bright objects when it is in use or not in use, which may result in permanent damage on CCD of the camera.
7. In case of any fault of the device, do not repair it by yourself, instead, you should consult the user's manual to find out the cause, and ask relevant professionals to repair it. The maintenance and repair work shall be done by maintenance personnel authorized by our company.

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Chapter I Overview of the product

1.1 A brief introduction to the product

IR intelligent high speed ball camera is a high performance digital signal processing (DSP) camera equipped with a zoom lens, and it is a hi-tech monitoring product incorporating a universal speed change PTZ unit and a digital decoder. Used for free and rapid positioning and continuous tracking scanning, it achieves all-round monitoring without dead zone in the real sense. It can adapt to change of brightness of the environment and distance of the target. Being of wholly digital control and exquisite and simple design, it minimizes connection to parts of the system, improves reliability of the system and facilitates installation and maintenance. Driven with a precise stepping motor, it is stable in operation, quick for reaction and accurate for positioning. The high speed intelligent ball has power-off memory function, and the working state before power failure can be recovered automatically after it is started again, making the system safer and more reliable.

Various characteristics of high speed ball camera enable it is suitable for monitoring of large-area and moving targets of various lines, such as monitoring of intelligent buildings, security of banks, urban roads, power departments, airports and stations.

1.2 Technical specification

1. Technical parameters of high speed intelligent ball

Power source	DC12V
Ambient temperature	Indoor ball: (0℃-+40℃) Outdoor ball: (-40℃-+60℃)
Ambient humidity	≤95% without condensation of moisture
Power consumption	150W (indoor) /60W (outdoor)
Communication mode	RS485 bus
Communication baud rate	1200/ 2400 / 4800 / 9600 bps
Horizontal rotation speed	0.5 °280 ° (level 1-64 speed change)
Horizontal rotation range	360 °rotation without restriction
Lifting range	90 °

Automatic reversing function	It can reverse for 180 °when it is vertical to the ground.
Automatic control of zoom speed	Control speed can be adjusted automatically in according to zoom length
Two-point scanning	355 °can be set
Two-point scanning speed	Level 1-64 can be set
Retention time for two-point scanning	1-60 seconds can be set
Quantity of preset points	128
Speed to each preset point	Level 1-64 can be set
Retention time for each preset point	1-60 seconds can be set
Cruise group	8
Quantity of cruise point for each cruise group	16 preset points
Fan and heater	Fan and heater are started automatically (for the ball only)

2. Parameters of high speed intelligent ball camera (parameters for different cameras vary)

Model	18×color and monochrome (for both day and night)	270×color and monochrome (for both day and night)
Synchronization mode	Internal synchronization	Internal/external synchronization
Scanning mode	2: 1 interlaced scanning	2: 1 interlaced scanning
Definition	480 lines	>480 lines
Min. luminance	0.01Lux	0.7Lux/0.002Lux
Aperture	Auto/manual	Auto/manual
Focusing	Auto/manual preferred	Auto/manual
Zoom ratio	Optical 18*12 times	Optical 27*10 times
Focus	4.1-73.8mm	4/88mm
Angle of image	Wide angle 47 °far angle 2 °	Wide angle 47 °far angle 2 °
Backlight compensation	Backlight compensation	Backlight compensation
White balance	Auto/manual	Auto
Gain control	Auto	Auto
Signal pattern	PAL	PAL
SNR	>55dB	>55dB
Video signal output	1.0Vp-p/75ohms	1.0Vp-p/75ohms

1.3 Description of functions

Main functions of IR intelligent high-speed ball camera are introduced briefly as follows:

1. Setting of address code, baud rate and control protocol

Any operation command has address code, baud rate and control protocol of its target in the camera, and a separate camera only responds to the operation command conforming to its own address code, baud rate and control protocol. Please refer to DIP setting for specific method of setting of address code, baud rate and control protocol of the camera.

2. Target tracking

The user can use the rocker on the control keyboard to turn the camera leftward, rightward, upward and downward and track mobile targets or mobile vision. Moreover, focus can be adjusted to change size of viewing angle or targeted image. In the state of automatic focusing, with movement of the lens, the camera adjusts rapidly in accordance with change of scenes automatically and acquires a clear image instantaneously.

3. Automatic focus/rotation speed match technology

In terms of manual adjustment, for long focus, high speed reaction of the ball camera enables rapid movement of screen by touching the rocker slightly and result in loss of data. Based on the personalized design, intelligent ball adjusts horizontal and vertical rotation speed of the camera automatically in accordance with length of focus, which makes manual target tracking more convenient and simpler.

4. Automatic reversing

If the operator holds the rocker after the lens is pulled to the bottom (be perpendicular), the lens rotates for 90° horizontally automatically and reverses for 90° upwards. At this time, objects on the rear can be viewed directly. In this way, whole-process continuous monitoring of vertical 90° can be achieved.

5. Setting and invoking of preset points

Preset functions is that ball camera can save position parameters such as horizontal angle and tilt angle of PTZ unit and lens focus of the camera in the current

state in the memory, and they can be invoked rapidly when they are in need to adjust PTZ unit and camera to the position. The operator can save and invoke preset points through control equipment such as control keyboard and IR controller conveniently and rapidly. The ball camera supports 255 preset points.

6. Control of lens

(1) Control of focus

The user can acquire a required panoramic picture or its miniature view by adjusting length of focus through control keyboard or main matrix unit of the ball camera.

(2) Control of focusing

In case of automatic focusing and zoom by default, lens of the camera will focus automatically on the center of the scene and maintain a clear image. In a special circumstance, the user can focus manually and acquire an expected image effect.

In case of manual focusing state, to resume automatic focusing, just swing the rocker to resume automatic focusing. Apart from this, a special control command can be issued or any preset point can be invoked to resume automatic focusing.

Lens of the camera cannot perform automatic focusing of the photographing target in the following circumstances:

- a. The target is not in the center of the picture.
- b. The target is both in a far place and a near place;
- c. The target is an object of strong light, such as luminous object like neon light and spotlight;
- d. The target is behind a glass with water beads or dust;
- e. The target moves too quickly;
- f. The target of large area, such as a wall;
- g. The target is too dark or dim.

7. Control of IR intensity

The user can adjust IR intensity (valid for OSD IR model) manually through aperture of control keyboard (for IRIS) upward or downward.

8. Automatic backlight compensation

When the function of backlight compensation is enabled, lens of the camera

can perform luminance compensation for a darker object automatically on a highlighted background, perform lighting adjustment for the highlighted background, prevent from a glare in the whole picture due to brightness of the background, and the target cannot be differentiated due to darkness, and acquire a clear image.

9. Automatic whiten balance

Automatic adjustment can be made and resume genuine color in accordance with change of environmental rays.

10. Night view function (shift between color and monochrome)

The camera with night view function can change CCD luminance automatically in accordance with change of environmental rays in the mode of automatic shift between color and monochrome. E.g.: Thanks to sufficient light in daytime, general luminance can be used to ensure a picture of bright colors. And in the night, it can be changed into low luminance automatically to display clear objects with a monochrome picture.

11. Automatic cruise

Some preset points can be arranged in the array of automatic cruise in accordance with required sequence through setting preset cruise points in advance. Only an external command is required to enable an indoor medium speed ball to move reciprocally in accordance with the set sequence of preset point and specified time interval continuously.

12. Pattern scanning

Pattern scanning is to save moving track of the ball camera through the menu and invoke the saved scanning route through power-on action, idle action and alarm interlinking.

13. Continuous scanning

Only an external command or invoking through power-on action, idle action and alarm interlinking is required to make the ball camera scan in a circulating way at a certain speed horizontally.

14. Intermittent scanning

Only an external command or invoking through power-on action, idle action and alarm interlinking is required to make the ball camera scan in a circulating way at

a certain interval and speed horizontally.

15. Regional scanning

Only an external command or invoking through power-on action, idle action and alarm interlinking is required to make the ball camera scan in a circulating way at a certain speed and in the specified range horizontally.

Chapter II Installation of the product

2. 1 Setting of DIP switch of ball camera

(1) DIP switch



(2) Address setting (SW2)

Bits 1-8 of the 8-bit DIP switch are used for setting address code of the infrared ball, and the address encoding can be performed in the range of 1~256. Only when the address code of each ball is the same as the address code of harddisk video recorder or matrix or control keyboard, control can be achieved. The 8-bit DIP switch used for setting address code adopts binary system. When each bit is pushed to ON, the value is 1, and when pushed to OFF, the value is 0. Refer to table for address.

Address	Binary	Address	Binary	Address	Binary	Address	Binary
0	00000000	15	11110000	30	01111000	45	10110100
1	10000000	16	00001000	31	11111000	46	01110100
2	01000000	17	10001000	32	00000100	47	11110100
3	11000000	18	01001000	33	10000100	48	00001100
4	00100000	19	11001000	34	01000100	49	10001100
5	10100000	20	00101000	35	11000100	50	01001100
6	01100000	21	10101000	36	00100100	51	11001100
7	11100000	22	01101000	37	10100100	52	00101100
8	00010000	23	11101000	38	01100100	53	10101100
9	10010000	24	00011000	39	11100100	54	01101100
10	01010000	25	10011000	40	00010100	55	11101100
11	11010000	26	01011000	41	10010100	56	00011100
12	00110000	27	11011000	42	01010100	57	10011100
13	10110000	28	00111000	43	11010100	58	01011100
14	01110000	29	10111000	44	00110100	59	11011100

(3) Baud rate setting (SW1)

DIP Switch	2400 bps	4800 bps	9600 bps	19200 bps
Bit 5	OFF	ON	OFF	ON
Bit 6	OFF	OFF	ON	ON
Bit 7	Protocol selector switch			
Bit 8	Rs485 terminal			

(4) Protocol setting (SW1)

Setup list of protocol DIP switch

Protocol type	Switch Setup	Switch Setup	Switch Setup	Switch Setup
	1	2	3	4
PELCO-D	OFF	OFF	OFF	OFF
PELCO-P	ON	OFF	OFF	OFF
SAMSUNG	OFF	ON	OFF	OFF
PANASONIC	ON	ON	OFF	OFF

(5) Related function setting

Simple cruise operation

Preset Point	Ball Machine/Video recorder Control Description	Invoke Preset Point	Set Preset Point
115	Start up the first cruise No. 1-16 scanner	☐	
116	Start up the second cruise No. 17-32 scanner	☐	
117	Start up the third cruise No. 33-48 scanner	☐	
118	Start up the fourth cruise No. 49-64 scanner	☐	
119	Start up the fifth cruise No. 65-80 scanner	☐	
110	Left limit point		☐
111	Right limit point		☐
112	Invoke horizontal limit scanner	☐	
113	Video recorder/rotation automatic matching on	☐	

114	Video recorder/rotation automatic matching off	☐	
120	Horizontal slow scanning	☐	
121	Horizontal fast scanning	☐	
121	Set guard bit		☐
122	Enable guard bit		☐
123	Stop guard bit		☐
130	Start up the first track record (valid only for menu machine type)	☐	
131	Start up the second track record (valid only for menu machine type)	☐	
132	Start up the third track record (valid only for menu machine type)	☐	
133	Start up the fourth track record (valid only for menu machine type)	☐	
127	Open spectra function (Applicable for dot matrix preset bit machine type)		☐
128	Close spectra function (Applicable for dot matrix preset bit machine type)		☐
111	Reset	☐	
150	Default value	☐	
Open/Close	Open/close video recorder menu (Practical for some types of machine)		

2. 2 Operations of ball camera

Specific operation methods for different system platforms are not the same, subject to the operation manual of system manufacturer. There are special requirements and operation methods in different circumstances. Please contact the distributor to acquire necessary information. Here we only introduce the methods to control the ball camera connecting to control keyboard manufactured in our company.

3. 1 Power-on self-check

After power of the ball camera is on, the camera moves horizontally and vertically automatically first, then pulls the lens to the nearest place, to the farthest place, and stops after movement is over. Confirm the ball camera operates normally through self-check.

Control the camera to rotate upwards, downwards, leftwards and rightwards:

After choosing a camera, upward, downward, leftward and rightward movement of the ball camera can be controlled manually with the rocker on the keyboard. Swinging of the rocker controls movement of the camera, and the camera move rightwards when the rocker swings rightwards. Likewise, the camera moves leftwards when the rocker swings leftward. When the rocker swings vertically, the camera moves in vertical direction. When the rocker is swung in a diagonal direction, the camera moves in horizontal and vertical directions at the same time and the movement direction is the same as that of the rocker.

3. 2 Setting of preset point

Set preset point in accordance with the following steps:

- (1) Select a camera (refer to instruction for control keyboard for details);
- (2) Operate rocker, zoom key, focusing key and aperture key to adjust picture of the camera;
- (3) Press number key+ **PRESET**(input the designated number of preset point, and save parameters of the preset scene.

3. 3 Invoke preset point

Set preset point in accordance with the following steps:

- (1) Select a camera;
- (2) Press number + **PREVIEW** (input a designated number of preset point), the camera moves to the preset point immediately, changes zoom, focusing and aperture of lens to preset parameters automatically; If a preset point with special functions is input (refer to preset point function table), the ball camera will perform the function for preset point with special functions (e.g. if No.99 preset point is input, the camera will perform automatic scanning function).

2. 2. 1 Figure of actual object 3-2



Figure 3-2

2. 2. 2 Dimensional diagram of rack 3-3

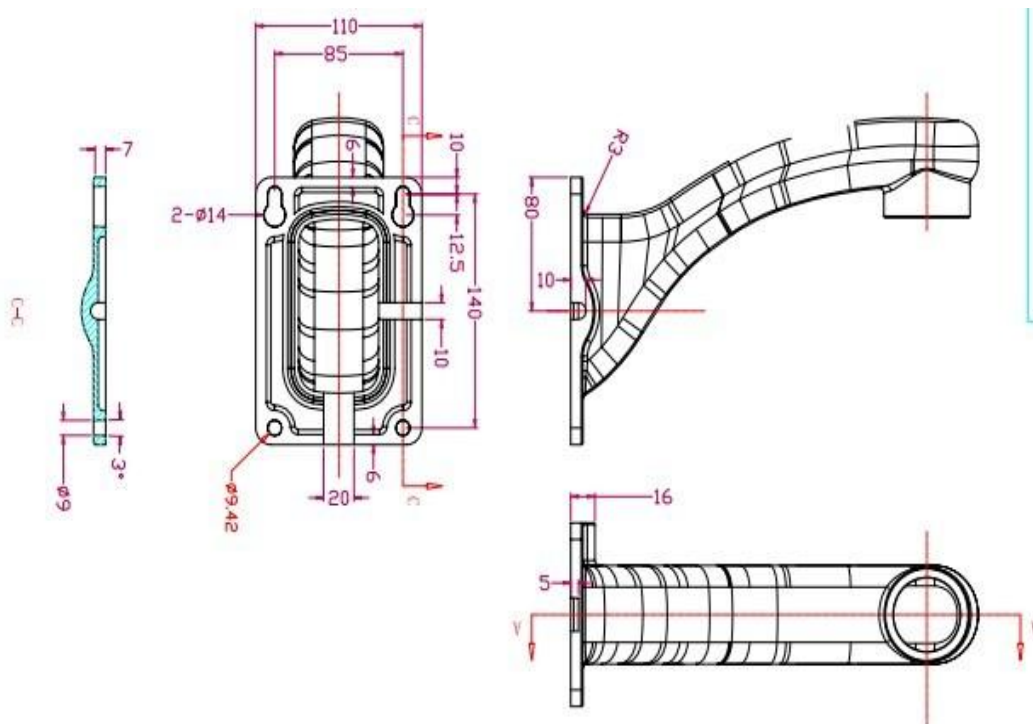


Figure 3-3

2. 2. 3 Installation of rack and ball camera

Step 1 Installation of rack



Figure 3-4 Determine position of screw installation hole



Figure 3-5 Drill holes on the installation positions



Figure 3-6 Drill holes required for installation



Figure 3-7 Tighten fixing screws

Determine installation positions on the wall to mount the ball camera, draw hole positions on the wall with a signal pen in accordance with positions of screw holes of the rack, as shown in figure 3-5. Drill holes on the wall as shown in figure 3-6. Place expansion screws into the hole, put the cable through the rack, aim the screw hole on the rack accurately at the screw and tighten the nut, as shown in figure 3.7.

Step 2 Installation of ball camera

Loosen 3 screws on the rack, aim the head of the cover of the ball camera at the rack accurately and put it in place, tighten 3 fixing screws on the rack and prevent ball camera from falling off.

Chapter III Troubleshooting

Failure	Possible Reasons	Solutions
No action, no image, fail of indicator after power-on	Improper connection of power supply	Correction
	Damaged power supply	Replacement
	Damaged fuse	Replacement
Image displayed after	Poor contact of power cord	Solve it.

power-on but out of control	Wrong setting of PTZ address code or Baud rate	Set the address or Baud rate again
	Unmatched protocol	Select the correct protocol
	Reverse connection or open circuit of RS485 line	Check connection of RS485 control line
Image displayed with jitter from motor and unstable image after power-on	Mechanical failure	Check and repair
	Insufficient power supplied	Replace power supply
	Poor contact of video cable	Solve it
Fuzzy image	Video recorder in mode of manual focusing	Adjust to automatic focusing mode
	Dirty ball cover	Clean the ball cover
Poor control of ball machine	Insufficient power supplied	Replacement
	Check if the matching resistance of the furthest ball machine is connected	Connected with the matched resistance
	Over long distance, over large signal attenuation	Use twist-pair or use cable at larger diameter
	Out of control caused by nonstandard operation	Disconnect power and restart

In case of fail in finding a solution for the ball machine, please contact the distributor or our company as soon as possible.