

Operating Instructions



1080P Intelligent Pedestrian Detection Camera

Please read this manual thoroughly before operating the device,
and keep it for future reference.

V1.2

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1. Precautions

1.1 Storage and Keeping

- 1) Storage temperature: -30~+80°C, operating temperature: -20~+70°C.
- 2) Avoid dropping or striking this device.
- 3) Never puncture, scratch or use abrasive cleaning materials on this device.
- 4) Do not place cables where they may be pinched or stepped on.

1.2 Operating Precautions

- 1) Working voltage: 10~32V. It stops working below 7V and power supply of improper voltage may cause the device damaged permanently.
- 2) Make sure all cables are connected properly. Observe polarity. Improper cable connections may damage the device. Remove the power cable connections when you don't intend to use the unit.
- 3) This product is a safe driving auxiliary equipment, not a substitution for driver's any operating actions in the process of vehicle driving. Also, it cannot guarantee a 100% recognition rate.
- 4) No obstacles are allowed within the end of lens, which has an impact on the product use.
- 5) After the installed device is manually adjusted again, it needs to be recalibrated to show the normal detection effect.



Warning!

1. High voltage is present within the device. The opening of the case should be by professionals.
2. Do not rely too much on this device while driving.



Special Notice

Never try to repair this device by yourself. In case of any problems, please turn off the device at once and notify our company or authorized dealer. The device is a complex device. Any disassembly or modification may lead to damage and void the warrantee.

1.3 Maintenance

- 1) Remove all the cable connections from the device before cleaning the device.
- 2) Use a mild household detergent and clean the unit with a slightly damp, soft cloth.
- 3) Never use strong solvents such as thinner, as they might damage the finish of the device.

	Caution	
	Risk of electric shock Do not open	
Caution: to reduce the risk of electric shock, Do not remove cover (or back). No user-serviceable parts inside. Refer servicing to qualified service personnel.		



This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute risk of electric shock to persons.



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.



This symbol is intended to alert the user not to dispose of electrical and electronic equipment.

CAUTION

You are cautioned that any changes or modifications not expressly approved in this manual could void your warrantee and neccessitate expensive repairs.

2. Product Features

Can be divided into the following three types of shells:

I



Side view: 70°



Horizontal: 70°



Horizontal:150°

II



170°/200°

III



Vertical: 70° or



With light: 150°/170°

Horizontal: 70°/150°/170°/200°

2.1 Pedestrian Detection Module

- 1) Pedestrians can be detected in the Detection Zone (region of interest), and a "ding" alarm will be issued.
- 2) The closer the pedestrian is to the vehicle, the more rapid the alarm sounds.

2.2 Artificial Intelligence Algorithm Blessing

- 1) The pedestrian detection and identification camera adopts deep learning technology, which can realize intelligent and high-precision pedestrian detection.
- 2) Deep Learning (DL) + Machine Learning (ML) + Artificial Intelligence (AI).

2.3 External Wi-Fi Communication and LAN Communication

- 1) Users can connect mobile phone with the device through an external Wi-Fi module to calibrate and set the device.
- 2) Users can also connect the device with an external USB—LAN cable to check RTSP.

3. Technical Specifications

Cameras are divided into vertical cameras and horizontal cameras according to different detection areas. See 7.1 for details. Vertical cameras are generally used to be installed on the side of the car. Horizontal cameras can be installed around the car

Differences

	 vertical	 horizontal
Viewing Angle(H)	6.0mm/70°	6.0mm/70° 2.3mm/150°
Detection Distance(m)	0.5~30m	0.5~30m 0.5~20m
Dimension(mm)	97.5×67.3×66.5	97.5×75.3×72
Weight(g)	355	470

	
Viewing Angle(H)	1.99mm/170° 1.45mm/200°
Detection Distance(m)	0.5~10m 0.5~8m
Dimension(mm)	103.5 x 53 x 66.5
Weight(g)	500

	 vertical	 horizontal			
Viewing Angle(H)	6.0mm/70°	6.0mm/70°	2.3mm/150°	1.99mm/170°	1.45mm/200°
Detection Distance(m)	0.5~30m	0.5~30 m	0.5~20m	0.5~10m	0.5~8m
Dimension (mm)	139.7 x 63.2 x 53.5				
Weight(g)	386(410g with light, only 150° and 170° viewing angle options are available.)				

Similarities

Resolution / Frame	HD 1920 x1080 / 25 fps or 1920 x1080/30 fps
Video Output	AHD(1.0Vp-p,75Ohm)
Audio Output	Warning acoustical signal Output
Communication Interface	USB 2.0(For Software upgrading)
Input Power	DC 10~32V
Rated Currency	With lights: 320mA; Without lights: 470mA
Power Dissipation(12V IN)	4W
Wire Length	0.5m
Operation Temperature	-20~+70°C
Storage Temperature	-30~+80°C
Waterproof Rating	IP69K
Colour	Black

4. Components and Accessories

Components or Ccessories	Quantity (piece)	Description
	1	Pedestrian Detection Camera
	1(Optional)	External extension cable, 8Pin mini din male connector to 8P mini din female connector (Left: with alarm signal cable. Or right: without alarm signal cable)
	1	Video output cable (left: without alarm signal cable. Or right: with alarm signal cable)
	1(Optional)	External Wi-Fi module (reusable) Note: Wi-Fi module comes with USB converter cable
	1	Hexagon wrench (for camera Angle adjustment)
	1(Optional)	Monitor (Supports AHD input)



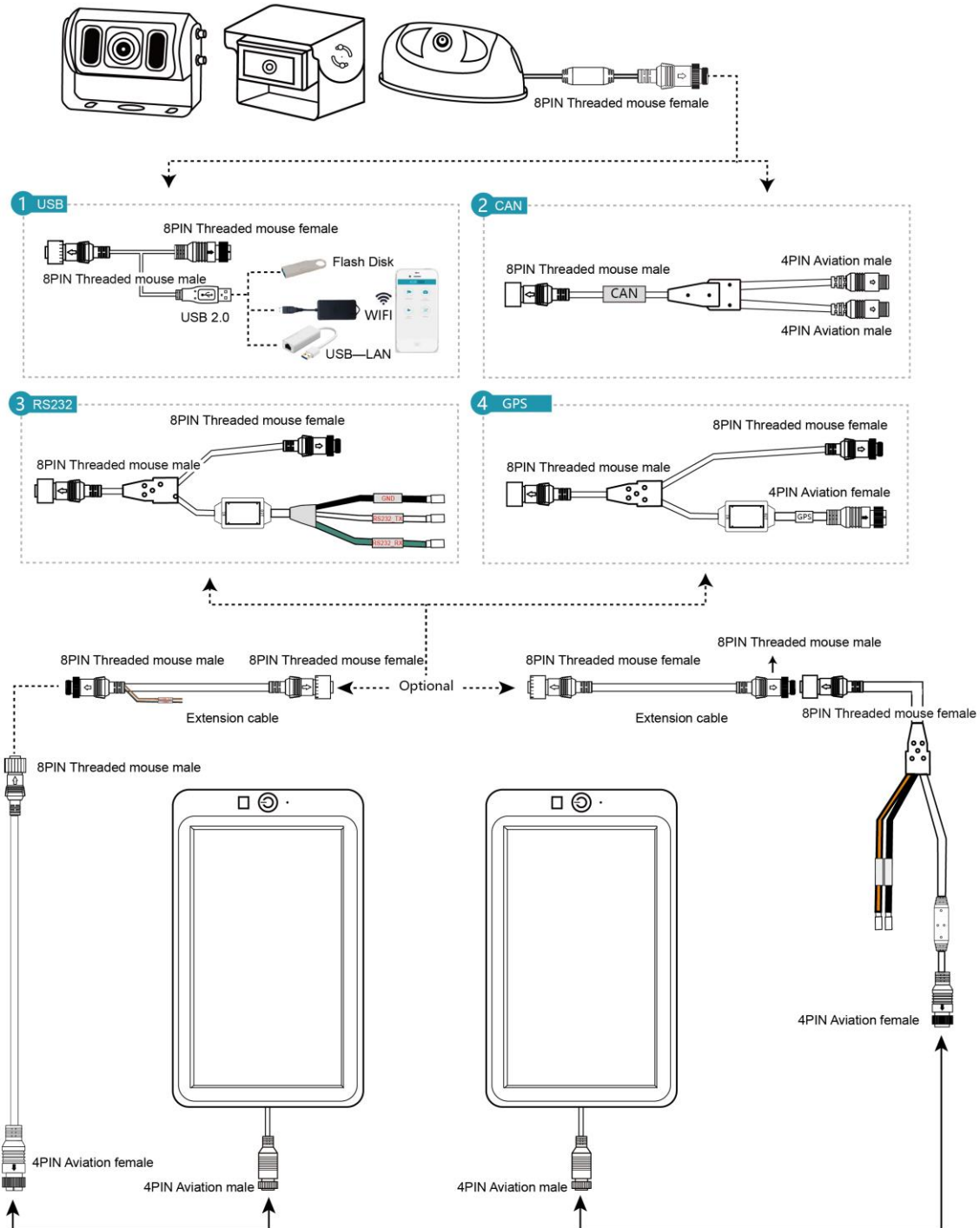
Special Notice

The camera diagram is shown with a Vertical side-view camera as an example. Accessory supply may be different for different application. Multiple devices can share one Wi-Fi module.

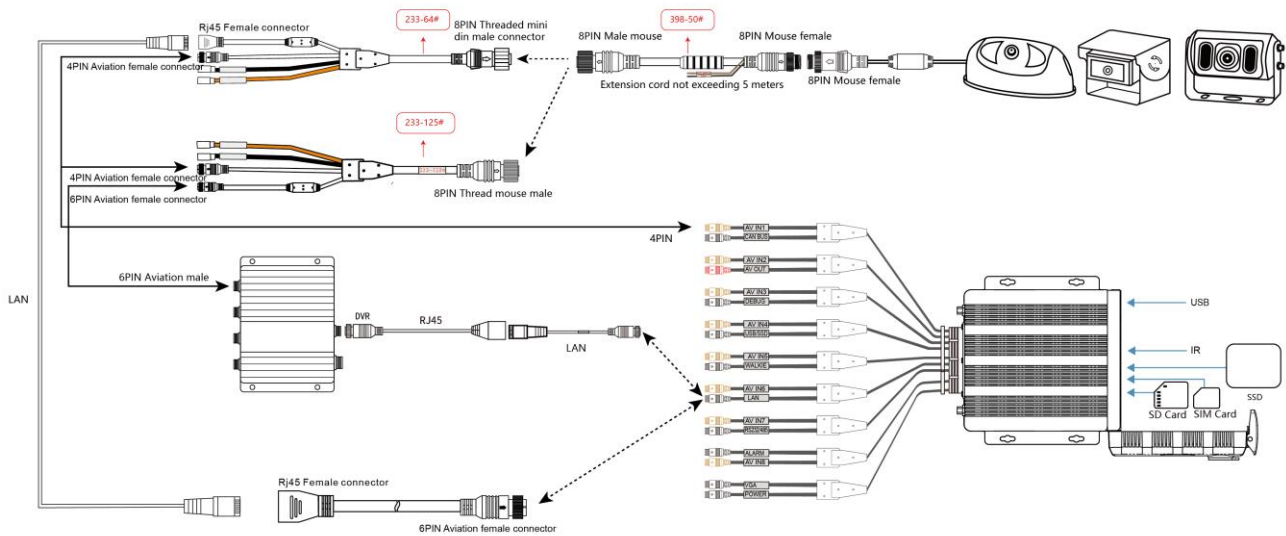
5. System Connection

Connection of pedestrian detection system is shown as figure below. Monitor can power the camera and display its real-time videos.

You can choose one of the following 4 types:



- When the device is used as IPC on DVR



- 1) **USB cable:** The USB interface can connect with Wi-Fi module (for calibration and setting), USB disk (for device upgrading) or USB-LAN converter (to get access to webpage setting and RTSP stream by network cable).
- 2) **CAN cable:** Support CAN communication protocol.
- 3) **RS232 cable:** Support RS232 communication protocol and can connect with external buzzer.
- 4) **GPS cable:** Support external GPS module.
- 5) **With 6PIN output cable:** Support external switches and DVRs, and can be used as an IPC to be scanned and connected by DVR.
- 6) **With RJ45 cable:** Support direct connection to DVR using network cable, and can be scanned and connected by DVR as IPC.

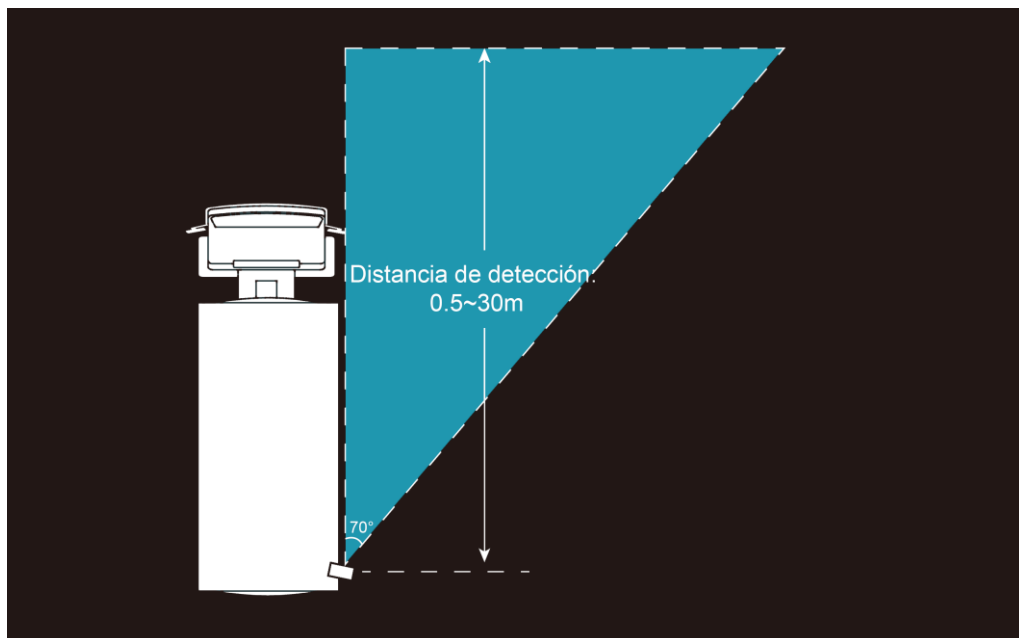
6. Installation

Move the camera to the position of the vehicle, and install the camera when the monitor can show the driver's required field of view. The base provided with the camera has strong adhesion to magnetic materials, and it can be installed successfully by fitting the base to the vehicle.

The camera installation height is recommended to be within the range of 1.0~3.5m. For this process, it is recommended to configure a manager to adjust the position of the device in the car, and the driver sits in the driving seat and observes the display to determine whether the device's visual range has covered the car's blind spot.

1) Vertical camera

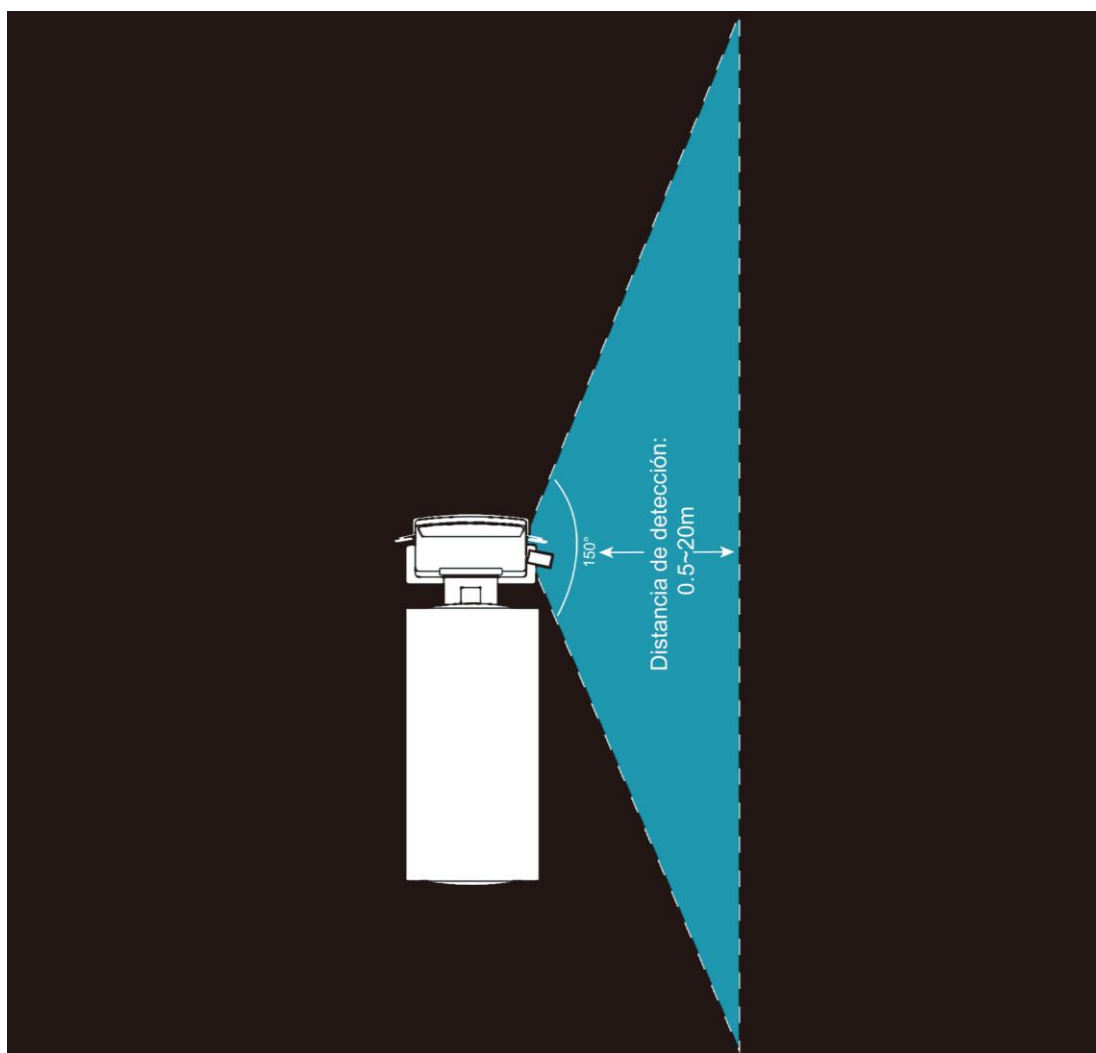
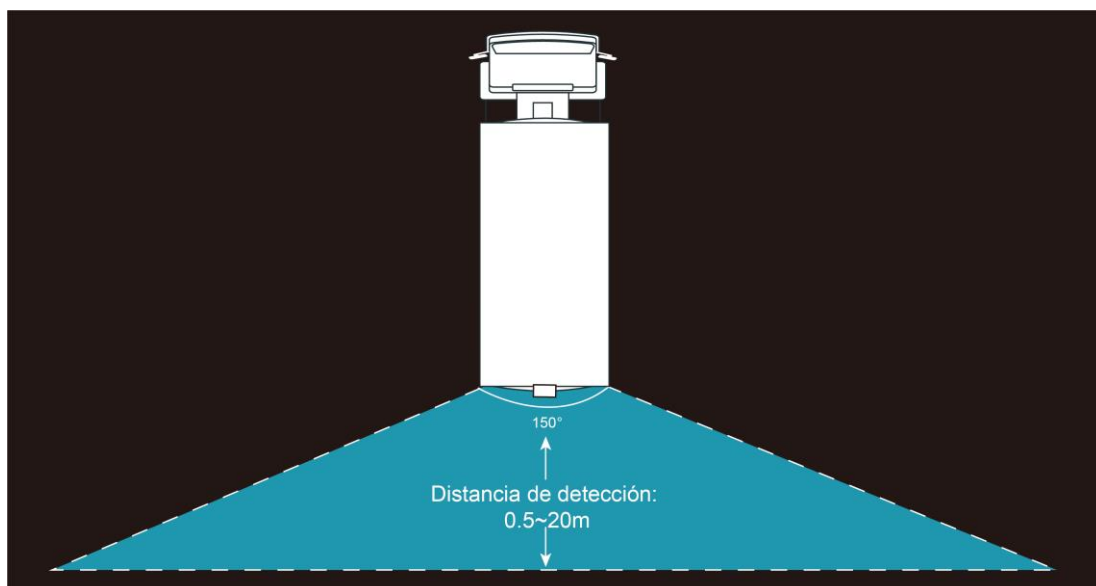
The vertical camera is installed on the side of the car with a viewing angle of 70° . As shown in the figure below, when the horizontal viewing angle of the camera is 70° , the maximum detection distance can reach 30m.



2) Horizontal camera

Horizontal camera can be installed around the car, with viewing angles of 70° , 150° , 170° and 200° .

$70^\circ/150^\circ/170^\circ/200^\circ$ viewing angle, the longest detection distance can reach 30m/20m/10m/8m respectively. As shown in the figure below, when the horizontal viewing angle of the camera is 150° , the maximum detection distance can reach 20m.

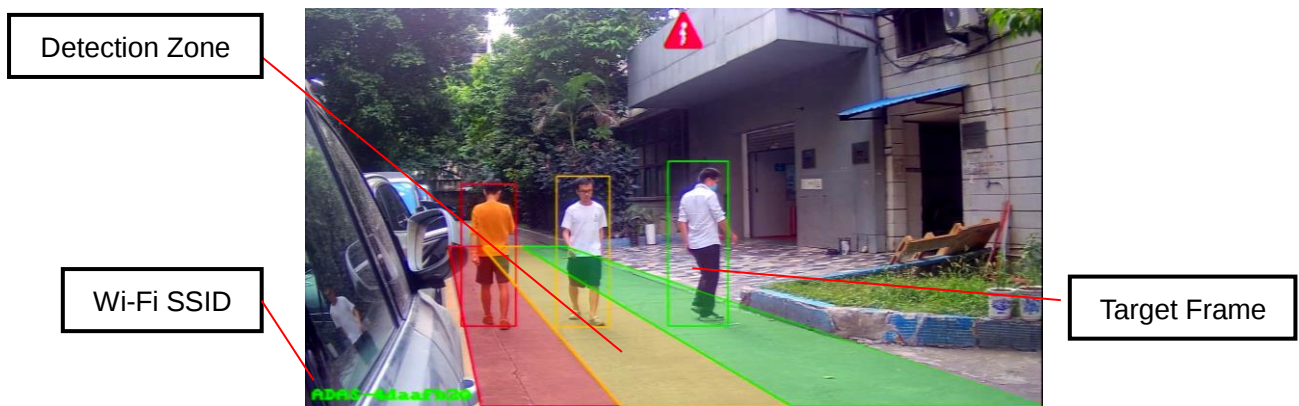


7. Calibration

7.1 Boot Screen Description

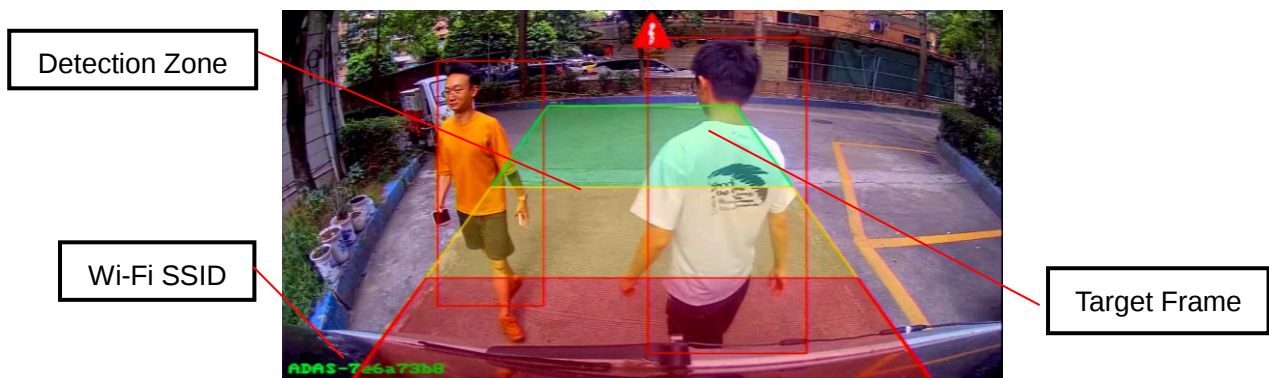
1) Vertical side-view camera

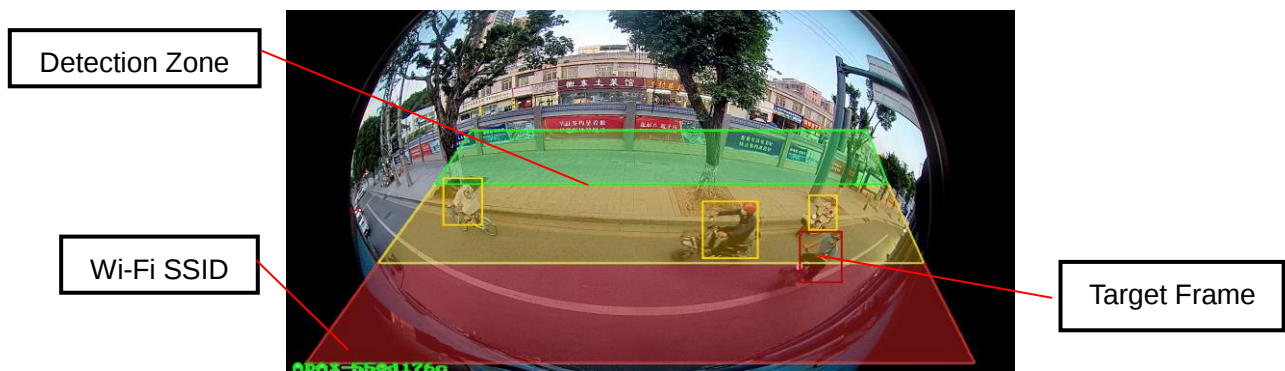
After starting up, the display screen of the device appears as shown below. The red, yellow and green areas in the picture constitute "Detection Zone", which detects and alarms pedestrians.



2) Horizontal camera

The difference between the horizontal camera startup screen and the vertical camera screen is that the "Detection Zone" is divided from vertical to horizontal. As shown in the figure below, they are horizontal camera startup images from different angles.



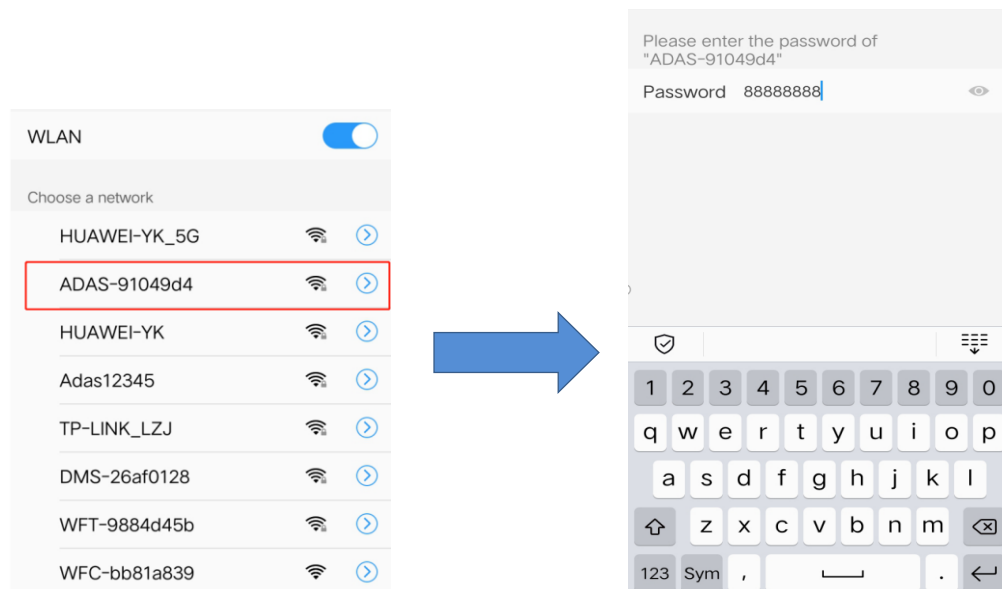


Note:

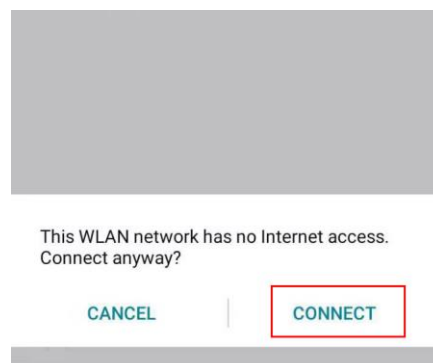
- 1) After powering on, the Wi-Fi name and version number in blue font are displayed in the lower left area of the screen. After about 10 seconds, the version number in blue font disappears, and the Wi-Fi name in blue font turns green and remains displayed. If the Wi-Fi module is not connected, the green Wi-Fi SSID will also disappear, and you will not be able to enter the web page calibration and settings.
- 2) The detection area, target frame and confidence level can all be displayed on the web page. Please refer to 9.2 for details.
- 3) Adjustment of the detection area when side-mounted: It is recommended to be close to the horizontal line of the vehicle and next to the wheels. Move horizontally away from the vehicle to the desired distance.

7.2 Wi-Fi Connection

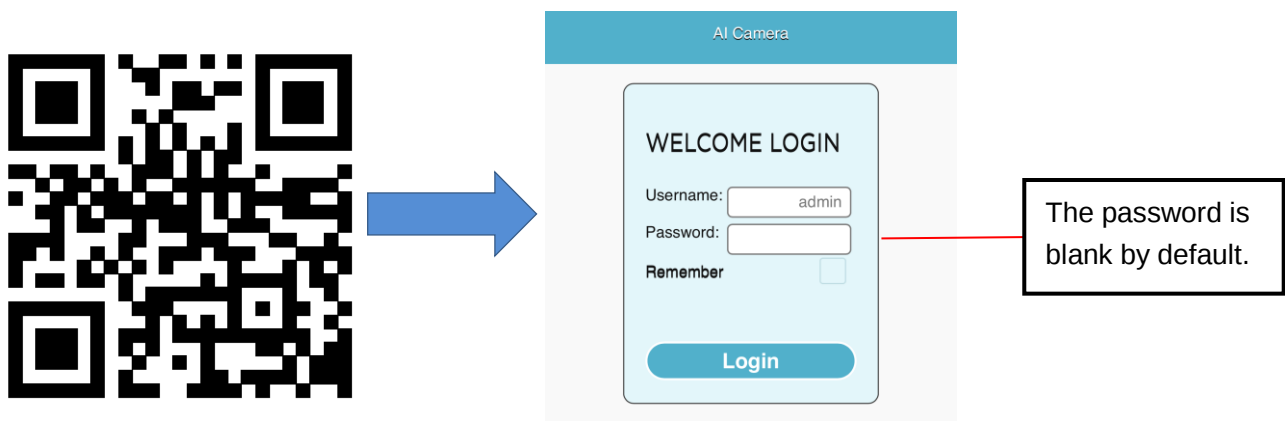
- 1) Find the Wi-Fi SSID corresponding to the device through the mobile phone (confirm that the Wi-Fi module has been connected, and see the green Wi-Fi SSID in the lower left corner of the monitor), then connect, and the initial password of Wi-Fi is "88888888". As shown below:



- 2) If it is the first time to connect with the Wi-Fi hot spot, it may prompt the message as followings. If so, choose the "connect" button to remain the valid connection.



- 3) Enter the URL "http://192.168.60.1" in the web browser of the mobile phone,(or scan the QR code below).The browser will enter the main menu as follows, and you could enter into preview screen after clicking "login", displaying the current video synchronously. And the effective communication distance of Wi-Fi is about 7m, please keep in this range.

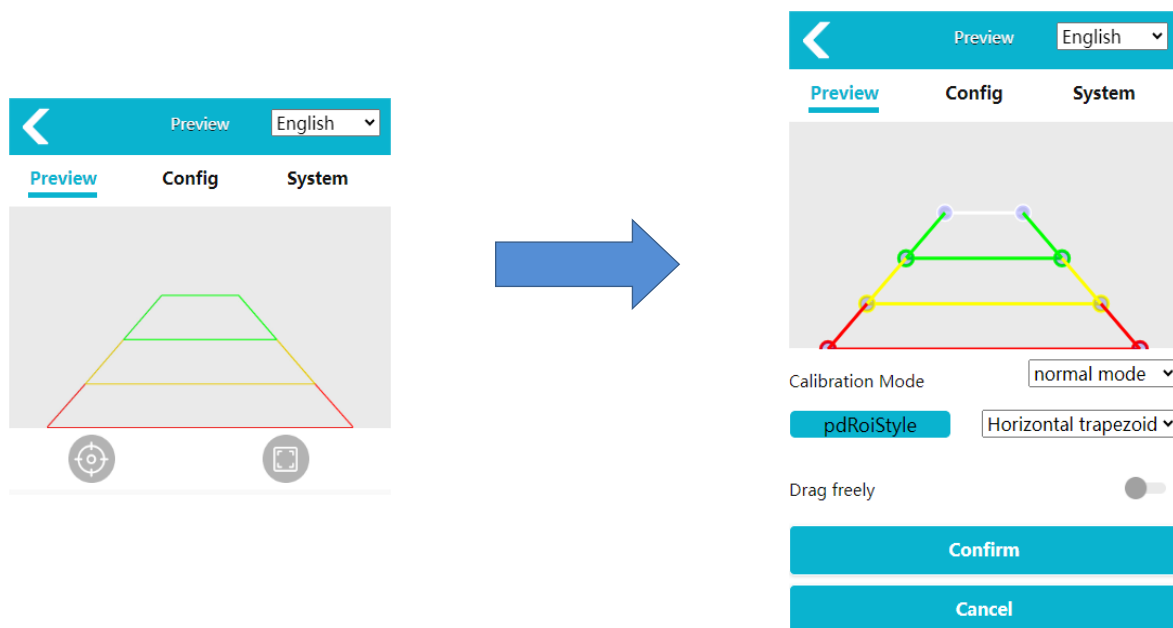


After finishing Wi-Fi connection, we can calibrate the pedestrian detection alarm system or operate some other settings about the device according to web page.

7.3 Operations of Detection Zone Calibrating

7.3.1 Calibration of Normal Mode

Click the  Calibration button on the web page, and choose "normal mode". The area on the phone screen corresponds to the "Detection Zone" on the monitor. "pdRoiStyle" has four types of ROI to choose, which are horizontal trapezoid, vertical (red frame on the left), vertical (red frame on the right), and semicircle.

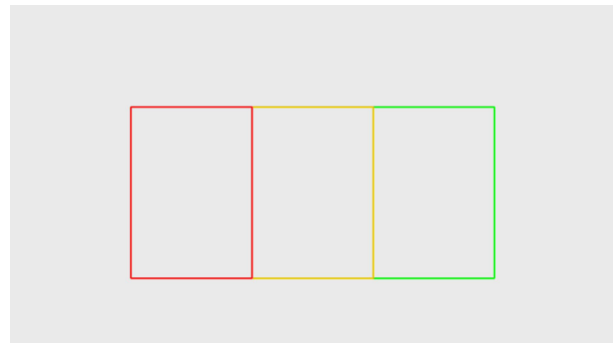
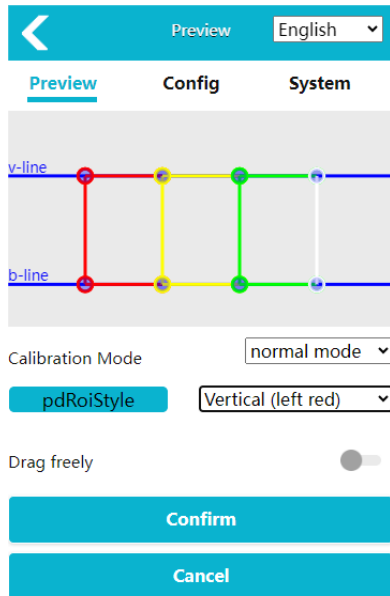


Choose the corresponding ROI type and drag the corresponding line segment or point to manually modify the ROI area. Click "Confirm" button for calibration. The calibration will take effect immediately

and the "Detection Zone" displayed on the monitor will be updated immediately.

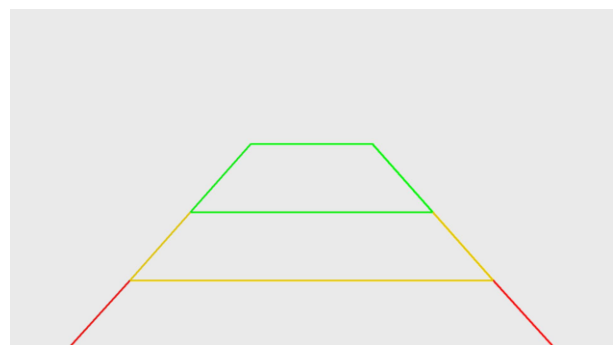
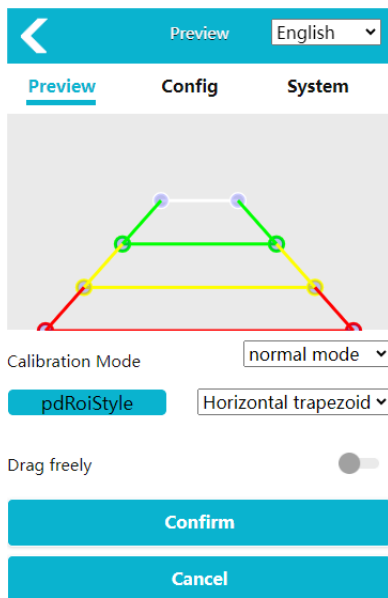
1) Vertical ROI

"pdRoiStyle" is "Vertical(left red)" or "Vertical(right red)".



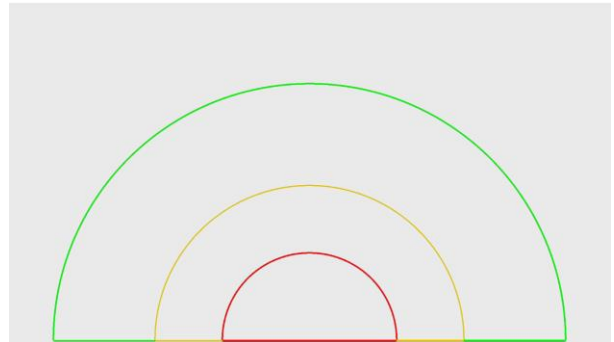
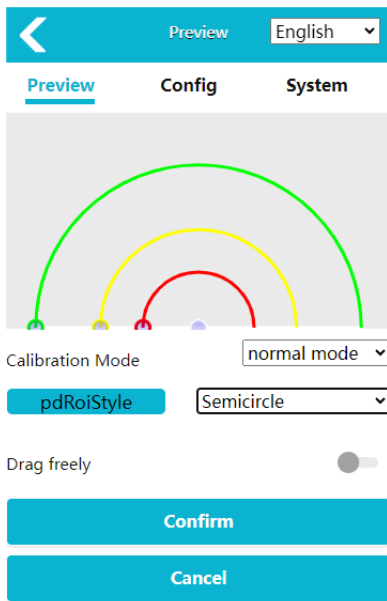
2) Horizontal trapezoid ROI

"pdRoiStyle" is "Horizontal trapezoid".



3) Semicircle ROI

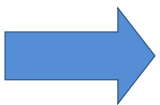
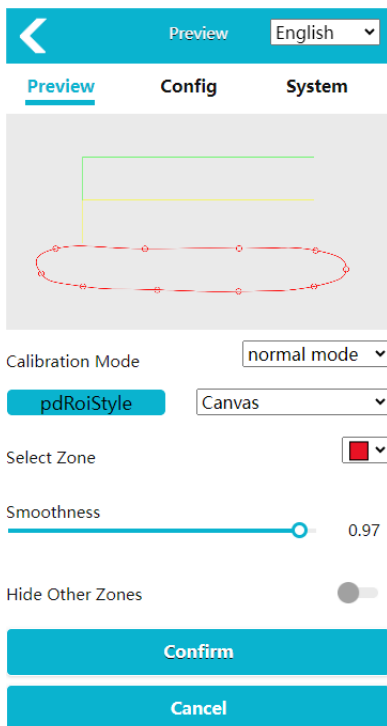
"pdRoiStyle" is "Semicircle".



4) Canvas ROI type

"ROI Type" is "Canvas".

The canvas ROI can be dragged freely to 10 points in different color areas. When the smoothness is higher, the curve will be smoother.



7.3.2 Calibration of Ranging Model

Ranging mode is currently only applicable to cameras featured with 2.8mm and 6.0mm lens

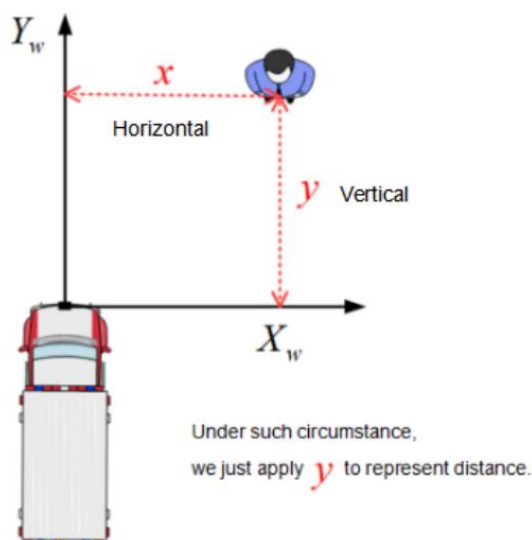
1) Two-dimensional code placement

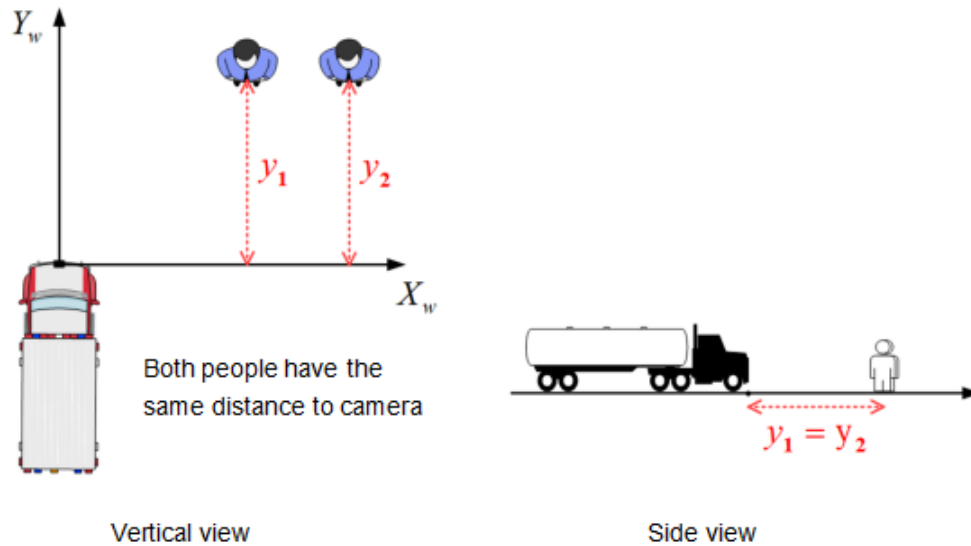
Put one in the left bottom and the other one in the right bottom. It works better, as shown below:



2) Distance measurement

We set up a Cartesian coordinate system on the ground, which represents the position of the person by coordinates, and y represents the ranging results.



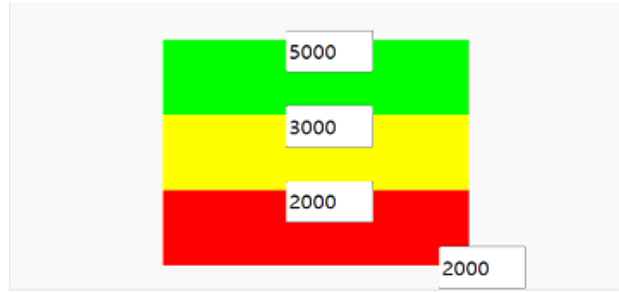


3) Operating procedures

- a. Click the  Calibration button on the web page, and choose "normal mode". The ROI type only has horizontal trapezoid.
- b. If the camera has not calibrated the two-dimensional code before, a prompt box will pop up to remind it to calibrate the code.
- c. When calibrating the two-dimensional code, two two-dimensional code calibration plates should be placed to ensure that the camera can fully see them.
- d. Click "Submit Calibration Board". After QR code is calibrated successfully, the ROI area will be reconfigured to the default value and the distance will be automatically filled to the red, yellow and green areas below.
- e. Modify the values of the red, yellow and green areas and press Enter/Confirm to change the corresponding ROI areas. (Red, yellow and green areas instruction: In the vertical direction, green area shows the distance between the front green edge and the camera (mm), yellow area shows the distance between the front yellow edge and the camera (mm), and red area shows the distance between the front red edge and the camera (mm). The horizontal region distance represents the distance (mm) from the left and right edges of each color ROI region to the camera.
- f. Click "Confirm" to save and exit the calibration setting.
- g. In measure mode, the pedestrian detection frame will overlay distance between camera position and X/Y wheelbase, and CAN data transmission will be converted into XY wheelbase distance (M) of the detected pedestrian.



Rectangle frame dragging diagram



Red-yellow-green areas diagram

8. Pedestrian Detection Functions

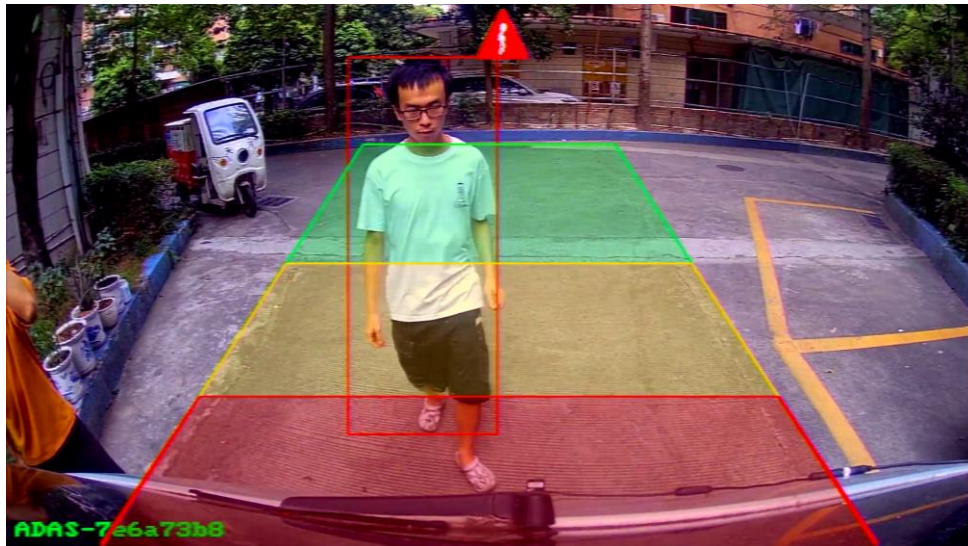
After the device power up or reboot, real-time video will appear on the display automatically. Then, the device will enter and keep in pedestrian detection mode. To make sure the normal operation of the system, please install and calibrate the pedestrian detection alarm system carefully according to the guide of Charter 6 and Charter 7.

Function description: When pedestrians appear in Detection Zone, the display will frame them with the corresponding color, and a "ding" alarm with different urgency will be issued. The alarm continues until pedestrians leave the Detection Zone area

Note: The Vertical side-view camera and horizontal camera have the same function. The following is the difference in the graphical way.

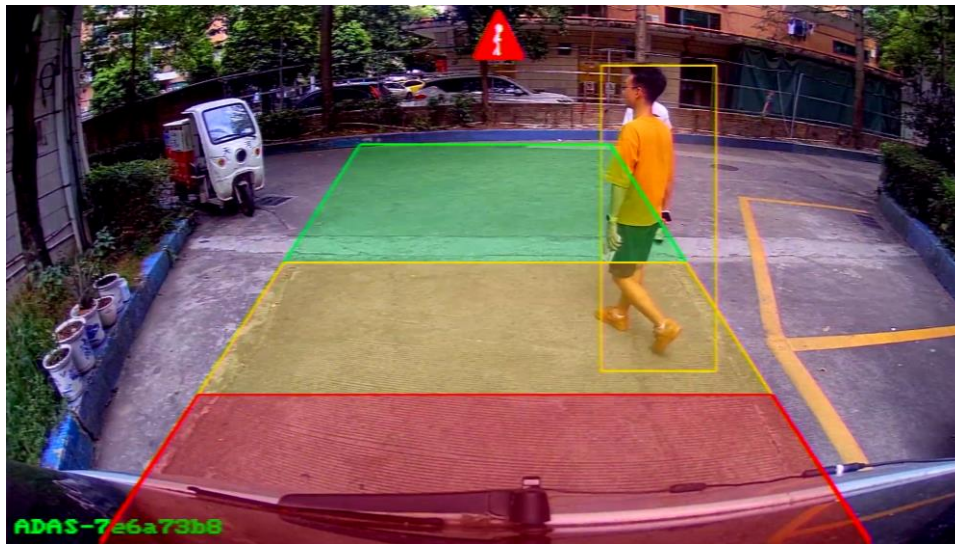
1) The red box alarm

When the pedestrian is detected and the red box is generated, it means that the pedestrian enters the red Detection Zone area. The output alarm sound is "ding ding ding", and the alarm sound frequency is relatively short.



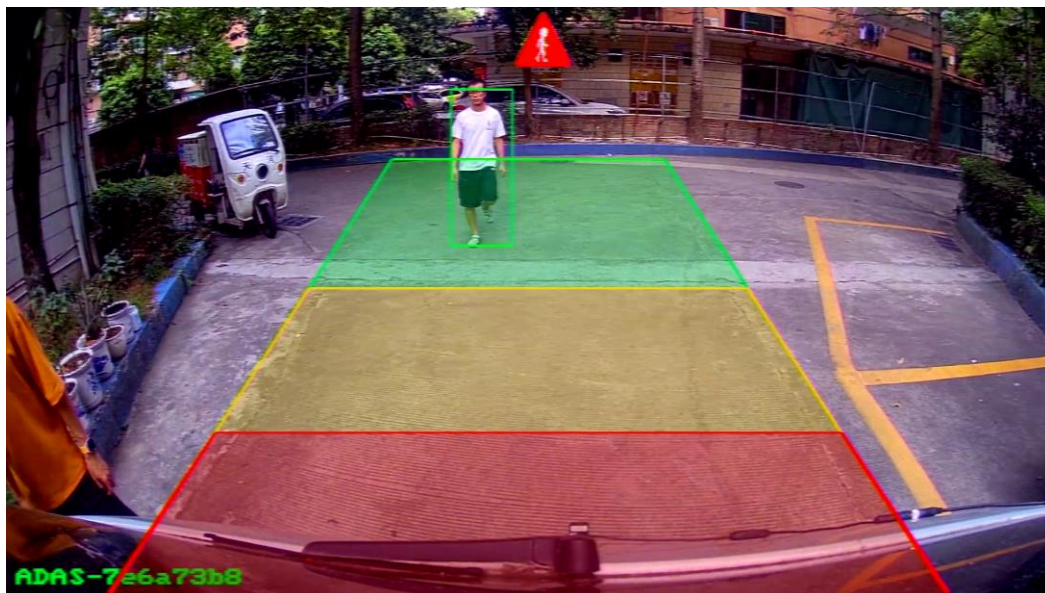
2) The yellow box alarm

When the pedestrian is detected and the yellow box is generated, the output alarm sound is "ding ding". The alarm sound frequency is moderate.



3) The green box alarm

When the pedestrian is detected and the green box is generated, the output alarm sound is "ding", and the alarm sound frequency is flat.

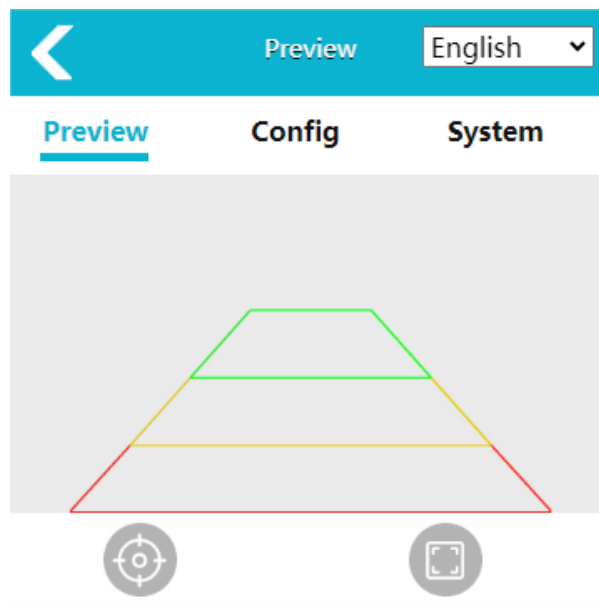


Note: when there are multiple boxes for pedestrian detection, the priority of alarm sound is: red box (highest) yellow box (second) green box (lowest). For example, when there are three boxes of red, yellow and green, the default alarm sound is the alarm sound of red box.

9. Functions of the Web Page & System Upgrade

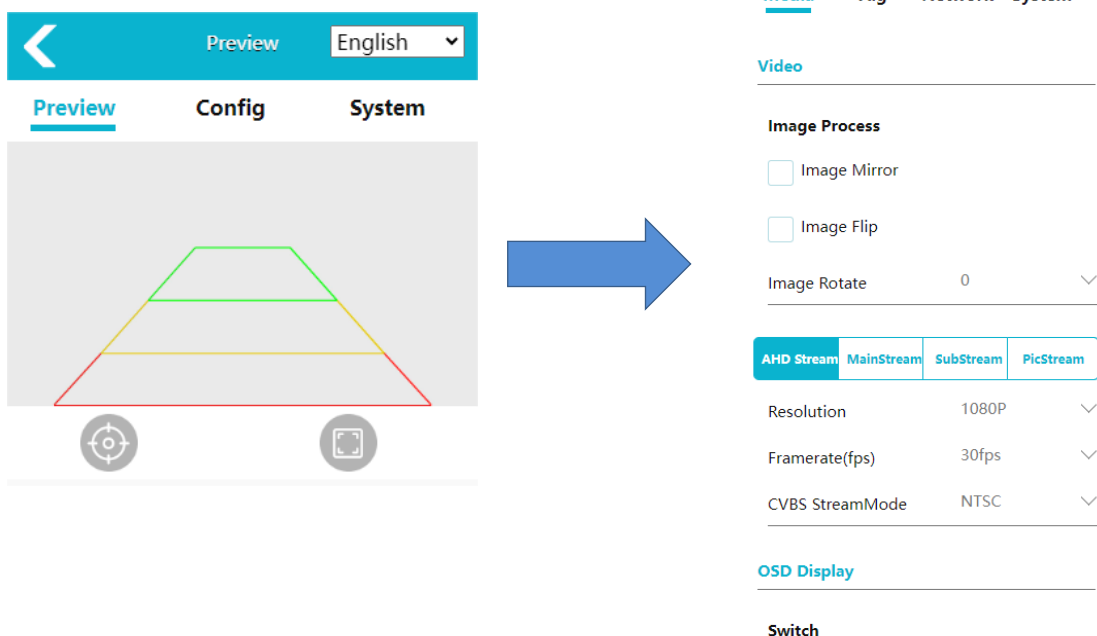
9.1 Calibration

For calibration, please refer to "Charter 7".



9.2 System Setting

Click "Config" button to enter the parameter setup interface. As shown below:



9.2.1 Media Config

Image Mirror	Switches control whether image mirror is enabled.
Image Flip	Switches control whether image flip is enabled.
Image Rotate	Can be set to 0 and 90, CW. When set to 0, the screen will not rotate. When set to 90, CW, the screen will rotate 90° clockwise.
AHD Stream	Set the display resolution and output frame rate. CBVS mode can be set to NTSC and PAL, and the actual standard of the cable needs to be connected for the effect to take effect.
MainStream	When the encoding format is set to MJPEG, the device needs to be restarted for it to take effect. The minimum I-frame interval changes as the frame rate changes.
OSD Display	OSD switch controls whether pic-stream is enabled or time/passage is displayed.

9.2.2 Algorithm Config

Volume	The alarm sound level is set to the default level 5. Level 0 indicates no sound. While level 5 represents the maximum volume.	
AlamerVolume	To set the volume of audible and visual alarm, with a default setting of level 8.	
Audio type	To switch the audio type. 6 audio types available, with DING sound setting by default.	
PD Configure	The following settings function only when three trigger lines are connected. It supports to separately set the triggering parameters for the single trigger line output: red line, yellow line, and green line.	
	Red/Yellow/Green Line Switch	To turn on/off the Red/Yellow/Green line switch. When turned on, the trigger lines will generate trigger output.
	Support area	When three trigger lines are connected at the same time and select a specific trigger line color, alarm output from the trigger line will be activated only upon camera's detection of a target within detection area of the corresponding color. For instance: Red line setting ① In the Support Area setting of the Red Wire, selecting red color implies that the red trigger line will only produce output when a target is detected within the red color area. ② Selecting red or yellow colors indicates that red or yellow trigger line will produce output when a target is detected within red color or yellow color area.
	Enable Person Model	To set whether trigger lines produce output when pedestrian alarm occurs. When enabling Person Model, the trigger line will generate outputs upon detecting pedestrians within the detection area of the specified color.
	Enable Car Model	To set whether trigger line produces output when vehicles are detected. When enabling Car model, the trigger line will generate outputs upon detecting vehicles within the detection area of the specified color.
	Enable Shelter Models	When activating Shelter Models, the trigger line will generate outputs upon detecting shelter from camera and producing shelter alarm.
PD Model	To set algorithm model. Pedestrian detection: pedestrians only; Pedestrians and vehicles detection: pedestrians and vehicles only; Vehicle detection: vehicle only.	
PD Sensitivity	Sensitivity adjustment: Higher settings increase the susceptibility of false positives, whereas lower settings increase the likelihood of false negatives.	
OSD FontSize	OSD fontsize display, with the option to disable confidence and adjust confidence	

	fontsize.
PD Alarm In	To set pedestrian detection trigger input. When PD Alarm In is enabled, the pedestrian detection algorithm will only be activated when connected to a multifunctional CAN cable or a device with Alarm In input, and when the Alarm In provides a 12V voltage.
PD Test Mode	To enable/disable PD Test Mode. When enabled, pedestrians detected outside specific areas will be enclosed in blue rectangular boxes on display, along with confidence values display of detected pedestrians.
Person Rect	To select whether to display rectangular boxes after pedestrians being detected.
Face Mosaic	When activated, pedestrians' faces within the detection area will be pixelated.
Mosaic Size	The size of the pixelated cells can be adjusted(5/10/15), with smaller cells resulting in more blur.
Alarm Interval	To set the lowest interval between two alarms in the red/yellow/green zones. During interval, no alarm will be triggered;
Alarm Out Duration	After detecting pedestrians within the detection areas, set the duration of outputting high-level voltage from trigger lines. The default is "AUTO"(2 seconds). When connecting to an MCU cable with a trigger line, "AUTO" (1s) means an output duration of 1 second; When "Alarm Output Mode" is set to high level voltage, the trigger line outputs a high level voltage signal after detecting pedestrians. When no pedestrians are detected, the high level voltage output lasts 2 seconds before dropping to a low level voltage.
Single Trigger Line Output Switch	To set whether trigger lines generate high-level voltage when pedestrians are detected in Red/Yellow/Green detection areas.
Detection Zone Switch	It is applied to single trigger line to control whether the single trigger line outputs to the red/yellow/green zones. It supports to choose whether to trigger an alarm output for the corresponding detection areas of red/yellow/green. For example, if the red area is disabled, no output will occur when an alarm is triggered in the red area. If no output is needed, the switches for the red, yellow, and green areas need to be turned off.
Detection Zone Style	To set whether to display filled colors, outline, or hide in the detection areas. Settings function immediately.
Min WorkSpeed	After connecting external GPS, the algorithm will be activated when the driving speed exceeds the minimum speed.
Max WorkSpeed	After connecting external GPS, when the driving speed is below the maximum speed, the algorithm will also be activated.
Shelter Alarm	After enabling shelter alarm, it can detect shelters and provide alarm notifications.

Alarm Out Model	Alarm Out Model can be set to either high level voltage or low level voltage. When set to high level, the trigger line outputs a high level voltage when pedestrians are detected within the detection areas, and a low level when no pedestrians are detected. Conversely, when set to low level voltage, the trigger line outputs a low level voltage when pedestrians are detected, and a high level when no pedestrians are detected.
Sensitivity	Sensitivity can be set between 0 and 1, with two decimal places, where a sensitivity setting of 0 corresponds to maximum sensitivity for the detection algorithm, and a setting of 1 corresponds to minimum sensitivity.

9.2.3 Networking Configuration

Support to set device IP, mask, gateway and other parameters manually. When connected to the device through a network cable, you could input http://IP to access the web page. It is equivalent to section 7.2. You can also connect RTSP streams over IP.

Dynamic IP timeout (seconds): When DHCP is turned on and no assignable IP is found within the set time (default is 16 seconds), the device uses its static IP value as the device's IP address.

The screenshot shows a web interface for configuring a device. At the top, there is a blue header bar with a back arrow, the word "Config", and a refresh icon. Below the header, there are four tabs: "Media", "Alg", "Network", and "System". The "Network" tab is currently selected and highlighted with a blue underline. Under the "Network" tab, there is a sub-section titled "Ethernet". Below this, there is a checkbox for "DHCP" which is currently unchecked. Below the checkbox, there are four input fields: "DHCP Timeout (s)" with a value of 16, "IP" with a value of 192.168.66.126, "Subnet Mask" with a value of 255.255.255.0, and "Gateway" with a value of 192.168.66.1.

9.2.4 System Configuration

Supports modifying device CAN ID, frame format, and baud rate parameters. When the device is externally connected to the CAN adapter, you can open the CAN adaptation host computer software on the computer, set the corresponding baud rate, and then open and view the CAN data sent by the device (including frame ID, time, and frame content).

Config

Media

Alg

Network

System

CAN

Pds CAN ID

0x18fad0fc

Ext CAN ID

0x18fae0fc

Frame Format

Extended

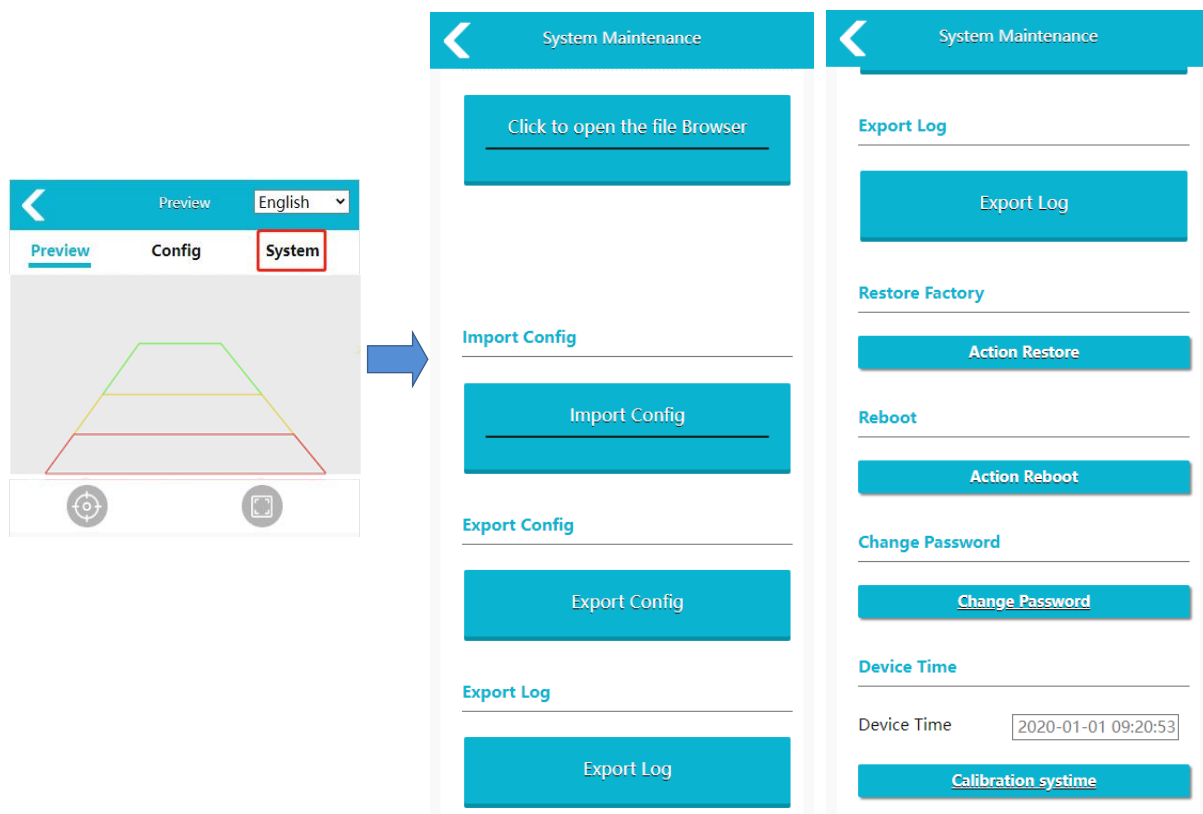
Baudrate

500

Pds CAN ID	Configure the CAN ID when applying the default CAN protocol.
Ext CAN ID	Set the CAN ID for extended protocols.

9.3 System Function

Click "System" button and enter into system page, in which series number, software version, hardware version, and UUID are shown.



Import Config	Import configuration files. The imported configuration file must be a compressed package containing (config.xml, config_bak1.xml, config_bak2.xml).
Export Config	Export the device configuration file.
Export Log	Export device log files.
Restore Factory	Restore the device to factory settings and all parameters are restored to default values.
Reboot	Restart the device.
Change Password	Modify the device login Password.
Device Time	Manually synchronize device time.

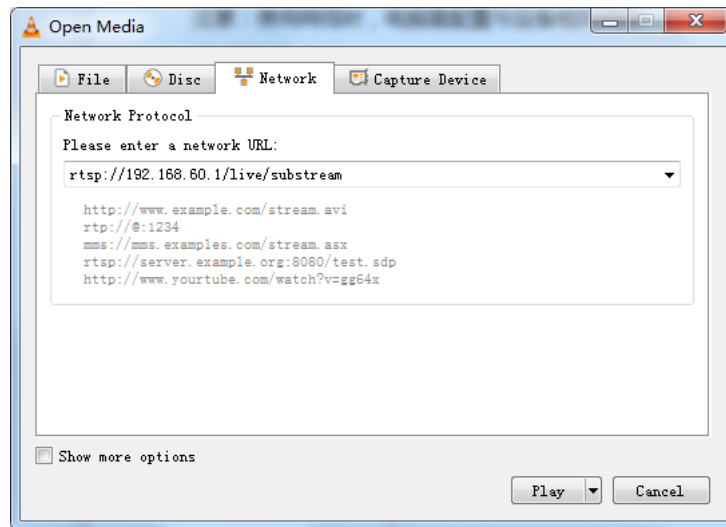
9.4 Protocol

The current device supports two types of protocol, RTSP and ONVIF.

Note: When using the network cable, the computer needs to be configured with the same network segment as the device.

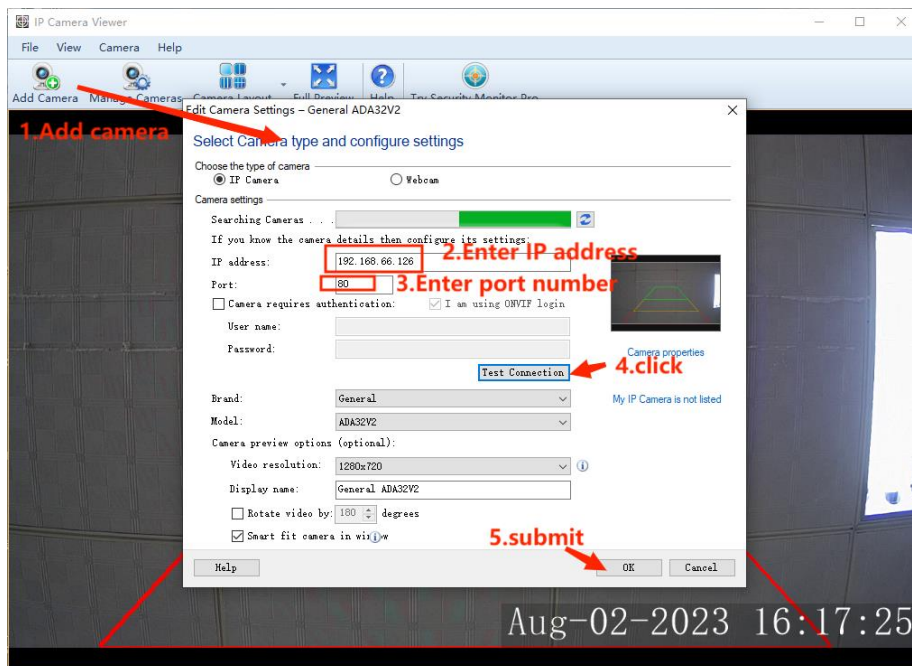
1) RTSP

Use video software to open RTSP stream. Take VLC as an example, connect network cable, open VLC, click Media->Open Network Streaming->rtsp://IP/live/mainstream (rtsp://192.168.60.1/live/mainstream if connect with device's Wi-Fi) ->click play.



2) ONVIF

Use IP camera Viewer or other software that supports ONVIF protocol. Followings are demonstrated by IP camera Viewer.



Make sure network is connected and then follow steps in figure 36: add new camera->input ipaddr->test ipaddr->ok.

Note: the port number is set to 80 by default.

9.5 System Upgrade

The device can be upgraded with a flash disk. Specific methods:

- 1) Format the flash disk as Fat32 file system.
- 2) Place the upgrade package named "XXXX_upgrade_XXXXXXXXX.XXXX.bin" on the flash disk, connect the flash disk to the device, restart the device, and wait for a few minutes to complete the upgrade. If you want to realize batch upgrade without automatically deleting the upgrade package after upgrade, you can rename the update report as "XXXX_upgrade_fixed_XXXXXXXXX.XXXX.bin".
- 3) After the upgrade, the software version number of the device will also change synchronously. Check the version number in the lower left corner of the monitor when the device is turned on. Or view the version number in the "System"->"Software Version" on the web page.

10. Troubleshooting

The symptoms described below do not necessarily mean a failure within the display. Please check the following items before you initiate request for repair.

Symptoms	Possible Causes/Solutions
No picture, no sound	Improper connection of automobile adapter; The power supply of the device is wrong, check whether the power indicator is normal; The volume is set "0" by mobile phone.
Can not login the web page	Confirm that the external Wi-Fi module is connected to the USB interface; Choose "CONNECT" when popping out dialog box of confirming the current Wi-Fi is unavailable; Confirm whether it is connected to the Wi-Fi successfully.
Upgrade failure	Remove the extension cable connection and upgrade again.