MEITRACK Passenger Counter User Guide

Change History

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Contents

1 Copyright and Disclaimer

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2 Product Introduction

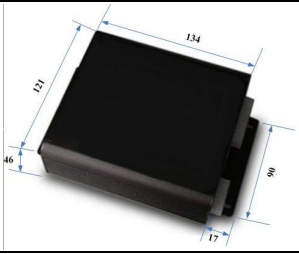
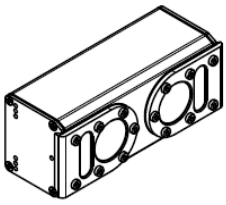
The passenger counter is a compact, automated and contactless smart device based on binocular stereo vision technology. This device can be installed in buses, metros, trains, steamboats, shopping malls and buildings.

2.1 Hardware and Software

2.1.1 Hardware List

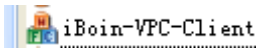
When you receive your device, please check whether the device is damaged and all the accessories are complete.

The following table describes standard hardware list:

No.	Hardware	Quantity	Picture
1	Passenger counter	1	
2	Stereo camera	2	
3	Connectors & wires	A set	

2.1.2 Software List

The following table describes standard software list:

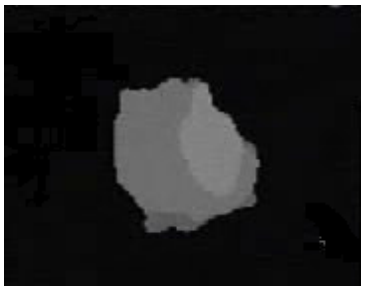
No.	Content	Quantity	Picture
1	DSP Client.exe program	1	
2	MEITRACK Passenger Counter User Guide	1	

2.2 Working Principle

Binocular stereo vision is an important vision form. Based on the parallax theory, it obtains two images from different locations through imaging device and calculates position deviation between image points, so as to obtain three-dimensional geometrical information of objects. Combined with the images got through our eyes and observing their differences, we can feel strong depth perception, establish feature relations, and find the mirroring points of physical points in the same space. The two images have distance differences and are called disparity images. Compared with a single two-dimensional camera, the stereo camera has higher precision in analyzing distances (depth or height) between objects in visual range.

Left camera image

Right camera image



Disparity

2.3 Technical Description

2.3.1 Main Features

- High reliability
- Easy to install
- Easy to connect multiple devices
- User friendly configuration software
- 2 stereo cameras (default acquisition rate: 50 frames per second)
- Built-in infrared light
- Reliable performance in any lighting conditions
- High counting accuracy (> 95%)
- IP65 rated stereo cameras
- Interfaces:
  - Power port
  - 1 RS485 serial port
  - 1 RS2321 serial port
  - 1 RJ45 Ethernet port

- 1 USB1.1 port
- Easily connected debugging or installation interface

2.3.2 Power Supply Specifications

- Power input: DC 12 V or DC 24 V. Input range : 8–36 V DC
- Stereo camera power consumption: ≤ 3 W
- Passenger counter power consumption: ≤5 W

2.3.3 Environmental Specifications

- Mean time between failures (MTBF): > 6000 hours
- Operating temperature: -25°C to 55°C
- Relative humidity: 10%–90% (non-condensing)
- Heat dissipation: natural cooling

2.3.4 Lighting Requirements

There are no strict lighting requirements. (If the infrared light is turned on, the passenger counter can work in completely dark environments). However, to reach optimal performance, it is recommended that users provide constant diffuse reflection (500–1000 lux, e.g. standard light intensity for indoor offices). Users should also avoid direct sunlight or strong light pointing in the detection area.

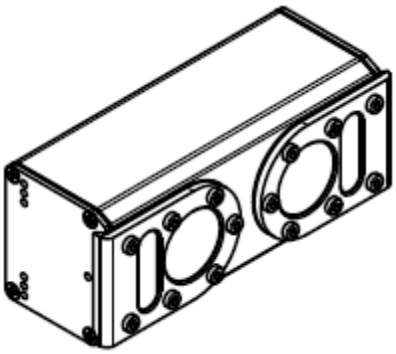
2.4 Appearance

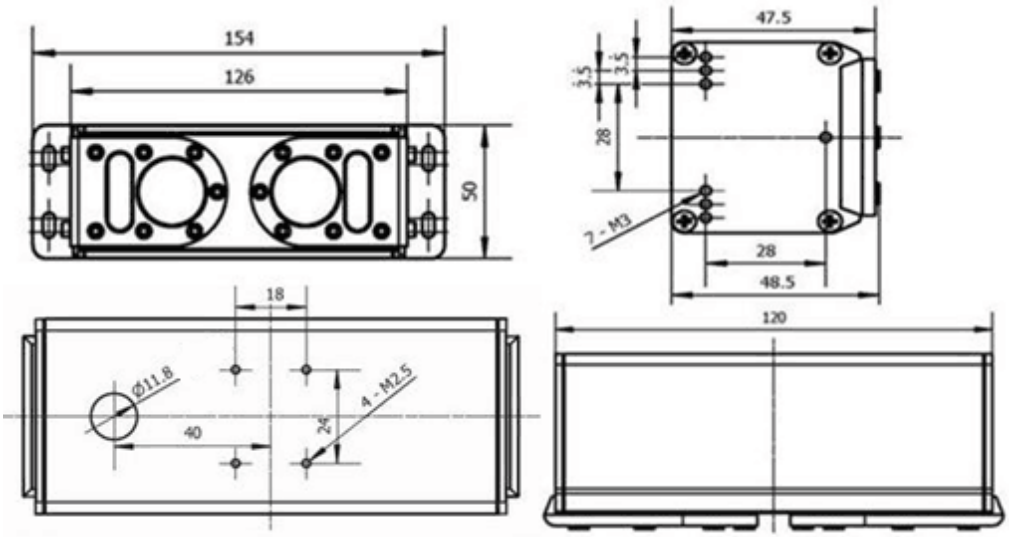
2.4.1 Stereo Camera

Casing: Black aluminum casing (water resistant)

Size: 126 mm x 50 mm x 48.5 mm

Weight: 280g



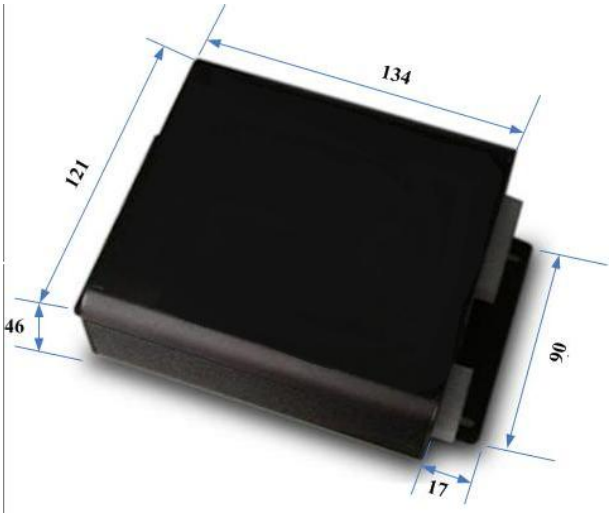


2.4.2 Passenger Counter

Casing: Black aluminum casing

Size: 154 mm x 120 mm x 45 mm

Weight: 480g



3 Installation

3.1 Caution

To reach optimal performance, high reflective materials or surfaces should be avoided in the camera detection area, the light should be evenly scattered, and there is no facula in the detection area. The floor reflectance index should be smaller than 0.7 (e.g. white acrylic paint).

In addition, during installation make sure that:

- There is no removable object in the detection area.

- The vehicle doors shall not be opened or closed frequently.
- There is no facula in the detection area.

3.2 Selecting Cameras

Stereo camera's focal length and installation height will affect the counter's counting accuracy. Before installation, users should measure the height and width of vehicle doors in advance and then purchase proper cameras.

Lens Focal Length	Minimum Mounting Height	Maximum Mounting Height	Camera No.	Detection Width
2.5 mm	185 cm	195 cm	2.5C****	80 cm
2.8 mm	195 cm	209 cm	2.8C****	90 cm
3.6 mm	210 cm	220 cm	3.6C****	100 cm
4 mm	225 cm	240 cm	4C****	120 cm
6 mm	245 cm	260 cm	6C****	140 cm
8 mm	265 cm	280 cm	8C****	140 cm

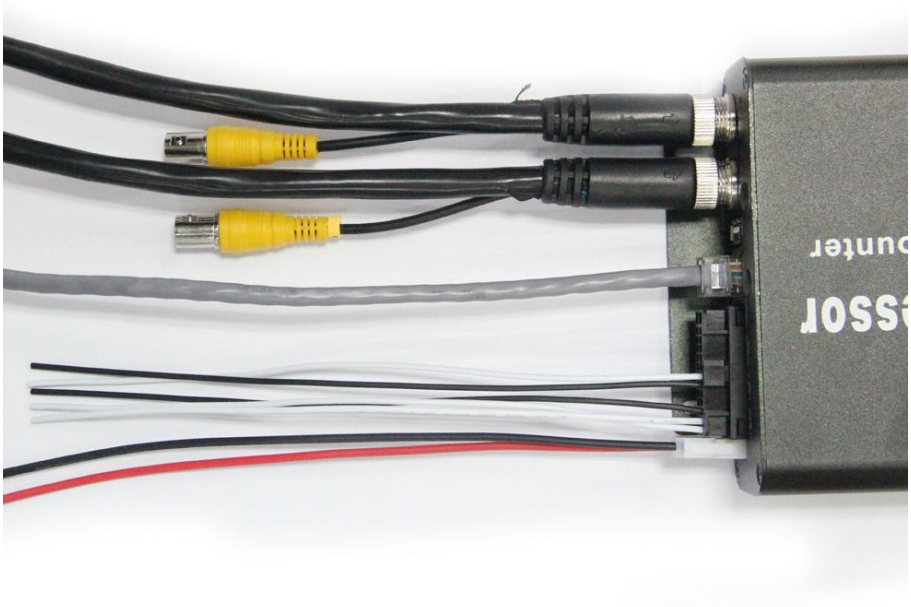
3.3 LED Indicator and Device Interface

3.3.1 LED Indicator

LED Indicator	Color	Function	Status
Power indicator	Red	Show power status.	On: The passenger counter is turned on. Off: The passenger counter is turned off.
Status indicator	Green	Show operation status of the passenger counter.	On: The passenger counter has started and is ready to operate. Blinking: The passenger counter is starting.
Reserved	Green		

Passenger counter:

3.3.2 Device Interface

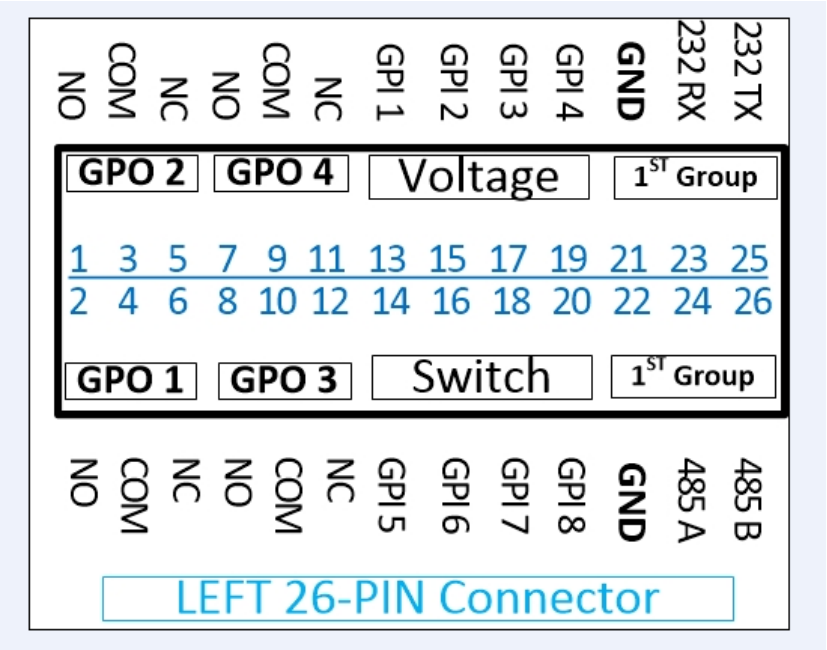


Channel 1

- Black wire: Connect to camera 1.
- Yellow wire: Connect to the DVR or other display devices.

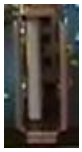
Channel 2

- Black wire: Connect to camera 2.
- Yellow wire: Connect to the DVR or other display devices.



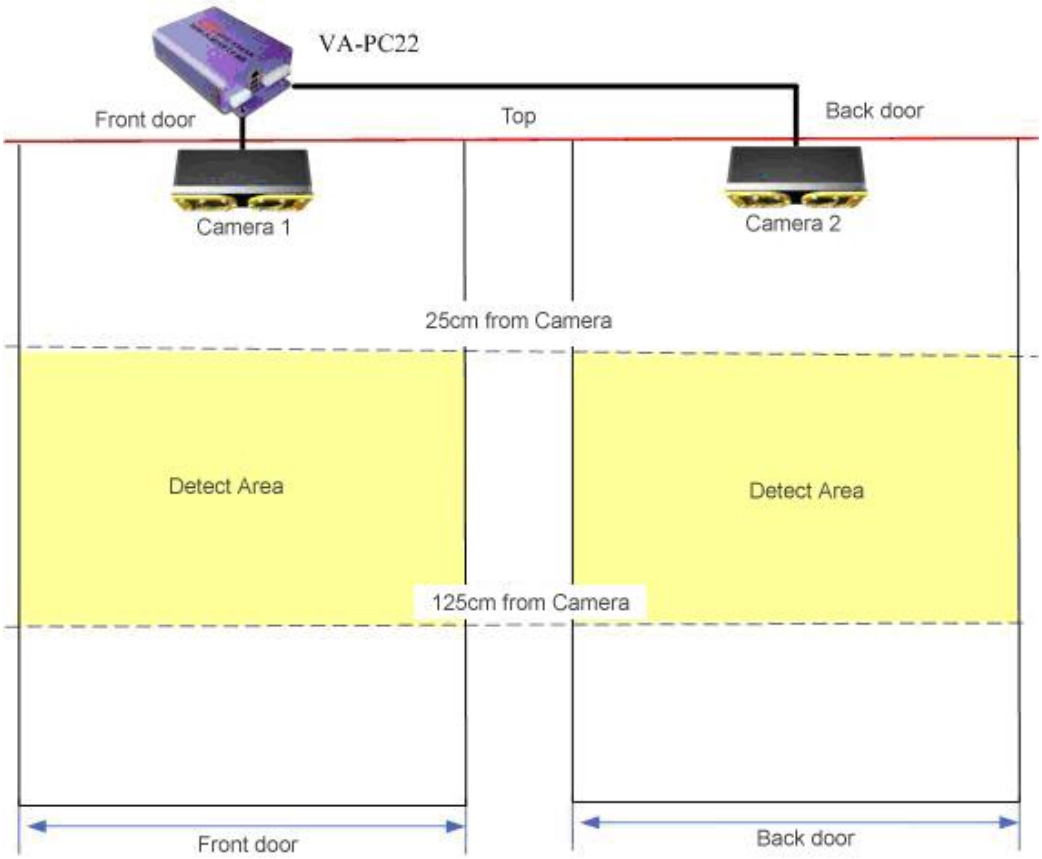
Note: Turn on the passenger counter, and then the device will beep for three times, indicating that the device is powered on. After 10 seconds, it will beep once again, indicating that the device has started and is ready to operate.

The following table describes two ports:

Port	Function	Picture
TCP/IP Port	Standard 10/100BaseT network connector	
USB1.1 Port	Standard USB port, which is used to export counting records and update the firmware.	

3.4 Connecting the Passenger Counter to Two Cameras

Connect the passenger counter to two cameras as follows:

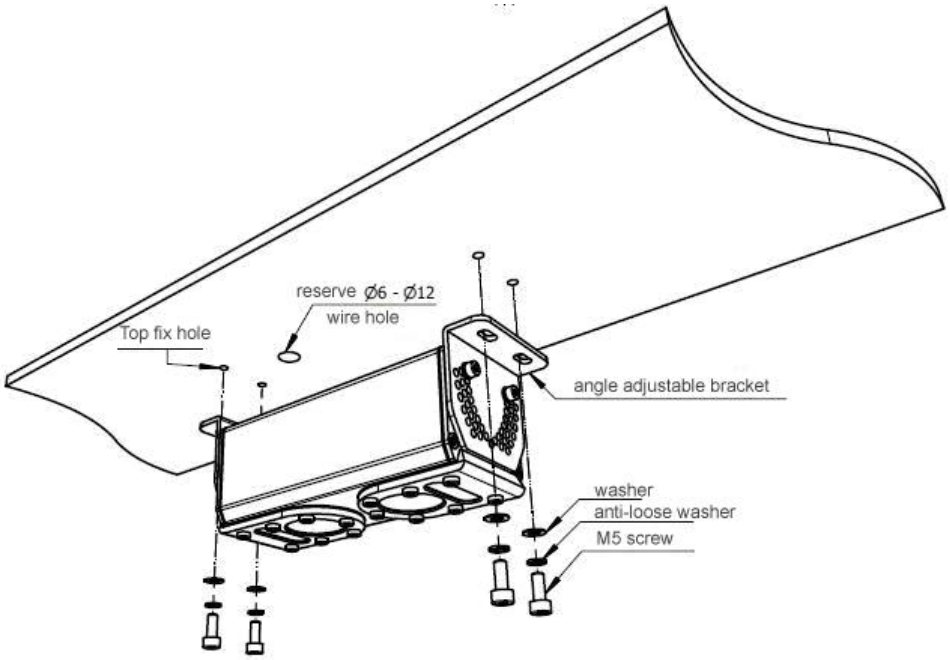


3.5 Installing Cameras

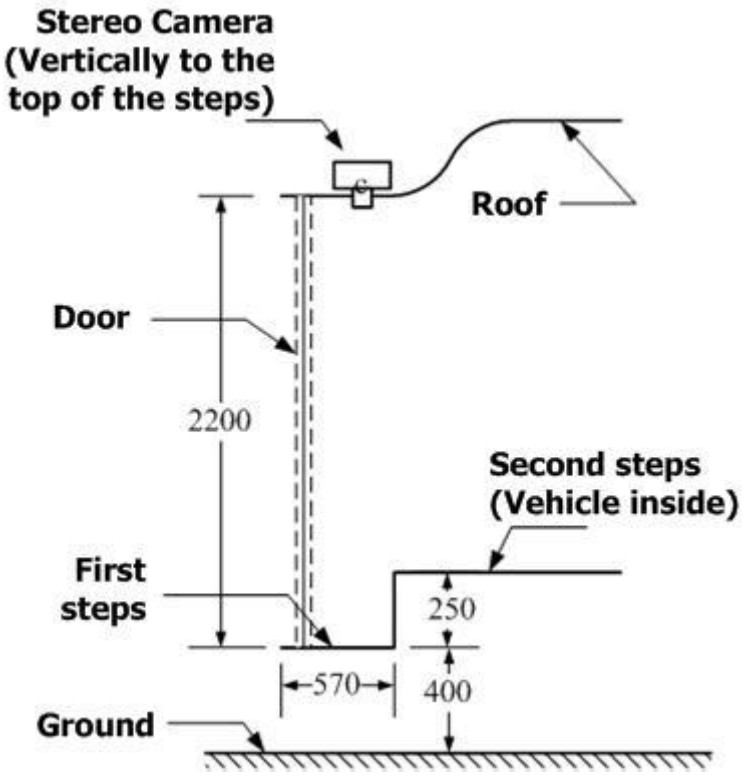
Note: Ensure that cameras' interface faces the vehicle door.

3.5.1 Mounting Cameras to the Vehicle Roof

Mount the camera bracket to the vehicle roof using four M5 screws, as shown in the following figure.



3.5.2 Camera Installation Drawing



3.6 Camera Installation Stability

The two cameras must be installed firmly.

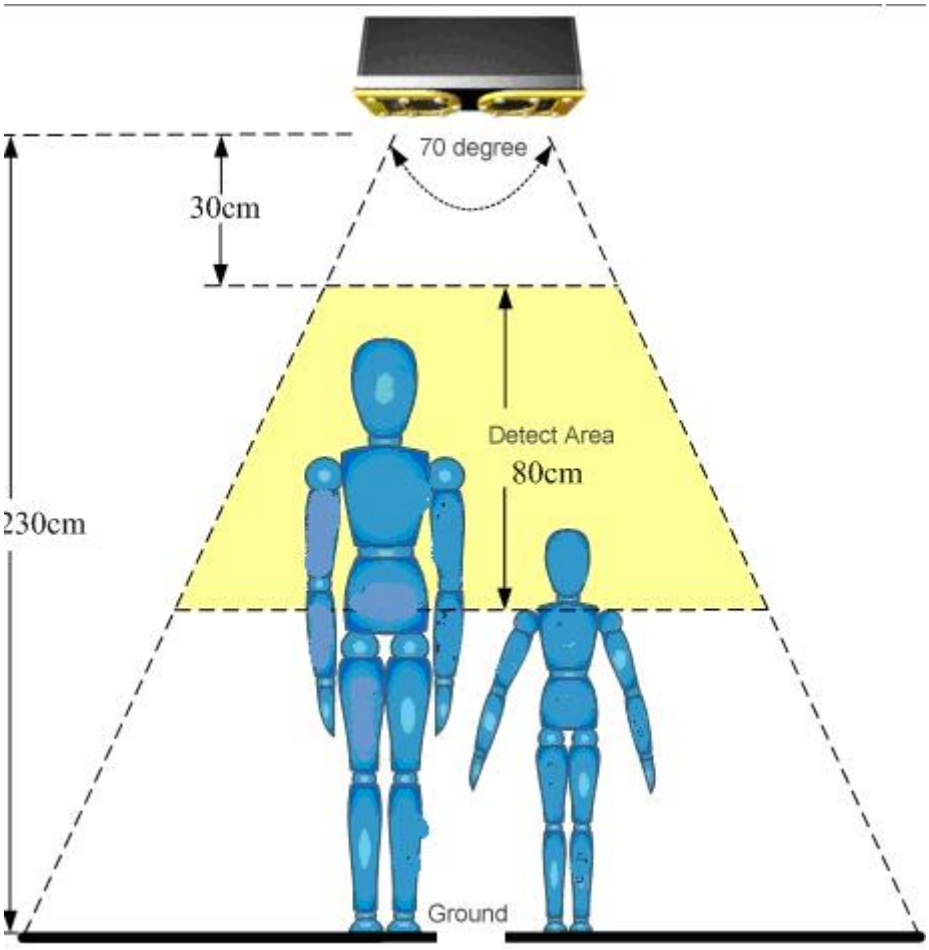
Note:

1. Don't move the cameras once they are installed.
2. The cameras don't require any protective cover to protect its lens. If a protective cover is used, please make sure that 400–700nm light can go through it.

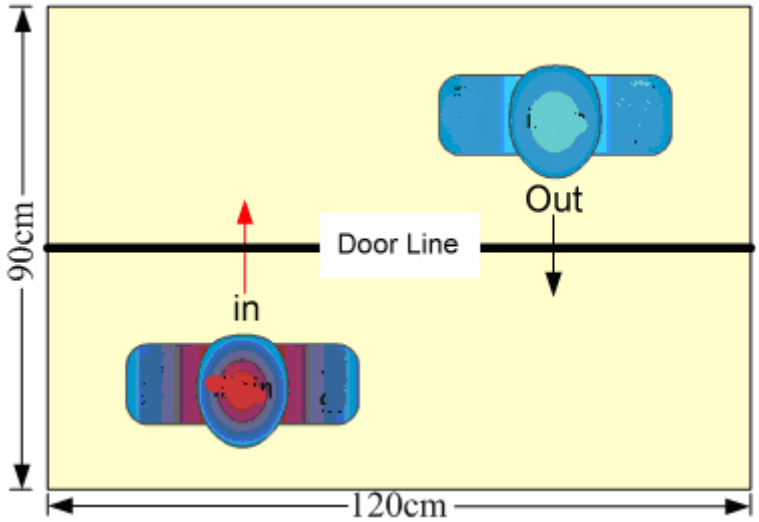
3.7 Camera Installation Height

The camera should be in the middle of the detection area, and the distance between the camera and the floor should be 230 cm, as shown in the following figure.

The area between 100cm to 200cm above the floor is the invalid detection area. The area between 25cm to 40cm below the camera is the blind area.

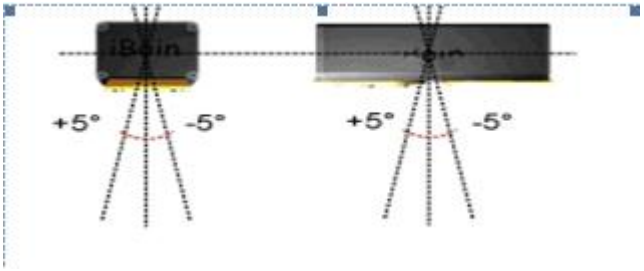


The detection area is as follows:

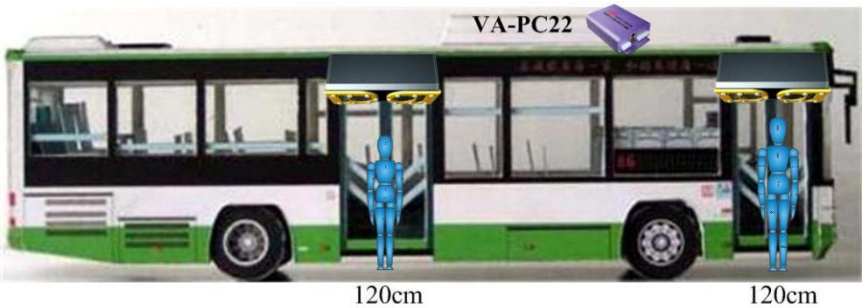


3.8 Vertical Installation

Ensure that the camera is vertical and the rotating angle cannot exceed 5 degrees.



3.9 Installation Example

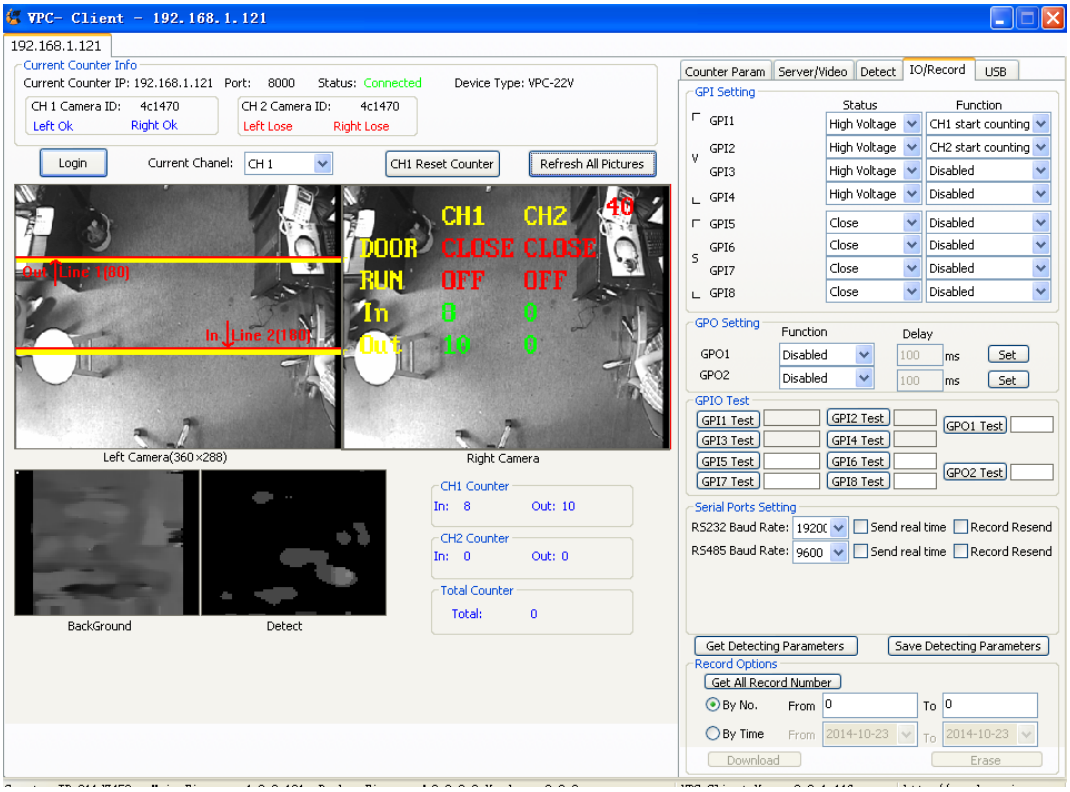


3.10 Obtaining Vehicle Door Status

The passenger counter is equipped with 4 input ports. GPI 1 is connected to the front door signal cable, and GPI 2 is connected to the back door signal cable.

Use the VPC-Client software to configure the passenger counter:

1. Click the **IO/Record** tab.
2. On the **IO/Record** tab page, set **GPI1** to **CH1 start counting** and **GPI2** to **CH2 start counting**.
3. Click **Save Detecting Parameters** to save the settings.



Note:

1. If you set **GPI Function** to **Disabled**, the passenger counter will start counting no matter what the GPI status is.
2. If you set **GPI Status** to **High Voltage** and **GPI Function** to **CH1 start counting** or **CH2 start counting**, the passenger counter will start counting. In general, GPI is connected to doors' indicators (that is, signal cable). In the camera picture on the right, it means that the door is closed and the passenger counter is not running.
3. The high voltage of GPI is DC 5–36 V.

4 Connecting the Passenger Counter to the MVT600

The following table describes the wiring between the passenger counter and the MVT600 tracker:

MVT600	Passenger Counter
GND	GND
RX	TX
TX	RX

5 Updating MVT600's Firmware

Update MVT600's firmware to **MVT600_EY23V810_20161028_2**. Only this firmware supports the passenger counter.

If you have any questions, do not hesitate to email us at info@meitrack.com.