Instruction Manual for Installation and Commissioning of P3 V3.0

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1. System Introduction

1.1 Product Overview

P3 is a professional vehicle-mounted passenger counter powered by AI algorithms. Installed above the vehicle door, the passenger counter can accurately determine whether the passenger gets on or off through a deep learning algorithm model, and precisely count the number of passengers on and off the vehicle.

The P3 passenger counter supports two power supply modes, that is, PON and POE. After counting the number of passengers, P3 employs the network interface or 485 serial interface to synchronize the number to the vehicle-mounted MDVR that then uploads the data to the platform for data analysis and statistics.

1.2 Tail Cable Definition

P3 has PON and POE power supply hardware versions available for choice according to the power supply mode of the vehicle-mounted device. PON and POE power supply modes correspond to different tail cables of power ports. The definition of tail cables is as follows:

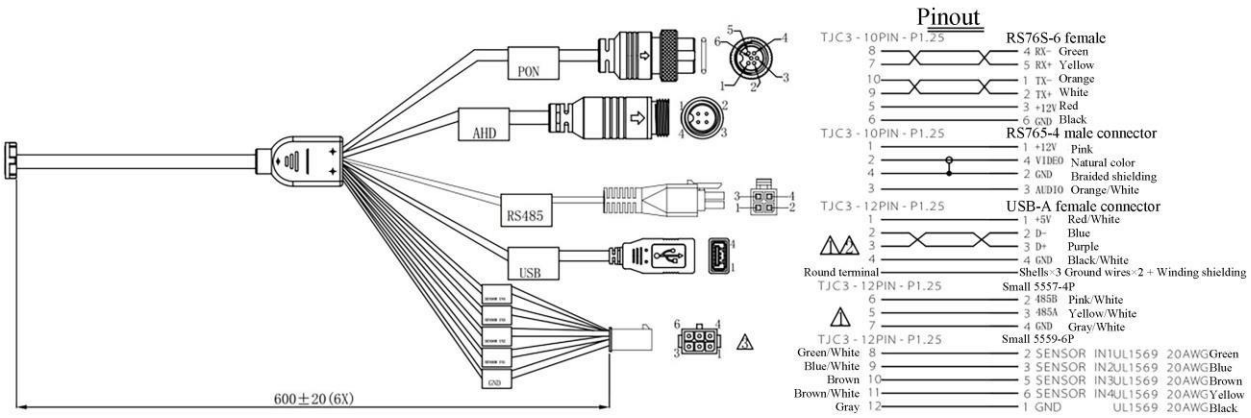


Figure 1.3.1 P3-PON Tail Cable Definition

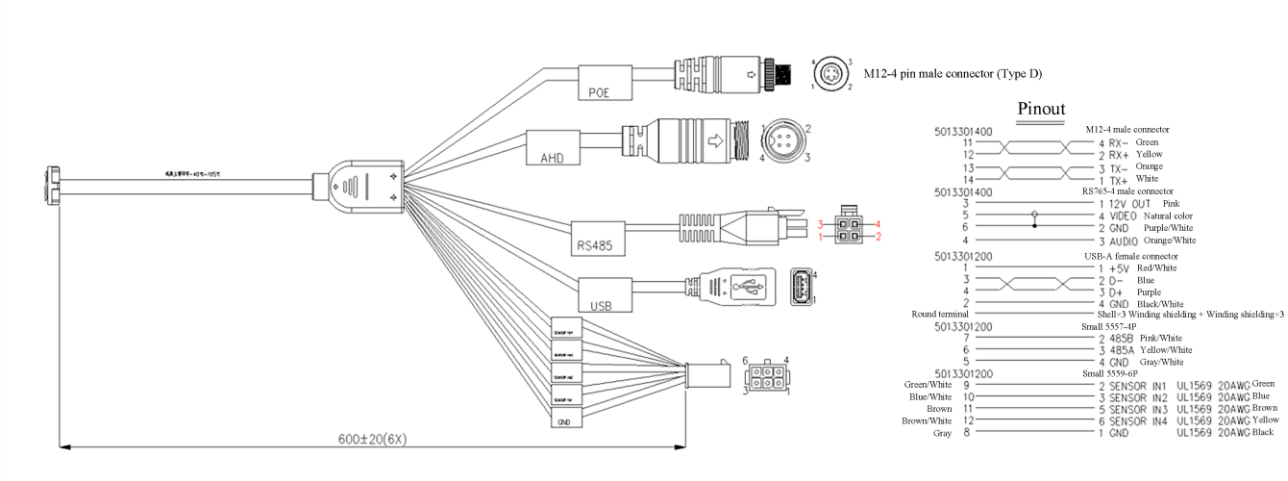
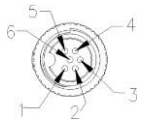
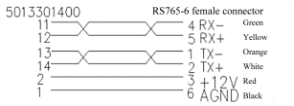
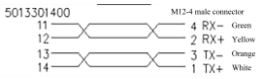
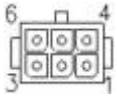
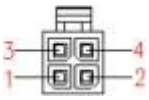
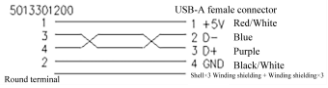
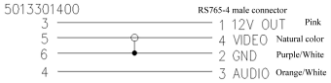


Figure 1.3.2 P3-POE Tail Cable Definition

The following shows the uses of each interface and its corresponding models:

Interface	Interface Type	Pin Definition	Model	Application
	PON(8~16V)		P3-PON	Power supply & network data transmission interface
	M12 D-code POE(48V)		P3-POE	Power supply & network data transmission interface
	IO		P3-PON P3-POE	Accessing the level to obtain the signal of door opening and closing
	RS485		P3-PON P3-POE	Connecting the passenger flow data through the 485 serial interface
	USB		P3-PON P3-POE	Accessing EasyCheck App for P3 operation and maintenance
	AHD		P3-PON P3-POE	Accessing the P3 slave

1.3 System Connection Diagram

[Note] The P3 passenger counter includes two product forms: master and slave. The P3 master works by independently connecting to the MDVR, but the P3 slave cannot work properly without being connected to the passenger counter master.

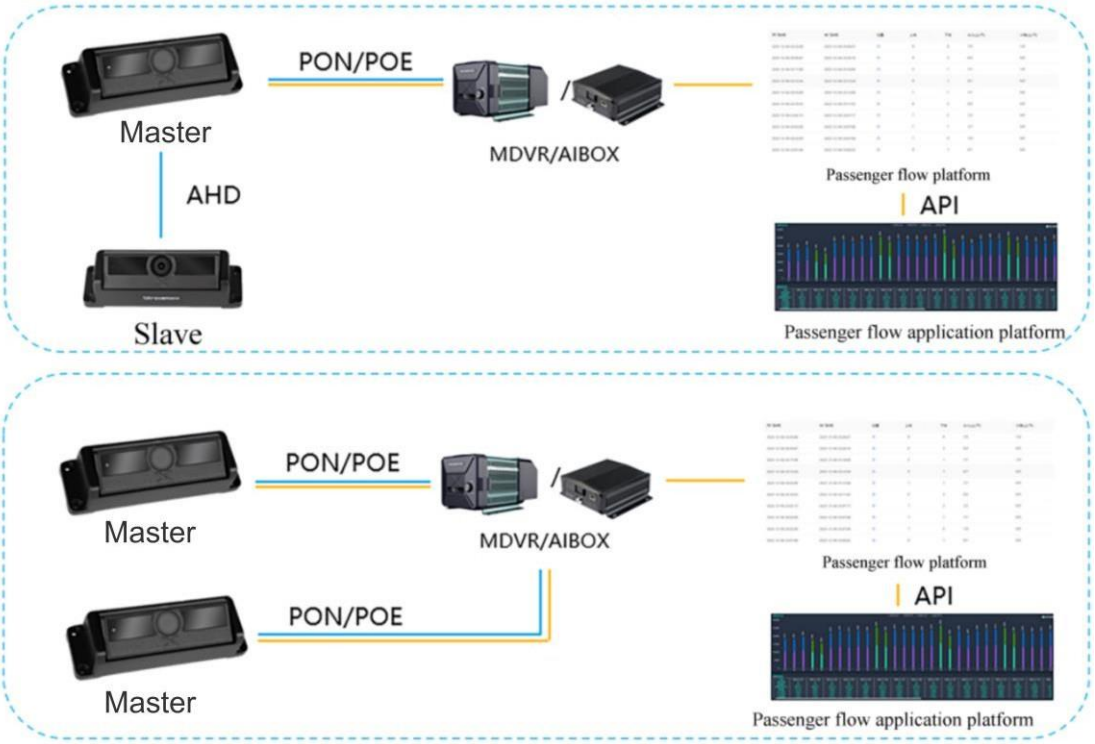


Figure 1.2.1

2. Definition and Boundary of Measurement Information

2.1.1 Description of Definition and Boundary of Measurement Information

As the passenger counter has certain requirements for the installation position environment, it is necessary to measure the installation position of the passenger counter before installation. Preliminary data measurement is of great significance for evaluating the installation and commissioning of the passenger counter. If the installation position does not meet the boundary of the passenger counter installation, please contact our technical personnel for support.

[Door height and width] The maximum height and width people are allowed to pass through the door when it is open. The door width and height ranges that match the passenger counter are 0.7 m to 1.6 m and 1.9 m to 2.4 m respectively.

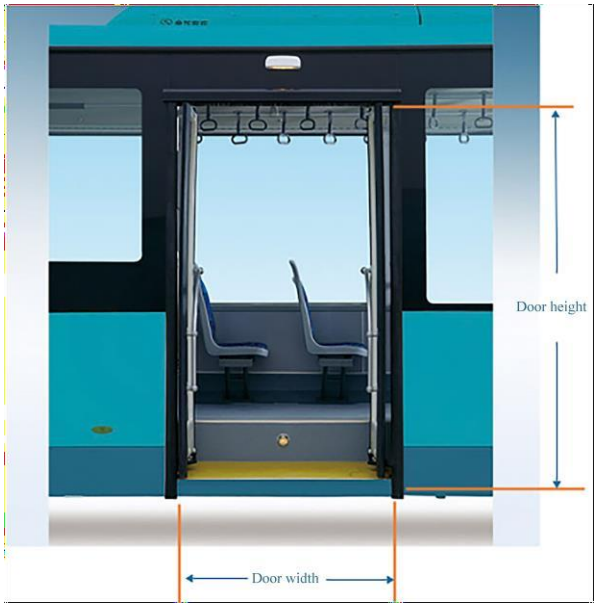


Figure 2.1.1 Measurement Diagram of Door Height and Width

[Number of installed passenger counters] Only one passenger counter can be installed on one single vehicle door.

[Installation direction of passenger counters] The installation direction of the passenger counter is consistent with the inward and outward directions indicated by the passenger counter sticker, with the "X" on the passenger counter faced outward to the door;

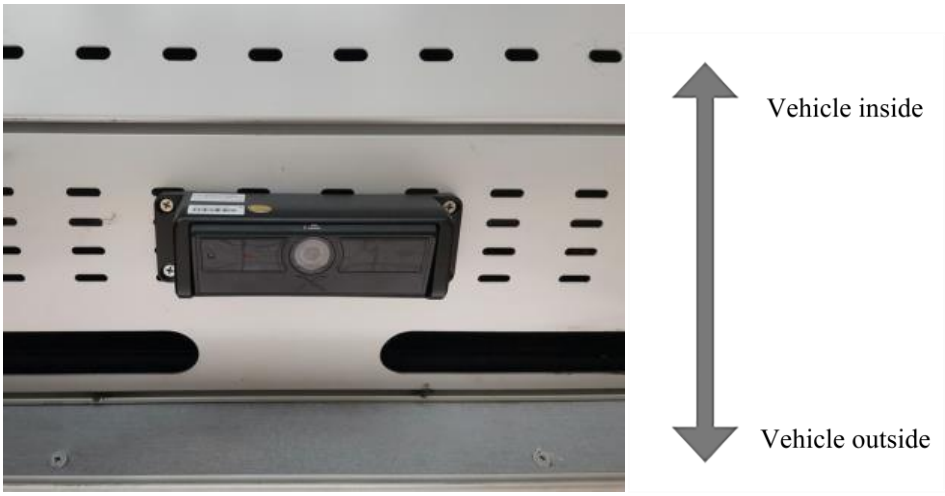


Figure 2.1.2Diagram of Installation Directions

[Installation height of passenger counter] The height from the passenger counter lens to the vehicle pedal should be 1.9 m to 2.4 m. If the installation height is not high enough, the passenger counter cannot recognize passengers, resulting in missing out some passengers.

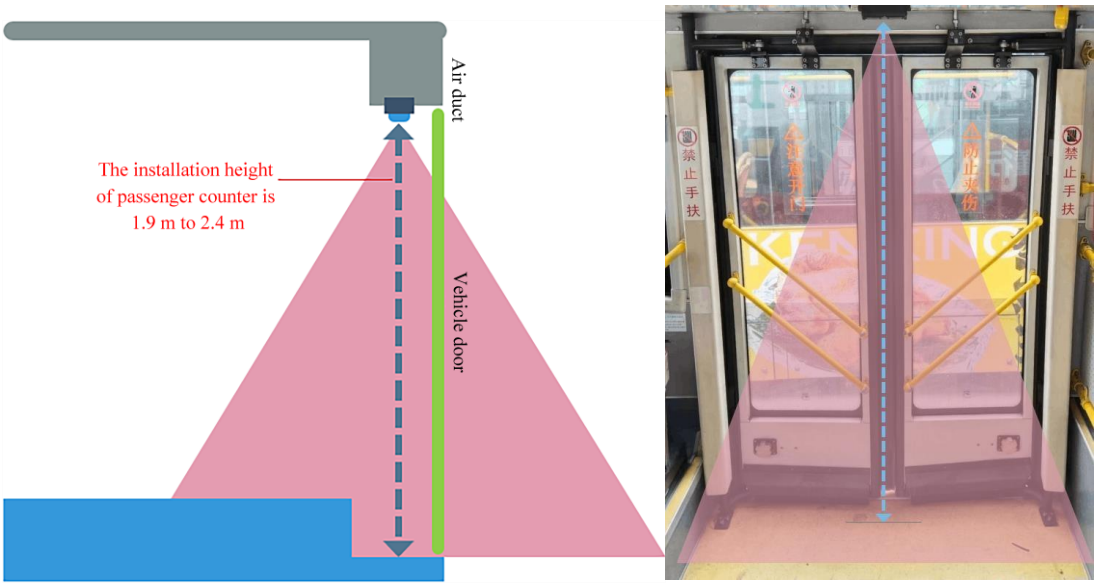


Figure 2.1.3 Measurement Diagram of Installation Height

[Horizontal distance between the passenger counter and the door edge] The passenger counter must be installed close to the edge of the vehicle body, from which the installation position must be < 30 cm. If the passenger counter is installed too far away from the edge of the vehicle body, the

passenger counter screen will include too many images inside the vehicle, making it unable to fully identify passengers getting on and off the vehicle, resulting in missing out some passengers.

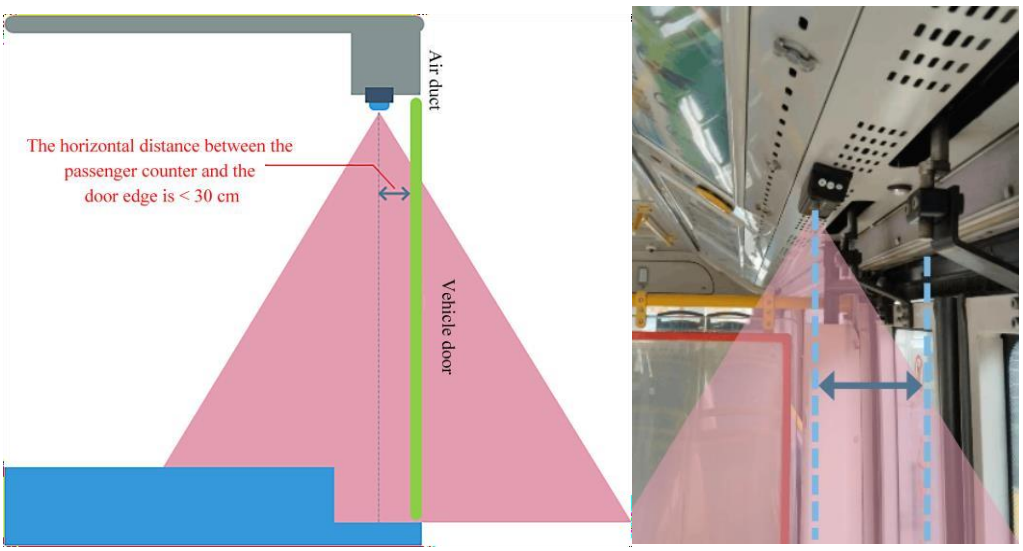


Figure 2.1.4 Diagram of Horizontal Distance Between Door Edges

[Distance between the passenger counter and the left and right walls of the vehicle door] The distance from the passenger counter lens to the left and right walls of the vehicle door should be equal. If the distance to the left wall is different from that to the right, it will fail to count some passengers due to poor vision on one side.

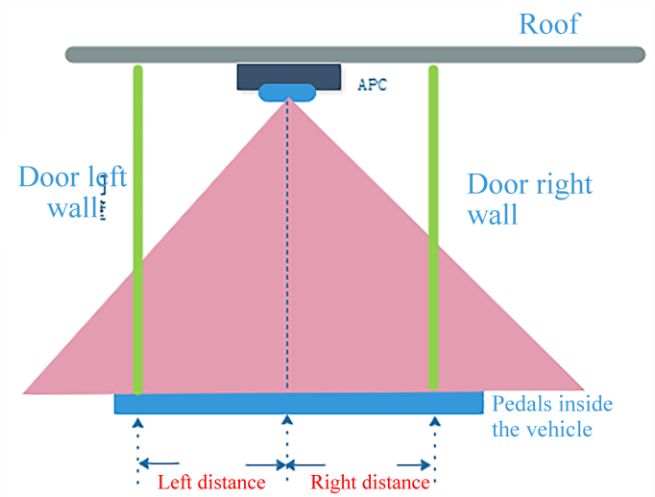


Figure 2.1.5 Measurement Diagram of Left and Right Edges

[Distance between the lens and the bottom of the vertical vehicle wall] The distance between the installation position of the passenger counter lens and the bottom of the vertical vehicle wall should not exceed 5 cm. The distance greater than 5 cm may block the view of the passenger counter and cause some passengers missed out.

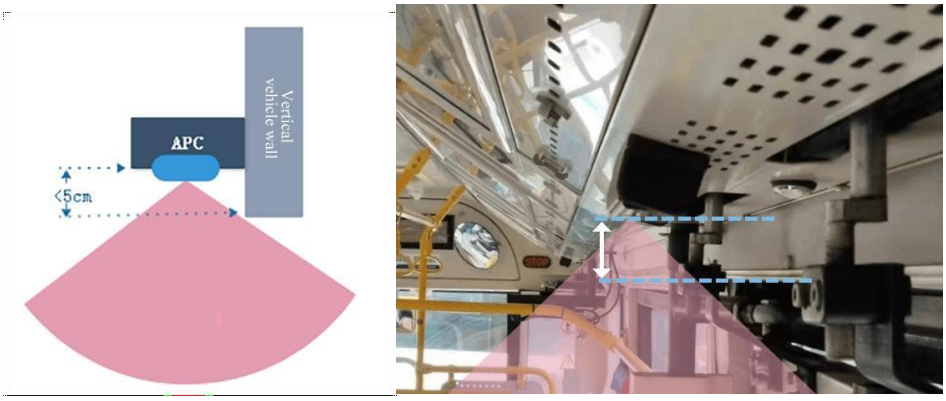


Figure 2.1.6 Measurement Diagram of Distance to the Bottom of the Vertical Vehicle Wall

[A flat installation surface of the passenger counter] The surface of the installation position of the passenger counter should be flat, with no raised objects.

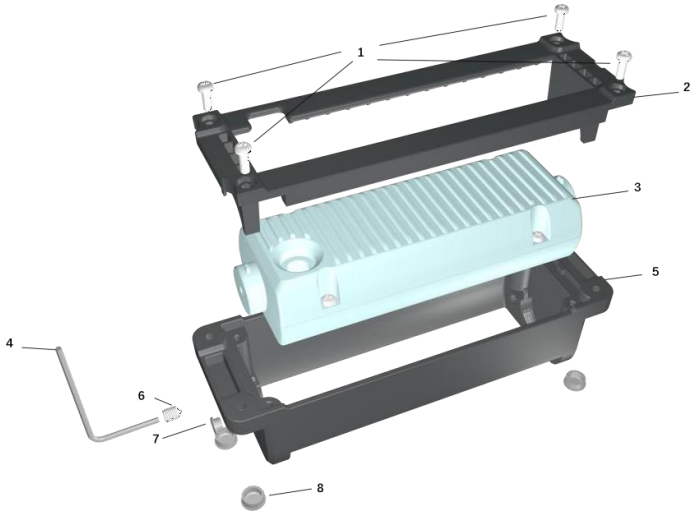
[Horizontal installation of the passenger counter] The left and right sides of the passenger counter should be parallel to the door, and the surface of the passenger counter lens should be horizontal to ensure that the vertical down passenger counter at the door collects passenger flow data. The maximum error range should be less than ±5 degrees. If it is not installed horizontally, the count accuracy will be affected.

2.2 Installation Mode and Bracket Selection of the Passenger Counter

The passenger counter can be installed in three modes, that is, embedded installation, ceiling-suspended installation and side-mounted installation, suitable for installation at different angles in bus air ducts. It is recommended to select the actual device installation mode based on the angle and position of the vehicle air duct on site. The following mainly describes the structure diagrams and adaptation angles of the passenger counter in different installation modes.

2.2.1 Ceiling-Suspended Installation

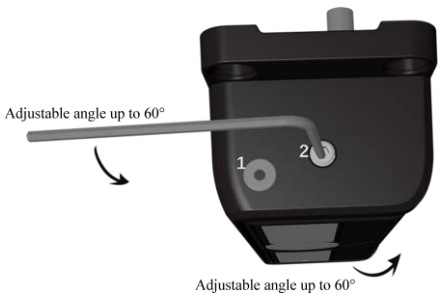
For ceiling-suspended installation, the angle can be adjusted up to 60 degrees outward to the vehicle.



1: Round head screws 2: Ceiling-suspended bracket base 3: Passenger counter main body 4: Allen key

5: Ceiling-suspended bracket 6: M6 machine-processed rice screw 7: Plastic plug 8: Plastic screw plug

Figure 2.2.1 Structure Diagram of Ceiling-Suspended Bracket of the Passenger Counter

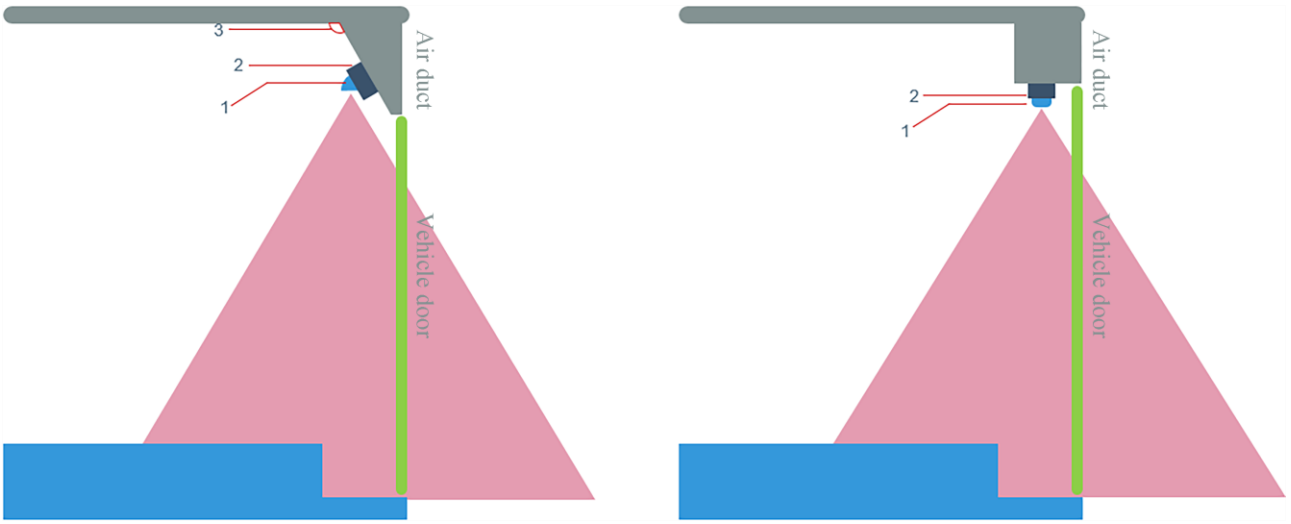


Hole 1: For fixing the main body of the passenger counter

Hole 2: For adjusting the angle of the main body of the passenger counter

Figure 2.2.2 Adjustable Angle of the Ceiling-Suspended Bracket of the Passenger Counter

When the angle between the installation surface of the passenger counter with the ceiling-suspended bracket and the horizontal plane is 120° to 180°, the main body of the passenger counter can be adjusted 0 to 60° outward of the vehicle, ensuring that the lens is vertical down to shoot images.



1: Main body of the passenger counter 2: Ceiling-suspended bracket 3: Angle between the installation surface of the passenger counter and the horizontal plane

Figure 2.2.3 Description of Applicable Scenarios of the Ceiling-Suspended Bracket

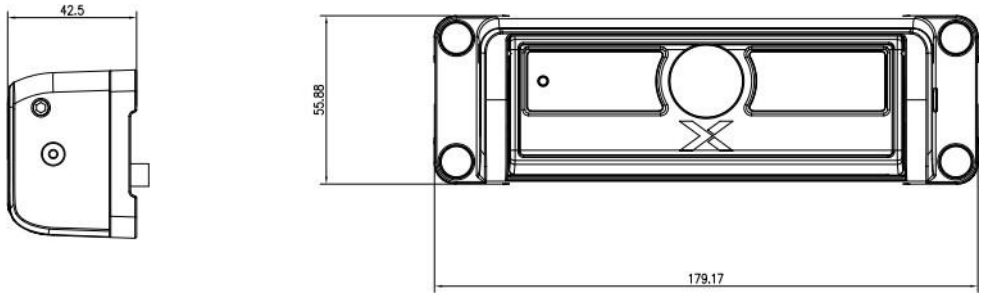
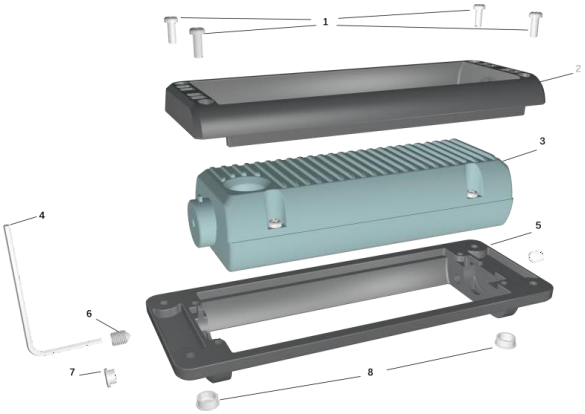


Figure 2.2.4 Dimensions of the Passenger Counter with the Ceiling-Suspended Bracket (Unit: mm)

2.2.2 Embedded Installation

For embedded installation, the angle can be adjusted up to 60 degrees outward to the vehicle.



1: Round head screws 2: Embedded bracket 3: Passenger counter main body 4: Allen key

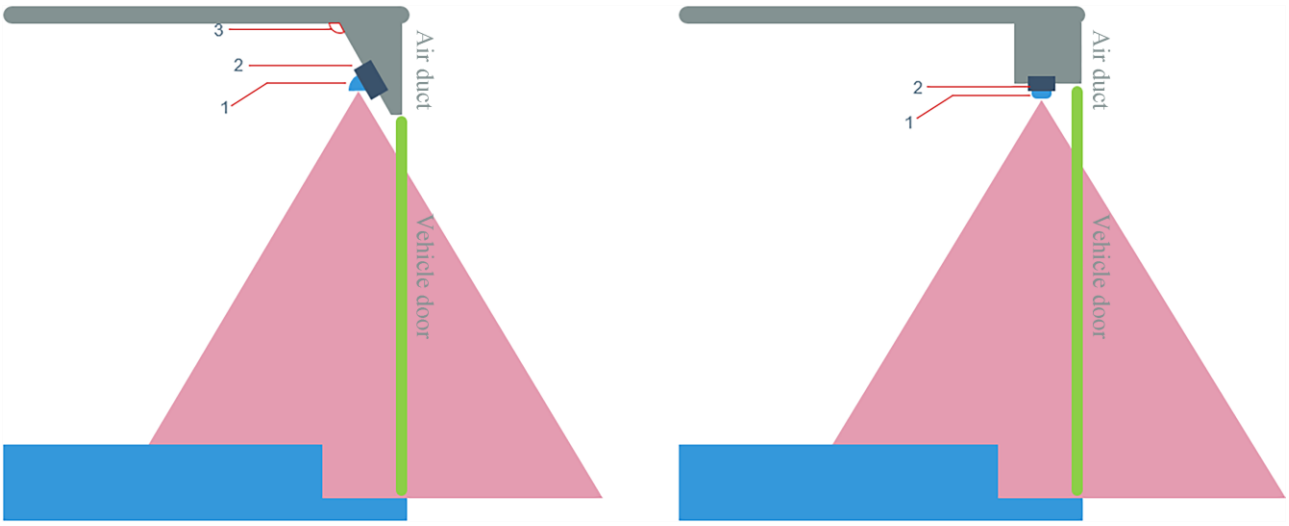
5: Embedded bracket base 6: M6 machine-processed rice screw 7: Plastic plug 8: Plastic screw plug

Figure 2.2.5 Structure Diagram of Embedded Bracket of the Passenger Counter

Note: The holes are used to fix the main body of the passenger counter

Figure 2.2.6 Adjustable Angle of the Embedded Bracket of the Passenger Counter

When the angle between the installation surface of the passenger counter with the embedded bracket and the horizontal plane is 120° to 180°, the main body of the passenger counter can be adjusted 0 to 60° outward of the vehicle, ensuring that the lens is vertical down to shoot images.



1: Main body of the passenger counter 2: Embedded bracket 3: Angle between the installation surface of the passenger counter and the horizontal plane

Figure 2.2.7 Description of Applicable Scenarios of the Embedded Bracket

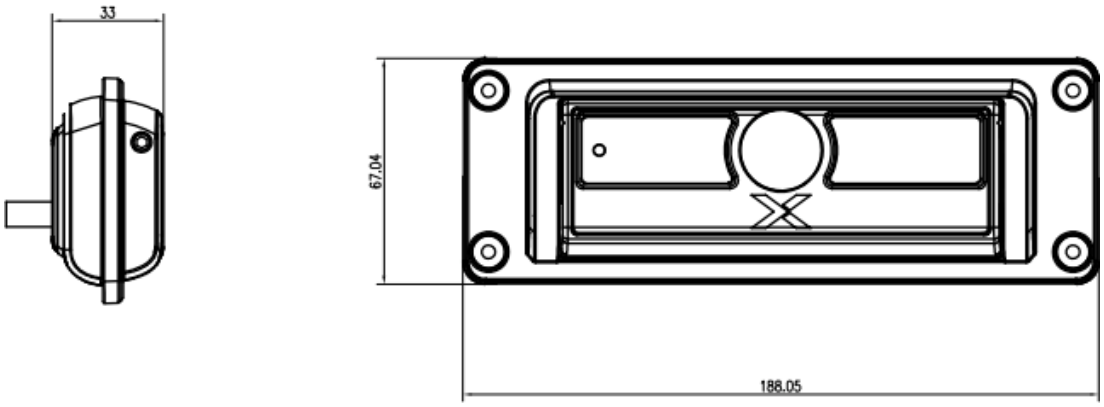
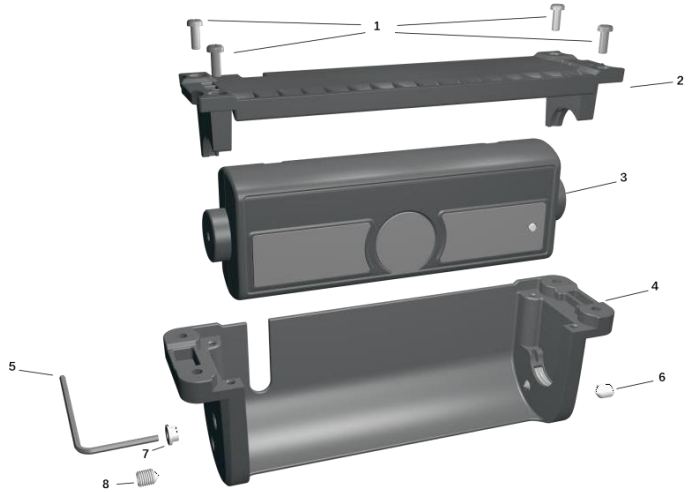


Figure 2.2.8 Dimensions of the Passenger Counter with the Embedded Bracket (Unit: mm)

Figure 2.2.9 Hole Dimensions for Embedded Installation

2.2.3 Side-Mounted Installation

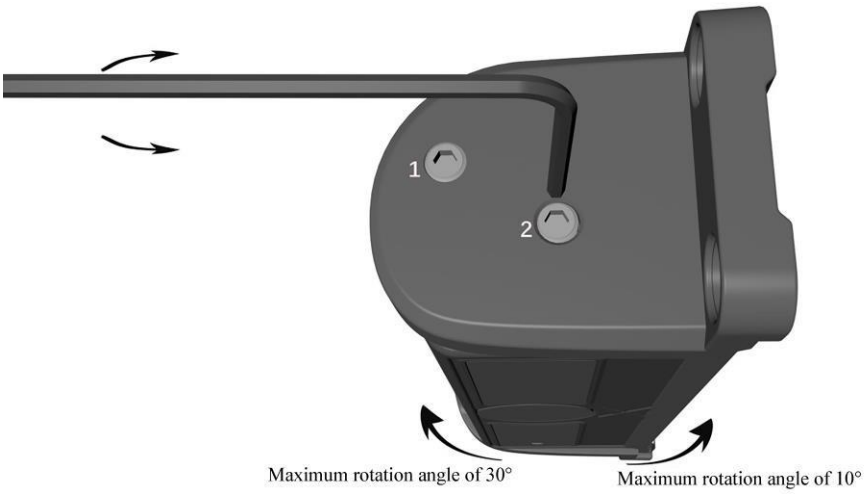
For side-mounted installation, the angle can be adjusted up to 30 degrees inward and up to 10 degrees outward to the vehicle.



1: Round head screws 2: Side-mounted bracket base 3: Passenger counter main body 4: Side-mounted bracket

5: Allen key 6: M6 machine-processed rice screw 7: Plastic plug

Figure 2.2.10 Structure Diagram of Side-Mounted Bracket of the Passenger Counter

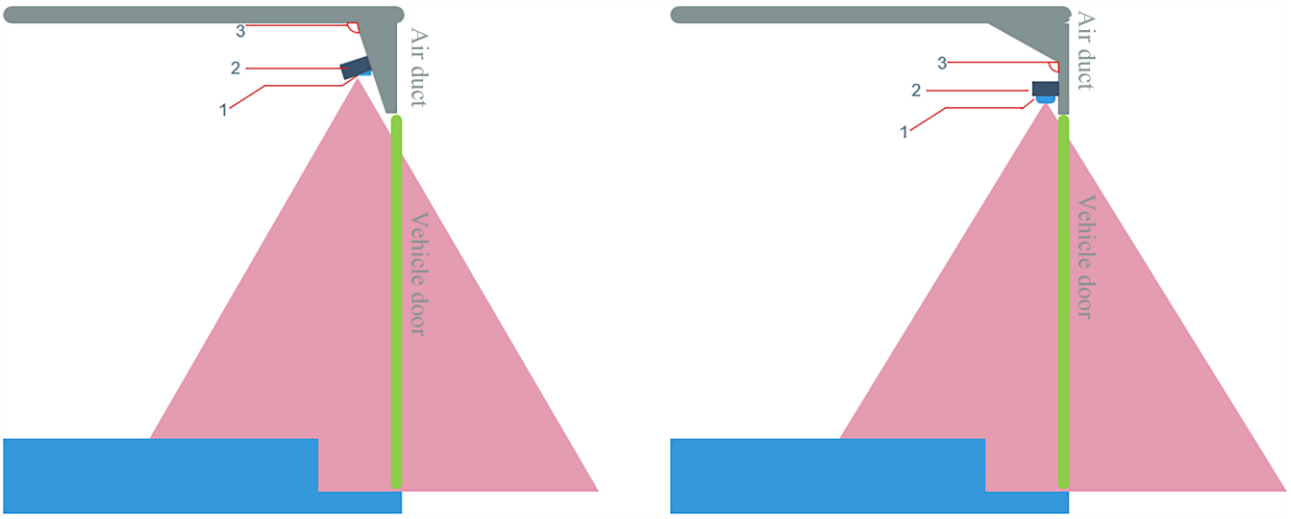


Hole 1: For fixing the main body of the passenger counter

]Hole 2: For adjusting the angle of the main body of the passenger counter

Figure 2.2.11 Adjustable Angle of the Side-Mounted Bracket of the Passenger Counter

When the angle between the installation surface of the passenger counter with the side-mounted bracket and the horizontal plane is 90° to 120°, the main body of the passenger counter can be adjusted 0 to 30° inward of the vehicle, ensuring that the lens is vertical down to shoot images.



1: Main body of the passenger counter 2: Embedded bracket 3: Angle between the installation surface of the passenger counter and the horizontal plane

Figure 2.2.12 Description of Applicable Scenarios of the Embedded Bracket

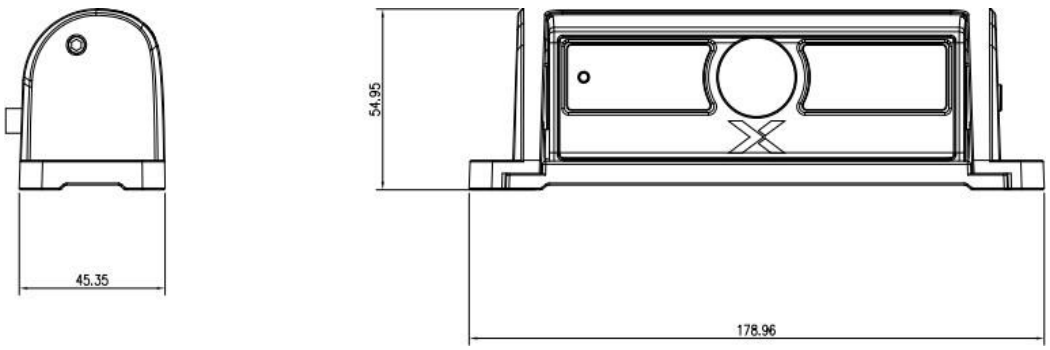


Figure 2.2.13 Dimensions of the Passenger Counter with the Side-Mounted Bracket (Unit: mm)

3. Device Installation

The common master and slave devices of the passenger counter installed on the two-door bus are used to demonstrate all steps of the device installation.

3.1 Division of Labor and Construction Arrangements

Supervision: The responsible person supervises on site to ensure the installation process meets the requirements. After the on-site acceptance and installation, the functions of each vehicle device can be used normally, with the vehicle restored and a clean environment. The responsible person communicates with the driver or the person in charge of the vehicle company on site to ensure that the vehicle has been accepted and signed.

Warehouse management: The person in this position is responsible for receipt accounting, inventory management, daily inventory count, allocation and distribution of materials, and repair and shipment of defective products.

Electricians: The person in this position is responsible for finding power and speed signal cable for various types of vehicles, ensuring wiring specifications and eliminating safety hazards.

Installation personnel: The person in this position is responsible for installing and fixing devices and wiring of devices to ensure that the device can be powered on and work normally; for device commissioning and calibration to ensure normal use of device functions; and for restoration of the vehicle environment after installation to keep it clean and tidy, and collection of on-site acceptance materials.

3.2 Preparation for Installation

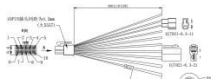
3.2.1 Installation Tool

List of Installation Accessories and Tools				
S/N	**Picture**	**Tool Name**	**Application**	**Quantity**

1		Torsion drill	Tighten screws	1pcs
2		30 mm drill bits	Hole wiring	1pcs
3		Screwdriver kit	Tighten screws, optional	1pcs
4		Crowbar	Pry up the vehicle panel	1pcs
5		Ties	Bundle cables	Prepare as needed
6		Dry cleaning cloth	Clean the dashboard	1pcs
7		Insulated rubber tape	Wrap wire ends	1pcs
8		Scissors	Cut insulated rubber tape or wire clip	1pcs
9		USB flash drive	Import parameters	1pcs
10		Allen key	Adjust and fix the angle of the passenger counter lens	1pcs
11		Signal extension cable of door opening and closing	Connect the signal cable of the vehicle door opening and closing and the terminal IO	1pcs
12		5 mm drill bits	Open holes	1pcs
13		Measuring tape	Measure the installation position of the passenger counter	1pcs
14		Multimeter	Measure the signal cable of the door opening and closing	1pcs
15		Wire stripper	Strip wires	1pcs

16		Spirit level	Measure whether the passenger counter is installed horizontally	1pcs
17		EasyCheck App	Debug the passenger counter when it is connected with our vehicle-mounted MDVR	1pcs
18	Android: Search "EasyCheck App" in Tencent MyApp to download	EasyCheck App	Provide the commissioning page for the passenger counter	Version 2.7.0 or above

3.2.2 Installation Materials

List of Product Materials				
S/N	**Picture**	Name	Description	**Quantity**
1		Passenger Counter P3 master	Detect whether passengers get on or off the bus	1pcs
2		Passenger Counter P3 slave	Detect whether passengers get on or off the bus	1pcs
3		6pin video extension cable	Connect the passenger counter master with the terminal	1pcs
4		4pin video extension cable	Connect the passenger counter slave and the master	1pcs
5		Passenger counter screws	Fix the passenger counter	1pcs
6		10pin IO input cable	A sensor line that can be connected to the door opening and closing signal	1pcs

3.3 Passenger Counter Installation

3.3.1 Installation Steps

The passenger counter can be installed in three modes, that is, embedded installation, ceiling-suspended installation and side-mounted installation, suitable for installation at different angles in bus air ducts. According to the angle position of the vehicle air duct and installation requirements,

the best installation mode and installation position are selected. The vehicle should be parked on a flat ground during installation.

General principle for installation: The passenger counter is installed in the middle of the air duct above the door, parallel to the door.

Specific installation steps: Use a measuring tape to measure the position in the middle of the upper edge of the door, draw a vertical line, and drill a hole on the vertical line about 10 cm to 30 cm away from the door (where the lens view will not be blocked by the vertical vehicle wall, and it is convenient for wiring). Then, fix the passenger counter at the drilled hole in parallel to the door, with the "X" on the passenger counter faced outward to the door, and the lens placed on the vertical line of the center of the door. Adjust the lens surface of the passenger counter to be horizontal to the vehicle body.

Figure 3.3.1 Rendering of Passenger Counter Installation

3.3.2 Device Connection Methods

Connect the passenger counter master to the IPC port of the vehicle-mounted MDVR using a 6pin video extension cable. Use the 4pin video extension cable to connect the passenger counter slave to the AHD port of the passenger counter master (marked on the passenger counter).

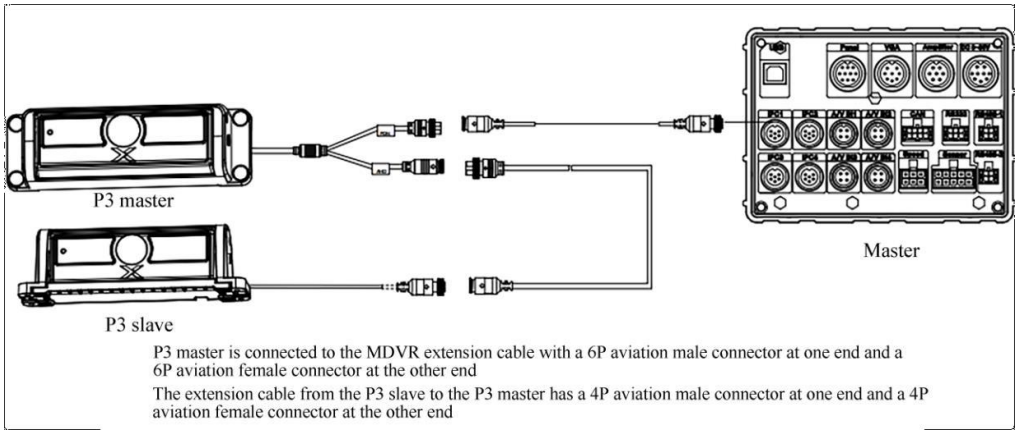


Figure 3.3.2 Device Connection Method

3.3.3 Connection Method of Signal Cable

There are various bus models, and some original vehicle models do not have CAN signals. In this case, the vehicles without CAN signals need stripped cables to connect the signal cable of vehicle's door opening and closing so that the P3 device can collect the signals of vehicle's door opening and closing.

<1>Pry up the central control board with the button of the vehicle's door opening and closing and find the corresponding integrated line of door opening and closing.

Figure 3.3.3 Central Control Board with Button of Door Opening and Closing

<2>Use a multimeter to measure the buttons of door opening and closing corresponding to the front and rear doors and find the signal cables of door opening and closing. Use a multimeter to measure the voltage of the signal cable of door opening and

closing. If it continues to be in a high/low level status after opening and closing the door, the signal of the vehicle's door opening and closing is a level signal. If the voltage increases upon the opening of the door and then decreases, the signal of the door opening and closing is a pulse signal.

Figure 3.3.4 Signal of Front Door Opening

<3>Use a wire stripper to strip the measured signal cable of door opening and closing, connect this signal extension cable to the signal cable of door opening and closing, and extend it to the vehicle-mounted MDVR.

If the signal of door opening and closing is a level signal, one door is connected to one signal cable of door opening and closing, to IO1-IO2 in sequence according to the door number. If the signal of door opening and closing is a pulse signal, generally the same door's opening or closing is connected to two pulses respectively. One door needs to be connected to two signal cables, and two doors are connected to IO1-IO4 in sequence according to door 1 opening, door 1 closing, door 2 opening, and door 2 closing. (If IO1 is occupied, it can connect to IO2-IO5, and so on)

<4>Wrap the stripped cable connection with the insulated rubber tape and restore the center control board with buttons of the vehicle.

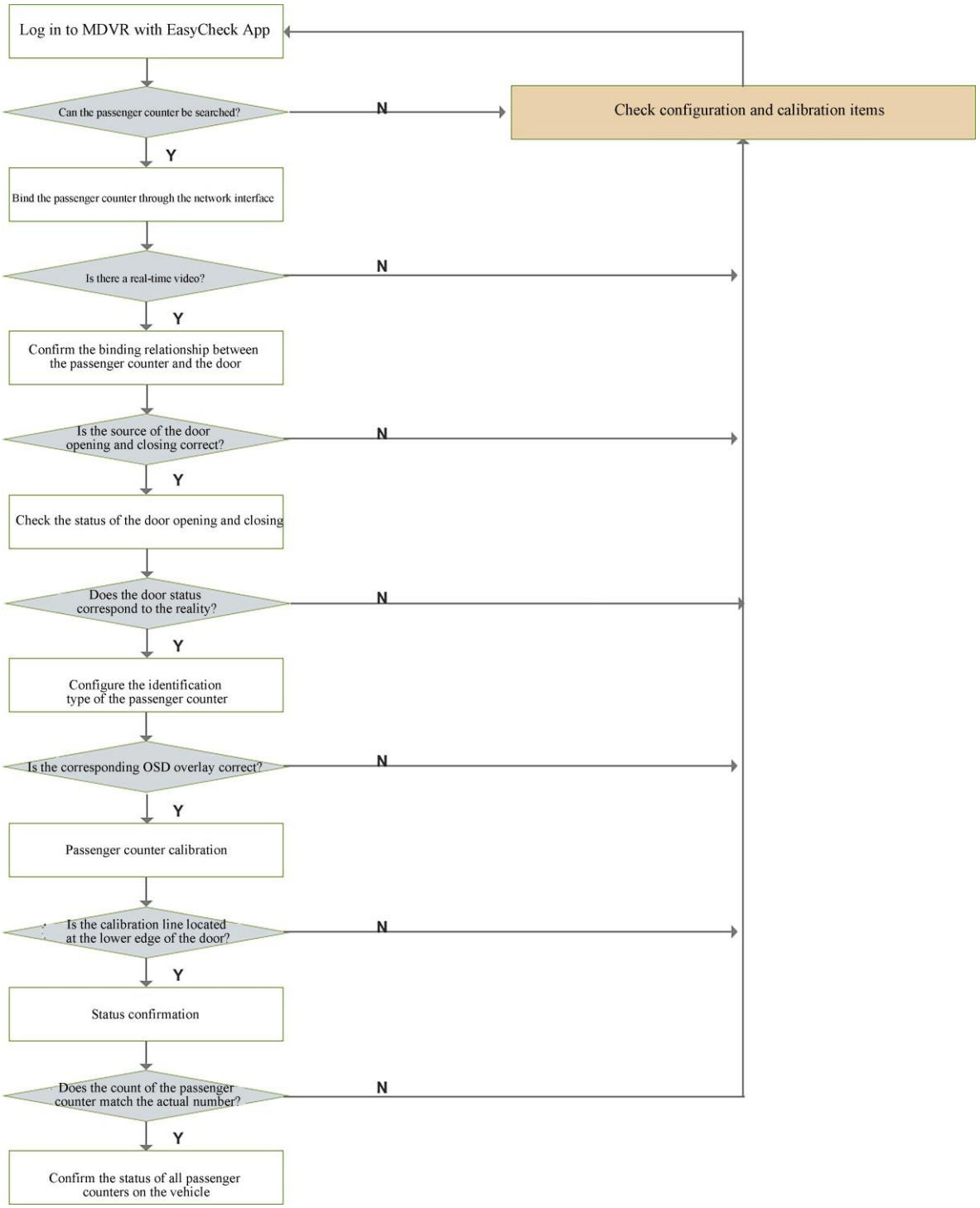
3.3.4 Installation Confirmation

After completing the device installation, the status should be confirmed through the following content:

- It proves that the passenger counter is powered on normally if the passenger counter turns on the infrared fill light properly when covered by the hand;
- The protective film on the passenger counter lens has been removed;
- The device software is the latest software version. The software version number can be queried in **Preferences - Basic Setup - Status Info - Firmware Version**.

4. Commissioning and Calibration

4.1 Calibration Confirmation Process



4.2 Calibration Operation

4.2.1 Step 1. Log in to MDVR with EasyCheck App

Insert the EasyCheck App into the MDVR, open the "EasyCheck App" (version 2.7.0 or above) on the mobile phone and search for the specified device. The device name is the "license plate number" configured for the device. Without the configured license plate number, the device name is the "device serial number".

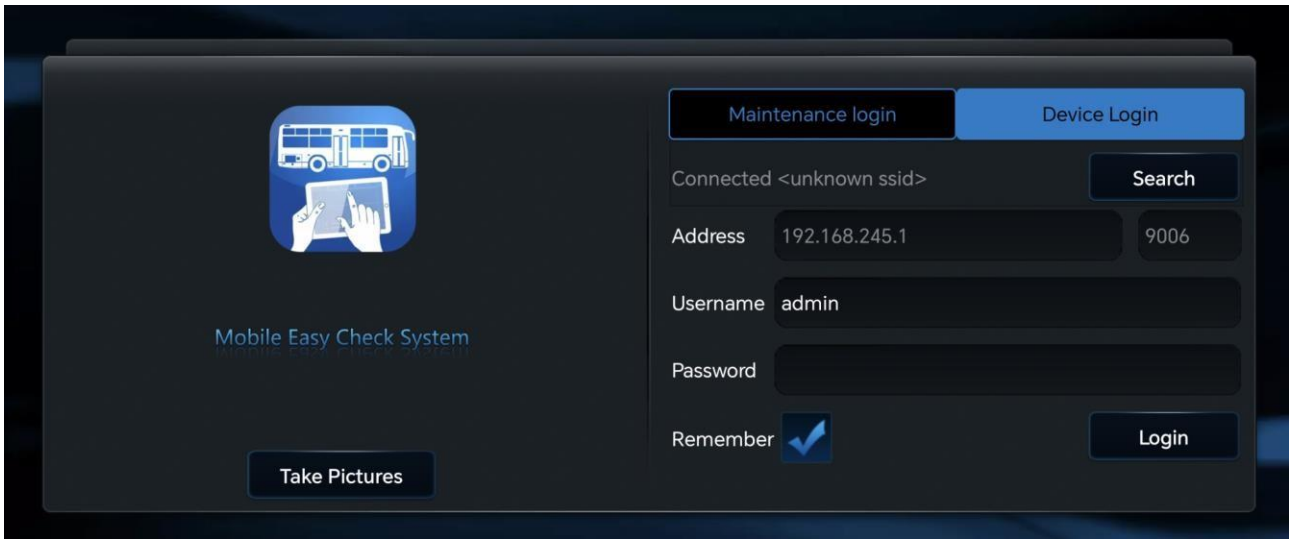


Figure 4.2.1 EasyCheck App Login

If the passenger counter directly accesses the signal of door opening and closing through IO or uses video recognition to open and close the door, please jump to <Step 2. Bind Passenger Channel>.

For example, MDVR receives the signal of door opening and closing through the IO interface/CAN interface:

<1>The signal of door opening and closing comes from the MDVR IO interface. For the settings of the door opening and closing, click the **Preferences - Alarm - Base - Signal Alarm** page on the EasyCheck App.

The name option corresponds to the door item. In this case, door 1 corresponds to <Door 1 (Opening and closing door)>. Click **Trigger - Setup** to configure the corresponding relationship

between the door signal and IO.

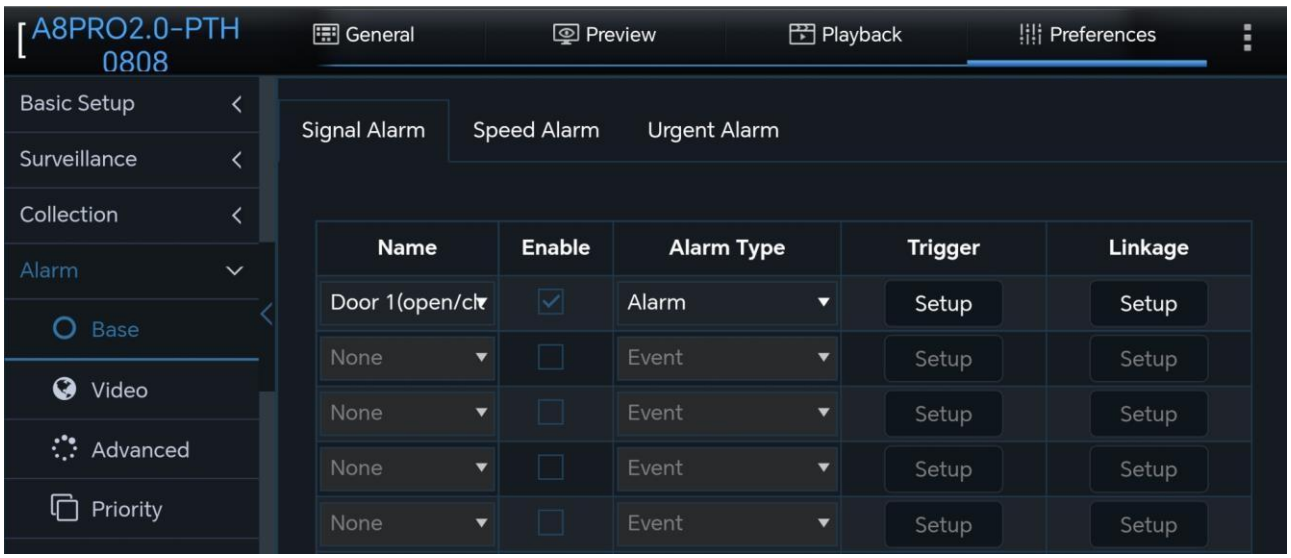


Figure 4.2.2 Configuration Page of Door Opening and Closing

If the access signal of the IO interface is a level signal, the IO number corresponds to the IO line number connected to the signal cable of door opening and closing. Generally, signals of high and low level correspond to the opening and closing signals of doors, respectively.

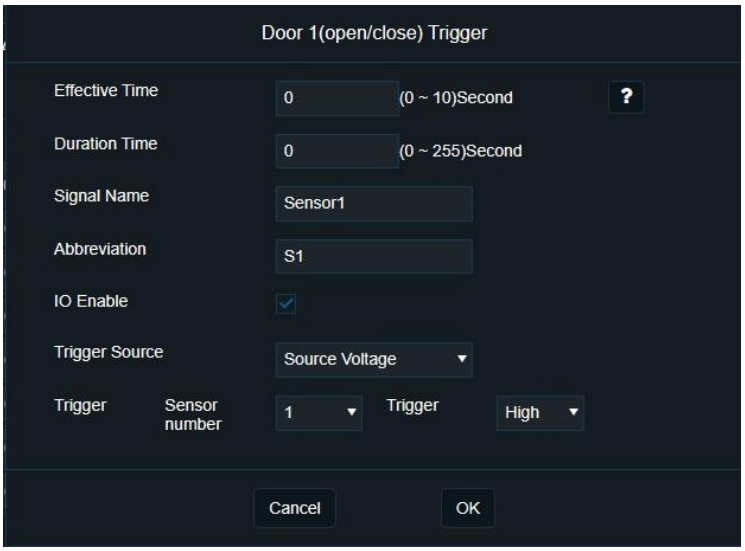


Figure 4.2.3 Access Signal of IO Interface as Level

If the access signal of the IO interface is a pulse signal, the IO number corresponds to the IO

line number connected to the signal cable of door opening and closing. Generally, to control the opening or closing of the same door, it must connect to two pulse signals respectively, where <Trigger> is the door opening signal and <Suppression> is the closing signal.

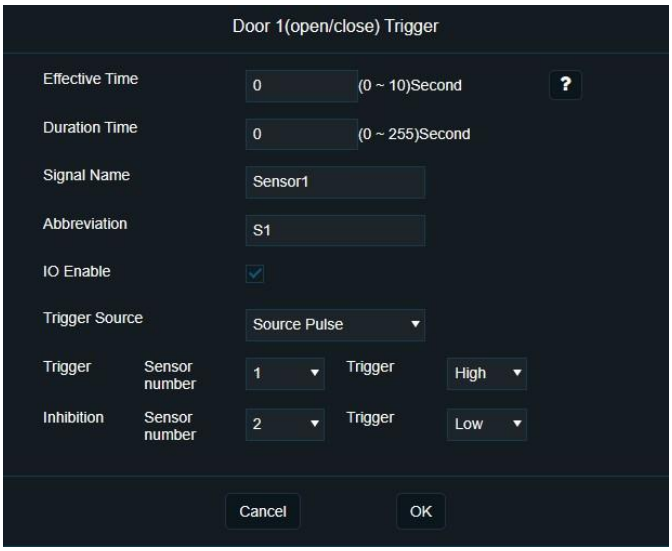


Figure 4.2.4 Access Signal of IO Interface as Pulse

<2>The signal of door opening and closing comes from the CAN interface of MDVR. When the signal of vehicle's door opening and closing comes from the vehicle CAN, please contact Streamax technical personnel.

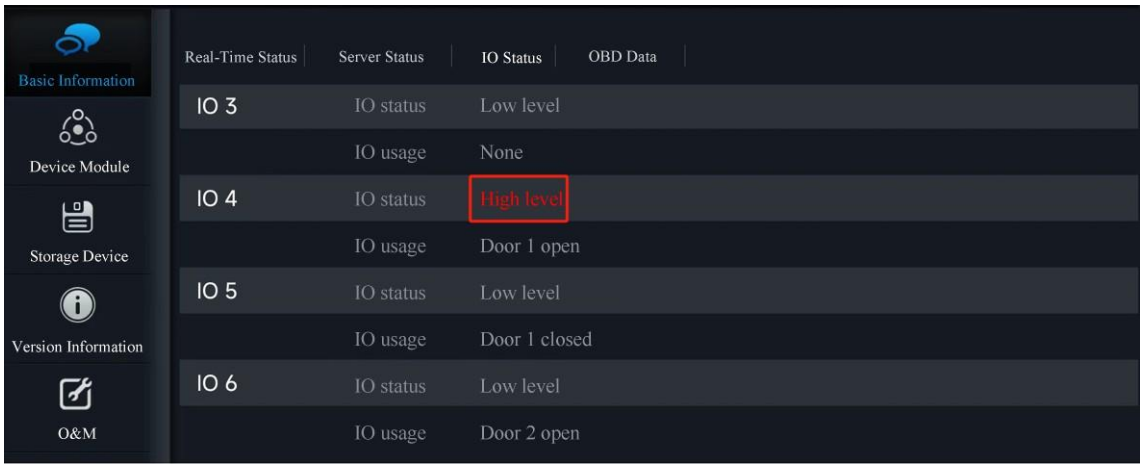
Note: Use the EasyCheck App to identify the IO number and determine the signal type of door opening and closing

In many OEM projects, the vehicle manufacturer connects the IO signal cable to the vehicle's reserved interface in advance. The IO status page of the EasyCheck App can be used to determine the IO number of the signal of door opening and closing and whether the signal of door opening and closing is a level signal or a pulse signal.

[Log in to the EasyCheck App] - [Enter the "**General - Basic Info - Sensor Status**" page] - [Open/Close the door] - [View the IO status]

As shown in the figure below, when door 1 is open, IO4 is high level, and when door 1 is closed, IO5 is high level. Then, the corresponding IO number to the open and closed door 1 is 4 and 5 respectively. The IO number of door 2 can be determined in the same way.

The IO status can also determine whether the signal of door opening and closing is a level signal or a pulse signal. If the IO for door opening and closing is different with changes in the IO status, the signal of door opening and closing is a pulse signal, and if not, it is a level signal.



4.2.2 Step 2. Bind Passenger Counter Channel

Configure each device on the **Preferences - Collection - General - Network** page of the EasyCheck App. Select <Function Type> as <Passenger flow statistics> and <Subtype> as <Door 1>-<Door 8>. Click the search icon " ". Search and view all passenger counters connected to MDVR.

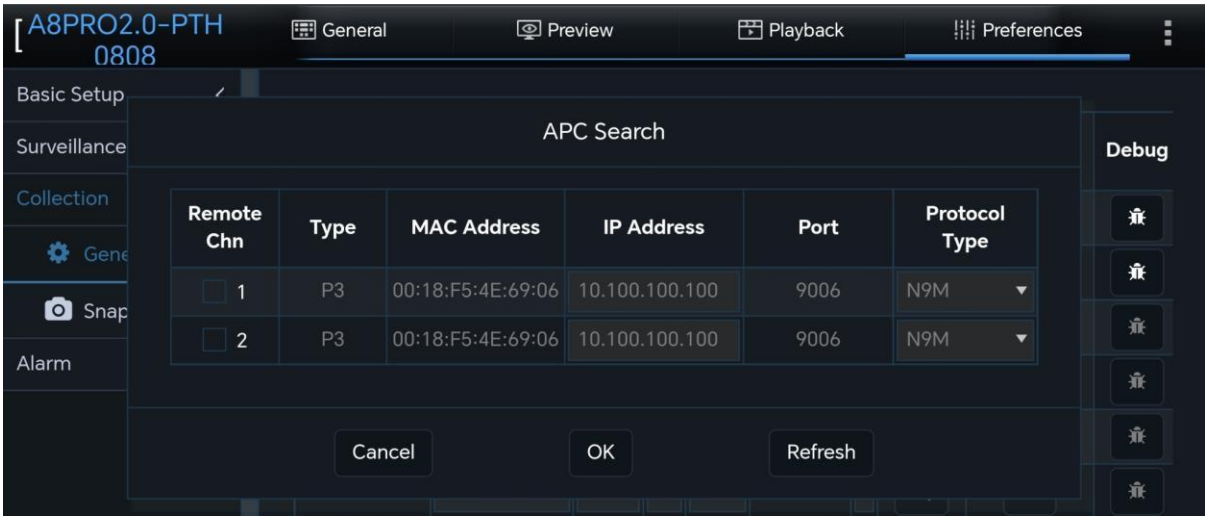


Figure 4.2.5 Network Interface Passenger Counter Search

P3 supports master mode and slave mode. The IP address and MAC address of the P3 master and the passenger counter slave are the same. Distinguish the master from slave through <Channel> 1 or 2. Among them, the channel 1 is the master, and the channel 2 is the slave.

With the multi-door BRT as an example, the corresponding relationship between door numbers and door positions is as shown below. For a typical two-door model, the front door is <Door 1> and the rear door is <Door 2>.

Figure 4.2.6 Corresponding Relationship Between Door Numbers and Door Positions

For the convenience of later installation, operation and maintenance, it is recommended that the P3 master is installed in door 1 and the P3 slave is installed in door 2. Device 1 corresponds to door 1, with the corresponding passenger flow channel 1 (passenger flow master channel). Device 2 corresponds to door 2, with the corresponding passenger flow channel 2 (passenger flow slave channel). After the configuration is completed, click **Save**.

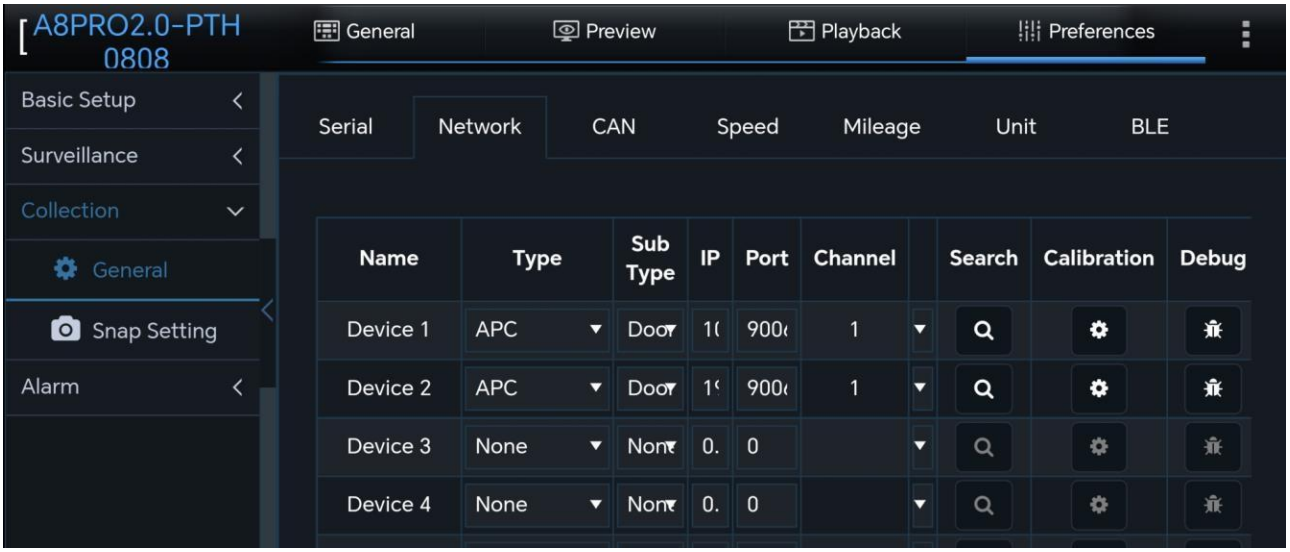


Figure 4.2.7 Configuration Page of Network Interface

4.2.3 Step 3. Confirm the Binding Relationship Between Passenger Counter and Door

After completing the binding of the passenger counter and the door, click the login icon " " under the page of **Preferences - Collection - General - Network** to log in to the passenger counter. After logging into the passenger counter, the normal status must be <Normal Mode> as shown in "Figure 4.2.8". Otherwise, the passenger counter parameters need to be confirmed.

On this page, you can see the real-time video of the passenger flow. Please use the video to confirm that the passenger counter corresponds to the door position. The door 1 corresponds to the front door, and door 2 corresponds to the rear door. If the current door number of the passenger counter does not correspond to the door position, the door number can be modified according to the video image, then with the modification saved.

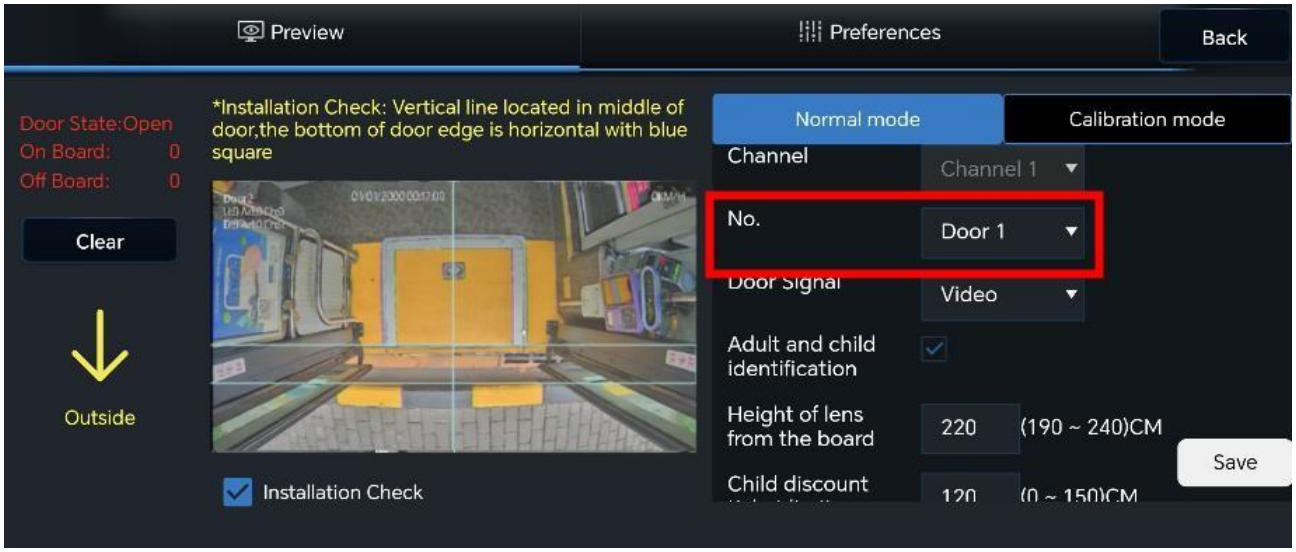


Figure 4.2.8 Door Number Configuration

The default login page is <Normal Mode>, and the passenger counter will not count in <Calibration Mode>.

4.2.4 Step 4. Check the Door Opening and Closing Status

Select the signal source of door opening and closing according to the actual signal access of

door opening and closing:

<1>If the MDVR accesses the signal of door opening and closing through the IO interface/CAN interface, with the configuration completed in Step 1, the <Door Opening and Closing Signal Source> should be configured as <Vehicle-mounted MDVR>. The configuration after being completed is saved.

<2>If the passenger counter is directly connected to the signal of door opening and closing through IO, the <Door Opening and Closing Signal Source> should be configured as the <Passenger Counter Sensor>. Meanwhile, the level/pulse signal should be configured, and the configuration is saved after being completed.

The access signal of the IO interface is a level signal. Generally, high level is the signal of door opening, and low level is the signal of door closing. One door corresponds to one signal cable only.

The access signal of the IO interface is a pulse signal. Generally, two pulses are required to control the opening or closing of the same door. One door needs two corresponding signal cables.

<3>When the physical signal cannot be used to access the signal of door opening and closing, video recognition can be used to open and close the door. Please contact Streamax technical personnel to confirm whether the model is suitable. <Door Opening and Closing Signal Source> should be configured as <Video Recognition>. The configuration after being completed is saved.

Figure 4.2.9 Signal Source of Door Opening and Closing

After opening the door, the door status seen through the passenger counter on the EasyCheck App page should be open, and after closing the door, the door status should be closed. If the door opening and closing status displayed on the page is inconsistent with the actual opening and closing status, you need to check the configuration of door opening and closing. To check the door opening and closing, please check the door status in the figure below.

Figure 4.2.10 Door Status View

4.2.5 Step 5. Configure Identification Type of Passenger Counter

Choose whether to turn on <Adult and Child Identification> according to needs. After enabling this function, it requires configuring the <Vertical Height of the Lens to the Ground> and <Height Limit for Child Fares>. After the configuration is completed, click **Save**.

After saving the configuration successfully, the OSD overlay will appear on the preview screen. Ad represents the number of adults, and Ch represents the number of children.

Figure 4.2.11 Adult and Child Recognition Overlay

4.2.6 Step 6. Calibrate Passenger Counter

Before entering the calibration mode, check again whether the passenger counter is installed in accordance with the requirements. Make sure that the vertical line is in the center of the door, and the lower edge of the door remains horizontal within the box superimposed on the screen.

If not, please adjust the installation position.

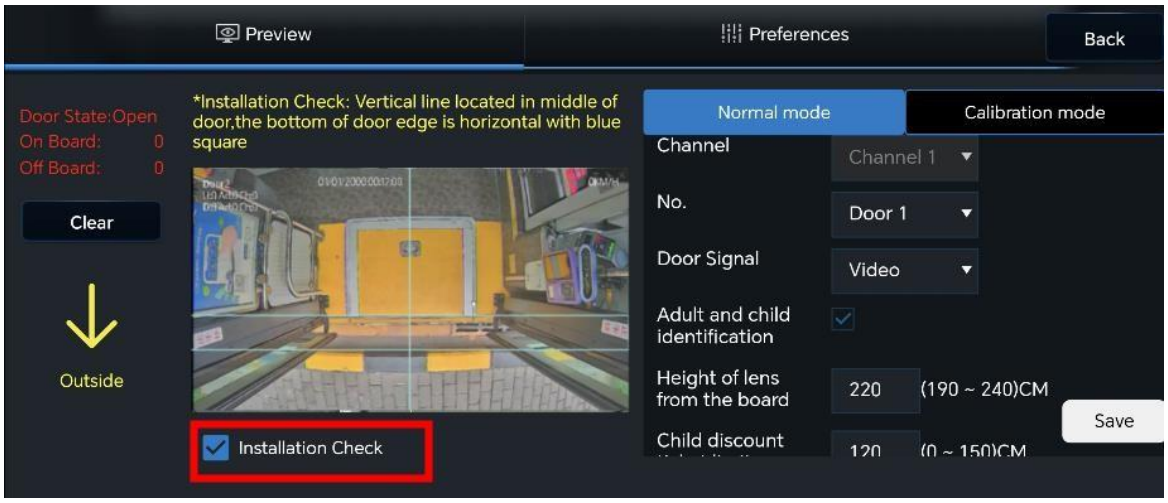


Figure 4.2.12 Installation Self-check Line

Calibration process:

<1>Switch to <Calibration Mode>, capture an image, and click on the image to calibrate. Remember to capture an image when no one is standing under the lens, and draw the calibration line. Images can be captured when the door is opened or closed for calibration.

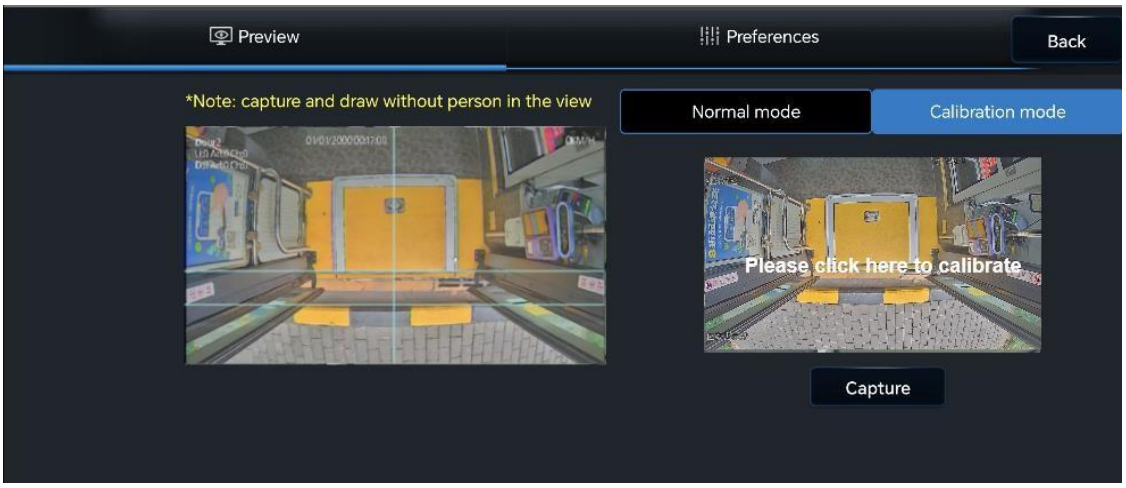


Figure 4.2.13 Capture Operation

<2>Move the calibration line to the lower edge of the vehicle door by clicking the button on the right. Please ensure that the installation is correct. The lower edge of the door is within the installation self-check line. Click **Save** to complete the calibration.

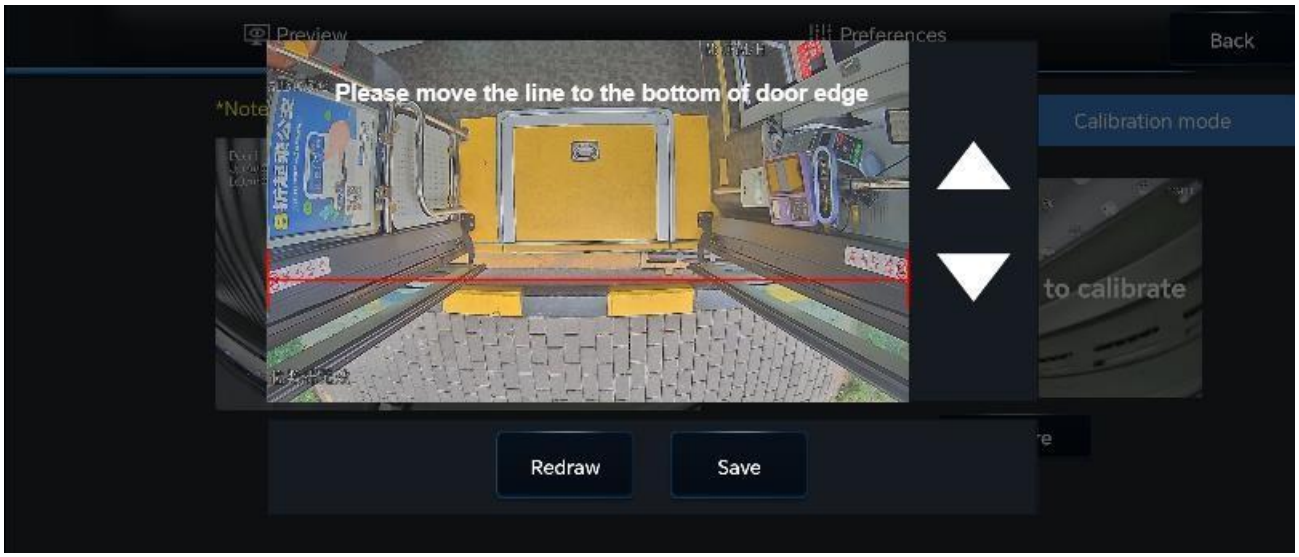


Figure 4.2.14 Calibration Operation

<3>After the calibration is completed, confirm whether the algorithm calibration line (red) in the left video in <Calibration Mode> is flush with the lower edge of the door.

The blue box is the recommended position of the lower edge of the door on the screen. If the

lower edge of the door exceeds the recommended range, the accuracy will decrease. The green box is the algorithm detection area.

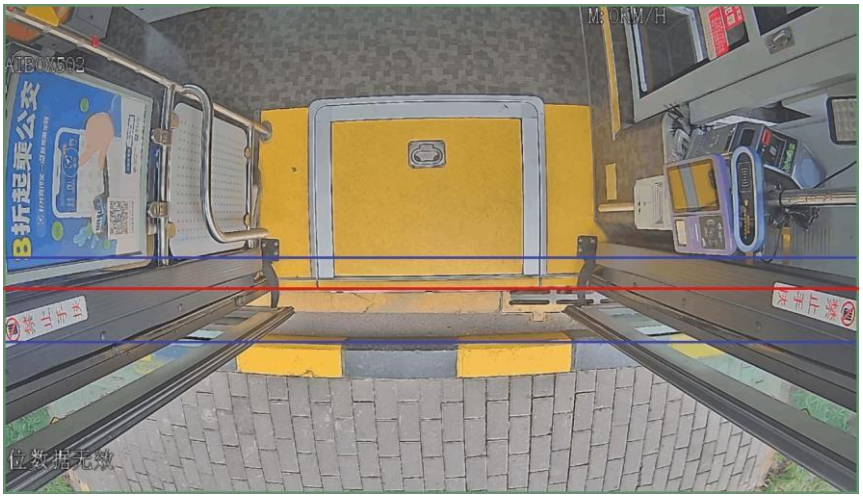


Figure 4.2.15 Algorithm Superposition in Calibration Mode

<4>After saving the configuration successfully, switch the passenger counter mode to "Normal Mode".

Description of special scenarios:

On the screen, there are seats with their backs against the windows, yet without baffles blocking them. The figure is as follows:

Figure 4.2.16 Description of Special Scenarios

<1>Click "Redraw".

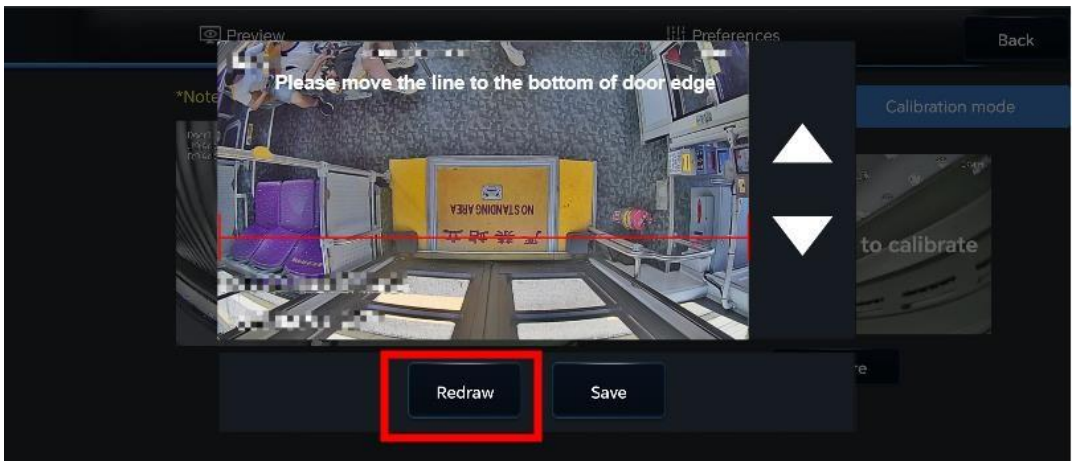


Figure 4.2.17 Modification of Calibration Line Range

<2>Draw a calibration line along the internal frame of the door, and click the button on the right to move the calibration line to the lower edge of the door.

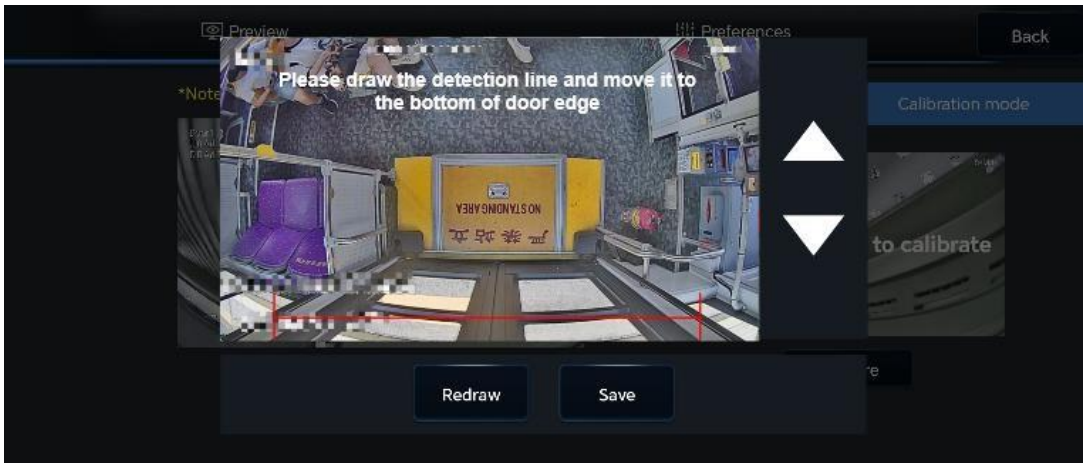


Figure 4.2.18 Door Internal Frame Position

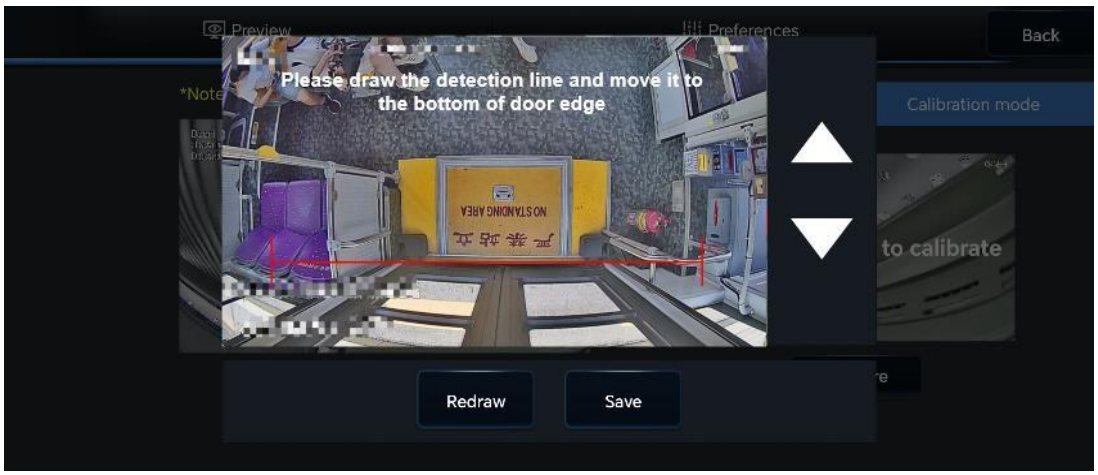


Figure 4.2.19 Calibration Completed

When the passenger counter is installed in the aisle, please contact technical service personnel for calibration operations.

4.2.7 Step 7. Confirm Status

After calibration is completed, switch the passenger counter mode to "Normal Mode". Carry out simulation tests of getting on and off the bus for the installed passenger counter respectively; under the premise of ensured opening of the door, the tests of getting on and off the bus are simulated ≥ 10 times each. Confirm whether the count of the passenger counter is consistent with

the actual number of times that passengers get on and off the bus.

The same goes to the calibration of the remaining doors and confirmation of the status.

4.3 Data Reporting

The passenger flow data is reported to the platform through the MDVR. The passenger flow data can be reported to the CB2 platform and the bus platform respectively. Configure the corresponding server in MDVR **Sever Setup.** As long as the configured MDVR of the passenger counter is normally connected and is online on the platform (CB2 and bus platform), the data of the passenger flow report can be viewed through the platform.

4.4 Passenger Flow Video

The P3 passenger counter channel can be bound to the MDVR IPC channel to preview and record the passenger flow in real time.

Search for passenger flow in **Surveillance - IPC Setup** of EasyCheck App. Select this passenger flow channel and bind it to the IPC channel, enabling to preview the passenger flow in real time. (Please make sure that the recording function of the IPC channel that needs to be bound is enabled).

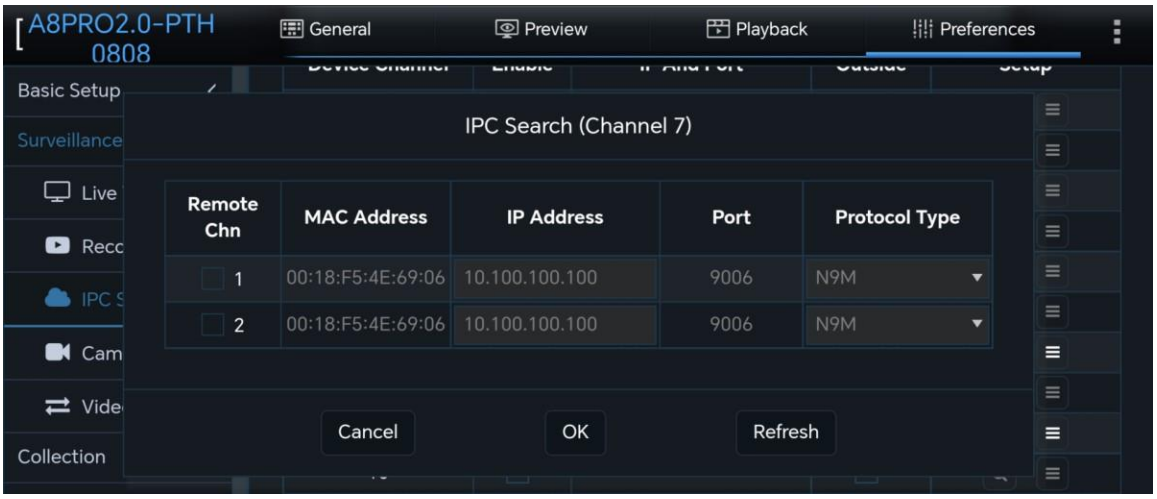


Figure 4.2.20 Check and Cleaning of IPC Passenger Flow Channel Binding

Clean up the installation site, collect and take away tools and waste separately, and put the original articles in the vehicle to their original place, and then the installation work ends.