MP3 Passenger Counter Installation and Commissioning Guide

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1. Product Introduction

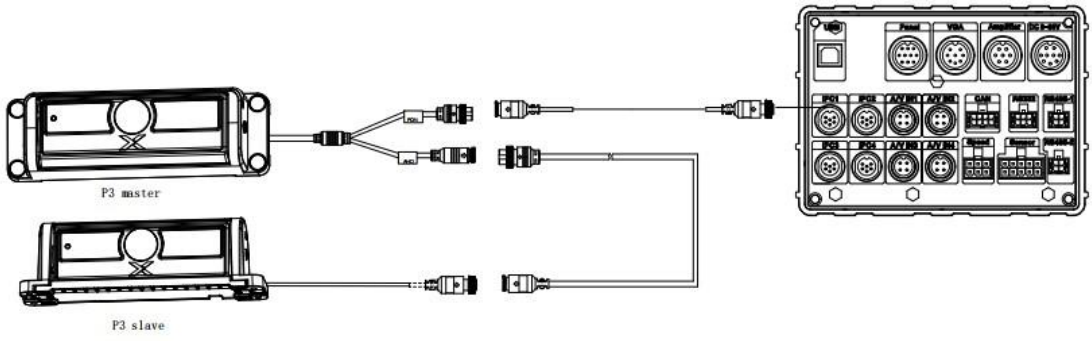
1.1. Overview

Leveraging the artificial intelligence algorithm, P3 is a professional on-board passenger counter. It can accurately identify the on and off directions of passengers, thereby accurately counting passengers getting on and off a vehicle. In addition, it can synchronize passenger flow data to the MDVR through the network interface. The MDVR uploads the passenger flow data to the

platform for analysis and statistics.

System Connection Diagram

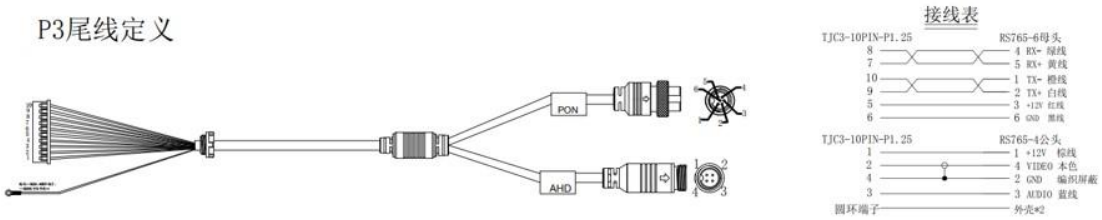
[Note] The P3 passenger counter has two forms: master and secondary slave. The master can be connected to the MDVR alone, while the slave must be connected to the master to work properly.



P3 master connects to the MDVR extension cable :
One 6PIN aviation male connector and one 6PIN aviation female connector

P3 slave connects to the extension cable of P3 master:
One 4PIN aviation male connector and one 4PIN avition female connector

1.2. Pigtail Cable Definition



2. Equipment Installation

2.1. Installation Tools

Since the on-board environment is special, the passenger counter must be installed in strict accordance with the standards. If you have any questions, please consult the relevant technical personnel.

Tool	Usage	Remarks
Measuring tools such as tape measure	Measure the height of the lens at the installation position of the passenger counter from the board.	The measurement of height information is configured upon the commissioning of the passenger counter. The height information has impact on the statistical accuracy of the algorithm.
Screwdriver, wire stripper, etc.	Installation tools	Prepare the tools in advance.
Horizontal angle measurement app	Measure the horizontal installation angle of the passenger counter.	Android: Search for "Measurement tool" to download. IOS: Search for "Measurement tool" in App Store to download.
Tool	Usage	Remarks

EasyCheck app	Provide UIs for commissioning the passenger counter.	Android: Search for "EasyCheck" to download. IOS: Search for "EasyCheck" in App Store to download.
EasyCheck	Commission the passenger counter when it is connected to the MDVR.	

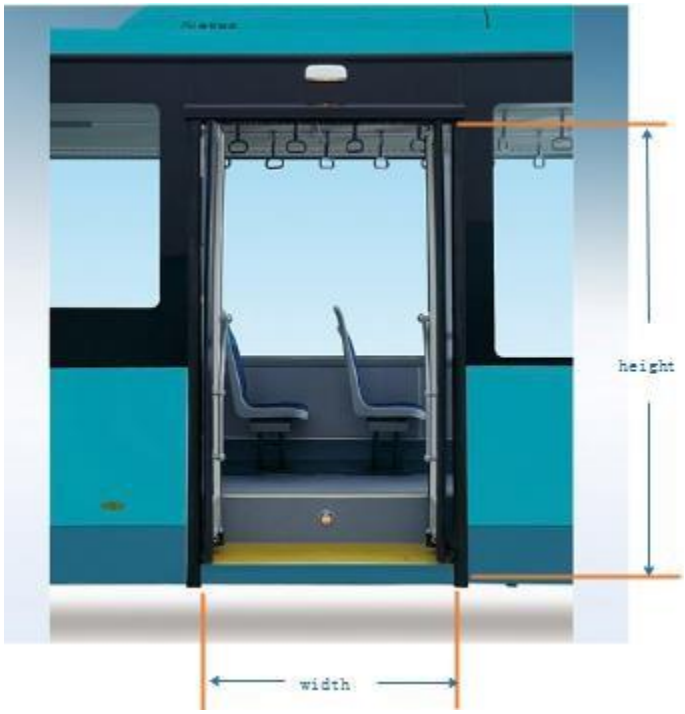
2.2. Installation Preparation

The passenger counter has certain requirements for the installation position and environment. Therefore, measure the installation position before and after installing the passenger counter. The preliminary data measurement is of great significance for evaluating the installation and commissioning of the passenger counter. After completing the relevant measurements, carefully fill out the **Passenger Counter Installation Information Collection Form V1.1** as required.

After the installation position of the passenger counter in a sample vehicle is confirmed, implement the installation and commissioning in the vehicles of the same model in accordance with the same standards.

2.2.1. Measurement Information Definition

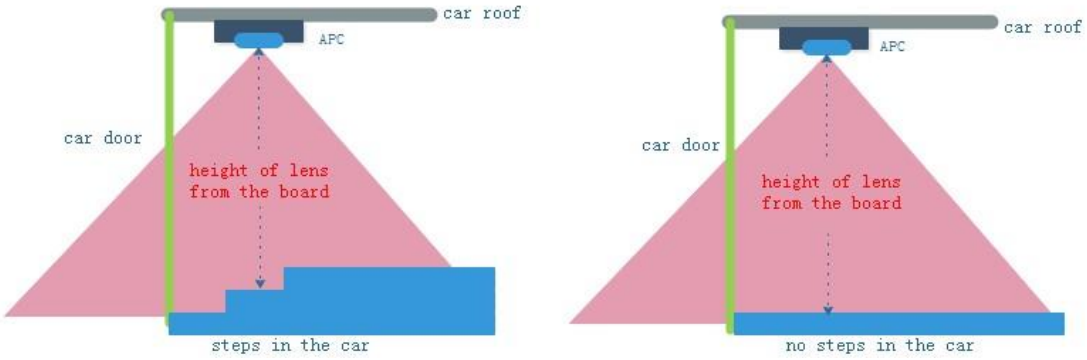
[Door height and width]: Indicate the maximum height and width of the door in the open state that allow a passenger to pass through.



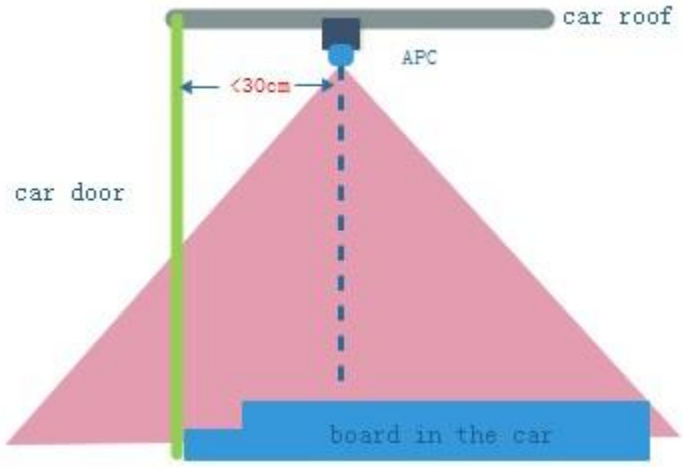
[Number of steps]: Indicate the number of steps for getting on the vehicle, as shown the following figure.

[Door opening/closing mode]: Indicate the door opening/closing mode, including pulse, level, and CAN signal.

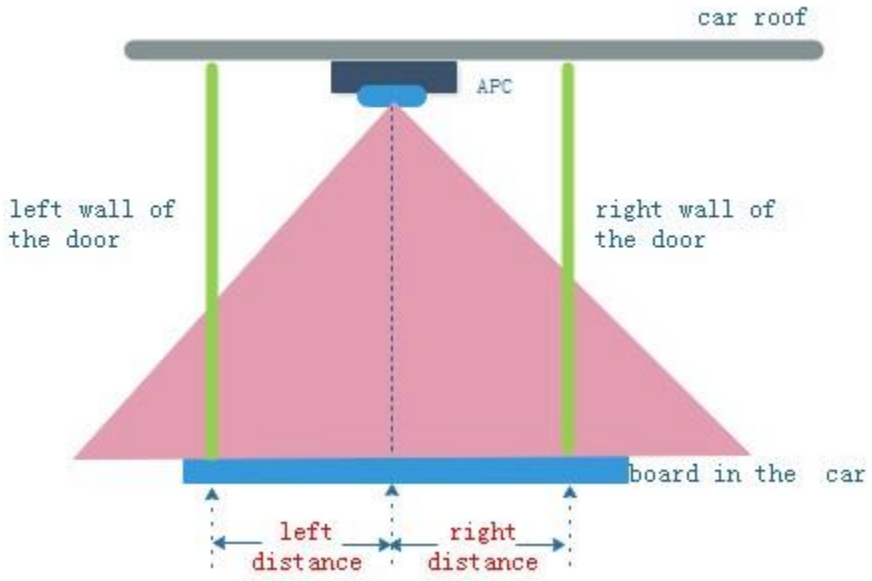
[Installation height of passenger counter]: Indicate the distance between the lens of the passenger counter and the step of the vehicle.



[Horizontal distance between passenger counter and edge of door]: Indicate the distance between the lens of the passenger counter and the edge of the door.



[Distance between passenger counter and left/right wall of door]: Indicate the distance between the lens of the passenger counter and the left/right wall of the door. If possible, install the passenger counter in the middle of the door.



Note: The above measurements are in the unit of centimeters (cm).

2.2.2. Installation Requirements

1) Only one passenger counter can be installed on a door.

2) The passenger counter is an intelligent IP camera and does not require additional power supply.

3) The height and width of the position where the passenger counter is installed should

be 1.9-2.4 m and 0.7-1.6 m respectively.

4) The passenger counter should be installed horizontally. If the installation conditions do not permit horizontal installation, ensure that the maximum error does not exceed ±5

degrees.

5） The passenger counter should be installed close to the edge of the vehicle body.

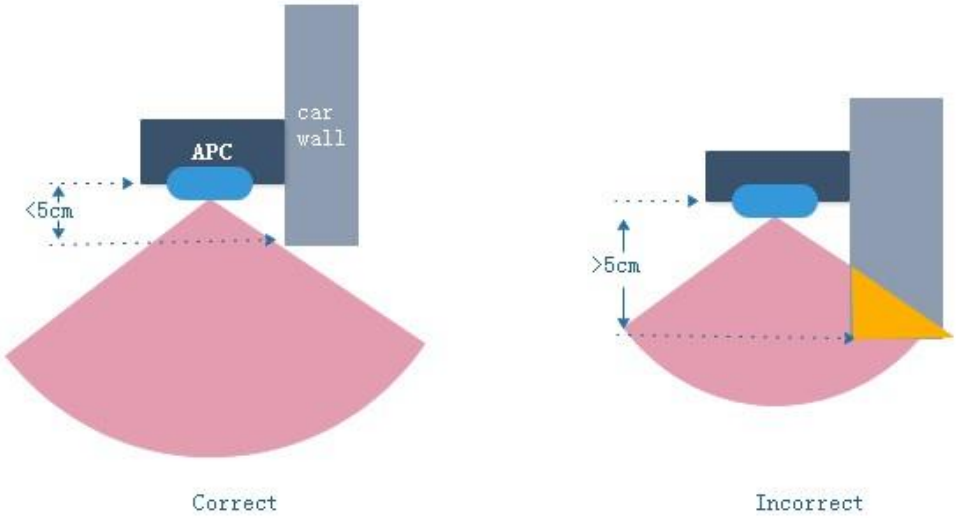
If the distance between the installation position and the vehicle edge is equal to

or greater

than 30 cm, contact the technical personnel for confirmation.

6） The passenger counter should be installed no more than 5 cm above the lower end of

the car wall .



7） The installation direction should be consistent with the direction indicated on the label

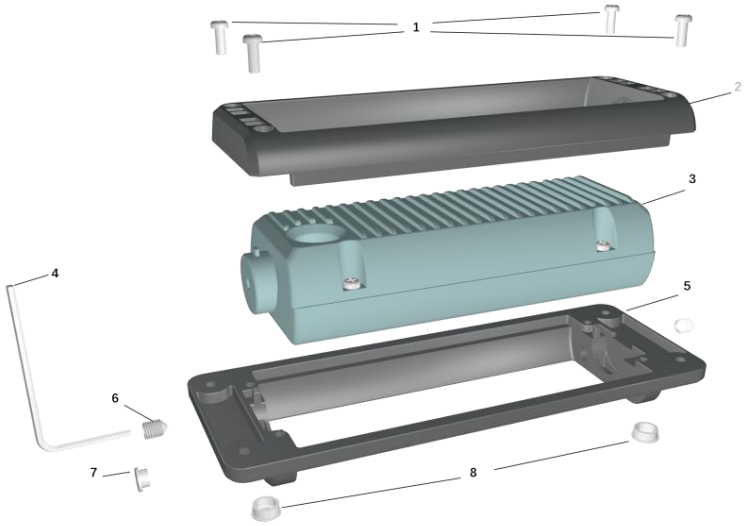
of the passenger counter.

2.3. Installation Modes

The passenger counter can be installed in three modes: built-in mounting, suspended-ceiling mounting, and side mounting. The actual installation mode should be selected according to the on-site air duct angle and position. The following mainly describes the structural diagrams and adaptation angles of the passenger counter with different installation modes.

2.3.1. Built-in Mounting Mode

In built-in mounting mode, the passenger counter can be adjusted up to 60 degrees to the outside of the vehicle.



1: Round head screw

2: Built-in bracket

3: Main body of passenger counter

4: Hex key

5: Built-in bracket base

6: M6 set screw

7: Plastic plug

8: Plastic screw plug

Figure_2.3_1 Structural diagram of suspended-ceiling mounting mode

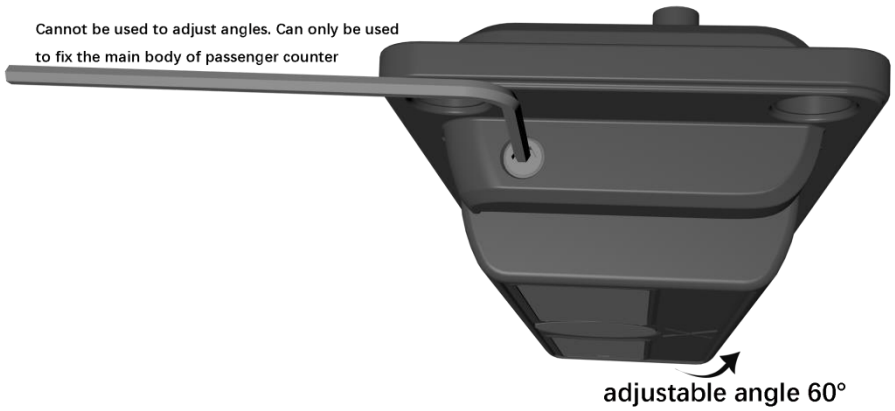


Figure_2.3_2 Adjustable angle of P3 built-in bracket

Unit: mm

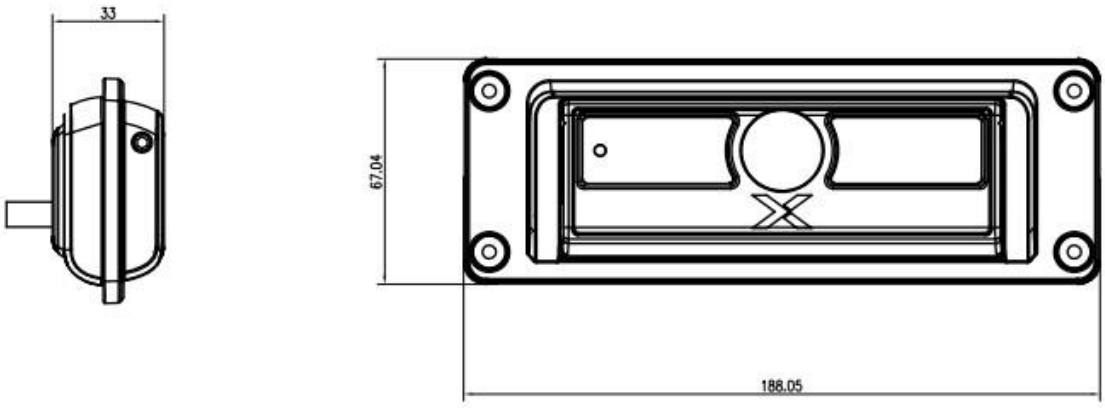


Figure_2.3_3 Dimensions of P3 built-in bracket

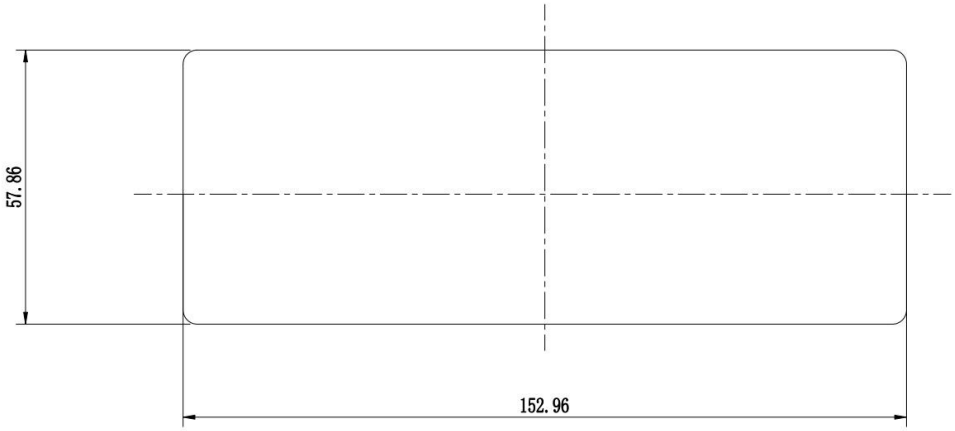
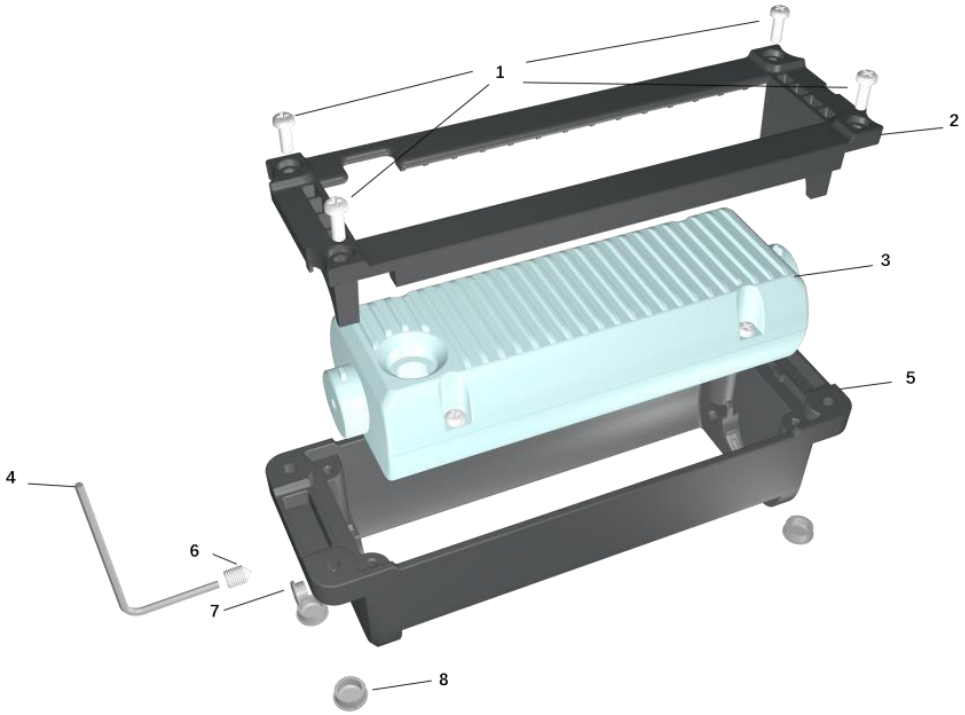


Figure_2.3_4 Built-in mounting reserves space for holes

2.3.2. Suspended-ceiling Mounting Mode

In suspended-ceiling mounting mode, the passenger counter can be adjusted up to 60 degrees

to the outside of the vehicle.



1: Round head screw

2: Suspended-ceiling mounting bracket base

3: Main body of passenger counter

4: Hex key

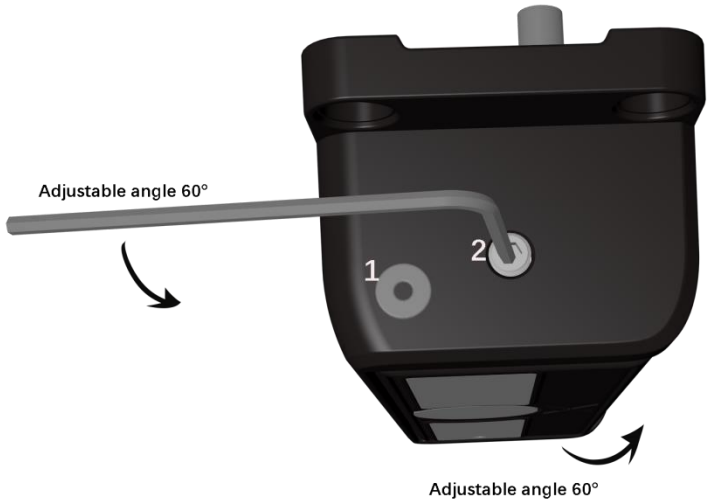
5: Suspended-ceiling mounting bracket

6: M6 set screw

7: Plastic plug

8: Plastic screw plug

Figure_2.3_4 Structural diagram of P3 suspended-ceiling mounting mode

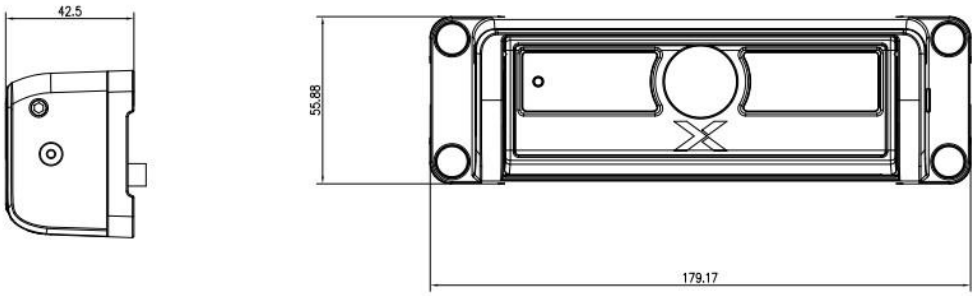


Hole 1: to fix the main body of passenger counter

Hole 2: to adjust the angle of passenger counter's main body

Figure_2.3_5 Adjustable angle of P3 suspended-ceiling mounting bracket

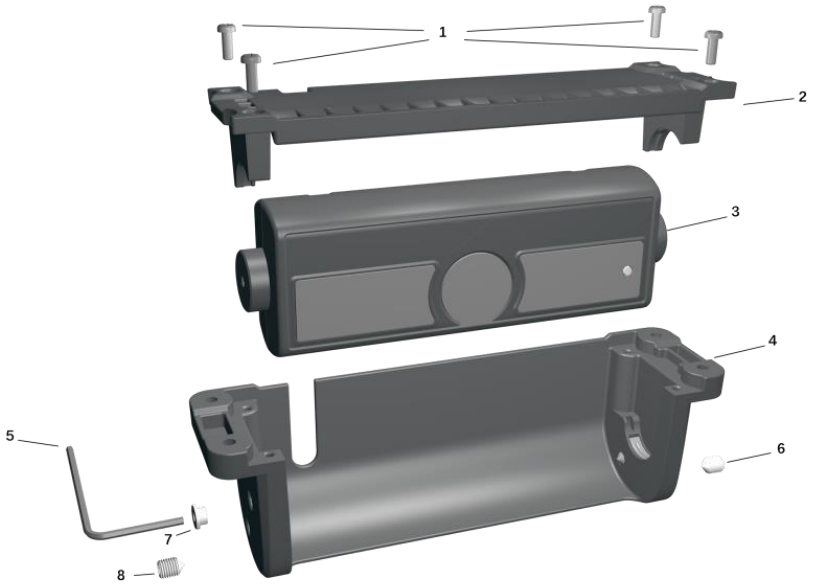
Unit: mm



Figure_B_2.3_6 Dimensions of P3 suspended-ceiling mounting bracket

2.3.3. Side Mounting Mode

In side mounting mode, the passenger counter can be adjusted up to 10 degrees to the inside of the vehicle and 30 degrees outside of the vehicle.



1: Round head screw

2: Side mounting bracket base

3: Main body of passenger counter

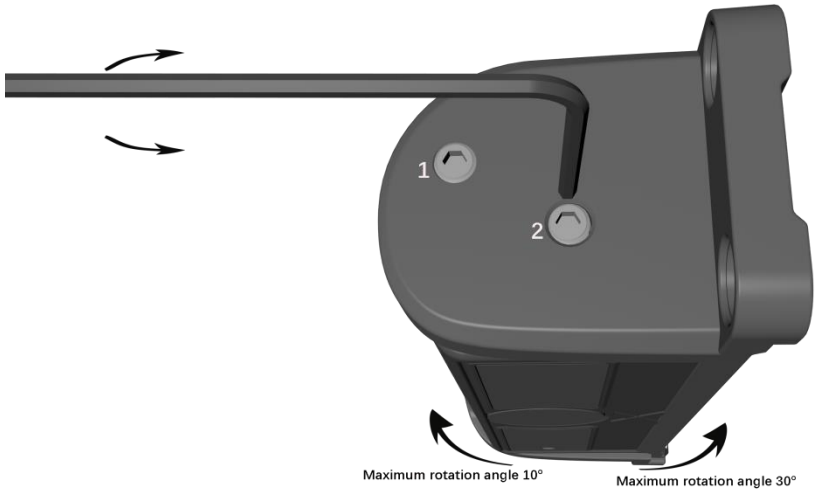
4: Side mounting bracket

5: Hex key

6: M6 set screw

7: Plastic plug

Figure_2.3_7 Structural diagram of P3 side mounting mode



Hole 1: to fix the main body of passenger counter

Hole 2:to adjust the angle of passenger counter's main body

Figure_2.3_8 Adjustable angle of P3 side mounting bracket

Unit: mm

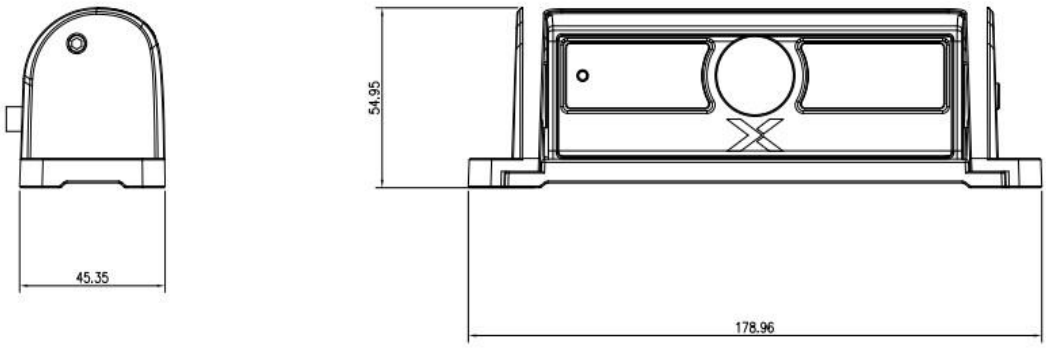


Figure_2.3_9 Dimensions of P3 side mounting bracket

2.4. Implementing the Installation

Select the position and mode for installing the passenger counter according to actual measurement results.

★ Connecting the MDVR to the door opening/closing signal sensor: Ensure that the MDVR connected to the passenger counter is properly connected to the door opening/closing

signal sensor.

★ Connecting the passenger counter to the MDVR: Ensure that the master of the passenger counter is properly connected to the MDVR through a 6PIN extension cable. For details

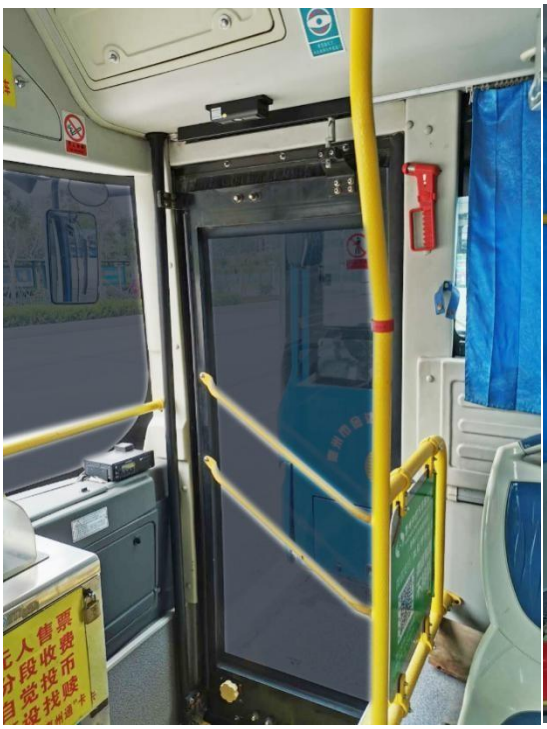
about the connections, see section 1.2 "System Connection Diagram."

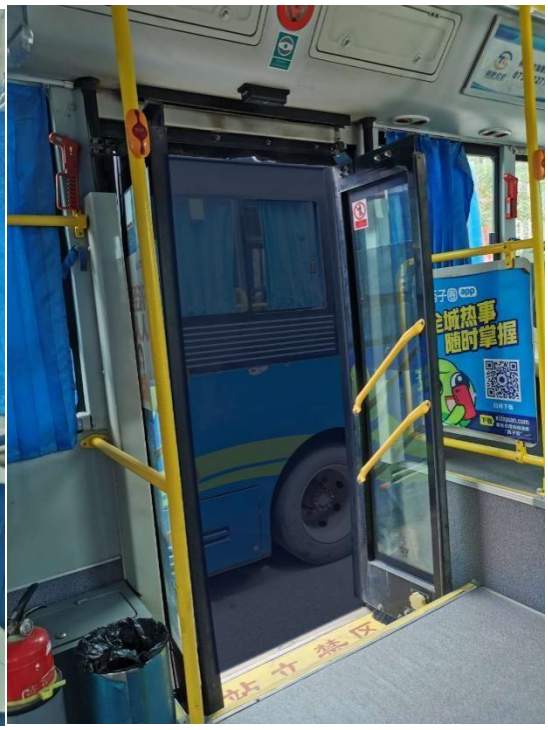
★ Connecting the primary and secondary hosts of the passenger flow meter: If the secondary host is adopted, ensure that the primary and secondary hosts the passenger flow meter are properly connected through a 4-pin extension cable. For details about the connections,

see section 1.2 "System Connection Diagram."

★ After the installation position of the passenger counter in a sample vehicle is confirmed, implement the installation and commissioning in the vehicles of the same model in accordance with the same standards.(according the installation postion of sample vehicle

and passenger counter’s angle scale after adjusting)





2.5. Confirming the Installation

After the equipment is installed, check as follows:

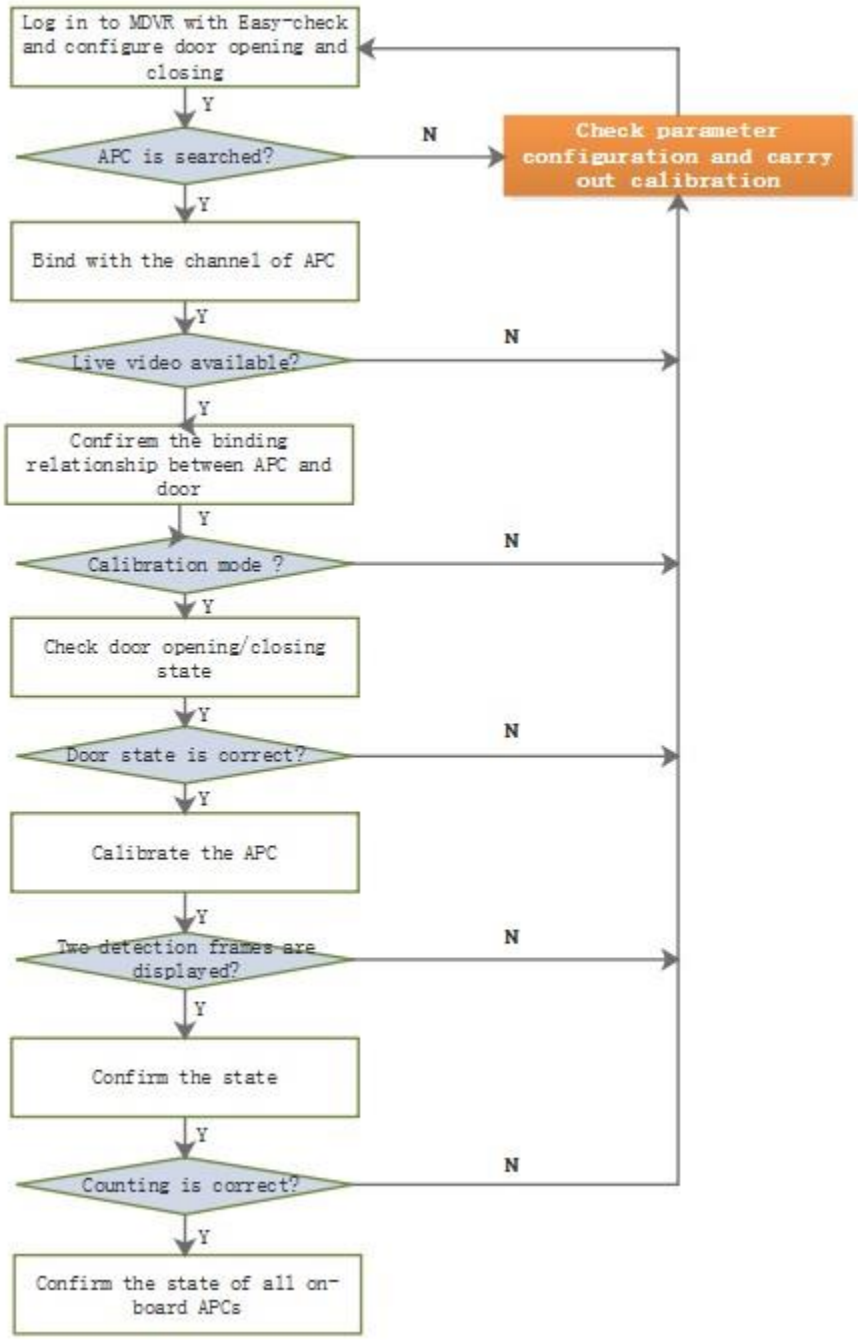
★ Block the passenger counter by hand. If the IR fill-in light is normally turned on, the passenger counter is normally powered on.

★ Ensure that the protective film on the lens of the passenger counter is removed.

★ Ensure that the software version is the latest.

3. Commissioning and Calibration

3.1. Calibration and Confirmation Procedure



3.2. Calibration Procedure

3.2.1. Step 1: Log in to the Mobile Easy Check System and configure the door

opening/closing signal sensor

1) Insert the Mobile Easy Check System hardware into the MDVR. Open the Mobile Easy Check System app and search for the specified equipment. The equipment name is the vehicle plate number. If no vehicle plate number is configured, search for the equipment by equipment SN.

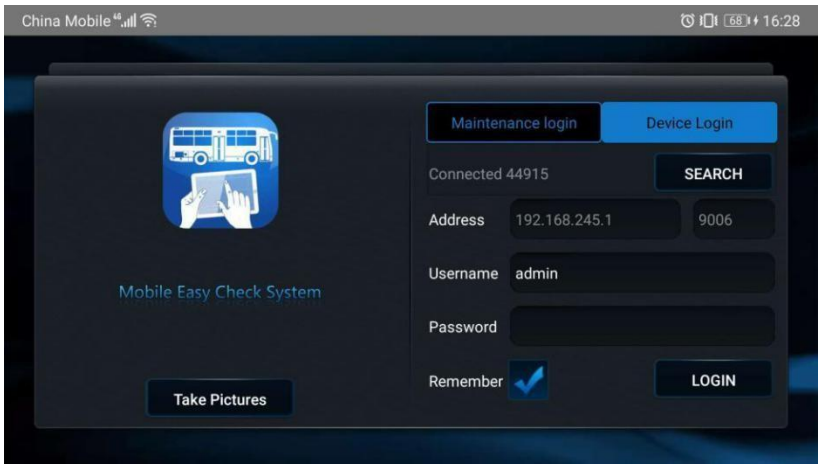


Figure_3.2.1 Login UI of the Mobile Easy Check System

2) The door opening/closing is triggered by level. Generally, the high level indicates the door opening signal, and the low level indicates the door closing signal. One door only corresponds to one signal cable. The door opening and closing is controlled by the same button.

On the Mobile Easy Check System, choose Preferences > Collection > General > Sensor, and set the door opening/closing sensor.

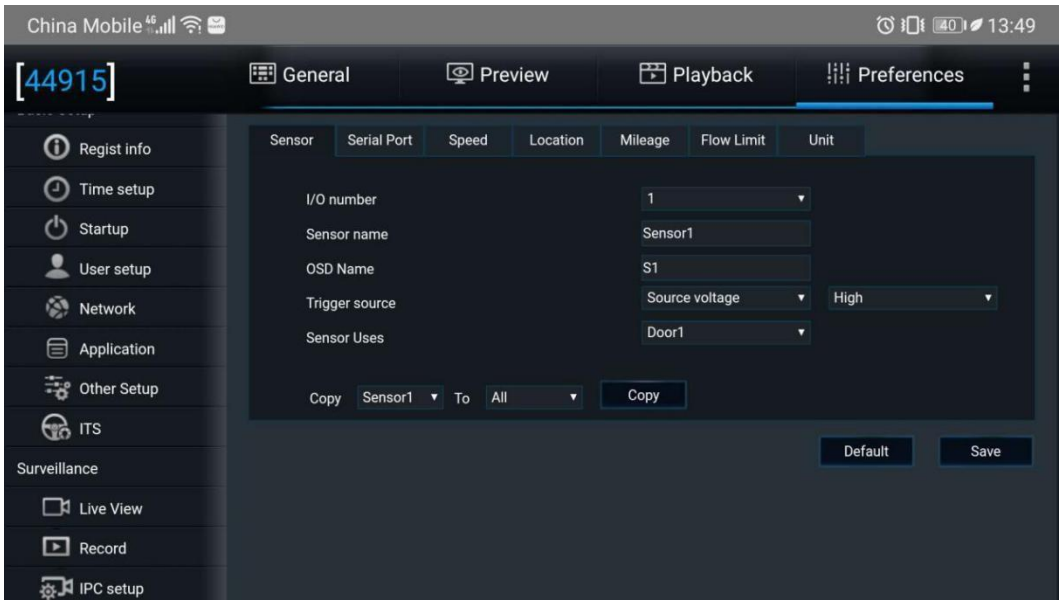


Figure_3.2.2 Door opening/closing I/O level configuration

Figure_3.2.2 shows that the I/O_1 of MDVR is set to be trigged by high level, used to detect the door opening/closing signal of door 1. Make more I/O configurations based on the preceding method.

3) The door opening/closing is trigged by pulse. Generally, two pulses are required for controlling the door opening and closing respectively. One door should be connected to two signal cables, and door opening and closing is controlled by two buttons.

On the Mobile Easy Check System, choose Preferences > Collection > General > Sensor, and set the door opening/closing sensor.

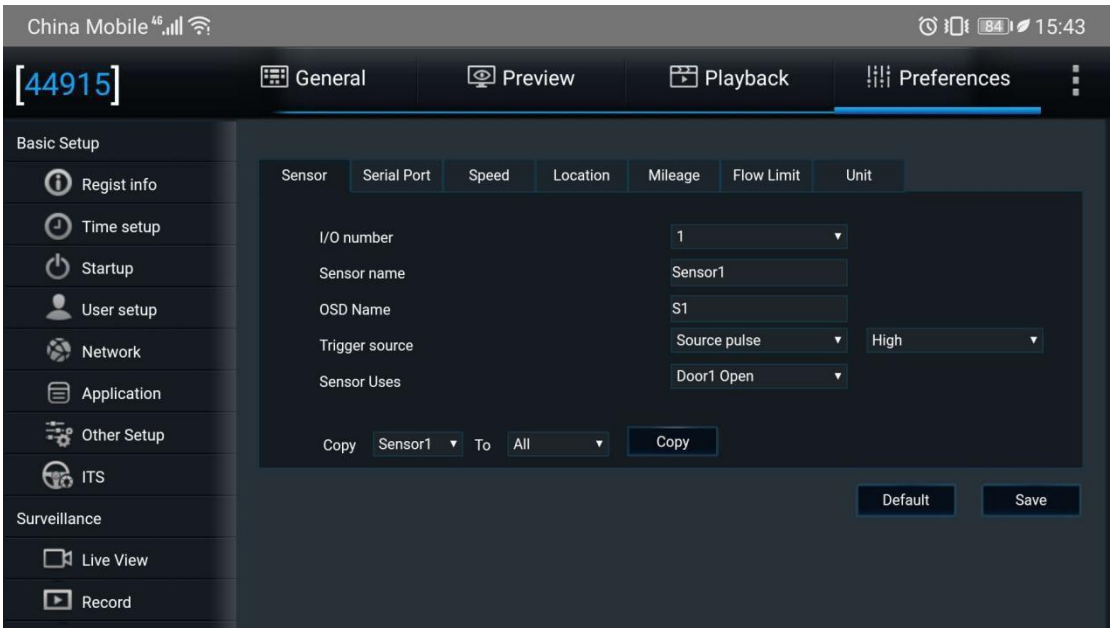


Figure_3.2.3 Door opening/closing configuration (pulse)

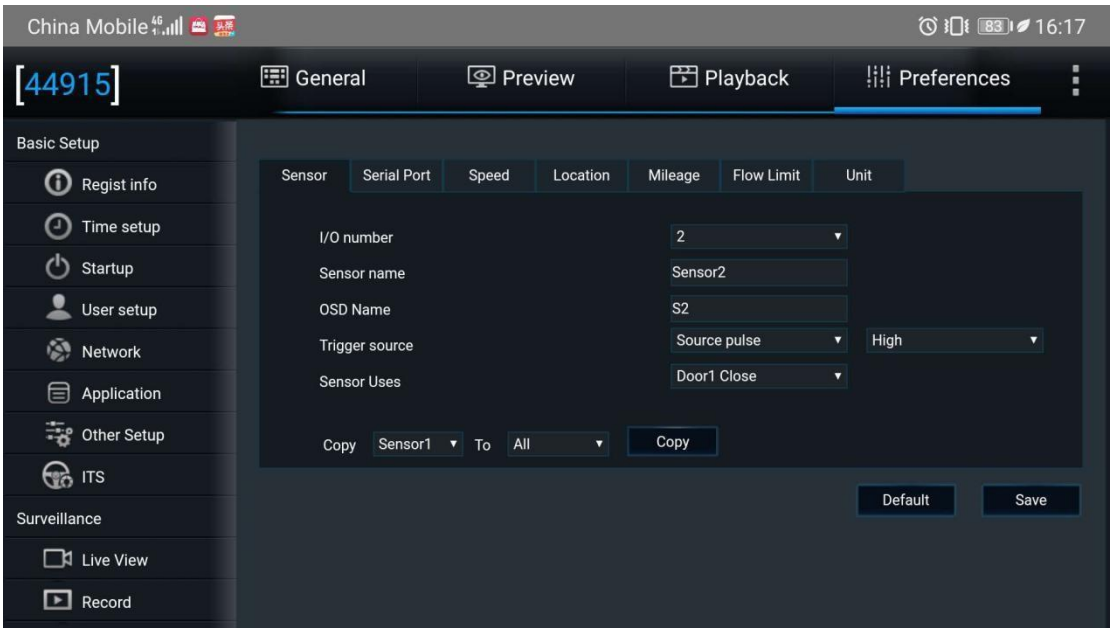


Figure_3.2.4 Door opening/closing configuration (pulse)

Figure_3.2.3 shows that the I/O_1 of MDVR is set to be trigged by high pulse, used to detect the door opening signal of door 1.

Figure_3.2.4 shows that the I/O_2 of MDVR is set to be trigged by high pulse, used to detect the door closing signal of door 1.

Make more I/O configurations based on the preceding method.

4) The door opening/closing is trigged by CAN signal. When the CAN signal trigger mode is adopted, contact Meriva Technology technical personnel.

3.2.2. Step 2: Bind the channel of the passenger counter

On the Mobile Easy Check System, choose **Preferences** > **Collection** > **Advanced** > **Network**, and set the devices. Map devices 1–8 with passenger flow meters 1–8 through configuration.

Set the function type to passenger flow statistics and the sub-type to Door 1 – Door 8. Click  . Search and view all passenger counters connected to the MDVR. P3 passenger counter supports both master and slave mode. The IP address and MAC address of the master and slave are the same. The master and slave are differentiated based on the channel, that is, channel 1 or channel 2. Channel 1 corresponds to the master and channel 2 corresponds to the slave (when the passenger counter is not connected, the slave channel will not be displayed after you search the IP address). Select the desired channel and click to save. In this way, the

passenger counter is bound with the device and the actual door position. If device 1

corresponds to door 1, the passenger counter is actually installed on the first door of the vehicle.

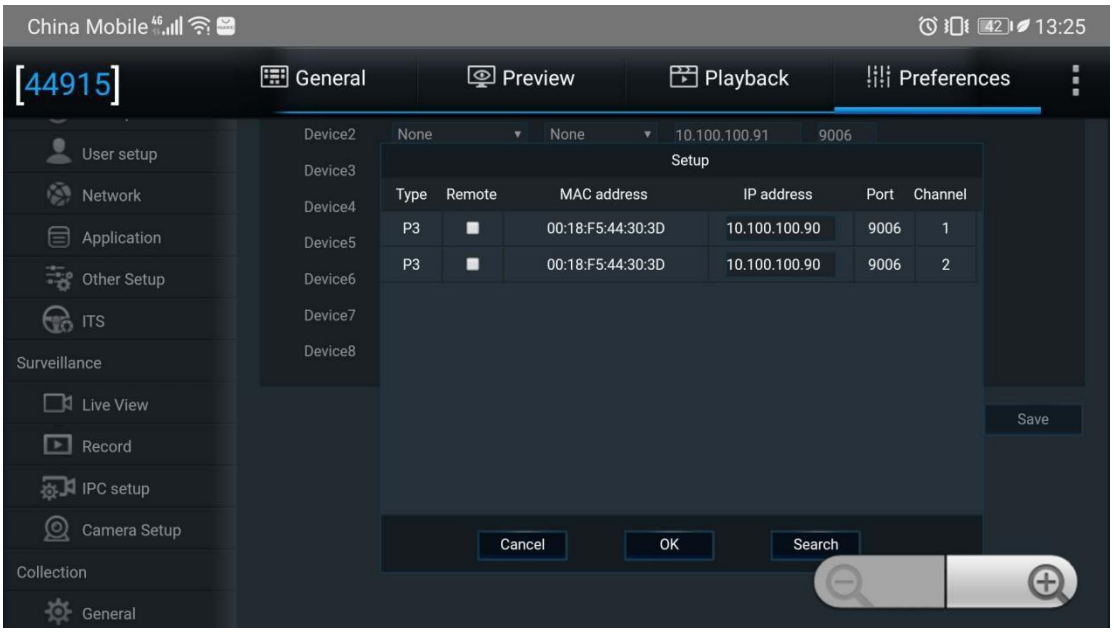


Figure_3.2.5 I/O passenger counter search

Figure_3.2.5 shows that only one P3 master is connected to the MDVR and it is also connected to the slave. Channel 1 is connected to the master and channel 2 is connected to the slave. You

can select a channel to bind with the device.

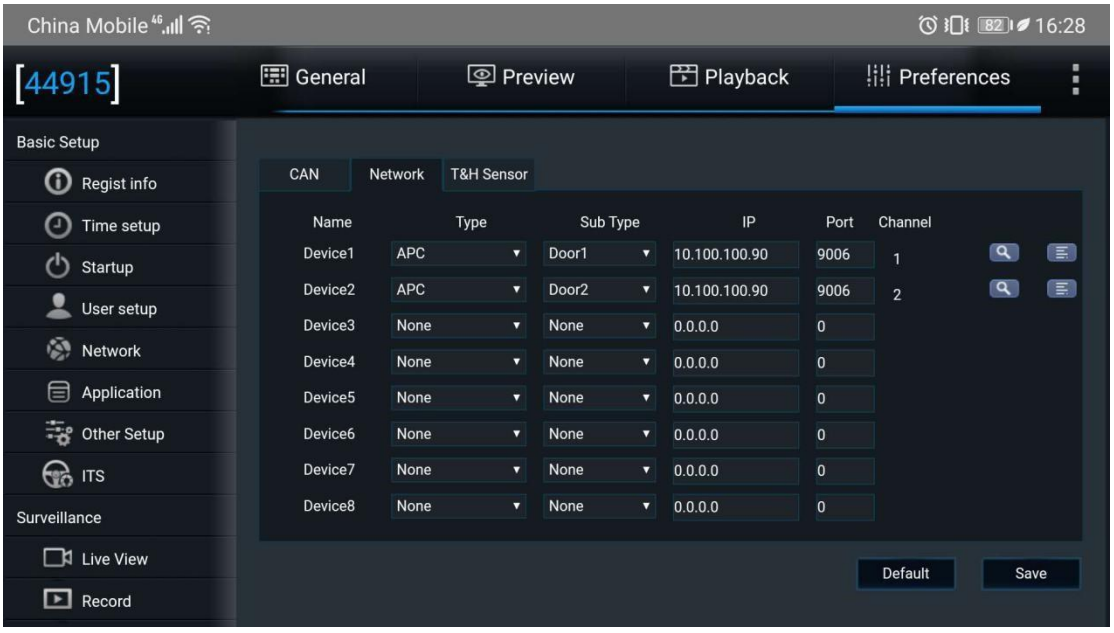


Figure_3.2.6 I/O passenger counter binding

As shown in Figure_3.2.6, configure to make device 1 correspond to door 1 as well as passenger flow channel 1 (channel of the master). Configure to make device 2 correspond to door 2 as well as passenger flow channel 2 (channel of the slave).

After configuring the passenger counter, you should clearly understand the door opening/closing signal that controls the passenger counter and the corresponding device SN (ranging from 1 to 8). Check the door opening/closing configuration in step 1.

3.2.3. Step 3: Confirm the binding relationship between the passenger counter and the door

After the passenger counter is bound with the door, choose **Preferences** > **Collection** > **Advanced** > **Network** and click  to log in to the passenger counter. The passenger counter after login must be in "common mode", as shown in Figure_3.2.7. Otherwise, you need to confirm the parameter configuration. Confirm the login passenger counter by IP address and channel No. To log in to the desired passenger flow meter, click the corresponding network device icon. You can view the live video of the passenger counter in the following figure. Confirm that the passenger counter corresponds to the specified door based on the live video. Door 1 corresponds to the front door, and door 2 corresponds to the rear door.

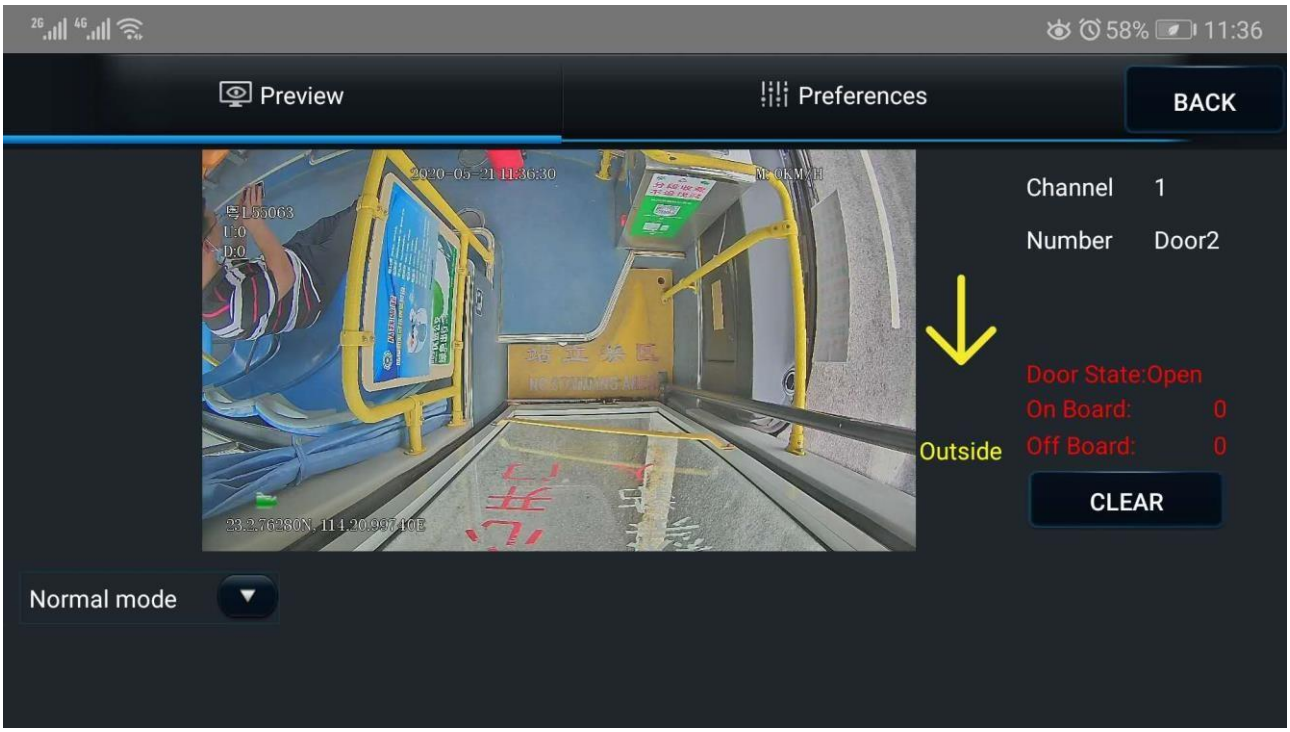


Figure_3.2.7 Default login UI of the passenger counter

★ You can check whether the door position is consistent with the actual installation position of the passenger counter based on the live video of the passenger counter. It is strongly recommended to configure the passenger counter in sequence. The first I/O of the MDVR is used to receive the door opening/closing signal of door 1, and the passenger counter is

installed on door 1. Configuration in sequence eases the understanding and O&M.

★ By default, the passenger counter is in common mode after login. If it is in calibration mode,

the O&M personnel may fail to switch the mode. In this mode, the passenger flow information will not be reported to the MDVR. Therefore, pay attention to the mode after

login.

3.2.4. Step 4: Check the door opening/closing state

Log in to the specified passenger counter through the Mobile Easy Check System. Open and close the door.

When the door is open or closed, check whether the corresponding door state is open or closed on the Mobile Easy Check System. If the displayed state is inconsistent with the actual state, check the door opening/closing configuration in step 1. Check the door state according to Figure_3.2.7.

3.2.5. Step 5: Calibrate the passenger counter

Enter the calibration mode. There are two ways to calibrate the passenger counter, namely, detection frame calibration and parameter calibration. The two calibration modes do not affect each other, and only one calibration mode is needed for actual calibration. The actual calibration mode depends on the one when the O&M personnel save and exit last time. Basic operations: Generally, the detection frame calibration mode is adopted for vehicles that are clearly marked "No standing area" (highlighted in yellow for some vehicles). The parameter calibration mode is adopted for vehicles in other models.

I. Detection frame calibration

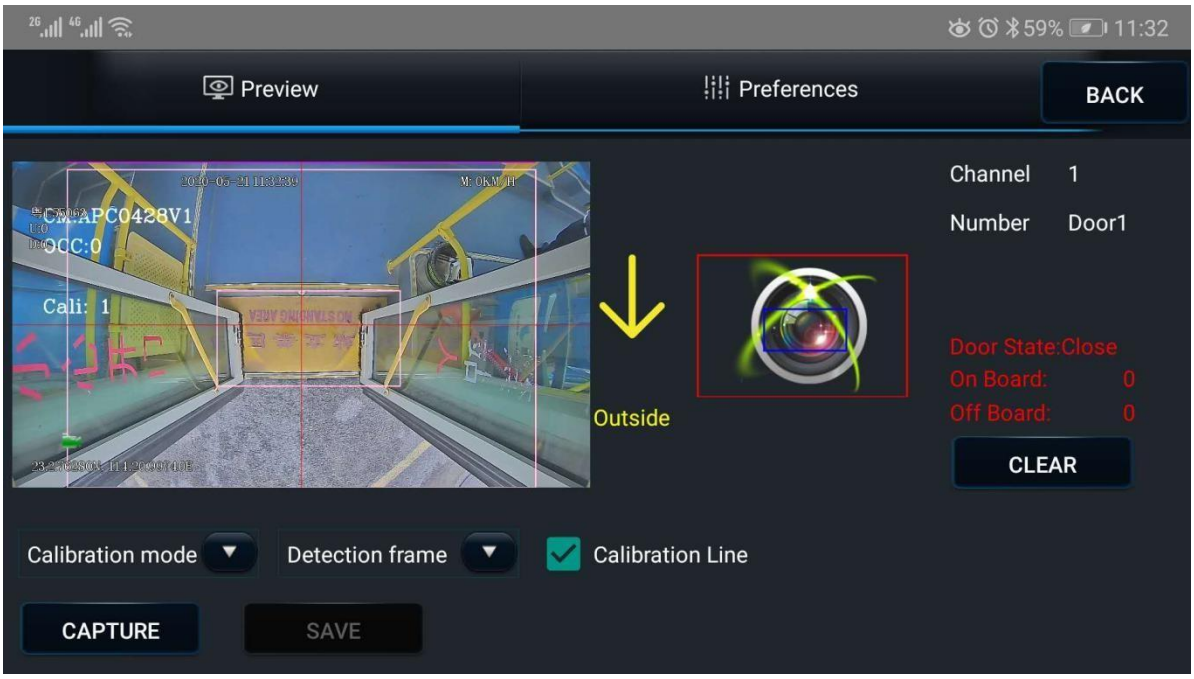


Figure_3.2.8 Detection frame calibration UI

Calibration procedure:

<1> Capture a photo when the door is open or closed.

<2> Draw a detection frame as prompted by the app. Draw a blue frame (no standing area of the vehicle). Save the frame and then draw a red frame (passenger flow detection area).

<3> Save the frame and switch the passenger counter mode to "common mode". **II. Parameter calibration**

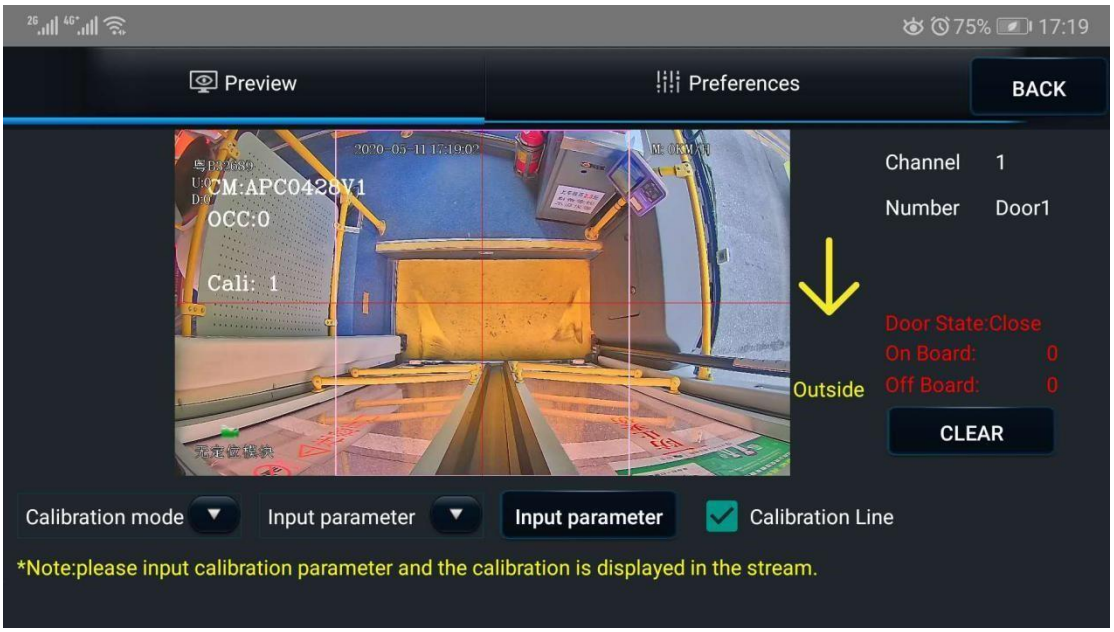


Figure_3.2.9 Parameter input UI for calibration

Calibration procedure:

<1> Ensure that the measurement for installation preparation in section 2.2 is completed.

<2> Fill out Figure_3.2.10 based on the information collected in the 《Passenger Counter Installation Information Collection Form V1.1.XLSX》。

<3> Save the frame and switch the passenger counter mode to "common mode".

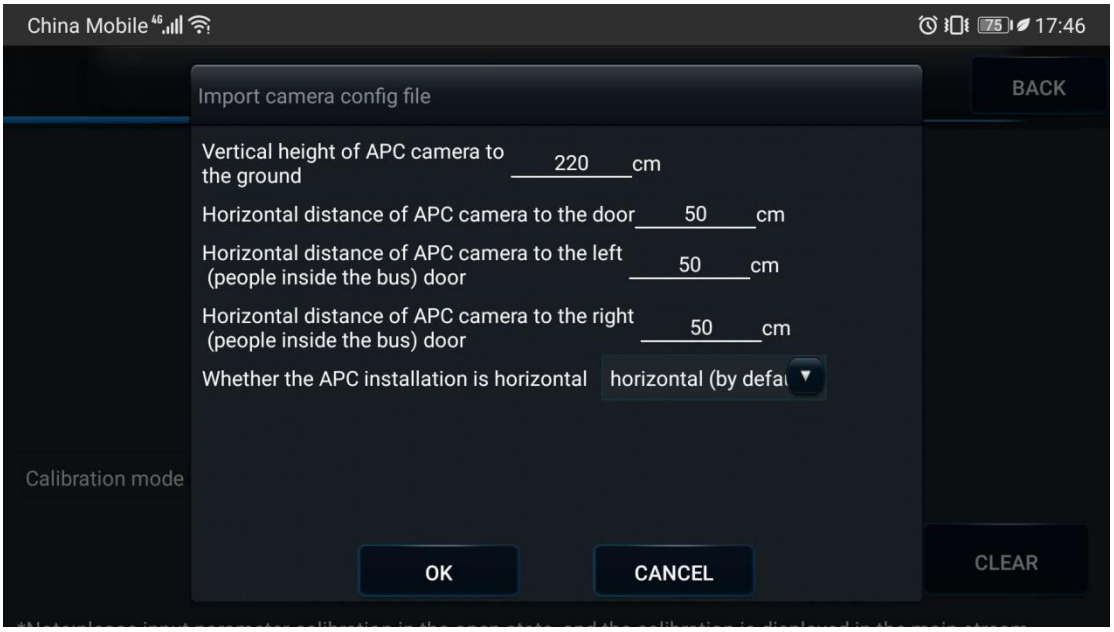


Figure_3.2.10 Parameter values for calibration

Parameter value range:

Distance between lens and ground: 190–240 cm

Distance to door edge: 1–100 cm

Distance to left door: 1–100 cm

Distance to right door: 1–100 cm

3.2.6. Step 6: Confirm the state

After the calibration is completed, switch the passenger counter to the "common mode". Carry out simulation tests on the installed passenger counter. Ensure that the door is in the open state. Simulate the passenger getting on and off the vehicle for 10 times or more. Check whether the count of the passenger flow meter is consistent with the number of passengers getting on/off the vehicle.

Carry out calibration and state confirmation of other doors in the same method.

4. .Data Reporting

The passenger flow statistics is reported to the platform through the MDVR. The passenger flow statistics can be reported to the CB2 platform and YUN Bus platform respectively. The corresponding server can be configured in **Network** of the MDVR. You can view the passenger flow statistics on the platform as long as the MDVR that is normally connected to the passenger counter and configured gets online on the platform (CB2 platform or YUN Bus platform).

5. .Passenger Flow Video

You can preview and record passenger flow in real time by binding the channel of the P3 passenger flow counter with the IPC channel of the MDVR.

Search for the passenger counter in **Surveillance** > **IPC set**. Select the IPC channel bound with the channel of the passenger counter to preview the passenger flow in real time. (Ensure that the recording function of the bound IPC channel is enabled.)

Figure_5.1 Binding with the IPC channel