FTDC-ADP-4CH Installation Sheet

As a professional, user-friendly and cost-effective dash camera with built-in AI processor, Fleetly FTDC-ADP-4CH detects risky driving events such as lane departure warning, forward collision warning and headway monitoring warning, as well as unsafe driving behaviors such as unfastened seatbelt, using mobile phones, yawning, distraction and smoking.

Preface

This FTDC-ADP-4CH Solution Installation Guide is hereby prepared to better guide engineering personnel to install FTDC-ADP-4CH and its accessories properly and quickly, and to improve installation efficiency.

This document mainly includes the following parts: preface, system overview, and preparation for installation, introduction to installation, and acceptance and cleaning. This document is applicable to installation engineering personnel.

Fleetly reserves the right of final interpretation of this document and the right to modify this document or information and descriptions therein. The contents of the manual are subject to change without further notice.

Important Notice

1. Before installation, please park the vehicle on the horizontal ground and shut down the engine (do not park the vehicle on a ramp or an inclined road).
2. Please read the section of packing list carefully and check carefully at the time of unpacking.
3. Please read the section of tool list carefully and provide installation tools before product installation.
4. Before installation, please observe the vehicle environment and follow the principles below:
    a. The installation position and cabling of the product shall neither affect the driver's view nor affect the adjustment of the rearview mirror and sun visor.
    b. The lens for monitoring the road condition ahead of the vehicle must be within the working range of the windshield wiper.
    c. The installation position of the camera for monitoring the driver in the vehicle shall comply with local regulations.

d. The installation location should be convenient for Micro SD card and SIM card replacement and maintenance.

5. The appropriate installation position shall be selected according to the vehicle environment, and this document is for reference only.
6. The appropriate power supply connection method shall be selected according to the vehicle environment. **If loose wire connectors are adopted, connection to the power supply and all signal cables of vehicle is required, and shall be carried out by specialized personnel, as it may be dangerous for non-specialized personnel to operate the power system of the vehicle without authorization.** This document is for reference only.
7. In case of any problem in the installation for special vehicles, please contact the product supplier in time for support.

1. System Overview

1.1 Product Overview

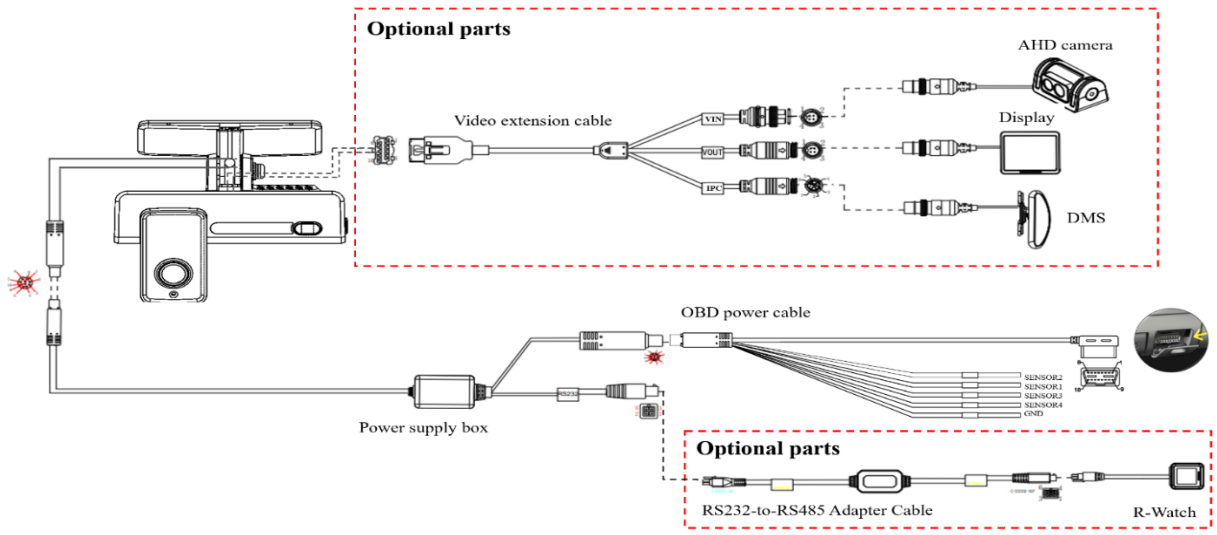
FTDC-ADP-4CH is an AI dashcam that helps drivers to reduce traffic accidents and facilitates fleets to improve management efficiency. Based on AI technology, it can actively detect risky driving events and unsafe driving behaviours, supporting sending local real-time reminders to the driver to avoid risks and uploading events to the fleet management platform for driver training. It transmits real-time and accurate vehicle position information and operation data to the fleet management platform. It provides high-quality remote intercom and video live view playback to make the fleet management easier and more efficient.

There are two models for FTDC-ADP-4CH, namely, the dual-lens model and single-lens model. For the single-lens one, the lens for cockpit monitoring is removed, while the rest of the structure maintains identical.

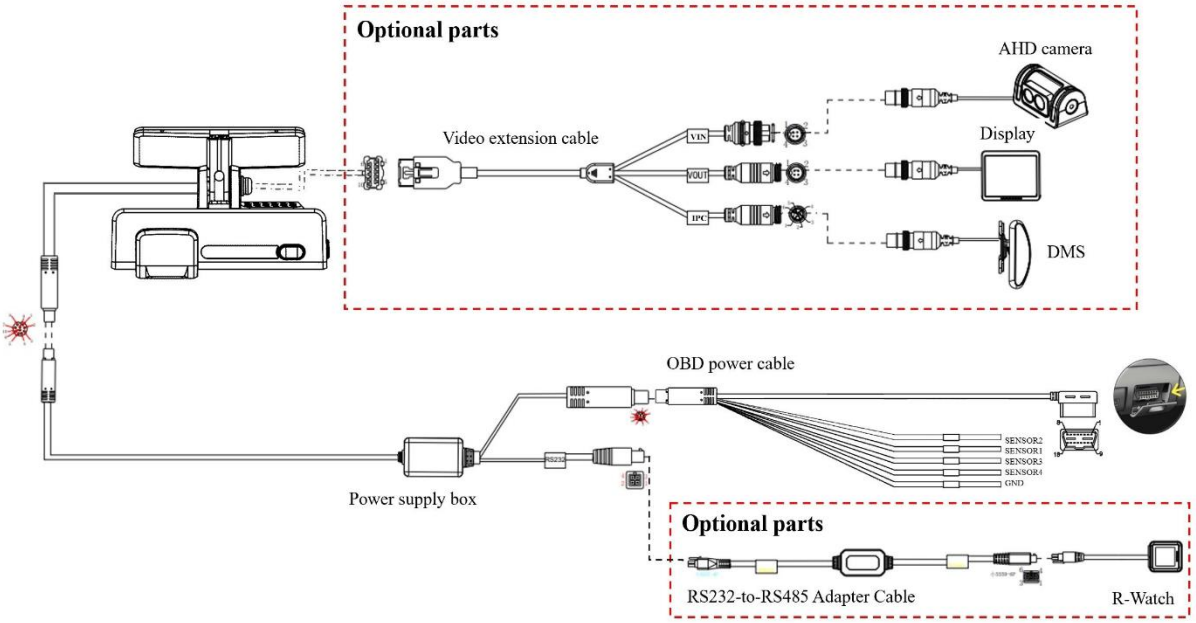
The product is suitable for most weather conditions such as day and night, sunny and rain, and can be installed on buses, taxis, ordinary passenger cars, passenger vehicles, freight vehicles, dangerous goods transport vehicles, school buses, dump trucks, sanitation vehicles, and other vehicles.

1.2 Schematic Diagram of System Connection-Power Supply through OBD

- Dual-lens model

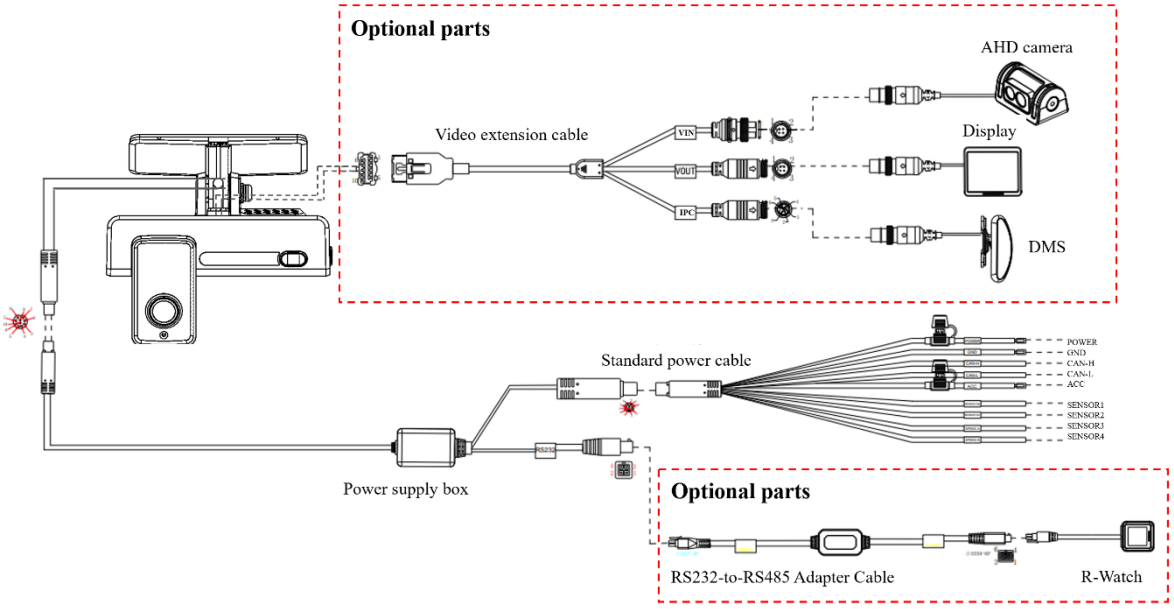


● Single-lens model

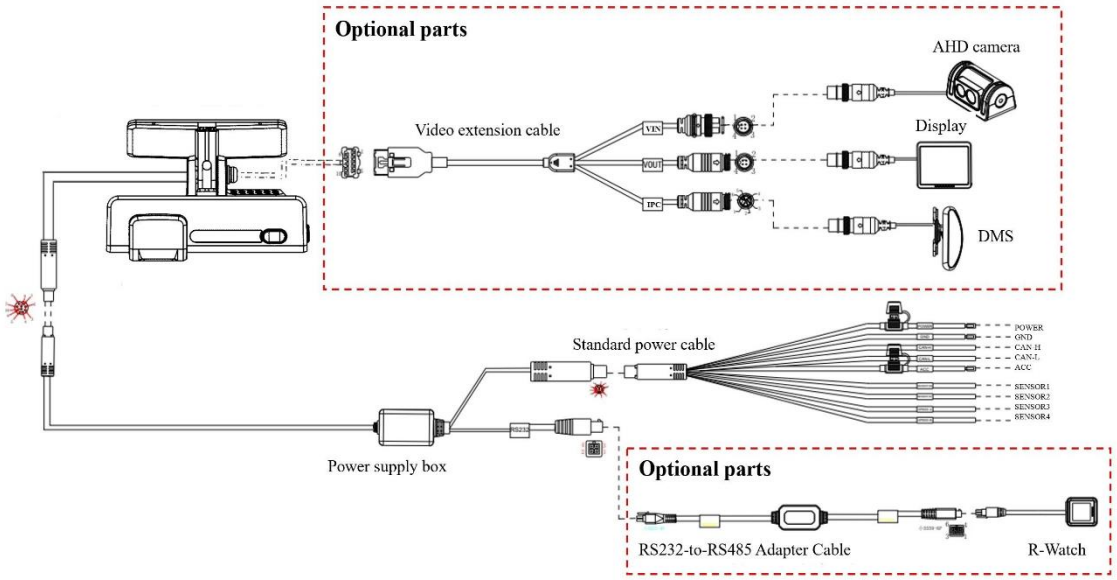


1.3 Schematic Diagram of System Connection-Power Supply through Standard Power Cable

● Dual-lens model



● Single-lens model



2. Preparation for Installation

2.1 Technical Requirements for Installation

Relevant personnel shall be familiar with the functions, applications, and overall compositions of the product.

Relevant personnel shall understand the electrical circuits and structure of motor vehicles and common installation methods of in-vehicle devices.

2.2 Understanding of Installation Environment

Before device installation, relevant personnel shall have a clear understanding of the vehicle model concerned, the installation positions of the Dashcam and auxiliary cameras of the Dashcam, the type and length of cables required for each vehicle model, and the list of common auxiliary materials, so as to ensure successful completion of device installation and commissioning.

2.3 Confirmation of Vehicle Conditions and Vehicle-related Electrical Information

Confirmation of vehicle information is the basic precondition of successful installation and also the guarantee of division of responsibilities to avoid any damage to the vehicle. For each component, proceeding to next step is only allowed after clear confirmation, and each operation shall be confirmed by the person in charge of the vehicle and the installation personnel.

(1) Check the appearance and interior trims of the vehicle for any damage.
(2) Check whether the vehicle can ignite normally.
(3) Check whether the vehicle power supply system is in good condition.

*Note:

Confirmation of the above information is crucial. Installation can only be carried out after the above information is considered normal through confirmation.

2.4 Power Supply Connection of Vehicle

FTDC-ADP-4CH has two power supply connection modes:

1. Quick power supply connection through the OBD port: This mode is suitable for quick installation by users.

2. Power supply connection through the loose wire: This mode requires operation by specialized installation personnel. The following mainly describes the mode of connection to the vehicle power supply according to the power cable requirements of the product.
    1) Required tool: multimeter.
    2) Selection of power supply connection position

When the vehicle is shut down, use a test pencil to detect whether the circuit is live. If it is live, it is judged as a constant power supply, and then measure the voltage.

When the vehicle is shut down and is in ACC position or ignition state, use a test pencil to detect whether the circuit is live. If it is electrically neutral in shutdown state, and is live in ACC position or ignition state, it is judged as an ACC power cable, and then measure the voltage.

3) Voltage measurement of power supply connection

Constant power supply: When the vehicle is shut down, use a multimeter to measure whether the voltage of the constant power supply cable is about 24 V or 12 V. If the voltage of multiple cables is in the range, select the cable with higher current as the constant power supply connection cable.

ACC: When the vehicle is in ACC position or ignition state, use a multimeter to measure whether the voltage is about 24 V or 12 V. If the voltage is 0 in shutdown state and 24 V or 12 V in ACC position or ignition state, select the cable as the ACC power supply connection cable.

***Note:**

During power supply connection, first conduct measurement at the positive and negative terminals of the power supply with a multimeter, to avoid wrong connection.

2.5 Connection of Necessary Signal Cables

Where required, the following signal cables must also be connected to enable the intelligent assisted driving functions of FTDC-ADP-4CH:

(1) CAN data cable - to obtain accurate vehicle speed (if GPS speed is used, the CAN cable may not be connected);
(2) Left and right steering signal cables - to obtain left and right steering information of vehicle;

Please consult the maintenance engineer of the vehicle discipline for specific position of CAN data cable. Generally, the left and right steering signal cables are arranged on the fuse board below the steering wheel or below the front passenger dashboard, and measurement for these cables can be conducted using a multimeter.

***Note:**

If the measured signal is a pulse signal, the source of left steering/right steering/brake signal shall be set as pulse on the setting screen of the Dashcam; if the measured signal is a continuous high- or low-level signal, the source of left steering/right steering/brake signal shall be set as level on the setting screen of the Dashcam.

3. Preparation for Installation Material and Tool List

3.1 Packing List Inspection

After unpacking the product, please confirm whether the Dashcam is intact and whether the accessories are complete.

1

2

Power supply box × 1

3

Standard power cable × 1
(with the fuse)

4

Allen key × 1

5

Mounting bracket × 1

6

Bracket bolt × 1

7

Crowbar × 1

8

Desiccant × 1

9

Alcohol cotton × 1

3.2 Preparation for Installation Tools

Before installation, the following installation accessories and tools shall be made available.

List of Installation Tools and Accessories

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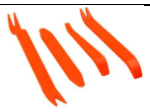
S/N	Picture	Tool Name	Application	Quantity
1		Common screwdriver kit	Tighten screws, optional	1pcs
2		Crowbar	Pry up the vehicle panel	1pcs
3		Ties	Bundle cables	Prepare as needed

4		Dry cleaning cloth	Clean the dashboard	1pcs
5		Mobile phone/Pad	Install the Veyes App for video Preview and parameter configuration	1pcs
6		Steel tape	Measure the installation height of the forward-facing ADAS lens and assist the installation in other scenarios	1pcs
7		Mark pen	Mark lines for Dashcam installation	1pcs
8		Cutting nippers	Cut and strip wires	1pcs
9		Insulated rubber tape	Wrap wire ends	1pcs
10		Scissors	Cut insulated rubber tape or wire clip	1pcs
11		USB flash disk	For future use	1pcs
12		Multimeter	Locate vehicle power supply Measure the conduction of harness Measure pulse signal	1pcs
13		3M adhesive tape	Fix DMS camera	1pcs
14		Three-legged ladder	Help to install the BSD camera	1
15		Waterproof sealant	Waterproof backfill after punching	1
16		Waterproof tape	Waterproof protection for outdoor wire connectors	1

The following installation tools are also required for the installation of DMS camera if required:

DMS Camera Installation Tools

S/N	Picture	Tool Name	Application	Quantity
1		Torsion drill	Tighten screws	1pcs
2		L-shaped Allen key	Adjust and fix the DMS lens at a certain angle (Included in the DMS camera packaging)	1pcs
3		3.5 mm × 25 mm self-tapping screw	Fix camera; standard (Included in the DMS camera packaging)	4pcs

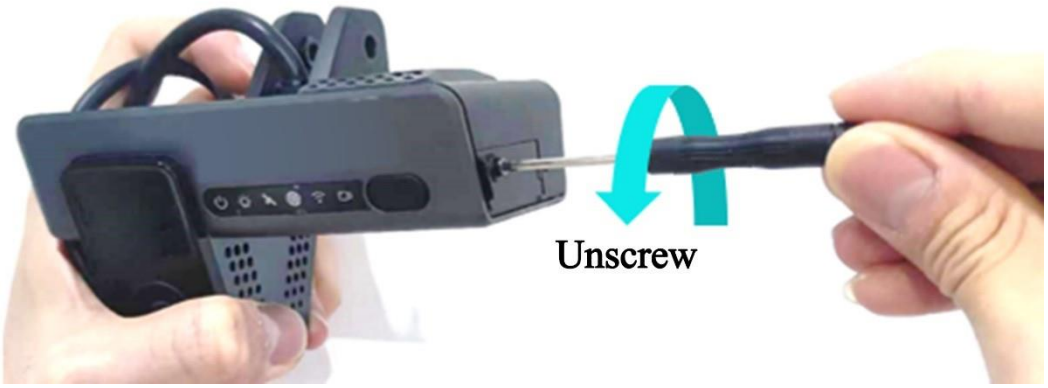
3.3 Preparation for SIM Card and Micro SD Memory Card

To ensure normal online communication and data storage of the device, please prepare a supporting Micro SIM card and a Micro SD memory card that meets the quality requirements before installation.

4. FTDC-ADP-4CH Installation

4.1 Installation of SIM Card and Memory Card

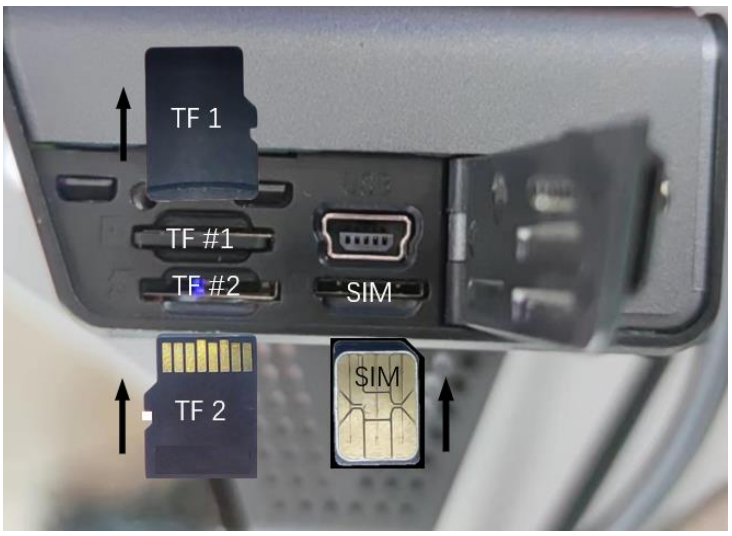
Take out the Dashcam (power-off), and use the Allen key in the kit to open the card slot panel on the right of the Dashcam by turning counter clockwise.



Install SIM card and Micro SD card as shown in the figure below (pay attention to the insertion direction of the cards).

If you feel smooth and flexible during installation, and hear a clear sound of "Da" when pushing in the cards completely, it indicates that the cards are installed in the correct direction; if there is obvious friction resistance during installation, it indicates that the installation direction is wrong. Take out the cards in time to avoid any damage to the cards and the card holder.

If the Micro SD card and SIM card are too small to be pushed in the card slot completely by hand, you can put the card in the card slot and then push it in with the crowbar included in the package.



***Note:**

(1) Because the operating temperature range of the device is -40°C to +70°C, the Micro SD card and SIM card shall be able to function well in some harsh environments for a long time. Specifically,

the metal contact on consumer-grade Micro SD cards and SIM cards is easy to oxidize under prolonged hot, humid, or salt-mist conditions. Frequent card pulling and pushing can lead to wear on the contact, and poor contact will also be caused by the deformed and bent ordinary cards due to the long-term pressure of the card holder. Therefore, if you use a SIM card, it is recommended to use an industrial plastic or ceramic M2M card for industrial devices (MP2/MP3/MS1 grade, operating temperature range -40℃ to 105℃). If you use a Micro SD card, it is required to use an industrial-grade Micro SD card, which can be used in a wide operating temperature range (-40℃ to 85℃) and has strong stability. Fleetly-recommended Micro SD cards are preferred. Failure to use the appropriate card as required may damage the accessories or even the device.

(2) Do not touch the surface of the metal contact of the SIM card with hands when taking and installing the card, for fear of contaminating the SIM card by dust and sweat stain.

(3) Before installing the SIM card, please check the surface of the metal contact of the SIM card for any dirt (such as dust, fingerprints and water stains). If any, clean the surface with a piece of non-woven fabric or rubber.

(4) In TF card slot 1, the Micro SD card shall be pushed in with the metal strip side facing down; in TF card slot 2, the Micro SD card shall be pushed in with the metal strip side facing up.

After installation of the SIM card and Micro SD card, fasten the card slot panel and tighten the screws. After installation of the SIM card and Micro SD card, remove the lens protection stickers on the front and rear lenses of the Dashcam, and tear off the protective film on the LED light on the front panel, as shown in the figure below.

4.2 Selection of Dashcam Installation Area

Requirements for installation area of FTDC-ADP-4CH:

(1) The Dashcam must be installed in the middle of the front windshield. It is generally installed in the rear-view mirror area above the centreline of the front windshield. A deviation less than 5 cm on the left and right sides is allowed for the installation position if it is not feasible to install the device in the

Middle as required (The deviation of the Dashcam relative to the centreline of the front windshield shall be calculated with the centreline of the forward-facing lens).

(2) When conditions permit, the height of the DSC lens shall not exceed the height of the driver's eyes, and the installation position shall be as low as possible provided that the driver's view is not obstructed. The linear distance from the position of the DSC lens to the driver's face shall not be more than 116 cm.

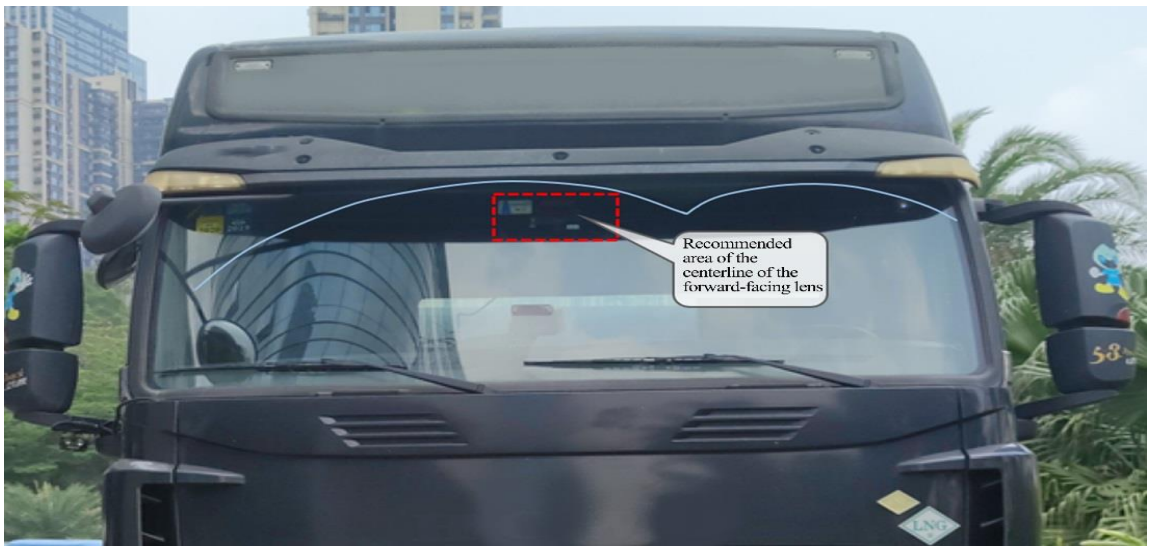
(3) The lens for road condition monitoring of the Dashcam must be within the working range of the left and right wipers (to ensure that the screen of the lens for road condition monitoring is clean and free from stains).

(4) The preferred vertical distance from the lens for road condition monitoring of the Dashcam to the ground is in the range of 130 cm-240 cm.

(5) Avoid installing other electronic devices around the Dashcam as far as possible, including ETC, intelligent rear-view mirrors, and electronic tags; otherwise, they may affect the positioning signal of the device.

The installation position shall be determined in such a way that the Dashcam will not hinder the driver from viewing the front blind spot reflector, and there is no obstruction (such as interior rear-view mirror or glass coating) within the field of view in front of and around the lens for cockpit monitoring and lens for road condition monitoring.

The installation area is generally selected as shown in the figure below:



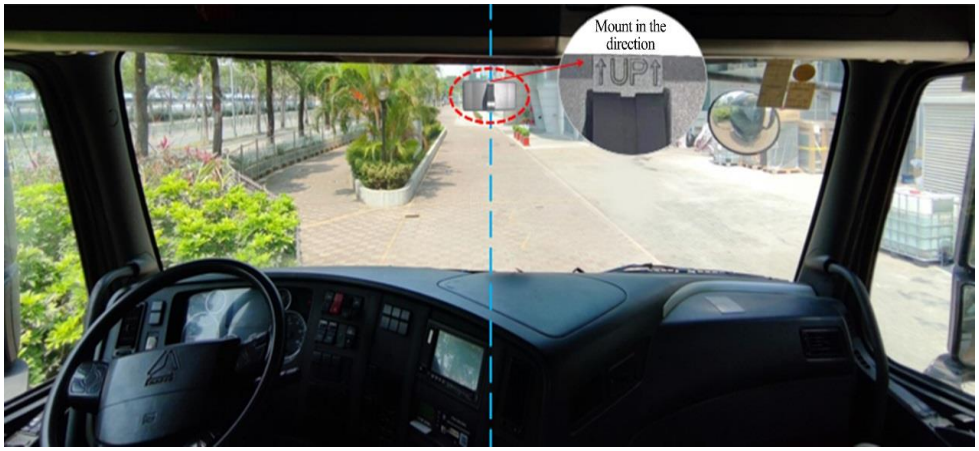
4.3 Installation of Dashcam Bracket

Park the vehicle on the horizontal ground, clean the interior and exterior of the glass in the target installation area with alcohol cotton to ensure that no dirt on the glass in this area will affect the angle of view of the lens for road condition monitoring, and ensure the glass is dry.

Tear off the 3M adhesive tape, install the bracket horizontally on the target installation area of the front windshield (the upper edge of the bracket should be parallel to the upper edge of the windshield) according to the direction indicated by the arrow on the bracket, and press the bracket for 10s to ensure that no air bubbles remain between the bracket and the glass.

***Note:**

When installing the bracket, install the bracket according to the direction indicated on the bracket, so that the toothed side faces to the right.



4.4 Installation of Dashcam

Connect the Dashcam to the bracket with the front side facing inward (with the teeth on the right side of the bracket engaged with those on the right inner side of the Dashcam), and tighten the bracket stud clockwise with a PH2 cross screwdriver (before tightening, first adjust the Dashcam to be vertical).

4.5 Angle Adjustment and Fixation of Dashcam

Adjust the Dashcam back and forth so that it is vertical. Fasten the bracket stud to ensure that the angle of the Dashcam will not be changed easily, and fix the Dashcam.

When fixing, ensure that the cockpit camera screen meets the following conditions:

1) The centre of the cockpit shall be in the middle of the screen.
2) The cockpit screen shall be horizontal.

3) The vehicle steering wheel shall be shown at the lower left/right corner of the screen.

The cockpit rendering after the lens for cockpit monitoring is properly adjusted is as follows:

Use a screwdriver to fasten the bracket studs clockwise so that the Dashcam will not shake easily.

***Note:**

Make sure that the connection between the bracket and the Dashcam is fastened (the device is rigidly connected with the vehicle), so that the Dashcam will not shake easily. Otherwise, the GPS positioning will be inaccurate. Only after the Dashcam is firmly connected with the vehicle can the device be powered on.

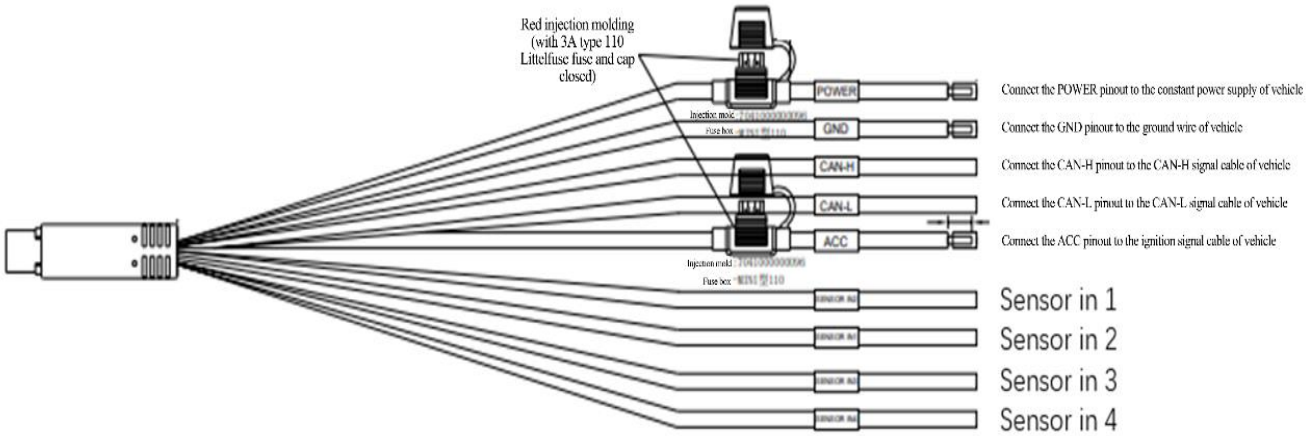
If the device is fixed and installed after power-on, it shall be powered on again before being tested or used. The GPS module built in FTDC-ADP-4CH is an inertial navigation module, and the above requirements can ensure the normal operation of inertial navigation products.

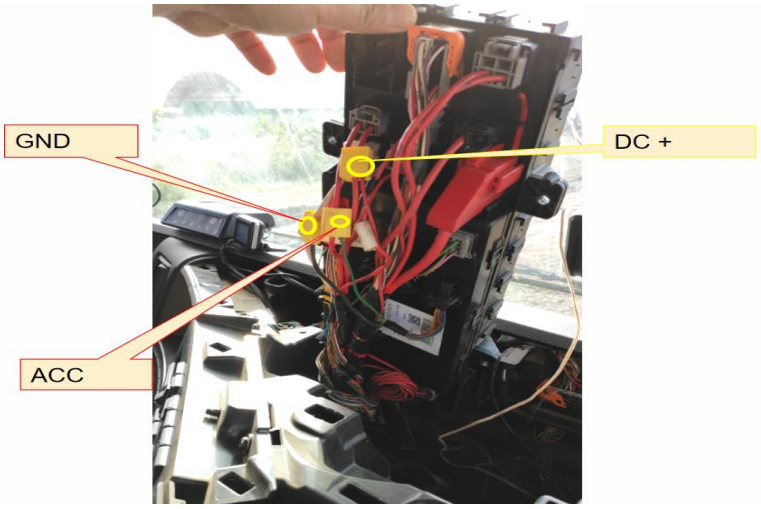
4.6 Power Supply Connection, Connection of Signal Cables and Cabling

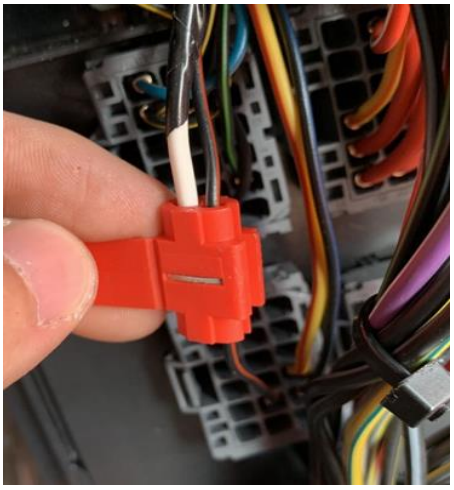
4.6.1 Power Supply Connection

(1) If the mode of quick power supply connection through the OBD port is adopted, locate the OBD port of the vehicle and directly connect with the port.

(2) If the mode of power supply connection through the loose wire is adopted, according to the definition of power loose wire, connect POWER/ACC/GND with the power cable of the vehicle, respectively







***Note:**

The power line shall be connected using "special stripping-free connection terminal" where possible (no stripping is required, so as to avoid the risk of electric leakage), and the connection shall be wrapped with insulated rubber tape to avoid electric leakage/short circuit.

If there is no special stripping-free connection terminal, stripped wires can also be used for connection. In this case, the connection process must conform to the standard specifications. After the connection is completed, the connection shall be wrapped with insulated rubber tape to avoid electric leakage/short circuit.

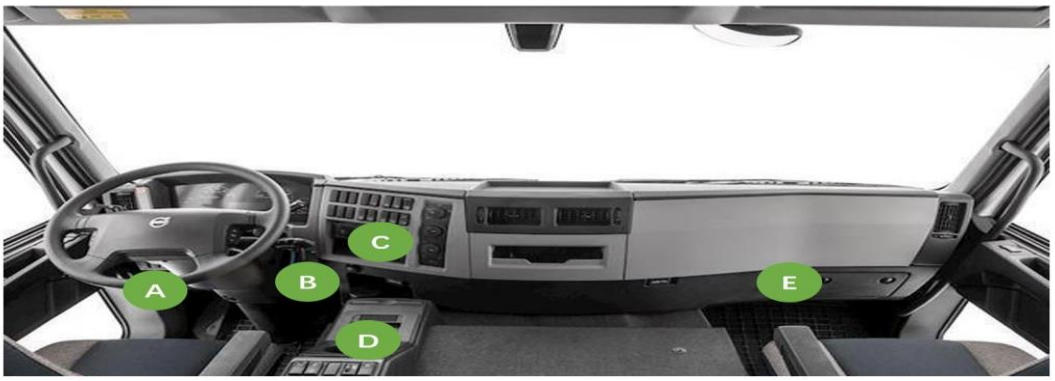
4.6.2 Connection of Signal Cables (CAN/Left/Right Steering Signal/Reversing)

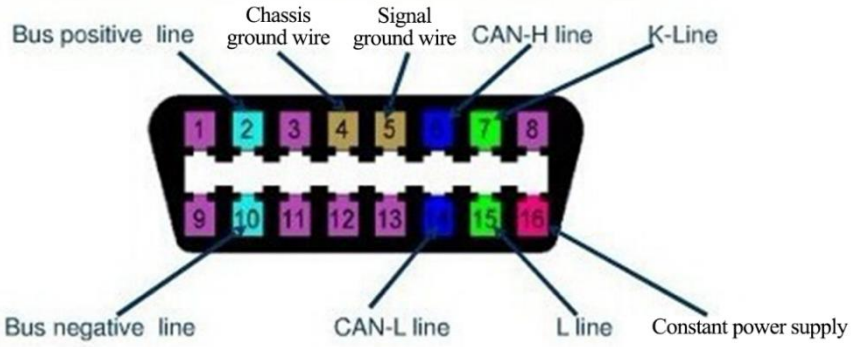
1. CAN

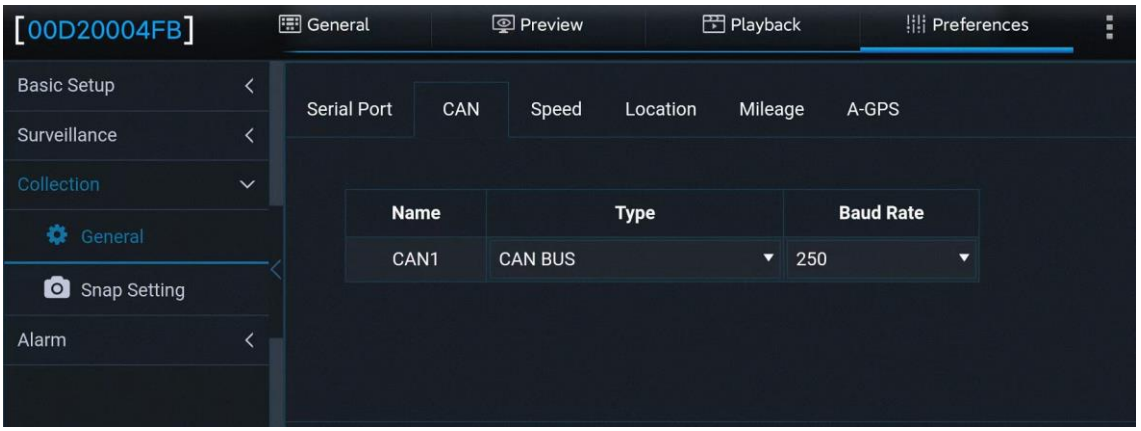
Consult the maintenance engineer of the vehicle discipline to locate the OBD port of the vehicle. Generally, the position of the OBD port of the vehicle is as shown in the figure below. Locate CAN-H and CAN-L cables of the vehicle behind the OBD port. Take the standard 16PIN inverted trapezoidal OBD port as an example, CAN-H and CAN-L cables generally correspond to pins 6 and 14, respectively. (The cable sequence varies with the shape of the OBD port. The example here is only for illustration.)

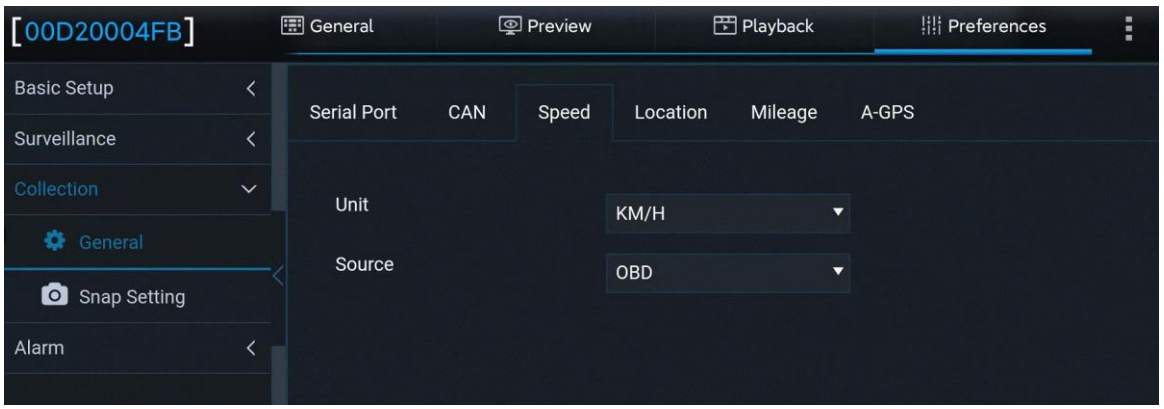
After the connection is completed, log in to the V yes app to connect the FTDC-ADP-4CH. Enter the configuration screen, and set the CAN model and baud rate of the device, and set the speed source as "OBD". At the same time, drive the vehicle for a short distance at the installation site to test the accuracy of vehicle speed pulse data.

General Positions of OBD Port of Different Vehicle Models







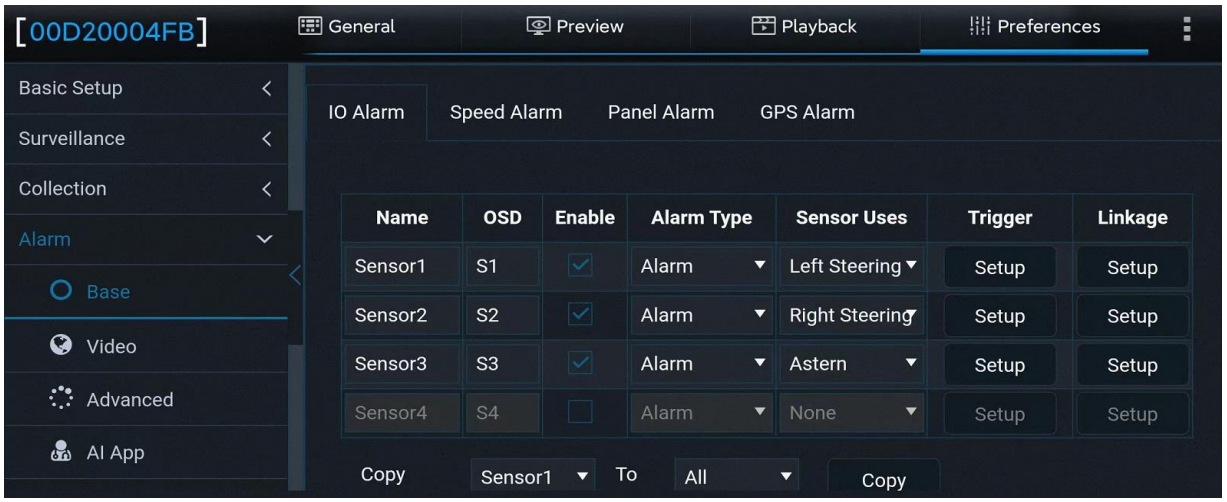


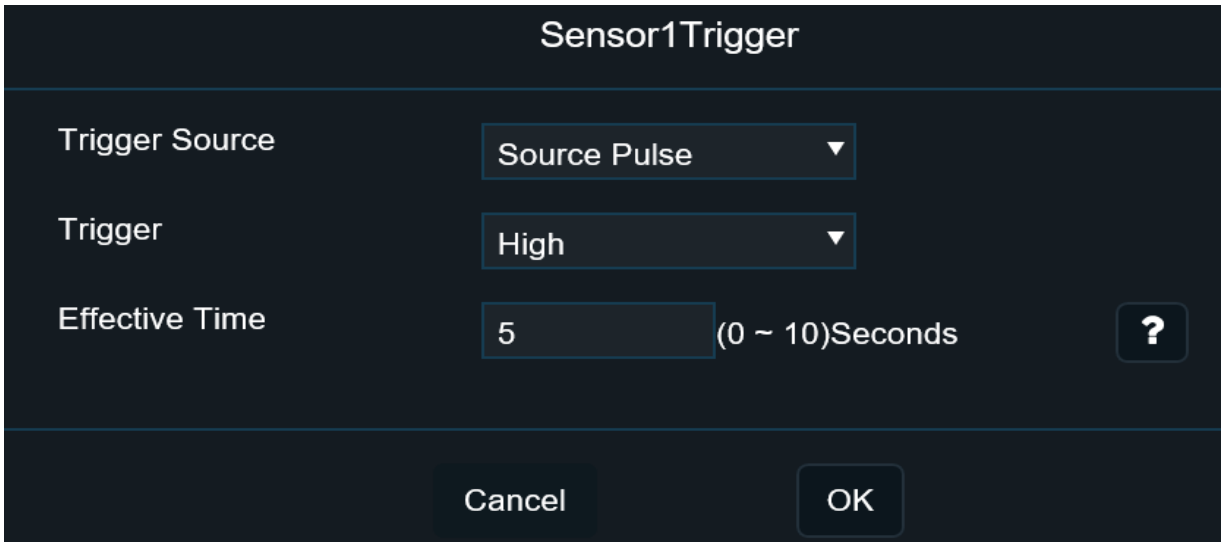
2. Left steering/right steering/reversing signal

After locating the fuse board below the steering wheel or the front passenger dashboard, measure the cable corresponding to left steering/right steering/reversing signal according to the tips on the cover back of the fuse board or using a multimeter.

There are four IO signal cables in the standard loose wire, so left steering, right steering, and reversing signals can be connected. After connection, set the corresponding IO signal cable parameters through V eyes.

If some customized loose wires have 8 IO signal cables, they should be connected as needed according to the actual application.





***Note:**

If the measured signal is a pulse signal, the source of left steering/right steering shall be set as pulse on the setting screen of the Dashcam; if the measured signal is a continuous high- or low-level signal, the source of left steering/right steering shall be set as level on the setting screen of the Dashcam.

4.6.3 Cabling

Upon the completion of connection of main cables according to the schematic diagram of system connection, as well as power supply connection and connection of signal cables, arrange these cables using a crowbar according to the diagram below and conceal them in the interior trim panel or the panel of the dashboard (i.e., concealed cabling).

If a DMS camera is required, the cable length of the DMS camera can be reserved for overall cabling.

(1) If the mode of power supply connection through the OBD port or loose wire is adopted, the cabling mode is as follows:

Since FTDC-ADP-4CH has a power supply box with a built-in turning-on/off control strategy, it is necessary to fix the power supply box at a certain position on the vehicle. Attention should be paid to the following items when the fixing position is selected:

① It should be close to the vehicle OBD port or loose wire power outlet.

② The mounting position should be flat.

③ It does not interfere with other components of the vehicle.

④ It keeps away from loudspeakers, engines, and other positions with excessive shake or vibration.

⑤ It should be as secluded as possible.

Due to the different positions of the OBD port of different vehicles, the corresponding cabling methods and the fixing position of the power supply box are also different. Here are two recommended installation positions for the power supply box. You can also fix it in other positions according to the actual vehicle.

Fixing position 1 of the power supply box:

Remove the side baffle of the driving seat, tear off the 3M tape on the power supply box, and fix it to the left or right baffle, as shown below:

Fixing position 2 of the power supply box:

Fix the power supply box on the right baffle of the driving seat with exposed cabling. Since the left baffle may interfere with the door, it is not recommended to install it on the left baffle with exposed cabling. After selecting the fixing position, tear off the 3M tape on the power supply box and fix it on the right baffle of the driving seat, as shown below:

5. FTDC-ADP-4CH Calibration

5.1 ADAS Calibration

5.1.1 Connection with App

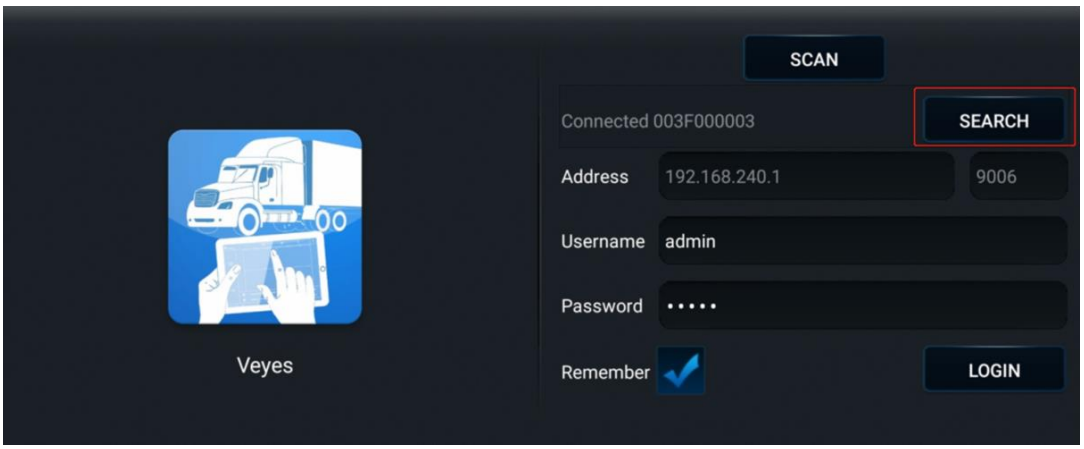
Start the vehicle and wait for the power status light of the Dashcam to turn on. The Dashcam is working normally and the Wi-Fi is in AP mode if the power status light is green and normally on and the Wi-Fi status light is green.

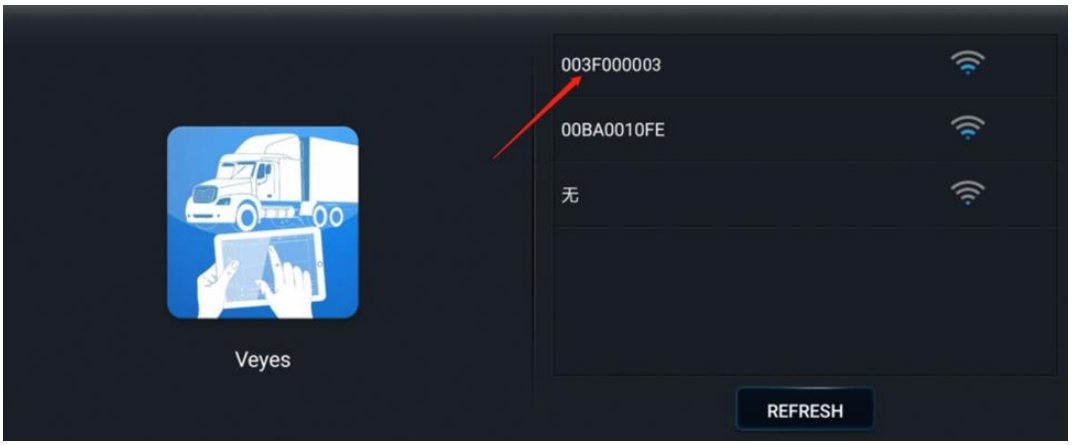
Log in to the Veyes app with your mobile phone/Pad within 3 minutes after the Dashcam is turned on. Enable Wi-Fi and GPS on your mobile phone before connecting the device with the truck Veyes App. After the FTDC-ADP-4CH is powered on, it remains in AP mode within 3 minutes by default. Then, run the truck Veyes app on your mobile phone and tap Search. The screen listing the Wi-Fi hotspots found is displayed. For the first logging, the name of the Wi-Fi hotspot is named after the cipher chip ID of the FTDC-ADP-4CH (usually the default is ST-xxxxxxxxxx). If the license plate number is modified, the hotspot name is the new license plate number. Search for a Wi-Fi hotspot named after the cipher chip ID of the FTDC-ADP-4CH or the license plate number you have entered. The login screen is displayed.

***Note:**

Within 3 min after startup, the Dashcam will automatically enable the WIFI transmission mode for debugging and connection with the app. If no connection is established with any app within 3 min, the Wi-Fi hotspot of the Dashcam will be OFF.

On the login screen, enter the corresponding username and password. Default username/password: admin/admin.





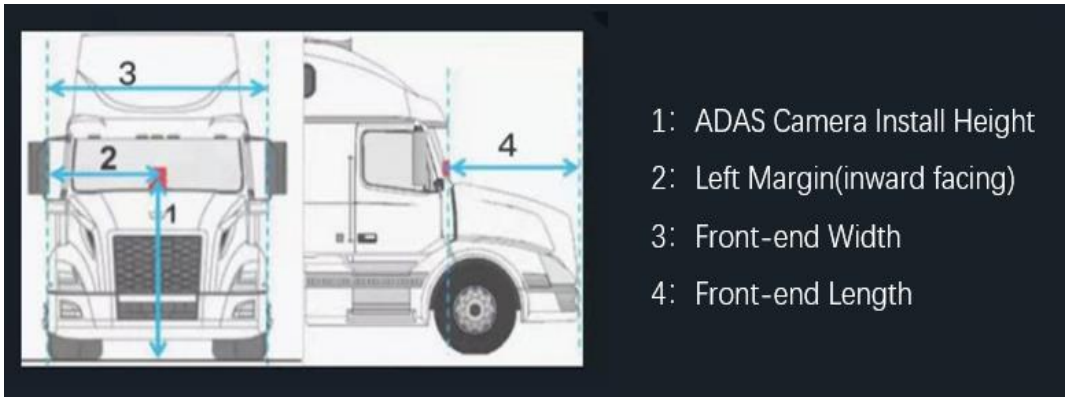
Tap **LOGIN**. The operation screen is displayed.

5.1.2 Installation Parameters Measurement of the ADAS Lens

Measure the vertical height (accurate to cm/inch) from the ground to the lens for road condition monitoring of FTDC-ADP-4CH with a tower ruler or tape and take it as the ADAS lens installation height. Measure the horizontal distance from the lens for road condition monitoring of FTDC-ADP-4CH to the outermost edge of the left tire (standing outside the vehicle and facing the left side of the front end) and take it as the left margin of the ADAS lens. Measure the front-end width (the distance between the outermost edges of the tires on both sides) and the front-end length (the horizontal distance from the ADAS lens to the license plate). Refer to the figure below for the example of distance measurement.

***Note:**

When the vertical height from the ground to the lens for road condition monitoring of FTDC-ADP-4CH is measured, read the height value after making sure that the tower ruler or tape is perpendicular to the ground.

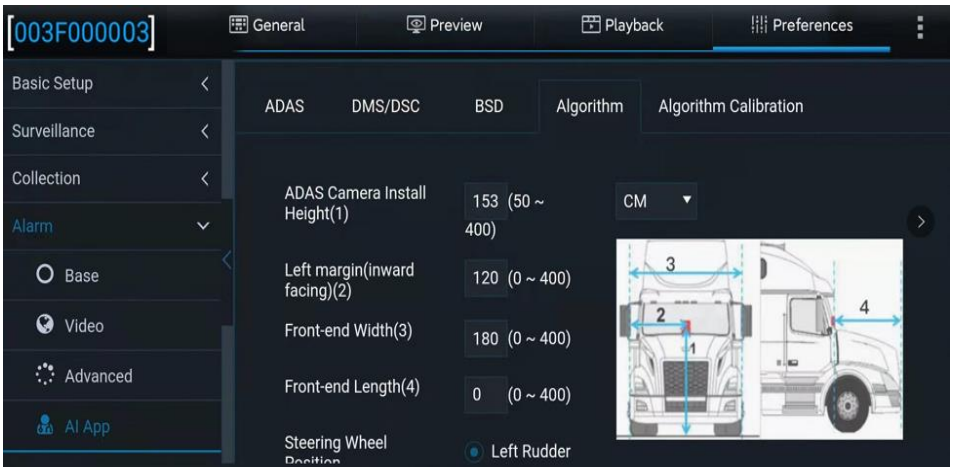


5.1.3 ADAS Lens Calibration

5.1.3.1 Calibration parameter setting

After entering the operation screen of the Veyes app, tap **Preferences > Alarm > AI App > Algorithm**, as shown in the figure below:

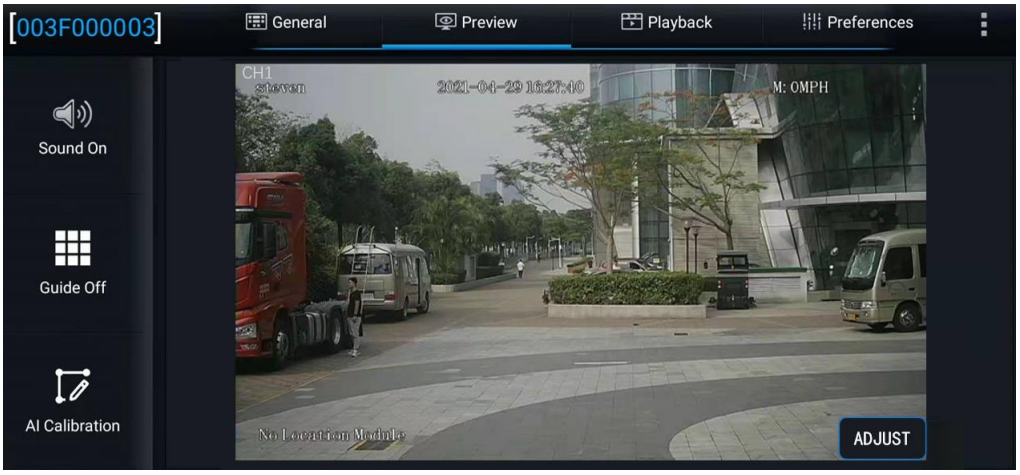
The ADAS calibration height can be in cm or in inch. In the parameter input boxes, fill in the ADAS lens installation height, the left margin of the ADAS lens, and the front-end width and front-end length read in the previous step, respectively. Tap Save after filling in the parameters.



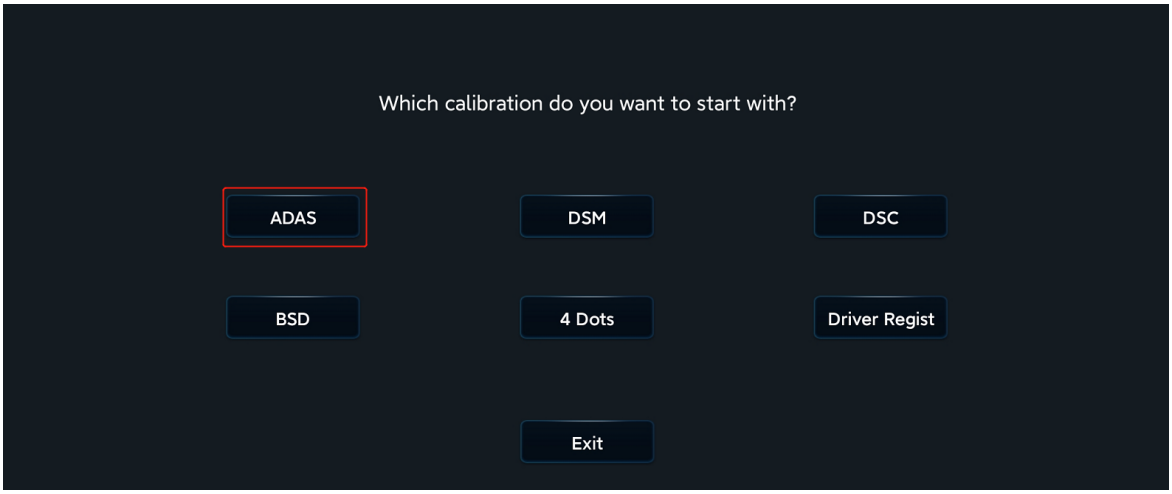
5.1.3.2 Automatic calibration

For manual calibration, there are two methods available, namely, the long-distance calibration method and the short-distance calibration method. However, since FTDC-ADP-4CH is capable of automatic calibration, it is only required to enter the relevant parameters manually in the manual calibration process, and it is not necessary to perform the long-distance and short-distance calibration procedures completely. The operation steps are as follows:

1. On the homepage, tap Preview to enter the **preview** screen and tap **AI Calibration** at the lower-left corner of the screen to enter the calibration selection screen.

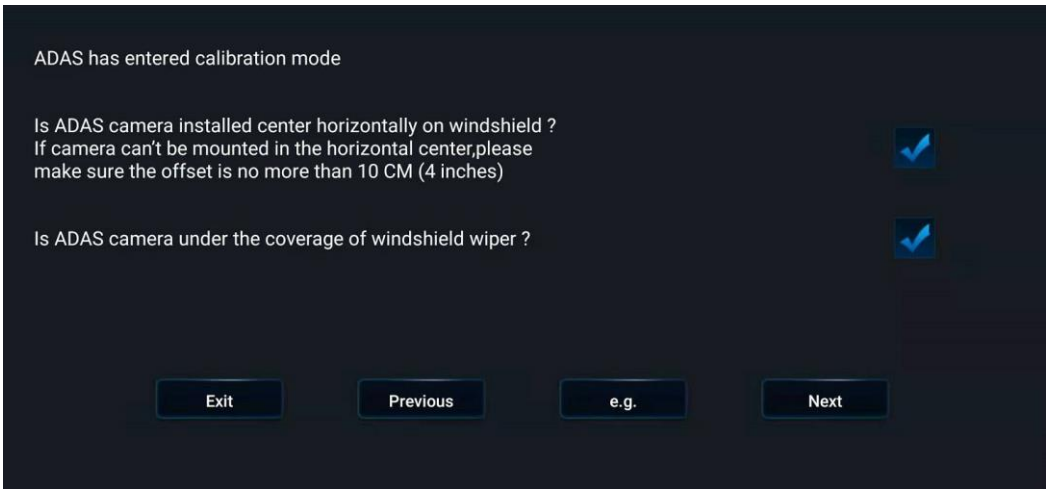


Enter the real-time preview screen, double-tap the ADAS channel screen to enter the main stream screen; tap the AI Calibration button at the lower-left corner of the screen to enter the AI calibration selection screen to perform ADAS calibration.



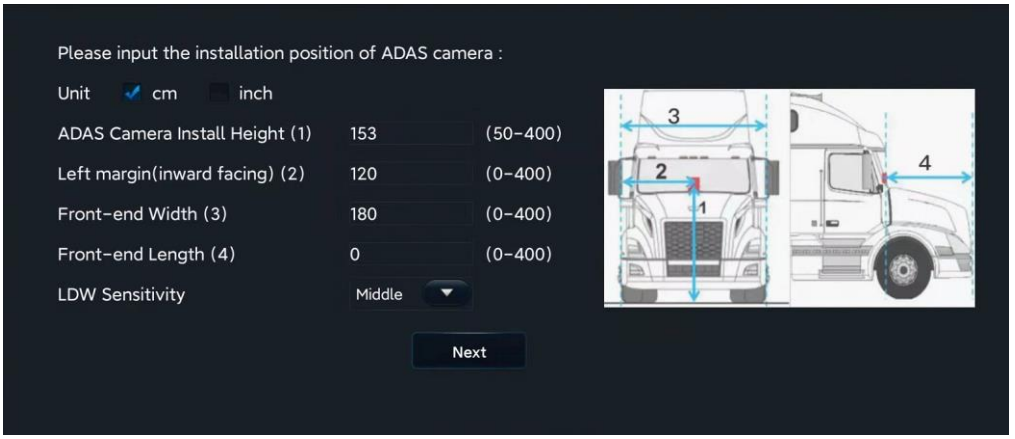
2. Select the calibration channel. ADAS cameras are all installed on Channel 1, so select Channel 1. Then, tap **Calibration** at the lower-right corner of the screen to enter the calibration process

3. Confirm that the ADAS is installed at a proper position of the front windshield and within the working range of the wipers, and then tap **Next**

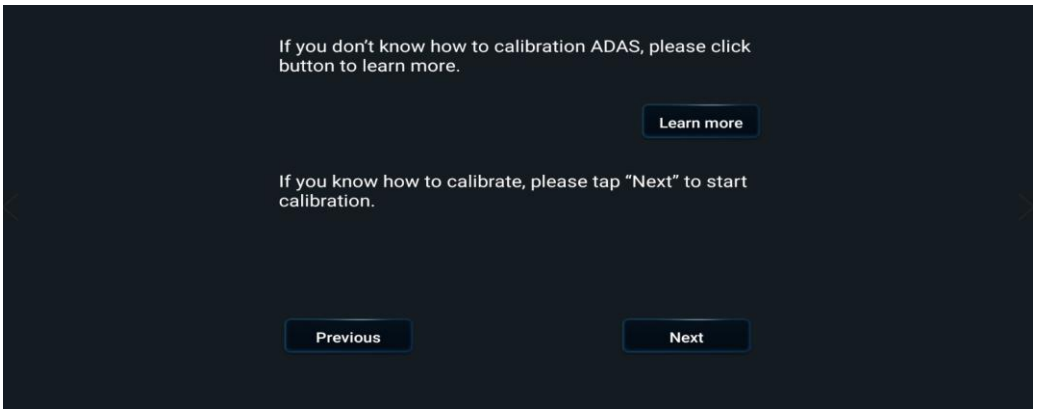


4. In the parameter input boxes, fill in the installation height of ADAS lens, the left margin of the ADAS lens, and the front-end width and front-end length read in 5.1.2 respectively. Refer to the

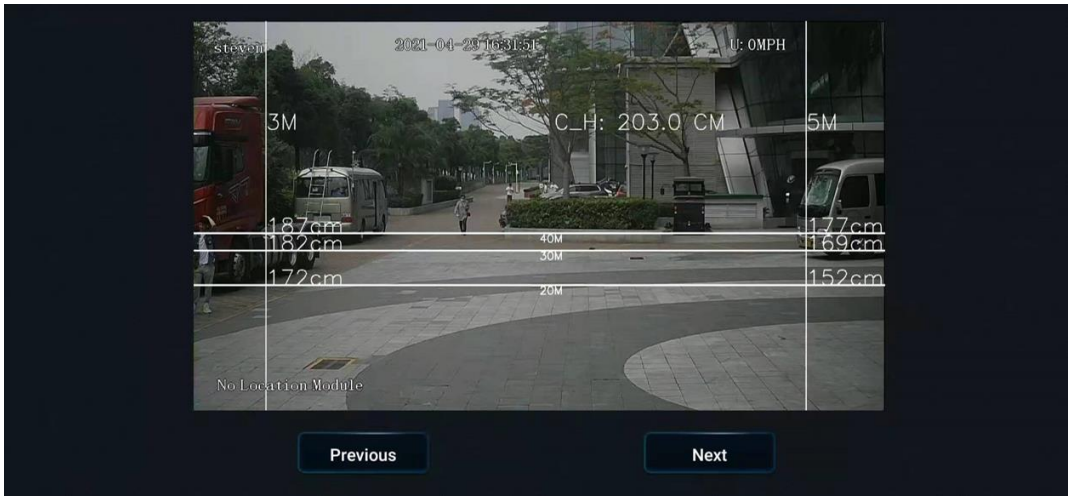
example on the right for the size measurement, with each parameter No. corresponding to each legend No., as shown in the following figure.



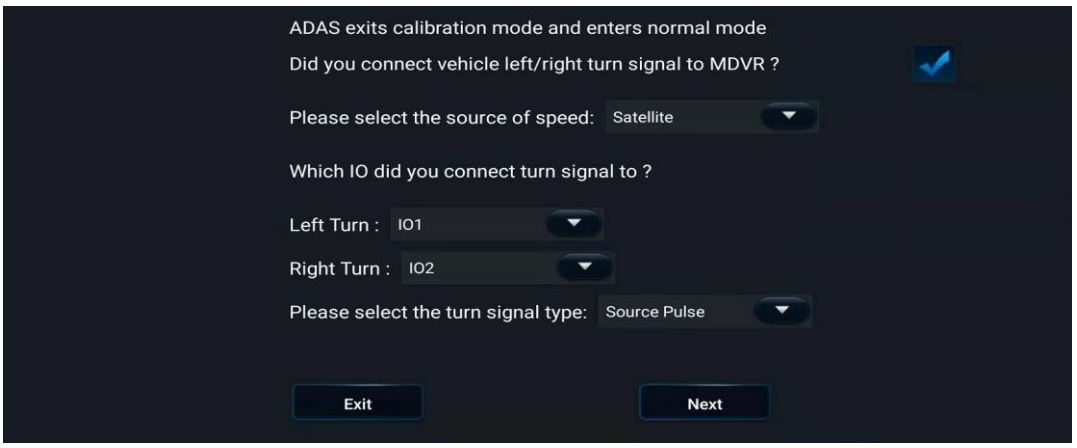
Tap **Next** to enter the screen as shown below.

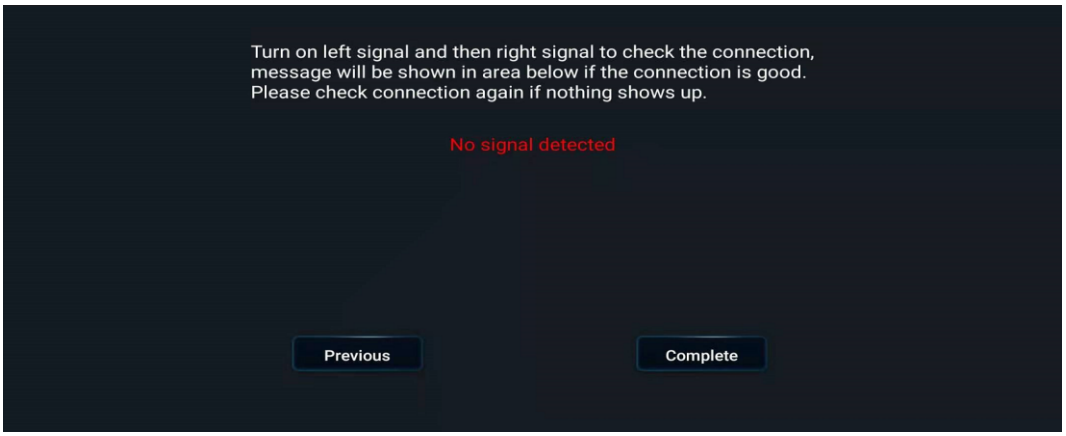


5. Tap **Next** to enter the screen as shown below. Since FTDC-ADP-4CH is capable of automatic calibration, it is only required to tap Next directly without adjusting the device on this screen.



6. Enter the screen below, select the source of speed according to the actual installation conditions, set the left and right steering signal parameters, and then tap **Next**. Check whether the left and right steering signals are valid according to prompts on the next screen that appears. After checking, tap **Finish** to exit the calibration screen.





7. Return to the real-time preview screen of the ADAS channel (by double-tapping the ADAS channel to enter the main stream screen), and check and confirm that there is no calibration line superimposed on the screen at this time, which means that the ADAS channel has returned to normal mode.

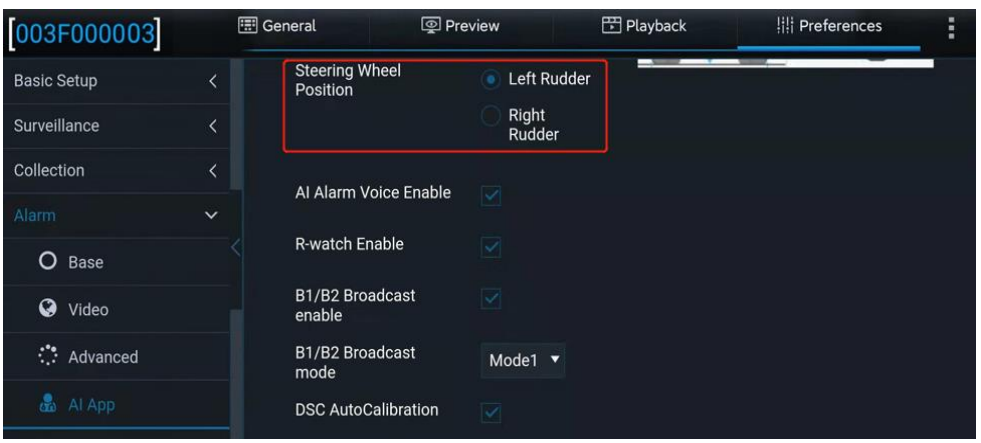
At this point, the calibration operations of the FTDC-ADP-4CH from the preview screen are completed.

5.2 DSC Calibration (only for dual-lens FTDC-ADP-4CH)

5.2.1 Left and Right Rudder Setting

On the operation screen of the Veyes app, tap **Preferences > Alarm > AI App > Algorithm**, as shown in the figure below:

Select left rudder or right rudder at **Steering Wheel Position**. The vehicle is a left rudder one if the driver's seat faces forward and the steering wheel is on the left side of the cockpit and a right rudder one if the steering wheel is on the right side of the cockpit.



5.2.2 Angle Adjustment of Cockpit Camera

On the operation screen of the Veyes app, tap Preview to enter the **Preview** screen, and double-tap Channel 2 to zoom in and view the cockpit screen.

The Dashcam has been fixed during installation. If you find that the angle of the cockpit screen is skewed or the driver's upper body and face cannot be seen, you need to loosen the fastening screws and re-adjust the camera angle.

6. Installation and Calibration of Optional Components

6.1 DMS Camera

For different usage scenarios, three types of DMS cameras connected externally to FTDC-ADP-4CH can be selected at present: A-pillar side-mounted C29N, A-pillar side-glass-mounted C29N, and dashboard-mounted C29N.

C29N is a camera with 0.7T intelligent computing power and can provide professional DMS function. Its built-in exposure of the central area of the face can cope with various complex light scenes (oblique sunlight, reflective clothing, black light-absorbing clothing, etc.). With a G-Sensor, it can automatically and flexibly adjust images to adapt to different installation states, such as A-pillar installation or dashboard installation. It is also practical in the case where the camera is 50 cm to 100 cm away from the face, catering to the installation requirements of multiple vehicle models.

The three cameras are as follows:

A-pillar side-mounted C29N (Focal length: 3 mm)	A-pillar side-glass-mounted C29N (Focal length: 3 mm)	Vertically dashboard-mounted C29N (Focal length: 3 mm)
		

Generally, customers can choose A-pillar side-mounted C29N or dashboard-mounted C29N according to the actual situation. However, since some vehicles have airbags on the A-pillar, there will be hidden dangers if the camera is fixed on the A-pillar. In this case, C29N with a glass mounting bracket can be chosen and fixed next to the A-pillar.

6.1.1 Requirements for Installation Position

1. When the A-pillar side-mounted or A-pillar side-glass-mounted C29N camera is selected, the camera should be adjusted to be vertical; when the dashboard-mounted C29N is selected, the camera should be adjusted to be horizontal.

2. The distance between the DMS lens and the face: No matter which installation method is used, it is suitable for the scene where the distance between the lens and the face is 50 cm to 100 cm, which solves the defect of selecting different cameras according to the distance requirements.
3. The height of the above three DMS cameras after installation must be lower than that of the driver's face, and the lens must have a low angle of view. In principle, the closer the DMS camera is to the dashboard, the larger the low angle of view will be, which is favourable. However, the DMS camera can be installed at a higher position, so that it will not be obstructed by the steering wheel.

For large trucks, the recommended installation height range of the DMS lens on the A-pillar or the front windshield is from the highest point of the steering wheel to 10 cm above the highest point of the steering wheel.

6.1.2 Requirements for Installation Angle

After the device is powered on, perform the adjustment with the assistance of the real-time preview screen. It is allowed to turn on the auxiliary line to facilitate positioning.

1. Make sure that the DMS camera has a low angle of view.
2. Adjust the angle (up, down, left, and right) of the DMS camera to ensure that the driver's face appears in the middle of the video screen, the driver's face and body are vertical on the video screen, and the lower edge of the screen is below the driver's chest.
3. Make sure that the fill light of the DMS camera illuminates the driver's face (fill light illuminating the seat belt is not allowed; otherwise, it will lead to overexposure of video).
4. Make sure that there is no other object (for example, the steering wheel) in the DMS video screen that will obstruct the driver's face and the seat belt features.

6.1.3 Requirements for Installation Detail

1. If the A-pillar installation or the A-pillar side glass installation with mounting bracket is adopted, the labeling surface of the DMS camera must face the A-pillar (the arc surface faces the driver's direction)
2. In the event of installation on the dashboard, the labeling surface of the DMS camera must face down (with the arc surface up).
3. After angle adjustment and calibration, the protective film on the DMS camera must be torn off, and the DMS camera must be locked with an Allen key, to avoid shaking.

Installation on left A-pillar: with the arc surface facing toward the cockpit and the cable end at the bottom

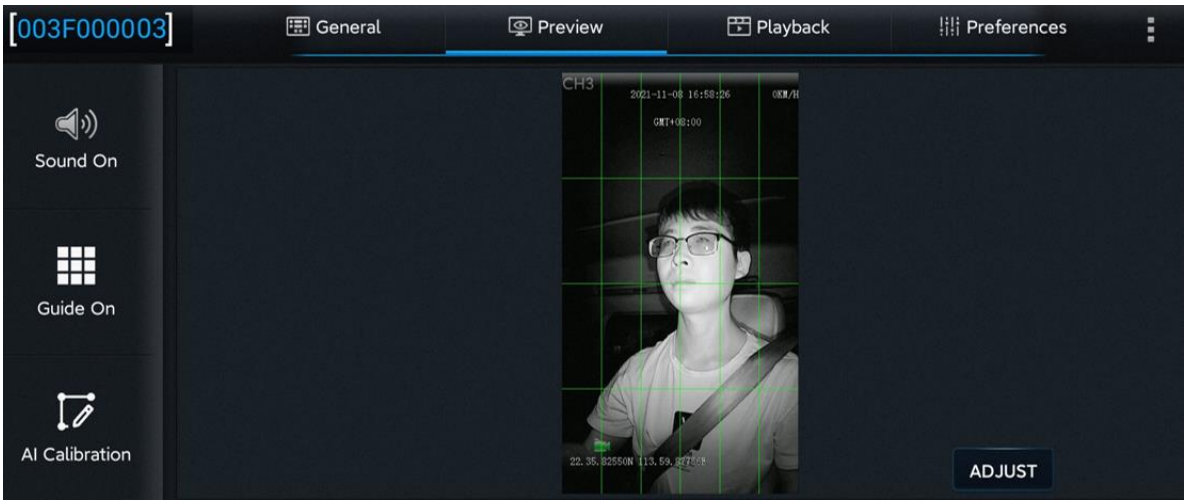
Installation on a dashboard: with the arc surface up

Installation on right A-pillar: with the arc surface facing toward the cockpit and the cable end at the top

6.1.4 Installation Steps

6.1.4.1 Installation steps of A-pillar side-mounted cameras

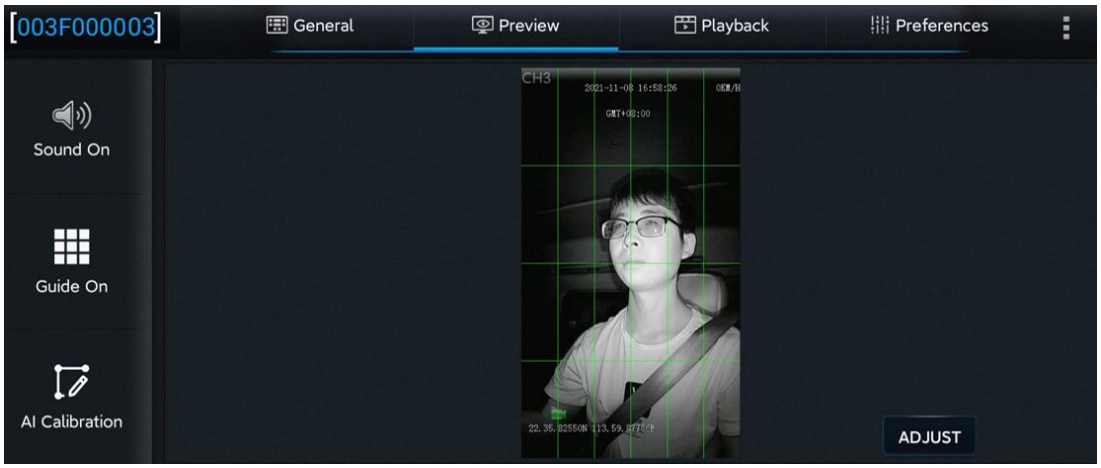
1. Energize the device, connect the device with the app, and enter the real-time preview screen. After that, check whether the driver is upright on the screen when the device is installed at the target position and the camera labeling surface faces the direction of the A-pillar (with the arc surface facing the driver). Since the C29N comes with a G-sensor, it can automatically and flexibly adjust the horizontal and vertical changes of images to suit the installation states. Just check the image here.



2. After the appropriate installation position meeting the above installation requirements is determined through the DMS camera screen, first tighten the upper screw of the DMS camera base (with the lower screw of the base not tightened temporarily, so as to adjust the angle of the camera up and down).

3. Adjust the left and right-angle joints of the DMS camera through the hexagon socket screws, so as to adjust the angle of the DMS camera left and right.

4. after adjusting the angle of the DMS camera up and down/left and right, make sure that the following requirements can be met when the driver is under normal driving habits and sitting posture:
    (1) Make sure the DMS camera has a low angle of view.
    (2) Make sure that the driver's face appears in the middle of the video screen, the driver's face and body are vertical on the video screen, and the lower edge of the screen is below the driver's chest.



    (3) Make sure that the fill light of the DMS camera illuminates the driver's face (fill light illuminating the seat belt is not allowed; otherwise, it will lead to overexposure of video).
    (4) Make sure that there is no other object (for example, the steering wheel) in the DMS video screen that will obstruct the driver's face and the seat belt features.
5. Tighten the lower screw of the DMS camera base and the screws at the left and right-angle joints to ensure that the camera will not shake.

6.1.4.2 Installation steps of glass-mounted cameras

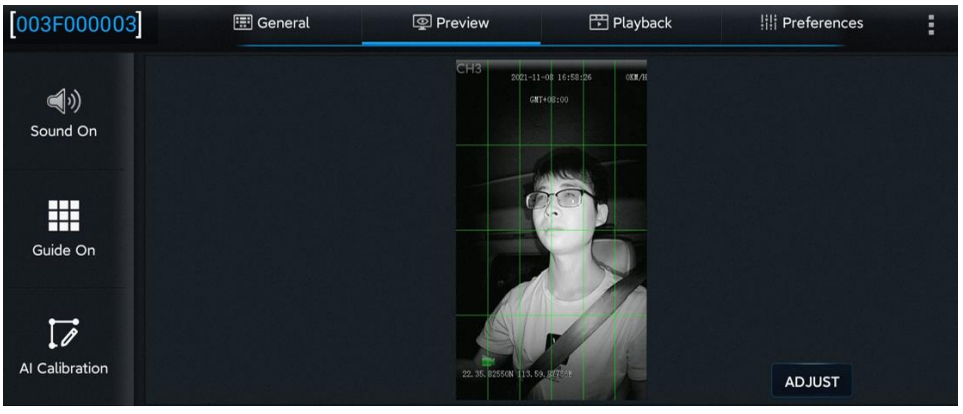
If the vehicle has an airbag on the A-pillar, and the A-pillar side-mounted camera could not be mounted on the A-pillar, the camera with a glass mounting bracket can be chosen. The specific installation process is as follows:

1. Power on the device first; then, connect the device with the app, enter the real-time preview screen, and on the premise that the 3M tape on the base of the glass-mounted camera is not torn off, roughly determine the camera installation position which shall meet the following requirements:
    (1) The glass mounting bracket shall not be too far away from the A-pillar, otherwise, it will obstruct the driver's view; the bracket base should be mounted parallel to the A-pillar.
    (2) Make sure that the camera has a low angle of view.
    (3) After the glass-mounted camera is installed, the upper part of the driver's body (above the chest) can be displayed on the camera screen. It shall be ensured that the seat belt features and face features can be seen, and the driver's face appears in the middle of the screen.
2. After determining the approximate position, adjust the labeling surface of the camera to face the A-pillar (with the arc surface facing the driver); then, tear off the 3M tape on the bracket base, and firmly attach the bracket to the windshield in the direction parallel to the A-pillar.

*** Note:**

When mounting, make the notched side of the bracket face upward, to facilitate camera angle adjustment after mounting, as shown in the following figure.

3. After attaching the base to the glass, adjust the spherical hinge by pushing the camera to ensure that the following requirements can be met when the driver is under normal driving habits and sitting posture:
    (1) Make sure the DMS camera has a low angle of view.
    (2) Make sure that the driver's face appears in the middle of the video screen, the driver's face and body are vertical on the video screen, and the lower edge of the screen is below the driver's chest.



(3) Make sure that the fill light of the DMS camera illuminates the driver's face (fill light illuminating the seat belt is not allowed; otherwise, it will lead to overexposure of video).

(4) Make sure that there is no other object (for example, the steering wheel) in the DMS video screen that will obstruct the driver's face and the seat belt features.

3. Tighten the screws on the right side of the DMS camera bracket to ensure that the camera will not shake.

6.1.4.3 Installation requirements for vertically dashboard-mounted cameras

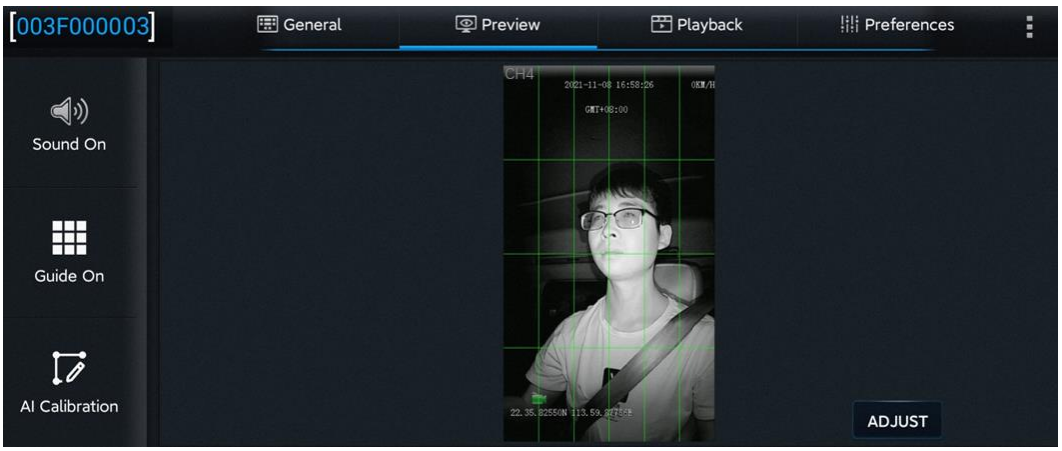
If the DMS camera is dashboard-mounted, the C29N camera needs to be fixed above the dashboard. The specific installation process is as follows:

1. Power on the device first; then, connect the device with the app, enter the real-time preview screen, and preliminarily determine the camera installation location which shall meet the following requirements:
   (1) The dashboard is flat and the camera can be fixed easily.
   (2) The driver's face on the DMS screen is not obstructed by the steering wheel, and the upper part of the driver's body (above the chest) can be displayed on the screen. It shall be ensured that the seat belt features and face features can be seen, and the driver's face appears in the middle of the screen.
   (3) DMS camera should be fixed in the middle of the dashboard. If this is not possible, the camera can be installed with rightward or leftward deflection, but the maximum deflection angle shall not exceed 30°.
2. After the installation position is determined, fix the DMS camera bracket on the dashboard with self-tapping screws.
3. After the base is fixed, adjust the angle of the DMS lens to ensure that the following requirements can be met when the driver is under normal driving habits and sitting posture:
   (1) Make sure that the driver's face appears in the middle of the video screen, the driver's face and body are vertical on the video screen, and the lower edge of the screen is below the driver's chest.
   (2) Make sure that the fill light of the DMS camera illuminates the driver's face (fill light illuminating the seat belt is not allowed; otherwise, it will lead to overexposure of video).
   (3) Make sure that there is no other object (for example, the steering wheel) in the DMS video screen that will obstruct the driver's face and the seat belt features.
4. Tighten the screws of the DMS camera bracket to ensure that the camera will not shake.

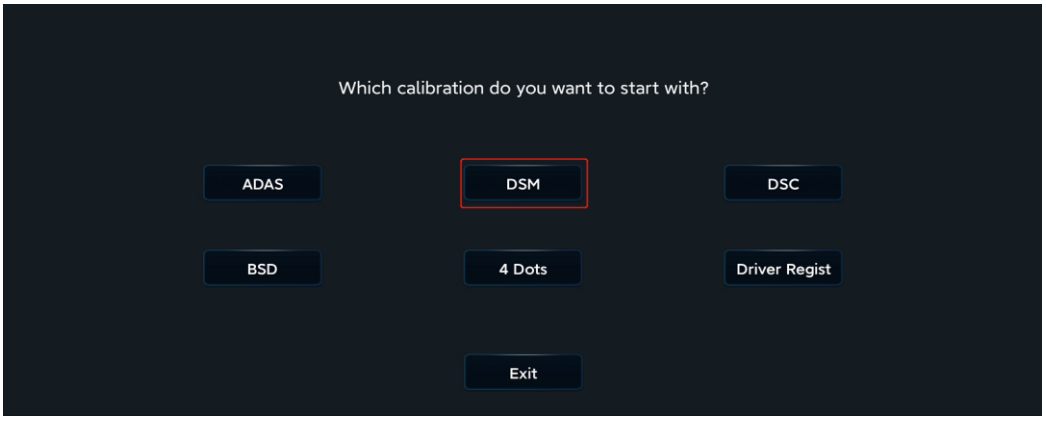
6.1.5 Requirements for Calibration

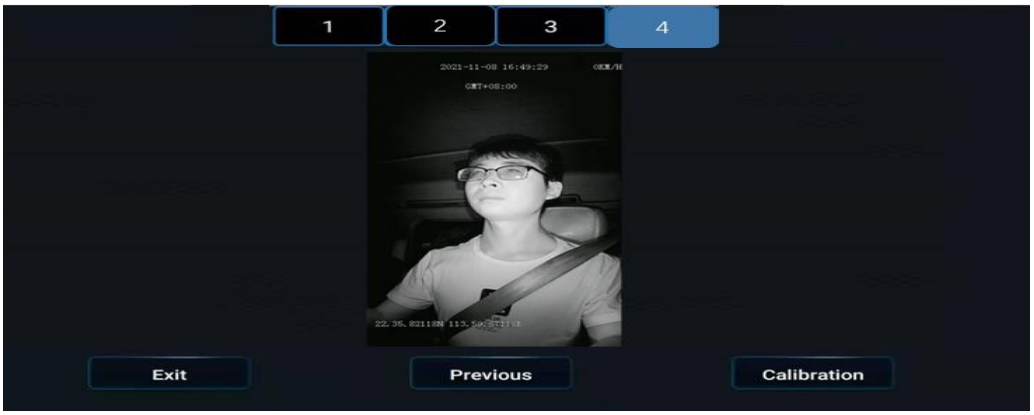
Log in to the Veyes app.

1. **Tap Preview on the homepage to enter the preview screen.**
   Double-tap the driver channel to enter the main stream full screen.
2. **Tap AI Calibration for calibration selection.**

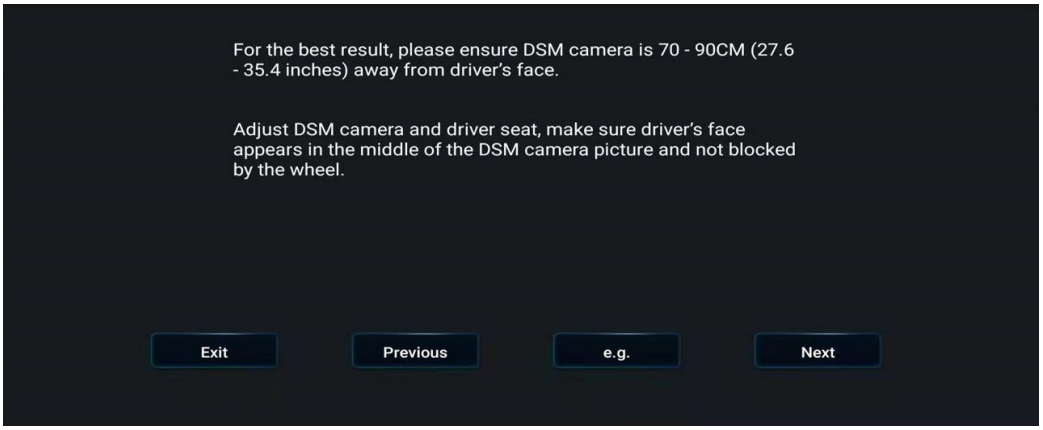


3. Select DMS for calibration.
4. Select the corresponding channel of the DMS camera (select Channel 3 here).
5. Tap Calibration to move on to the next step.





6. Confirm the prompts - tap Next to move on to the next step.

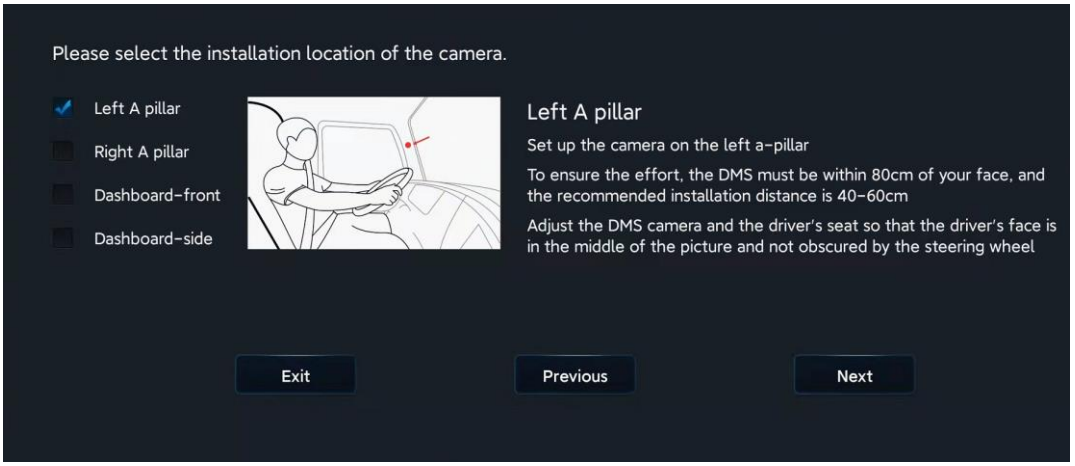


7. **Select the installation position of the DMS camera.**

The left A-pillar, the right A-pillar, the front side of the dashboard, and the lateral side of the dashboard are available. If you have any questions, please tap each option in turn, and refer to the legend and description on the right.

After selecting the corresponding installation mode, the software automatically associates the calibration method with the installation mode, not requiring any manual operation (for installation on the left A-pillar, the right A-pillar, and the lateral side of the dashboard, the lateral side calibration is applied, and for the installation on the front side of the dashboard, the front side calibration is applied).

(This step is very important, and the selected installation mode must be consistent with the actual installation mode)



*Note:

Before tapping **Next** to start formal calibration, the driver shall sit in the normal driving posture and look straight ahead.

8. Tap Next to move on to the next step for automatic face calibration.

During calibration, make sure that the driver sits still according to normal driving habits and posture and looks straight ahead.

In the process of side calibration, the intelligent algorithm will automatically learn the driver's head deflection angle and face feature data. If the driver moves his/her head during the calibration, the calibration will restart automatically.

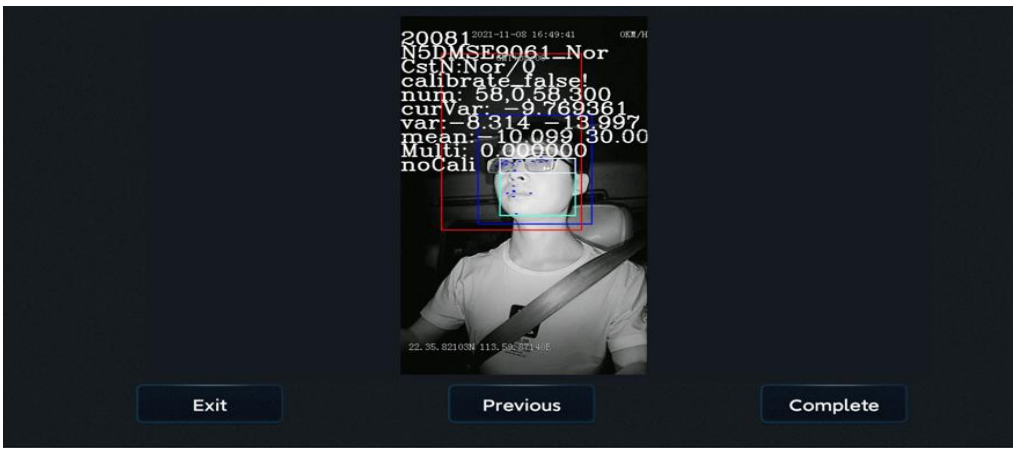
*Note:

For installation on the left A-pillar, the right A-pillar, and the lateral side of the dashboard, the human face and the camera must form a certain angle to complete the calibration.

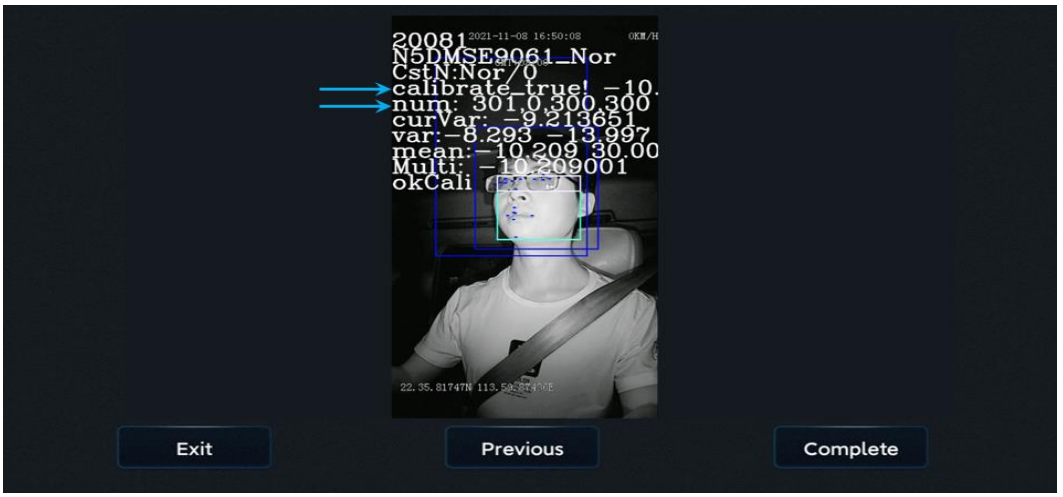
For installation on the front side of the dashboard, the human face must be in front of the camera to complete the calibration.

The driver sits still and waits for the device to be calibrated automatically. When the value of NUM reaches 301 in the mode of side installation and side calibration (51 in the mode of front installation and front calibration), the calibration frame turns from red to blue, and then the calibration ends.

Calibration is ongoing:



Calibration is completed:



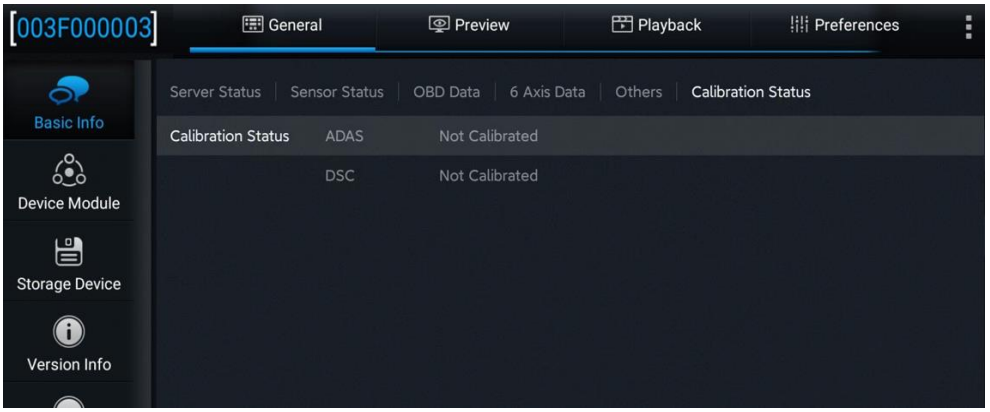
Tap Complete to complete the calibration and exit the calibration mode.

After the actual calibration of each algorithm channel is completed, check whether the calibration is successful through Veyes. Tap **General > Basic Info > Calibration** Status on the Veyes interface to check whether each channel is calibrated successfully.

Note:

Only the channel with the algorithm enabled will display the calibration status. There are two types of calibration status: not calibrated and successfully calibrated;

Since both ADAS and DSC adopt the automatic calibration, whose completion requires the vehicle to actually drive for a period of time, even if the parameters are configured, the status prompt that ADAS and DSC are successfully calibrated cannot be immediately seen.



7. Acceptance and Cleaning

7.1 Cleaning

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.

7.2 Installation Acceptance

1. Conduct acceptance for the installation details and parameter setup item by item according to the acceptance list provided by the customer.
    (1) Focus on inspection of parameter setup, and save screenshots.
    (2) Focus on inspection of video images, and capture and save videos.
2. Take pictures of all the devices and the centre console after installation.
    (1) Take pictures of the installation positions of all items.
    (2) Take a picture of the rendering inside the cockpit after installation