

X3N-H0404

Installation Guide



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Table of Contents

	Foreword.....	5
	Important Instructions.....	5
1.	System Overview.....	7
	1.1 Product Overview.....	7
	1.2 Schematic Diagram of Equipment Connection.....	7
	1.3 Schematic Diagram of System Connection.....	7
	1.4 Definition of External Cable Interface.....	8
2.	Preparation for Installation.....	10
	2.1 Technical Requirements for Installation.....	10
	2.2 Understanding of Installation Environment.....	10
	2.3 Confirmation of Vehicle Conditions and Vehicle-related Electrical Information.....	10
	2.4 Power Supply Connection of Vehicle.....	10
	2.5 Connection of Necessary Signal Cables.....	11
3.	Preparation of List of Installation Materials and Tools.....	12
	3.1 Inspection as per Packing List.....	12
	3.2 Preparation of Installation Tools.....	13
	3.3 Preparation of SIM Card and SD Memory Card.....	16
4.	Installation of X3N Main Unit.....	17
	4.1 Installation of SIM Card and SD Card.....	17
	4.2 Installation of Hard Disk.....	17
	4.3 Installation of X3N Main Unit.....	18
	4.4 Power Supply Connection and Connection of Signal Cables.....	19
	4.4.1 Power Supply Connection.....	19
	4.4.2 Connection of Signal Cables (Pulse or CAN/Left/Right Steering Signal/Reversing).....	20
	4.5 Installation of GPS, 3G/4G and WiFi Antennas.....	23
	4.5.1 Installation of GPS Antenna.....	23
	4.5.2 Installation of 3G/4G Antenna.....	24
	4.5.3 Installation of WiFi Antenna.....	24

5.	Installation and Calibration of Optional Components	26
5.1	ADAS Camera	26
5.1.1	Requirements for Installation Position.....	26
5.1.2	Requirements for Installation Details.....	27
5.1.3	Installation Steps.....	28
5.1.4	Calibration Requirements.....	29
5.2	DMS Camera	41
5.2.1	Requirements for Installation Position.....	41
5.2.2	Requirements for Installation Angle.....	42
5.2.3	Requirements for Installation Details.....	43
5.2.4	Installation Steps.....	43
5.2.5	Calibration Requirements.....	47
5.3	Side BSD Camera	50
5.3.1	Applicable Model.....	50
5.3.2	Requirements for Installation Position.....	50
5.3.3	Requirements for Installation Details.....	50
5.3.4	Installation Steps.....	52
5.3.5	Calibration Requirements.....	53
6.	Process Requirements	57
6.1	Treatment Standard of Unused Connection Wire Ends	57
6.2	Connection Process of Aviation Connector	57
6.3	Requirements of Opening for Wiring	57
6.3.1	Interior Opening for Wiring of Vehicle.....	58
6.3.2	Exterior Opening of Carbody- Opening for Installation of Tail Harness of Camera... 58	58
7.	Acceptance and Cleaning	60
7.1	Cleaning	60
7.2	Installation Acceptance	60

Foreword

This *X3N-H0404 Installation Guide* is hereby prepared to better guide engineering personnel to install X3N-H0404 and its accessories properly and quickly, and to improve installation efficiency.

This document mainly includes the following parts: foreword, system overview, preparation for installation, introduction to installation, calibration, and acceptance and cleaning.

This document is applicable to installation engineering personnel.

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Important Instructions

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 wiring of the product shall neither affect the driver's view nor affect the adjustment of the rearview mirror and sun visor;
 - b. The camera 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 position shall be convenient for the replacement and maintenance of TF card and SIM card.
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. The connection to the power supply and all signal cables of vehicle 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.
8. Veyes App is required to debug and configure X3N-H0404 during installation.

9. Please scan the QR code below, or search and download the Veyes APP in the App Store. After the download is completed, connect the APP to the equipment for related operations according to the prompt on the interface of the APP.



IOS (Apple Store)



Foreign Android (Google Store)

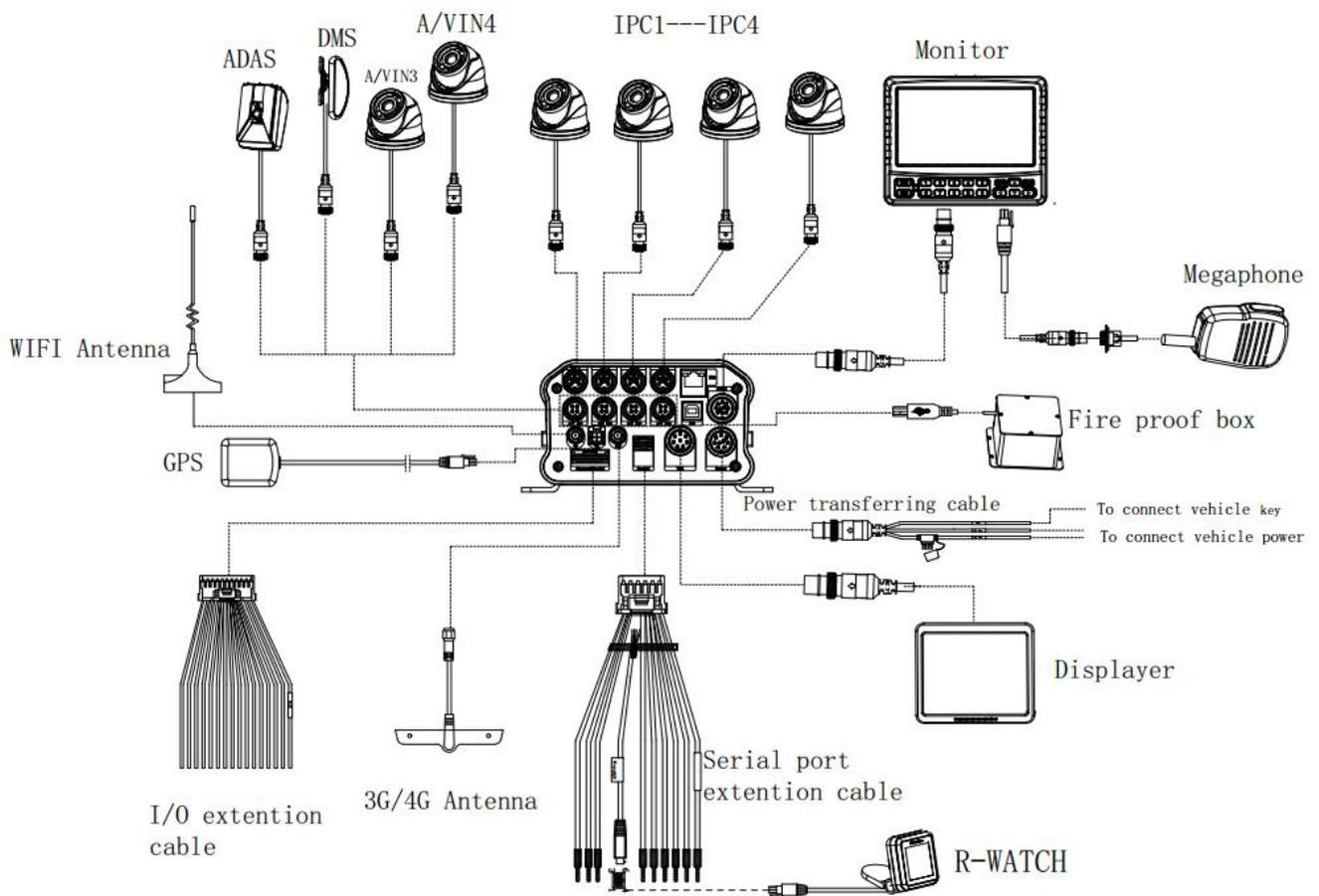
1. System Overview

1.1 Product Overview

X3N-H0404 is a cost-effective and functionally scalable device specially designed for vehicle video surveillance and remote video surveillance. Its features are as follows:

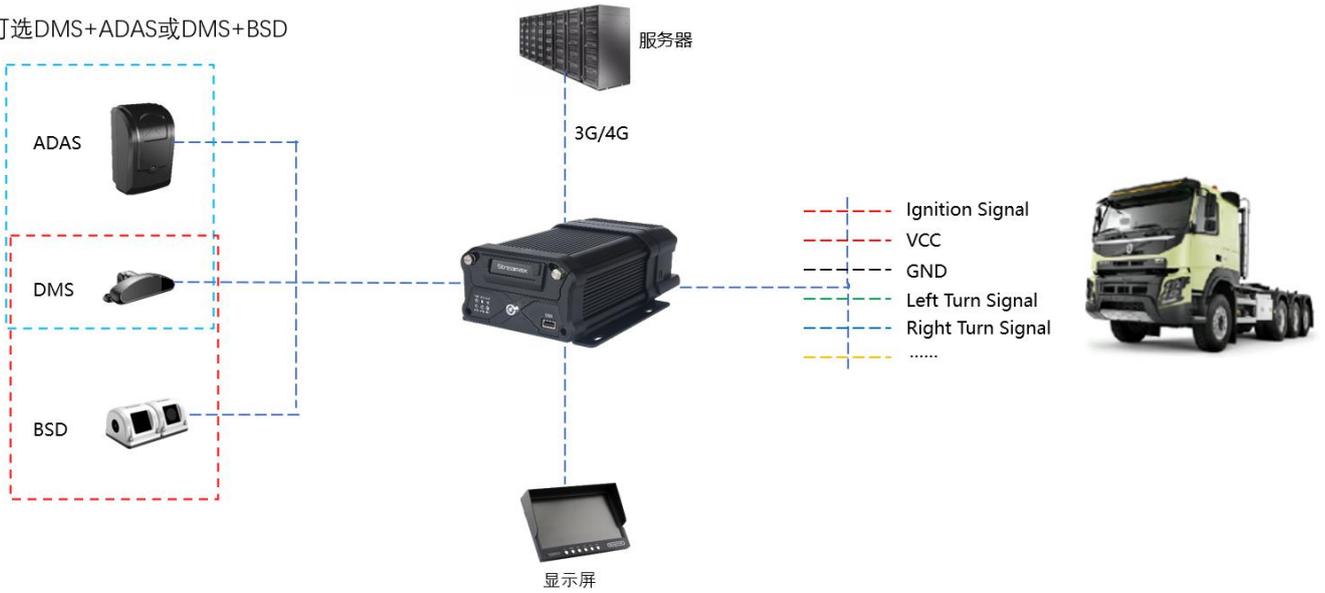
1. Support GPS positioning technology, allowing recording vehicle traveling trajectory in real time for background analysis;
2. Include 3G/4G, WIFI, G-Sensor and other modules, realizing various functions;
3. Support 720P and 1080P HD resolution video recording;
4. Special file system, ensuring video data security and protecting personal privacy;
5. Compliance with industrial design requirements, aluminum alloy enclosure and large-area cooling fins, ensuring good heat dissipation effect;
6. Support remote video monitoring and remote video playback;
7. Support four AHD cameras and four IPC network cameras;

1.2 Schematic Diagram of Equipment Connection

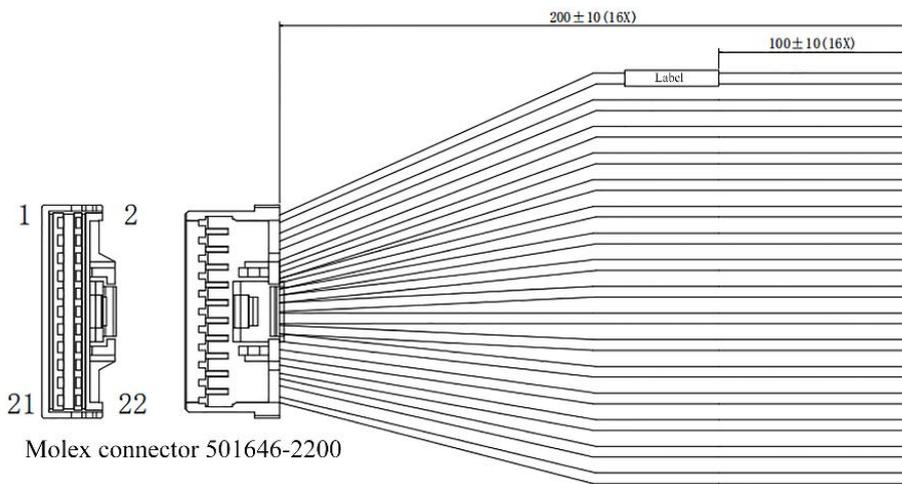


1.3 Schematic Diagram of System Connection

可选DMS+ADAS或DMS+BSD



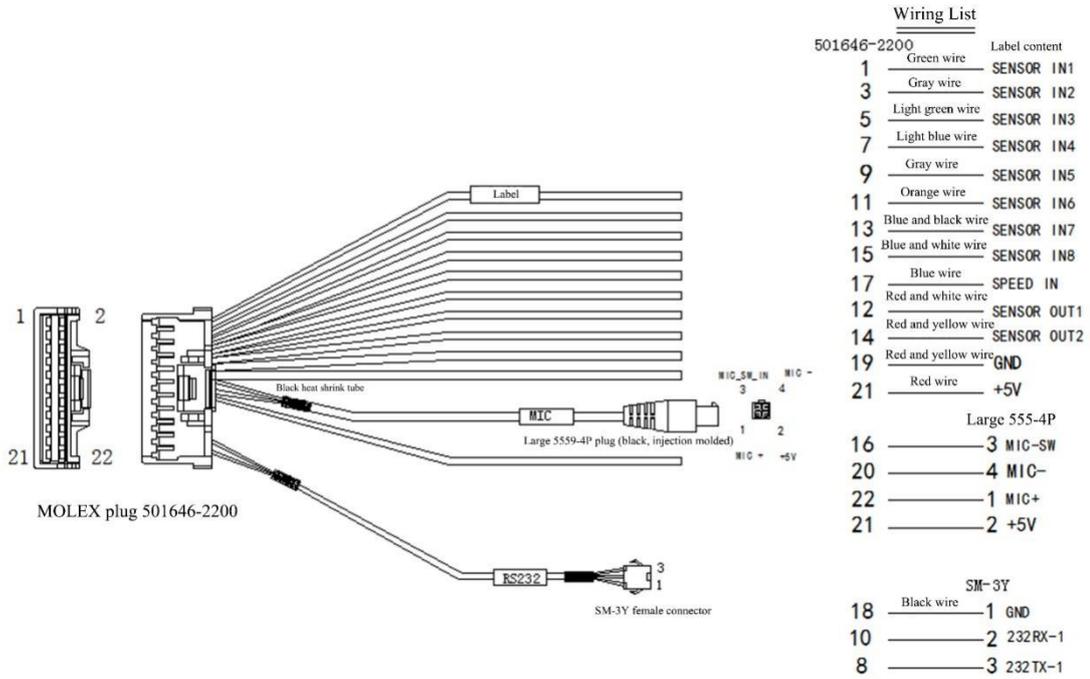
1.4 Definition of External Cable Interface



Pinout

501646-2200	Label content
1	Red SENSOR IN1
3	Gray SENSOR IN2
5	Light green SENSOR IN3
7	Light blue SENSOR IN4
9	Gray SENSOR IN5
11	Orange SENSOR IN6
13	Blue/Black SENSOR IN7
15	Blue/White SENSOR IN8
17	Blue SPEED IN
12	Red/White SENSOR OUT1
14	Red/Yellow SENSOR OUT2
19	Black GND
21	Red +5V
18	Black GND
10	Green 232RX-1
8	White 232TX-1

Alarm Serial Port Connecting Cable



Serial Port Connecting Cable

2. Preparation for Installation

2.1 Technical Requirements for Installation

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

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

2.2 Understanding of Installation Environment

Before equipment installation, relevant personnel shall have a clear understanding of the vehicle model concerned, the installation positions of the main unit and auxiliary cameras of the EDR, 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 equipment 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

The main unit is connected to the vehicle power supply. For specific power supply connection method, refer to 4.3 for details.

- (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 24V. If the voltage of multiple cables is about 24V in shutdown state, 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 24V. If the voltage is 0 in shutdown state and about 24V 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 X3N-H0404:

- (1) Vehicle speed pulse cable or CAN data cable - to obtain accurate vehicle speed data;
- (2) Left and right steering signal cables - to obtain left and right steering information of vehicle;
- (3) Brake signal cable - to obtain vehicle braking information.

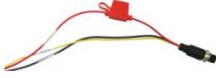
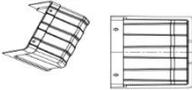
Please consult the maintenance engineer of the vehicle discipline for specific position of vehicle speed pulse cable/CAN data cable. Generally, the left and right steering signal cables and the brake signal cable are arranged on the fuse board below the steering wheel or below the front passenger dashboard, 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 interface of the main unit; 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 interface of the main unit.

3. Preparation of List of Installation Materials and Tools

3.1 Inspection as per Packing List

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

List of Product Materials				
S/N	Picture	Product Name	Purpose	Qty.
1		X3N-H0404	On-board main unit with hard disk	1 pcs
2		ADAS camera	Road condition detection	1 pcs
3		DMS camera	Driver behavior detection	1 pcs
4		BSD camera	Blind spot detection	1 pcs
5		R-WATCH	Intelligent display screen	1 pcs
6		CP4	Video display screen, optional	1 pcs
7		CP4 bracket	Support the display screen on a slant	1 pcs
8		CP4 patch cord	Display screen patch cord	1 pcs
9		CP4 extension cable	Display screen extension cable	1 pcs
10		4G antenna	4G communication antenna	1 pcs
11		Alarm serial port connecting cable	RS232 serial port with IO alarm input	1 pcs
12		9PIN power cable	Power input cable	1 pcs
13		Rear shield assembly	Protect the interface connection	1 pcs

14		MINI key	Unlock	1 pcs
15		WIFI antenna	Enhance the WIFI signal	1 pcs
16		7.5A fuse	Socket-mounted fuse, plug-in, ordinary type 32V, 7.5A	1 pcs
17		15A fuse	Socket-mounted fuse, plug-in, ordinary type, blue case, 32V, 15A	1 pcs
18		Wet and dry paper	Clean the camera lens or the windshield	2 pcs
19		Standard SIM card	Dial-up, self-purchased	1 pcs
20		6PIN audio and video extension cable (optional length)	IPC camera audio and video extension cable, optional	1 pcs
21		4PIN audio and video extension cable (optional length)	AHD camera audio and video extension cable, optional	1 pcs
22		External GPS module	High-precision positioning, required	1 pcs

3.2 Preparation of Installation Tools

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

List of Installation Tools and Accessories				
S/N	Picture	Name of Tool	Purpose	Qty.
1		Torsion drill	Tighten screws	1 pcs

2		Common screwdriver socket	Tighten screws; optional	1 pcs
3		Crow plate	Pry up the vehicle panel	1 pcs
4		Ties	Bundle cables	Several
5		Dry cleaning cloth	Clean the countertop	1 pcs
6		Smartphone/pad	Install the EasyCheck App for video preview and parameter configuration	1 pcs
7		Steel tape	Measure the installation height of the forward-facing ADAS camera lens and assist the installation in other scenarios	1 pcs
8		Mark pen	Mark lines for main unit installation	1 pcs
9		Cutting nippers	Cut and strip wires	1 pcs
10		Insulated rubber tape	Wrap wire ends	1 pcs
11		Scissors	Cut insulated rubber tape or wire clip	1 pcs
12		USB flash disk	Standby	1 pcs
13		Multimeter	Locate vehicle power supply	1 pcs
			Measure the conduction of harness	
			Measure pulse signal	
14		3M adhesive tape	Fix DMS camera	1 pcs
15		Rubber sleeve	Rubber sleeve at the opening for cable protection	Several

16		Corrugated conduit	Aesthetic wiring and cable protection	
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The following installation tools are also required for the installation of DMS camera if required:

DMS Camera Installation Tools				
S/N	Picture	Name of Tool	Purpose	Qty.
1		PH2 cross screwdriver	1. Adjust and fix the DMS camera lens at certain angle (generally included in the DMS camera packaging) 2. Tighten the lens screws; for ADAS calibration	1 pcs
2		3.5mm*25mm self-tapping screw	Fix camera; standard (generally included in the DMS camera packaging)	4pcs

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

BSD Camera Installation Tools				
S/N	Picture	Name of Tool	Purpose	Qty.
1		Wire stripper	Strip and cut wires, and cut ties	1 pcs
2		Multimeter	Locate vehicle power supply Measure the voltage of vehicle	1 pcs
3		Common screwdriver socket	Fix bracket and camera	1 set

4		20m tape measure	Ranging and calibration	1 pcs
5		Electric hand drill	Drill holes on the carbody	1 pcs
6		High-speed steel drill bits	Drill holes on the carbody 3.4mm and 3.8mm drill bits	Several
7		Tapper	Drill holes on the carbody for the concealed installation of tail harness 18mm and 20mm drill bits	Several
8		A piece of steel wire	Lead wires to pass through holes	1 pcs
9		EasyCheck App	Calibrate camera	1 pcs
10		Ties	Put harness in order	1 bag
11		3M insulated rubber tape	Connection insulation	1 pcs
12		Mini type level	Ensure that the camera is installed vertically	1 pcs
13		SUPER 918A Glass sealant	Seal holes on carbody for waterproofing	1 pcs

3.3 Preparation of SIM Card and SD Memory Card

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

4. Installation of X3N Main Unit

4.1 Installation of SIM Card and SD Card



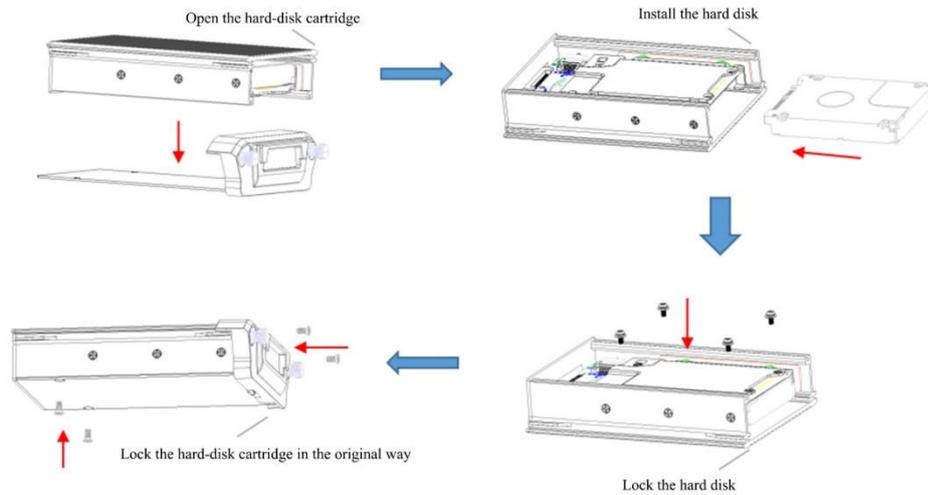
- ① Loosen the silver bolt.
- ② Turn the lock cylinder to OPEN with a key, and then pull out the upper hard-disk cartridge.
- ③ Open the lower right cover, and then insert SIM card and SD card.
- ④ After installation, turn the lock cylinder to LOCK.

***Note:**

- (1) 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.
- (2) Before installing 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.

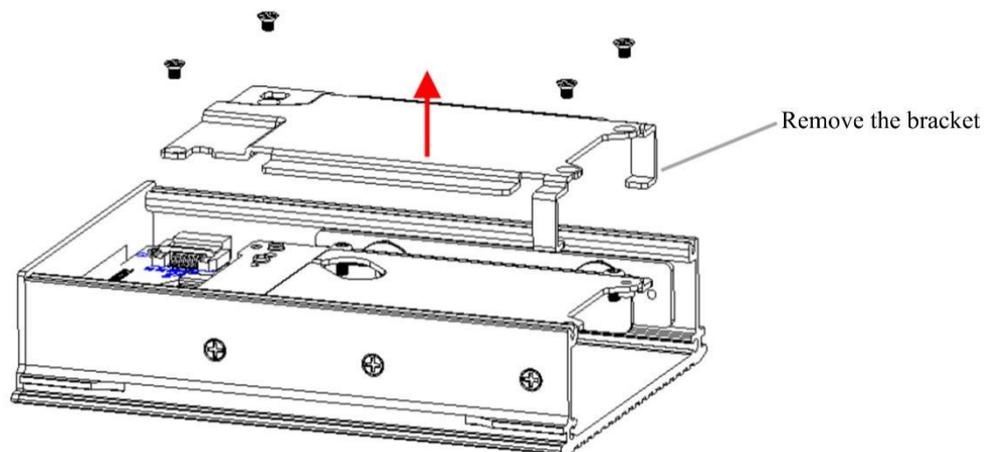
4.2 Installation of Hard Disk

Installation of 9.5mm/7.0mm thick hard disk



Installation of 15mm thick hard disk

If a 9.5mm/7.0mm thick hard disk is installed in the original state, while you want to install a 15mm thick hard disk, you need to remove the bracket and then install the 15mm thick hard disk.



4.3 Installation of X3N Main Unit

Installation requirements of X3N main unit:

The installation position and method of the main unit shall be determined according to relevant electrical equipment construction specifications and on-site vehicle installation conditions.

The installation position shall be determined with careful consideration given to safety, vibration resistance, heat dissipation, waterproofing, damp-proofing, dust-proofing, protection against damage and easy maintenance, and shall meet the following requirements:

1. Vibration resistance: The terminal shall be installed at the position with weak vibration in the vehicle, and should be kept away from the engine.
2. Heat dissipation: The terminal shall be kept away from on-board heat sources and be installed at a ventilated position for heat dissipation.

3. Waterproofing: During installation of the terminal, attention shall be paid to high temperature prevention and waterproofing.
4. Damp-proofing: The terminal shall be installed at a dry and ventilated place.
5. Dust-proofing: The terminal shall be installed at a place with less dust.
6. Electrical: The terminal shall be kept away from complex electromagnetic environment and strong interference environment as far as possible.
7. The installation position of the main unit shall be flat. Keeping the main unit sidelong and on a slant shall be avoided as far as possible.
8. There shall be enough space to open and close the front panel (without affecting the removal and replacement of SIM card and SD card).
9. There shall have enough distance at the tail of the main unit to plug and unplug the aviation connector (without affecting the connection), and the tail harness must be wrapped firmly and neatly.

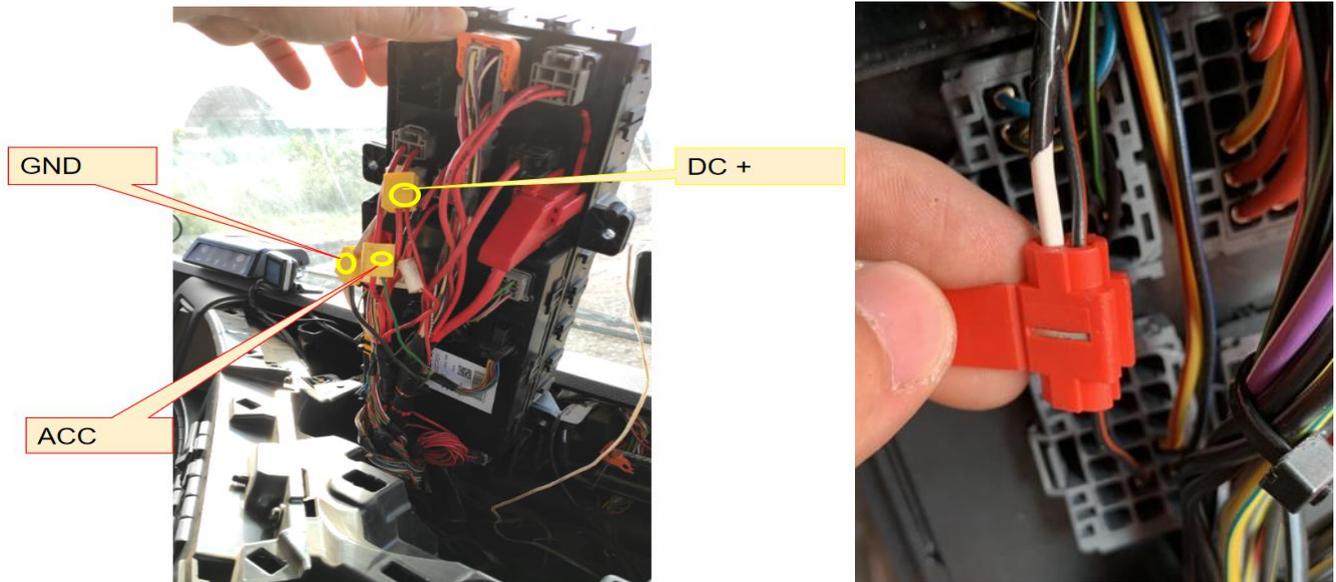
If the above conditions are met, the main unit can be fixed with screws. It is recommended that the main unit be installed below the rear recliner or the front passenger seat in the cabin, as shown in the figure below.



4.4 Power Supply Connection and Connection of Signal Cables

4.4.1 Power Supply Connection

Power cable: Connect DC+ to the vehicle constant power supply, ACC to the vehicle power cable, and GND to the vehicle ground wire.



***Note:**

The power cable 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.

4.4.2 Connection of Signal Cables (Pulse or CAN/Left/Right Steering Signal/Reversing)

1. Vehicle speed pulse or CAN (one out of two)

- (1) Consult the maintenance engineer of the vehicle discipline to locate the vehicle speed pulse cable. In the discrete-wire alarm serial port connecting cable:

Connect "SPEED IN" to the vehicle speed pulse cable;

After the connection is completed, log in to the EasyCheck App to connect the X3N-H0404 main unit. Enter the configuration interface, and set the speed source of the equipment as "Pulse". At the same time, drive the vehicle for a short distance at the installation site to test the accuracy of vehicle speed pulse data.

- (2) Consult the maintenance engineer of the vehicle discipline to locate the OBD interface of the vehicle. Generally, the position of the OBD interface of the vehicle is as shown in the figure below. Locate CAN-H and CAN-L cables of the vehicle behind the OBD interface. Take the standard 16PIN inverted trapezoidal OBD interface as an example, CAN-H and CAN-L cables generally correspond to pins 6

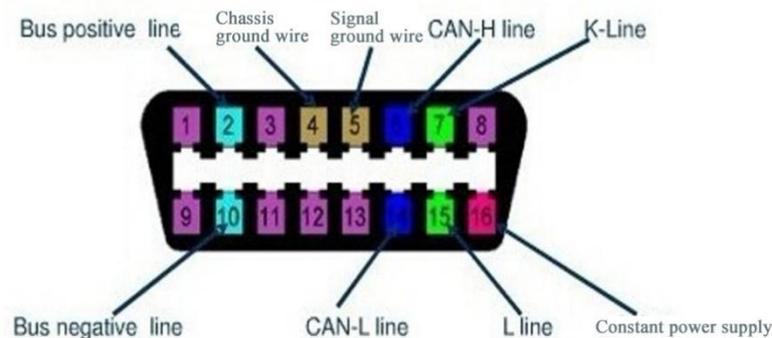
and 14, respectively. (The cable sequence varies with the shape of OBD interface. The example here is only for illustration.)

After the connection is completed, log in to the EasyCheck App to connect the X3N-H0404 main unit. Enter the configuration interface, set the CAN model and baud rate of the equipment, 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 Position of OBD Interface of Each Vehicle Model



Pin Definition of OBD Interface of Vehicle



2. Left steering/right steering/reversing signal

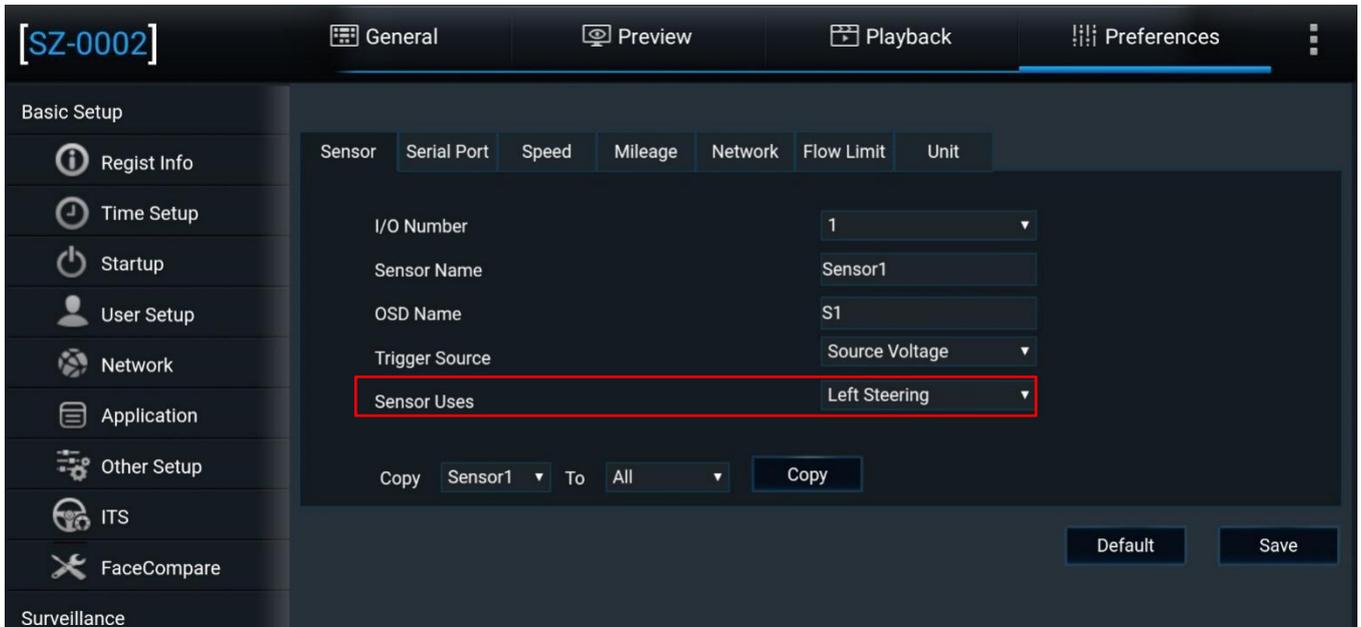
After locating the fuse board below the steering wheel or the front passenger dashboard, measure the cable corresponding to left steering/right steering/reversing signal according to the tips on the cover back of the fuse board or using a multimeter.

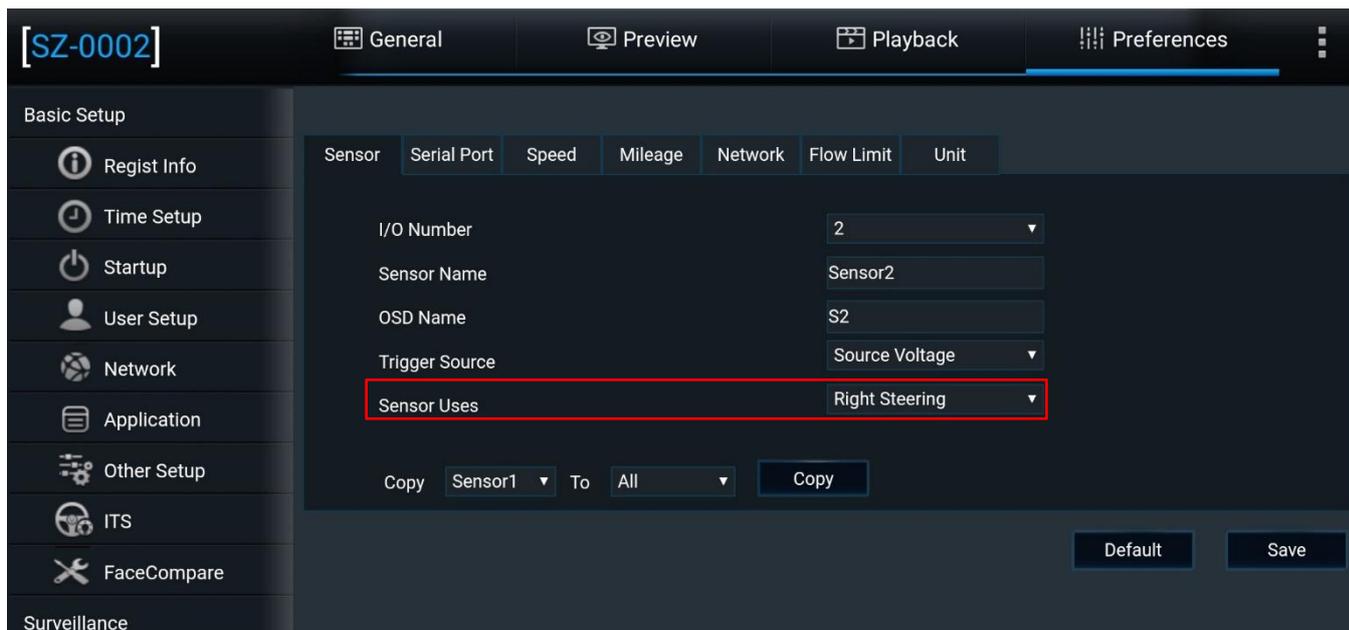
There are eight IO signal cables in the discrete wire, and the signal cables such as left steering, right steering and reversing all need to be connected. Moreover, it is necessary to

connect the X3N-H0404 main unit through the EasyCheck App, so as to enter the configuration interface and set the use of corresponding signal cable.

Example:

- ① Connect SENSOR IN1 to the left steering signal cable of the vehicle. In this case, click [Preferences] gt; [Collection] gt; [General] gt; [Sensor] in sequence to set the "Sensor Uses" as "Left Steering", and then click "Save".
- ② Connect SENSOR IN2 to the right steering signal cable of the vehicle. In this case, click [Preferences] gt; [Collection] gt; [General] gt; [Sensor] in sequence to set the "Sensor Uses" as "Right Steering", and then click "Save".
- ③ Connect SENSOR IN3 to the reversing signal cable of the vehicle. In this case, click [Preferences] gt; [Collection] gt; [General] gt; [Sensor] in sequence to set the "Sensor Uses" as "Reversing", and then click "Save".





***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 interface of the main unit; 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 interface of the main unit.

4.5 Installation of GPS, 3G/4G and WiFi Antennas

4.5.1 Installation of GPS Antenna

Installation requirements of GPS antenna:

1. The front side (labeling side) of the GPS antenna shall be up as required;
2. It is recommended that the antenna be installed on front passenger side, more than 10 cm away from the A-pillar.
3. There shall be no other equipment above the antenna. Moreover, the antenna shall be kept clear of in-vehicle audio-video, interphone and other electronic equipment to prevent interference;
4. The antenna installation position shall be far away from the position with severe vibration;
5. The antenna shall be far away from the air outlet of the air conditioner to prevent condensate accumulation due to temperature change.

The GPS antenna is fixed in the vehicle.



4.5.2 Installation of 3G/4G Antenna

Installation requirements:

1. The equipment that may interfere with 3G/4G signals, such as original on-board GPS positioning module, shall be kept more than 15 cm away from the antenna.
2. Excess tail harness of the 3G/4G antenna shall be concealed in the A-pillar or the center console.



Tear off the 3M adhesive film on the 3G/4G antenna and stick the antenna under the A-pillar at the front passenger side.

4.5.3 Installation of WiFi Antenna

Tear off the 3M adhesive film on the bottom of the WiFi antenna to stick the antenna to one side of the center console of the vehicle.

Installation requirements:

1. The antenna cannot be installed in a confined space, as this may affect signal reception.
2. Excess tail harness of the WiFi antenna shall be concealed in the A-pillar or the center console.



5. Installation and Calibration of Optional Components

5.1 ADAS Camera

*Before installation and calibration of the ADAS camera, it must be ensured that the vehicle is parked on the flat ground. It is forbidden to park the vehicle on a slope or a potholed road for ADAS installation and calibration.

5.1.1 Requirements for Installation Position

1. If conditions permit, it must be installed in the middle of the front windshield.
2. If the wiper stops at the lower part of the front windshield, the ADAS installation position shall be at least 10 cm above the lower edge of the front windshield to avoid being covered by the windshield wiper at stop position.



3. If the wiper stops vertically in the middle of the front windshield, the ADAS camera lens shall be installed as close to the middle position as possible (to avoid too high sensitivity for any lane deviation on this side) and be less than 10 cm away from the centerline, provided that the lens will not be covered by the windshield wiper at stop position.

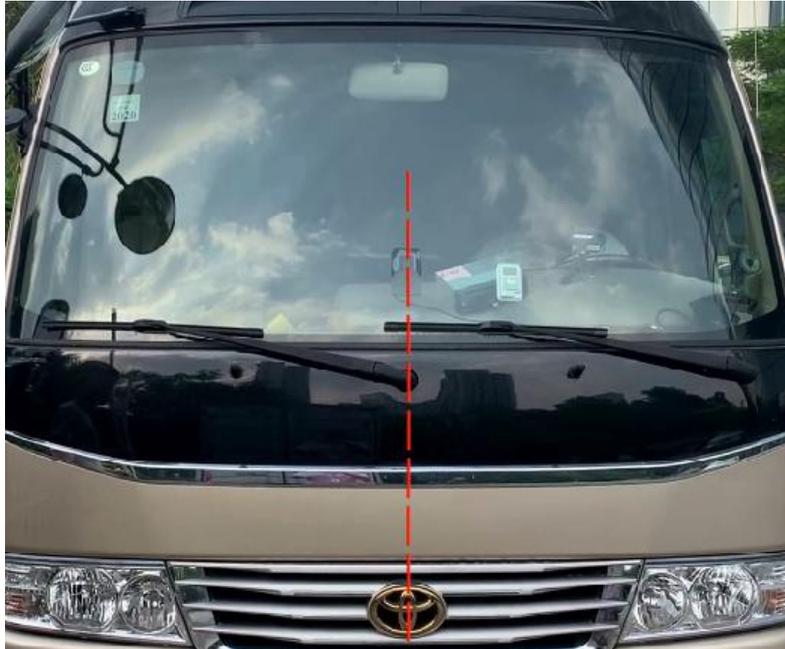


4. Make sure that ADAS is installed within the working area of the left and right windshield wipers (so as to ensure that the area within the range of the ADAS camera lens can be cleaned by the windshield wiper).
5. For ADAS, the optimum installation height is 150 cm - 240 cm and the optional one is 120 cm - 260 cm.

5.1.2 Requirements for Installation Details

There are several methods to determine the centerline of the front windshield of a vehicle:

1. Generally, there are symmetrical air outlets on the dashboard near the front windshield. The centerline of the front windshield can be found based on the symmetry of the air outlets.
2. The centerline of the front windshield can be determined through the vehicle emblem, as shown in the figure below:



3. If the centerline cannot be determined by the above method, the following traditional method can be adopted:
Measure the width of the front windshield with a steel tape to locate the center point of the front windshield, and then locate and mark horizontal center point 1.



Next, in the vertical direction, locate another horizontal center point 2 on the front windshield at least 20 cm away from center point 1. Connect center points 1 and 2 with a mark pen, to draw the centerline of the front windshield.



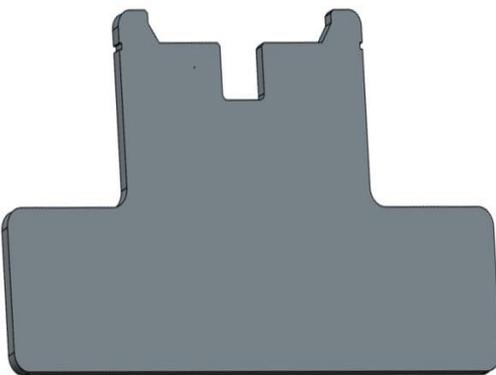
5.1.3 Installation Steps

After the installation area and the centerline are determined, the following shall be done:

1. Clean the interior and exterior of the glass in the target installation area with alcohol cotton in the packaging (to ensure that no dirt will affect the angle of view of the ADAS camera lens), and ensure the glass in the wiping area is dry.
2. Tear off the 3M adhesive film on the ADAS camera lens, and then stick the ADAS camera horizontally and vertically on the front windshield.
 - (1) If there is no special mounting bracket for ADAS installation, it is recommended that one person should stand outside the vehicle to observe whether the ADAS camera is installed horizontally and vertically, and the person in charge of ADAS camera installation should make fine adjustments to ensure that the camera is indeed installed horizontally and vertically, and then can press the ADAS camera tightly to ensure no bubble between the 3M adhesive tape and the glass.



- (2) If there is a special mounting bracket for ADAS (as shown in the figure below), the following steps are implemented: Place the mounting bracket vertically on the dashboard below the target installation area, and then tear off the 3M adhesive film on ADAS, and align the lower edge of the ADAS camera to the notched ADAS fixing seat above the special bracket. Finally, press the camera onto the glass continuously to ensure no bubble between the 3M adhesive tape and the glass.



Note:

The ADAS camera must be installed horizontally and vertically; otherwise, the ADAS algorithm will be greatly affected due to a skew angle of view of the ADAS screen.

5.1.4 Calibration Requirements

There are two calibration methods for ADAS:

One is the long-distance calibration method. This method applies if the installation site is open and has at least a 30m flat road section.

One is the short-distance calibration method. This applies if the installation site has limited conditions and a 5m or less flat road section.

The two calibration methods are introduced below. To ensure the calibration effect and the recognition effect of ADAS, if conditions permit, the "long-distance calibration method" is preferred.

5.1.4.1 Long-distance calibration method (20m/30m/40m)

Application scenario: The installation site is open and has at least 30m flat road section. To ensure the calibration accuracy, this method is preferred.

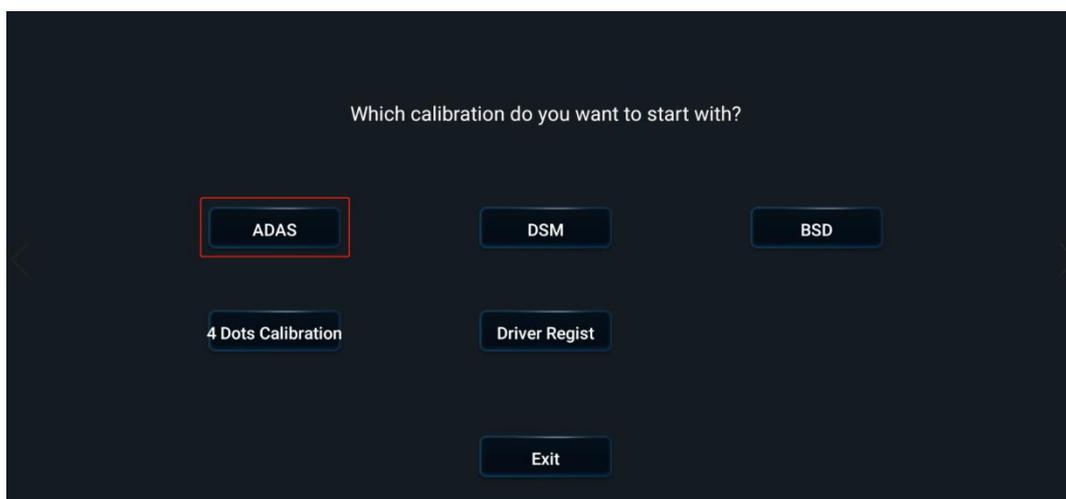
Calibration process:

Log into the Veyes APP to enable the ADAS calibration process.

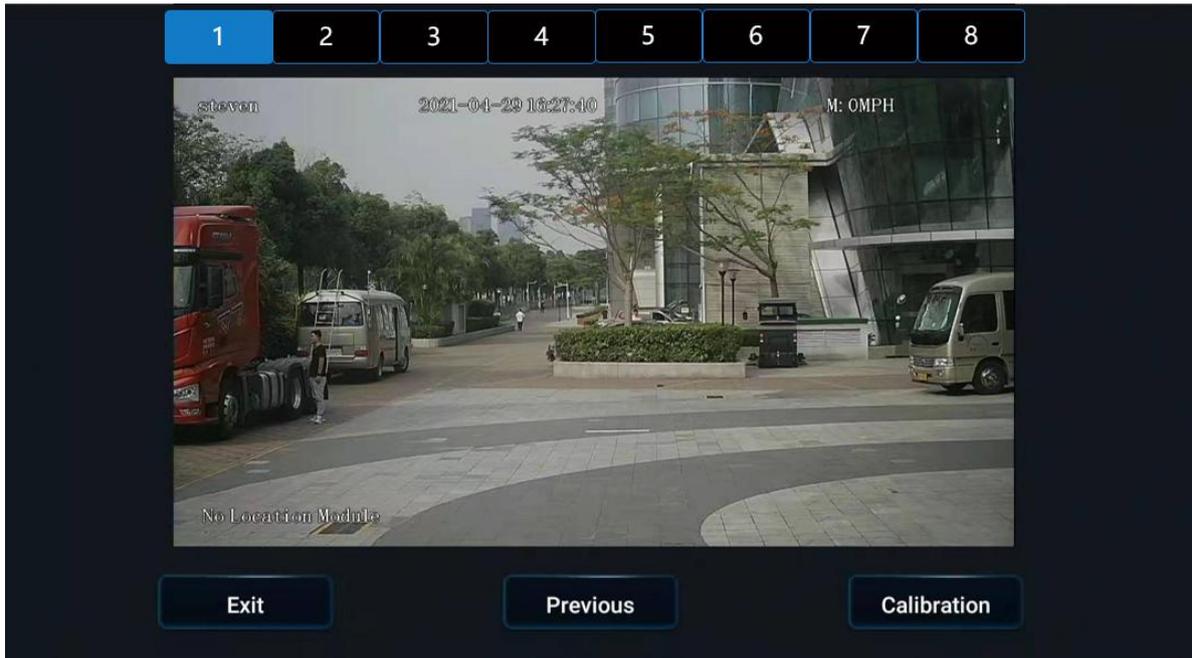
1. Click [Preview] on the homepage to enter the preview interface, and then click [AI Calibration] on the lower left corner of the screen for calibration selection.



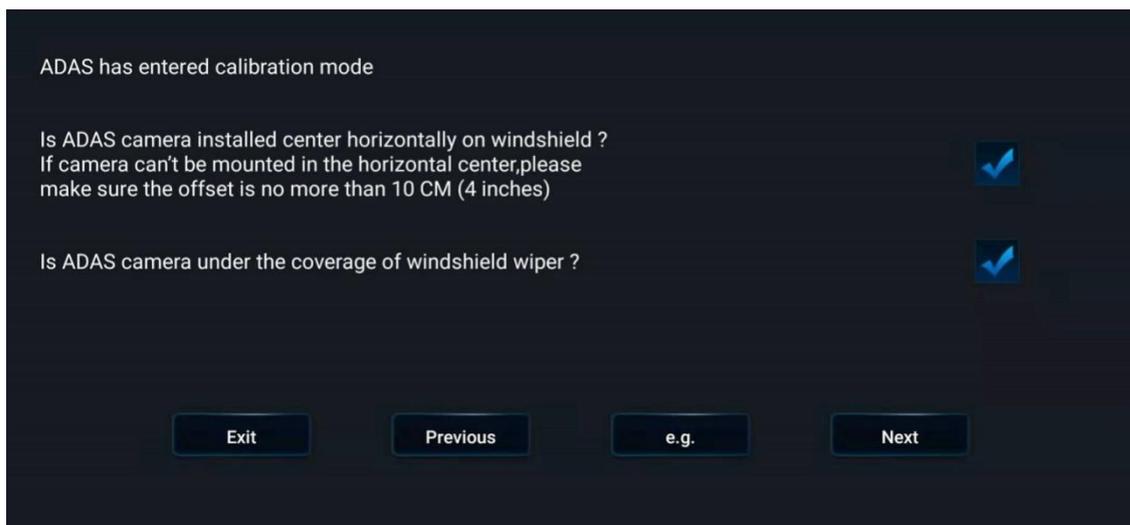
Enter the real-time preview interface and double-click the ADAS channel screen to enter the main stream, and then click "AI Calibration" at the lower left corner of the screen to enter the AI calibration selection interface for ADAS calibration.



2. Select calibration channel. Since ADAS cameras are all installed in channel 1, select channel 1 here. Next, click "Calibration" at the lower right corner of the screen to enable the calibration process.



3. Confirm that ADAS is installed at a reasonable position on the front windshield and is within the working range of the windshield wiper.

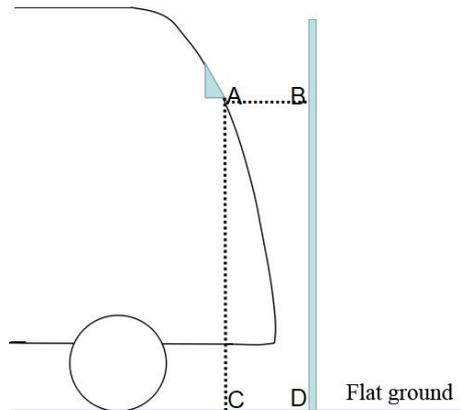


4. Measure the installation height of ADAS (it should be noted that the height refers to the height of the camera lens to the ground, accurate to cm/inch), and enter this value on the interface of the EasyCheck App.

The specific method for measuring the installation height of camera lens is as follows:

As shown in the figure below, mark the position of ADAS camera lens as A. Keep a telemeter rod BD upright (be identified by level bubble) at a short distance (about 20 cm) in front of the vehicle corresponding to the camera. Keep a steel tape measure perpendicular to BD to measure the distance between A and B, so as to obtain distance |AB| and installation height |BD| of lens. The direction of AB is perpendicular to the vehicle head and is right ahead of the camera.

According to $|CD|=|AB|$, keep a tape measure perpendicular to point D to determine position C of the camera on the ground from point D, and make a mark.



Enter the measured installation height $|BD|$ of lens on the interface of EasyCheck App, which is taken as 203cm in this installation.

Note: It shall be ensured that the measuring tool for measuring ADAS height is upright, and the measuring point is at the lens, not the upper or lower edge of ADAS shell.

Please input the height of ADAS camera :
(from camera lens to the ground)

Metric system: (100 - 400) CM

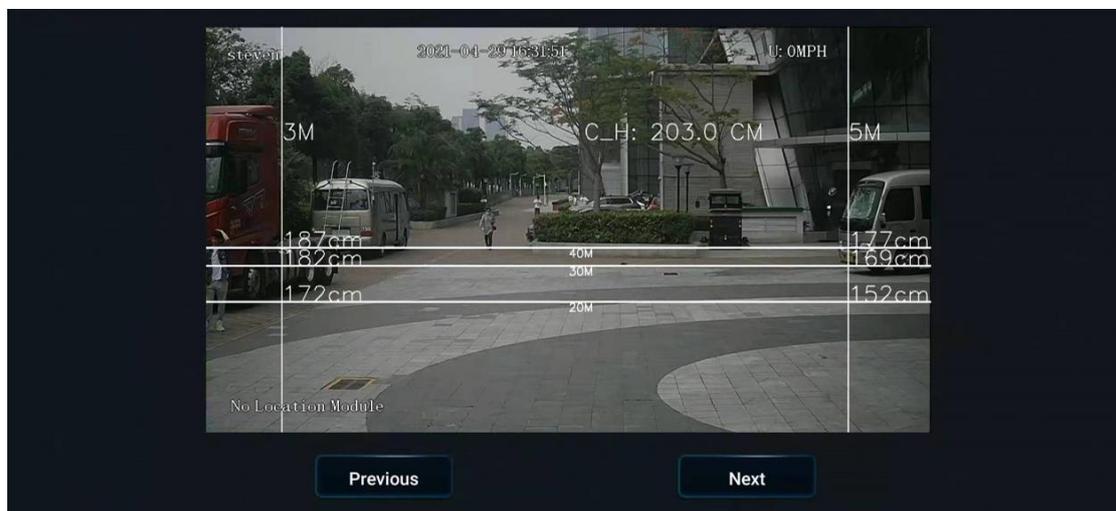
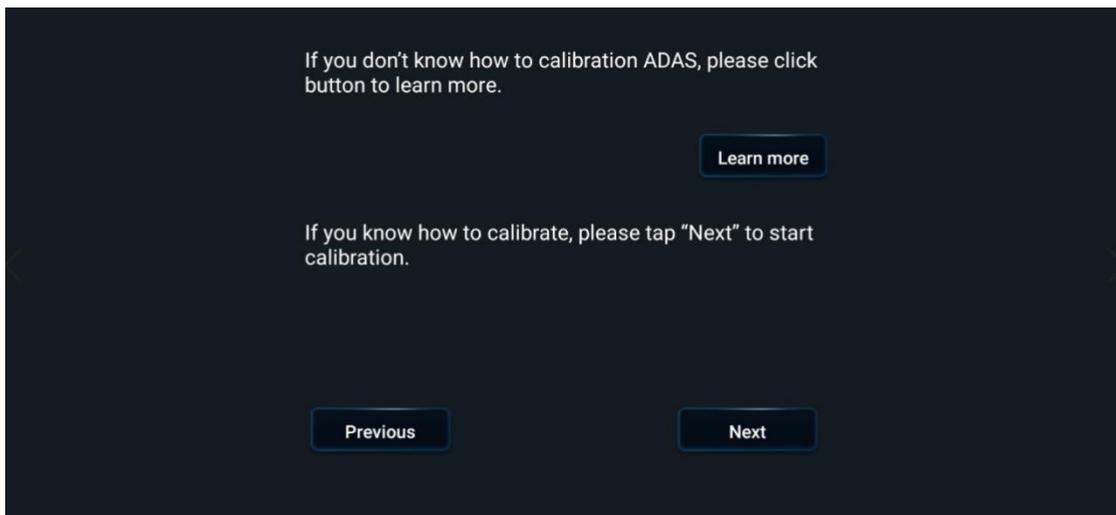
or

British system: (39 - 157) inches

5. Use a leather measuring tape to pull the line forward from the point (point C) of ADAS lens to the ground in the direction parallel to the vehicle body, and set obvious marks at the position of 20m and 30m respectively. It is recommended to use a conspicuous rod for marking.



After entering the installation height of lens, click "Next" on the operation interface of EasyCheck App to enter the following interface. You can view the ADAS calibration tutorial on this interface. If you know how to calibrate, continue to click "Next".



Open the back cover of ADAS camera and adjust the angle of ADAS lens to make the 20m calibration line in ADAS calibration screen coincide with the mark point at 20m on the ground, and the 30m calibration line in ADAS calibration screen coincide with the mark point at 30m on the ground.



- After that, click "Next", select the source of speed according to the actual installation situation, set the left and right turn signal parameters, and then click "Next". In the next interface, check whether the left and right turn signals are valid according to the prompts. After checking, click [Complete] to exit the calibration interface.

ADAS exits calibration mode and enters normal mode

Did you connect vehicle left/right turn signal to MDVR ?

Please select the source of speed: Satellite

Which IO did you connect turn signal to ?

Left Turn : I01

Right Turn : I02

Please select the turn signal type: Source Pulse

Exit Next

Turn on left signal and then right signal to check the connection, message will be shown in area below if the connection is good. Please check connection again if nothing shows up.

No signal detected

Previous Complete

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

At this point, tighten the screws for adjusting the ADAS angle and the screws of the back cover to complete the long-distance calibration.

5.1.4.2 Short-distance calibration method (3m/5m)

Application scenario: The space of installation site is limited, but there is at least 5m flat road surface. Although 3m or 5m can be selected for short-distance calibration, 5m is preferred in order to ensure calibration accuracy. The following is introduced with short-distance calibration (5m).

Principle of short-distance calibration:

When the long-distance calibration method is used, a mark point (point K as shown in the figure below) will be set 20m/30m/40m forward from the point of the ADAS lens (point A as shown in the figure below) to the ground (point C as shown in the figure below), and the 20m/30m/40m

calibration line in the ADAS screen will be adjusted to match the corresponding mark point on the ground.

In case of short-distance calibration, it is limited by the environment of the installation site, and it is impossible to set mark points at 20m/30m/40m. According to the principle of similar triangle, when a telemeter rod is set at 3m/5m (as shown at point F below), corresponding height |HF| of line AK can be found on the telemeter rod. In this way, the 20m/30m/40m calibration line in the calibration screen can coincide with the mark point H on the telemeter rod at point F by adjusting the angle of ADAS lens, and thus long-distance calibration can be realized in case of short-distance calibration (3m/5m). The calculation method is as follows:

As shown in the following figure, mark the position of ADAS camera lens as A, the projection position of A on the ground as point C, the setting position of telemeter rod as point F, and the 20m or 30m mark point in the long-distance calibration method as point K.

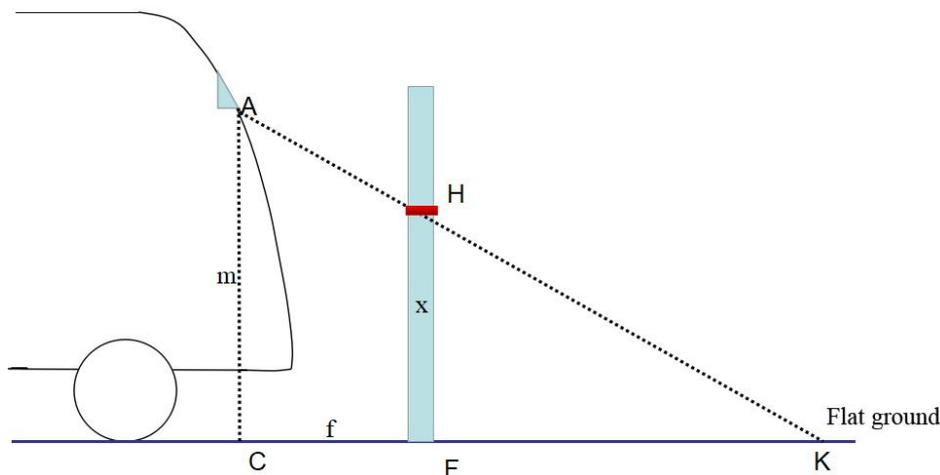
Take |CF|=5m and |CK|=20m as an example:

C. With F and K in the same straight line, |CF|=5m and |CK|=20m, |AC| can be measured and taken as 203cm, and thus |HF| can be obtained according to the similar triangle formula.

$$|HF|/|AC|=|FK|/|CK|$$

Then, $|HF|=(|AC|*|FK|)/|CK|$, and $|HF|=152.25\text{cm}$ after plugging in the values.

This means that the effect of setting the 20m calibration line on the ground can also be achieved, provided that a telemeter rod is placed 5m in front of the ADAS lens, the height position (152cm) on the telemeter rod is marked, and the angle of the ADAS lens is adjusted to make the 20m calibration line in the calibration screen coincide with the height position (152cm) on the telemeter rod.



Note: The software will automatically calculate the mapping height of 20m/30m/40m calibration line on the telemeter rod according to the above principle of similar triangle when the telemeter rod is set at |CF|=3m/5m respectively, as shown in the following figure.



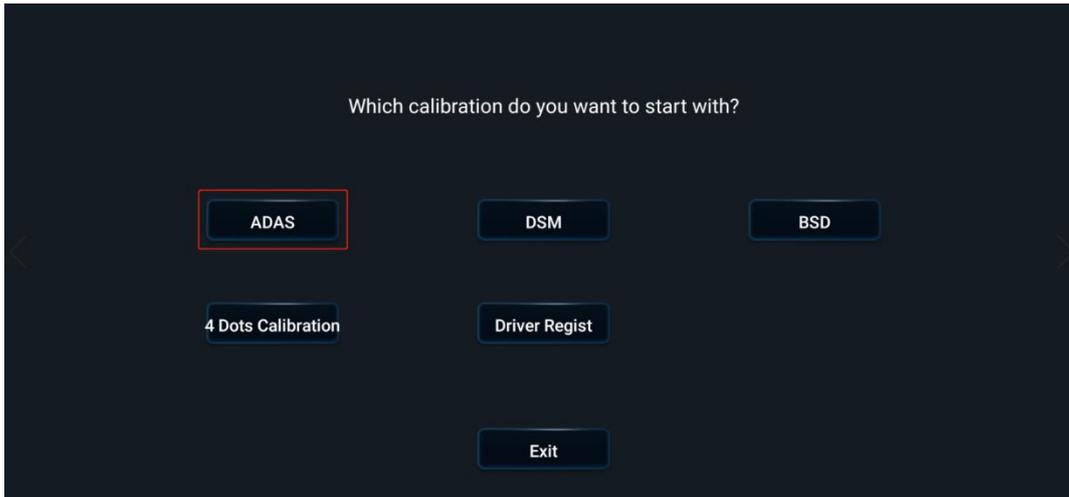
Calibration process:

Log into the Veyes APP to enable the ADAS calibration process.

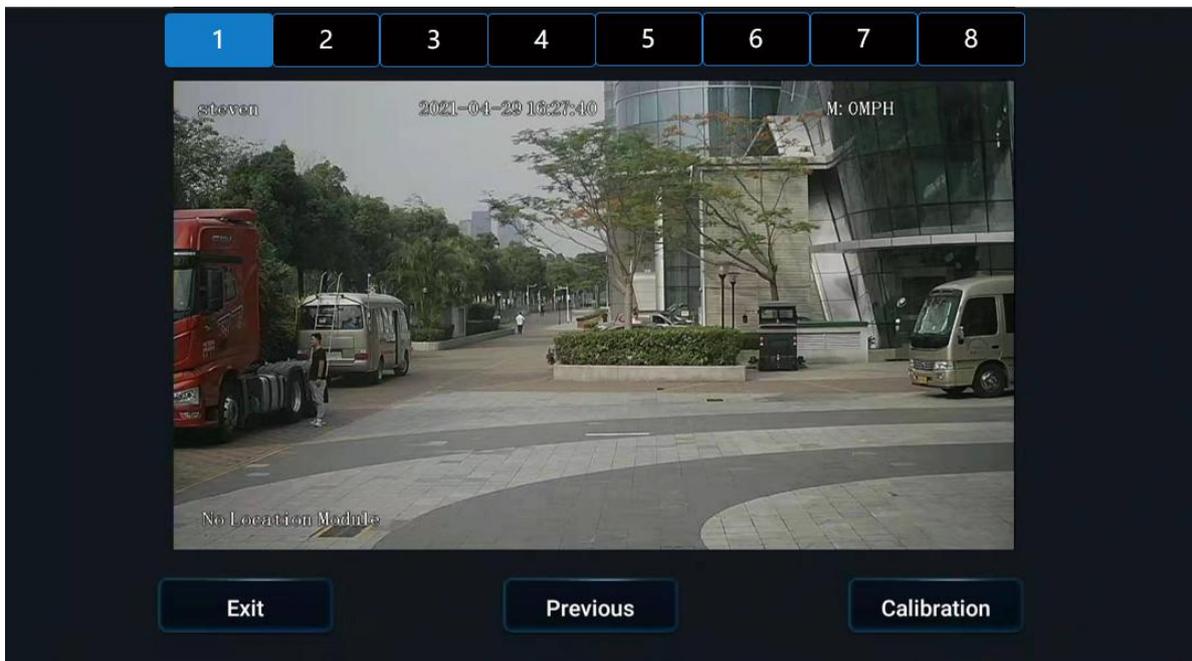
1. Click [Preview] on the homepage to enter the preview interface, and then click [AI Calibration] on the lower left corner of the screen for calibration selection.



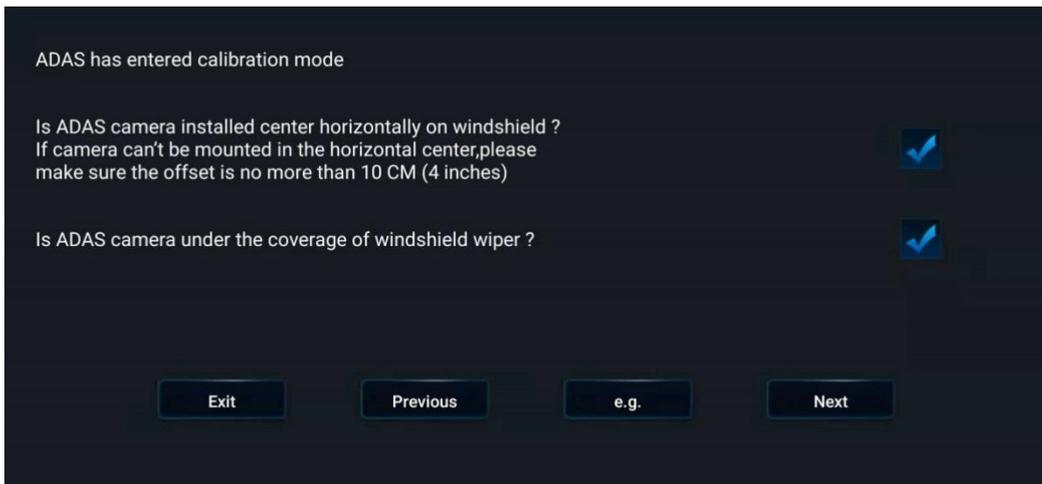
Enter the real-time preview interface and double-click the ADAS channel screen to enter the main stream, and then click "AI Calibration" at the lower left corner of the screen to enter the AI calibration selection interface for ADAS calibration.



2. Select calibration channel. Since ADAS cameras are all installed in channel 1, select channel 1 here. Next, click "Calibration" at the lower right corner of the screen to enable the calibration process.



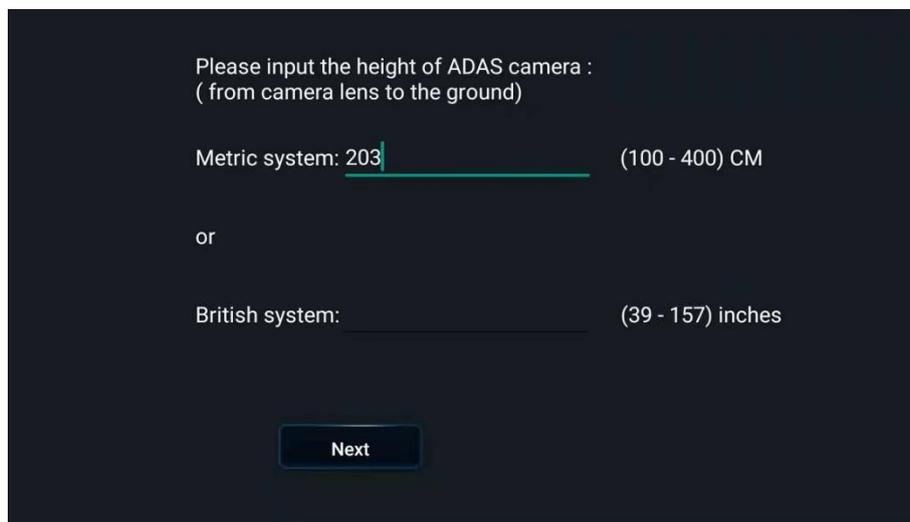
3. Confirm that ADAS is installed at a reasonable position on the front windshield and is within the working range of the windshield wiper.



4. Measure the installation height of ADAS (it should be noted that the height refers to the height of the camera lens to the ground, accurate to cm/inch), and enter this value on the interface of the EasyCheck App.

The method for measuring the installation height of lens is the same as that used in long-distance calibration, and will not be repeated here.

Enter the measured installation height |BD| of lens on the interface of EasyCheck App, which is taken as 203cm in this installation.



5. Pull a 5m line forward from the point of the ADAS lens to the ground in the direction parallel to the vehicle body, set the telemeter rod with height scale at 5m vertically, and read the value at the intersection of the horizontal 20m calibration line and the vertical 5m calibration line in the ADAS screen, which is 152cm. Then set an obvious mark point at 152cm on the telemeter rod. It is recommended to use a conspicuous rod for marking.



- Open the back cover of ADAS camera, and adjust the angle of ADAS lens to make the 20m calibration line in ADAS calibration screen coincide with the mark point at 152cm on the vertical telemeter rod at 5m.



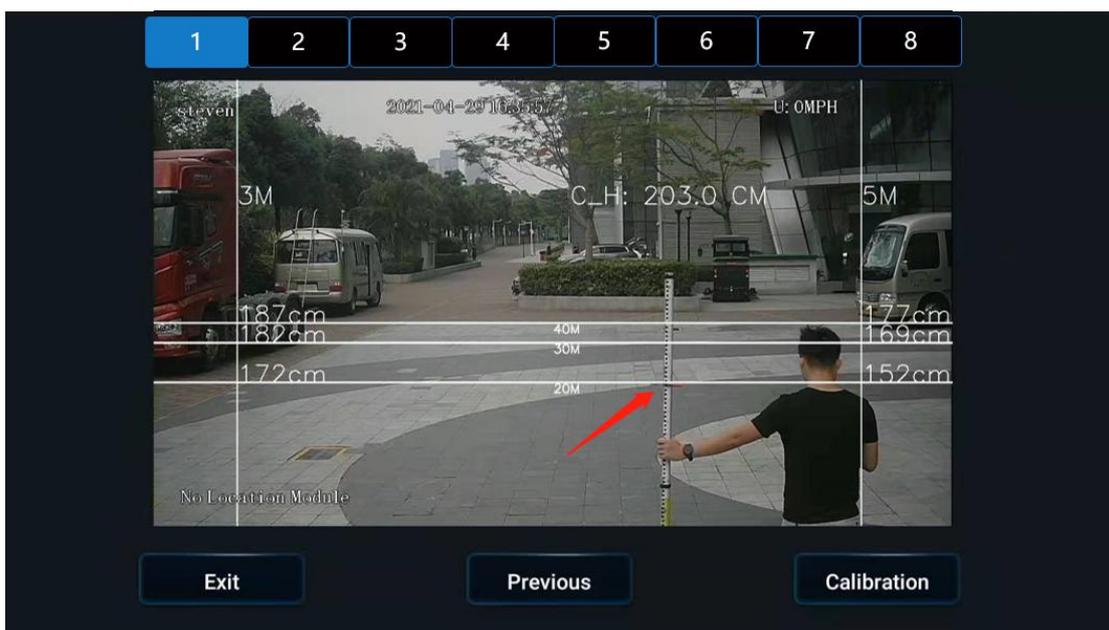
1. Dismantle the screw



2. Remove the back cover



3. Unscrew the screw and adjust the lens



- After that, click "Next", select the source of speed according to the actual installation situation, set the left and right turn signal parameters, and then click "Next". In the next interface, check whether the left and right turn signals are valid according to the prompts. After checking, click [Complete] to exit the calibration interface.

ADAS exits calibration mode and enters normal mode

Did you connect vehicle left/right turn signal to MDVR ?

Please select the source of speed:

Which IO did you connect turn signal to ?

Left Turn :

Right Turn :

Please select the turn signal type:

Turn on left signal and then right signal to check the connection, message will be shown in area below if the connection is good. Please check connection again if nothing shows up.

No signal detected

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

At this point, tighten the screws for adjusting the ADAS angle and the screws of the back cover to complete the short-distance calibration.

5.2 DMS Camera

5.2.1 Requirements for Installation Position

1. If the A-pillar camera (CA29M, the recommended model in general) is selected, the DMS camera shall be installed on the A-pillar on the driver's side, with the side facing the driver's face.
2. The DMS camera lens shall be 80-110 cm away from the driver's face.
3. The installation height of the DMS camera on the A-pillar shall be flush with the driver's face.



5.2.2 Requirements for Installation Angle

Auxiliary adjustment through real-time preview screen after the equipment is powered on:

1. Adjust the angle of the DMS camera up and down, and left and right, to ensure that the driver's face appears in the middle of 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 faces towards the driver's face (the fill light shall not face towards the seat belt; otherwise, it will lead to overexposure of video).
3. Make sure that there is no other object (such as steering wheel) in the DMS video screen that will block the driver's face and the seat belt features.

5.2.3 Requirements for Installation Details

1. In the event of installation on A-pillar (crescent-shaped CA29M), the labeling surface of the DMS camera must face toward the A-pillar (with the arc side facing toward the driver).
2. In the event of installation on countertop (crescent-shaped CA29M/CL29M), the labeling side of the DMS camera must face down (with the arc side 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 a socket head wrench to avoid shaking up and down, and left and right.



Installation on left A-pillar: with the arc side facing toward the cabin and the wire end at the bottom



Installation on countertop: with the arc side up

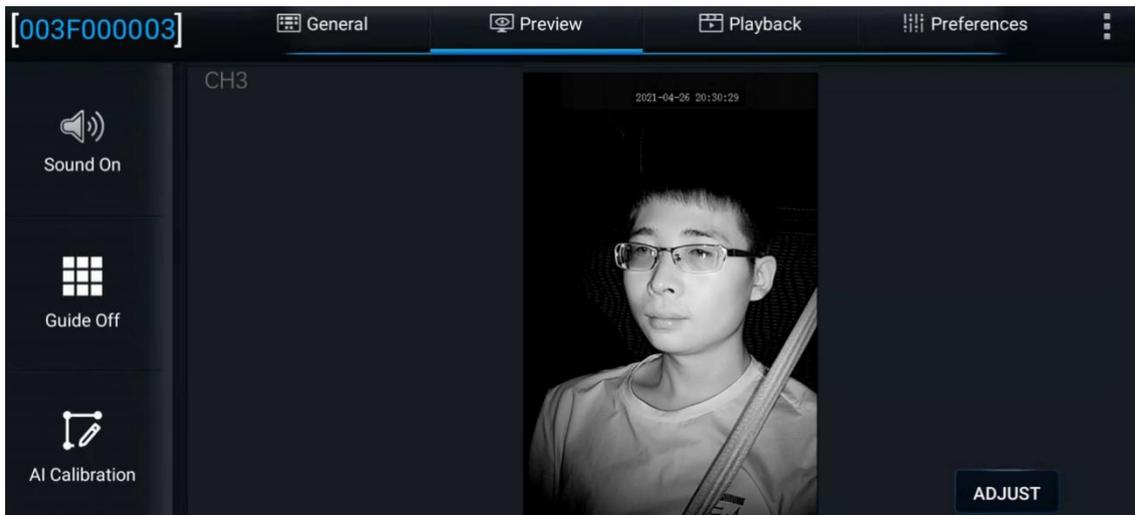


Installation on right A-pillar: with the arc side facing toward the cabin and the wire end at the top

5.2.4 Installation Steps

1. First, power on the equipment and connect the equipment with the APP. Enter the real-time preview screen, and first check whether the driver stands right side up in the screen when

the target installation position and the labeling side of the camera face toward the A-pillar (with the arc side facing toward the driver).



2. If the driver stands right side up in the screen, there is no need to set the installation type of DMS camera. Directly move on to step 3.

If the driver stands upside down in the screen, click [Setup] > [Surveillance] > [Image Setup] in sequence, and then select corresponding channel of the DMS camera. For example, if the DMS camera model is crescent-shaped CA29M, the camera type here will be "CA29M" by default, and then select the corresponding installation position at "Install Pos":

In the event of installation on the left A-pillar, select "Left A-pillar".

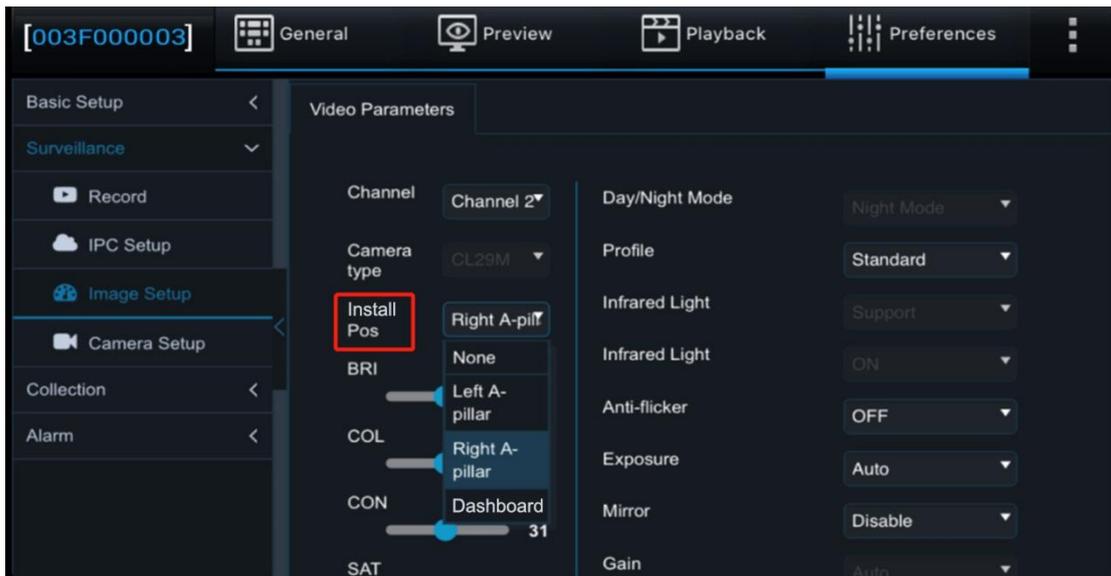
In the event of installation on the right A-pillar, select "Right A-pillar".

In the event of horizontal installation of CA29M camera on the dashboard, select "Dashboard".

***Note:**

After the corresponding correct installation position is selected according to the installation requirements, if the driver stands upside down in the screen, never adjust the angle by modifying or turning over the mirror image in the image setup.

Be sure to select the corresponding correct installation position at "Install Pos" after selecting the corresponding channel. If your selection is correct, the screen will turn over automatically and normally.



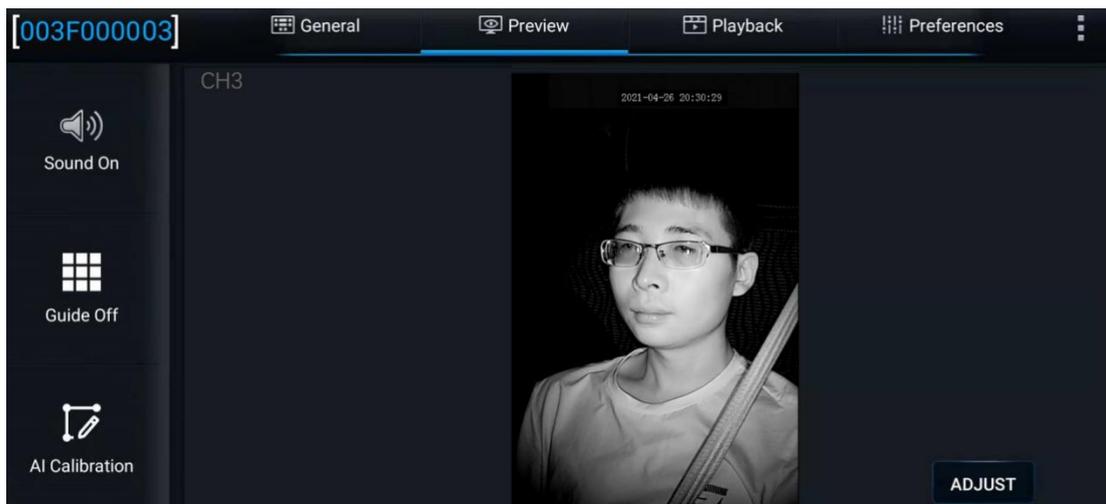
3. After the appropriate installation position meeting the above requirements for installation details is determined through the DMS camera screen, first tighten the upper screw of the DMS camera mount (with the lower screw of the mount not tightened temporarily, so as to adjust the angle of the camera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



4. 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.



5. After adjusting the angle of the DMS camera up and down/left and right, make sure that the driver sits according to normal driving habits and posture, to meet the following conditions:
- (1) Make sure that the driver's face appears in the middle of 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 faces toward the driver's face (the fill light shall not face toward the seat belt; otherwise, it will lead to overexposure of video).
 - (3) There is no other object (such as steering wheel) in the DMS video screen that will block the driver's face and the seat belt features.
6. Tighten the lower screw of the DMS camera mount and the screws at the left and right angle joints to ensure that the camera will not shake up and down or left and right.



5.2.5 Calibration Requirements

Log in to the EasyCheck App.

1. **Click [Preview] on the homepage to enter the preview interface.**

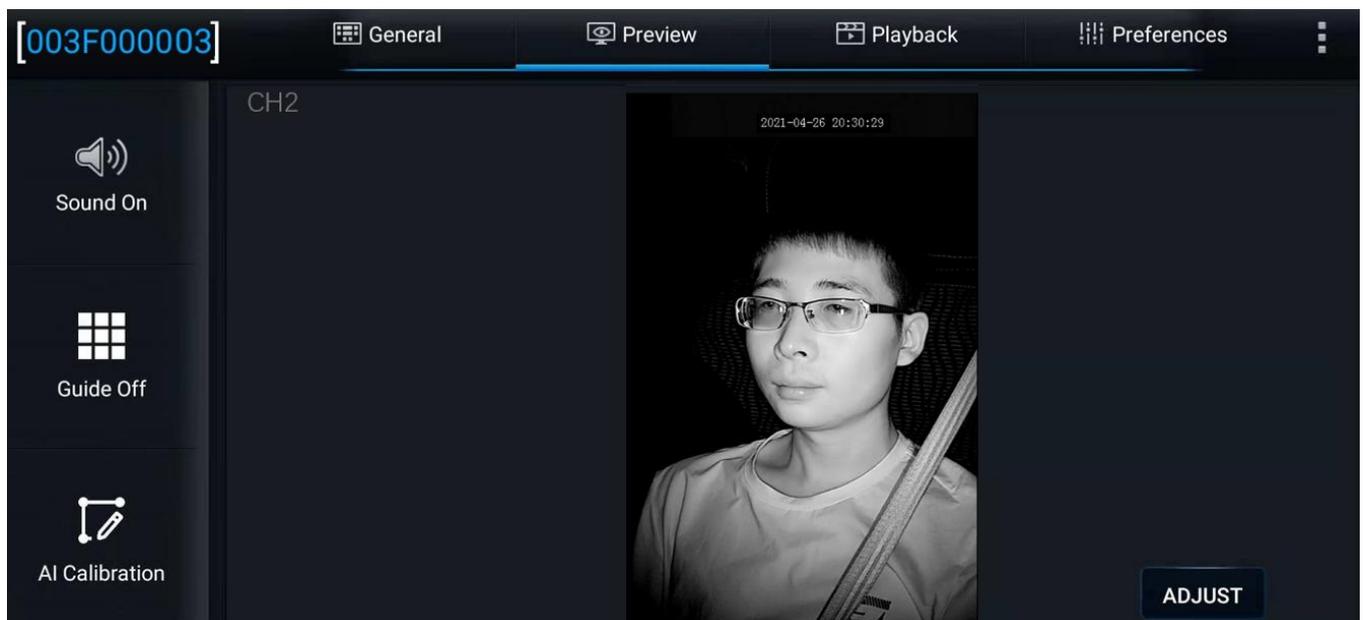
Double-click the driver channel to enter the main-stream full screen.

Adjust the angle of the DMS camera so that the driver's face appears in the middle of the screen and the lower edge of the screen is below the driver's chest.

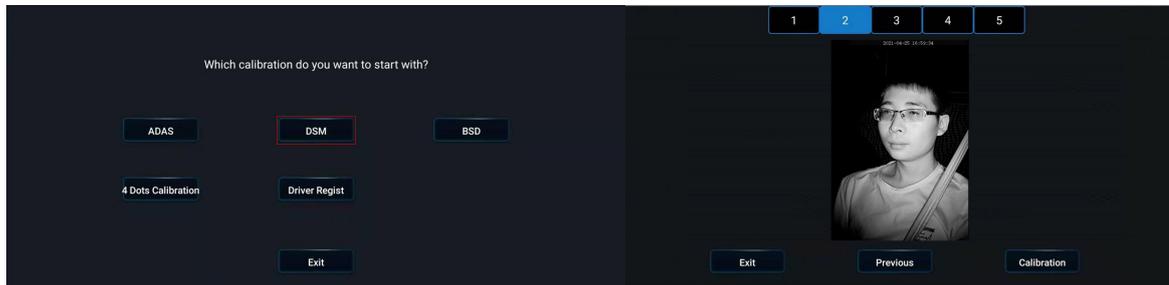
Make sure that the fill light of the DMS camera faces toward the driver's face (the fill light shall not face toward the seat belt; otherwise, it will lead to overexposure of video).

Make sure that there is no other object (such as steering wheel) in the DMS video screen that will block the driver's face and the seat belt features.

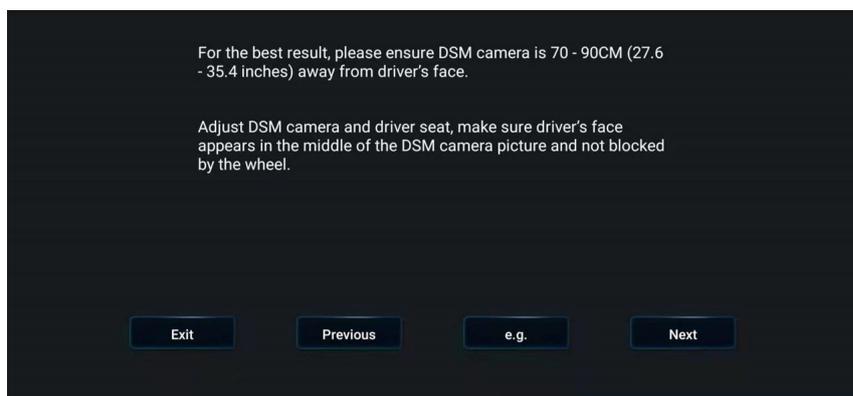
2. Click [AI Calibration] for calibration selection.



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

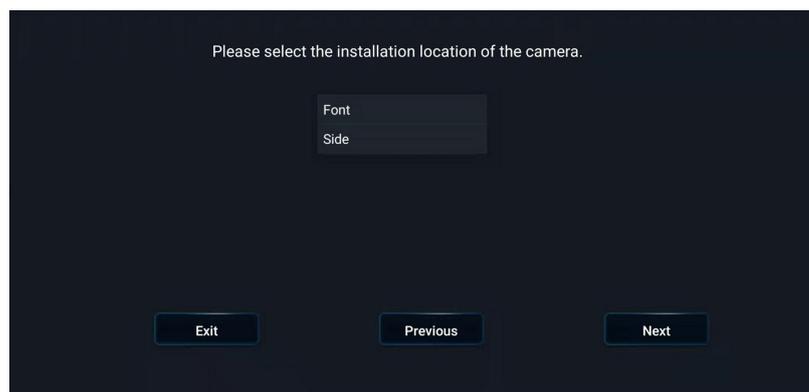


6. Confirm the prompts — click [Next] to move on to the next step.



7. Select [Front] or [Side] to determine the installation method of DMS camera.
If the camera is installed on the A-pillar, select "Side" for side calibration.
If the camera is installed right in the middle of the dashboard, select "Front" for front calibration.

(Make sure the correct one is selected, as this step is very important.)



***Note:**

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

Never select front calibration if side installation is selected. The driver shall turn the head sideways to face toward the camera to complete the calibration.

8. Click [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 the positions of feature data of the driver's face. If the driver moves his head during the calibration, the calibration will restart automatically.

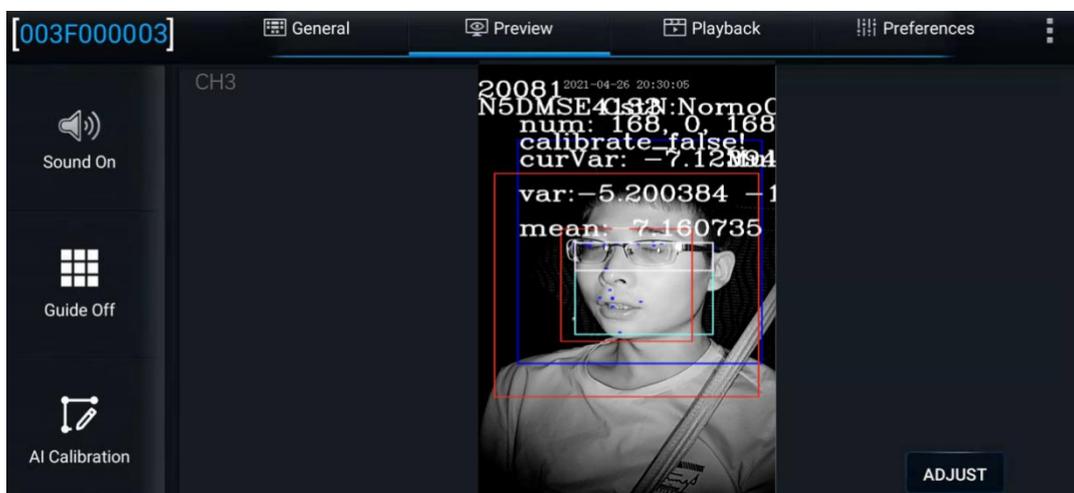
***Note:**

In the side calibration mode, there must be an angle between the driver's face and the camera to complete the calibration.

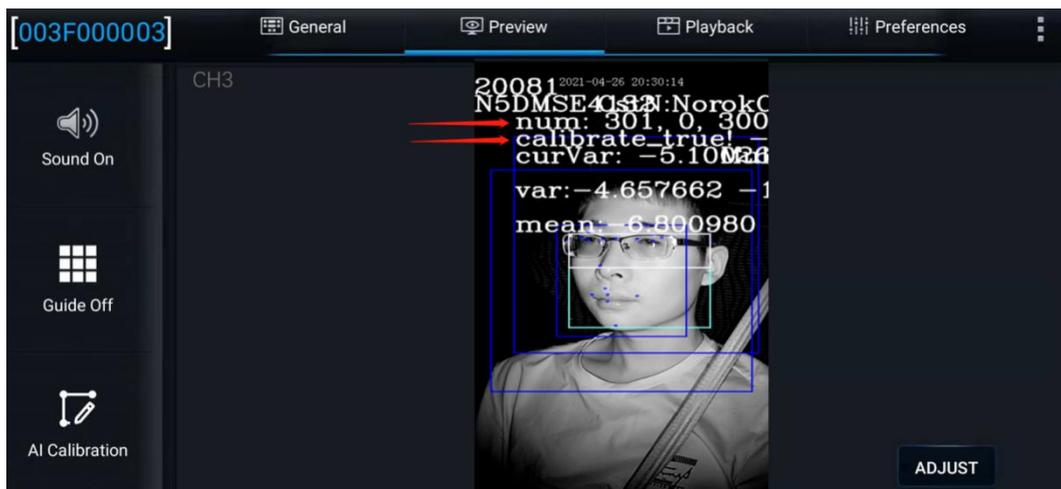
In the front calibration mode, the camera must be in front of the camera to complete the calibration.

The driver sits still and waits for the equipment 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 automatic calibration ends.

Calibration is ongoing:



Calibration is completed:



Click [Finish] to complete the calibration and exit the calibration mode.

5.3 Side BSD Camera

*Before installation and calibration of the BSD camera, it must be ensured that the vehicle is parked on the flat ground, and it is forbidden to park the vehicle on a slope or at the location with a cavity for BSD installation and calibration.

5.3.1 Applicable Model

The side BSD system is suitable for rigid carbody. (The compartment and the vehicle head are integrated. For the non-trailer type, the compartment can be at different angles to the carbody.)

5.3.2 Requirements for Installation Position

- (1) The BSD camera is suitable for installation at the left/right tail of the carbody. The lens shall face forward and be installed at the height of $195\text{ cm} \pm 15\text{ cm}$ to the ground.
- (2) The BSD camera must be installed vertically.
- (3) The installation position of BSD camera on the carbody shall be flat without any inclined arc surface, and be convenient for drilling and wiring.



5.3.3 Requirements for Installation Details

- (1) The side BSD camera can be installed on the left or right side of the carbody. Although the cameras used are of the same specification and model, they can be of different structures to match different sides of vehicle.

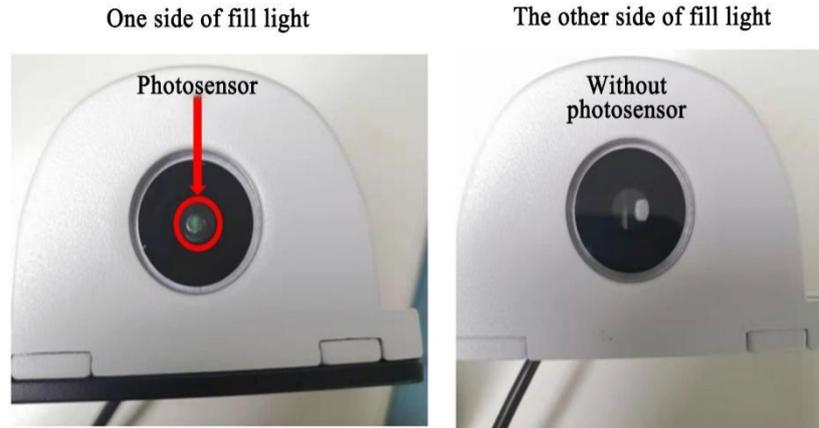
As shown in the figure below, "B" is in the red circle of the label, indicating that the camera is installed on the right side.

As shown in the figure below, "A" is in the red circle of the label, indicating that the camera is installed on the left side.



- (2) The BSD camera consists of two parts: lens and fill light, so it needs to be assembled. The camera must be assembled with the lens at the upper part and the fill light at the lower part, regardless of left or right camera. Moreover, the photosensitive side of the fill light must face down.





- (3) During installation of the BSD camera, the BSD camera base can first be installed with the round hole at the upper part and the waist hole at the lower part (so as to facilitate adjustment left and right, and thus ensure the vertical installation of BSD).



5.3.4 Installation Steps

1. Park the vehicle on the flat ground.
2. Select the appropriate installation position according to the actual situation of the vehicle, and install the BSD camera at the left/right tail of the carbody, with the installation height of 195 ± 15 cm to the ground (during installation, consideration shall be given to convenient drilling on the carbody and easy arrangement of outgoing line in the vehicle).
3. At the selected installation position, drill the first hole with a 2.8mm drill bit, and then properly fix the camera mount. Make sure that the round hole is at the upper part and the waist hole at the lower part, as shown in Fig. 1 below.
4. Align the mount with a level, and drill the remaining three screw holes. At the same time, drill a tail harness inlet hole for the camera at the appropriate position with an 18mm taper,

and then apply glass sealant to the screw holes on the carbody. Finally, tighten the mount screws, as shown in Fig. 2 below.

5. Fix the camera on the mount (first apply excessive glass sealant to the inlet hole), and measure the installation height of the lens, as shown in Fig. 3 (at the height of 203 cm) below.



Fig. 1

Fig. 2

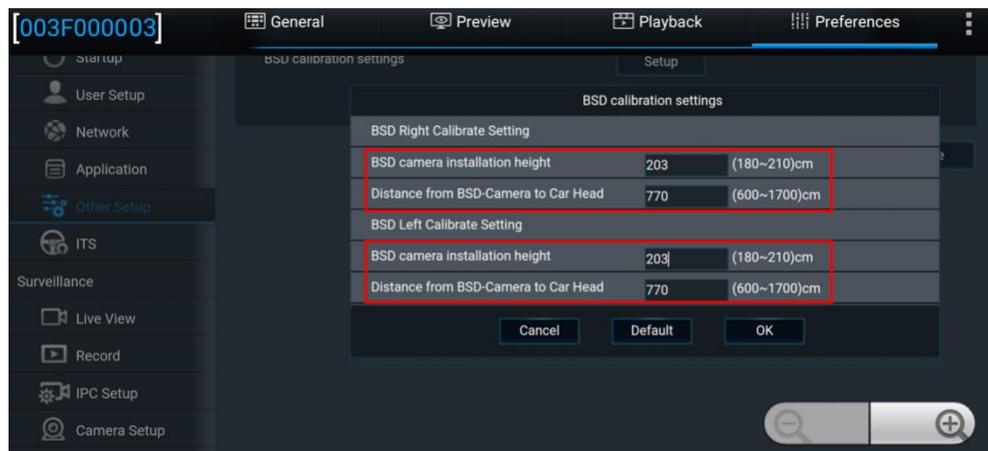
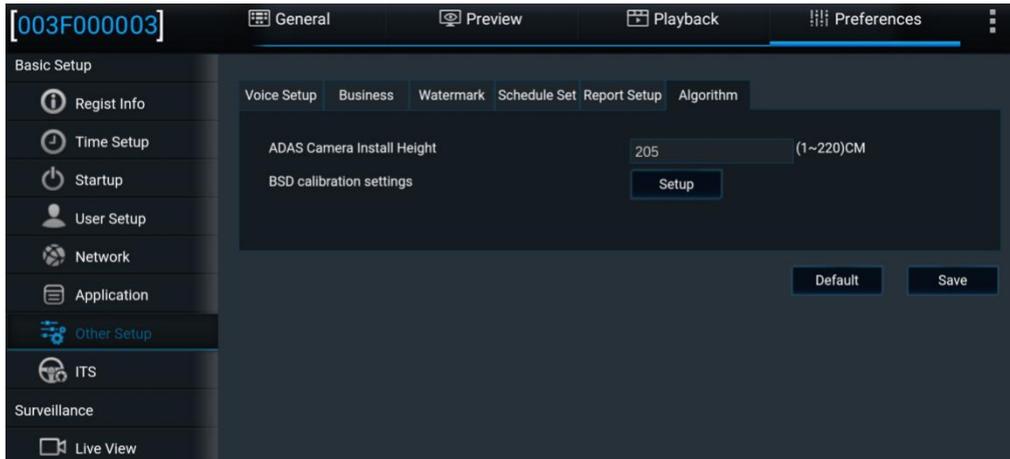
Fig. 3

5.3.5 Calibration Requirements

1. Measure the distance between the point of the BSD camera lens relative to the ground and the vehicle head and the installation height of the camera (i.e. height from the camera lens to the ground, accurate to cm).



2. Click "Setup - Basic Setup - Other Setup – Algorithm – BSD Install Height" in sequence, and then enter the following two values: distance between the point of the BSD camera lens relative to the ground and the vehicle head, and installation height of BSD camera.

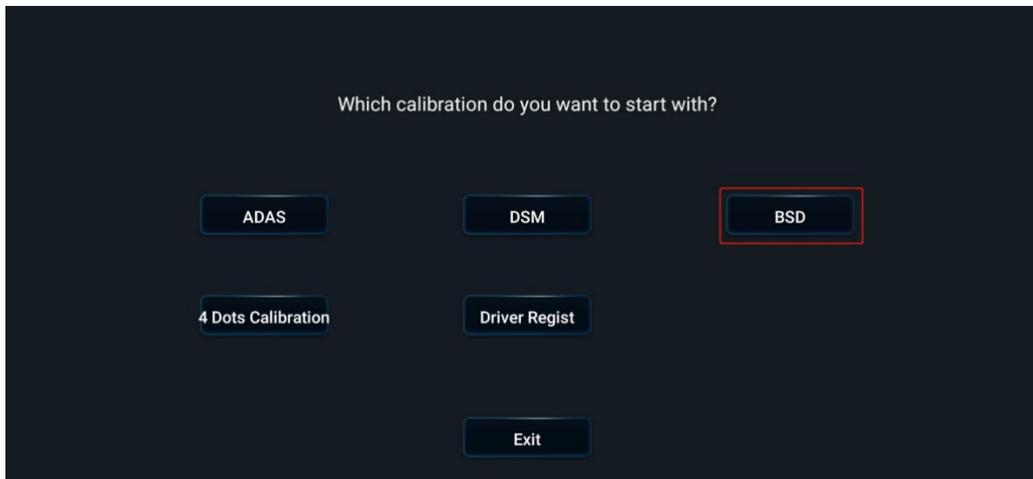


3. Place a marker close to the side of the vehicle at 2m in front of the vehicle head, as shown in the left picture below.
4. Start and connect the equipment, and preview the picture through the EasyCheck App, as shown in the right figure below.

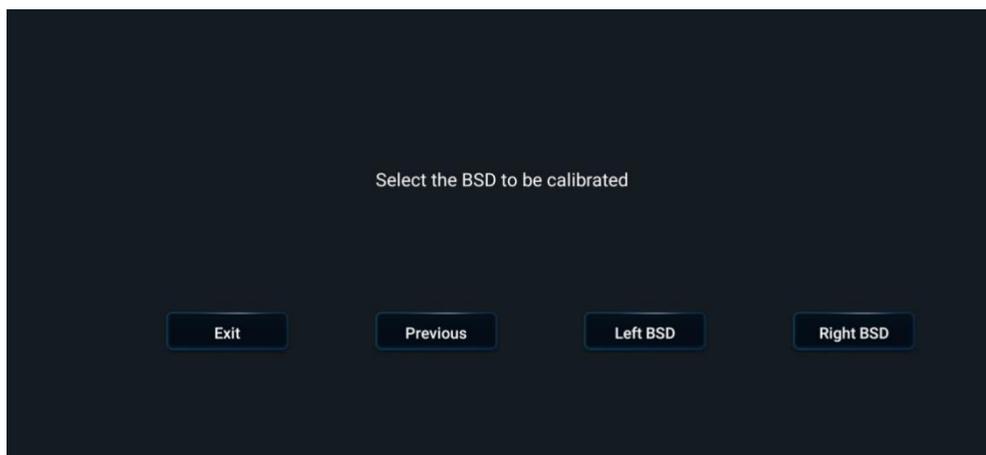




- 5. On the preview interface, click "AI Calibration" and select "BSD Calibration", as shown in the figure below:

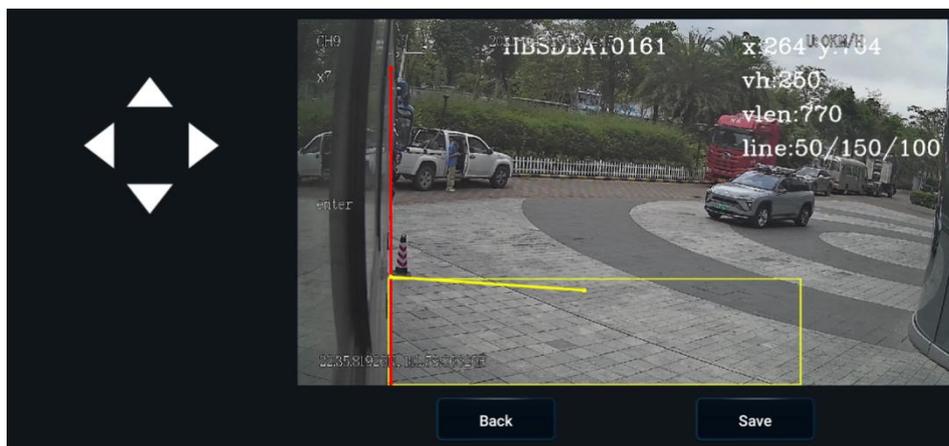


- 6. Select the left or right BSD to be calibrated, and enter the real-time preview screen. Here, take the right BSD as an example.





- On the real-time preview screen of BSD, click "Calibration" at the bottom of the real-time screen, At this point, a vertical red line, a horizontally inclined yellow line and a yellow box appear on the screen, and "Up", "Down", "Left" and "Right" buttons appear on the left side of the screen:



- Click the "Left" and "Right" buttons on the left side of the screen to move the "red vertical line" in the real-time screen until it just fits the edge of the carbody, and then click the "Up" and "Down" buttons to move the "yellow inclined line" in the real-time screen until it just coincides with the mark point on the ground at 2m away from the vehicle. (As shown above, the "vertical red line" coincides with the edge of the vehicle in the screen, while the "inclined yellow line" coincides with the traffic cone mark point on the ground at 2m away from the vehicle.)

Confirm that the "red vertical line" and the "yellow inclined line" fit corresponding edges well, and then click "Save". Return to the real-time preview screen.

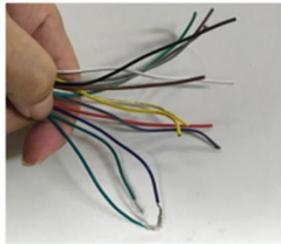
At this point, the BSD calibration ends, and the alarm speed threshold can be changed to 0 to test the alarm trigger.

6. Process Requirements

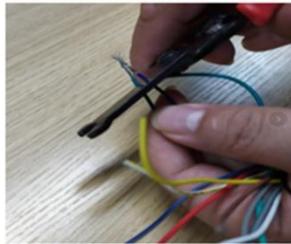
6.1 Treatment Standard of Unused Connection Wire Ends

1. All unused signal connection wire ends must be wrapped. Refer to the figure below for the standard treatment process requirements.
2. Unused aviation connectors must also be wrapped.

Basic Process Requirements - Protection Process Standard Requirements for Unused Wire Ends and Aviation Connectors



1 - Rectification and collection



2 - Cut off bare cores



3 - Wrap the wire ends with tape



4 - Wrapping



5 - Effect after completion of the work



6 - Wrapping of unused aviation head with



6.2 Connection Process of Aviation Connector

Basic Process Requirements - Connection Process of Aviation Connector



1 - Before connection



2 - Connected without tightening the screw



3 - Tighten the screw



4 - Wrapping with insulating tape



5 - Wrapping in two layers (one round trip)



6 - Effect after completion of the work

6.3 Requirements of Opening for Wiring

6.3.1 Interior Opening for Wiring of Vehicle

- ① If the mode of opening for wiring is adopted, a rubber sleeve shall be additionally set at the opening to protect the cables from being worn out by the sharp part of the opening.
- ② To ensure aesthetic wiring, the mode of concealed wiring where possible and arrangement of surface wiring in corrugated conduits shall be adopted.



6.3.2 Exterior Opening of Carbody- Opening for Installation of Tail Harness of Camera

The two requirements described in 6.3.1 shall be met. In addition, waterproof adhesive shall also be applied at the opening to prevent rainwater from entering the vehicle.



- ① At the screwing part of camera and the opening for installation of tail harness on the exterior of the carbody, glass sealant shall be applied for waterproofing.
- ② For the purpose of aesthetics, the color of glass sealant shall be the same as or be similar to the carbody.

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.
 - (3) Allow the driver to drive the vehicle for a short distance to check whether the ADAS/DMS/BSD camera functions normally.
2. Take pictures of all the equipment and the center console after installation.
 - (1) Take pictures of the installation positions of all items.
 - (2) Take a picture of the rendering inside the cabin after installation.