Z5 Installation Guide

Preface

In order to better guide engineers in the correct and efficient installation of the Z5 and its associated products, and to improve installation efficiency, this **"Z5 Installation Guide"** has been compiled.

This document mainly includes: Preface, System Overview, Installation Preparation, Installation Instructions, and Acceptance and Cleanup .

The intended readers of this document are: Installation Engineers.

Our company reserves the final interpretation rights of this document and retains the right to make corrections or changes to the information and instructions contained within. Any changes will not be separately notified.

Important Notes

1. Before installation, ensure the vehicle is parked on a level surface, stationary, and the engine is off (do not park on ramps or inclined surfaces).
2. Carefully read the packing list section and check carefully when unpacking.
3. Carefully read the tools list section and prepare the required installation tools before installation.
4. Please observe the vehicle environment before installation and follow the principle：

a. The installation position and cable routing should not obstruct driver’s view or affect the adjustment of the rearview mirrors.

b. Choose an appropriate installation position based on the vehicle environment. This document is for reference only.

c. Installing the Z5 requires drilling holes in the installation and cable routing positions for mounting and cable routing.

5. Choose an appropriate installation position based on the vehicle environment. This document is for reference only.
6. The appropriate power supply method should be selected according to the vehicle environment, If using a terminal connector, connect to the vehicle’s power and signal lines. This should be done by a professional; non-professionals attempting to use the vehicle's electrical system may pose a safety risk. This document is for reference only.
7. If encountering issues with installation on special vehicles, please contact the product supplier for support.
8. You can connect to the Z5 product using a mobile app for installation, debugging, and configuration.
9. Please scan the QR code below or search for and download Veyes app.

IOS (App Store)　　Android (Google Store）

1.System Overview

1.1. Product Overview

Z5 is a highly integrated AI device designed for cargo management and video surveillance. It is equipped with a high-speed processor and a built-in operating system, combined with advanced H.265 compression and decompression technology and GPS positioning, supports 2Ch video recording with maximum resolutions of 4k and 1080p respectively, and is compatible with external Micro SD card. In addition, the Z5 features built-in Bluetooth function, which supports connecting external door sensor to obtain the open/close status of cargo door. It also supports 4G network connection and remote connection platform to transmit alarm information in time.

The device intelligently switches between different working modes based on its operational state. This enables the collection of fundamental cargo volume data while detecting and reporting abnormal alarms to the platform. At the same time, it optimizes power consumption to extend standby time when operating on battery power.

Z5 with a minimalist design tailored for cargo management. It is highly shock-resistant, exceptionally stable, and easy to use.

This product suite is suitable for scenarios involving cargo transportation monitoring and is applicable to various types of cargo box.

1.2. System Diagram

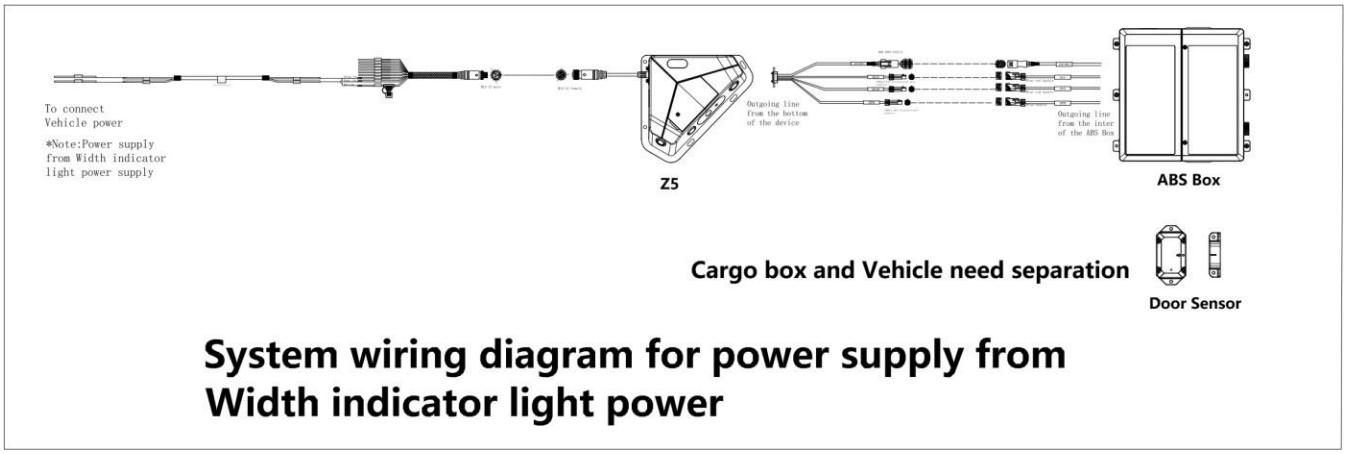
1.2.1. Installation Diagram

Installation Diagram

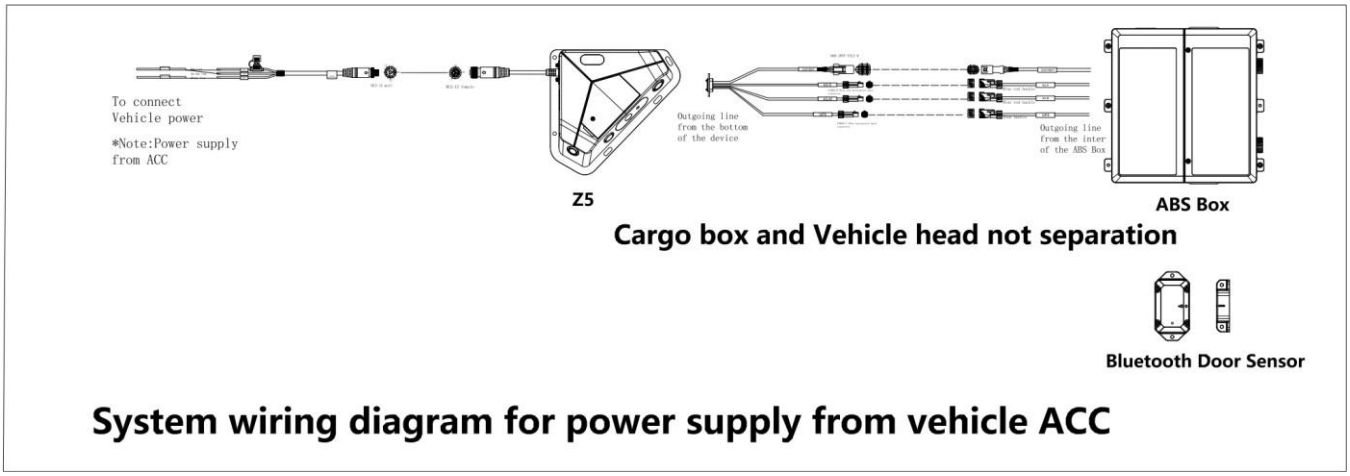
1.2.2. System connection diagram

The cargo box and truck cab can be divided into two types: **detachable** and **non-detachable**.

- If the cargo box and truck cab are **detachable**, the Z5 system draws power from the clearance light power supply.
- If the cargo box and truck cab are **non-detachable**, the Z5 system draws power from the vehicle's ACC power supply.



System connection diagram（Power from the wide-beam lamps）



System connection diagram（power supply from ACC） Note：

For more details, please refer to the system connection documentation.

2.Installation Preparation

2.1. Installation Technical Requirements

Be familiar with the product functions and applications, and the overall composition principle of the product.

Understand the electrical circuits and structure of motor vehicles, and understand the common installation methods of in-vehicle device.

The system involves multiple components and requires the use of ladders for high-level operations. It is recommended that two or more people install it.

2.2. Understanding the Installation Environment

Before installation, it is important to have a clear understanding of the vehicle model, including its length, height, and power supply location. Estimate and calculate the installation

positions for the Z5 main unit, Z5 battery box, and door sensors, as well as the required cable types and lengths for the vehicle model. Also, prepare a list of commonly used installation tools.This will ensure completion of installation and debugging.

2.3. Confirmation of Vehicle Condition and Electrical Information

Vehicle information confirmation is a basic prerequisite for successful installation，and it is also a responsibility allocation guarantee to avoid vehicle damage. Each component needs to be confirmed before proceeding to the next step, and each step of operation needs to be confirmed by the vehicle supervisor and the installation personnel.

（1） Check the vehicle's exterior and interior for any damage.

（2） Check if the vehicle can be ignited normally。

（3） Check if the vehicle's power system is in good condition.

*Note：The confirmation of the above information is crucial. Installation can proceed to the next step only after confirming that everything is functioning normally.

2.4. Vehicle Power Supply

（1） Required Tools：voltage tester/Multimeter

（2） Power Supply Location Selection

1. In the ignition-off state:Use a voltage tester to check if the circuit is live. If the circuit is live, determine it is a constant power source and measure the voltage.

2. When the vehicle is turned off, in ACC gear, or in ignition mode，Use a voltage tester to check the power status of the circuit. If the circuit is not live in the ignition-off state but becomes live in the ACC position or ignition-on state, then determine that this location is the ACC power line and measure the voltage.

3. In the ignition-on state: At the wiring near the cargo box clearance light, use a voltage tester to check the electrical status of the circuit. If there is no voltage when the clearance light control switch is off, and voltage is present when the switch is on, then this position can be considered as the clearance light power supply line then measure the voltage.

（3） Voltage Measurement for Power Supply

1. Constant Power：Use a multimeter to measure the voltage of the constant power supply line when the vehicle is in the ignition-off state. The voltage should be around 12V or 24V.

If multiple wires show approximately 24V in the ignition-off state, choose the one with higher current as the constant power supply line for connection.

2. ACC：Use a multimeter to measure the voltage of the ACC power supply line when the vehicle is in the ACC or ignition-on state. If the voltage is 0V in the ignition-off state and around 12V or 24V in the ACC or ignition-on state, this line should be used as the ACC power supply line for connection.

*Note：When measuring the power supply, first use the multimeter to check the positive and negative terminals to avoid incorrect connections.

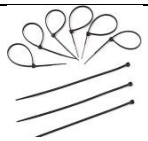
3.The list of installation tools and equipment

3.1. Preparation of auxiliary installation tools

Before installation, the following auxiliary materials and tools need to be prepared.

Installation Tools and Auxiliary Materials List				
No.	**Image**	**Tool Name**	**Purpose**	**Quantity**
1		Common screwdriver set	Used for tightening screws (optional)	1pcs
2		Dry cloth	Used for cleaning the cargo box or cab	1pcs
3		Smart phone/pad	Used for installing Veyes app for video preview, calibration, and parameter configuration	1pcs
4		Steel measuring tape	Used for measuring the installation height of device and providing installation assistance	1pcs
5		Marker pen	Used to mark the device installation location	1pcs

6		Wire cutters	Used for cutting wires and stripping insulation	1pcs
7		Electrician’s tape	Used for wrapping wire	1pcs
8		Scissors	Used for cutting electrician's tape	1pcs
9		Multimeter	Used for checking vehicle power and measuring ACC signals	1pcs
10		Test Pen	Used for checking vehicle power and measuring ACC signals. If the installer is familiar with the vehicle's power system, the test pen can replace the multimeter.	1pcs
11		3M tape	Used for securing cables	1pcs
12		30-meter measuring tape	Used for distance measurement and calibration	1pcs
13		Cordless drill	Used for screwing, body drilling, and so on	1pcs
14		High-speed steel drill bit	Used to drill vehicle body with a 3.5mm drill bit	Several
15		Hole cutter	Used for tail wire installation and vehicle body drilling with a 30mm drill bit	Several
16		Piece of wire	Used for through-hole wiring	1pcs

17		Cable ties	Used for organizing wires	1bag
18		Sealant	Used for sealing vehicle body holes	1pcs
19		Sealant gun	Used for applying glass sealing sealant	1psc
20		Corrugated tubing	Used for protecting cables. Note: Corrugated tubing can be provided by the installer, but it's recommended to use materials from the available list.	20-30 meters per vehicle
21		Cable clamp	Used for securing wiring, locking screws after installation.	Several
22		**Wires**	Red for power, black for ground (color-coded). Note: Power cables can be provided by the installer, but it's recommended to use materials from the available list.	20-30 meters per vehicle
23		**Ladder**	Used for equipment installation, drilling, etc. The height should reach near the roof of the vehicle	1psc

24		AA batteries	Used for door sensors. Each door sensor requires 2 AA batteries	Several
25		**Waterproof tape**	Used for protecting outdoor cable joints from water damage	1psc

3.2. Z5 System Packing List

After opening the product packaging, please confirm that the Z5 , ABS box, door sensors, and their accessories are intact and complete.

3.3 SIM card and TF storage card preparation

To ensure the normal Internet communication and data storage of the device, please be sure to prepare a matching Nano SIM card and a TF storage card that meets the quality requirements before installation. For the Z5 system to work, a SIM card is required, while the TF card is optional depending on whether local recording is needed.

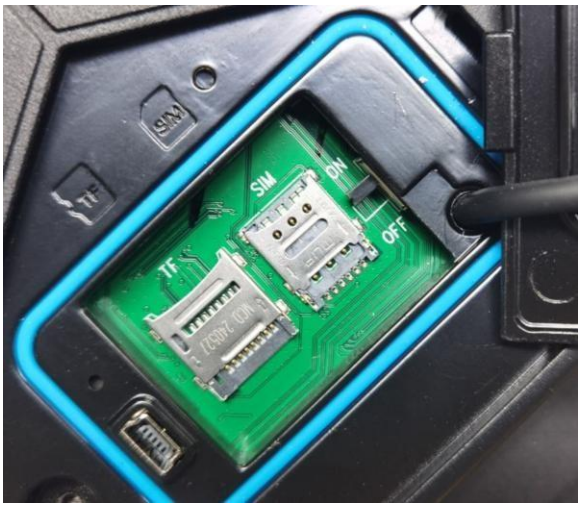
Note: Industrial-grade Nano SIM cards (MP2) are required. Ordinary Nano SIM cards (MP1) are not allowed. For the TF card, only industrial-grade TF cards should be used. The company

will not be responsible for any issues caused by using ordinary Nano SIM cards or ordinary TF cards.

4. Z5 Installation

4.1. SIM Card and TF Card Installation and Power Switch Confirmation

Before installing the Z5 in the cargo box, first open the Z5 cover to install the SIM card and TF card. After the cards are installed, switch the device to the "ON" position, then reattach the Z5 cover and securely lock it.



Note: The switch is the system's main power switch. The system will only work when it is in the "ON" position.

4.2. ABS Box Installation

4.2.1. ABS Box Installation Location Selection

1. 在 On the outside of the cargo box, avoid the area near the vehicle door and use positioning stickers to select the installation location for the ABS box.

Note: When selecting the installation location, open the vehicle door to ensure that the door does not hit the ABS box.

2. Use a marker pen to mark the positions for the ABS box fixing screws and the holes for wiring.

Note: Before finalizing the ABS box position, refer to the installation location of the Z5 inside the cargo box. Also, due to the weld points on the cargo box crossbars and walls, placing the battery box too close may affect the balance of the bracket. It is recommended that the height of the ABS box be at least 2 cm below the bottom of the cargo box crossbar.

4.2.2. ABS Box Fixing

1. Use a 3.5mm drill bit to drill a small hole at the location where the ABS box is installed

2. Use a 30mm drill bit to drill the outlet hole for wiring，This hole is for the connection cable between the main unit and the battery box.

Note: In order to drill quickly, use a 3.5mm drill bit to drill a small hole at the center of the hole in advance.

3. Place the battery box in the installation position and use a drill to insert the fixing screws into the screw holes to secure the battery box base

4. Use a screwdriver to tighten the screws to lock the ABS box cover

Note: Before the ABS box cover is locked with the screws, wiring will be performed. We will not explain it here. The details are described in the wiring section.

5. The effect picture after the ABS box is installed:

4.3. Z5 Host Installation

4.3.1. Z5 Host Installation Position Description

Install the Z5 on the left side panel of the vehicle's cargo box, near the rear door. Use the Z5 bracket for a trial installation inside the cargo box to select the position. Common cargo box types include corrugated and flat-panel walls. The installation considerations for each type are as follows:

1，Corrugated cargo box：The position for the Z5 bracket fixing screws needs to be on the inwardly convex surface. The wiring hole between the Z5 and the ABS box should be drilled on the outwardly convex cargo box wall. Select the first inwardly convex cargo box wall behind the rear wall as the farthest left fixed position for the Z5 bracket. The upper part of the main unit should be closely fixed to the U-shaped slot at the top of the cargo box. Below is the corrugated cargo box:

2，Flat-panel cargo box : The Z5 is installed near the rear side and top edge of the cargo box. Below is the flat-panel cargo box:

The following is a schematic diagram of the Z5 installation location:

Note：In the diagram, the corrugation at the back of the cargo box is outwardly convex, and the Z5 bracket can only be installed one grid forward. When the corrugation at the back of the cargo box is inwardly convex, the leftmost side of the Z5 bracket is installed on the innermost inward convex corrugation.

4.3.2. Z5 Host Installation Position Selection:

4.3.2. Z5 Host Installation Position Selection：

1. Inside the cargo box, according to the principles outlined in "4.1.1 Z5 Installation Position Description," use positioning stickers to move within the cargo box and determine the installation position of the Z5.

The reference installation positions are as follows:

Note: In the cargo box shown in the above diagram, there is no position at the back where holes can be drilled, so the Z5 cannot be installed properly. In this case, move the z5 one grid to the right for installation. If the back wall of the cargo box is inwardly convex corrugation, the Z5 can be installed directly next to the cargo box's rear column, as shown in the diagram below.

2. Use positioning stickers to determine the installation position of the Z5.

Note：1，When determining the installation position of the Z5, the installation position of the battery box must be considered.

2，The Z5 must be installed horizontally, and when marking the position with the sticker, ensure that it is also horizontal.

3，After determining the installation position, use a marker pen to indicate where the holes should be drilled for the Z5 mounting screws.

Note: For corrugated cargo boxes and flat cargo boxes, the position of the screws used to secure the Z5 differ.Particularly with flat cargo boxes, to avoid the risk of the screw holes passing through the cargo box wall and hitting the ABS box, the lower right corner fixing hole should not be used to secure the Z5. Below is the reference view with positioning stickers:

For corrugated cargo boxes, the upper right corner fixing hole should not be used to secure the Z5. Below is the reference view with positioning stickers:

4.3.3. Z5 Host Fixing

1. 1. Use a 3.5mm drill bit to drill a small hole at the location where the screws of the Z5 bracket are fixed (small holes are easier to drill and are convenient for installing the fixing screws later)

2. Place the main unit in the installation position, and pull the wiring between the Z5 and the ABS box through the drilled hole to the ABS box. Use an electric drill to insert the fixing screws into the screw holes to secure the Z5.

4.3.4. Image Effect：

1，The protective sticker on the camera lens should be removed after the Z5 is installed

2，The camera's image effect at the installation position must not be obstructed. For cameras inside the cargo box, they should be able to capture all areas of the cargo box except for the right-side blind spot. For cameras outside the cargo box, they should be able to capture

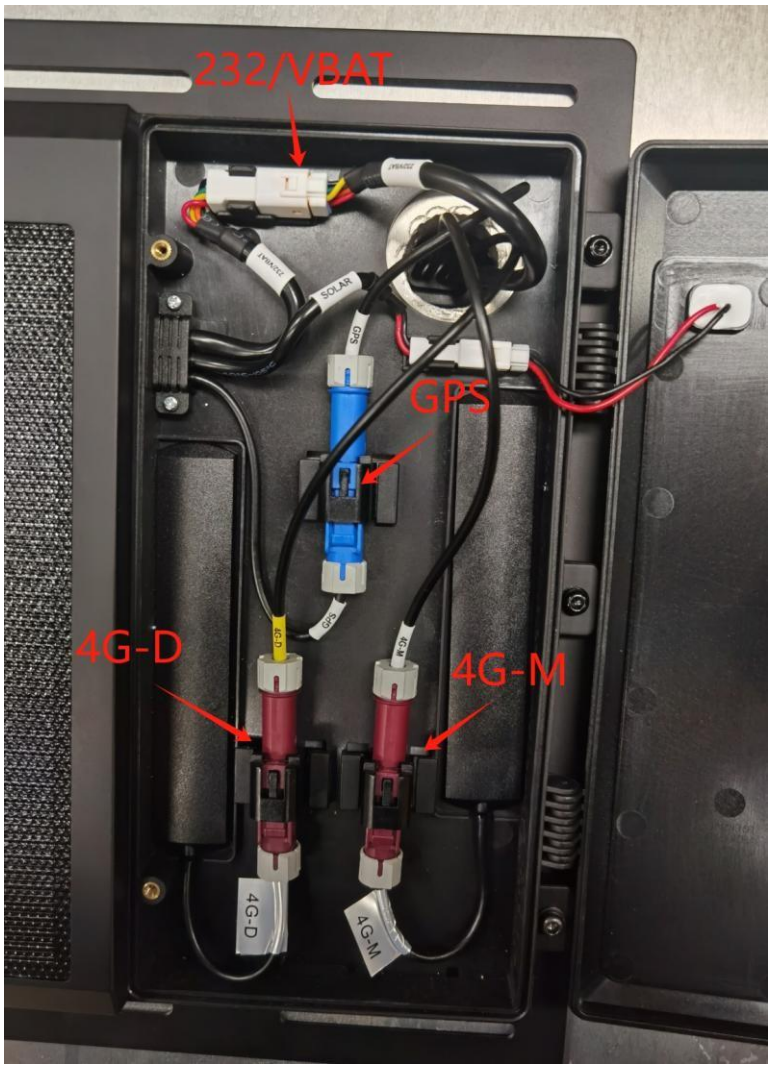
the entire vehicle door and part of the area outside the door.

The image effect after installation is shown in the diagram below:

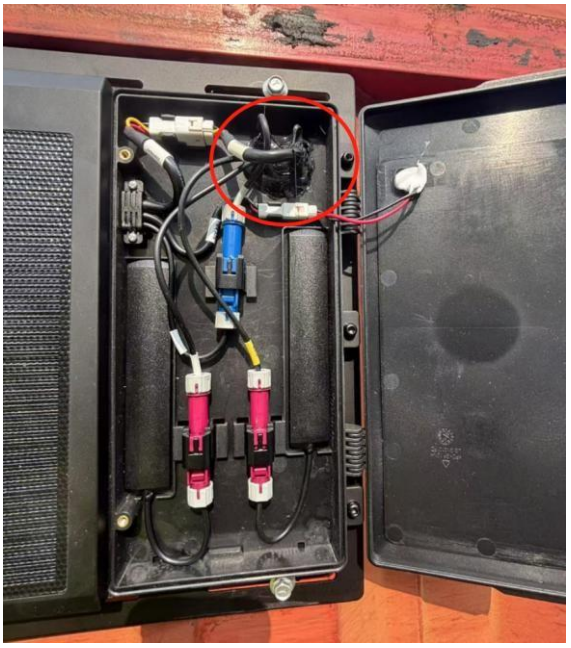
Notes: When installing, the upper edge of the Z5 should be placed horizontally.This step requires using the Veyes app to check the device's image.For the method, refer to the instructions in the section "5. Z5 AI calibration and adding door sensor".

4.4. Z5 Host and ABS Box Wiring

1. Insert the connector of the Z5 host end connection line into the battery box through the drilled holes in the cargo box wall and battery box. Use a waterproof rubber plug to cover the connector, and then secure the waterproof rubber plug at the opening of the cargo box.According to the connector labels, connect the GPS antenna, 4G antenna (main and auxiliary antennas), power cable, and other connector.



2. After connecting the wires, adjust their position to make them easier for applying sealant. Use a sealant gun to apply glass sealant around the hole and the wires to seal the hole and achieve a waterproof effect.



注意：After connecting the wire connectors according to the corresponding connections, do not unplug them to avoid damaging the cable clamp or cable clamp brackets. If it is necessary to unplug, please locate the disassembly position, press it down, and then unplug the cable clamp.

3. After applying the waterproof sealant, close the ABS box cover and tighten the locking screws.

4.5. Vehicle Power Supply Connection

The cargo box and the vehicle front are divided into two types: detachable and non-detachable. If the cargo box and the vehicle front are detachable, the Z5 system

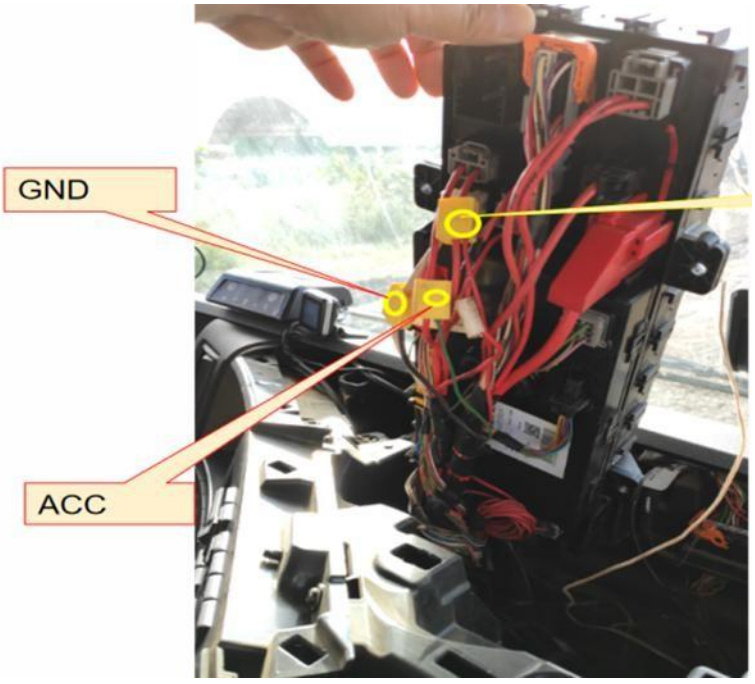
draws power from the side marker light's power supply. If the cargo box and the vehicle front are non-detachable, the Z5 system draws power from the vehicle's ACC.

4.5.1. Installation for Non-Detachable Cargo Box and Vehicle Front

In scenarios where the cargo box and the vehicle front are non-detachable, the device draws power from the vehicle's ACC.

Installation steps：

1. Use a multimeter to measure and locate the vehicle's ACC line and ground wire.

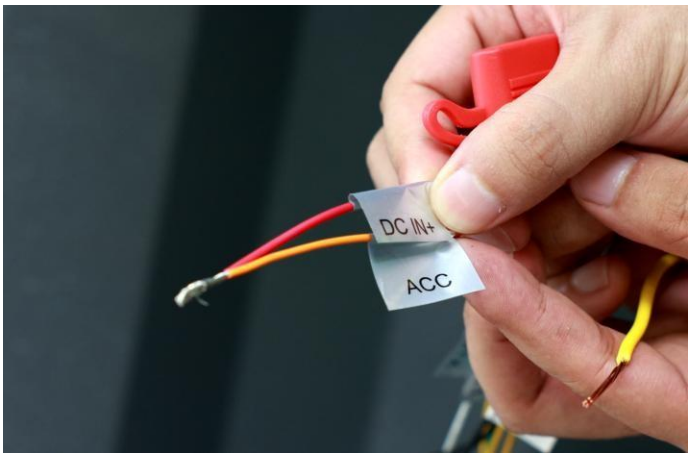


2. Due to model variations, the routing path for each vehicle may differ. Use a tape measure to measure the distance between the ACC line, ground wire, and the Z5 to determine the length of the power wiring. Refer to the following wiring diagram:：

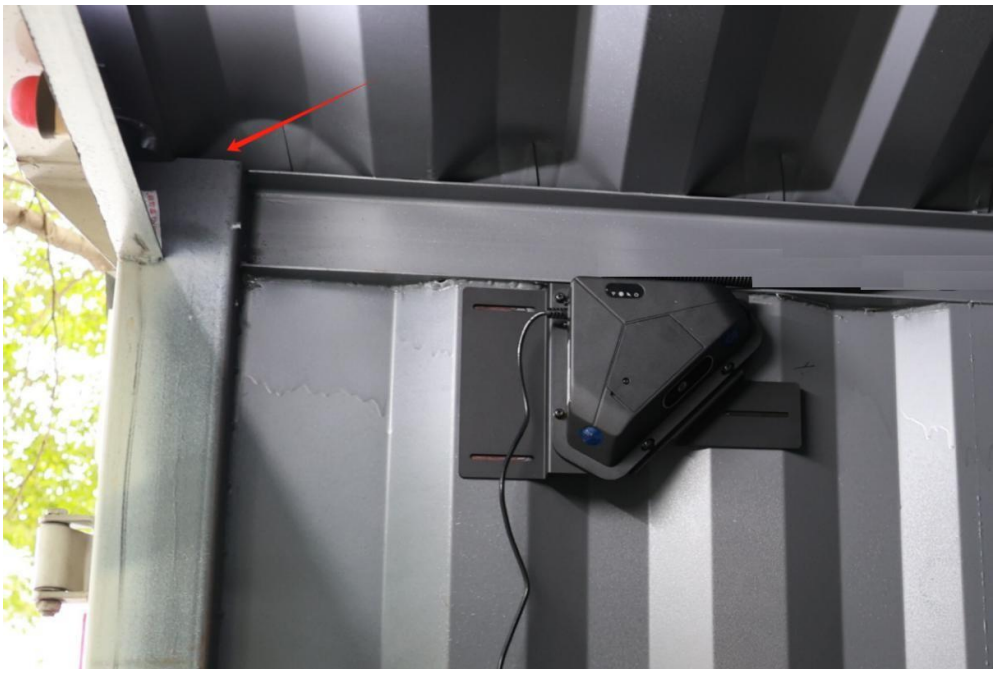
Wiring diagram for routing from the vehicle front:

3. Connect the wiring from the device accessories to the Z5's tail wire connector.

4. Connect the DC IN+ and ACC from the accessory wiring together.



5. Locate the cargo box's hole for routing wires from the inside to the outside of the cargo box, and confirm that the power cable can pass through.

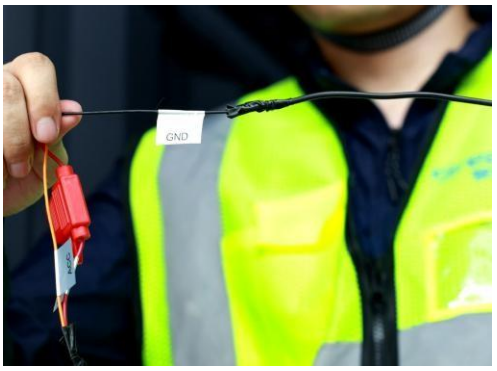


Note：If there is no suitable hole for routing the wires, you will need to use a drill or other tools to create a hole, allowing the power wiring to pass through.

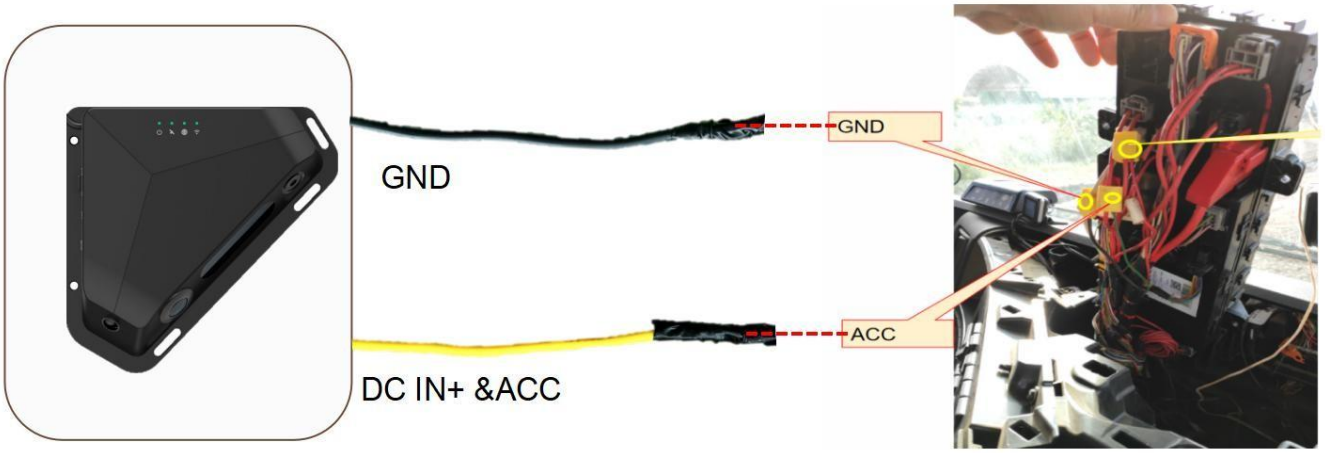
6. Based on the measured distance from the device to the power source location, prepare a power cable of the appropriate length.

7. Connect one end of the power cable to the device's accessory wiring, and the other end to the vehicle's ACC and ground wires.

Connect the power cable to the device's accessory wiring: DC IN+, ACC, and GND.

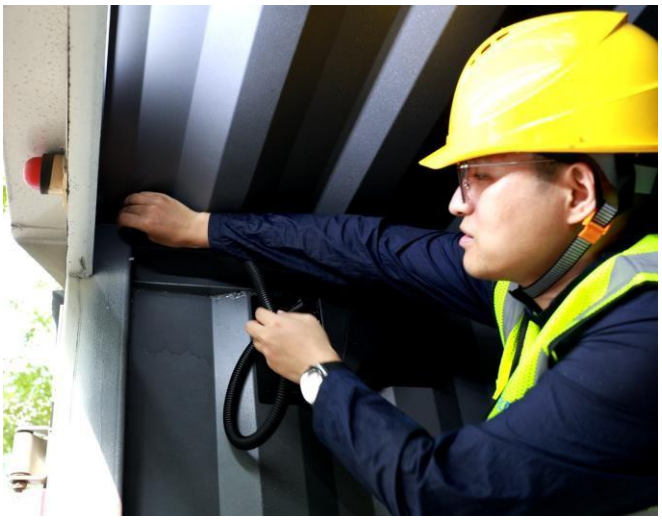


Connect the power cable to the vehicle’s ACC and GND:



8. Place the power cable inside the corrugated tubing.

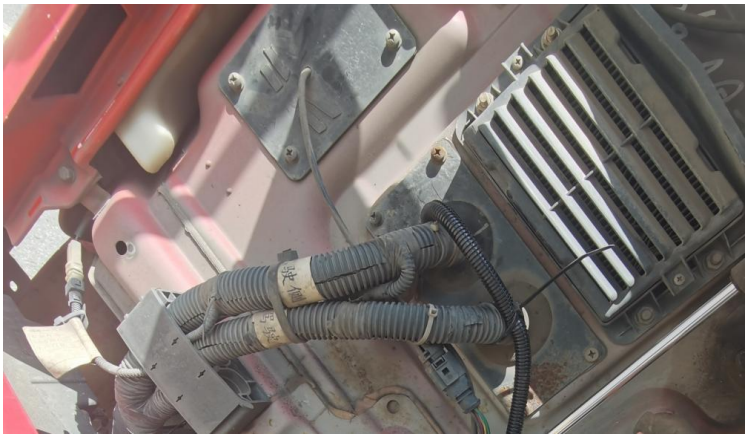

Pass the power cable through the cargo box hole. During routing, use methods such as applying sealant , cable clamp, or cable ties to secure the cable. Power cable through the cargo box power wiring hole:




Note：The wiring hole locations may vary between different vehicles. Some use vertical U-shaped slot for wiring downward, while others route the wiring along horizontal U-shaped slot to the opposite side, then through existing holes

9. Connect the power cord that runs outside the cargo box to the vehicle's ACC and ground wire through a suitable location at the bottom of the vehicle, following the original routing of the vehicle.

10. The power cable routed on the outside of the vehicle must be secured with cable ties to prevent damage from significant vibrations, friction, or other causes.



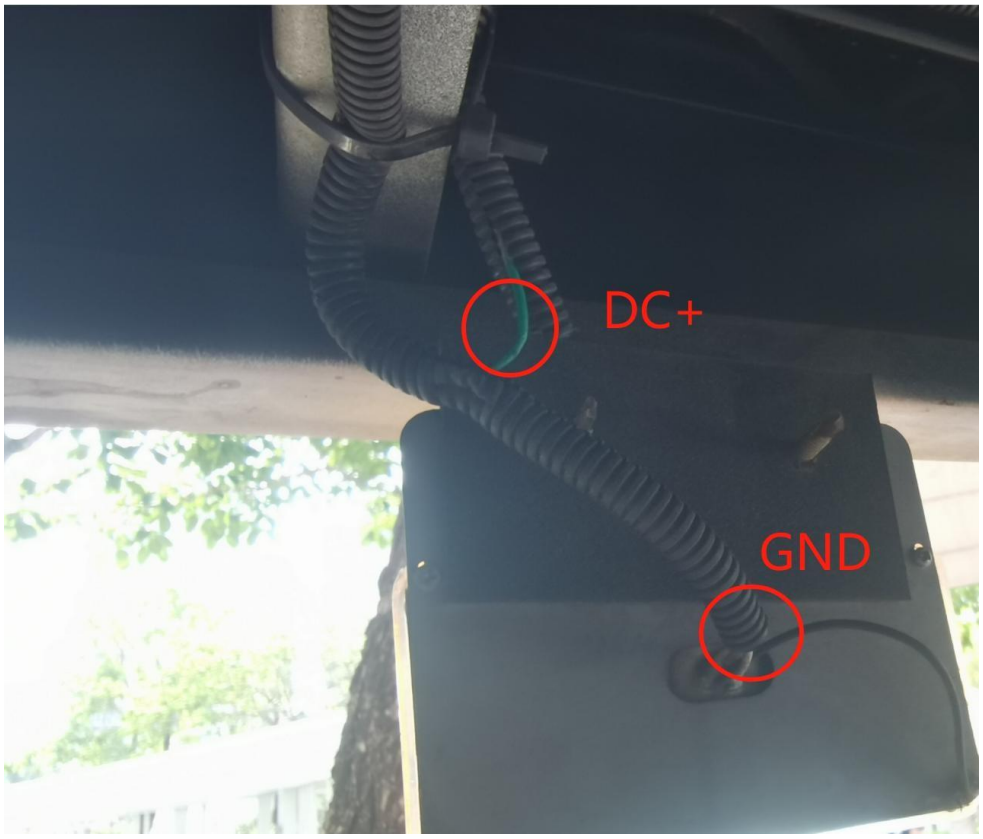
4.5.2. Installation for Detachable Cargo Box and Vehicle Front

In scenarios where the cargo box and the vehicle front are detachable, the device draws power from the clearance light's power supply in the cargo box.

Installation steps：

1. Use a multimeter to measure and locate the vehicle's clearance light's DC+ and

ground wire (GND).

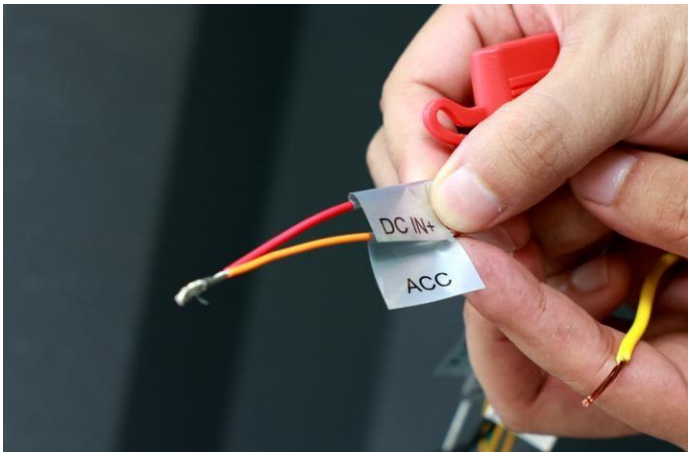


Note: For some vehicle models, the clearance light's power supply requires the vehicle to be started and the clearance light switch to be turned on.

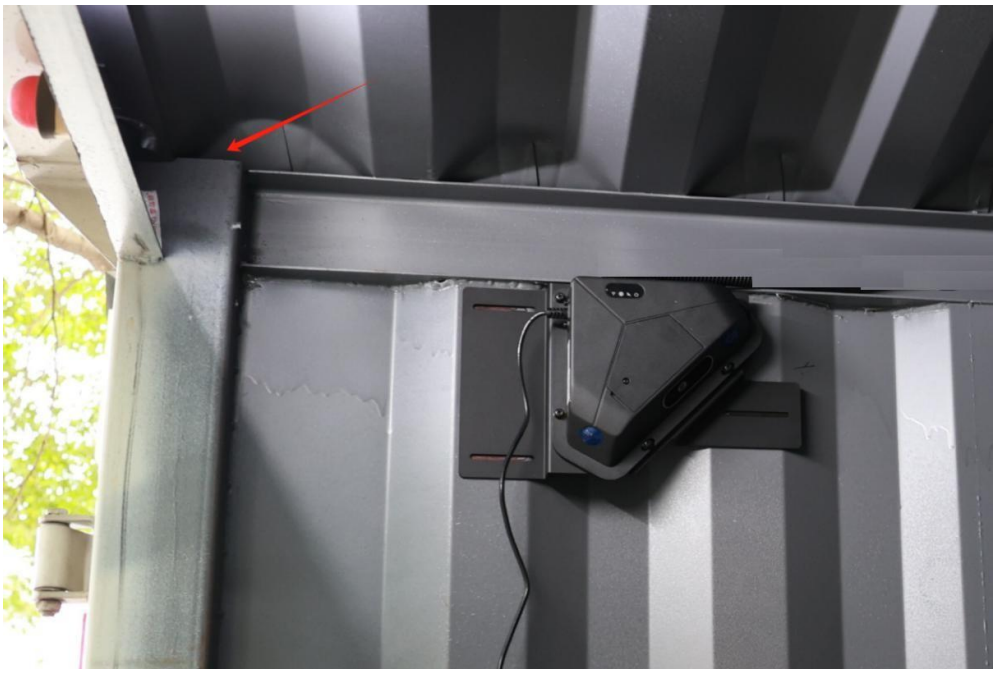
2. Due to model differences, the wiring paths may vary for each vehicle. Use a tape measure to measure the distance between the clearance light's power wire, ground wire, and the Z5 to determine the length of the power cable needed. Refer to the following diagram:

3. Connect the wiring from the device accessories to the Z5's tail wire connector.

4. Connect the DC IN+ and ACC from the accessory wiring together.



5. Locate the cargo box's hole for routing wires from the inside to the outside of the cargo box, and confirm that the power cable can pass through.



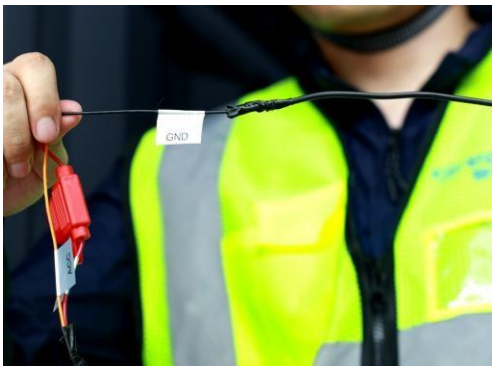
Note：If there is no suitable hole for routing the wires, you will need to use a drill or other tools to create a hole, allowing the power wiring to pass through.

6. Based on the measured distance from the device to the power source location, prepare a power cable of the appropriate length.

7. Connect one end of the power cable to the device's accessory wiring. The other end of the power cable will connect to the vehicle’s clearance light power wire and ground wire.

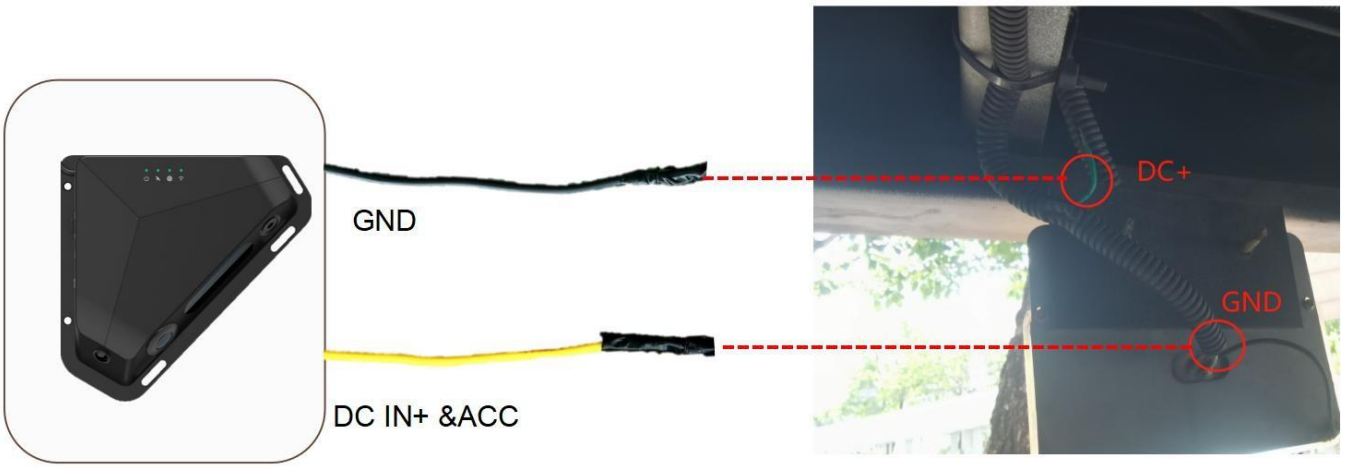
Connect the power cable to the accessory wiring's DC IN+, ACC, and GND.

Positive connection



Negative connection

Connect the power cable to the positive terminal and ground of the vehicle's clearance light power wire:

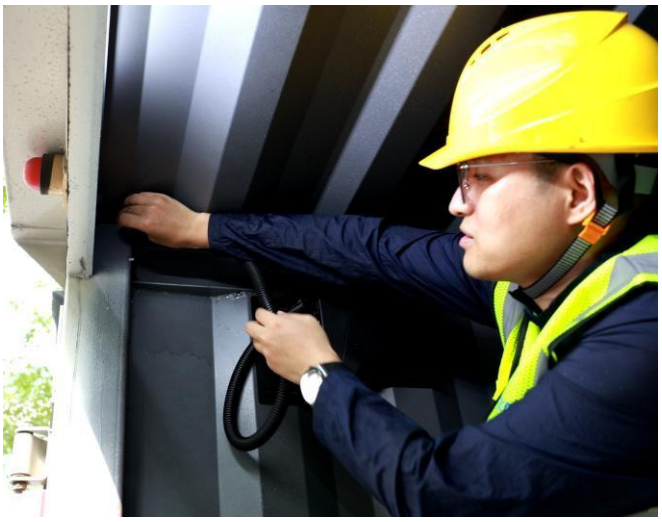


8. Place the power cable inside the corrugated tubing

9. Pass the power cable through the cargo box hole. During routing, use methods such

as applying sealing, cable clamp, or cable ties to secure the cable.

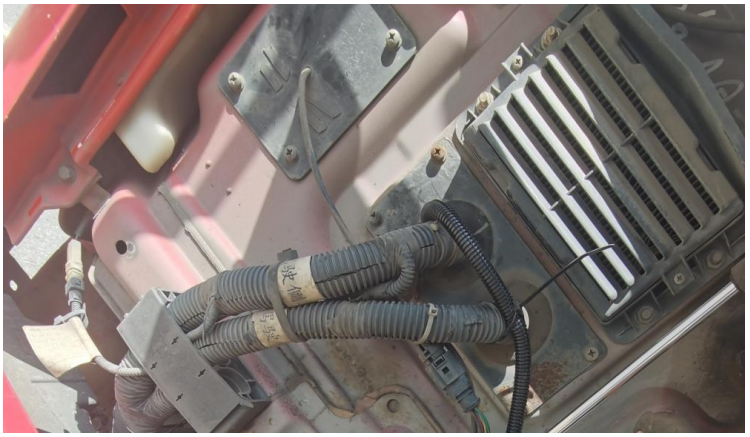
Power cable routing through the cargo box power wiring hole:




Note: The routing hole locations may vary between different vehicles. Some use vertical U-shaped slot for downward wiring, while others route the wiring along horizontal U-shaped slot to the opposite side, then through existing holes.

10. Route the power cable that has passed to the outside of the cargo box along the appropriate position at the bottom of the vehicle, and connect it to the clearance light's power wire. You can follow the position where the vehicle has already been routed.

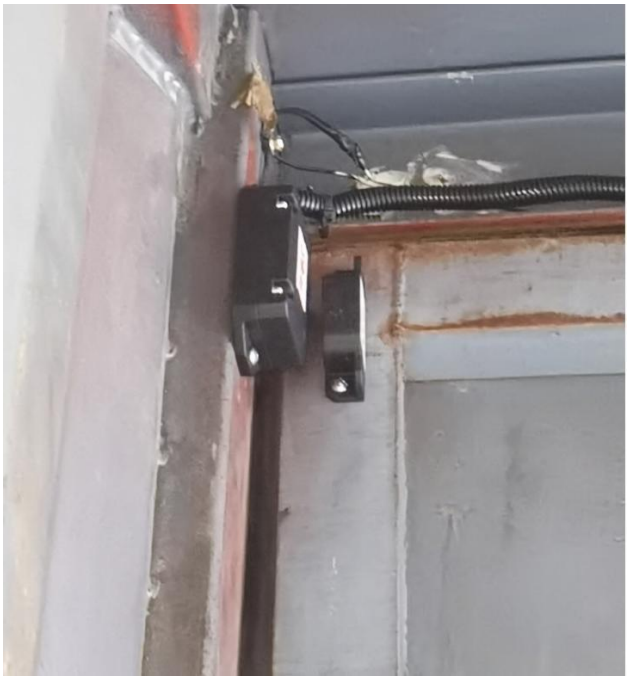

11. The power cable routed on the outside of the vehicle must be secured with cable ties to prevent damage due to significant vibrations, friction, or other causes.



4.6. Door Sensor Installation

4.6.1. Door Sensor Installation Position descriptions:

Choose a suitable installation position for the door sensor on the vehicle door. This position must ensure that the door does not hit the door sensor when opening or closing, and that the door sensor can correctly switch between the door open and door closed states. Below are the recommended installation positions for the door sensor.



*Note： 1，For double-opening cargo doors, the magnet of the door sensor should be installed on the first door to be opened when the cargo doors are opened.

3，The installation height should be selected close to the top position.

4.6.2. Door Sensor Installation Steps：

1，Door Sensor Battery Installation

The door sensor itself does not come with a battery. You need to prepare an AA battery (size 5) and install it inside the door sensor.

Wrench to loosen the screw

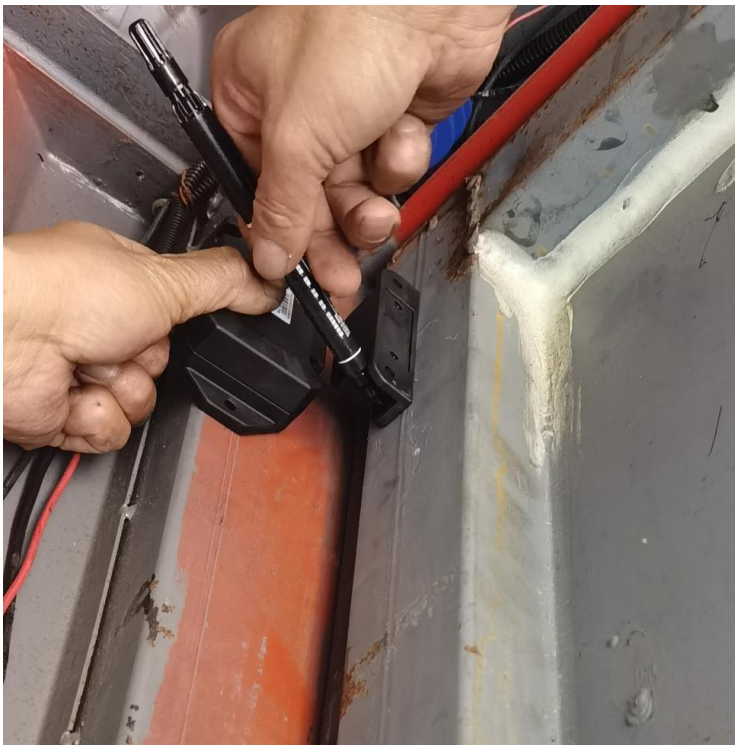
Battery polarity indicators

Install the battery

Note: After installing the battery, you can trigger the door sensor's switch state by using the sensor magnet and check the indicator light to verify if the sensor is working. Then, tighten the screws to ensure the door sensor's waterproofing.

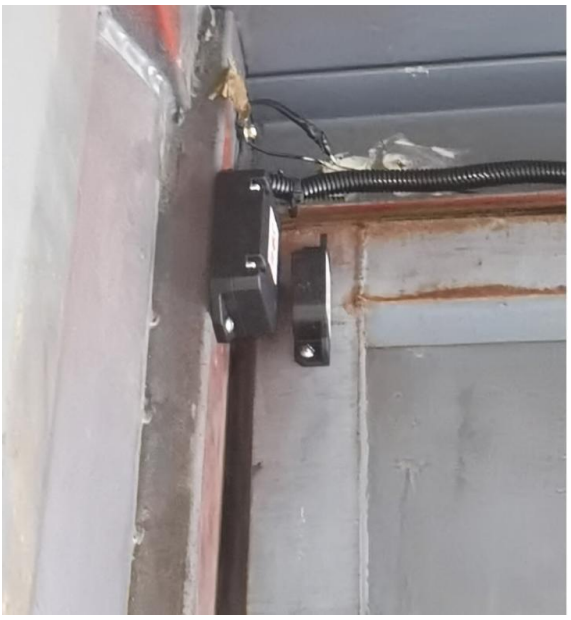
2，select the appropriate installation position for the door sensor and magnet.

3，Use maker pen indicate screws position



4，Use a 3.5mm drill bit to drill a small hole first, making it easier to install the fixing screws later

5，Place the door sensor in the installation position, and use a electric drill to drive the fixing screws into the screw holes to secure the door sensor and magnet.



6，Perform an open/close door test to ensure that the door sensor's status indicator light turns on and off or flashes correctly. Also, confirm that the door sensor and magnet do not directly hit with each other when opening and closing the door.

5. Z5 AI Calibration and Adding Door Sensor

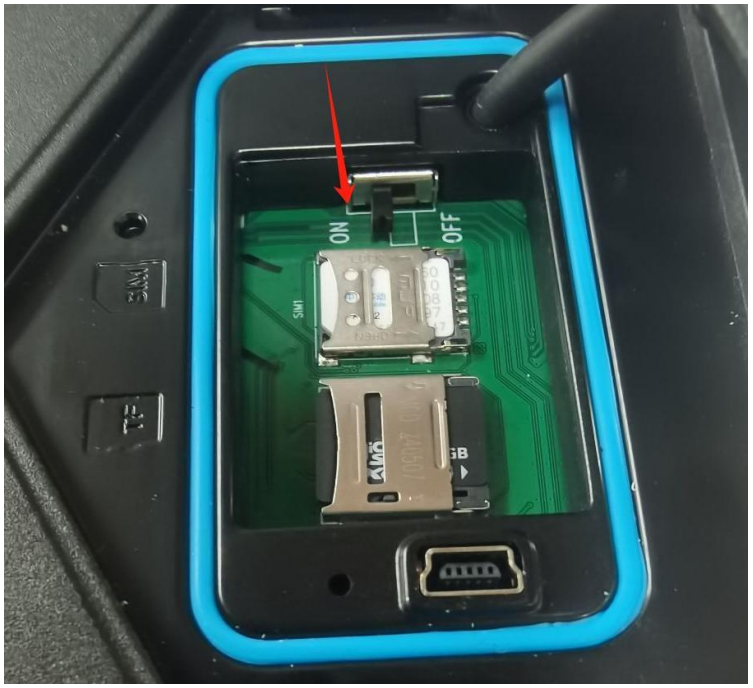
After the device is installed, AI calibration for occupancy measurement and the addition of the door sensor must be performed in order to ensure the proper functioning of the cargo occupancy measurement feature and the detection of cargo door open/close status.

5.1. Download the Veyes APP

Search for and install the Veyes APP on your phone via Google Play or the App Store.

5.2. Powering on the Device

After the device is installed, connect it to the vehicle’s power supply and set the device’s switch to the "ON" position to power on the device.



5.3. Connecting the Phone to the Device Hotspot

Open the phone's Wi-Fi settings and connect to the device's AP hotspot. The default AP hotspot name for the device is "00F0******."

5.4. After Connecting to the Hotspot, Log into the Device

Open the Veyes APP on your phone and log in. The default username is "admin" and the default password is "admin."

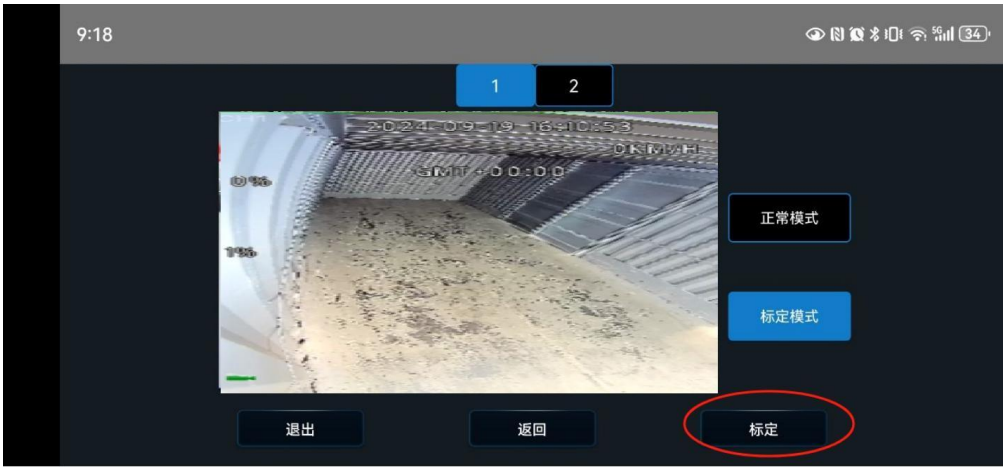
5.5. Occupancy Measurement Algorithm Calibration

Before calibration, ensure the device is properly installed and that the cargo box is empty with no goods inside.

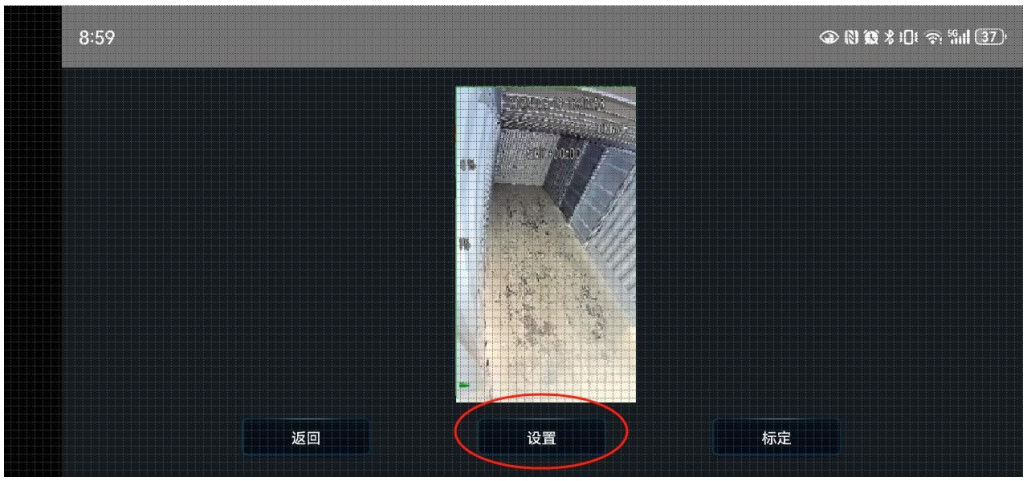
Step 1：In the "Preview" page, click on "AI Calibration":

Step 2：Click the "Cargo Box" entry to enter the calibration settings interface.

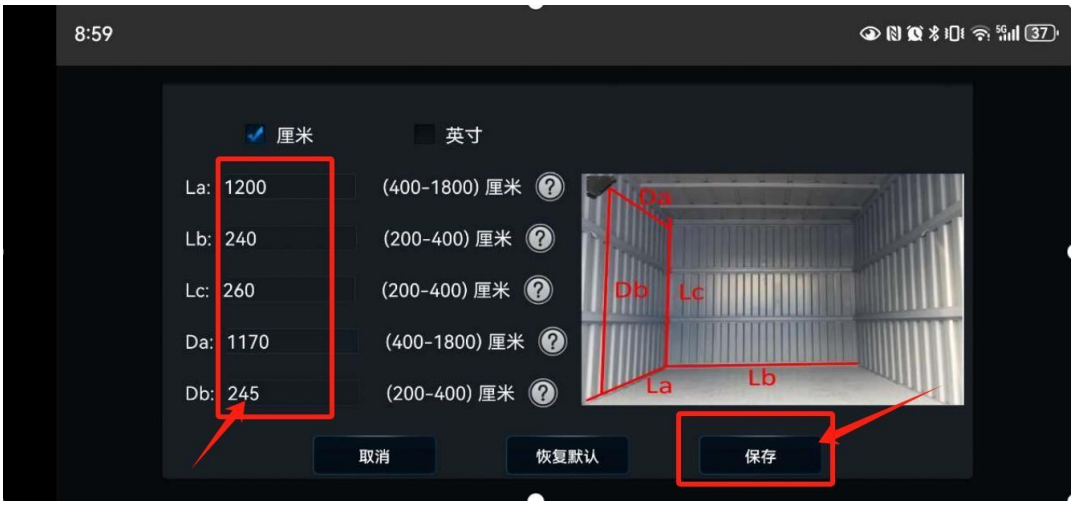
Step 3：Click the calibration menu at the bottom right corner to enter the calibration settings interface.



Step 4：Click the "Settings" menu at the bottom to enter the "Calibration Parameters Settings" interface.



Step 5：In the "Calibration Parameters Settings" interface, based on the measured length, width, and height of the vehicle's cargo box and the device installation position, set the correct values in the calibration parameter table as shown below, and then save.



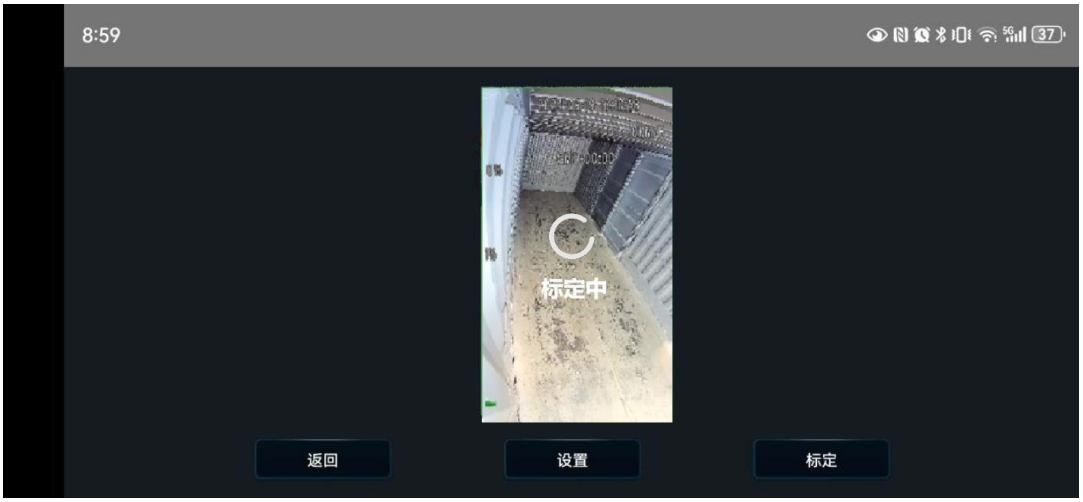
Parameter explanation:

a，Cargo box length La；Range 300~1800 cm, default value 1200； b，Cargo box width Lb；Range 150~400 cm，default value 300； c，Cargo box height Lc；Range150~400 cm，default value 300；

d，Vertical height from the device to the bottom of the cargo box Db；Range 150~400 cm，default value 260；

e，Horizontal distance from the device to the farthest point at the front of the cargo box Da；Range 300~1800 cm，default value 1100；

Step 6：After completing the "Calibration Parameters Settings," return to the previous interface and click "Calibration" at the bottom right to perform the occupancy measurement algorithm calibration.



Step 7：Once the message "Calibration Complete" appears, the calibration is complete.

5.6. Add Door Sensor

Setp 1：In the “Configuration” — “Basic Settings” — “Network Settings” — “Bluetooth” interface, click the “Search” menu to search for Bluetooth door sensor devices.

Setp 2：In the list of found Bluetooth devices, check the MAC address of the door sensor installed on the cargo box and click “Confirm.”

Note: The MAC address of the corresponding device will be attached to the door sensor device.

Step 3: After adding the Bluetooth door sensor, set its "Bluetooth Type" to "Main Door Sensor," and click "Save" to complete the addition of the Bluetooth door sensor.

Step 4: If there are multiple doors on the cargo box, multiple door sensors can be installed. In this case, the door sensor installed on the rear door of the cargo box must be set as the "Main Door Sensor," while the sensor installed on the side door should be set as the "Auxiliary Door Sensor."

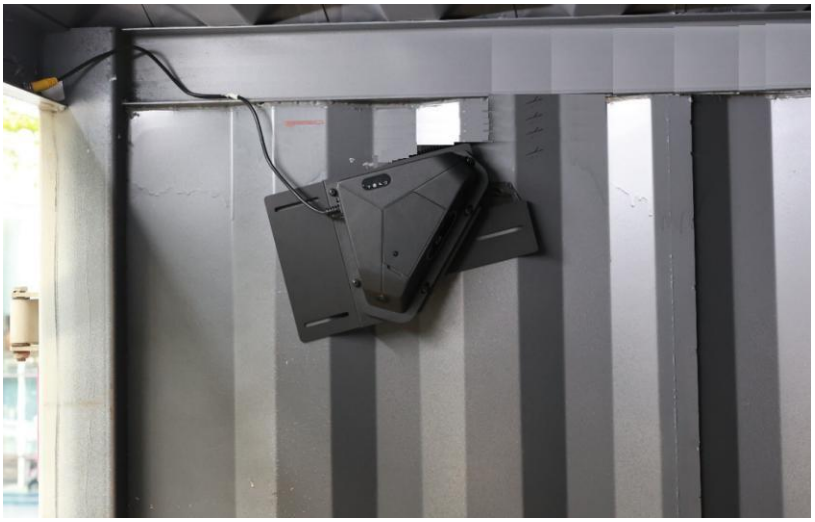
6.Z5 Function Settings

For detailed function settings, please refer to the product user manual.

7. Common Issues

7.1. Z5 Host Installation Tilt

The following installation of the Z5 is tilted, which is an improper installation that affects the occupancy measurement function. The top edge of the host needs to be installed horizontally.



7.2. ABS Box Installation Location Collision

The following installation location of the battery box is at risk of being struck by the cargo door handle after the door is opened. The installation location should avoid being hit.

7.3. Door Sensor Main Body Installation Affects Signal

When the door is opened, if the main body of the door sensor is installed on the door, it will be separated from the Z5 by the cargo wall. This can weaken the wireless Bluetooth signal, affecting the door sensor's status recognition.

8. Acceptance and Cleaning

8.1 Cleaning the Installation Site

Clean up the installation site, collect and take away the tools and garbage separately, and restore the original items on the vehicle to complete the installation work

8.2 Installation Acceptance

1. Inspect the installation details and parameter settings item by item according to the acceptance checklist provided by the customer.

（1） Focus on checking the parameter settings and save screenshots.

（2） Focus on checking the video images, capture video and save it.

2. Take overall photos of all installed equipment and the central console after installation.

（1） Take photos of the installation positions of all materials.

（2） Take photos of the driver's cabin after installation.