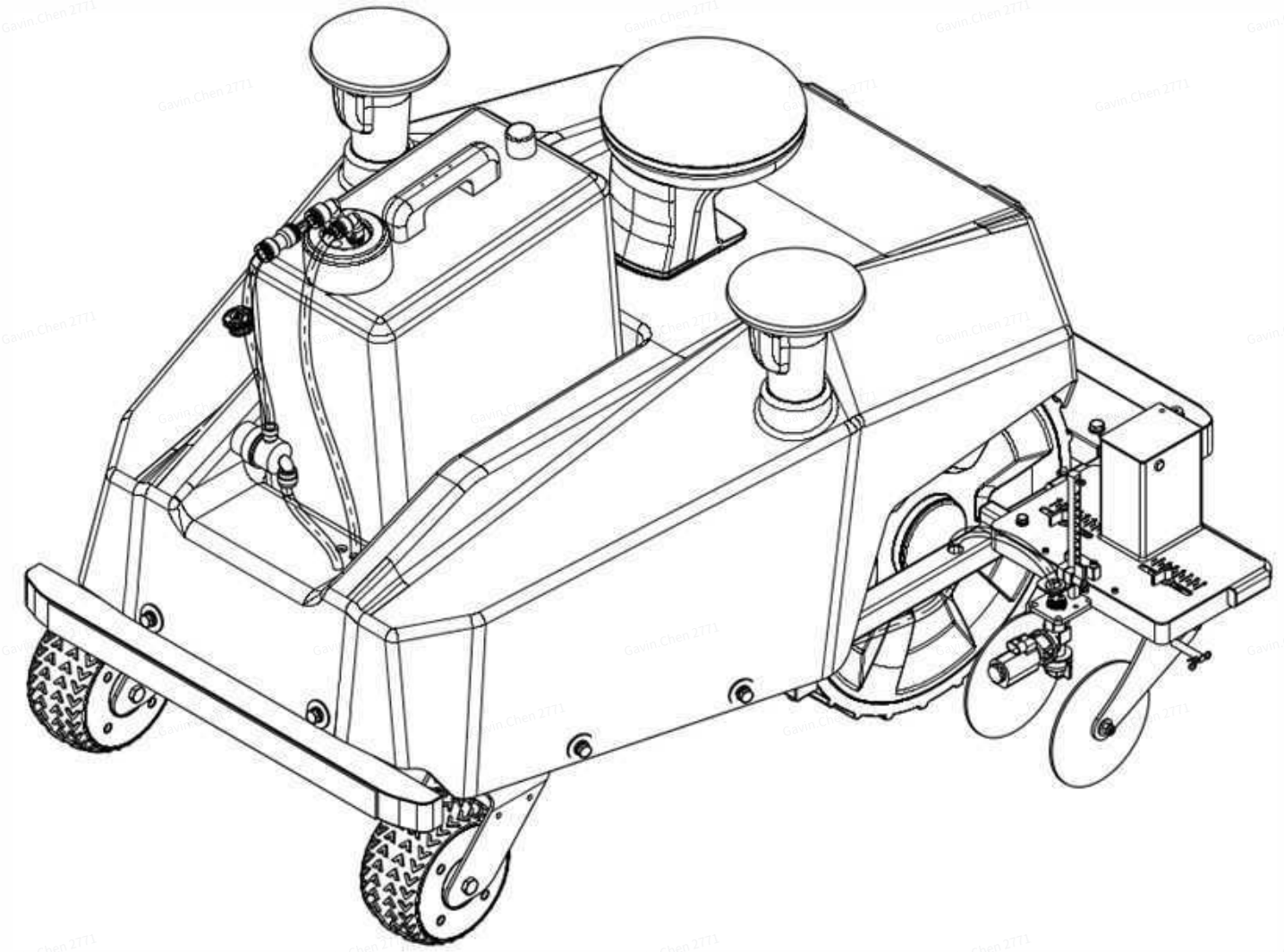
RLM01 Line Marking Robot Instruction Manual V1.3 (English) New Structure

FJDYNAMICS
丰疆智能



RLM01 Line Marking Machine

Instruction Manual

2025-12 | Rev. 1.3

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Revision History:

Version	Date	Revised Content
1.0	2025.01	First Edition
1.1	2025.05	Explanation of Revised Parts
1.2	2025.07	Explanation of Revised Parts
1.3	2025.12	Explanation of Revised Parts

Read before use:



Please operate strictly in accordance with this user manual!

Improper use may lead to device damage and performance degradation;



If you encounter any problems during use, please contact the service staff in a timely manner.

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Safety Notice

	This symbol indicates important safety instructions. Failure to comply with these instructions may endanger the personal safety or property of operators and other personnel. Before attempting to operate the line marking machine, please read and understand all instructions in this manual.

Assess the level of risk associated with this product based on the meanings of the following signal words

Safety Warning Symbol	Signal Word	Description
	Danger	Indicates an urgent and dangerous situation that, if not avoided, could result in death or serious injury.
	Warning	Indicates a potentially dangerous situation that, if not avoided, could result in death or serious injury.
	Attention	(No safety warning symbol) indicates a situation that may lead to property damage.

 **Warning**	Before using this machine, please be sure to read and understand all safety instructions in this manual, including the content of safety warning symbols. If you do not understand the warnings and instructions in this manual, do not use this product. This machine is only for use by personnel who have read, understood, and complied with the safety signs printed on this manual and the line marking machine, and meet the age requirements of local regulations.

 **Warning**	When using this machine, basic safety precautions should always be followed to reduce the risk of explosion, electric shock, fire, and other serious personal injuries.

 **Warning**	People wearing electronic medical devices such as pacemakers should consult a doctor before using this product. Operating electrical equipment near a cardiac pacemaker may cause pacemaker interference or malfunction.

Attention	The marking paint used shall comply with local laws and regulations.

Attention	Marking paint shall comply with local laws and regulations when discharged or disposed of.

Attention	Repairs can only be performed by qualified maintenance technicians. We recommend that you contact the nearest dealer for repairs. During repairs, only identical parts should be used for replacement.

- Before attempting assembly and operation, please read, understand, and comply with all instructions and warnings in this manual.
- Please familiarize yourself with all control devices and their correct operation methods, and know how to quickly stop the operation of the equipment and disconnect all control devices.
- Do not allow children or untrained adults to operate or repair this equipment.
- Please note that local regulations may restrict the age of operators, so please comply with the user age requirements stipulated by local laws.
- If a situation not covered in this manual occurs, please make a careful judgment and contact after-sales service for assistance.

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1. Product Overview

1.1 Introduction

This intelligent line marking machine is a high-efficiency line marking equipment specifically designed for modern sports fields. With electrification as its core power source, compared to traditional fuel-powered equipment, it is not only more environmentally friendly but also reduces maintenance costs and noise pollution. Equipped with an RTK high-precision positioning system, it can achieve centimeter-level precise line marking, accurately presenting even the most complex field layouts and line designs, ensuring that the field lines meet professional standards.

This line marking machine is suitable for all types of sports fields, whether it's a football field, basketball court, or track and field stadium, etc., and can handle them with ease. Moreover, it has extremely high work efficiency, which can significantly reduce the line marking time, minimize the impact on field usage, and enable the sports field to be put into use more quickly.

1.2 Specifications

Length × Width × Height	1074*1015*707mm
Weight (excluding battery)	76 kg
Operating Temperature Range	5~40°C
Water and dust protection rating	IPX3
Main Material	Q235/SPCC/ABS
Paint Bucket Capacity	20L/25L
Line speed	(1-3) km/h
Adjustment range of line width	6~17cm
Nozzle height adjustment range	3~11cm (relative to the ground)
Rated Power	100 W
Rated Voltage	48 V
Maximum Input Current	10 A
Full charge operation	5h (0.5 kWh battery)/10h (1 kWh battery)

2. Structure and Installation Tools

> **Note:** The products shown in the manual are of general configuration, and the actual received goods may vary slightly. Please refer to the physical items.

2.1 Packing List

Serial Number	Name	Quantity		Serial Number	Quantity	Name	
1	Host	1		14	4	Quick-release cap gasket	
2	Warranty Card	1		15	1	Prefilter	
3	Certificate of Conformity	1		16	1	Diaphragm Pump	
4	Round Mouth Quick Release Cap	2		17	1	Charger	
5	Drip Cap	2		18	1	Hex key (No. 2)	
6	Flat Mouth Quick	2		19	1	Hex key (No. 2.5)	

	Release Cap						
7	Fan Nozzle	2		20	1	Hex key (No. 4)	
8	Nozzle	2		21	1	Double-ended open-end wrench (No. 10)	
9	Spray Head Filter	2		22	1	Double-ended open-end wrench (No. 13)	
10	Battery Charging Adapter Wiring Harness	1		23	1	Voltage Converter	
11	Tracheal connector nozzle	1		24	1	Socket wrench	
12	drip-proof diaphragm	3		25	2	Hexagon Bolt	
13	10-inch tablet computer	1					

3. Install

3.1 Safety Instructions

	To avoid personal injury and equipment damage, please carefully read the safety recommendations in this manual before installation.

Please note that the following safety recommendations cannot cover all possible risk scenarios.

Installation and Disassembly Safety

1. Rainy and snowy weather conditions are not conducive to the operation of the equipment, so please do not install it in such conditions.
2. Installation of equipment is strictly prohibited in places such as dark and damp areas.
3. Please install and disassemble the equipment according to the correct installation method described in the instruction manual.
4. Before installation and disassembly, please turn off all power sources and disconnect the battery terminal cables to prevent equipment damage caused by live disassembly.

3.2 Electrical Safety

1. When performing electrical operations, it is necessary to comply with local regulations and standards. Relevant staff must have the corresponding work qualifications.
2. Please carefully check whether there are potential hazards in the work area, such as near high-voltage lines, etc.
3. Before installation, you should know the location of the emergency power switch. When an accident occurs, you should first cut off the power switch.
4. When it is necessary to turn off the power, be sure to carefully check and confirm that the device has been properly shut down.
5. Please do not place the device in a damp place, and do not allow liquid to enter the interior of the line marking machine.
6. Improper and incorrect electrical operations may cause accidents such as fires or electric shocks, and cause serious or even fatal injuries to the human body and damage to equipment.
7. Ensure that all connecting cables are in good condition. If any cable is damaged, please stop using it and replace it with a new cable before resuming use.
8. Electric tool plugs must match the sockets. Do not modify the plugs in any way. Electric tools that require grounding must not use any adapter plugs. Using the original plugs and matching sockets can reduce the risk of electric shock.

3.3 Personal Safety

1. When operating power tools, stay vigilant, focus on the current operation, and follow common sense. Do not operate power tools when you are tired, or under the influence of drugs, alcohol, or medication. A momentary lapse of attention while operating power tools can lead to serious personal injury.

2. Use personal protective equipment. Always wear goggles. Using protective equipment such as dust masks, non-slip shoes, safety helmets, or hearing protection devices under appropriate conditions can reduce personal injury.
3. Prevent accidental starting. Ensure the switch is in the off position before connecting the power supply and/or battery pack, picking up, or transporting the tool.
4. Charging while fingers are on the switch or the switch is on when handling tools can lead to accidents.
5. Before starting the power tool, remove all adjustable Allen wrenches or adjustable wrenches. An adjustable wrench or Allen wrench left on the rotating parts of the power tool can cause personal injury.
6. Do not overextend your arms. Always stand firmly and maintain body balance. This will enable better control of the power tool in case of an accident.
7. Dress Code. Do not wear loose clothing or jewelry. Keep hair and clothing away from moving parts. Loose clothing, accessories, or long hair may get caught in moving parts.
8. If there are connection devices for dust collection and suction equipment, ensure that they are properly connected and used correctly. Using dust collection equipment can reduce dust-related hazards.
9. Do not take it lightly or neglect the safety guidelines of the tool just because you use it frequently and are familiar with it. Any negligence may lead to serious injury in an instant

3.4 Use and Precautions of Electric Tools

1. Do not misuse power tools. Use appropriate power tools according to their intended purpose. Operating within the designed ratings ensures that power tools can perform tasks more efficiently and safely.
2. Do not use power tools with malfunctioning switches. Power tools that cannot be controlled by switches are extremely dangerous and must be repaired.
3. Before adjusting, replacing accessories, or storing the power tool, the power supply must be disconnected and/or the battery pack (if removable) must be removed. This preventive safety measure reduces the risk of accidental start-up of the power tool.
4. Store idle power tools out of the reach of children, and prohibit personnel unfamiliar with power tools and relevant instructions from operating power tools. Using power tools without training can pose a danger.
5. Maintain power tools and their accessories. Check for misalignment or jamming of moving parts, damage to components, and other conditions that may affect the operation of power tools. If damaged, power tools should be repaired before use. Many accidents are caused by improper maintenance of power tools.

6. Follow these instructions and use power tools, accessories, etc. according to the operating conditions and content. Using power tools for unintended purposes may lead to danger.
7. Keep the handle and gripping surface dry, clean, and free of grease. In the event of an accident, a slippery handle and gripping surface can affect the safe operation and control of the tool.

3.5 Maintenance

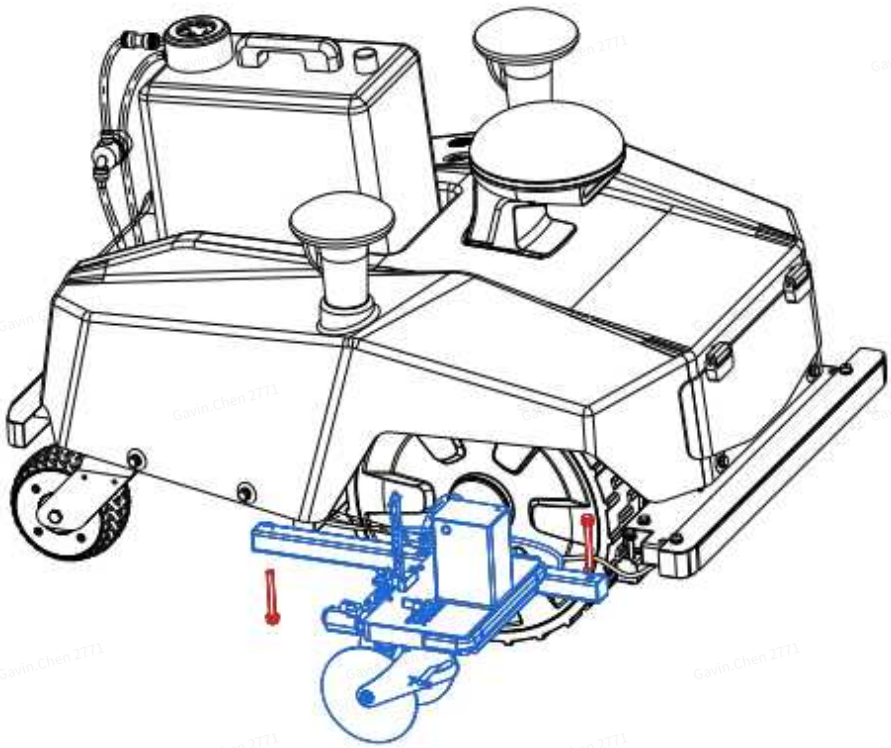
1. Electric tools must be repaired by qualified maintenance personnel using the same spare parts. This ensures the safety of the electric tools.
2. Do not attempt to repair damaged battery packs on your own. Battery packs should be repaired by the manufacturer or an authorized repair service provider.

3.6 Installation Steps

Park the line marking machine on a level and clean area, prepare a pair of gloves, and take out, organize, and arrange the installation tools and components from the accessory box.

3.6.1 Install the nozzle assembly

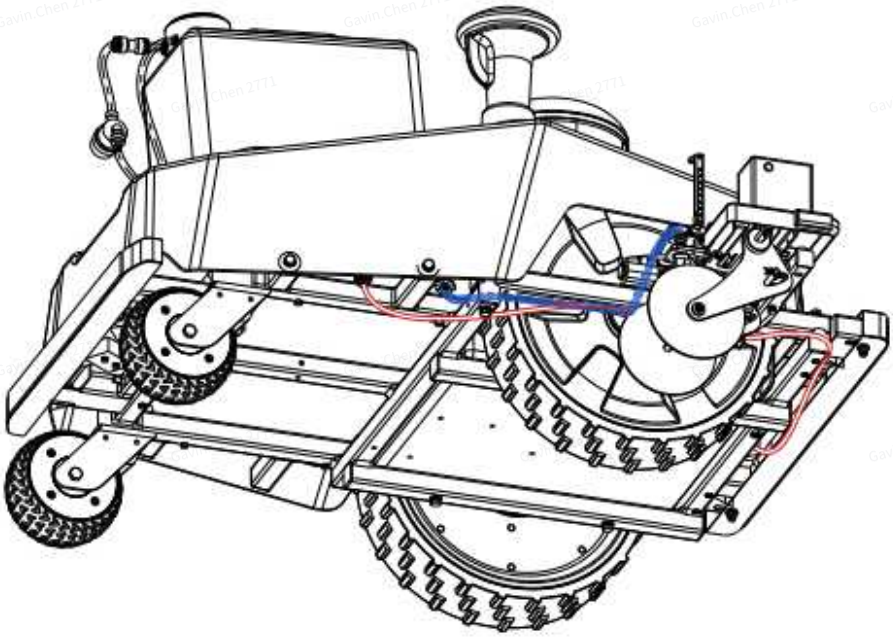
1. Find two M8*70mm hexagon socket head cap screws in the toolbox, and use them to secure the nozzle assembly to the frame.





Serial Number	Accessory Name	Quar
1	Hexagon head bolt	2

2. Connect the power cord and water pipe to the quick-release interface at the bottom of the vehicle body.



4. Preparations before Use

4.1 Charging

4.1.1 Charge the battery

- Charging the battery requires the following:

  1 x RLM01 Battery

  1 x Battery Charger

- Insert the battery into the battery compartment





- Connect the charger



- **Note:**
  - The battery charger does not include an ON/OFF power switch; after being plugged into a wall power outlet, the battery charger is in the ON state.
  - When plugged into a wall power outlet (with the battery connected), the "red" light of the charging indicator lights up, indicating that the battery charger has started charging.
  - When the battery is fully charged, the "green" indicator light will illuminate.

4.1.2 Charging the Tablet

- Charging a tablet requires the following:

  1 x Tablet Charger

  1 x TYPE-C data cable for tablets



- Connect the charger to a power outlet
- When charging, a lightning symbol will be displayed on the battery icon on the screen.

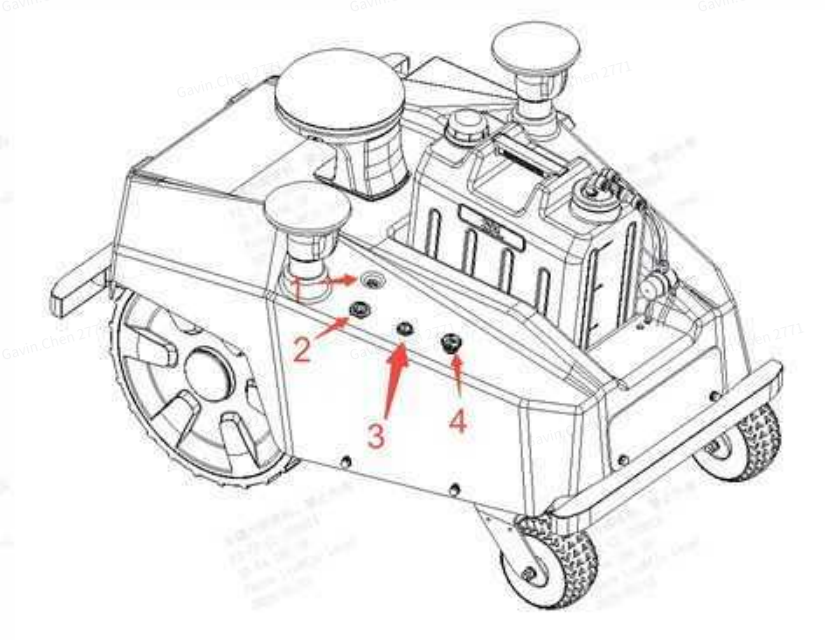
4.2 Turn on the power



- **Introduction to Sensors and Switches**
  - Raindrop sensor, which can send prompt messages to the APP when it rains.
  - Power switch, press to turn on, green light will illuminate, press the button again to reset, and the entire vehicle will power off and shut down.

- Manual control of the paint spraying system: turning left is for exhaust, turning right is for paint spraying.
- Emergency stop switch. When the emergency stop switch is pressed, the drive wheel motor and pump are powered off and stop working. Rotate the button clockwise to clear the emergency stop signal.

Normal power supply status can be restored.



4.3 Test the spraying system

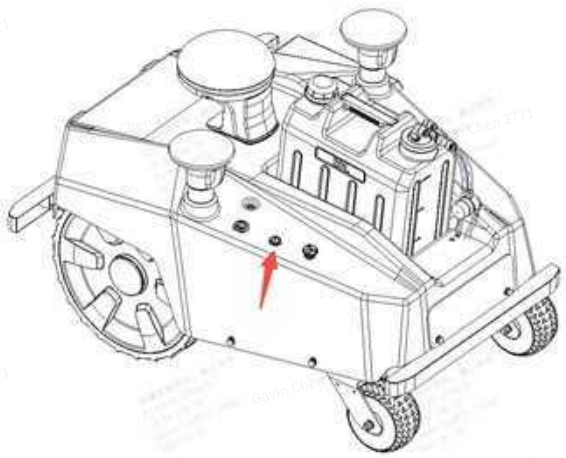
- Select paint
  - The selected paint should be water-based, harmless to the grass on the field, and comply with local laws and regulations.
  - You can choose between ready-to-use and water-mixed paints. When spraying, the paint density should be <=1.2. For water-mixed paint, it is recommended to use a paint-to-water ratio of 1:4 (i.e., one part of the stock solution diluted with four parts of water), and stir for at least 3 minutes to ensure the paint and water are fully diluted.



- Spray Painting Preventive Measures
  - Exposure Control: Local ventilation is required when the product is sprayed, heated, or dried within the effective area.
  - Respiration: When testing spraying in an enclosed space (indoors), wearing a mask is required.
  - Hands: Wear gloves to prevent direct contact.
  - Eyes: Wear goggles to prevent splashes.
  - Skin: Wear work clothes to prevent splashing.

> **Note:**
>
> **If paint accidentally gets into the eyes:** Before the paint dries, rinse the eyes with plenty of water for at least 10 minutes. If you feel unwell, seek medical attention.
>
> **Skin contact with paint:** Before the paint dries, remove contaminated clothing and wash the skin with water and soap.
>
> **If paint is accidentally swallowed:** Drink plenty of water, do not induce vomiting, and seek medical attention promptly.
>
> **Fire extinguishing methods for paint:**Water, foam, carbon dioxide, or dry powder extinguishers can be used to extinguish the fire.

- Exhaust and painting test
  - Before painting, it is necessary to exhaust air for 15 seconds first, then paint for 5 seconds to ensure that all water pipes are filled with paint and free of air.





  - Function of three-position rotary switch:

1	When the switch is turned to the**left**, it is for exhaust.
2	When the switch is turned to the**right**, it is for painting.
3	When the switch is in the **middle position** , it is in the off state.

5. Deploy RTK Base Station

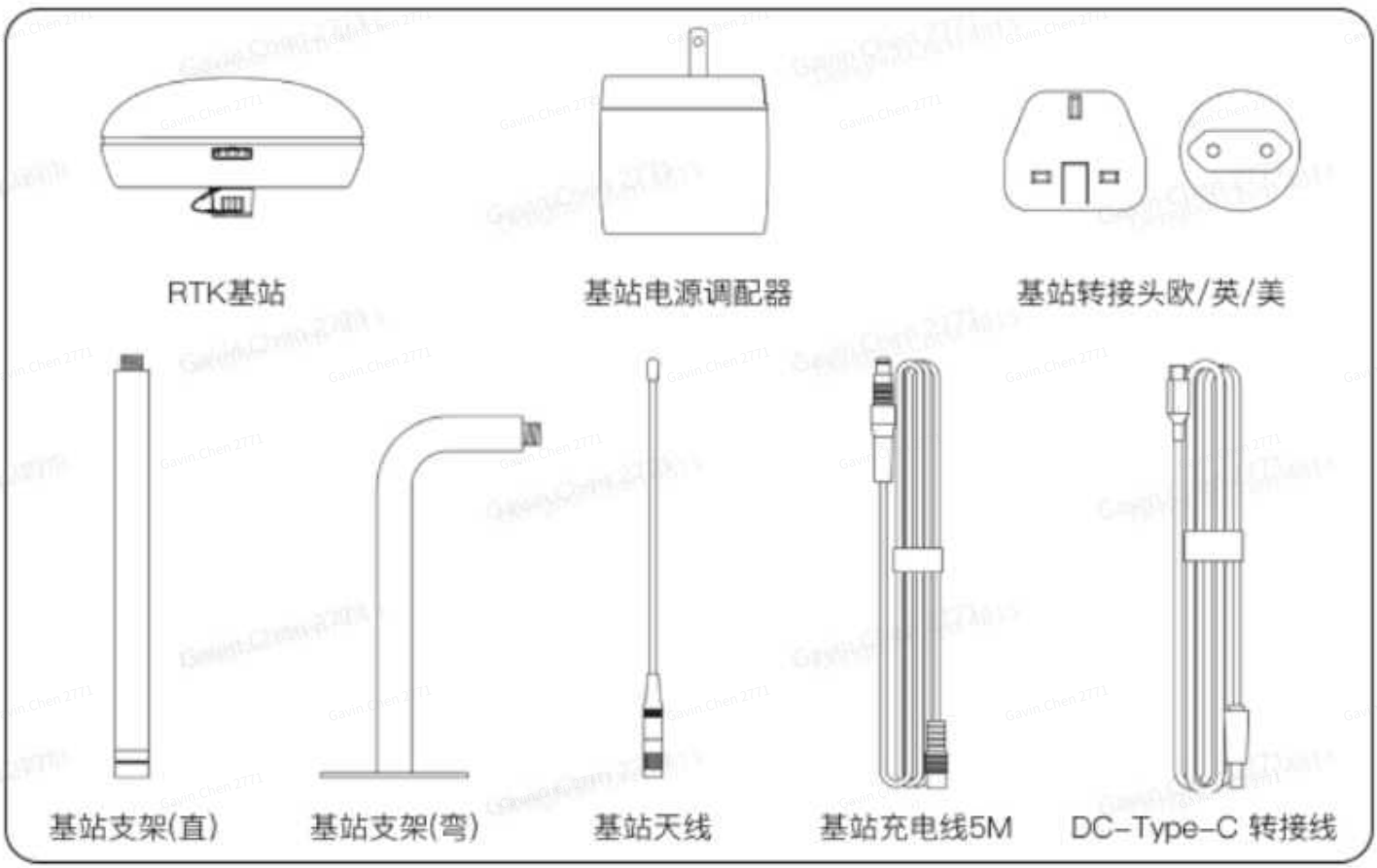
The line marking machine can obtain RTK positioning data through local NTRIP services or FJD base stations.

If you have a network RTK service number based on NTRIP, we recommend that you use the NTRIP service for line marking without the need to deploy an RTK base station.

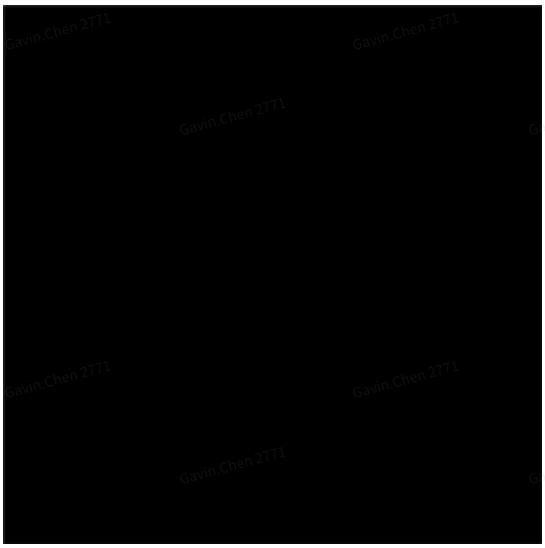
If you do not have an NTRIP service account or the local NTRIP service signal is unstable, you can refer to the following steps to deploy an RTK base station.

5.1 Base Station Unboxing

Open the base station packaging box, and the internal accessories are as follows:



5.2 Antenna and Charging Cable





- When using the base station, an external antenna is required; without an antenna, the positioning signal will be unstable.
- The base station has no built-in battery and requires an external power supply when in use.
- Additionally, the base station can also be powered via TYPE-C.

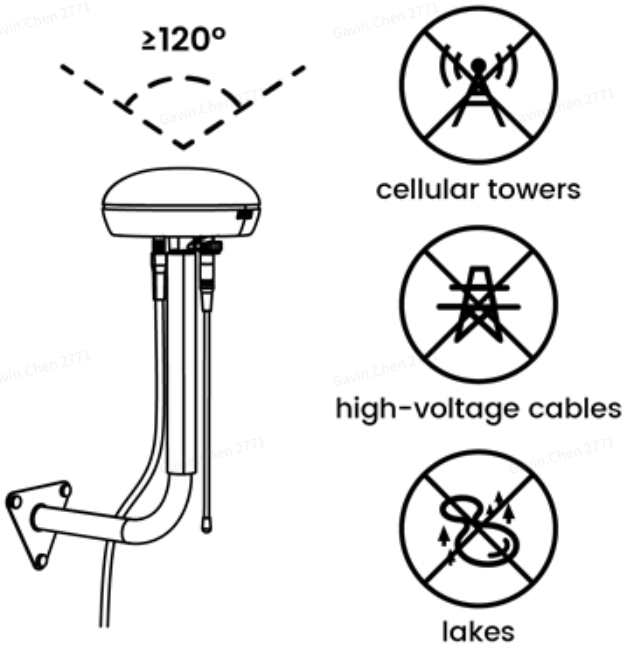


5.3 Installation Method

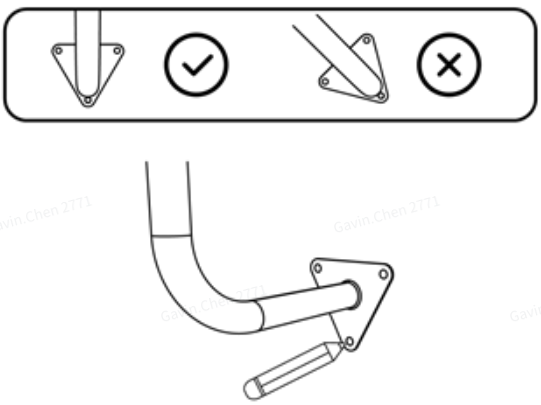
To optimize the performance of the RTK system, the base station must be located in an open area with good satellite signal reception. You can install the base station on a wall or roof, or on flat and open ground.

5.3.1 Install the base station on the wall/roof

1. RTK antennas should be installed in open areas such as rooftops or walls.
2. Ensure that there is a portion of unobstructed sky within a 120° angle.
3. Install the RTK antenna at a location at least 500 meters away from base stations, high-voltage cables, and water bodies such as lakes.

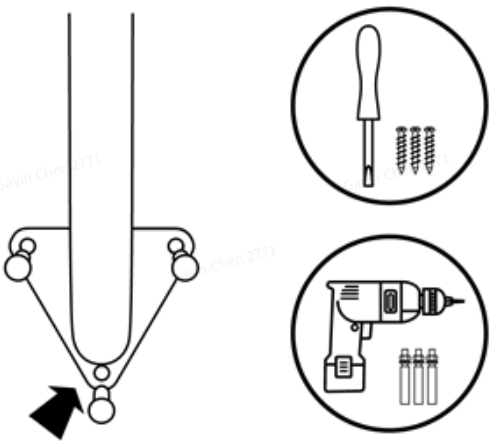


4. Mark the installation position of the curved mounting rod on the wall.
5. The mounting pole must be positioned vertically upward.



6. Select appropriate screws based on the wall material and drill holes at the marked positions.
7. For wooden walls: Use M6 screws and a screwdriver.

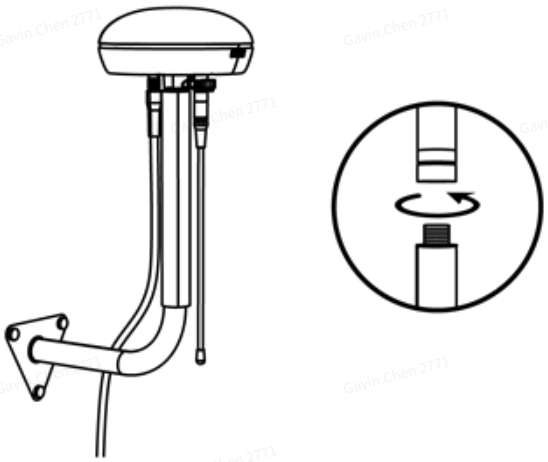
   For concrete walls: Use M8 expansion bolts and power tools (self-provided).



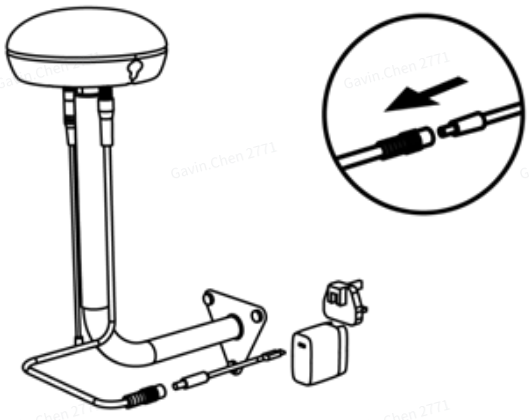
8. Install a direct hanging pole, RF antenna, and power cord (5m) on the RTK base station.



9. Securely fasten the two mounting rods.

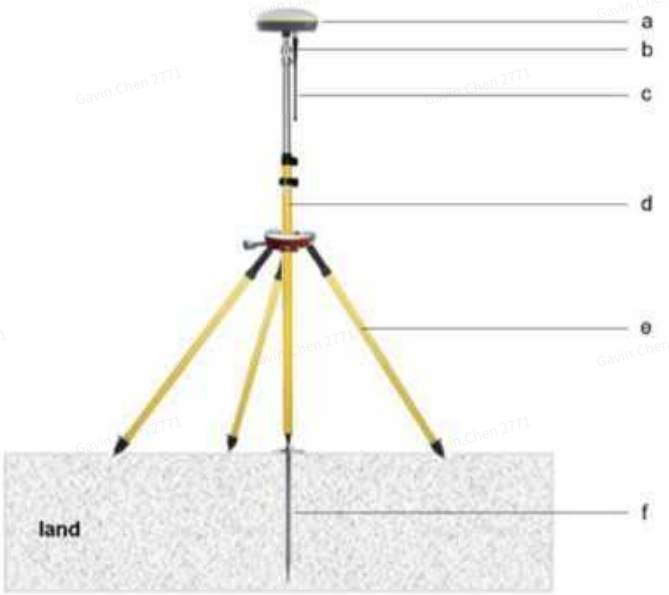


10. Insert the DC USB-C cable, adapter, and power adapter plug into a power outlet to activate the RTK base station.



5.3.2 Install the base station on the ground

If installing the base station on a wall/roof is not suitable for your usage scenario, you can choose to purchase our [Tripod Kit] accessory and install the base station on the ground. You can refer to the detailed instructions below.



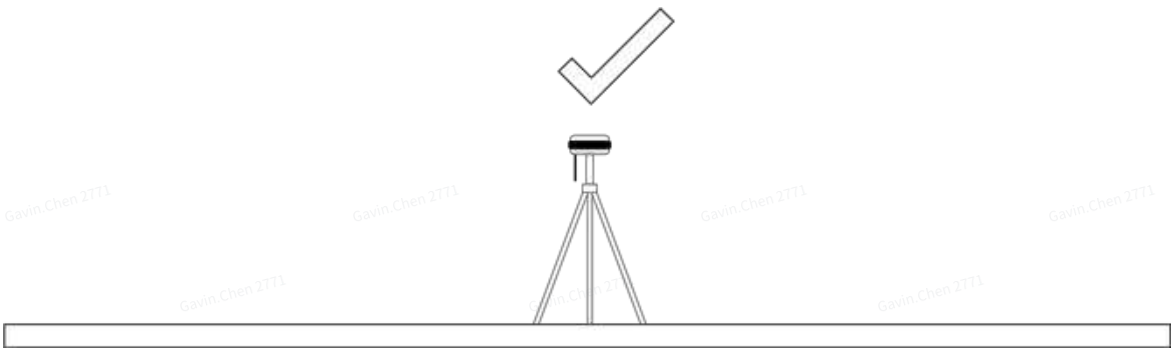
a	V1 receiver	d	Alignment pole
b	Adaptor with 5/8-inch screw	e	Tripod
c	Radio antenna	f	Marking pin

- **Location Selection Requirements**

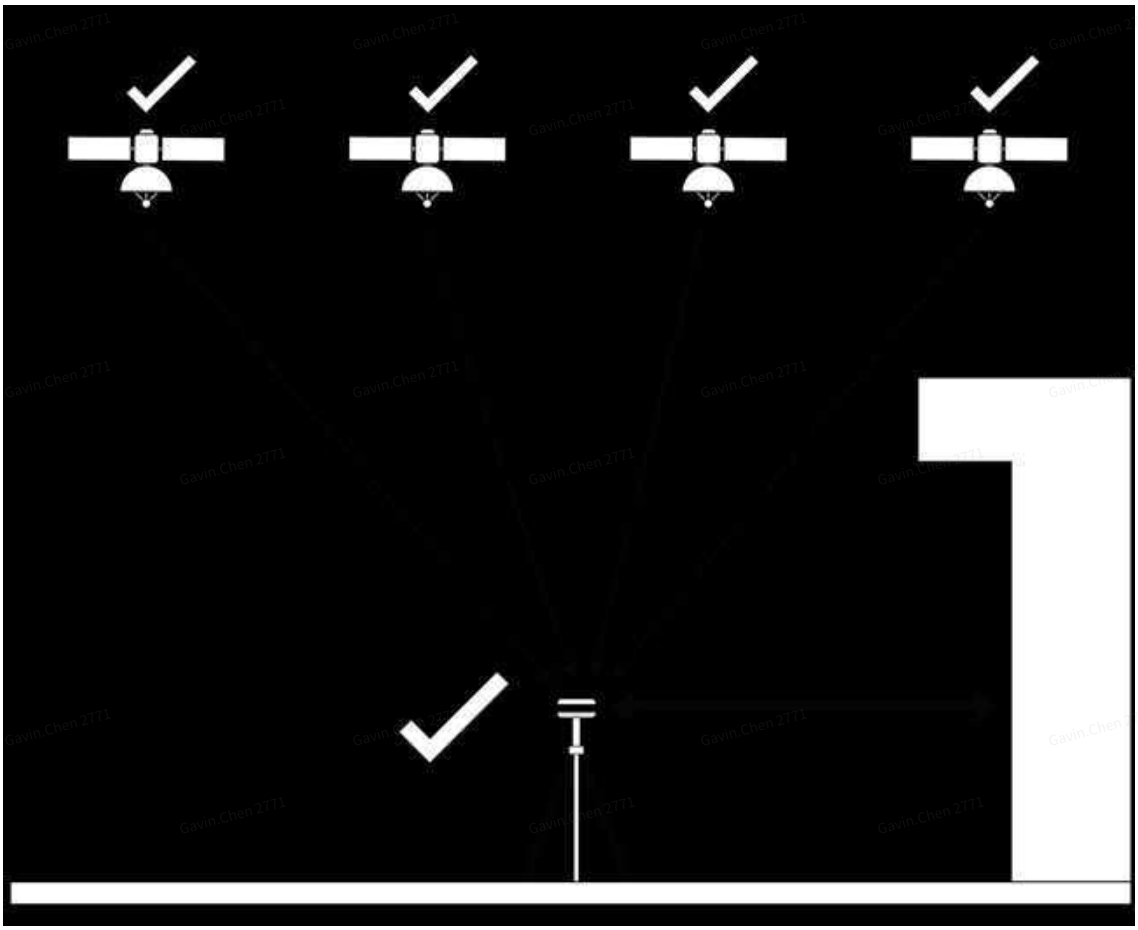
Placing the base station next to buildings and fences taller than the base station will block the originally visible satellites, the line drawing may be less accurate, or RLM01 may stop drawing altogether. The farther the base station is placed from high-rise buildings/trees, the better.

- **Good location**

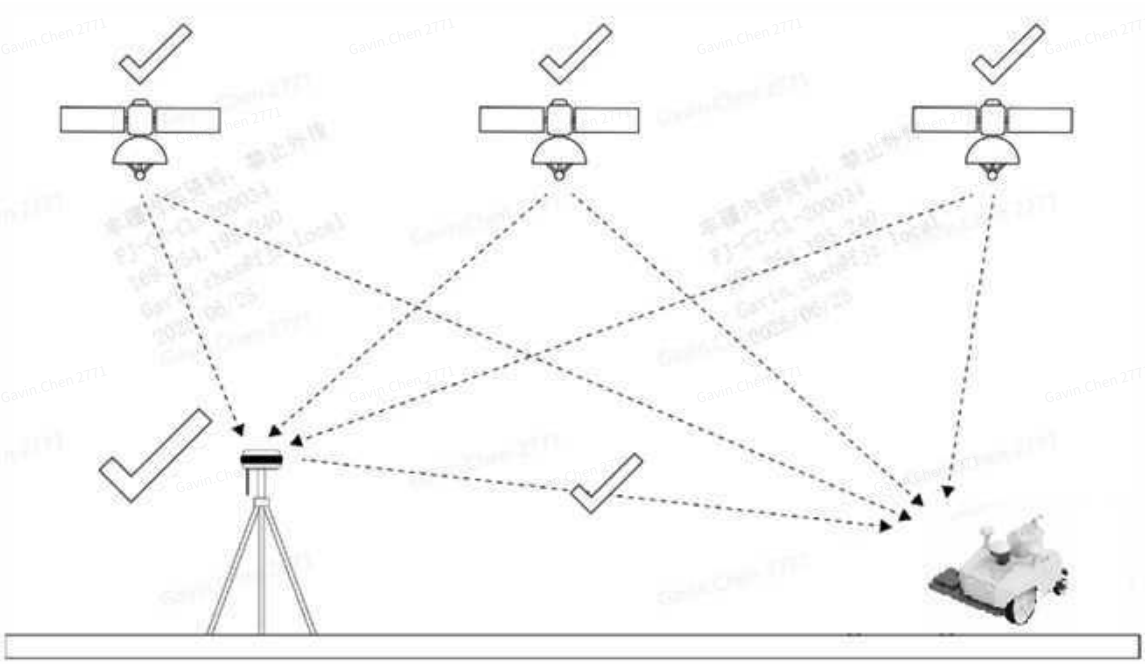
On a flat surface.



- **Good location**

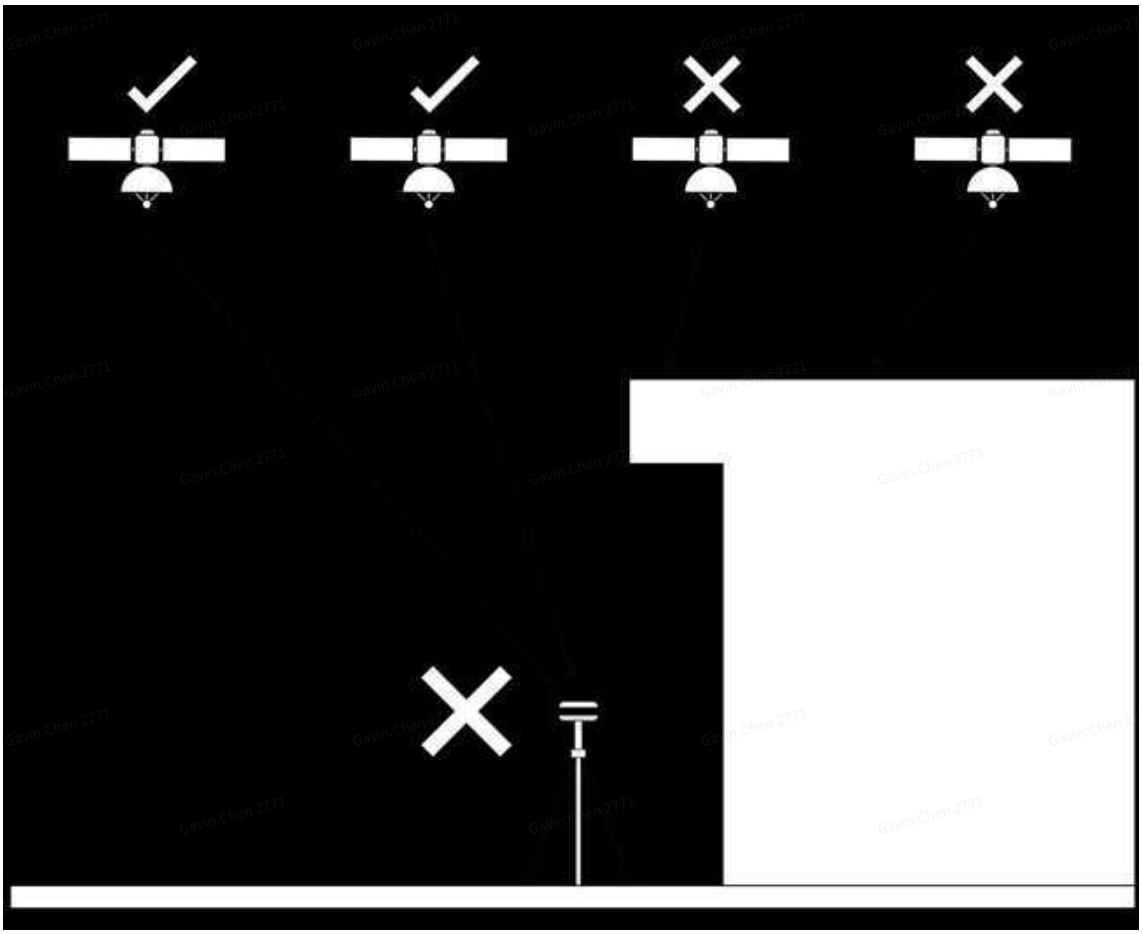


- **Good location**



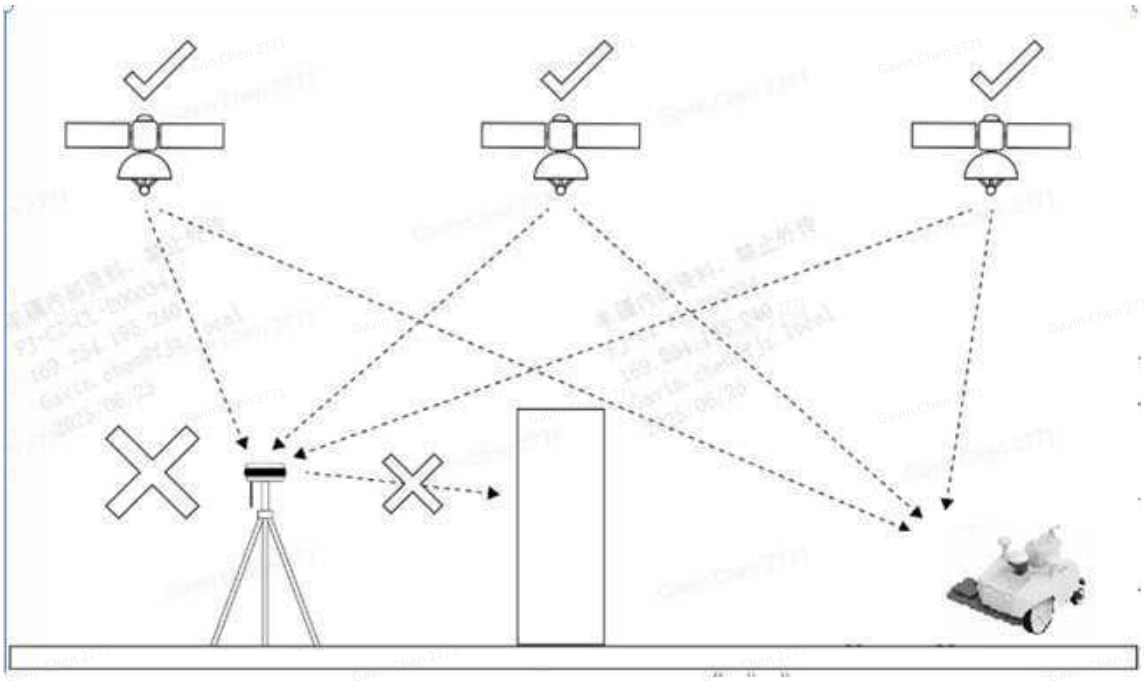
- **Position Error**

In this case, the building blocks the satellite.



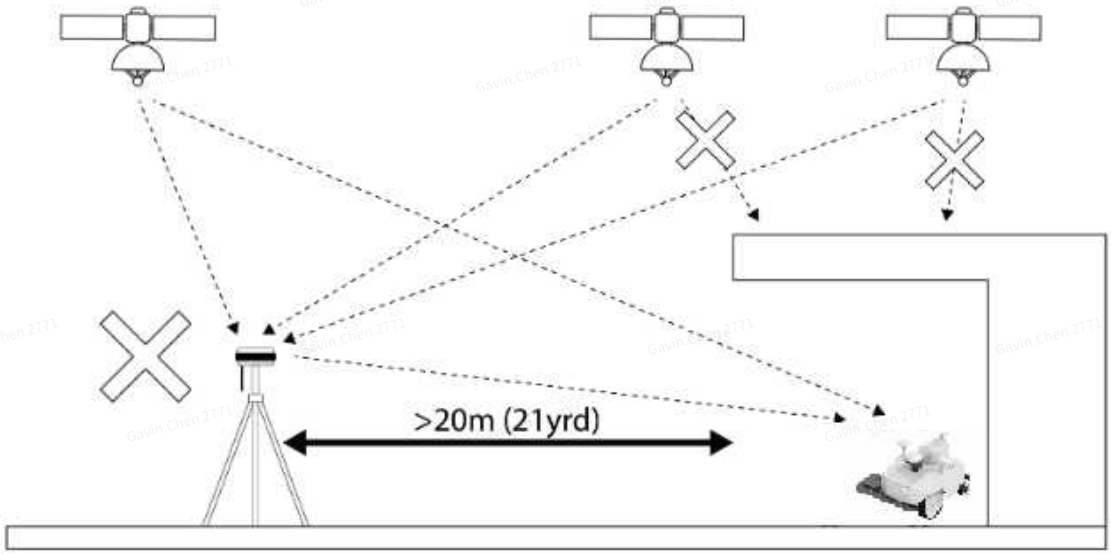
- **Position Error**

In this case, the object obstructs the satellite.

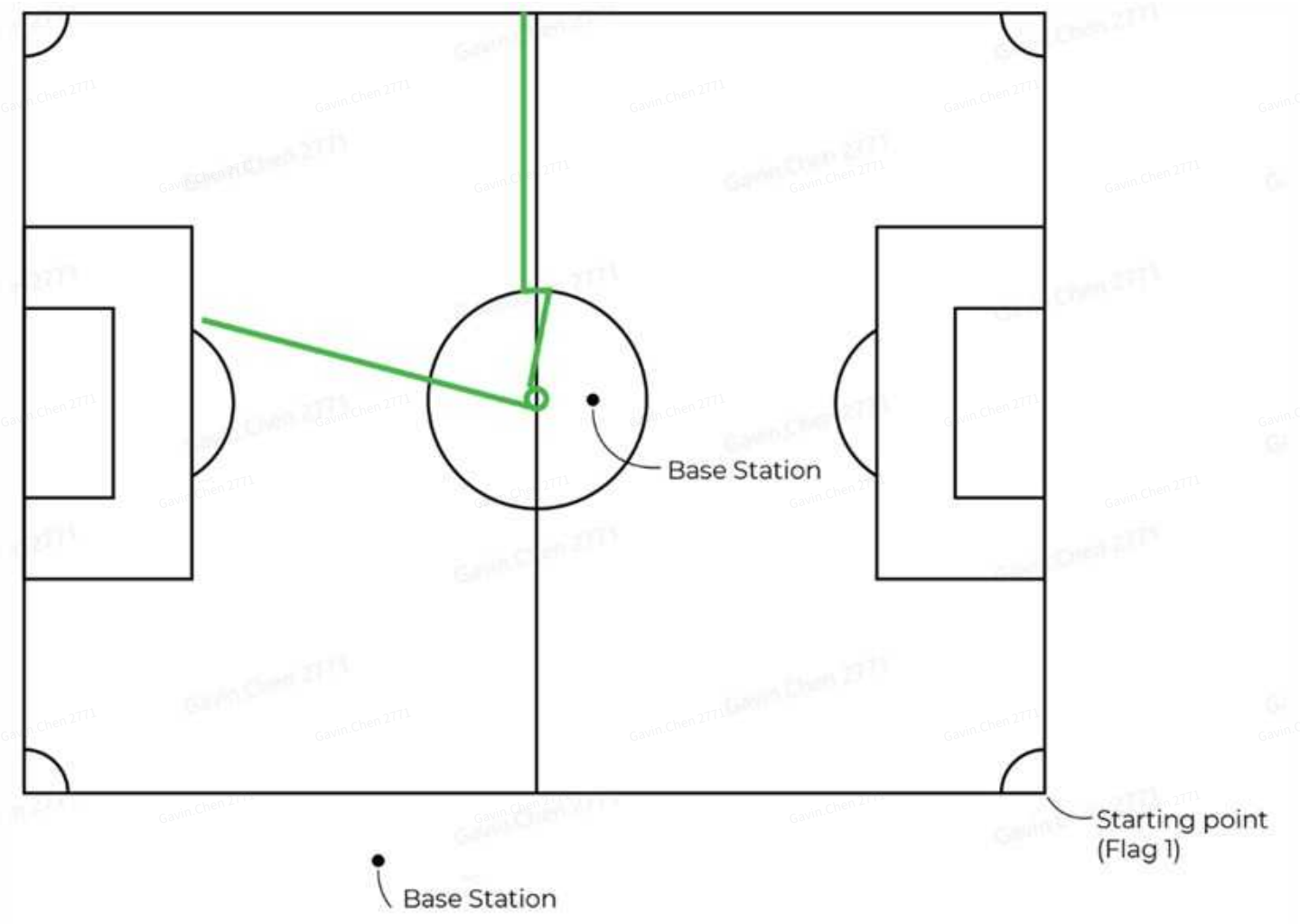


- **Position error**

In this case, the building blocks the satellite.



- **Note:**
  - When marking the site, it is important to place the base station in a position where RLM01 will not hit it during operation.
  - Additionally, it is not allowed to move the base station during operation. This will cause RLM01 to deviate from the line currently being drawn.

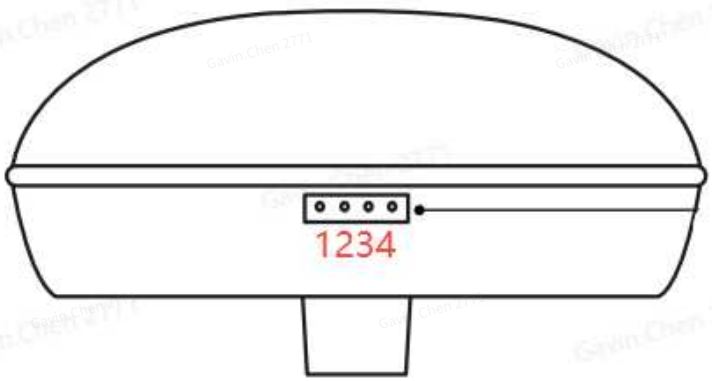


5.3.3 Base Station Indicator Light Description

- To turn on the device, press the power switch.



- Indicator Light Instructions



1. Power Indicator	Green light is constantly on when powered on
2. Data Indicator	Indicator light off: indicates that the base station is not transmitting differential data or has not started static data collection. Green light always on: After the setup is completed, the data link has been established. The indicator light blinks at the transmission frequency. Green light flashing: Differential data is being transmitted. Blue blinking: In static mode, when the acquisition interval is greater than or equal to 1 second, the indicator light blinks at the acquisition interval; When the sampling interval is less than 1 second, the indicator light flashes at a sampling interval of 1 second.
3. Satellite Indicator	Indicator light off: No satellite tracking; Green light constantly on: Fixed solution, the base station is in normal operating condition;

	Green blinking: Positioning but not in a fixed solution state; Red blinking: Satellite tracking but not positioning; Alternating flashing between green and red: GNSS single board is abnormal.
4. Bluetooth Indicator Light	Indicator light off: No Bluetooth connection; Blue light stays on: Bluetooth/WiFi connection established;

6. Instructions for Use

6.1 Preparation

- Read and understand the safety instructions before use.
- If you are using an RTK base station, ensure that the base station has been deployed.
- Ensure that a good Wi-Fi or mobile hotspot signal is available nearby.
- Ensure your FJD tablet is fully charged.
- Ensure that your FJD tablet is connected to the network, which can be achieved by connecting to Wi-Fi or inserting a SIM card.
- Ensure that the Bluetooth function of your FJD tablet is enabled.

6.2 Download the Line Marking Robot Application

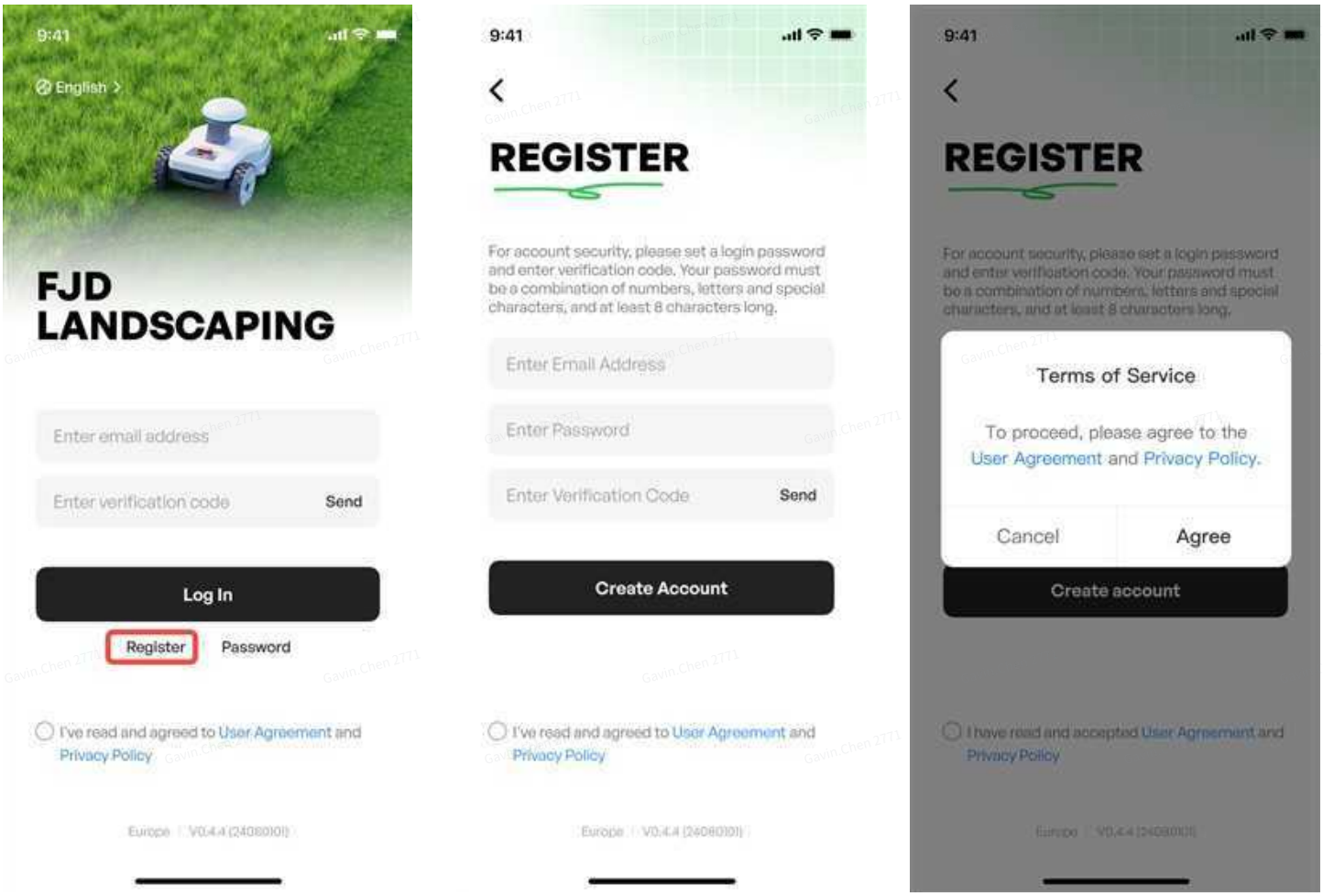
- The FJDynamics Line Marking Robot is specifically designed for use with the application. Please download the application first. You can obtain the iOS application by scanning the QR code below or searching for {FJD Landscaping} in the Android or App Store.
- The application has been installed on the tablet

6.3 Tablet PC

- Press and hold the power button of the tablet, then release it when the screen lights up. **First, connect the tablet to the Internet, which can be done via a 4G card or Wi-Fi.**
- Open FJD Landscaping APP



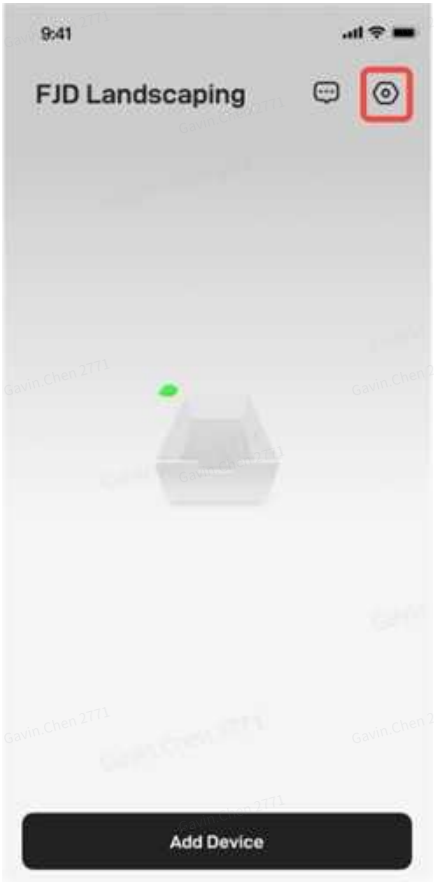
6.3.1 Register and Log In

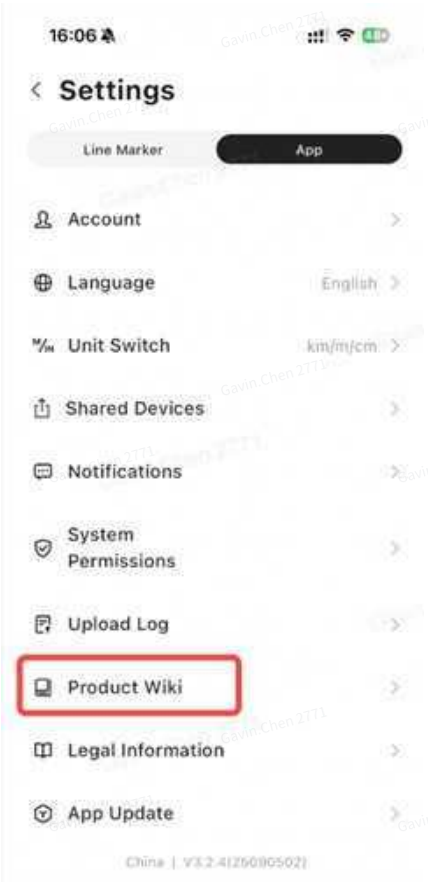


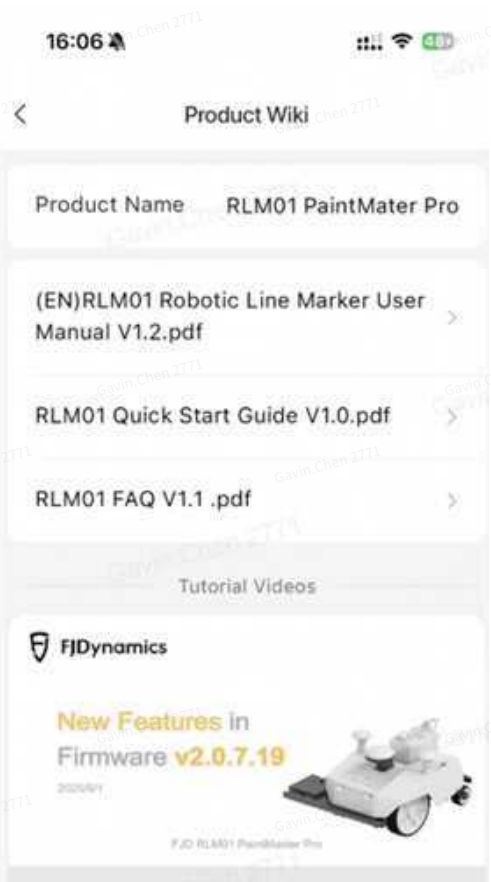
- After opening the application, you can create an account according to the following instructions.
  a. Click to register now.
  b. Enter your email address.
  c. Click the Send Verification Code button, and the verification email will be sent to your email address (if you don't receive it, please check your junk email folder).
  d. Enter the verification code (the verification code is valid for 10 minutes; please click the Send button again to obtain a new verification email).
  e. Set a password (the password must be between 8 and 22 characters long and contain at least lowercase letters and numbers).
  f. View the User Agreement and Privacy Policy.
  g. Click to complete registration and login.

6.3.2 View Product Lingo

- Click the " **Settings** " button to enter the "Product Lingo" where you can view the RLM01 user manual, FAQs, user guide videos, etc. If you encounter any problems during use, you can find solutions here.

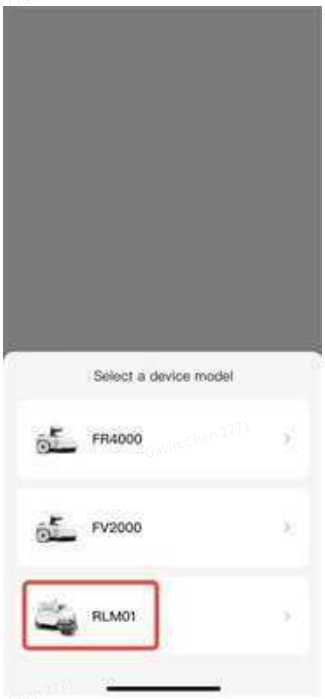


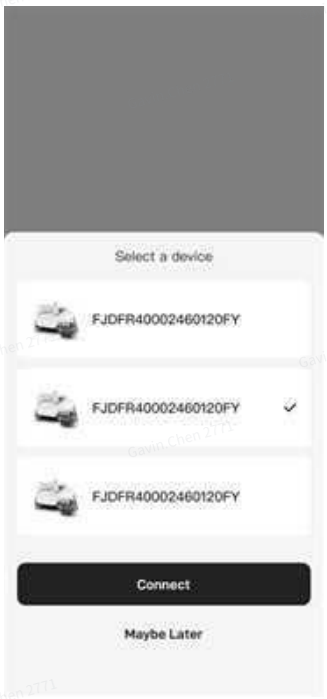




6.3.2 Add Underline Robot









!	**Note: To ensure the normal operation of Bluetooth, please make sure that Bluetooth is enabled on your phone and the distance between the phone and the line marking robot is less than 3m.**

- Click the "Add Device" button.
- Select "RLM01" from the options.
- Connect the line marking machine according to the serial number, which is on the back of the battery compartment cover.
- Complete the Bluetooth connection and network connection of RLM01 according to the page instructions. For network connection, you can choose a 4G card or WIFI.
- If you choose to use a 4G SIM card to connect to the network, please refer to the following steps.
    a. Before installation, please confirm with the FJD sales representative whether the RLM01 comes standard with a 4G card at the time of factory shipment. If it does not come standard, please purchase a generic 4G card locally.
    b. When installing, first insert the 4G card into the card holder.

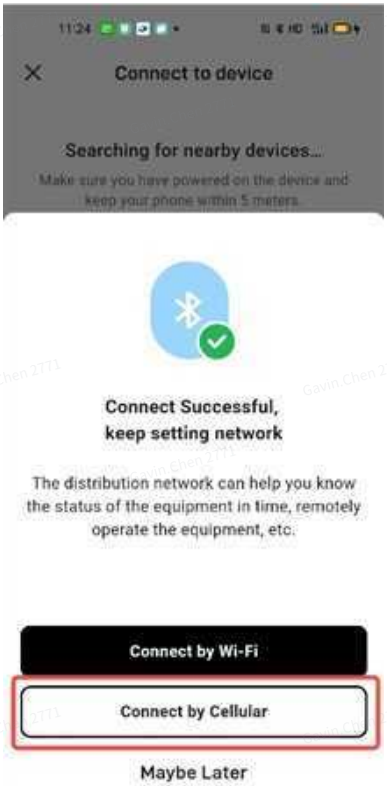


    c. The 4G card needs to be installed inside the main control board of RLM01. As shown in the figure below, insert the card holder into the card slot, making sure the metal side of the SIM card faces down.





    d. If you choose to connect to the network via a 4G SIM card, refer to the following process. Some 4G SIM cards require entering the APN to connect to the network properly. Usually, you can find the APN information on the 4G SIM card packaging, or consult your local carrier.







e. After the 4G card is properly connected, a black 4G icon will be displayed on the home page of the APP. If the icon is red or the signal strength is 0 bars, it indicates that the 4G card has been inserted but there is no network. Please check the APN settings.



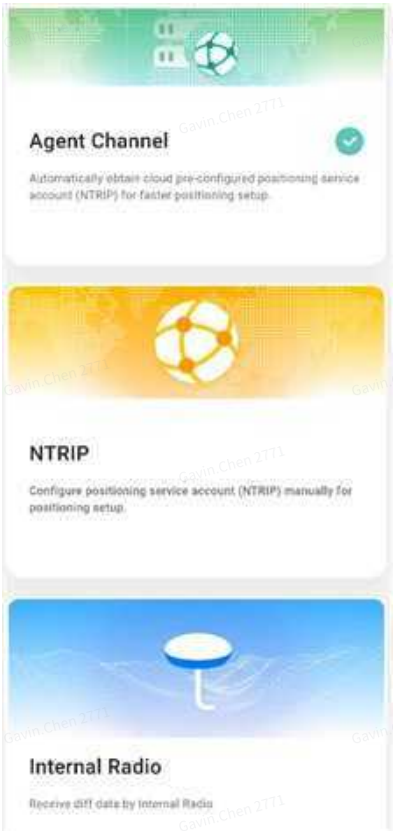
6.3.3 Set Positioning Mode

- You can choose one of the following 3 positioning methods

1)**Agent Channel**: Agent Channel, the NTRIP account will be automatically bound to the line marking machine. Before use, please confirm that FJD technical support staff has configured the Agent Channel for your RLM01 on the GM platform. A checkmark will appear in the Agent option, indicating successful configuration, and you can return to the home page to start creating a map.

2)**NTRIP**: You need to find a local NTRIP service provider to purchase an account or buy FJD NTRIP service.

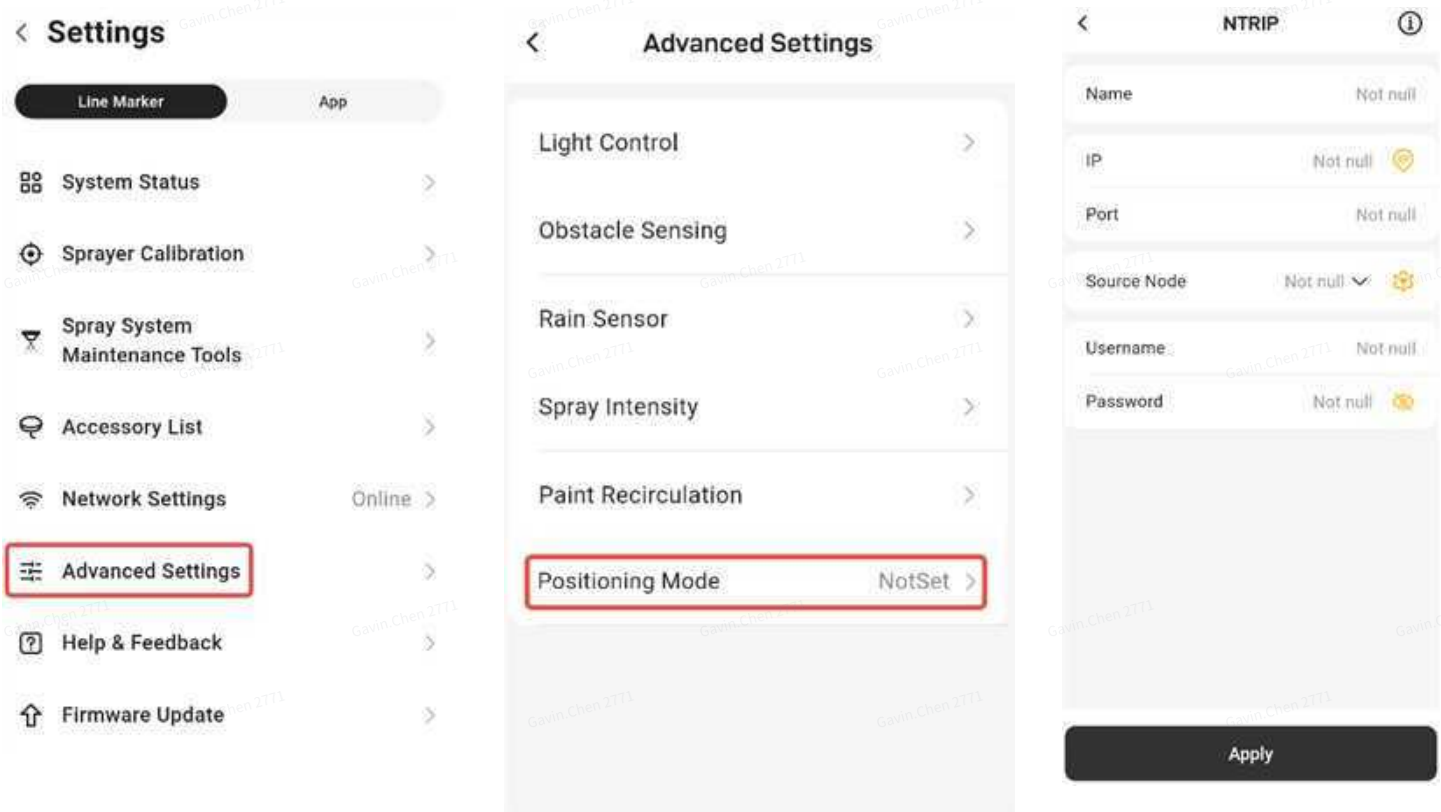
3)**Internal Radio**: Base station mode, using FJD base station for positioning services.



6.3.3.1 Set Agent Channel Positioning Mode

6.3.3.2 Set NTRIP Positioning Mode

- The following is the detailed process for configuring NTRIP. Please purchase an account from a local NTRIP service provider or purchase FJD NTRIP service in advance.



- Parameter Description:

Name:	Customize
IP:	IP Address of NTRIP Service
Port:	Provided by the NTRIP service provider, incorrect input may prevent connection to the server
Source Node:	Provided by the NTRIP service provider, incorrect input may result in the inability to obtain positioning data
Username:	Provided by the NTRIP service provider, incorrect input may prevent connection to the server
Password:	Provided by the NTRIP service provider, incorrect input may prevent connection to the server

6.3.3.3 Set Internal Radio Positioning Mode

Connect to the Base Station

- Click the "Base Station" button.
- Enter the base station serial number, which is located on the nameplate at the bottom of the base station.
- Select 【Save】 to save when connecting for the first time, and then you can select 【Skip】 to skip.
- After successful connection, set the known point of the base station, and the name can be customized.



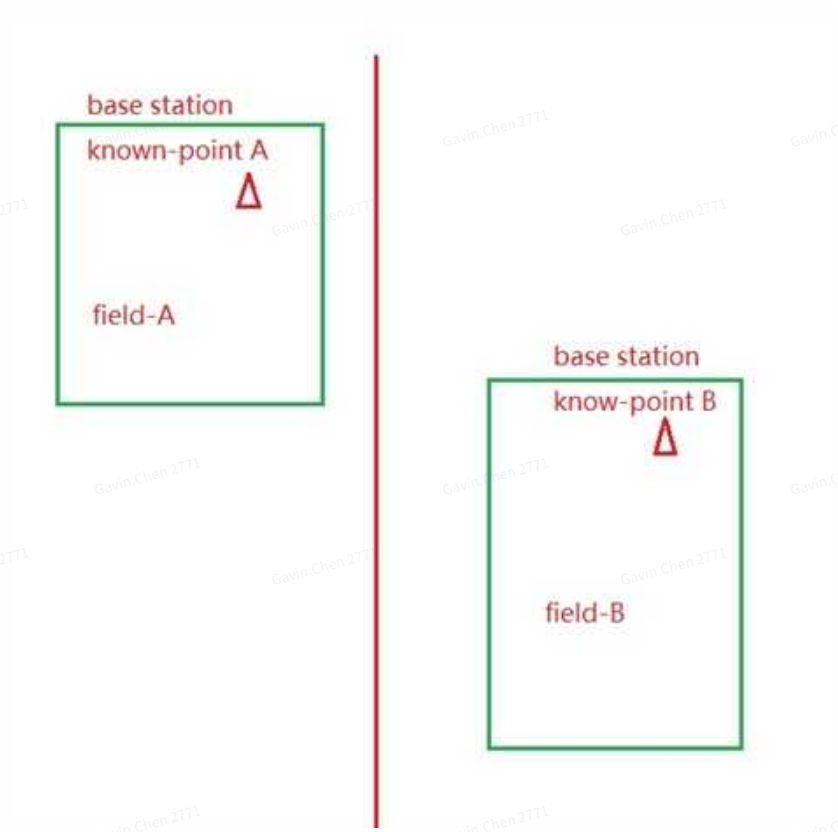




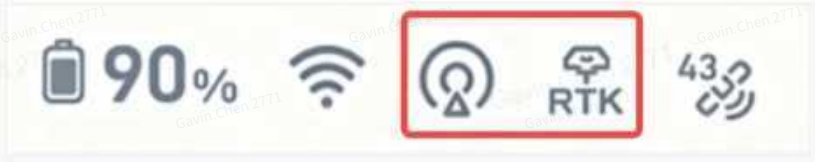


- Suppose a known point A is set at Stadium A. When marking lines at this stadium for the second time, the base station needs to be erected at the same location, and the known point A set during the first time should be selected. This operation ensures that the map will not shift.
- If moving to court B for line marking, and the distance between courts A and B is too far or blocked by obstacles, it is necessary to reset the known point B and perform mapping under the known point B, as shown in the figure below.





- After a successful connection, the APP home page displays a black base station icon. If the icon is red, it indicates that valid positioning data has not been obtained. Please check the installation location of the base station and the status of the base station indicator lights.



- **Note:** After the base station has completed setting the known points for the first time after changing its location, it is recommended to power off and restart the RLM01 once, and then proceed with map creation to ensure that the map does not shift.

6.4 Remote-controlled Line Marker







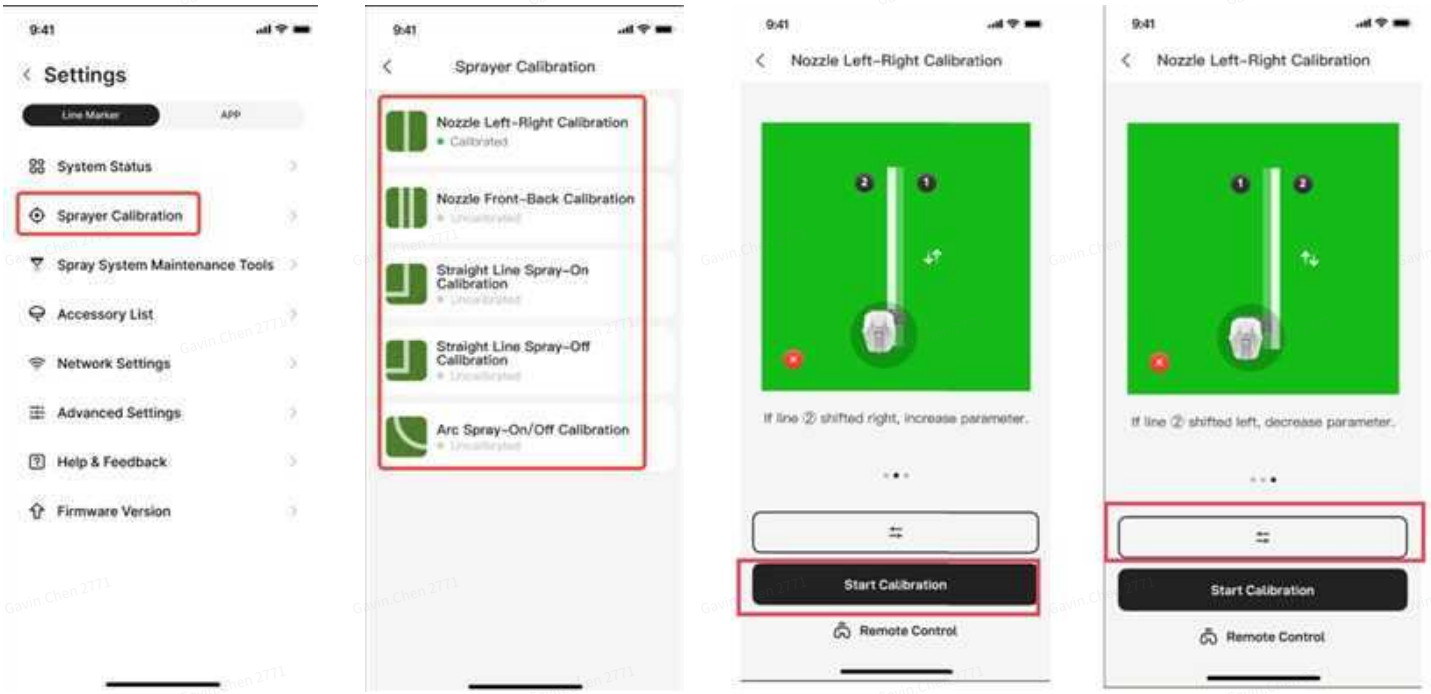
- Select the joystick button to enter remote control mode.
- Sliding the left joystick forward and backward controls the forward and backward movement of the line marking machine.
- Sliding the right joystick left and right controls the left and right turns of the line marking machine.

- The driving speed can be adjusted from 1 to 3 gears at the bottom of the screen. Please familiarize yourself with the operation in the low gear first before using the high gear.

6.5 Calibration

In an outdoor location without obstructions and with good satellite signals, select an 8m x 8m open flat ground/grassland, and use water or paint to complete the following 5 calibration steps in sequence to ensure that the right angles and arcs intersect perfectly.

- Click the [Settings] button in the upper right corner of the home page to enter.



- Click the [Start Calibration] button, and the line marking machine will start drawing straight lines or arcs. Ensure that the line marking machine is in the center of the venue and there are no obstacles around it.
- Click the [Parameter Settings] button and modify the calibration parameters according to the prompts.

6.6 Map Creation

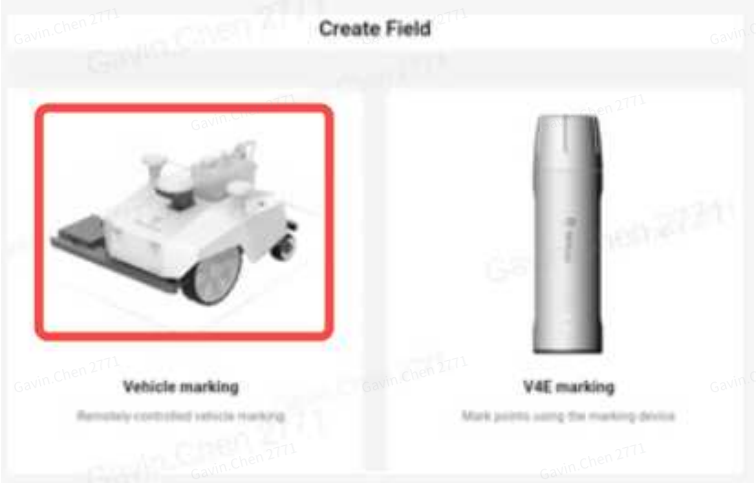
There are two ways to create a map: by vehicle nozzle dotting or V4E dotting.

6.6.1 Use vehicle sprayer dots to create a map

1. Create a map.

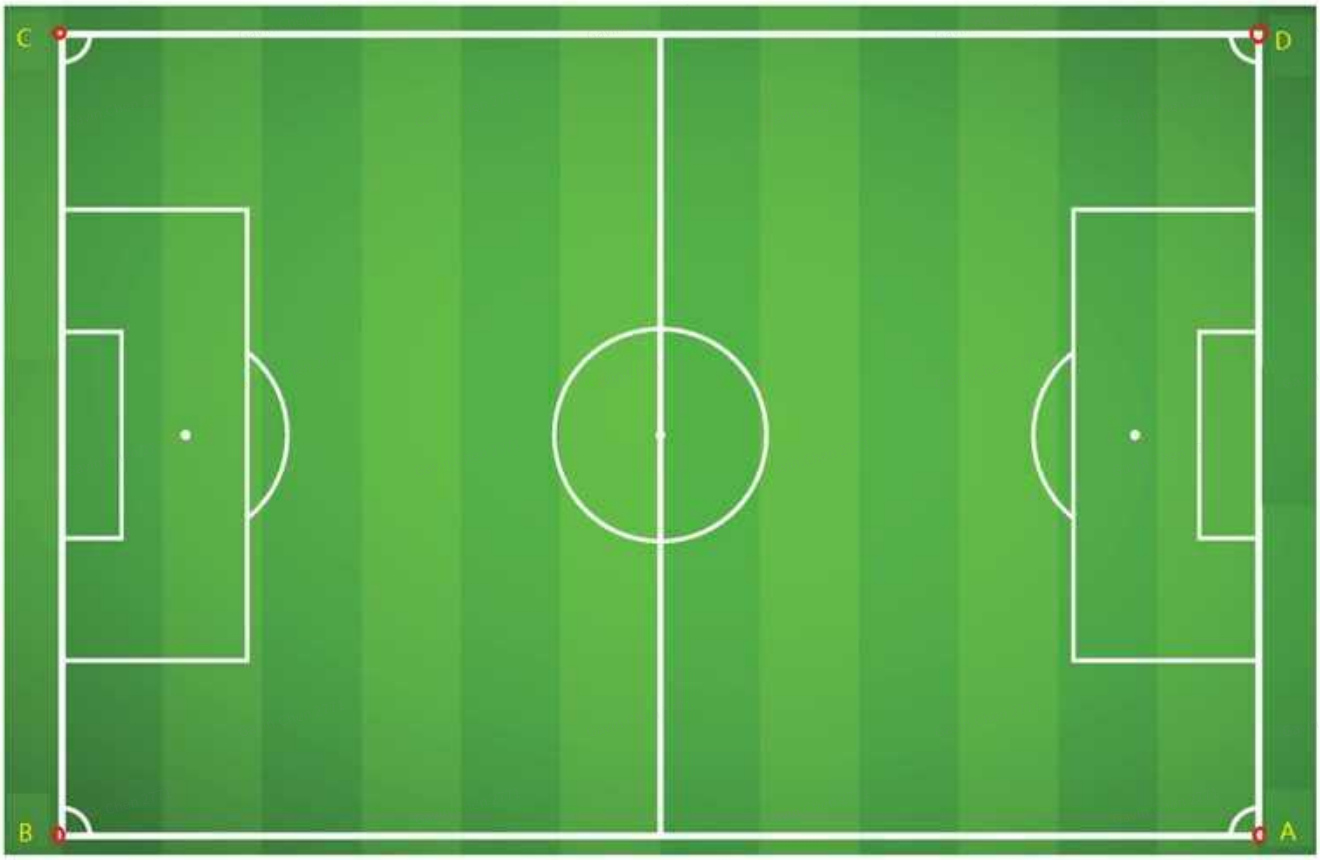
- Click the [Create Map] button.
- Select to collect coordinates through the RLM01 sprinkler position, and simultaneously select the court type.







- Use the nozzle position to collect the coordinates of the stadium.
  a. For a field without a goal, it is recommended to collect 4 points, which should be collected in the clockwise order of ABCD as shown in the figure below.

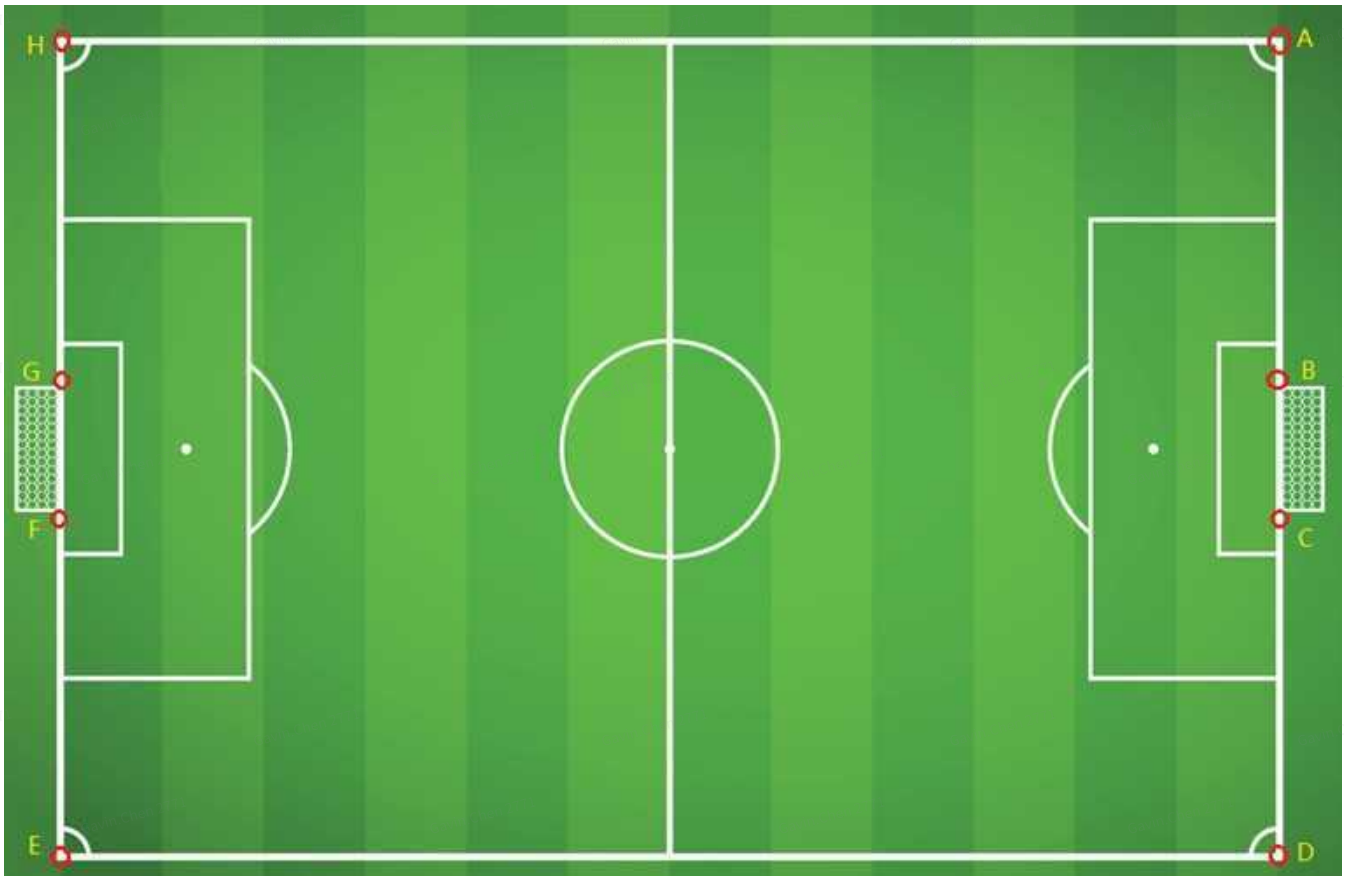


- Remote control the line marking machine to align the right nozzle with the center position of the right angle and collect the coordinates.





b. For a field with fixed goalposts, it is recommended to collect 8 points, which should be collected in the clockwise order of ABCDEFGH as shown in the figure below.



- When spraying dots, the nozzles are placed at the center of the right angle and near the goalpost.









2. Save the map.

- After the collection is completed, click the ✔ save button to complete the map creation.



6.6.2 Use V4E to create a map by marking points

1. Turn on the V4E power supply. The V4E marker is used to quickly collect the position coordinates of the court.



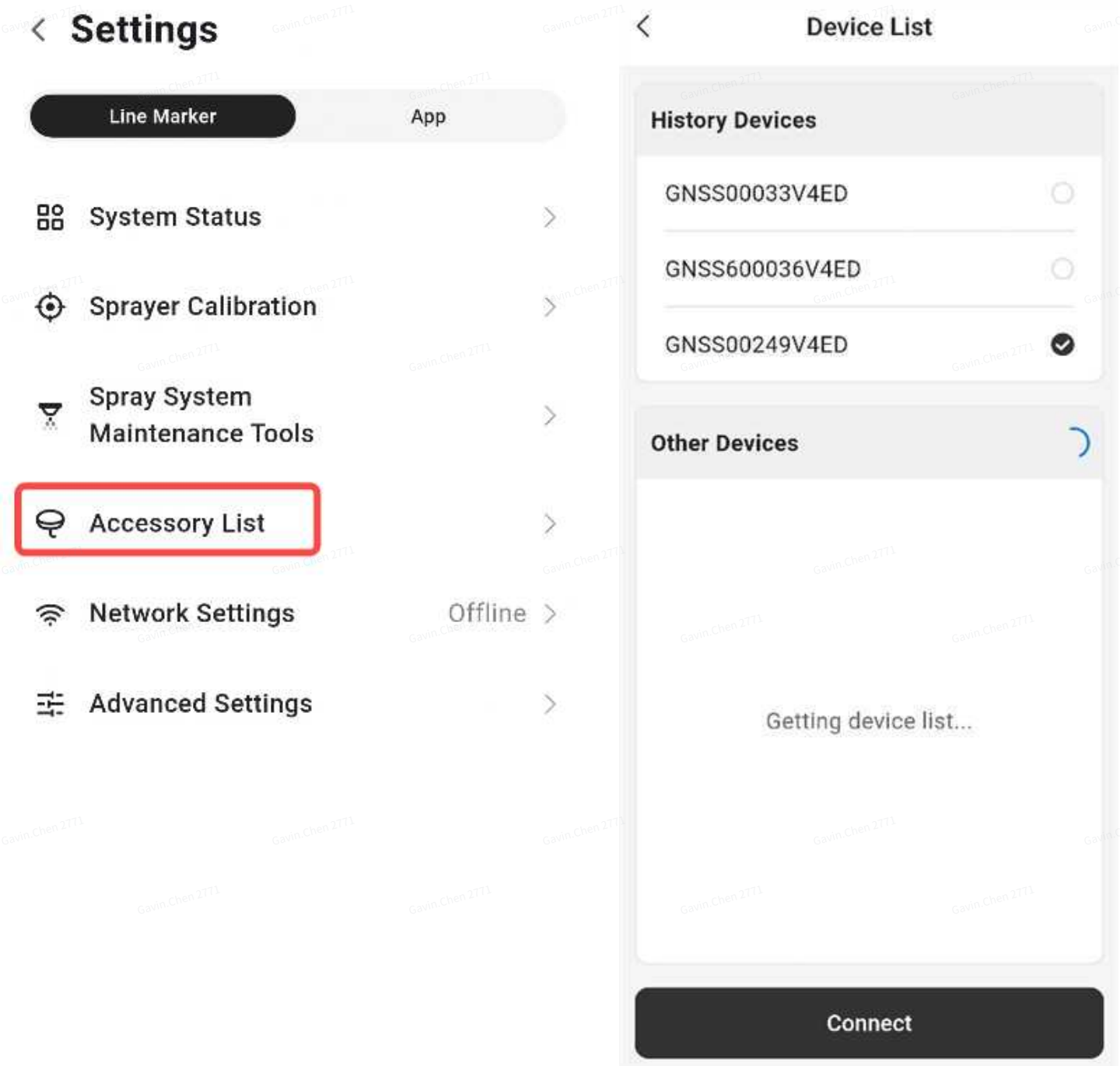
1. **Power Button**: Long press the power button to turn the device on or off.

2. **Working Indicator**:

- Blue blinking: indicates that the device is not connected to the application (APP).
- Red blinking: indicates that the device has connected to the application (APP), but has not obtained a valid positioning (fixed solution).
- Green solid: NTRIP account has been logged in and a fixed solution has been obtained, **the device is ready and can perform coordinate collection**.

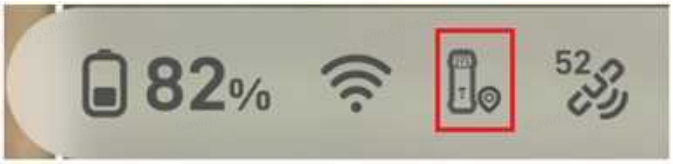
3. **Charging Indicator**: When charging, the power indicator shows red; after fully charged, the indicator turns blue.

2. Bind V4E, enter the settings menu, select the V4E serial number for binding according to the following procedure, and the serial number can be viewed on the V4E nameplate.



3. Set the positioning mode for V4E

- Ensure that the RLM01 line marking machine is connected to WIFI or 4G.
- If Agent Channel is selected in [Set Location Mode], V4E will also automatically associate with the Agent Channel.
- On the field, if the satellite signal reception is good, the network and NTRIP account are configured correctly, the green positioning indicator light of V4E will light up
- Returning to the APP home page will display the icon indicating that V4E is working properly, as shown in the figure below. If the V4E icon is not displayed or is red, please check the network and Agent configuration.



4. Create a map.

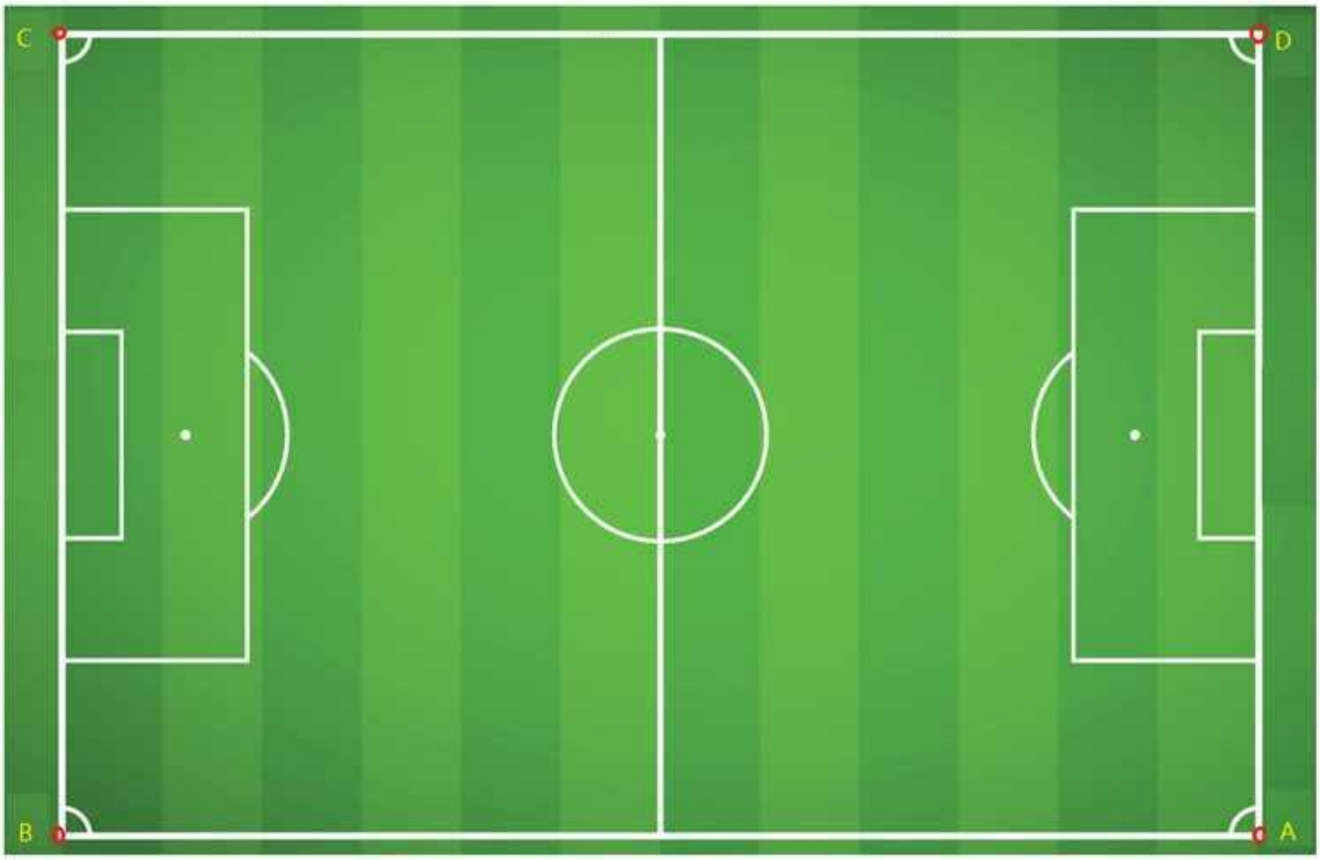
- Click the [Create Map] button.
- Select the V4E marker and the court type simultaneously.



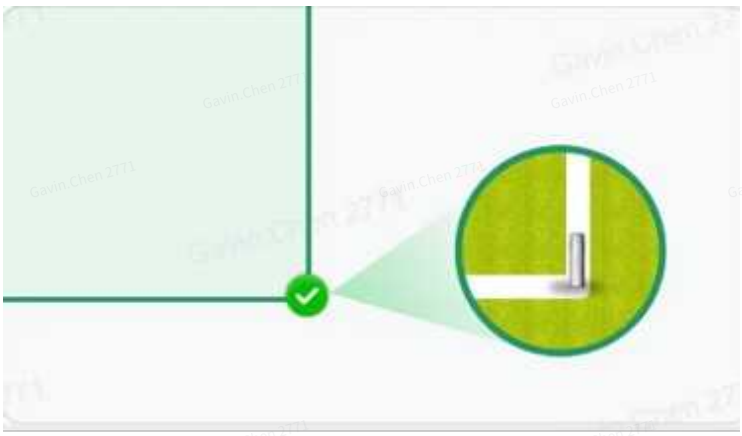




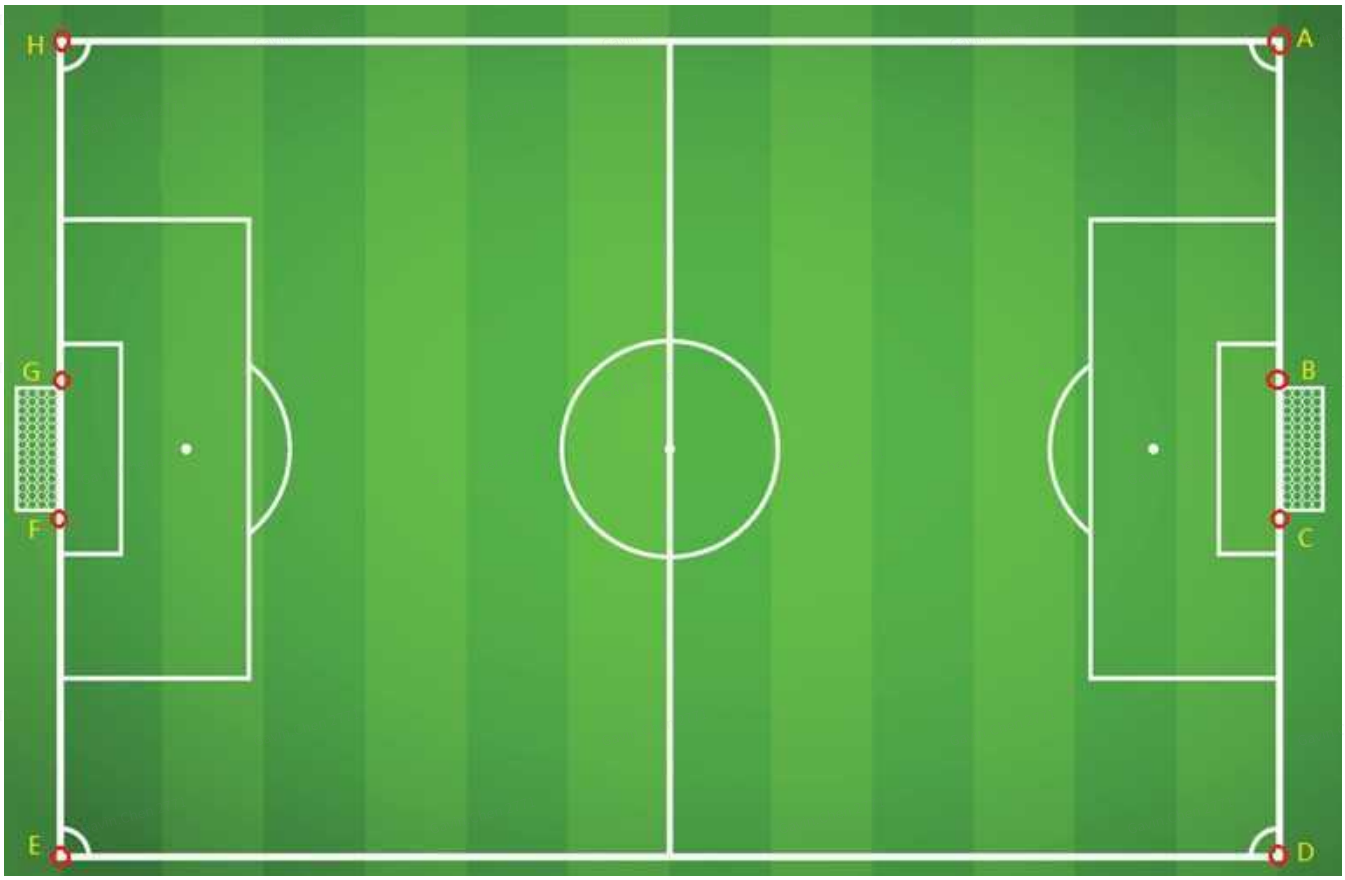
- Use V4E to collect court coordinates.
  a. For a field without a goal, it is recommended to collect 4 points, which should be collected in the clockwise order of ABCD as shown in the figure below.



- When dotting V4E, place it at the center of the right angle.



b. For a field with fixed goals, it is recommended to collect 8 points, which should be collected in the clockwise order of ABCDEFGH as shown in the figure below.



- When marking V4E, it is placed at the center of the right angle and near the goalpost.





5. Save the map.

- After the collection is completed, click the ✔ save button to complete the map creation.



6.7 Start the scribing task

- Tap "start task" on the tablet to open the map list.
- Select the created map.
- Remote control the line marker to the vicinity of the court, click the start button, and the line marking task can begin.
- In the "task setting" menu, parameters such as transition and scribing speed, as well as painting pressure, can be set.







7. Precautions for the assignment

7.1 Precautions before scribing operation

- Please read the instruction manual before starting the operation.
- Please plan your work time well and avoid working in bad weather conditions such as rainy days, snowy days, windy days, cold days (ambient temperature ⩽5°C), hot days (ambient temperature ⩾35°C), and humid days (ambient humidity >85%).
- Before starting the operation, all obstacles on the lawn must be cleared, and it is necessary to ensure that non-operating personnel are evacuated from the work site.
- Before starting work, mix the paint and thinner (water) according to the required ratio, prepare them according to the amount needed, stir well, and then use.
- Pressing the rotary switch on the front of the electromechanical control box of the undercarriage can complete the exhaust and painting functions. During exhaust, ensure that all gases in the pipeline are exhausted; when switching to painting, observe whether the angle, shape, etc. of the sprayed liquid meet the requirements.

7.2 Precautions during scribing operations

- Observe the marking status of the marking machine in real time, such as whether the straightness of the marked line has significantly deviated. If so, stop marking immediately and further investigate the cause.
- Observe the real-time usage of the line marking paint. A 20L bucket can theoretically complete the line marking for two 11-a-side football fields. Generally, only an appropriate amount of paint is added, so it is necessary to monitor the paint usage. However, there is a liquid sensor in the pipeline. When there is no liquid in the pipeline, the line marking machine will automatically pause operation, and the system will also prompt the user that the paint is used up and to add it in a timely manner.
- Observe in real time all kinds of situations within the site during the operation of the line marking machine. During the operation, non-staff are not allowed to enter the work area, as this may affect the progress of line marking and cause harm to personnel.

7.3 Precautions after scribing operation

- After the scribing operation is completed, the painting system should be cleaned in a timely manner to prevent residual paint in the pipeline from adhering to the inner wall of the painting pipeline.
- Use a dedicated bucket to store the residual paint in the paint spray bucket. Do not leave any residual paint in the paint spray bucket overnight to prevent paint precipitation and scaling from affecting the next paint spraying and line marking, and it must be cleaned thoroughly according to the cleaning process.

8. Maintenance

8.1 Maintenance Plan

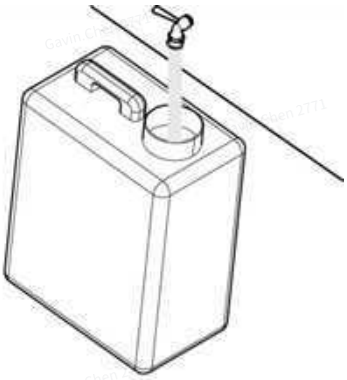
Maintenance Task/Cycle	Each time	Every 200 working hours	Every 2 years
Clean the painting system	✓		
Check the button	✓		
Replace the hoses and their connectors of the painting system			✓
Replace the nozzle		✓	
Replace the third-stage filter element		✓	

8.2 Cleaning Process of the Painting System

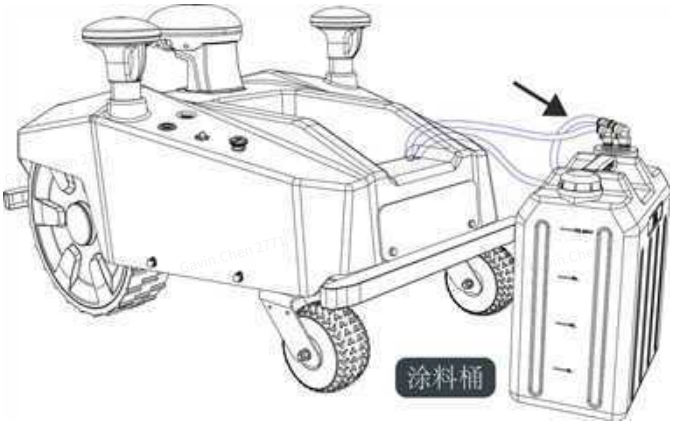
8.2.1 Flush paint buckets

Required items: Spare empty paint bucket or ordinary bucket (at least 10 liters, with the bucket opening specification consistent with the paint bucket provided by our company), warm water, dish soap (optional).

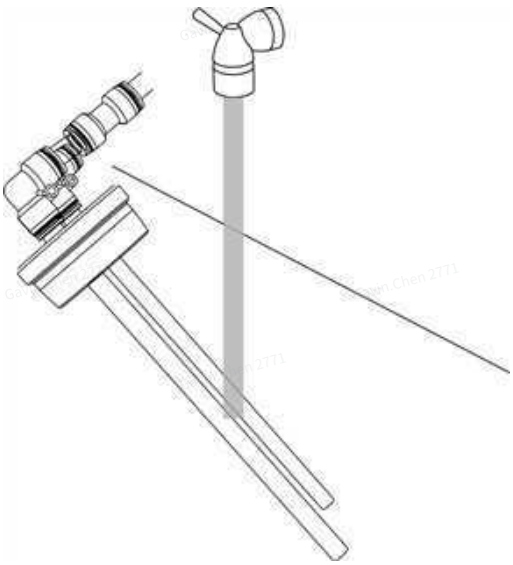
1. Add at least 10 liters (2 imperial gallons) of warm water to a spare empty clean water bucket, then place it near the equipment for standby use.



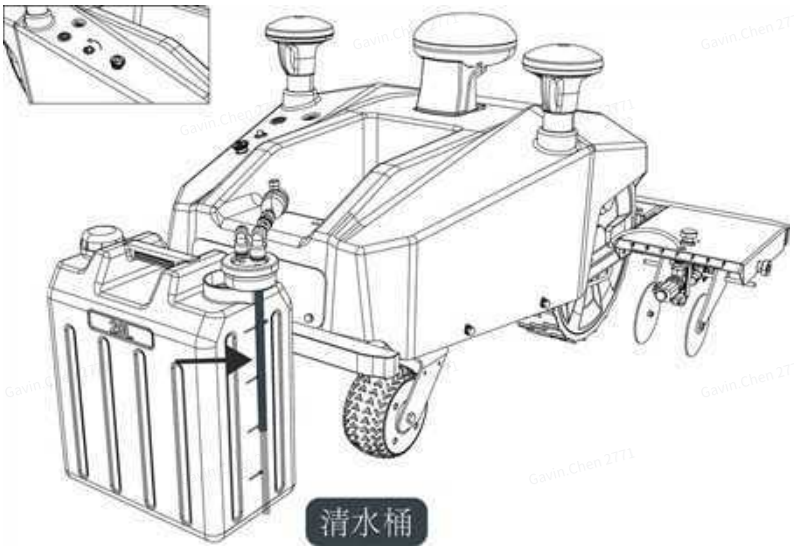
2. Remove the paint bucket from the equipment and place it on the nearby ground.



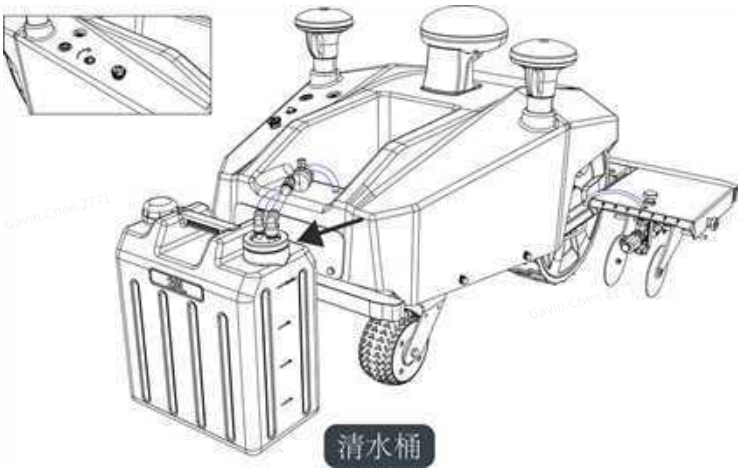
3. Remove the bung from the barrel. Rinse the two hard tubes on the barrel lid with warm water.



4. After rinsing thoroughly, insert the bucket lid into the opening of the spare paint bucket previously placed nearby, ensuring that the exhaust pipe (the ϕ10mm PU tube on the bucket lid) remains outside the bucket and the suction pipe inside the bucket. Point the exhaust pipe opening towards the designated discharge port or container. Turn the rotary switch on the electric control box to the exhaust mode until the liquid discharged from the exhaust pipe is clear and transparent.



5. Turn the rotary switch on the electric control box to the off mode, reinsert the barrel plug, and ensure that both hard tubes on the barrel plug are inside the barrel. Then turn the rotary switch on the electric control box to the spray painting mode, and the nozzle will start spraying liquid. Note: Ensure that the nozzle is spraying towards the designated discharge port.



6. During nozzle spraying, after discharging the residual paint from the replaced paint bucket into the designated discharge port or container, rinse the paint bucket under the faucet.



7. After the paint bucket is cleaned, observe the liquid sprayed from the nozzle until it is clear and transparent, then turn the rotary switch on the electric control box to the off mode.

8.2.2 Flush the secondary filter

Required Items: Hot tap water.

1. Rotate counterclockwise to unscrew the filter cup of the filter, and remove the filter element of the secondary filter.



2. Rinse the secondary filter element with warm water to remove paint residue.

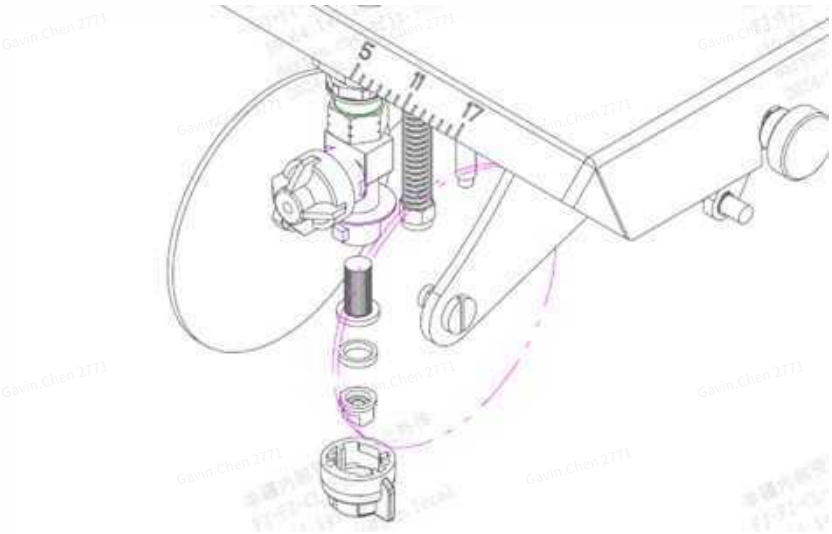


3. Reinstall the cleaned filter element and tighten the filter cup.

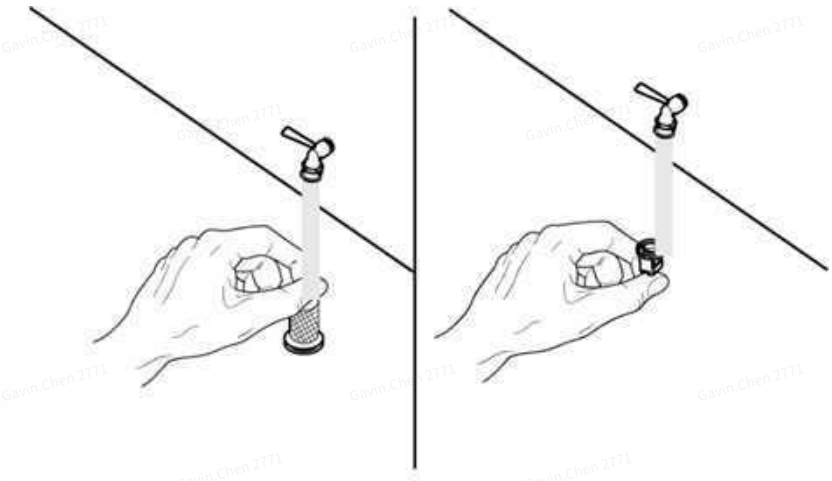
8.2.3 Clean the nozzle

Required Items: Warm water, a cup, dish soap (optional).

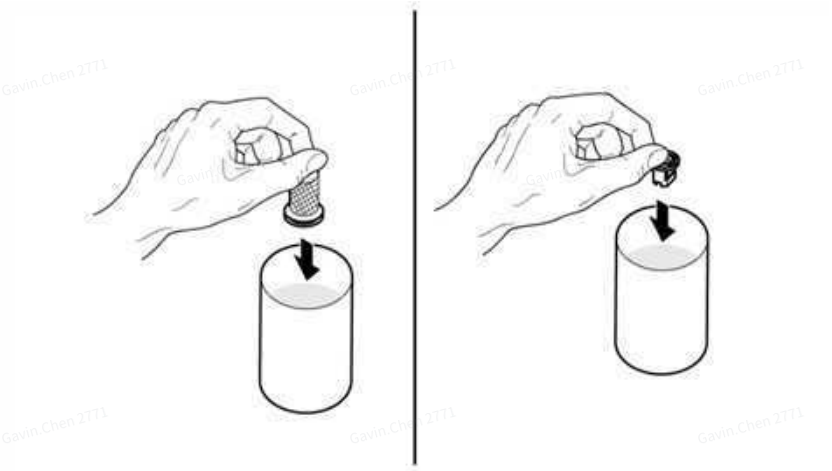
1. Rotate the nozzle quick-release cap counterclockwise, pull down the nozzle quick-release cap, then push the nozzle out of the housing, and remove the nozzle, three-stage filter element, and washer.



2. Rinse the nozzle and the three-stage filter element with warm water to remove any paint residue.



3. Place the nozzle and the three-stage filter element in a glass of water and soak them. It is best to let them soak in the water until the nozzle is used again.



9. Troubleshooting

Fault Description	Possible Reasons	Processing Solution
Spray painting fails to form	The paint is too thick	Add appropriate diluent for dilution
	The quick plug at the suction line of the diaphragm pump has come loose and is leaking air	Check the sealing condition at the quick plug of the pipeline and install it properly
	Diaphragm pump suction pipe is aged and damaged	Replace the suction tube
	Internal diaphragm of diaphragm pump is aged, damaged, or painted sticky	Replace with a new pump
	Nozzle blocked or damaged	Replace the nozzle
	The exhaust of the painting system is insufficient	Repaint after fully re-exhausting
	Primary/Secondary/Tertiary filter element clogged	Clean or replace the primary/secondary/tertiary filter element
The diaphragm pump does not dispense paint	Motor damage	Replace with a new pump
	Diaphragm pump suction pipe is damaged and leaking air	Replace the suction tube
	The quick plug at the suction line of the diaphragm pump has come loose and is leaking air	Check the pipeline and install it properly
	Primary/Secondary/Tertiary filter element clogged	Clean or replace the primary/secondary/tertiary filter element
	The nozzle is completely blocked	Replace the nozzle
	The exhaust of the painting system is insufficient	Repaint after fully re-exhausting
	Severe internal blockage or severe diaphragm damage in the diaphragm pump	Replace with a new pump
	The diaphragm pump is internally emptied, resulting in the "air entrapment" phenomenon	Fill clean water into the suction pipe of the diaphragm pump, then restore the pipeline and restart it

> **Note:** The above are common faults. If the issue persists, please contact after-sales service personnel promptly for handling.

10. Waste Disposal

The disposal of waste paint and other items shall comply with local laws and regulations.

This product contains metal materials and electronic components. Waste disposal should be based on the principle of environmental protection, comply with local laws and regulations, and hand over the discarded materials (including packaging materials, metal parts, electronic components, etc.) to local manufacturers with recycling and disposal qualifications for processing.

11. Storage

Proper storage methods are crucial for maintaining the performance of line marking machines and extending their service life. The following are several points to note when storing line marking machines:

1. **Dryness and Ventilation:** The line marking machine should be stored in a dry environment to prevent the machine from getting damp, which may affect the normal operation of its electrical system and mechanical components. Meanwhile, good ventilation conditions can prevent the internal parts of the machine from getting damp or corroded due to long-term enclosure.
2. **Avoid direct sunlight and rain** : Direct sunlight and rain may cause the housing of the line marking machine to fade and deform, rapid aging of the paint spraying pipeline, and even affect the performance of its internal electronic components and mechanical parts. Therefore, a location that avoids direct exposure to sunlight and rain should be selected for storing the line marking machine.
3. **Non-corrosive gas environment:** The environment where the line marking equipment is stored should avoid the presence of corrosive gases, as these gases may corrode the metal components of the line marking equipment and affect its service life.
4. **Regular Inspection and Maintenance:** Even when stored in the correct environment, it is recommended to regularly inspect and maintain the marking equipment to ensure it is in optimal condition. This includes checking for signs of wear on mechanical components, leakage at pipe joints, etc., and promptly performing repairs and replacements.

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