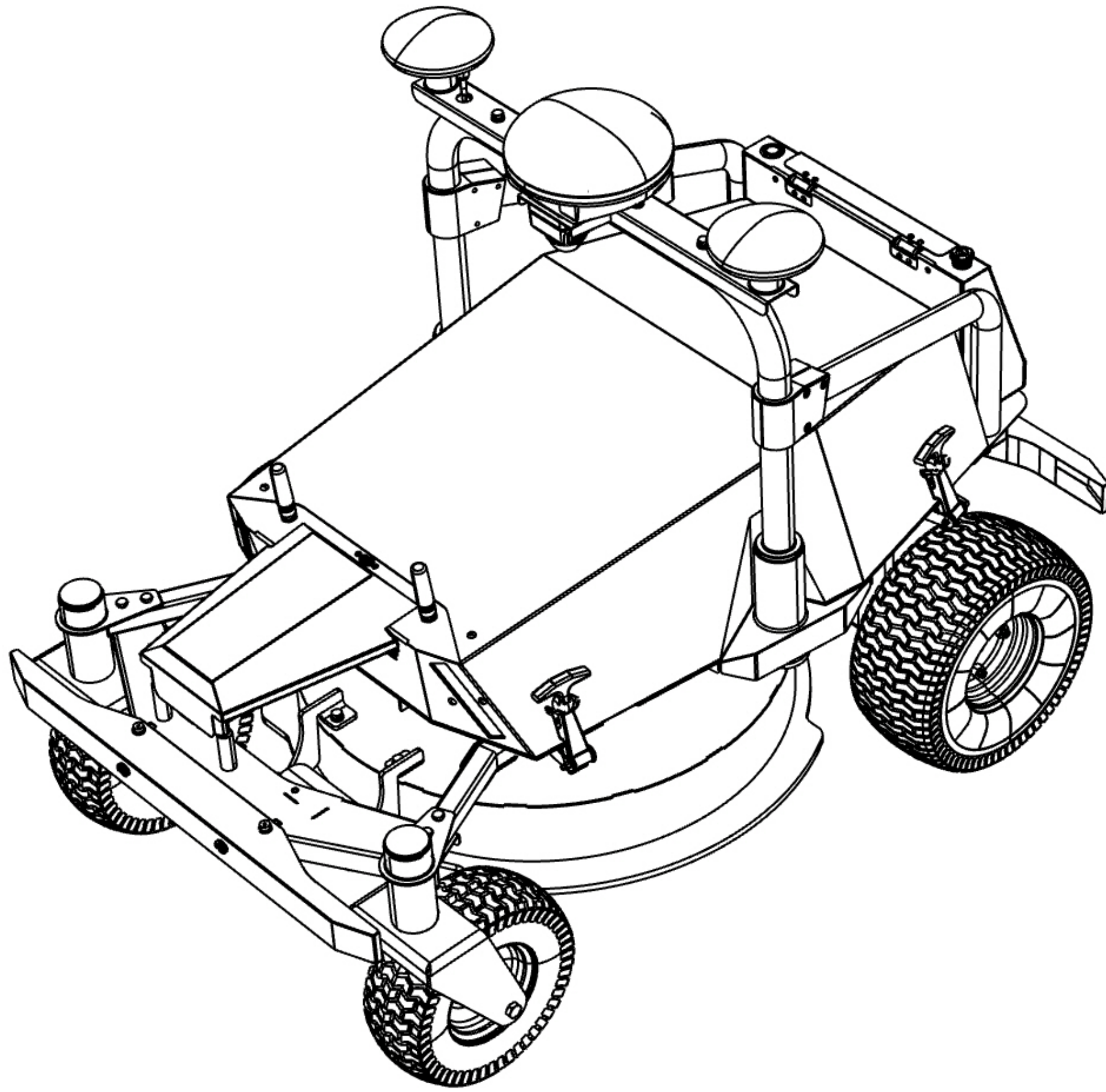



**FJDynamics**



**FJD RM21**

# **Autonomous Mower**

## **User Manual**

 March 1, 2024 | Rev. 1.0

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This manual is subject to change without notice.

## Read Before Use:



To reduce the risk of injury, the user must read and understand this manual before using the mower.

Keep this manual properly for future reference.

## Safety Instructions



This symbol indicates important safety instructions. Failure to follow these instructions could endanger the personal or property safety of the operator and others. Before operating the mower, read and understand all the instructions in this manual.

The severity of hazards may be assessed according to the following signal words.

Safety Symbol	Signal Word	Explanation
	DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	NOTICE	(Without the safety symbol) Indicates a potential situation which could result in property loss.

**WARNING**

Before using the mower, ensure that you have read and understand all the safety instructions in this manual, including the safety symbols. Do not use the mower unless you understand all the safety warnings and instructions herein. The mower can only be used by people who have read, understand, and will follow all the safety instructions and warnings in this manual and on the mower, and have reached the minimum age required by local laws and regulations.

**WARNING**

When operating the mower, always follow the basic safety instructions to reduce the risk of explosion, electric shock, fire, and other accidents that could result in serious personal injury.

**WARNING**

California Proposition 65: Battery posts, terminals, and related accessories contain lead and lead compounds known to the State of California to cause cancer, birth defects, or other reproductive harms. See [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov) for details. Wash your hands after handling.

**WARNING**

Failure to follow the operation instructions could cause injury to the operator or others. The owner must understand all the instructions and only allow approved personnel who understand these instructions to operate the mower. The operator must be sound in body and mind and not under the influence of mind altering substances such as medicines, alcohol, and drugs.

**DANGER**

Ensure that the mower is operated according to the safety instructions in this manual. Any carelessness or mistake could result in serious personal injury. The mower can cut off hands and feet, and throw objects. Failure to follow the safety instructions in this manual could result in serious personal injury or death.

**DANGER**

People wearing pacemakers or other medical electronic devices must consult a doctor before using the mower. Operating the electrical equipment nearby could interfere with or result in a failure of the pacemaker.

**NOTICE**

Only qualified mechanics are allowed to maintain and repair the mower. We suggest you have your mower serviced by a local dealer. When servicing, use only identical replacement parts.

## Operator

Do not operate the machine if you are under eighteen or the minimum age specified in local laws and regulations.

## Operating Environment

1. Drive in an open field far from the crowd and ensure that there are no irrelevant personnel or vehicles in the operation area.
2. Stay away from people, livestock, obstacles, wires, tall buildings, and signal towers to avoid interference with signals.
3. Do not operate in extreme weathers such as heavy rain, thick fog, snow, lightning, and strong wind.
4. Ensure that there is no human or obstacle around the vehicle's path during testing, calibration, adjustment, or auto turning to prevent personal injury or property damage.

## Inspection

1. Ensure that the battery level is high.
2. Ensure that the parameter calibration is complete before auto operations.
3. Ensure that the antennas and associated components are properly installed. Calibrate again if any of them is moved.
4. Ensure that all cables are intact. If any damage is found, stop the operation and replace the cable.

## Others

1. Disassembling the product without authorization may invalidate the warranty.
2. Damage caused by force majeure events, such as lightning strikes, overvoltage, and collision, is not covered by the warranty.
3. Connect the devices strictly in accordance with this manual. When connecting cables such as data cables, hold the end of the plug and gently plug or unplug it. Do not pull the plug by force or twist it, which may break the pins.

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# 1 Overview

## 1.1 User Instructions

This manual is aimed to help the owners and operators understand how to maintain and operate this mower. Read this manual carefully. Information and instructions in this manual can help you obtain reliable mower performance. It is the owner's responsibility to ensure that the operators and technicians read and understand this manual. Before operating, read this manual and all the safety symbols. It is also the owner's responsibility to ensure that the operators and technicians are qualified for and capable of operating the mower. All the dealer technicians must be familiar with the safe operation of the mower. Never allow children or untrained personnel to operate or repair the mower. Note that local laws may have the minimum age requirements for the operators.

## 1.2 Use of Manual

This manual applies to the FJD RM21 series. It provides users with the basic operation, assembling, adjusting, and maintenance instructions of the mower. As operating conditions may vary, this manual cannot cover all scenarios. In this manual, directions such as rightward and leftward are used in relation to the direction you are facing. All the figures used in this manual are up to date at the time of printing, but they may differ from the mower you receive due to upgrades and modifications. FJDynamics reserves the right to re-design and modify the mower without notice. If you notice any change that is not shown in this manual, consult your local dealer about the updates.

## 1.3 Intended Use of Mower

This 48V autonomous mower is only intended to be used for cutting grass.

## 1.4 General Safety Rules

1. Before attempting to assemble and operate the mower, read, understand, and follow all the instructions and warnings in this manual. Keep this manual properly for future reference.
2. Be familiar with all controls and their correct operation. Learn how to stop the mower and disengage all controls quickly.
3. Never allow children or untrained personnel to operate or repair the mower. Note that there can be an age limit on the operator according to your local laws and regulations.
4. If you come across a situation that is not covered in this manual, use extreme caution and contact the customer service for help.

## 1.5 Modifications

To improve the machine performance, contact FJDynamics for official modifications. By modifying the mower yourself, you waive the right to make any legal claims based on this manual. Use only genuine FJDynamics parts for modifications. Using other parts will void the warranty. Do not install non-standard devices on the mower without the consent from FJDynamics. Otherwise it may cause personal injury or damage the mower.

To improve the machine performance, contact FJDynamics for official modifications. By modifying the mower yourself, you waive the right to make any legal claims based on this manual. Use only genuine FJDynamics parts for modifications. Using other parts will void the warranty. Do not install non-standard devices on the mower without the consent from FJDynamics. Otherwise it may cause personal injury or damage the mower.

## 1.6 Warranty

### 1.6.1 Warranty Registration Form

The owner must fill out the Warranty Registration Form provided in the owner's package to register the mower. As the new owner of the mower, when you use the form, it must be filled out and signed by both the authorized dealer and the initial purchaser.

### 1.6.2 Serial Number

The nameplate is located on the front of the mower, and it provides the following information:

- Name, model, and serial number
- Key specifications and symbols
- Manufacturer and manufacture date

Register the serial number and the model of the mower on the Warranty Registration Form if repair or replacement is required.

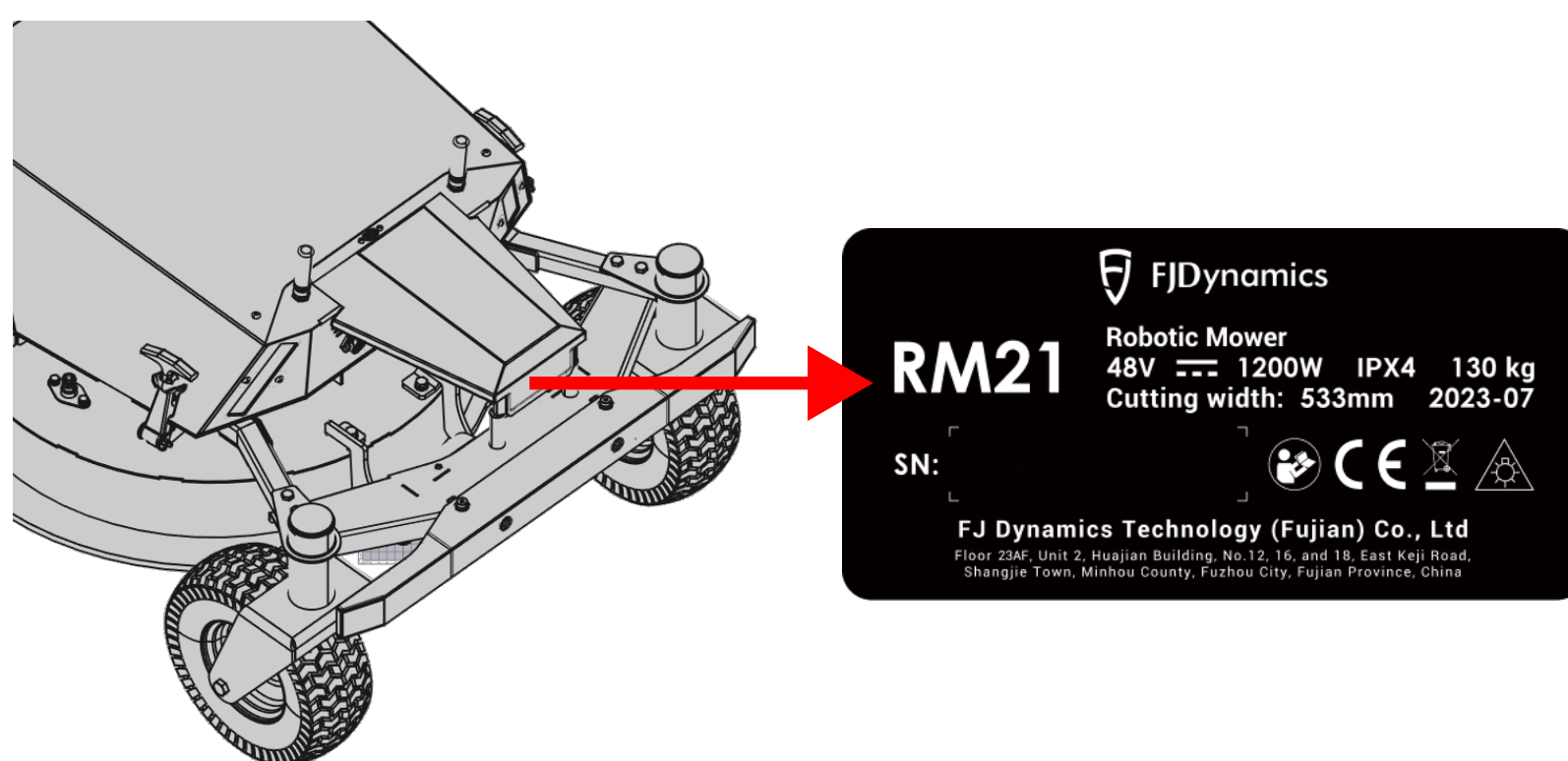


Figure1 Sample nameplate



Note: Any unauthorized modification or use of non-approved parts will void the warranty. FJDynamics will not be responsible for any subsequent consequences. All warranty services and repairs must be performed by authorized FJDynamics dealers.



Reference: chapter 13 "Warranty Policy"

## 2 Power Tool Safety Warning



### WARNING

Read all safety warnings, instructions, illustrations and specifications provided with the power tool. Failure to follow all instructions listed below may result in electric shock, fire and/or serious injury. Save all warnings and instructions for future reference. The power tool in the warning refers to a mains-powered tool (with a cord) or battery-powered tool (cordless).

### 2.1 Work Area Safety

- Keep work area clean and well lit. Cluttered or dark areas invite accidents.
- Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases or dust. Power tools create sparks which may ignite the dust or fumes.
- Keep children and bystanders away while operating a power tool. Distractions can cause you to lose control.

### 2.2 Electrical Safety

- Power tool plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with earthed (grounded) power tools. Unmodified plugs and matching outlets will reduce risk of electric shock.
- Avoid body contact with earthed or grounded surfaces, such as pipes, radiators, ranges and refrigerators. There is an increased risk of electric shock if your body is earthed or grounded.
- Do not expose power tools to rain or wet conditions. Water entering a power tool will increase the risk of electric shock.
- Do not abuse the cord. Never use the cord for carrying, pulling or unplugging the power tool. Keep cord away from heat, oil, sharp edges or moving parts. Damaged or entangled cords increase the risk of electric shock.
- When operating a power tool outdoors, use an extension cord suitable for outdoor use. Use of a cord suitable for outdoor use reduces the risk of electric shock.
- If operating a power tool in a damp location is unavoidable, use a residual current device (RCD) protected supply. Use of an RCD reduces the risk of electric shock.

### 2.3 Personal Safety

- Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use a power tool while you are tired or under the influence of drugs, alcohol or medication. A moment of inattention while operating power tools may result in serious personal injury.
- Use personal protective equipment. Always wear eye protection. Protective equipment such as a dust mask, non-skid safety shoes, hard hat or hearing protection used for appropriate conditions will reduce personal injuries.
- Prevent unintentional starting. Ensure the switch is in the off-position before connecting to power source and/or battery pack, picking up or carrying the tool.

- Carrying power tools with your finger on the switch or energizing power tools that have the switch on invites accidents.
- Remove any adjusting key or wrench before turning the power tool on. A wrench or a key left attached to a rotating part of the power tool may result in personal injury.
- Do not overreach. Keep proper footing and balance at all times. This enables better control of the power tool in unexpected situations.
- Dress properly. Do not wear loose clothing or jewelry. Keep your hair and clothing away from moving parts. Loose clothes, jewelry or long hair can be caught in moving parts.
- If devices are provided for the connection of dust extraction and collection facilities, ensure these are connected and properly used. Use of dust collection can reduce dust-related hazards.
- Do not let familiarity gained from frequent use of tools allow you to become complacent and ignore tool safety principles. A careless action can cause severe injury within a fraction of a second.

## 2.4 Power Tool Use Instructions

- Do not force the power tool. Use the correct power tool for your application. The correct power tool will do the job better and safer at the rate for which it was designed.
- Do not use the power tool if the switch does not turn it on and off. Any power tool that cannot be controlled with the switch is dangerous and must be repaired.
- Disconnect the plug from the power source and/or remove the battery pack, if detachable, from the power tool before making any adjustments, changing accessories, or storing power tools. Such preventive safety measures reduce the risk of starting the power tool accidentally.
- Store idle power tools out of the reach of children and do not allow persons unfamiliar with the power tool or these instructions to operate the power tool. Power tools are dangerous in the hands of untrained users.
- Maintain power tools and accessories. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use. Many accidents are caused by poorly maintained power tools.
- Keep cutting tools sharp and clean. Properly maintained cutting tools with sharp cutting edges are less likely to bind and are easier to control.
- Use the power tool, accessories and tool bits etc. in accordance with these instructions, taking into account the working conditions and the work to be performed. Use of the power tool for operations different from those intended could result in a hazardous situation.
- Keep handles and grasping surfaces dry, clean and free from oil and grease. Slippery handles and grasping surfaces do not allow for safe handling and control of the tool in unexpected situations.

## 2.5 Battery Tool Use Instructions

- Recharge only with the charging pile or charger specified by the manufacturer. A charging pile or charger suitable for one type of battery may create a risk of fire when used with another type of battery.
- Use power tools only with specifically designated battery packs. Use of any other battery packs may create a risk of injury and fire.
- When battery pack is not in use, keep it away from other metal objects, like paper clips, coins, keys, nails, screws or other small metal objects that can make a connection

- from one terminal to another. Shorting the battery terminals together may cause burns or a fire.
- Under abusive conditions, liquid may be ejected from the battery; avoid contact. If contact accidentally occurs, flush with water. If liquid contacts eyes, additionally seek medical help. Liquid ejected from the battery may cause irritation or burns.
- Do not use a battery pack or tool that is damaged or modified. Damaged or modified batteries may exhibit unpredictable behavior resulting in fire, explosion or risk of injury.
- Do not expose a battery pack or tool to fire or excessive temperature. Exposure to fire or temperature above 130 °C may cause explosion.
- Follow all charging instructions and do not charge the battery pack or tool outside the temperature range specified in the instructions. Charging improperly or at temperatures outside the specified range may damage the battery and increase the risk of fire.

## **2.6 Service**

- Have your power tool serviced by a qualified repair person using only identical replacement parts. This will ensure that the safety of the power tool is maintained.
- Never service damaged battery packs. Service of battery packs should only be performed by the manufacturer or authorized service providers.

## 3 Precautions

### 3.1 Operator Instructions

- During operation, operators must wear approved personal protective equipment, at least including safety helmets, protective eyewear, hearing protection, appropriate clothing, and safety shoes. Personal protective equipment cannot eliminate the risk of injury, but it will reduce the injury severity if an accident does occur.
- Only allow operators, who are responsible, trained, familiar with the instructions, and physically capable to operate the machine.
- Do not wear scarves, loose clothing, shorts, and sandals that may be caught up by moving parts. Do not use the mower barefoot.
- Always wear a full face shield or dust mask when operating in a dusty environment.
- Always wear gloves when handling the blades.
- Always wear hearing protection to avoid damage to hearing when operating. Do not use radios or music headphones.
- The operator must concentrate on the mowing task, and always look ahead of the mower's path while staying aware of the surroundings.
- Pay full attention in case any abnormality occurs.
- Ensure that the first aid equipment is available nearby when operating the mower.
- Do not operate the mower when feeling tired.
- Do not operate the mower under the influence of medicines, alcohol, and drugs.

### 3.2 Mowing Operation

- Before operating, read, understand, and follow all the instructions on the machine and in this manual.
- Let someone know that you are mowing so that he or she can offer help when an injury or accident occurs.
- People who operate, maintain, and repair the mower must read and understand this manual. Abide by the age limit set by the local laws and regulations. The owner is responsible for training them.
- The owner and the operator of the mower should take safety precautions against accidents and are responsible for accidents or injury occurring to themselves and others, and property damage.
- Do not put your hands or feet near rotating parts or under the mower. Always stay away from the discharge opening.
- Ensure that the mowing area is free of bystanders and animals. Stop the mower if anyone enters the mowing area.
- Do not mow in reverse unless necessary. Check the surroundings when using the remote controller to operate the mower.
- Do not operate the mower when safety devices are not in place or damaged.
- Do not operate the mower lacking proper maintenance.
- Slow down before turning.
- Do not drive at high speeds, especially in crowded areas or on slopes.
- Do not carry passengers.
- Do not mow slopes steeper than 20 degrees.
- Do not leave a running mower unattended. Always park on level ground, engage the parking brake, and then turn off the mower.

- Pay attention to the traffic when operating near or crossing a road.
- Clean oil spills before operating or storing the mower.
- In case of abnormal vibration, stop the mower and troubleshoot immediately. Abnormal vibration often indicates that the mower is not working normally.
- Stop the blades and turn off the power supply when not mowing. Wait for all parts to stop before cleaning the mower or removing the discharge chute. After the mower is turned off, the blades will still rotate for a few seconds. Do not put any parts of your body near the blades before the blades stop completely.
- If the mower runs into a foreign object, stop the mower immediately and check for damage when safety is ensured.
- If situations occur that are not covered in this manual, use care and good judgment. Contact Local Dealer for assistance.

### 3.3 Mowing Area

- Before mowing any area, thoroughly check the area for holes, falling objects, and hidden objects that may cause danger. Remove objects that can be thrown by the blades, such as stones, toys, and wires.
- Do not operate near people and animals. Do not mow when children or others are around.
- Make a mowing plan to avoid discharging grass clippings toward roads, sidewalks, bystanders, vehicles, and windows.
- Do not mow anything other than grass.
- During mowing, do not drive through leaves or other debris that may cause build-up.
- Stop the blades when driving across dirt roads, gravel roads, or paved roads.
- Use extreme caution when approaching blind corners, doorways, shrubs, trees, or other objects that can block your view and impede mowing.
- To reduce the risk of electric shock, do not operate the mower in rain, on wet roads, or on wet grass.
- To avoid loss of control and rollover, do not operate the mower near drop-offs or near water, and reduce the driving speed and use extreme caution on slopes.

### 3.4 Slope Operation

- Slopes are a major factor related to loss of control and rollover that could result in serious injury or death. Use extreme caution when operating on slopes. Do not mow the slope if you are not sure whether it is suitable for operation.
- Do not start or stop the mower on slopes.
- Do not mow slopes steeper than 20 degrees.
- Do not operate the mower when the traction, steering, or stability is in question. Tires can slide even if the mower is stopped.
- Always keep the mower in gear when driving down slopes. Do not use the neutral gear and coast down slopes.
- Watch for holes, ruts, stones, or other unnoticeable obstacles. Be extremely careful in tall grass areas where obstacles may be hidden. Uneven terrain and obstacles could overturn the mower.
- Drive at low speeds so that you do not have to stop on slopes.
- Do not mow on wet grass. Wet grass can cause the tires to slip on slopes.
- Move slowly and gradually on slopes. Do not change the speed or direction suddenly. Otherwise, the mower could roll over.
- Use extreme caution when operating the mower with grass collectors or other attachments, because they can affect the stability of the mower.

### 3.5 Child Safety

- Tragic accidents can occur if the operator does not notice the presence of children. Children tend to be attracted by mowers and mowing activities. Do not assume that children will remain where you last saw them.
- Keep children away from the mowing area and supervised by a responsible adult other than the operator.
- Stay alert and turn off the mower if a child enters the mowing area.
- Ensure there is no children around when mowing or driving the mower.
- Never allow children to operate the mower.
- Use extreme caution when mowing near blind corners, shrubs, trees, or other objects that may block your view.

### 3.6 Battery and Charging Safety



#### WARNING

The battery may present a risk of fire or chemical burn if misused. Do not disassemble, overheat or incinerate the battery. Leakage from the battery may occur under extreme usage, charging or temperature conditions or if the battery is damaged, crushed or punctured. This leakage indicates a failure of the battery and the battery should be properly disposed of.



Note: Only use the batteries and charging pile/charger provided by FJDynamics to avoid damage to the mower.

- Do not use the charging pile/charger in rain, in wet locations or near flammable liquids or gases.
- Do not place the charging pile outdoors, in a humid place, in a place prone to accumulation of water, or in a place with flammable liquids or gases.
- The recommended voltage is marked on the charging pile/charger. Do not connect the charging pile/charger to a different AC voltage.
- An extension cord should not be used unless absolutely necessary. Use of an improper extension cord could result in a risk of fire, electric shock, or electrocution. If an extension cord must be used, ensure that it can withstand the current of the charging pile/charger. Otherwise, the voltage will drop, resulting in charging failure and overheat.
- Do not use multiple extension cords.
- Ensure that the power cord is in good condition. Regularly check the power cord and the extension cord to see whether the insulation is broken, damaged, or cracked. Disconnect the damaged cord from the outlet and the charging pile/charger and repair or replace it immediately.
- Use the power cord properly and keep it away from heat, oil, water, sharp edges and moving objects. Hold the plug when disconnecting the power cord from the outlet. Do not drag the charging pile/charger by the power cord.
- Do not modify the plug or power cord in any way.
- Properly place the charging pile/charger to avoid being stepped on, tripped over, or damaged.
- Store the charging pile/charger and the power cord in a cool and dry place.
- Keep the charging pile/charger and the power cord away from all liquids.

- Use extra care when loading the mower onto a truck or a trailer with a ramp. The mower falling from the ramp could result in serious injury or death.
- Use a full width ramp for loading the mower onto a trailer or truck.
- Only transport the mower with approved trailers. Turn the power switch to the off position with the indicator off, and fix the front and rear wheels and the body with heavy-duty belts to prevent mower movement in any direction and avoid damage during transport.
- Engaging the parking brake is not sufficient to lock the mower in place during transport. You should also fix the mower firmly and horizontally on the carrier and lift the deck to its highest position.
- The angle between the ramp and the ground should not exceed 20 degrees.
- Load the mower onto truck or trailer by driving up ramps of suitable strength using a slow speed. Do not lift the mower by hand.
- Be familiar with the control devices before driving the mower up or down a ramp.
- Do not operate the mower on public roadways.
- Check and abide by local traffic regulations before transporting the mower on roads.

### 3.7 Transport

- Use extra care when loading the mower onto a truck or a trailer with a ramp. The mower falling from the ramp could result in serious injury or death.
- Use a full width ramp for loading the mower onto a trailer or truck.
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- Be familiar with the control devices before driving the mower up or down a ramp.
- Do not operate the mower on public roadways.
- Check and abide by local traffic regulations before transporting the mower on roads.

### 3.8 Storage



#### **WARNING**

Store the mower properly. Power off the mower before cleaning.





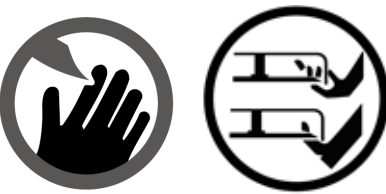

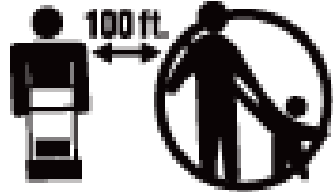
- Allow the mower to cool before storage.
- When not in use, the mower should be stored indoors in a dry place, out of reach of children, and prolonged direct sunlight.






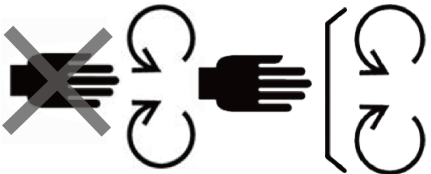


### 3.9 Service

- Remove the batteries or disconnect the power supply before repairing, cleaning, or taking parts off the mower.
- Do not reach below the blade guards. Keep your hands, feet, and clothes away from rotating blades.
- Only use accessories authorized by FJDynamics.
- Electrical maintenance should only be performed by trained professionals.
- Keep the blades sharp and clean for best performance and safe operation.
- Check the daily and weekly maintenance lists to ensure that electrical connection is firm and bolts are tightened.
- Never remove or tamper with safety devices. Regularly check their proper operation. Never do anything to interfere with the intended function of a safety device or to reduce the protection provided by the safety device.
- Repair or replace damaged parts before restarting and operating the mower.
- Periodically inspect the mower cables. Damaged cables should be repaired by an authorized service agency.
- Use caution when replacing the blade. Wrap the blade or wear gloves. Replace the damaged blade. Do not repair or alter the blade.
- Keep the mower free from accumulation of grease, dirt, and other possibly combustible materials.
- To avoid personal injury and mower damage, do not clean the mower with a pressure washer.
- Do not use the battery-operated mower in rain.
- Never remove or tamper with safety devices. Regularly check their proper operation. Never do anything to interfere with the intended function of a safety device or to reduce the protection provided by the safety device.
- Tires must be inflated to the pressure specified in the manual. Too much air in the tire could cause the tire to burst, causing personal injury. Do not use tires with scratches or cracks, as such tires may burst. Contact FJDynamics or a local dealer for replacement or repair of tires, tubes, and rims.

## 4 Symbols

Symbols that may appear on the product are listed below. Read and understand their meanings for better and safer operation of the product.

Symbol	Name	Description
V	Volt	Voltage
A	Ampere	Current
Hz	Hertz	Frequency
W	Watt	Power
min	Minute	Time
—	Direct current	Type or characteristic of current
Km/h	Kilometers per hour	Driving speed of the mower
	Safety alert	Indicates a potential personal injury hazard.
	Wet condition alert	Do not use the mower in rain or in wet conditions.
	Read user manual	To reduce the risk of injury, users must read and understand the user manual before using the product.
	Eye protection	Always wear protective eyewear or protective eyewear with side shields.
	Keep hands and feet away	Stay clear of the area under the cutting deck.
	Steep slope hazard	Do not mow on slopes of greater than 20°.
	Keep distance	Keep a distance of at least 100 feet from all bystanders.

Symbol	Name	Description
	Thrown objects	Stay away from the mower when it is running, as objects could be thrown by the blades in any direction.
	Keep bystanders away	Do not mow when people are around.
	Mower body warning	Do not ride or place any objects on the mower.
	Electric shock hazard	Switch off the power supply before working on the mower.
	Do not step	Do not step.
	Maintain safety devices	Do not open or remove safety shields while the mower is running.
	Pinch points	Moving
	Mind your hands	Mind your hands.

## 5 Product Introduction

### 5.1 Specifications

Weight	Weight (with 2 batteries)	170 kg (375 lbs)
Size without charging pile	Length	1330 mm (52 inches)
	Height	1012 mm (40 inches)
	Width	857 mm (34 inches)
Cutting deck	Number of blades	1
	Deck size	635 mm (25 inches)
	Cutting height	20~127 mm (0.8~5 inches)
Performance	Gradeability	≤20°
	Driving speed	0~6 km/h (0~3.7 mph)
	Battery voltage	48 V DC
	Battery capacity	4 kWh
	Battery life	5 h
	Max. mowing area per 3 days	90000 m <sup>2</sup> (22 Acres)
	Max. mowing area per charge	13000 m <sup>2</sup> (3.2 Acres)
	Water protection rating	IPX4
Smart driving	Automatic path planning	Yes
	Operation modes	Remote control
		Automatic

## 5.2 Mower Overview

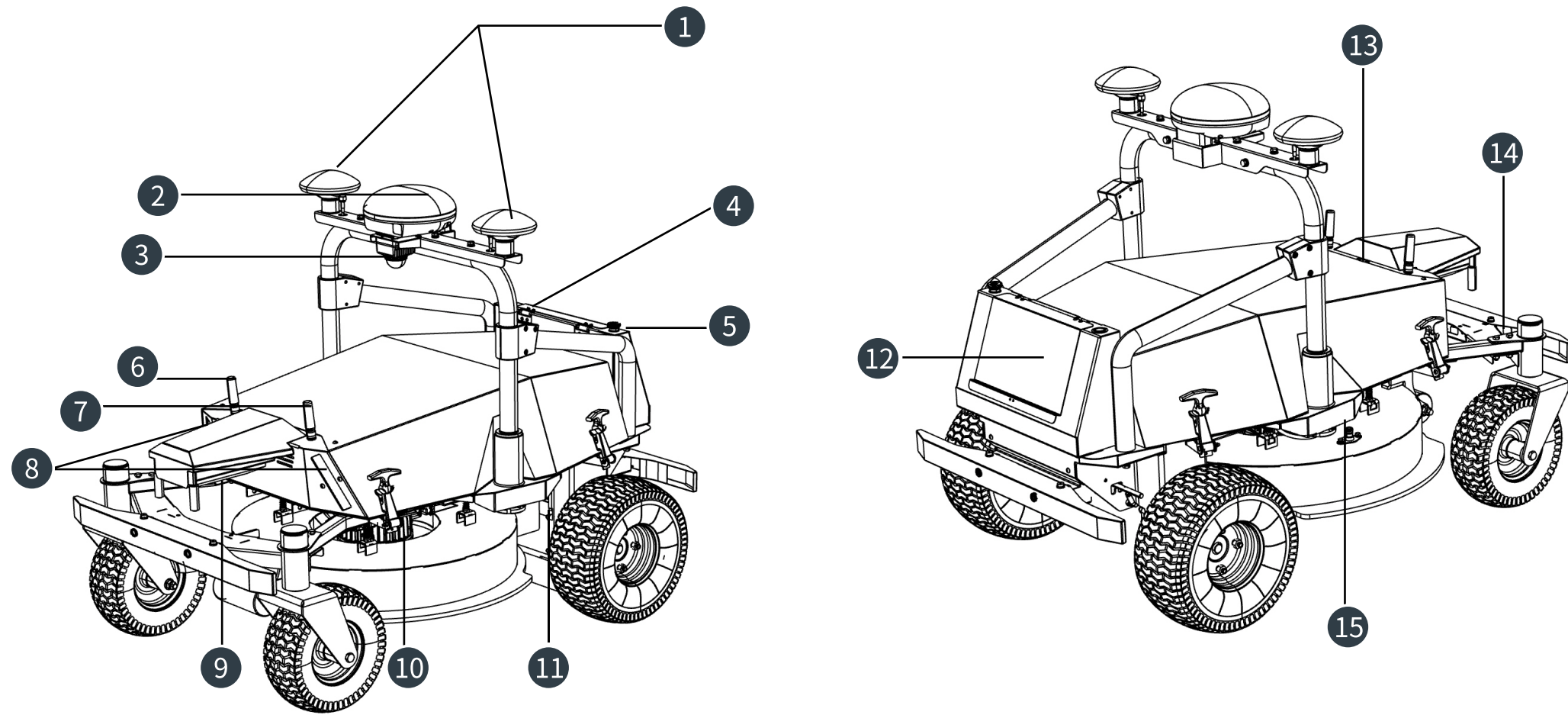


Figure2 Mower overview

### Main components

No.	Name	No.	Name
1	GNSS antenna	9	Charging port
2	INS assembly	10	Blade motor
3	LiDAR	11	Drive motor
4	Power button	12	Control terminal
5	Emergency stop button	13	Raindrop sensor
6	Radio antenna	14	Bumper
7	Wi-Fi antenna	15	Deck height adjuster
8	Headlights		

## 5.3 Headlights

The headlights are located on the front of the mower. Tap on the display or use the remote controller to turn on/off the headlights ①.

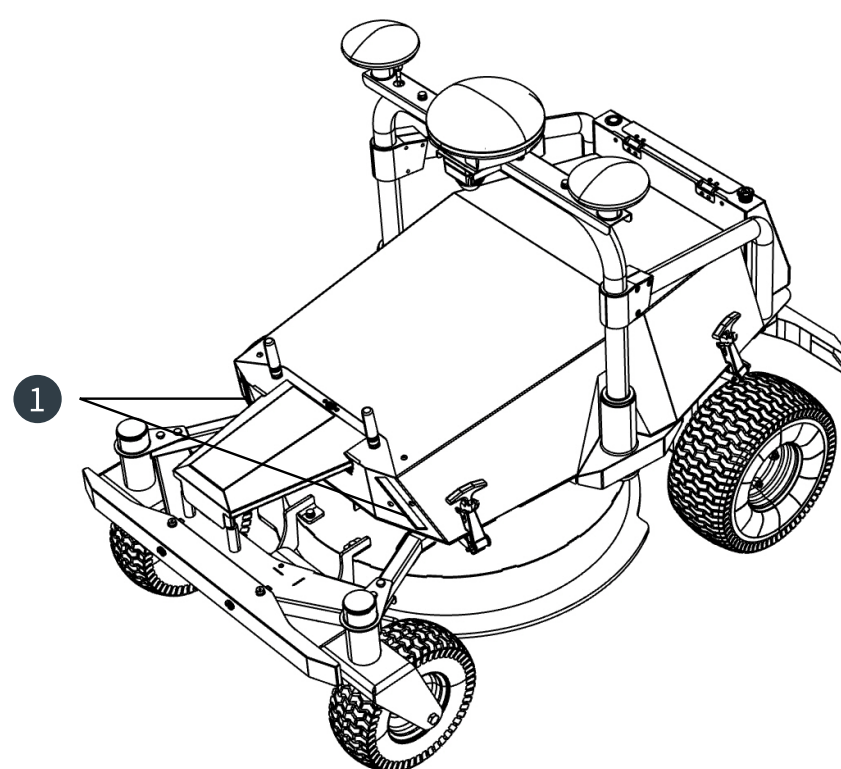


Figure3 Headlights

## 5.4 Anti-scalp wheel

The anti-scalp wheel ❶ comes standard on FJDynamics mowers. It is designed to minimize scalping when mowing on rough and uneven terrain.

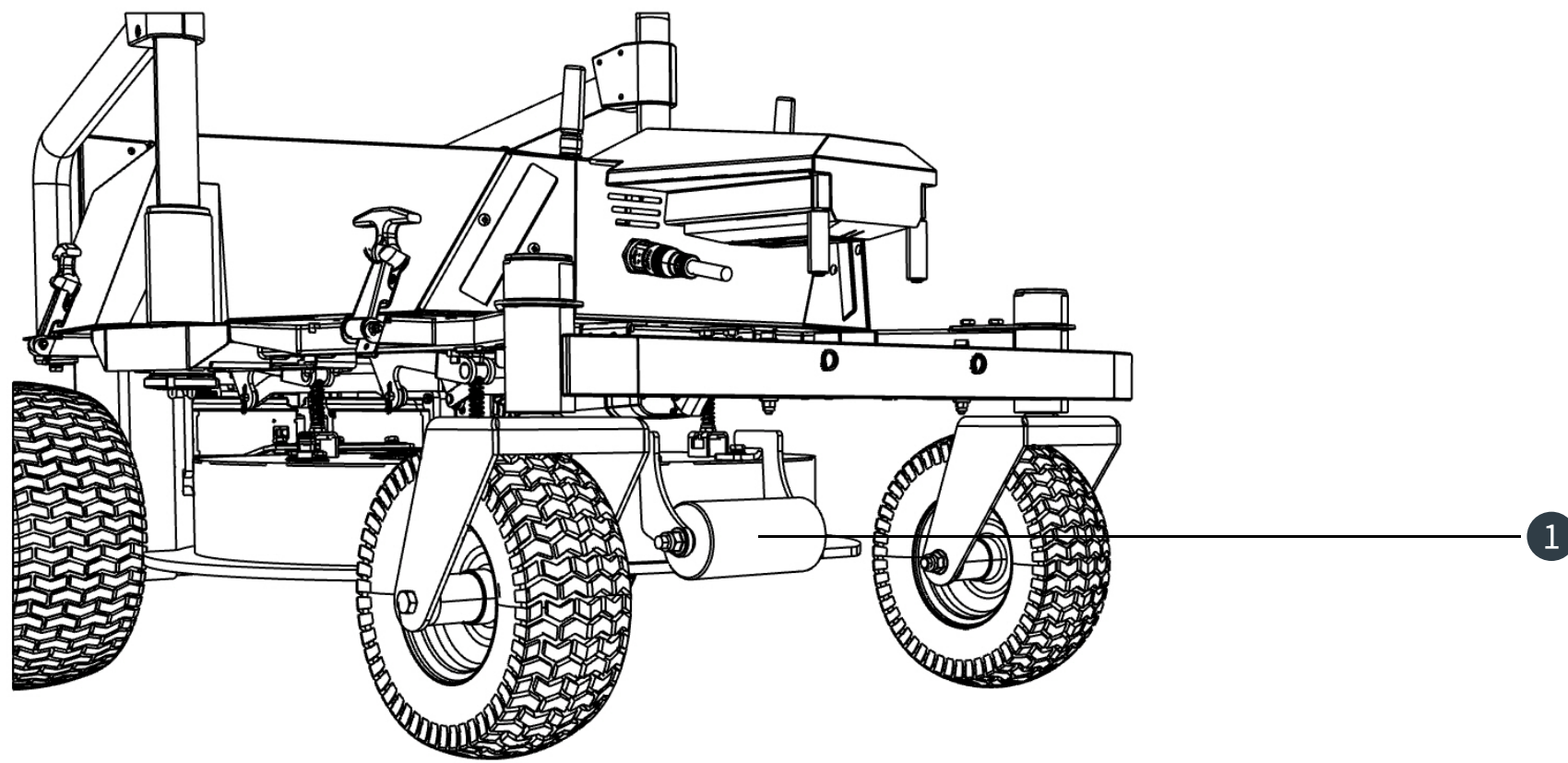


Figure4 Anti-scalp wheel

## 5.5 Manual Release of Electromagnetic Brakes

When a power failure occurs or the batteries are depleted, you can release the electromagnetic brakes of the drive motors manually so that you can push the mower out of the operation area. While the mower is running, ensure that the electromagnetic brakes are engaged.

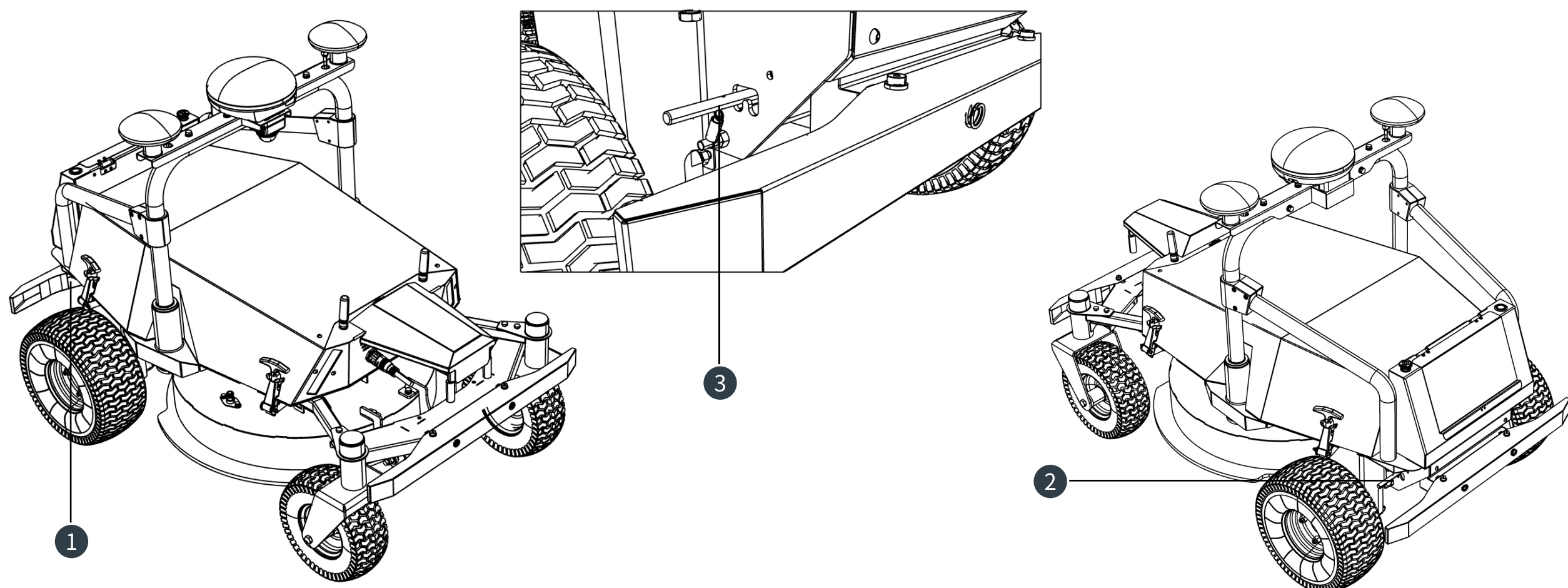


Figure5 Manual release levers of brakes

No.	Name
1	Lever to manually release the electromagnetic brake of the right drive motor
2	Lever to manually release the electromagnetic brake of the left drive motor
3	Lever to manually release the brake

Switch the lever to the other position to release the electromagnetic brake of the drive motor, and switch it back to engage the brake.



Note: After maintenance, return the electromagnetic brakes to the engaged state.



**WARNING**

Do not operate the mower when the electromagnetic brakes are released. Ensure that the electromagnetic brakes are engaged before operation. Failure to do so could cause serious damage to the mower and void the warranty.

## 6 Assembly

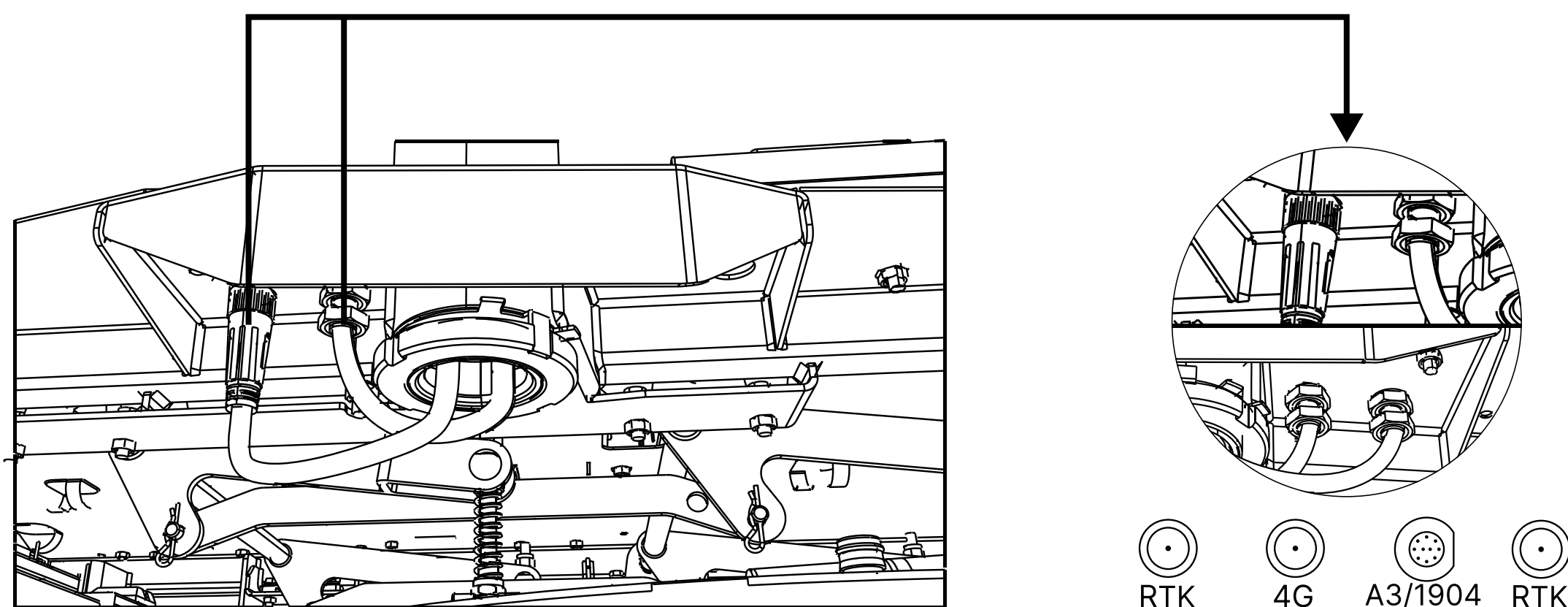
### 6.1 Packing List

The actual packing list may vary.

No.	Name	Qty.	Remarks
1	FJD RM21 Autonomous Mower	1	
2	Charging pile	1	
3	Base plate of charging pile	1	
4	Controller assembly-Wi-Fi supported	1	
5	Tool kit	1	
6	Hook wrench 68-80	1	In the tool kit
7	Hex wrench 5 mm	1	In the tool kit
8	Open-end wrench 6×7	1	In the tool kit
9	Hex wrench 4 mm	1	In the tool kit
10	Open-end wrench 13×16	2	In the tool kit
11	L-type socket wrench 24 mm	1	
12	Certification	1	
13	Warranty card	1	

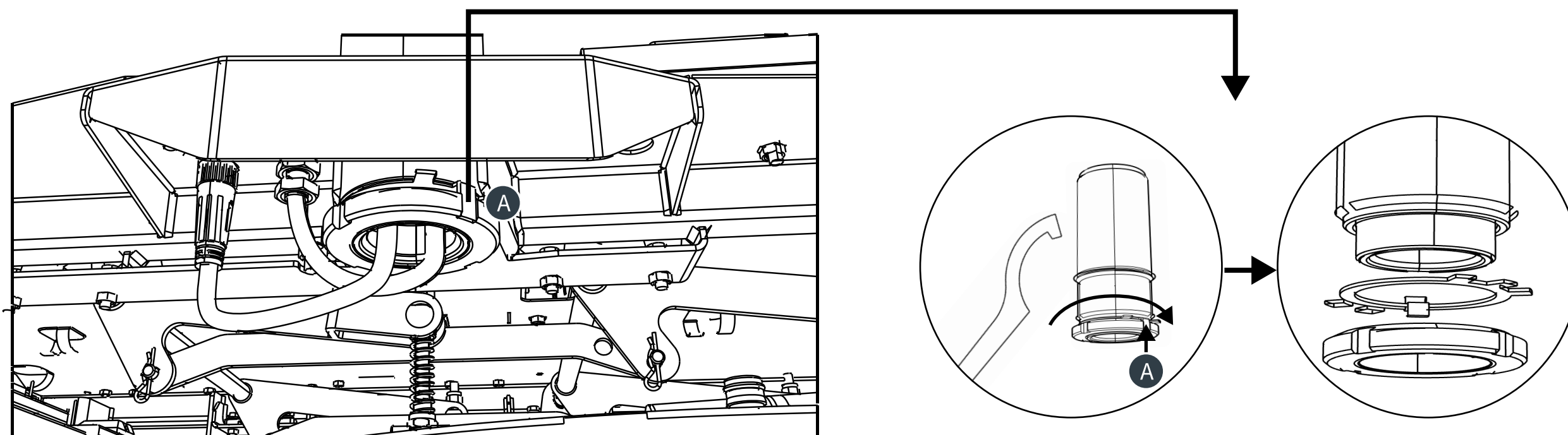
## 6.2 Installing the Batteries

1. Disconnect the cables from the four ports of RTK, 4G, and A3/1904 at the bottom of the antenna bracket on both sides.



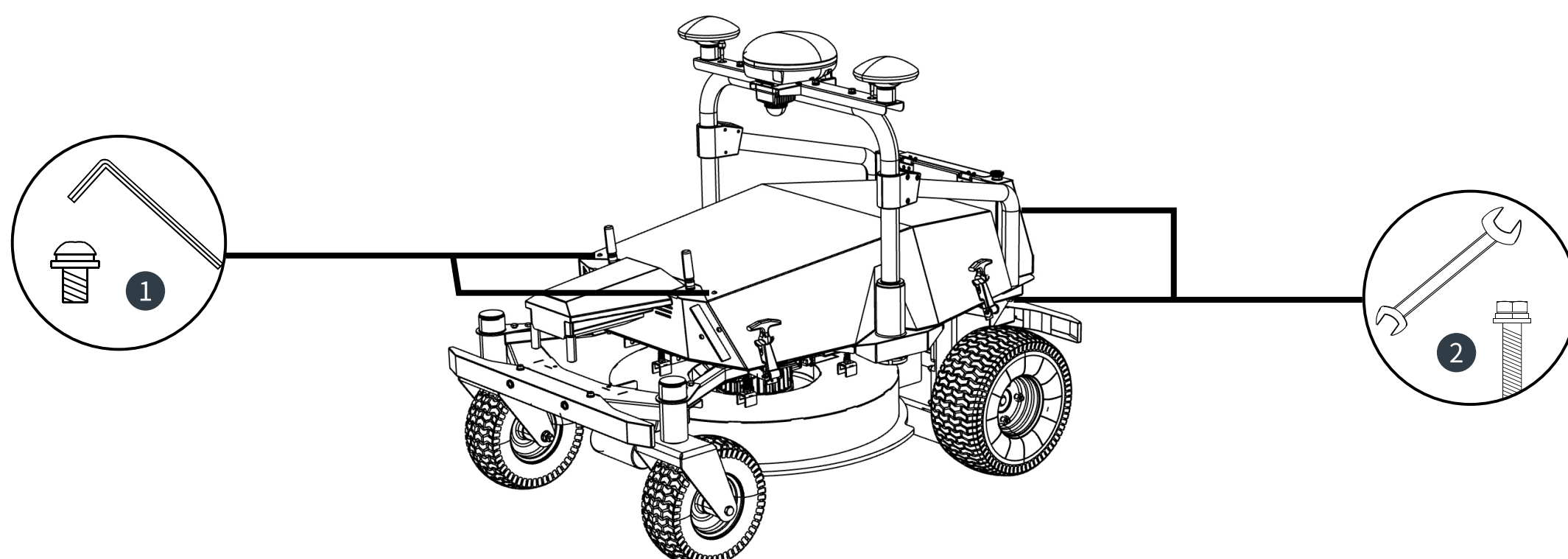
**Figure6** Disconnect cables from ports

2. Pry the gasket at position A, and loosen the retaining ring with the hook wrench.



**Figure7** Loosen the retaining ring

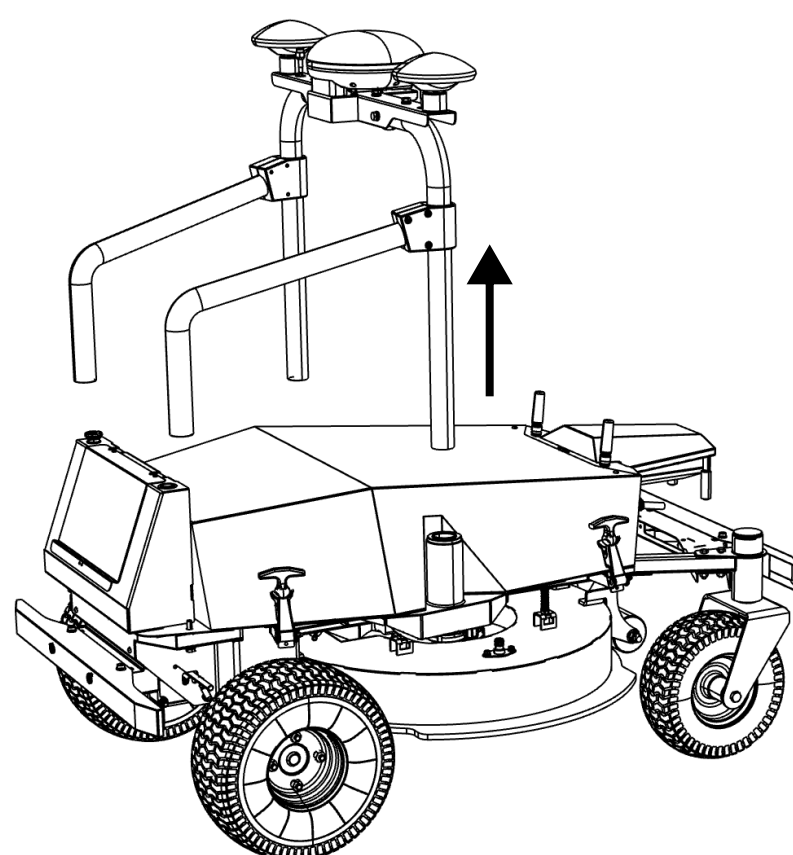
3. Remove the screws **1** from both sides of the shell and remove the bolts **2** from the bottom of the antenna bracket.



**Figure8** Remove the screws and bolts

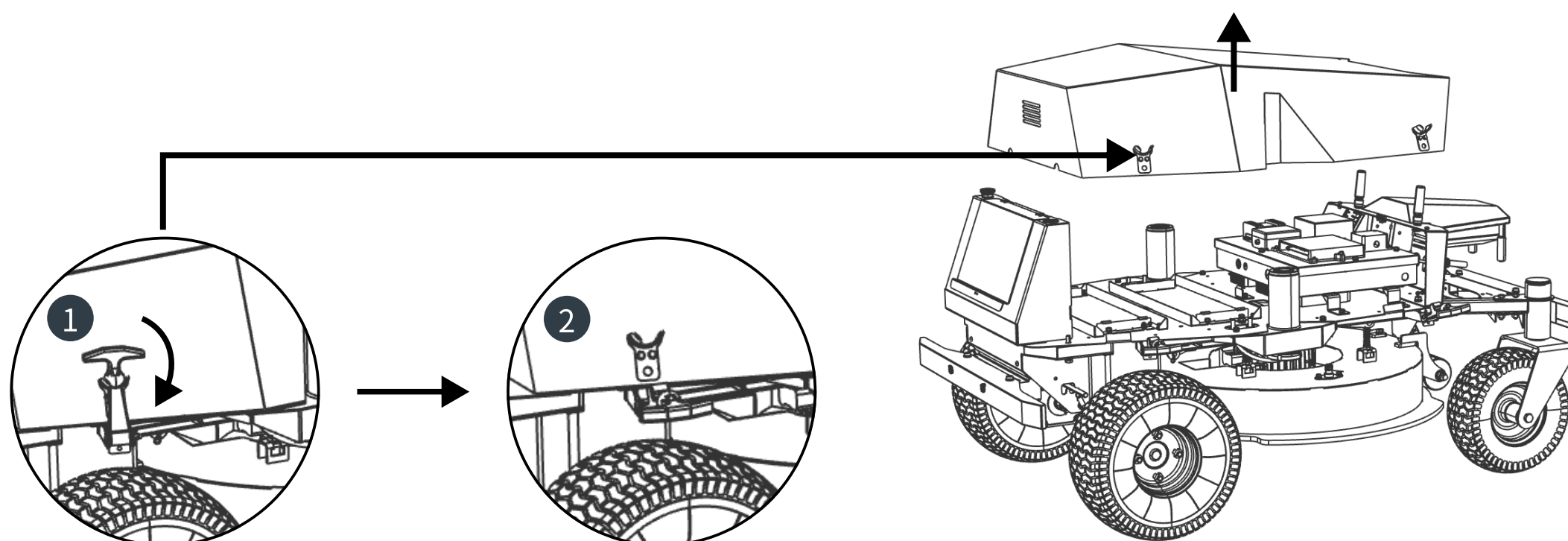
4. Pull out the antenna bracket.

Note: Put aside the antenna bracket carefully to avoid any damage to devices.



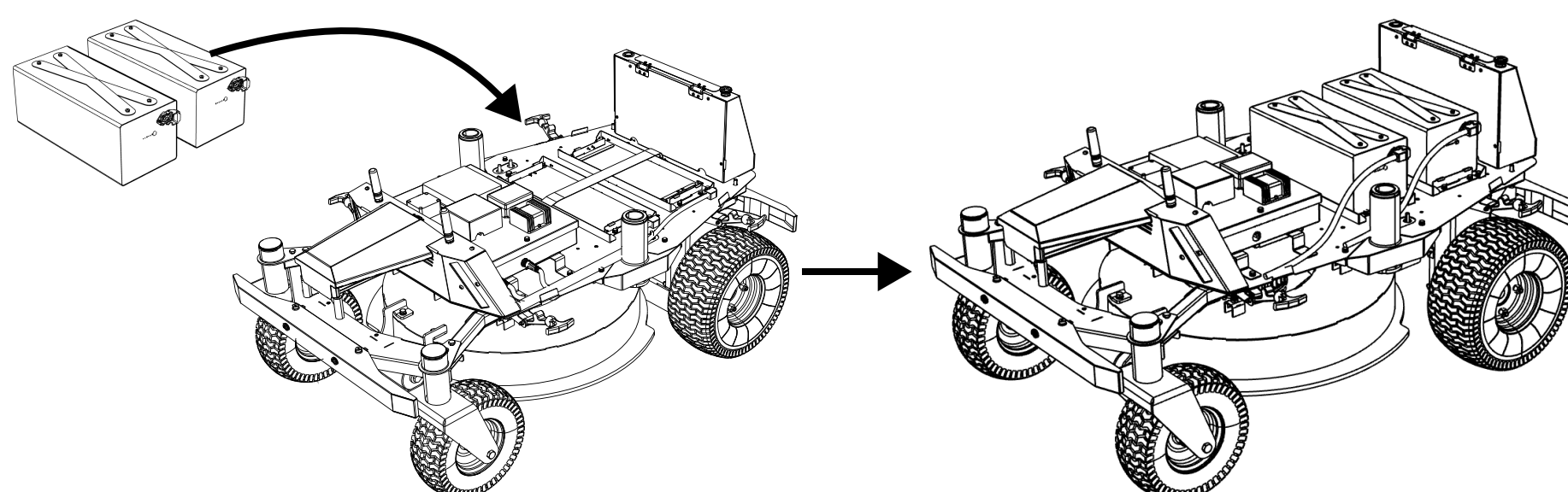
**Figure9** Remove the antenna bracket

5. Open the four buckles on both sides of the shell and remove the shell.



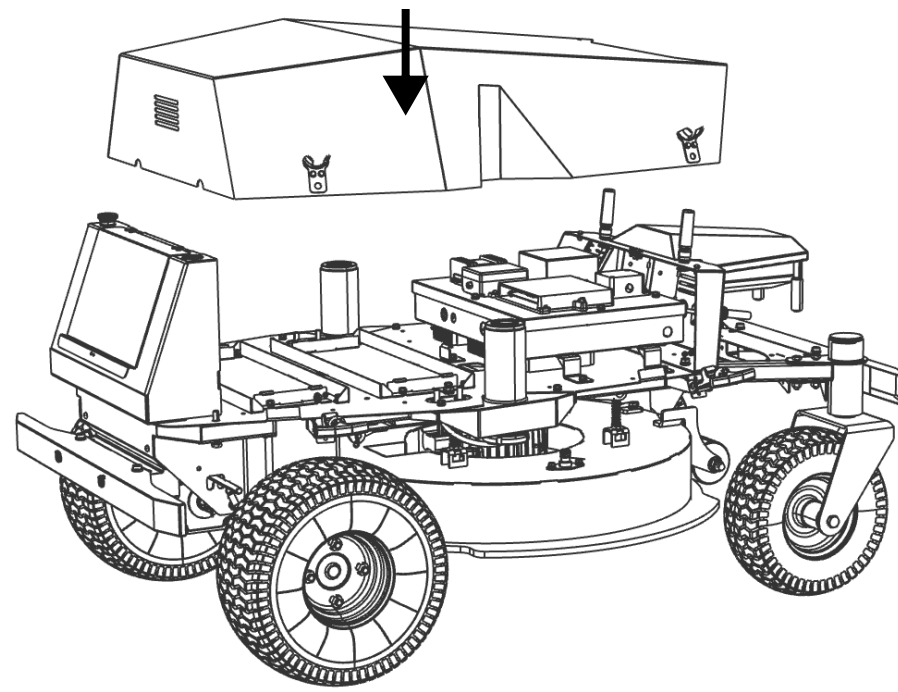
**Figure10** Remove

6. Put in the batteries, tie the elastic strap, and connect the cables.



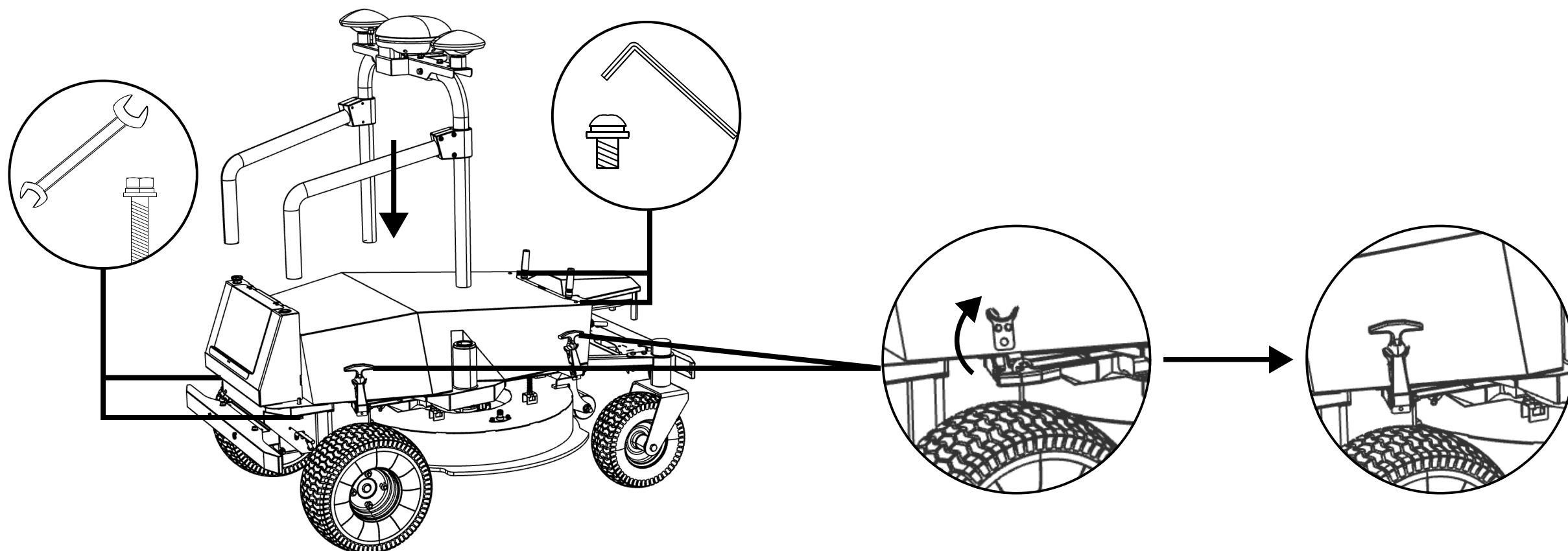
**Figure11** Put in the batteries

7. Ensure that the connections are firm before installing the shell.



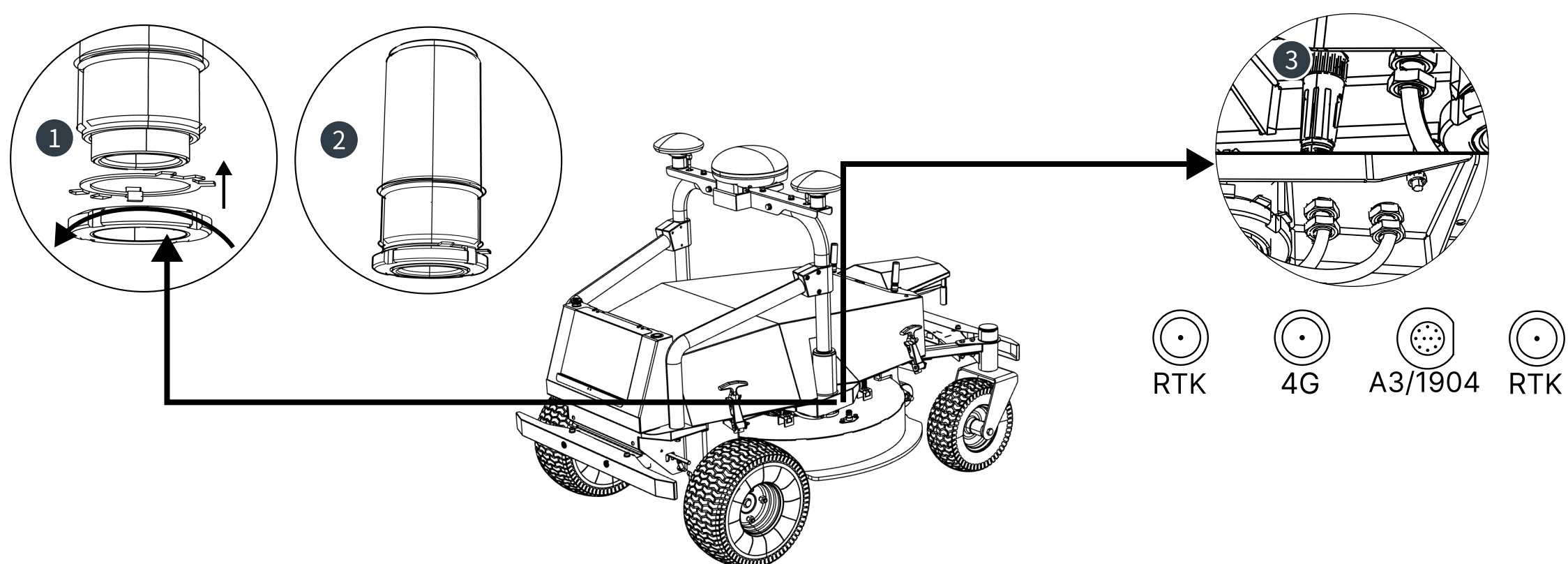
**Figure12** Put back the shell

8. Install the antenna bracket, tighten the antenna bracket bolts and shell screws, and then close the buckles.



**Figure13** Install the antenna bracket

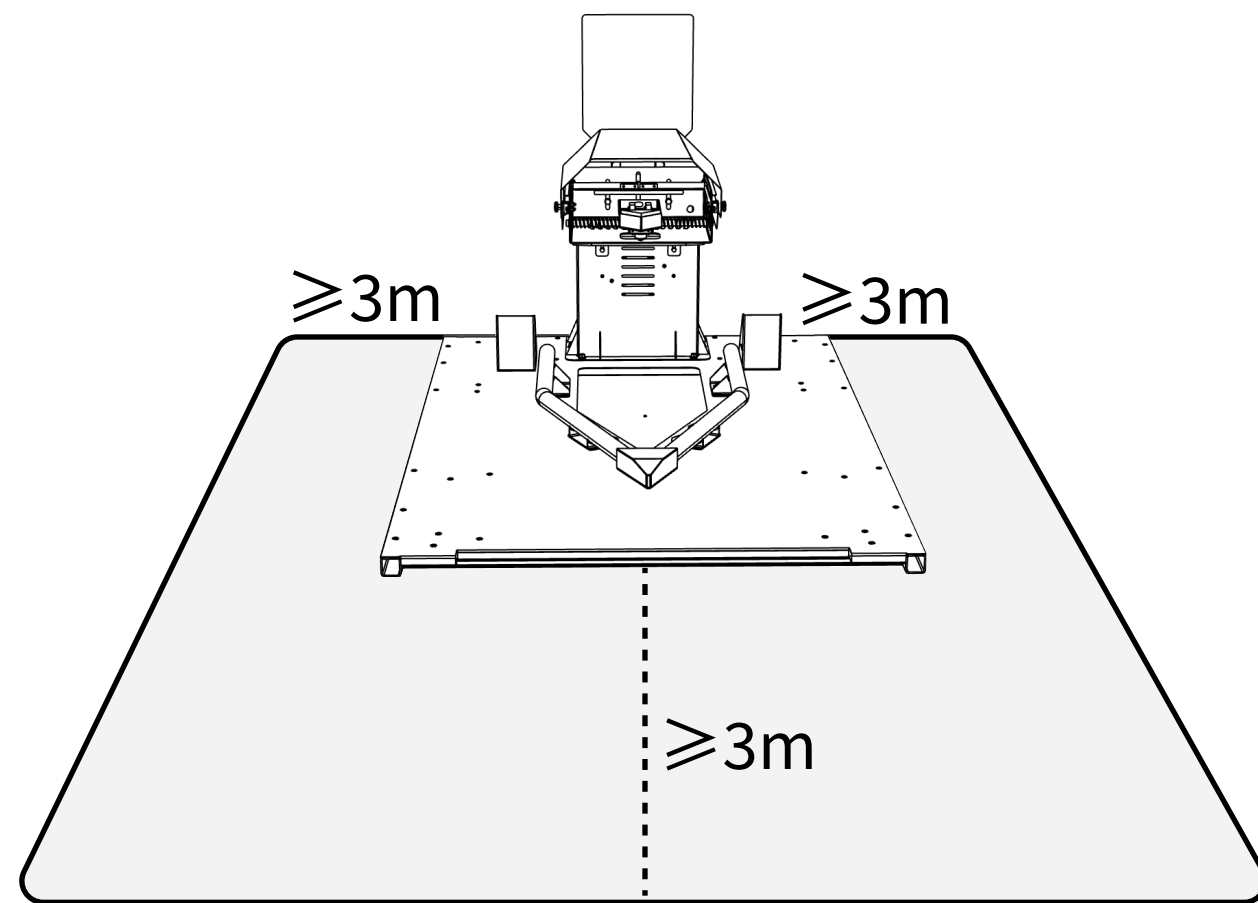
9. Install the retaining rings and gaskets onto both sides of the bracket and connect the cables to the ports.



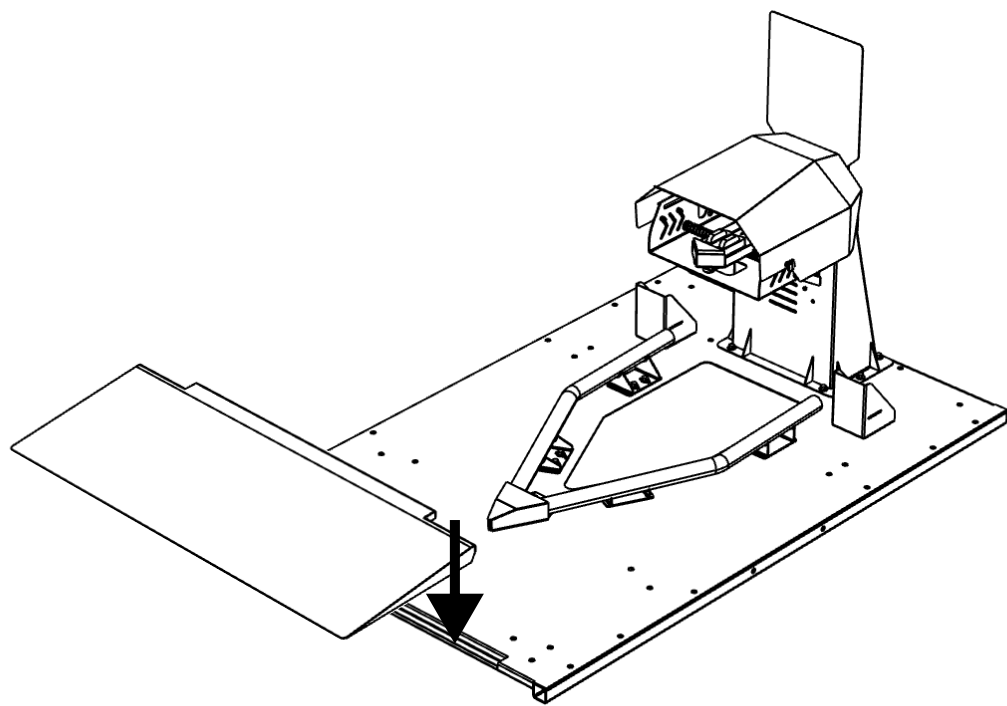
**Figure14** Fix the bracket and connect the cables

## 6.3 Installing the Charging Pile

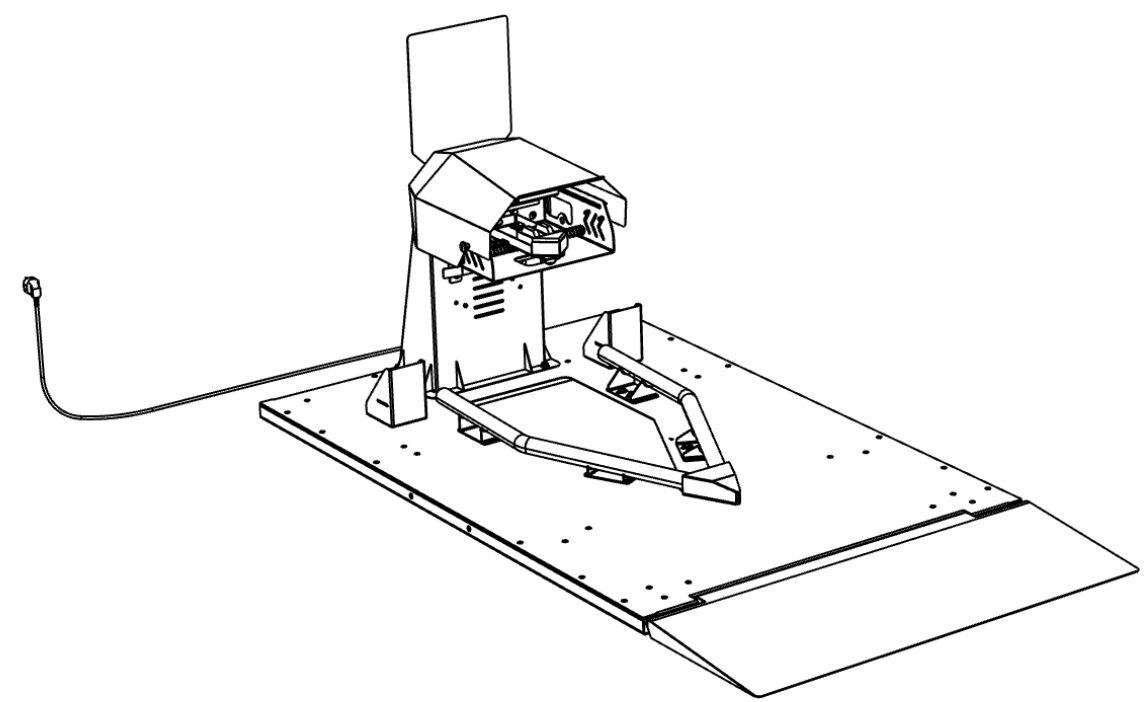
- Place the charging pile on level ground. Avoid uneven terrain and slopes.
- Ensure that there are no obstacles within 3 m around the charging pile.



**Figure15** Select the installation position



**Figure16** Assemble the base plate



**Figure17** Plug in the power

# 7 Operation

## 7.1 Safety Instruction



### **DANGER**

Understand proper use of the mower and read this manual before any operations. Start with slow maneuvers to familiarize yourself with the mower operations before working at the normal speed.



### **WARNING**

Approach depressions or raised obstacles at a slow speed. Keep the blade sharp and ensure that spare blades are available for replacement. Dull blades and blades improperly sharpened may lead to various problems. For details about blade sharpening, see section 11.4 "Blade Maintenance". Check blade sharpness on a regular basis.



### **DANGER**

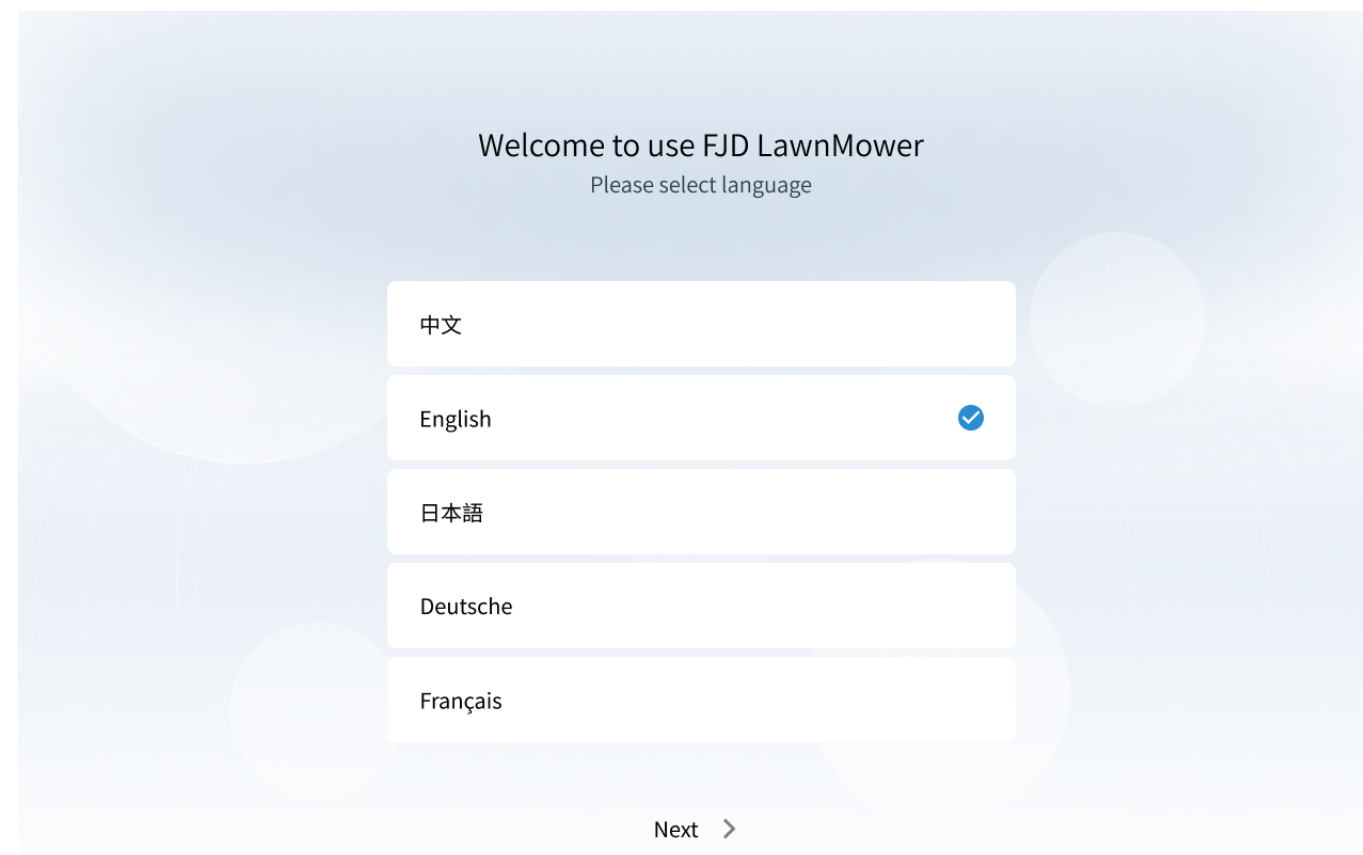
Power off the mower before working under it. Turn off the blade switch on the screen, and press the power button to turn off the mower. Ensure that the indicator is off. Wear gloves when handling the blade. Always check for blade damage if the mower hits a rock, a twig, or other foreign objects during an operation.

- **Cooling down the motors**

The motors slow down when its temperature exceeds the overheat protection threshold. When this occurs, wait for 30 to 60 minutes until the motors cool down. If the motor temperature continues increasing, the drive will forcibly stop the motors.

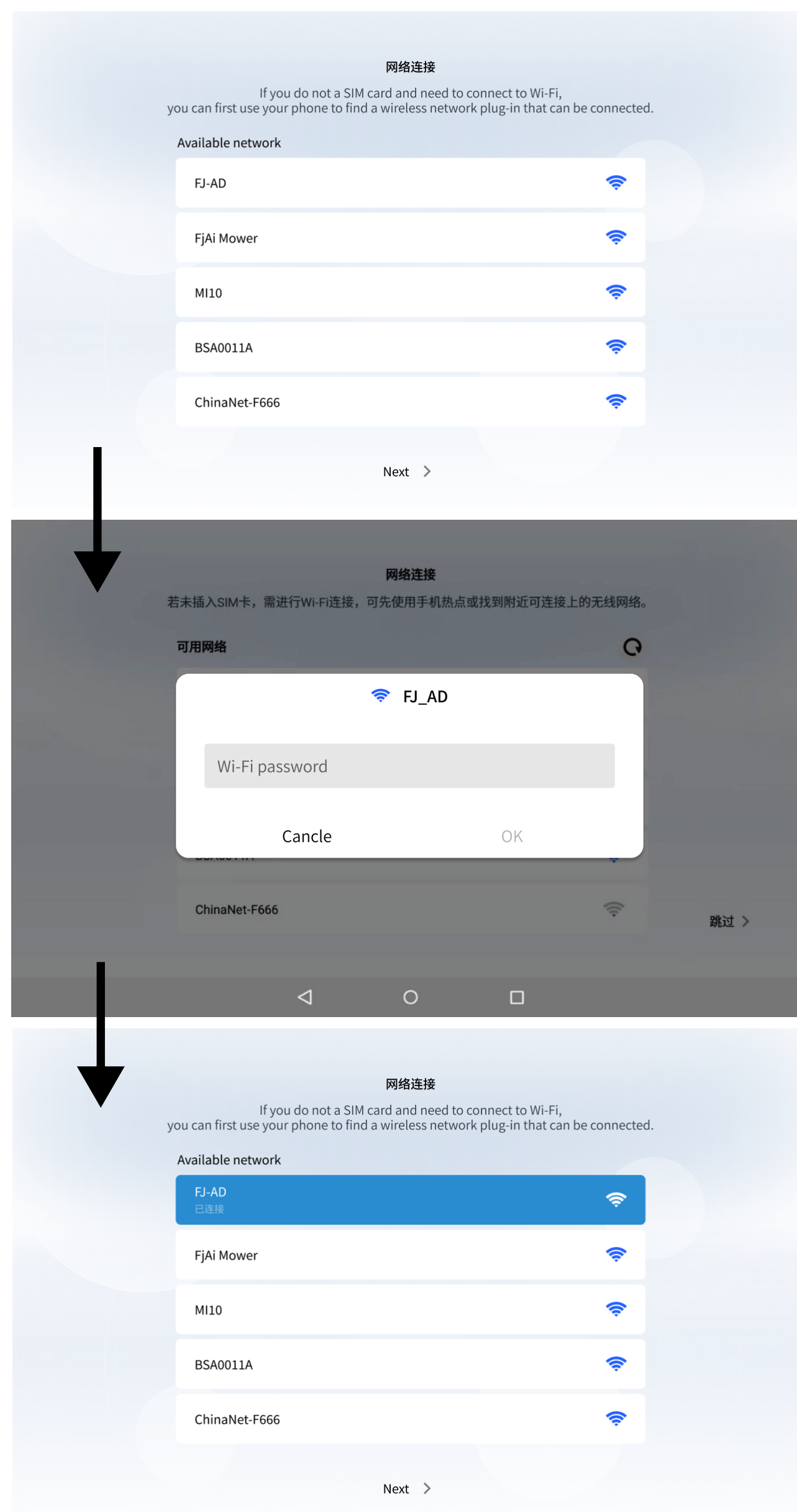
## 7.2 First Start

1. Press the power button and wait for the system to start.
2. Select the language when starting the system for the first time, and then tap Next.



**Figure18** Select the language

3. Select the Wi-Fi network, enter the password, and wait until the network is connected. Tap Skip to access the registration/login screen.

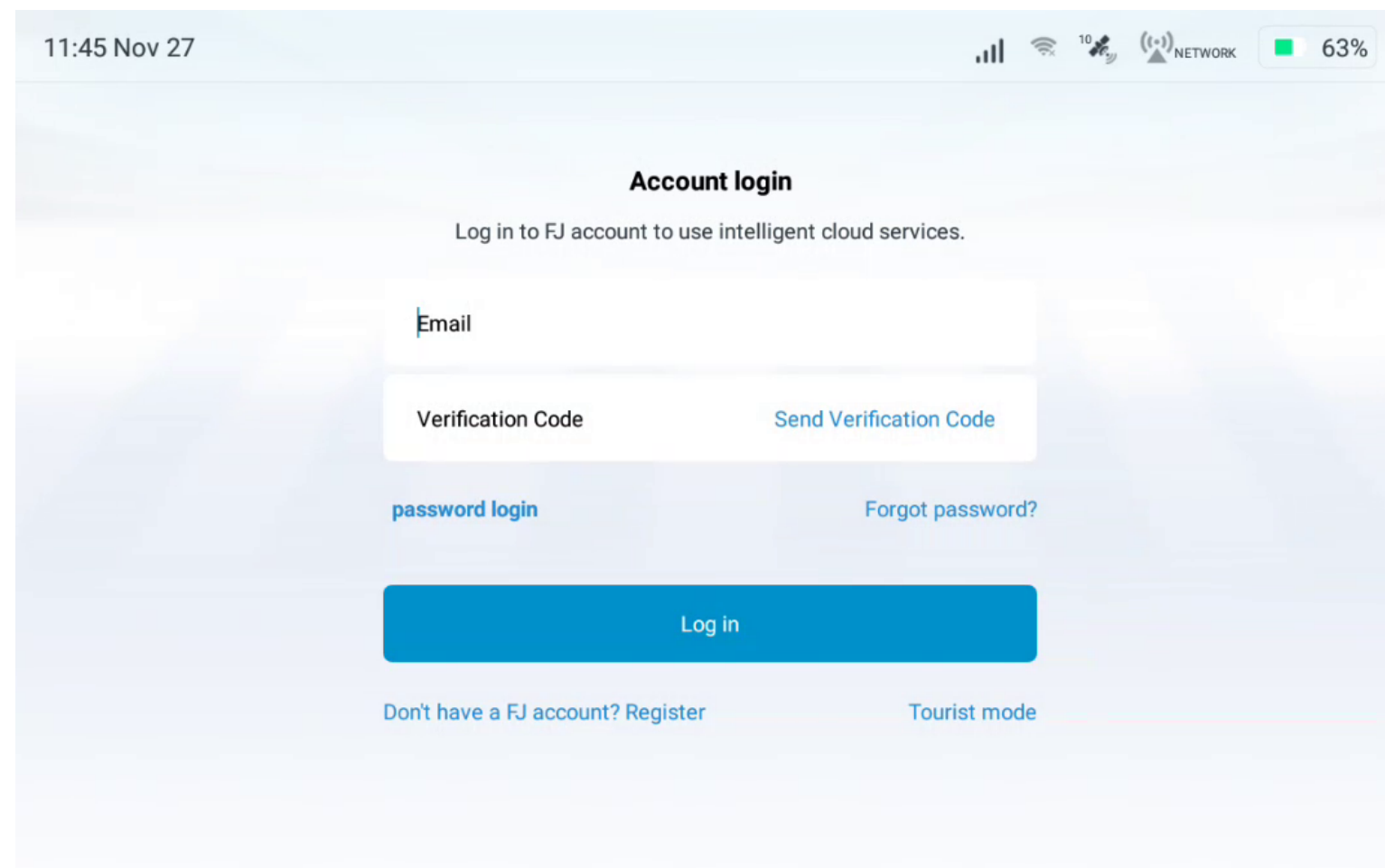


**Figure20** Connect to the network

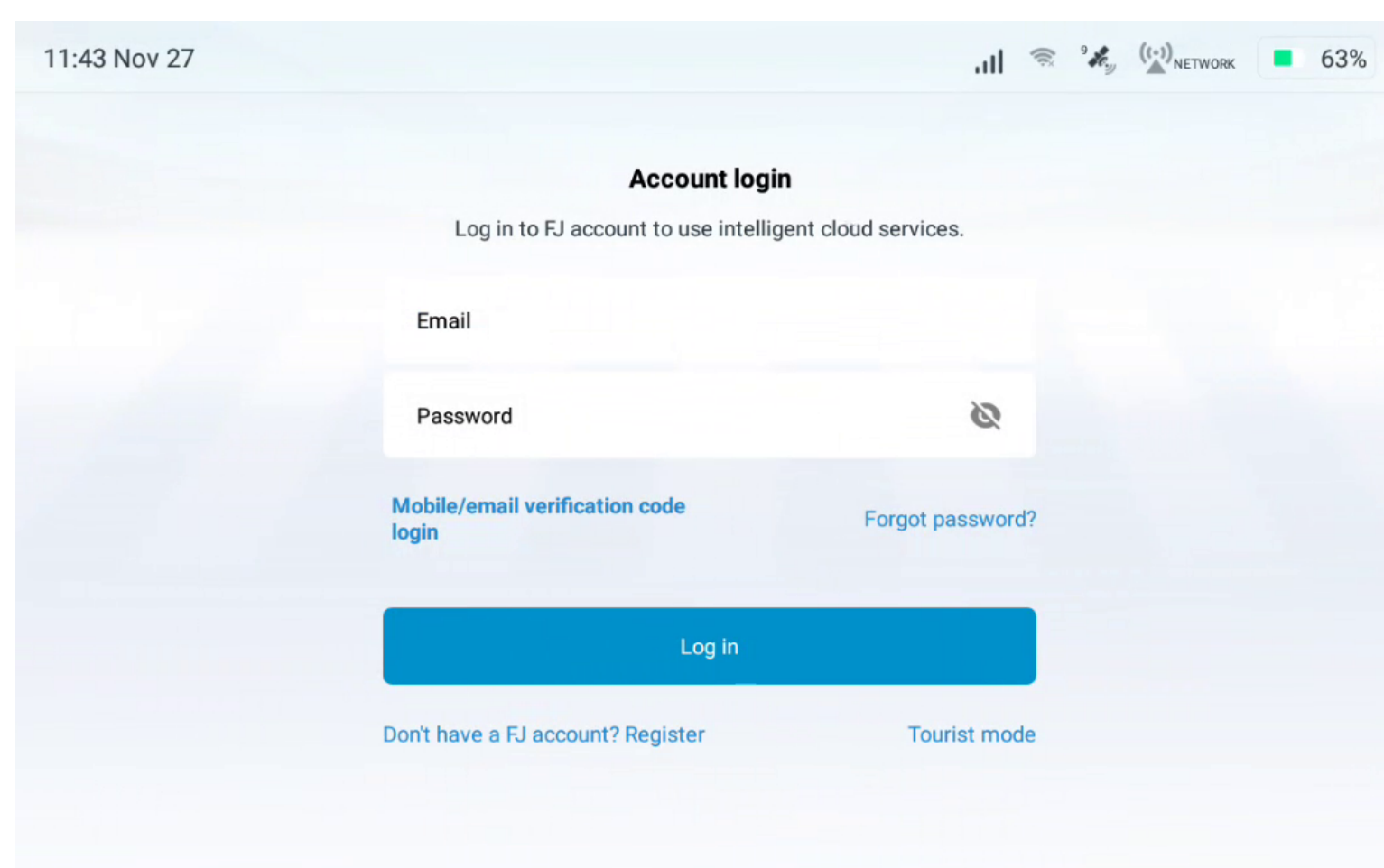
## 7.37.3 Login and Registration

### Login

Registered users can enter the username (email address or phone number) and the password or verification code to log in.



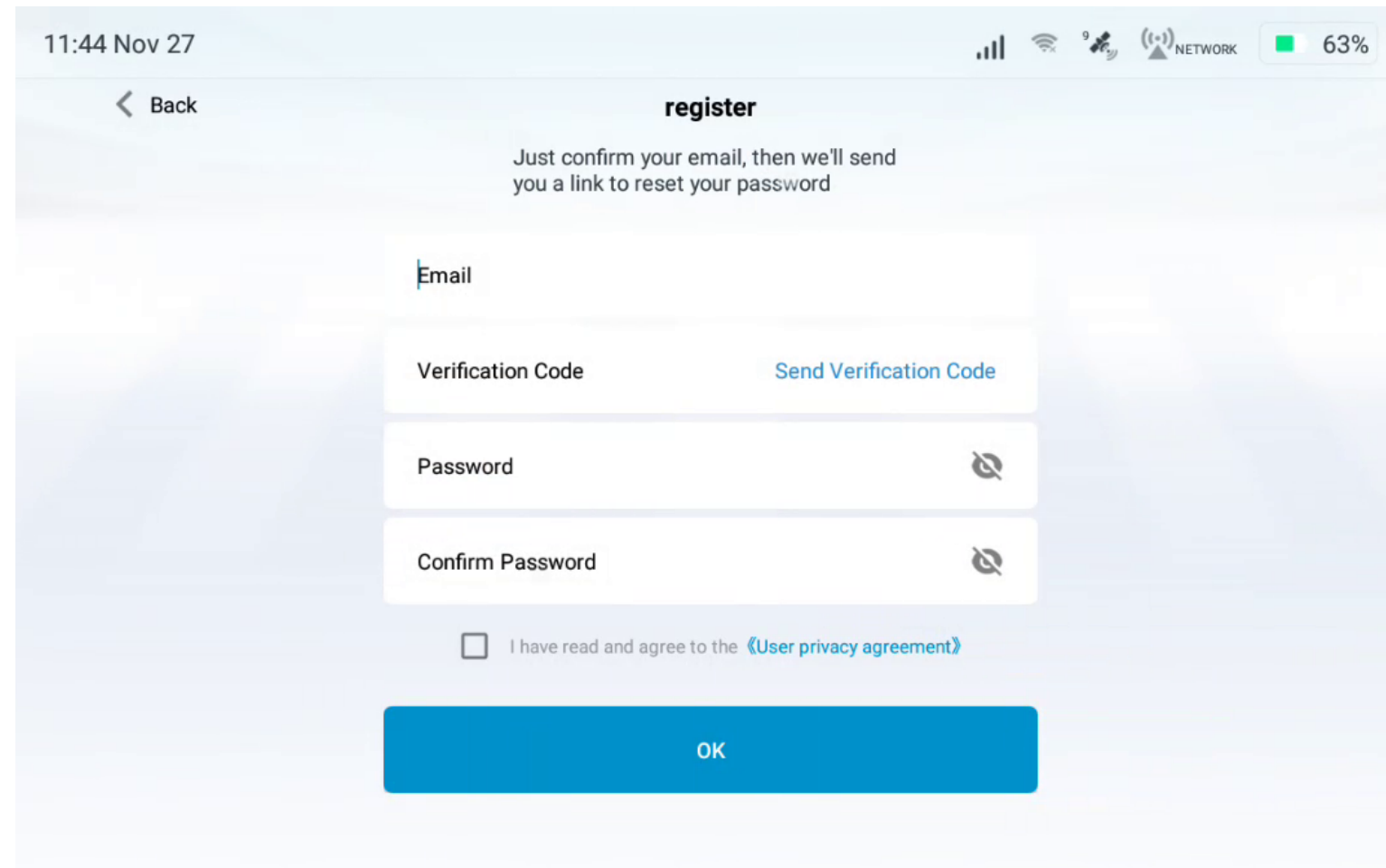
**Figure21** Login with the verification code



**Figure22** Login with the password

### Registration

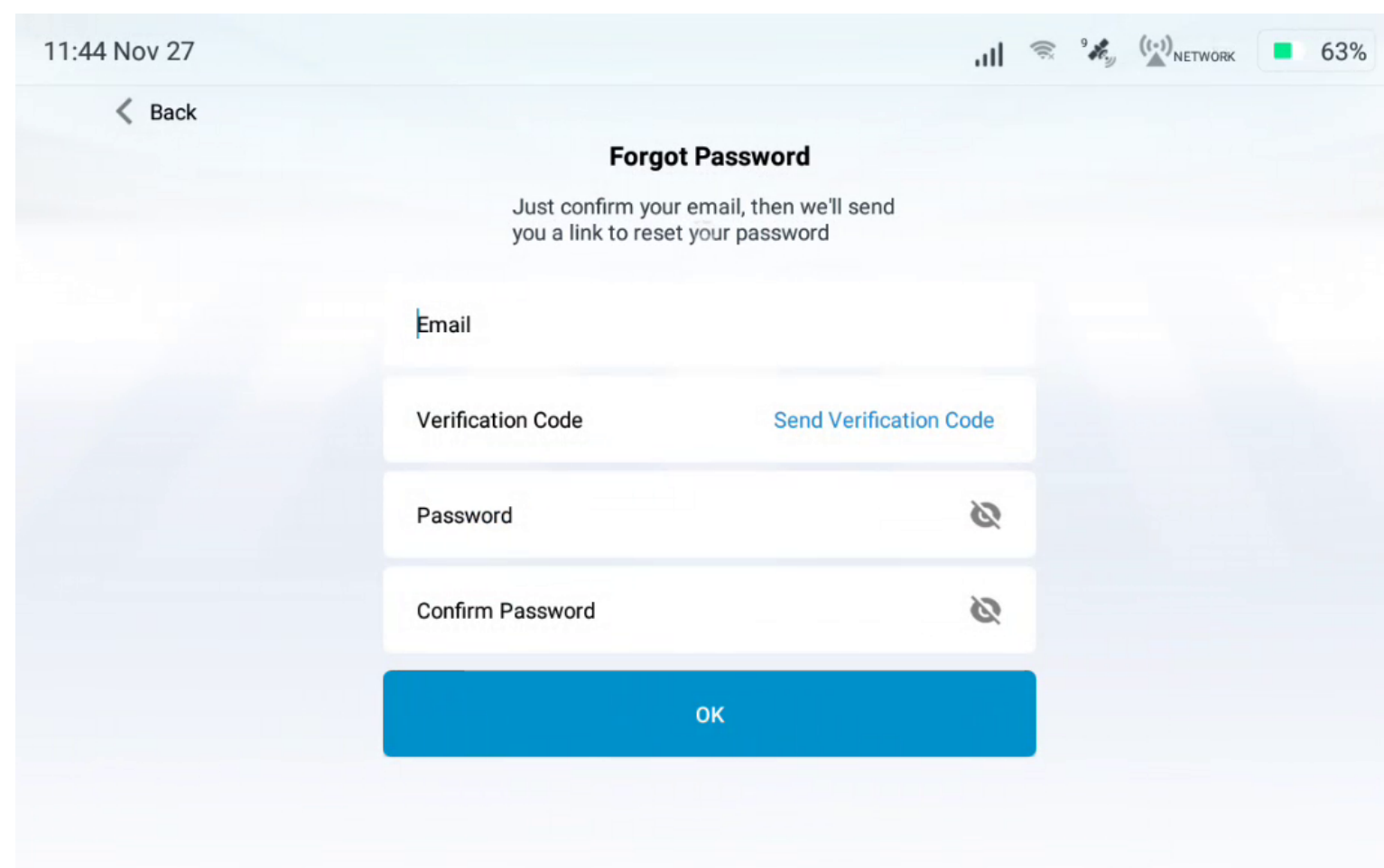
New users need to register with the system. Tap Don't have an account? Register to access the registration screen. Then, enter the email address/phone number, verification code, and password, confirm the password, select "I have read and agree to the User Privacy Agreement", and tap OK to complete registration and access the home screen.



**Figure23** User registration

## Forgot password

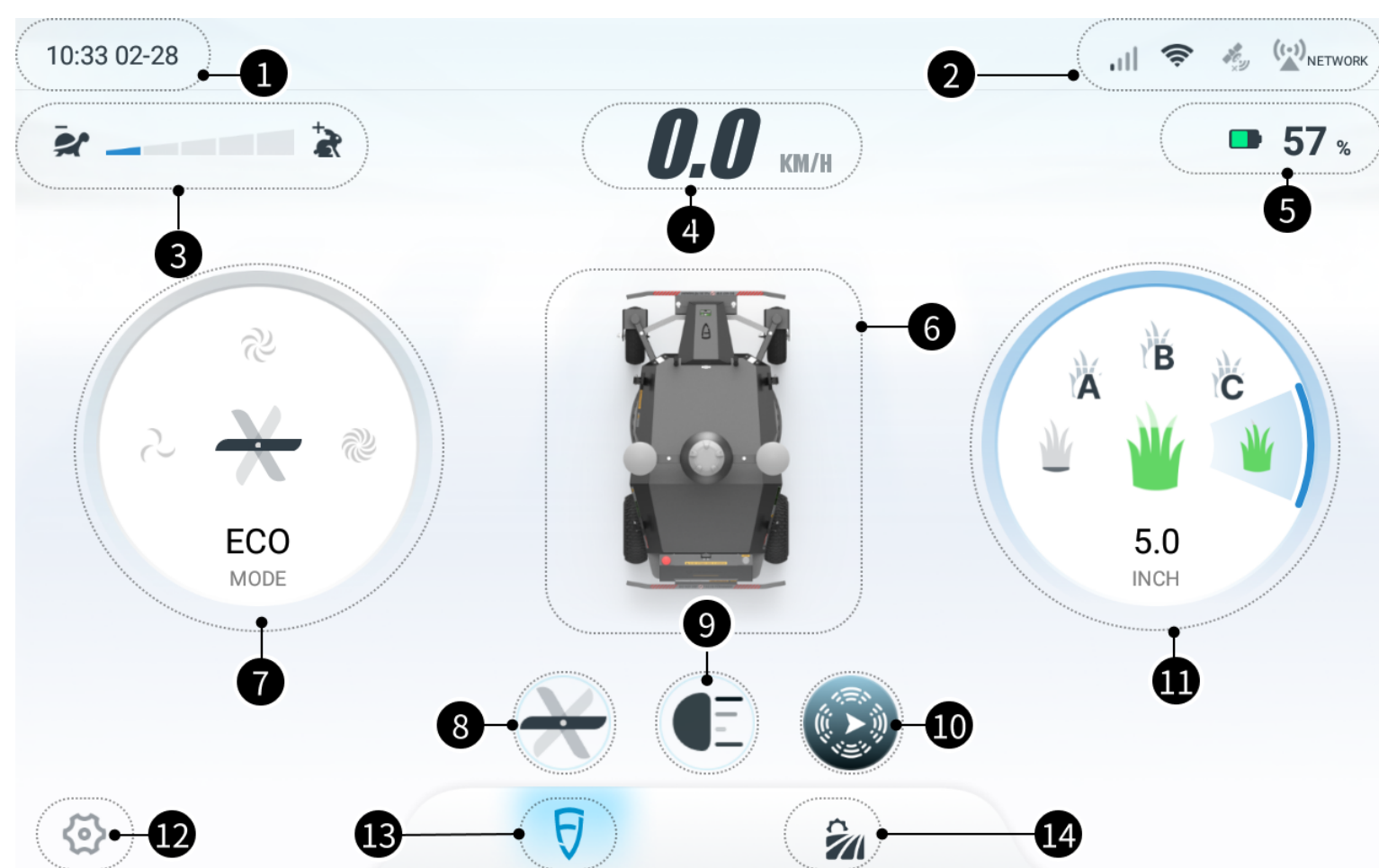
If you already have an account but forget the password, tap **Forgot password?** to access the password resetting screen. Then, enter the email address/phone number, verification code, and new password, confirm the new password, and tap **OK**.



**Figure24** Forgot the password

## Home screen

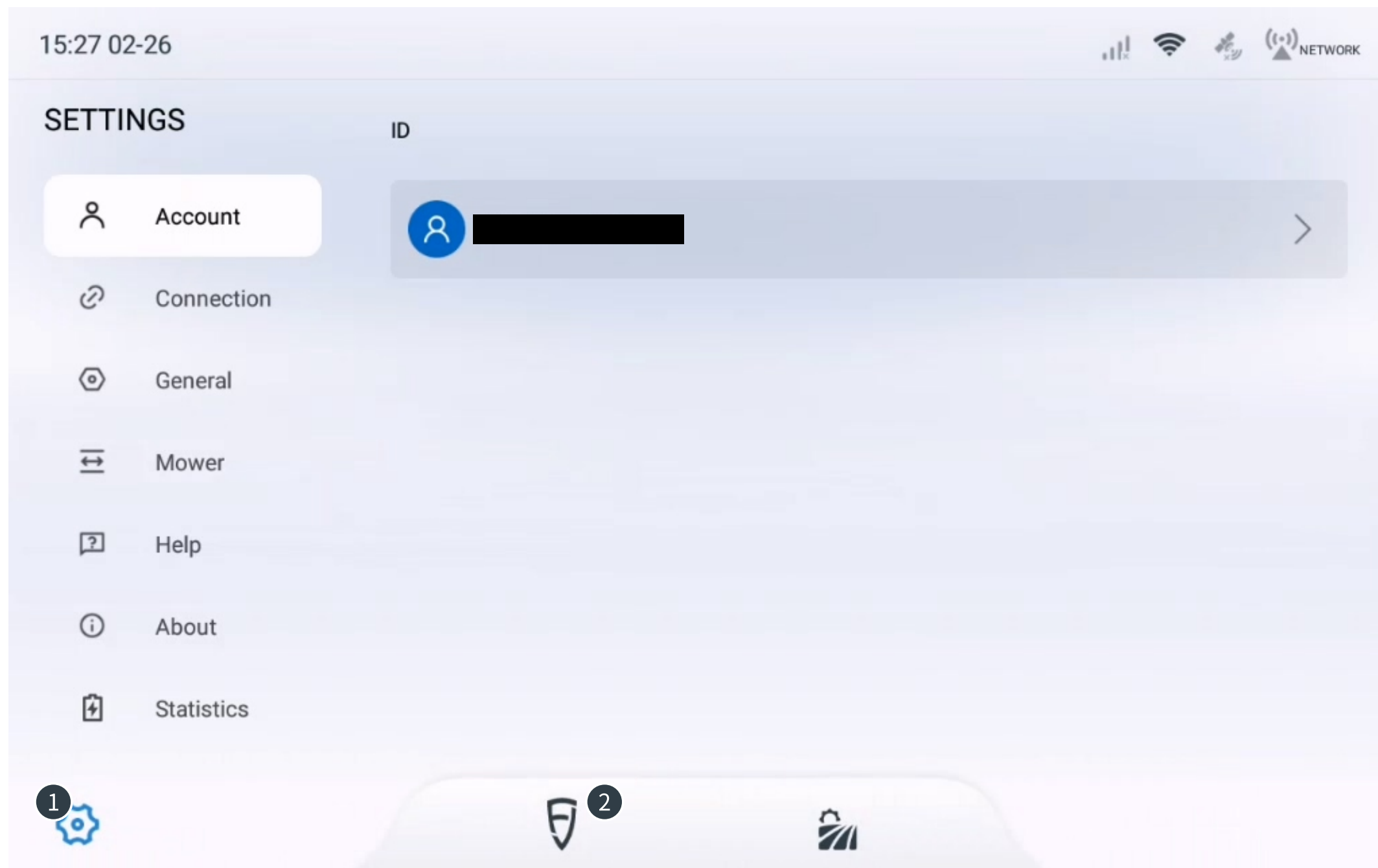
The home screen uses a simple and intuitive user interface design to show the mower status.



**Figure25** Home screen

No.	Name	Description
1	System time	The system time and time zone can be set in the Android system settings.
2	Basic status	Shows the status of the radar, remote controller, 4G network, Wi-Fi, Bluetooth, satellites, and RTK, and battery level.
3	Speed limit	Sets the speed limit for the mower.
4	Speed	Real-time speed of the mower.
5	Battery level	Battery level of the mower. Tap to show the battery details.
6	Mower status	Shows the operating status by highlighting certain parts, such as the blade and headlights. The driving direction is also displayed.
7	Blade speed	Sets the blade running mode.
8	Blade switch	Tap to start or stop the blade. Before the blade starts, a message appears for your confirmation.
9	Headlight switch	Tap to turn on or off the headlights.
10	Obstacle avoidance switch	Tap to turn on or off the obstacle avoidance function.
11	Cutting height	Press and hold A, B, or C to adjust the cutting height.
12	Settings	Tap to access the settings screen.
13	Home screen	Tap to return to the home screen.
14	Auto operation	Tap to switch to the auto operation mode.

# Settings



**Figure26** Settings

No.	Name	Description
1	Settings	Tap to access the system and operation settings.
2	Home screen	Tap to return to the home screen.

## 7.4 Auto Operation

When you tap the auto operation button, the system checks whether the mower is ready for an auto operation and displays the auto operation screen if it is ready.

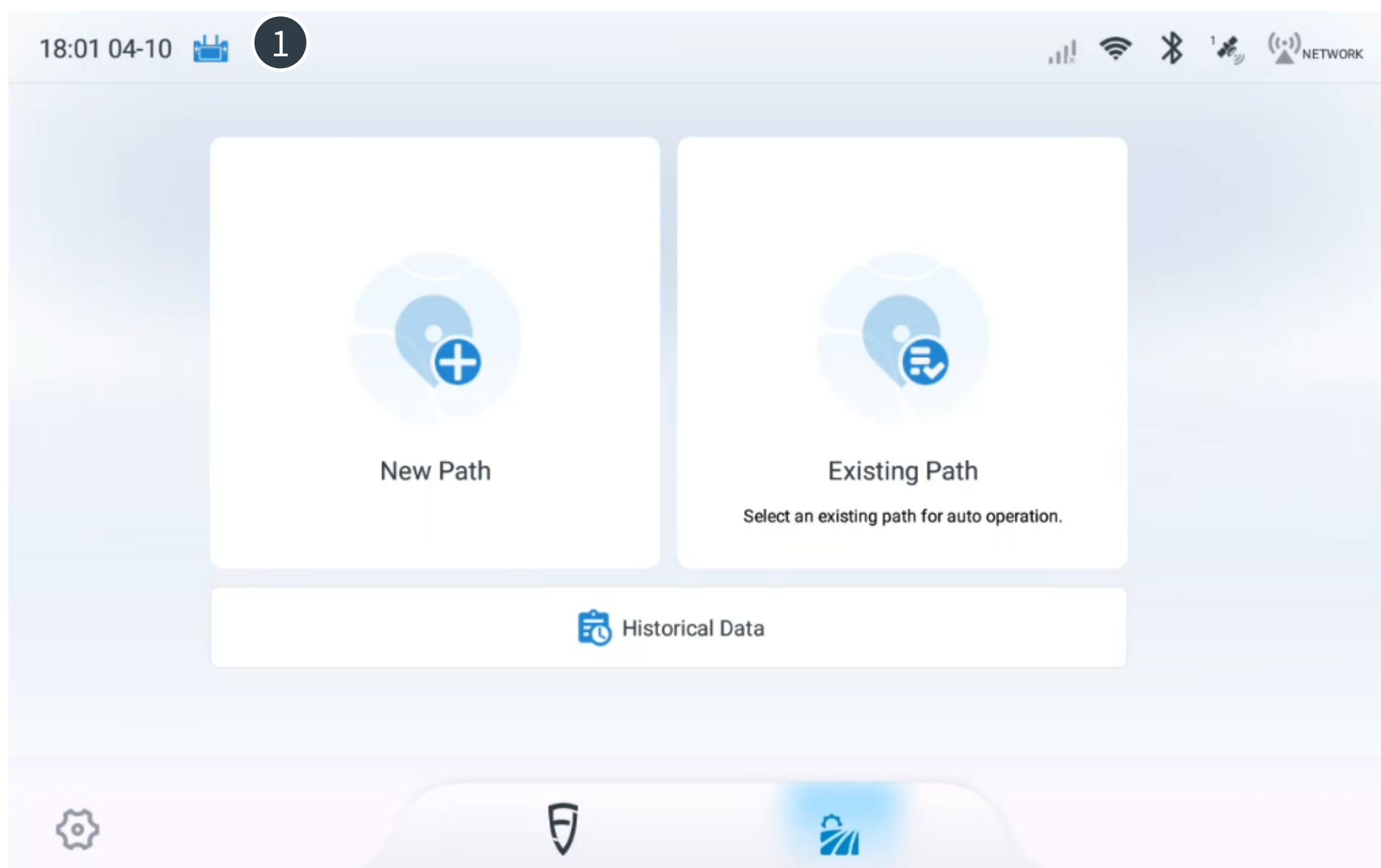


Figure27 Auto operation screen

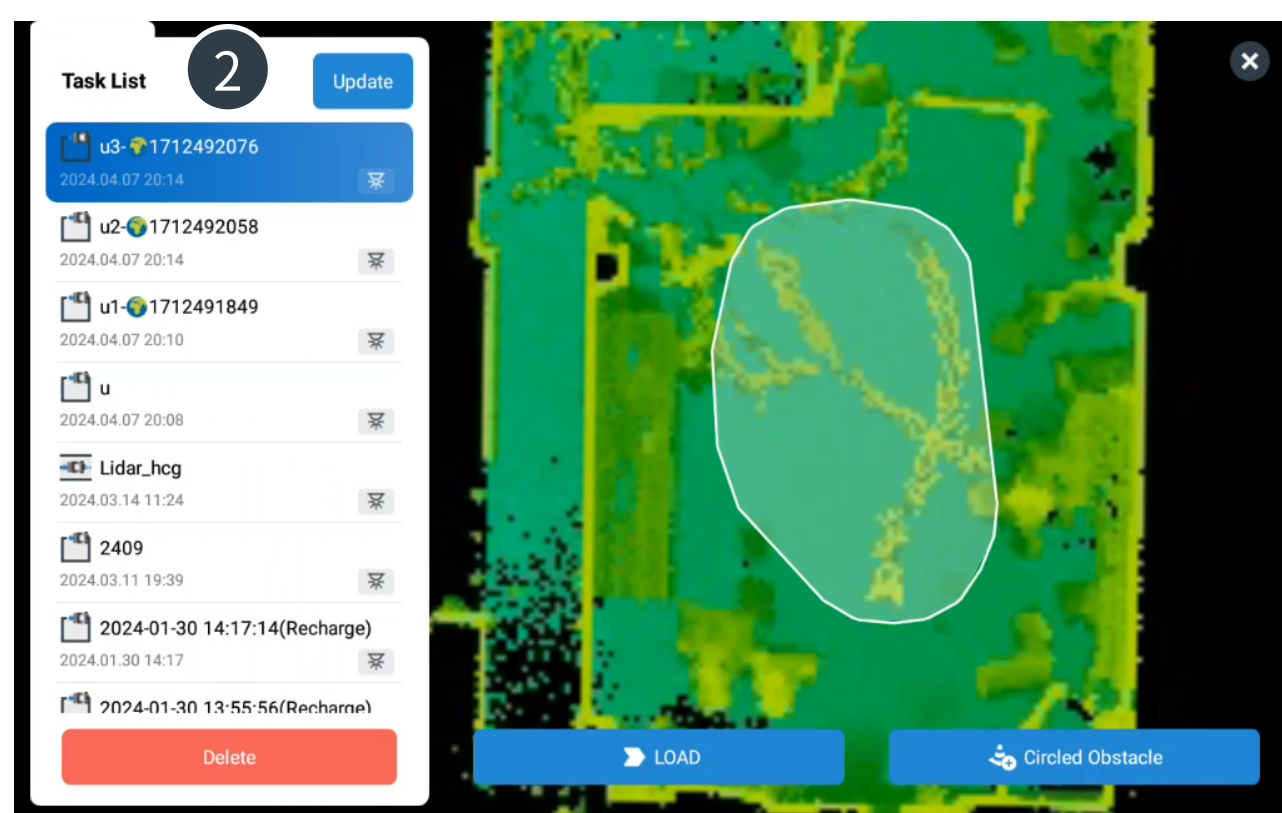


Figure28 Select a path

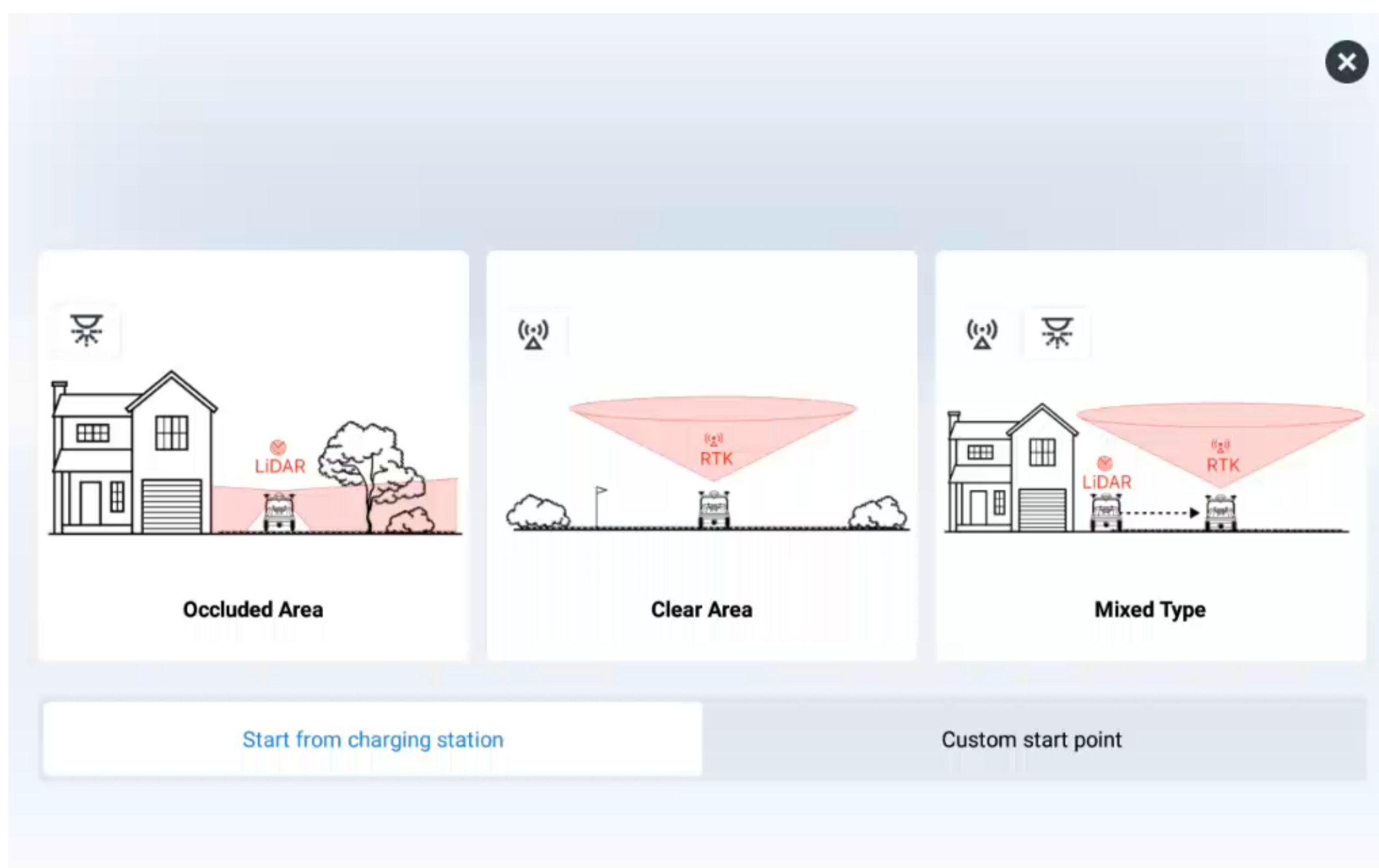


Figure29 Historical operations

No.	Name	Description
1	Create a path	Create a path to start auto operations.
2	select a path	Select an existing path to start auto operations.
3	Historical operations	Historical operation records.

## Selecting the type of the new path

Select the path type after you choose to create a new path



**Figure30** Select the path type

No.	Name	Description
1	Occluded Area	To work in areas where the RTK signal is not available due to overhead obstructions, you can create high-accuracy LiDAR maps for the areas and create LiDAR paths based on these maps, so that the mower can perform auto operations without RTK signals.
2	Clear Area	In areas with no obstructions or other environmental constraints, you can operate or create maps with the support of RTK.
3	Mixed Type	--
4	Start from charging station	--
5	Custom start point	--

## 7.5 Map Scan

1. Tap +New.



Figure31 Create a map

2. The charging pile calibration screen appears. Use the remote controller to move the mower to the charging pile, and tap Arrive at Charging Station to start the calibration.

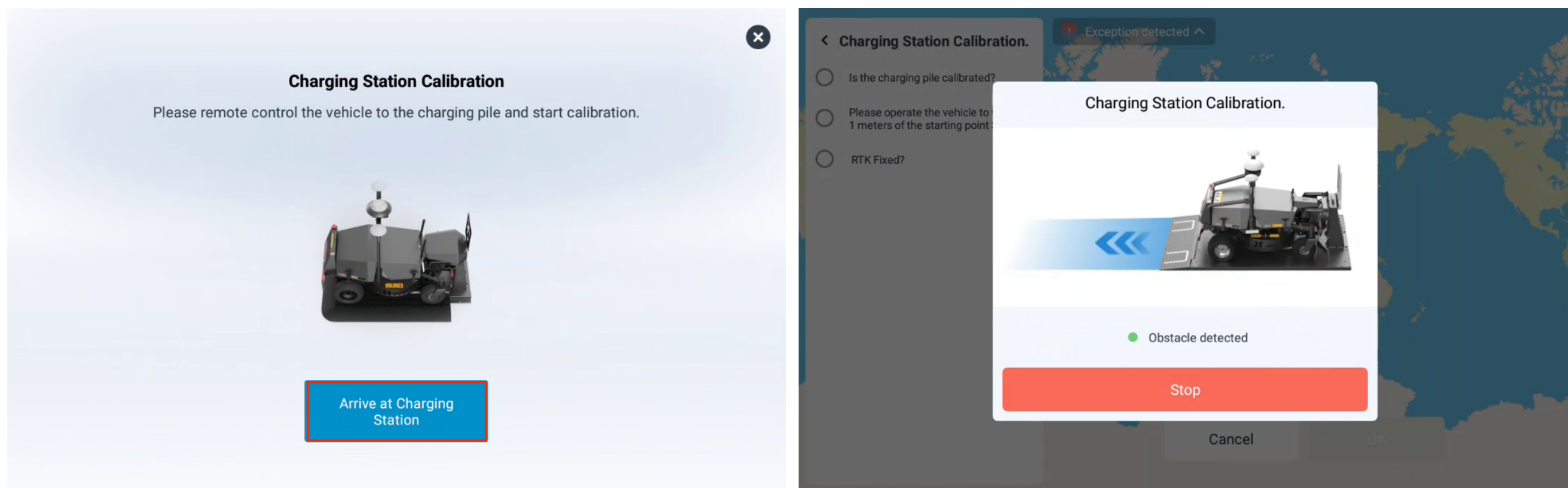


Figure32 Calibrate the start point

3. Map scan starts automatically after charging pile calibration is completed. Move the mower one cycle around the target area as prompted.



Figure33 Scan the area

## 7.6 Creating a Path in Occluded Area Mode

The map selection screen appears if you choose the obstructed area mode.

1. Select the map where the path is located.

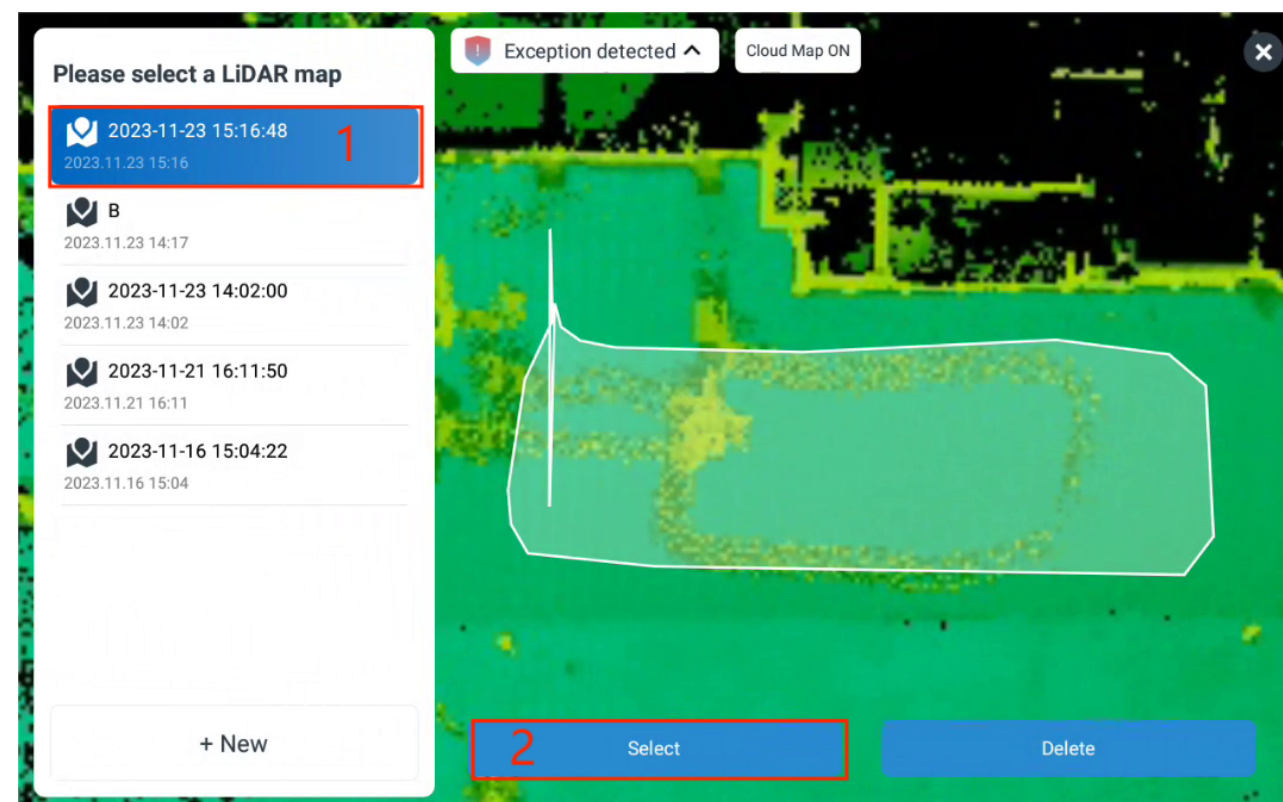
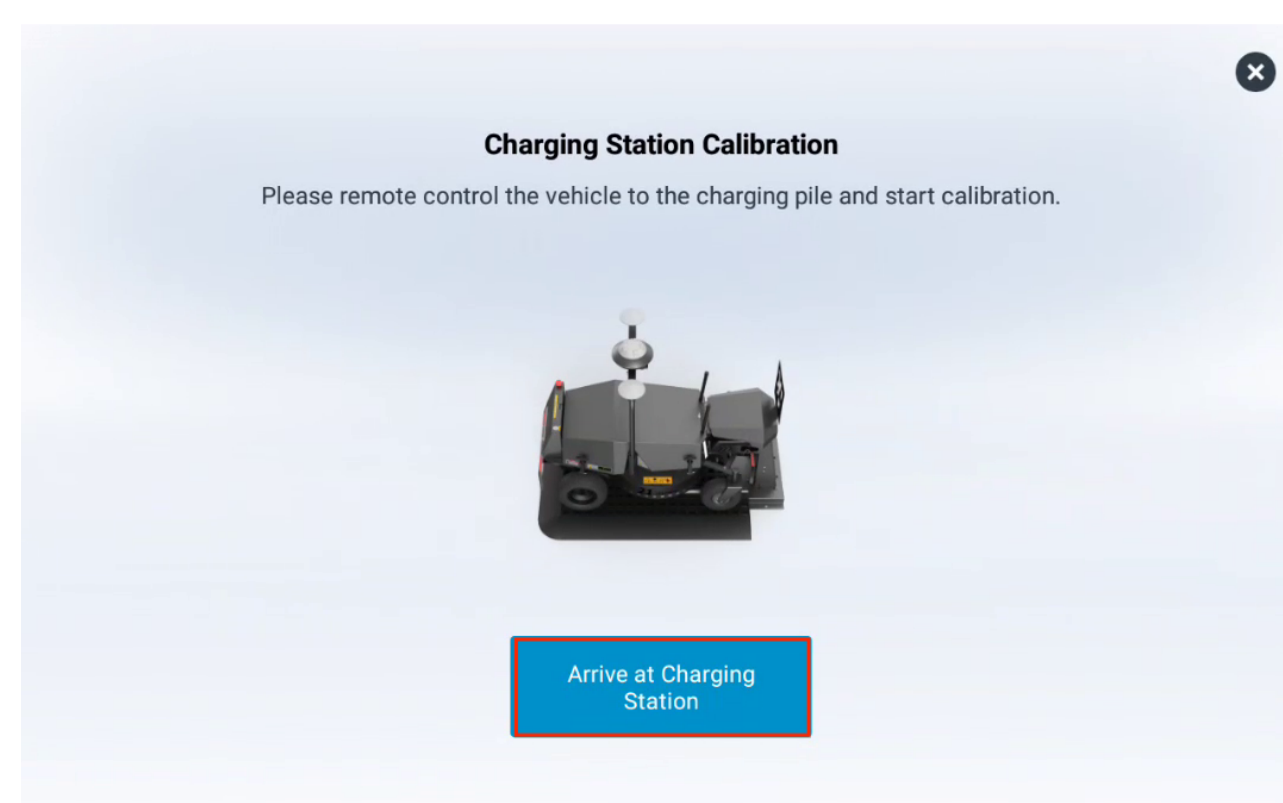


Figure34 select the map

2. Move the mower to the charging pile of the selected map and tap Arrive at Charging Station. If the system determines that the mower is at the charging pile, you can enter the map and create the path.



Figurefigure35 Calibrate the start point

3. Select the path type.

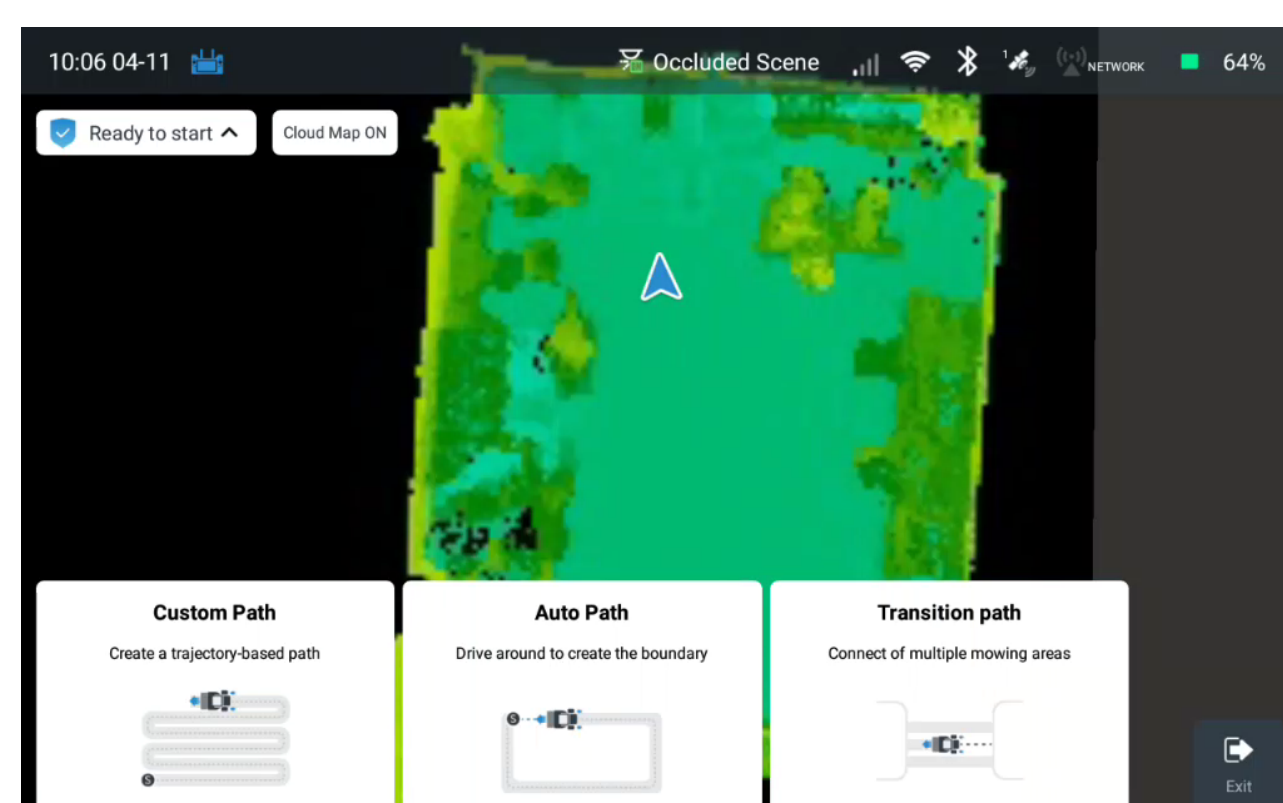


Figure36 Select the path type

#### 4. Create the path.

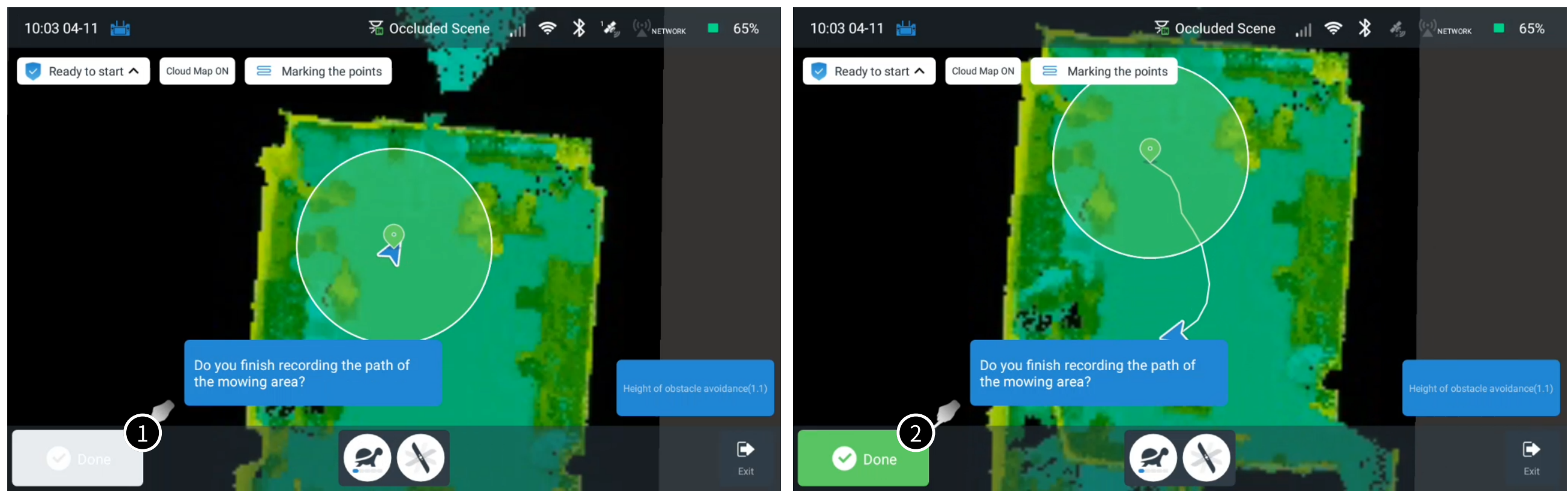


Figure7 Create a custom path

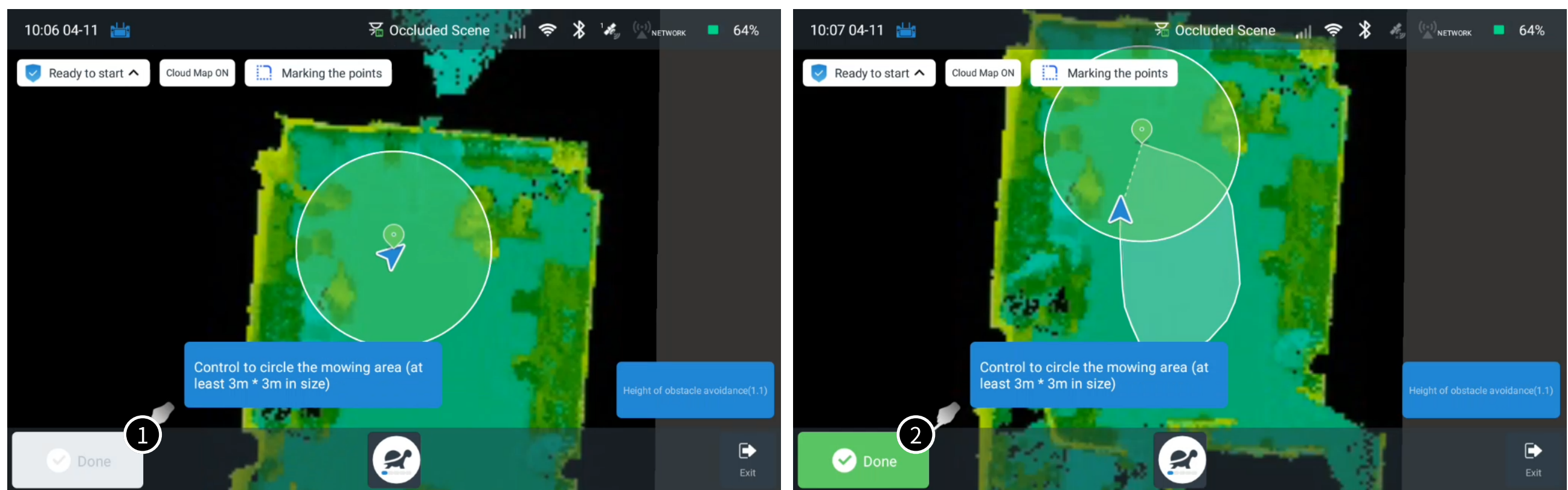


Figure38 Create an auto path

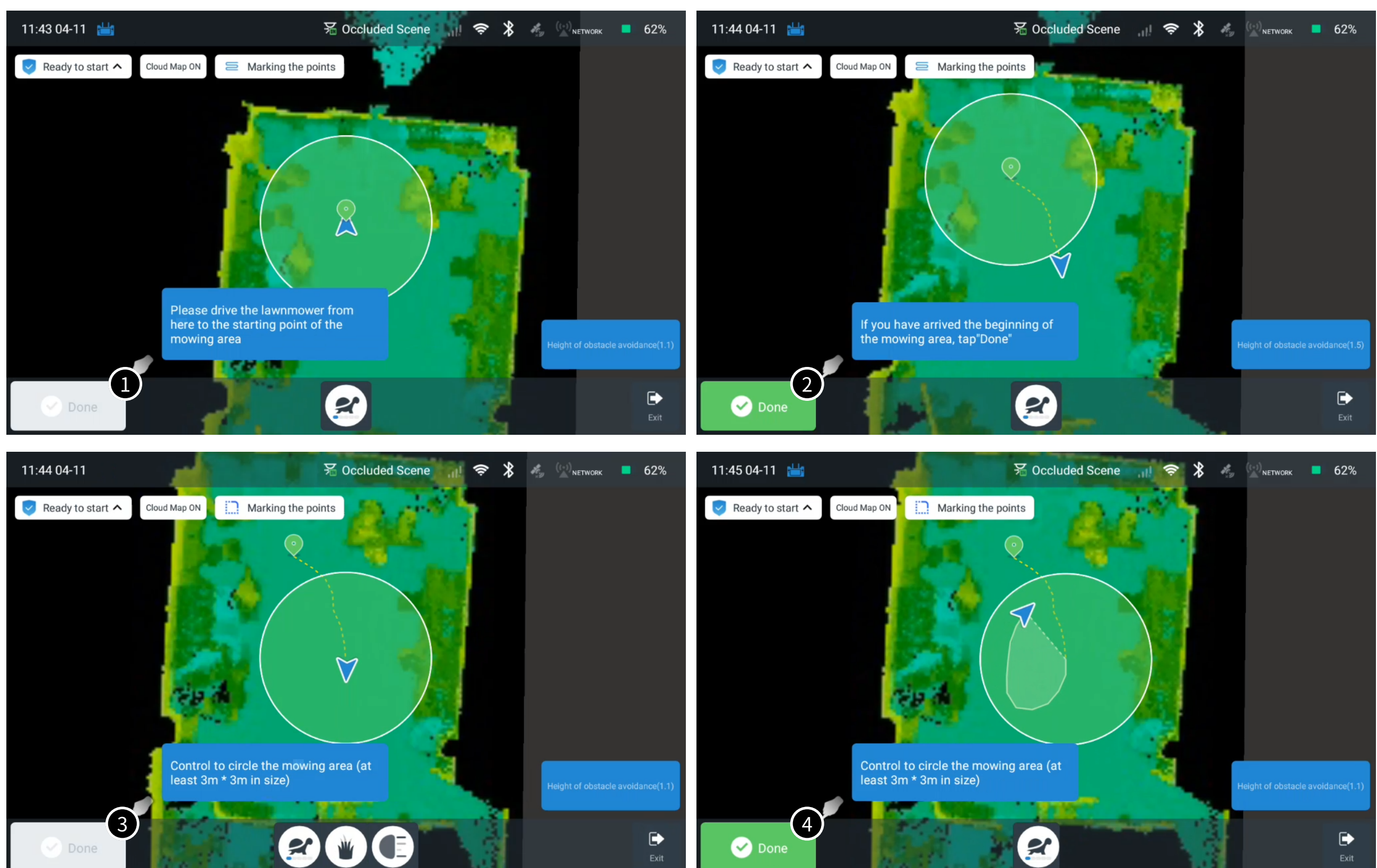
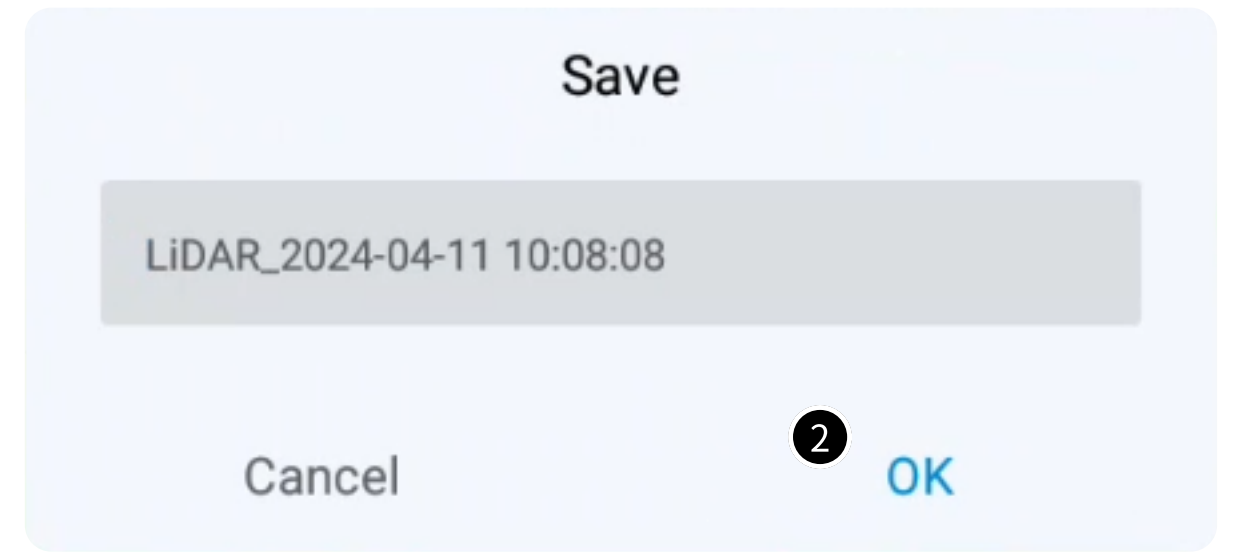
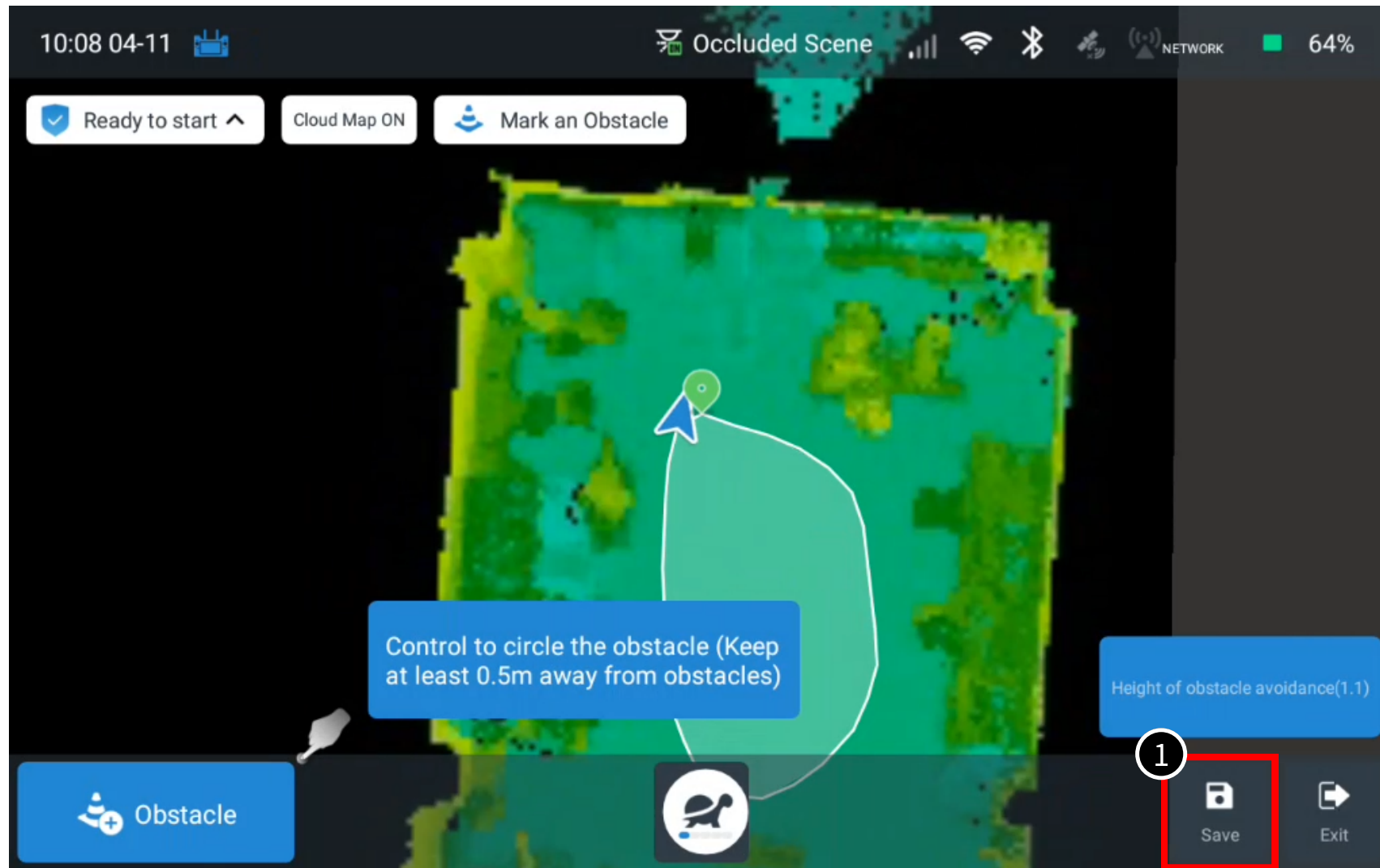
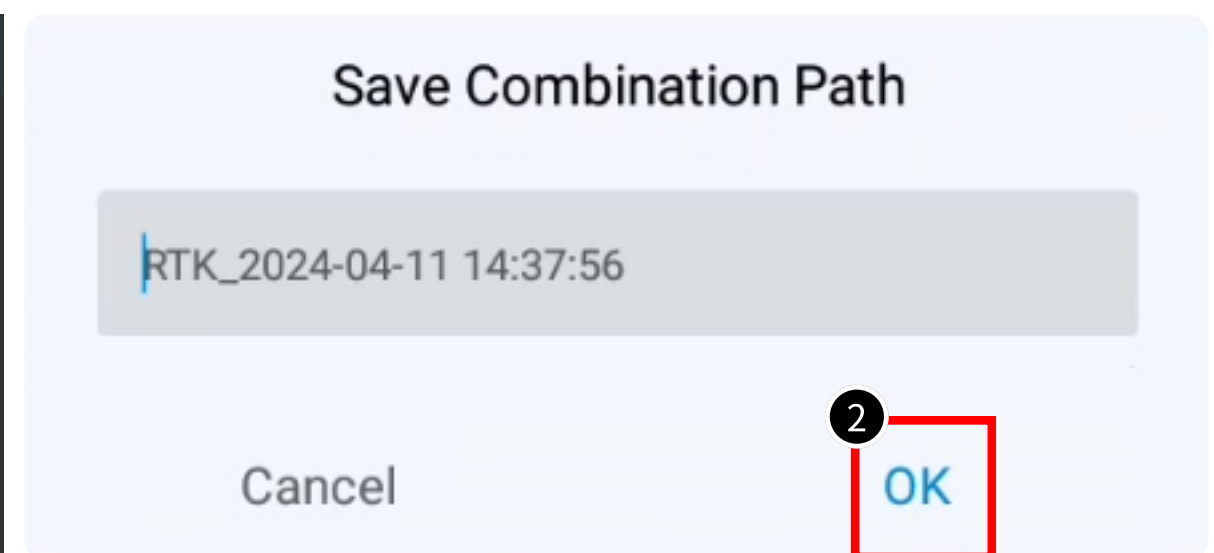
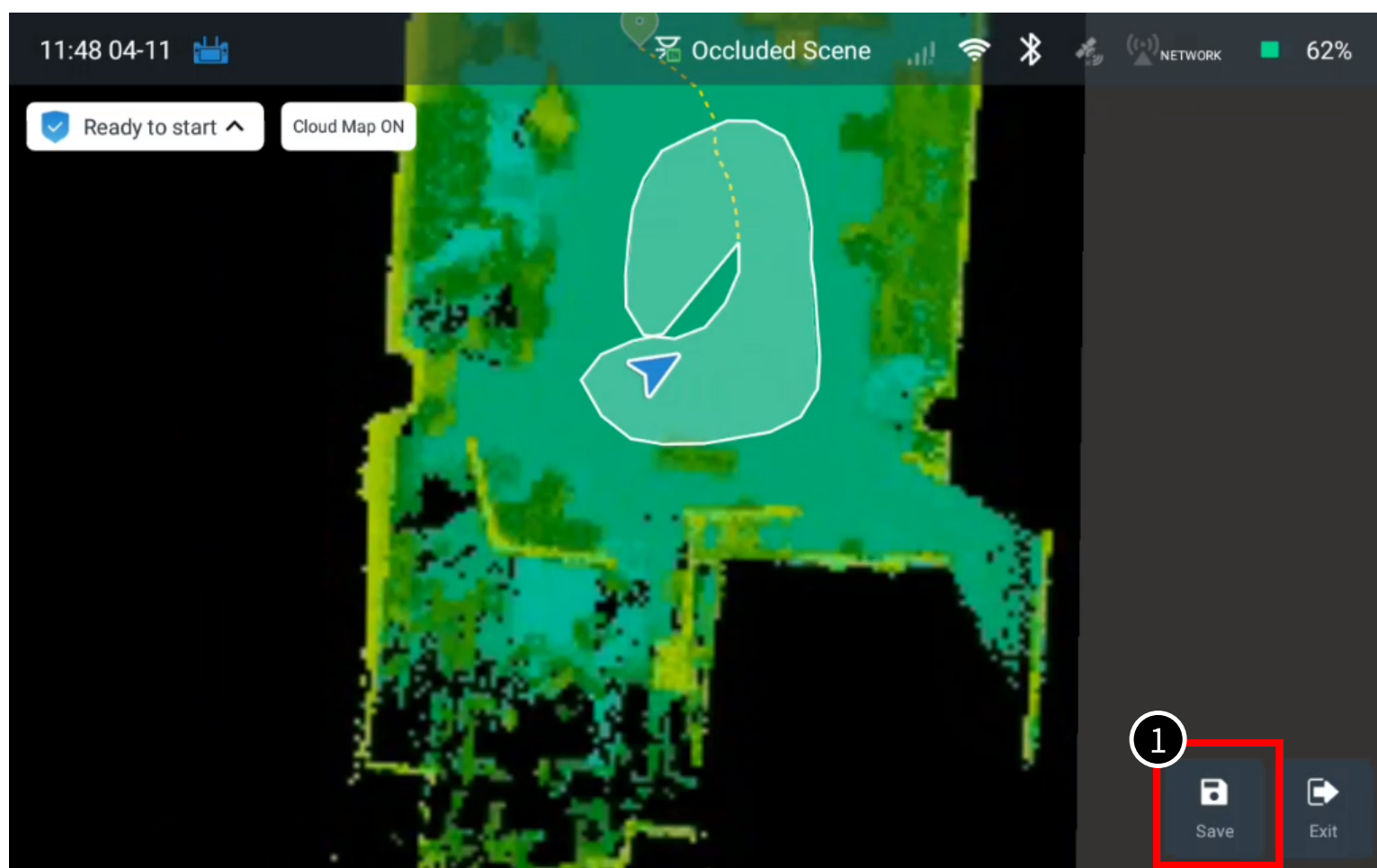


Figure39 Create a connecting line and a path

#### 4. Save the path.



**Figure40** Save the custom/auto path



**Figure41** Save the combination path

## 7.7 Creating a Path in Clear Area Mode

The path type selection screen appears when you choose the clear area mode.

3. Select the path type.

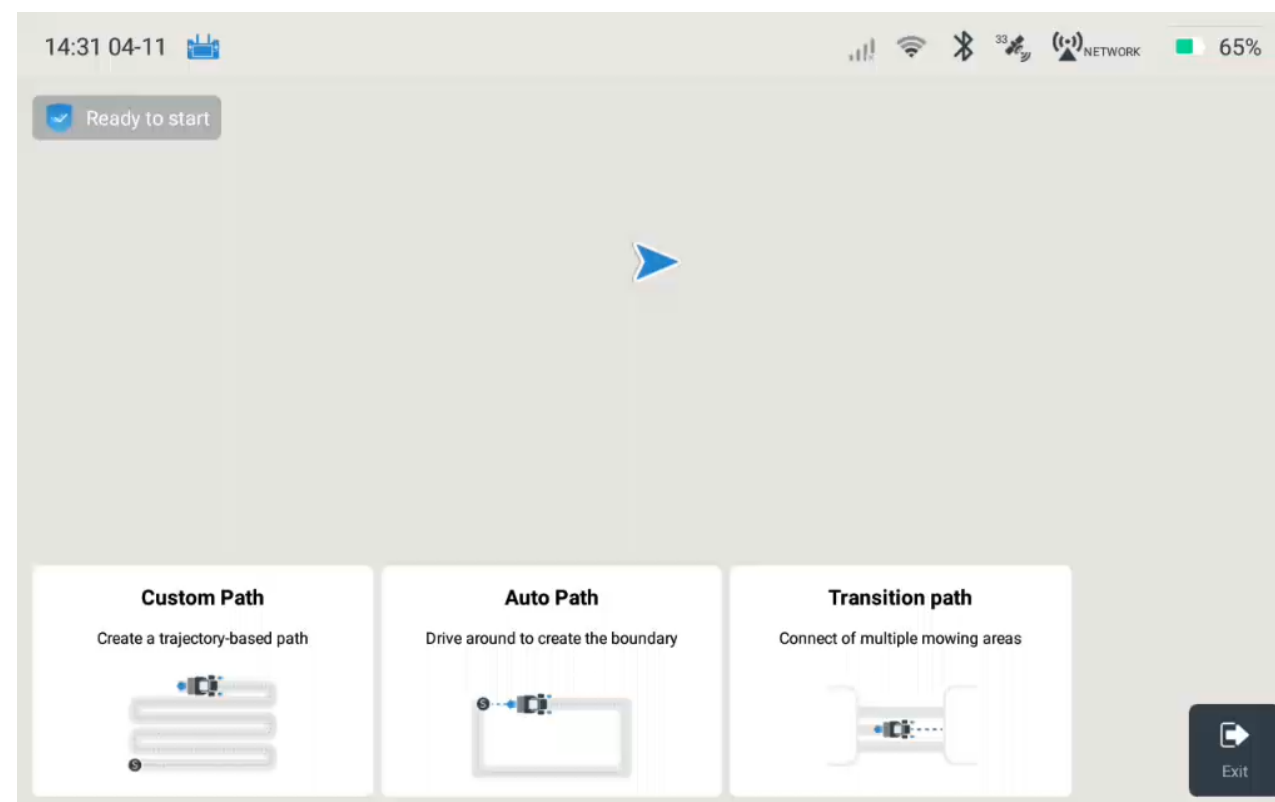


Figure42 Select the path type

2. Create the path.

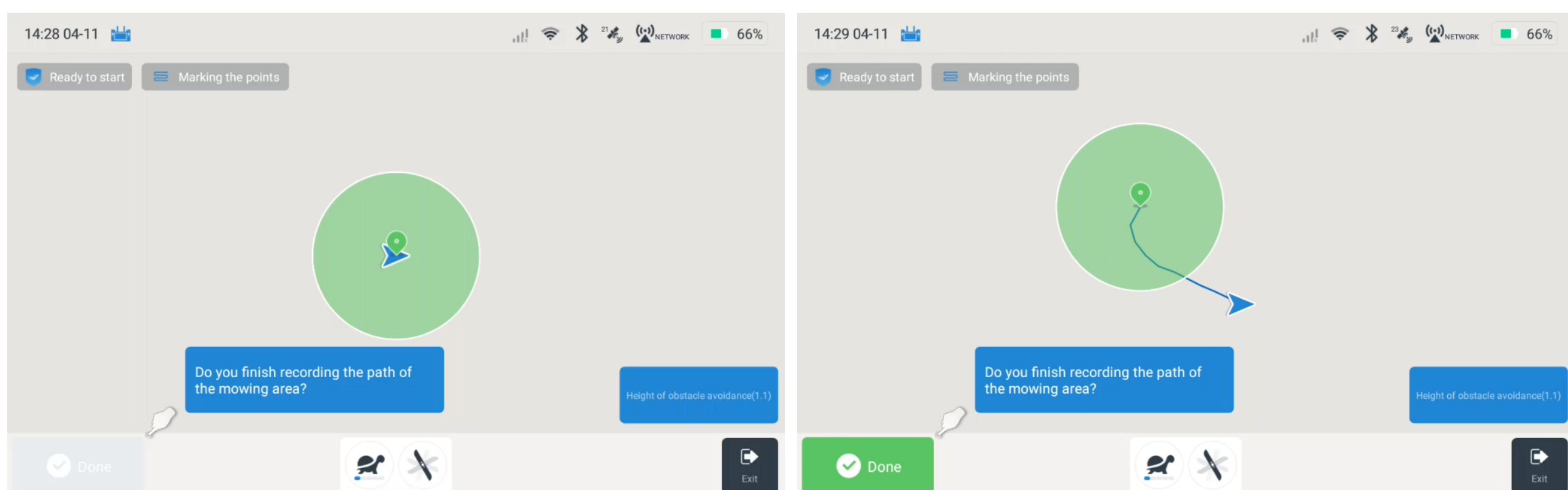


Figure43 Create a custom path

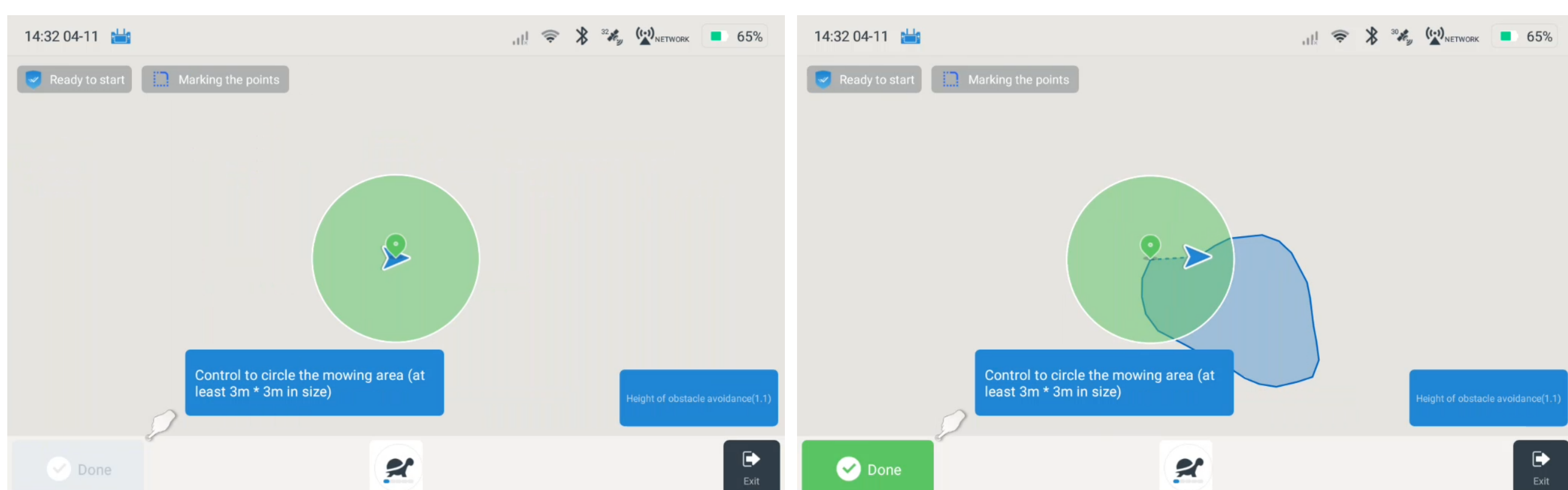
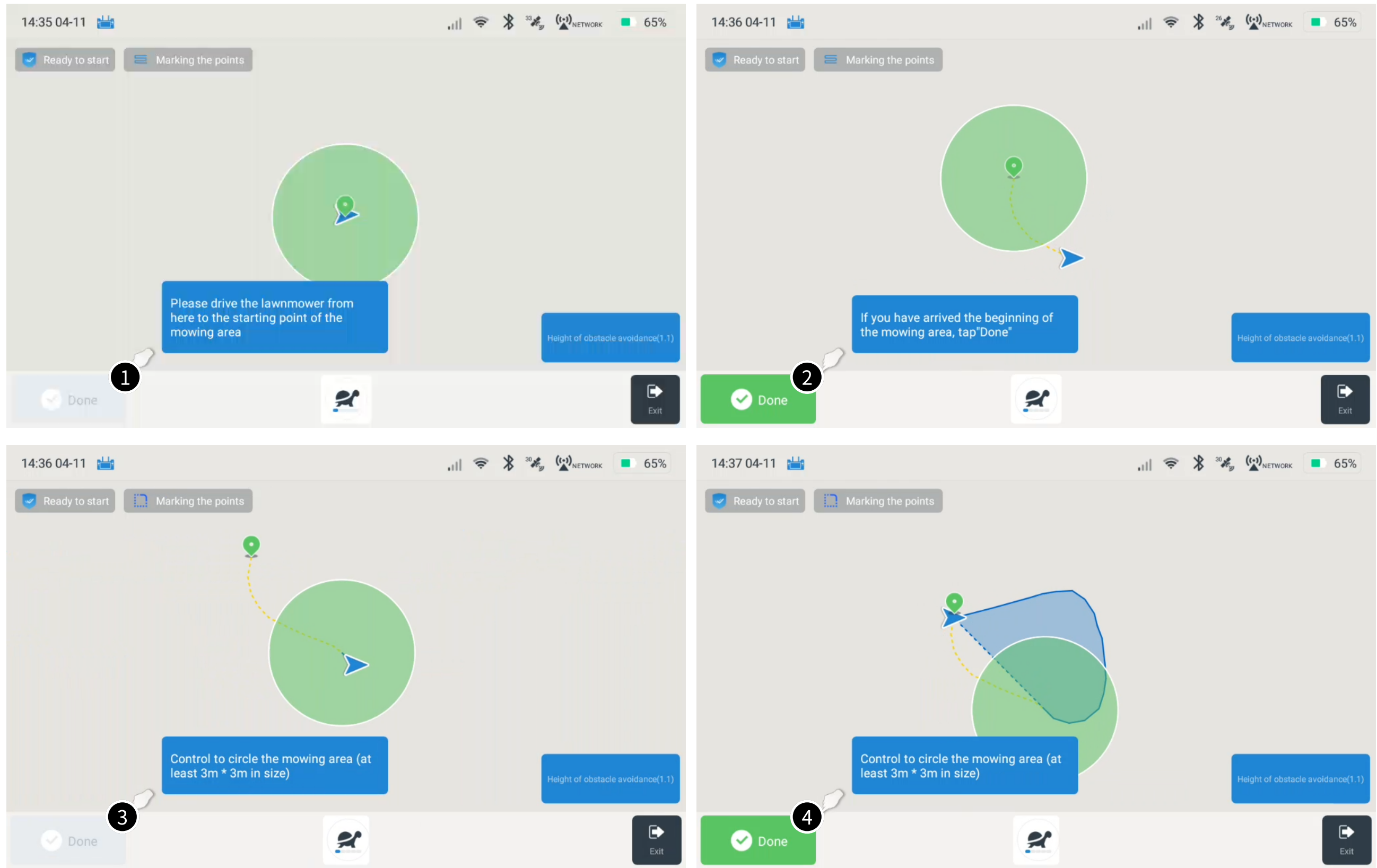
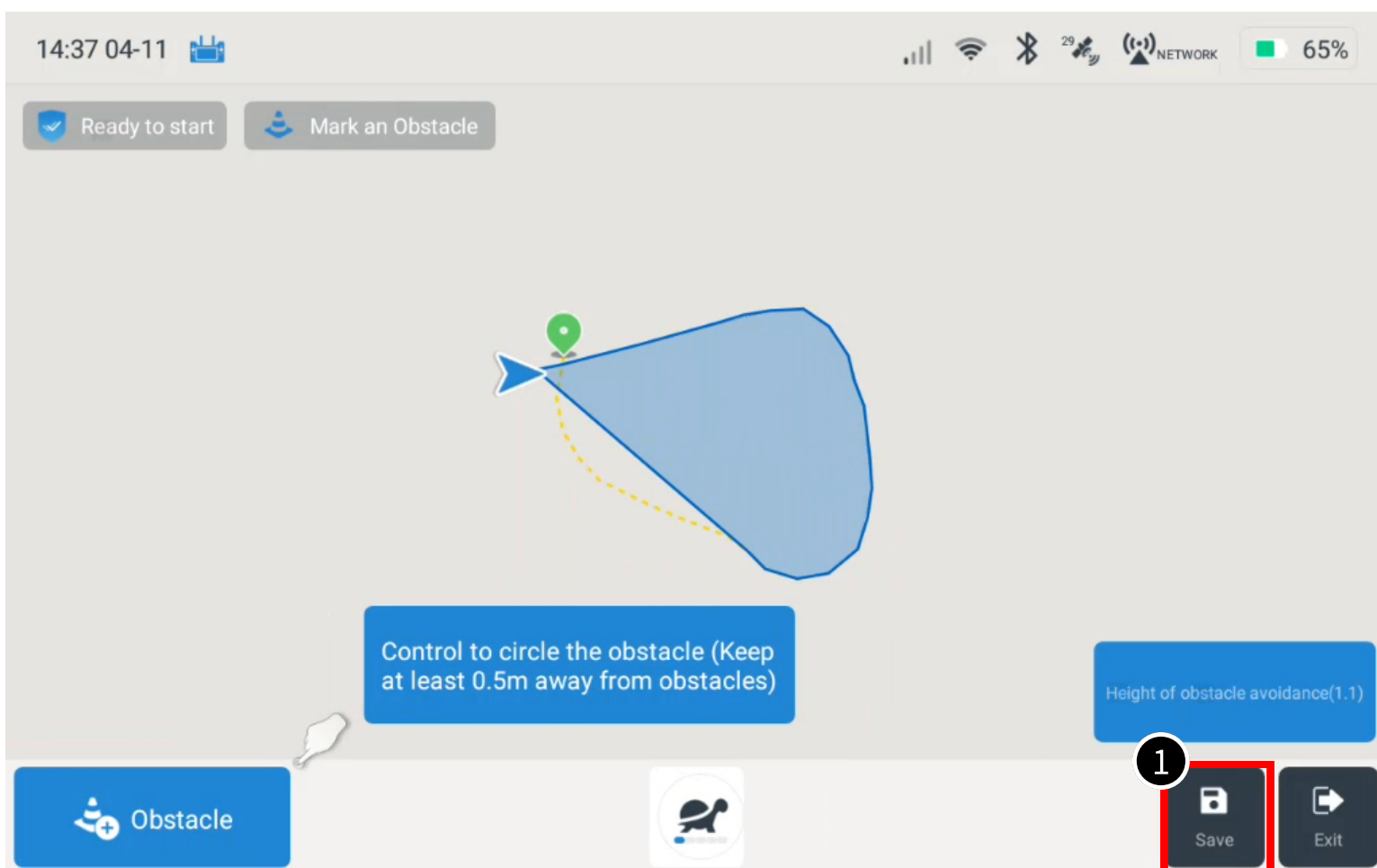


Figure44 Create an auto path

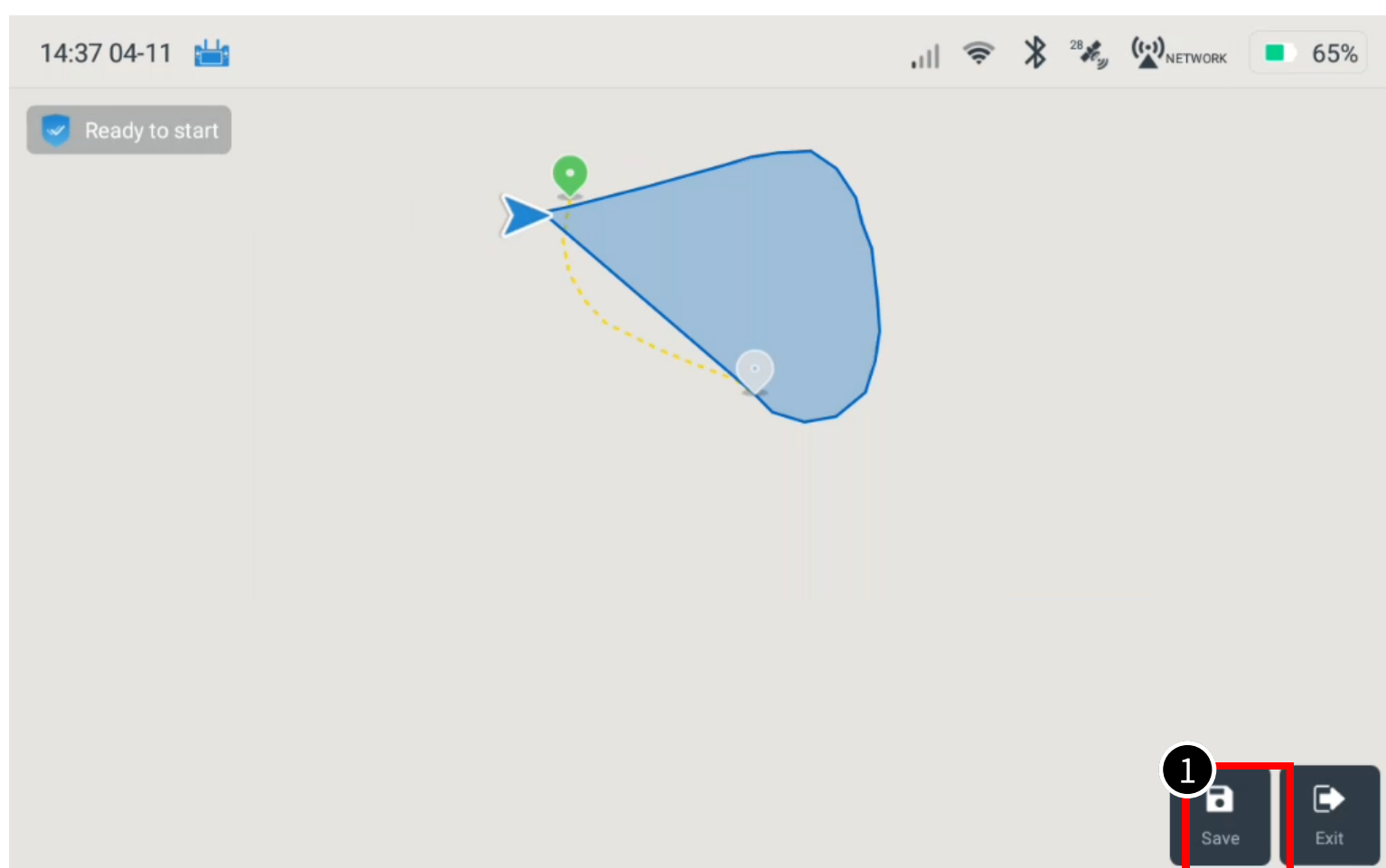
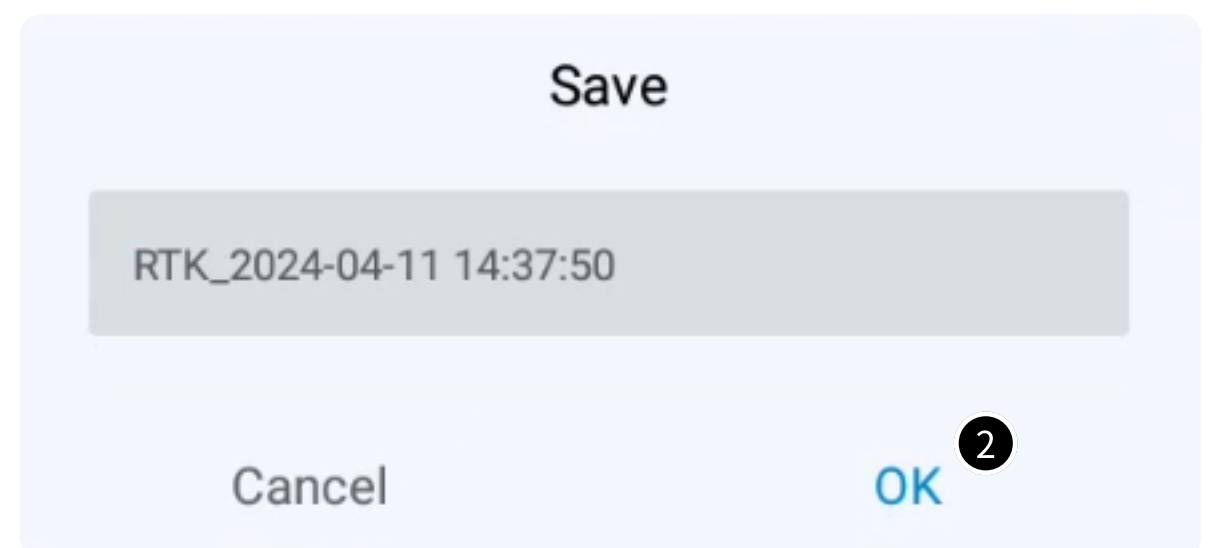


**Figure45** Create a connecting line and a path

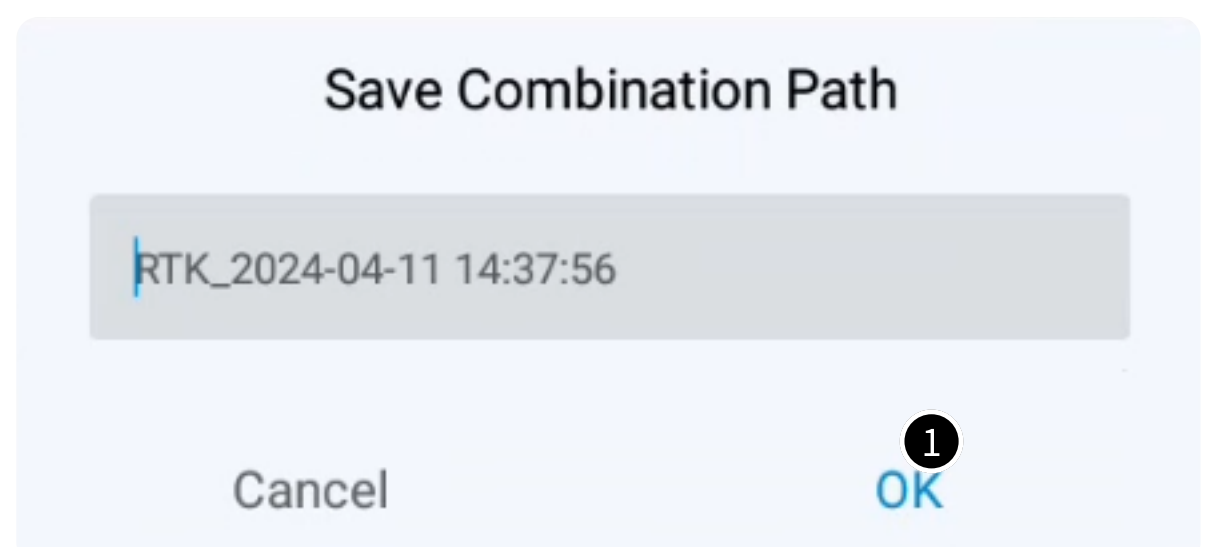
3. Save the path.



**Figure46** Save the custom/auto path



**Figure47** Save the combination path



## 7.8 Creating a Path in Mixed Type Mode

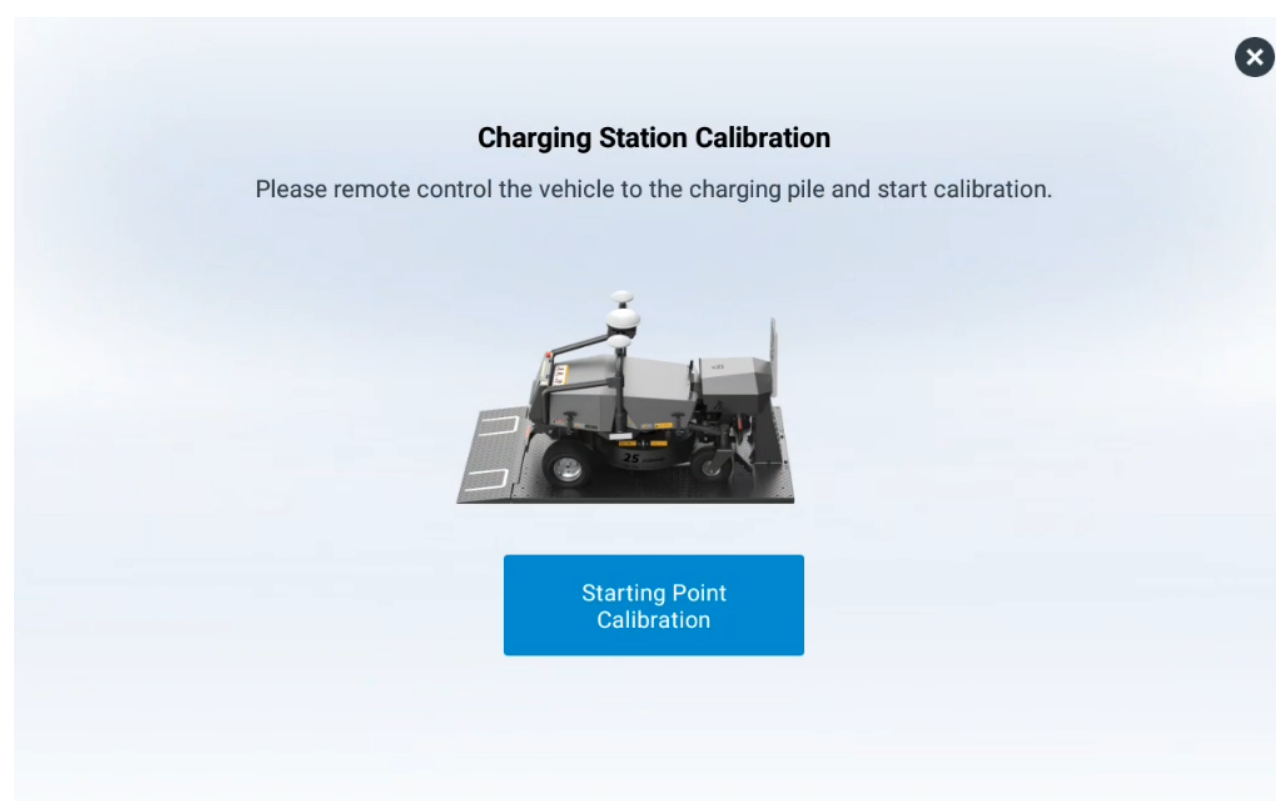
Perform the following operations to create a path if the mower needs to drive from an obstructed area to an open area.

1. Select or create a map.



Figure48 Select a map

2. Move the mower to the charging pile of the map and tap Arrive at Charging Station. If the system determines that the mower is at the charging pile, you can enter the map and create the path.



Figurefigure49 Calibrate the start point

3. Move the mower from the charging pile to the operation area to create a connecting line.

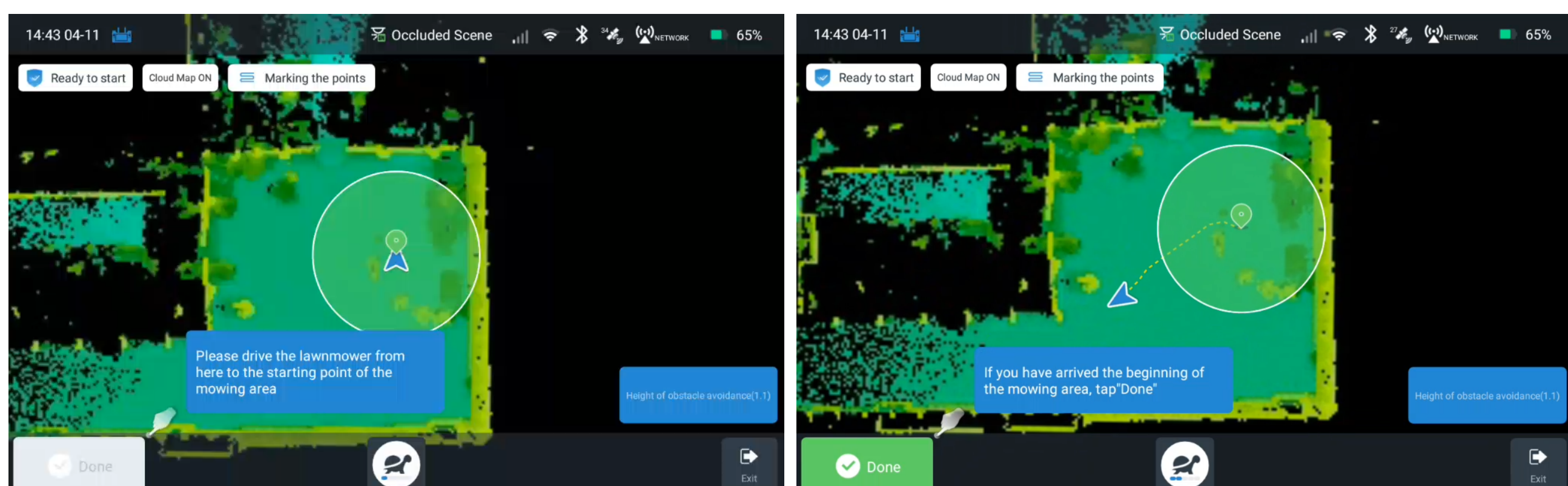
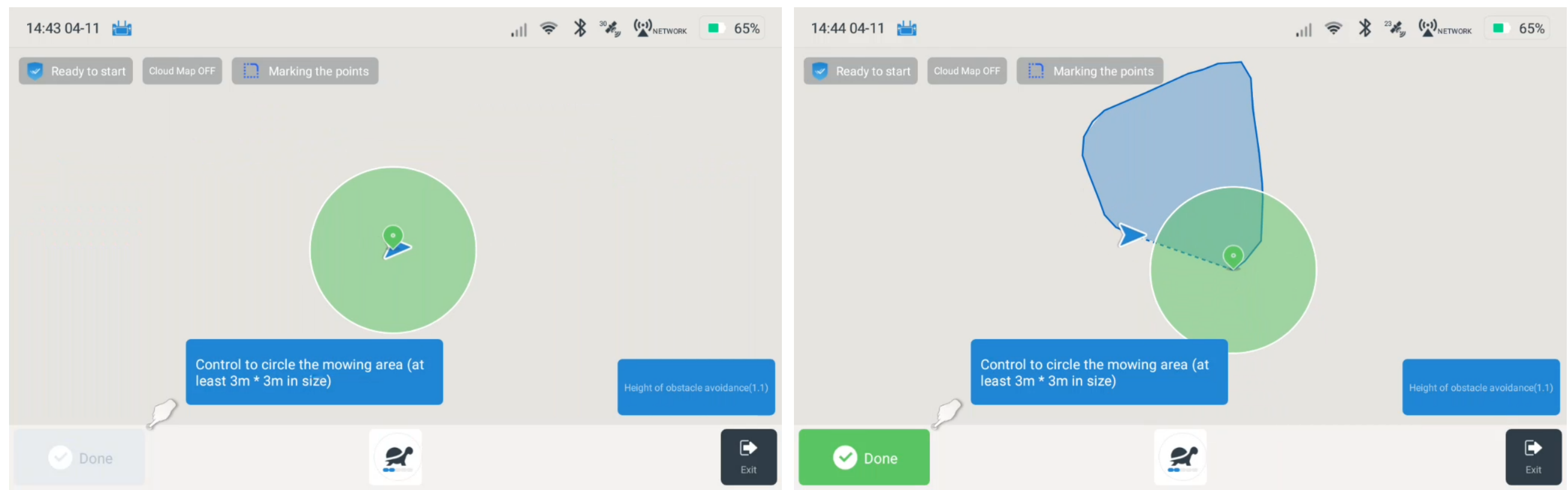


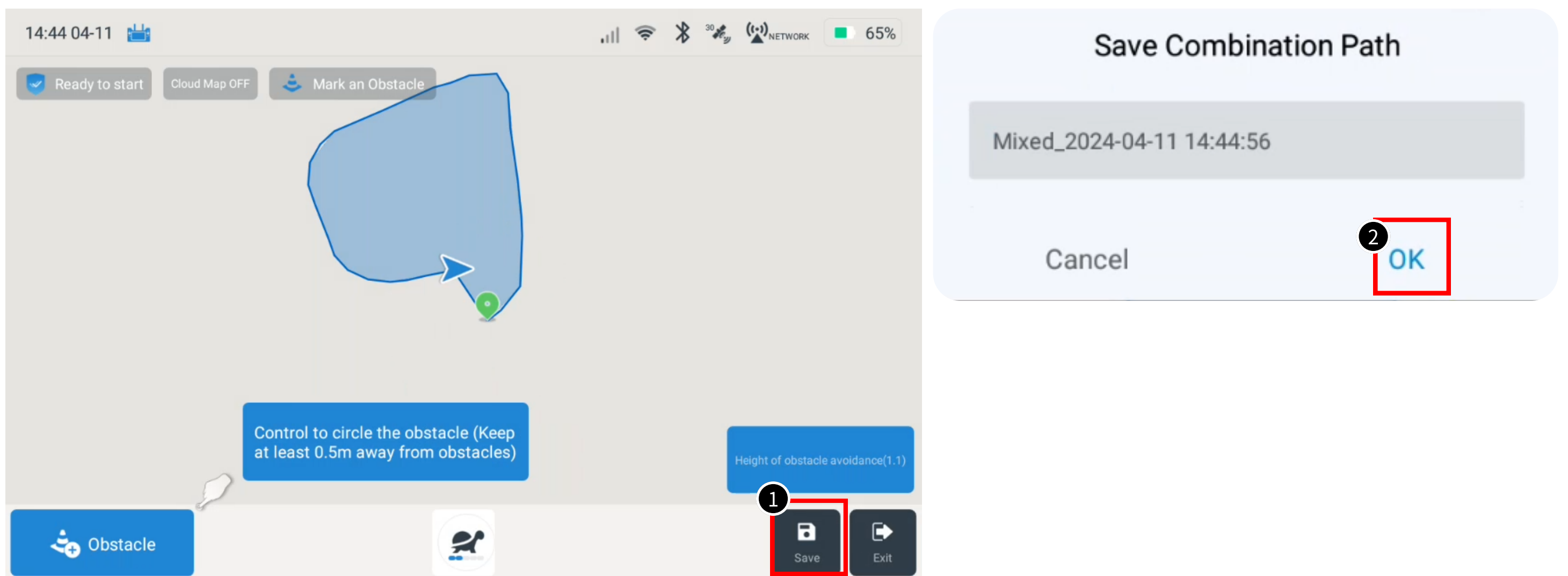
Figure50 Create a connecting line

#### 4. Create an auto path.



**Figure51** Create an auto path

#### 5. Save the combination path.

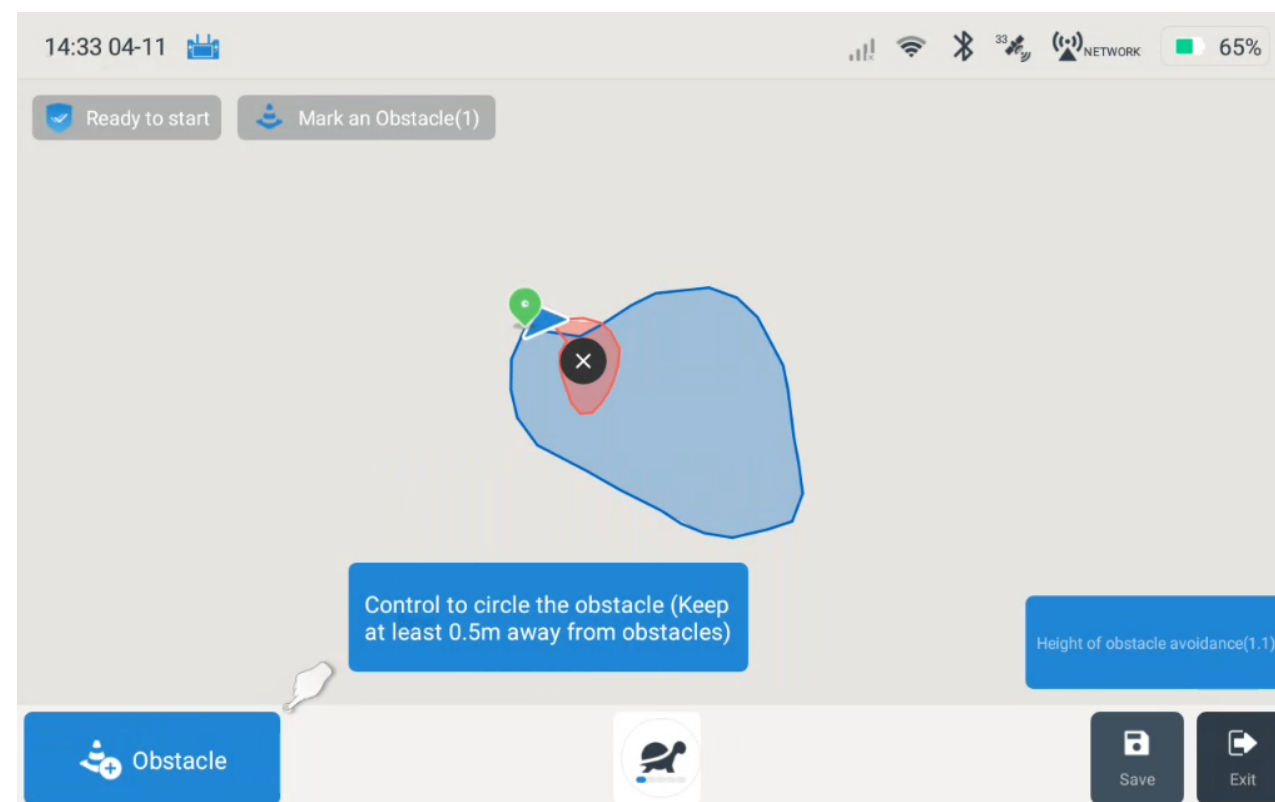


**Figure52** Save the combination path

## 7.9 Marking Obstacles

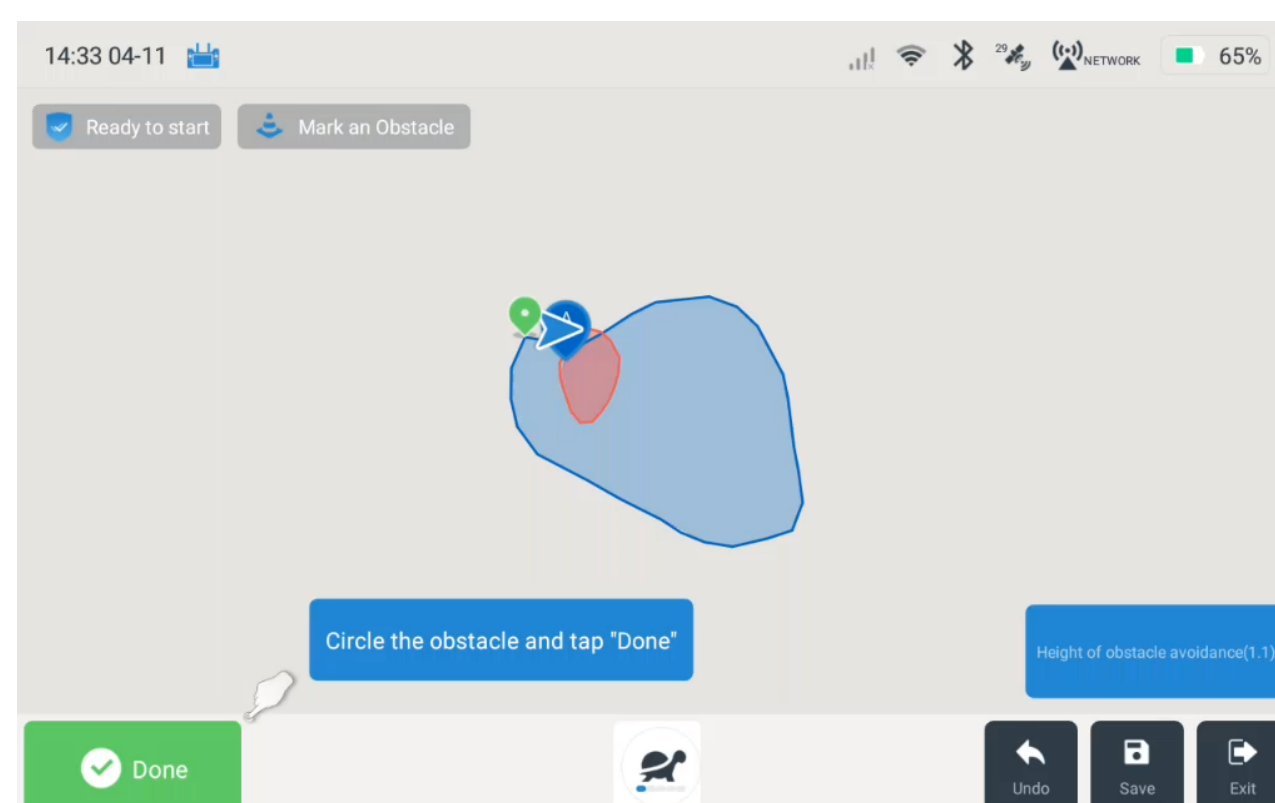
Always keep the mower at least 0.5 m away from obstacles in the mowing area.

1. Tap Obstacle to mark an obstacle.



**Figure53** Mark an obstacle

2. Circle the obstacle and tap Complete.



**Figure54** Obstacle marked

## 7.10 Selecting a Path

If you decide to use an existing path, choose one from the list on the left.

1. Select a path.

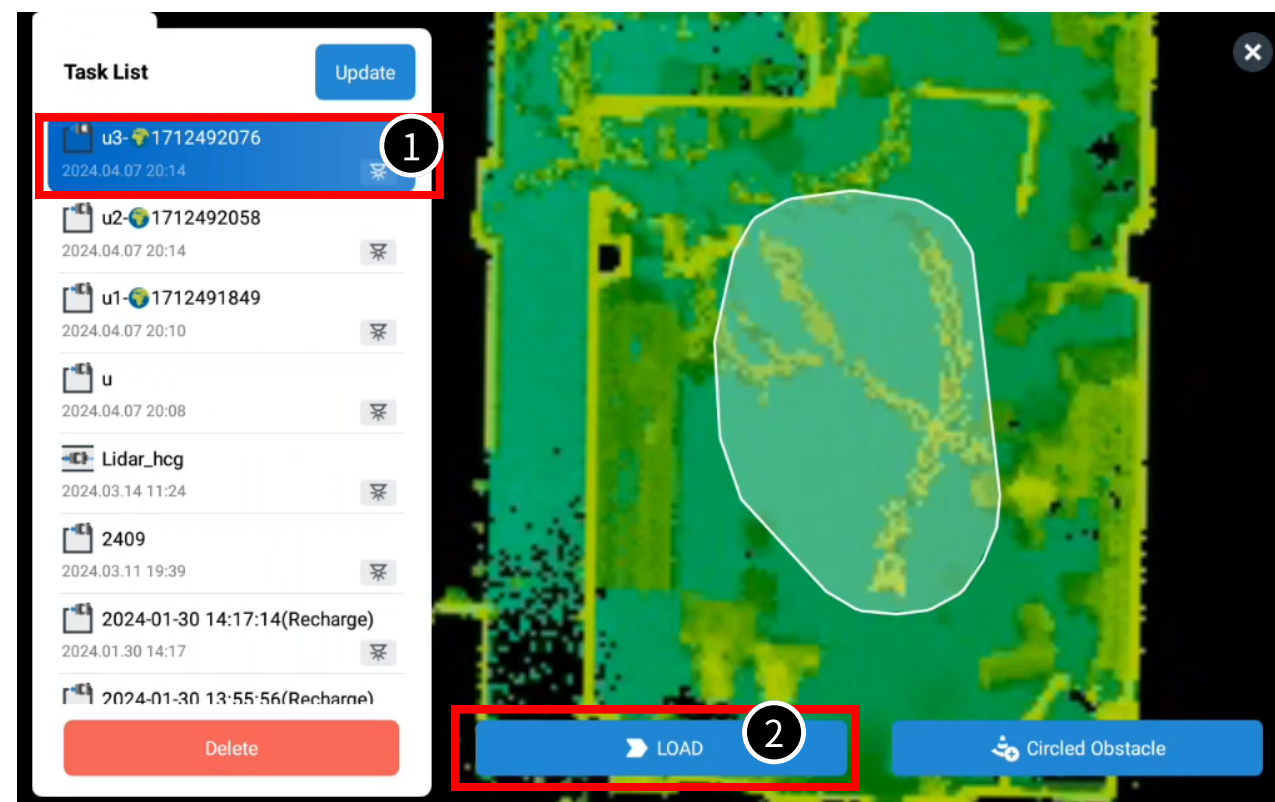


Figure55 Select a path

2. Tap Start to start the auto operation.

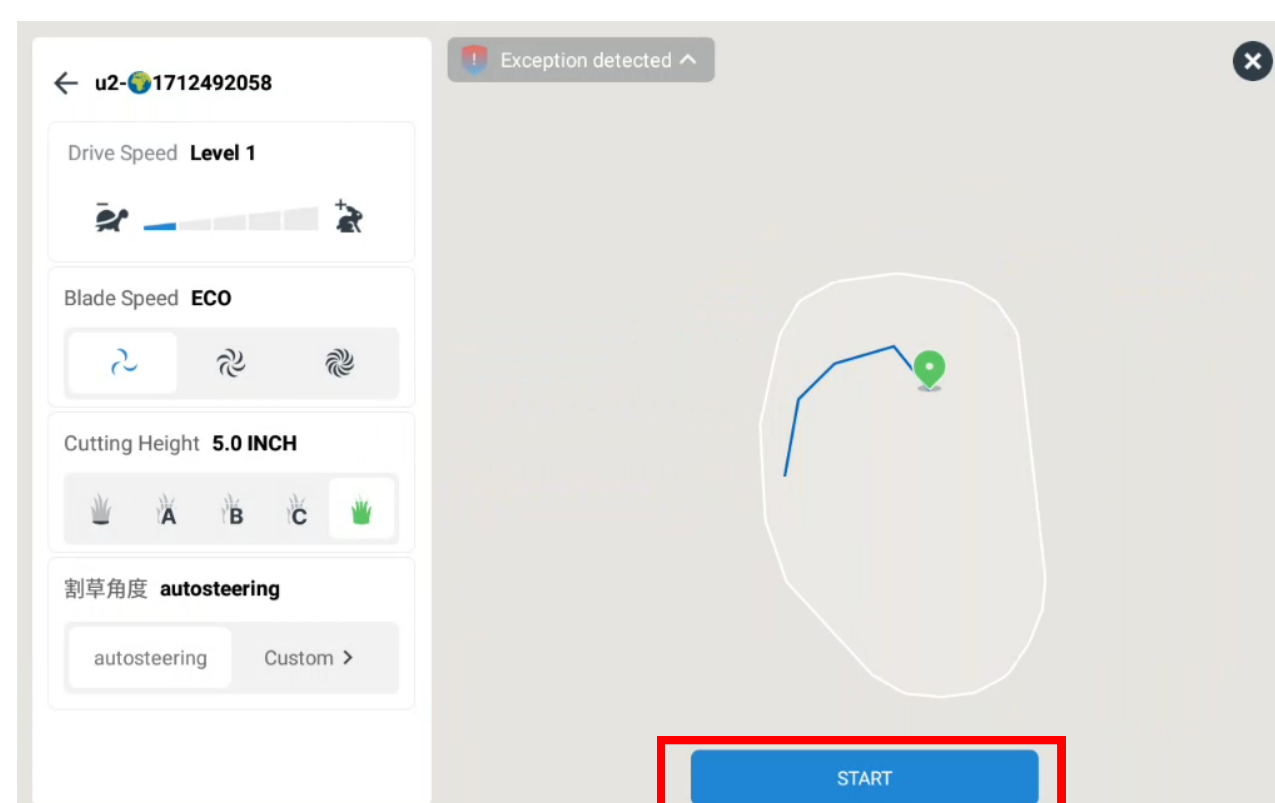


Figure56 Operation preview

3. Use the remote controller to move the mower to the charging pile or the start point and tap Arrive at Charging Station or Arrive at Start Point to start the auto operation.

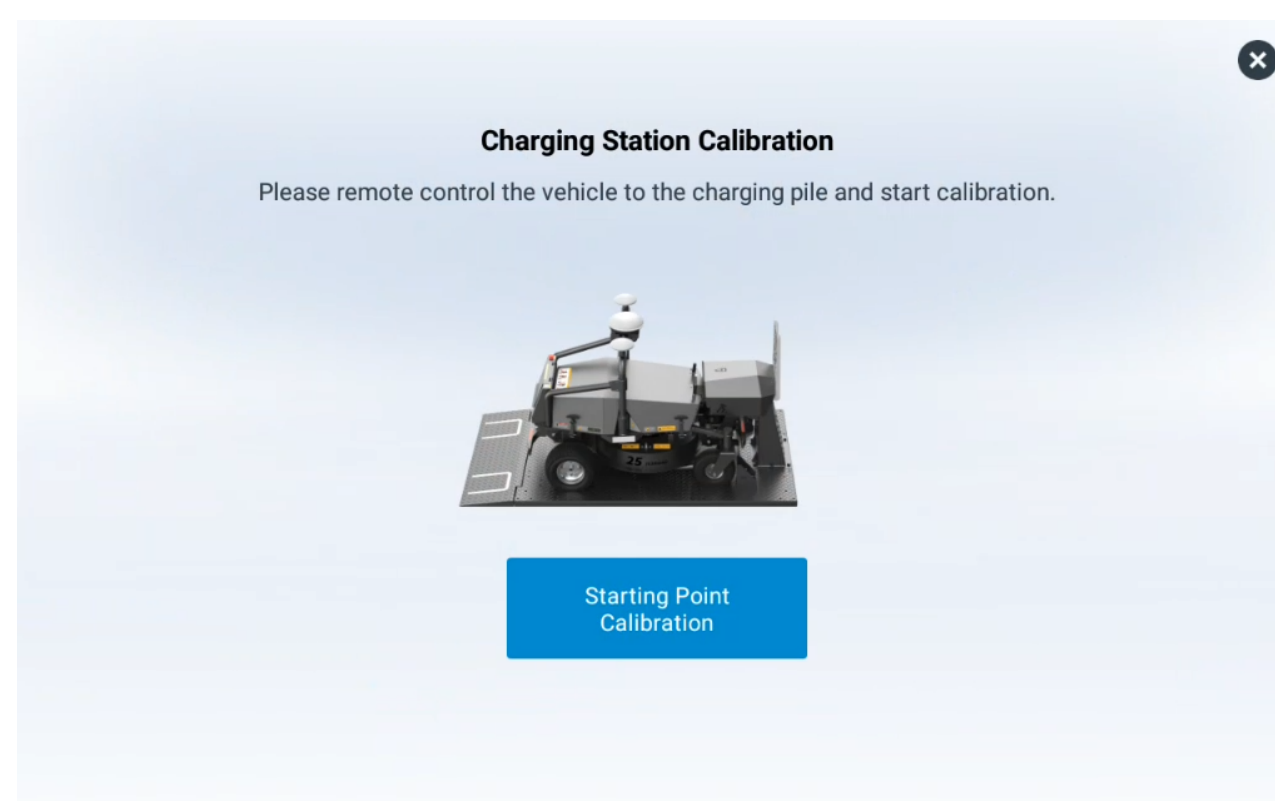


Figure57 Calibrate the start point

4. If the system determines that the mower is at the charging pile in the map, the auto operation starts after a countdown.

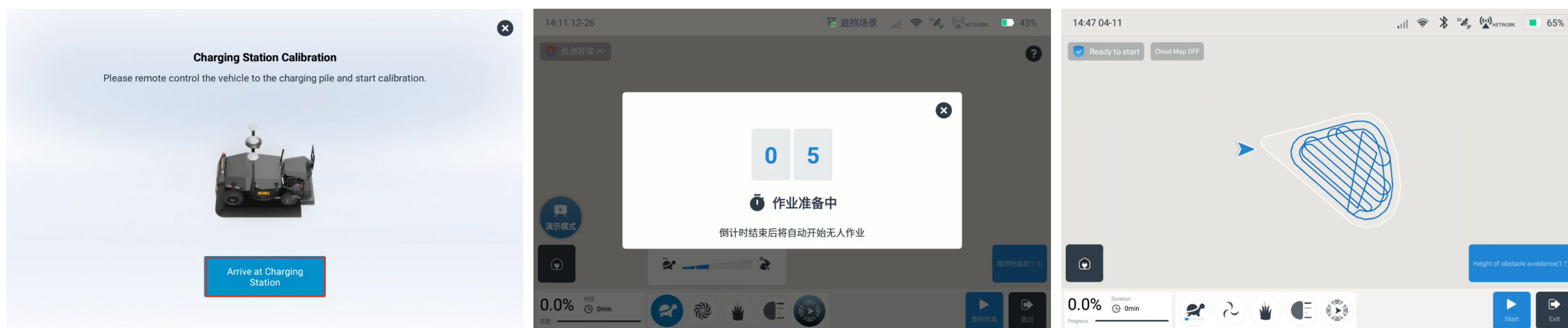


Figure 58 Start the auto operation

## 7.11 Historical Operations

Completed and paused operations are all recorded.

1. Select an interrupted operation and tap Continue to continue the operation from where it is paused.

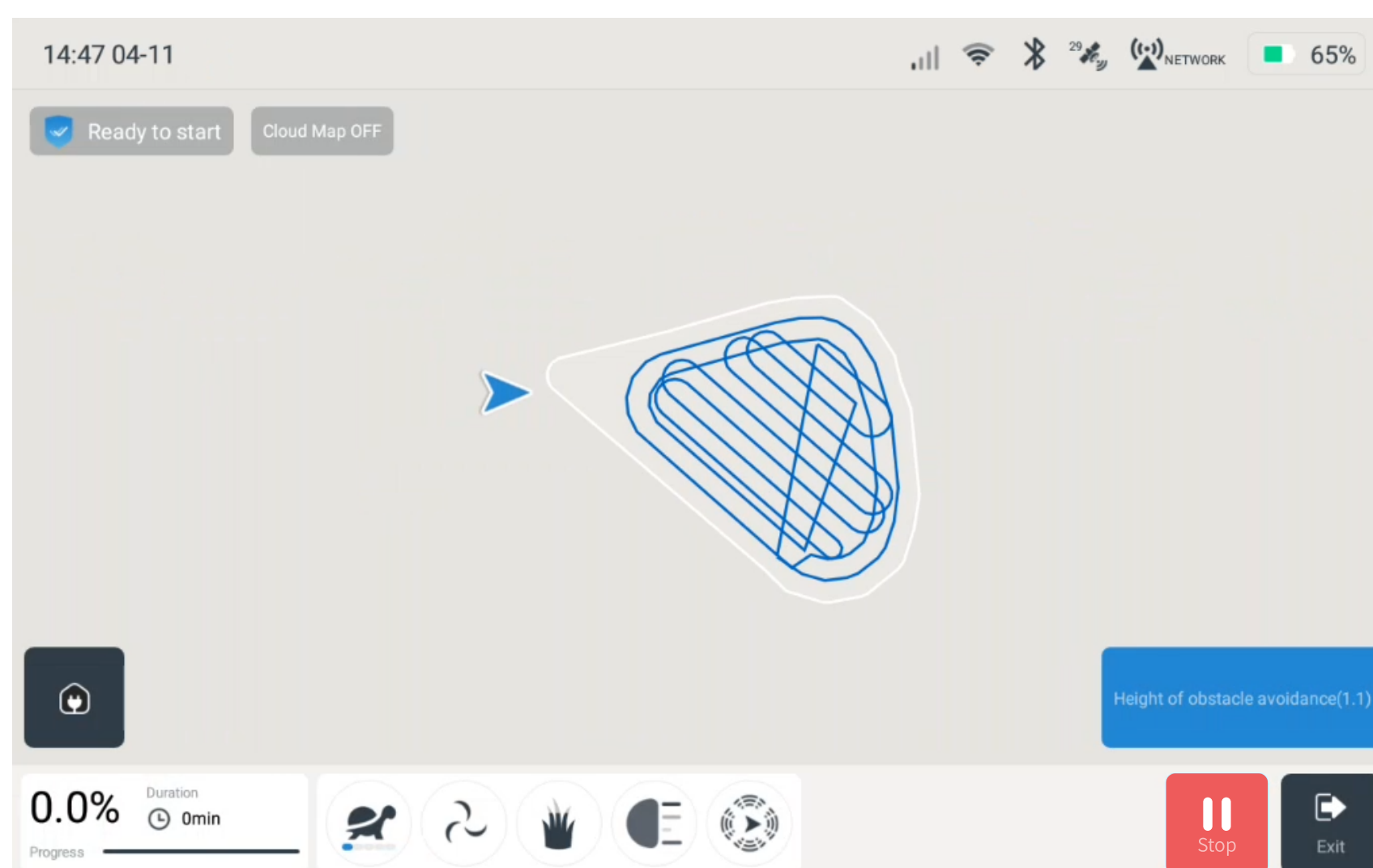


Figure 59 Operation in progress

2. Select a completed operation and tap Restart to perform the operation again.

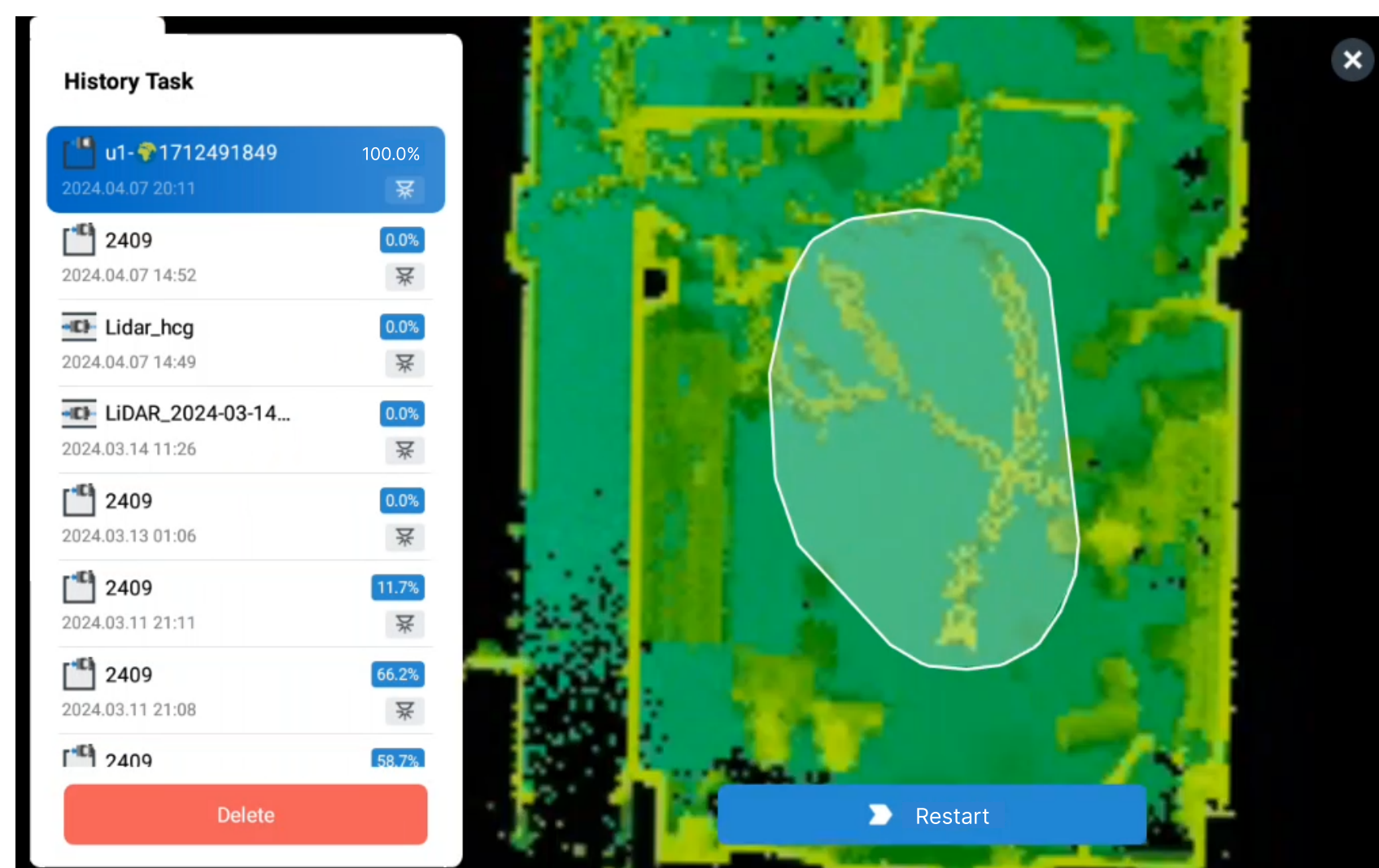


Figure 60 作业历史

# 8 Operation via Remote Control

## 8.1 Remote Controller

1. Connect to the mower Wi-Fi.

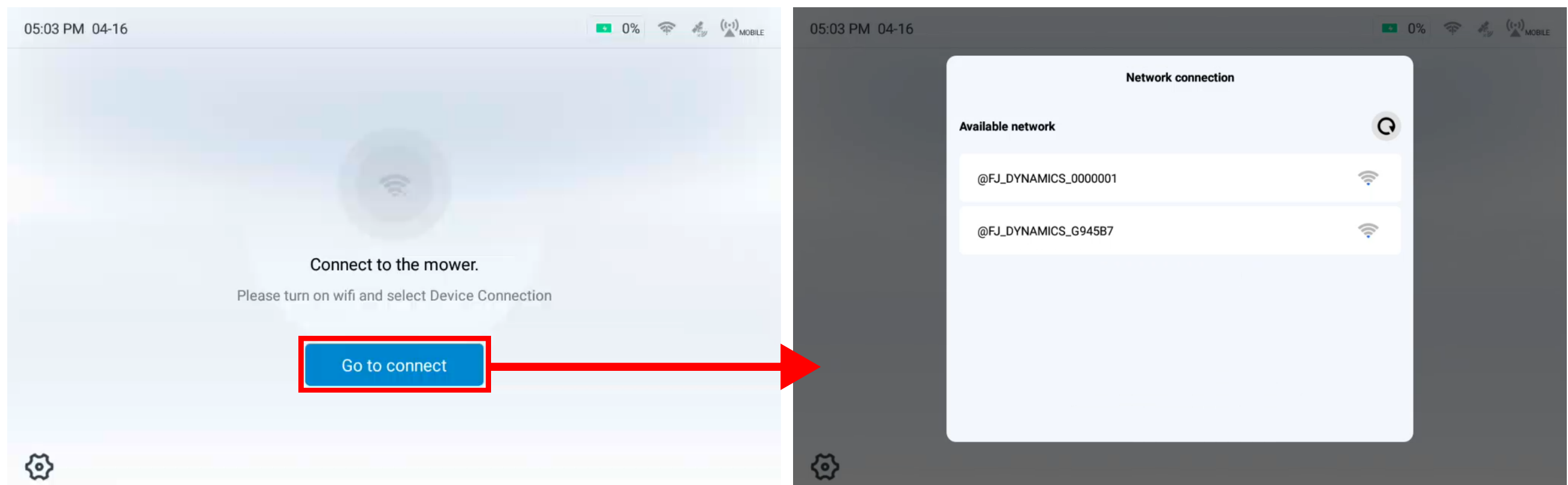
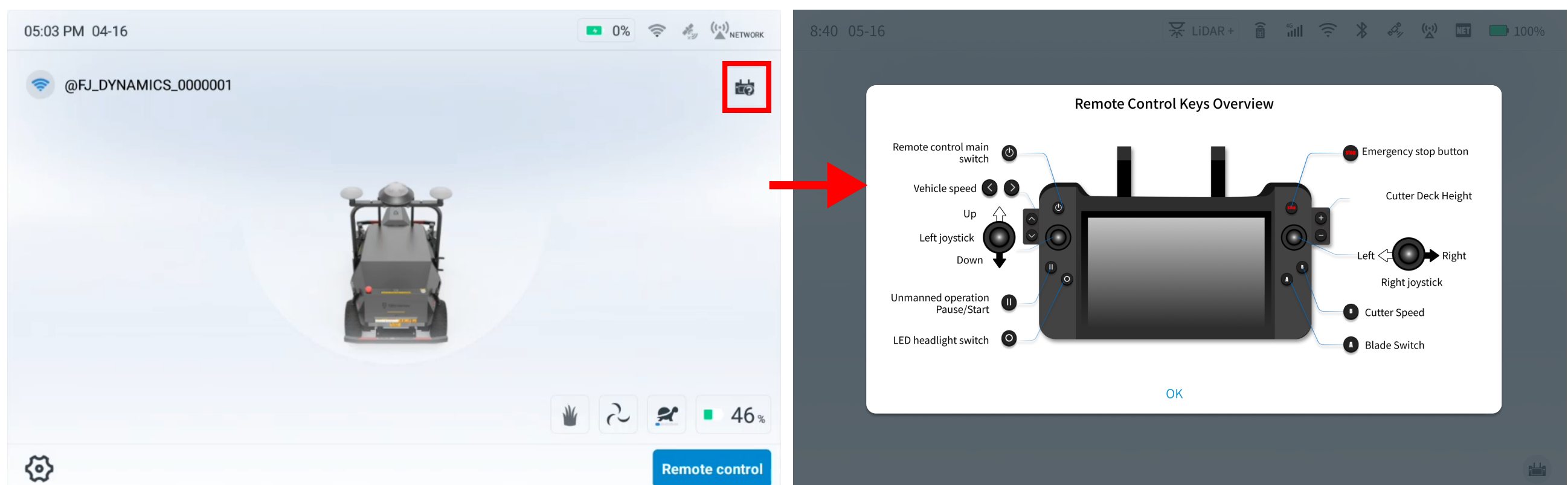


Figure61 Connect to the mower Wi-Fi

2. View the button functions.



Figurefigure62 Button functions

3. Now you can use the remote controller to control the mower.

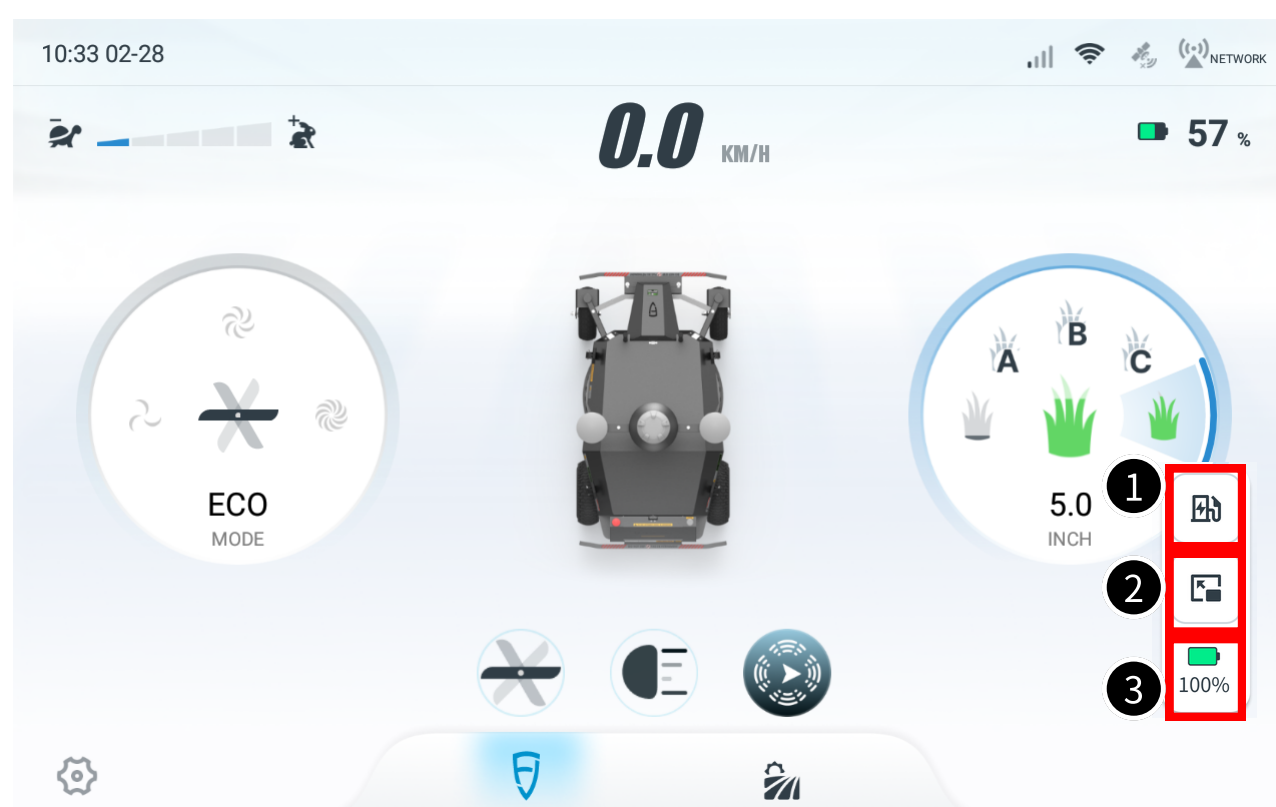
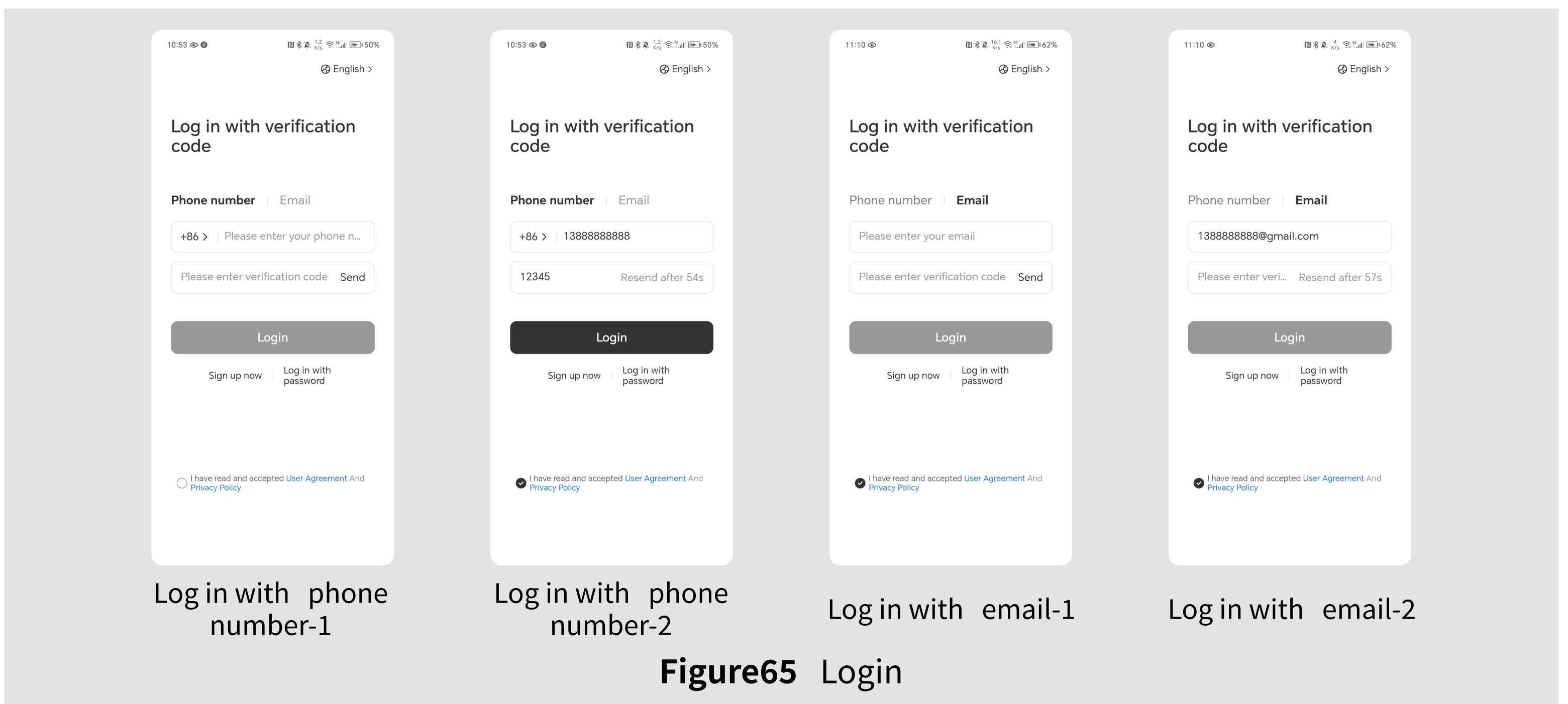
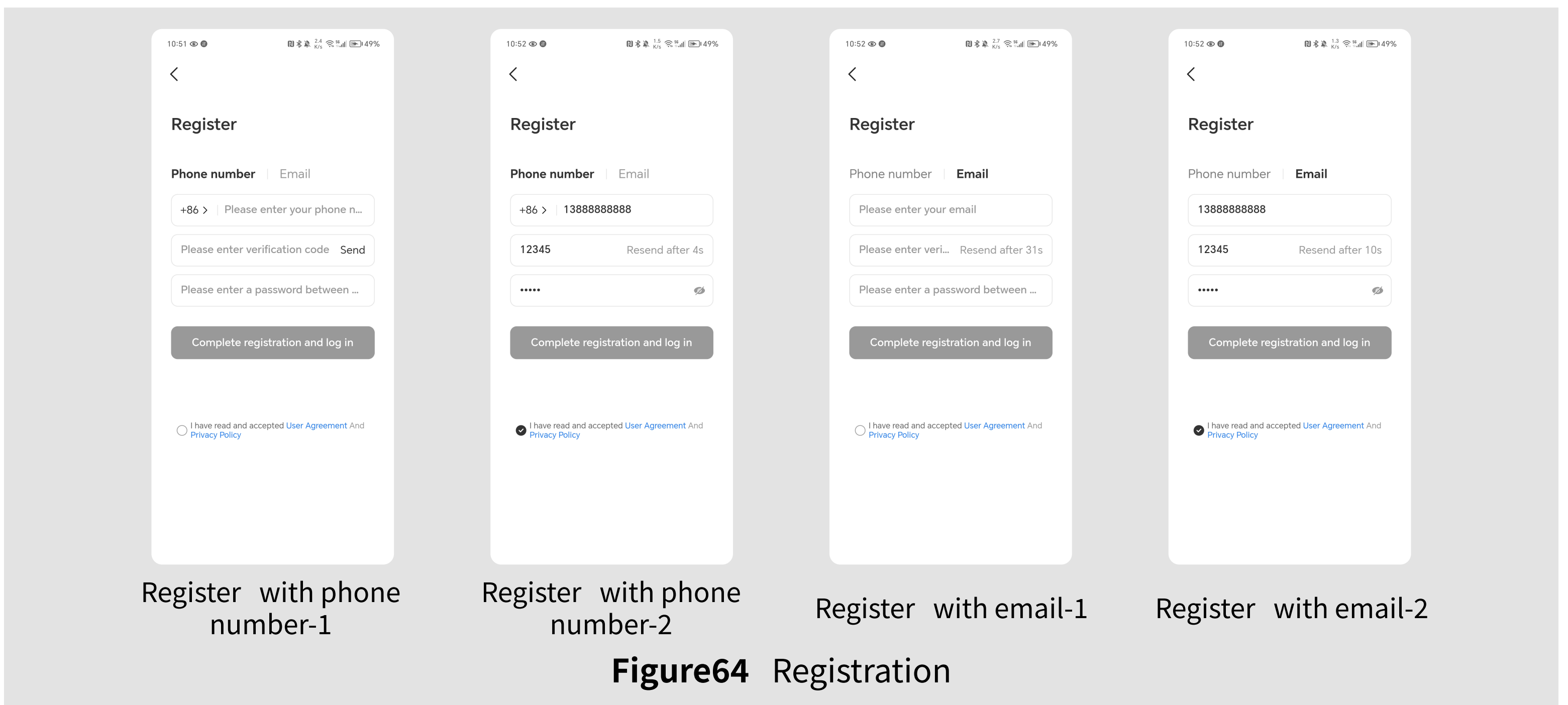


Figure63 Remote controller in use

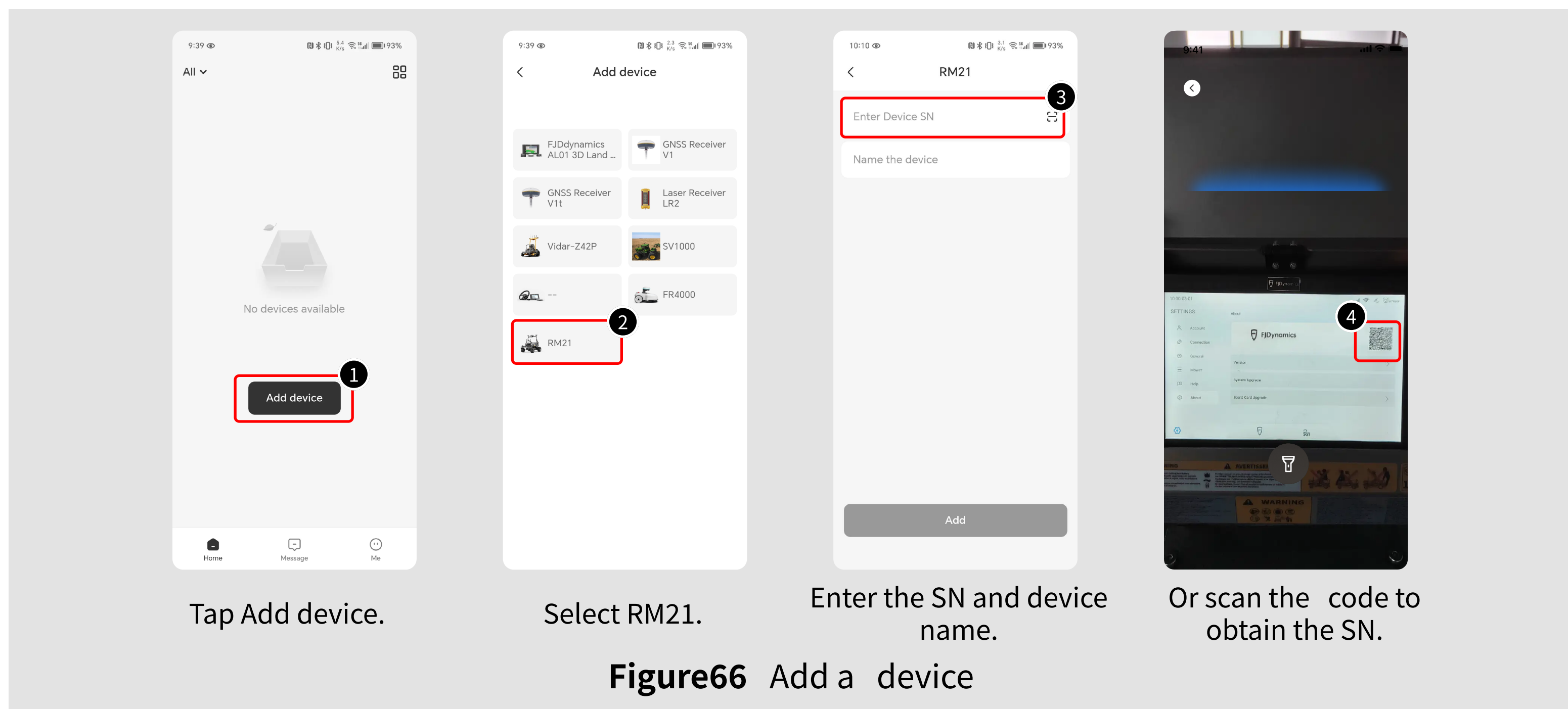
No.	Function
1	Power on the charging pile.
2	Exit remote control.
3	Battery level.

## 8.2 App

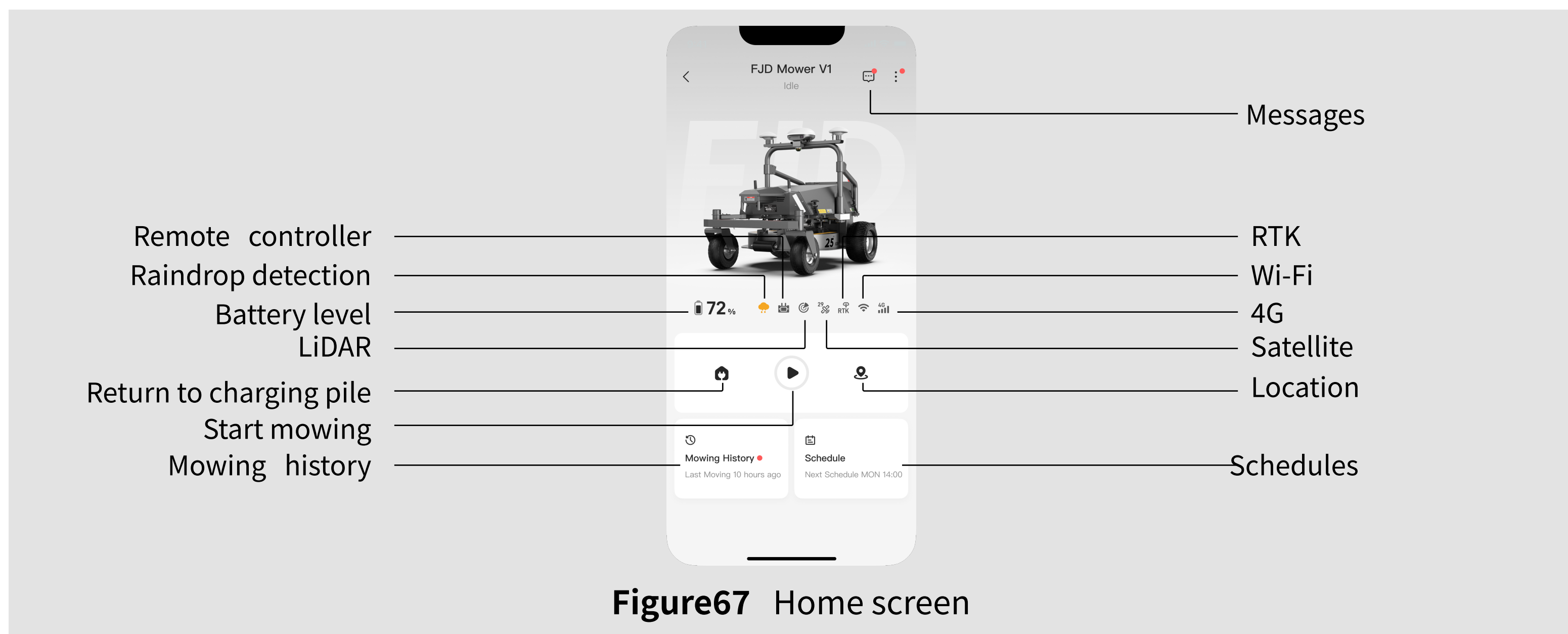
### 8.2.1 Registration and Login



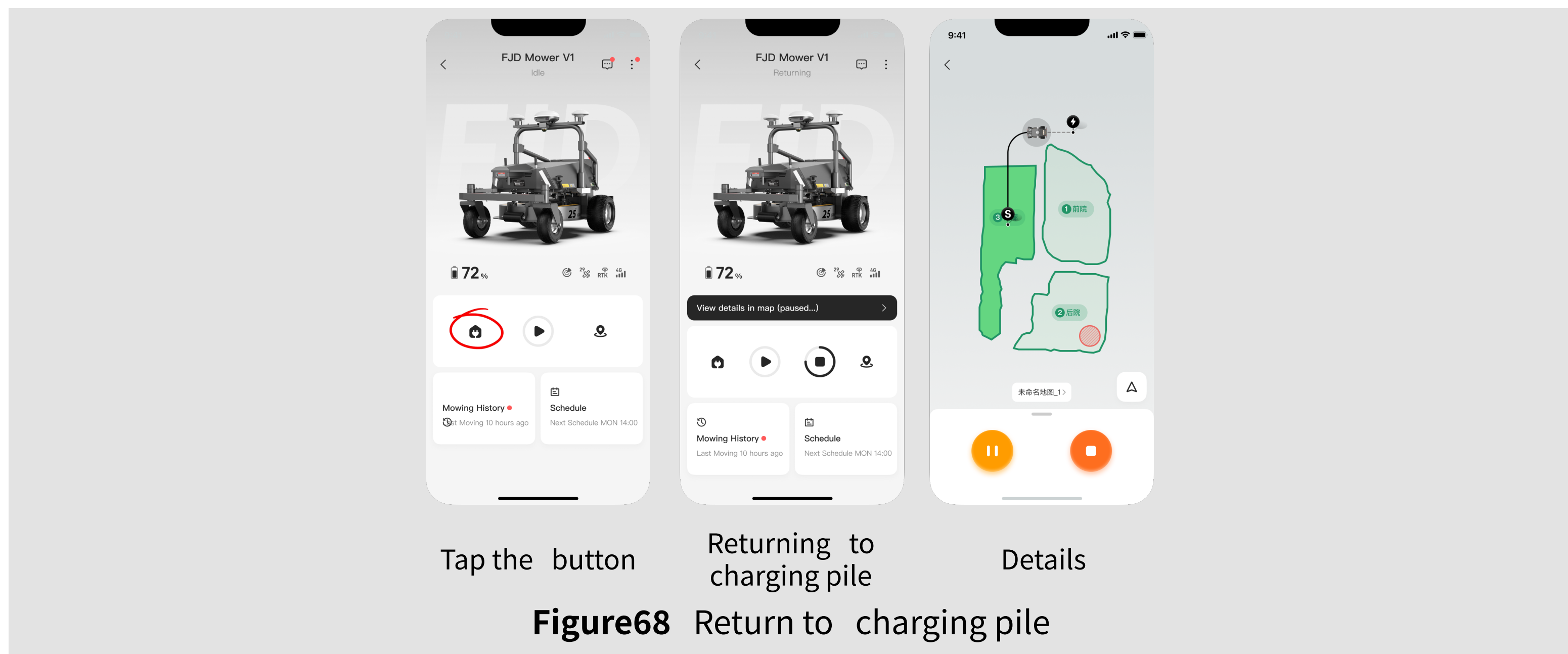
## 8.2.2 Adding a Device



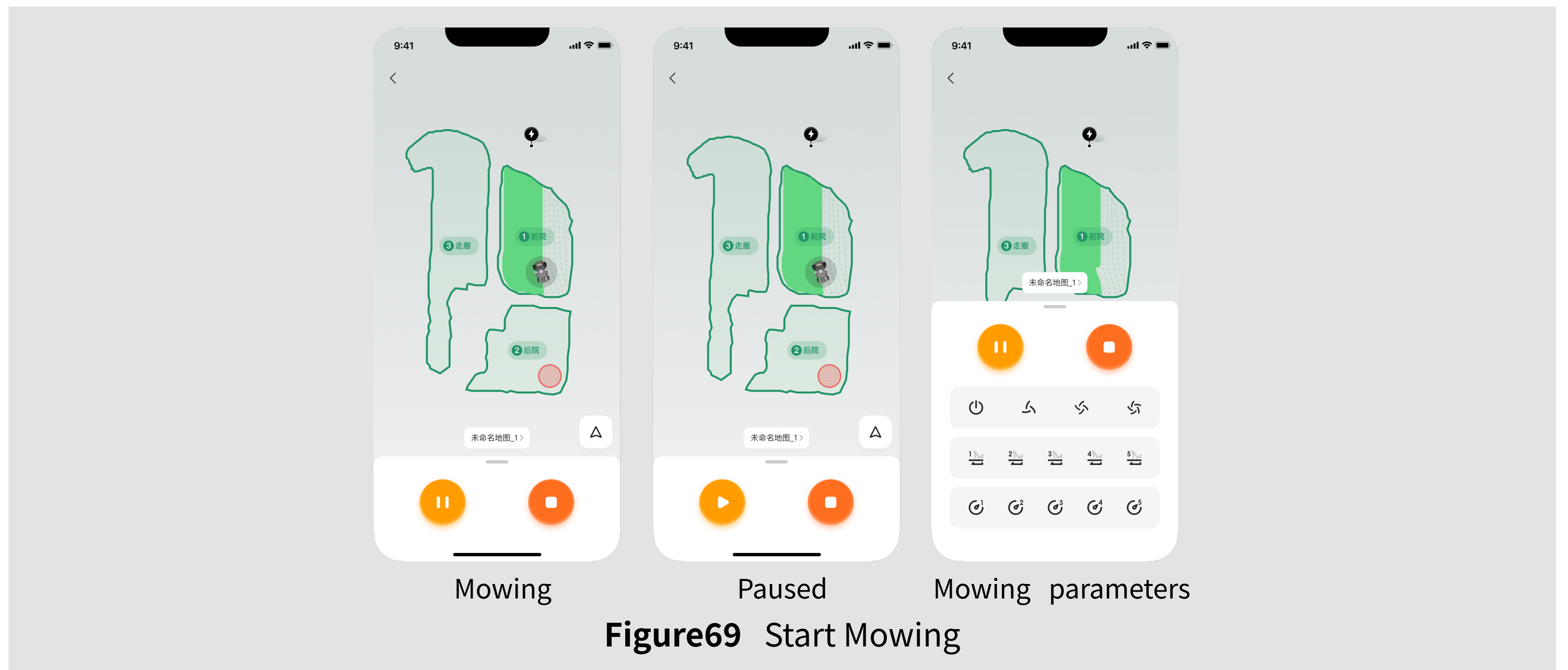
## 8.2.3 Home Screen



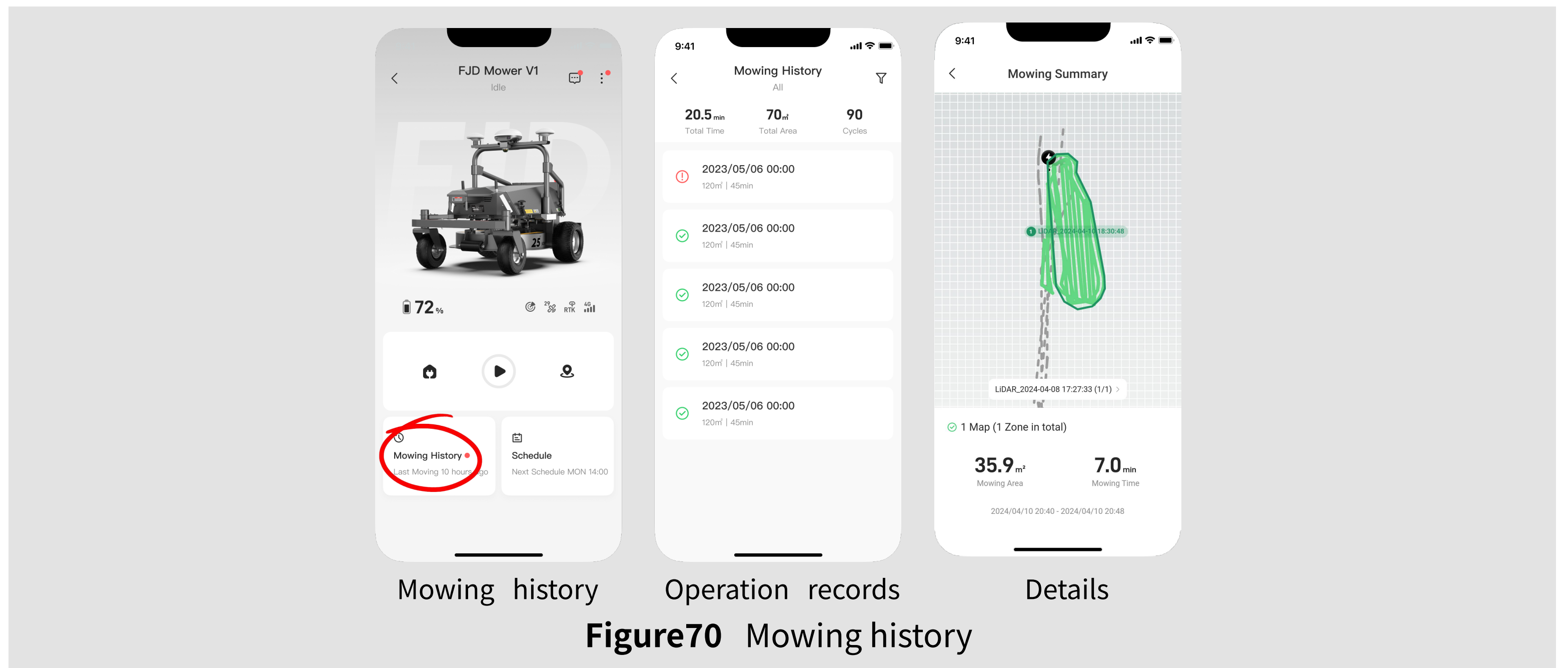
## 8.2.4 Return to Charging Pile



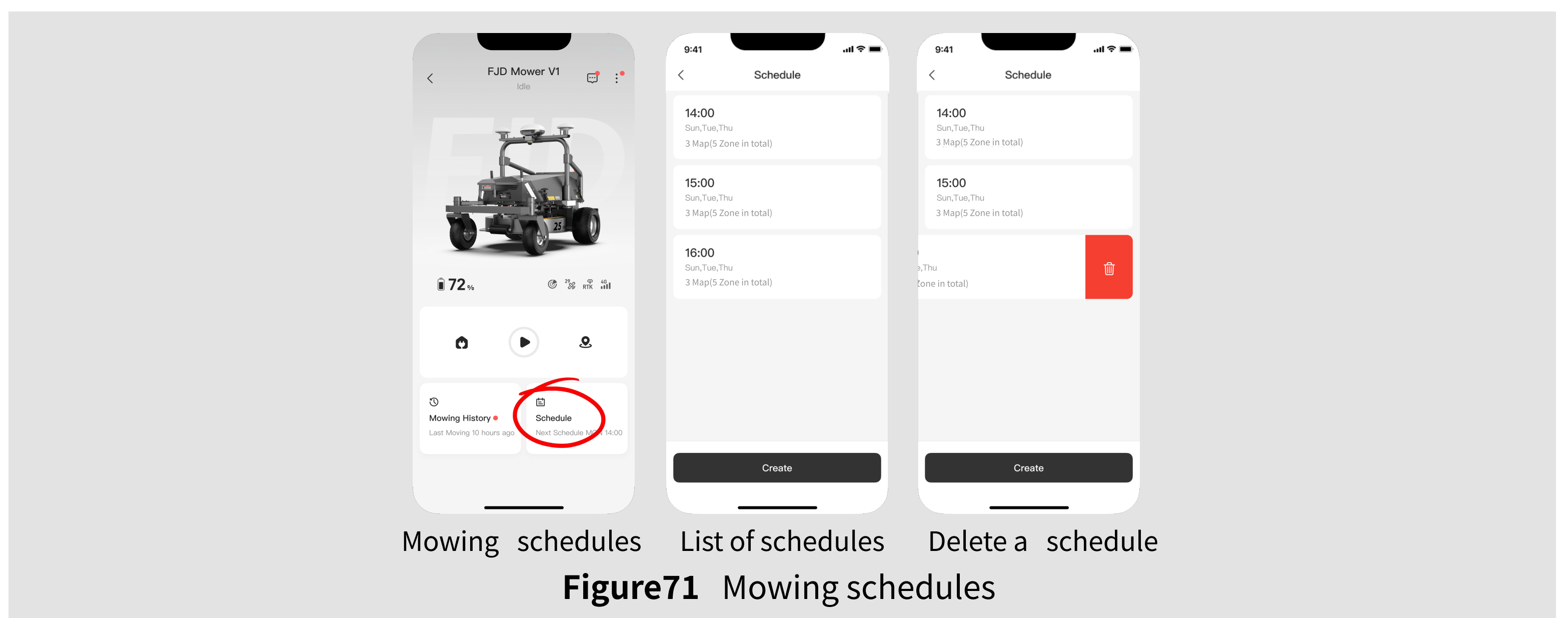
## 8.2.5 Start Mowing

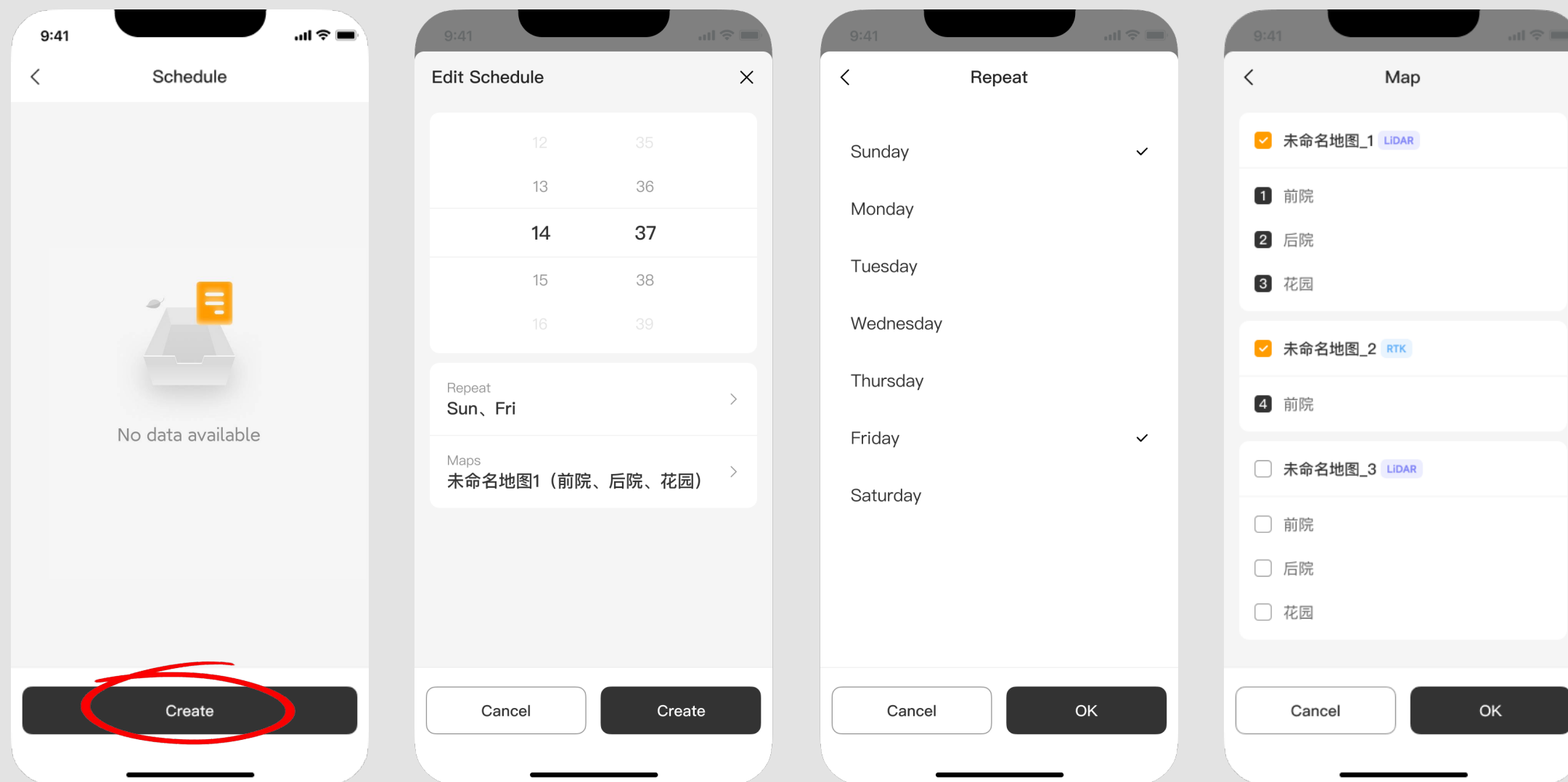


## 8.2.6 Mowing History



## 8.2.7 Schedules





Tap Create.

Select the time.

Select the days.

Select the map.

**Figure72** Create a schedule

## 9 Using the Cutting Deck

### 9.1 Precautions

1. During the first use, mow the grass slowly on level ground.
2. The mowing method depends on the size and shape of the site, as well as obstacles including trees, fences, and buildings.
3. To ensure a better mowing effect, mow the grass in the afternoon or evening when the humidity is relatively low.

### 9.2 Adjusting the Height of the Cutting Deck



**DANGER**

Do not adjust the blade after the mower is powered on. The mower blade is invisible from the outside and is located very close to the deck housing. Fingers and toes can be cut off instantly when touching the blade.

The cutting deck is adjustable in the height range of 20 to 127 mm (0.8 to 5 inches). Lift the cutting deck properly during mowing to avoid being damaged by tree stumps, rocks, and other objects.

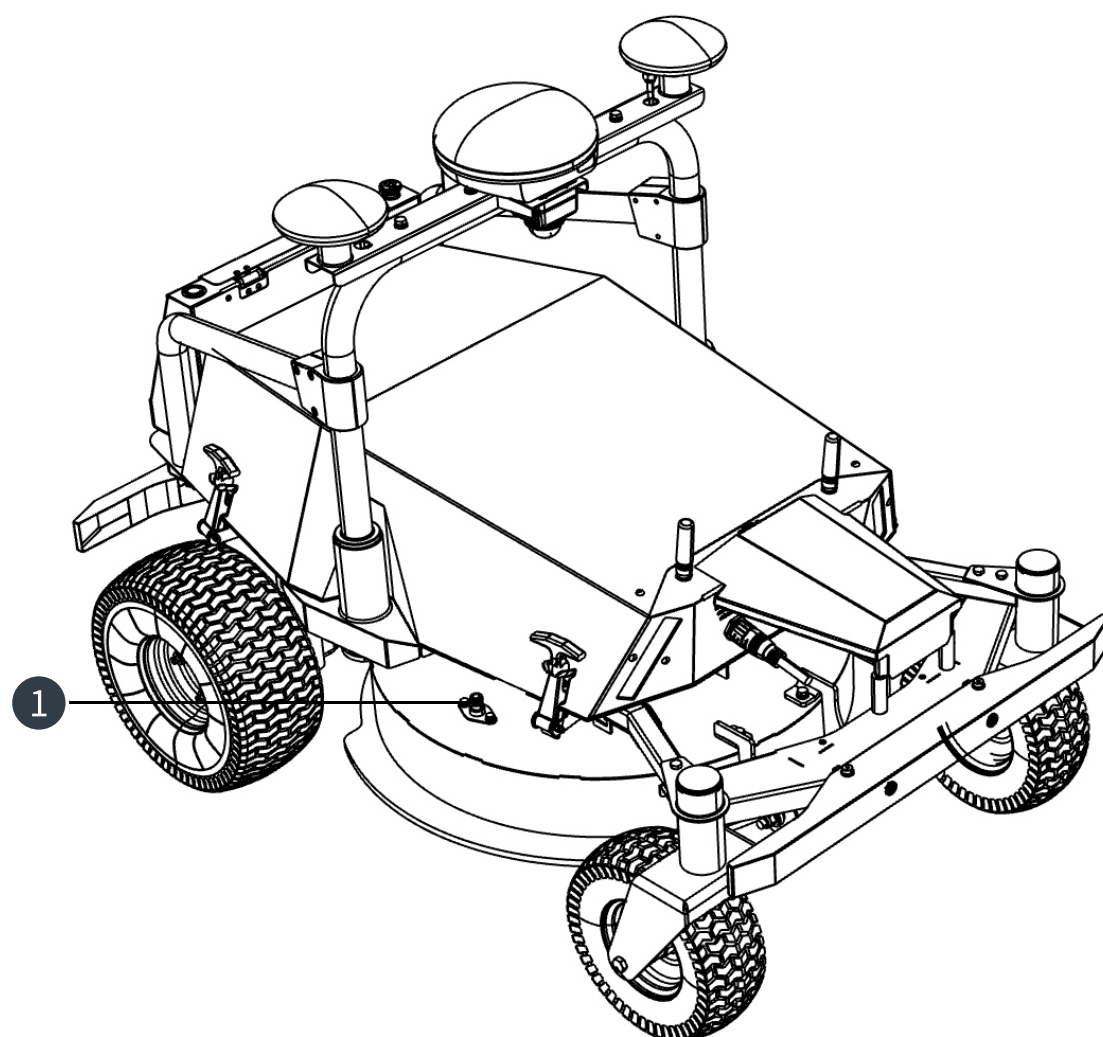
### 9.3 Cleaning the Cutting Deck



**DANGER**

Do not adjust the blade after the mower is powered on. The mower blade is invisible from the outside and is located very close to the deck housing. Fingers and toes can be cut off instantly when touching the blade.

Connect the water pipe to the wash port ① of the cutting deck, and turn on the water tap and the blade. Clean the cutting deck after each use.



**Figure73** Wash port

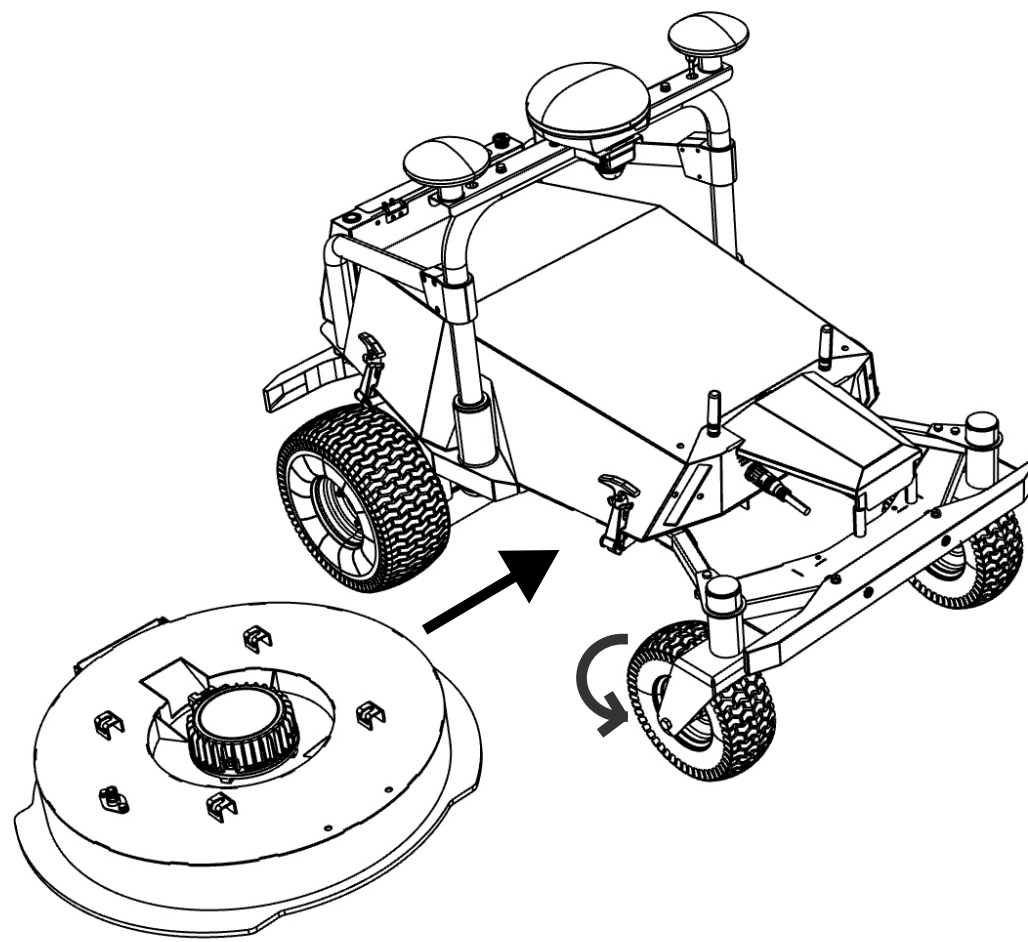
## 9.4 Installing the Cutting Deck



### WARNING

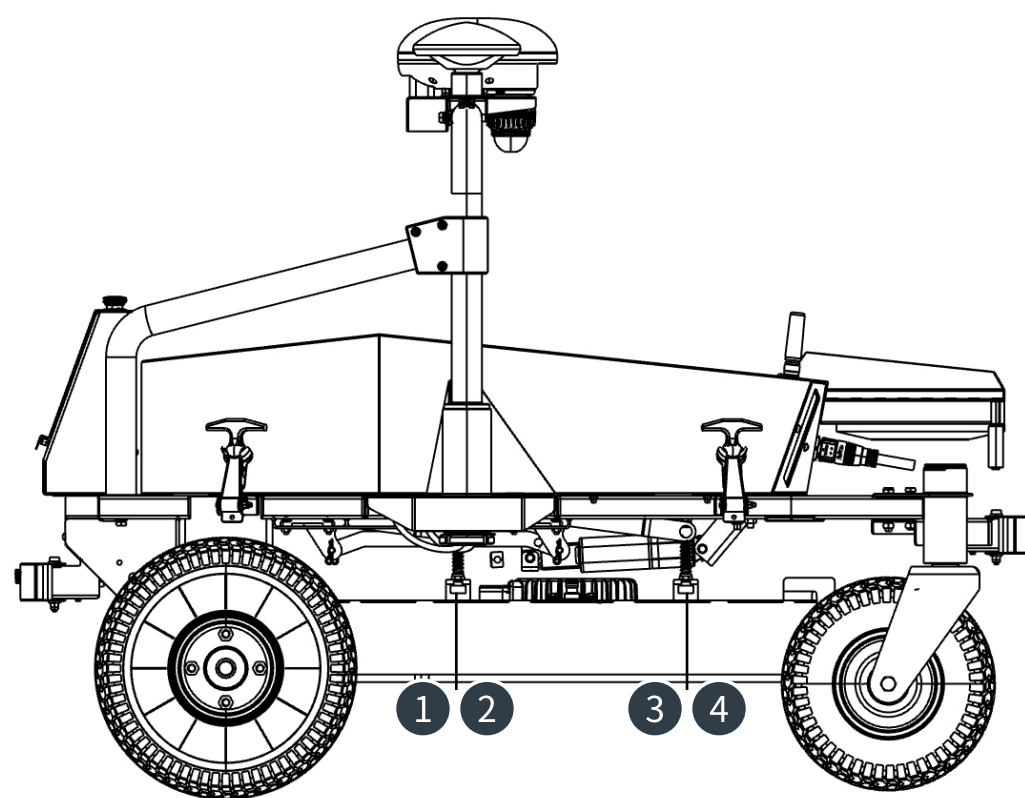
Power off the mower before removing the cutting deck.  
Park the mower on firm and level ground and engage the brake before removing the cutting deck.

1. Put the cutting deck to the right of the mower, and slide it under the mower chassis as shown below. Ensure that the front wheels are turned by 90 degrees.



**Figure74** Slide the cutting deck under the mower chassis

2. Mount the cutting deck to the four threaded rods as shown below, and tighten them with hexagon nuts.



**Figure75** Mount the cutting deck

3. Fix the anti-scalp wheel bracket with M8 bolts.
4. Mount the anti-scalp wheel and shaft sleeve, and fix them with M12 bolts and nuts.

## 9.5 Adjusting the Levelness and Height of the Cutting Deck

After installing the cutting deck, check its levelness and height, and adjust them when necessary. When the cutting deck is not parallel to the ground, adjust the height adjustment fork. Ensure that the blade edge is 20 mm (0.8 inches) above the ground when the cutting deck is in its lowest position.



Note: Before checking the cutting deck height, ensure that the tire pressure is at the specified level. If the tire pressure is abnormal, the deck cannot be adjusted to the correct cutting height.

## 9.6 Removing the Cutting Deck

To remove the cutting deck, reverse the foregoing steps.



### WARNING

The cutting deck needs to be installed or removed by professionals with special devices.

## 9.7 Operation on Slopes



Use the machine only on slopes not steeper than 20 degrees. Slopes are a major factor related to loss of control and rollover that could result in serious injury or death. Use extreme caution when operating on slopes.

- Use extreme caution when operating on slopes.
- Exercise extreme caution when changing directions on slopes.
- Drive and turn slowly on slopes.
- Do not mow at places that can cause slip or tip-over.
- To maximize the traction, drive forward to go uphill.
- Slow down and turn around slowly to go downhill.
- Watch for holes, ruts, bumps, rocks, and other hidden objects that can cause rollover.
- Be extremely careful in tall grass areas where obstacles may be hidden.
- Remove all obstacles such as rocks and twigs.
- Drive slowly and gradually on slopes. Do not make sudden changes in speed or direction.
- Do not start or stop the mower on slopes. If the tires lose traction, turn off the blade motor and drive slowly and carefully.
- During mowing, keep a safe distance from ditches, retaining walls, or embankments that can cause the machine to fall or get mired. This reduces the risk of rollover and avoids serious injury or death.

To avoid rollover, it is suggested to use a push mower or handheld mower to mow on slopes, or near ditches, retaining walls, or embankments.

Do not mow on wet grass. Wet grass can reduce traction, resulting in slip or loss of steering control.

When the tires lose traction while operating on a slope, power off the mower, and seek help.

Do not start, stop, or make turns suddenly, especially when on slopes.

The mower can mow horizontally on a moderate slope. Mowing a slope of 15 degrees or above may cause the drive tires to lose traction, leading to loss of control.

### **Do not mow slopes steeper than 20 degrees.**

Drive the machine off the slope using extreme caution when you detect signs of traction loss, and try operating on the slope again after the problem is solved. Terrain conditions can affect traction, resulting in possible loss of control of the machine. Some of the conditions to be aware of are:

Wet surfaces

Depressions such as holes, ruts, and eroded areas

Mounds

Soil type, such as sand, loose soil, gravel, and clay

Grass type, density, and height

Extreme dry conditions

Tire pressure

The above only lists several examples that requires caution when operating on slopes. There are many other possibilities too numerous to mention, so use extreme caution when operating on slopes.

## 9.8 Slope Reference

You can make a drawing like the following to determine the slope before mowing.

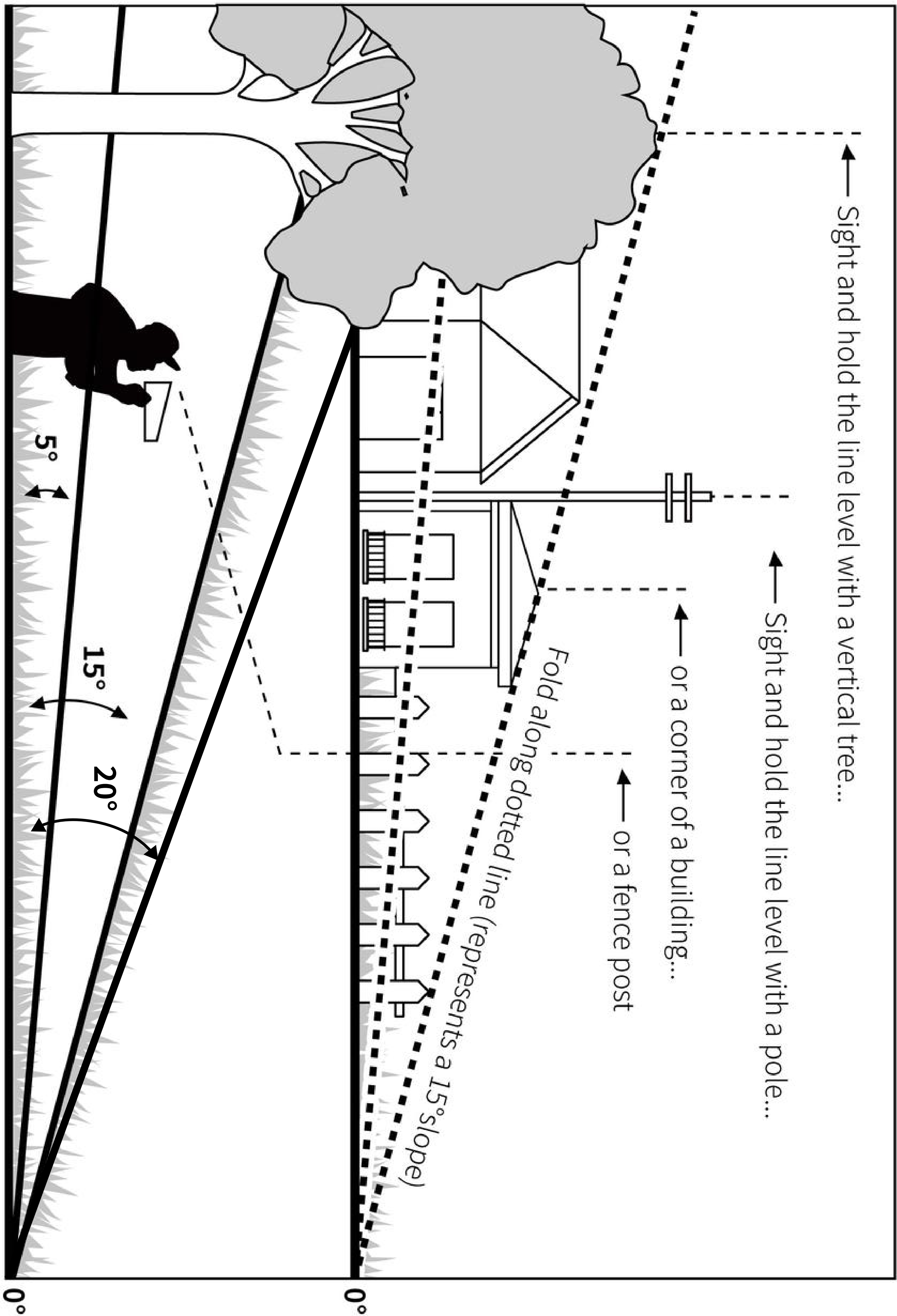


Figure76 Slope reference

## 10 Electrical System Safety

- Before working on the electrical system, power off the mower and disconnect the battery cables. Read the user manual before adjusting or repairing any components.
- Before transporting the mower, power off the mower and disconnect the battery cables.
- Keep the power unit free of grass clippings, leaves, and other debris. Do not clean the power unit with water.
- Wear protective eyewear and equipment, and use insulated tools when working around the batteries.
- Do not use solvents, hard cleaners, or abrasives to clean dirt or debris off the battery compartment, power unit, and cutting deck.
- Keep bystanders away before starting or stopping the blade.

### 10.1 Charging Pile

The mower is provided with the charging pile approved by FJD. Plug the charging pile into a 110 V/20 A or 220 V/10 A power socket. Do not charge the batteries with chargers not designed for this product.

**The charging pile indicator may show the following status during charging:**

Color	Meaning	Solution
Solid green	Charging in progress or completed. Check the battery level on the home screen.	No solution required.
Solid red	An exception such as OTP, OVP, short circuit, reverse polarity, and charging timeout occurs.	Contact the local dealer to solve the problem.
Blinking red	Battery overheating.	Let the batteries cool down and continue the charging.



Note: Place the charging pile in a dry place to avoid water ingress.

### Charging instructions:

- The battery includes a battery management system (BMS), and therefore, does not need to be fully discharged before recharging.
- It takes around 5 hours to fully charge the mower.
- The battery left uncharged will slowly discharge. Ensure that the batteries are fully charged before using the mower from long-term storage.
- During long-term storage, fully charge the batteries every 30 days to maintain the battery lifespan.
- Ensure that the cooling fan inlet and outlet of the charging pile are not blocked during charging.
- Immediate charging required

## Immediate charging required

If the battery power is in the range of 5% to 10%, the mower screen shows a low battery prompt, and the mower returns for charging automatically. If the battery power is no higher than 5%, the blade stops and you should remotely control the mower to return.



Reference: Read and understand all the safety warnings and instructions. Failure to follow these instructions may result in electrical shock or serious injury.

## 10.2 Removing the Batteries

Refer to section 6.2 “Installing the Batteries” . Do not remove the batteries unless for maintenance and other special purposes.



**DANGER**

Do not open the batteries to expose the inner structure, as it will cause battery damage and personal injury.



**WARNING**

Before maintaining the mower, power off the mower and disconnect the battery cables.

## 10.3 Faults

When a fault is detected, the control system takes measures to protect the operator and the mower. Before powering off the mower or a component, the control system displays the fault on the screen. Most faults can be quickly rectified by noting the causes, restarting the mower (pressing the power button), and changing the way the operator uses the mower. Refer to the following table for the faults that may occur during operations. If a fault persists, it needs to be resolved by a trained professional using a more detailed solution.

Faults		
Low charging temperature protection	High charging temperature protection	Discharging overcurrent protection
Undervoltage protection for total voltage	Undervoltage protection for single battery	Charging overcurrent protection
Overvoltage protection for total voltage	Overvoltage protection for single battery	Low discharging temperature protection
High discharging temperature protection	Low temperature protection	Battery voltage sampling fault
High temperature protection for battery module	Battery temperature sampling fault	Low charging temperature alarm
High charging temperature alarm	Discharging overcurrent alarm	Undervoltage alarm for total voltage
Undervoltage alarm for single battery	Charging overcurrent alarm	Overvoltage alarm for total voltage
Overvoltage alarm for single battery	Low discharging temperature alarm	High discharging temperature alarm
Low temperature alarm	High temperature alarm	Battery overtemperature alarm
Low battery alarm	Battery software communication error	Left drive motor and controller mismatch
Overvoltage protection for left drive motor	Undervoltage protection for left drive motor	Left drive motor communication error
Locked-rotor protection for left drive motor	Abnormal left drive motor voltage	Overtemperature protection for left drive motor

<b>Faults</b>		
Left drive motor reset	Hall sensor fault for left drive motor	Right drive motor and controller mismatch
Overvoltage protection for right drive motor	Undervoltage protection for right drive motor	Right drive motor communication error
Locked-rotor protection for right drive motor	Abnormal right drive motor voltage	Overtemperature protection for right drive motor
Right drive motor reset	Hall sensor fault for right drive motor	Blade motor and controller mismatch
Overvoltage protection for blade motor	Undervoltage protection for blade motor	Blade motor communication error
Locked-rotor protection for blade motor	Abnormal blade motor voltage	Overtemperature protection for blade motor
Blade motor reset	Hall sensor fault for blade motor	VCU communication timeout
VCU cutting deck lifting/descending sensor fault	VCU cutting deck not calibrated	ECU communication timeout
VCU blade motor communication timeout	VCU left drive motor communication timeout	VCU right drive motor communication timeout
VCU drive motor stall protection	BMS communication timeout	VCU cutting deck lifting timeout
VCU cutting deck descending timeout		

Note:

VCU: Vehicle Control Unit

ECU: Electronic Control Unit

BMS: Battery Management System

# 11 Maintenance

## 11.1 Maintenance Schedule

Interval	Procedure
Daily or before each use	<ul style="list-style-type: none"><li>• Check the safe start interlock system.</li><li>• Observe whether tires are flat.</li><li>• Check the blade.</li><li>• Check whether components like the discharge chute, screws, nuts, or bolts are damaged, missing, or loose. Ensure that all protective devices are in place and working.</li></ul>
After each use	Clean the blade.
Every 25 hours	Check the tire pressure.
Every 100 hours	Check the rear wheels to ensure that all nuts are tightened with the recommended torque.
Every 200 hours	Check the front wheels to ensure that they can move freely.
Before storing the mower	<ul style="list-style-type: none"><li>• Fully charge the batteries.</li><li>• Perform the above maintenance steps and clean the mower completely.</li><li>• Check whether components are damaged, missing, or loose. Replace or tighten components if required before storing the mower.</li></ul>
Annually	<ul style="list-style-type: none"><li>• Check the parking brake system.</li></ul>

## 11.2 Regular Maintenance

Regular maintenance is the best prevention. The following provides proper maintenance suggestions and schedules that the operators should follow. Remain alert to unusual noises, as they could be signaling a problem. Visually inspect the mower for any abnormal wear or damage. When performing scheduled maintenance, you can also detect potential problems. Inspect the mower blade daily for grass clippings, and wire and string tangles. Grass clippings and dirt may accumulate under the cutting deck, especially when the grass is wet or has high moisture content. The accumulated grass clippings and dirt will harden, restricting blade rotation, and will probably result in poorer cutting quality. Therefore, clean the mower regularly. Fully lift the cutting deck, support it with a jack stand or wedge, and then scrape any substance accumulated beneath the cutting deck.

## 11.3 Tires and Wheels

### Tires

The tire pressure must comply with the requirements of this manual. High tire pressure could lead to a tire burst, resulting in injury or even death. Special skills and tools are required for tire repair. Contact the dealer for replacement or repair of the tires, inner tubes, and rims.



#### WARNING

Only use the specified tires.

#### 1. Tire pressure

Although the tire pressure has been preset to the specified value, it gradually decreases with time. Check the tire pressure and inflate the tires as needed based on the tire appearance as follows.

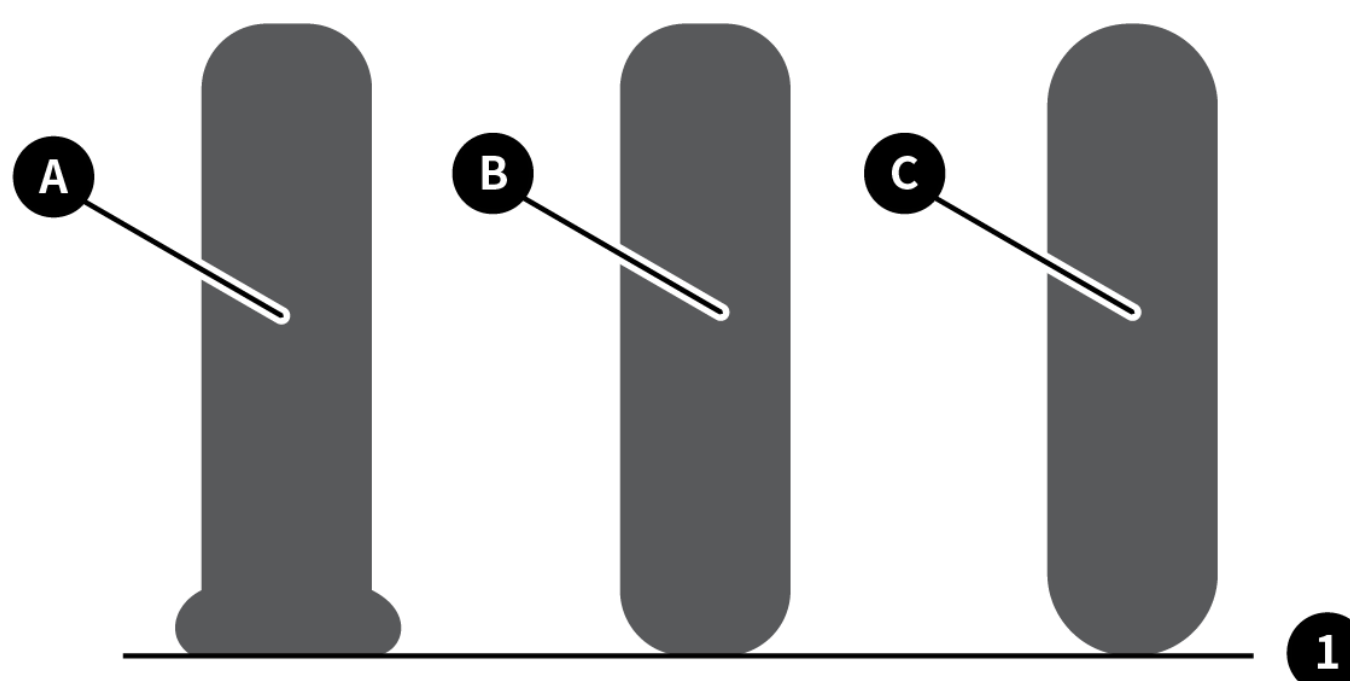


Figure75 Tires in different tire pressures

No.	Description
1	Ground
A	Low
B	Normal
C	High

#### 2. Standard tire pressure

Tire	Specifications	Pressure
Front	--	Solid tire
Rear	13x6.50-6	MAX20 PSI



Note: Inspect the tires daily and replace the damaged tires immediately.

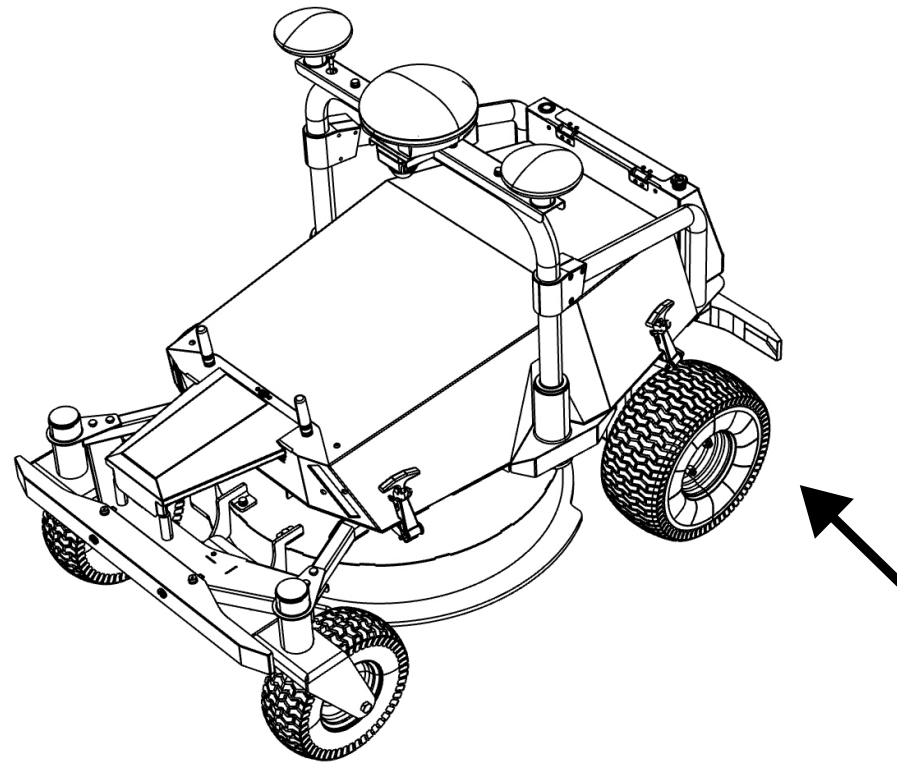


## WARNING

Ensure that all bolts on the wheels and axles are tightened before using the mower.

## Wheels

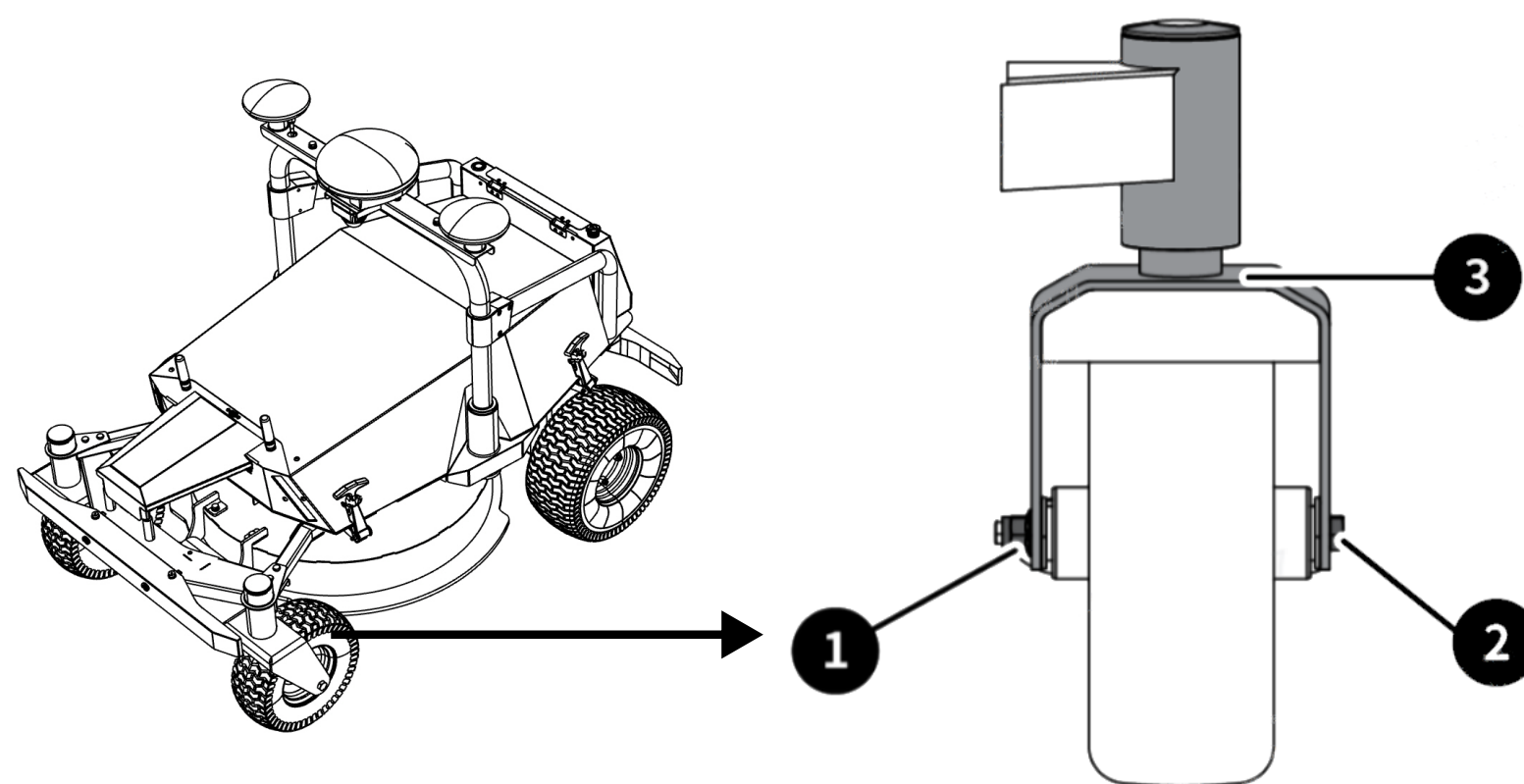
If wheels are replaced, tighten the bolts with a torque of  $45 \pm 5 \text{ N} \cdot \text{m}$  ( $33.2 \pm 3.7 \text{ lb-ft}$ ), drive the mower for around 200 m, and then check the torque.



**Figure76** Rear wheel bolts

### 1. Remove the front wheels

- a. Park the mower on level ground.
- b. Press down the emergency stop button to power off the mower.
- c. Lift the front of the mower in a professional and safe way.
- d. Remove the lock nut **1**, and pull out the front wheel bolt **2**.
- e. Take the front wheel off the front fork **3**.



**Figure77** Remove the front wheel

No.	Name
1	Lock nut
2	Front wheel bolt
3	Front fork

### 2. Install the front wheels

- a. Put on the front wheel.
- b. Insert the front wheel bolt and tighten the lock nut with a proper torque.

## 11.4 Blade Maintenance

Check the blade daily. The blade is the key to cutting efficiency and quality. Keep the blade sharp, as a dull blade will tear the roots apart instead of cutting and increase power consumption. Replace the bent, cracked, or damaged blade immediately.



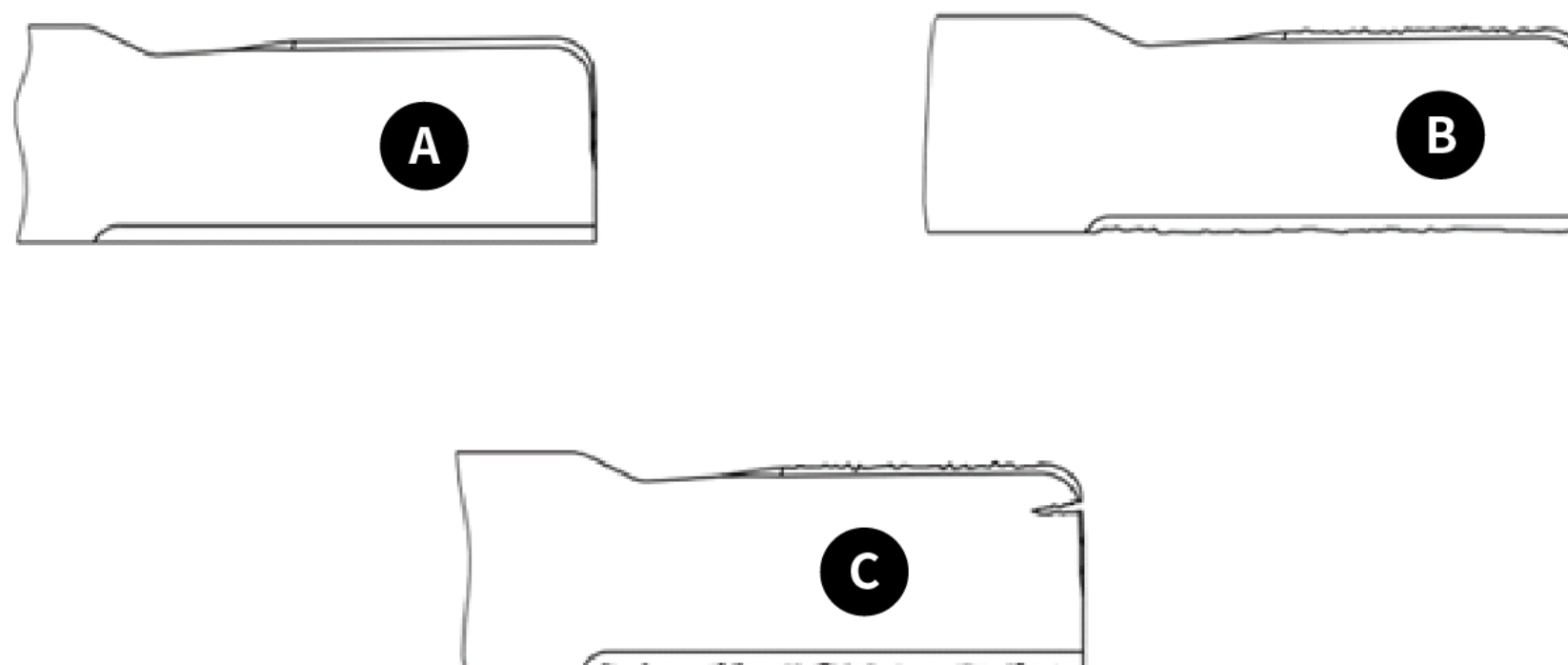
Do not heat up the bent blade to straighten it, or weld the cracked or broken blade.



Press down the emergency stop button to turn off the blade motor. Always wear gloves when working on the blade. Check whether the blade is damaged whenever the mower hits rocks, twigs, or other objects.

### 1. Inspection

The blade must be sharp. In the case of ② shown in the figure below, sharpen the blade. In the case of ③, replace the blade. Check whether the blade bolt is loose and tighten it with the specified torque if necessary.



**Figure78** Blade states

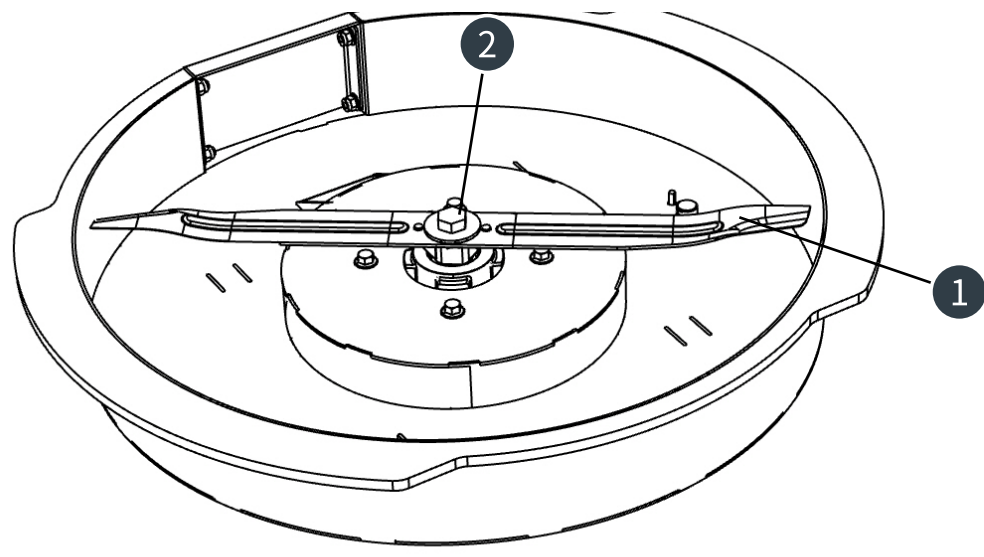
No.	Name
A	New
B	Worn
C	Cracked



Always wear sturdy goggles when grinding and polishing the blade.

### 2. Replace the blade

- Press down the emergency stop button and the power indicator is off.
- Dismount the cutting deck and turn it upside down.
- Put on leather gloves and loosen the bolt ② that fixes the blade ① with a 15/16" socket wrench.
- Turn the bolt counterclockwise to loosen it.

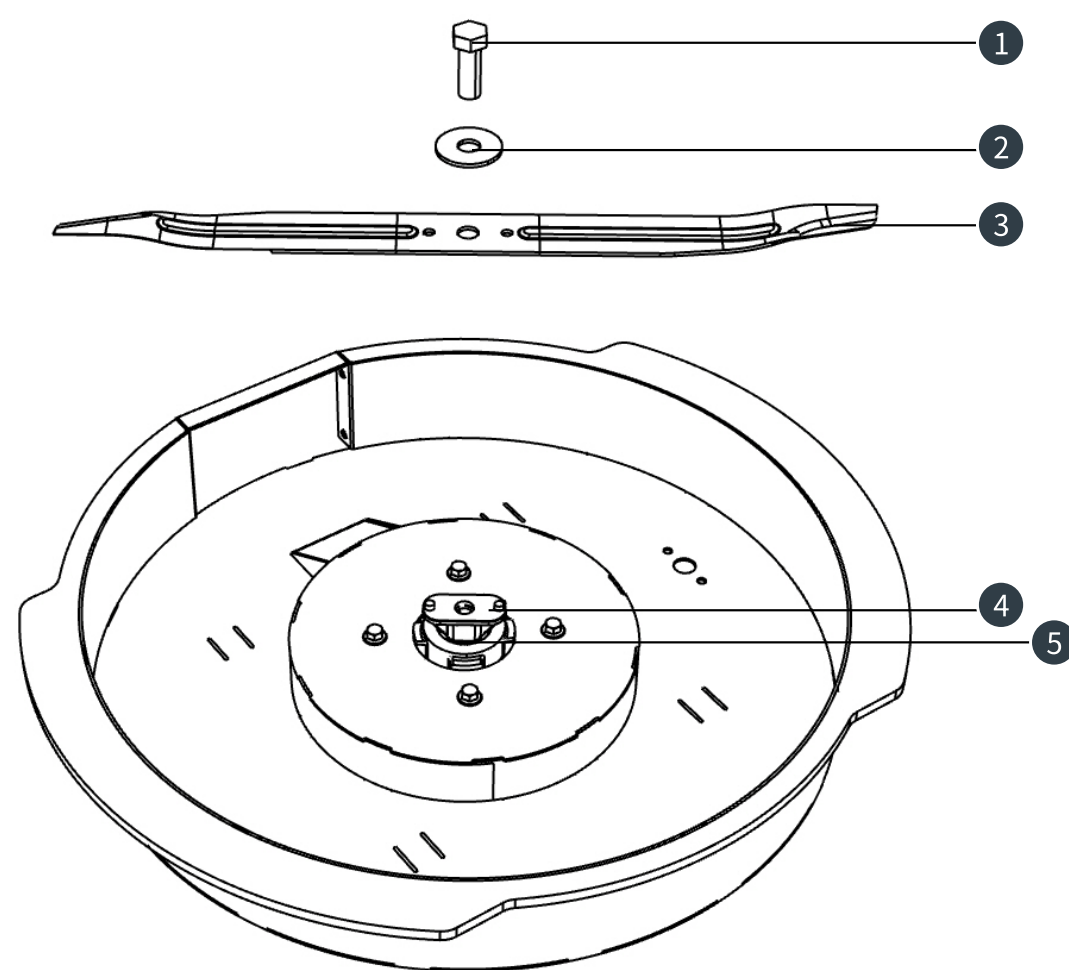


**Figure79** Remove the blade

No.	Name
1	Blade
2	Bolt

e. Install the new blade. Ensure that the blade edge faces the ground after the cutting deck is mounted.


Place the blade holder ④ on the blade motor ⑤, and place the new blade ③ on the blade holder. Ensure that the holes are aligned. Place the disc spring ② on the blade ③ and insert the bolt ①, as shown below. Then, tighten the bolt with a torque of 135–150 N • m (99.6–110.6 lb-ft).



**Figure80** Install the blade


No.	Name
1	Bolt
2	Disc spring
3	Blade
4	Blade holder
5	Blade motor


3. The torque values are as follows:


 <b>WARNING</b>	Tighten the wheel bolts and blade bolt; otherwise, the wheels or blade may be lost, resulting in serious machine damage or personal injury.
---	---


Part	lb-ft	N • m
Wheel bolt	33.2±3.7	45±5
Blade bolt	99.6~110.6	135~150

It is recommended to check the wheel bolts upon the first 2 hours of operation and then every 100 hours, and repair or replace them when necessary.

	Check the blade balance with a commercial balancing tool, which is available at most hardware stores, or by placing the blade on an inverted line punch or a 1/2" bolt. The blade should not lean or tilt. Spin the blade slowly, and the blade should not wobble. If the blade is out of balance, true it up before reinstalling it. Place the blade on a flat surface to check whether it is distorted, and replace it when necessary.
---	--

 <b>WARNING</b>	To ensure proper cutting, the curved part of the blade must point upward towards the inner side of the cutting deck.
---	--

 <b>WARNING</b>	Install the blade to ensure that the edge of the rotating blade does not touch the underside of the cutting deck.
---	---

 <b>WARNING</b>	If you fail to torque the bolt correctly, the blade may be lost, resulting in serious injury.
---	---

## 11.5 Cleaning the Mower

### Clean the vehicle body

Wipe the vehicle body with a cloth. Cleaning the mower with water may cause the following damage:

1. Damage or disconnection of electrical wiring, which may cause fires.
2. Damage of tires, oil seals, and other rubber and resin parts.
3. Peeling of the coating surface.
4. Battery damage.



#### **WARNING**

Do not clean electrical equipment and devices with water, and prevent water entering the mower.

### Clean the cutting deck

Clean the cutting deck (especially the underside) carefully after each use, as grass clippings, leaves, dirt, and other debris can accumulate at the underside of the cutting deck, causing rust and corrosion. Power off the mower before cleaning the cutting deck. Keep the mower away from water sources when cleaning the grass clippings and leaves accumulated on or around the motor cover. Wipe it clean with a dry cloth. If debris accumulates on the underside of the cutting deck during mowing, turn off the blade, power off the mower, and scrape the cutting deck clean with a proper tool.

If the mower is used in harsh environments, such as wet grass and low mowing height, it is recommended to remove and clean the cutting deck, and check the blade and bolts when necessary.

## 11.6 Storing the Mower

If the mower is not to be used for a long time, perform the following to prepare the mower for storage.

Clean the mower as described in the previous section.

Check the blade, and replace or grind it when necessary (refer to the section "Blade Maintenance").

Store the mower in a dry, clean, well-ventilated place, out of the reach of children. Keep it away from fertilizers, rock salts, and other corrosive materials.

Do not cover the mower with a plastic sheet, as it traps moisture around the mower, causing rust and corrosion.

Check the mower thoroughly for any worn or damaged parts and order the replacement parts from the dealer.

Check the tire pressure monthly to prevent flat tires.

For details about battery maintenance, refer to the section "Battery Maintenance" .

## 11.7 Before Using a Mower from Storage

Follow the procedure below before using a mower from storage:

Clean trash and dirt off the mower.

Tighten all loose bolts, and keep all pins in place.

Mount all safety shields and covers, and check whether the safety precautions in this manual are followed.

Fully charge the batteries according to the section "Electrical System Safety" .

## 11.8 Battery Maintenance



### WARNING

Replace with batteries designated by FJD. Using any other parts may cause hazards or product damage.



### WARNING

Do not smoke while maintaining the batteries.



### WARNING

Wear protective eyewear and clothing, and use insulated tools when maintaining the batteries.



### WARNING

It is not recommended to clean the charging pile/charger with compressed dry air. When there is no other choice, always wear safety goggles, as well as masks in a dusty environment.

Your mower is powered by batteries. If maintained properly, the batteries can last for years. Maintain the batteries as instructed below:

When the mower is not in use, power off the mower to reduce power consumption.



### WARNING

Only use the charging pile/charger provided by FJD. Improper charging will void your warranty, and may cause equipment damage, serious injury, or death.

- During battery maintenance, check whether the battery cables are securely fixed.
- Prevent grass, dirt, and debris from accumulating near battery terminals.
- To avoid battery damage, stop discharging the batteries after undervoltage protection is triggered.
- Charge the batteries in a well-ventilated and dry place away from sparks or airflow. Keep the charging pile/charger away from rain, vapor, or other liquids.
- Do not use the charging pile/charger provided to charge other products.
- Do not touch the charging pile electrodes or any uninsulated part of the output connector.

**To prolong the service life of the batteries and keep them in good condition, maintain the batteries as instructed below.**

- Over-discharge may shorten the battery life and result in permanent battery damage.
- When the batteries are fully discharged and the mower is powered off, charge the mower within 24 hours even for 5 to 10 minutes.

- If the mower is not to be used for a long time (for days or weeks), power off the mower to reduce the standby power consumption and prolong the storage time.
- Ensure that the battery level is around 50% before long-term storage and recharge the mower to above 50% every three months during storage to maintain battery health.
- The recommended storage temperature of the batteries is 25°C (77°F). Store the batteries for no more than one month at -20°C to 45°C (-4°F to 113°F), and no more than six months at 0°C to 35°C (32°F to 95°F).
- The optimum charging temperature of the batteries is 0°C to 40°C (32°F to 104°F), and the optimum discharging temperature is -15°C to 50°C (5°F to 122°F).
- Avoid violent vibration during the use and storage of the batteries.

## 11.9 Maintenance Precautions

Park the mower on level ground, turn off the blade switch, raise the cutting deck, and then press down the emergency stop button.

### NOTICE

Wait for all moving parts to stop before adjusting, cleaning, or servicing the mower. Repairing or maintenance requiring electrical power should be performed by trained maintenance personnel only. Read and follow the safety precautions in this manual.

- Any maintenance requiring the removal of safety shields must be performed by trained mechanics.
- Before inspecting the underside of the cutting deck, power off the mower so that the indicator is off and the blade switch cannot be accidentally turned on.
- Clean the underside of the cutting deck with a stick or similar tool, and keep all body parts away from the cutting deck.
- Keep the battery compartment and cutting deck clean of trash, grass clippings, and other debris.
- Keep the battery compartment, power unit, and cutting deck clean of dirt and debris. Do not use water, solvents, hard cleaners, or abrasives.
- Always wear protective eyewear when maintaining batteries, grinding the blade, and cleaning off accumulated debris. When the mower is running, do not adjust or service the cutting deck, blade, or any attachment of the mower.
- Do not work under the mower or its attachment unless it is safely supported with jack stands. Ensure that the mower is secure when it is raised and placed on the jack stands.
- Do not touch the hot parts of the mower.
- Tighten the nuts and bolts, especially the blade bolt. Keep the mower in good condition.
- Do not damage the safety devices. Check whether they are functioning normally on a regular basis.
- Do not clean the cutting deck while the mower is running. Power off the mower and ensure that the blade has stopped before cleaning the cutting deck. Clean the discharge area with a stick if it is blocked. Never use your hands.
- Take care when working under the cutting deck as the blade is extremely sharp. Wear gloves and take extra care during servicing.
- Use only genuine FJD mower parts.
- Always disconnect the battery cables when transporting the mower. Keep the mower free of grass clippings, leaves, and other debris.

**As the batteries of this mower contain lithium-ion, a toxic and corrosive material, observe the following safety instructions.**



**WARNING**

All toxic materials must be disposed of in a specified manner to prevent environmental contamination. Before disposing of a damaged or worn-out lithium-ion battery, contact the local waste disposal facility or environmental protection agency for information and specific instructions. Deliver the battery to a local recycling or disposal center certified for lithium-ion disposal.



**WARNING**

If any battery breaks, with or without leaks, do not recharge or use it. Replace the broken battery with a new one. Do not attempt to repair it. To avoid injury, explosion, electric shock, and environmental contamination, cover the battery terminals with insulating tape.

- Do not attempt to dismantle or destroy any battery.
- Do not attempt to open the batteries.
- The electrolyte released through battery leakage is corrosive and toxic. Do not discharge the solution into the river. Avoid skin contact, and do not swallow it.
- Do not dispose of the batteries in household trash.
- Do not incinerate the batteries.
- Do not discard the batteries in any place that will become a landfill.

## 12 Troubleshooting

### 12.1 Cutting Deck

Contact your local dealer if you have any doubts.

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
The mower cannot discharge clippings properly.	The grass is wet.	Mow the grass when it is dry.
	The grass is tall.	Increase the cutting height and mow the grass twice.
	The cutting height is low.	Increase the cutting height.
	The driving speed is high.	Reduce the driving speed.
Some areas are uncut or still need cutting after mowing.	The driving speed is high.	Reduce the driving speed.
	The grass is tall.	Increase the cutting height and mow the grass twice.
	The blade is worn or damaged.	Replace the blade.
	Grass clippings build up inside the cutting deck.	Clean the inside of the cutting deck.
The mower cuts unevenly.	The driving speed is high.	Reduce the driving speed.
	The blade is dull.	Sharpen the blade.
	The blade is worn.	Replace the blade.
	The cutting deck is not leveled.	Level the cutting deck as instructed in the section "Adjusting the Levelness and Height of the Cutting Deck".
	The blade is worn.	Replace the blade.
	The anti-scalp wheel is set improperly.	Adjust the anti-scalp wheel height.
	The tire pressure is low.	Inflate the tires to the normal pressure.

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
The lawn is scalped, and the soil is exposed.	The cutting height is low.	Increase the cutting height.
	The driving speed is high when turning.	Reduce the driving speed when turning.
	The ground is bumpy.	Change the mowing method, such as the mowing direction.
	The blade is bent.	Replace the blade.
The mower vibrates violently.	The tire pressure is low.	Inflate the tires to the normal pressure.
	Grass clippings build up inside the cutting deck.	Clean the cutting deck.
	The blade is bent or out of balance.	Replace or balance the blade.
The cutting deck is overloaded.	The blade bolt is loose.	Tighten the bolt.
	The driving speed is high.	Reduce the driving speed.
The blade appears zig-zag and taupe.	Grass clippings build up around the deck spindle.	Clean the cutting deck.
	The blade is dull.	Sharpen the blade.
	The blade is worn.	Replace the blade.
The blade appears zig-zag and taupe.	The cutting deck is not leveled.	Level the cutting deck.
	Fault prompts are displayed on the mower screen.	Refer to section 10.3.
The mower cannot be started.	Refer to section 10.3.	Refer to section 10.3.
	The power indicator is off.	Press the power button.
	The battery cables are disconnected.	Ensure that all battery cables are connected.
	The circuit breaker trips.	Check whether the circuit breaker trips.

## 12.2 Batteries

Follow the battery maintenance precautions when handling the batteries.

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
The mower cannot be started.	The batteries are dead.	Fully charge the batteries.
	Battery terminals are improperly connected.	Clean the battery terminals, and tighten the bolts and nuts.
	The batteries reach the end of their life.	Replace the batteries.
	The wiring harnesses and switches are faulty.	Contact your local dealer for repair.
The mower is not charging.	The batteries reach the end of their life.	Replace the batteries.
The terminals are severely corroded and overheated.	The terminals are not fastened.	Clean the terminals, and tighten the bolts and nuts.
The battery electrolyte suddenly decreases.	There are cracks and holes in the batteries.	Replace the batteries.
	The charging voltage is high.	Check the charging pile/charger.

### 12.3 Blade Motor and Blade Motor Controller



#### **WARNING**

Before performing the following steps, ensure that your digital multimeter is capable of measuring the resistance of up to 1.2 million ohms ( $\Omega$ ).

Disconnect all battery cables before any repair or maintenance. Then, wait for five minutes, and perform the following steps.

1. Remove debris from all components of the cutting deck.
2. Check whether all the electrical connections of the blade motor and the blade motor controller are fastened properly. If the lock screws on the blade motor controller are loose, tighten them with a torque of 8–10 N · m (5.9–7.4 lb-ft), and ensure that the cutting deck works properly. If loose connections are not found, perform the following steps.
3. Label the contacts of the blade motor controller to ensure correct connections.
4. Label all wires corresponding to the labels in step 3 to ensure correct connections.
5. Disconnect all cables from the blade motor controller.
6. Measure the resistance ( $\Omega$ ) of the blade motor controller:
  - a. Set the multimeter to the continuity mode.
  - b. Place the positive (+) probe of the multimeter on the positive (+) terminal of the blade motor controller, and place the negative (-) probe on the negative (-) terminal of the controller.
  - c. If the multimeter beeps, the controller is damaged and needs to be replaced.

7. If no issues are found, connect the blade motor controller to the blade motor.
8. Measure the resistance ( $\Omega$ ) of the blade motor:
  - a. Set the multimeter to the resistance mode.
  - b. Place the positive (+) probe of the multimeter on the motor terminal U, place the negative (-) probe of the multimeter on the motor terminal V, and check the reading.
  - c. Place the positive (+) probe of the multimeter on the motor terminal U, place the negative (-) probe of the multimeter on the motor terminal W, and check the reading.
  - d. Place the positive (+) probe of the multimeter on the motor terminal V, place the negative (-) probe of the multimeter on the motor terminal W, and check the reading.
  - e. If the above three readings are greater than 5  $\Omega$ , replace the blade motor.
9. Measure the resistance in the six-pin motor connector by placing the negative (-) probe of the multimeter on pin 2 and the positive (+) probe of the multimeter on pin 3. Resistance should read between 800k and 1.2m ohms ( $\Omega$ ). Resistance between pin 2 and pins 1, 4, 5, and 6 should be 0 ohm. If resistances are above or below these ranges, replace the blade motor.
10. If the above steps are completed and the issues persist, refer to the following troubleshooting processes for wiring harnesses.

## 12.4 Wiring Harnesses

Problem	Cause	Solution
The mower cannot be started.	Connections to the wiring harness terminals below the power button are poor.	If the connectors are loose, reconnect them. If the pins of the wiring harness are loose, contact your dealer for repair.
	The connections between wiring harnesses and batteries are loose.	Check and reconnect the connectors.
The motors do not work.	Power harnesses or communication harnesses to the motors are faulty.	Check for loose connectors or discontinuity of the power harnesses and communication harnesses, and contact your dealer for repair if necessary.
The switches do not work.	The connections between wiring harnesses and batteries are loose.	Locate the faulty switch according to on-screen instructions, check for abnormality in its connectors, and contact your dealer for repair if necessary.

## **13 Warranty Policy**

Refer to the FJDynamics RM21 Autonomous Mower After-sales Service Policy for Overseas Dealers (2024).

