Installation and Calibration Instructions for the PWL Parallel Guidance kit.





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Contents

1 Before You Start 5

1.1 A Word to the Operator 5

1.2 Safety Precautions 5

1.3 Disclaimer 6

2 NanoSteer 210 at a Glance 7

3 Hardware 8

3.1 Overview 8

3.2 Before Installation 10

3.2.1 Check 10

3.2.2 Preparation 10

3.3 FC3 Controller 12

3.3.1 Interface 12

3.3.2 Indicator light 12

3.3.3 Installation 12

3.4 FM5 Electric Steering Wheel 13

3.4.1 Packing List 13

3.4.2 Installation 14

3.5 DP10 Display 19

3.5.1 Packing List 19

3.5.2 Installation 19

3.6 J100 Angle Sensor Installation 21

3.7 G100 Tilt Sensor Installation 22

3.8 Cable 24

3.8.1 Introduction 24

3.8.2 Connection 25

4 Software 27
4.1 Overview 27
4.2 Status 29
4.3 Task 33
4.4 Machine 37
4.4.1 Machine 37
4.4.2 Implement 48
4.4.3 Function 52
4.5 System 58
4.5.1 Network 58
4.5.2 Differential 61
4.5.3 System 66
4.6 Operation 75
4.6.1 Key icon explanation 75
4.6.2 Create line to start task 79

1 Before You Start

Dear customers,

Thank you for purchasing our product. Before starting your work, please carefully read the following, and make sure your operator will carefully read them if you are not the operator:

- This user guide is for your product only. If the actual situation does not match with the situation in the user guide, the actual situation shall prevail.
- For safety and instructions on how to use this system, please carefully read the precautions for safe operation, exemptions from responsibility and instructions in the user guide.
- The information in this user guide is subject to change without notice. We reserve the right to change or improve the device as well the content in the user guide without any obligation to notify you. For any questions, please contact us.

1.1 A Word to the Operator

The **PWL NanoSteer 210 Auto-steering System** (hereinafter referred to as **NanoSteer 210 System**) is designed as an operator aid for precision agriculture applications. It is NOT a SUBSTITUTE for you. At all times, please keep in mind that YOU are fully responsible for the safe operation of the vehicle.

You should closely review the safety precautions and directions as to the proper use of the system in this guide and at all times comply with the same.

This user guide is written for the **PWL NanoSteer 210** only. If the actual situation does not match with the situation in the user guide, the actual situation shall prevail.

The information in this user guide is subject to change without notice. We reserve the right to redesign, change or improve the system as well the content in the user guide as necessary without notification.

1.2 Safety Precautions

Safety precautions in this part are intended to minimize the risk of personal injury and/or damage to property.

Improper use of the system can lead to death or injury to persons, damage to property and/or malfunction of the system. Please integrate safety with your daily work all the time.

Before starting your work, please carefully read and understand the safety section, know the positions and operations of all controls, and check all controls in an area clear of people and obstacles.

Remember that YOU are the key to safety. Good safety practices not only protect you, but also the people around you.

1.3 Disclaimer

We assume no responsibility or liability for any damages to property, personal injuries or death resulting from the following conditions, including the **PWL NanoSteer 210 System** and any of its components:

- Any damage or losses resulting from installation or operation not in accordance with the precautions and instructions in this user guide or from intentional destruction or damage to the system.
- Any damage to property and/or malfunction of the system resulting from maintenance centers that not authorized by the PWL service centers.
- Any disasters, such as earthquakes, storms, floods etc.
- A change of data, loss of data, etc.
- Wrong transport.
- Use of non-original parts.
- Usage not explained in the user guide.
- Use of the system or the GNSS signal for any purpose other than the intended purpose.

We cannot guarantee the accuracy, integrity, continuity, or availability of the GNSS signal.

It is your responsibility to exercise common sense and navigational judgment while using the system.

2 NanoSteer 210 at a Glance

The **PWL NanoSteer 210** is integrated navigation devices designed specifically for agricultural machinery autopilot, delivering reliable positioning and guidance to enhance farming precision and operational efficiency. The **PWL NanoSteer 210** comes with a large 10-inch screen and advanced software that supports complex functions. The device integrates seamlessly with agricultural machinery, providing intuitive operation and stable performance to meet diverse needs across small to large-scale farming scenarios.

- Accuracy:
  - Dry land: 2.5 cm @RMS (≤ 10 km/h)
  - Paddy land: 5 cm @RMS (≤6km/h)
- Line acquisition distance: < 7 m
- Vehicle velocity range: 0.2 - 18 km/h
- Correction data source: CORS, Radio, and Satellite Correction
- NMEA output: GGA, GSV, VTG, GSA, ZDA, RMC and GST
- Data format: RTCM3.X
- Optional sensor: Angle sensor, GNSS secondary antenna and camera

The system consists of the following:

- Hardware
- Software

3 Hardware

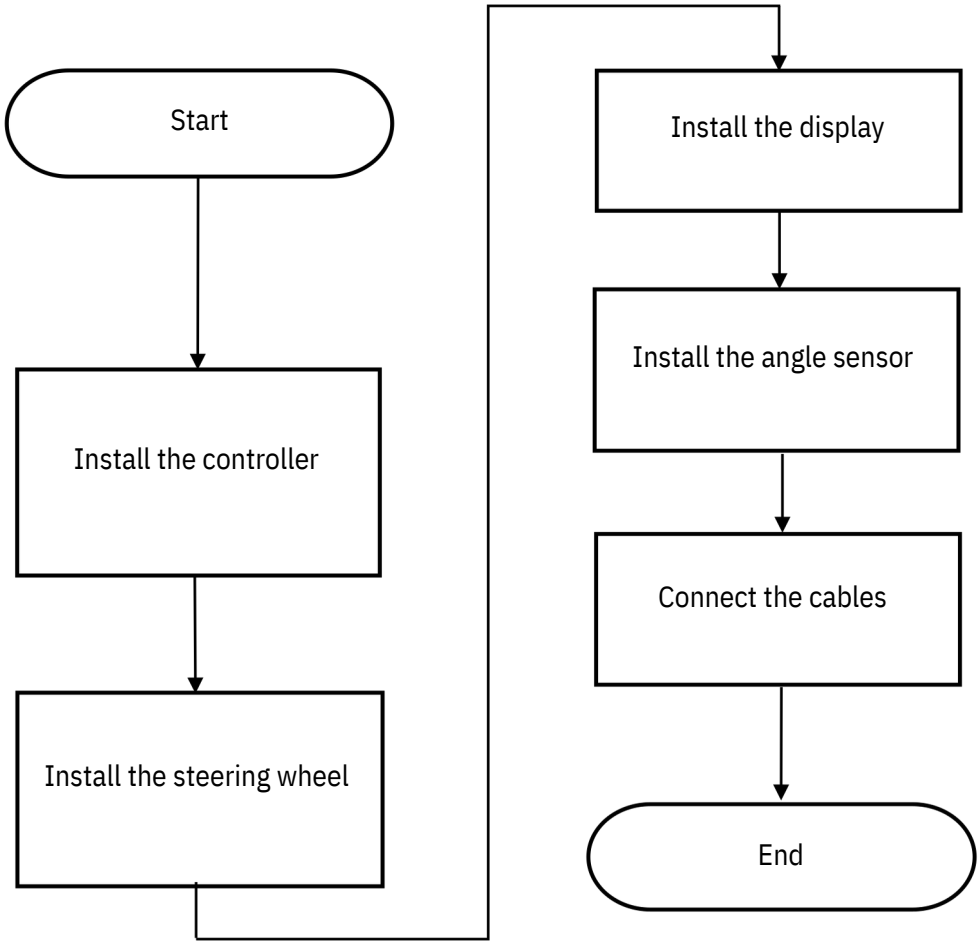
3.1 Overview

NanoSteer 210 hardware consists of the following:

Hardware	Picture	Where to install
FC3 Controller		It should be installed on the place that is at central axis of the vehicle roof. Before installing it, please check if there are screws and fixed brackets.
DP10 Display		It should be installed on the place where is easy to view and operate for the driver.
FM5 Electric Steering Wheel		It should be directly fixed on the steering shaft.
J100 Angle Sensor (Optional)		It should be installed on the right side of the front axle of the vehicle.
NGP300 Auxiliary Antenna (Optional)		It should be installed on the place that is at central axis of the vehicle roof. The distance between the NGP300 antenna and FC3 controller must be longer than 1 meter.
Camera (Optional)		The camera is used to observe the surrounding environment of the vehicle.

Hardware	Picture	Where to install
G100 Tilt Sensor (Optional)		The G100 tilt sensor is installed on the boom connecting the implement and the tractor.
Control Panel (Optional)		It should be installed on the place where is easy to hold and operate for the driver.
System cables	-	See Cable for details.

The typical installation process is as follows:



3.2 Before Installation

3.2.1 Check

Before installation, please make sure that the vehicle to be installed meets the following basic conditions:

- The vehicle is parked on a clean level floor.
- There is adequate clearance to work all around.
- The park brake is applied and the wheels are chocked.
- All implements and headers are lowered to the ground.
- The pressure of the front tires is enough.
- If it is too low, please inflate the tires to reach the required tire pressure.
- The space between connecting rods responsible for the steering of the front tires is not too large.
- If it is too large, please adjust it.
- The vibration produced by the engine is not too strong when the vehicle is started.
- The battery voltage is normal.
- The voltage is 12 V (off status), and 12 - 16V (on status).
- The steering wheel is light during working and there is no gap in the combination of the steering shaft and the steering wheel.
- The installation spaces of the steering wheel, Y-shaped bracket and C-shaped bracket are enough.

3.2.2 Preparation

Before installation, please prepare the following tools:

Name	Specification
Screwdriver	1
Socket head screw wrench	1
Open-end wrench	1
Diagonal pliers	1
Three-jaw gear puller Tape	1
Knife	1
Electric drill	1
Socket wrench	1

3.3 FC3 Controller

The FC3 controller are specialized controller designed to power agricultural navigation systems, with each model optimized for distinct installation needs and functional requirements.

The FC3 takes an all-in-one design—integrating an IMU, antenna, and board—tailored for roof mounting on farm equipment, delivering stable performance to ensure reliable navigation for agricultural operations.

3.3.1 Interface

9-pin port*1(232*2, CAN*1);

RF interface, for GNSS secondary antenna TNC interface;

Sim card slot*1.

3.3.2 Indicator light

After connecting all the cables, you can turn on the power button to start the FC3 controller. When it starts up, you can judge the status by observing the color of indicator light:

Red light flashing: Upgrade mode

Red light constantly on: Self-check of device

Green light constantly on: The device self-check has been completed

Green light flashing: RTK fixed solution

3.3.3 Installation

The controller needs to be installed on the roof of the car, and the installation bracket has been pre-installed at the bottom.

It can be fixed by screws or adhesive tape. After the preparation work is completed, the controller should be installed on the central axis of the tractor.



3.4 FM5 Electric Steering Wheel

3.4.1 Packing List

Name	Quantity	Picture
FM5 Electric Steering Wheel	1	
T bracket	1	
T bracket extension	1	
Y-shaped bracket and C-shaped bracket	1	
M5*12 M6*40	8 3	
Steering wheel handball	1	

3.4.2 Installation

1. First, align the motor and steering wheel and tighten them with screws to connect them (They were already connected when you received them)

This step does not require installing the steering wheel cover.



If it has been installed beforehand, please remove the steering wheel coverfor subsequent installation.

2. Second, install the shaft adapter.

Flip the motor over and fix the shaft adapter with screws.



3. Third, install the T-shaped bracket at the bottom of the motor.

Install with screws as well, no need to tighten now for subsequent installation and adjustment of position.



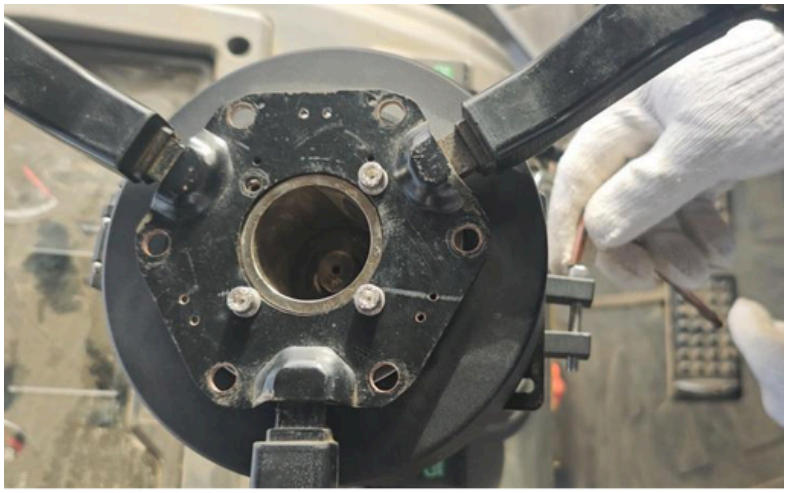
4. Fourth, at the end of the steering pestle, install and fix the Y and C brackets,

which also do not need to be fully tightened for easy adjustment of position.



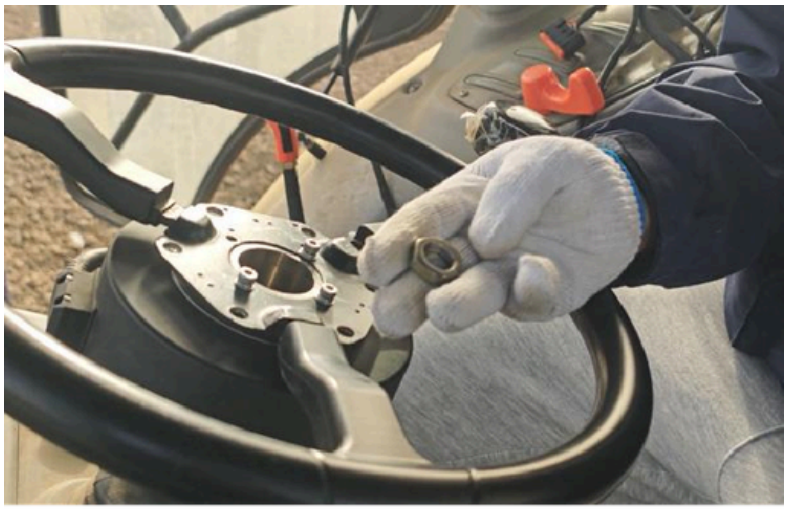


5. Then, insert the motor into the steering pestle and secure all mounting brackets with screws.

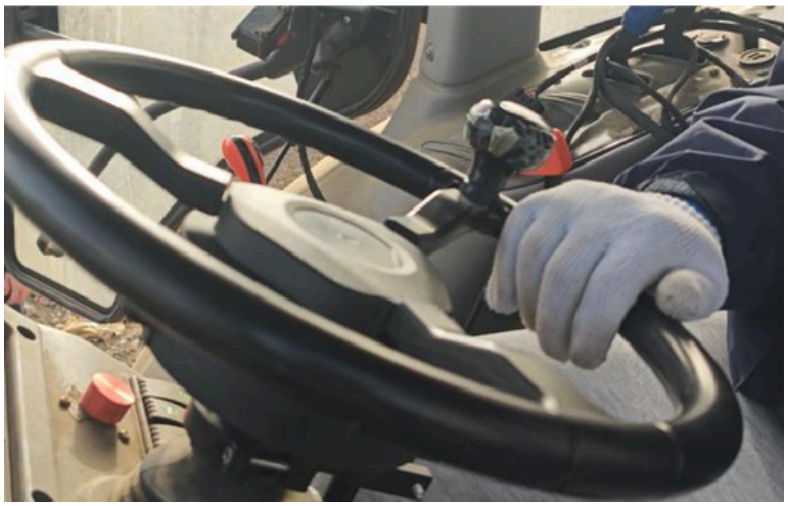




6. Finally, insert the shaft screw into the motor hole, tighten it with a socket wrench, and then cover the steering wheel cover to complete the installation of the motor steering wheel.







3.5 DP10 Display

3.5.1 Packing List

Name	Quantity	Picture
DP10 display	1	
RAM bracket kit	1	

3.5.2 Installation

The intelligent display should be installed in a place that is easy for you to view and operate. Typically, this is the armrest on the right door.

1. First, install the rectangular base ball head with U-shaped screws and secure it in a suitable place inside the cab.



2. Then connect the RAM bracket to the ball head.



3. Finally, connect the tablet to the RAM bracket, tighten and secure it. Installation is completed.





3.6 J100 Angle Sensor Installation

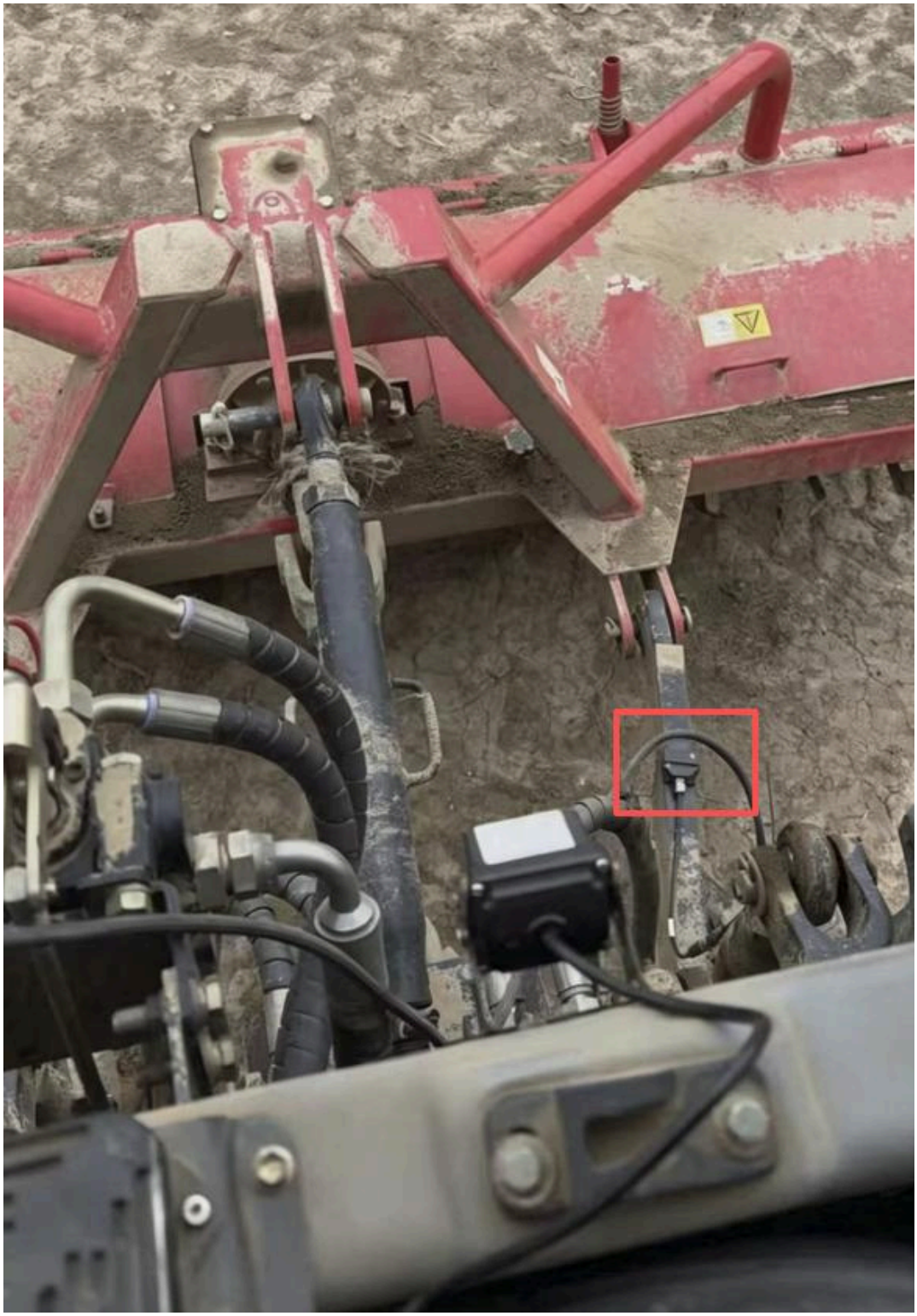
For angle sensor, the sensor itself has already been integrated with the mounting plate bracket in advance, just select a suitable place, install and fix it flat on the right front wheel side (make sure it is the right front wheel).





3.7 G100 Tilt Sensor Installation

For G100 tilt sensor, the sensor itself has already been integrated with the mounting plate bracket in advance, just install and fix it on the **upper arm** connecting the implement and the vehicle, ensuring that the angle between the sensor surface and the horizontal plane can change following the lifting and lowering of the implement.



3.8 Cable

3.8.1 Introduction

Generally, a system only has one integrated harness.

If you purchase an optional angle sensor, you will also have an **extension wire** for the angle sensor.

Integrated wiring harness, the main head is the **connector of the controller**.

Following the controller connector downwards, it will reach a branch port, where there will be a total of Five branch lines.

One of the branch ports is very short and serves as the interface for the **angle sensor**, which can be used with the extension cable;

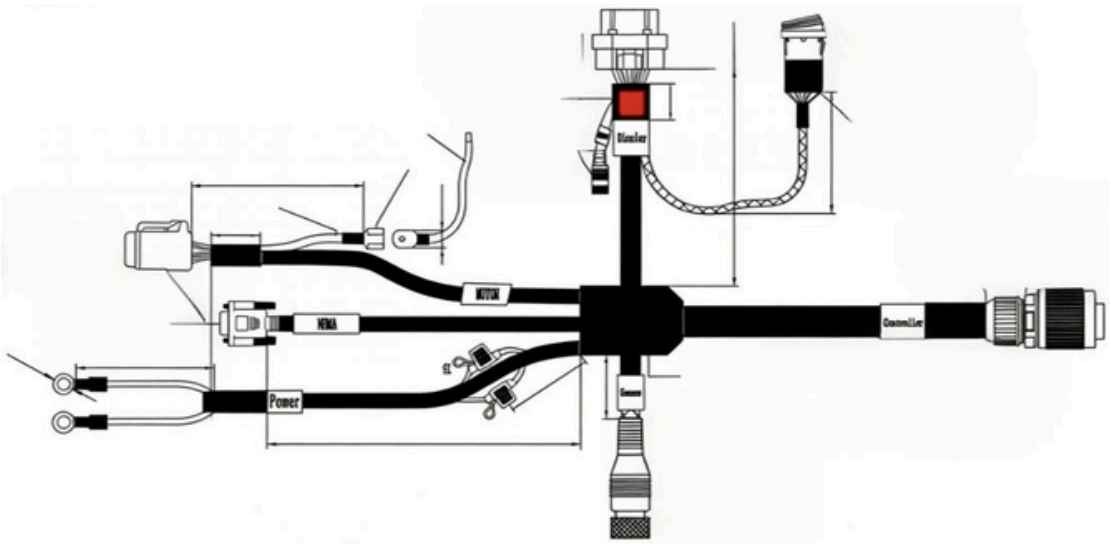
The next branch port, you can first see the fuse, followed by the interfaces for the positive and negative poles of the **power supply**;

One of the remaining three branches is the interface for the **motor**, as well as the switch and the horn wire. If the original steering wheel has a horn, it can be connected through this harness to preserve the horn;

The next branch port is the **DB9 connector**, which can be used to output the **NMEA data**.

The last branch is the interface for the **display** screen and the interface for the external **camera**.

The wiring harness diagrams are shown below——Each connector is labeled and easily recognizable.



3.8.2 Connection

1. First, connect the power interface.

To operate the battery, first remove the positive electrode, then remove the negative electrode.

After disassembly, connect the negative port first, and then connect the positive port.



2. After the connection is completed, connect the four branch ports in sequence (display screen+motor+controller+angle sensor), where the angle sensor is optional.







3. When connecting the angle sensor, a sufficiently long wire harness needs to be reserved to prevent the wire from being pulled off by subsequent tire turning.

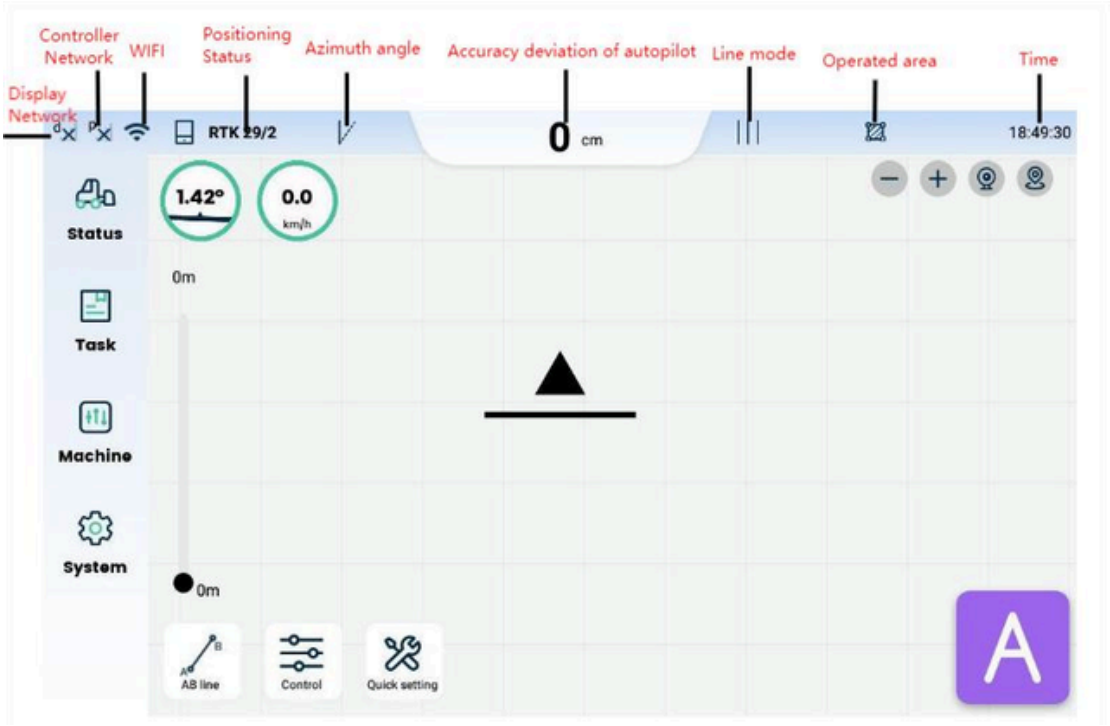


After connecting the wiring harness, the messy wiring harness can be tied upwith cable ties and fixed on the body.

4 Software

4.1 Overview

The main software interface is as follows——



For satellite positioning status:

• NO No satellite signal.

• AUT connection authorization

• FLT Floating point solution.

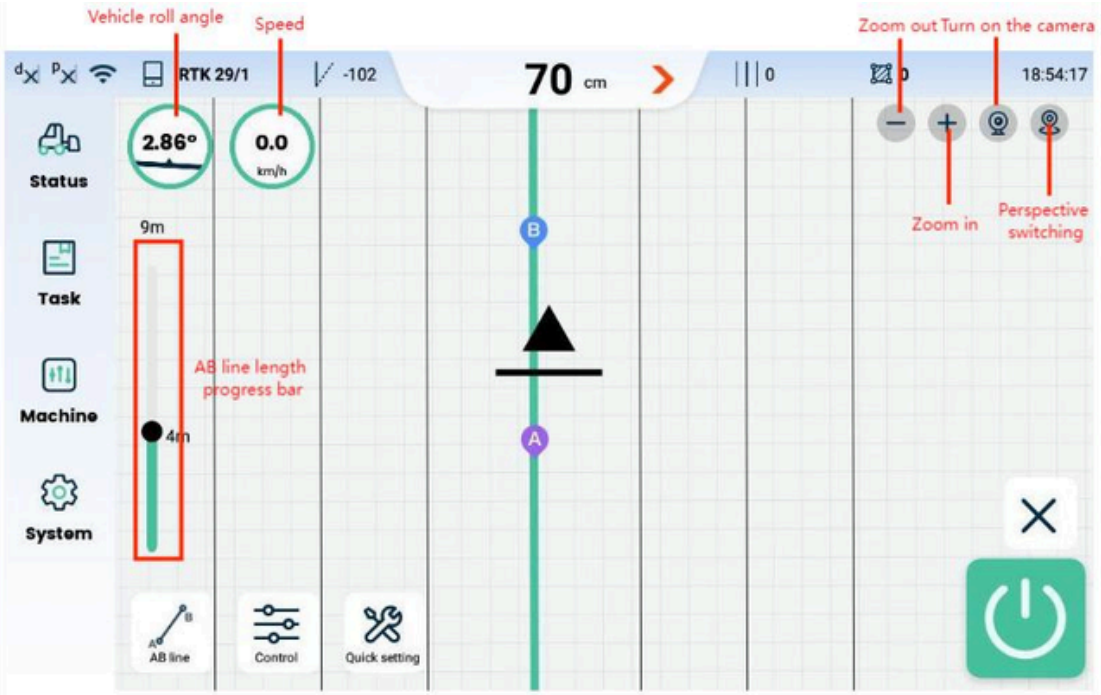
• DIF SBAS Status (Satellite based Augmentation System).

• RTK Fixed solution. The number after RTK, the number before "/" represents the number of available satellites,and the number after "/" represents the differential age.

Please start working after the solution status is fixed RTK solution.

• PPP Satellite based positioning enhancement state, while reaching a fixed solution.

• PPP-SStar based system, the system is in a converging state.



- 9m : This number represents the straight-line distance between point A and point B after setting the guidance line.

- 0m : The distance already traveled.

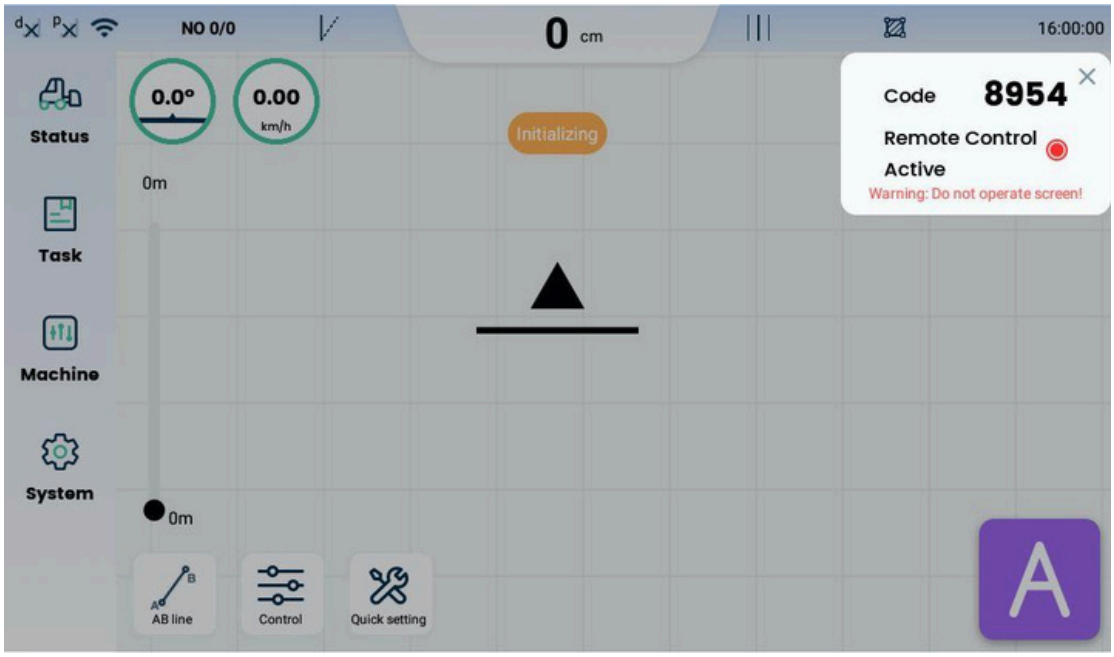
- : The pattern represents the vehicle.

- :The pattern represents point A. (After successful clicking, it is used to create a new task guidance line point A, which will become point B. After the line is created, it will become . Click to activate autopilot.)

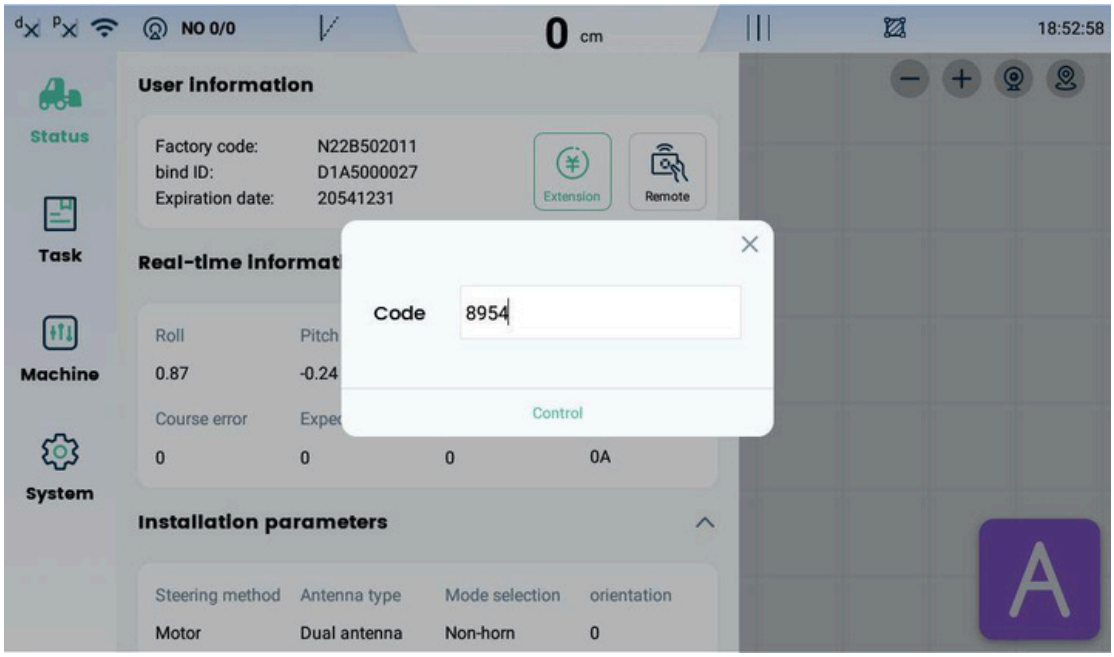
4.2 Status

• User Information——Users can see the factory code, bind ID and other information；

• **Remote**——After clicking the button, the device enters the remote standby controlled state. If it needs to be controlled, it should be maintained on the interface shown in the figure below and no other operations should be performed;

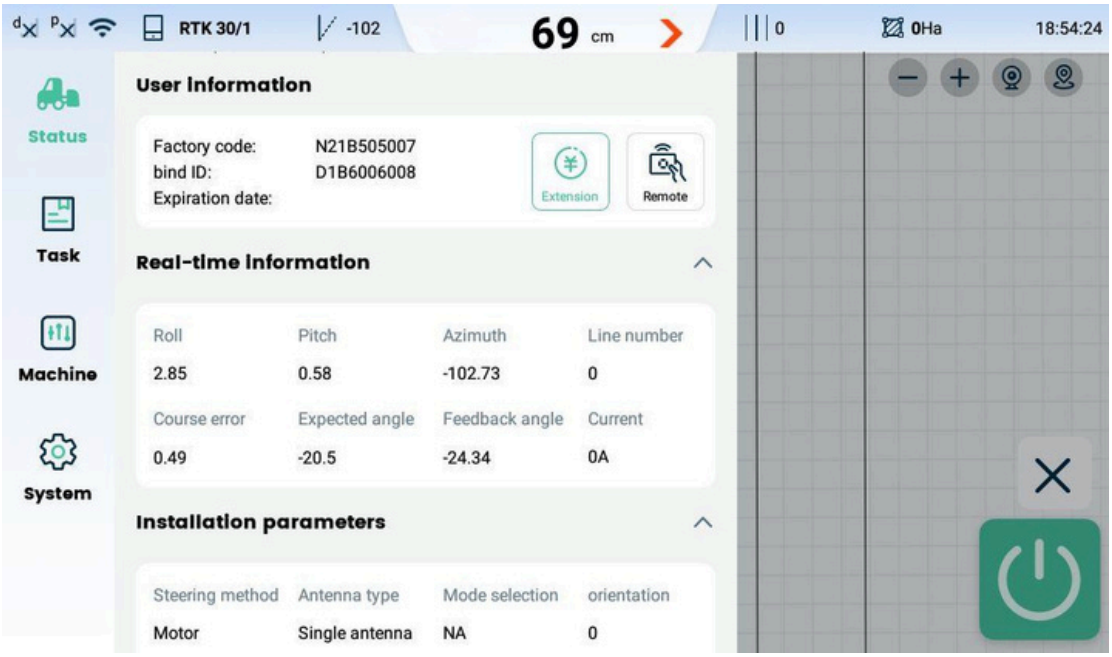


• **Remote**——After long pressing the button, a pop-up window will appear. At this time, enter the control code of the device to be controlled in the window and confirm, and it will enter remote control mode. At this time, the device can remotely view and modify the parameters of the other device.



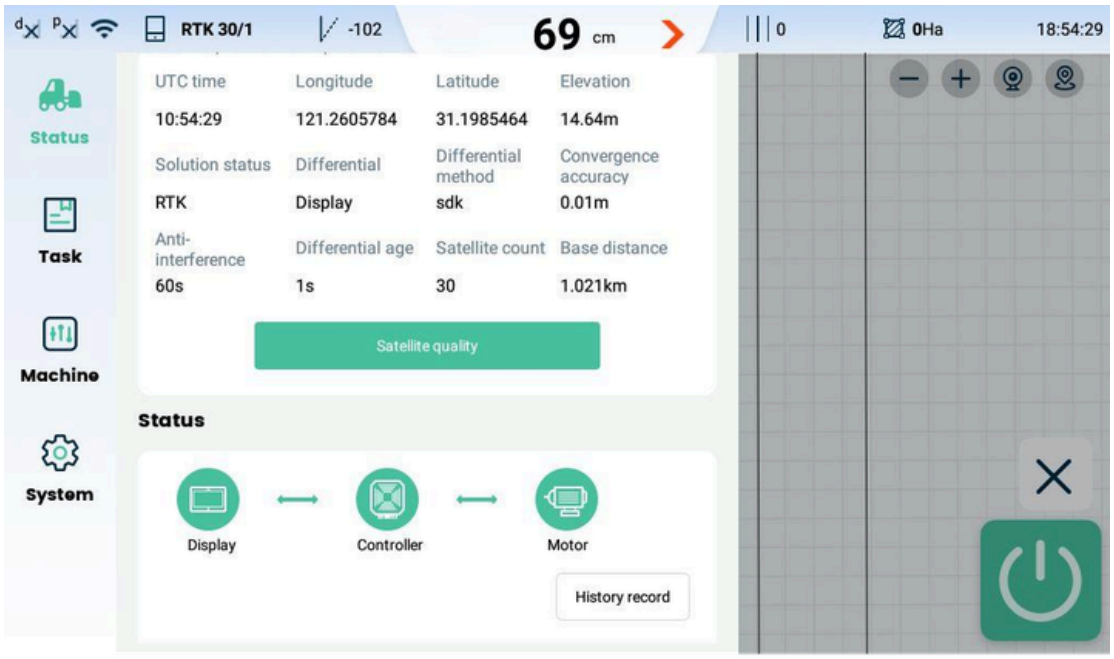
• Real-time Information——Users can see the real-time status of the current device, such as roll and pitch values, guidance line numbers, and other information；

• Installation parameters——Users can see the installation parameters of the current device, such as steering method (motor/hydraulic), antenna type (dual antenna/single antenna), configuration selection, and other information；



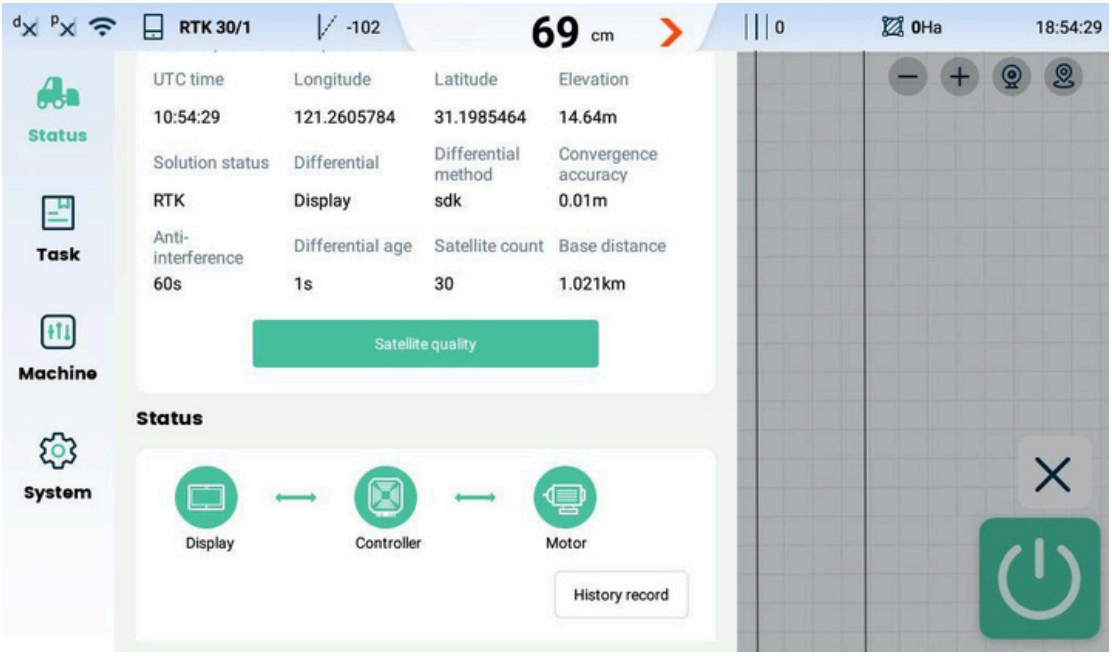
• Satellite status——Users can see thesatellite status of the current device positioning, such as latitude and longitude, differential mode, accuracy,differential age, satellite quantity, and other information;

• Satellite quality——By clicking the green button, users can observe the current device's satellite search status. Green represents nice satellite signal search quality, orange represents average star search quality, and red represents poor star search quality





• Device status

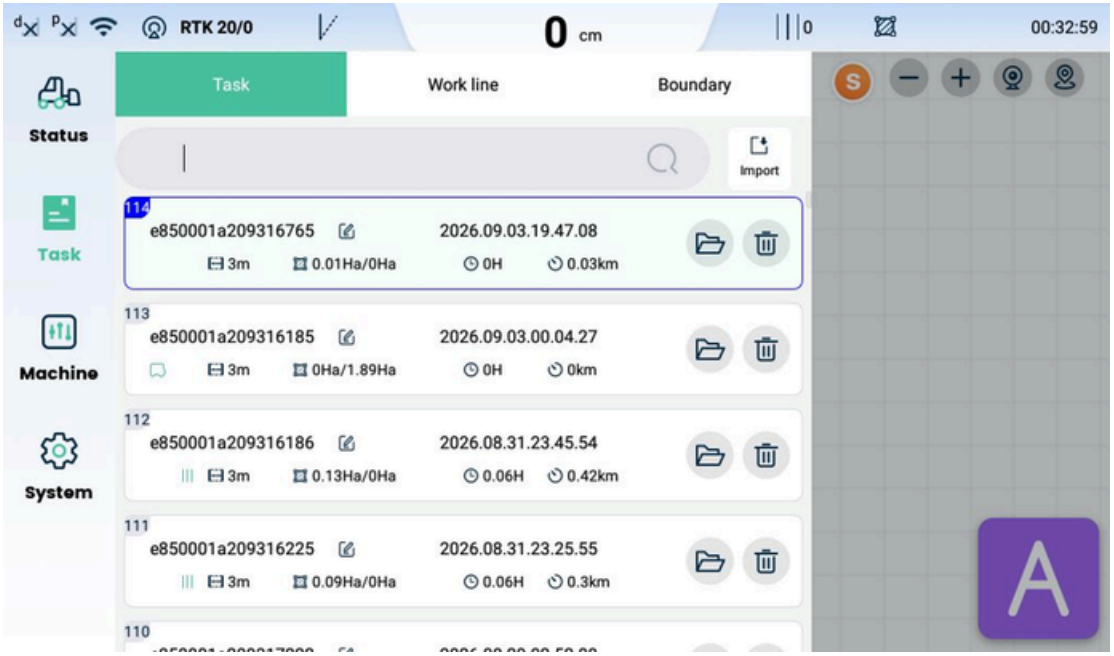


Users can see the connection status ofthe controller, motor, and display through it. When the device malfunctions, it will turn red, indicatinga problem with the circuit connection or equipment.

4.3 Task

The current task interface has been divided into three parts, namely Task, Work Line, and Boundary.

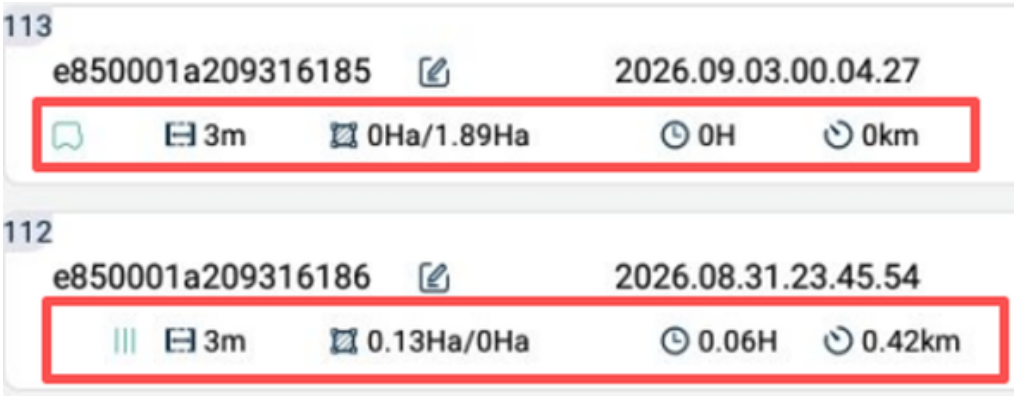
4.3.1 Task



- :Click on the icon to **modify the task line name**.

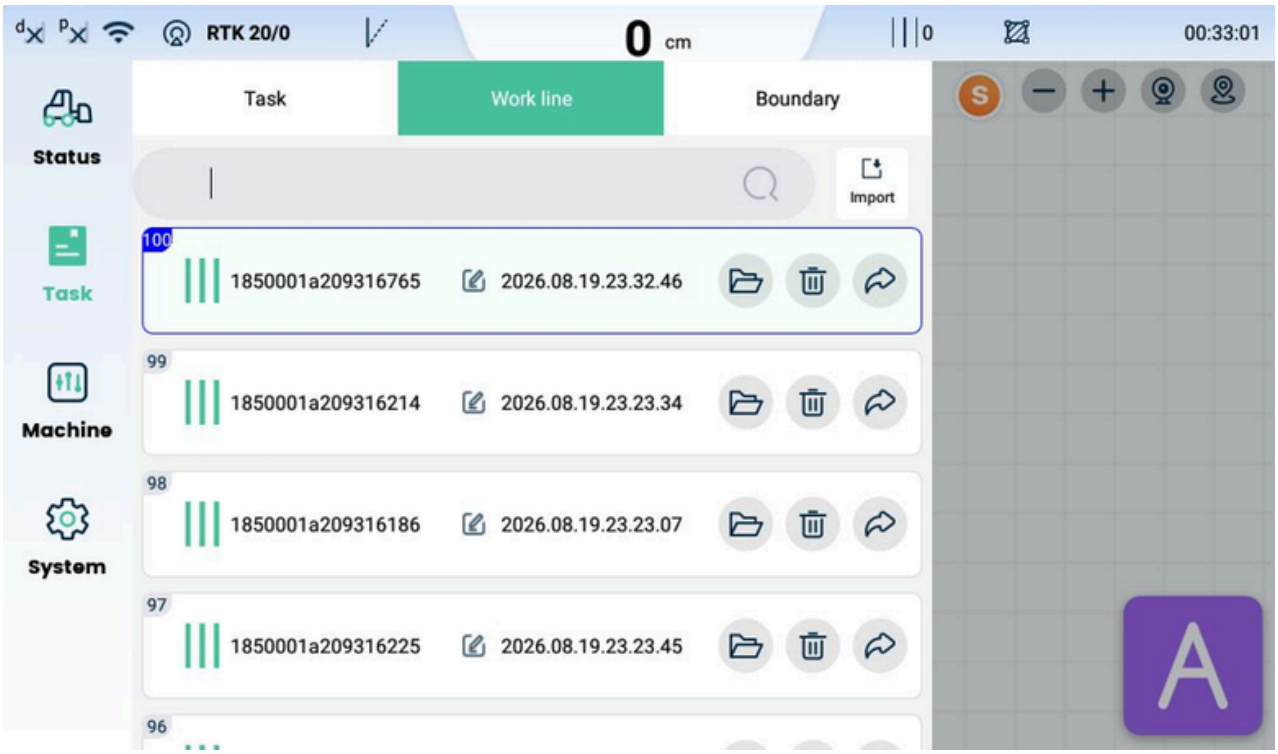
- ： Click the icon to open the task file, and click **Loading task** to continue the task based on the previous task result; Click **Restart** to cancel the set offset and start the task trajectory.

- ： Click on the icon to deletethe corresponding task file.



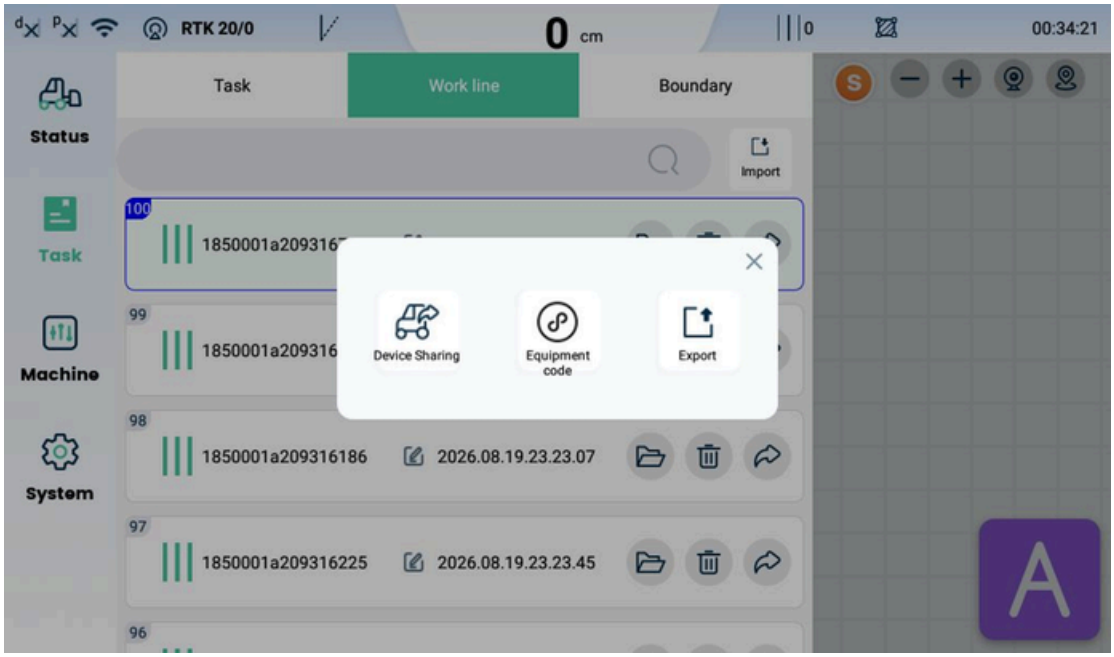
task time, acreage, and width of implement through this small window

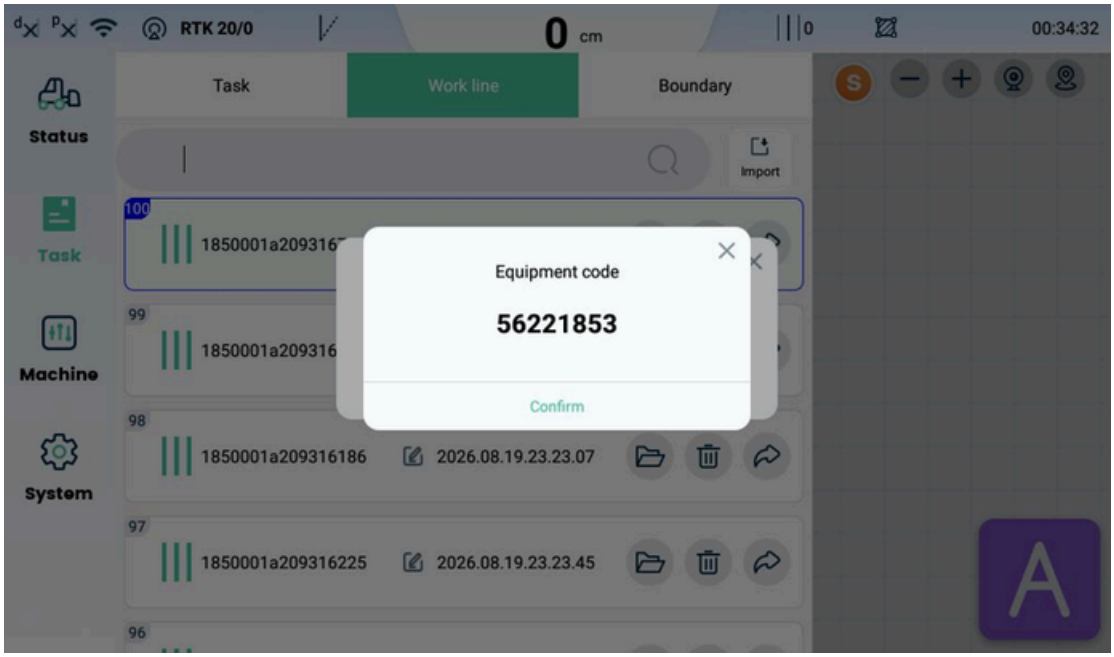
4.3.2 Work line



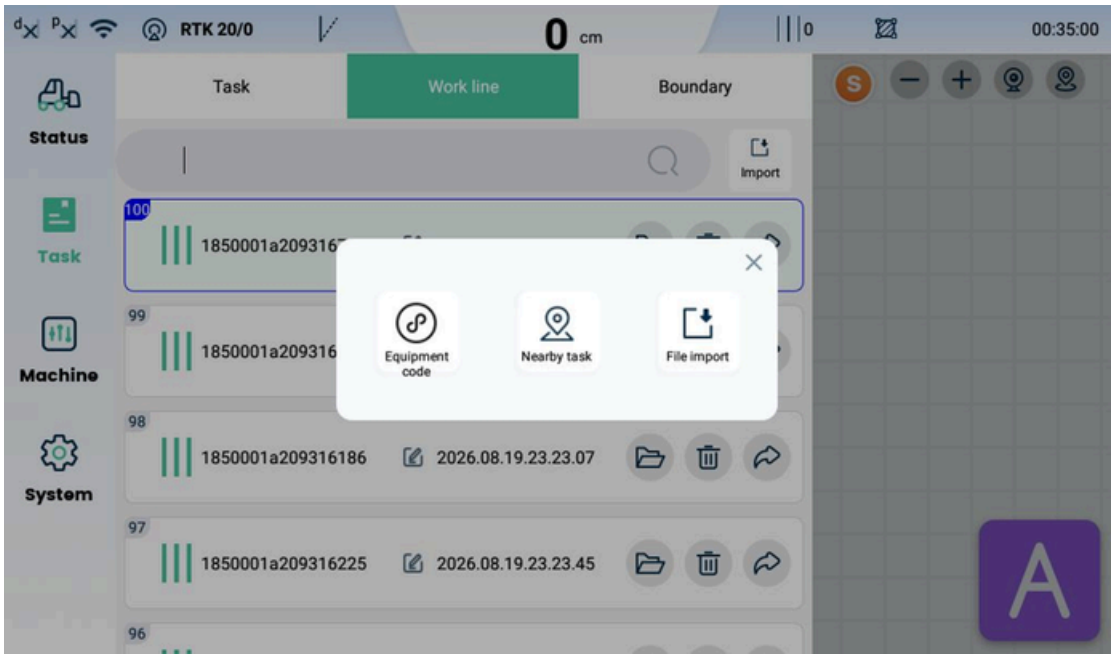
- : Click on the icon to modify the Work line name.
- : Click the icon to open the Work line file
- : Click on the icon to delete the corresponding Work line file.

- : Click this icon to share or export the corresponding task file. Click on **Device Sharing** and enter the **device SN** to share the task to the corresponding device; Clicking on the **Equipment code** will generate a random device code and next, users should press **Confirm**. At this point, another device can import the input device code to import the task file; Click **Export** to export the task file to the storage device.

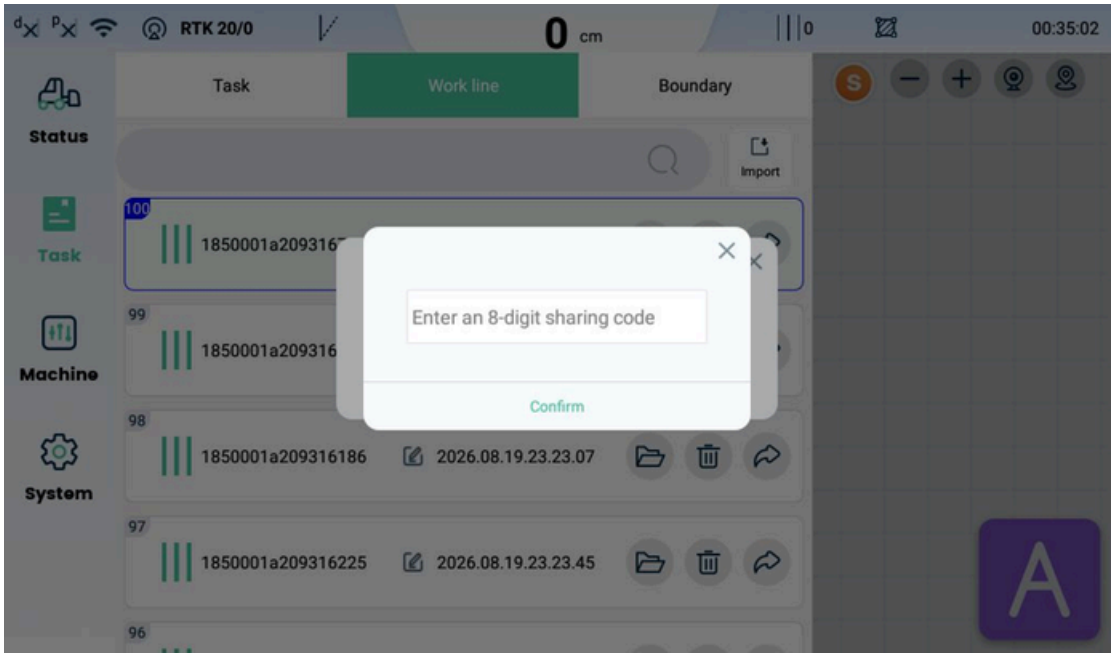




- 
: Click this icon to import the task file.



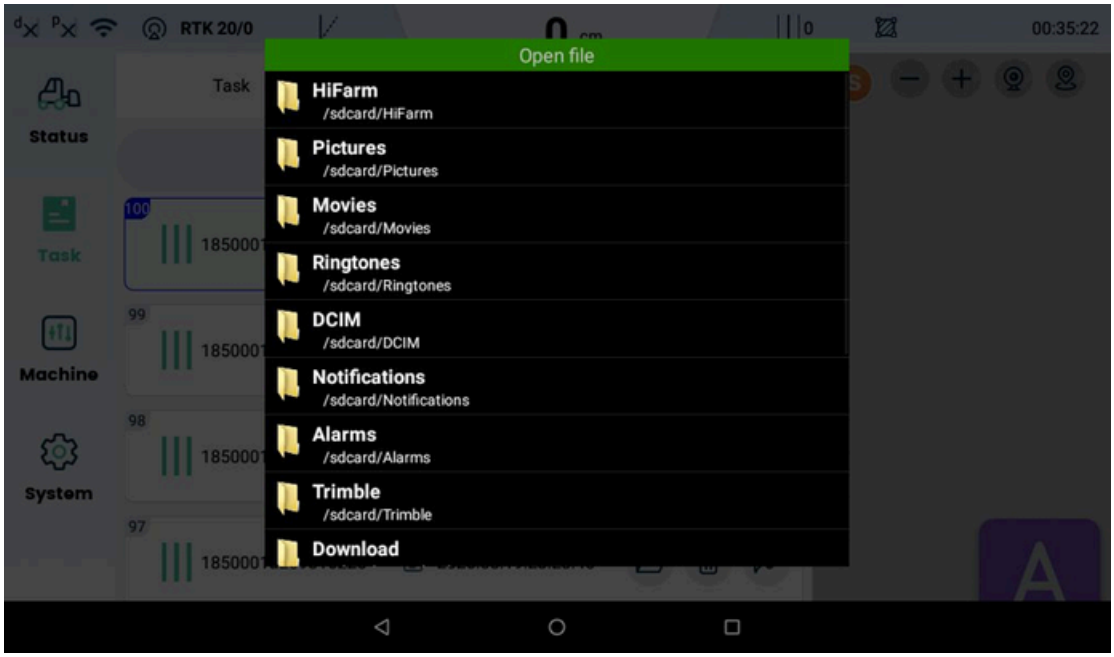
- 
: Click on the **Equipment code** and enter the task sharing code to import the task files related to the sharing code.

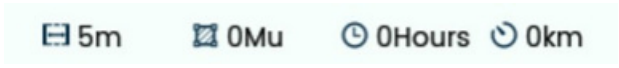


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: Undeveloped.

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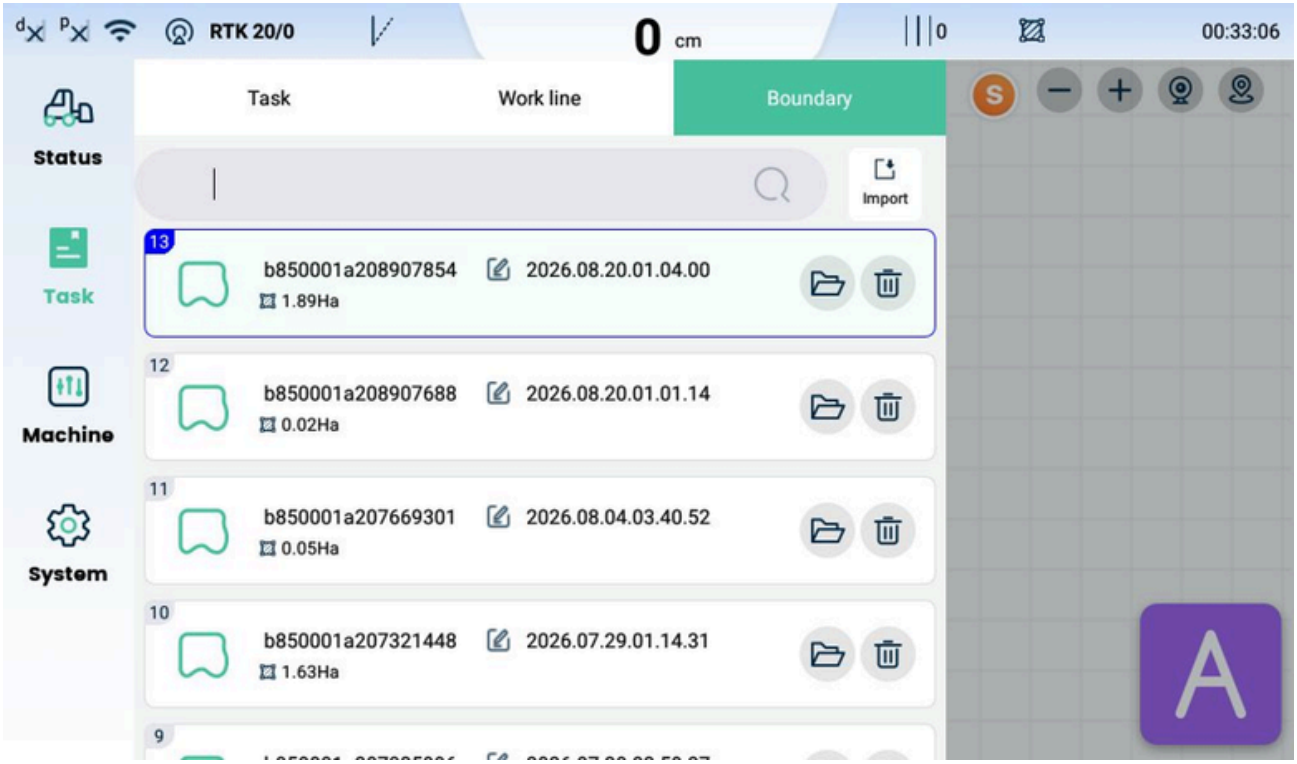
：Click to import task files from local storage.



- 

：You can observe the task time, acreage, and width of implement through thissmall window.

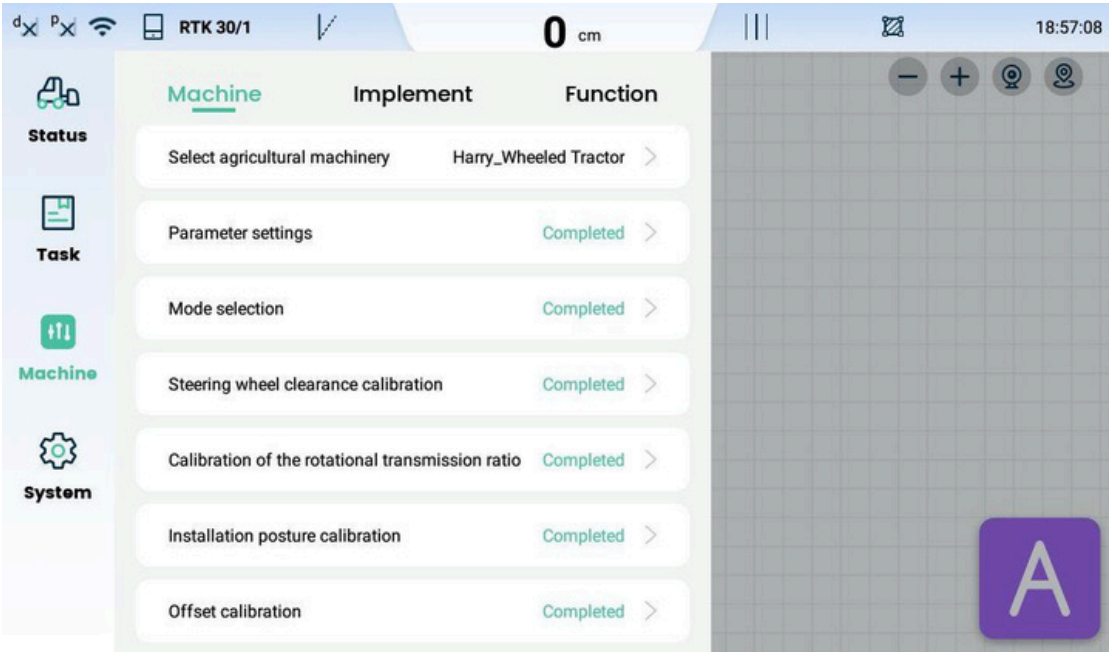
4.3.3 Boundary



-  :Click the icon to open the Boundary.
-  :Click on the icon to delete the corresponding Boundary file.

4.4 Machine

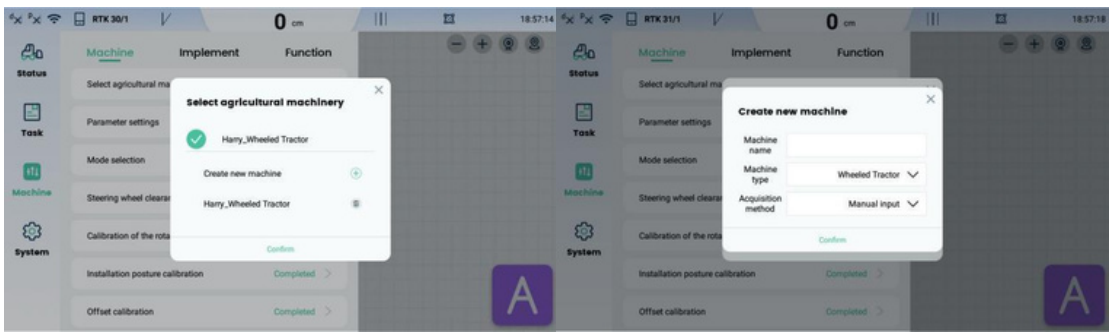
4.4.1 Machine



4.4.1.1 Select agricultural machinery

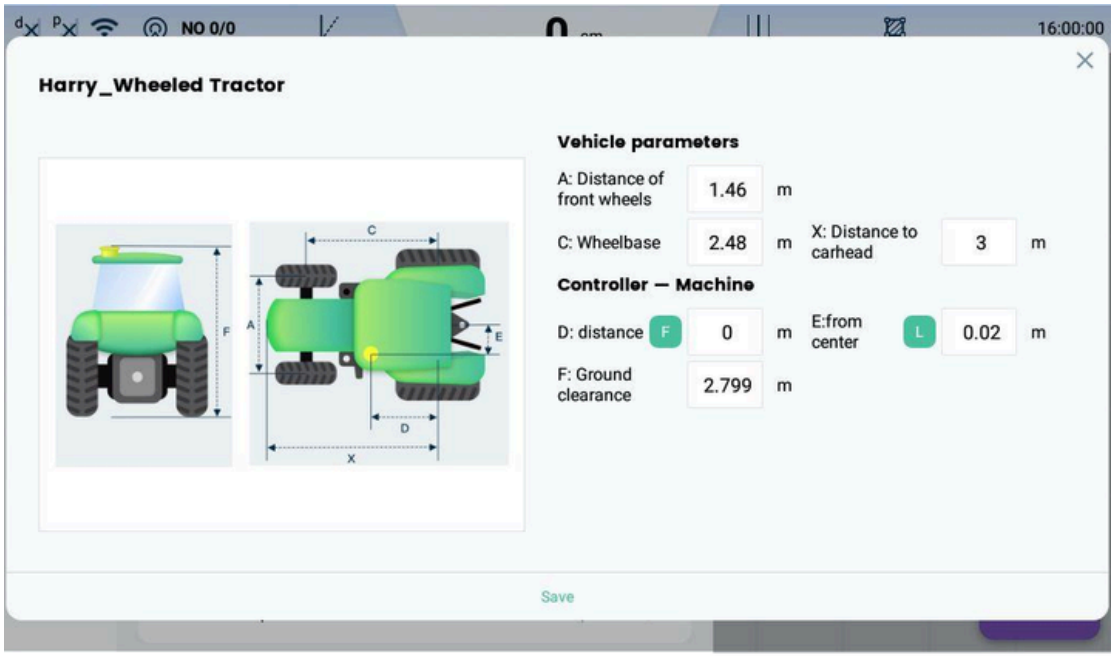
Click this option to create and select an agricultural machinery object.

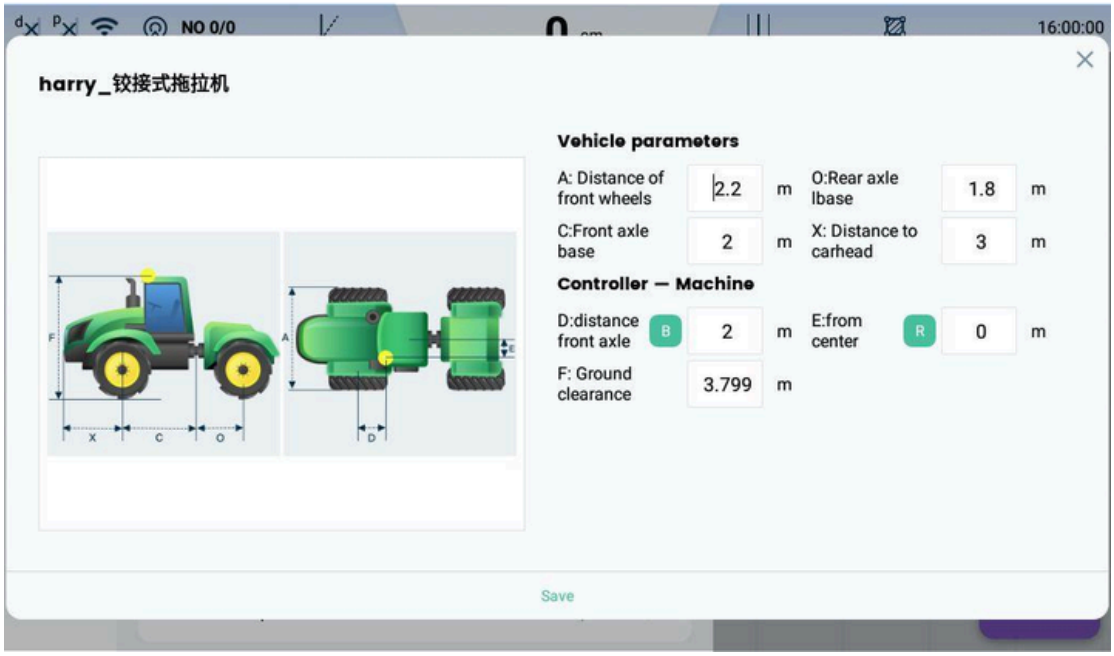
There are various types of agricultural machinery to choose from, such as **wheeled tractors**, **harvesters**, **articulated tractors**, etc. The subsequent parameter measurement standards for agricultural machinery will vary depending on the selected type of machinery.

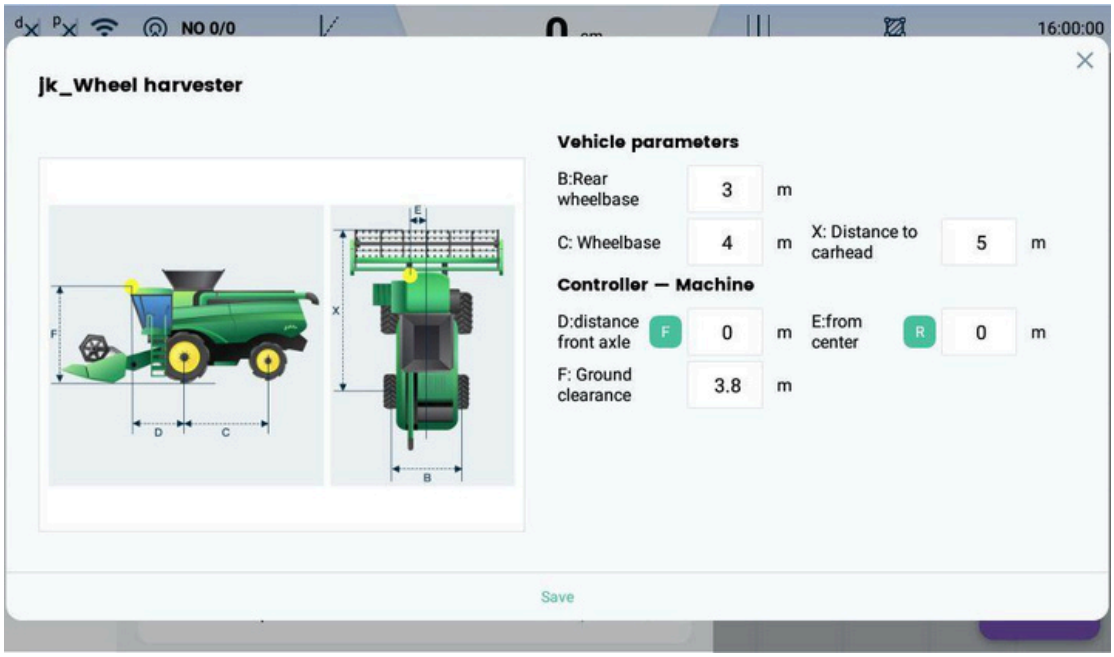


4.4.1.2 Parameter settings

Click on parameter settings, enter various measurement parameters of the vehicle model, and accurately fill in the parameters as shown in the figure. Observe A \ C \ D \ E \ F \ X in the figure, measure the actual data with a ruler, and fill in the corresponding data box (**Note that the unit is "meter"**)







Please try to control the measurement error within 1CM and remember to save the data.

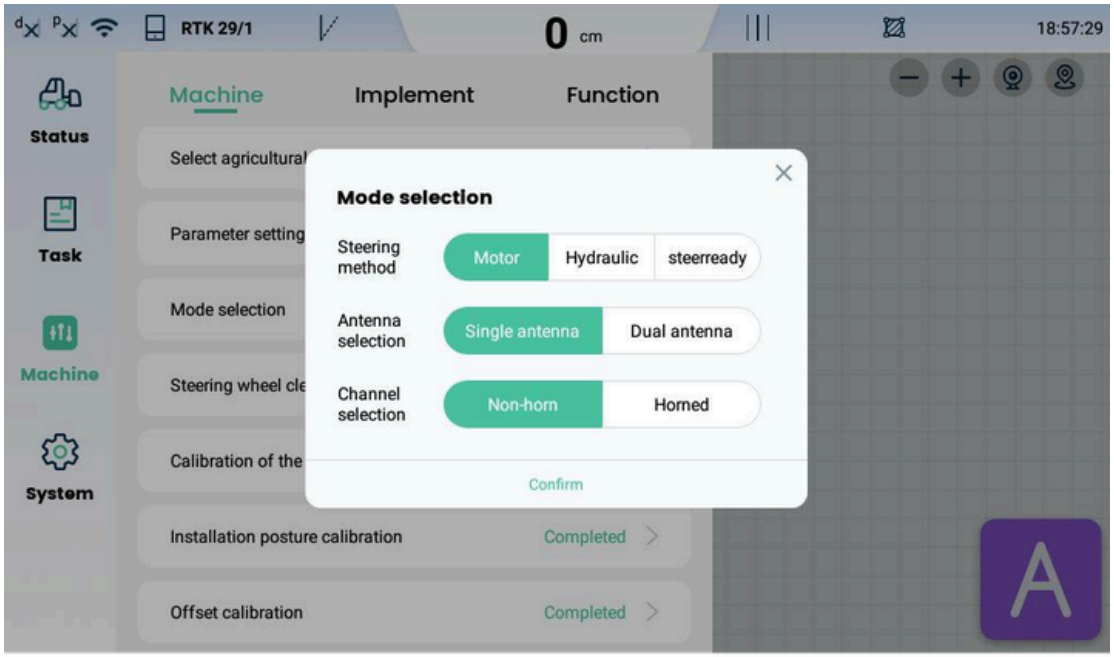
4.4.1.3 Mode selection

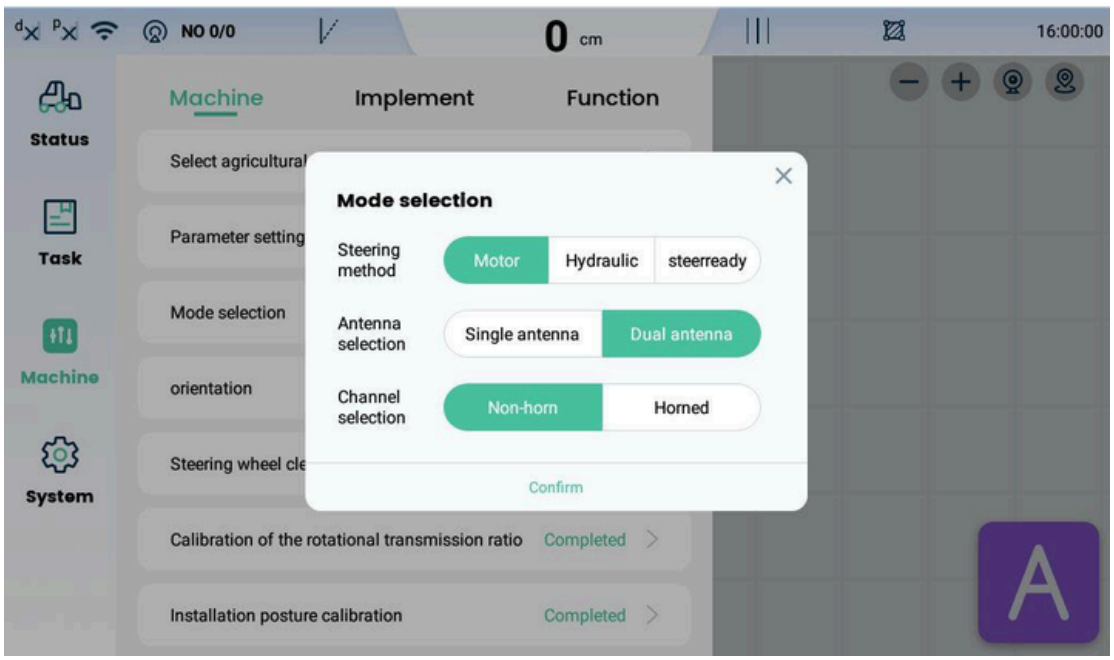
Select **Steering method**, **Antenna selection**, and **Channel selection**.

Non-horn: Angle free sensing mode channel.

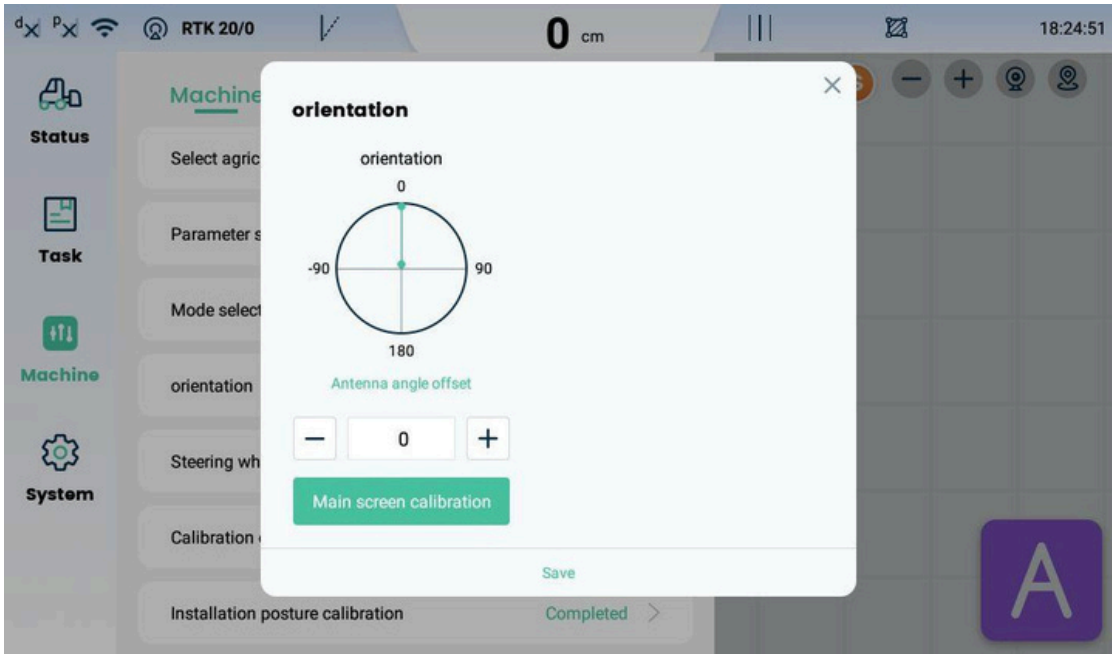
The selected options in the diagram are **motor controlled steering**, **single antenna**, and **angle free sensing mode**.

If the single antenna mode is selected, each time the orientation is reset, the vehicle will be required to drive forward at a speed of 2km/h to determine its heading.

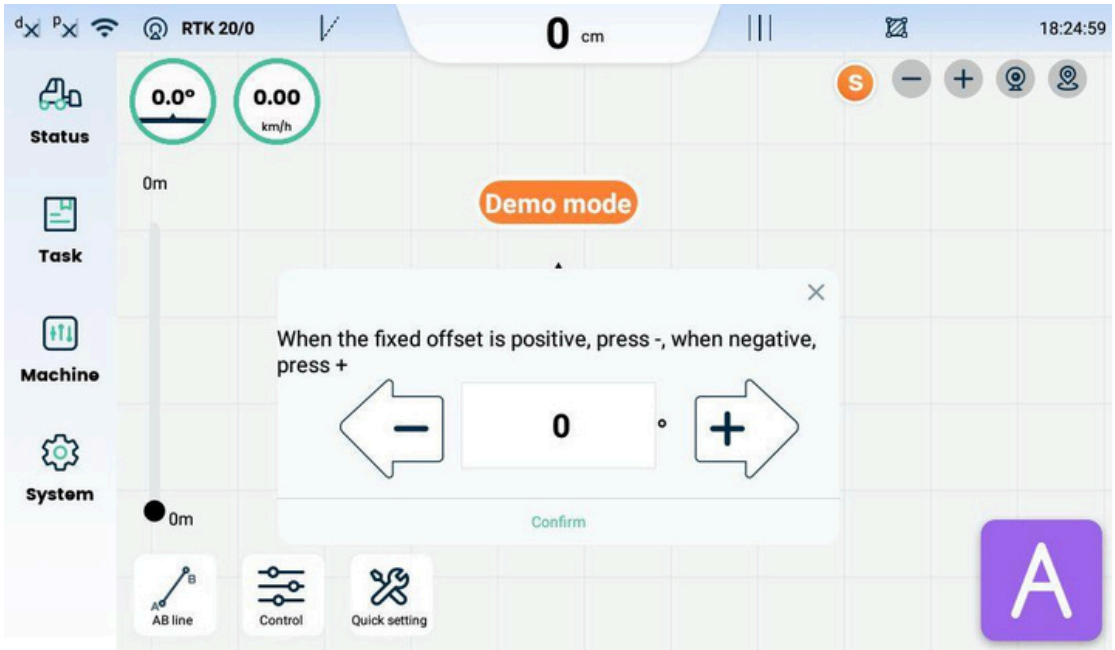




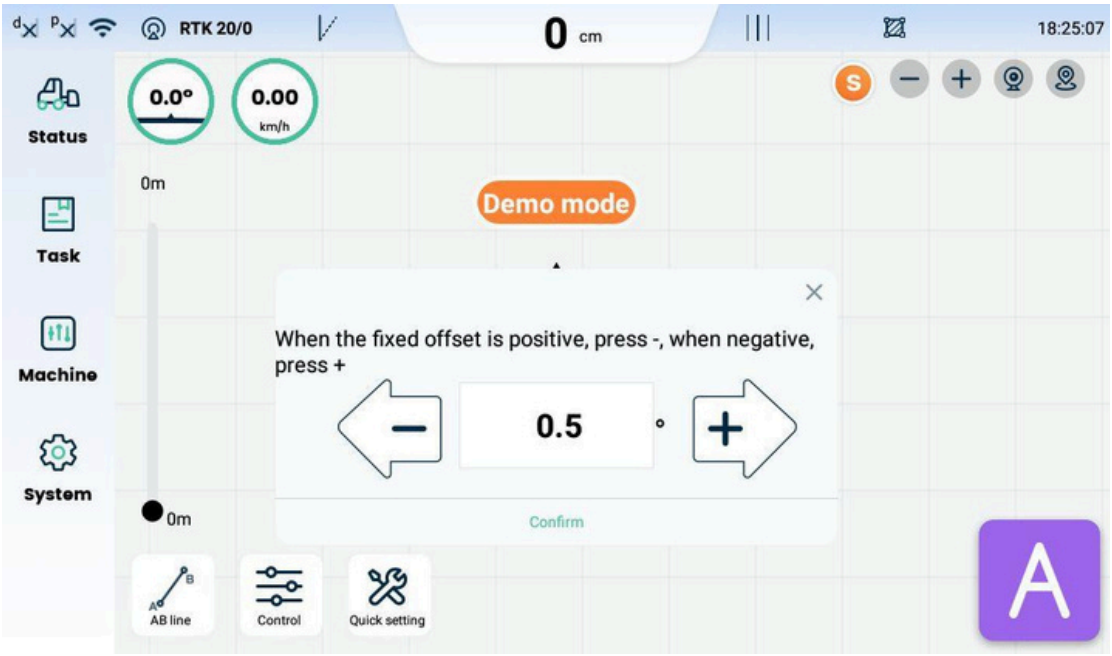
If dual antennas are selected, an orientation option will be added for setting.



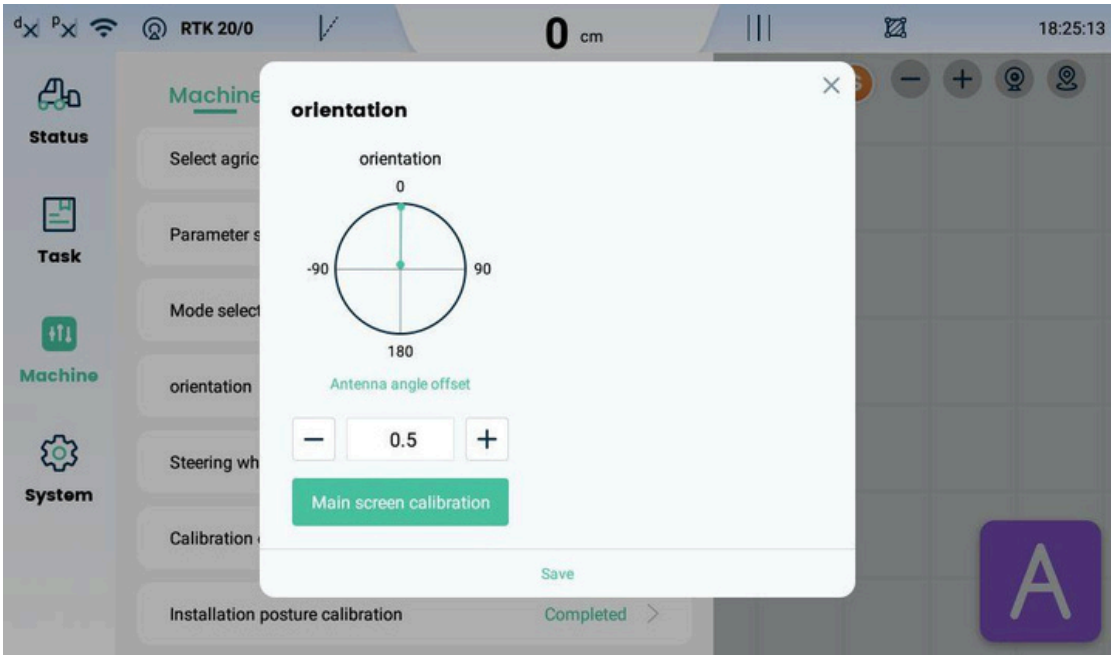
Click on "**Main Screen Calibration**" to enter the calibration process.



According to the interface prompt, adjust the heading angle based on the **fixed offset** displayed at the top of the current autopilot screen until the **fixed offset** is eliminated.



Click **Confirm** to return to the initial window and save the parameter confirmation.

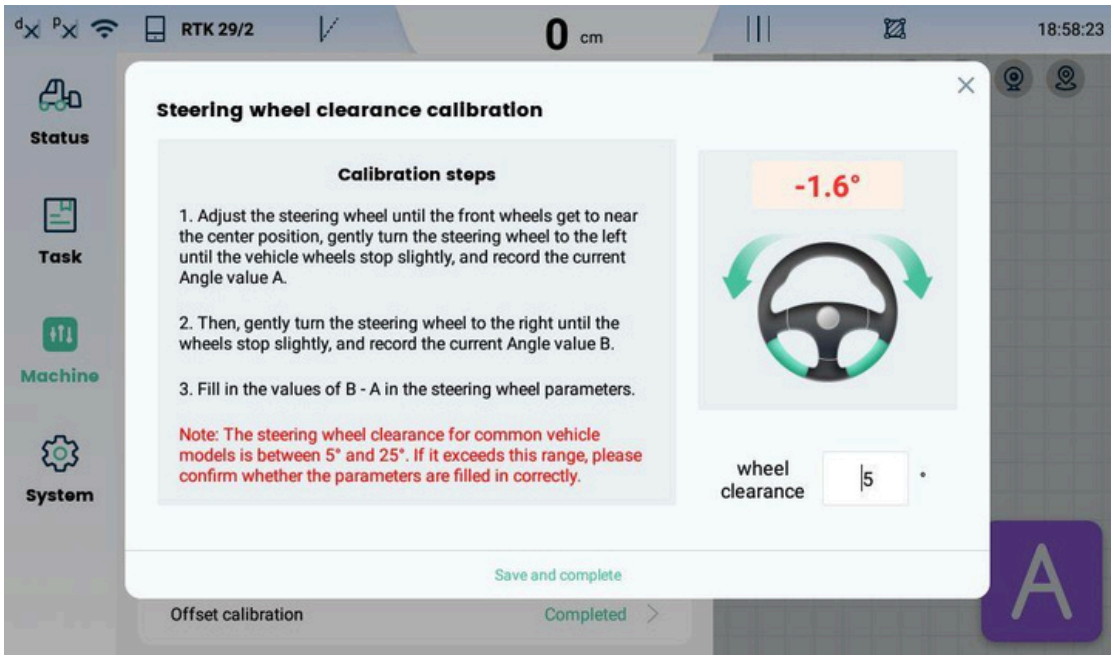


4.4.1.4 Steering wheel clearance calibration

Steering wheel clearance, in layman's terms, refers to the maximum angle/stroke that the steering wheel can rotate left and right without turning the wheels. Simply put, it is the range of "idle, no resistance, and no wheel response" when you turn the steering wheel. It is also commonly known as "steering wheel free stroke" in the industry.

Calibrate according to the interface instructions. By turning the steering wheel left and right (**ensuring that there is no reaction from the wheels during the process**) and subtracting the angle values corresponding to the left and right positions, **taking the absolute value**, the steering wheel clearance value can be obtained.

If a J100 angle sensor is installed and the angle sensor mode is selected, this calibration can be omitted.



4.4.1.5 Calibration of the rotational transmission ratio

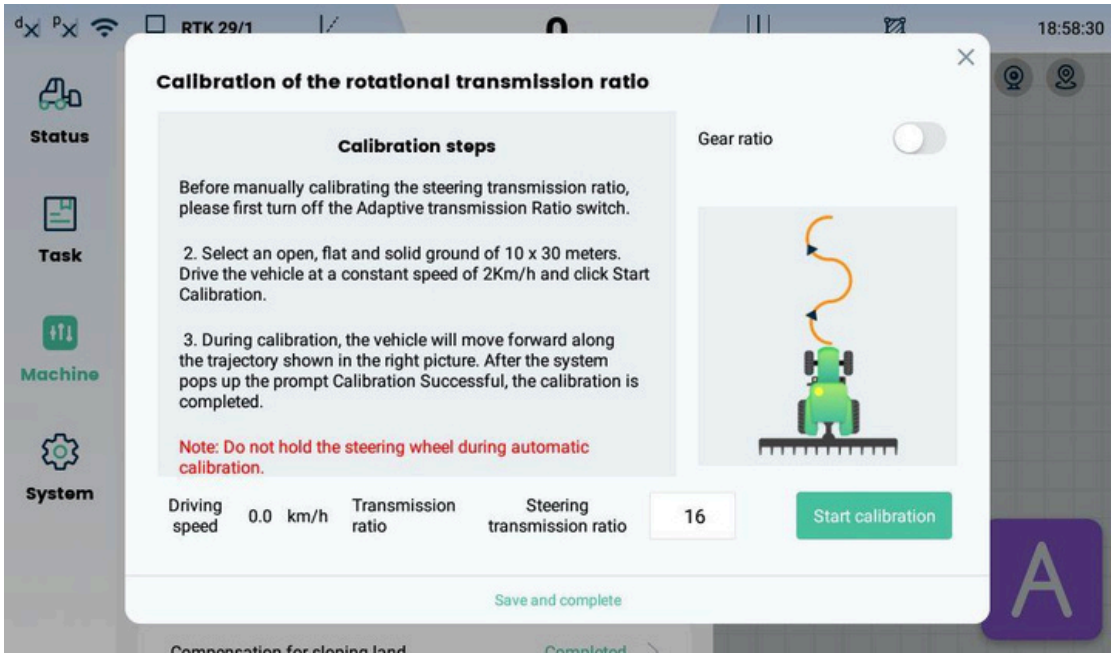
The steering wheel transmission ratio, simply put, is the ratio of the "angle of rotation of the steering wheel" to the "actual steering angle of the vehicle wheels" - essentially a core parameter that measures "how much the steering wheel rotates, how much the wheels will rotate", directly determining the "steering sensitivity" and "handling feel" of the steering wheel.

The formula can be intuitively understood:

Transmission ratio=Steering wheel rotation angle (°) ÷ Vechle wheel steering angle (°)

When calibration begins, the vehicle will automatically move forward with an S-shaped trajectory. Please ensure that there is enough space ahead. By performing automatic driving on the S-shaped trajectory, the vehicle can automatically calibrate the transmission ratio.

If a J100 angle sensor is installed and the angle sensor mode is selected, this calibration can be omitted.

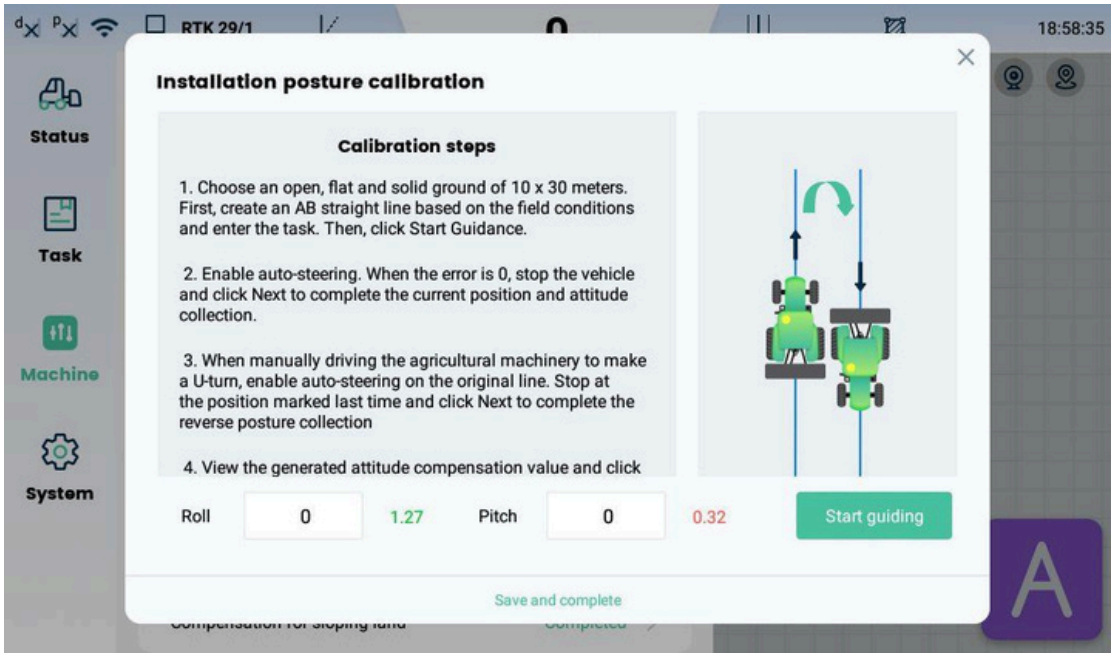


4.4.1.6 Installation posture calibration

The roll angle (Roll) and pitch angle (Pitch) of a vehicle are two key angles that describe the vehicle's attitude in three-dimensional space, corresponding to "left to right tilt" and "front to back pitch", respectively, in degrees (°), defined based on the ISO 8855 vehicle coordinate system (X-axis forward, Y-axis left, Z-axis upward).

First, create a straight guidance line and follow the interface instructions for **round-trip** autonomous driving to calibrate the vehicle's roll and pitch values.

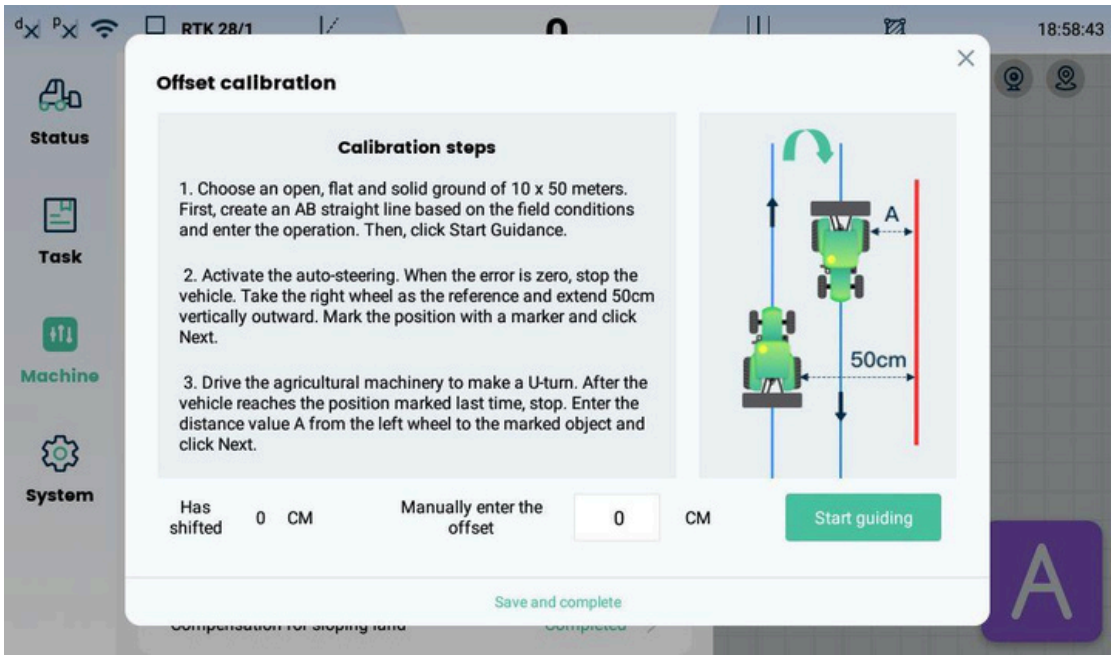
Remember to save and complete.



4.4.1.7 Offset calibration

The calibration of the “Offset” is a key step in correcting GNSS antenna offset, controller installation error, and steering mechanical deviation by "traveling back and forth on the same AB line+marking measurement", so as to make the coincidence of the round-trip trajectory ≤ ± 1 cm. The core is to make the "outbound" and "return" trajectories consistent and eliminate missed cultivation/re cultivation during the crossover.

Perform calibration operation according to the interface instructions, input **measurement values**, and complete calibration.



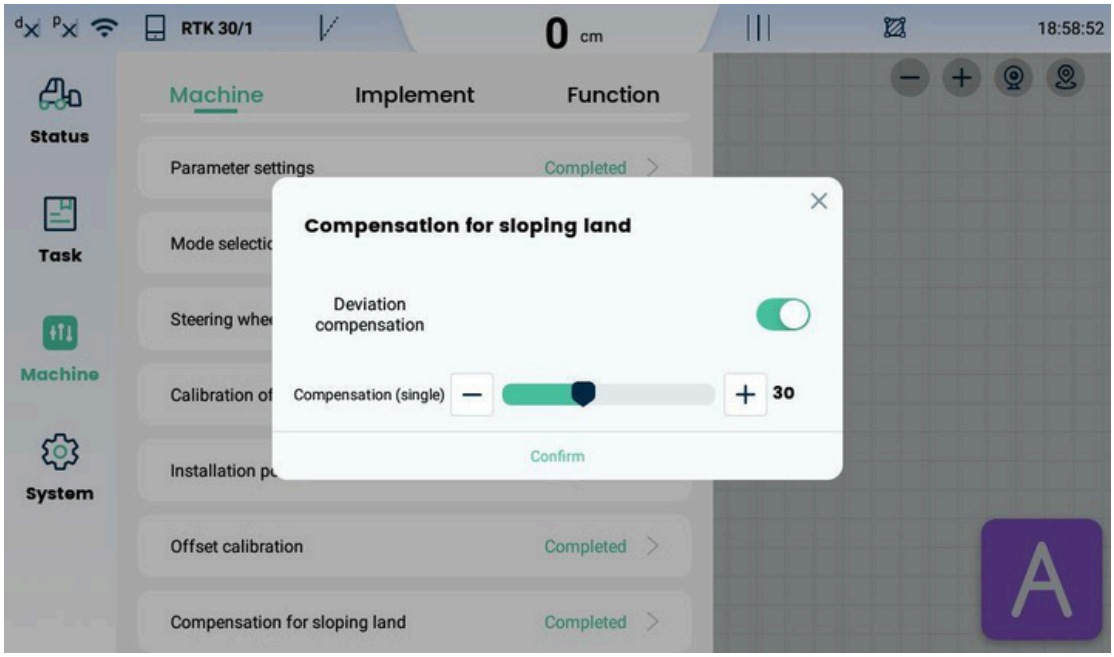
4.4.1.8 Compensation for sloping land

Slope calibration is a process that uses IMU attitude compensation, slope baseline calibration, and trajectory correction in sloping terrain to eliminate positioning deviations caused by roll/pitch, enabling agricultural machinery to operate stably along the preset AB line with a handover accuracy of ± 1.5 cm - ± 2.5 cm, avoiding the risks of missed tillage/re tillage and lateral slip.

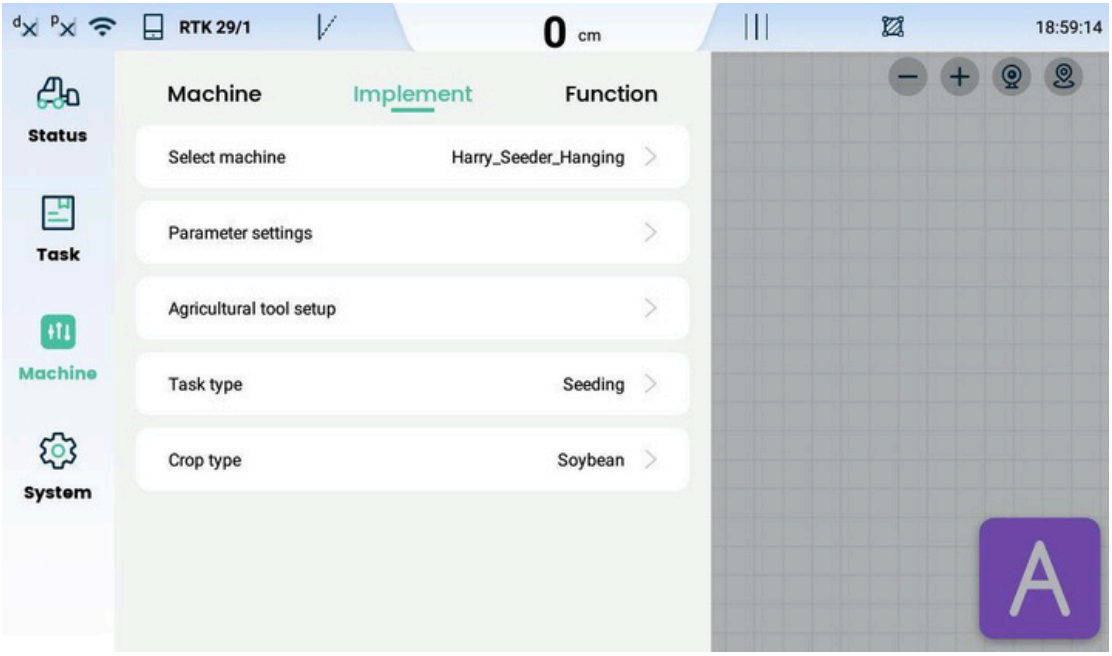
The larger the fixed deviation of driving on a slope is, the larger the corresponding compensation value should be set.

If the value is set too low, there may be no compensation or compensation may be slow; If set too high, there is a possibility of overshoot leading to overcompensation.

Usually, keeping the switch on and the default value is sufficient.

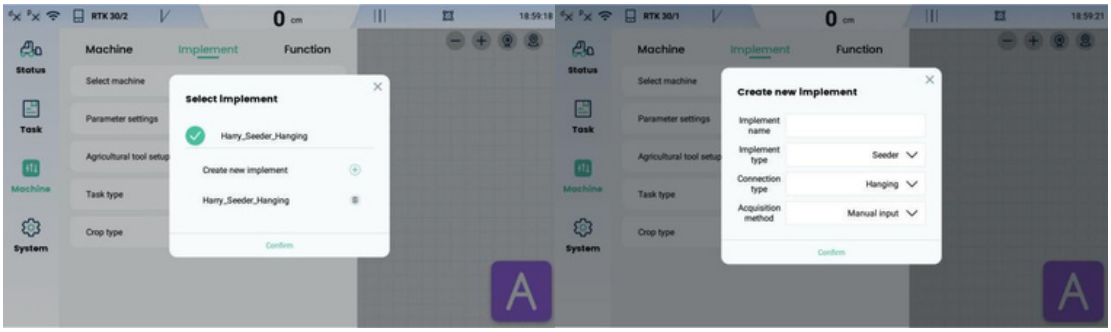


4.4.2 Implement



4.4.2.1 Select Implement

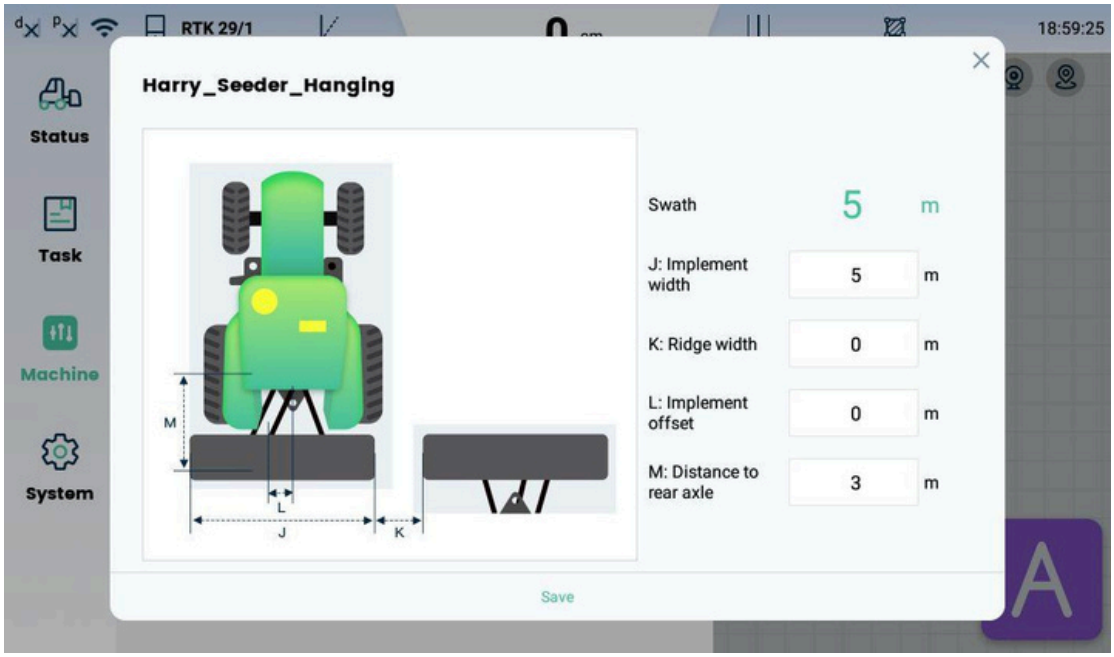
Click this option to create and select an implement object.



4.4.2.2 Parameter settings

Click on parameter settings and enter various **measurement parameters** of the implement, including implement width, ridge width, implement offset, etc.

Swath=Implement width+Ridge width



4.4.2.3 Implement setup

Combined ridge calibration (also known as "cross row calibration") is a key step in achieving an accuracy of ± 1 cm - ± 2 cm by measuring the overlap/gap between adjacent work widths, correcting the offset and width parameters of implement at the display terminal, and ensuring that the combined ridge (the connecting zone between adjacent work runs) has a uniform width, no missed tillage/re-tillage.

The steps are as follows——

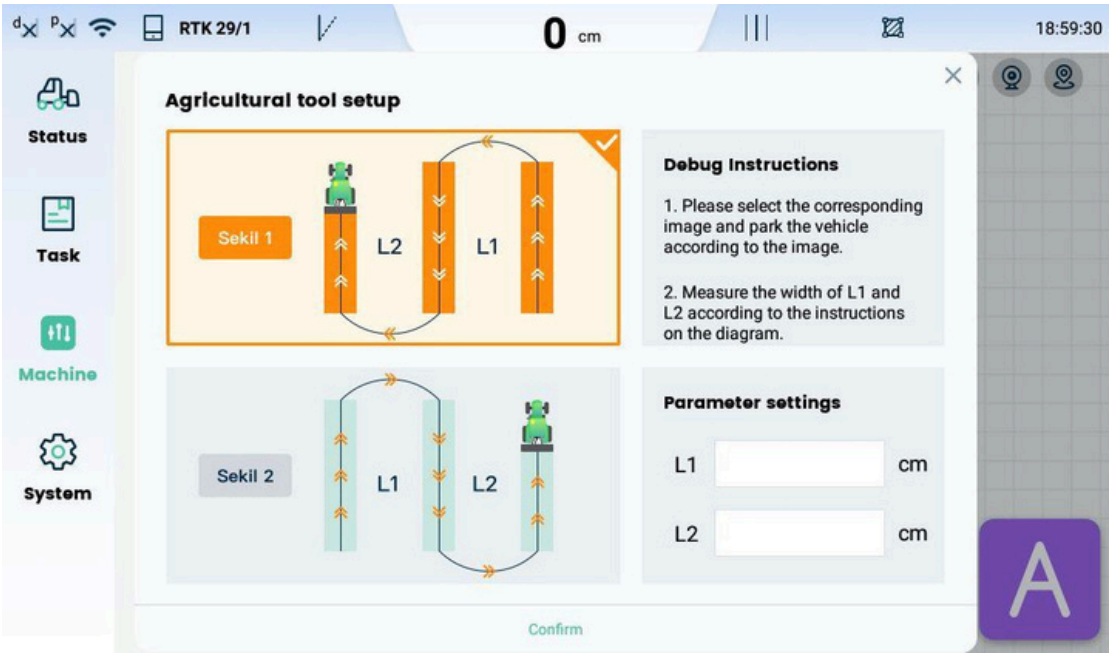
Set AB line: Display and control terminal → create AB line, with a distance of ≥ 10 m between A/B points, enter autopilot.

Work three times: Work continuously along line AB for three times, forming two combined ridges (left and right).

Measurement deviation: Use a tape measure to measure the width of the left and right combined ridges, and record the difference from the standard value (e.g. standard 50 cm, measured left 52 cm, right 48 cm).

Correction parameters: Terminal → Machine → Implement setup → Input offset (left 52cm, right 48cm) → Confirm → Automatically calculate and save calibration results.

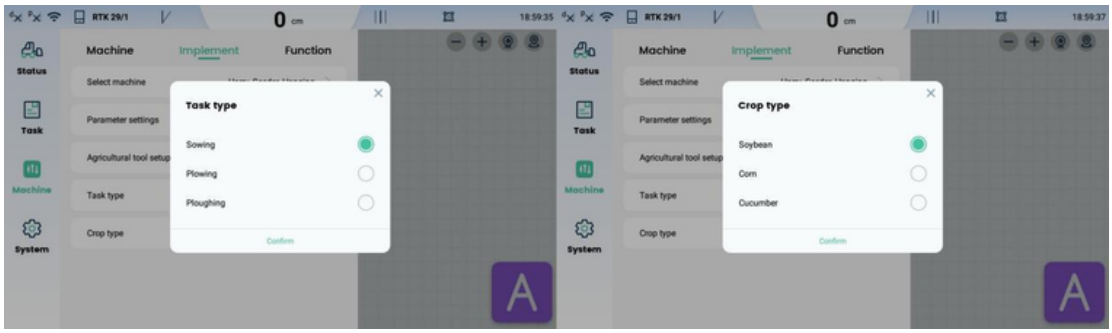
Verification: Perform 2 more operations, combine with uniform ridge width (deviation ≤± 1 cm), and save the parameters.



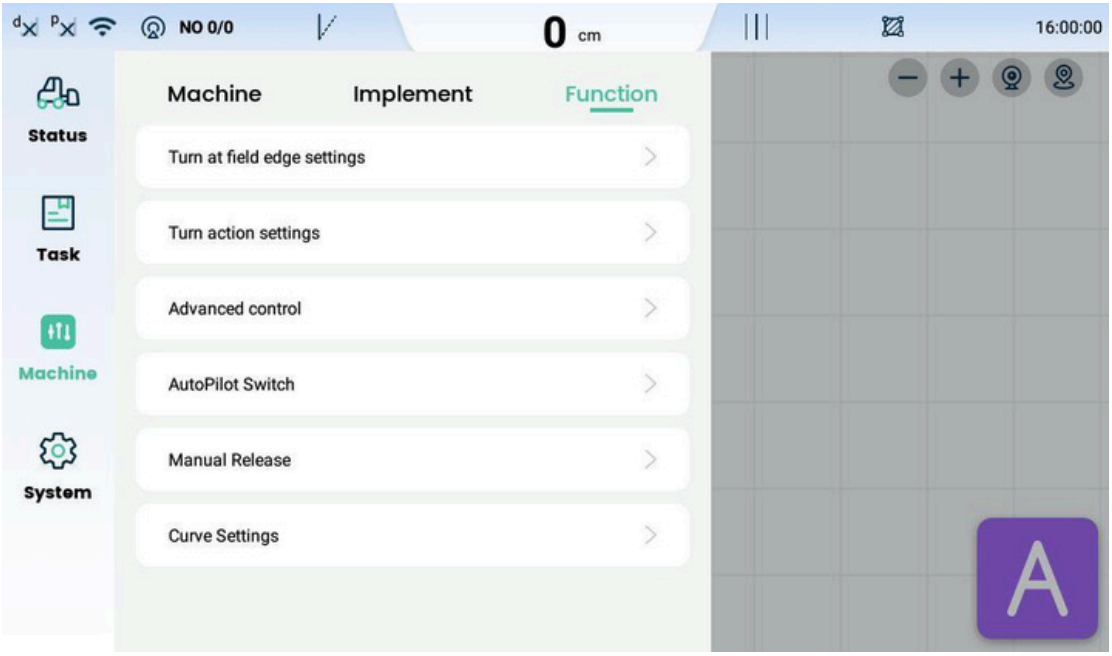
4.4.2.4 Task/Crop type

Select the types of task for distinguishing the types of task applicable to implements.

Select the types of crop for distinguishing the types of crop applicable to implements.



4.4.3 Function



Turn action settings and Advanced control are for R&D testing purposes, it is generally not needed to open it.

4.4.3.1 Turn at field edge settings

The **button in the upper right corner** can activate or deactivate the automatic turning function.

Turn setting

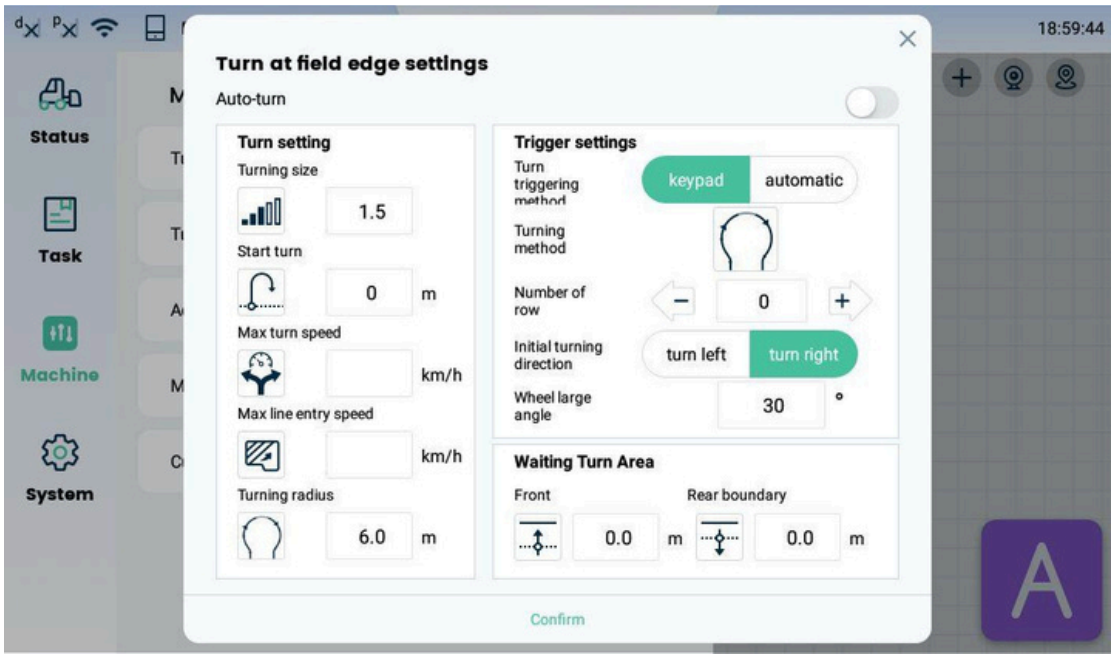
• **Turning size**: Set the proportional value of the turning radius to 1-2.

• **Start turn**: Set the distance after entering the waiting lane to execute the turning action.

• **Maxi turn speed**: Set the maximum speed of the vehicle during the turning process.

• **Maxi line entry speed**: Set the maximum speed for entering the line after completing a turn.

• **Turning radius**: Set the minimum turning radius for the vehicle.



Trigger settings

The triggering method can be set as **key triggered/automatic triggered**.

Turning method: Automatic adaptation. According to the turning radius, it will automatically adapt between the U-shape and the light bulb.

Number of row: The number of **skip-row** can be set.

Initial turning direction: The initial turning direction can be set to left/right turn.

Wheel large angle: The **maximum wheel angle** can be set to limit during turning actions.

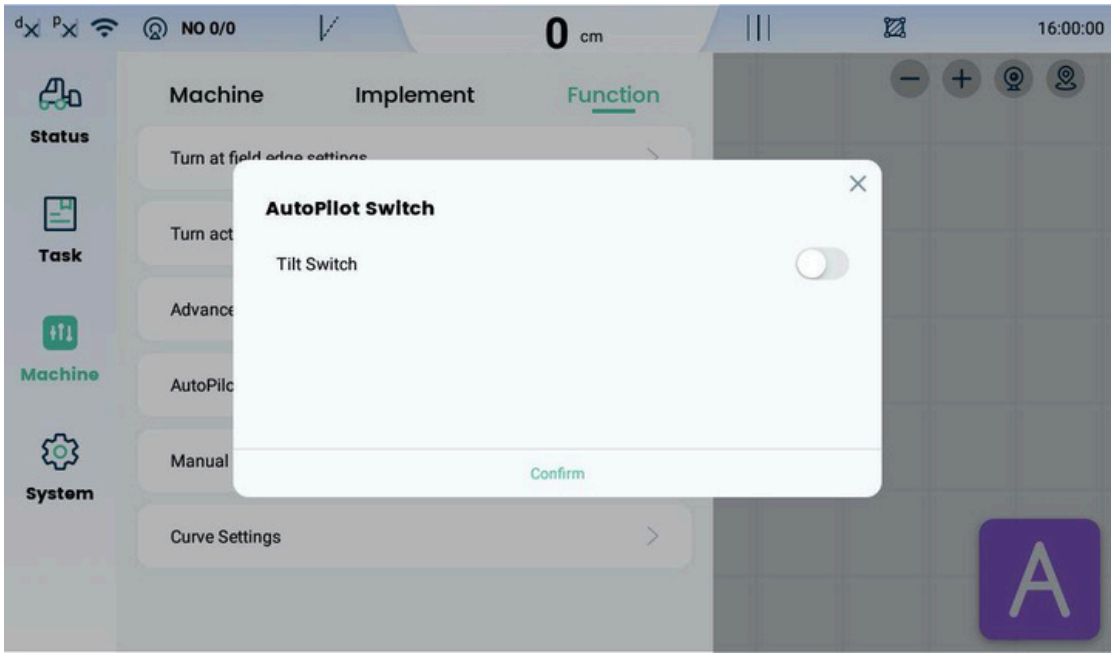
Waiting Turn Area

Front boundary: Set the distance from the upcoming boundary to start executing the turning action.

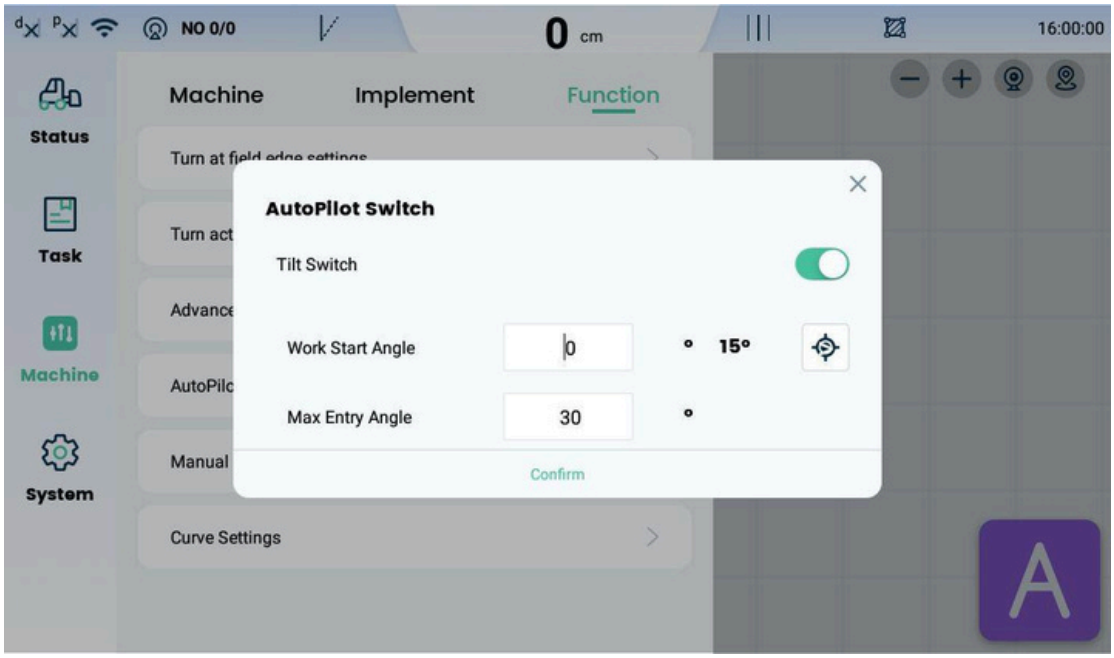
Rear boundary: Set the distance from the boundary that has already been exceeded to start executing the turning action.

4.4.3.2 AutoPilot switch

This feature is only useful when the G100 tilt sensor is installed.



Turn on the **tilt switch** button, and some related setting parameters will be displayed.



Work Start Angle: **Critical angle** for automatic **engage/disengage** of autopilot.

15° : The current angle value of the tilt sensor.

: Enter the current tilt degree into the box at the front.

Max Entry Angle: When the angle of the vehicle **entering the line** is greater than this angle, the tilt sensor function **fails**.

4.4.3.3 Manual release

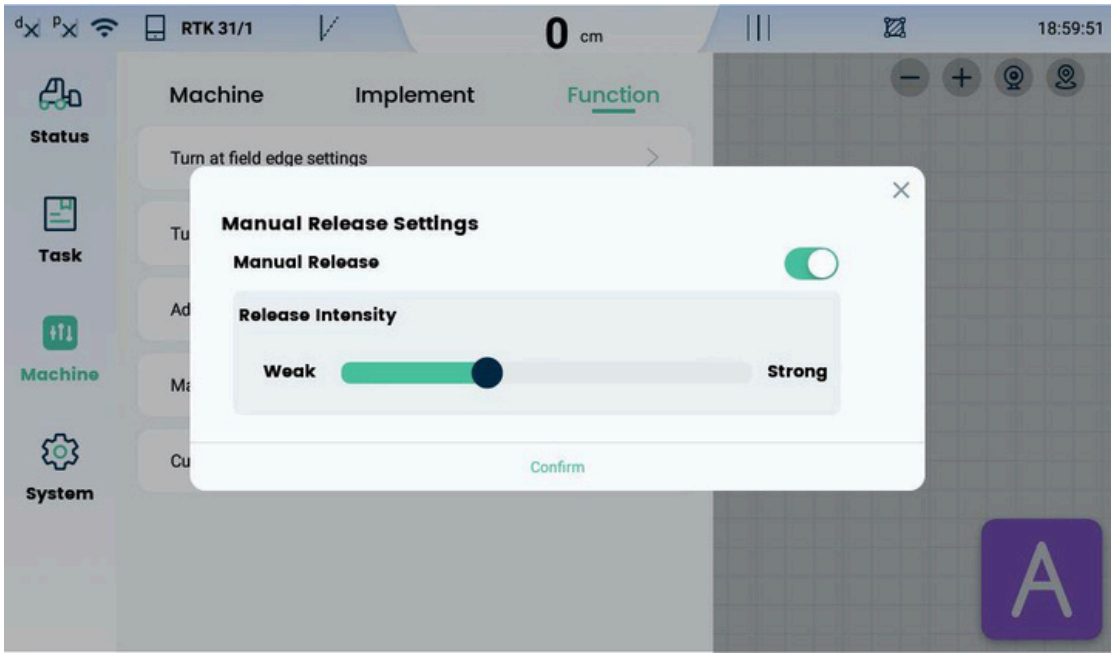
Click on the upper right corner to enable manual release of autopilot function

Drag the progress bar

The closer the black circle is to '**strong**', the greater the force is required to manually disengage autopilot.

The closer the black circle is to '**weak**', the less force is required to manually disengage autopilot.

Click **Confirm** to save



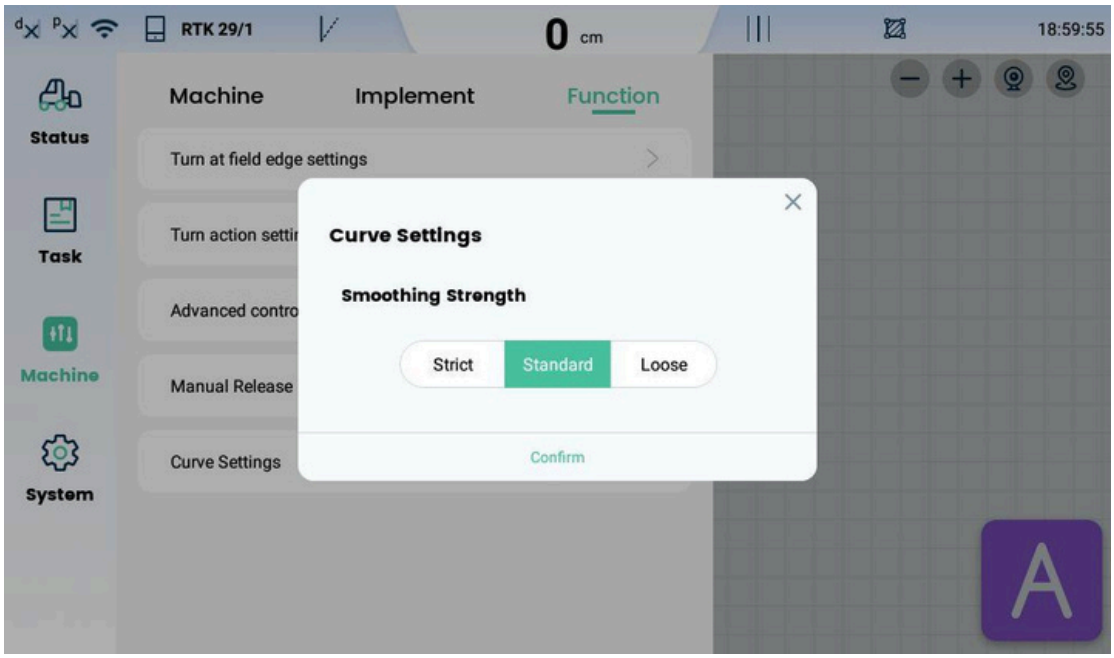
4.4.3.4 Curve settings

Smooth strength represents the smoothness of the line after the curve is created.

Loose: Represents the maximum smoothness of the line.

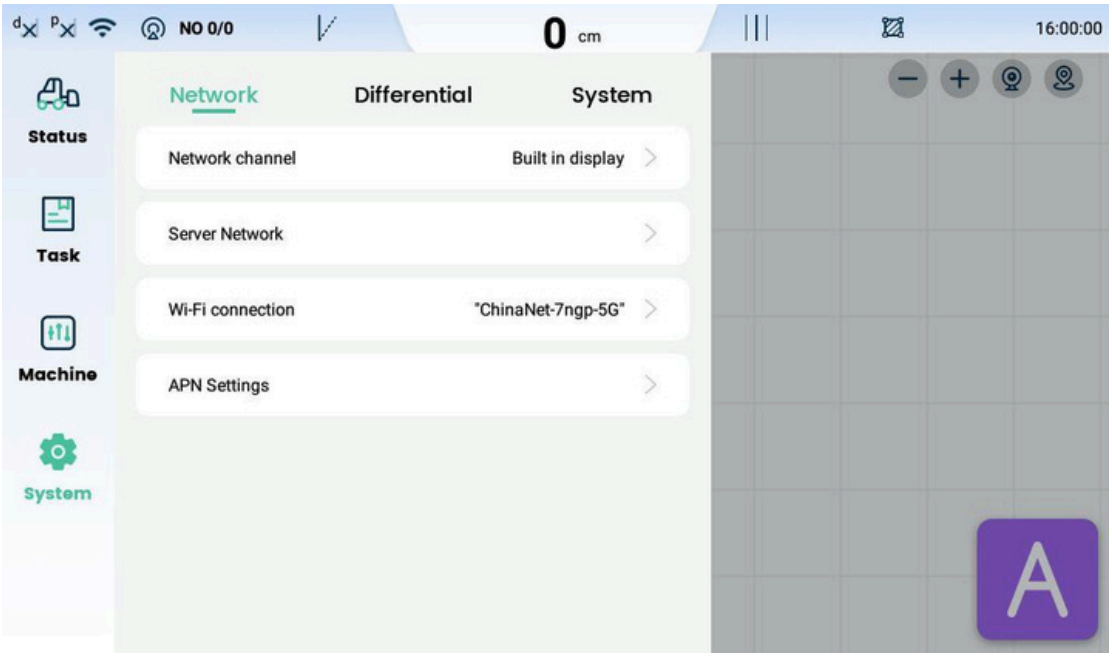
Standard: Represents a smoothness level between **Loose** and **Strict** for lines

Strict: Represents the minimum smoothness of the line, maintaining the true state of the line.



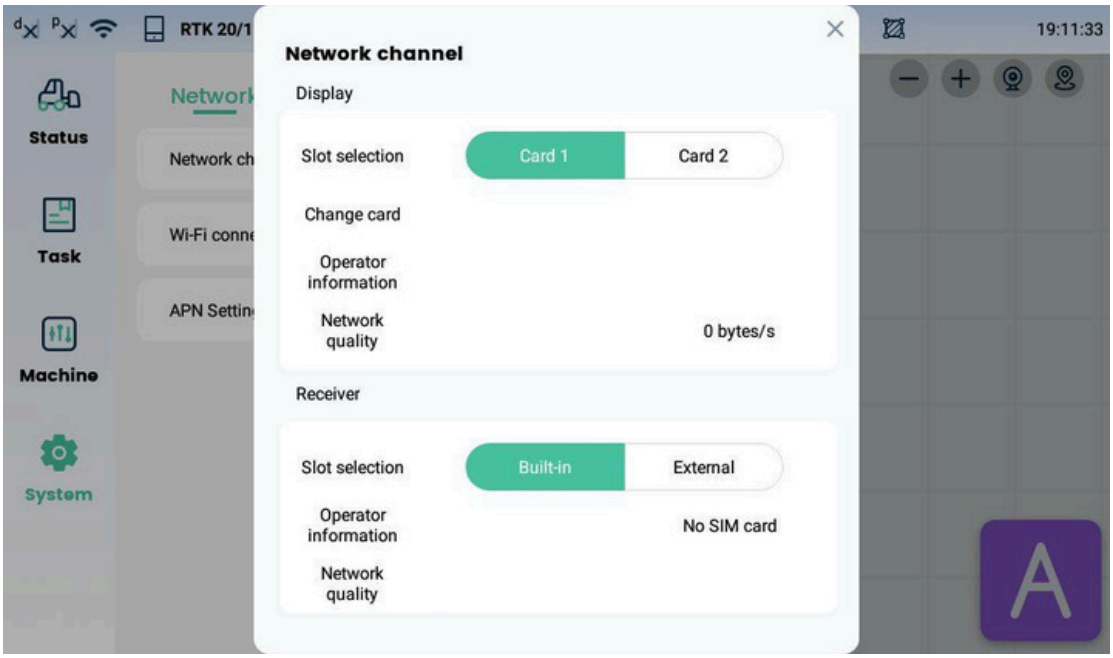
4.5 System

4.5.1 Network



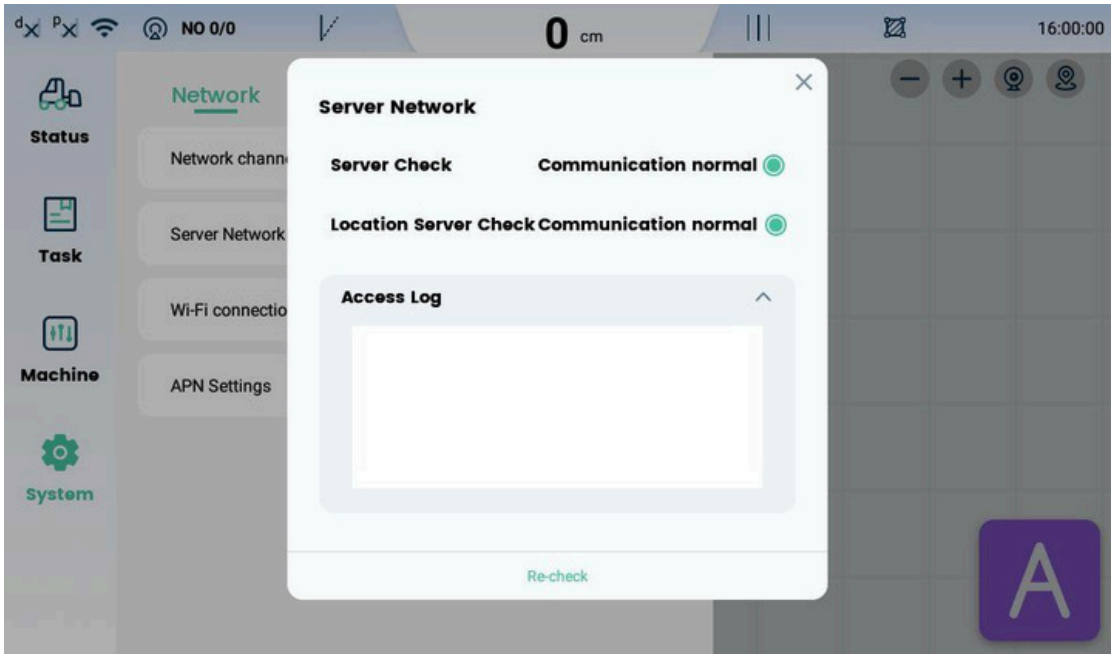
4.5.1.1 Network channel

Click on the **Network channel**, select the SIM card network channel, and choose between the SIM card in the display screen or the SIM card in the controller.



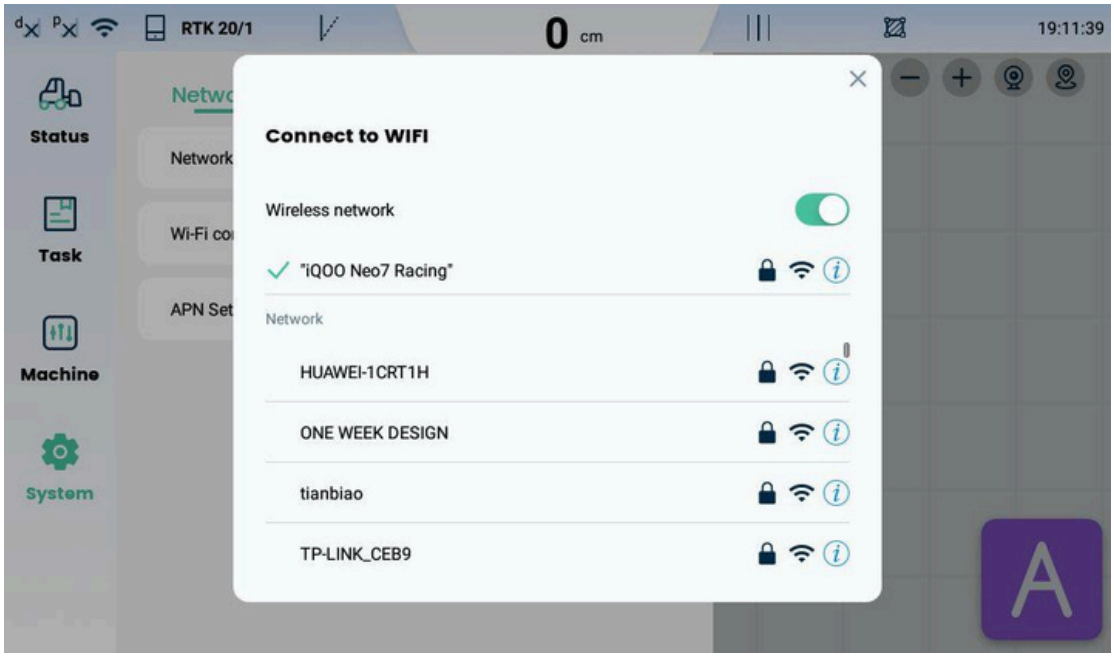
4.5.1.2 Server Network

The server network connectivity self-test function relies on the smooth network connection of the server platform for device time authorization and version upgrade. If there is no problem with the network connection, the self-test results here should be green.



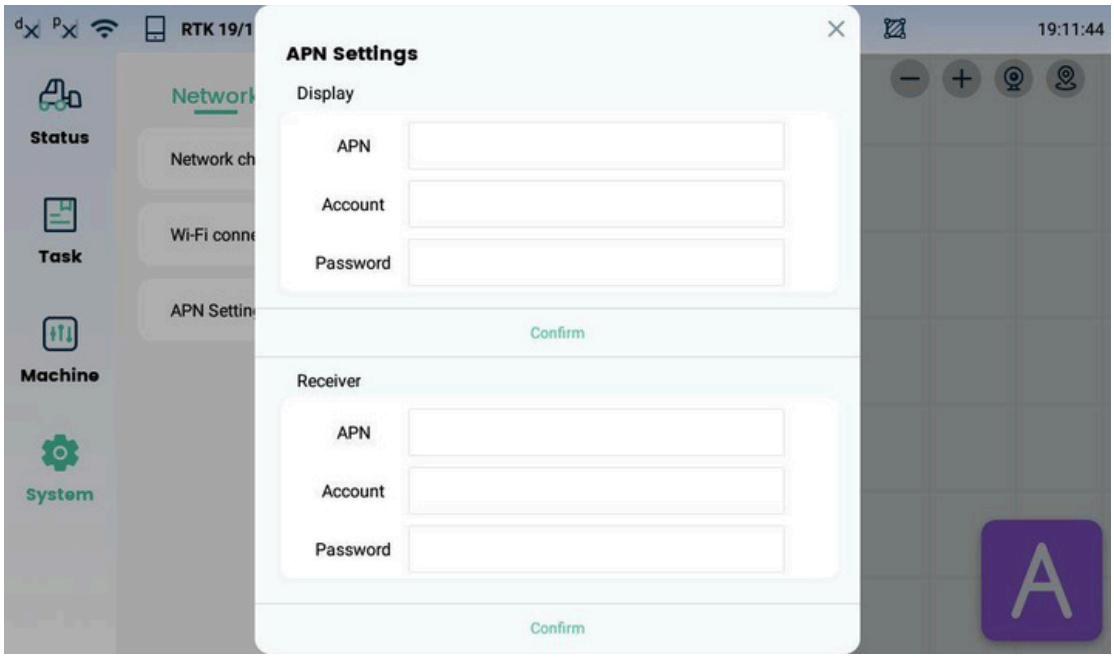
4.5.1.3 Wi-Fi connection

Connect to WiFi network here.

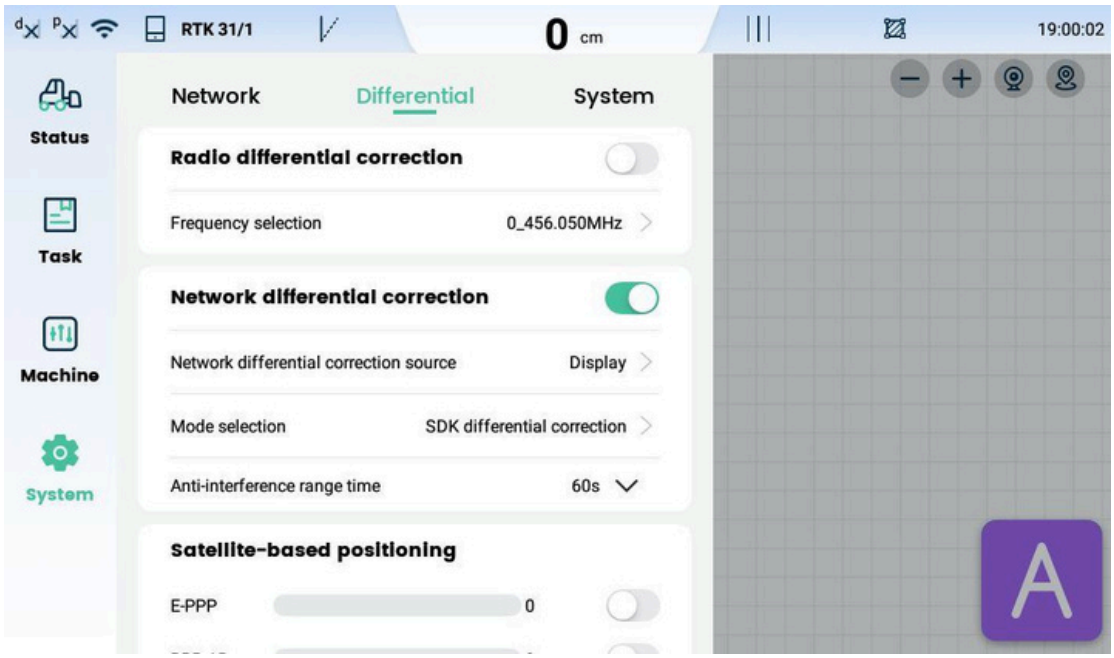


4.5.1.4 APN settings

Enter the APN configuration parameters of the SIM card in the display screen or controller.



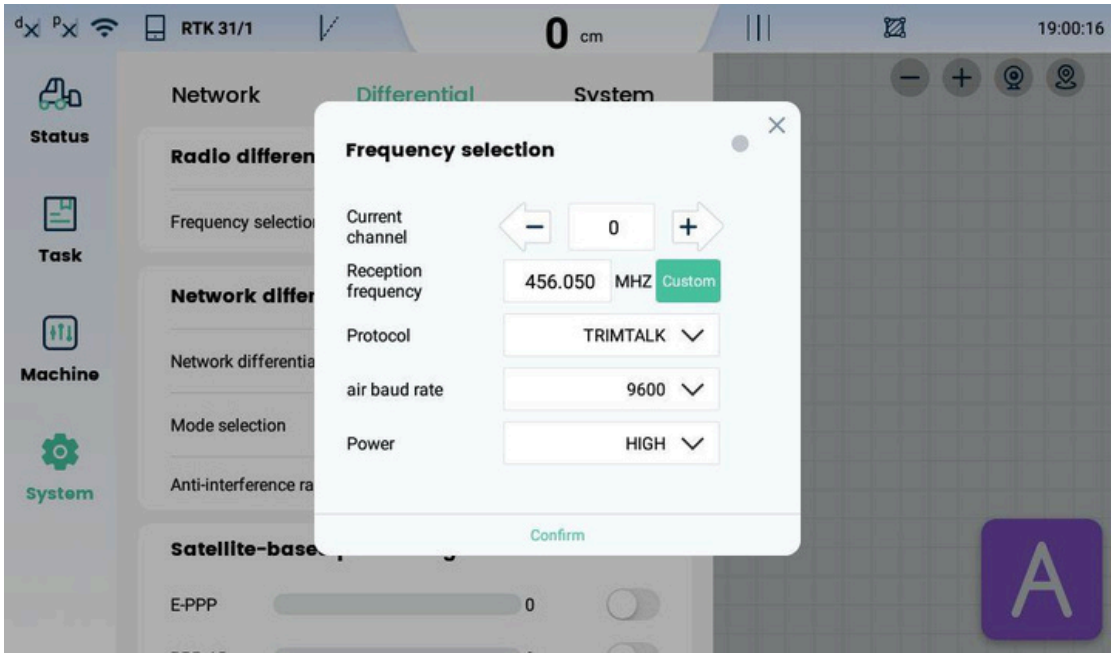
4.5.2 Differential



4.5.2.1 Radio differential correction

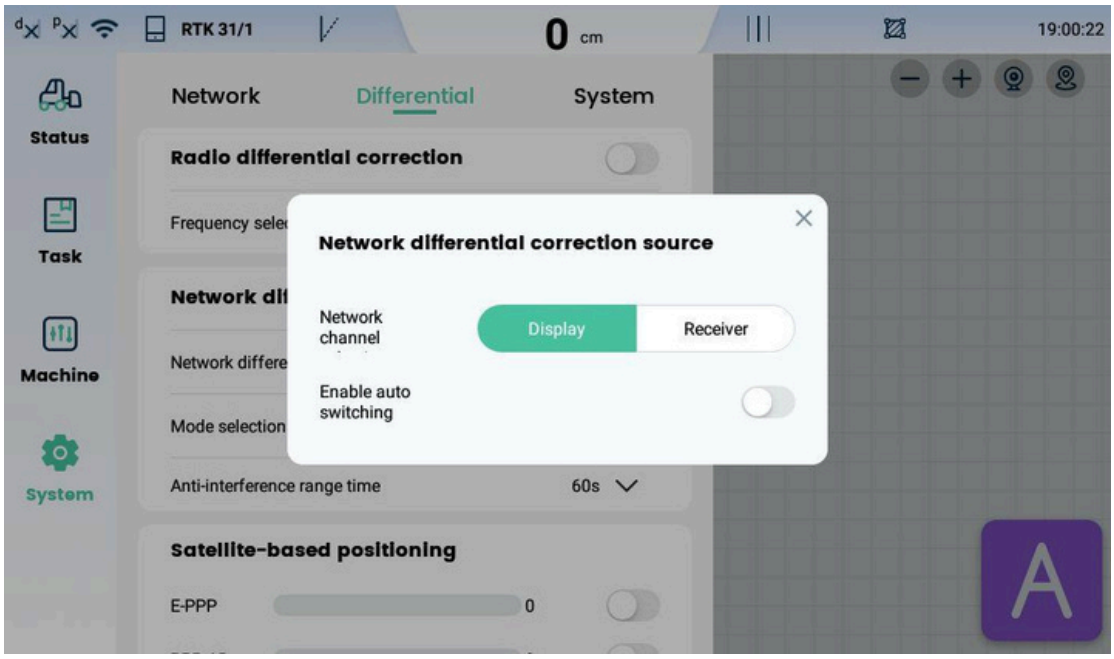
Select the radio differential, connect to the radio base station, enter the corresponding frequency, protocol, baud rate, etc., click **Confirm**, and establish the connection status.

The radio function can only be used with “Pro” controller products.

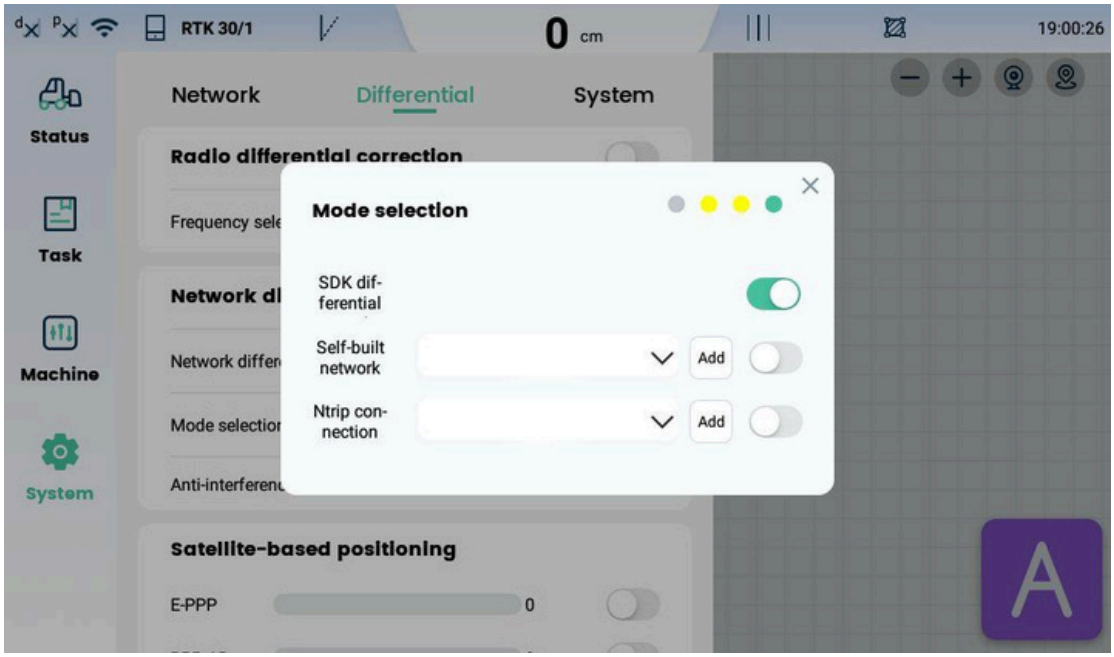


4.5.2.2 Network differential correction

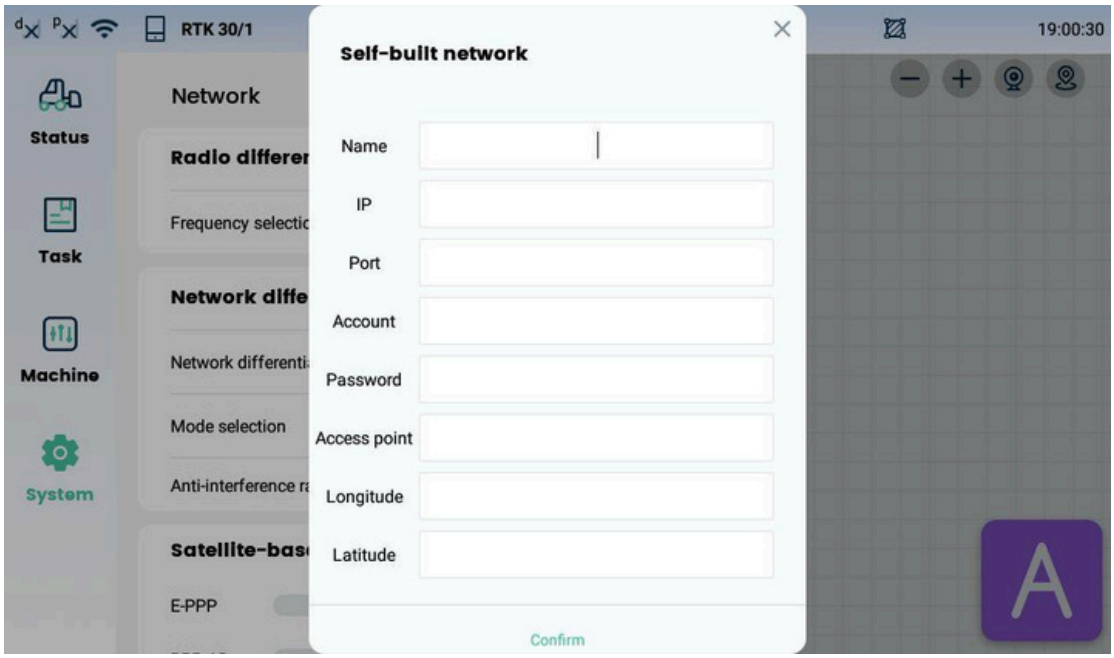
Users can choose the network differential correction source as the receiver or display, or select **auto switching** to automatically read the side with the network as the differential source.



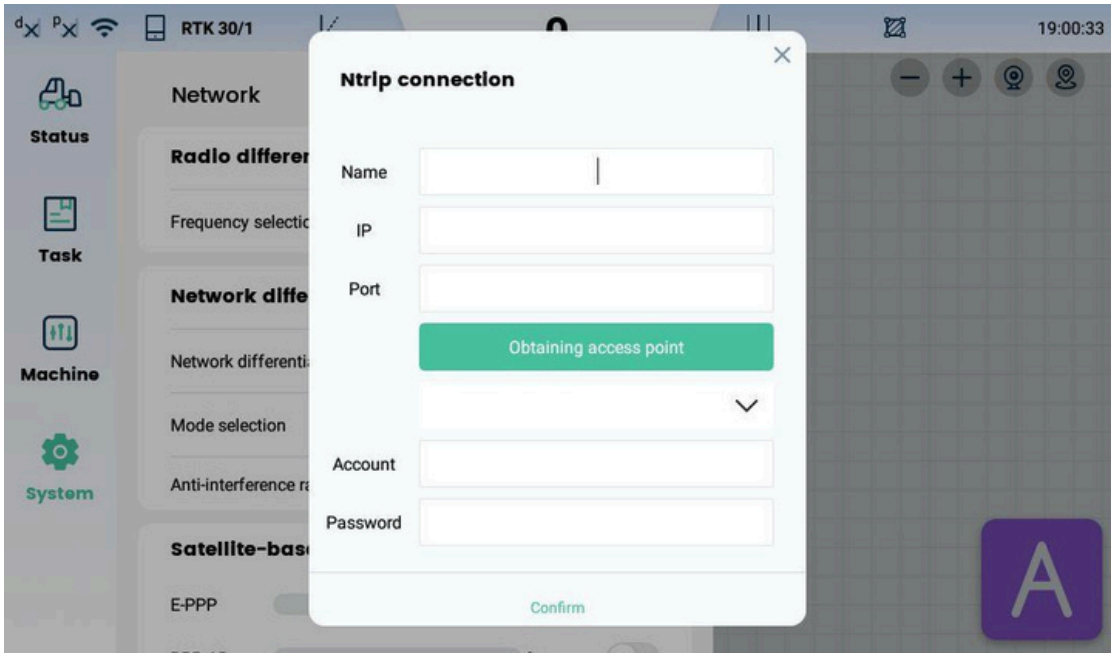
SDK differential: Open the SDK method for differentiation (**Device SDK authorization required**)



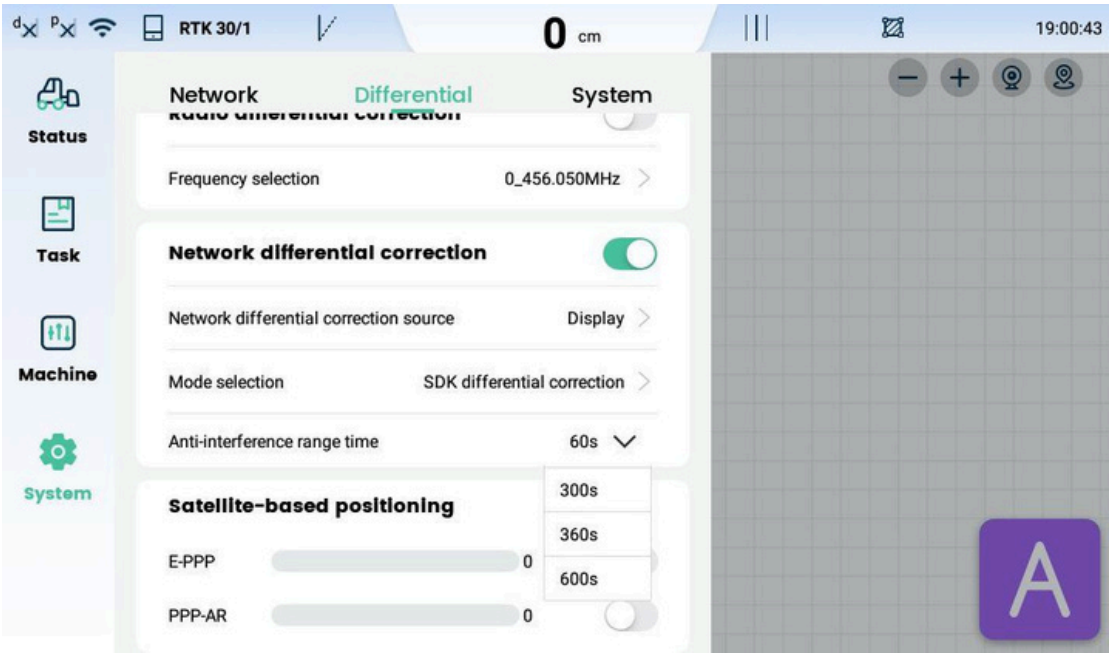
Self-built network: Enter name, IP, port, account password, access points, etc.



Ntrip connection: Enter name IP, port, account password, access point acquisition.



Anti-interface range time can be set. When the differential signal is lost, a time limit can be set to maintain high-precision satellite positioning within this limit, so as not to enter **AUT** mode. It can be set for up to **600** seconds. As the differential age increases, the satellite positioning accuracy will gradually deteriorate.

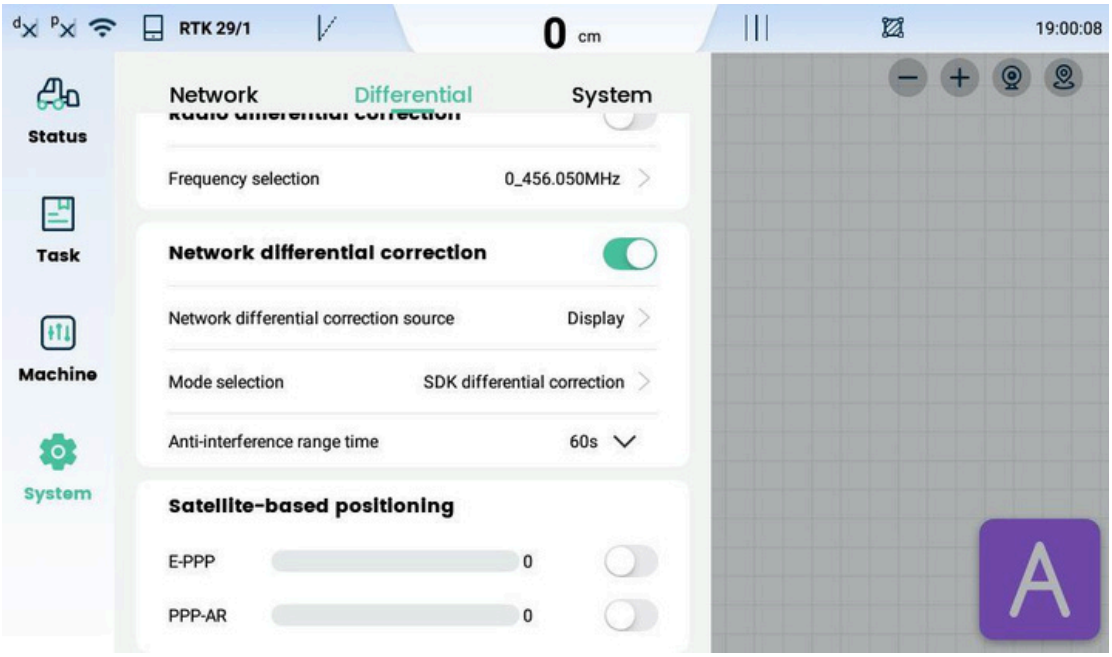


4.5.2.3 Satellite-based positioning

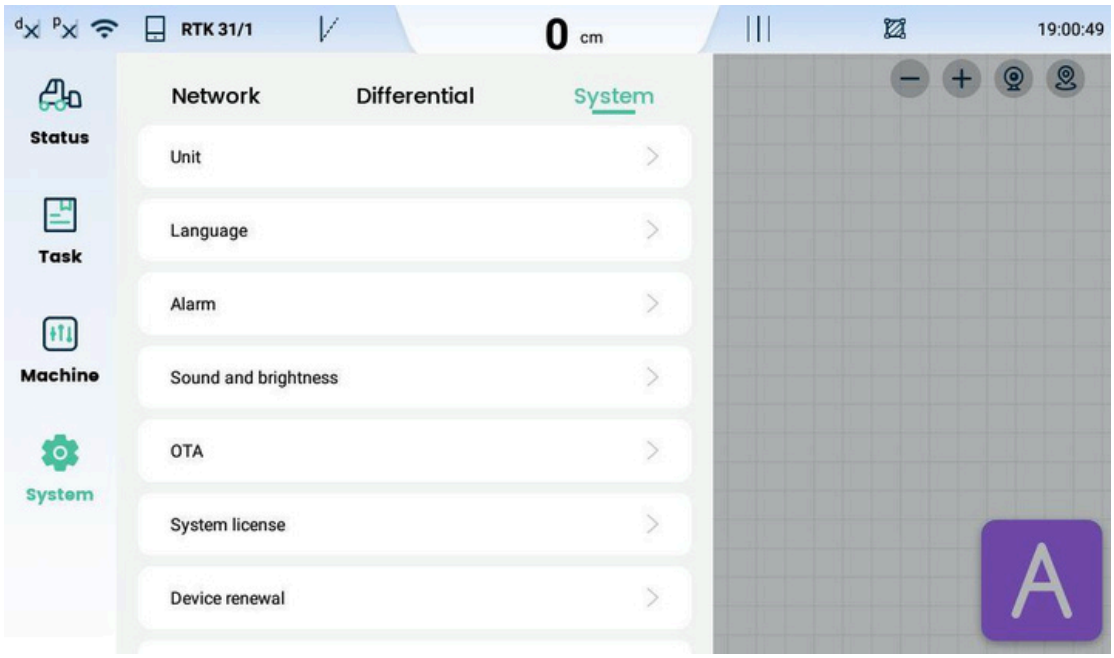
E-PPP: E6-HAS (**Free**)

PPP-AR: **Paid** Satellite Base Signal(**Device PPP-AR authorization required**), **During the authorization execution process, it is required that the device be in a powered on and networked state**.

The progress bar represents the **convergence progress**.

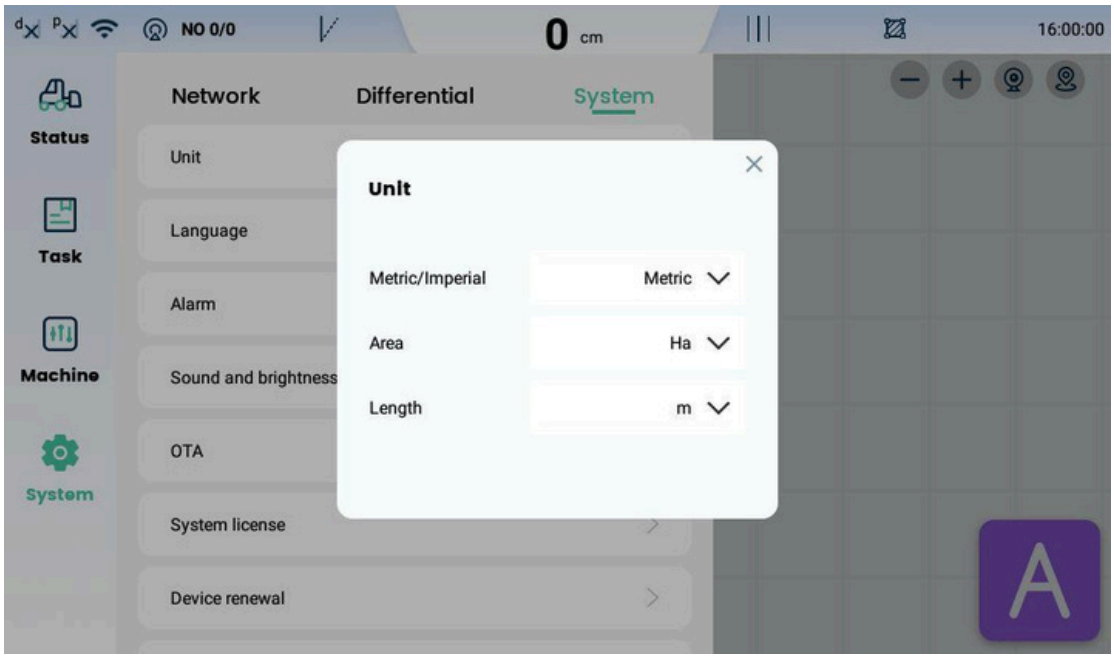

RTK 29/1
0 cm
19:00:08
Status
Task
Machine
System
Network
Differential
System
Frequency selection
0_456.050MHz
Network differential correction
Network differential correction source
Display
Mode selection
SDK differential correction
Anti-interference range time
60s
Satellite-based positioning
E-PPP
0
PPP-AR
0
A

4.5.3 System

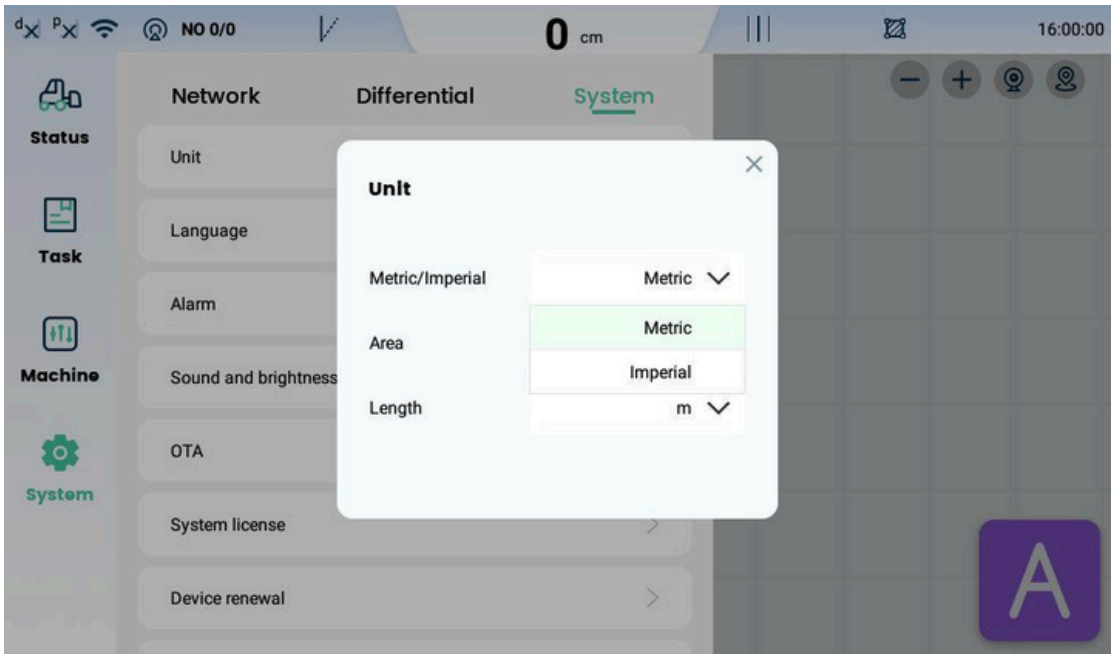


4.5.3.1 Unit

Users can choose area and length units.

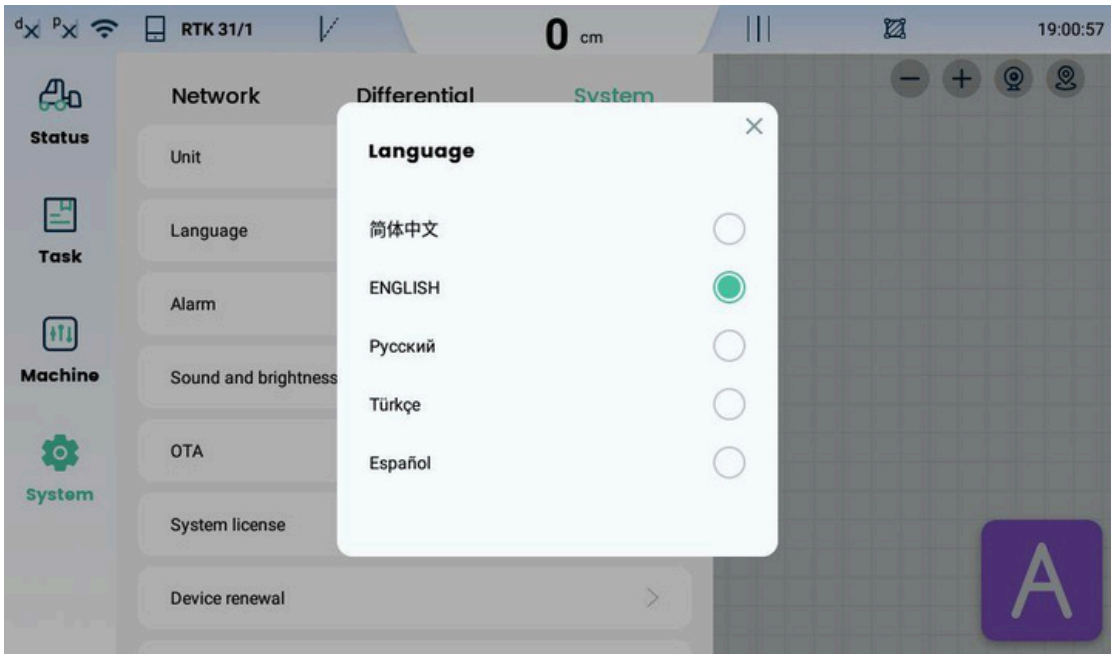


Users can choose to use **metric** or **imperial** units.



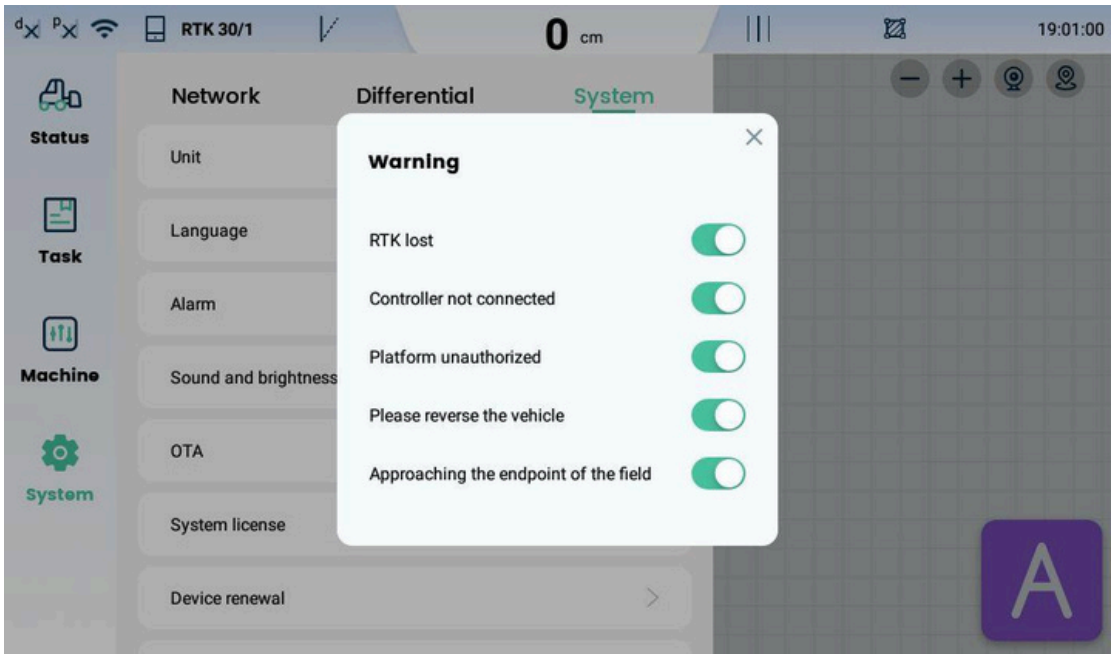
4.5.3.2 Language

Users can choose different interface languages.



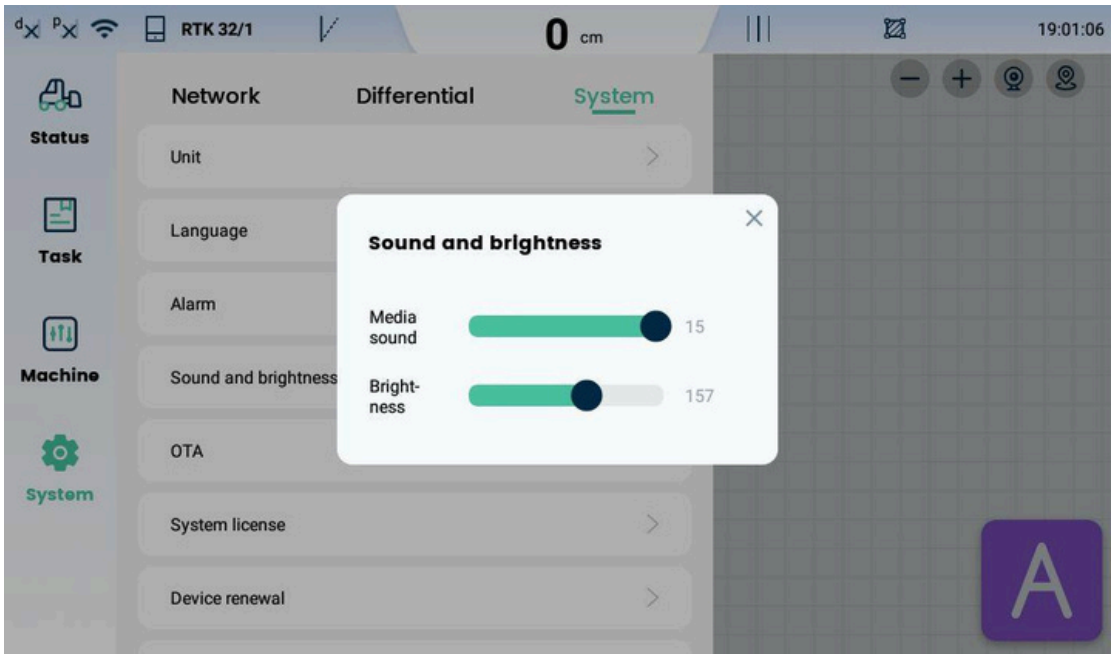
4.5.3.3 Alarm

When the system function requires prompt or alarm, there will be a voice broadcast to remind the user, and users can choose whether to turn on the voice broadcast reminder of a certain function.



4.5.3.4 Sound and brightness

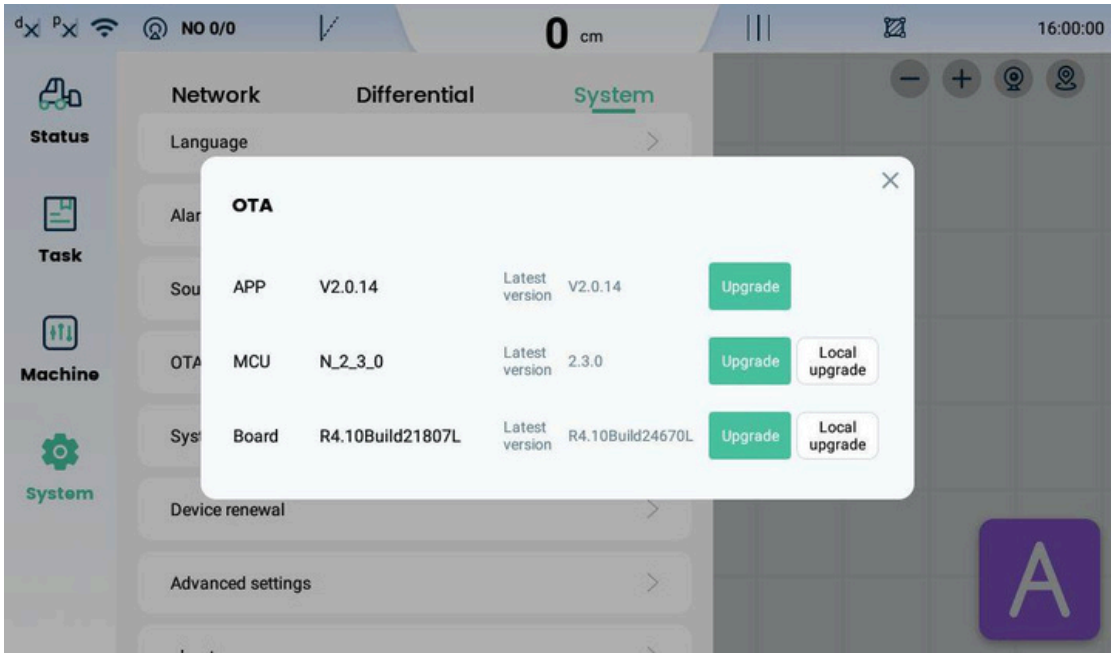
Users can adjust media sound volume and screen brightness.



4.5.3.5 OTA

Users can perform version upgrades in this window, either online (in a networked environment) or locally. The version file can be copied to the local storage via a USB drive, and the file can be found and upgraded locally.

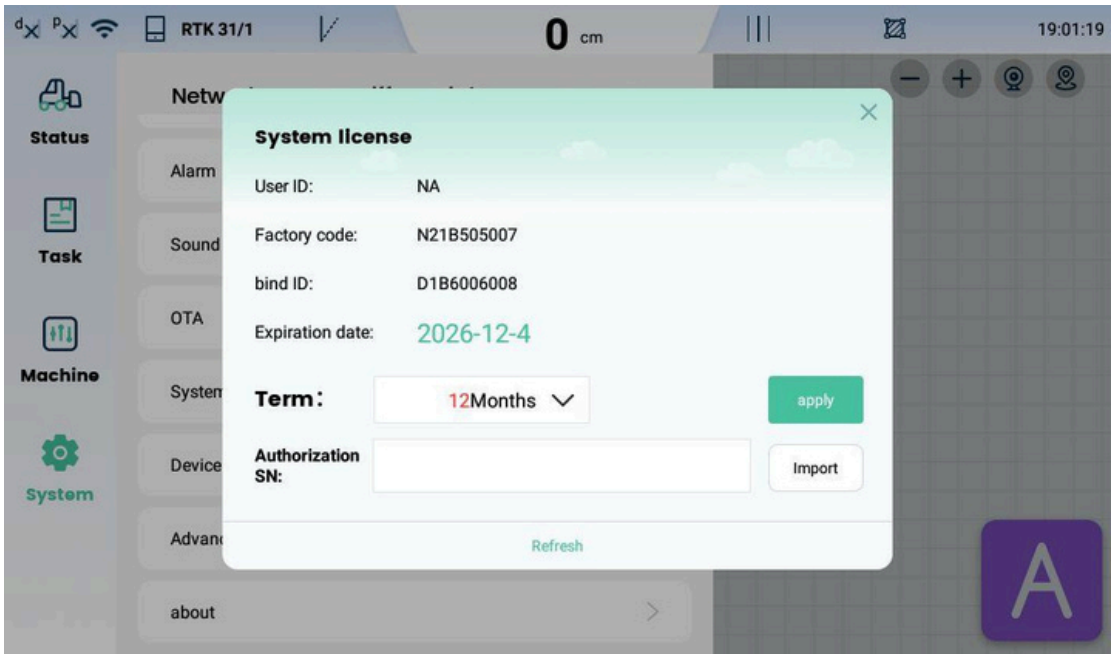
For Board, in the vast majority of cases, there is no need to upgrade, so a password is set. If an upgrade is required, the user will receive a notification and password.


NO 0/0
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Status
Task
Machine
System
Network
Differential
System
Language
Alar
Sou
OTA
Sys
Device renewal
Advanced settings
OTA
APP
V2.0.14
Latest version
V2.0.14
Upgrade
MCU
N_2_3_0
Latest version
2.3.0
Upgrade
Local upgrade
Board
R4.10Build21807L
Latest version
R4.10Build24670L
Upgrade
Local upgrade
A

4.5.3.6 System license

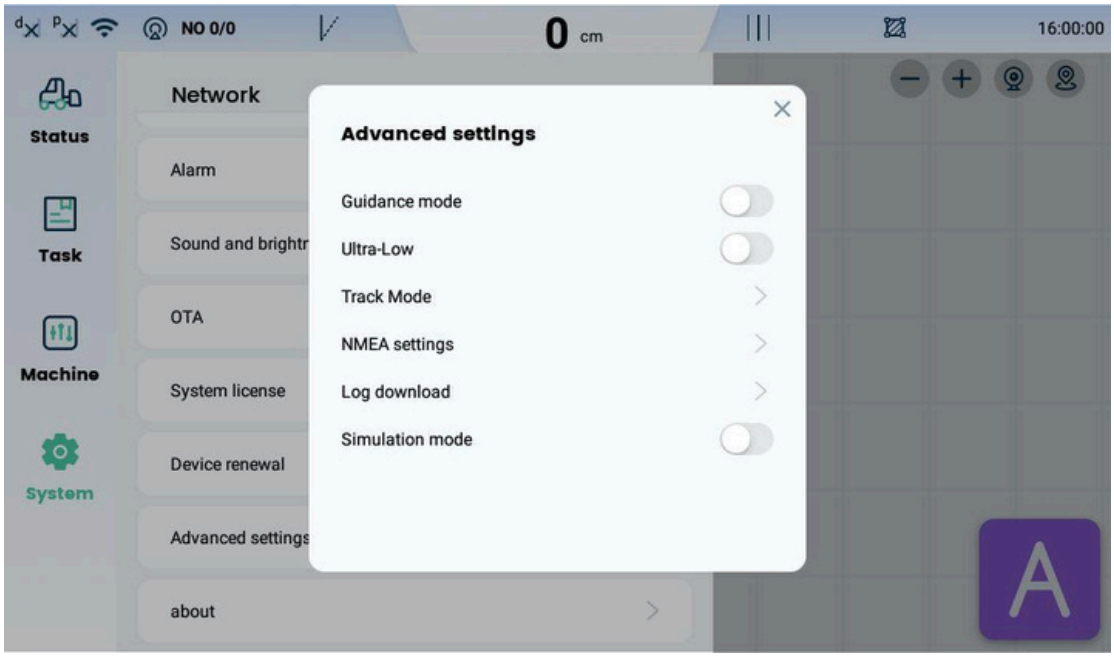
Users can authorize device usage on this interface. Users can apply online through the platform, and **technicians** will issue the device activation code upon receiving the application. After the issuance is completed, the device will automatically receive the authorization activation period;

Alternatively, authorization status can be obtained by entering an **activation code**, which needs to be obtained from **technical personnel**.



4.5.3.7 Advanced settings

In advanced settings, you can enable guidance mode, Ultra-low mode, configure track mode, configure NMEA data export, download logs, and turn on simulator mode.



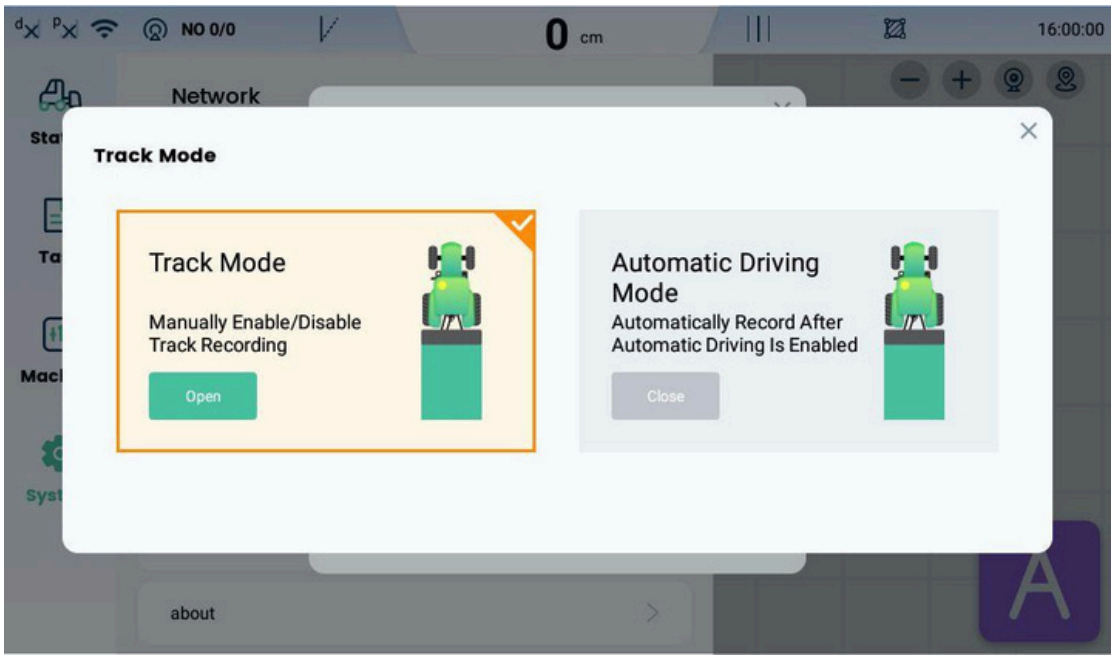
Guidance mode: It is a mode that does not allow the electric steering wheel to work. When this mode is enabled, the autopilot switch button on the operation interface will **disappear and be disabled**.

Ultra-Low: When the operating speed of the user's vehicle is **below 1km/h**, this mode needs to be turned on, and the **steering wheel clearance calibration (4.4.1.4)** value needs to be adjusted to about 120% of the normal calibration value. For example, the steering wheel dead zone was originally set to **30 °**, but in ultra-low speed mode it can be set to **40 °**. In addition, in single antenna mode, when determining the heading forward at a speed of 2km/h, the operation steps need to be very **rigorous**, strictly following the instructions for heading determination. After the heading calibration is completed and the vehicle is stopped, must wait the yellow instruction pop-up window to disappear before restarting the vehicle.

Track Mode: Trajectory painting mode selection.

In the first mode, the recording state of the trajectory can be freely determined, regardless of the autopilot state;

In the second mode, trajectory recording is strongly correlated with the autopilot state, and trajectory recording can only be performed when autopilot status is engaged.



4.5.3.8 About

In the About interface, various device number information can be viewed, including key information such as model, device number, IMEI, etc.



4.6 Operation

4.6.1 Key icon explanation

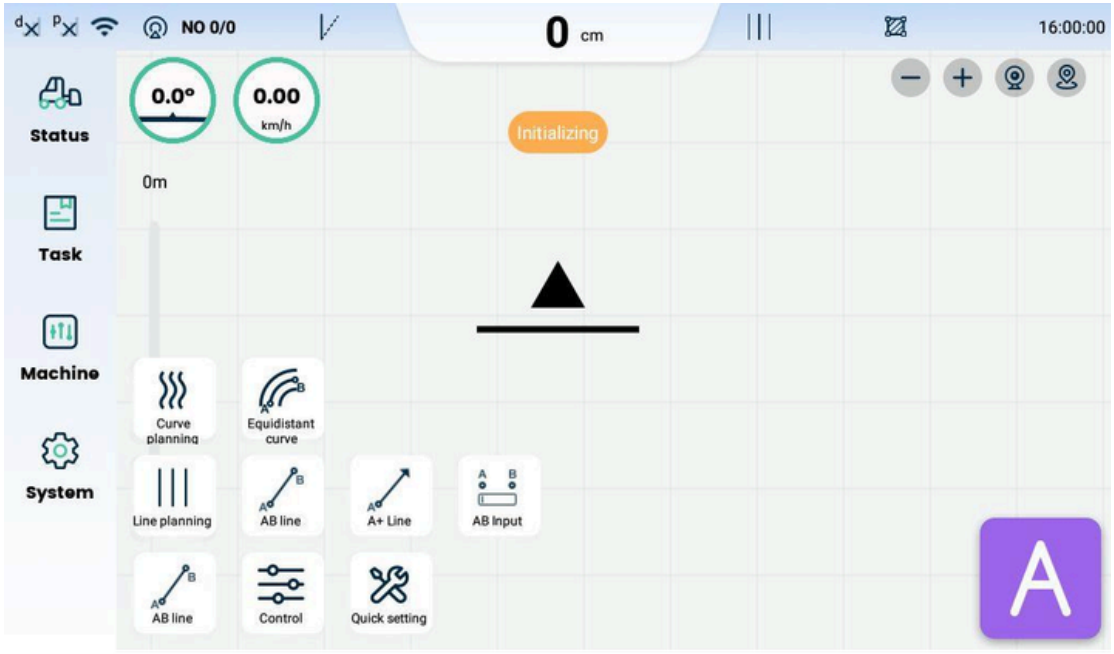
Choose line mode——

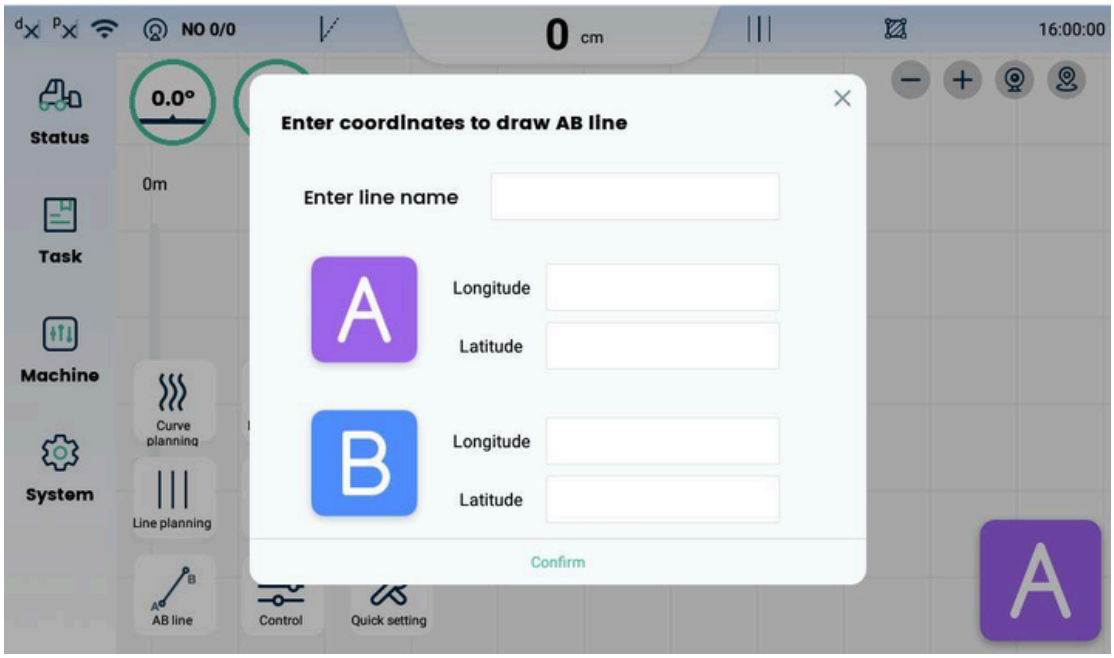
AB line: AB straight line.

A+line: After completing point A, the vehicle will automatically generate a guidance line according to the current orientation of the vehicle.

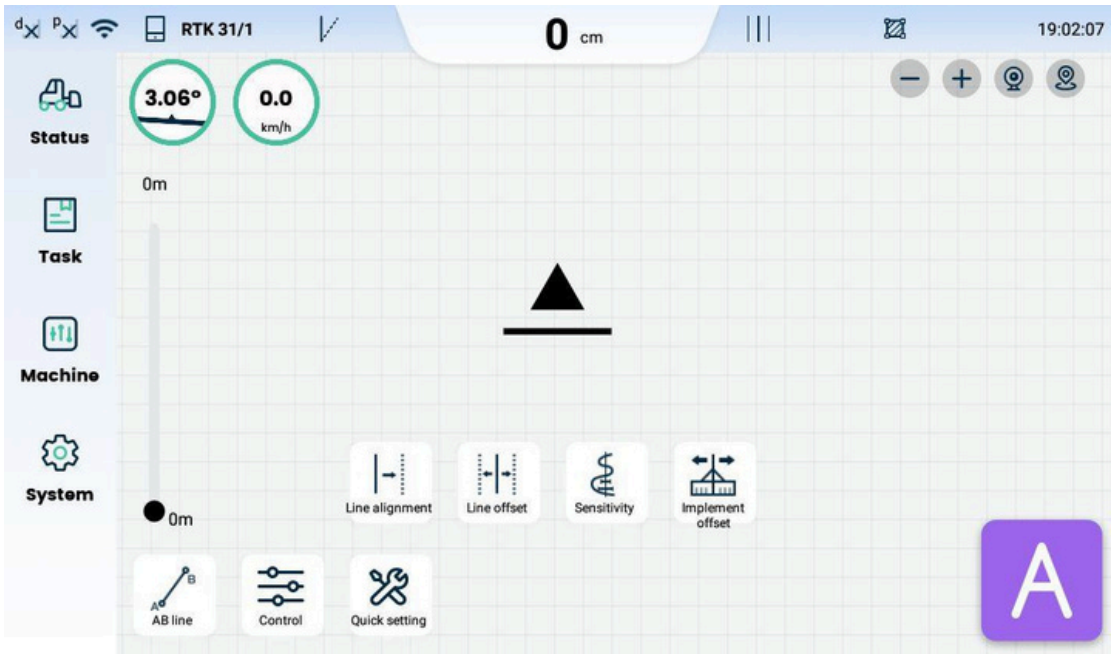
Equidistant curve: Curve line mode.

AB Input: Create an AB line by entering the **latitude** and **longitude** of point AB.

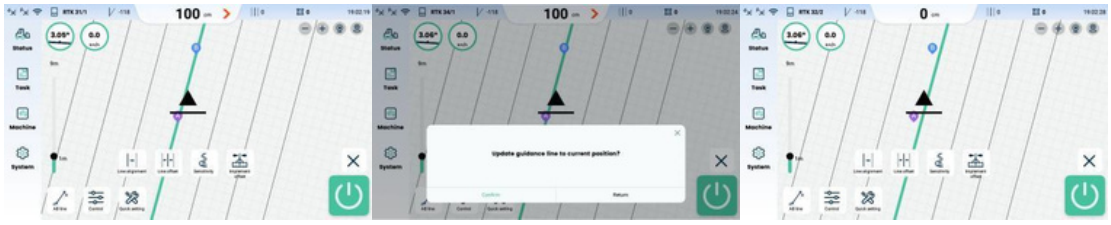




Control——



Line alignment： When there is a guidance line task on the current interface, pressing this button will drag the guidance line to align with the vehicle.



Line offset: Users can manually move the guidance line left and right manually.



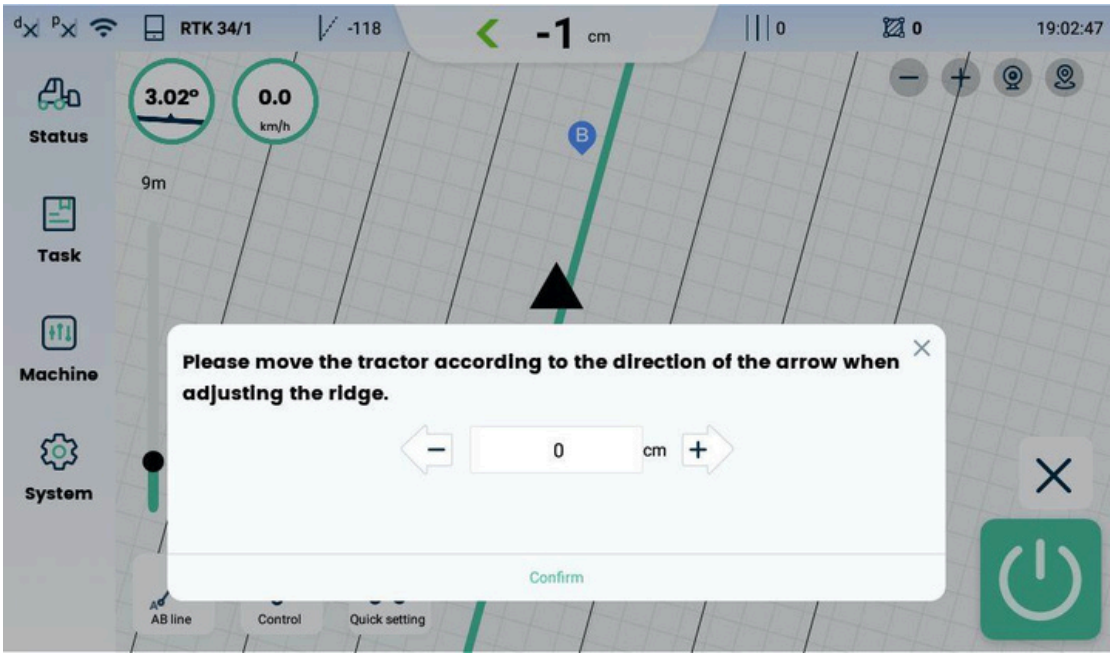
Sensitivity——

Amplitude： The magnitude of the motor action, the larger the value is, the greater the motor will turn action.

Sensitivity： The response speed of motor action, the smaller the value is, the faster the response will be.



Implement offset: Provide a main interface window that allows manual adjustment of implement the offset of adjust the combination of ridges.

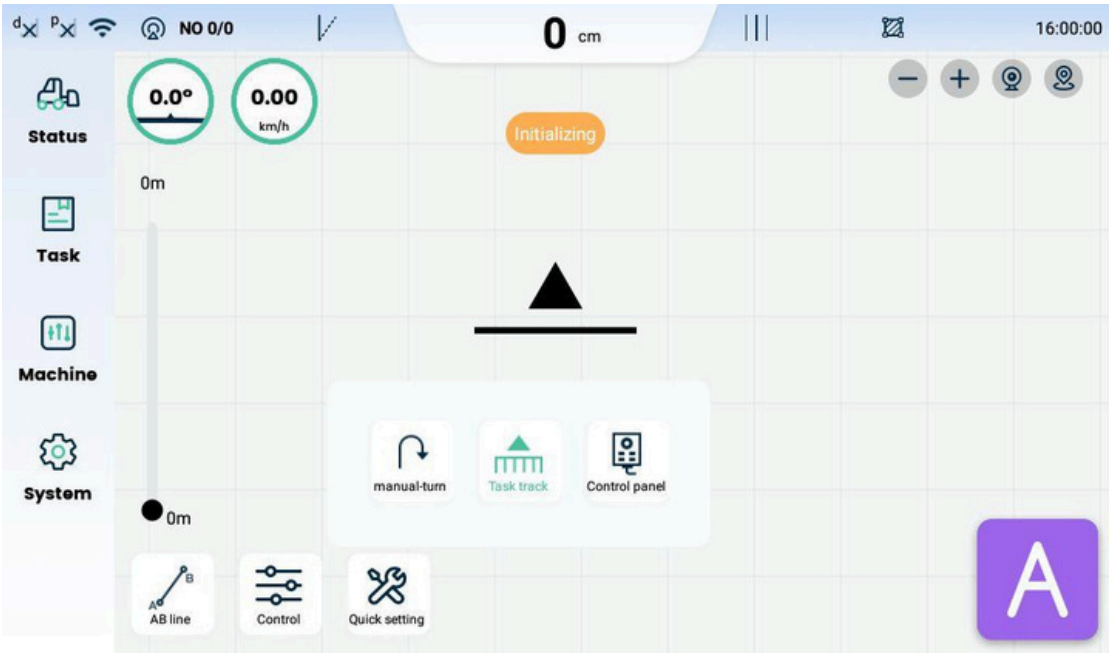


Quick setting—

Manual-turn: Click to switch between manual U-turn and automatic U-turn modes.

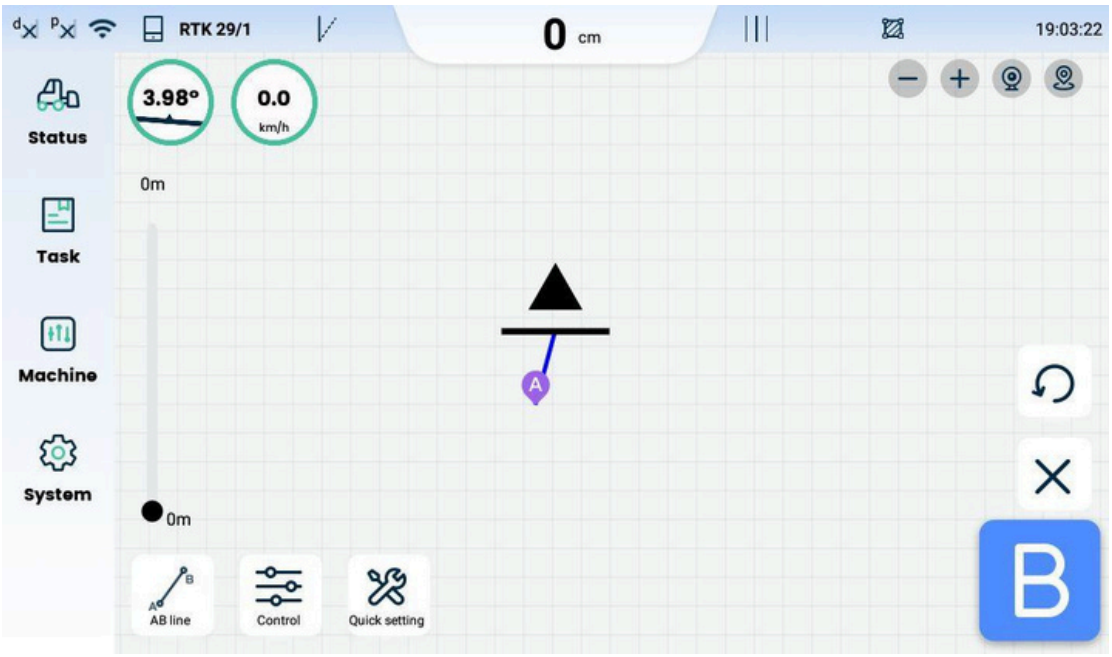
Task track： Users can open or close the trajectory recording status.

Control panel: When a control panel is connected to the system, enabling this button indicates support for control panel operations.



4.6.2 Create line to start task

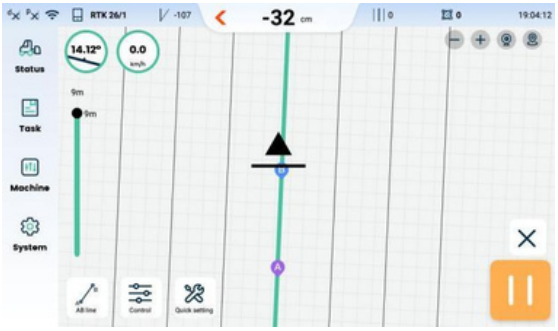
Press “A” and drive forward.



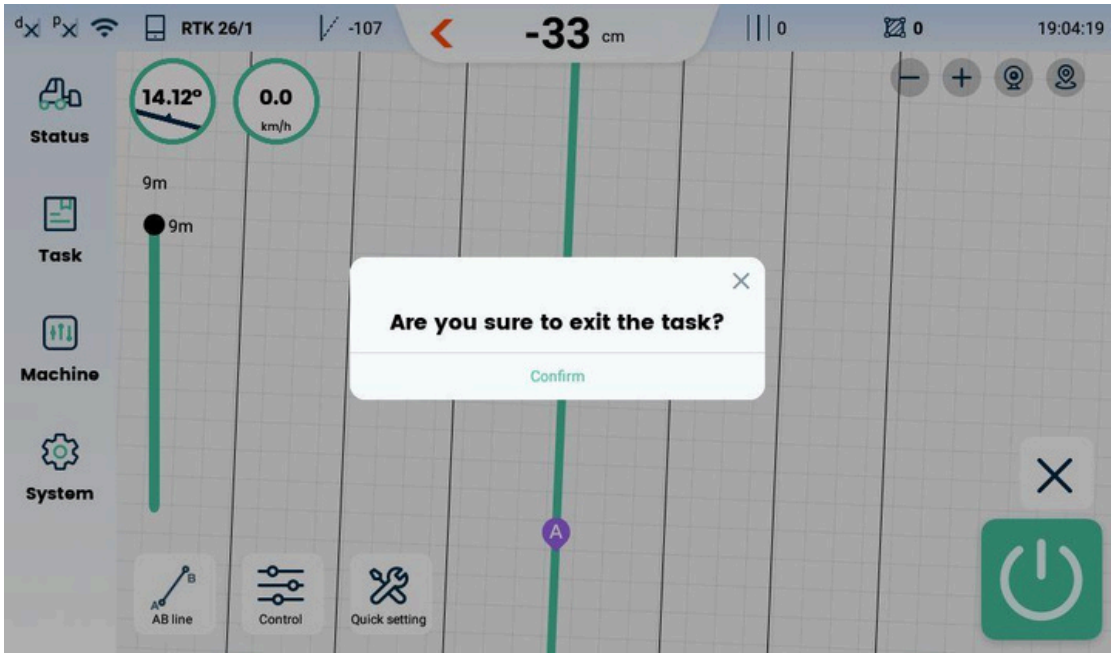
After driving a certain distance, press "B". Then press “√” to finish line creating.



Press  to engage autopilot, press  to disengage autopilot.



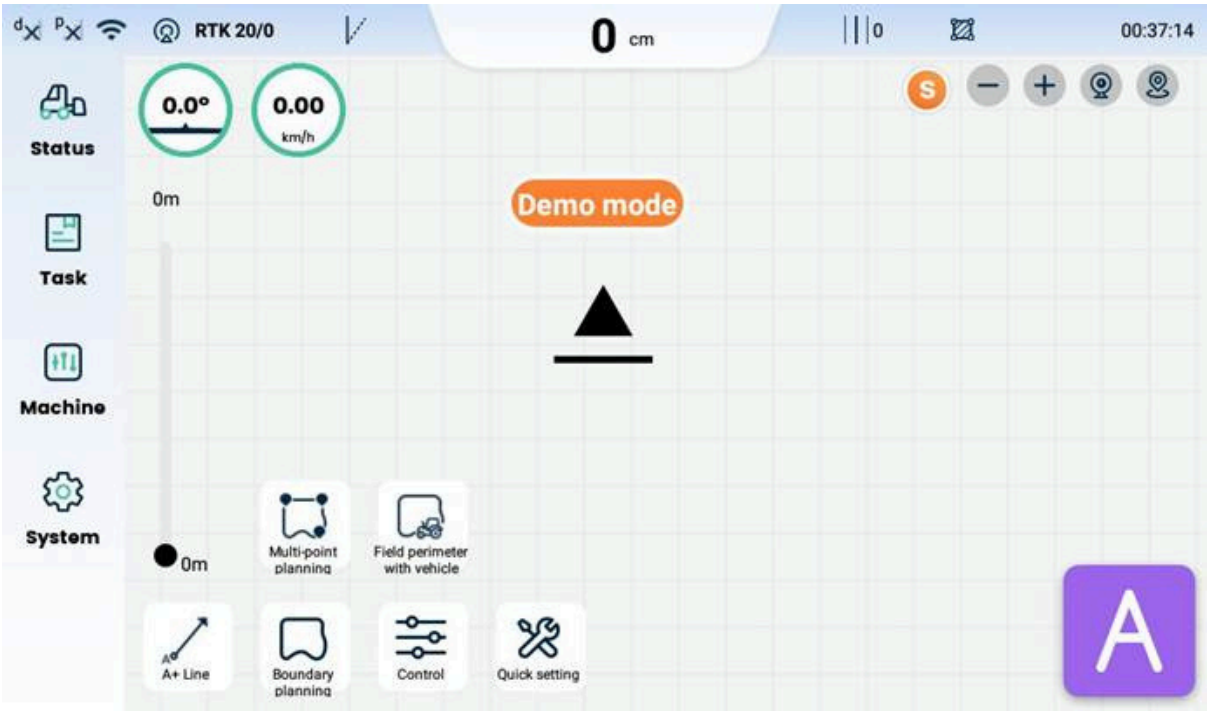
Press ✕ to exit the task.



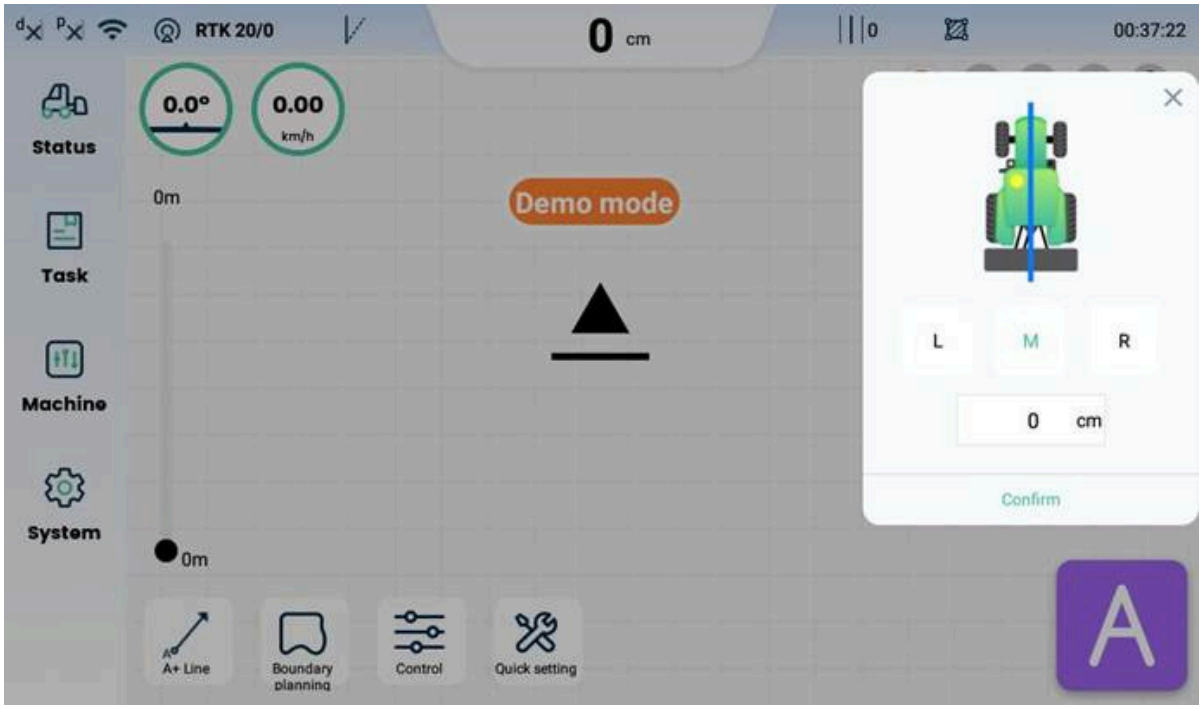
Boundary Planning——

Multi-point planning: Draw boundaries by recording the positions of multiple points.

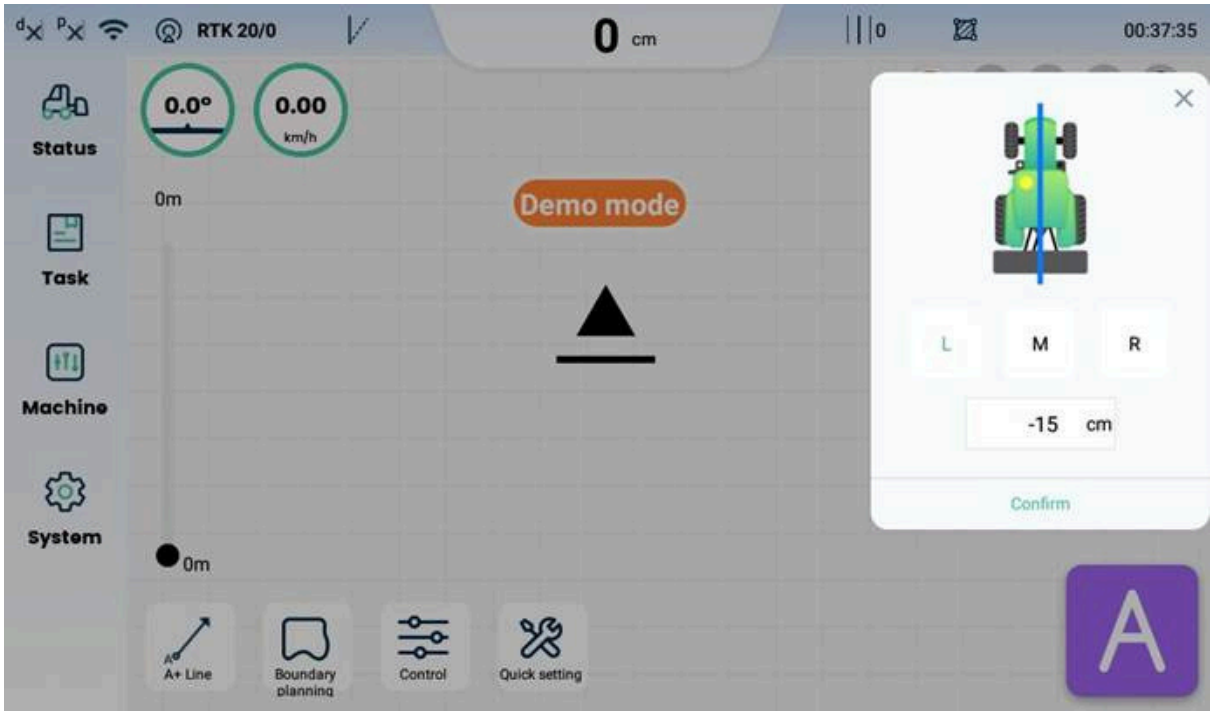
Field perimeter with vehicle: Draw boundaries by recording the vehicle's travel trajectory.



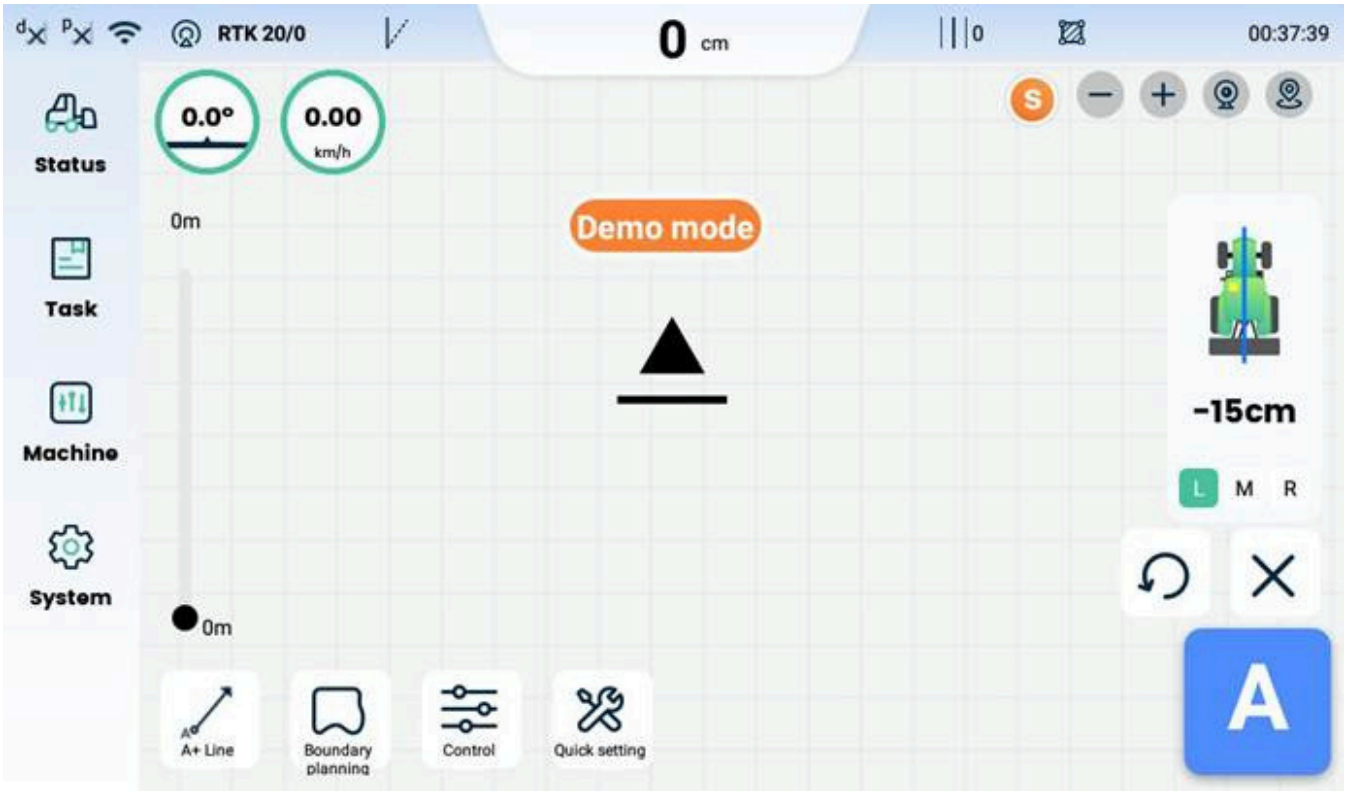
Choose a way to enter the boundary drawing process.

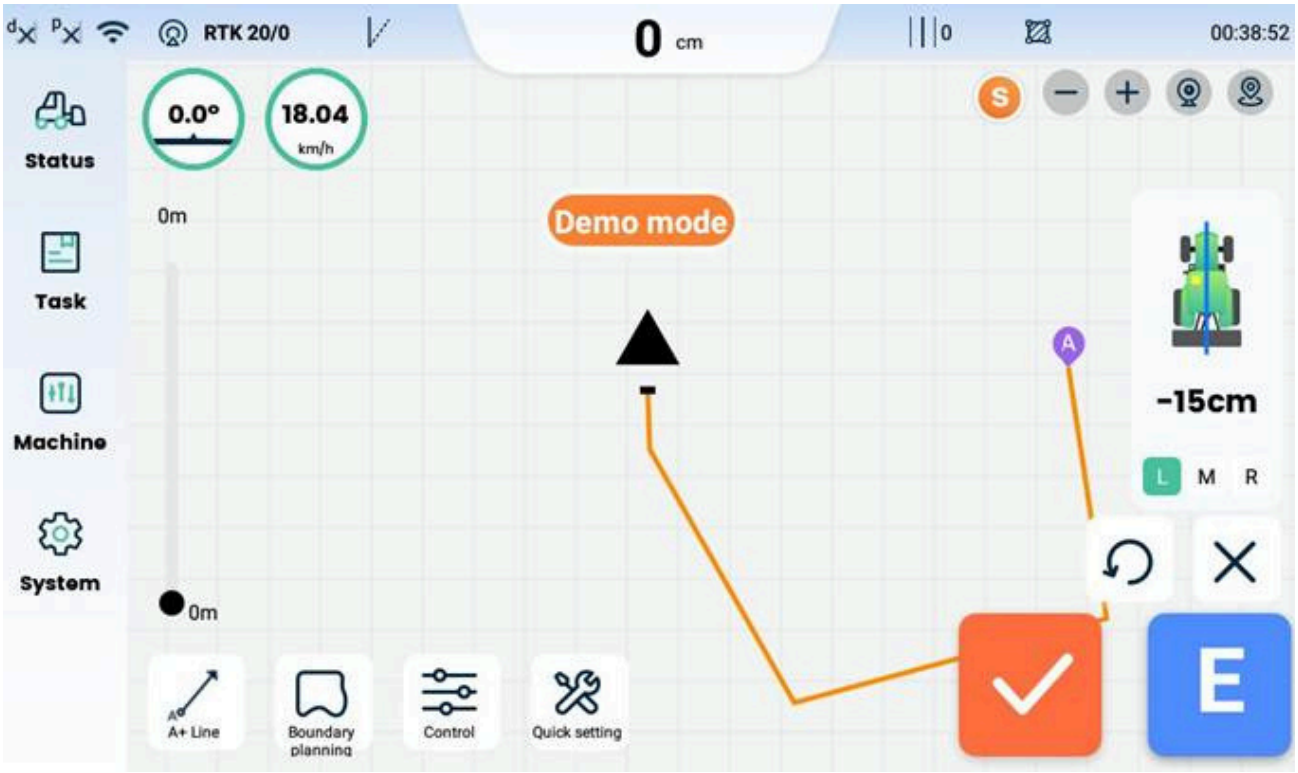


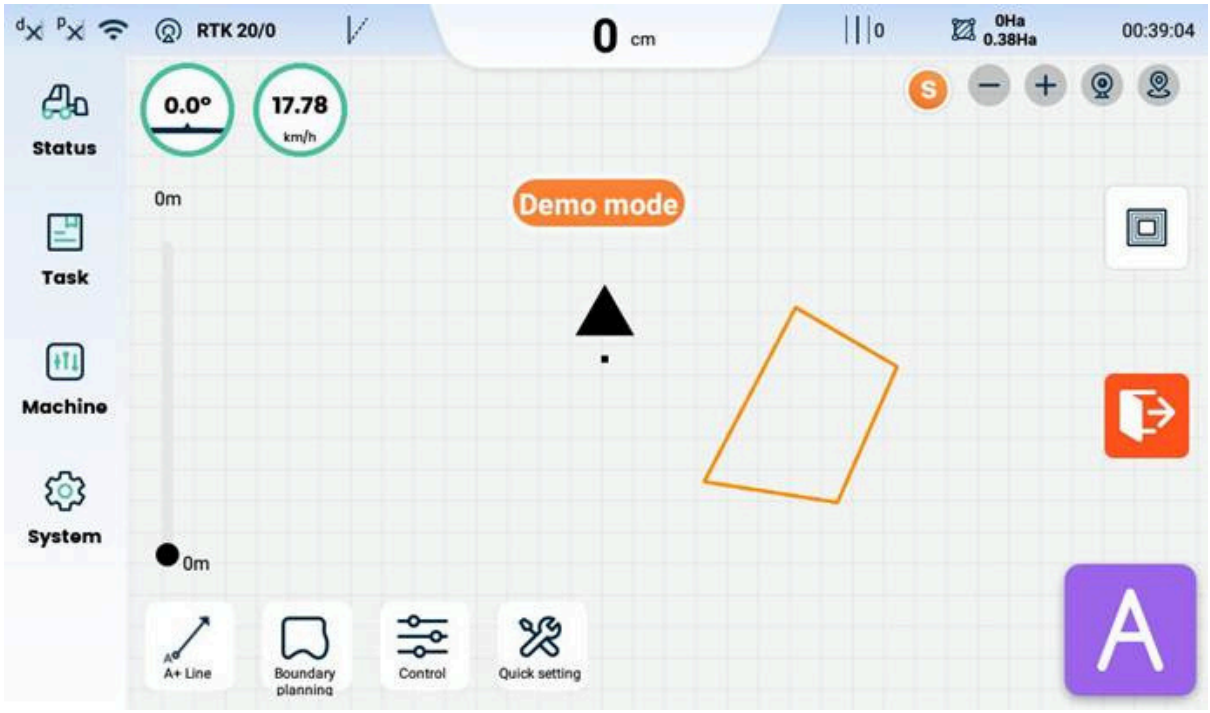
The left and right positions of the recording reference can be changed by inputting positive and negative offset values.



Multi-point planning—The vehicle travels to different positions, records the points separately, and finally clicks  completing boundary creation.

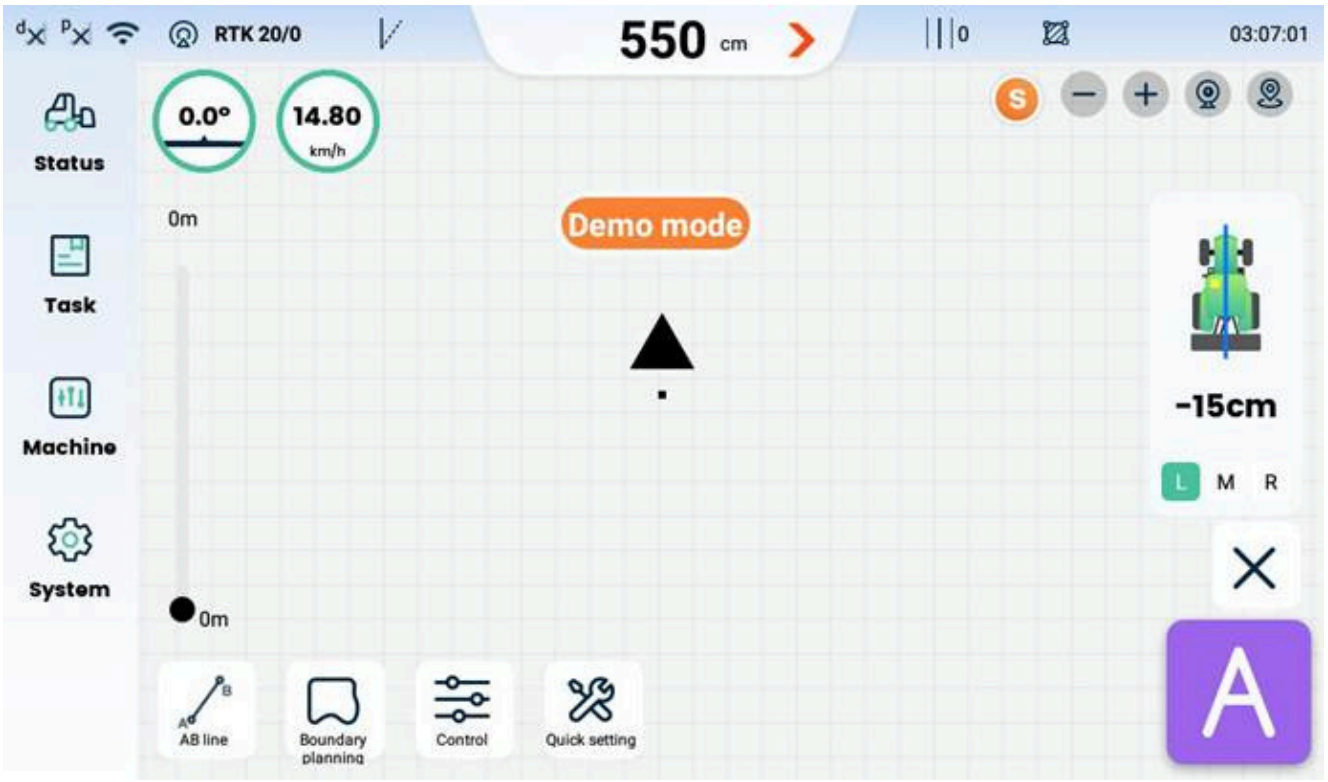


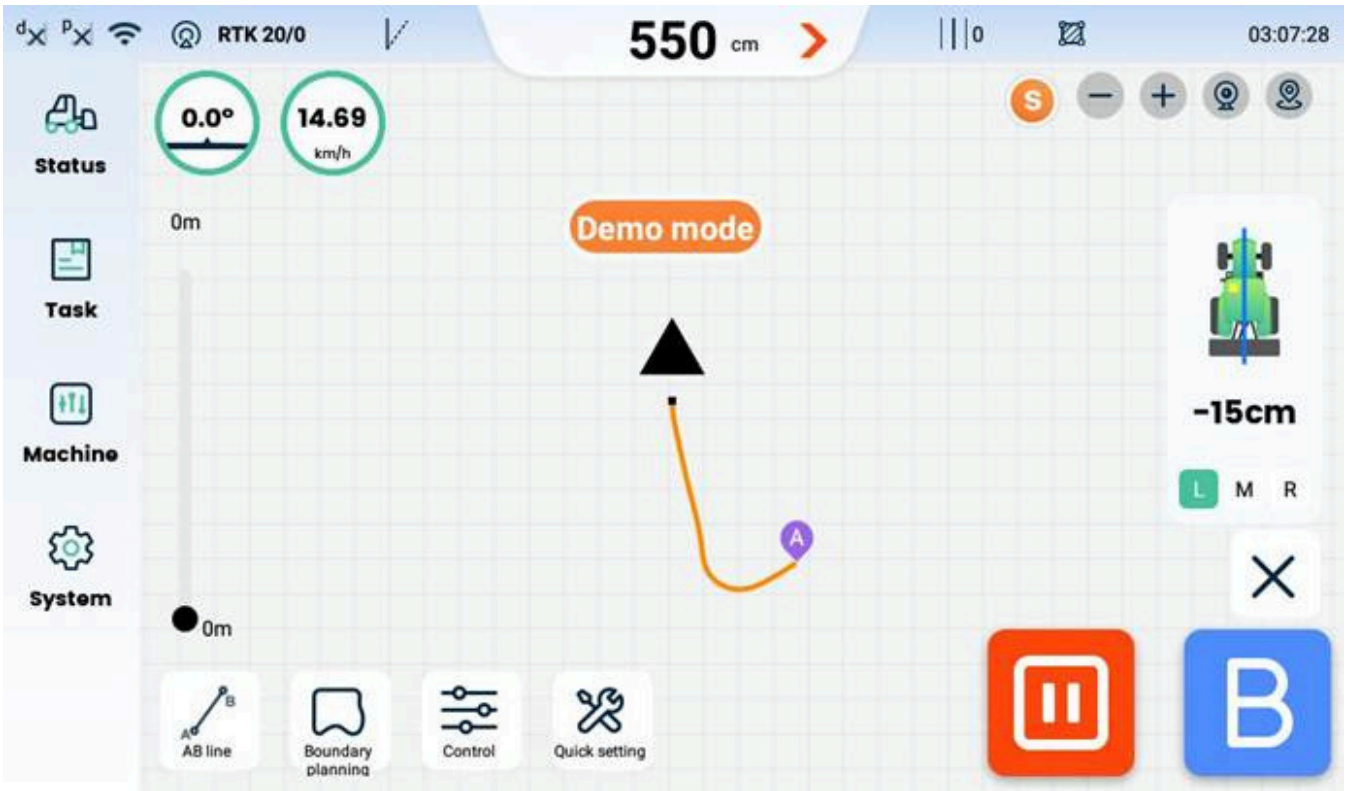



RTK 20/0
0 cm
0
0Ha
0.38Ha
00:39:04
0.0°
17.78
km/h
Status
Task
Machine
System
0m
Demo mode
0m
A+ Line
Boundary planning
Control
Quick setting
A

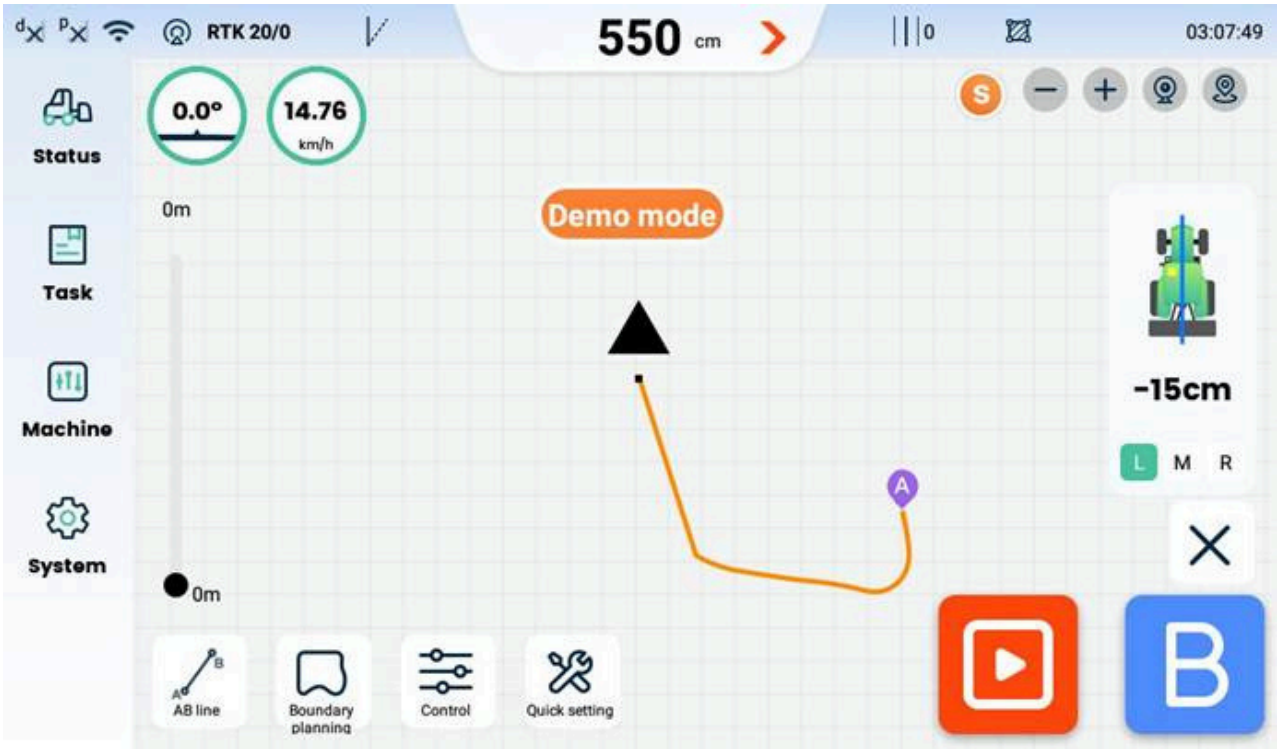
Field perimeter with vehicle—The boundary is created based on the specific trajectory of the vehicle's movement, and a straight line can be drawn by pausing midway.

Click  start to create boundary.

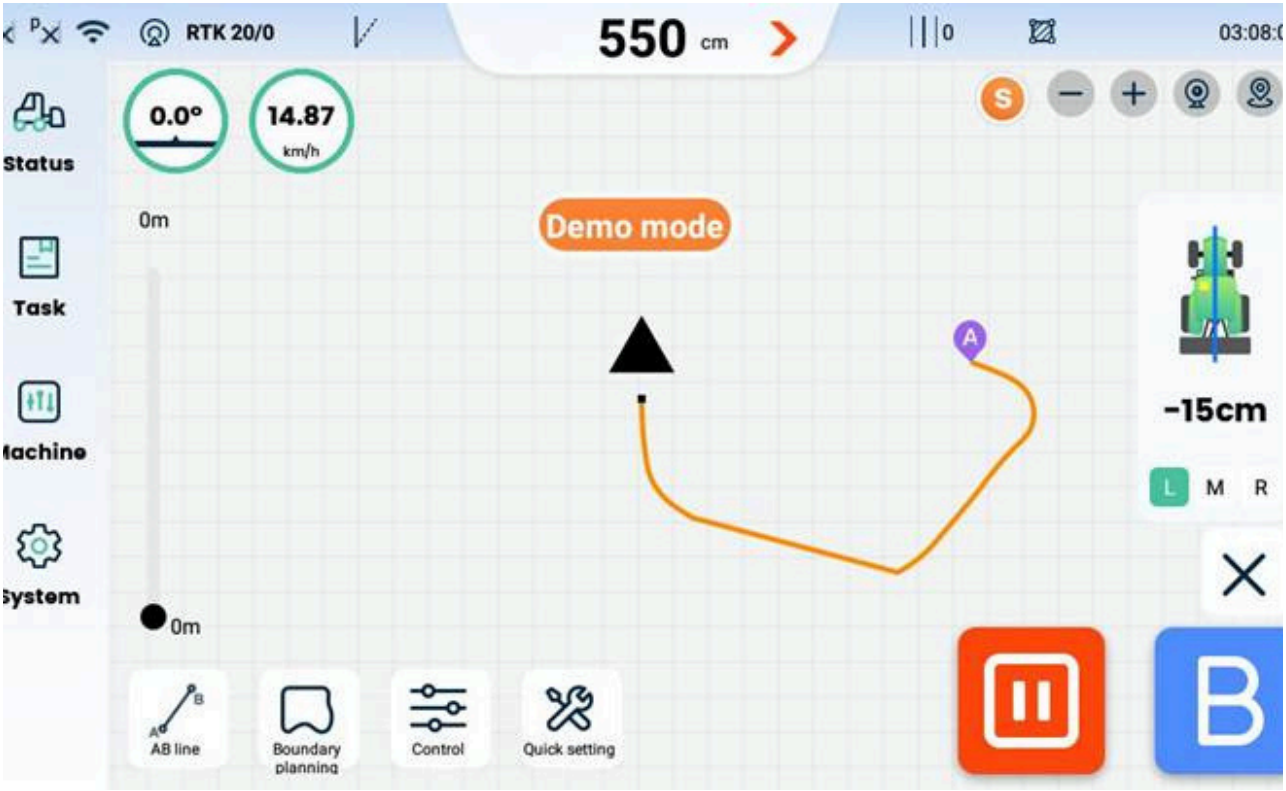




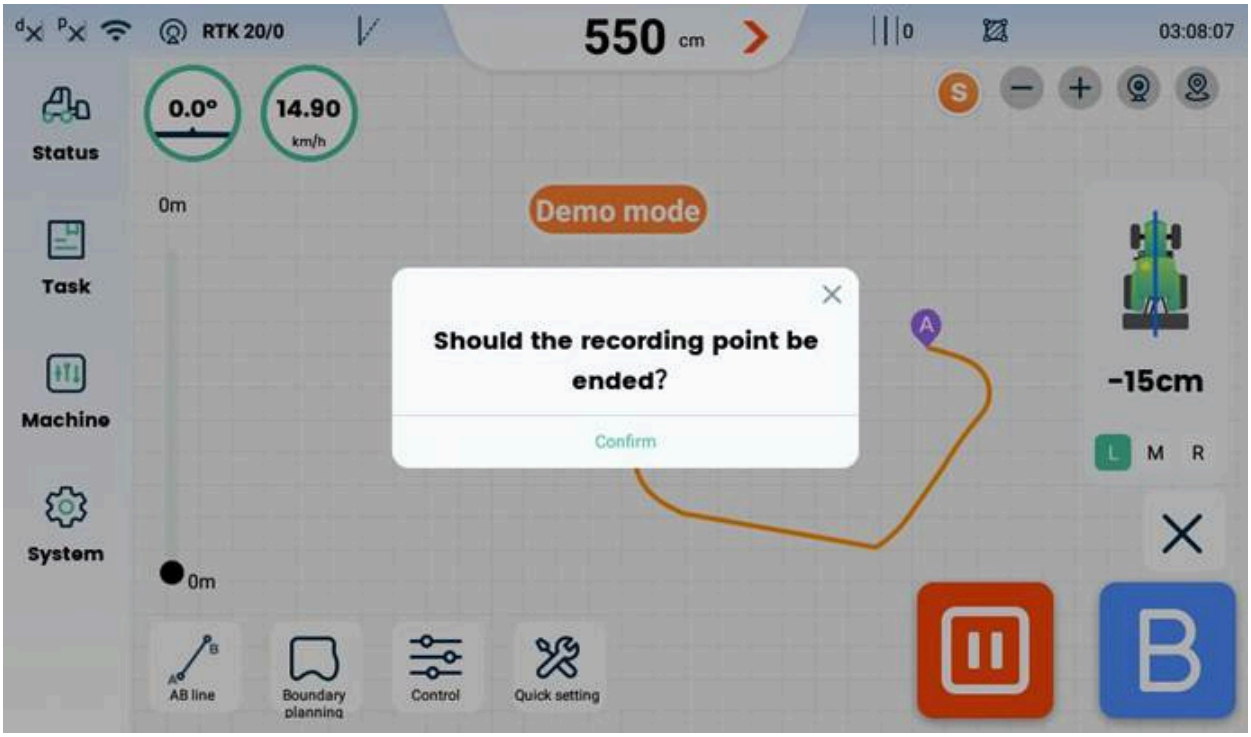
Click  pause drawing, the next section becomes a straight line.



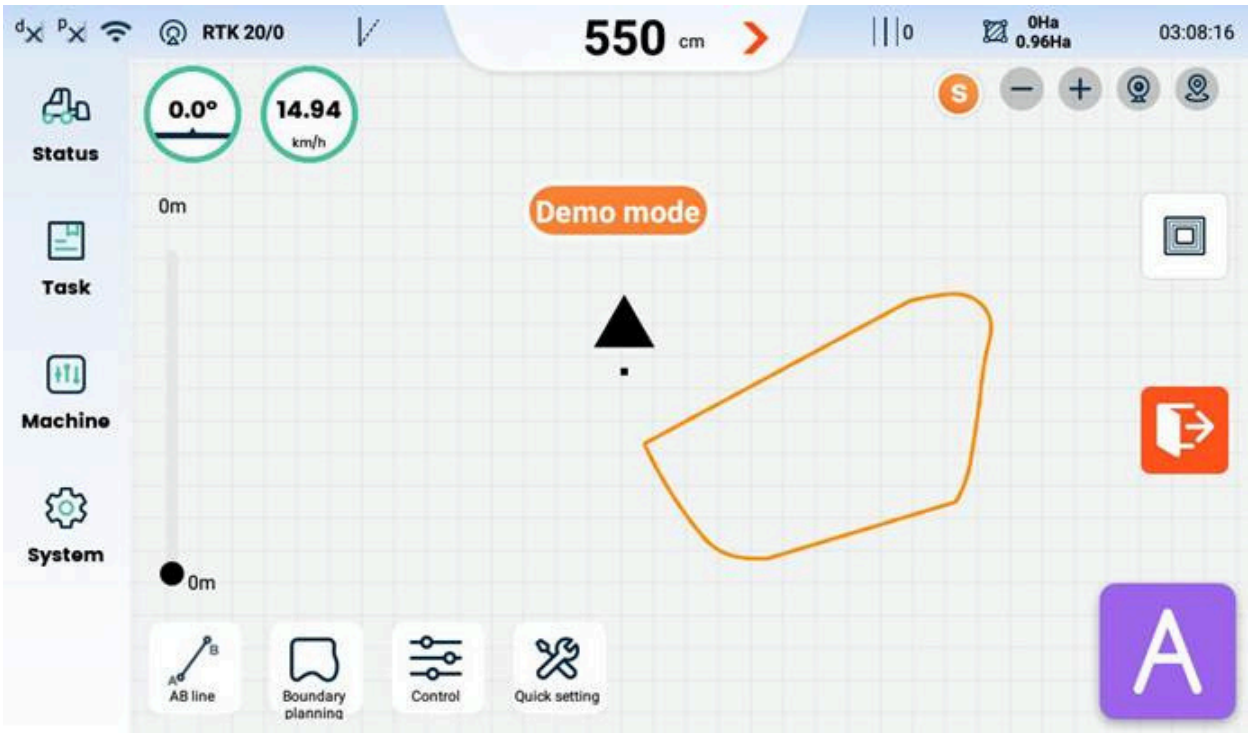
Click  resume drawing, the next section will continue to restore the free trajectory.



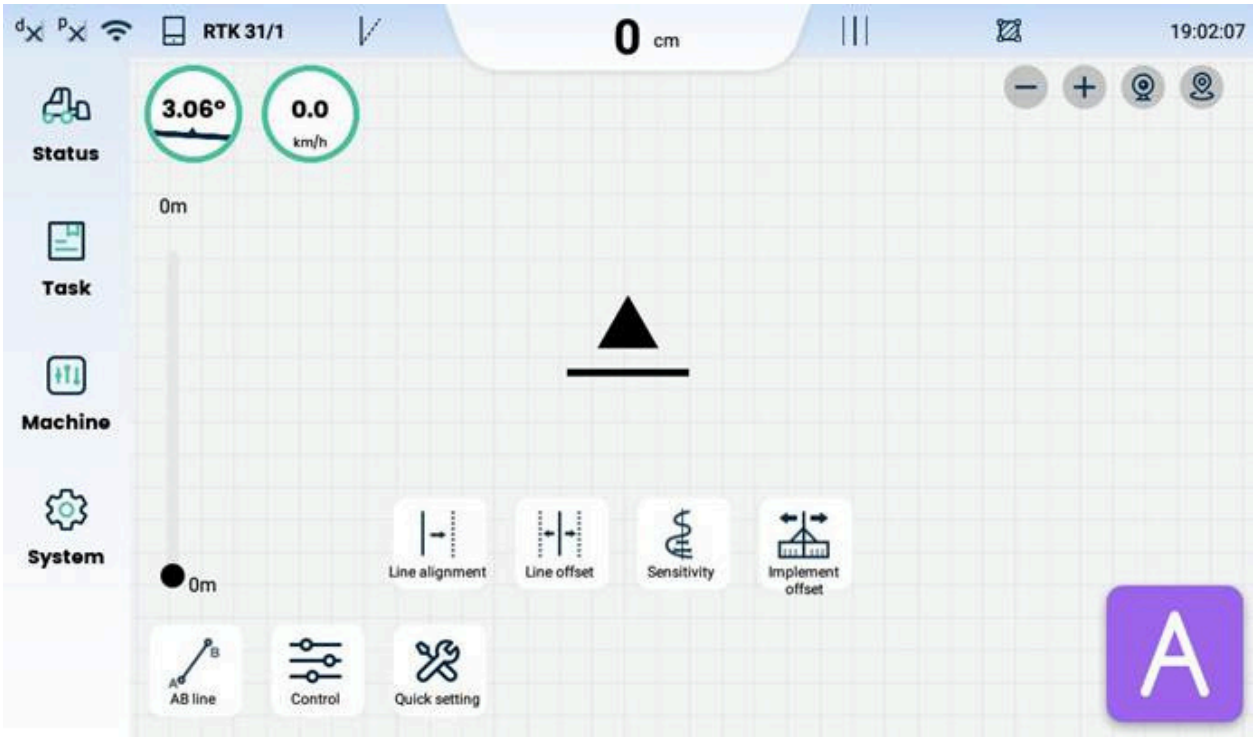
Click  confirm completion of trajectory drawing, and proceed with closure.



Complete boundary creation.



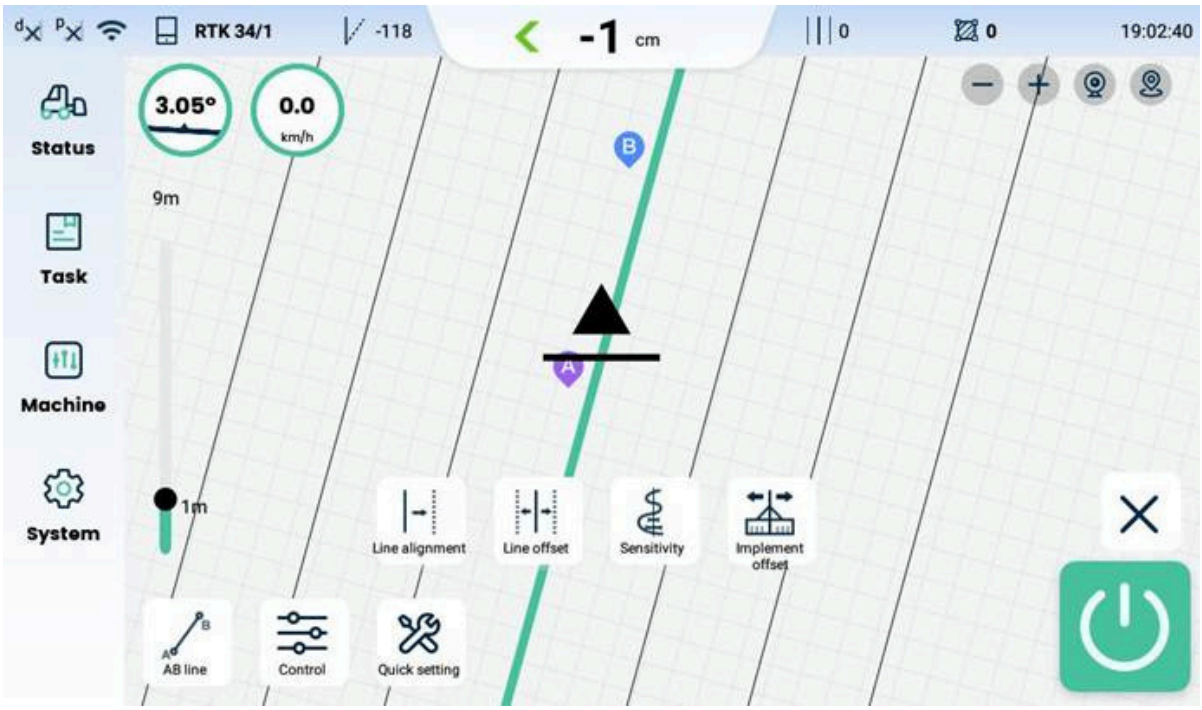
Control——



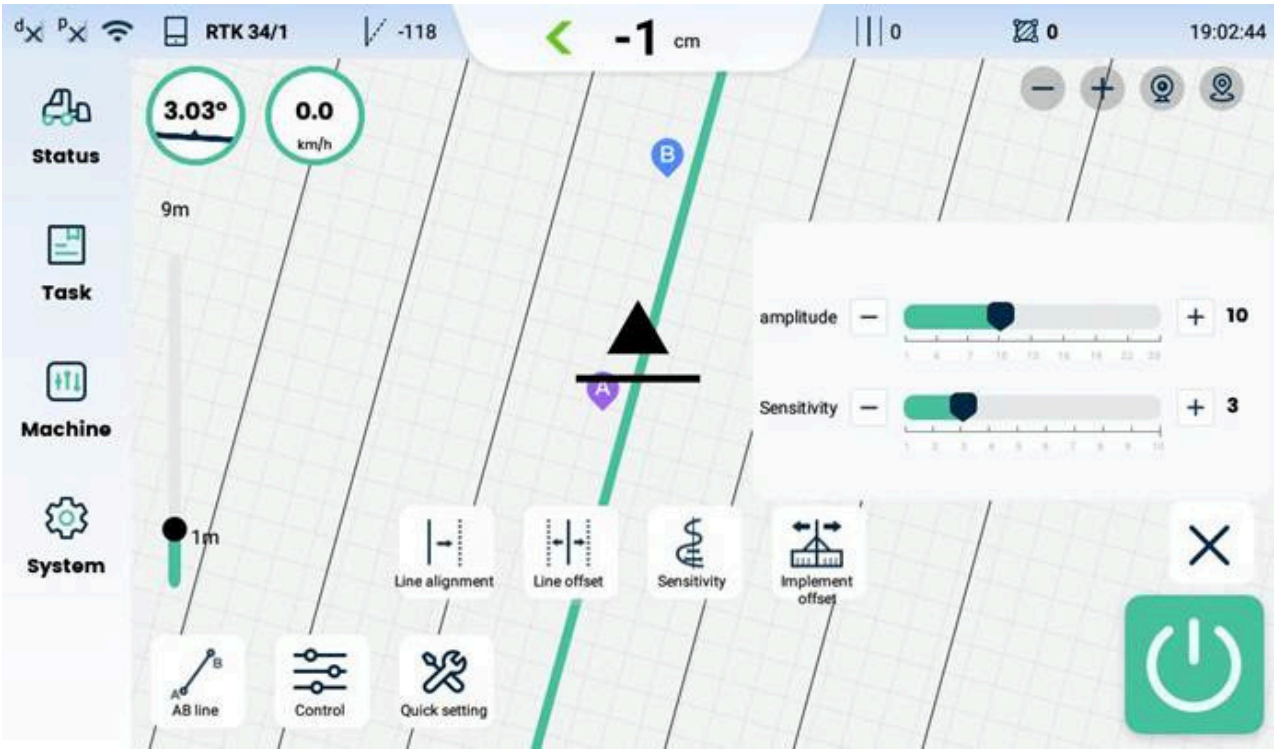
Line alignment: When there is a guidance line task on the current interface, pressing this button will drag the guidance line to align with the vehicle.



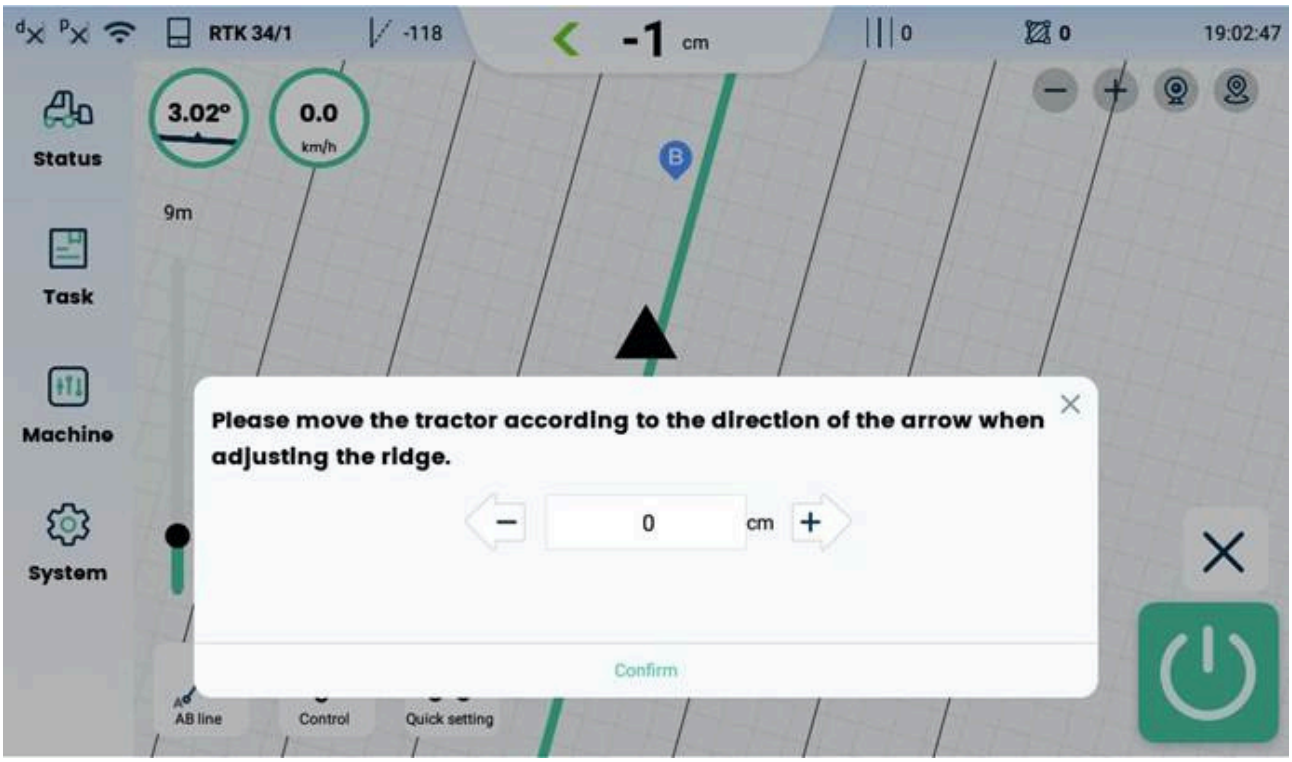
Line offset: Users can manually move the guidance line left and right.



Sensitivity–
Amplitude: The magnitude of the motor action. The larger the value is, the greater the motor will turn action.
Sensitivity: The response speed of motor action; the smaller the value is, the faster the response will be.



Implement offset: Provide a main interface window that allows manual adjustment of the offset of the implement to adjust the combination of ridges.

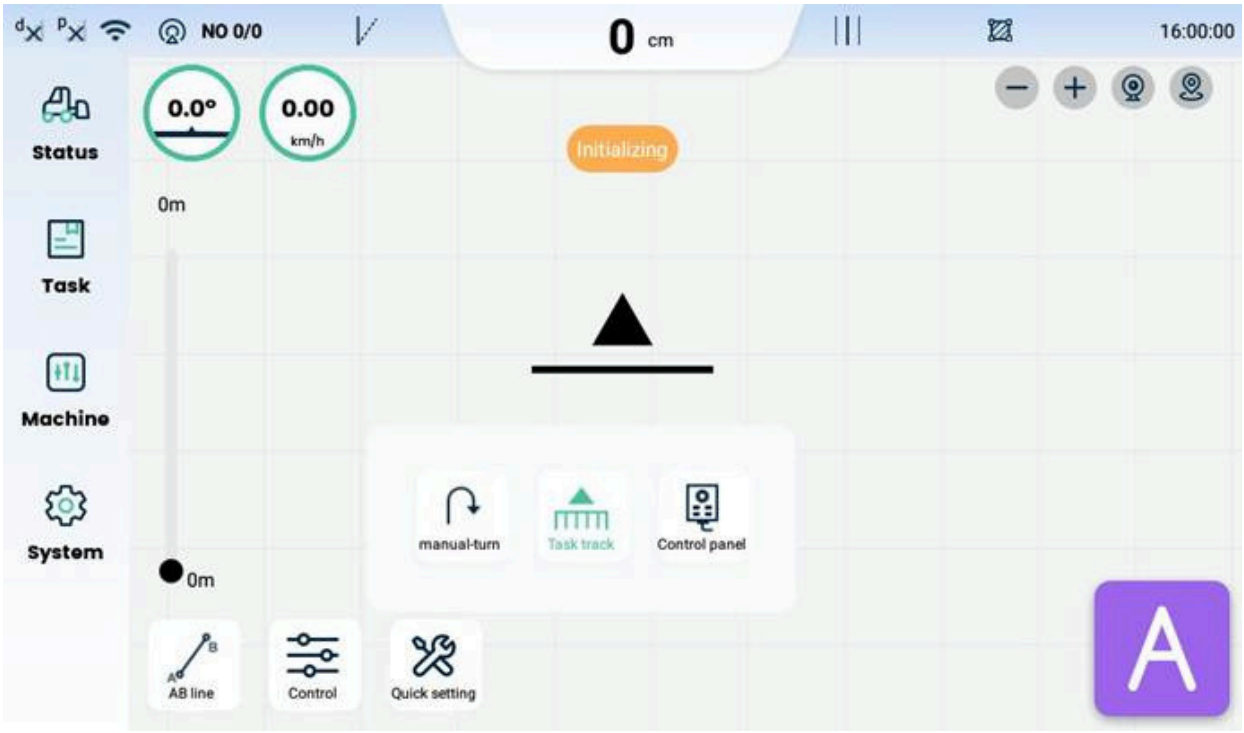


Quick setting—

Manual-turn: Click to switch between manual U-turn and automatic U-turn modes.

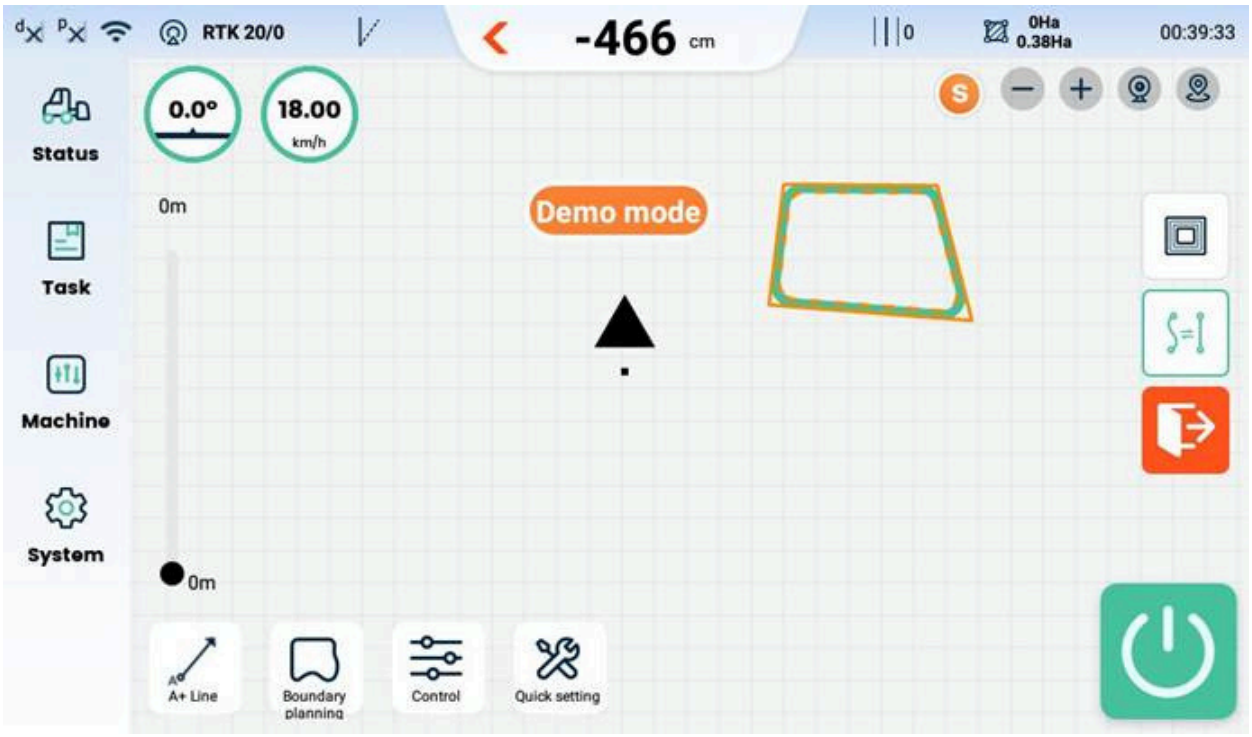
Task track: Users can open or close the trajectory recording status.

Control panel: When a control panel is connected to the system, enabling this button indicates support for control panel operations.

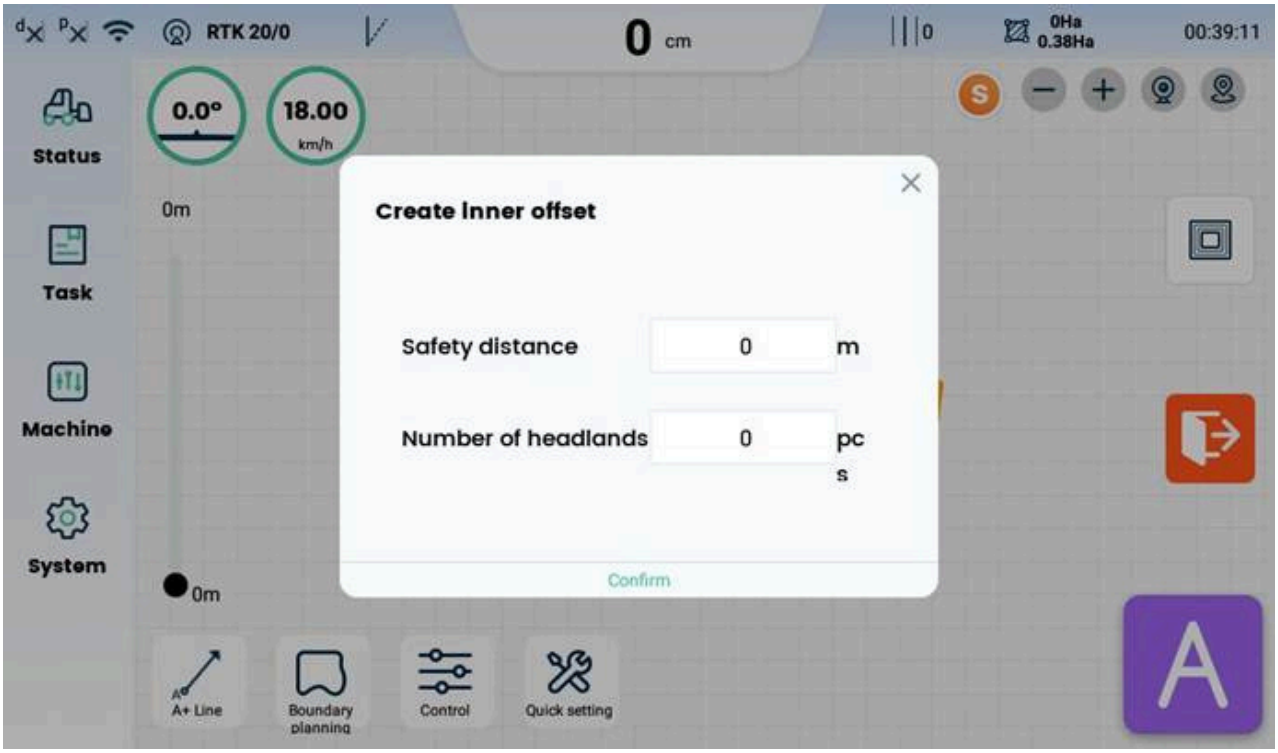


Start task

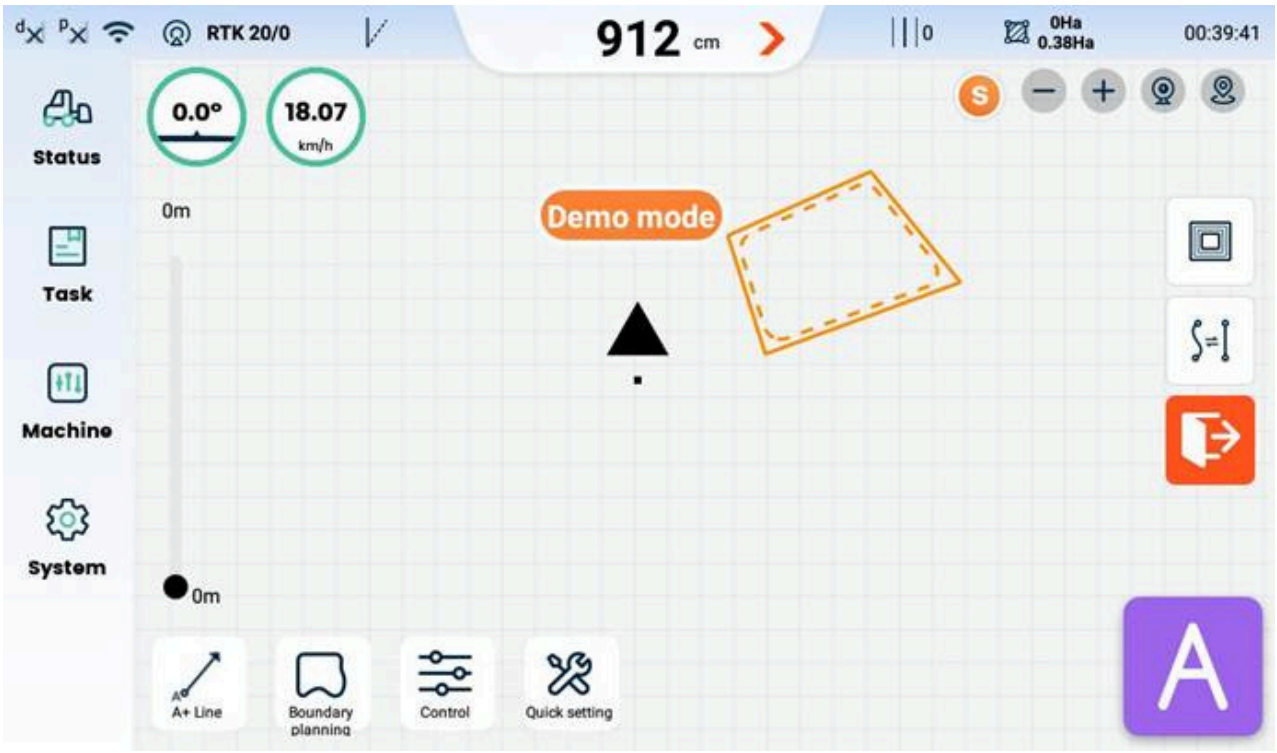
When there is a boundary or a guidance line on the interface, the task is successfully created and completed.

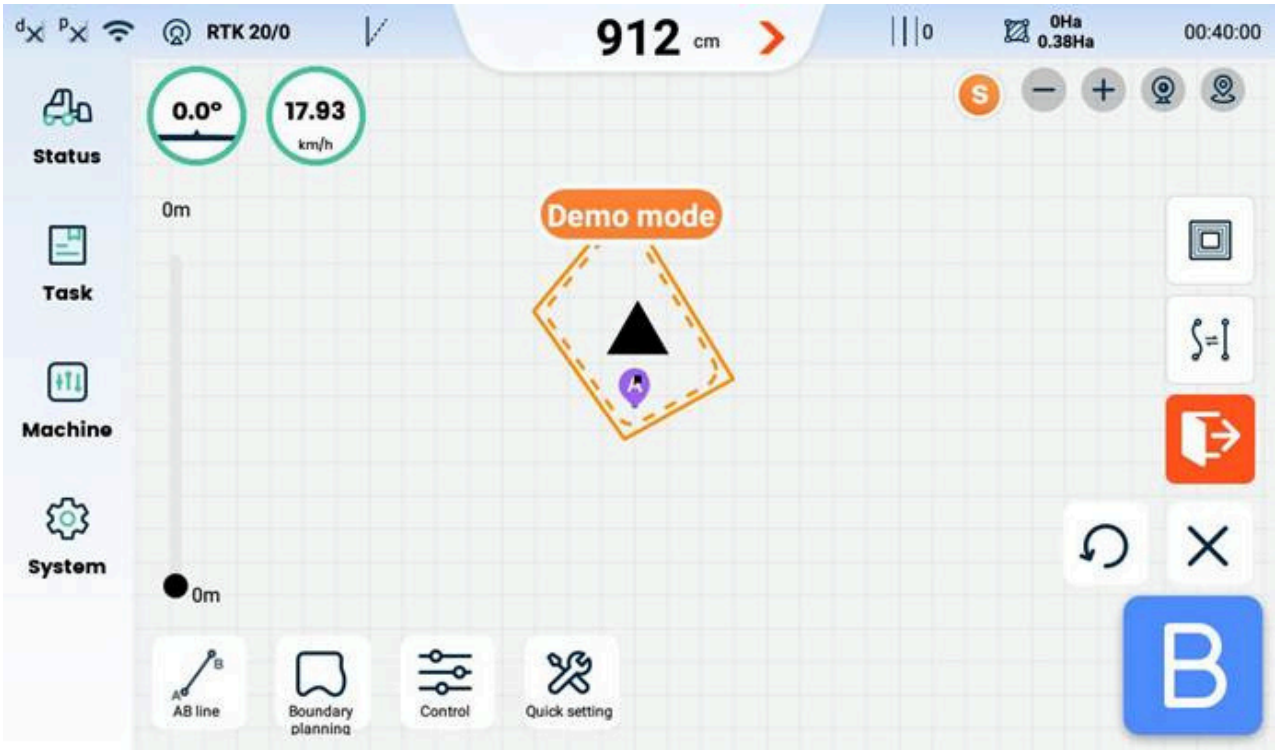


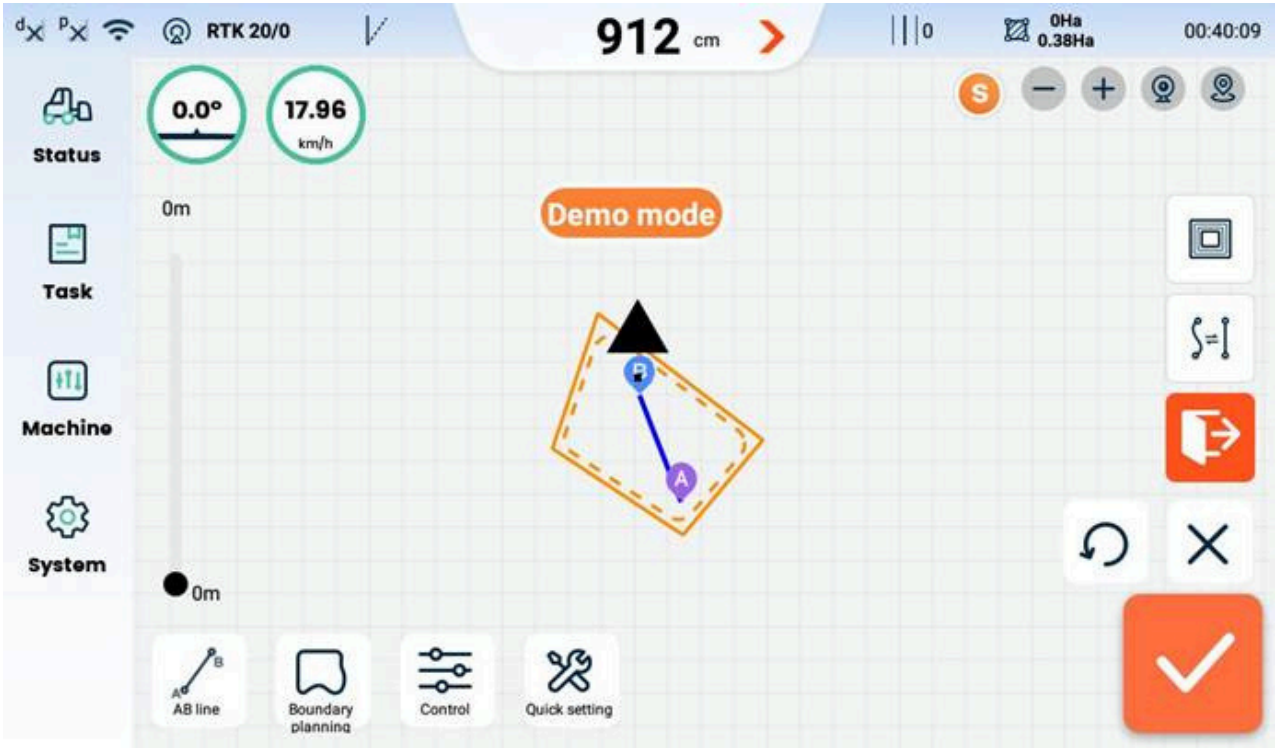
Click  to generate headland.



Click  to **switch** between **guidance line** operation and **headland operation**.

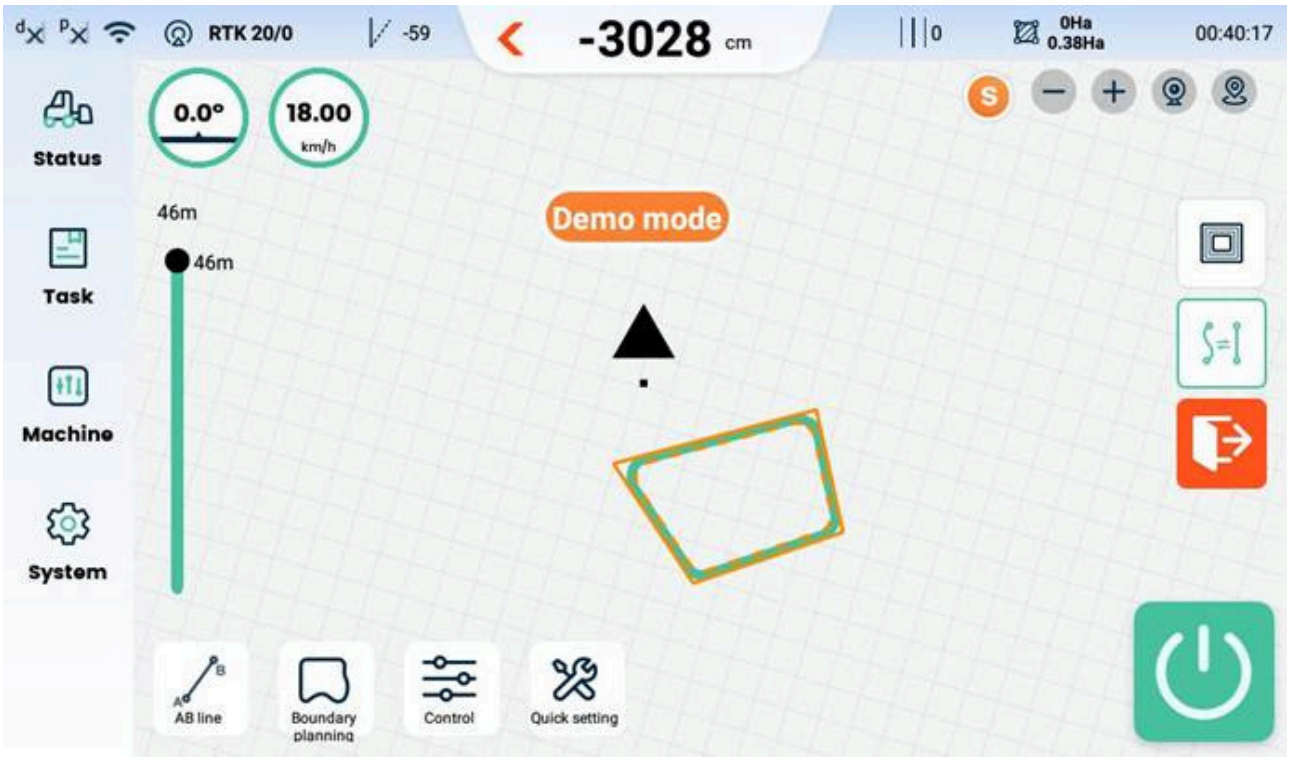


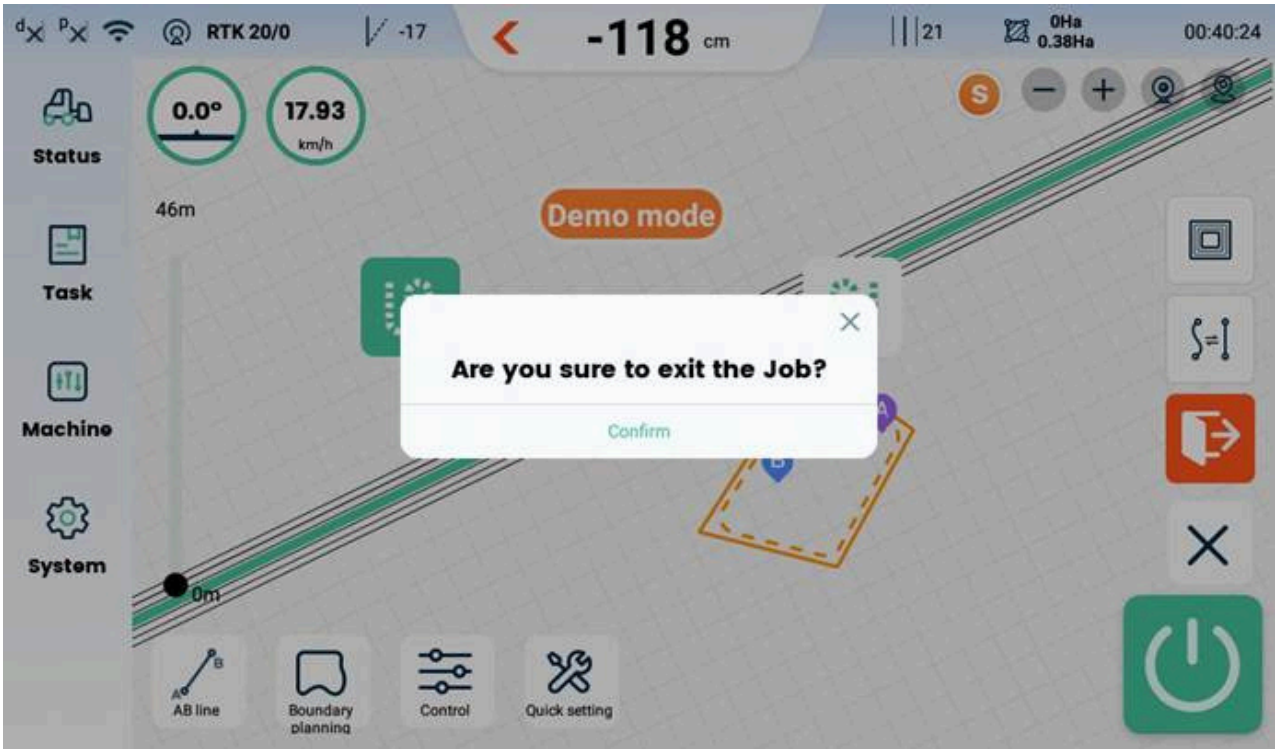




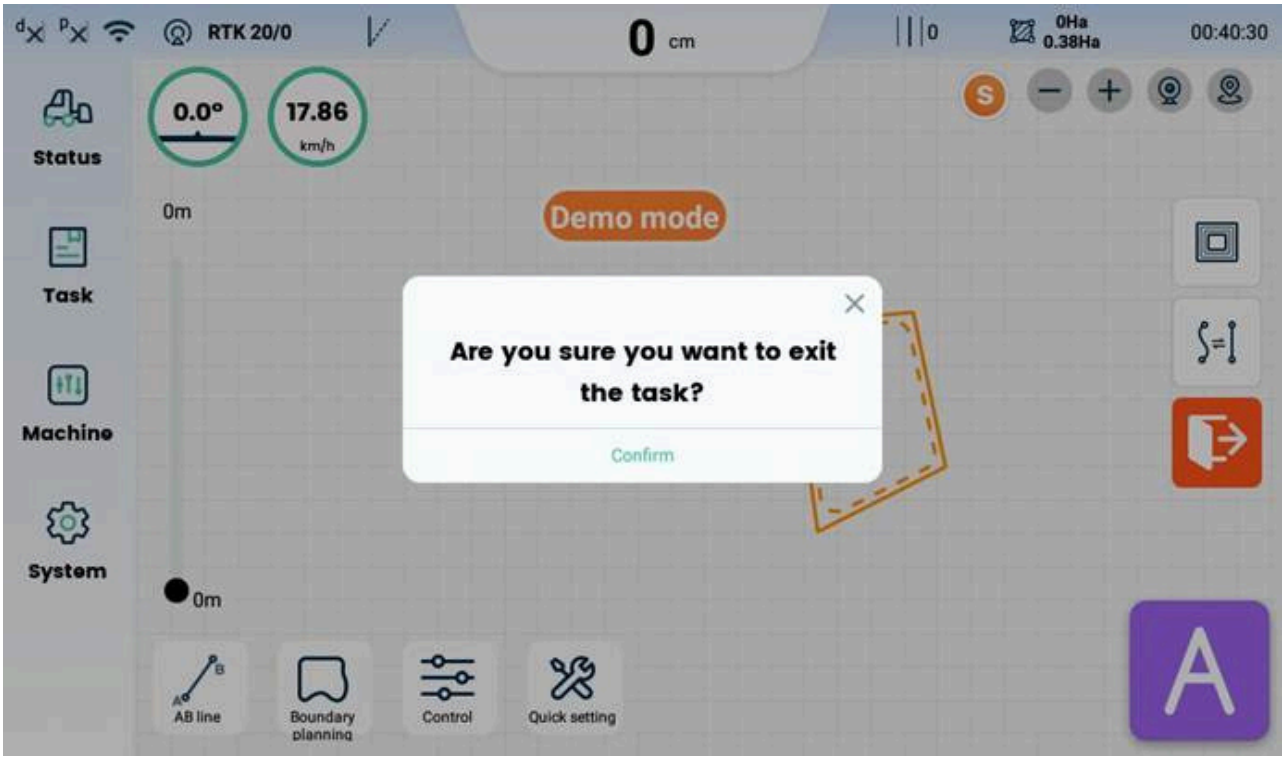


Click  to engage **autopilot.**





Click  to close the guidance line.



Click  to close the whole task.

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Gorzyce 175, Otfinów 33-250
Tel. 795 700 895
NIP:9930691316, Regon: 523485892